PROGRAMA ESQUEMÁTICO

Terça-feira, 01 de outubro de 2019

13:00 às 15:00 - Simpósios e Módulo Temático
15:10 às 17:10 - Simpósios
17:10 às 17:30 - Coffee break nos estandes
17:30 às 19:00 - Sessão de Painéis I
19:00 às 20:30 - Cerimonia e Conferência de Abertura

Quarta-feira, 02 de outubro de 2019

8:00 às 9:00 - Cursos Grupo I (1ªaula)
9:00 às 9:30 - Intervalo nos estandes
9:30 às 11:20 - Módulos Temáticos
11:30 às 12:30 - Conferências
12:30 às 14:00 - Almoço
14:00 às 16:00 - Simpósios
16:00 às 16:30 - Coffee break nos estandes
16:30 às 18:00 - Sessão de Painéis II
18:10 às 19:10 - Cursos Grupo II (1ªaula)
19:20 às 21:00 - Assembleia SBNeC

Quinta-Feira, 03 de outubro de 2019

8:00 às 9:00 - Cursos Grupo I (2ªaula)
9:00 às 9:30 - Intervalo nos estandes
9:30 às 11:20 - Módulos Temáticos
11:30 às 12:30 - Conferências
12:30 às 14:00 - Almoço
14:00 às 16:00 - Simpósios
16:00 às 16:30 - Coffee break nos estandes
16:30 às 18:00 - Sessão de Painéis III
18:10 às 19:10 - Cursos Grupo II (2ª aula)

Sexta-Feira, 04 de outubro de 2019

8:30 às 9:30 - Cursos Grupo I (3ªaula)
9:30 às 10:00 - Intervalo nos estandes
10:00 às 11:00 - Cursos Grupo II (3ªaula)
11:00 às 12:00 - Conferência de Encerramento
12:00 às 12:30 - Encerramento e Premiações

PROGRAMA

Terça-feira, 01 de outubro de 2019

13:00 às 15:00 - Simpósio e Módulo Temático

Sala 1 - Comunicação Sonora Animal
Coord: Ana Cleide Vieira Gomes Guimbal de Aquino (UFRA)
Comunicação sonora animal e comportamento de begging call em aves
Ana Cleide Vieira Gomes Guimbal de Aquino (UFRA)
Aquisição da linguagem e comportamento de begging call em bebês
Ana Cleide Vieira Gomes Guimbal de Aquino (UFRA)
Aquisição de verbos: o que dizem as crianças
Ana Paula Martins Alves Salgado (UFRA)

Sala 2 - Endophenotypes, neurobiological alterations and fear conditioning in posttraumatic stress disorder: Pre-clinical and clinical evidence
Coord: Deborah Suchecki (UNIFESP)
TEPT uma doença sistêmica? Alterações neurobiológicas, endofenótipos e trauma
Ana Teresa Delfino (PROVE) (UNIFESP)
Individual differences in behavior and brain connectivity in a model of PTSD based on contextual fear conditioning
Deborah Suchecki (UNIFESP)
Revealing a Cortical Circuit Responsive to Predatory Threats and Mediating Contextual Fear Memory
Newton Canteras (USP)

Sala 3 - Health Neuroscience and Physical Activity
Coord: João Bento Torres Neto (UFPA)
Physical fitness, physical activity and brain health during childhood: The ActiveBrains randomized controlled trial.
Irene Esteban-Cornejo (University of Granada – Spain)
O cérebro como mediador dos efeitos da atividade física sobre a cognição em jovens adultos.
João Bento Torres Neto (UFPA)
Estimulação multissensorial e treinamento de dupla tarefa: impactos sobre a cognição em idosos.
Natáli Valim Oliver Bento Torres (UFPA)

Sala 4 - Novas Perspectivas para a Doença de Parkinson: dos alvos moleculares às propostas terapêuticas
Coord: Elaine Aparecida Del Bel (FORP-USP)
Doença de Parkinson e as Barreiras Encefálicas
Fernanda Grecco Grano (FORP-USP)
Papel da Matriz Extracelular no Processo Neurodegenerativo
Glauce Crivelaro do Nascimento (FORP-USP)
Métodos Alternativos de Detecção e Tratamento da Discinesia induzida pela L-DOPA: fatores neuroinflamatórios
Maurício dos Santos Pereira (FORP-USP)
Novos Avanços na Doença de Parkinson: doxiciclina e seus efeitos neuroprotetor e anti-discinético
Elaine Aparecida Del Bel (FORP-USP)

Sala 5 - Uso de testes psicológicos: IFP-II, WISC-IV e NEUPSILIN para Avaliação de personalidade e funções cognitivas em Transtornos Psiquiátricos e em Transtorno do Espectro Autista - TEA.
Coord: Myriam Christina Alves Rodrigues (UniEvangélica)
Síndrome de Asperger avaliação de personalidade e cognição
Myriam Christina Alves Rodrigues (UniEvangélica)
Transtornos Psiquiátricos: Avaliação de personalidade e cognição
Myriam Christina Alves Rodrigues (UniEvangélica)
Comunicação Oral 1- 18.078 Efeitos do exercício resistido durante a gestação no comportamento da prole submetida a separação materna.
Autores: Adriana Souza dos Santos [1], Aline Martins Faustino [1], Wellington de Almeida [1], Ethiane Segabinazi [1], Loise Loise Peres Bronauth [1,] Lenir Orlandi Pereira [1 1] UFRGS
Comunicação Oral 2-18.079 Aspectos alimentares e nutricionais de crianças e adolescentes com transtorno do espectro autista.
Autores: Tayná Magagnin [1], Marco Antônio da Silva [1], Fabiane Ferraz [1], Jacks Soratto [1] [1] UNESC

15:10 às 17:10 - Simpósios

Sala 1 - O papel da ativação microglial e da microbiota intestinal em transtornos mentais: mecanismos moleculares e implicações terapêuticas
Coord: Gislaine Zilli Réus (UNESC)
Papel da microbiota intestinal e da ativação microglial na depressão
Gislaine Zilli Réus (UNESC)
Influência do sexo e da microbiota intestinal na esquizofrenia
Danielle Macedo Gaspar (UFC)
Relação entre a microbiota intestinal, sistema imune e a neuroinflamação na fisiopatologia dos Transtornos do Espectro Autista
Cinara Ludvig Gonçalves (UNESC)
O papel da disfunção imune na fisiopatologia da doença de Huntington
Zuleide Maria Ignácio (UFFS)

Sala 2 - Eletrofisiologia e cognição: contribuições de registros de atividade eletrofisiológica em diferentes escalas na compreensão do comportamento
Coord: Andre Mascioli Cravo (UFABC)
Sincronização em gama no córtex visual prediz comportamento
Gustavo Rohenkohl (USP/ ESI)
Efeitos da aprendizagem na codificação temporal
Marcelo Bussotti Reyes (UFABC)
Correlatos neurais da quebra de expectativa em uma tarefa de linguagem
Marcelo Salvador Caetano (UFABC)
Dissociação de marcadores sensoriais e decisionais em tarefas temporais
Andre Mascioli Cravo (UFABC)

Sala 3 - Enduring neural and behavioral effects of early life adversity: how far and how deep it goes?
Coord: Silvia Honda Takada (UFABC)
Nutrition and neurodevelopment: behavioral and molecular assessments.
Cristiano Mendes da Silva (UNIFESP) (LabNeuN)
Maternal melatonin and the programming of brain and behavior
Lívia Clemente Motta Teixeira (USP)
Short- and long-term effects of oxygen deprivation at birth
Silvia Honda Takada (UFABC)

Sala 4 - Sincronia neural e atividade oscilatória em registros eletrofisiológicos
Coord: Adriano Bretanha Lopes Tort (UFRN)
Oscilações hipocampais, aprendizado e processamento de recompensa
Bryan da Costa Souza (UFRN)
Oscilações corticais e sincronização com atraso
Fernanda Selingardi Matias (UFAL)
Oscilações cerebrais, circuitos corticais e epilepsia
Maria Elisa Calcagnotto (UFRGS)
Oscilações cerebrais sincronizadas com a respiração
Adriano Bretanha Lopes Tort (UFRN)

Sala 5 - Esquizofrenia: Avaliação de processos sensoriais, perceptuais e neuropsicológicos
Coord: Maria Lucia de Bustamante Simas (UFPE)
Avaliação do efeito de antipsicóticos típicos e atípicos nas habilidades sensório perceptivas em pacientes com Esquizofrenia
Renata Maria Toscano Barreto Lyra Nogueira (UFPE)
Teste de percepção de pareidolias e estímulos sonoros para avaliação do agravamento do surto da Esquizofrenia
Maria Lucia de Bustamante Simas (UFPE)
Avaliação proprioceptiva e visuoconstrutiva do estado psicótico em pacientes com Esquizofrenia
Aline Mendes Lacerda (UFPE)

17:10 às 17:30 - Coffee break nos estandes

17:30 às 19:00 - Sessão de Painéis I

19:00 às 20:30 - Cerimônia e Conferência de Abertura

Sala 1 - Sex differences in ketamine's antidepressant and addictive properties
Coord: Deborah Suchecki (UNIFESP)
Mohamed Kabbaj (Florida State University)

Quarta-feira, 02 de outubro de 2019

8:00 às 9:00 - Cursos Grupo I

Sala 1 - Bases Estruturais e Neuroquímicas da Neuroplasticidade
Coord: Karen Renata Herculano Matos Oliveira (UFPA)
Aula 1: Bases estruturais da Neuroplasticidade
Carlomagno Pacheco Bahia (UFPA)

Sala 2 - O papel do núcleo accumbens na expressão de comportamentos motivados por estímulos apetitivos e por drogas de abuso
Coord: Cláudio Da Cunha (UFPR)
Aula 1: Neurobiologia do núcleo accumbens
Cláudio Da Cunha (UFPR)

Sala 3 - Viés implícito, ameaça pelo estereótipo e mulheres nas ciências - mecanismos neurobiológicos, impactos sobre a vida acadêmica e estratégias de enfrentamento
Coord: Fátima Cristina Smtih Erthal (UFRJ)
Aula 1: Processamento cerebral implícito - influência sobre a construção dos estereótipos
Fátima Cristina Smtih Erthal (UFRJ)

Sala 4 - Introdução a etologia
Coord: Amauri Gouveia Jr. (UFPA)
Aula 1: O que é etologia
Amauri Gouveia Jr. (UFPA)

Sala 5 - Experiências de uma neurocientista na bolsa de valores: estratégias para sobreviver no mercado financeiro
Coord: Elizabeth Sumi Yamada (UFPA)
Aula 1: Educação financeira: antes de investir tenha sua reserva de emergência
Elizabeth Sumi Yamada (UFPA)

Sala 6 - TMS-EEG - Princípios básicos e aplicações em neurociência
Coord: Abrahão Fontes Baptista (UFABC)
Aula 1: Princípios básicos de uso de TMS simultâneo com EEG
Abrahão Fontes Baptista (UFABC)

9:30 às 11:20 - Módulos Temáticos

Sala 1 - Novel treatments for emotional disorders
Coord: Deborah Suchecki (UNIFESP)
Neurobiology of ketamine's antidepressant effects
Mohamed Kabbaj (Florida State University)
NPY involvement with emotional disorders
Deborah Suchecki (UNIFESP)

Comunicação Oral 1- 18.019 Efeitos do tratamento com diferentes classes de medicamentos com ações antidepressivas e anti-inflamatórias durante o desenvolvimento de ratos submetidos ao estresse precoce.
Autores: João Paulo Behenck [1], Ritele Hernandez Silva [1], Laura de Araujo Borba [1], Airam Barbosa de Moura [1], Maira Eduarda Mendes Botelho [1], Ana Caroline Darabas [1], Raissa Walter de Freitas [1], Breatriz da Costa Chede [1], Monique Michels [1], Felipe Dal-Pizzol [1], João Quevedo [1,2,] Gislaine Zilli Réus [1]I[1]UNESC, [2]UTHealth
Comunicação Oral 2- 18.022 Efeito ansiolítico do carvacrol no teste de labirintoto em cruz elevado em camundongos: evidências para o envolvimento de receptores GABAA.
Autores: Lucas Diogo Rosa [1,2], Feliphy Rodrigues Custódio [1,2], Paulo de Tarso Teles Dourado de Aragão [1,2], Cleane Gomes Moreira [1,2], Lysrayane Kerullen David Barroso [1,2], Francisca Valéria Bezerra Sampaio Marques [1,2], Miguel Costa Rodrigues Júnior [1,2], Ana Clara de Souza Correa [1,2], Nayara Araújo Cardoso [1,2], Evaneide Pereira de Sá Carvalho [1,2], Lissiana Magna Vasconcelos Aguiar [1,2], Carla Thiciane Vasconcelos de Melo [1,2. 1] UFC[2] UFC
Comunicação Oral 3- 18.063 - Papel da via monoaminérgica e fator neurotrófico derivado do cérebro no efeito-tipo antidepressivo do derivado piperazínico, LQFM212**.**
Autores: Lorrane Kelle da Silva Moreira [1], Adriane Ferreira de Brito [1], Dayane Moreira da Silva [1], Iziara Ferreira Florentino [1], Flávio S de Carvalho [2], Fábio Fagundes da Rocha [3], Ricardo Menegatti [2], Elson Alves Costa [1. 1 2] UFG FF - [3] UFRRJ.
Comunicação Oral 4 - 23.010 Enriquecimento ambiental previne o déficit de extinção de memória aversiva decorrente de estresse agudo de contenção via a fosforilação da subunidade GluA1 de AMPA no hipocampo.
Autores: Leticia Morais Bueno de Camargo [2], Leonardo Santana Novaes [2], Carolina Demarchi Munhoz [2]
[2] ICB/USP

Sala 2 - O papel da ativação imune precoce no desenvolvimento dos transtornos do sistema nervoso central
Coord: Clarissa Martinelli Comim (UNISUL)
A relação entre a ativação imune precoce e os transtornos do neurodesenvolvimento
Clarissa Martinelli Comim (UNISUL)
A neuroinflamação como causa ou consequência dos transtornos psiquiátricos?
Omar José Cassol-Jr (Instituto São José)
Comunicação Oral 1 - 01.004 - Maternal resistance physical exercise changes neurobiological and epigenetic parameters in offspring hippocampus in adult life.
Autores: André Luís Ferreira de Meireles [1], Ethiane Segabinazi [1], Natália Felix Gasperini [1], Christiano Spindler [1], Adriana Souza dos Santos [1], Daniela Pochmann [2], Viviane Rostirola Elsner [2,] Simone Marcuzzo [1 1] UFRGS [2] IPA
Comunicação Oral 2 - 18.019 - Efeitos do tratamento com diferentes classes de medicamentos com ações antidepressivas e anti-inflamatórias durante o desenvolvimento de ratos submetidos ao estresse precoce**.**
Autores: João Paulo Behenck [1], Ritele Hernandez Silva [1], Laura de Araujo Borba [1], Airam Barbosa de Moura [1], Maira Eduarda Mendes Botelho [1], Ana Caroline Darabas [1], Raissa Walter de Freitas [1], Breatriz da Costa Chede [1], Monique Michels [1], Felipe Dal-Pizzol [1], João Quevedo [1,2], Gislaine Zilli Réus [1 1] UNESC [2] UTHealth

Sala 3 - Aspectos neurobiológicos da emoção e da dor
Coord: Azair Liane Matos do Canto de Souza (UFSCAR)
Efeito do convívio com o coespecífico com dor sobre o comportamento emocional e nociceptivo em camundongos.
Azair Liane Matos do Canto de Souza (UFSCAR)
Características comportamentais e neurais da modulação da dor e emoções em camundongos machos e fêmeas.
Daniela Baptista de Souza (UFSCAR)
Comunicação Oral 1 - 15.010 - Efeito terapêutico e preventivo do exercício voluntário em roda de atividade na dor crônica e no comportamento do tipo depressivo induzidos por estresse por subjugação social repetida.
Autores: Marco Oreste Finocchio Pagliusi Junior [1,2,3], Ivan José Magayewski Bonet 4,5, Arthur de Freitas Brandão [1,2,3], Cláudia Herrera Tambeli [1,2,3], Carlos Amilcar Parada [1,2,3], Cesar Renato Sartori [1,2]
Comunicação Oral 2 - 15.008 - Envolvimento dos receptores opióides e canabinóides do tipo I na analgesia induzida pela estimulaçao elétrica crônica experimental do cortex insular
Autores: Elizamara Santos Gonçalves [1], Heloisa Alonso Matielo [1], Daniel Ciampi De Andrade Araújo [2], Manoel Jacobsen Teixeira [2], Camila Squarzoni Dale [1]

Sala 4 - Comportamento verbal e neurociências
Coord: Ana Paula Martins Alves Salgado (UFRA)
Aquisição de verbos psicológicos e Evidências da movimentação ocular
Ana Paula Martins Alves Salgado (UFRA)
Gorjeios infantis e aquisição da linguagem
Ana Cleide Vieira Gomes Guimbal de Aquino (UFRA)
Comunicação Oral 1- 13.043 Diferenças em tarefas de leitura usando FMRI.
Autores: Bruce Martins de Santana [1,2], Mariana Penteado Nucci da Silva [2,3], Katerina Lukasova [1,2], Edson Amaro Junior [2,31] UFABC, [2] FMUSP, [3] HAE
Comunicação Oral 2- 13.033 Habilidades de memória de curto prazo e de trabalho em crianças de 6-12 anos com aquisição de leitura típica e com atraso: um estudo com fNIRs.
Autores: Brenda Miura Lunardi 1, Juliane K. Lima [1,] Naimi M. N. Leite [1], Dayse D. Souza [1], Candida Ferreira [1], Laisa Amorim [1], Camilo Olalla [1], Diego Teixeira [1], João Ricardo Sato [1], Claudinei Biazoli [1], Joana B. Balardin [2], Katerina Lukasova [1], Maria Teresa Carthery-Goulart [1 1] UFABC, [2] HIAE

Sala 5 - Reatividade defensiva a contexto de ameaça em humanos
Coord: Fátima Cristina Smtih Erthal (UFRJ)
Contextos de segurança e prática de jogos violentos virtuais promovem modulações distintas na reatividade defensiva à exposição de imagens de violência
Fátima Cristina Smtih Erthal (UFRJ)
Imagética mental como estratégia para o estudo das respostas defensivas em humanos
Cristina Marta Del-Ben (USP)
Comunicação Oral 1 - 18.051 - Maus tratos na infância predizem a gravidade dos sintomas de transtorno de estresse pós-traumático (TEPT): O papel da revitimização.
Autores: Camila Gama[1], Liana Portugal [1], Amanda Leão [1], Sérgio Souza Junior [1,] Raquel Gonçalves [1], Leticia Oliveira [1], Mirtes Pereira[1]. UFF[1]
Comunicação Oral 2 - 23.015 - Diferenças interindividuais no comportamento exploratório e social de ratos submetidos a um protocolo de estresse traumático.
Autores: Paula Agostina Zoe Sumaran Ortega [1], Mariella Bodemeier Loayza Careaga [1], Carlos Eduardo Neves Girardi [1], Deborah Suchecki [1 1] UNIFESP

11:30 às 12:30 - Conferências

Sala 1 - Common neural circuits to different defensive behaviors.
Coord: Anderson Manoel Herculano Oliveira da Silva (UFPA)
Newton Canteras (ICB-USP)

Sala 2 - Enriquecimento ambiental: efeitos preventivos e terapêuticos em ratos submetidos à hipóxia neonatal
Coord: Rosa Maria Martins de Almeida (UFRGS)
Carlos Alexandre Netto (UFRGS)

12:30 às 14:00 - Almoço

14:00 às 16:00 - Simpósios

Sala 1 - Glial cells and their impact to aging and brain diseases
Coord: Flávia Gomes (UFRJ)
Neonatal infection leads to increased susceptibility to Aβ oligomer-induced cognitive impairment in mice: the role of microglial cells.
Júlia Clarke (UFRJ)
Neuroinflamation and its association with autism.
Patrícia Beltrão-Braga (USP)
Astrocytes and glioprotection: focus on aging process.
André Quincozes dos Santos (UFRGS)
Astrocyte heterogeneity: implications for aging and neurodegenerative diseases.
Flávia Gomes (UFRJ)

Sala 2 - On the nature of reactivation processes in memory reconsolidation
Coord: Jorge Alberto Quillfeldt (UFRGS)
Process between reconsolidation and extinction of the memory?
Leandro Bertoglio (UFSC)
Retrieval of retrained and reconsolidated memories are associated with a distinct neural network
Maria Eugenia Pedreira (Universidad de Buenos Aires, Buenos Aires, República Argentina)
Prior negative emotional events limit fear memory destabilization/reconsolidation process
Victor A. Molina (Universidad Nacional de Cordoba, Cordoba, República Argentina)
Integrating findings and concepts: memory reconsolidation, theory and applications
Jorge Alberto Quillfeldt (UFRGS)

Sala 3 - O sistema endocanabinoide: Diversidade e controle da fisiologia e patologia do sistema nervoso
Coord: Ricardo Augusto de Melo Reis (UFRJ)
Endocanabinóides secretados por glia diferenciam progenitores de oligodendrócitos hipocampais
Ricardo Augusto de Melo Reis (UFRJ)
Papel dos canabinoides no desenvolvimento da retina.
Karin da Costa Calaza (UFF)
Sinalização canabinóide peptídica em processos neurogênicos e gliogênicos da zona subventricular
Cecília Hedin-Pereira (VPPCB-Fiocruz)
Endocanabinoides peptidicos no tratamento da epilepsia e distúrbios metabólicos
Emer Suavinho Ferro (USP)
Sistema endocanabinoide, canabinoides e autismo: etiologia, diagnóstico e tratamento
Renato Malcher Lopes (UnB)

Sala 4 - Diferentes facetas da suplementação com ácido fólico sobre o neurodesenvolvimento
Coord: Lenir Orlandi Pereira Silva (UFRGS)
Um olhar sobre o contexto mundial do uso da suplementação com ácido fólico e as principais preocupações sobre o neurodesenvolvimento.
Lenir Orlandi Pereira Silva (UFRGS)
Impacto in vivo e in vitro da suplementação com ácido fólico.
Jaqueline Vieira Carletti (UFC)
Efeitos de diferentes doses de suplementação gestacional com ácido fólico sobre o neurodesenvolvimento da prole.
Bruna Ferrary Deniz (UFCSPA)

Sala 5 - Mulheres na Ciência: avanços e desafios.
Coord: Leticia de Oliveira (UFF)
Viés implícito e a construção de estereótipos de gênero.
Leticia de Oliveira (UFF)
Ameaça pelo estereótipo.
Eliane Volchan (UFRJ)
Disparidade de gênero em encontros científicos
Fátima Cristina Smtih Erthal (UFRJ)

Quarta-feira, 02 de outubro de 2019

16:00 às 16:30 - Coffee break nos estandes

16:30 às 18:00 - Sessão de Painéis II

18:10 às 19:10 - Cursos Grupo II

Sala 1 - Como o envelhecimento influencia as mudanças no funcionamento cerebral? Novos paradigmas de desenvolvimento no envelhecimento humano
Coord: Cláudia Helena Cerqueira Mármora (UFJF)
Aula 1: Evidências de mudanças e adaptações neuroplásticas no envelhecimento humano
Cláudia Helena Cerqueira Mármora (UFJF)

Sala 2 - Modulação social da dor e estresse em camundongos
Coord: Azair Liane Matos do Canto de Souza (UFSCAR)
Aula 1: Bases neurobiológicas da empatia
Azair Liane Matos do Canto de Souza (UFSCAR)

Sala 3 - Neuroimagem Funcional Aplicada ao Comportamento Humano
Coord: Patricia Pinheiro Bado (IDOR/UFRGS-HCPA)
Aula 1: Ressonância Magnética Funcional: Bases biológicas do sinal BOLD
Patricia Pinheiro Bado (IDOR/UFRGS-HCPA)

Sala 4 - Problemas do cotidiano das Neurociências: ênfase em comportamento animal.
Coord: Giordano Gubert Viola (IFRN)
Aula 1: O princípio dos 3R nas neurociências comportamentais.
Cilene Lino-de-Oliveira (UFSC)

Sala 5 - A abolição do valor de p – prato requentado ou remédio urgente?
Coord: Marcus Vinícius Chrysóstomo Baldo (USP)
Aula 1: Estatística frequentista e teste de hipóteses: limitações e controvérsias
Marcus Vinícius Chrysóstomo Baldo (USP)

Sala 6 - Uso de instrumentos PROTEC e SON-R para Avaliação Neuropsicológica Infantil
Coord: Myriam Christina Alves Rodrigues (UniEvangélica)
Aula 1: SON-R - Teste de inteligência: Avaliação cognitiva em pré-escolares
Myriam Christina Alves Rodrigues (UniEvangélica)

19:20 às 21:00 - Assembleia da SBNeC

Quinta-Feira, 03 de outubro de 2019

8:00 às 9:00 - Cursos Grupo I

Sala 1 - Bases Estruturais e Neuroquímicas da Neuroplasticidade
Coord: Karen Renata Herculano Matos Oliveira (UFPA)
Aula 2: Sinalização glial na Neuroplasticidade
Karen Renata Herculano Matos Oliveira (UFPA)

Sala 2 - O papel do núcleo accumbens na expressão de comportamentos motivados por estímulos apetitivos e por drogas de abuso
Coord: Cláudio Da Cunha (UFPR)
Aula 2: Registro eletrofisiológico de neurônios do núcleo accumbens durante a expressão de respostas motoras a drogas de abuso, estímulos apetitivos e a estímulos condiconados
José Augusto Pochapski (UFPR)

Sala 3 - Viés implícito, ameaça pelo estereótipo e mulheres nas ciências - mecanismos neurobiológicos, impactos sobre a vida acadêmica e estratégias de enfrentamento
Coord: Fátima Cristina Smtih Erthal (UFRJ)
Aula 2: Impacto dos estereótipos sobre o desempenho acadêmico
Karin da Costa Calaza (UFF)

Sala 4 - Introdução a etologia
Coord: Amauri Gouveia Jr. (UFPA)
Aula 2: Um modelo conceitual de comportamento
Thiago Marques de Brito (UFMT)

Sala 5 - Experiências de uma neurocientista na bolsa de valores: estratégias para sobreviver no mercado financeiro
Coord: Elizabeth Sumi Yamada(UFPA)
Aula 2: Educação financeira: renda fixa é um investimento conservador? Nem sempre...
Elizabeth Sumi Yamada(UFPA)

Sala 6 - TMS-EEG - Princípios básicos e aplicações em neurociência
Coord: Abrahão Fontes Baptista (UFABC)
Aula 2: TMS simultâneo a EEG - Prática de aquisição de sinal
Daniel Ciampi de Andrade (UFABC)

Quinta-Feira, 03 de outubro de 2019

9:30 às 11:20 - Módulos Temáticos

Sala 1 - Identificando vulnerabilidade a transtornos mentais: psicometria, neuroimagem e inteligência artificial.
Coord: Mirtes Garcia Pereira (UFF)
Reações de imobilidade em situações de ameaça: implicações para o transtorno do estresse pós-traumático
Mirtes Garcia Pereira (UFF)
Inteligência artificial em neuroimagem: decodificando traços de personalidade e vulnerabilidade a transtornos mentais
Leticia De Oliveira (UFF)
Comunicação Oral 1 - 14.021 - Neuroimaging pattern recognition to evaluate emotional chronic effects in ayahuasca experts.
Autores: Lucas Rego Ramos [1], Orlando Fernandes Junior [1], Tiago Arruda Sanchez [1-1] UFRJ
Comunicação Oral 2 - 18.049 - Predição de sintomas do transtorno de estresse pós-traumático a partir de padrões multivariados de sinais fisiológicos para imagens de ameaça em estudantes: uma abordagem de aprendizado de máquina.
Autores: Liana Portugal [1], Luiz Antônio Junior [3,] Rita de Cássia Soares Alves [1,] Orlando Fernandes Junior [2,] Debora Saade [3,] Alexandre Plastino [3,] Eliane Volchan [2,] Mirtes Pereira [1,] Leticia Oliveira, UFF[1], UFRJ[2], UFF [3]

Sala 2 - Uso de aparelhos de telefonia móvel na análise do movimento humano
Coord: Givago da Silva Souza (UFPA)
Tecnologia de aparelhos celulares e análise do movimento
Anderson Belgamo (IFSP)
Avaliação acelerométrica do movimento humano
Givago da Silva Souza (UFPA)
Comunicação Oral 1 - 20.001 - The use of a low-cost multisensory glove for therapeutic rehabilitation activity in patients with paretic hand after a stroke.
Autores: Camila Nunes da Silva [1] , Alna Carolina Mendes Paranhos [1] , Carlomagno Pacheco Bahia [1 1] UFPA
Comunicação Oral 2 - 12.020 Avaliação da lateralidade do controle motor de membros superiores com análise de sinergia muscular com eletromiografia.
Autores: Carolina Gomes da Silva [1], Bruno Gomes Dutra [1], Narrery Silva dos Santos [1], Erick Melo Rocha [1], Deusa Priscila da Silva Resque [1], Daniel Alves da CruZ Filho [1], Adriany Maria de Moura Lobato [1], Antonio Pereira Junior [11] UFPA

Quinta-Feira, 03 de outubro de 2019

Sala 3 - Mecanismos neurobiológicos subjacentes à vulnerabilidade e resistência de roedores a estressores.
Coord: Ricardo Luiz Nunes-de-Souza (UNESP)
Papel do córtex pré-frontal medial esquerdo e direito na modulação da ansiedade de camundongos susceptíveis e resilientes ao estresse de derrota social
Ricardo Luiz Nunes-de-Souza (UNESP)
Vulnerabilidade e resistência em modelos experimentais de pânico
Hélio Zangrossi Junior (FMRP-USP)
Comunicação Oral 1 - 14.009 Desenvolvimento de um protocolo intra-individual para investigação da codificação neural de graus de controle sobre estímulos aversivos.
Autores: Bruno de Avó Mesquita [1,2,3], Danilo Benette Marques [1,2,3], Matheus Teixeira Rossignoli [1,2,3], Rafael Ruggiero [1,2,3], João Pereira Leite [1,2,3], [1] DNCC [2] FMRP [3] USP/RP
Comunicação Oral 2 - 23.011 O bloqueio dos receptores mineralocorticóides no córtex pré-frontal medial (CPFm) durante o estresse evita o comprometimento da extinção da memória aversiva em ratos.
Autores: Kairo Alan Albernaz Mariano [1], Carolina Demarchi Munhoz [11] ICB/USP

Sala 4 - Alimentação e recompensa: da homeostase à compulsão.
Coord: Patricia Pinheiro Bado (IDOR/UFRGS/HCPA)
Mecanismos que influenciam a alimentação além da homeostase.
Anna Carolina Rego Costa (UFRJ / Fundadora do "Além do Comer")
Processamento neural de recompensa e excessos alimentares.
Patricia Pinheiro Bado (IDOR/UFRGS/HCPA)
Comunicação Oral 1 - 14.016 - Red is sweet! Event-related potential study alerts: traffic-light warning labels for high sugar ultra-processed food may be ineffective.
Autores: Rafaela R. Campagnoli [1,2], Thayane C. C. Lemos [2], André A. M. Coutinho [2], Laura Krutman [1,3], Rafael F. Delgado [3,4], María Carmen Fernández-Santaella [3], Mirtes G. Pereira [2], Leticia Oliveira [2], Neha Khandpur [5,6], Eliane Volchan [7], Isabel A. David [1,2 1] UFF, [2] UFF [3] [4], [5] USP [6] Harvard University [7] UFRJ
Comunicação Oral 2 - 14.029 - Correlatos biológicos e psicológicos de preditores de índice de massa corporal (imc) de meninas de 10 a 14 anos de idade**.**
Autores: Tatiane Possani [1], Maria Fernanda Laus [2], Sebastião de Sousa Almeida [1 1] USP-RP, [2] UNAERP

11:30 às 12:30 - Conferência

Sala 1 - Imageamento por Ressonância Magnética multi-modal em modelos de lesão encefálica perinatal
Coord: Carlos Alexandre Netto (UFRG)
Stephane Vladimir Sizonenko (Universidade de Genebra, Suíça)

Sala 2 - Closed loop TMS/EEG-rTMS to treat chronic pain
Coord: Rosa Maria Martins de Almeida (UFRGS)
Abrahão Fontes Baptista (UFABC)

12:30 às 14:00 - Almoço

Quinta-Feira, 03 de outubro de 2019

14:00 às 16:00 - Simpósios

Sala 1 - Auditory neurons on hearing and beyond
Coord: Ricardo Maurício Xavier Leão (FMRP-USP)
Ultrashort synaptic delays in an auditory synapse for sound localization
Henrique von Gersdorff (Vollum Institute-Oregon Helath and Sciences University)
Ionotropic actions of metabotropic glutamate receptors on MNTB neurons
Christopher Kushmerick (UFMG)
Control of hippocampal theta oscillations by auditory neurons from the dorsal cochlear nucleus
Richardson Naves Leão (UFRN)
Possible mechanisms of the inhibition of long-term potentiation in the hippocampus by high intensity sound
Ricardo Maurício Xavier Leão (FMRP-USP)

Sala 2 - Myelin and Oligodendrocyte Implications in Neurological and Psychiatric Disorders
Coord: Cecilia Hedin Pereira (Fiocruz)
Myelin and Olicgodendrogenesis deficits in corticosterone induced model of depression
Cecília Hedin-Pereira (VPPCB-Fiocruz)
Behavior of Autoaggressive Cells in Multiple Sclerosis Onset.
Alessandro S Farias (UNICAMP)
Energy metabolism alterations in oligodendrocytes are pivotal to schizophrenia
Daniel Martins-de-Souza (UNICAMP)
Glutamate transporters regulate developmental myelination: possible implications in neuropsychiatric disorders
Babette Fuss (Virginia Commonwealth University)

Sala 3 - Physical activity, aging and neurological diseases
Coord: Aderbal Silva Aguiar Junior (UFSC)
Physical activity, aging, and Parkinson's disease: what do we learn from experimental models?
Aderbal Silva Aguiar Junior (UFSC)
Functional and biochemical effects of exercise modalities in the aging process
Ionara Rodrigues Siqueira (UFRGS)
The effect of physical exercise on multiple sclerosis: immunomodulation and neuroprotection
Rafael Cypriano Dutra (UFSC)
The role of physical exercise in the pathophysiology of traumatic brain injury
Luiz Fernando Freire Royes (UFSM)

Sala 4 - Degeneração e regeneração do sistema nervoso: atualizações e perspectivas sob uma óptica celular e molecular.
Coord: Victor Tulio Ribeiro de Resende (UFRJ)
Neuroproteção e imunomodulação após avulsão e reimplante de raízes motoras medulares.
Alexandre Leite Rodrigues de Oliveira (Unicamp)
Destruição da mielina e morte axonal na neuropatia da Hanseníase.
Bruno de Siqueira Mietto (UFJF)
Mielinização de axônios regenerados em modelo de lesão de CNS.
Silmara Veline de Lima (Children's Hospital Harvard University)
Estratégias de bioengenharia tecidual para regeneração de segmentos do sistema nervoso periférico.
Victor Tulio Ribeiro de Resende (UFRJ)

Sala 5 - Intervenções no período gestacional para a prevenção de dano encefálico perinatal: efeitos do exercício, do enriquecimento ambiental e da lactoferrina
Coord: Carlos Alexandre Netto (UFRGS)
Lactoferrina, uma promissora proteína do leite bovino na prevenção da lesão encefálica perinatal
Stephane Vladimir Sizonenko (Universidade de Genebra, Suíça)
O nado gestacional previne as alterações metabólicas e os déficits cognitivos causados pela hipóxia/isquemia neonatal
Eduardo Farias Sanches (UFRGS)
O enriquecimento ambiental gestacional como estratégia neuroprotetora em neonatos submetidos a hipóxia-isquemia
Carlos Alexandre Netto (UFRGS)

16:00 às 16:30 - Coffee break nos estandes

16:30 às 18:00 - Sessão de Painéis III

18:10 às 19:10 - Cursos Grupo II

Sala 1 - Como o envelhecimento influencia as mudanças no funcionamento cerebral? Novos paradigmas de desenvolvimento no envelhecimento humano
Coord: Cláudia Helena Cerqueira Mármora (UFJF)
Aula 2: Aprendizagem e Memória mudam o Cérebro?
Cláudia Helena Cerqueira Mármora (UFJF)

Sala 2 - Modulação social da dor e estresse em camundongos
Coord: Azair Liane Matos do Canto de Souza (UFSCAR)
Aula 2: Efeitos comportamentais e neurais da empatia induzida pela dor em camundongos.
Daniela Baptista de Souza (UFSCAR)

Sala 3 - Neuroimagem Funcional Aplicada ao Comportamento Humano
Coord: Patricia Pinheiro Bado (IDOR/UFRGS-HCPA)
Aula 2: Desenho experimental e processamento dos dados
Patricia Pinheiro Bado (IDOR/UFRGS-HCPA)

Sala 4 - Problemas do cotidiano das Neurociências: ênfase em comportamento animal.
Coord: Giordano Gubert Viola (IFRN)
Aula 2: Como o ambiente de laboratório pode influenciar a pesquisa em Neurociências
Giordano Gubert Viola (IFRN)

Sala 5 - A abolição do valor de p – prato requentado ou remédio urgente?
Coord: Marcus Vinícius Chrysóstomo Baldo (USP)
Aula 2: O abandono do teste de hipóteses em direção a métodos alternativos
Marcus Vinícius Chrysóstomo Baldo (USP)

Sala 6 - Uso de instrumentos PROTEC e SON-R para Avaliação Neuropsicológica Infantil
Coord: Myriam Christina Alves Rodrigues (UniEvangélica)
Aula 2: PROLEC - Provas de Avaliação dos Processos de Leitura: Avaliação da Dislexia.
Myriam Christina Alves Rodrigues (UniEvangélica)

Sexta-Feira, 04 de outubro de 2019

8:30 às 9:30 - Cursos Grupo I

Sala 1 - Bases Estruturais e Neuroquímicas da Neuroplasticidade
Coord: Karen Renata Herculano Matos Oliveira (UFPA)
Aula 3: Neuroplasticidade em resposta a lesões periféricas
Suellen Alessandra Soares de Moraes (UFPA)

Sala 2 - O papel do núcleo accumbens na expressão de comportamentos motivados por estímulos apetitivos e por drogas de abuso
Coord: Cláudio Da Cunha (UFPR)
Aula 3: Benzodiazepinas e neuroesteroides podem bloquear o efeito de psicoestimulantes sobre a liberação de dopamina no núcleo accumbens
William Sanchez Luna (UFPR)

Sala 3 - Viés implícito, ameaça pelo estereótipo e mulheres nas ciências – mecanismos neurobiológicos, impactos sobre a vida acadêmica e estratégias de enfrentamento
Coord: Fátima Cristina Smtih Erthal (UFRJ)
Aula 3 : Como lutar contra os estereótipos? Estratégias a serem adotadas em âmbito acadêmico
Karin da Costa Calaza (UFF)

Sala 4 - Introdução a etologia
Coord: Amauri Gouveia Jr. (UFPA)
Aula 3: Neuroetologia: modelos animais
Andre Walsh-Monteiro (IFPA)

Sala 5 - Experiências de uma neurocientista na bolsa de valores: estratégias para sobreviver no mercado financeiro
Coord: Elizabeth Sumi Yamada (UFPA)
Aula 3: Educação financeira: como investir em renda variável com segurança
Elizabeth Sumi Yamada (UFPA)

Sala 6 - TMS-EEG - Princípios básicos e aplicações em neurociência
Coord: Abrahão Fontes Baptista (UFABC)
Aula 3: TMS simulatâneo a EEG – Prática de análise de sinal
Yossi Zana (UFABC)

Sexta-Feira, 04 de outubro de 2019

10:00 às 11:00 - Cursos Grupo II

Sala 1 - Como o envelhecimento influencia as mudanças no funcionamento cerebral? Novos paradigmas de desenvolvimento no envelhecimento humano
Coord: Cláudia Helena Cerqueira Mármora (UFJF)
Aula 3: Gerontopsicomotricidade
Elaine Andrade Moura (UFJF)

Sala 2 - Modulação social da dor e estresse em camundongos
Coord: Azair Liane Matos do Canto de Souza (UFSCAR)
Aula 3: Estresse crônico de contenção: avaliação comportamental de camundongos submetidos ao modelo de empatia.
Paulo Eduardo Carneiro de Oliveira (UFSCAR)

Sala 3 - Neuroimagem Funcional Aplicada ao Comportamento Humano
Coord: Patricia Pinheiro Bado (IDOR/UFRGS-HCPA)
Aula 3: O dado de RMf é confiável? IgNobel e discussões recentes.
Patricia Pinheiro Bado (IDOR/UFRGS-HCPA)

Sala 5 - A abolição do valor de p – prato requentado ou remédio urgente?
Coord: Marcus Vinícius Chrysóstomo Baldo (USP)
Aula 3: O crepúsculo da estatística frequentista e o despertar para novas práticas
Marcus Vinícius Chrysóstomo Baldo (USP)

Sala 4 - Problemas do cotidiano das Neurociências: ênfase em comportamento animal.
Coord: Giordano Gubert Viola (IFRN)
Aula 3: Análise integrada de comportamentos complexos.
Cassio Morais Loss (UNIFESP/INCT-TM)

Sala 6 - Uso de instrumentos PROTEC e SON-R para Avaliação Neuropsicológica Infantil
Coord: Myriam Christina Alves Rodrigues (UniEvangélica)
Aula 3: Estudo de casos utilizando os instrumentos: PROLEC e SON-R
Myriam Christina Alves Rodrigues (UniEvangélica)

11:00 às 12:00 - Medalha Neurociências Brasil 2019
Prof. Rubem Carlos Araújo Guedes (UFPe)
Conferência de Encerramento

12:00 às 12:30 - Encerramento e Premiação

Terça-feira, 01 de outubro de 2019
17:30 às 19:00 - Sessão de Painéis I

01. Desenvolvimento do Sistema Nervoso & Distúrbios do Desenvolvimento

01.001 - INIBIÇÃO MITOCONDRIAL NO NEURODESENVOLVIMENTO: UM POSSÍVEL MODELO ANIMAL DE ESQUIZOFRENIA?

MITOCHONDRIAL INHIBITION IN NEURODEVELOPMENT: A POTENTIAL ANIMAL MODEL FOR SCHIZOPHRENIA?

Autores: Thiago Garcia Varga 1, Juan Guilherme de Toledo Simões 1, Amanda Siena dos Santos 1, Tatiana Rosado Rosenstock 1
Instituição: 1 FCMSCSP - Faculdade de Ciências Médicas da Santa Casa de São Paulo (R. Dr. Cesário Mota Júnior, 61 - Vila Buarque, São Paulo - SP, 01221-020)Introdução:
Neurodevelopment refers to the process that generates and shapes the nervous system of animals. It begins during the earliest stages of embryonic development and it is the last system to be completed after birth, which occurs during the end of adolescence. The majority of mechanisms that constitutes neurodevelopment such as cell proliferation, migration, neural differentiation, synapse formation and its maintenance creating the neural pathways, are ATP dependent and therefore mitochondria dependent. Mitochondria are organelles not only involved in ATP production through oxidative phosphorylation but also calcium buffering and programmed cellular death, which makes them crucial for cell survival and death. Hence, disturbs during nervous system development can lead to behavioral deficits and neuropsychiatric disorders. Previous results of our research group showed that a mitochondria dysfunction during neurodevelopment, by Rotenone (a complex I inhibitor) administration, induces behavioral deficits, such as hyperlocomotion and decreased social interaction when the rats were young adults (P60).Objetivos:The aim of this study is to verify if the behavioral deficits presented in the neonatal Rotenone administration animal model could be attenuated or reverted by antipsychotic (Haldol – Hal) or psychostimulant (Metilphenidate – MPD) administration and then draw a parallel between this animal model and a neuropsychiatric disorder, more specifically schizophrenia, attention deficit hyperactivity disorder or autism spectrum disorder.Métodos:To reach our goal, we treated Wistar puppies (P) intraperitoneally (i.p.) from P5 to P11 with Rotenone (Rot) (0.1mg/kg), Saline (Sal) or Vehicle (Veh). At P60, each animal previously treated with Sal, Veh or Rot was then treated i.p., 30 min before the behavioral tests (Open field and Social interaction), with either Saline (Sal-Sal, Veh-Sal, Rot-Sal), Hal (Sal-Hal, Veh-Hal, Rot-Hal) or MPD (Sal-MPD, Veh-MPD, Rot-MPD). Project approved by CEUA number 006/18 at FCMSCSP.Resultados e Conclusões:Results are shown mean±SEM (n=7 for each group) and were analyzed by One-Way Anova and Duncan post-hoc normalized to control group (Sal-Sal 100%). We verified: i) an increase in locomotor activity after treatment with Rot-Sal (134.88%±3.95; $p < 0.05$ when compared to Sal-Sal) that was decreased by treatment with Rot-Hal (94.76%±15.74; $p < 0.05$ when compared to Rot-Sal) but not with Rot-MPD (compared to Rot-Sal); ii) a decrease in social interaction at P60 after treatment with Rot-Sal (68.35%±5.87; $p < 0.05$ when compared to Sal-Sal) that was reverted by treatment with Rot-Hal (100.80%±6.66; $p < 0.05$ when compared to Rot-Sal) and also with Rot-MPD (100.60%±6.89; $p < 0.05$ when compared to Rot-Sal). We conclude that neonatal treatment with Rot causes behavior deficits at young age, such as hyperlocomotion and deficit in social interaction which are mostly reverted by treatment with Hal but not with MPD in P60, suggesting a possible animal model for schizophrenia.
Palavras-chaves: animal model, mitochondria, neurodevelopment, rotenone, schizophrenia
Agência Fomento: FAPESP e Capes/Cnpq

01.002 - ANÁLISE DA RESPOSTA GLIAL ASTROCITÁRIA NO CÓRTEX PRÉ-FRONTAL DE RATOS APÓS ANÓXIA NEONATAL E FOTOBIOMODULAÇÃO

ANALYSIS OF THE ASTROCITARY GLIAL RESPONSE IN THE PREFRONTAL CORTEX OF RATS AFTER NEONATAL ANOXIA AND PHOTOBIOMODULATION

Autores: Fernanda Aparecida Costa Souza 1, Débora Sterzeck Cardoso 1, Juliane Midori Ikebara 1, Leonardo Trindade Fabretti 1, Nasser Ali Daghastanli 1, Ilka Tiemy Kato 1, Alexandre Hiroaki Kihara 1, Silvia Honda Takada 1
Instituição: 1 UFABC - Universidade Federal do ABC (Alameda da Universidade, s/nº - Bairro Anchieta, São Bernardo do Campo - SP)
Introdução:
Neonatal anoxia is the occurrence of oxygen deprivation at birth that can lead to permanent cognitive and motor sequelae. The metabolic changes that occur in the face of oxygen deprivation involve a drastic reduction of the energy reserves of the cell and the Na + gradients, resulting in glutamate reuptake

failures and toxic increase of extracellular glutamate, leading to cell death due to excitotoxicity of both neurons and glial cells. In addition, there is evidence that anoxia leads to neuroinflammation further contributing to cell death. Among the glial cells, astrocytes are the most abundant cells in the nervous system. After trauma or injury to the nervous system, astrocytes proliferate, grow in size, and undergo fibrosis due to the accumulation of filaments, expressing higher levels of glial fibrillary acidic protein (GFAP), a set of characteristics known as astrogliosis or reactive astrocytosis. To our knowledge, there are very few strategies to minimize the oxygen deprivation sequelae. In this regard, we propose the use of photobiomodulation as a possible neuroprotective approach since it can possibly modulate local inflammation.Objetivos:The objective of the present study was to analyze the GFAP protein in the prefrontal cortex of neonatal rats 72 hours after neonatal anoxia and the influence of photobiomodulation therapy.Métodos:The pups were divided in 4 groups: Control Sham (CS) and Anoxia Sham (AS), Control Laser (CL) and Anoxia Laser (AL). For anoxia, P1 to P2 wistar pups (Rattus novergicus, Wistar) weighing 6 to 8 g were used, according to the validated model described by Takada, and cols., 2011 (100% N2 for 25 min, at 37°C). Laser groups were exposed to low intensity laser therapy for 1 min (λ = 808nm) immediately after the stimuli. Sham groups were not exposed to the laser. For the analysis of the GFAP protein levels, prefrontal cortex were dissected 72 hours after the stimulus and processed for Western Blotting technique (n= 4-6/group). The detection of the protein was performed by chemiluminescence, and the quantification was based on the intensity of the bands using ImageJ software. CEUA 8852240517.Resultados e Conclusões:First, we intended to investigate if neonatal anoxia caused reactive gliosis. We observed that AS (0.344 ± 0.034) presented higher GFAP levels when compared to CS (0.157 ± 0.053), P-value = 0,025. Then, we investigated if photobiomodulation was effective in changing this neuroinflammatory signal and we observed that AL (0.080 ± 0.013) presented lower levels than AS (0,344±0,034), p-value < 0.001, and no differences between AL and CS (p-value = 0.379), indicating possible modulatory effect of photobiomodulation. According to the results, we can suggest that neonatal anoxia increases the protein levels of GFAP 72h after the stimulus in the prefrontal cortex of Wistar rats, indicative of reactive astrogliosis, and that photobiomodulation might modulate this astrogliosis, reversing this response in rats submitted to neonatal anoxia.

Palavras-chaves: PERINATAL ASPHYXIA, NEUROPROTECTION, NEUROINFLAMMATION
Agência Fomento: FAPESP 2018/14072-7

01.003 - COMPORTAMENTO DO TIPO COMPULSIVO E DÉFICITS NA APRENDIZAGEM E MEMÓRIA DO MEDO INDUZIDOS PELA EXPOSIÇÃO PRÉ-NATAL AGUDA AO ÁLCOOL

COMPULSIVE-LIKE BEHAVIOR AND DEFICITS ON FEAR MEMORY LEARNING INDUCED BY ACUTE PRENATAL ALCOHOL EXPOSURE

Autores: Thomás Rocha Campos 1, Alladeah Bemhu de Carvalho Almeida 1, Pablinny Moreira Galdino de Carvalho 1, Carolina Carvalho de Souza 1, Alberto Corrêa Mendonça 2, Adryano Augustto Valladão de Carvalho 1
Instituição: 1 UFOB - Universidade Federal do Oeste da Bahia (Rod. BA 827, Estr. do Barrocão, s/n - Prainha - Barreiras - BA), 2 UFG - Universidade Federal de Goiás (Chácaras Califórnia, Goiânia - GO, 74045-155)

Introdução:

Background: Previous research has shown a strong correlation between prenatal alcohol exposure (PAE) and the incidence of anxiety-related disorders during adolescence and adulthood. Most of these studies were performed considering the moderate or heavy alcohol exposure, typical of alcoholic women, however, there is evidence that PAE, even if acute, can promote serious changes in fetal development, including disturbances in neuronal structuring, and some lesions and behavioral deficits can be observed experimentally using animal models. Nevertheless, few studies have evaluated behavioral deficits in adolescence or adulthood resulting from acute gestational alcohol consumption and, to our knowledge, there is no study relating the association between acute PAE (aPAE) and compulsive-like behavior and in mice. Objetivos:Objectives: To investigate the spectrum of possible changes triggered by acute fetal alcohol exposure on behavioral responses that allow the evaluation of compulsive-like behavior and fear memory learning in adult mice. Métodos:Methods: To model aPAE, on gestational day 12 (G12) female swiss mice were exposed to ethanol or saline and their male offspring were divided into three groups: control, ethanol (EtOH) and positive control ((diazepam (DZP) or fluoxetine (FLX)). Then, the offspring was tested on

postnatal days (P) 45–60 in one of the following three assays: marble-burying test (MBT), elevated plus maze (EPM) and step-down passive avoidance test (SDPA). The data were statistically analyzed by oneway ANOVA followed by Dunnett's test for MBT and EPM groups, and Mann-Whitney and Wilcoxon tests for SDPA. The results are expressed as mean ± standard error of mean, and $p < 0.05$ was considered significant. This project was submitted and approved by the Ethics Committee For Animal Use of UFOB (protocol n. 0021/2019 CEUA-UFOB).
Resultados e Conclusões:
Results: In the MBT, oral treatment with FLX (n=6; 13.33 ± 0.95) reduced the number of marbles buried in a 30 min session ($p < 0.05$) and the EtOH (n=10; 19.90 ± 0.10) buried significantly more marbles than control (n=10; 16.67 ± 1.01) group ($p < 0,01$). In the EPM, intraperitoneal treatment with DZP (n=8; 25.87 ± 4.80) produced an anxiolytic effect with an increase for % of time spent in the open arms ($p < 0,01$) and surprisingly, increased open arm time was also observed in EtOH (n=8; 24.00 ± 2.46) compared to the control (n=10; 8.20 ± 8.58) group ($p < 0,01$). In the SDPA, the step-down latency was reduced in EtOH (training=18,80 ± 7,19; 24h=27,90 ± 8,25) as compared to the control (training=24.33 ± 4.67; 24h=85.92 ± 18.34) group after 24h learning ($p < 0.01$). Conclusions: These findings suggest that aPAE leads to social alterations associated with compulsive-like behavior, behavioral disinhibition, and deficits in learning and memory in male offspring.
Palavras-chaves: Ethanol, Fetal Alcohol Spectrum Disorders, Behavior
Agência Fomento: CNPq, CAPES

01.004 - MATERNAL RESISTANCE PHYSICAL EXERCISE CHANGES NEUROBIOLOGICAL AND EPIGENETIC PARAMETERS IN OFFSPRING HIPPOCAMPUS IN ADULT LIFE

MATERNAL RESISTANCE PHYSICAL EXERCISE CHANGES NEUROBIOLOGICAL AND EPIGENETIC PARAMETERS IN OFFSPRING HIPPOCAMPUS IN ADULT LIFE
Autores: André Luís Ferreira de Meireles 1, Ethiane Segabinazi 1, Natália Felix Gasperini 1, Christiano Spindler 1, Adriana Souza dos Santos 1, Daniela Pochmann 2, Viviane Rostirola Elsner 2, Simone Marcuzzo 1
Instituição: 1 UFRGS - Universidade Federal do Rio Grande do Sul (Av. Paulo Gama, 110 - Farroupilha, Porto Alegre - RS, 90040-060), 2 IPA - Centro Universitário Metodista (Rua Coronel Joaquim Pedro Salgado, 80 - Rio Branco, Porto Alegre - RS, 90420-060)
Introdução:
Maternal physical exercise is well established as a positive factor to offspring health, its benefits include better performance in memory and learning tasks. However, the influences of other types of exercise modalities, as resistance exercise (RE), in offspring brain are poorly explored.
Objetivos:
The aim of this study was to investigate the influences of maternal RE in behavior, neurobiological and epigenetic parameters of the offspring in adult life.
Métodos:
Adult female Wistar rats from CREAL/UFRGS (#29840) were divided into four groups: sedentary before and during gestation (SS), exercised during gestation (SE), exercised before gestation (ES) and exercised before and during gestation (EE). The exercised rats were submitted to a RE protocol, which consisted of climbing a ladder tilted at 80º, 4 to 8 times, with fixed standardized weights on the proximal region of the tail. Only the offspring males were analyzed and exposed to the following procedures: at P (postnatal day) 80 to P85 spatial memory evaluation by the Morris Water Maze (WM) (n=15–11), neuroplastic factors expression in hippocampus (BrdU+ and IGF-1) (n=6–4) and hippocampal epigenetic mechanisms (global methylation of DNA, global acetylation of H3/H4 histones and Global activity of HDAC2) (n=6–8). The differences between groups were determined using the following tests: General Linear Model, One-way ANOVA, Kruskal-Wallis and Bonferroni post-hoc. Bonferroni correction was used, when necessary, to determine pairwise differences. Statistical analysis was performed using the SPSS Statistics® and statistical significances were established at $p < 0.05$.
Resultados e Conclusões:
The offspring of maternal exercise practiced during gestational period (SE) spent less time to find the platform in the fourth training day in WM apparatus when compared to SS offspring (17.13s ± 1.71s vs. 31.42s ± 3.55s) ($p < 0.001$); in addition, the SE offspring also spent less time in opposite quadrant of WM apparatus in probe day compared to SS (12.11s ± 1.76s vs. 22.38s ± 2.41s) ($p < 0.05$). Besides, the SE offspring did not differ to SS in neuroplastic factors, but an increase in Global HDAC2 activity was founded (3.65 ± 0.23 vs. 2.39 ± 0.38) ($p < 0.05$). Differently from what has been reported previously by the group SE, maternal exercise practiced in pregestational period

(ES) did not promote differences in behavior, but enhanced the expression of IGF-1 (31.50 ± 3.84 vs. 3.81 ± 0.83) ($p < 0.05$) and BrdU (61.93 ± 19.66 vs. 15.59 ± 0.27) ($p < 0.01$), generating a decrease of global DNA methylation (0.19 ± 0.04 vs. 0.85 ± 0.25) ($p < 0.05$) and an increase of global H4 acetylation (6.19 ± 0.67 vs. 2.19 ± 0.09) ($p < 0.05$) when compared to SS group. This is the first report to observe the influence of maternal RE in offspring brain and to explore inheritance mechanisms in adult life. These data suggest that RE before gestational period is beneficial to offspring and enhance neuroplastic marks, probably by epigenetic inheritance mechanism.
Palavras-chaves: Acetylation, Brain, Methylation, Memory, Physical Exercise
Agência Fomento: CAPES e CNPq

01.005 - DESENVOLVIMENTO DA MEMÓRIA DE TRABALHO EM CRIANÇAS DE 6-12 ANOS: UM ESTUDO COM fNIRS

DEVELOPMENT OF WORKING MEMORY IN 6-12 YEAR-OLD CHILDREN: A fNIRS STUDY
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Introdução:
Working memory (WM) is an essential function for cognitive development and can be measured through span tasks. Its neural correlates can be evaluated using fNIRS, a brain-imaging technique that registers blood-oxygen level responses related to brain activity using near-infrared light.
Objetivos:
This study aimed to evaluate neural substrates of WM in 80 children aged 6-12. The research was approved by UFABC Ethics Committee (number 2886946).
Métodos:
A cap with 28 channels, 8 emitters, 15 detectors was placed over the participant's frontal lobe, following the 10-20 system. Forward and Backwards Digit Span tasks were performed: children heard a recorded sequence of numbers and were asked to repeat them in the same or reverse order according to blocks. Before the experiment, span in both orders was determined for each participant, to adjust the task complexity level. NirsLAB was used for data analysis. Among its tools, the Statistical Parametric Mapping (SPM) maps hemodynamic series in head-space models.
Resultados e Conclusões:
Data from 5 subjects was lost due to excessive noise and task errors. Concentration of oxygenated hemoglobin was compared between direct and reverse order tasks (75 subjects). SPM results showed greater concentrations of oxy-Hb for reverse order task. Channels located at the right anterior prefrontal cortex exhibited significant thresholded activation. Activation in reverse order was mapped through educational stages: year 2 students (n=22) showed the lowest value for thresholded activation, at anterior PFC; year 3 (n=10) showed greater activation at medial frontal and left intermediate frontal cortex; year 4 (n=16) showed greater activation at left anterior PFC and granular frontal cortex; and year 5 (n=27) showed greater activation at left anterior PFC. P-value for thresholded activations was 0.05. As expected, the reverse order task was more cognitively demanding than the direct and showed greater activation of the PFC in all groups. fNIRS results could differentiate patterns of executive functioning (backwards task) from phonological short-term memory (forward task). Activation patterns varied with age: younger subjects presented a more disperse activation, and older subjects a more localized frontal activation, related to executive functions. FNIRS data evidenced good differentiation between children with lower and higher WM capacities, suggesting that this technique is valuable to monitor typical and atypical WM development. Present results can be used for future development of machine learning, aiming to classify people in specific tasks and ages according to fNIRS activation.
Palavras-chaves: Cognitive development, fNIRS, Working memory
Agência Fomento: UFABC/Capes/Fapesp

01.006 - ALTERAÇÕES DE PARÂMETROS COMPORTAMENTAIS RESULTANTES DA EXPOSIÇÃO PRÉ-NATAL DE GLIFOSATO EM CAMUNDONGOS

EFFECTS OF PRENATAL EXPOSURE TO GLYPHOSATE ON BEHAVIORAL PARAMETERS OF MICE

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Introdução:

Glyphosate (N-phosphonomethyl-glycine) is an organophosphorus compound largely used as a non-selective herbicide and a crop desiccant. Glyphosate and glyphosate-based herbicides are some of the most used herbicides in Brazil and many other countries. Recent scientific studies have shown evidence of central nervous system-damaging events resulting from glyphosate herbicide exposure, including in a model with animals exposed during the perinatal phase.

Objetivos:

The objective of this study was to analyze the behavioral effects of prenatal exposure to glyphosate on mice.

Métodos:

Glyphosate (0,3 mg/kg) or distilled water were orally administrated to pregnant Swiss mice from one day after the day of mating, which was confirmed by the detection of vaginal plug, to the last day of the gestation period. The offspring mice (n = 22) were separated from their progenitors on the 21st postnatal day (21 PND) and were assigned to four different groups in concordance to their gender and to the exposure of glyphosate: glyphosate exposed male (GM); glyphosate exposed female (GF); male control (MC); female control (FC). The following behavioral tests were performed: open field test (OP), y-maze, social interaction test (SIT) and marble burying test (MBT). These tests were started on the 25th postnatal day (25 PND) and were concluded up until the 35th postnatal day (35 PND). The Ethic Committee on Animal Use of the Federal University of Ceará (CEUA-UFC, CEUA 4067310818) approved all of the experimental procedures that are described in this study.

Resultados e Conclusões:

Results showed significant increase of the number of crossing (meanGM = 100; meanMC = 49,50; $p < 0,0001$) and rearing (meanGM = 50,17; meanMC = 31,50; $p < 0,0112$) in the OP only in GM in relation to the control group of the same sex. Also in OP, significant differences between GM and GF were observed in the number of grooming (meanGM = 5,167; meanGF = 2; $p < 0,0034$). There was a significant increase of the MBT results (meanGM = 11,86; meanMC = 2,20; $p < 0,0009$) in GM in relation to MC. There were no significant results in SIT and y maze. In this study, the gestational exposure to glyphosate resulted in signs of hiperactivity and obsessive or repetitive characteristics, which can be linked to neuropathologies such as Attention Deficit Hyperactivity Disorder (ADHD), Autism and Obsessive-Compulsive Disorder (OCD). These characteristics were observed predominantly in male mice.

Palavras-chaves: Glyphosate, Neurodevelopment, Hyperactivity
Agência Fomento: CAPES

01.007 - IMBALANCE OF DOPAMINERGIC SYSTEM IN POSTNATAL MICE ALTERS BEHAVIOR AND NEURAL BRANCHING IN A SEXUALLY DIMORPHIC MANNER

IMBALANCE OF DOPAMINERGIC SYSTEM IN POSTNATAL MICE ALTERS BEHAVIOR AND NEURAL BRANCHING IN A SEXUALLY DIMORPHIC MANNER

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Introdução:

Dopamine (DA) is a neurotransmitter involved in many brain functions, like reward system, cognition and learning. It is also known that DA is important during brain development, and a range of neuropsychiatric disorders share both developmental and dopaminergic hypothesis, such as Attention Deficit Hyperactivity Disorder, Schizophrenia and Generalized Anxiety Disorder. DAergic receptors are metabotropic receptors and they are divided in two families: D1, coupled to Gs protein; and D2, coupled to Gi protein.

Objetivos:

Our aim is to evaluate the effects of L-DOPA, SKF-38393 (D1 receptor agonist) and Quinpirole (D2 receptor agonist) administration during the first five

days of life on anxiety and depression-like behavior and neural branching when mice are 4 week old.
Métodos:
We intraperitoneally injected male and female Swiss mice, from P1 to P5, with Saline (Sa), 10mg/kg L-Dopa + 5mg/kg Benserazide (10LD), 50mg/kg L-Dopa + 25mg/kg Benserazide (50LD), 5mg/kg SKF-38393 (SKF) or 0,5mg/kg Quinpirole (Quin). At 4 week old, animals were tested for exploratory motor, anxiety and depression-like behavior, by Open Field Test (OFT), Elevated Plus Maze (EPM), Novelty-Suppressed Feeding (NSF) and Forced Swim Test (FST). After the behavioral tests (minimum 10 animals/group), mice's brains were processed for Golgi analysis (minimum 5 animals/group), ideal for examination of neuronal morphology and connectivity. CEUA nº 39/2015. A Sholl analysis program were used to reconstruct neuronal structures, and the number of branch intersections crossing each 10µm radius from the soma to the most distal dendritic ramification was counted. All data were analyzed using One Way ANOVA, for parametric data, and One Way ANOVA on Ranks, for non-parametric data. We used Tukey test and the difference was considered statistically significant when $p < 0,05$.
Resultados e Conclusões:
We observed a decrease in the number of dippings in SKF females (p=0,010) and 10LD males (p=0,049) at EPM. In the NSF test, SKF and Quin females showed an increased latency (p=0,001; p=0,040), while 50LD males did the opposite (p=0,021) and Quin males lost less weight during the test (p=0,002). We also observed that Quin females decreased time (H=7,363 One Way ANOVA on Ranks, $P < 0,05$) and Quin males decreased both time (H=20,773 One Way ANOVA on Ranks, $P < 0,05$) and frequency of climbing (H=19,691 One Way ANOVA on Ranks, $P < 0,05$) in the FST. Also, SKF females showed a reduction in the number of dendritic intersections at 60 (p=0,0294), 70 (p=0,0094), 80 (p=0,0376), 90 (p=0,0306), 110 (p=0,0319) and 120 (p=0,0190) µm radius from the cell soma. In our study, we observed that early imbalanced activation of DAergic system during the first 5 postnatal days affects prepubertal mice behavior and neuronal branching. In addition, we observed differences between males and females. Thus, our data suggest that correct activation of DAergic system at a specific developmental window is important for behavior pattern later in life.
Palavras-chaves: Neurodevelopment, Dopamine, Sexual dimorphism
Agência Fomento: CNPq, FAPEMIG, CAPES, ISN, PRPq

01.008 - MOTOR BEHAVIOR OF ZEBRAFISH LARVAE IS DECREASED BY ACTIVATION OF BOTH D1 AND D2 RECEPTORS DURING EARLY DEVELOPMENT

MOTOR BEHAVIOR OF ZEBRAFISH LARVAE IS DECREASED BY ACTIVATION OF BOTH D1 AND D2 RECEPTORS DURING EARLY DEVELOPMENT
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Instituição: 1 UFMG - Universidade Federal de Minas Gerais (Avenida Presidente Antonio Carlos, 6627 - Pampulha - Belo Horizonte/MG)
Introdução:
Dopamine (DA) is involved in many brain functions (learning, voluntary motion etc). DA is important during brain development, and DAergic abnormalities are linked to psychiatric disorders like ADHD and schizophrenia. There are two subfamilies of DAergic receptors: D1, which is linked to Gs and increases phosphorylation of DARPP-32; and D2, which is linked to Gi and decreases phosphorylation of DARPP-32 and Akt. DARPP-32 and AKT are altered in the brain of schizophrenic patients. Recently, zebrafish larvae have been used as an experimental model for psychiatric disorders. However, very little is known regarding DAergic signaling in zebrafish.
Objetivos:
We aimed to study the role of DAergic receptors on zebrafish motor behavior.
Métodos:
We treated 5dpf larvae (total of 620 larvae) with 100uM DA, 10 µM SKF-38393 (D1 agonist), 10 µM Quinpirole (D2 agonist), 10 µM SCH-23390 (D1 antagonist) or 10 µM Eticlopride (D2 antagonist) (CEUA 9/2012). Their traveled distance, time mobile and mobile episodes were recorded and measured for 5 (DARPP-32 signaling) and 30 minutes (Akt signaling). All data were statistically analyzed using One Way ANOVA and Tukey posthoc.
Resultados e Conclusões:
We observed that the treatment with DA reduces the distance traveled ($p < 0,001$), time mobile ($p < 0,001$) and mobile episodes ($p < 0,001$) of zebrafish larvae, as well as D1 and D2 agonists ($p < 0,001$) and antagonists ($p < 0,001$) at 5 minutes. At 30 minutes, DAergic treatment also showed a decrease in motor behavior (distance traveled $p < 0,001$; time mobile p=0,016, mobile episodes $p < 0,001$), with no significant

difference between groups treated with DA, D1 and D2 agonists (p=0,139) or antagonists (p=0,194). Our results suggest that the activation of both D1 and D2 receptors reduces the motor behavior of the larvae. However, since it is a developing brain and the zebrafish has 14 DAergic receptors, three hypotheses to explain the phenomenon can be raised: (a) specific agonists for D1 and D2 receptors in mammals are not specific for DAergic receptors in zebrafish; (b) intracellular signaling in a developing brain is different from the adult brain; (c) different DA receptors are expressed in several neuronal types, which can result in similar behavioral consequence. Therefore, more studies need to be done to understand what happens in the DAergic pathways and to understand the mechanisms involved the cellular and/or molecular mechanisms involved in DA signaling.

Palavras-chaves: dopamine, neurodevelopment, zebrafish, motor behavior
Agência Fomento: FAPEMIG, ISN, CAPES, CNPq, PRPq

01.009 - EFEITOS DA SUPLEMENTAÇÃO OU DEFICIÊNCIA EM ÁCIDOS GRAXOS ÔMEGA-3, DURANTE A GESTAÇÃO, NO SISTEMA ENDOCANABINOIDE DA PROGÊNIE

Effects of supplementation or deficiency in omega-3 fatty acids during gestation on the endocannabinoid system of the progeny

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Introdução:

The endocannabinoid system (ECS) is important to many neural functions such as migration, proliferation and maturation during brain development. This system is formed by receptors (CB1 and CB2), endogenous ligands (endocannabinoids – ECs) and synthesis and degradation enzymes. The ECs are bioactive lipids derived from arachidonic acid, a main metabolite of omega-6 fatty acids. Omega-3 fatty acids (n-3) are also important during critical periods of brain development, and metabolites of this family may also interact with ECS. Furthermore, the n-3 is involved in epigenetic regulation of many genes related to gliogenesis, neurogenesis and plasticity. However, the effects of a supplementation or deficiency of n-3 in the maternal diet, under the ECS and plasticity of the progeny's brain is still not clear.

Objetivos:

Evaluate the effects of n-3 supplementation or deficiency, during gestation, on ECS and plasticity of cerebral cortex and hippocampus of neonate rats.

Métodos:

Adult female rats were maintained in a supplemented or deficient n-3 diet, 15 days prior to mating and during pregnancy. Cerebral cortex (Cx) and hippocampus (Hp) of the mothers and offspring (0 - 3 post-natal days) were obtained and analyzed by Western blot (CEUA/CONCEA nº A20/17-023-17).

Resultados e Conclusões:

All data are expressed as mean ± SEM and the groups are represented by Ct (control), Dn3 (n-3 deficient diet) and Sn3 (n-3 Supplemented diet). Analyses by western blot of the brain tissues of the mothers, showed reduction in the CB1 receptor expression (CB1R) in the Cx of Dn3 group (0.45 ± 0.05, n=5) compared to Ct (0.69 ± 0.07, n=5, p=0.03). The CB2 receptor expression (CB2R) was increased in the Cx of Dn3 group (2.25 ± 0.29, n=6) vs. Ct group (1.50 ± 0.17, n=6, p=0.04) and vs. Sn3 group (1.11 ± 0.12, n=6, p=0.003). In the Hp, CB2R expression also increased in Dn3 group (1.75 ± 0.22, n=7) vs. Ct group (1.05 ± 0.1, n=7, p=0.02) and vs. Sn3 group (1.06 ± 0.1, n=7, p=0.01). We also found a reduction in CB1R expression in neonates Hp of Dn3 group (0.29 ± 0.02, n=5) vs. Ct (0.52 ± 0.05, n=5, p=0.03) and vs. Sn3 group (0.60 ± 0.09, n=5, p=0.009). No difference was found in CB2R expression in Cx or Hp of neonates. In addition, PKA phosphorylation (pPKA) was increased in neonates Cx in Sn3 group (0.70 ± 0.08, n=5) vs. Ct (0.20 ± 0.02, n=5, p=0.0004) and vs. Dn3 group (0.32 ± 0.06, n=5, p=0.003). On the other hand, pPKA was reduced in neonates Hp of Dn3 group (0.18 ± 0.01, n=5) vs. Ct (0.33 ± 0.05, n=5, p=0.02) and vs. Sn3 (0.48 ± 0.11, n=5, p=0.04). Altogether, our findings suggest that the deficiency of n-3 might promote changes in CB1R and CB2R expression in both mothers and progeny. The alteration in pPKA expression in the progeny might be related with changes in signaling

pathways related to plasticity. More data are in progress to understand the influence of omega-3 fatty acids on the ECS during brain development.
Palavras-chaves: Ômega-3, Desenvolvimento, Sistema endocanabinoide
Agência Fomento: CNPq, INNT-INCT, CAPES

01.010 - OBESIDADE MATERNA INDUZIDA PELA REDUÇÃO DO TAMANHO DA NINHADA: PREJUÍZOS NO COMPORTAMENTO DA PROLE

MATERNAL OBESITY INDUCED BY LITTER SIZE REDUCTION: IMPAIRS ON OFFSPRING BEHAVIOR
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Introdução:
Maternal obesity can lead to impairments in neurodevelopment and behavior of their offspring and can be indicated as a cause of later psychiatric disorders, including autism, schizophrenia and cognitive disabilities.
Objetivos:
The objective of this study was to evaluate the effect of maternal obesity induced by litter size reduction on maternal and offspring behavior.
Métodos:
Maternal obesity induced by litter size reduction was evaluated in F1 (F1 generation), and behavioral consequences in offspring F2 (F2 generation). We used pregnant female Wistar rats (F0 dams) and on the day after birth (PND1) the litters F1, were divided into two experimental groups (n=8 per group): normal litter (NL) with 12 pups (6 males and 6 females) and reduced litter (RL) with 4 pups (2 males and 2 females) per mother. The offsprings were weighed weekly until PND56. The females of these litters F1 were placed to mate at PND56, their litters F2 were normalized into 6 females and 6 males at PND1 and the consequences of maternal obesity on maternal and offspring behavior were evaluated. Maternal behavior (MB) was assessed from the 2nd to the 8th lactation day. The offsprings were evaluated in the following tests (n = 8 per group): quantification of ultrasonic vocalizations (USV; PND5) and homing behavior (HB; PND13). In adolescence (PND 28-32): light-dark (LD), play behavior (PB) and forced swimming (FS) tests. To avoid the litter effect, one couple (one male and one female rat) from each litter were used only once for each test. All experimental procedures were approved by CEUA (protocol 09/2019).
Resultados e Conclusões:
The litter size reduction in F1 led to maternal obesity as demonstrated by weight gain (PND8: 15.49±0.33 to 21±0.16g, $p < 0.001$) that remained until PND56 (178.3±3.23 to 198.2±1.31, $p < 0.001$) when compared to F1-NL group. Maternal obesity did not affect maternal behavior (72.17±3.40 vs 67.88±2.29%, $p > 0.05$) when compared to the F1-NL group. Offspring F2-RL group had a reduction in the number of USV (male: 122.1±12.72 to 38.9±9.28, $p < 0.001$; female: 96.8±18.23 to 26.3±6.37, $p < 0.01$) and in the time spent in nest bedding area in HB test (male: 114.8±7.19 to 27.7±10.55s, $p < 0.001$; female: 106.6±11.99 to 60.3± 5.13s, $p < 0.01$) when compared to F2-NL group. During adolescence, F2-RL group showed a reduction in play time in PB test (male: 234.9±9.69 to 139±16.73s, $p < 0.001$; female: 179.6±8.75 to 112.0±13.77s, $p < 0.001$), an increase in immobility time during FS test (male: 74.5±8.66, to 155.1±12.9s, $p < 0.001$; female: 85.83±5.28 to 156±14.51, $p < 0.01$) and an increase in permanence on the dark side in the LD test (male: 208.5±9.41 to 246.6±12.86s, $p < 0.05$: female: 170.8±6.77 to 243.3±9.13s, $p < 0.001$) when compared to F2-NL group. Obesity induced by litter size reduction has caused impairments in communication, olfactory discrimination and socialization. In addition, the offspring demonstrated depressive and anxious-like behavior.
Palavras-chaves: litter size reduction, maternal obesity, offspring behavior
Agência Fomento: Capes, Fapemig, CNPq

02. Sinaptogênese e Fatores Tróficos

02.001 - O PAPEL DA SINALIZAÇÃO PGC-1α/UCP2 NOS EFEITOS BENÉFICOS DO EXERCÍCIO FÍSICO NO CÉREBRO

THE ROLE OF PGC-1α/UCP2 SIGNALING IN THE BENEFICIAL EFFECTS OF PHYSICAL EXERCISE ON THE BRAIN
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Introdução:

Regulation of mitochondrial energetic metabolism is related to pathology of several neurological diseases, such as Parkinson's and Alzheimer's disease. Peroxisome proliferator-activated receptor-gamma (PPAR- γ) coactivator 1 alpha (PGC-1 α) / fibronectin type III domain containing protein 5 (FNDC5) regulates central mechanisms, such as brain derived neurotrophic factor (BDNF) expression and neuronal uncoupling mitochondrial proteins. FNDC5/irisin is a released myokine during muscle contraction that acts as potential molecular mechanisms for adaptations to exercise. Moreover, the exercise-induced expression of neuronal UCP facilitates the influx of protons into the internal mitochondrial membrane, decreasing oxidative stress.
Objetivos:
We summarize recent evidence of the role of PGC-1 α/UCP pathway in the benefits of physical exercise on the CNS.
Métodos:
This systematic review included 60 articles published from 1994 to 2018. The following keywords were used in Pubmed database: exercise, mitochondrial uncoupling proteins, UCP, irisin, FNDC5, neurogenesis, neuroprotection. In addition, a manual review of the references of the included articles was carried out in order to include a potential unidentified study in the initial searches.
Resultados e Conclusões:
Animal models have demonstrated that exercise improves brain energy metabolism and has an antidepressant, anxiolytic, antioxidant and neuroprotective effect. The beneficial effects of exercise seem to depend on cross talking between muscles and CNS through the exercise-induced release of irisin, which circulates in the blood until reaching target tissues, such as brain. Moreover, FNDC5/irisin is a potential neurotrophin that promotes neuronal development and differentiation. Mitochondrial decoupling proteins in response to exercise confer neuroprotection against physiological processes and pathological mechanisms in neurodegenerative diseases involving mitochondrial dysfunction and chronic oxidative stress. PGC-1 α/UCP pathway is involved in the benefits of regular physical exercise on the CNS, increasing the resistance to neurodegeneration and promoting neuroplasticity.
Palavras-chaves: Exercise, Irisin, Mitochondrial Uncoupling Proteins, Neuroprotection, Central Nervous System
Agência Fomento: CNPq e FAPESC

04. Células-Tronco: Lesões do Sistema Nervoso e Reparo

04.001 - PRÉ-CONDICIONAMENTO DE CÉLULAS ESTROMAIS MESENQUIMAIS DERIVADAS DE MEDULA ÓSSEA DE RATOS COM AGONISTAS DE RECEPTOR TOLL-LIKE.

PRECONDITIONING OF RAT BONE MARROW-DERIVED MESENCHYMAL STROMAL CELLS WITH TOLL-LIKE RECEPTOR AGONISTS.
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Introdução:
Bone marrow-derived mesenchymal stromal cells (BM-MSCs) are dynamic cells that can sense the environment, adapting their regulatory functions to different conditions. Accordingly, the therapeutic potential of BM-MSCs can be modulated by preconditioning strategies aimed at modifying their paracrine action. Although rat BM-MSCs (rBM-MSCs) have been widely tested in preclinical research, most preconditioning studies have used human and mouse BM-MSCs.
Objetivos:
The aim of this study is to observe whether rBM-MSCs modify their phenotype and paracrine functions in response to Toll-like receptor(TLR) agonists.
Métodos:
Cells were preconditioned as the protocol described by Waterman et al (PloS one,5:e10088, 2010). rBM-MSCs were stimulated for 1h with either lipopolysaccharide (LPS) or high-molecular-weight polyinosinic-polycytidylic acid (Poly(I:C)) diluted in maintenance medium. The immunophenotype of rBM-MSCs was evaluated by flow cytometry.The morphological

analysis of rBM-MSCs was performed through immunostaining with phalloidin and DAPI. Cell viability was analyzed by LIVE/DEAD and Magnetic Luminex Screening assay was performed to analyze levels of interferon (IFN)- γ,some interleukins, tumor necrosis factor (TNF)- α and vascular endothelial growth factor(VEGF). Levels of VEGF and monocyte chemoattractant protein-1(MCP-1) were analyzed with the Milliplex MAP Rat Cytokine/Chemokine Magnetic Bead Panel. Axitinib, a VEGFR inhibitor, was used to determine the effect of MSCs-derived VEGF on Dorsal Root Ganglia (DRG) neurite outgrowth. We observed reconnection of both distal and proximal stumps to the ends of a silicone tube after nerve transection. Inside the tube were injected rBM-MSCs (preconditioned or not). Then, rats were perfused, longitudinal sections of sciatic nerve were obtained and labeled for Tuj1 marker. (CEUAs: 175-18; 092-16)
Resultados e Conclusões:
The data showed that rBM-MSCs expressed TLR3, TLR4 and Melanoma Differentiation-Associated protein 5(MDA5) mRNA and were able to internalize Poly(I:C), a TLR3/MDA5 agonist. LPS or Poly(I:C) stimulation did not affect the viability or the morphology of rBM-MSCs, and did not modify the expression pattern of key cell-surface markers. Poly(I:C) did not induce statistically significant changes in the release of several inflammatory mediators and VEGF by rBM-MSCs, although it tended to increase IL-6 and MCP-1 secretion; whereas LPS increased the release of IL-6, MCP-1 and VEGF, 3 factors that were constitutively secreted by unstimulated cells. The DRG culture showed that soluble factors produced by unstimulated and LPS-preconditioned rBM-MSCs can stimulate neurite outgrowth similarly, in a VEGF-dependent manner. LPS-preconditioned cells, however, were slightly more efficient in increasing the number of regrowing axons in a model of sciatic nerve transection in rats. In conclusion, LPS preconditioning boosted the production of constitutively secreted factors by rBM-MSCs, without changing their mesenchymal identity, an effect that requires further investigation in exploratory preclinical studies.
Palavras-chaves: Ação parácrina, Agonista de receptor Toll-like, Células estromais mesenquimais, Regeneração, Sistema Nervoso Periférico
Agência Fomento: FAPERJ, CNPq e CAPES

04.002 - UM ESTUDO SOBRE A MODULAÇÃO DA ATIVIDADE SECRETÓRIA DE CÉLULAS ESTROMAIS MESENQUIMAIS EXPOSTAS A SEGMENTOS DE TECIDO NEURAL

A STUDY ON THE MODULATION OF MESENCHYMAL STROMAL CELLS SECRETORY ACTIVITY EXPOSED TO NEURAL TISSUE SEGMENTS
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Introdução:
Bone marrow-derived mesenchymal stromal stem cells (BM-MSC) exert regenerative potential due to their paracrine activity and the modulation of the microenvironment of injured tissues. This activity occurs due to the capacity of these stem cells to release soluble factors with trophic activity. Studies have revealed the potential of the BM-MSC to the regeneration of Peripheral Nervous System (PNS), but there are still gaps regarding the behavior of MSCs in the injured tissue microenviroment.
Objetivos:
The aim of this study was to analyze the balance of trophic activity BM-MSCs through indirect co-culture with different neural tissue explants.
Métodos:
BM-MSCs were obtained from the bone marrow of Wistar rats (CEUA: 092-16) and characterized by their morphology and CD90 marker. The indirect co- culture of BM-MSCs was performed under different conditions with fragments of the following explants: skin, sciatic nerve, cerebral cortex and spinal cord, during 48 hours. The conditioned medium of the co-cultured BM-MSCs was collected and analyzed by Enzyme-Linked Immunosorbent Assay (ELISA). The proliferation and cell characterization markers of the BM-MSCs were also assessed as well as the viability of these cells using the LIVE/DEAD assay.
Resultados e Conclusões:
BM-MSCs in indirect co-culture showed no significant difference in cell viability; however, the morphology of cells in co-culture with spinal cord fragments has been altered. The BM-MSCs density increased when exposed to fragments of the spinal cord, and decreased when exposed to fragments of cerebral cortex, in comparison to the control condition. Fluorescence intensity was inversely correlated to the pattern observed for cell density. Cell proliferation of BM- MSCs, evaluated by immunocytochemistry, also showed no significant

difference in the conditions when compared to the control. The conditioned medium evaluated for the presence of VEGF (Vascular Endothelial Growth Factor) showed no significant difference between the groups, but there was a light increase of VEGF-A protein levels when BM-MSCs were co-cultured with Central Nervous System (CNS) tissues. BM-MSCs exposed to tissue fragments of the CNS showed changes in their morphology as well as VEGF-A expression, indicating that the interaction with these tissues may be modulating the behavior of MSCs.
Palavras-chaves: célula estromal mesenquimal, secretoma, sistema nervoso
Agência Fomento: CNPq

04.003 - PRODUÇÃO E CARACTERIZAÇÃO DE ORGANOIDES CEREBRAIS DE PACIENTES COM TRANSTORNO DEPRESSIVO MAIOR

PRODUCTION AND CHARACTERIZATION OF CEREBRAL ORGANOIDS FROM MAJOR DEPRESSIVE DISORDER PATIENTS
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Introdução:
Major Depressive Disorder (MDD) is a psychiatric condition of high prevalence that results in substantial personal suffering, disability and social costs. The main treatments for MDD are the use of antidepressant drugs that act over serotonin neurotransmitter and the transcranial direct current stimulation (tDCS). Experimental in vitro models to study the molecular mechanisms of MDD and differential drug response are lacking. Thus, the objective of this study was the production of cerebral organoids from induced pluripotent stem cells (iPSCs) derived from MDD patients, as a 3D model aiming to allow a better elucidation of the mechanisms underlying the disease.
Objetivos:
Our aim was the production and characterization of cerebral organoids from induced pluripotent stem cells (iPSCs) derived from MDD patients.
Métodos:
The project was approved by Ethics Committee Register CEP-HU/USP: 976/10 – SISNEP CAAE 0003.0.198.000-10. Five iPSCs cell lines (iPS32, 33, 34, 49, 50), derived from patients of the Escitalopram vs. Electrical Current Therapy for Treating Depression Clinical Study (which ranged from 18 to 75 years), were differentiated into cerebral organoids and characterized morphologically by immunofluorescence.
Resultados e Conclusões:
Of the 5 iPSCs lines that passed through the differentiation process into cerebral organoids, only one reached the end of the process (iPS50), while the other four could not be differentiated. iPS50 showed positive labeling for Sox2 and Class III β-Tubulin (Tuj1). Sox2, a stem cell marker, was located on subventricular zone and Tuj1, a neuron-specific marker, was located at cortical plate, indicating that the cytoarchitecture of the cerebral organoids had a correct development. In conclusion, we were able to produce cerebral organoids from MDD patients, however more tests need to be done in order to improve the technique and make it more reproducible.
Palavras-chaves: cerebral organoids, induced pluripotent stem cells, major depressive disorder
Agência Fomento: Fundação de Amparo à Pesquisa do Estado de São Paulo (FAPESP) Conselho Nacional de Desenvolvimento Científico e Tecnológico (CNPq)

04.004 - TERAPIA COM CÉLULAS-TRONCO MESENQUIMAIS PROTEGE A BARREIRA HEMATOENCEFÁLICA, REDUZ ASTROGLIOSE E PREVINE OS DANOS COGNITIVO E COMPORTAMENTAL EM MODELO EXPERIMENTAL DE SEPSE.

MESENCHYMAL STROMAL CELLS PROTECT BLOOD-BRAIN BARRIER, REDUCE ASTROGLIOSIS AND PREVENT COGNITIVE AND BEHAVIORAL DAMAGE IN EXPERIMENTAL SEPSIS
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Introdução:
Sobreviventes da sepse frequentemente apresentam danos cognitivos e comportamentais. Essas complicações podem ocorrer devido a uma resolução inadequada da resposta inflamatória e da encefalopatia associada a sepse (EAS). Até o presente momento não existem tratamentos para os danos neurológicos provenientes da EAS, logo, a investigação de novas terapias se faz necessária.
Objetivos:
O objetivo do presente estudo foi avaliar os efeitos da terapia com células-tronco mesenquimais (CTM) na integridade da barreira hematoencefálica (BHE), na ativação astrocitária e nos danos cognitivo e comportamental em modelo experimental de sepse.
Métodos:
O presente estudo foi aprovado pelo Comitê de Ética do Instituto Oswaldro Cruz, Fiocruz (CEUA-IOC L-012/2015). Para tal, utilizou-se camundongos adultos Swiss Webster submetidos a cirurgia de perfuração e ligadura do ceco (CLP) para indução da sepse e animais Sham (falso operado) como controle. Após a cirurgia, todos os animais receberam reposição volêmica (1ml de salina, via subcutânea) e antibioticoterapia (meropenem 10 mg/kg, via intraperitoneal, 6, 24 e 48h). Seis horas após a cirurgia, os animais receberam, por via intravenosa, CTM (1×105 células em 0.05 mL salina) ou salina (SAL, 0.05 mL)
Resultados e Conclusões:
Vinte e quatro horas após a cirurgia, os animais CLP+SAL apresentaram aumento do escore clínico (Média±EPM; 9,8±0,61) e níveis plasmáticos de interleucina (IL)-1 β, IL-6, e MCP-1 (13,04±3,10, 91,78±24,61, 375,60±87,68, respectivamente) comparado ao grupo Sham (1,00±0,16, 3,20±0,57, 9,26±2,41, 12,19±1,39, respectivamente). Apesar da terapia celular não alterar o escore clínico e a taxa de sobrevivência, houve redução dos níveis sistêmicos de IL-1 β, IL-6, e MCP-1 (5,67±0,80, 56,09±13,82, 98,64±16,37, respectivamente). Em 72h após a cirurgia, o tratamento com CTM protegeu a integridade da BHE (CLP+SAL v.s. CLP+CTM, 1,36±0,02 v.s. 1,06±0,07) e reduziu a astrogliose (CLP+SAL v.s. CLP+CTM, 3374±717,6 v.s. 1121±133,7). Tais resultados podem ser associados com a melhora nas memórias espacial (avaliada pelo teste do Labirinto aquático de Morris) e aversiva (teste de medo condicionado) e no comportamento do tipo ansioso (avaliado pelo teste do Labirinto em cruz elevado) no dia 15 (CLP+SAL v.s. CLP+CTM, 3,15±0,36 v.s. 5,10±0,55, 87,00±12,05 v.s. 121,8±7,67, 64,50±13,40 v.s. 28,85±6,78, respectivamente). Dessa forma, a terapia com dose única de CTM levou à melhora na inflamação sistêmica e no dano cognitivo, protegeu a BHE e reduziu a astrogliose.
Palavras-chaves: Sepse, Encefalopatia, Terapia celular, Célula tronco mesenquimal
Agência Fomento: CAPES, CNPq, FAPERJ

07. Transmissão Sináptica e Transdução De Sinal

07.001 - EXPOSIÇÃO AGUDA À NICOTINA REDUZ PERFIL DE CAPTAÇÃO DE GABA EM RETINAS DE EMBRIÕES DE GALINHA DURANTE O DESENVOLVIMENTO

ACUTE EXPOSURE TO NICOTINE REDUCED GABA UPTAKE PROFILE IN CHICKEN EMBRYOS RETINA DURING DEVELOPMENT
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Introdução:
Nicotine (NIC) is the main psychoactive component of cigarette smoking, and its mechanism of action is the activation of nicotinic acetylcholine receptors (AChR). During retinal development, these receptors are usually expressed in the retinal layers and interact with GABAergic pathway.
Objetivos:
The aim is to evaluate if an acute stimulation of AChR is able to modulate [3H]-GABA uptake in chicken embryos retinas staged E11.
Métodos:
In the evaluated results, so far, 31 animals were used (62 retinas). Retinas were dissected and [3H]-GABA uptake was performed for 60’ in control group, exposed only to saline (Hanks 4). In treated group, NIC in different concentrations (10, 50 and 100 µM) was added 30’ before [3H]-GABA uptake assay. The groups treated with NO-711 (GAT-1 antagonist/GABA uptake inhibitor) 50 µM, Eserine (acetylcholinesterase inhibitor) 100 µM or Acetylcholine (ACh) 100 µM, were

pre-incubated 30' before [3H]-GABA uptake. For the time curve, [3H]-GABA uptake was performed in 1', 5', 10', 30' and 60'. One-way ANOVA followed by Bonferroni post-test were performed for results with 3 or more groups and unpaired t-test for results with 2 groups. The results were expressed as mean±SEM. Statistical significance was achieved at $p < 0.05$. The project was approved in CEUA#IBCCF038/19.

Resultados e Conclusões:

We observed that in the absence of Na+ ions, low temperature (4ºC) or in the presence of NO-711 50 µM, [3H]-GABA uptake was completely blocked (Ctrl=175 ± 19; without Na+=26 ± 2; 4ºC=20 ± 6; NO-711=53 ± 3; (fmol/mg/hour), $p < 0.05$, n=4). We observed that after 30', the time curve reached an equilibrium of GABA uptake (1'=8 ± 8; 5'=35 ± 7; 10'=58 ± 2; 30'=179 ± 22; 60'=165 ± 24; (fmol/mg/hour), $p < 0.05$, n=3). Further, we analyzed GABA uptake in the presence of NIC (10, 50 and 100 µM), Eserine and ACh. We observed that NIC 50 µM was able to inhibited 40 % of [3H]-GABA uptake (Ctrl=237 ± 25; NIC 10 µM=245 ± 18; NIC 50 µM=141 ± 15; NIC 100 µM=226 ± 20; (fmol/mg/hour), $p < 0.05$, n=4). Eserine 100 µM also reduced 30 % of [3H]-GABA uptake, (Ctrl=253 ± 27; Eserine 100 µM=165 ± 19; (fmol/mg/hour), $p < 0.05$, n=3). Surprisingly, ACh 100 µM enhanced 70 % of [3H]-GABA uptake (Ctrl=253 ± 27; ACh 100 µM=433 ± 27 (fmol/mg/hour), $p < 0.05$, n=4). We conclude that GABA uptake is mediated by GAT-1 and this transporter can be modulated by nicotinic receptors. However, we also identified that ACh is able to increase GABA uptake levels, opposed to our NIC findings, leading to a possible activation of muscarinic receptors instead, which might also be able to modulate GAT-1 activity.

Palavras-chaves: GABA, Nicotine, Retina

Agência Fomento: CAPES e Proppi-UFF

07.002 - EXPOSIÇÃO POR 5 DIAS DE CAFEÍNA MODULA O TRANSPORTE DE AMINOÁCIDOS EXCITATÓRIOS NO HIPOCAMPO DE CAMUNDONGOS ADOLESCENTES

FIVE-DAY EXPOSURE TO CAFFEINE MODULATES EXCITATORY AMINO ACID TRANSPORT IN THE HIPPOCAMPUS OF ADOLESCENT MICE

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Introdução:

Caffeine (CAF) acts as a non-selective antagonist of adenosine A1 (A1R) and A2A (A2AR) receptors, widely distributed throughout the central nervous system (CNS), interacting with various neurotransmitter systems, including the glutamatergic system. Glutamate, the main excitatory amino acid, plays a fundamental role in the hippocampus, acting in the learning and memory processes, where its receptors (NMDA and AMPA) and its transporters (EAATs) have direct action on the modulation of these processes.

Objetivos:

To evaluate whether CAF is able to modulate the transport of excitatory amino acids in the hippocampus after five-day exposure and its withdrawal.

Métodos:

Male and female swiss mice, aged between 35 and 40 days postnatal, are injected subcutaneously once for five days, with 10, 20 and 40 mg/Kg of CAF or vehicle. The experimental groups are divided into four groups: Group 1 (1h treatment = G1); Group 2 (120h of treatment = G2); Group 3 (120h treatment + 120h withdrawal = G3); Group 4 (120 hours of treatment + 120 hours of withdrawal + 1 hour of treatment = G1 + G2 + G3). We analyze the uptake and release of [3H] - D-ASP from all groups. Univariate ANOVA followed by Bonferroni post-test were performed for results with 3 or more groups and unpaired t-test for results with 2 groups. The results were expressed as mean ± SEM. Statistical significance was achieved with $p < 0.05$. The project was approved in CEUA 968/2017.

Resultados e Conclusões:

Results: In relation to the uptake profile of [^{3}H]-D-ASP, we observed that there was no difference in comparison to the control in group 1 (basal = 100.0, CAF 10 mg/Kg = 90.50 ± 6.652, CAF 20 mg/Kg = 87.75 ± 3.881, CAF 40 mg/Kg = 91.50 ± 3.403, $p < 0.05$, n = 4); However, group 2 showed a decrease in this profile (basal = 100.0, CAF 10 mg/Kg = 85.00 ± 8.926, CAF 20 mg/Kg = 70.43 ± 6.301, CAF 40 mg/Kg = 68.75 ± 8.960, $p < 0.05$, n = 8), as in group 3 (basal = 100.0, CAF 10 mg/Kg = 87.40 ± 5.528, CAF 20 mg/Kg = 81.20 ± 6.857, and CAF 40 mg/Kg = 73.00 ± 6.675, $p < 0.05$, n = 12) and group 4 (basal = 100.0, CAF 20 mg/Kg = 88.33 ± 1.716, $p < 0.05$, n = 10). We also analyzed the release levels of [^{3}H]-D-ASP only at the dose of 20 mg/Kg in

group 2 (basal = 7.016 ± 1.311, CAF 20 mg/Kg = 5.362 ± 1.069, p < 0.05, n = 7) and in group 4 (basal = 9,450 ± 0,8549, CAF 20 mg/Kg = 3,717 ± 1,395, p < 0,05, n = 4), both of which presented reduction when compared to control. Conclusion: The excitatory amino acid uptake and release profiles in the hippocampus undergo caffeine modulation after exposure and withdrawal.
Palavras-chaves: Cafeína, Hipocampo, EAATs, Adolescência
Agência Fomento: FAPERJ, CNPq

07.003 - EXPOSIÇÃO MATERNA A HERBICIDA A BASE DE GLIFOSATO COMPROMETE O SISTEMA PURINÉRGICO E INDUZ DESEQUILÍBRIO REDOX NO HIPOTÁLAMO DE RATOS IMATUROS

MATERNAL EXPOSURE TO GLYPHOSATE-BASED HERBICIDE COMPROMISES THE PURINERGIC SYSTEM AND INDUCES REDOX IMBALANCE IN THE OFFSPRING HYPOTHALAMUS
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Introdução:
Since 2008, Brazil is the largest pesticide consumer worldwide. This leadership accounts for the contamination of water and food, which may have consequences for the environment and affect human health. The pesticide debate has been highlighted since the approval of Draft Bill 6299/02. The bill proposed new rules on the approval and use of new pesticides. Moreover, it leads to a systematic increase in the consumption of pesticides by the Brazilian population. In this context, research seeking to study the mechanisms involved in the pesticide toxicity became very important.
Objetivos:
The present study aim to determine the effects underlying the neurotoxicity induced by maternal exposure to glyphosate-based herbicide (HBG) during the gestation and lactation in the offspring hypothalamus.
Métodos:
Female Wistar rats were treated with glyphosate-based herbicide (0.36% glyphosate) in drinking water from gestation day 5 to lactation day 15 (GBH Group). Controls received only water during the same period (ethical approval CEUA/UFSC #8510150517). The hypothalamus of 15-day-old offspring were dissected to further analyze the generation of reactive oxygen species (ROS), nitrogen species (RNS), as well as the glutathione (GSH) content. Moreover, we determine the enzymatic activity of NTPDase and ecto-5'-nucleotidase, involved in the nucleotide hydrolysis. The assay was performed using ATP, ADP or AMP as substrate. Data were analyzed by unpaired t-test (n = 6) and differences were considered significant at P -value < 0.05.
Resultados e Conclusões:
Results showed increased ROS generation in the GBH group (9566 ± 1050), when compared to the control group (5921 ± 492.6), whereas the amount of RNS did not present statistical difference between the GBH group (30840 ± 3456) and the control group (26100 ± 2795). The GSH content was higher in the GBH group (62.00 ± 7.352 µmol/mg protein) then in the control group (33.07 ± 1.034 µmol/mg protein). In addition, the ATP and ADP hydrolysis were not altered by GBH treatment. However, the activity of ecto-5'nucleotidase was decreased in the GBH group (17.81 ± 0.7203 nmol Pi released/min/mg protein), when compared with the control one (22.25 ± 1.286 nmol Pi released/min/mg protein). The results suggest that HBG may affect the purinergic signaling, probably leading to decreased adenosine levels, since the ecto-5'-nucleotidase activity was decreased. This event might be involved in inflammatory processes that generate redox imbalance. As compensatory mechanism may increase the glutathione content.
Palavras-chaves: GLYPHOSATE-BASED HERBICIDE, PURINERGIC SYSTEM, REDOX IMBALANCE
Agência Fomento: CAPES, CNPq, FAPESC, UFSC

07.004 - O PAPEL DO PRANLUKAST NAS DISFUNÇÕES SINÁPTICAS INDUZIDAS EM UMA CONDIÇÃO INFLAMATÓRIA DESMIELINIZANTE

THE ROLE OF PRANLUKAST UPON SYNAPTIC DYSFUNCTIONS INDUCED IN A INFLAMMATORY DEMYELINATING CONDITION

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Introdução:

Multiple sclerosis (MS) is an autoimmune disease known to induce inflammation and demyelination of the CNS, that ultimately leads to neurodegeneration. Nevertheless, synaptic dysfunctions have been recognized as one of the first pathophysiological aspects of the disease, independently of demyelination occurrence. The pharmacological studies to treat MS have focused in the remyelinating and anti-inflammatory effects, being the synaptic impacts poor explored. In this context, pranlukast, an antagonist of Gpr17 receptor used against asthma, was also identified as able to induce remyelination in a model of MS, but its relevance on synapses alteration remains unknown.

Objetivos:

Therefore, our aim is to investigate the effect of pralunkast in synaptic changes of the visual cortex induced by a MS animal model.

Métodos:

For this, adult Swiss mice were fed with chow containing 0,2% cuprizone or control chow for 5 weeks. Furthermore, a third experimental group fed with cuprizone chow was simultaneously treated with an intraperitoneal injection of pranlukast (0.1mg / kg) during the same period. The validation of the cuprizone-induced demyelination in the visual cortex was verified by staining with luxol fast blue. Synaptic analysis was performed using immunostaining for PSD-95. Puncta number were obtained from 12-15 images of 4-5 animals and evaluated using NIH ImageJ Puncta Analyzer plug-ins.

Resultados e Conclusões:

Through luxol fast blue staining for myelin, we observed that control mice showed intense staining in all layers of the visual cortex, whereas those treated with cuprizone exhibited weak staining, validating the model. For statistical analysis, we used the one-way ANOVA test with Tukey´s multiple comparison post test, considering statistically significant $p \leq 0.05$. Our synapse data showed that animals treated with cuprizone exhibited an increased number (mean = 2.33; SD = 0.57) of PSD-95 immunolabeling puncta compared to the control group (mean = 1; SD = 0.22) , while those treated with both cuprizone and pranlukast had a partial recovery (mean = 1.42; SD = 0.25) of the levels of control animals (Control x Cuprizone, p=0.006; Control x Cuprizone+Pranlukast, p=0.226; Cuprizone x Cuprizone+Pralukast, p=0.029). Thus, our preliminary results indicate that pranlukast is able to restore, albeit partially, the synaptic changes promoted by inflammatory demyelination, although the mechanisms still need to be explored

Palavras-chaves: Desmielinização, Esclerose Múltipla, Pranlucaste

Agência Fomento:

09. Regulação Neuroendócrina e Autonômica

09.001 - EFEITOS DA ADMINISTRAÇÃO CRÔNICA DE ESTEROIDES ANABÓLICOS ANDROGÊNICOS DERIVADOS DA TESTOSTERONA EM RATOS MACHOS ADULTOS

EFFECTS OF CHRONIC ADMINISTRATION OF TESTOSTERONE-DERIVED ANABOLIC ANDROGENIC STEROIDS IN ADULT MALE RATS

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Introdução:

Anabolic androgenic steroids (AAS) are a family of synthetic hormones derived from testosterone that have anabolic and androgenic properties that are associated with abusive use. This phenomenon may lead to psychopathology due to neuroendocrine modulation

Objetivos:

The aim of this study was to evaluate the effects of chronic administration of AAS in adult male Wistar rats

Métodos:

Thus, 28 male Wistar rats with 7-week-old (CEUA 7338220818) were used. Half animals were submitted to bilateral orchiectomy and 14 days after surgery, they were daily-received testosterone esters (TST) during the subsequent 4 weeks (durateston®, 5 mg/kg/day in peanut oil). The groups were: 1) not castrated animals (NC), which received vehicle; 2) castrated animals (C),

which received vehicle; 3) NC+TST; 4) C+TST. All animals were observed for monitoring of body weight changes and submitted to behavioral tests in the last 5 days: elevated plus maze (EPM), open field (OF), object recognition (OR) and agonistic behavior test (ABT) for exploratory behavior analysis, anxiety-like behavior, cognitive and aggressive behavior. At the end of treatment, the animals were euthanized and blood samples were collected for biochemical analysis. Statistical analysis was performed through analysis of variance (ANOVA) one criterion or two criteria, followed by Tukey post-test
Resultados e Conclusões:
The body weight gain of TST deprived animals (C group) was lower when compared to the other groups with exception of the uncastrated group (C: 89.6 ±28.2g; NC+TST: 105.1 ±27.7g; C+TST: 107.4 ±34.8g; $p < 0.05$). The exploratory behavior analysis showed a greater distance covered by the animals NC+TST in EPM compared to groups without TST (NC: 6.3 ±2.8m; C: 8.8 ±2.0m; NC+TST: 12.3 ±2.6m; $p < 0.05$), as well as longer percentage of time spent in the open arm compared to NC group (NC: 14.8 ±13.2%; NC+TST: 38.4 ±13.3%; $p < 0.01$). The OR test demonstrated that animals with TST supplementation recognize the new object faster than deprived animals (C: 31.8 ± 14.1s; NC+TST: 16.6 ± 8.0s; $p < 0.05$). The OF and ABT tests did not present significant differences between the groups. In the biochemical analysis, animals in TST deprivation had lower levels of triglycerides than supplemented animals (C: 152.3 ±28.8 mg/dL; NC+TST: 272.6 ±52.2 mg/dL; $p < 0.05$), but a higher level of cholesterol compared to NC and C+TST groups (NC: 64.4 ±15.1 mg/dL; C: 85.8 ±10.2 mg/dL; C+TST: 61.9 ±8.1 mg/dL; $p < 0.01$). In addition, CK-MB levels showed lower values in castrated animals compared to not castrated animals (NC: 1182.0 ±521.0 UI/L vs C: 829.5 ±276.6 UI/L and NC+TST: 1224.0 ±462.0 UI/L vs C+TST: 498.3 ±168.1 UI/L; $p < 0.05$). In summary, our findings reveal that TST supplementation may result in greater exploratory and cognitive behavior, but not accompanied by greater aggressiveness. On the other hand, TST deprivation may be associated with lower weight gain, hypercholesterolemia and lower muscle injury
Palavras-chaves: Testosterona, Ésteres andrógenos, Regulação endócrina
Agência Fomento:

09.002 - AMPA RECEPTORS PHOSPHORYLATION STATE AT THE HUMAN LIMBIC SYSTEM IS ASSOCIATED TO CARDIAC AUTONOMIC TONE

AMPA RECEPTORS PHOSPHORYLATION STATE AT THE HUMAN LIMBIC SYSTEM IS ASSOCIATED TO CARDIAC AUTONOMIC TONE
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Introdução:
The central autonomic network regulates the sympathetic and parasympathetic axis to promote visceral, neuroendocrine, and behavioral manifestations in emotional responses due to sharing common structures with the limbic system (i.e. amygdala). Patients with emotional disorders may show decreased resting parasympathetic tone accessed by heart rate variability (HRV), but the neural plasticity changes in the limbic system associated with this cardiac autonomic dysregulation are unknown. The phosphorylation levels at the Serine 831 (P-GluA1-Ser831) and 845 (P-GluA1-Ser845) sites of the GluA1 subunit of the AMPA receptor are well established biochemical markers of synaptic plasticity measurable by Western Blot (WB) but require fresh brain tissue. Anterior temporal lobectomy (ATL) is a well-established surgical procedure to treat drug-resistant epilepsy patients. Brain tissue obtained during ATL provides a unique opportunity to investigate synaptic plasticity mechanisms involving protein phosphorylation in the human limbic structures.
Objetivos:
Evaluate the association between levels of the GluA1 subunit and its phosphorylation state in the limbic system structures and resting cardiac autonomic tone.
Métodos:
The electrocardiogram was measured in eighteen patients with drug-resistant mesial temporal lobe epilepsy (MTLE) during the morning after the first night of sleep at the hospital. The following HRV indices were used to evaluate cardiac autonomic tone: a) SDNN; b)

rMSSD and c) HF. The brain tissue resected during the ATL (amygdala, AMY; anterior hippocampus, aHIP) was used to evaluate the levels of P-GluA1-Ser845 and P-GluA1-Ser831 by WB. A backward multiple linear regression model was performed to evaluate the association between the P-GluA1-Ser831 and P-GluA1-Ser845 levels in the AMY, aHIP and each HRV index variation independently on the confounding factors such as sociodemographic, clinical, anesthetic, and neurosurgical variables.
Resultados e Conclusões:
The P-GluA1-Ser845 levels in the AMY or aHIP alone explain 23 to 38 percent of the HRV indices variation (R2 from 0.23 to 0.38, $p < 0.05$). The observed association remains significant and independently on all the controlled confounding factors. As showed by the multiple linear regression model, taken together with disease duration, the levels of P-GluA1-Ser845 in AMY or aHIP explained 44 to 54 percent (R2 from 0.44 to 0.54, $p < 0.01$). Both variables show a negative association to cardiac autonomic tone. The P-GluA1-Ser845 levels in AMY or aHIP are independently associated with resting HRV in MTLE patients. This result suggests that the increase of synaptic efficiency in AMY and aHIP contributes to the cardiac autonomic tone impairment, supporting that neuroplasticity mechanisms in the limbic system are associated with autonomic regulation in normal or pathological physiology. Also, this work provides insights into the bed to bench approach to integrate basic and clinical research methods.
Palavras-chaves: Human Limbic System, Synaptic Plasticity, Heart Rate Variability, AMPA Receptors, Cardiac Autonomic Tone
Agência Fomento: FAPESC; CNPq; CAPES

11. Sistemas Sensoriais

11.001 - O TRATAMENTO LOCAL COM EXTRATO DE AÇAI MELHORA A HISTOPATOLOGIA E A RESPOSTA MOTORA SEM INFLUENCIAR A MELHORA SENSORIAL EM MODELO DE TENDINOPATIA.

LOCAL TREATMENT WITH AÇAI EXTRACT IMPROVES HISTOPATHOLOGY AND MOTOR RESPONSE WITHOUT INFLUENCING SENSORIAL IMPROVEMENT IN TENDINOPATHY MODEL.
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Introdução:
Açai extract (AE) presents therapeutic potential in anti-oxidant and anti-inflammatory pharmacological approaches. In the acute phase of tendon lesion, histopathological changes, locomotor and sensorial impairment are reported, however the effect of AE on the histopathological and functional aspects is not yet well established.
Objetivos:
The aim of this work was to evaluate the effects of raw AE administered in the acute phase of Achilles tendon traumatic injury on histopathological, sensorial and motor aspects.
Métodos:
To this, 12 male rats (Wistar, ± 200 g) were divided into control group (CTRL), saline (SAL), 75 µg/mL açai (TIA75) and 175 µg/mL açai (TIA175). CTRL did not undergo intervention, while SAL and TIA underwent total rupture of the right calcaneus tendon followed by suturing and subsequent intra-tendinous injection of saline (0.9% NaCl) or açai brut extract on the aforementioned concentrations on 2, 4 and 6 days post-injury (dpi). Von Frey (VF) test was performed on days 0,1 and 7 and evaluated the nociceptive sensitivity with the use of monofilaments of different sizes. Impressions of the animal footprint were evaluated to analyze the locomotor response before (day 0) and after (days 1 and 7) the injury. After 7 dpi, the tendons were dissected, cut at 10 µm and stained with hematoxylin and eosin (HE) and DAPI for nuclear labeling. The histopathological score was analyzed by a validated classification system, composed of six parameters and quantified using a scale of 0-3 points. Photomicrographs were obtained by bright field and fluorescence microscopy. Data are presented as mean ± standard deviation and the statistical analysis was done using Kruskal-Wallis test. $P \leq 0.05$ was considered significant. (CEUA/UFPA nº 9162230518).
Resultados e Conclusões:
VF analysis showed a decrease in the paw withdrawal threshold for nociceptive sensitivity at day 1 for SAL, TIA75 and TIA175 (SAL 0.17 g ± 0.06; TIA75 0.86 g ± 0.04; TIA175 0.83 g ± 1.06; $P = 0.025$) compared to CTRL (CTRL 4.4 g ± 3.2). On the 7th day of treatment there was no significant improvement in sensitivity. Footprint impression on the 7th day suggests improvement of the locomotor pattern, evidencing better weight discharge. Total score of the

histopathological scale showed a histological improvement only for the TIA175 group in relation to SAL (TIA175 7.4 ± 1.6 vs. SAL 16.9 ± 1.1; p > 0.001). The histological score for fiber structure, nuclear roundness and inflammation were significantly lower for the TIA175 group when compared to the SAL group (TIA175 7.4 ± 1.6; 1 ± 0.4; 0.6 ± 0.6; e SAL 3 ± 0; 3 ± 0; 2.9 ± 0.3, respectively; p > 0.001). There was an increase in cell density in all groups treated with respect to CTRL (SAL 3 ± 0; TIA75 3 ± 0; TIA175 3 ± 0 vs. CTRL 0 ± 0; p < 0,001). Treatment with AE at high concentrations improves the locomotor pattern and histopathological aspects, however it is not potentially able to improve sensory response and cell density in the acute phase of tendinous lesions in rats.
Palavras-chaves: AÇAI EXTRACT, SENSORIAL, HISTOPATHOLOGY, TENDINOPATHY
Agência Fomento: PROPESP

11.002 - MODULAÇÃO DA ATIVIDADE OSCILATÓRIA CORTICAL DURANTE JULGAMENTOS DE CAUSALIDADE

MODULATION OF THE CORTICAL OSCILLATORY ACTIVITY DURING CAUSALITY JUDGMENTS
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Introdução:
When two discs collide and a delay is inserted before the movement of the second disc, sensation of causality tends to diminish as a function of the delay. It has been shown that the phase of alpha oscillations prior to the collision on fronto-central electrodes of the electroencephalogram (EEG) can explain the variability of causality judgements (Cravo et al, J Cogn Neurosci, 27:1887, 2015).
Objetivos:
To access the specificity and the causal role of alpha on participant's behaviour we redesigned this paradigm combined with Amplitude Modulated Transcranial Alternate Current Stimulation (AM-TACS).
Métodos:
In different blocks, stimulation in frequencies of 6.8Hz (theta), 10Hz (alpha), 16.4Hz (beta) or SHAM, carried by a 1kHz wave was applied over the scalp of 80 participants (33 men; mean age 24±4 years, approved by the University of Birmingham Research Ethics Committee, ERN_15–0335A). Resting state eyes-open EEG was taken for two minutes prior and after each block. We sorted the trials in 36 consecutive bins based on the phase of stimulation at the moment of collision and fitted a logistic function on the mean answers for each delay to acquire causality threshold (CT) - delay in which half of the answers were non-causal - for each bin. We used a circular-linear regression to obtain the Beta preferred index (Bpref) as a proxy for the contribution of phase to CTs. Eleven participants were excluded based on the inability to perform the task.
Resultados e Conclusões:
A repeated measures ANOVA revealed no statistically significant differences between Bpref for theta (0.0139±0.0153), alpha (0.0152±0.0135) or beta (0.0134±0.0175) stimulations ($F(2,136) = 0.445$, $p = 0.622$). We repeated this procedure 1000 times after shuffling the phase of stimulation to create a null distribution of Bpref. The real Bpref fell within the mean of the null distributions (p-values = 0.597, 0.724, 0.705 for theta, alpha and beta conditions, respectively), indicating a lack of effect of stimulation. We also compared the frequency distribution of the resting state EEG between conditions and baseline. No evidence of stimulation effects was found on the EEG. We conclude that AM-TACS has limitations when used in spite of individual variability to affect cortical oscillations.
Palavras-chaves: Causality, Perception, TACS, Timing
Agência Fomento: FAPESP (2016/20042-8, 2017/26235-5)

11.003 - ESTUDO DA ARQUITETURA CORTICAL DO CÉREBRO DO MACACO-PREGO (SAPAJUS LIBIDINOSUS)

STUDY OF THE CORTICAL ARCHITECTURE OF THE CAPUCHIN MONKEY BRAIN (SAPAJUS LIBIDINOSUS)
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Introdução:
There is a putative relation between lateralized behavioral variations and neuroanatomical asymmetries among the several primate species. In comparison with other Old World primates, the Sapajus genus presents functional and morphological cortical asymmetry, and such factors are associated

with primate-originated evolutionary convergence aspects. They present high cognition and memory, have large social tolerance and use tools for many tasks, similar to apes. Nevertheless, there are many unclear neurophysiological and behavioral aspects were not discovery to justify the observed cognitive aspects in Sapajus, i.e., the neural subtract under the unexpected behavior these primates.
Objetivos:
The objective this work was to study the structural architecture of the neocortex of Sapajus and to compare with other human and no human primates from literature data, in qualitative terms.
Métodos:
Two adult specimens of Sapajus libidinosus were used. No animals were killed for the purpose of this study. The animals, after the removal of the brains, were immersed in 10% formaldehyde for preservation. Their brains were placed in plastic boxes containing 4% formalin. After was made the preparation for Golgi-Cox method and performed the slides for studies in photomicroscope. This work was approved by the Institutional Ethics Committee of the Federal University of Goiás (COEP-UFG 81/2008, and authorized by IBAMA 15275) and the Institutional Ethics Committee of the Federal University of Tocantins (COEP-UFT 23101.003220 / 2013-85).
Resultados e Conclusões:
The main organization observed in humans and no humans' primates were observed in the neocortex of Sapajus, as neurons disposition, types of cortex [granular and agranular, for instance], horizontal striation, the dendrites reaching, the disposition of the neurons in the layers. The Golgi-Cox methods stain few neurons aleatorily and do not permit a quantitative valid analysis, however, it is possible to verify aspect as the horizontal striations in the occipital and parietal lobes, the apical dendrites of the pyramidal neurons from layer V reaching to molecular layer, the difference among the many kind of cortex, mainly the granular and agranular ones. In summary, the cortical organization found in the neocortex of Sapajus were, qualitatively identical to other primates, however, quantitative studies could to be performed to stabilize the neural density of the Sapajus neocortical and to compare com humans and other primates.
Palavras-chaves: Citoarquitetura, Cognição, Comportamento
Agência Fomento:

11.004 - REPRESENTAÇÃO RETINOTÓPICA DE COMPARTIMENTOS DE CITOCROMO OXIDASE NA ÁREA VISUAL V2 DE PRIMATAS S. APELLA

RETINOTOPIC REPRESENTATION ACROSS V2 VISUAL AREA COMPARTMENTS IN S. APELLA PRIMATE
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Introdução:
In the primate brain, the second visual cortical area (V2) encodes various attributes of the visual stimulus, such as orientation and direction of movement, color, speed, depth and spatial frequency. Histochemical reaction of V2 sections for the enzyme cytochrome oxidase (CytOx) reveals a pattern of three bands characterized by differential CytOx distribution, two of them being CytOx-rich (thick and thin bands) interleaved by CytOx-poor interbands. Anatomical connectivity studies suggest that thick bands send projections to area MT (which processes visual motion and that is a part of the dorsal visual pathway) and thin and interbands send projections to area V4 (which analyzes color and is part of the ventral stream of visual information processing). Due to this characteristic connectivity pattern, we hypothesize that the different attributes of the visual stimuli are processed in separate compartments of V2. In this arrangement, thick bands would be a part of the dorsal pathway, while thin and interbands would be part of the ventral pathway. For example, color and direction of movement would be processed, respectively, in the thin and thick bands.
Objetivos:
To test this hypothesis, we performed electrophysiological recordings in anesthetized and paralyzed capuchin monkeys (Sapajus apella) while visual stimuli with different attributes were presented. All experiments were approved by "Comissão de Ética no Uso de Animais em Pesquisa (CEUA)" of the "Centro de Ciências de Saúde" (IBCCF 190-06/16).
Métodos:
We recorded extracellular activity with multiple electrodes (matrices of 16 x 2, ~250 µm distance between the electrodes) at several depths within the lunate posterior bank, while visual stimuli (gratings) with different attributes of orientation, direction of movement, spatial frequency, velocity, contrast and

color were presented. After the experiment, the animal was perfused intracardially and its brain was fixed and sectioned. We later performed histochemistry for CytOx in order to reveal the V2 compartments and the penetration path of each electrode along the cortex. We recorded 1080 sites in the area V2 in six hemispheres of three monkeys. Data analysis was made using the Matlab software.
Resultados e Conclusões:
We observed a preponderance of directional-selective cells in the thin bands and of orientation-selective cells in the thick bands of V2 ($p < 0.003$). A comparison of circular indices with traditional indexes reveals a difference in the distribution of these metrics in the thin and thick bands, which contrast with a homogeneous distribution of these indices in the interbands. We measured the average receptive-field location of each recording site and analyzed the neuronal response properties across the different bands. Currently, we are analyzing the V2 topography across the region we recorded from, using as major parameters the center position of receptive-field and its size. In conclusion, we found evidence for the segregation of functions in the compartments of V2.
Palavras-chaves: área visual V2, eletrofisiologia , primatas , topografia
Agência Fomento: CAPES, CNPq, FAPERJ, Insituto Serra-Pilheira

11.005 - EFFECTS OF TEMPORAL SELECTION ON STIMULUS REPRESENTATION

EFFECTS OF TEMPORAL SELECTION ON STIMULUS REPRESENTATION
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Introdução:
Studies have shown that spatial attention modulates stimulus representation in working memory (WOLFF et al.,Nat Neurosci.,(6):864-871,2017) and sensory information. Besides, temporal attention seems to enhance relevant sensory information input, creating a temporal protection window against distractors (EDE et al.,Nat Commun., 9(1):1449,2018).
Objetivos:
Given the importance of attention to neural processing, we aim to investigate the influence of temporal attentional selection in stimulus representation at sensory and memory processing stages.
Métodos:
Twenty participants had to perform an orientation reproduction task while a 64 electrodes EEG was concomitantly recorded. The experimental protocol was approved by The Research Ethics Committee of the Federal University of ABC [CAE: 60639616.3.0000.5594]. They had to reproduce the orientation of one of three gratings presented sequentially. In different blocks, the to-be-reported stimulus was informed before the presentation of the targets (valid blocks) or after the end of the stream (neutral blocks). Thus, in different blocks, a given stimulus could be surely task-relevant (valid), surely task-irrelevant (invalid), or potentially task-relevant (neutral) at the moment of the stimulus presentation. Multivariate pattern analysis was performed to investigate the effect of temporal attention and selection on stimulus representation during sensory processing and recall.
Resultados e Conclusões:
Attention had a main effect on behavioral measures. The prior knowledge about stimulus relevance affected the absolute error [$F(1,19) = 62.18$, $p < 0.001$, $\omega 2=0.47$] and the reaction time [$F(1, 19) = 62.33$, $p < 0.001$, $\omega 2= 0.13$], leading to lower absolute errors and faster responses. Nevertheless, it is not possible to disentangle whether attention affects perception, working memory maintenance, recall, or all possibilities. EEG analysis showed that stimuli orientation was decodable during the period that valid, invalid and neutral stimuli appeared, but the scores were not significantly different between conditions [$F(2,19)=1.097$, $p=0.34$]. Therefore, our preliminary results suggest that temporal attentional selection affects more prominently the working memory process.
Palavras-chaves: temporal attention, working memory, visual perception
Agência Fomento: Fundação de Amparo à Pesquisa do Estado de São Paulo (FAPESP)

11.006 - HISTOMORFOMETRIA DAS TERMINAÇÕES NERVOSAS DA FARINGE HUMANA POR IMUNOFLUORESCÊNCIA E MICROSCOPIA CONFOCAL: UM GRUPO CONTROLE PARA O ESTUDO DA APNEIA OBSTRUTIVA DO SONO

HISTOMORPHOMETRY OF HUMAN PHARYNGEAL NERVE ENDINGS BY IMMUNOFLUORESCENCE AND CONFOCAL MICROSCOPY: A CONTROL GROUP FOR STUDY OF SLEEP OBSTRUCTIVE APNEA

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Introdução:
Obstructive sleep apnea is a disorder characterized by recurring collapses of the pharyngeal region during sleep, resulting in reduced oxygen saturation and a high risk of cardiovascular diseases. The physiopathological mechanism remains unclear. Evidence suggests that changes in the proprioceptive sensory innervation of the pharynx may contribute to emergence of the disease.
Objetivos:
The primary aim of this study is to investigate the nerve ending morphology of palatoglossus, palatopharyngeal and superior pharyngeal constrictor muscles, and compare the nerve density of these muscles.
Métodos:
We assessed specimens of palatoglossus, palatopharyngeal and superior pharyngeal constrictor muscles removed from six adult patients (five women and one man), aged between 22 and 35 years, submitted to palate tonsillectomy. Nine cuts (50µm-thick transverse) of each tissue from the 6 individuals were assessed and examined under confocal laser scanning microscopy. The intensity of immunofluorescence for PGP 9.5 in the specimens was measured using Image J (NIH, Bethesda, USA). The mean density was calculated from the percentage of the immunostained area of the muscle nerve fibers on the previously selected panoramic images. All procedures in this study were approved by the ethics committee on animal experimentation of the Federal University of Ceará (registration number: 1.645.613.The results were expressed as mean and standard deviation. The Shapiro-Wilk test for normality was applied to compare the mean nerve densities between the three muscles under study. Next, the t-test and Wilcoxon test for non-parametric data were conducted, followed by the Kruskal-Wallis test and Dunn's test of multiple comparisons. All of these tests used the GraphPad Prism program, version 5.0. and analyses were considered statistically significant at $p < 0.05$.
Resultados e Conclusões:
A number of thin elongated free nerve endings (110 to 516 µm long). Calibrous nerve bundles, more than 200µm thick, were found in the deepest layers of the lamina propria. Also observed were 500µm-long nerve fascicles. Ruffini-like formations, with a maximum diameter of 90µm. Oval formations with a maximum diameter of 164µm and unclassifiable formations were identified in the muscle layer. Spiral-wharves formations measuring up to 305µm, with intense brancing, were also observed. Mean nerve fiber density was 0.061% in the palatoglossus muscle, 0.12% in the palatopharyngeal muscle and 0.21% in the superior pharyngeal constrictor muscle. When the mean nerve fiber densities of the samples selected were compared, a statistically significant decrease was observed in the palatoglossus region when compared to the superior pharyngeal constrictor muscle. This study demonstrated that the palatoglossus, palatopharyngeal and superior pharyngeal constrictor muscles are endowed with different types of mechanoreceptors, which presumably work as proprioceptors and participate in neuronal control of the upper airway.
Palavras-chaves: Obstructive sleep apnea, Pharyngeal muscles, Mechanoreceptors, Nerve endings, Immunofluorescence
Agência Fomento:

12. Sistemas Motores

12.001 - ADMINISTRAÇÃO CRÔNICA DE METOCLOPRAMIDA INDUZ ALTERAÇÕES MOTORAS EM CAMUNDONGOS SWISS COM MUDANÇAS NA EXPRESSÃO PROTÉICA ESTRIATAIS DAS PROTEÍNAS FOSB E DARPP 32

CHRONIC METOCLOPRAMIDE INDUCES MOVEMENT DISORDERS AND STRIATAL CHANGES IN FOSB AND DARPP 32 PROTEIN EXPRESSION IN SWISS MICE

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Introdução:
The most common causes of drug-induced movement disorders are dopamine receptor blocking drugs, including antipsychotics and antiemetics. Parkinsonism and tardive disorders occur during chronic exposure.

Metoclopramide (Met, Plasil ®) appears to increase NMDA receptors in striatum, with dopamine release more in striatum than nucleus accumbens by selectivity effect in D2R pre-synaptic.
Objetivos:
Extrapyramidal signs (EPS) and vacuous chewing movements (VCMs) were evaluated after chronic administration of Met and correlated with striatal FOSB and phospho Thr 75- darpp 32 (Thr 75-darpp 32) protein expression.
Métodos:
Twenty-two male Swiss mice at 10 weeks of age received i.p. (i) Met 5 (n=7) or 8 mg/kg (n=8); (ii) Saline as control group (10ml/kg) (n=7). Catalepsy, rota-rod tests and VCMs were carried out on a weekly basis over the course of three consecutive days, with two records of each behavioral weekly. FOSB and Thr 75-darpp 32 immunohistochemistry assays were conducted. Two- way repeated-measures ANOVA for catalepsy and VCMs, with one-way ANOVA for FOSB and Thr 75-darpp 32 expression were performed. Bonferroni test was used. CEUA-UFABC No. 9535060218.
Resultados e Conclusões:
For catalepsy test, a significant effect of Treatment was found [F(2,19)= 9.283; P = 0.002], as well in VCMs [F(2,17)= 13.825; P & lt; 0.001], and an increase in the catalepsy time and VCMs was observed over time for Met 8 mg/kg group (Bonferroni test, P & lt; 0.05), with Pearson correlation (catalepsy vs VCMs) r = 0.520; P = 0.011. Postural instability, like evaluated on rota-rod test, was observed for both doses [F(2,19)= 3.332; P = 0.05, Bonferroni test, P & lt; 0.05] with decreased time on device. For Met 8 mg/kg, FOSB protein expression was increased in Dorsolateral (DL) [F(2,19)= 4.754; P = 0.021, Bonferroni test, P & lt; 0.05], and Dorsomedial (DM) [F(2,19)= 3.833; P = 0.04, Bonferroni test, P & lt; 0.05] striatal region, with Pearson correlation (catalepsy vs DL- FOSB) r = 0.417; P = 0.03. For both doses, Thr 75-darpp 32 protein expression was decreased in DL region [F(2,17)= 8.707; P = 0.002]. Conclusion Met gives rise to EPS and VCMs like antipsychotics. DARPP-32, regulating transcription of striatal genes like Fos Family, is considered as the most important integrator between the cortical input and the basal ganglia, and associated with motor control. In this work, Met induced increased FOSB expression in dorsal striatum, core for EPS, with decreased Thr 75-darpp 32, an inhibitor of PKA.

Palavras-chaves: psicofarmacologia, neurofisiologia, vacuous chewing movements, catalepsia, neurobiologia
Agência Fomento:

12.002 - ANTAGONISTAS DE DOPAMINA E L-NOARG INDUZEM DISFUNÇÃO MOTORA COM EXPRESSÃO DIFERENCIAL DE c-Fos e nNOS EM CAMUNDONGOS.

DOPAMINE ANTAGONISTS AND L-NOARG INDUCE MOTOR DYSFUNCTION WITH DIFFERENTIAL STRIATAL c-Fos AND nNOS EXPRESSION IN MICE.
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Introdução:
Antipsychotic effect appear be mediated by dopamine receptor blockade in the limbic system, and extrapyramidal side-effects (EPS) involves a transient central D2 occupancy in the striatum. L-NOARG and haloperidol (Hal) are both known to induce catalepsy in rodents, but movement disorders induced by Metoclopramide (Met, Plasil®) still remains unknown. Hal and Met to increase NMDA receptors in striatum, with nitric oxide (NO) modulating glutamate and dopamine releasing underlying motor control and EPS.
Objetivos:
Evaluate some motor side effects after acute administration of Met, Hal, or L-NOARG in different dosages, and to correlate with c-Fos and nNOS protein expression in the striatum.
Métodos:
Sixty five male Swiss mice at 9 weeks of age received i.p. (i) Met 1, 5, 8, 15, or 45 mg/kg; (ii) Hal 0.1, 0.5 or 1 mg/kg; (iii) L-NOARG 15, or 45 mg/kg; (iv) Saline (10ml/kg) (n=5/group). The catalepsy test was recorded between 30-120 min and rotarod test 60 min after injection. c-Fos and nNOS assays were conducted. Two- way RM ANOVA for catalepsy and one-way ANOVA for rotarod test and protein expression was performed. Bonferroni test was used. CEUA-UFABC No. 9943080317.
Resultados e Conclusões:
All treatments (Met, Hal, and L-NOARG) induced catalepsy. An increased cataleptic effect was observed in Met groups [F(20,176) = 5.412; P < 0.001], except to 1 mg/kg [Bonferroni: P > 0.05]. Similar effect was observed in Hal groups [F(3,16) = 424.406; P < 0.001],

and L-NOARG [F(2,12) = 13.883; P < 0.001]. All dosages of Met showed decreased time in rotarod test [F(5,49) = 6.425, P < 0.001] except to 1 and 5 mg/kg [Bonferroni: P > 0.05]. Alike results for Hal were identified [F(3,24) = 14.225; P < 0.001], with a normal test for L-NOARG [F(2,19) = 1.608; P = 0.229]. Results c-Fos and nNOS assays showed: (a) with all Met treatments except 1 mg/kg showed an increase of c-Fos expression in dorsolateral (DL) striatum [F(4,14) = 14.11; P < 0.001], with Pearson correlation (catalepsy vs dosages) r = 0.681; P = 0.004 and increased nNOS expression [F(4,14) = 14.46; P < 0.001] by 8 mg/kg dose of Met; (b) Hal 1 mg/kg increased c-Fos expression in DL [F(3,9) = 21.86; P < 0.001], with increased nNOS expression for 0.5 mg/kg [F(3,14) = 14.46; P < 0.001]; (c) L-NOARG increased nNOS expression with 15 and 45 mg/kg doses in DL [F(3,11) = 16.59; P < 0.001]. Conclusion Met and L-NOARG give rise to extrapyramidal side effects like Hal. Met induced increased c-Fos expression and nNOS in DL striatal region comparable to typical antipsychotics confirming this region as core for EPS, possibly with NO modulating motor disabilities.

Palavras-chaves: Haloperidol, Catalepsia , Metoclopramida , c-fos, nNos
Agência Fomento:

12.003 - ANÁLISE DA ATIVIDADE EVOCADA POR ESTIMULAÇÃO CORTICAL DOS NEURÔNIOS ESPINHOSOS MÉDIOS ESTRIATAIS DURANTE A OCORRÊNCIA DAS DISCINESIAS INDUZIDAS PELA L-DOPA.

ANALYSIS OF CORTICALLY EVOKED ACTIVITY OF STRIATAL MEDIUM SPINY NEURONS DURING THE OCCURRENCE OF L-DOPA-INDUCED DYSKINESIAS.

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Introdução:

Models of Parkinson's disease (PD) propose that chronic exposure to the precursor of dopamine (DA), L-DOPA, generates a hyperdopaminergia state that contributes to an imbalance in the activity of striatal medium spiny neurons (MSNs) generating hyperactivity of MSNs that project to the direct pathway (dMSNs) and hypoactivity of MSNs that project to the indirect pathway (iMSNs). This imbalance in the MSN activity during the on-state of L-DOPA treatment would be responsible for the appearance of abnormal involuntary movements (AIMs) or L-DOPA-induced dyskinesias (LIDs). The striatum receives massive cortical excitatory glutamatergic inputs that influence MSNs activity. Abnormal cortical transmission might contribute to abnormal MSN activity during the occurrence of LIDs.

Objetivos:

We aimed to characterize the impact of motor cortex stimulation on the responsiveness of striatal MSNs during the on-state of LIDs.

Métodos:

All experimental procedures are in accordance with the FFCLRP Ethics Committee approval (case N°. 18.5.35.59.5). For experimental PD induction, we microinjected the neurotoxin 6-hydroxydopamine (6-OHDA) in the right medial forebrain bundle (MFB). Control animals (sham-operated) were submitted to the same procedures and received vehicle microinjection in the MFB. Sham-operated and 6-OHDA-lesioned rats were chronically treated with either vehicle (0.9% saline solution) or L-DOPA (5 mg/kg L-DOPA combined with 12.5 mg/kg benserazide) for 3 weeks. Animals were recorded for 3 hours after administration of vehicle or L-DOPA, three days a week during the chonic treatment for behavioral analysis of axial, limb and orofacial dyskinesias. The stepping test was performed once a week, 1 hour after administration of vehicle or L-DOPA to monitor the effect of L-DOPA antiparkinsonian activity. At the end of the chronic treatment period, we performed in vivo single unit extracellular electrophysiological recordings in anesthetized rats to address the impact of motor cortex stimulation on the responsiveness of striatal MSNs. Animals were then perfused transcardially for immunocytochemistry.

Resultados e Conclusões:

The stepping test demonstrated that 6-OHDA induced a marked reduction in the number of adjusting steps performed with the anterior contralateral paw (interaction: F1-34 = 107.8, P < 0.0001, two-way repeated measures ANOVA). Chronic administration of L-DOPA to 6-OHDA-lesioned rats induced a significant increase over time on axial limb and orofacial LIDs. Electrophysiological recording are in progress. We expect that this study will provide important insights on how cortical glutamatergic drive interfere with MSN activity during the occurrence of LIDs.

Palavras-chaves: Eletrofisiologia , Doença de Parkinson , Discinesias induzidas pela L-DOPA , Neurônios espinhosos médios
Agência Fomento: FAPESP

12.004 - FOCAL UPPER LIMB DYSTONIA: A FUNCTIONAL NEAR INFRARED SPECTROSCOPY APPROACH OF THE FINGER TAPPING TASK.

FOCAL UPPER LIMB DYSTONIA: A FUNCTIONAL NEAR INFRARED SPECTROSCOPY APPROACH OF THE FINGER TAPPING TASK.

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Introdução:
Upper limb dystonia is a type of focal dystonia characterized by sustained or intermittent abnormal muscle activity resulting in twisting movements and abnormal limb postures. The extension and phenomenology of motor symptoms are variable and may have distinct etiologies. Imbalanced inhibitory and excitatory processing are suggested across several studies in focal dystonia (Movement disorders, 18(3), 231-240, 2003). Increasing research on the pathophysiology of dystonia have been identifying not only abnormalities of sensorimotor processing but also evidence for aberrant neuronal plasticity (Neurobiology of disease, 42(2), 162-170, 2011). It has been acknowlegde that functional neuroimaging regarding tasks that do not induce dystonia are likely to show the long standing consequences of the disorder (Neuroimage, 56(3), 1011-1020, 2011). Researches using Functional near-infrared spectroscopy (fNIRS) have been providing solid measures of hemodynamic responses in cortical surface. This acquisition technique allows the indirect inference of local concentration of oxy and deoxy-hb and might be feasible for a clinical approach
Objetivos:
This study aims to investigate the pattern of cortical activity in idiopathic focal upper limp dystonia by using fNIRS during the finger-tapping task.
Métodos:
Twenty-one patients with idiopathic focal right upper limp dystonia and twenty healthy controls took part in this study. All subjects were right-handed. The finger-tapping task consisted of twelve blocks, which contained one of three different conditions (four blocks each): right hand, left hand or both hands; each block lasted 30 seconds, followed by an interval of 30-seconds. . Sources and detectors were positioned bilaterally on the measuring cap with reference to the 10–20 international systems. In total, 23 channels covered regions of the motor and sensorimotor cortices in addition to the supplementary motor area (SMA). The channel-wise analysis was Bonferroni corrected, p(thresholded) < 0.002. Normality tests were conducted suggesting violation of a normal distribution.
Resultados e Conclusões:
Compared to controls, reduced concentration of Oxy-Hb the contrast ight hand > resting was observed in dystonia patients in areas covering the left middle frontal gyrus (mean β difference=7.56x10-5) and medial postcentral gyrus (mean β difference= 8.63x10-5) and supramarginal gyrus (mean β difference=9.95x10-5). Our findings suggest diminished activation in upper limb dystonic patients in premotor, somatosensory and ipsilateral motor areas during finger tapping with their dominant hand, showing results that are consistent with other studies that suggest sensorimotor under activation as a long standing consequence of dystonia. However, it is relevant to highlight that increased motor excitability may be triggered by complex tasks as found in different experimental designs.
Palavras-chaves: Dystonia, fNIRS, finger tapping
Agência Fomento: PROUNIEMP

12.005 - EFEITOS DO TRATAMENTO COM INOSINA NA LESÃOCOMPRESSIVA DA MEDULA ESPINAL EM CAMUNDONGOS

EFFECTS OF INOSIN TREATMENT IN THE COMPRESSIVE INJURY OF THE SPINAL CORD IN MICE

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Introdução:

Traumatic spinal cord injury is a serious clinical disorder that causes significant changes in sensory and motor functions. Research in the field of Regenerative Medicine has been conducted in recent years from studies involving the use of substances, especially molecular therapies that stimulate regeneration.

Objetivos:

The aim of our study was to evaluate the regenerative potential of the nucleoside Inosine (IN) in the spinal cord compression model in mice.

Métodos:

Because exposure of the male reproductive system has a higher risk of urinary tract infection, we used female C57/Bl6 mice. Spinal cord compression was performed by laminectomy of the T9 vertebra and extradural cord compression with vascular clip (30g for 60 seconds). The Committee on Ethics with the Use of Animals (CEUA) in Scientific Experimentation of the Health Sciences Center of the Federal University of Rio de Janeiro (Protocol - Macaé 021) approved the procedures performed and the handling of the animals. Treatment was performed at daily doses 2 or 24 hours after injury by intraperitoneal injection in saline or IN solution (70 mg/kg) until the seventh day after injury. The animals were distributed randomly in five groups: Saline group 2 hours (SG2); IN group 2 hours (ING2); Saline group 24 hours (SG24); IN group 24 hours (IN24); Sham group. To assess motor function, we used the Basso Mouse Scale (BMS) test, horizontal ladder walking test and global mobility analysis. The sensory part evaluated in tests such as the pinprick and the analgesimeter. For the histological analysis, were performed immunohistochemical technique and semi-thin cuts. The statistical analysis used was Student's t-test and the results were considered significant when $p < 0.05$.

Resultados e Conclusões:

Our results showed that the immunohistochemistry for GFAP in the ING2 compared to the SG2 demonstrated a significant decrease in activation of astrocytes (n=6:0.029999; n=6:0.05554, respectively; Difference between groups (DBG)±SEM 0.02555±0,004375; p=0.0002), suggesting a glial scar reduction. For the ING24 compared to the SG24 our results showed a significant decrease in activation of astrocytes (n=3:0.02379; n=5 0.05245, respectively; DBG±SEM 0.02866±0.01090; p=0.0391). Moreover, our results showed that the immunohistochemistry of the MBP in the ING2 compared to the SG2 demonstrated a significant increase in the MBP expression (n=6:0.05320; n=3:0.03548, respectively; DBG±SEM -0.01771±0.006878; p=0.0367), suggesting that the treatment with ING2 promotes better remyelination after injuries. For the ING24 compared to the SG24 our results showed a significant increase in the MBP expression (n=3:0.04655; n=5:0.02971, respectively; DBG±SEM -0.01684±0.002132; p=0.0002). It was not found significant differences in the global mobility test and the sensory tests. Therefore, from these data, there is a motor improvement in the animals and, therefore, further analysis will be performed to prove the results and develop parameters to be used in clinical practice.

Palavras-chaves: inosina, lesão de medula espinal, recuperação funcional

Agência Fomento: CNPq; CAPES; FAPERJ

12.006 - EFEITOS DO MODELO DE ISQUEMIA FOCAL DA MEDULA ESPINHAL NA FUNÇÃO DA PATA ANTERIOR DE RATOS

SPINAL CORD FOCAL ISCHEMIC INJURY MODEL EFFECTS ON RAT'S FORE-LIMB FUNCTIONALITY

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Introdução:

Spinal Cord Injury (SCI) is a clinical feature with great impact on individual's quality of life, causing plegias, paresis, spasticity, anesthesia and authonomic deregulation. Its physiopathology involves traumatic aggression to Spinal cord, causing cell body's rupture as well as axonal fibers and blood vessels, which leads to a pathological response involving hemorrhage and edema, which exacerbate ischemic cascade of metabolic events. The ischemic condition leads to nervous tissue to necrosis and Na+/Ca+ influx, deregulation and glutaminergic excitotoxicity. Lastly, the local inflammatory response is inducted through glial cell activation and reactive astrocytosis, leading to

glial scar formation. Reactive astrocytes activation inhibits axonal growth, which is also affected by Perineuronal Networks (PNNs) proliferation, whose main components are Chondroitin Sulfate Proteoglycans (CSPG)
Objetivos:
To investigate Spinal Cord focal Ischemic Injury effects on functionality and proprioception on the experimental rat's model.
Métodos:
Total amounts of 15 animals were distributed into two groups: Control Animals Group, containing n=10 animals that had only spinal cord exposition and no further intervention; and Injured Animals Group, containing five animals that underwent surgery and focal spinal cord ischemia induction. Before model induction, all animals passed through the acclimatization period and were trained on sensory-motor tests (Spaghetti Test, Staircase Test). We used focal ischemia model through 20 pMol Endothelin-1 microinjections at 1 mm depth at C4 level into the spinal cord corresponding to the corticospinal tract. All results were analyzed through ANOVA one-way and Tukey Significant Difference. Ethics Committee acceptance: CEPAE- UFPA:BIO0079-12
Resultados e Conclusões:
Spaghetti test Results: Rats use Preferred Paw (PP) to execute motor adjustments: Catch Reformulation (RP), Extension/Flexion (EX/FL), Abduction/Adduction (AB/AD). Test results show movement pattern shift (occurrence mean ± standard deviation) (PP: RP 13,67 ± 3,51; EX/FL 4,00 ± 1,00; AB/AD 2,67 ± 1,53),3 DPL (PP: RP 11,33 ± 1,53, EX/FL 2,67 ± 1,15; AB/AD 0,67 ± 0,58), 7 DPL (PP: RP 13,67 ± 1,53 , EX/FL 2,67 ± 1,53; AB/AD 0,67 ± 0,58) e 14 DPL (PP: RP 14,33 ± 2, 31, EX/FL 3,00 ± 2,00; AB/AD 1,33 ± 0,58), in which injured animals developed motor adjustment for injury compensation. Staircase Test Results: Injured group had significant difference compared to baseline (PP 9.61±3.58), 3 DPL (PP: 2.33±1.03), 7 DPL (PP: 2.67±0.52), 14 DPL (PP: 5.67±1.75) e 21 DPL (PP: 5.27±1.75). Test results show motor adjustment for injury compensation, in which injured animals started using non preferred paw for previous preferred paw tasks. These results show that contralateral plastic response has a major function in recovery in spinal cord focal ischemic injury, as unilateral glial scar inhibits axonal growth, mainly through the mechanical and chemical ipsilateral-specific block, non-injured contralateral, as well as axonal outgrowth

Palavras-chaves: Medula Espinhal, Isquemia, Redes Perineuronais
Agência Fomento: CNPq, CAPES, FAPESPA, Federal University of Pará.

12.007 - ATIVIDADE CORTICAL DURANTE TAREFA DE ESCRITA EM DISTONIA - UM ESTUDO COM ESPECTROSCOPIA FUNCIONAL DE INFRAVERMELHO PRÓXIMO (fNIRS)

CORTICAL ACTIVITY DURING THE WRITING TASK IN DYSTONIA- A STUDY WITH FUNCTIONAL NEAR INFRARED SPECTROSCOPY (fNIRS)

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Introdução:
Dystonia is a neurological disorder characterized by involuntary sustained or intermittent muscle contractions causing abnormal postures and/or movements typically patterned and twisting, and often repetitive and sometimes task-specific. The most common task-specific dystonia is Writer's Cramp. Functional imaging studies have associated dystonia with abnormal activity levels across multiple different motor and sensory brain regions leading to a conception of a "circuit" disorder. Most studies investigating neural mechanisms of motor control and its pathologies currently make use of neuroimaging techniques, such as functional magnetic resonance imaging (fMRI) and positron emission tomography (PET), which, however, impose important physical constraints on mobility. Latter advances in functional near infrared spectroscopy (fNIRS) offer a new possibility for investigating cortical areas and the

neural correlates of complex motor behaviors non-invasively under naturalistic experimentation.
Objetivos:
This study aimed to investigate the cortical activity in focal right upper limb dystonia patients using functional near infrared spectroscopy (fNIRS) during writing.
Métodos:
Twenty-one patients with right upper limb idiopathic dystonia and twenty-one healthy volunteers paired by age and years of education were recruited by neurologists in the participating centers according to restrictive exclusion criteria and submitted to a simple right-hand writing task paradigm that consisted of 4 epochs of alternating writing/resting blocks (30 s duration each). fNIRS data was acquired using a NIRSport system with 8 sources and 8 detectors. The data were analyzed using NIRSLab v2017.06, using the approach proposed by Baker et al., (2013) with an autoregressively whitened robust regression model, which deals with physiological noise and motion artifacts statistically within the general linear model (GLM) (Huppert, 2016). To test a priori hypotheses that brain activation to simple handwriting in cortical sensorimotor and supplementary motor regions would be less specific in patients than in controls, we defined right and left primary motor (M1) and somatosensory ROIs and a supplementary motor area (SMA). Differences between groups on changes in both oxy-Hb and deoxy-Hb for each ROI were then compared using Mann Whitney tests.
Resultados e Conclusões:
This study adopted fNIRS as an exploratory technique to investigate brain activity in focal upper limb dystonia during the writing task in an ecological way, which is not possible with other mapping techniques such as fMRI and PET due to their physical constraints. Results revealed an increased activation in patients' left primary motor cortex in accordance with a study conducted with imaginative writing task (Delnooz et al., 2013), increased activation in patients' left somatosensory cortex and a trend for greater activation on patients' right primary motor cortex, meeting evidence of bilateral activation and indicating possible primary disorder or endophenotype.
Palavras-chaves: conectividade, distonia, fNIRS
Agência Fomento:

12.008 - KINEMATIC CHANGES IN THE UNINJURED LIMB AFTER UNILATERAL BRACHIAL PLEXUS INJURY

KINEMATIC CHANGES IN THE UNINJURED LIMB AFTER UNILATERAL BRACHIAL PLEXUS INJURY
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Introdução:
When reaching or moving an object from a standing position the brain has the challenge of stabilizing upper limb movements while conserving postural balance. Traumatic brachial plexus injury (TBPI) causes important sensory and motor upper limb impairment and thus might also affect trunk/upper limb motor synergies.
Objetivos:
The objective of this study was to investigate through kinematic recording of the uninjured limb if TBPI affects trunk/limb motor synergies.
Métodos:
Eight volunteers with a unilateral traumatic TBPI and nine age-paired healthy volunteers were invited to perform two different tasks while index finger kinematic parameters were measured. The first task consisted in, from a standing position, perform a series of reaching movements towards a homogenous surface located at a distance shoulder-surface of 120% of the arm's length upon which no specific endpoint was drawn. In a second task, the volunteers were asked to perform an elbow flexion/bringing a cup to the mouth movement in the upright position. The experimental procedures were approved by the local ethics committee (process number 1.375.64).
Resultados e Conclusões:
From the eight individuals included in the TBPI group, three had a complete (C5-T1), and five had a partial (C5-C7) TBPI. Two participants with TBPI were eligible to perform the task with their injured limb–they were able to adopt and maintain the initial positions. Due the important motor impairment in affected upper limb observed in BPI group, we considered for statistical analysis only the kinematic parameters related to the uninjured upper limb. Results showed lower values for time to peak velocity (0.39%, SD 0.04 vs 0.47%, SD 0.04) and longer movement duration

(1.71s SD 0.35 vs 1.48s SD 0.36s) in TBPI individuals compared to healthy participants for the uninjured limb's index finger marker ($p < 0.01$), suggesting a higher cost for motor planning and execution after a TBPI unilateral lesion in this task. Furthermore, TBPI individuals presented lower index finger displacement (mean 68.39 cm SD 6.23 vs mean 70.98 cm SD 7.37; $p < 0.01$) compared to those of healthy volunteers, which may indicate a strategy of minimizing the upper limb movement amplitude to prioritize the conservation of balance. The results of the second experiment showed lower values for time to peak velocity (Mean 0.37% SD 0.04 vs 0.40% SD 0.04) in seven BPI compared to eight healthy subjects for the uninjured limb's index finger marker ($p < 0.05$), confirming that a unilateral BPI lesion leads to higher cost in performing movements with the unaffected limb even when no explicit trunk movement is required. In conclusion, this study demonstrates that upper limb sensorimotor deficits affect both trunk and upper limb motor synergies, suggesting a greater cost of motor control for BPI individuals compared to healthy individuals. In addition, it serves as a warning for the clinical community about the need of individualized therapeutic practices to help reverse plastic adaptations caused by peripheral lesions.

Palavras-chaves: brachial plexus injury, motor synergies, postural control

Agência Fomento: CAPES, FAPERJ, CNPQ, FINEP, FAPESP

13. Memória & Aprendizado

13.001 - TEMPORAL INVOLVEMENT OF THE LATERAL ENTORHINAL CORTEX IN THE SYSTEMS CONSOLIDATION OF AN AVERSIVE CONTEXTUAL MEMORY

TEMPORAL INVOLVEMENT OF THE LATERAL ENTORHINAL CORTEX IN THE SYSTEMS CONSOLIDATION OF AN AVERSIVE CONTEXTUAL MEMORY

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Introdução:

Systems consolidation is a dynamic and time-dependent process in which contextual memories become independent of the hippocampus and dependent on cortical structures for their retrieval. Anatomically, the entorhinal cortex (EC) forms connections with the hippocampus and a number of cortical structures, many of which participate in memory processes, thus acting as an important relay center between these areas.

Objetivos:

To characterize the role of the lateral entorhinal cortex (LEC) in the systems consolidation of an aversive contextual memory through the temporary inactivation of this structure with bilateral intracerebral infusion of GABAA agonist muscimol 15 min prior to the test session.

Métodos:

Adult male Wistar rats weighing an average of 350g were trained in the Contextual Fear Conditioning, a hippocampus-dependent task, and tested in the same context 2 or 28 days later. All animals were submitted to a retest session 4h after the test session, in a drug-free condition. Freezing, an innate defensive behaviour used to quantify fear expression, was measured for Vehicle and Muscimol groups and the LEC was considered to participate in fear memory retrieval when freezing for both groups differed statistically. Student's t-test was used and significance was set at $P < 0.05$. Experiments were approved by the university's ethics committee (Project Number 34361)

Resultados e Conclusões:

When tested 2 days after training, results were statistically non-significant (P=0.09) between the Vehicle (N=11; SEM=46.4±6.35; SD=21.07) and Muscimol (N=7; SEM=32.57±6.69; SD=17.71) groups. As expected, in the retest session no statistical difference (P=0.19) was found between Vehicle (N=11; SEM=45.4±8.03; SD=26.63) and Muscimol (N=7; SEM=35,80±11,06; SD=27,09) groups. Likewise, 28 days after training results were non-significant (P=0.08) between Vehicle (N=7; SEM=62.67±6.38 SD=16.90) and Muscimol (N=9; SEM=46.48±5.75; SD=17.27) groups and Vehicle (N=7; SEM=46.19±10.52 SD=27.82) and Muscimol (N=9; SEM=50.81±6.80 SD=20.42) did not differ statistically (P=0.70) in the retest session. Evidence from the literature point to the participation of the EC in systems consolidation and the experiments performed in this work seek to elucidate the temporal dynamics of this structure in the memory process. These are preliminary results in which a statistically significant effect of muscimol was not seen in relation

to the control group in both intervals. Despite this, an expressive difference was observed between the test and retest sessions when animals were tested 28 days after training. Further experiments are necessary to reach more conclusive results.
Palavras-chaves: Entorhinal cortex, Memory, Systems consolidation
Agência Fomento: Capes

13.002 - DURAÇÃO DA JANELA DE CONSOLIDAÇÃO SISTÊMICA E DINÂMICA DE GENERALIZAÇÃO DE MEMÓRIAS REMOTAS PARA O CÓRTEX INFRALÍMBICO

TEMPORAL INVOLVEMENT OF THE INFRALIMBIC CORTEX IN THE SYSTEMS CONSOLIDATION AND GENERALIZATION DYNAMICS OF AN REMOTE AVERSIVE CONTEXTUAL MEMORY
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Introdução:
With time, memories undergo systems consolidation, a process in which they become independent of the hippocampus and dependent on cortical structures for their retrieval. The infralimbic cortex (ILC) participates in remote memory retrieval, although the moment that this structure is recruited for retrieval is not clear.
Objetivos:
To characterize the role of the infralimbic cortex (ILC) in the systems consolidation of an aversive contextual memory through the temporary inactivation of this structure with bilateral intracerebral infusion of GABAa agonist muscimol 15 min prior to test.
Métodos:
Adult male Wistar rats weighing 270-350g were trained in the Contextual Fear Conditioning, a hippocampus-dependent task, and tested in the same context 2 or 28 days later. All animals were submitted to a retest session 4h after the test session, in a drug-free condition. Freezing is an innate defensive behavior in which there is an absence of movement except for those related to breathing, and is used to quantify fear expression. Therefore, freezing levels were measured for vehicle and muscimol groups and ILC was considered to participate in fear memory retrieval when groups differed statistically. Student's t-test was used and significance was set at $P < 0.05$. CEUA Number. 34361
Resultados e Conclusões:
When tested 2 days after training, results were statistically non-significant (P=0,2338) between the Vehicle (N=9; SEM= 43,41±5,642; SD= 16,93) and Muscimol (N=10; SEM=31,87± 7,262; SD= 22,963) groups. As expected, in the retest session no statistical difference (P=0,6858) was found between Vehicle (N=9; SEM=42,19±5,377; SD= 16,132) and Muscimol (N=10; SEM=45,93 ± 7,14; SD=22.58) groups. In contrast, 28 days after training results were statistically significant (P=0.0155) between Vehicle (N=8; SEM=45,35±7,828; SD= 22,14) and Muscimol (N=8; SEM=18,38± 5,893; SD= 16,67) groups and Vehicle (N=8; SEM=35,91±8,184; SD= 23,15) and Muscimol (N=8; SEM=36,8± 7,186; SD= 20,33) did not differ statistically (P=0.9362) in the retest session. The results show that ILC is necessary for remote memory retrieval (28 days), but not for recent memory (2 days). A new group of animals will be trained in the Contextual Fear Conditioning and tested 14 days later, in order to determine more precisely when the ILC is necessary for memory retrieval. Animals will also be tested 28 days after training in a similar context, in order to access memory quality.
Palavras-chaves: Aversive Memories, Infralimbic Cortex, Systems Consolidation
Agência Fomento:

13.003 - DECAIMENTO DA MEMÓRIA DE CURTO PRAZO IMPLÍCITA EM INTEGRAÇÃO VISUMOTORA

IMPLICIT SHORT-TERM MEMORY DECAY ON VISUOMOTOR INTEGRATION
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Introdução:
The context at which we perform some actions influence how we perceive and act. A well-known effect of the context is the serial dependence effect. Stimuli presented in previous trials can influence current performance in visuomotor integration tasks and temporal estimation. However, the underlying mechanism that makes this influence possible is not well-known.

Objetivos:
In this project, we hypothesized that serial dependence effect relies on implicit short-term memory mechanism and characterized the decay of information in short-term memory.
Métodos:
Twenty subjects (21±4 y.o., 12 women) performed a computer task wherein they had to press a button at the same time a moving target hit a barrier (constant target speeds of 20, 22, 24, 26, 28 degrees of visual angle per second). To evaluate the decay of the serial dependence effect, we varied the inter-trial interval (ITI) across blocks. ITIs were fixed within block at values 0.1, 1, 2, 4, and 8 seconds, and the order of ITIs across blocks were counterbalanced across participants. Participants performed 255 for each ITI condition, resulting in 1275 trials per session. To evaluate the decay of the serial dependence effect, we analyzed participants' temporal error: the difference between the time at which the participant pressed the button and the target's arrival time at barrier. We performed a multiple linear regression on temporal errors with current speed and previous speed as regressors. Our main variable of interest was the slope for previous target speed. If our hypothesis was correct, we would expect a decrease in previous speed weight on temporal errors as the ITIs increased. In other words, as more time passes between trials, the memory trace from previous trial would decay and participants would rely more on current speed information.
Resultados e Conclusões:
We found a significant effect of ITI on the weight given to the previous speed on performance (One-way repeated measures ANOVA: $F(4,19) = 3.205$, $p = 0.029$ with Greenhouse-Geisser Correction). A post-hoc comparison (using Holm's sequential Bonferroni correction) showed that the weight given to the previous speed was significantly stronger when the ITI was of 0.1s than of 1s ($p=0.045$) or 4s ($p=0.024$). No other comparisons were significant. A one-sample t-test comparing the weight given to the previous speed across each ITI showed that they were all significantly different than zero (all p-values < 0.001). Taken together, our results suggest that although the effect of short-term memory decreases with time, it is still present even after 8-seconds, indicating a robust and long-lasting modulation. CEP Number (CAAE): 84603118.8.0000.5594
Palavras-chaves: Short-Term Memory, Decay, Visuomotor Integration
Agência Fomento:

13.004 - EFEITOS DA ATIVAÇÃO NORADRENÉRGICA NA ESPECIFICIDADE DA MEMÓRIA CONTEXTUAL EM RATOS

EFFECTS OF NORADRENERGIC ACTIVATION ON CONTEXTUAL MEMORY SPECIFICITY IN RATS
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Introdução:
Extensive evidence indicates that norepinephrine released during an emotionally arousing experience play an important role in strengthening contextual memory consolidation. Although several studies have shown that noradrenergic activation can enhance memory strength, divergent results regarding its effects on memory specificity have been reported, i.e. a reduction and an enhancement on memory generalization have been shown.
Objetivos:
To investigate the effects of noradrenergic stimulation on contextual memory specificity through systemic administration of the α2 adrenergic antagonist yohimbine, using the discriminative contextual fear conditioning (CFC) task.
Métodos:
CFC training was performed in conditioning chambers where different groups of Wistar male rats (CEUA-UFABC protocol number 4544081018) were presented with three foot-shocks (0.3 mA, 1s each) and immediately after training, received subcutaneous injection of yohimbine (0.3 or 1.0 mg/kg) or vehicle (0.9% saline). Following recent (2 days) or remote (28 days) retention intervals all subjects returned to a novel context (B) and to the training context (A), in this order. The freezing time was assessed in both contexts as a measure of memory strength and specificity.
Resultados e Conclusões:
A two-way ANOVA revealed that animals tested 2 days after training showed a significant interaction between drug treatment (yohimbine or vehicle) and context (A or B) ($F(2, 28)=3.6$; $p < 0.05$). The Newmann-Keuls post hoc test revealed that vehicle-treated animals showed equivalent freezing levels through both training and novel contexts ($p=0.16$), which indicates non-specific fear conditioning and, thus, a generalized memory. Behavioral results are expressed as the group mean freezing time in seconds ± standard error of the mean

(S.E.M) (N=10; Mean (A)=64.53±14.73; Mean (B)=44.25±20.16). Yohimbine-treated animals, on the other hand, showed higher freezing levels when tested in context A, compared with context B, on both drug doses - 0.3 ($p < 0.001$) (N=10; Mean (A)=100.05±19.95; Mean (B)=26.01±7.47) and 1.0 mg/kg ($p < 0.05$) (N=11; Mean (A)=75.17±14.34; Mean (B)=35.19±9.72). These results suggest that noradrenergic activation enhanced memory specificity at this time-point and training intensity. Animals tested 28 days after training showed no significant treatment effect ($F(2, 25)=0.03$; $p=0.97$), showing that there was no effect of the noradrenergic activation on both 0.3 (N=10; Mean (A)=85.26±13.53; Mean (B)=27.22±11.09) and 1.0 mg/kg doses (N=9; Mean (A)=87.33±18.99; Mean (B)=32.14±11.40). One possible explanation for the failure of noradrenergic activation in increasing memory specificity at 28 days after training is that control animals trained with 0.3 mA foot-shocks shows a specific contextual fear memory at this remote time-point (N=9; Mean (A)=77.78±18.75; Mean (B)=33.68±10.20). This result has clinical relevance in the research of anxiety disorders which involve generalized fear responses.

Palavras-chaves: fear conditioning, emotional memory, memory generalization, norepinephrine, yohimbine
Agência Fomento: PIC/UFABC

13.005 - EFEITO DA DISTRIBUIÇÃO DE INTERVALOS NA TAREFA DE REPRODUÇÃO TEMPORAL

THE EFFECT OF INTERVAL DISTRIBUTION ON TEMPORAL REPRODUCTION

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Introdução:

Several studies have shown that when human participants are asked to reproduce the duration of different intervals, their performance is attracted towards the mean of the intervals (Jazayeri & Shadlen, Nat. Neurosci., 13(8), 1020, 2010). However, whether other aspects of the distribution of the presented intervals modulate performance remains unknown.

Objetivos:

We aimed to investigate if changing the underlying distribution of presented intervals can bias performance.

Métodos:

Forty human participants (19.9±2,9 y.o., 20 female, experiment approved by CEP number 03607118.4.0000.5594) were instructed to reproduce the duration of 200 sequentially presented visual stimuli. In each trial, we presented two circular targets in a computer screen, the first being the reference interval and the second the to-be-reproduced interval. During the second interval, the participant had to press a button to stop the presentation when a similar interval as the reference had elapsed. There were six possible intervals to be reproduced, linearly spaced between 650ms to 1300ms. Such intervals could be part of two distributions: either a “mostly-extreme” (U-distribution) or a “mostly-central” (inverted-U distribution). During the experiment, the first half of the trials followed one distribution while the next half followed the other. The order of distributions was balanced between participants. We performed a simple linear regression between presented and reproduced durations and compared the slope (β) between distributions and conditions.

Resultados e Conclusões:

We expected that the U-distribution would show less regression to the mean, which would result in a higher slope coefficient than for the inverted-U distribution. We found a marginally significant difference for the slopes of different distributions ($\beta_{inverted\text{-}U} = 0.72\pm0.25$, $\beta_U = 0.78\pm0.20$, $F(1,38) = 4.082$, $p = 0.05$), but did not find any differences regarding the interaction of distributions and condition ($F(1,38) = 0.748$, $p = 0.393$) nor condition itself (($F(1,38) = 0.005$, $p = 0.946$)). Our results suggest that the underlying distribution of the intervals modulate performance.

Palavras-chaves: Behavioural, Time Reproduction, Timing
Agência Fomento:

13.006 - EFEITOS DA INIBIÇÃO NORADRENÉRGICA NA ESPECIFICIDADE DA MEMÓRIA CONTEXTUAL EM RATOS

EFFECTS OF β-ADRENORECEPTOR BLOCKADE ON CONTEXTUAL FEAR MEMORY SPECIFICITY IN RATS

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Introdução:
Traumatic events are often better remembered than neutral events. A disorder associated with this occurrence is post-traumatic stress disorder (PTSD), which occurs after a very stressful event and causes generalization of the context where it occurred in situations where there is no imminent danger. Previous studies have shown that propranolol, a non-selective β-adrenergic receptor antagonist, has beneficial effects on PTSD symptoms in human trials, while others show evidence that propranolol reduces freezing in the discriminative contextual fear conditioning (CFC) in different memory procedures, thus reducing generalization.
Objetivos:
The present study aims to investigate the effects of β-adrenoreceptors blockade on memory specificity in different time-points, using the discriminative CFC task.
Métodos:
Male Wistar rats (CEUA-UFABC # 4544081018) were exposed to CFC training. In Experiment 1, they received 3 footshocks (1 mA, 1s each) and immediately after, were treated with propranolol (s.c. – 5.0 or 10.0mg/kg) or saline 0.9% (2mL/kg). In Experiment 2, a different set of animals went through the same experimental design, but with weaker footshocks (0.3mA) and immediately after, were treated with propranolol (i.p. – 2.5, 5.0 or 10.0mg/kg) or saline 0.9% (2mL/kg). Two days (Experiment 1 – recent memory) or 28 days (Experiment 2 – remote memory) later the animals were tested for memory specificity in a novel context (B) and 1 min later, in the training context (A). The freezing time (s) was measured in each context for 4 min and an Index of Generalization (IG) was calculated using the formula [(s) B/ ((s) A + (s) B)]. Behavioral results are expressed as the group mean IG ± standard error of the mean. The range expected for IG is from 0 (optimal discrimination) to 0.6 (optimal generalization).
Resultados e Conclusões:
In both, recent and remote memory, animals were able to discriminate between contexts, and post-training propranolol treatment did not affect the conditioned freezing response in any context at the two time-points. For Experiment 1, a one-way ANOVA showed no Treatment effect [F(2,25)=0.294;p=0.748; saline (N=10; Mean=0.37±0.05); propranolol 5mg/kg (N=9; Mean=0.39±0.03); 10mg/kg (N=9; Mean=0.41±0.04)]. For Experiment 2, there was also no significant Treatment effect [F(3,36)=0.180;p=0.909; saline (N=10; Mean=0.22±0.04); propranolol 2.5mg/kg (N=10; Mean=0.20±0.06), 5mg/kg (N=10; Mean=0.24±0.07); 10mg/kg (N=10; Mean=0.25±0.05)]. Our results suggest that, with the training parameters used in the present study, post-training β-adrenoreceptors blockade did not interfere with recent and remote memory specificity.
Palavras-chaves: Contextual fear conditioning, Emotional memory, Memory generalization, Noradrenergic receptors, Propranolol
Agência Fomento: PIC/UFABC

13.007 - ASPECTOS DO DESENVOLVIMENTO DO TREINO ESPACIAL NA PERSISTÊNCIA DE MEMÓRIAS DURANTE O ENVELHECIMENTO NORMAL.

ASPECTS OF SPATIAL TRAINING DEVELOPMENT IN THE PERSISTENCE OF MEMORIES DURING NORMAL AGING.
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Introdução:
Animals exposed to pre-adolescence training (19 to 21 postnatal day) present a beneficial learning when adolescents (Wartman et al., 2012). Prior to this phase, glucose metabolism shows a significant peak around the 14th to 17th day of life of rodents (Vannucci 2000).
Objetivos:
The relationship between behavioral aspects and metabolic demand in the brain is explored at the core of elucidating biological issues related to the perspective that pre-adolescence training may have an advantage for adult life.
Métodos:
Male C57BL/6 mice were used at 20 days and at 3 months of age. They consisted of two main groups: (i) trained in pre-adolescence and re-trained as adults; (ii) pseudotrained in pre-adolescence and trained for the first time as adults. The training was done on a task dependent on the hippocampus, the Barnes maze. Quantification of GLUT1, GLUT3, PMCA and Cav1.2 of the hippocampus will be characterized by Western Blot.
Resultados e Conclusões:
Pre-adolescent animals (p20-25): 1. Time spent at the periphery of the target hole, the trained group spent

more time near the target hole as trained in relation to the pseudotrained group, which did not learn (4th day - trained: 73 ⍰4.2s*, pseudotrained: 0.9 ⍰0.2s); 2. Cumulative distance to target hole, the trained group remained less distant from the target hole than the pseudotrained group that sought the most through the target hole and remained more distant (4th day - trained: 35322 ⍰10555cm*; pseudotrained: 132293 ⍰7685cm). Trained n= 7; Pseudotrained n= 5. These same animals were returned to the Barnes maze in the adulthood (3 months). 1. Time spent at the periphery of the target hole: the retrained group spent more time near the target hole presenting a beneficial learning already from the 1st day in relation to the animals trained for the first time (retrained: 58 ⍰6.2s*, first-trained: 22 ⍰9.6s); 2. Cumulative distance to target hole: the retrained group remained less distant, maintaining the advantage already on the 1st day compared to the first-trained group (retrained: 98522 ⍰5838cm*, first-trained: 137119 ⍰24301cm). The data represent the mean ⍰SEM analyzed using Two-way RM ANOVA with *p < 0.05; Retrained n= 3; First-trained n= 5. CEUA-UFABC – 7718170717. Conclusion: The results extend the findings of Wartman et al. (2012), showing that trained pre-adolescent animals retain beneficial learning in adulthood from the first day of training. It is mainly attested to the persistence of memory during development in relation to the use of distinct species, different developmental analysis and in another behavioral paradigm. References: 1. Brain Res. 1475:37, 2012. 2. Semin. Perinatol. 24:107, 2000.

Palavras-chaves: Cérebro Jovem, Glicose, Memória espacial, Proteínas, Desenvolvimento normal
Agência Fomento: Projeto FAPESP: 2016/50484-2. Bolsista FAPESP: 2018/17720-0

13.008 - MODULAÇÃO DO ARMAZENAMENTO DA MEMÓRIA DE RECONHECIMENTO SOCIAL ATRAVÉS DE SISTEMAS DE NEUROTRANSMISSORES NO CÓRTEX INSULAR.

MODULATION OF THE STORAGE OF SOCIAL RECOGNITION MEMORY BY NEUROTRANSMITTER SYSTEMS IN THE INSULAR CORTEX

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Introdução:

Introduction: The insular cortex (IC) receives projections from prefrontal, entorhinal and cingulate cortex, olfactory bulb and basal nuclei and has reciprocal connections with the amygdala and entorhinal cortex. These connections suggest a possible involvement in memory processes; this has been borne out by data on several behaviors. Social recognition memory (SRM) is essential to form social groups and to establish hierarchies and social and affective ties. Despite its importance, knowledge about the brain structures and the neurotransmitter mechanisms involved in its processing is still scarce.

Objetivos:

Aim: To investigate the participation of NMDA-glutamatergic, H2-histaminergic, D1/D5- dopaminergic, β-adrenergic and 5-HT1A-serotoninergic receptors of the IC on the consolidation of SRM.

Métodos:

Male Wistar rats (300-330g) with cannulae implanted intra-IC by stereotaxic surgery were subjected to a social discrimination task. After 4 consecutive days of habituation to the open field arena, animals were exposed to a conspecifc juvenile (22 days-old) for 1 hour (sample phase). Immediately after, the animals received infusions of Vehicle (Veh), NMDA coagonist D-serine (50 µg/side); NMDA antagonist AP5 (5 µg/side); D1/D5 agonist SKF38393 (12.5 µg/side); D1/D5 antagonist SCH33390 (1.5 µg/side); β-adrenergic agonist Isoproterenol (3 µg/side); β-adrenoreceptor antagonist Timolol (1 µg/side); H2 agonist Dimaprit (2.3 µg/side); H2 blocker Ranitidine (17.5 µg/side); 5-HT1A agonist 8-OH-DPAT (6.25 µg/side) or 5-HT1A antagonist NAN-190 (1.25 µg/side). Twenty-four hours after the sample phase, the animals were submitted to retention test, in which they were exposed for 5 min to the previously presented juvenile (familiar) and a second juvenile (novel). CEUA/PUCRS 15/00470.

Resultados e Conclusões:

Results: Antagonists and agonists of NMDA and H2 receptors had no effect on SRM. One-way ANOVA showed no significant differences among groups Veh, D-Serina and AP5 ($F(2,33) = 0.069$, $P = 0.932$; n = 12 animals per group), as well as among groups Veh, Dimaprit and Ranitidine ($F(2,27) = 0.029$ $P = 0.971$; n = 8-12 animals per group). The intra-IC infusion of

antagonists of D1/D5 or β-adrenergic and the agonist of 5-HT1A receptors immediately after the sample phase impaired the consolidation of SRM. One-way ANOVA followed by Tuckey's Multiple Comparison Test revealed significant differences between groups Veh and SCH233390 ($F(3,39) = 2.994$, $P = 0.042$; n = 9-12 animals per group), Veh and timolol ($F(3,36) = 3.149$, $P = 0.036$; n = 8-12 animals per group) and Veh and 8-OH-DPAT ($F(3,38) = 4.144$, $P = 0.012$; n = 8-12 animals per group). Conclusions: The results suggest that the dopaminergic D1/D5, β-adrenergic and serotonergic 5-HT1A receptors in the IC, but not glutamatergic NMDA and the histaminergic H2 receptors, participate in the consolidation of SRM in the IC.

Palavras-chaves: Insular Córtex, Neurotransmitters, Social recognition Memory, Memory, Memory Process
Agência Fomento:

13.009 - EFFECTS OF MEDIA MULTITASKING ON TIME EXPENDING READING, IMMEDIATE AND LONG-TERM MEMORY

EFFECTS OF MEDIA MULTITASKING ON TIME EXPENDING READING, IMMEDIATE AND LONG-TERM MEMORY

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Introdução:

To do something else while using some media is known as Media Multitasking (MM). Students often multitask by using mobile phones in the classroom while they are learning new information. This is detrimental as MM can impair cognitive functions and academic achievement. Trying to remember information (retrieval practice - RP) after it was learned can boost learning, but it is unknown if it can decrease negative effects of MM.

Objetivos:

We investigate whether receiving and reading short messages received on mobile phone while reading short texts impairs short (same day) and long-term retention (7 days later) of information presented in the texts.

Métodos:

This project (ethical approval: #2.697.276) involved 60 college students (15 men; mean±SD age 20.75±2.53 years). Each participant read three consecutive texts (about 700 word each) on PsychoPy v.2.1 Software (within-participants), each of which under two manipulations in random order. They either read the text without multitask (RO; control condition), or they read the text while receiving/reading three messages on their mobile phone (MM conditions). After reading each text, they were submitted to 3 other immediate manipulations: answering 7 short answer questions about the text [RO followed by RP (RO →RP) or MM followed by RP (MM →RP)] or they reread seven passages about the text that included the same information in the RP condition [MM followed by Reread (MM →RR)]. Seven days later the participants were asked to answer all 21 questions about the 3 texts (delayed recall).

Resultados e Conclusões:

There was no difference in the time participants took to read the texts in the RO and MM conditions. There was no effect of sex. However, multitasking while reading the texts [$F(1,56)=239.56$] impaired immediate recall (MM →RP: 32.50%±21.28%) compared to the only reading the text (RO →MM: 40.11%±24.43%) ($p < 0.04$; Cohen's $d=-0.33$). On delayed recall 7 days later, there was a testing-effect [$F(1,112)=167.25$; $p < 0.001$]. Participants in the MM →RR condition performed worse (22%±22.28%) than in the MM →RP (35.28%±23%; Cohen's $d=-0.59$) and RO →RP (38.28%±24.86%; Cohen's $d=-0.69$) conditions. There were no differences between MM →RO and MM →RP, which indicates that RP followed by feedback minimized the detrimental effects of MM while reading a text. We conclude that although participants did not take extra time reading the text while they multitasked, multitasking impairs immediate memory (by around 8%). Engaging in RP after reading only or multitasking led to higher recall days later than rereading similar content. Additionally, RP minimizes the effects of multitask while reading. The educational implications of this work are that multitasking while studying impairs memory and should be avoided. Educators can further decrease this effect by providing opportunities for students to practice retrieval.

Palavras-chaves: Media Multitasking, Retrieval Practice , Memory, Learning
Agência Fomento: Fundação Araucária de Apoio ao Desenvolvimento Científico e Tecnológico do Estado do Paraná

13.010 - EVIDÊNCIA DE MEMÓRIA DE TRABALHO COMO DÉFÍCIT DE DOMÍNIO GERAL EM DIFICULDADE DE APRENDIZADO EM MATEMÁTICA

EVIDENCE FOR WORKING MEMORY AS A DOMAIN-GENERAL DEFICITS IN MATHEMATICAL LEARNING DISABILITIES

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Introdução:

Mathematical learning disabilities (MLD) is characterized by the persistent difficulty in learning mathematics, which is not attributed to low intelligence, motor and sensorial deficits, or external factors. The underlying deficits of MLD are still under debate. On the one hand, domain-general factors, such as working memory (WM), have been indicated as the main deficits in MLD. On the other hand, a deficit in the approximate number system (ANS), which is the most basic form of quantity processing, has been indicated as a domain-specific deficit in MLD.

Objetivos:

To investigate the presence of domain-general and domain-specific deficits in MLD and their association with arithmetics performance.

Métodos:

This study had IRB approval (CAAE: 15070013.1.0000.5149). 280 children completed the arithmetics and spelling subtests of Teste do Desempenho Escolar. 35 children were classified with MLD (Mage= 9.25 +- 0.44 ; Mintelligence= 0.17 +- 0.71) and 173 children were classified with typical achievement (TA, Mage = 9.28 +- 0.45; Mintelligence = 0.35 +- 0.73). Groups matched in age, $t(206)= 0.31$, $p= 0.76$, and intelligence (measured with Raven), $t(206)= 1.32$, $p= 0.19$. Children completed the Corsi Blocks test (CB), a non-symbolic magnitude comparison (NSMC) task ("which array of dots is larger?"), and an arithmetics task. The span in the backward CB (CBB) was used as the WM measure, the Weber fraction (w), extracted from the accuracy in the NSMC task, was used as the ANS measure, and the total score in the arithmetic task was used as a measure of math achievement.

Resultados e Conclusões:

In CBB, children in the TA group (M = 4.74 +- 1.15) presented a higher span than children in the MLD group (M = 4.40 +- 0.69), $t(77.841) = 2.32$, $p < 0.05$. However, no significant difference between MLD (M = 0.27 +- 0.12) and TA (M = 0.25 +- 0.12) groups was observed for w, $t(206) = -0.77$, $p = 0.44$. Interestingly, both CBB span, $r = 0.345$, $p < 0.001$, and w, $r = -0.165$, $p < 0.05$, were correlated with the arithmetics task. Our results suggest that children with MLD present a lower WM span when compared to children with TA. This pattern is in line with the hypothesis that MLD mainly results from domain-general instead of domain-specific deficits. However, a significant correlation was found between the arithmetic task and both WM and ANS, indicating that these functions are important predictors of mathematics achievement. Overall, these results contribute to a better characterization of the MLD profile, which has implications not only for research but also for clinical diagnosis and interventions.

Palavras-chaves: Approximate Number System, Dyscalculia, Math Learning Difficulties, Mathematical Learning Disabilities, Working Memory
Agência Fomento: CAPES, FAPEMIG e CNPq

13.011 - INFLUÊNCIA DE ESTÍMULOS EXTERNOS NA ESTIMAÇÃO TEMPORAL

INFLUENCE OF EXTERNAL STIMULI ON TIMING ESTIMATION

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Introdução:

Daily, we estimate the passage of time from a certain event (starting point) to anticipate other events that will happen. That starting point, often called "time marker" can be self-controlled (e.g., a response emitted by the organism) or can be external to the organism (e.g., a light or sound). In other words, time markers can be responses or stimuli. But do they lead to similar temporal performance (i.e., is the organism as precise and accurate in predicting future events when a response or a stimulus is a time marker)? Previous studies comparing responses and stimuli as time markers have indeed suggested similar temporal performance between groups. Moreover, in an FI

procedure the rats estimate more precisely the passage of time on filled intervals (i.e. filled by stimulus) than empty intervals. However, the effect of the different types of time markers on temporal performance is still poorly described.
Objetivos:
The present experiment aimed to investigate the effect on performance of light (external stimulus) on timing estimation in a DRRD procedure.
Métodos:
In this experiment, nine rats were trained in a differential reinforcement of response duration schedule (DRRD). They had to maintain a lever press for at least 1.5 seconds in order to get reinforcement (Group Response, R). Lever presses shorter than 1.5 seconds were not reinforced. Concomitantly, a second group of nine rats was also trained in the DRRD schedule. However, for this second group, a light was turned on whenever the lever was pressed; was turned off when the lever was released; and remained off during the moments in which the lever was not pressed (Group Stimulus and Response, SR). Therefore, during training, the time marker for Group R was a response (lever press), while for Group SR both the response and the light served as time markers. Next, all rats had two testing sessions. For Group R, each test session had on average 80% of regular trials (similar to training) and 20% of trials in which the light was turned on during lever presses (similar to Group SR). For Group SR, each test session had on average 80% of regular trials and 20% of trials in which the light was off during lever presses (similar to Group R).
Resultados e Conclusões:
To assess temporal perfomance during test, lever press durations were compared to those produced during regular trials. Mean press duration (and standard deviation) in regular trials for group R was 1.48 (0.17), while for group SR it was 1.48 (0.18). During test trials, mean duration for group R was 1.59 (0.20), while for group SR it was 1.76 (0.32). A mixed-effects model analysis with trial (regular vs. test) as within-subjects factor, and group (R vs. SR) as between-subjects factor revealed a significant effect of trial ($F= 21.854$, $p = 0.002$), no effect of group ($F = 0.810$, $p = 0.395$), and close-to-significant trial by group interaction ($F= 3.914$, $p =0.083$). These results suggest that rats from both groups learned the target interval efficiently but relying on different time markers, since performance was disrupted by a change in the time marker tested during test trials.

Palavras-chaves: Timing, Operant Conditioning, Learning, external stimuli, rats
Agência Fomento: UFABC

13.012 - CORTICOSTERONA AUMENTA A DISCRIMINAÇÃO DA MEMÓRIA RECENTE DE MEDO AO CONTEXTO EM RATOS

CORTICOSTERONE INCREASES RECENT CONTEXTUAL FEAR MEMORY DISCRIMINATION IN RATS.
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Introdução:
Overgeneralized fear has long been implicated in generalized anxiety (GAD) and post-traumatic stress disorder (PTSD), however, mechanisms underlying memory consolidation are still not completely understood. Previous studies have revealed that stronger fear conditioning training protocols are associated with both increased post-training corticosterone (CORT) levels and fear responses at retrieval tests. Additionally, exogenous CORT administered immediately post-training modulates memory consolidation following an inverted U-curve trendline.
Objetivos:
Here we used discriminative contextual fear conditioning (CFC) to investigate the role CORT plays in the consolidation of fear memories, focusing in memory specificity.
Métodos:
Adult male Wistar rats were exposed to CFC training with two footshock intensities (0.3 or 1.0mA, in distinct experiments) and were immediately treated with CORT-HBC (4.0mg/kg or 8.0mg/kg (s.c). Sigma-Aldrich C174) or saline (2mL/kg). Two days later, rats were tested for memory specificity first in a novel context (B) and 1 min after in the training context (A). Order (B-A) was validated by a previous pilot experiment done in our lab. Freezing time (s) was used to measure memory strength and an Index of Generalization (IG) was calculated using the formula [(s) B / ((s) A + (s) B)]. The range expected for IG is from 0 (optimal discrimination) to 0.6 (optimal generalization). IG Values around 0.3 are intermediate between generalization and

discrimination. The procedures and experimental design was approved by CEUA-UFABC under process #5553080618.

Resultados e Conclusões:

CORT (8.0mg/kg) decreased memory generalization across contexts, by modulating freezing in A and by reducing freezing levels in B. Analyzing IG, CORT 8.0 has significantly decreased memory generalization [(0.3mA; N=7, Mean=0.20±0.06) (1.0mA; N=8, Mean=0.36±0.04)] when compared to the saline groups [(0.3mA; N=7, Mean=0.46±0.05) (1.0mA; N=7, Mean=0.50±0.01)]. Separate One-way ANOVAs showed significant Treatment effect for the 0.3mA ($F(2,19)=4.68$, $p=0.02$) and 1.0mA groups ($F(2,21)=6.66$, $p < 0.01$). Newmann-Keuls post-hoc test showed $p < 0.01$ between 8.0mg/kg and saline group for both intensities. No difference was found between the 4.0mg/kg and saline groups in both intensities. Merging both intensity of shocks, Saline group showed 13 generalizers (G) and 1 discriminator (D), the 4.0mg/kg showed 11 Gs and 5 Ds, and the 8.0mg/kg showed 5 Gs and 10 Ds . The Cochran-Armitage test for trend showed that there is a linear association between increasing CORT concentrations and the number of Ds [$X^2(1)=9.39$, $p < 0.01$]. For the first time, we report an association between CORT and improved recent memory discrimination. We also validate that CORT modulates memory strength following a dose-response inverted U-curve but, in addition, we show it modulates memory specificity following a positive, linear dose-response curve. This association will further advance clinical research in the treatment of PTSD and GAD.

Palavras-chaves: specificity, generalization, footshock, post-traumatic stress disorder, freezing

Agência Fomento: FAPESP processo número 2017/24012-9

13.013 - ASSINATURAS ELETROFISIOLÓGICAS DA PERCEPÇÃO DE TEMPO TAREFA-DEPENDENTE

TASK-DEPENDENT ELECTROPHYSIOLOGICAL SIGNATURES OF TIME PERCEPTION

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Introdução:

Studies that investigate the neural correlates of time perception often measure brain activity while participants perform a temporal task. However, several of these studies are based exclusively on tasks in which time is relevant, making it hard to dissociate brain activity related to temporal processing from other types of temporally structured brain activity.

Objetivos:

Our aim is to investigate electrophysiological signatures of time perception in a task-dependent manner, using a modified version of a task about judgments of the duration or the colour of two sequentially presented visual stimuli (Coull et al., 2004; Kulashekhar et al., 2016).

Métodos:

Twenty-two human volunteers (24.8±2.6 y.o., 12 female, experiment approved by CEP number 38370314.0.0000.5594) participated in the study. In each trial, participants were presented with two visual targets (S1 and S2) and had to judge whether S2 was shorter/longer or redder/ bluer than S1. The first target could last from 750ms to 1500ms, randomly, and coloured in the RGB space [1-C 0 C], where C could range randomly from 0.2 to 0.5. Duration of S2, as well as C, could be -80%, -40%, -20%, +20%, +40%, +80% of duration and C of S1. In different blocks, participants knew which magnitude (duration or colour) they would have to judge before (Pure Time or Pure Colour Conditions) or after (Mixed Condition) the presentation of the two stimuli.

Resultados e Conclusões:

Our behavioural results showed, as expected, that performance, measured by JND (Just Noticeable Difference), was better when participants knew beforehand which magnitude they would judge (JNDPureTime = 0.209±0.083s, JNDMixed(time trials) = 0.253±0.099s, paired t-test $t(21) = -3.0508$, $p = 0.0061$; JNDPureColour = 0.1029±0.064 of C parameter and JNDMixed(colour trials) = 0.157±0.082 of C parameter, paired t-test $t(21) = -3.3908$, $p = 0.0028$). Electrophysiological data (EEG) was analysed using a Representational Similarity Analysis (RSA) and a cluster-based permutation test approach to investigate whether and when information about time and colour was encoded. During the presentation of S1, we did not find consistent encoding of temporal, colour or task information (no candidate clusters). On the other hand, after S2 offset, we found that temporal information was encoded in a task-relevant manner (Pure Time Condition: window tested = -50ms-500ms from S2 offset; cluster = 202-500ms, $p < 0.001$; Pure

Colour condition: no cluster candidates). Our results suggest that these correlates of time perception arise from decisional stages, rather than encoding stages.
Palavras-chaves: Behaviour, Electrophysiology, RSA, Time Perception
Agência Fomento: Processo nº 2017/24575-3, Fundação de Amparo à Pesquisa do Estado de São Paulo (FAPESP).

13.014 - O COMPROMETIMENTO DA MEMÓRIA DECLARATIVA INDUZIDO PELA DOR INDEPENDE DA INTENSIDADE

PAIN-INDUCED IMPAIRMENT OF DECLARATIVE MEMORY IS INDEPENDENT OF PAIN INTENSITY
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Introdução:
Memory is an important process that has a significant impact on daily occupational activities. The declarative memory formation is divided into three basic processes: acquisition, consolidation and evocation. These processes are highly modifiable according to environmental, hormonal and physical conditions of the individual at the time of living. In this context, pain is an important variable that can influence some cognitive activities, such as memory. However, there is a lack of reports regarding the effects of pain on memory formation. Thus, understanding which process of memory formation is affected by pain is the first step to unveil the mechanisms responsible for the cognitive deficit associated with pain.
Objetivos:
We sought to determine the effects of pain in each of the novel object recognition memory processes in rats: acquisition, consolidation and evocation. Moreover, we investigate whether the analgesic treatment with morphine or anesthetic treatment with lidocaine would prevent the pain-induced impairment on memory.
Métodos:
The experiments were performed in Male Wistar rats weighing 270-320 g. All procedures were approved by the Ethics Committee on Animal Research (protocol n°1079). In order to evaluate the effect of pain during different phases of memory processing, formalin (1% or 0,25%) was injected into the hind paw at different experimental time points on object recognition test: 20 minutes before training (test for memory acquisition), immediately after training (test for memory consolidation) and 20 minutes before the test (test for memory evocation). In some groups, there are other treatments after consolidation phase, an intraperitoneal injection of the opioid morphine or a subcutaneous injection of lidocaine solution. The nociceptive behavioral responses characterized by flinches were measured for 60 minutes in a mirrored-wood chamber. Data with normal distribution and homogeneity of variance were analyzed by t-test, one-way or two way ANOVA. Data that failed in the normality test and/or homogeneity of variance were analyzed by the Kruskal-Wallis test.
Resultados e Conclusões:
In this study, we demonstrated that pain impairs acquisition and consolidation, but not evocation of object recognition memory, a declarative-type of memory. Animals that received formalin before or immediately after the training, but not before the test, explored similarly the novel and familiar object during the test. In addition, morphine administration drastically reduced nociceptive behavior but did not prevent the pain-induced impairment on memory. However, the formalin-induced impairment of object recognition memory was prevented by lidocaine which is a local anesthetic and therefore completely blocked the nociceptive behaviour. Thus, our findings suggest that the decrease of pain is not sufficient to prevent the impairment of memory consolidation. In this sense, the magnitude of memory impairment likely depends on the presence of nociceptive activity, but not on its intensity.
Palavras-chaves: pain, memory, object recognition, morphine, lidocaine
Agência Fomento: CAPES

13.015 - DONEPEZIL REVERSES SCOPOLAMINE-INDUCED DEFICITS IN SPONTANEOUS OBJECT RECOGNITION MEMORY OF MARMOSET MONKEYS (Callithrix penicillata).

DONEPEZIL REVERSES SCOPOLAMINE-INDUCED DEFICITS IN SPONTANEOUS OBJECT RECOGNITION MEMORY OF MARMOSET MONKEYS (Callithrix penicillata).
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Introdução:
Recognition memory is the ability to judge whether stimuli have been encountered in the past. This important cognitive function can be impaired in neurological disorders, such as Alzheimer's Disease (AD), where significant cholinergic neurotransmission deficits are observed. Muscarinic receptor antagonism with scopolamine (SCP) can reversibly impair object recognition. Furthermore, acetylcholinesterase inhibitors (e.g., donepezil - DPZ) are the main pharmacological treatment available for AD, yet few studies have specifically assessed their effects on this type of memory.
Objetivos:
Thus, we determined whether an acute DPZ treatment in marmoset monkeys (Callithrix penicillata) could reverse a SCP-induced deficit in the spontaneous object recognition (SOR) task. Although this task is widely used to assess recognition memory in rodents, it was only recently extended to nonhuman primates.
Métodos:
The study was approved by the Animal Ethics Committee of the University of Brasilia (no. 37/2017). Marmosets were randomly assigned to an experimental group (n=5/group): saline (SAL), 0.05 mg/kg of SCP or 0.50 mg/kg of DPZ + 0.05 mg/kg of SCP, and initially submitted to a single 10 min habituation trial in an open field apparatus. After a 24 h period, each subject was tested in the SOR task. For this two-trial procedure, each marmoset received its respective treatment and, after 20 min, a 10 min sample trial was held. Then, after a 6 h retention interval, a 10 min test trial was held. On the sample trial, two identical objects were placed in the apparatus. On the test trial, one object was replaced with a new item.
Resultados e Conclusões:
Marmosets given SAL explored the new object significantly longer than the familiar item, whereas those that received SCP explored both objects equally. Interestingly, the DPZ+SCP group also spent significantly more time exploring the new rather than the familiar object. However, the latency to start exploring on the test trial did not differ between the objects or groups. Likewise, total exploration and locomotion were similar between groups and over trials. Therefore, an acute SCP treatment impaired the marmosets' performance in the SOR task, which was prevented by the acetylcholinesterase inhibitor DPZ. The SOR task is also a promising new behavioral tool to assess recognition memory in monkeys.
Palavras-chaves: donepezil, marmoset, monkey, recognition memory, scopolamine
Agência Fomento: CAPES

13.016 - NO EVIDENCE FOR PERCEPTUAL LEARNING OF TWO DURATIONS AT ONCE IN HUMANS

NO EVIDENCE FOR PERCEPTUAL LEARNING OF TWO DURATIONS AT ONCE IN HUMANS
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Introdução:
Several studies have indicated robust temporal perceptual learning in the scale of a few hundreds of milliseconds in humans (Bueti & Buonomano, TIME, 2:3, 2014). This effect is usually verified in single-condition training protocols; however, there is also evidence for learning of two durations when trained consecutively (Banai et al., Neurosci, 165:2, 2011).
Objetivos:
In this study, we aimed to investigate, in human participants, the effects of learning both 100ms and 500ms empty auditory intervals over training, and the effect of generalization of learning to the untrained visual modality.
Métodos:
Temporal discrimination thresholds were measured within a session for each standard duration in separate blocks of trials, using a single stimulus protocol (Karmarkar & Buonomano, Learn Mem, 10:2, 2003) and following a Psi staircase. Participants in the training group (N=34) underwent a pre-test session (day 1), a training phase with five sessions (days 2-6), and a post-test session (day 7). The control group (N=18) took part only in the two test sessions. During testing, auditory and visual blocks were presented in randomized order. In the auditory-only training phase, all blocks of one duration were consecutively presented before the other duration in a session, and that order remained the same among all sessions of a given participant. We selected for further analysis only participants whose thresholds improved with training, as indicated by negative regression slopes (N=18). This

study has been approved by the local ethics committee (CAAE: 90852818.6.0000.5594).
Resultados e Conclusões:
Improvements in temporal discrimination were verified for 85% of participants who started each session with the 100ms blocks, but for only 40% that performed the 500ms blocks first. Pre- and post-test data, computed as learning indexes, revealed positive learning for both training and control groups in all conditions: auditory 100ms (mean=0.27, SD=0.36, t(35)=4.47, p < .001, d'=0.74) and 500ms (mean=0.25, SD=0.8, t(35)=5.31, p < .001, d'=0.88), and visual 100ms (mean=0.17, SD=0.3, t(35)=3.4, p < .001, d'=0.57) and 500ms (mean=0.18, SD=0.26, t(35)=4.27, p < .001, d'=0.71). When these indexes were compared between groups, no differences were detected, neither for the within subjects effects of duration (F(1,34)=0.006, p=0.94), modality (F(1,34)=2.26, p=0.14), their interaction (F(1,34)=1.95, p=0.17), and the between-subjects effect of group (F(1,34)=1.18, p=0.28). Although a trend of lowering thresholds could be observed during training, this enhancement was not sufficient for distinguishing overall test performance from the control group.
Palavras-chaves: Cross-modal generalization, Perceptual learning, Sub-second interval, Time perception
Agência Fomento: Fundação de Amparo a Pesquisa do Estado de São Paulo (FAPESP)

13.017 - EFFECTS OF NEONATAL IMMUNE ACTIVATION ON VISUAL MEMORY AND GSK-3β AND TAU PROTEIN EXPRESSION IN THE BRAIN

EFFECTS OF NEONATAL IMMUNE ACTIVATION ON VISUAL MEMORY AND GSK-3β AND TAU PROTEIN EXPRESSION IN THE BRAIN
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Introdução:
The neonatal immune system is still immature, which makes them more susceptible to the infectious agents. Neonatal immune activation is associated with increased permeability of the blood-brain barrier, causing an inflammatory cascade in the central nervous system (CNS) and altering behavioral and neurochemical parameters. One of the hypotheses that has been studied is that neuroinflammation may be involved in neurodegenerative processes.
Objetivos:
Evaluate visuo-spatial memory, cytokines levels and the expression of tau and GSK-3 β proteins in hippocampus and cortex of adult animals exposed to neonatal endotoxemia.
Métodos:
Male and female C57BL/6 animals were used and with two days old received a single subcutaneous administration of 25 µg/kg of lipopolysaccharide (LPS) (O26:B6 E. coli LPS). The control group received PBS. The animals were monitored on the days following exposure to endotoxemia for evaluated to mortality, resulted in survival of 25% after 80h. At 60,120 and 180 days old, visual-spatial memory was evaluated through the morris water maze aims to evaluate learning and the ability to acquire spatial memory using environmental tips. In the test, the time spent in the quadrant in which the platform was located is evaluated. The acquisition was evaluated the system Any-Maze ®. The hippocampus and cortex were dissected and the concentration of cytokines (IL-1 β and TNF- α) was determined by ELISA (R & D Systems, Minneapolis, MN) and expression of tau and GSK-3 β proteins, through the technique of western blot. All procedures were approved by the Animal Care and Experimentation Committee of UNISUL 17.003.4.01.IV. Naïve animals were used for endogenous controls. For statistical analyses, Shapiro-Wilk normality test were utilized to determine the parametric and nonparametric data. Data from the behavioral test and biochemical analyses are parametric data and it were reported as mean±SEM and analyzed by the Student's t test. A *p < 0.05 was considered statistically significant.
Resultados e Conclusões:
Results: The animals exposed to LPS in the neonatal period present visuo-spatial memory impairment at 120 and 180 days old (p < 0.0001 and p = 0.0403 respectively). Here was an increase of TNF- and IL-1 levels in the hippocampus and cortex only at 60 days old (p > 0.05). Here was an increase in the expression of GSK-3 β in hippocampus of the animals at 60, 120 and 180 days old (p < 0.0001, p = 0.0150 and p = 0.040 respectively). In the cortex, this increase occurred in the 120 and 180 days old (p = 0.0396 and p = 0.0066 respectively). Tau protein expression was high in hippocampus and cortex at 120 days old (p = 0.0127 and p = 0.0004 respectively) and in hippocampus at 180 days old (p = 0.0171). Conclusion: The data show

that neonatal immune activation may be associated with long-term visuo-spatial memory impairment, neuroinflammation and increased expression of GSK-3 β and Tau proteins in CNS.
Palavras-chaves: neonatal immune activation, central nervous system, GSK-3β, Tau
Agência Fomento:

13.018 - INFRALIMBIC CORTEX ACTIVITY DURING CONTEXTUAL FEAR MEMORY CONSOLIDATION ENSURES MEMORY SPECIFICITY AND SUSCEPTIBILITY TO EXTINCTION

INFRALIMBIC CORTEX ACTIVITY DURING CONTEXTUAL FEAR MEMORY CONSOLIDATION ENSURES MEMORY SPECIFICITY AND SUSCEPTIBILITY TO EXTINCTION
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Introdução:
Memory formation and maintenance are some of the most important physiological processes for animal behavior regulation. For successful learning and memory retention, several brain regions are required, and their activity can modulate it. In rodents, the infralimbic (IL) cortex activity is associated with extinction memory acquisition and consolidation [1,2]. However, its role in the consolidation of aversive memories is still elusive. References: 1 – Milad, Nature, 420, 70, 2002 2 – Do-Monte, J. of Neuroscience, 35, 3607, 2015
Objetivos:
The aim of this study was to investigate the IL's role in memory consolidation using a contextual fear conditioning (CFC) paradigm.
Métodos:
In our experiments, the GABA-A agonist muscimol (MUS) was injected directly into the IL cortex, through guide cannulae surgically implanted, to transiently inactivate this brain region in different stages of memory processing. In all experiments, animals were tested in the same context (test A) or in a novel one (test B) in the days following the CFC. All data are expressed as mean ± SEM of the percentage of time spent freezing.
Resultados e Conclusões:
Initially, MUS or vehicle (VEH) was injected into the IL immediately after CFC. No differences were found between groups on test A, but on test B the MUS group expressed significantly higher freezing levels when compared with controls (MUS: 30 ± 3 %; VEI=17 ± 3%; P=0.008; N=7/group), suggesting a role for the IL's activity during consolidation in suppression of fear memory generalization. In the next experiment, MUS or VEH was injected into the IL 6 h after the CFC, a moment in which the consolidation process is considered to have already ended. No differences were found in tests A and B, suggesting the IL involvement is time-dependent. When animals were trained in a lower intensity CFC, differences were only found, again, in test B (MUS: 22 ± 4%; VEI=13 ± 2%; P=0.04; N=7/group), indicating that the IL control over consolidation is independent on the conditioning intensity. Finally, the last experiment assessed the effect of an IL inactivation during consolidation upon subsequent extinction learning. MUS-treated animals expressed higher freezing levels in tests A (MUS: 61 ± 6%; VEI: 28 ± 5%; P=0.01; N=7-8/group) and B (MUS: 34 ± 7%; VEI: 10 ± 1%; P=0.001; N=7-8/group) posterior to extinction, suggesting that IL's activity during consolidation is not only necessary for specificity but also required for successful extinction training. The MUS-rats also had a significantly lower extinction rate, measured as the ratio between freezing levels in pre- and post-extinction tests A, when compared to controls (MUS: 21 ± 4%; VEI: 60 ± 6%; P=0.0001; N=7-8/group). The present results suggest that activity in IL cortex during contextual fear memory consolidation controls memory specificity and extinction susceptibility. The research was approved by the local Animal Research Ethical Committee (CEUA-UFSC) under the protocol number 9263110516
Palavras-chaves: Contextual fear conditioning, Fear generalization, Medial prefrontal cortex, Muscimol
Agência Fomento: CNPQ

13.019 - EXTINCTION LEARNING WITH SOCIAL SUPPORT DEPENDS ON PROTEIN SYNTHESIS IN PREFRONTAL CORTEX BUT NOT HIPPOCAMPUS

EXTINCTION LEARNING WITH SOCIAL SUPPORT DEPENDS ON PROTEIN SYNTHESIS IN PREFRONTAL CORTEX BUT NOT HIPPOCAMPUS
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Introdução:
In tasks related to the extinction of fear memory, social interaction may be a positive regulator at inhibiting behavioral response to fear and thus may be an easy and accessible alternative for the treatment of fear disorders.
Objetivos:
The objectives of this research was to evaluate the response of extinction memory with social support, as well to verify the different brain regions involved in this memory.
Métodos:
Male Wistar rats (300-330g) were subjected to CFC task alone and 24h later they were submitted to a 10-min extinction training (Ext) of CFC, Alone or in the presence of a familiar non-fearful conspecific (Social Support). After 24h all animals were placed again in the same apparatus alone for a 3-min extinction retention test (Test). Animals received infusions of vehicle (Veh), Anisomycin (Ani, 80 µg per side; inhibitor of protein synthesis), Rapamycin (Rapa, 5 µg per side; mTOR-dependent protein synthesis inhibitor) or DRB (8 ng per side; inhibitor of gene expression) into the ventromedial prefrontal cortex (vmPFC) or into the CA1region of the hippocampus immediately after the Ext. Data were analyzed by one-way ANOVA followed by the Newman–Keuls test or by two-way ANOVA followed by the Bonferroni test. CEUA/PUCRS 7480.
Resultados e Conclusões:
The presence of a social support during the Ext inhibits the retrieval but not the consolidation of the extinction of CFC. One-way ANOVA showed significant differences between groups ($F(3,28) = 16.40$; $P < 0.0001$), and Newman-Keuls test revealed significant differences between the first 3 min of Ext Support and the first 3 min of Ext Alone. During the Test, animals of both Alone and Support groups that received intra-vmPFC infusions of Aniso, Rapa or DRB showed an impairment of extinction memory when compared to their control groups. Group Alone: Boferroni's post-hoc revealed significant differences between Veh vs. Ani ($P < 0.01$), Veh vs. Rapa ($P < 0.001$), and Veh vs. DRB ($P < 0.001$). Similar results were observed on the Test Support group: Veh vs. Ani ($P < 0.001$), Veh vs. Rapa ($P < 0.001$), and Veh vs. DRB ($P < 0.001$). CONCLUSION: The consolidation of extinction memory with social support relies on vmPFC rather than hippocampus gene expression and ribosomal and mTOR-dependent protein synthesis. These results provide additional knowledge about the cellular mechanisms and brain structures involved on the effect of social support in changing behavior and fear extinction memory.
Palavras-chaves: contextual fear conditioning, extinction, social support
Agência Fomento:

14. Cognição & Emoção

14.001 - PERDA DA ASSIMETRIA ATENCIONAL POR SOBRECARGA DE ESTÍMULOS NUMA TAREFA DE ATENÇÃO DIVIDIDA

LOSS OF ATTENTIONAL ASYMMETRY DUE TO OVERLOAD OF STIMULI IN A DIVIDED ATTENTION TASK
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Instituição: 1 Unoeste - Universidade do Oeste Paulista (Campus 1, Presidente Prudente-SP), 2 Biomed-Unoeste - Curso de Biomedicina - Universidade do Oeste Paulista (Campus 1, Presidente Prudente-SP)
Introdução:
Attention involves the ability to respond preferentially to more significant stimuli in detriment of distractors. Divided attention is a process in which there is simultaneous processing of different stimuli, impairing the performance and increasing the response time in comparison to the individual execution of the same tasks. There is evidence of asymmetries in the attention mechanisms, exhibited by shorter reaction times and number of errors to the right side compared to the left side of the space.
Objetivos:
The present study verified the presence of attentional asymmetry in a divided attention task, assuming that there are alterations in the attentional process with the increase of the demand.
Métodos:
This study was registered and approved by the National Research Ethics Committee under CAAE number 87866718.1.0000.5515. Forty-three healthy young adults of both genders participated. Participants performed 336 trials of the Landmark Test (LT) alone or concomitantly with competing tasks (word or number memorization), distributed in seven blocks. Test protocols were developed on Psychopy software. Analysis of variance for repetitive measures (ANOVA)

were used to compare the mean reaction times (RT) and the mean percentage of errors in LT with Task, Position and Deviation (from center) as factors.
Resultados e Conclusões:
The results for the RT showed a significant difference for the Deviation factor (F2,72=37,414, p < 0.001) and close to significant interaction for the Task, Side and Gender factors (F2,72=2,910, p=0.061). There was no significant difference for Task (F2.72=1.363, p=0.263), Position (F1.36=1.707, p=0.200) and between Genres (F1.36=0.127, p=0.724). The ANOVA for errors showed significant differences for Task (F2,82=39,631, p < 0.001), Position (F1.41=7.971, p=0.007), Deviation (F2,82=309,586, p < 0,001) and for the interactions between Task and Position (F2,82=14,587, p < 0.001), Task and Deviation (F4,164=8.325, p < 0.001), Position and Deviation (F2,82=5,001, p=0.009) and Task, Position and Deviation (F4,164=9,483, p < 0.001). There was no significant difference between the Genders (F1.41=0.034, p=0.856) or their interactions.. The results pointed to a discrete alteration of the normal attentional asymmetry in the overload conditions evidenced by possibly the symmetry of the reaction times in men and also by the greater increase in the number of errors for right targets in relation to left targets, even during the improvement of the participants' performance by learning the task.
Palavras-chaves: attention, cognition, psychophysics, psychophysiology, reaction time
Agência Fomento: Unoeste

14.002 - EFEITOS DA ESTIMULAÇÃO TRANSCRANIANA POR CORRENTE CONTÍNUA CEREBELAR ASSOCIADA AO TREINO COGNITIVO NA MEMÓRIA DE TRABALHO EM IDOSOS SAUDÁVEIS

EFFECTS OF CEREBELLAR TRANSCRANIAL STIMULATION BY CONTINUOUS CURRENT ASSOCIATED WITH COGNITIVE TRAINING OF WORKING MEMORY IN HEALTHY ELDERLY

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Introdução:
Evidence suggests that the cerebellum is involved cognition abilities. Transcranial direct current stimulation (tDCS) has been identified as a tool capable of modulating neural patterns.
Objetivos:
To investigate the acute and cumulative effects of transcranial stimulation applied to the cerebellum associated with cognitive training in working memory in healthy elderly. This study was approval to REC-UFPE (CAAE: 79909817.5 .0000.5208).
Métodos:
Thirty healthy volunteers aged 60-72 years (mean ≅ 66.3), (25 female and 5 male) were recruited. They were randomly divided into experimental group (EG: 15 participants) was submitted to cerebellar anodic stimulation (anodic tDCS) and control group (CG: 15 participants) was submitted to sham current (simulated tDCS). Each participant underwent five sessions following their pacing protocol. All participants underwent cognitive training during tDCS (anodic or sham). The performances were measured through neuropsychological tests to assess working memory [Digit Span Forward and Backward Test (DSF/ DSB) and Letter-Number Sequencing Test (LNST)]. Measurements occurred in the first session before (T1) and after the intervention (T2), after a week (T3) and three months (T4) of the last stimulation session.
Resultados e Conclusões:
Based on the GLM of repeated measurements, there is an interaction effect between Time x Group for direct order (F (3.04, 85.13) = 2.57, p = 0.04, η2 = 0.084). The posthoc analysis (Bonferroni) of the interaction between Time x Group showed that there was difference in the values of the tests in the direct order within the EG between T1 and T4 (p = 0.035). However, the interaction between Time x Group showed that there was no difference in the DSF within the CG (p > 0.05) between the three times. The results of the DSB the GLM analysis showed that there is no effect on the interaction between Time x Group in the intra-group analysis of the EG (p > 0.05). The analysis of the LNST, GLM revealed that there was no interaction effect between Time x Group in the intra-group analysis in both groups (p > 0.05). In the evaluation performed at T1, the two groups was observed that for all tests there was no significant difference between the means (p > 0.05). In the DSTF, the results in the EG (Mean = 9.704, standard deviation (SD)= 1.76 and p = 0.934) and in the CG (M= 9,762, SD= 2.03 and p = 0.934) were similar. In the DSB the results in the EG (Mean = 4.007, SD = 1.12 and p = 0.395) and in the CG (M = 4.54, SD = 2.10,p = 0.395) were similar as well. In the LNST the results in the EG (Mean = 6.633, SD = 1.55 and p = 0.532) and in the CG (M = 6.167, SD= 2.40, p = 0.532) were also similar independent of the moment of application (p >

0.05). The anodic tDCS improved the performance of the EG in the intra-group analysis in the DSF when compared to T1 and the T4 ($p < 0.05$). These results suggest that the concept of polarity-dependent is not well diffused for transcranial direct current stimulation in the cerebellum.

Palavras-chaves: cerebellum, cognitive training, transcranial stimulation

Agência Fomento: FACEPE

14.003 - EFEITOS DA ESTIMULAÇÃO TRANSCRANIANA POR CORRENTE CONTÍNUA CEREBELAR ASSOCIADA AO TREINO COGNITIVO NA MEMÓRIA DE TRABALHO EM IDOSOS SAUDÁVEIS

EFFECTS OF CEREBELLAR TRANSCRANIAL STIMULATION BY CONTINUOUS CURRENT ASSOCIATED WITH COGNITIVE TRAINING OF WORKING MEMORY IN HEALTHY ELDERLY

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Instituição: 1 UFPE - Universidade Federal de Pernambuco (Av. Prof. Moraes Rego, 1235 - Cidade Universitária, Recife - PE.)

Introdução:

Evidence suggests that the cerebellum is involved cognition abilities. Transcranial direct current stimulation (tDCS) has been identified as a tool capable of modulating neural patterns.

Objetivos:

To investigate the acute and cumulative effects of transcranial stimulation applied to the cerebellum associated with cognitive training in working memory in healthy elderly. This study was approval to REC-UFPE (CAAE: 79909817.5 .0000.5208).

Métodos:

Thirty healthy volunteers aged 60-72 years (mean ≅ 66.3), (25 female and 5 male) were recruited. They were randomly divided into experimental group (EG: 15 participants) was submitted to cerebellar anodic stimulation (anodic tDCS) and control group (CG: 15 participants) was submitted to sham current (simulated tDCS). Each participant underwent five sessions following their pacing protocol. All participants underwent cognitive training during tDCS (anodic or sham). The performances were measured through neuropsychological tests to assess working memory [Digit Span Forward and Backward Test (DSF/ DSB) and Letter-Number Sequencing Test (LNST)]. Measurements occurred in the first session before (T1) and after the intervention (T2), after a week (T3) and three months (T4) of the last stimulation session.

Resultados e Conclusões:

Based on the GLM of repeated measurements, there is an interaction effect between Time x Group for direct order ($F (3.04, 85.13) = 2.57$, $p = 0.04$, $\eta 2 = 0.084$). The posthoc analysis (Bonferroni) of the interaction between Time x Group showed that there was difference in the values of the tests in the direct order within the EG between T1 and T4 ($p = 0.035$). However, the interaction between Time x Group showed that there was no difference in the DSF within the CG ($p > 0.05$) between the three times. The results of the DSB the GLM analysis showed that there is no effect on the interaction between Time x Group in the intra-group analysis of the EG ($p > 0.05$). The analysis of the LNST, GLM revealed that there was no interaction effect between Time x Group in the intra-group analysis in both groups ($p > 0.05$). In the evaluation performed at T1, the two groups was observed that for all tests there was no significant difference between the means ($p > 0.05$). In the DSTF, the results in the EG (Mean = 9.704, standard deviation (SD)= 1.76 and $p = 0.934$) and in the CG (M= 9,762, SD= 2.03 and $p = 0.934$) were similar. In the DSB the results in the EG (Mean = 4.007, SD = 1.12 and $p = 0.395$) and in the CG (M = 4.54, SD = 2.10,$p = 0.395$) were similar as well. In the LNST the results in the EG (Mean = 6.633, SD = 1.55 and $p = 0.532$) and in the CG (M = 6.167, SD= 2.40, $p = 0.532$) were also similar independent of the moment of application ($p > 0.05$). The anodic tDCS improved the performance of the EG in the intra-group analysis in the DSF when compared to T1 and the T4 ($p < 0.05$). These results suggest that the concept of polarity-dependent is not well diffused for transcranial direct current stimulation in the cerebellum.

Palavras-chaves: cerebellum, cognitive training, transcranial stimulation

Agência Fomento: FACEPE

14.004 - ANÁLISE DAS POPULAÇÕES NEURONAIS DOS CIRCUITOS ENVOLVIDOS NA AGRESSÃO E DEFESA SOCIAL EM ROEDORES.

ANALYSIS OF ACTIVE NEURONS IN AGGRESSIVE AND SOCIAL DEFENSIVE BEHAVIOUR IN MICE

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Instituição: 1 USP - University of São Paulo (Av. Professor Lineu Prestes, 2415)

Introdução:
Amygdalar, hypothalamic and brainstem nuclei play an important role in the modulation of social behaviour through olfactory clues (Gross & Canteras, 2012; Hashikawa et al, 2016; Swanson, 2000).The resident-intruder paradigm has been widely used in social behavioural neuroanatomic studies (Miczek, 1979). This paradigm was important to outline a common brain circuit which is involved in aggressive and social defensive behaviour in the mice.
Objetivos:
Analyse neural populations selective activated in the neural circuit of aggressive and defensive behaviour in each social context (aggression and social defeat) in mice.
Métodos:
Animals (n=15) were exposed to the resident-intruder paradigm in both social context, then they were transfunded and the histological material collected and processed. We performed a double immunofluorescence (IF) and fluorescent in situ hybridization (FISH) in order to analyse the pattern of Fos expression in the ventrolateral part of the ventromedial hypothalamic nucleus (VMHvl); anterior and posterior MEA (MEAa, MEAp); and interfascicular and principal part of the bed nucleus of stria terminalis (BSTif, BSTp). Ethical committee approval protocol n°23/2017.
Resultados e Conclusões:
In the MEA, our data demonstrates a different mobilized neural populations comparing aggression and social defeat, ANOVA group effect: MEAa ($F(3,34) = 8,83$); $p=0,0015$), MEAp ($F(3,34) = 14,432$; $p < 0,00015$). The analysis of the pattern of activated neurons in the nuclei of the BST, indicates a similar activation for the different contexts: ANOVA group effect: BSTif ($F(3,34) = 16,55$; $p = 0,00007$) e no BSTp ($F(3,34) = 12,68$; $p < 0,0003$). Our data suggest that different neural population are active in both behavioural contexts, although the same nuclei are activated in both aggression and social defeat. Results of the neural pattern of activation in the MEA nuclei, indicates that, the neural population might be reacting to individual exploration of the different contexts. Interestingly, the neural activation in the BST nuclei suggests a role of this nucleus in signaling which context the animal is facing.
Palavras-chaves: Neuroanatomy, Social Behaviour, Hypothalamus
Agência Fomento: CNPQ-CAPES

14.005 - ESTADO REDOX NO CÉREBRO DE Danio rerio (ZEBRAFISH) NO COMPORTAMENTO TIPO-AGRESSIVO: POSSÍVEL PARTICIPAÇÃO DO RECEPTOR CANABINÓIDE TIPO 1 (CB1).

REDOX STATE IN THE BRAIN OF Danio rerio (ZEBRAFISH) IN THE AGGRESSIVE-LIKE BEHAVIOR: POSSIBLE PARTICIPATION OF THE CANNABINOID TYPE 1 RECEPTOR (CB1).
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Instituição: 1 UFPA - Federal University of Pará (1-Augusto Corrêa Street, Belém, PA, 66075-110, Brazil.), 3 UM - University of Michigan (500 S State Street, Ann Arbor, MI 48109, EUA), 4 NMT - Nucleus of Tropical Medicine (92-Generalíssimo Deodoro Avenue, Belém, PA, 66055-240, Brazil)
Introdução:
Aggression is a set of behaviors emitted by animals when it is necessary to protect themselves, during resource disputes or the risk of imminent predation. This behavior is observed in Danio rerio through the establishment of hierarchies involving complex neurochemical systems. In this context, the endocannabinoid system is responsible for the modulation of complex behaviors, such as social interactions. In addition, submissive individuals are known to undergo disturbances at the cellular level, such as oxidative stress. However, the participation of this system in the regulation of behavioral and biochemical changes in Danio rerio is still unknown.
Objetivos:
The aim of this work was to assess the participation of the cannabinoid type 1 receptor in the behavioral and biochemical modulation of aggression in Danio rerio.
Métodos:
In this study, 36 subjects were used and divided into two groups: saline (n=18) and ACEA (n =18). Furthermore, 48 subjects were used for the biochemical analyses and divided into three groups: control (n =8), saline (n =16) and ACEA (n =16) all with 0.5 g and aged 12-14 weeks. The procedure consists in 24-hour isolation and after that was administered via i.p 5 µl of ACEA (CB1R agonist), followed by the removal of the barrier and 30 minute of interaction, in

which only the initial and final five minutes were filmed for analysis. The control group doesn't participate of the fights. Furthermore, the behavioral parameters analyzed were: chase, strike, bite, flee, retreat and freeze. Thus, according to the frequency of the behaviors the subjects were identified as dominant and submissive. After the dyads, the subjects were sacrificed and their brains were removed for biochemical analysis to measure levels of non-protein thiol. The experiments were done according to the animal ethics committee (213-14 - CEPAE UFPA). In addition, the data was analyzed using the two-way ANOVA followed by post hoc Tukey, considering $p < 0.05$.

Resultados e Conclusões:

The results show a significant decrease in chase behavior in dominant subjects of the ACEA group compared to the saline group (saline 33.57±6.33, ACEA 7.71±1.98, $p = 0.0018$). In addition, there was a reduction in strike behavior in ACEA dominant subjects in relation to the Saline group (Saline 44.50±8.90, ACEA 3.66± 2.26, $p = 0.0001$). There was also a reduction in bite behavior of dominant subjects between the ACEA and saline groups (saline 27.66±8.90, ACEA 6.71±0.89, $p = 0.0041$). However, there was no statistical difference in flee, retreat and freeze behaviors between the groups. In addition, biochemical analyses showed that there was a significant difference in the levels of non-protein TIOL among submissive subjects in the control, saline and ACEA groups (Control 100.00±13.25; saline 64.99±11.30 and ACEA 104.16±17.44; p=0,0095; p=0,0018). Therefore, our results suggest that the activation of the CB1R modulates the aggressive behaviors in Danio rerio and oxidative stress caused by agonistic interaction.

Palavras-chaves: REDOX STATE, AGGRESSIVE-LIKE BEHAVIOR, RECEPTOR CANABINÓIDE, Danio rerio (ZEBRAFISH

Agência Fomento: CNPQ

14.006 - A ATIVAÇÃO DA SUBSTÂNCIA CINZENTA PERIAQUEDUTAL EM CAMUNDONGOS C57BL/6 SUBMETIDOS AO ESTRESSE POR CONTENÇÃO OU AO ESTRESSE SOCIAL

THE ACTIVATION OF ROSTRAL PERIAQUEDUCTAL GRAY AFTER RESTRAINT STRESS AND SOCIAL STRESS IN C57BL/6 MICE

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Introdução:

The periaqueductal gray matter (PAG) is an important mesencephalic structure involved in the modulation of different types of behavior. Recently, an essential role of this structure has been observed in the modulation of complex defensive responses in aversive situations. In this regard, many works showed that the activation of PAG functional columns is sufficient to elicit different defensive responses (such as escape, freezing and jump). Such studies point to an important role of the functional dynamics between the PAG nuclei for the perception and modulation of an adequate response in aversive situations. However, this functional dynamic is still poorly understood.

Objetivos:

In order to better understand how the PAG would modulate different patterns of defensive responses we intend to compare the activity of rostral PAG after two distinct contexts: restraint stress - during which the mobility of the animal is fairly limited - and social stress - which requires more forms of defense (whether active or passive).

Métodos:

For this, we have compared the pattern of dorsomedial PAG rostral (rPAGdm), the dorsolateral PAG rostral (rPAGdl) and lateral PAG rostral (rPAGl) activation in C57Bl/6 mice submitted to social defeat (n=6), restraint stress (n=14) and control animals (n=5). The activation was evaluated measuring the density of Fos-immunoreactive neurons of the selected brain regions. *CEUA approval #58/2016.

Resultados e Conclusões:

A two-way ANOVA showed a significant interaction between the type of stress and PAG sites analyzed ($F(2,57)=38,24$; $p < 0,0001$). Using univariate ANOVAs and post hoc pairwise comparisons (Tukey HSD) we noted that, compared to the Control groups, Defeated and Immobilized animals up-regulated Fos expression in all sites analysed (Defeated: rPAGdm, $p < 0,0001$ | rPAGdl, p=0,0104 | rPAGl, p=0,0002; Immobilized: rPAGdm, p=0,0004 | rPAGdl, p=0,0072 | rPAGl, p=0,0013). In addition, the density of Fos-labeled cells of PAG columns – particularly rPAGdm – was significantly greater in the Defeated group than in the Immobilized (rPAGdm, p=0,0459 | rPAGdl, p=0,9976 | rPAGl, p=0,4461). The increase in PAG activity during both types of stress is consistent with its role in modulating different types of defensive responses.

Interestingly, the activity in some columns of the Immobilized group (especially the dorsomedial columns) was less intense than in the group Defeated, that must be associated with the differences between the two situations. These data motivate us to analyze other regions of PAG and to relate the characteristics of the defensive behavior of the Defeated animals with the activation pattern of these nuclei.

Palavras-chaves: Defense, Entrapment, Social Defeat, Periaqueductal Gray

Agência Fomento: FAPESP grant 2018/24288-7 & 2016/18667-0

14.007 - MALÁRIA CEREBRAL INDUZ COMPORTAMENTO-TIPO ANSIEDADE EM CAMUNDONGOS

CEREBRAL MALARIA EVOKES ANXIETY-LIKE BEHAVIORAL IN MICE

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Introdução:

The murine experimental cerebral malaria (ECM) model is one of the most utilized models to better understand the neuropathology associated with malaria. The malarial strain ANKA Plasmodium berghei (PbA) is widely used to infect mice that are susceptible to the evolution of cerebral malaria. A significant percentage of human cerebral malaria survivors develop behavioral changes and neurocognitive deficits, which include aggressive, depressive, and anxious behavior, associated with impulsivity problems and a lack of attention.

Objetivos:

In order to better understand such alterations, the objective of this study is to analyze behavioral changes, including memorial deficits, locomotion, exploratory behavior, and anxiety like behavior, in Swiss Albino mice that developed cerebral malaria.

Métodos:

The behavior of eight Swiss Albino mice was evaluated on the 7o day post - PbA infection. The animals were subdivided into control (N=4) and infected (N=4) groups. The tests were analyzed with the aid of the software program X-Plo-Rat 2005, and statistical analysis done by utilizing the software GraphPad Prism version 6.0, considering data as significant when $p < 0.05$. The data was expressed as mean ± standard error.

Resultados e Conclusões:

Based on the behavioral data, the elevated plus maze showed a statistically significant difference between the control and experimental group in relation to the quantity of time spent in the open arm (p=0.0147, 160.63s±32.23s control vs 42.45s±4.75s infected), closed arm (p= 0.0002, 62.21s±14.76s control vs 229s±5.85s infected), and the entrances in the open arm (p= 0.0026, 11.25±1.02 control vs 3.7±0.47 infected). Time spent exploring the open arms, with no walls, is strongly suggestive of lower levels of anxiety-like behavior as there is additional risk to the mouse exploring an exposed arm. Time spent in closed arms is suggestive of anxiety-like behavior and fear as the walls provide a safer, darker space to hide. As PbA infected mice spent a significantly longer period of time in closed arms, and a significantly shorter period of time in open arms, as compared to control mice, the evidence suggests that the PbA infected mice displayed anxiety-like behavior. Taken together, our results demonstrate that the development of cerebral malaria in mice is associated with anxiety like behavior.

Palavras-chaves: Malária cerebral , Plasmodium berghei Anka, Alterações comportamentais

Agência Fomento: Fulbright

14.008 - PROBABILISTIC LEARNING OF BINARY SEQUENCES IN A SOCIAL DECISION ENVIRONMENT

PROBABILISTIC LEARNING OF BINARY SEQUENCES IN A SOCIAL DECISION ENVIRONMENT

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Introdução:

One of the simplest and most powerful procedures in the study of decision-making processes dependent on probabilistic learning is that of repeated binary choices (RBC), where the agent must predict each event in a binary time sequence. Humans tend to adopt a strategy that does not maximize their gains, in a suboptimal performance of probability pairing (PP).

Objetivos:
Understand RBCs held collectively by groups consisting of one real agent and two virtual agents.
Métodos:
Experiments approved by the Human Research Ethics Committee-CEPSH (Protocol Number: 2.426.055). In Experiment I, 17 groups consisting of one real agent and two virtual agents, had to predict the binary sequence generated by a Markov matrix of order 0 (M0) and order 2 (M2). In Experiment II, 8 subjects, chosen from 17 groups, did the same task alone, predicting a binary sequence of order 2, as control.
Resultados e Conclusões:
In Experiment I, there was no difference between the accuracy of the real agents when predicting the sequence of order 0 and order 2 (p-value > 0,3). Comparing both experiments, there is a significant difference between the accuracies of the real agents in the group and the real agents alone (p < 0,01). Real agents when predicting the Markov binary sequences in a group, whether order 0 or order 2, they do not learn the sequence. By doing the same task alone, they were able to learn the sequence with much greater accuracy, the likely motive being an interference in the learning that the other two virtual agents cause in the real agent.
Palavras-chaves: probabilistic learning, learning, social neuroscience
Agência Fomento:

14.009 - DESENVOLVIMENTO DE UM PROTOCOLO INTRA-INDIVIDUAL PARA INVESTIGAÇÃO DA CODIFICAÇÃO NEURAL DE GRAUS DE CONTROLE SOBRE ESTÍMULOS AVERSIVOS.

DEVELOPMENT OF A WITHIN-SUBJECT DESIGN TO INVESTIGATE THE NEURAL ENCODING OF DEGREES OF CONTROL OVER AVERSIVE STIMULI.
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Introdução:
The degree of control perceived over adverse events is one of the most important factors that determine their influence on the organism. Many animal models of stress-related disorders make use of the generalization of uncontrollability expected over stressors. However, the ability to discriminate between controllable and uncontrollable aversive stimuli has not been characterized in animal models.
Objetivos:
To develop a within-subject behavioral design to assess the ability of rats in discriminating distinct degrees of control over aversive stimuli. We hypothesized that behavioral responses with distinct topographies would exhibit different discrimination performances or generalization tendencies.
Métodos:
Adult male Wistar rats were subjected to a behavioral protocol where they learned between two responses (N=8) to either avoid or escape shocks during a preliminary training block, then they were submitted to alternating escapable (ES), and inescapable (IS) shocks preceded by distinct conditioned stimuli. ES was signaled by a light stimulus and IS by a sound tone. One group had to perform a run (RUN) response in a shuttle box and the second group had to perform a nose poke (NP). We developed the nose poke apparatus as a custom made Arduino-based automatized retractable adaptation to the same shuttle box used for the first group. The latency to the first response was recorded. Discrimination was estimated by the difference between stimuli mean latencies. This protocol was approved (107/2018).
Resultados e Conclusões:
Mean discrimination in the RUN response was greater than NP ($t(14)=2.36$, $p=0.033$). With two animals (12%, N=2/16) from the RUN group showing significant discrimination ($t(58)=4.69$, $p < 0.0001$); $t(58)=3.64$, $p=0.0006$). We found a significant interaction between the degree of control over shocks and response topography over the mean latency ($F(1,14) = 5.59$, $p=0.033$). ES latency was greater than IS in the RUN (post hoc LSD test $t(14)=2.80$, $p=0.013$) and RUN ES latency was greater than NP ES ($t(28)=2.06$, $p=0.048$). We also found significant interaction between behavioral response and block average (10 trials) of ES latency along the experiment considering both training and discrimination test ($F(3,42)=2.972$, $p=0.042$). We observed an overall latency increase over time (training vs. final block $t(42)=7.69$, $p < .0001$), which was more evident in the NP task (final block NP vs. RUN $t(56)=3.05$, $p=0.003$). Our results confirm a long-held

proposition that rats tend to generalize the expectancy of a particular degree of control over aversive stimuli. However, we demonstrate that, although unlikely, rats can discriminate between ES and IS. We found better discrimination performance in the RUN response and greater sensitivity to extinction of a learned response due to IS events in NP. Taken together, our work suggests distinct behavioral topographies for further investigations on how the brain encodes degrees of control and cognitive generalizations over adverse events.

Palavras-chaves: Controlabilidade, Desamparo aprendido, Psicologia experimental, Resistência ao estresse

Agência Fomento: FAPESP, CNPq e CAPES

14.010 - EFEITO DE VALORES OUTLIERS EM INTERVALOS TEMPORAIS NA PRODUÇÃO DE DURAÇÃO MÉDIA SUBJETIVA

EFFECT OF OUTLIER VALUES OF TEMPORAL INTERVALS IN THE PRODUCTION OF SUBJECTIVE MEAN DURATION

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Introdução:

We constantly use temporal information to interact with the environment we are inserted in. Most of the time, this information is noisy and carries some variability, creating difficulties in the estimation of average intervals of time between two events.

Objetivos:

In the present work, we investigated how human observers estimate the mean interval between events in two behavioral experiments.

Métodos:

In both experiments, each trial consisted of a sequence of six intervals. Participants were instructed to press a button in order to reproduce the average value of the six intervals presented in each trial. Each interval was initiated by the presentation of a visual stimulus and had its end marked by an auditory stimulus. Regular interval durations were randomly drawn from a log-normal distribution with a distribution mean uniformly sampled from 400 to 1200 ms. Participants were instructed to, at the end of the trial, reproduce the average interval duration. To evaluate the influence of outlier values on average interval production, one interval in the sequence was produced based on a log-uniform distribution with half and double the mean of the regular intervals as limiting values, producing discrepant interval durations at that position in a significant proportion of the sequences. In Experiment I, this potentially outlying interval of time was presented in the fifth position in the interval series. In Experiment II, this potential outlier was presented in the second position. By comparing the results of experiments I and II, we intend to evaluate the effects of the presentation position of an outlier.

Resultados e Conclusões:

Twenty participants were recruited for both Experiment I (22.1±2.7 y.o., 9 female) and Experiment II (22±2.4 y.o., 9 female), totaling forty participants. A Spearman correlation between the reproduced interval and the average interval in Experiment I ($R = 0.53$, $t = 34.23$, $df = 2998$, p-value < 0.001) and Experiment II ($R = 0.47$, $t = 29.06$, $df = 2998$, p-value < 0.001) and a simple linear regression between the same variables for Experiment I ($R^2 = 0.28$, $F(1, 2998) = 1171$, p-value < 0.001) and Experiment II ($R^2 = 0.34$, $F(1, 2998) = 844.3$, p-value < 0.001) produced statistically significant test results and suggest that the volunteers understood and performed the task correctly. In addition, we estimated the weights (β) that were given by the volunteers to each of the intervals of a trial when they reproduced the means. Surprisingly, the volunteers did not underweight the intervals in positions with outliers. Instead, they gave an extremely consistent positive weight to the intervals in specifically those positions in comparison with weights at other positions, which were subject to more inter-individual variation. As expected, the weight given to the outlier in the fifth position ($\beta 5 = 0.16$, $s = 0.01$, t-value = 11.29, p-value < 2e-16) is slightly greater than in the second position ($\beta 2 = 0.10$, $s = 0.02$, t-value = 5.51, p-value < 3.99e-08), suggesting a recency effect.

Palavras-chaves: cognição, neurociência, percepção, tempo

Agência Fomento: Fundação UFABC

14.011 - SOCIAL STIMULI CAUSE SUSTAINED SMILE EXPRESSION: SOCIAL TOUCH AND EMPATHY TRAITS ENHANCE THIS EFFECT

SOCIAL STIMULI CAUSE SUSTAINED SMILE EXPRESSION: SOCIAL TOUCH AND EMPATHY TRAITS ENHANCE THIS EFFECT

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Introdução:
Social stimuli are pleasant, favoring the expression of smile on who observes them. Empathy and higher predispositions towards social touch can facilitate engagement in social interactions.
Objetivos:
Our aim was to investigate if social interaction scenes cause a sustained impact on smile expression after their visualization and if empathy trait and frequency of habitual social touch (grooming) modulate this process.
Métodos:
The sample consisted of 80 healthy university students (47 female). The study was approved by the Ethics Committee of UFOP (CAAE: 32885314.2.0000.5150). The participants viewed on a computer screen a block of 14 pictures of dyads in social interaction scenes (Bonding) and another block of 14 pictures in which those dyads were in the same background scene, but without directly interacting (Control). Each picture was exposed for 4 seconds and was followed by a black screen for 4 to 5 seconds. Participants read a text about social interaction before viewing the Bonding block, while a text on social isolation was read before the Control block. Participants filled out empathy scales (Emotional Contagion and Interpersonal Reactivity Index - IRI) and the Mutual Grooming Scale (To touch and Being touched). Facial electromyographic activity of the Zygomatic Major muscle (ZM) was recorded.
Resultados e Conclusões:
The ZM amplitude was greater during the visualization of Bonding pictures than during the Control ones (Median Bonding = 0.088 μV (-0.0632 μV / 0.3254 μV); Median Control = 0.034 μV (-0.0572 μV / 0.1336 μV); $p < 0.05$). However, this difference was not maintained after the pictures' visualization (Median Bonding = 0.082 μV (-0.028 μV / 0.701 μV); Median Control = 0.042 μV (-0.046 μV / 0.169 μV); p=0.22). The ZM amplitude during the Bonding pictures' visualization is positively associated with Emotional Contagion (Rho = 0.43, $p < 0.001$), IRI – Global Empathy (Rho = 0.29, $p < 0.05$) and habitual frequency of being touched - Mutual Grooming scale (Rho = 0.25, $p < 0.05$). In addition, the ZM amplitude after the visualization of Bonding pictures is also positively associated with Emotional Contagion (Rho = 0.26, $p = 0.02$), IRI – Global Empathy (Rho = 0.30, $p < 0.01$), habitual frequency of being touched (Rho = 0.31, $p < 0.01$) and to touch (Rho = 0.28; $p = 0.01$) - Mutual Grooming scale. We concluded that social stimuli increase the expression of smile during and immediately after their visualization. Empathy traits and habitual frequency of social touch facilitate such a process. We would like to thak the Federal University of Ouro Preto (UFOP) and the and Coordination for the Improvement of Higher Education Personnel (CAPES).
Palavras-chaves: Positive emotion, social interaction, empathy, social touch, facial electromyography
Agência Fomento: Universidade Federal de Ouro Preto (UFOP) e Coordenação de Aperfeiçoamento de Pessoal de Nível Superior Diretoria de Avaliação (CAPES)

14.012 - ALIMENTOS ULTRAPROCESSADOS E A HABILIDADE DE ADVERTÊNCIAS TEXTUAIS EM MODULAR RESPOSTAS EMOCIONAIS

ULTRA-PROCESSED FOOD PRODUCTS AND THE ABILITY OF TEXT WARNINGS TO CHANGE EMOTIONAL RESPONSES

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Introdução:
Emotions predispose us to action through an appetitive motivational system (approaching of pleasant stimuli) and a defensive motivational system (avoidance of unpleasant stimuli). The food industry is effective in activating the appetitive system of consumers and contributes to the increase of obesity and associated diseases through the commercial promotion of ultra-processed foods (industrially high caloric and with low

nutritional content). An open question is whether textual warnings that inform the risks of consuming these foods for health would be able to modulate the emotional and behavioral responses to ultra-processed foods.
Objetivos:
The goal of the present study is to investigate the modulation of emotional responses to pictures of ultra-processed foods after texts that will inform the participants of the negative consequences of the consumption of these foods.
Métodos:
Volunteers perform a task on the computer in two experimental blocks, "Text Warning" and "Text Neutral", where they observe and classify images of foods preceded by (1) information about their impact on health (text warning) or (2) information about mode of food storage (text neutral). After each image the volunteers classify it as valence, arousal and desire for consumption. During the test, cortical electrical activity is also recorded through an electroencephalogram apparatus for the analysis of event - related potentials (EEG - ERP) in order to investigate modulation of the ERP late positive potential. Finally, questionnaires assessing individual traits such as anxiety and negative affect and indexes such as body mass index of the subjects were also collected. All of the procedures were approved by the local research ethics committee (CAAE: 92088518.8.0000.5699), and all participants gave informed consent before data collection.
Resultados e Conclusões:
Preliminary behavioral data from partial sample of 32 participants (23 women and 9 men) shows that in the warning block the consumption desire classification was significantly lower than for the neutral condition (respectively M = 4.73, SD=1.3; and M = 5, 14, SD=1.06, $p < 0.001$). Mean scores of the Valence and Arousal were also significantly reduced in the warning (Valence M = 5.34, SD=1.29 Arousal M = 5.40, SD=1.1), when compared to the neutral block (Valence M = 5.80, SD=1.05; Arousal M = 5.66, SD=0.99), $p < 0.01$ for the comparisons. The results shows that participants judged the images as less pleasant, less arousing and with lower desire for consumption in warning condition compared to the neutral one, which preliminary demonstrate the effectiveness of the text warnings. The experiment is underway and an increase in the sample is expected for correlation of data with individual traits and analysis of EEG data.
Palavras-chaves: EMOTION, ATTENTION, FOOD, EEG
Agência Fomento: CNPq/FAPERJ

14.013 - PREDIÇÃO DE RESISTÊNCIA OU DESAMPARO APRENDIDOS PELA ATIVIDADE DA REDE HIPOCAMPO-CÓRTEX PRÉ-FRONTAL DURANTE ESTRESSE

PREDICTION OF LEARNED RESISTANCE OR HELPLESSNESS BY HIPPOCAMPAL-PREFRONTAL CORTICAL NETWORK ACTIVITY DURING STRESS
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Introdução:
The network hypothesis of depression postulates that resistance and vulnerability are determined by distinct patterns of higher order neural network activity that underlie the encoding of relevant information during a stressful experience, such as the degree of control the individual has over it. However, these hypothetical patterns are yet to be identified.
Objetivos:
To identify medial prefrontal cortex (mPFC) and hippocampal (CA1) oscillatory dynamics during controllable or uncontrollable stressors that predict resistant (R) or helpless (H) individuals.
Métodos:
We implanted microwire electrodes in the mPFC and CA1 of adult male Wistar rats. Different subjects were submitted to either controllable shocks, yoked uncontrollable shocks, or no shocks (NS) signaled by a conditioned light stimulus (CS) in a shuttle box. Previously stressed animals were exposed to uncontrollable shocks on the next day. Footshock escape latencies were evaluated on the third day to categorize R and H individuals. CEUA approval: 156/2014. We investigated collective patterns of electrophysiological activities during the first exposure that could distinguish animals under stress or predict behavior on test session through unsupervised multivariate analysis and machine learning.
Resultados e Conclusões:
We found that fundamental features of theta oscillations (4-10 Hz) during stress exhibited high prediction performance of R (N=11) versus H (N=9) individuals: increased CA1 (AUC=.92) and mPFC (AUC=.95) theta powers and synchrony (AUC=.87)

during CS+ preceded by higher mPFC theta-gamma phase-amplitude coupling (AUC=.79). We also found electrophysiological discriminators of animals under stress (N=20) versus NS (N=6): CA1-mPFC theta synchronization (AUC=.92) and decreased CA1 beta power (AUC=.99) during CS followed by increased CA1 theta peak frequency after shocks (AUC=.97). We assembled the specific features related to stressor per se or controllability down to single scores representing their collective patterns through factor analysis. Finally, we fitted a regularized linear discriminant classifier model solely on these two predictors, and it exceptionally classified all NS, R and H individuals correctly (100%, cross-validation: 92%). Also remarkably, stressor scores were greater in both R ($t(23)=10.21$, $p < .0001$) and H ($t(23)=6.96$, $p < .0001$) than NS, while controllability scores were only greater in R ($t(23)=4.31$, $p=.0003$), indicating that H animals ($t(23)=0.06$, $p=.94$) lacked this activity. The most distinctive collective pattern, identified across all subjects (principal component 1, 48% explained variance), showed a stronger correlation to escape performance than all single variables separately ($r(18)=.77$, $p < .0001$). Here we identified a distinctive collective pattern of enhanced CA1-mPFC network theta activity that underlies the development of cognitive mechanisms of stress resistance and demonstrated that deleterious effects of stress on behavior might develop in the absence of this higher order protective activity.

Palavras-chaves: Electrophysiology, Stress resistance, Depression, Controllability, Machine learning
Agência Fomento: CNPq, FAPESP and CAPES

14.014 - DIETA DE CAFETERIA PALATÁVEL INFLUENCIA ASPECTOS EMOCIONAIS E MNEMÔNICOS DE RATAS

PALATABLE CAFETERIA-DIET INFLUENCES MEMORY AND EMOTIONAL ASPECTS OF FEMALE RATS

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Introdução:

The worldwide intake of fat and/or sugar increased considerably. A number of studies show that palatable hyperlipidic diets, named cafeteria-diet (CAF) or "Western" diet pattern, not only is associated with metabolic disturbances and obesity, but also impact emotional and cognitive processes in people. High-fat diet (HD) intake induced multiple behavioral alterations of mainly anxiety-like nature and impaired the learning and memory in rodents. HD consumption alters brain neurochemistry in a region-specific manner and this alteration might be partially responsible for the HD-induced behavioral impairments. The mechanisms related to intake of CAF and the development of these alterations remain unclear, but changes in hippocampal BNDF levels are implicated in memory impairs and anxiety-like behavior changes. In addition, to the well-known that sex hormones influence neuronal activity and cognitive functions. Oscillations in the level of sex hormones throughout the estrous cycle may buffer deficits triggered by CAF-intake.
Objetivos:
In this study, we aimed to investigate the effects caused by long-term CAF intake in female rats using behavioral and neurochemical measures in different phases of the estrous cycle.
Métodos:
Female Wistar rats (3-month-old) had free access to commercial chow (CC) or CAF for 28 days.After, sucrose preference, spontaneous alternation, plus-maze discriminative avoidance task (PMDAT) and recognition novel object tasks were performed. On the 33th day, the animals were euthanized, brains were collected and processed for immunohistochemical analysis, besides blood samples were used for biochemical analysis. All the procedures were approved by the Ethics Committee (CEUA nº 8816291116).
Resultados e Conclusões:
The results showed that CAF-treated animals consumed less food when compared to CC group (CC = 14.78 ± 0.73 g/day and CAF = 12.04 ± 0.77 g/day, $p < 0.05$) and gained body mass (CC = 17.48 ± 1.57 g and CAF = 33.24 ± 2.17 g, $p < 0.005$), but caloric intake was not altered (CC = 255.6 ± 12.7 kj/g and CAF = 257.6 ± 16.51 Kj/g, $p > 0.05$). Furthermore, CAF-treated females in metestrus/diestrus showed impaired in the recognition memory of new object ($p > 0.05$) and decreased the intake in the sucrose preference test (CC = 86.12 ± 2.57 g; CAF = 64.30 ± 2.43 g; $p < 0.05$) compared with animals in estrous and proestrus phases. In addition, CAF-treated rats showed impaired

performance in the spontaneous alternation test ($p < 0.05$) and had reduction of BDNF-immunoreactivity in the hippocampus ($p < 0.05$). Finally, female rats fed CAF showed increase of total cholesterol, triglycerides and high-density lipoprotein phase-dependent ($p < 0.05$). Taken together, our results suggest that CAF-diet intake contributes to metabolic alterations that may induce emotional and behavioral changes in female rats' phase-dependent.

Palavras-chaves: emotional alterations, estrous cycle, memory deficits, western diet
Agência Fomento: FAPESP/CNPq

14.015 - CONSTRUÇÃO DE ESCALA AFETIVA PARA AVALIAR GRANULARIDADE EMOCIONAL.

CONSTRUCTION OF AN AFFECTIVE SCALE FOR ASSESSING EMOTIONAL GRANULARITY.

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Introdução:

In the affective workspace framework, affective core is the basic state that is activated when someone experiences an emotion. Hence, emotions are categorizations of such affective core based on the language conceptual system. Accordingly, the construct of emotional granularity was proposed as the capacity to use discrete emotional adjectives precisely (BARRETT, 1998) . In order to measure emotional granularity, a likert scale of affective words must be answered ecologically and longitudinally. The correlations between the answers will denote individuals differences in generalizing or discriminating emotional states. However, to the best of our knowledge, there is no properly constructed and validated Brazilian affective scale, as the PANAS in english (WATSON; CLARK; TELLEGEN, 1988).

Objetivos:

The purpose of this study is to develop an brazilian affective scale to allow the investigation of emotional granularity.

Métodos:

To construct the scale, we have search for words representing affective states on conventional linguistic corpora, affectivies lexicons and from the literature. After the first search, the list of words was refined and reduced based on a series of criteria including timing of affective state and linguistic features. The refined list was then applied in a synonym task. Sixteen volunteers separated the 165 words into synonym groups. Finally, a graph-based cluster analysis was performed on R in order to reveal the underlying linguistic structure.

Resultados e Conclusões:

The initial lexical comprised almost 400 emotional words, reduced to 165 adjectives after applying the selection criteria. The cluster analysis of the synonyms task using Louvain algorithm results in 6 main communities of synonyms. Moreover, an independent cluster analysis was performed using K-means algorithms, consistently resulting in 7 main communities of words. Conclusions: A Brazilian lexical of affective words was constructed and tested in a synonym task, resulting in consistent and plausible linguistic structure. Further refinement and validation of such scale will allow properly measuring the emotional granularity in Brazilian samples. Ethical approval - CAAE: 01247318.9.0000.5594 Parecer: 3.277.612 REFERENCES BARRET, Lisa Feldman. Discrete emotions or dimensions? The role of valence focus and arousal focus. Cognition and emotion, v. 12 n. 4, 579-599,1998. WATSON, David; CLARK, Lee Anna; TELLEGEN, Auke. Development and Validation of Brief Measures of Positive and Negative Affect: The PANAS Scales. Journal of Personality And Social Psychology, v. 54, n. 6, 1063-1070, 1988.

Palavras-chaves: affective, emotion, scale
Agência Fomento: UFABC

14.016 - RED IS SWEET! EVENT-RELATED POTENTIAL STUDY ALERTS: TRAFFIC-LIGHT WARNING LABELS FOR HIGH SUGAR ULTRA-PROCESSED FOOD MAY BE INEFFECTIVE

RED IS SWEET! EVENT-RELATED POTENTIAL STUDY ALERTS: TRAFFIC-LIGHT WARNING LABELS FOR HIGH SUGAR ULTRA-PROCESSED FOOD MAY BE INEFFECTIVE

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Introdução:

Front-of-package labels are a recommended approach to reduce consumers' intake of ultra-processed food products, targeting excessive salt, sugars and fat. The multiple traffic-light label is one such example. It indicates the content of target nutrients by using a red (high), amber (medium) and/or green (low) color-coding. However, increasing evidence suggests clear disadvantages of the multiple traffic-light label. It is likely that the red color-code may have implicit cross-modal influences on taste perception by enhancing sweetness perception and approach dispositions toward sweet taste food.

Objetivos:

In this study, we investigated whether priming cues of traffic-light colors would differently modulate the visual motivational salience of salty and sweet ultra-processed food products.

Métodos:

This study was approved by the Ethics Committee of Fluminense Federal University (CAAE: 0369.0.258.258-11).Twenty-four college students (18 female, mean age = 21.4 years, SD = 3.39) passively viewed red, amber or green circles followed by ultra-processed food pictures while we recorded electrocortical activity (EEG). Previously, we performed an explicit association between the color codes (red, amber or green) and health-related meanings. The early posterior negativity (EPN), an early temporo-occipital visual component, indexed the motivational salience of food products pictures since it is related to hedonic valence (i.e., pleasantness).

Resultados e Conclusões:

Results showed that the EPN mean amplitude (time window: 200-300 ms) was significantly greater (i.e., less positive) for sweet taste products (M = 8.76 microvolts, SD = 6.37) relative to salty products (M = 10.70 microvolts, SD = 6.22) when primed with red circles ($t(23) = 2.90$; $p < 0.01$, Cohen's $d = 0.59$), but not when primed with amber circles (Sweet: M = 9.77 microvolts, SD = 6.14 versus Salty: M = 10.89 microvolts, SD = 7.55; $t(23) = 1.47$; $p = 0.15$, n.s., Cohen's $d = 0.32$), nor when primed with green circles (Sweet: M = 10.04 microvolts, SD = 5.66 versus Salty: M = 10.28 microvolts, SD = 6.35; $t(23) = 0.26$; $p = 0.80$, n.s., Cohen's $d = 0.05$). These results suggest that the red priming code, in the context of food, selectively increases the motivational relevance elicited by viewing sweet taste ultra-processed food products. As a neurophysiological correlate of stimuli motivational relevance, the enhanced EPN component for high sugar products is implicitly associated to an approach motivation towards consuming. This effect occurs despite its explicit association with increased health-risks. Health policy makers should consider these implicit visual-taste cross-modal associations of the multiple traffic-light labels that might lead to unintended consequences towards sweet ultra-processed food.

Palavras-chaves: EEG/ERP, emotion, EPN, motivation, ultra-processed food products

Agência Fomento: CAPES, CNPq, FAPERJ, FINEP

14.017 - ALGORITMOS DE APRENDIZADO DE MÁQUINA DECODIFICANDO A ATIVIDADE CEREBRAL EM RESPOSTA A INGESTÃO DE BAIXAS DOSES DE AYAHUASCA EM USUÁRIOS EXPERIENTES

MACHINE LEARNING ALGORITHMS DECODING BRAIN EMOTIONAL RESPONSES AFTER A LOW DOSE OF AYAHUASCA INTAKE IN EXPERIENCED USERS

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Introdução:

The growing understands of the mechanisms of classical psychedelic drugs (serotonin 2A, or 5HT2A, receptor agonists) and recent clinical findings converge on the idea that might be useful to use them in treatment of anxiety and mood disorders. Ayahuasca is a psychedelic substance that already showed a significant anxiolytic and antidepressant effect. Ayahuasca is an amazon psychedelic brew used by many different communities for religious purposes. However, few studies have shown how emotional

processing occurs during an ayahuasca psychedelic experience.
Objetivos:
This study aims to investigate the effect of a low dose of ayahuasca in experienced users before and after oral ingestion.
Métodos:
Nineteen (19) healthy male volunteers regular ayahuasca user (mean age=31.5 years; SD=10.7) were tested by implicit emotional recognition task in fMRI in two sessions before and after ayahuasca intake. The volunteers' task was to recognize the genre of faces neutral and emotional expressions (such as disgust, fear, happy, and sad) during each session. The stimuli were present in a 15 block pseudo-randomized design on each run separately. The procedures and experimental paradigm of this study were approved by the research ethics committee of the University Hospital Clementino Fraga Filho of the Federal University of Rio de Janeiro - CAAE: 34772414.9.0000.5257. Machine Learning algorithms (Multiple Kernel Learning - MKL) were used to investigate the effect of ayahuasca on brain activation from regular ayahuasca users in both fMRI sessions, before and after intake. MKL algorithm applied a "leave one subject out (two sessions)" cross-validation strategy, and one model was applied to each emotional expression.
Resultados e Conclusões:
Among all emotion expression tested in this study, MKL algorithm was only able to significantly decode patterns of brain activation between fMRI sections using information from disgust face expression. In this case, the MKL algorithm successfully identified if the pattern of brain activation was before or after ayahuasca intake, with an accuracy of 71.1% (p=0.04). The brain regions with the highest contribution to the model included supramarginal gyrus, anterior and middle cingulate cortex, inferior frontal gyrus, orbitofrontal cortex, ad temporal and sensorimotor regions. The MKL model accuracy to other emotional expressions (fear, happy and sad) stay at the chance level (60.5%, 52.6%, and 60.5%, respectively) and no significant result was found. These results show that emotional processing before and after ayahuasca intake could be altered, in regular users only during disgust face expression. Indicating that pattern of brain activation is a subtle difference in the perception or emotional processing of these stimuli.
Palavras-chaves: Emotion, Psychedelic, Machine Learning, Ayahuasca, fMRI

Agência Fomento: CAPES, CNPq, FAPERJ

14.018 - PROJEÇÕES GABAÉRGICAS DO NÚCLEO MEDIAL DA AMÍGDALA EM CAMUNDONGOS

GABAERGIC PROJECTIONS OF THE MEDIAL NUCLEUS OF THE AMYGDALA IN MICE
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Introdução:
The medial nucleus of the amygdala (MEA) receive dense projections from the vomeronasal organ and it delivers crucial information to modulate social behavior, gender discrimination and the provision of specific cues in the control of sexual and aggressive behavior (Dulac e Torello, 2003), besides informing social and reproductive status, health conditions and competitive ability (Brennan e Kendrich, 2006). Few studies reported MEA projections in mice and its chemical identity.
Objetivos:
The goal of our study is to understand the gabaergic MEA projections in mice.
Métodos:
Transgenic male and female VGatCRE mice (n=14) received 50nl of the anterograde virus AAV5.EFA.DIO.HCHR2(H134R)EYFP into the MEA. After 25 days, animals were perfused and the brains were collected and processed. To amplify the EYFP signal, one series of the brain slices were immunoreacted for GFP and one series were Nissl stained for cytoarchitecture reference. Ethical committee approval protocol n° 58/2016.
Resultados e Conclusões:
We observed gabaergic efferent projections in the BST, adjacent regions of the VMH and PMV, in all of them, we could observe synaptic terminals. The injections were too extensive to distinguish the anterior and posterior of the MEA. The pattern of MEA efferent projections to the BST observed in our study was similar to that described for MEAad in rats, and despite the apparent long injection site, probably the bigger viral infection was centered in the MEAad. Also the PMV projections were the same described by Canteras et al (1995), however the projections to VMH are different those described in rats. The gabaergic projections observed here avoided the VMH, targeting

adjacent regions in hypothalamus, while projections from MEA targeted the VMH in rats. The same projections and density were observed in both males and females. The found terminal boutons showed those nuclei do not received only passage fibers, therefore there are axon terminals from MEA infected neurons.

Palavras-chaves: Social Behavior, Social Stress, Hypothalamus

Agência Fomento: Fapesp

14.019 - ATIVAÇÃO OPTOGENÉTICA DAS PROJEÇÕES NPAS1-POSITIVAS DO PÁLIDO VENTRAL PARA O NÚCLEO ACUMBENS PROMOVE PREFERÊNCIA POR LUGAR

OPTOGENETIC ACTIVATION OF NPAS1-PROJECTING NEURONS FROM THE VENTRAL PALLIDUM TO THE NUCLEUS ACCUMBENS PROMOTES PLACE PREFERENCE

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Introdução:

The ventral pallidum (VP) is a key brain area related to reinforcement, aversion, and motivated behaviors. This unique structure has both hedonic hotspots and coldspots, where opioid neurotransmission can increase (hedonic hotspots) or decrease (hedonic coldspots) liking and wanting. As a structure closed connected to both reward-related areas and aversive centers, it is a key brain area to the codification of the hedonic value of relevant information. It is strongly innervated by the nucleus accumbens (NAcc), and these NAcc outputs are essential for reward-related responses. VP also heavily send projections back to the NAcc, but the role of such projections on reward-related behaviors are not fully elucidated.

Objetivos:

To address this question, we used an optogenetic approach to activate VP Npas1-neurons, which heavily projects to NAcc, in a real-time place preference (RTPP) procedure.

Métodos:

All experiments were performed in accordance with the Institutional Animal Care and Use Committee guidelines at the University of Maryland School of Medicine (protocol number #0517004). Female Npas1-Cre-2A-tdTomato mice (n = 13) stereotaxically received the excitatory light-gated ion channel channelrhodopsin (AAV5-EF1a-DIO-hChR2(H134R)-eYFP) into the VP and optical fibers implanted in the NAcc. Control animals were injected with the fluorescent protein eYFP. After 3 weeks of recovery, the animals were tested in the RTPP protocol. The RTPP was performed as follows: on the first day, the animals were habituated during 15 minutes to the RTPP arena (two adjoining - 20 × 20 cm - acrylic compartments with white floors and walls separated by a small door) to the evaluation of initial preference for the sides of the apparatus using the automated tracking software EthoVision XT 14. Next day, animals were connected to the laser generator (controlled by an Arduino connected to the EthoVision) through the optical fibers and put on the RTPP arena for 20 minutes to the evaluation of the percentage of time spent in the light-paired chamber. They were randomly assigned to receive the blue light stimulation (10 mW, 40 hz, 10 ms pulse width) in one chamber of the apparatus. Twenty-four hours after the stimulation, animals were tested again in the arena without being connected to the laser paraphernalia to the evaluation of a conditioned effect of the neuronal stimulation. Data were expressed as mean ± SE and analyzed by repeated measures ANOVA followed by Newman-Keuls test, considering $p < 0.05$ as significant.

Resultados e Conclusões:

The blue light stimulation increased the time spent in the light-paired chamber in the ChR2 animals compared to eYFP (ChR2 = 65.2 ± 4.6; eYFP = 50.3 ± 2.3; $p < 0.05$) and to pretest of the same group (ChR2 pretest = 49.8 ± 2.1; ChR2 stimulation = 65.2 ± 4.6; $p < 0.01$). No conditioned effects were found when animals were tested 24 hours later. Our results revealed that the activation of the Npas1-neurons that projects from the VP to the NAcc is rewarding.

Palavras-chaves: npas1-neurons, nucleus accumbens, optogenetic, real-time place preference, ventral pallidum

Agência Fomento: FAPESP processos 2018/05496-8 e 2015/25308-3

14.020 - EFEITOS DO EXERCÍCIO AERÓBICO DE BAIXA INTENSIDADE SOBRE O PERFIL EMOCIONAL-COMPORTAMENTAL E MASSA CORPORAL DE CAMUNDONGOS SWISS ADULTOS SAUDÁVEIS MACHOS E FÊMEAS

LOW-INTENSITY AEROBIC EXERCISE EFFECTS ON EMOTIONAL-BEHAVIORAL PROFILE AND BODY WEIGHT OF HEALTHY ADULT MALE AND FEMALE SWISS MICE

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Introdução:
Low-intensity aerobic exercise researches about health promotion in healthy people regarding the behavioral-emotional profile influences remain small.
Objetivos:
To investigate the low-intensity exercise effects on emotional-behavioral profile of healthy adult male and female mice.
Métodos:
Swiss mice (30 males and 30 females) were accustomed to treadmill the first 5 days at constant speed of 10 m/min (training group) or on treadmill off (sedentary group) during 5 minutes. After adaptation, exercise protocol was performed at same constant speed for 30 minutes/day, five days a week, for two weeks. Sedentary animals remained on the treadmill off. After 24 hours of the last training day, all animals were submitted to behavioral tests: Sucrose Preference (SPT), Tail Suspension (TST) and Forced Swim (FST). Body weight and food intake were quantified for 4 weeks (1st-basal, 2nd-adaptation, 3rd- and 4th-training).
Resultados e Conclusões:
Male mice showed higher body weight (Sedentary Males: 43.63±0.74, P < 0.0001. Training: 43.63±0.60, P < 0.0001) and feed consumption (Sedentary Males: 396,66±8,81; P=0,03. Training: 418,33±9,28; P=0,01) compared to females (Sedentary Females: 37.33±0.42 and 333.66±3.28; Training: 36.63±0.44 and 345.66±11.89, respectively). However, trained Males and Females groups had body weight gain prevention during the 4 weeks (1st versus 4th: Sedentary Males: P=0.002. Females: P=0.04), without modifying feed intake between animals. Just sedentary females had an increase in food intake at 4th week (403.3±12.01, P=0.01, two-way ANOVA). Curiously, in SPT test was evident the differences between sexes, emphasizing trained females. Training Females group showed uptake 99% of the solution on the first day, 94.1% on the second day and 97.87% on the third day. The other groups increased their uptake gradually over the course of 3 days. The Sedentary Females group uptake 57.14% on the first day (P=0.03 vs Training Females, P=0.04 vs males), 66.7% on the second day (P=0.01 vs males) and 73.91 % on the third day. Training Males group uptake approximately 17% of the solution on the first day (P=0.001 vs females), 21% on the second day (P=0.002 vs females) and 38.23% on the third day (P=0.006 vs females) - two-way ANOVA. The Males groups didn't showed differences in the sucrose solution uptake. In FST test, only Training Females group had a shorter immobility time (51.9±7.88, one-way ANOVA) comparing to other groups (Training Males: 146.9±8.99, P=0.001, Sedentary: 176±9.37, P < 0.0001 Sedentary Females: 148.7±11.37, P=0.002). Finally, in TST test trained groups (Males: 37.2±6.7; Females: 32.2±5.45) had a shorter immobility time comparing to sedentary groups (Males: 89.4±10.17; P=0.02; Females: 93.6±8.42, P=0.005, one-way ANOVA). Conclusion: Low-intensity aerobic exercise was sufficient to prevent natural body mass gain of this species and to modulate the behavior of healthy male and female swiss mice, providing a better emotional state and well-being. CEUA Nº 1461210519
Palavras-chaves: Ansiedade e depressão, comparação entre gêneros, comportamento, Exercício aeróbico, Promoção da saúde
Agência Fomento: CAPES, UFSC

15. Dor

15.001 - ROLE OF HO-CO PATHWAY IN INFLAMMATORY PAIN AVERSIVENESS AND NOCICEPTION: NITRIC OXIDE, μ AND δ OPIOID RECEPTORS MODULATION.

ROLE OF HO-CO PATHWAY IN INFLAMMATORY PAIN AVERSIVENESS AND NOCICEPTION: NITRIC OXIDE, μ AND δ OPIOID RECEPTORS MODULATION.

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Introdução:
Introduction: Gaseous neuromodulators have essential functions in the central nervous system. It has been already described the roles of Heme Oxygenase(HO)/carbon monoxide (CO) and nitric oxide

(NO) pathways in inflammatory nociception as well as in emotional modulation.
Objetivos:
Objective: The aim of this study was to evaluate whether treatments with a HO-1 inducer (CoPP 2.5 mg/kg) or CO-releasing molecule (CORM-2 5 mg/kg) may inhibit inflammatory nociception and pain aversiveness in wild type (WT) and inducible Nitric Oxide synthase-knock out (NOS2-KO) mice with persistent inflammation induced by Complete Freund's Adjuvant (CFA) and its relationship with μ (MOR) and δ (DOR) opioid receptors.
Métodos:
Methods: WT and NOS2-KO adult male mice (n=6/group) were injected with CFA (30 μl) or saline (0.9%) into the hind paw and evaluated in von Frey (at 1, 3, 7 and 10 day), and in escape- avoidance paradigm (PEAP) (day 10) 3h after treatments with CORM-2, CoPP or Vehicle (DMSO 1%). Additionally, WT animals were pre-treated with HO-1 inhibitor (SnPP 10 mg/kg) 30 minutes before treatment with CoPP in day 10 and evaluated the same tests. HO-1, NOS1, NOS2, DOR, and MOR protein expression in dorsal hippocampal were evaluated using western blot assays. Procedures were approved by CEUA-FORP, USP-Brazil (Number: 2017.1.306.58.2).
Resultados e Conclusões:
Results: CFA reduced the mechanical threshold in WT (CFA 37.07±0.7, % of control) and NOS2- KO (CFA 58.0±2.4 % of control) mice. CORM-2 and CoPP recovered mechanical sensitivity in WT (CORM-2 61.7±0.5; CoPP 69.8±1.5 % of control) and NOS2-KO mice (CORM-2 98.8±0.5; CoPP 98.9±0.3 % of control). CFA increased the % time in the light compartment of PEAP of WT strain (Tukey test, $P < 0,05$), while CORM-2/CoPP reversed this effect (Tukey test, $P > 0,05$). HO-1 pathway blocking with SnPP impaired CoPP effect in von Frey (CFA SnPP + CoPP 39.0±0.53 % of control) and PEAP (Tukey test, $P < 0,05$). NOS2-KO mice did not show alterations in PEAP. CORM-2 or CoPP promoted an increase in HO-1 in WT and NOS2-KO strains (Tukey test, $P < 0,05$), but not in the NOS1 or NOS2. Further, CORM-2 and CoPP increased the MOR and DOR protein expression in the hippocampus of WT mice (Tukey test, $P < 0,05$). Conclusion: This result showed that HO-CO pathway activation promotes anti-allodynic effect (WT and NOS2-KO strains) and reduced pain aversiveness possible due to an increase in HO-1, MOR, and DOR expression in the dorsal hippocampus.
Palavras-chaves: Dor, Nocicepção, Neurofisiologia da Dor, Comportamento Aversivo

Agência Fomento: FAPESP

15.002 - EFEITO DO DISSELENETO DE m-TRIFLUORMETIL-FENILA NA DÍADE DOR-DEPRESSÃO INDUZIDA POR RESERPINA

EFFECT OF m-TRIFLUOROMETHYL-DIPHENYL DISELENIDE IN THE PAIN-DEPRESSION DYAD INDUCED BY RESERPINE

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Introdução:
Several epidemiological studies have shown that pain and depression coexist in more than 70% of cases of chronic pain. The main theory of depression involves the deficiency of monoaminergic neurotransmitters, such as serotonin, that also plays an important role in the negative modulation of nociceptive impulse at spinal level. In this way, selective serotonin reuptake inhibitors have been used for the treatment of this comorbidity, however its use is still not satisfactory due to discontinuation, withdrawal symptoms and efficacy below 50%. m-Trifluoromethyl-diphenyl diselenide (m–CF3–PhSe)2 is an organoselenium compound that presents antidepressant-like and antinociceptive effects, possibly related to its interaction with serotoninergic system, since it inhibits the uptake of serotonin and the enzyme monoamine oxidase A, responsible for degradation of serotonin. Reserpine is a blocker of monoamine transport for storage in the synaptic vesicles, causing depletion of these monoamines, mimicking countless aspects present in the pain-depression comorbidity.
Objetivos:
Therefore, this work aimed to analyze the effect of (m–CF3–PhSe)2 in a comorbid pain-depression model induced by reserpine in mice.
Métodos:
The Swiss mice from the UFSM (ethics committee approval number 4664250915) were treated with reserpine 0.5 mg/kg for 3 days (i.p., once a day) and in the next 2 days they were treated with (m–CF3–PhSe)2 10 mg/kg (p.o., once a day). 30 min after the last

treatment with (m–CF3–PhSe)2 the spontaneous and forced locomotor activities, the depressive-like and the hyperalgesic behavior of mice were evaluated in the locomotor activity monitor (LAM), rota-rod test, forced swimming test (FST) and hot plate, respectively. Data were expressed as mean ± SEM. Statistical analysis were performed by two-way ANOVA - Newman-Keuls test. Values of $p < 0.05$ were significant.
Resultados e Conclusões:
The treatment of mice with (m–CF3–PhSe)2 reverted the reserpine-induced depressive-like behavior, demonstrated by a decrease in the latency time to immobility ($F (1,36) = 6,039$; $p = 0.019$) and an increase in the immobility time of mice ($F (1,35) = 9.181$; $p = 0.005$) in the FST, and hyperalgesia, indicated by a reduction in the latency to nociceptive response in the hot-plate ($F (1,31) = 5.97$; $p = 0.020$). Reserpine reduced the spontaneous locomotor activity of mice in the LAM, demonstrated by the reduction in the number of crossings ($F (1,27) = 21.3$; $p = 0.001$) and rearings ($F (1,25) = 12.88$; $p = 0.001$), and (m–CF3–PhSe)2 presented only a tendency to normalize these parameters. The forced locomotor activity of mice in the rota-rod was not altered by any treatment, suggesting that the alterations of spontaneous locomotor activity of mice was due motivational factors. The results demonstrated that (m–CF3–PhSe)2 presented antidepressant-like and anti-hyperalgesic effects in the model of pain-depression dyad induced by reserpine and it could represent an interesting alternative in the treatment of these pathologies.
Palavras-chaves: Reserpine, Pain, Depression, Organoselenium compound
Agência Fomento: CNPq, FAPERGS

15.003 - EMPATIA PARA DOR: TRATAMENTO SISTÊMICO COM CANABIDIOL REVERTE A HIPERALGESIA INDUZIDA PELO CONVÍVIO COM UM PAR EM CONDIÇÃO DE DOR CRÔNICA.

EMPATHY FOR PAIN: SYSTEMIC TREATMENT WITH CANNABIDIOL REVERSES THE HYPERALGESIA INDUCED BY COHABITATION WITH A PAIR IN CHRONIC PAIN CONDITION

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Introdução:
Introduction: Pain-related empathy is expressed by the ability to perceive and understand the nociceptive process in the other individual. Research findings from our laboratory demonstrated that living together with a cagemate in chronic pain is able to alter the nociceptive behavior in mice. Drugs that modulate the endocannabinoid system can be alternatives for the management of affective-motivational pain. However, there are no works evidencing if cannabidiol (CBD), a major component of Cannabis Sativa would be involved in this modulation.
Objetivos:
Aim: Here, we evaluate the effects of CBD injected systemically, on writhing test, in mice that cohabitation with a conspecific in chronic pain model.
Métodos:
Methods: Male Swiss mice (n=7-8/group), CEUA: 33052210180, were housed in dyads and lived together for 28 days since weaning. On the 14th day, they were grouped as follow: cagemate nerve constriction [CNC ; i.e. one animal from each pair was subjected to sciatic nerve constriction (SNC) surgery] or cagemate sham (CS ; i.e. one animal from each pair was subjected to (SS) sham surgery). After that, each pair was returned to its homecage to live together for further 14 days. On the 28th day, they received systemic injections of vehicle (physiological saline with 2% Tween 80) or CBD (0.3, 1.0, 10.0 or 30.0mg/kg, subcutaneous) and after 25min were submitted to the writhing test, induced by intraperitoneal (i.p.) injection of 0.6% acetic acid (0.1 mL/10g).
Resultados e Conclusões:
Results: Two-way ANOVA [Factor 1: condition (SNC or SS), Factor 2: treatment (vehicle or CBD)] revealed a significant difference for the condition factor [$F(1,66)=15.86$; $P < 0.05$] and for treatment factor [$F(4,66)=10.14$; $P < 0.05$]. The Duncan test confirmed

the CNC groups displayed higher number of abdominal writhes compared to the CS group. The doses of CBD (10.0 or 30.0 mg/kg) attenuated the hypernociception induced by living with a pair in neuropathic pain, when compared to vehicle CNC group. Conclusion: Our results show that the cohabitation with a pair in chronic pain condition induced hypernociception. The two higher doses of CBD produced an antinociceptive effect. Taken together, the present results suggest the involvement of endocannabinoid system in the modulation of pain empathy in mice.
Palavras-chaves: Empathy, Pain, Cannabidiol
Agência Fomento: UFSCar, CNPQ (153163/2016-0)

15.004 - EUGENIA BRASILIENSIS LEAVES EXTRACT ATTENUATES VISCERAL AND SOMATIC INFLAMMATORY PAIN IN MICE

EUGENIA BRASILIENSIS LEAVES EXTRACT ATTENUATES VISCERAL AND SOMATIC INFLAMMATORY PAIN IN MICE
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Introdução:
Eugenia brasiliensis Lam. is a Brazilian tree distributed throughout Atlantic rain forest, since Bahia until Santa Catarina state, and is popularly known as “grumixaba, ibaporoiti, and cereja-brasileira”. The bark and leaves of Eugenia brasiliensis are used in folk medicine as adstringent, diuretic, energizing, anti-rheumatic and anti-inflammatory potential, however, few studies in the literature prove its activity. Thus, the present work sought to provide scientific evidence for the popular use of E. brasiliensis, contributing to the National Policy of Medicinal and Phytotherapeutic Plants, as well as promoting adequate treatment for the entire population.
Objetivos:
This study aimed at investigating the chemical composition, antinociceptive and anti-inflammatory effect of the hydroalcoholic extract of Eugenia brasiliensis (HEEb).
Métodos:
Chemical composition of the HEEb was determined by High Performance Liquid Chromatography/ESI-Mass Spectrometry (HPLC-ESI-MS/MS). The antinociceptive and anti-inflammatory effects of HEEb (at doses of 30, 100 and 300 mg/kg) was verified in mice after oral administration by intra-gastric gavage (i.g.) 60 min prior to experimentation. It was investigated whether HEEb decreases visceral pain and leukocyte migration induced by an intraperitoneal injection of acetic acid (0.6%). We also evaluated whether HEEb decreases nociceptive behavior induced by formalin (including paw edema and temperature), prostaglandin E2 (PGE2), histamine, and compound 48/80. Finally, we evaluated the effect of HEEb (100mg/kg, i.g.) in the chronic inflammatory (mechanical and thermal hypersensitivity) pain induced by complete Freund's adjuvant (CFA), as well as quantifying the concentration of the pro-inflammatory cytokines TNF-α and IL-6 in the paw by ELISA method.
Resultados e Conclusões:
Seven polyphenols were identified in HEEb by HPLC-ESI-MS/MS analysis. HEEb treatment (in doses of 30, 100 and 300 mg/kg, i.g.) alleviated nocifensive behavior and leukocyte migration caused by acetic acid. Moreover, HEEb (only at the doses of 100 and 300 mg/kg, i.g.) reduced the inflammatory pain and paw temperature induced by formalin, as well as it decreased nociceptive behavior induced by histamine and compound 48/80. Therefore, the dose of 100 mg/kg i.g. was chosen for subsequent experiments. Acute and repeated treatment of animals with HEEb markedly reduced the mechanical and thermal (heat) hypersensitivity, besides decrease paw edema and temperature induced by CFA, and this effect was evident until the day 7. Moreover, repeated treatment with HEEb significantly reduced the levels of IL-6 and TNF- α in the paw when compared to the CFA group. This is the first report showing that HEEb presents antinociceptive and anti-inflammatory effects in the visceral and somatic inflammatory pain in mice, possibly involving the inhibition of histamine receptors and pro-inflammatory cytokines activated pathways. Our results support the use of Eugenia brasiliensis for inflammatory diseases and pain.
Palavras-chaves: Eugenia brasiliensis, Inflammation, Pain
Agência Fomento: CAPES

15.005 - EFEITO DA FOTOBIOMODULAÇÃO NA CICATRIZAÇÃO DE FERIDAS E QUALIDADE DE VIDA DE PACIENTES DIABÉTICOS.

EFFECT OF PHOTOBIOMODULATION ON WOUND HEALING AND QUALITY OF LIFE OF DIABETIC PATIENTS.

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Introdução:

Diabetic complications such as foot ulcers are responsible for approximately 60% of non-traumatic lower limb amputations, resulting in high morbidity and mortality, with great socioeconomic impact and significant losses in patient's quality of life. Conventional treatments for diabetic wounds are restricted, painful and usually long, so it is mandatory the development of additional protocols able of generating more benefits for these patients in a shorter time. Photobiomodulation (PBM) demonstrates positive effects in decreasing painful symptoms and cellular proliferation, favoring tissue repair and promoting wound healing in diabetic patients.

Objetivos:

This study aimed to evaluate the therapeutic effect of PBM on wound healing and quality of life of diabetic patients from the University of São Paulo Hospital.

Métodos:

Longitudinal and interventional study of diabetic patients presenting wounds was realized (CEPSH nº1426/18). After signing the Informed Consent Form, patients were submitted to clinical evaluation, filled pain screening (BPI, DN4 and McGill) and quality of life (HADS and catastrophism) questionnaires and then, they were submitted to PBM therapy (Therapy EC/DMC, 660 nm, 100 mW, 14s per point (1.4 J/cm²), 0.35 cm² area, continuous wave, visible beam, 14 applications – twice a week). At the end of treatment, patients were again evaluated for pain and quality of life. Digital photographs of wounds were performed at the 1st and last day of treatment, area (cm²) and rate of retraction were analyzed by Image J software. Results were analyzed by paired t-test and represented by mean±standard error; $p < 0.05$.

Resultados e Conclusões:

Data demonstrated that all (n=7) patients at beginning of evaluation presented changes of sensitivity on feet, such as foot numbness, burning, prickly, tingling with worsening symptoms at night and from those, 67% had history of amputation. After PBM treatment, all patients presented an increase of the quality of the wound with evident improvement of secretion, odor and epithelization. However, 14 PBM applications were not enough for total wound retraction. Also, it was observed a decrease of 43.6% in patient's pain intensity, with improvement in their motor activity, humor and so, their social relationships, resulting with significant pain impact (mean: 4,086±1,857, n=7; p=0.0453) when applied BPI questionnaire. Also, when evaluated the DN4 scores, it was not found any differences in symptoms of patients (p= 0,0588). Thus, when HADS score was applied, it was observed a significantly advance in the symptoms of anxiety (mean: 8,00±5,43; n=7; p=0.0428; 31.4%), but not in depression (mean: 6,429±5,143; n=7; p=0,1111; 23%). According to catastrophism scores, it was not observed any difference after treatment (mean: 28,00±20,00; n=7; p=0,1201; 30.6%). So, PBM was capable to improve quality of life and pain scores of diabetic patients, proving to be effective for this purpose and it is also an adjuvant tool in healing process.

Palavras-chaves: Diabetes Mellitus, Pain, Photobiomodulation, Wound Healing

Agência Fomento: FAPESP 2018/18483-1

15.006 - PERFIL SENSORIAL DE PACIENTES DIABÉTICOS AVALIADOS PELO TESTE QUANTITATIVO SENSORIAL E O IMPACTO NA QUALIDADE DE VIDA.

SENSORY PROFILE OF DIABETIC PATIENTS EVALUATED BY QUANTITATIVE SENSORIAL TEST AND ITS IMPACT ON QUALITY OF LIFE.

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Introdução:

Diabetic neuropathy (DN) is characterized as heterogeneous and complex clinical syndrome associated with the progressive loss of nervous fiber of the peripheral somatic and autonomic nervous system, which causes devastating sequels between diabetic patients, such as painful symptoms. In this process, it is predominant the involvement of the small fibers (A δ and C), present in the epidermis, also known as intraepidermal nervous fibers (IENF). DN reaches 50% of diabetic patients, in which a significant portion presents generalized pain and are refractory to conventional treatments.

Objetivos:

This study aimed to characterize exteroceptive phenotypical profile of diabetic patients, as well as to evaluate the impact of sensorial disabilities on their quality of life, to direct a suitable treatment to ND patients in the future.

Métodos:

Longitudinal and observational study was performed with diabetic patients (n=28) of the University of São Paulo Hospital (CEPESH 1426/18). After signed the Informed Consent Form, patients were submitted to clinical evaluation, filled pain screening (BPI, DN4 and McGill) and quality of life (HADS and catastrophism) questionnaires. After, they were conducted to the quantitative sensory test (QST), applied on left foot and hand (control). A skin biopsy (5 mm3) of the inferior member (Sural part) was also collected in order to evaluate small fibers quality. Data was analyzed by SPSS program and Image J software.

Resultados e Conclusões:

Results demonstrate that 42,86% of volunteers were classified with Neuropathic pain, while 25% of them presented nociceptive pain and the last 32,14% doesn't show pain, according to DN4 scores. Based on Sensitive Dimension, the most frequent symptoms reported were stabbing (50%), tugging (57%) and aching (64,3%) pain. However, according to Emotional Dimension 57,1% described pain as annoying, which means that pain was the most reported symptom and that most interfered in patients' quality of life, since that 21,4% of patients with pain also presented depression. Also, QST showed that there is a partial alteration of mechanical and thermal sensitivity of diabetic patients, with addition loss of small fibers in those patients (85,7%, n=6). Pain it is the main symptom reported and directly affects the diabetic patient's quality of life. Also, the Diabetes Mellitus (DM), for a long time, alters the exterosensitivity perception. Tracing the sensitivity profile of DM patients, we can better understand this population and in the future provide a better treatment for the refractory portion.

Palavras-chaves: Diabetic Neuropathy, Intraepidermal Nervous Fiber, Quantitative Sensory Test

Agência Fomento: Cnpq - 165068/2018-3

16. Neurodegeneração e Envelhecimento

16.001 - INVESTIGAÇÃO DO POTENCIAL EFEITO NEUROPROTETOR DO MONOTERPENO MIRTENOL COMPLEXADO EM BETA-CICLODEXTRINA EM UM MODELO ANIMAL PROGRESSIVO DA DOENÇA DE PARKINSON.

NEUROPROTECTIVE EFFECT OF MONOTERPENE MYRTENOL COMPLEXED WITH BETA-CYCLODEXTRIN IN A PROGRESSIVE ANIMAL MODEL OF PARKINSON'S DISEASE.

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Introdução:

Parkinson's disease (PD) is a neurodegenerative disease characterized by the death of dopaminergic neurons in the substantia nigra pars compacta. The etiology of PD is still unclear, however, previous studies reported the oxidative stress plays an important role. Currently, the main challenge is the search for the development of new drugs that may help in the treatment of PD. In this context, bioactive compounds isolated from plants may present therapeutic potential.

Objetivos:

Evaluate the neuroprotective potential of monoterpene myrtenol complexed with beta-cyclodextrin (MYR) in an animal model of progressive

parkinsonism by repeated administration of reserpine (RES).
Métodos:
Male Swiss mice (6-7 months, n = 32) received RES (0.1 mg/kg, s.c.) every other day (28 days), with or without treatment with daily administration of MYR (5 mg/kg, p.o.). Catalepsy, olfactory discrimination, oral movement, open field and novel object recognition evaluations were performed across treatment, whereas immunohistochemistry for tyrosine hydroxylase was conducted at the end in experiment. All the procedures were approved by the Ethics Committee (CEUA nº 5592021018).
Resultados e Conclusões:
The main results of this study show that chronic treatment with MYR delayed the onset of catalepsy behavior (RES-CTR: 33.4 ± 5.8 s, RES-MYR: 14.8 ± 3.3 s, $p < 0.05$) and decreased the frequency of vacuous chewing movements (RES-CTR: 32.8 ± 5.9 s, RES-MYR: 20.2 ± 3.0 s, $p < 0.05$). In addition, MYR treatment protected the animals to the memory deficit and olfactory sensibility loss. Taken together, these results showed that MYR has a neuroprotective potential in progressive model of PD. Further studies are needed to elucidate the action mechanism(s) of this monoterpene.
Palavras-chaves: natural products, monoterpene, parkinsonism
Agência Fomento: FAPESP (#2015/20785-8 and #2018/26609-5); CNPq (#425694/2016-0); CAPES (Finance Code 001).

16.002 - EFEITOS DO TREINAMENTO DE BAIXA INTENSIDADE NO CÉREBRO E NO MÚSCULO DO MODELO 1D DE DISTROFIA MUSCULAR CONGÊNITA.

EFFECTS OF LOW INTENSITY TRAINING ON THE BRAIN AND MUSCLE IN THE CONGENITAL MUSCULAR DYSTROPHY 1D MODEL.
Autores: Adriano Alberti 1,2, Jaime Amador Soares 1, Letícia Ventura 1, Viviane Freiberger 1, Matheus Luchini Dutra 1, Leoberto Ricardo Grigollo 1,2, Cristina Salar Andreu 3, Rudy José Nodari Júnior 2, Clarissa Martinelli Comim 1
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Introdução:
Introduction Congenital Muscular Dystrophy type 1D is characterized by a hipoglicosilação of α- dystroglycan protein (α-DG), and this can be strongly implicated in an increase of the degeneration of skeletal muscle tissue and abnormal development of the central nervous system, leading to cognitive impairment. However, the pathophysiology of brain involvement is still unclear. The low-intensity exercise is known to decrease some parameters associated with muscular degeneration in animal models of other forms of progressive muscular dystrophies.
Objetivos:
Objective The objective of this study was to analyze the effects of aerobic exercise protocol of low intensity on cognitive involvement and oxidative stress in brain tissue and the gastrocnemius muscle.
Métodos:
Methods It were used adult male, homozygous (KO), heterozygous (HT) and wild (WT) mice. To complete 28 days of life, they underwent a physical exercise protocol of low intensity for 8 weeks. Twenty four hours after the last day of training, animals were submitted to inhibitory avoidance test and open field test to evaluate the aversive and habituation memory, respectively. The structures of the brain striatum, prefrontal cortex, hippocampus and cortex and gastrocnemius muscle were taken for evaluation of protein carbonylation, lipid peroxidation and activity of catalase and superoxide dismutase. This project was approved by the Committee of Ethics in Research on the Use of Animals (CEUA) of the University of Southern Santa Catarina - UNISUL (Protocol No. 13.035.4.08.IV).
Resultados e Conclusões:
Results There was low- intensity exercise protocol reversed the change in aversive memory and habituation. The increase in protein carbonylation in striatum, prefrontal cortex and hippocampus and lipid peroxidation in the prefrontal cortex and hippocampus were also reversed by the protocol used in the trained KO mice in comparison to nontrained. In the evaluation of the antioxidant activity, the protocol used increased catalase activity in hippocampus and cortex of the animals trained KO compared to untrained. The gastrocnemius was found that the use of the study protocol decreased the protein carbonylation and lipid peroxidation and increased activity of catalase and superoxide dismutase. Conclusion In conclusion, it can

be inferred that the use of low intensity exercise protocol for 8 weeks was able to reverse the cognitive damage and reduce oxidative stress in brain tissue and in the gastrocnemius muscle of animals with DMC1D.
Palavras-chaves: Largemyd mice, memory, oxidative stress, central nervous system
Agência Fomento:

16.003 - EXTRATO PADRONIZADO DE GINKGO BILOBA MODULA ANSIEDADE E MEMÓRIA EM CAMUNDONGAS COM REDUÇÃO NO TRANSPORTADOR VESICULAR DE ACETILCOLINA

STANDARDIZED EXTRACT OF GINKGO BILOBA MODULATES ANXIETY AND MEMORY IN FEMALE VESICULAR ACETYLCHOLINE TRANSPORTER KNOCK-DOWN MICE
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Introdução:
The vesicular acetylcholine transporter (VAChT) has a crucial role in takes up cytosolic acetylcholine (Ach) into synaptic vesicles and regulates the available ACh for release. VAChT mice shows deficit in memory recognition memory and has been used as a model to study Alzheimer's disease in humans. In Alzheimer disease patients, the standardized extract of Ginkgo biloba (EGb) has been shown to produce neuroprotective effects as well as to be effective for reducing cognitive decline.
Objetivos:
The objective of this study was to evaluate the effect of chronic treatment with EGb in 3 different doses (250, 500 and 1000 mg.kg-1) in female knockdown for the vesicular acetylcholine transporter mice lines (VAChT KD) (11-12 weeks old) subjected to treatment with one daily dose of EGb for 30 days.
Métodos:
VAChT KDHET and VAChT KDHOM (45% and 65% decrease in the VAChT expression, respectively) and VAChT wild type (VAChWT) were treated with EGb at doses 250, 500 or 1000 mg.kg-1 or vehicle (saline 0,9%) (orally) (n = 8 / group) (Ethics Committee UNIFESP-3065230418). On day 24 (training session) and 25 (test session) the animals were evaluated in plus maze discriminative avoidance task (PM-DAT) to evaluate acquisition and retention of memory as well as anxiety-like behaviours and spontaneous motor activity. For statistical analysis it was used one or two-way ANOVA, and the differences considered significant when $P < 0.05$.
Resultados e Conclusões:
Behavioural analysis of the percentage of time spent into the non-aversive enclosed arm vs the aversive enclosed arm revealed, for the first time, that chronic treatment with EGb, administered at both 250 and 500 mg.kg-1 doses improved the plus maze discriminative avoidance short-term memory in the VAChT KDHETERO group ($P < 0,0001$), but no long-term memory evaluated in the test ($P= 0,089$). Moreover, treatment with 250 mg.Kg-1 EGb enhanced long-term memory of discriminative avoidance of the VAChT KDHOMO mice ($P=0,0097$), not observed in the other groups. In addition, the VAChT KDHETERO mice treated with 250 and 500 mg.Kg-1 EGb spent more time into the open arms within the training session than the vehicle-treated mice ($P=0,009$ and $P=0,0019$ respectively), suggesting the anti-anxiety effects to these doses of EGb. No changes in the spontaneous locomotors activity was observed following the treatments ($P > 0.05$). Altogether, our data suggested that EGb differentially modulates anxiety-like behaviors and as well as beneficial effects in memory of mice with neurocognitive impairments.
Palavras-chaves: Acetylcholine, Discriminative avoidance, Ginkgo biloba, Memory, VAChT
Agência Fomento: CAPES

16.004 - ANÁLISE DO PAPEL DO MIR-22 NA NEUROPROTEÇÃO E REGENERAÇÃO NO SISTEMA NERVOSO CENTRAL

ANALYSIS OF THE ROLE OF MIR-22 IN NEUROPROTECTION AND REGENERATION IN THE CENTRAL NERVOUS SYSTEM
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Introdução:
The central nervous system (CNS) neurons are responsible for conducing nerve impulses throughout the body regulating different functions. Damage in this system, including neurodegenerative diseases or traumatic injuries, leads to permanent neurological deficits. Neuronal cell death, axon degeneration and the failure of axon regrowth in the adult CNS are responsible for those persistent deficits. For example, glaucoma, a progressive optic neuropathy characterized by damage of retinal ganglion cells (RGCs) and the degeneration of their axons, in the optic nerve, and cell bodies, leads to permanent loss of vision. The regulation of gene expression by viral vector-mediated gene transfer is an interesting strategy to promote neuroprotection and axon regeneration. In this line, the use of microRNAs, which are small non-coding RNAs important in the regulatory gene expression pathways, has emerged as a promising strategy to promote CNS repair. However, knowledge about the role of microRNA in neuroprotection and regeneration is still limited.
Objetivos:
The aim of this work is to verify the role of miR-22, which has been shown to regulate neuronal survival, in neuroprotection and regeneration in the CNS.
Métodos:
Experiments involving animals were performed with the approval of ethics committee for animal experiments of UFMG (4/2017 and 237/2018). First, we performed a bioinformatics analysis to identify predicted and validated mRNA targets of miR-22 and performed functional analyzes for those targets mRNAs. Then, recombinant adeno-associated virus (rAAV) vectors expressing miR-22 (rAAV.miR-22) and mCherry fluorescent protein were produced, allowing the identification of transduced neurons. As control we produced a vector expressing only mCherry (rAAV.mCherry). We tested the transduction efficiency of rAAV.miR-22 and rAAV.mCherry in vitro, using primary cortical neurons, and in vivo, by intravitreal injection in Wistar rats to transduce RGCs. Finally, we verified if rAAV-mediated overexpression of miR-22 promotes neurite regeneration in an in vitro model of scratch lesion of primary cortical neurons.
Resultados e Conclusões:
According to the bioinformatics analysis, the miR-22 presents 58 predicted targets and 2 already validated targets. We also observed that rAAV.miR-22 and rAAV.mCherry were able to efficiently transduce primary cortical neurons in vitro and RGCs in vivo, evaluated by mCherry fluorescence in those neurons. Preliminary results (n=1) showed that rAAV.miR-22 increases neurite regeneration by approximately 47% at 100 µm and 41% at 200 µm from the lesion border. However, additional experiments are needed to confirm this effect and to verify if miR-22 promote neuroprotection and axon regeneration in vitro and in vivo. In conclusion, this work can provide a better understanding of the role of miR-22 in neuroprotection and regeneration following CNS damage.
Palavras-chaves: Central Nervous System, Gene therapy, microRNA, Neuroprotection, Regeneration
Agência Fomento: Conselho Nacional de Desenvolvimento Científico e Tecnológico (CNPq) e International Society for Neurochemistry (ISN)

16.005 - ÁCIDOS ANACÁRDICOS DA CASTANHA DE CAJU SÃO POTENCIAIS AGENTES NUTRACÊUTICOS COM MÚLTIPLOS EFEITOS ANTI-INFLAMATÓRIOS E ANTIOXIDANTES NO MODELO EXPERIMENTAL DE ROEDORES DA DOENÇA DE PARKINSON

ANACARDIC ACIDS FROM CASHEW NUTS ARE POTENTIAL NUTRACEUTICAL AGENTS WITH MULTIPLE ANTI-INFLAMMATORY AND ANTIOXIDANT EFFECTS IN RODENT EXPERIMENTAL MODEL OF PARKINSON`S DISEASE

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Introdução:

Pesticides contribute to the incidence of Parkinson's disease (PD) inducing aberrant redox cycling, mitochondrial dysfunction, protein dysfunction and neuroinflammation. In this regard, Anacardic acids (AAs) obtained from cashew nuts exhibit antioxidative and anti-inflammatory properties which has been indicated as a potential nutraceutic agent.

Objetivos:

The present study evaluated the efficacy of oral administration of AAs (50mg/Kg) on oxidative stress and inflammation induced by rotenone for 7 days in the substantia nigra (SN) and striatum (St).

Métodos:

All procedures with animals were approved by the Ethics Committee on Animal Use of the Federal University of Pernambuco (no.23076.005404/2015-04). Adult Swiss mice (n=6 /group) were divided in 4 groups: Control (Ct); AAs-trated; Rotenone-trated; AAs + rotenone-trated. Levels of lipoperoxidation (LP), GSH/ GSSG ratio and nitric oxide (NO) were evaluated on the SN and St. Western blot or ELISA was adopted for quantifying NFkB-p65, pro-IL-1B, Metalloproteinase 9 (MMP-9), Tyrosine hydroxilase (TH) and Glial fibrilary acidic protein (GFAP) levels. All the experiments were carried out in triplicates and the results are expressed as mean ± standard deviation.

Resultados e Conclusões:

Results: Compared to Ct-group rotenone significantly increased levels of LP and NO in both St (LP: 16,07 ± 3,23 vs 51,27 ± 14,37; NO: 2,90 ± 0,57 vs 3,70± 0,28) and SN (LP: 3,17 ± 0,74 vs 8,34± 1,25; NO: 2,40 ± 0,53 vs 5,76± 1,17). It also reduced GSH/GSSG ratio in both St (6,80± 0,41 vs 9,18 ± 1,33) and SN (10,38 ± 2,42 vs 8,32± 0,61). Regarding inflammatory markers, rotenone per se increased the levels of NFkB-p65 in the SN (1,24 ± 0,49 vs 6,56 ± 2,21), pro IL-1B (SN: 1,22 ± 0,34 vs 5,15 ± 1,64; St: 1,66 ± 0,49 vs 3,32 ± 1,36) and MMP -9 (SN: 2,33 ± 0,17 vs 7,71 ± 0,69; St: 1,64 ± 0,14 vs 7,16 ± 0,64). AAs-treatment alone did not induce differences compared to Ct condition in GFAP (SN: 0,34 ± 0,11 vs 0,23 ± 0,07; St: 0,46 ± 0,11 vs 0,40 ± 0,13) or TH protein levels in both regions (SN: 1,75 ± 0,54 vs 1,79 ± 0,35; St: 1,81 ± 0,37 vs 1,80 ± 0,24). AAs per se were able to reduce pro-IL-1B in the St (~60%) and MMP-9 levels in both SN (~61%) and St (~54%). The concomitant treatment of AAs with rotenone compered to rotenone alone reversed the increased LP (~43% in St and ~40% in SN) and NO levels in SN (~51%) as well as restored the redox balance given by GSH/GSSG ratio in both nuclei (~20% in striatum and ~8% in SN). It also attenuated the reduction of TH (~35% in St and ~50% in SN), and attenuated the increase of pro-IL-1B (~60% in St and ~54% in SN), MMP-9 (~60% in both nuclei), NF-kB p65 in the SN (~54%) and GFAP levels in the St (~30%). Conclusions: The data showed that protective action of AAs in experimental rotenone-induced PD involve multiple targets which can be attributed to its potent antioxidative and anti-inflammatory properties.

Palavras-chaves: Anacardic acids, Parkinson´s disease, Rotenone, inflammation, oxidative stress

Agência Fomento: Coordenação de Aperfeiçoamento de Pessoal de Nível Superior (CAPES); Fundação de Amparo a Ciência e Tecnologia do Estado de Pernambuco(FACEPE)

16.006 - AVALIAÇÃO DO EFEITO ANTI-INFLAMATÓRIO DE TRÊS PEPTÍDEOS SINTÉTICOS, ANÁLOGOS DA FRATERNINA, EM MODELO MURINO DE PARKINSONISMO INDUZIDO PELA NEUROTOXINA 6-OHDA

EVALUATION OF THE ANTIINFLAMMATORY EFFECT OF THREE SYNTHETIC PEPTIDES, SIMILAR TO FRATERNINE, IN A 6-OHDA-INDUCED MOUSE MODEL OF PARKINSONISM

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Introdução:

Parkinson's disease (PD) is a neurodegenerative and progressive disorder of the Central Nervous System, characterized by the selective loss of dopaminergic neurons from the Substantia nigra region. To date, no effective treatment have been addressed to PD. Most drugs used are directed to the treatment of the

symptoms, and do not stop its progression. Therefore, the development of new drugs with more effective strategies to halt the progression of PD has become necessary. Previous studies have suggested that animal toxins exhibited a wide range of pharmacological effects and may represent potentials drugs for the treatment of neurodegenerative disorders. Recently, our research group has isolated a peptide named Fraternine from the venom of the social wasp Parachartergus fraternus. It was observed that Fraternine displayed a potential neuroprotective effect in a 6-OHDA-induced mouse model of parkinsonism
Objetivos:
In the present study, we evaluated the neuroprotective effect of three synthetic peptides (Fraternine-24, Fraternine-14 and Fraternine-10), similar to Fraternine, by quantification of inflammatory mediators in a 6-hydroxydopamine (6-OHDA) induced mouse model of PD. Moreover, we also performed behavioral assessments of motor coordination (Rotarod and apomorphine-induced rotations).
Métodos:
The initiation of the experimental procedures occurred with the approval of the Ethics Commission on Animal Use of the UnB (CEUA / UnB), approved and homologated under protocol number UnBDoc 79100/2014. The animals were divided into three groups (n = 6-8 / group): negative control, group lesioned with 6-OHDA (40 µg / animal) and treated with vehicle solution, the group treated with the synthetic peptides at the concentrations of 7.2, 6.4 and 8.3 respectively and the vehicle group, without the 6-OHDA injury and treated with saline solution. The treatments were via intracerebroventricular, one hour after the lesion and in the third and fifth day after the parkinsonism induction. In the last day of experiment, the animals were euthanized, the brains extracted, and we measured the pro-inflammatory cytokines IL-1 β and IL-6 and tumor necrosis factor (TNF- α).
Resultados e Conclusões:
After the analysis, all the peptides were able to significantly decrease the number of contralateral rotations ($p < 0.01$) induced by apomorphine, showing a potential antiparkinsonian effect. However, only Fraternine-14 had an effect on the length of time the animals stayed in the Rotarod. In addition, the higher dose of the peptide Fraternine-24 significantly decreased the release of the cytokine TNF- α, exhibiting a potential anti-inflammatory effect. In this sense, substances that act as neuroinflammatory modulators represent a promising alternative for the treatment of PD. Since Fraternine-24 was able to inhibit the release of TNF- α and mitigate rotations induced by apomorphine, this compound may present neuroprotective properties, being highly relevant in the treatment of the disease.
Palavras-chaves: Parkinson's disease, Synthetic peptides, Animal venoms, Neuroinflammation , Neuroprotection
Agência Fomento:

16.007 - SUPEREXPRESSÃO DO MIR-26A COMO ESTRATÉGIA PARA PROMOÇÃO DA REGENERAÇÃO AXONAL NO SISTEMA NERVOSO CENTRAL

OVEREXPRESSION OF MIR-26A AS STRATEGY TO PROMOTE AXON REGENERATION IN THE CENTRAL NERVOUS SYSTEM
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Introdução:
The central nervous system (CNS) has extrinsic and intrinsic inhibitory factors that prevent functional axon regeneration. Therefore, damage to the CNS, for example in glaucoma, leads to permanent deficits. The retina and optic nerve are part of the CNS and widely used to study axon regeneration. Moreover, the degeneration of retinal ganglion cells (RGCs) axons, in the optic nerve, and cell bodies occur in glaucoma, which is the main cause of irreversible blindness worldwide. The promotion of robust axon regeneration may lead to new treatments for various neurodegenerative disturbs, such as glaucoma. Studies have been conducted to identify the intrinsic mechanisms responsible for regulating axonal regeneration in the CNS and found that microRNAs, such as miR-26a, are involved in this control. MicroRNAs are non-coding RNAs, containing 21-23 nucleotides, that act as post-transcriptional regulators of gene expression. The miR-26a has been shown to promote neurite outgrowth and axonal regeneration in the peripheral nervous system, targeting mRNAs that encodes proteins that actively inhibit regeneration,

such as GSK3 β and PTEN. However, the role of miR-26a in axon regeneration in the CNS is still unknown.
Objetivos:
We aim to test if overexpression of miR-26a promotes axonal regeneration of CNS neurons, using in vitro and in vivo models.
Métodos:
Animal experiments were done with the approval of ethics committee for animal experiments of UFMG (4/2017 and 237/2018). We performed a bioinformatics evaluation of predicted and validated mRNA targets of miR-26a. Then, we produced recombinant adeno-associated viral (rAAV) vectors, in high titers, expressing miR-26a (rAAV.miR-26a) or EGFP (rAAV.EGFP), as control. Both vectors express EGFP fluorescent protein to identify the transduced neurons. Vector testing in vitro was made with primary cortical neurons culture. We also test vector transduction in vivo by intravitreal injections into adult Wistar rats. After 3 weeks, we prepared retinal flat mount to evaluate the transduction capacity of the rAAV vectors by analyzing the EGFP expression in RGCs. Finally, we analyzed neurite regeneration after scratch lesion of primary cortical neurons culture transduced with rAAV.miR-26a.
Resultados e Conclusões:
We found 33 predicted mRNA targets of miRNA-26a and 30 targets already validated according to bioinformatic analysis. Viral transduction efficiency evaluation showed that rAAV.miR-26a and rAAV.EGFP are working properly and efficiently, since primary cortical neurons and RGCs showed positive expression of EGFP. Preliminary results showed an increase in neurite length of 80% from the scratch lesion up to 100 µm and 63% up to 200 µm (n=1) by rAAV.miR-26a compared to control. The next steps consist in confirming the neurite regeneration effect of rAAV.miR-26a and evaluate axonal regeneration of RGCs after optic nerve crush. This study could identify novel therapeutic targets to promote axonal regeneration in the CNS and new treatments for neurodegenerative diseases.
Palavras-chaves: axon regeneration, glaucoma, microRNA, recombinant adenoassociated viral vector, retinal ganglion cells
Agência Fomento: Conselho Nacional de Desenvolvimento Científico e Tecnológico (CNPq), International Society for Neurochemistry (ISN)

16.008 - DOENÇAS DE PARKINSON E ALZHEIMER ASSOCIADAS AO ENVELHECIMENTO

ALZHEIMER AND PARKINSON DISEASES ASSOCIATES TO AGING
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Introdução:
Aging is a natural process that leads to morphologic and physiologic alterations that may, in turn, lead to diseases, and the consequences of neural system aging presents clear relation with the dementia etiology. The appearance of Alzheimer's disease (AD) is associated with genetic and aging factors, with inefficient treatments and neuropathology only being detected after death. The Parkinsonism [PK] is also associated to genetic causes and aging, with treatment presenting better results than those of AD, and is divided into three basics types: idiopathic parkinsonism; drug-induced Parkinsonism and Parkinsonism-Plus syndrome.
Objetivos:
To associate both AD and PK to aging features and some theories linked to aging.
Métodos:
Descriptors Alzheimer disease, aging, Alzheimer and aging, Parkinson syndrome, Parkinson disease, aging and Parkinson, theories of aging, were used to obtain several papers from the databases Scielo, Elsevier, Scopus and Google Scholar. Seventy-three articles were selected based on the inclusion criteria, that is, they had as its main themes AD, PK and associated problems. The research was based in articles from national and international journals as well as in some classic and important books, such as the Biology of Aging: observations and principles. The selected papers were published between 2005 and 2019.
Resultados e Conclusões:
The papers selected amounted to 30 about AD, 17 about PK, 10 about aging and 14 about other subjects such as molecular biology and brain structure; making for a sum greater than 73, as some papers contemplated more than one disease. Our results demonstrated that the association between dementia and aging are frequently cited in these papers. Those articles indicated the association of the Tau protein, kallikrein and neurofibrillary tangles with aging and

features of AD and PK. Genetic and mesencephalon degeneration from exogenous origin were cited as PK causes. The citations were extensive about the cited characteristics; however, these associations are not quite clear in biochemical, physiologic and clinic terms with objective of prevention, treatment or cure perspectives. None of the selected papers has referred to those diseases as a public health problem or done a deep discussion about them, with rare exceptions. The vast material has shown the possibility of classifying dementia as a risk factor for human health, but reaches this conclusion based on the sum of the factors studied. If AD and PK are to be considered a public health problem, according to our conclusion, they must be treated as early as possible, since literature data indicates a strong relation between aging and dementia. Therefore, one concludes that, regardless of the difficulties as to discovering their precise etiologies, AD and PK are both associated to the stochastic process of aging, and to lower the probability of acquiring AD, PK or other types of dementia, the prevention aspects must be studied and applied to the population.

Palavras-chaves: Aging, Alzheimer Disease, Parkinson Disease
Agência Fomento:

16.009 - EFEITOS DO ENVELHECIMENTO NO ENCÉFALO

EFFECTS OF AGING ON ENCEPHALON

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Introdução:

The increase of the proportion of elderly has configured a global aspect. Aging is an irreversible process that occurs all life long, from birth to death, and it is followed by a decline of bio- logical functions of most organs, as the reduction of kidney´s flow, the cardiac debit, the tolerance to the glucose, the vital capacity of the lungs, the corporal mass and the cellular immunity and is also followed of the decline in some intellectuals, associative and motor abilities. The aging process is extremely complex and multifactorial, and for its multidiscipline nature, the study of the molecular bases of this phenomenon has generated a great number of theories, being distinguished the random theories, based in the random accumu- lation of molecules with structural or functional alterations, and the related not-random theories with mechanisms programmed in the genoma of each organism.

Objetivos:

This work searches to contextualize the cerebral aging through the cortex, since it is the main structure of the neural system as for the sensorial, motor and associative functions.

Métodos:

Descriptors were used to obtain several papers associated to aging and encephalon.

Resultados e Conclusões:

Our results have demonstrated that association between dementias and aging seems to be well stabilized; however, there are not a reliable hypothesis quite clear in biochemical, physiologic and clinics terms, and otherwise, the hodiern treatment proposals are not clear. With the aging, morfophysiological modifications occur as the reduction of cortical neurons and volume of the nucleus of the neurons; what could imply in pathologies as the loss of memory, the Alzheimer´s disease and other dementias, indicating a strong relation between dementia and aging. Nevertheless, the specific mechanism associating both in cellular and molecular are so far to be applicate to the clinical proceedings.

Palavras-chaves: Aging, Dementia, Encephalon
Agência Fomento:

16.010 - MODELO DE INTEGRAÇÃO NEUROVISCERAL PARA A AUTONOMIA EM IDOSOS

A NEUROVISCERAL INTEGRATIVE MODEL FOR AUTONOMY IN EDERLY

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Introdução:

The advantages of physical conditioning for the elderly population in relation to the physiological aspects and the improvement of physical capacities are widely reported in the literature. However, in the last decade, researchers have been dedicated to verifying and justifying the benefits of physical exercise in cognitive performance for this population. Physical training and the best state of physical fitness have been associated

with better cognitive performance, with emphasis on the dimensions of operational memory and inhibitory control. These two elements at a time comprise a model of neurovisceral integration proposed by Thayer and collaborators (2009), in which the executive functions interact with the cardiac autonomic control promoting fine and dynamic body adjustments that will facilitate the behavioral responses of the individual to the organism. environment. Therefore, our hypothesis was that neurovisceral integration composes the functional autonomy model of the elderly, of which the triad cognition - SNA - physical conditioning is a part.
Objetivos:
Thus, the objective of this study was to elaborate a model of functional autonomy for the elderly considering the neurovisceral integration theory in the elderly.
Métodos:
Participants were 28 healthy elderly (23 women and 5 men) aged 66.71 ± 7.64 years. Before the experimental procedures all signed an ICF and the study was approved by the COPEP of the State University of Maringá under the opinion 1,161,402. Three cognitive tests were used. The Spatial N-back, which is an instrument that evaluates working memory, the Stroop, which evaluates selective attention and inhibitory control, and the "Wisconsin Charts" for behavioral flexibility and abstract problem solving. For the presentation of the stimuli we use Software Presentation. We chose to analyze HRV in the domains of time, frequency and nonlinear analysis. For physical fitness we used the 6-minute walk test, Time Get Up And Go, manual grip strength and flexibility.
Resultados e Conclusões:
The results showed correlations ($p < .05$) between the performance in the N-back with the variables "correct in 2-back" (r =, 398), "total hits" (r =, 393) and "errors" (r= -, 438). Correlations were also found between HRV and N-back for the variable "errors" with mean HR (r =, 406) and mean RR (r = -, 383). The findings of this study confirm that individuals with higher HRV tend to perform better in executive function tasks. Specifically, we find a close relationship between parasympathetic activity and tasks that require working memory. We also found the relationship between physical fitness and working memory, suggesting that elderly patients with greater aerobic capacity present positive benefits in FE performance.
Palavras-chaves: Aging, Funções executivas, Executive Functions, Physical aptitude
Agência Fomento:

16.011 - EFEITO DO TREINAMENTO DE BIOFEEDBACK CARDIORRESPIRATÓRIO NA VARIABILIDADE DA FREQUÊNCIA CARDÍACA DE IDOSOS ISOLADOS SOCIALMENTE

EFFECT OF CARDIORESPIRATORY BIOFEEDBACK TRAINING ON HEART RATE VARIABILITY OF SOCIALLY ISOLATED ELDERLY
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Introdução:
The elderly' health is a fundamental issue to be studied in the midst of changing the configuration of the Brazilian age pyramid. Heart rate variability (HRV) is a good parameter for assessment of the autonomic nervous system, as well as general health status. It is known that social isolation may compromise the health in general and specially in the oldness.
Objetivos:
Our aim is to compare rest HRV over 14 cardiovascular biofeedback training sessions in socially isolated elderly.
Métodos:
For that, 10 elderly (age = 70.6 ± 5.9 years) belonging to a long-term institution were divided into 2 groups - training and control. Both groups had 14 task sessions with a frequency of 3 times a week that consisted of HRV register during pre-task rest (5 min), task (15 min) and post-task rest (5 min). Only pre-task rest (along 14 sessions) were used to comparisons. The task of the control group consisted in viewing neutral photos taken from the International Affective Picture System. The task of the training group consisted in the biofeedback of the cardiac and respiratory systems. HRV were registered using biofeedback equipment (Nexus® 10, version 1.2) and it was extracted the Root Mean Square of the Successive Differences (RMSSD). Statistical analyzes were performed in Statistica software version 10.0, with a significance level of $p < 0.05$. The study was approved by the Ethics Committee of UFOP (CAAE: 85839018.9.0000.5150).
Resultados e Conclusões:
There were no differences between the groups in HRV pre-task rest in the first session (control 63,4 ± 54,3ms, trained 98,3 ± 37,6ms; p=0,27). However, after 2

sessions, there were difference in HRV between control (42,1 ± 31,7ms) and trained groups (99,5 ± 41,2ms; p=0.03). This difference was maintained in the last session (control 52,1 ± 39,5ms, trained 140,2 ± 42,2ms, p=0,009). We concluded that biofeedback training is an efficient technique to increase the HRV rest (parasympathetic component) of socially isolated elderly, and could improve the general health conditions focusing in sociality.
Palavras-chaves: Biofeedback, variability of heart rate, elderly, institutionalization
Agência Fomento: CAPES; UFOP

16.012 - NEUROTOXICITY AND BEHAVIORAL EFFECTS OF PROLINE TRANSPORTER INHIBITORS

NEUROTOXICITY AND BEHAVIORAL EFFECTS OF PROLINE TRANSPORTER INHIBITORS
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Introdução:
Proline transporters (PROT) are expressed in the Central Nervous System (CNS) and are associated with excitatory neurotransmission. However, its role in regulating neural function is poorly understood. New drugs that modulate the PROT function could help to understand the role of this protein in the CNS, as well as to open new therapeutic possibilities.
Objetivos:
Analyze the neurotoxicity potential and behavioral effects of three new proline transporters inhibitors (PROTi).
Métodos:
In order to assess the new drugs neurotoxic potential, three new PROTi were tested in LUHMES (Human Neuronal Precursor Cells) cell model, astrocytes culture and co-culture of astrocytes and LUHMES. Behavioral tests were conducted using male Swiss mice, 8-12 weeks (CEUA UFG n.˚ 44/18). The mice were submitted to the Y-Maze, the Plus-Maze, the Marble Burying and the Open Field Task.
Resultados e Conclusões:
In LUHMES cells, the EC50 viability values were 50 µM (LQFM-215) and more than 100 µM (LQFM-216, LQFM-217). The co-culture of astrocytes and LUHMES abolish the cytotoxic effect of the new drugs. We observed a specific impact of PROTi in developing neurites (V/NA > 4), with EC50 values for developing neurites area of 3.1, 20.1 and 21 µM for LQFM-215, LQFM-216 and LQFM-217, respectively. Regarding the behavioral effects, the LQFM-215 compound did not affect the animals alternance in the Y-Maze apparatus (p = 0.14). In the Plus-maze test, the time spent on the open arms (p = 0.60) and the number of entries in the open arms did not show differences (p = 0.78). In the Open Field Task, it was observed a reduction in the number of traveled quadrants (4.57±5.67, p = 0.032), in animals rearing (28 ± 25.88, p = 0.037) and in the number of crossings in the center of the apparatus (11.4 ± 11.82, p = 0.01). In the marble burying test, there was observed an increase in the number of buried spheres in the group that received the highest dose (10 mg/kg) when compared to the control (11.38±4.32, p = 0.038). The three new PROTi presented an impact in LUHMES cells growth at the micromolar level, which was abolish by astrocyte presence. Additionally, LQFM-215 do not affect animal executive memory, improve the marble burying test and reduces the exploratory behavior in Open Field. Take together our data indicates that LQFM-215 is a neuroactive compound.
Palavras-chaves: Discovery of new drugs, Proline transporters, Glutammatergic neurotransmission
Agência Fomento: CNPq, CAPES, FAPEMIG, FAPEG

16.013 - CARACTERIZAÇÃO A LONGO PRAZO DA CICATRIZ GLIOFIBRÓTICA EM UM MODELO DE LESÃO CEREBRAL HIPÓXICO-ISQUÊMICA NEONATAL

LONG-TERM CHARACTERIZATION OF THE GLIOFIBROTIC SCAR IN A MODEL OF NEONATAL HYPOXIC-ISCHEMIC BRAIN INJURY

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Introdução:
Hypoxic-ischemic encephalopathy (HIE) is an important cause of death amongst children, corresponding to 11% of the deaths of children up to 5 years old in developing countries. HIE children can be treated with therapeutic hypothermia within 6 hours after birth, but early death or survival with long-term disabilities/impairments are still possible outcomes. In adults, neuronal death is usually followed by scar formation on the injured tissue, which usually has a fibrotic component. In this regard, astrocytes, pericytes and microglia, as well as peripheral myeloid cells, have been shown to have crucial roles on the formation of the glial scar and on the repair of the adult central nervous system.
Objetivos:
Identify and qualitatively assess the characteristics of scar formation on different brain areas of newborn mice subjected to a model of hypoxic-ischemic encephalopathy.
Métodos:
Post-natal day 10 Balb/c mice were subjected to the Rice-Vannucci model of HIE: permanent ligation of the right common carotid artery followed by 80 min in a hypoxic chamber at 8% O2. Animals were deeply anesthetized and then transcardially perfused with ice-cold 0,9% saline solution, followed by 4% paraformaldehyde, at different time points post-injury. Brains were cryodissected and immunofluorescence analysis were performed via confocal laser scanning microscopy. Ethics Committee protocol: 080/17.
Resultados e Conclusões:
Immunofluorescence analysis of coronal brain slices with confocal microscopy showed extracellular matrix remodeling with deposition of proteins such as fibronectin and laminin, from as early as 7 days to up to 7 weeks after the injury, in the ipsilateral cerebral cortex. This occurred in association with the formation of a fibroblastic reticular network (expressing ER-TR7 antigen) at 4-7 weeks post-injury, as well as with an apparent increase of astrocytes (GFAP+ cells) and microglia/macrophages (F4/80+ cells) from 3 days for up to 7 weeks after the injury. We also noticed histomorphological differences in the composition of the glial scar when the hippocampus and the striatum were compared to the cerebral cortex. The striatal and hippocampal scars were mainly glial, with less fibrotic components. Moreover, microglia/macrophages were found both in the core and the periphery of the cortical scar, whereas astrocytes were mainly found in the border of the scar. In contrast, in the hippocampal and striatal scars microglia/macrophages and astrocytes were intermingled. Finally, we observed the persistent presence of serum proteins, such as albumin and fibrinogen, in the glial scars. In conclusion, these data suggest that HIE induces the formation of glial scars with distinct characteristics in different brain regions.
Palavras-chaves: cicatriz glial, hipóxia-isquemia, neuroinflamação
Agência Fomento: CAPES; CNPq; FAPERJ

16.014 - EFEITO NEUROPROTETOR DO ÓLEO ESSENCIAL DAS FOLHAS DE LIPPIA GRATA COMPLEXADO COM BETA-CICLODEXTRINA EM UM MODELO ANIMAL PROGRESSIVO DA DOENÇA DE PARKINSON

NEUROPROTECTIVE EFFECT OF LIPPIA GRATA LEAF ESSENTIAL OIL COMPLEXED WITH BETA-CYCLODEXTRIN IN A PROGRESSIVE ANIMAL MODEL OF PARKINSON'S DISEASE

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Introdução:
Parkinson's disease (PD) is the most common neurodegenerative movement disorder aging-related and it is characterized by the degeneration of dopaminergic neurons in the substantia nigra pars compacta (SNpc). The etiology of PD remains poorly understand however evidences suggests an important role of oxidative stress and neuroinflammation. Furthermore, PD therapy highlight low efficacy/side effect relationship. In fact, novel therapeutic approaches are necessary to ameliorate the strategies

in the treatment of PD. In this context, Lippia grata is a plant widely used in folk medicine with anti-inflammatory and antioxidant properties.
Objetivos:
The aim of this study was to evaluate the neuroprotective potential of the essential oil of L. grata complexed with beta-cyclodextrin (LIP) in mice model of progressive parkinsonism by repeated administration of low dose (0.1 mg/kg) of reserpine (RES).
Métodos:
Male Swiss mice (6-7 months; 40-55 g, n = 61) received subcutaneous (s.c.) injections of RES or vehicle every other day (28 days) at the volume of 10 ml/kg, with or without a concomitant treatment with daily oral administrations of LIP (5 or 10 mg/kg, p.o.). Catalepsy, olfactory discrimination, oral movement, open field, novel object recognition and elevated plus maze evaluations were performed across the treatment. At the end of the treatment the animals were euthanized, the brains collected and processed for immunohistochemical and oxidative stress analysis. All the procedures were approved by the Ethics Committee (CEUA nº 9407030517/2017). Data are expressed as mean ± standard error of the mean.
Resultados e Conclusões:
The main results showed that (1) chronic treatment with LIP delayed the onset of catalepsy behavior (RES-CTR: 18.0 ± 5.1s; RES-LIP5: 9.9 ± 3.2s, $p < 0.05$); (2) decreased the frequency of vacuous chewing movements (RES-CTR: 29.3 ± 6.6; RES-LIP5: 19.8 ± 3.1; RES-LIP10: 10.6 ± 2.0 movements/5min, $p < 0.05$) and (3) inhibited memory deficit. Moreover, the treatment with LIP (4) protected against dopaminergic depletion (TH+ cells) in the dorsal striatum (STR) and SNpc, (5) reduced the alpha-synuclein immunoreactivity in the STR and hippocampus (HYP), (6) decreased the TBARS levels in HYP and (7) reduced the oxidative stability index (OSI) in the STR and HYP. Taken together, these findings showed that LIP has a neuroprotective effect in a progressive model of PD, suggesting as a future novel therapeutic approach for the treatment of PD.
Palavras-chaves: Neuroproteção, Plantas medicinais, Reserpina
Agência Fomento: FAPESP (#2015/20785-8); CNPq (#425694/2016-0); CAPES (Finance Code 001, Beserra-Filho JIA).

16.015 - EFEITOS DO EXTRATO DE CASCA DE UVA EM MODELO PROGRESSIVO DE PARKINSONISMO EM CAMUNDONGOS.

EFFECTS OF GRAPE SKIN EXTRACT IN A PROGRESSIVE PARKINSONISM MODEL IN MICE.
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Introdução:
Parkinson's disease (PD) is a progressive neurodegenerative disease characterized by the progressive loss of dopaminergic neurons and its pathophysiology may be related to oxidative stress. Previous studies have shown that antioxidant agents from natural products have a neuroprotective effect in animal model of PD. Fruits and vegetables contain an array of antioxidant components, such as polyphenols and flavonoids. In this context, grape skin extract shows antioxidant, anti-inflammatory, antimicrobial and antiviral activities.
Objetivos:
The purpose of the present study was to evaluate the neuroprotective potential of grape skin extract (GS) in an animal model of progressive parkinsonism by administration of low doses of reserpine (RES).
Métodos:
Male Swiss mice (6-7 months-old, n = 30) received RES (0.1 mg/kg s.c.), every other day (38 day), with or without a concomitant treatment with daily administrations of GS (175 mg/L, p.o.). Catalepsy, oral movements and open field tests were performed across treatment. At the end of behavioral tests, the animals were euthanized and the brains collected for the immunochemistry for tyrosine hydroxylase (TH). All the procedures were approved by the Ethics Committee (CEUA nº 8979280616).
Resultados e Conclusões:
The main results show that chronic treatment with GS delayed the onset of catalepsy behavior in mice (on the 25th RES-CRT = 23.1 ± 6.6 and RES-GS = 12.3 ± 3.7, $p < 0.05$; and on the 27th RES-CRT = 35.0 ± 8.0 and RES-GS = 21.7 ± 3.6, $p < 0.05$), suggesting GS had protective effect against the difficulty to start a movement. In

addition, GS-treated animals showed reduction of oral movements frequency when compared to RES-treated mice on the 26th (RES-CRT = 54.0 ± 9.0 and RES-GS = 39.0 ± 6.0, $p < 0.05$), suggesting again the prevention of the RES-induced motor impairments. No differences were observed in open field (travelled distance, $p > 0.05$). Furthermore, GS-treated animals had reduction of the immunoreactivity in the dorsal striatum for TH (RES-CRT = 0.3 ± 0 and CTR-GS = 0.4 ± 0, $p < 0.05$), indicating a prevention of TH depletion, which occurred in the RES group. Taken together, these findings show that the GS has neuroprotective properties that may have a therapeutic potential for PD.

Palavras-chaves: neuroprotection, Parkinson's Disease, antioxidant, polyphenols, flavonoids
Agência Fomento: FAPESP (Grant #2015/20785-8 Ribeiro AM), CNPq (#425694/2016-0); CAPES (Finance Code 001, Macêdo AM; Beserra-Filho JIA; Custódio AC).

16.016 - NON-SEDENTARY MICE SHOWED BETTER SCIATIC NERVE REGENERATION AFTER INJURY

NON-SEDENTARY MICE SHOWED BETTER SCIATIC NERVE REGENERATION AFTER INJURY

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Introdução:

Sciatic nerve lesion is the most frequent lower extremities injury around the world. Although the peripheral nervous system can regenerate after injury, the functional deficits are maintained, particularly when the lesion is distant from the target. The exercise stimulates the plasticity, to speed up the budding of the motor neuron, and decrease the reinnervation latency time.

Objetivos:

We aimed to evaluate if the exercise promotes similar regeneration in sedentary and previously trained animals.

Métodos:

In this work (CEUA-UFF: 589/2014), we studied 4 groups (n=6/Group): PTT (trained previously, injured and exercised after), LTT (exercised after injury) LST (just injured) and CST (control without injury or exercise). The C57Black6 male mouse (weight of 19-25g) was anesthetized (Ketamine and xylazine, i.p.) and performing sciatic nerve crushing (by 1-minute forceps compression). Treadmill training (two 30-minutes cycles with a 10-minutes pause between them, in a 10m/min speed) started 10 days before surgery (PTT group), and 3 days after injured (PTT and LTT). Functional analyses (Electronic von Frey test; Pinprick and Sciatic Functional Index - SFI) were made before to surgery (normality pattern), 1 and 14th days after surgery when the electroneuromyography (ENMG) from gastrocnemius muscles and sciatic nerve morphological analyses were made. ANOVA and Bonferroni test were used to statistical analyses, and we plotted the mean±EPM.

Resultados e Conclusões:

All injured groups showed a loss to the sensitivity on the withdraw reflex when compared to CST (0.380±0.022), but the trained groups (PTT 0.545±0.008, and LTT 0.650±0.028) showed improvement in tactile stimulus detection 14 days after injury by Electronic von Frey test. The PTT group showed a significant difference when compared with the LST group ($p < 0.05$). Moreover the PTT group no-showed a significant difference compared with the non-injured group (CST) indicating better sensitivity recovery them the other injured groups. Painful sensitivity assessment no-showed significant differences between the groups (PTT 4.50±0.28; LTT 4.75±0.25 and CST 5.0±0.0) by the pinprick test. The injured groups showed lower negative values on the first day after injury by SFI, indicating that the nerve injured procedure was corrected. At 14 days after injury, the PTT group (-28.21±10.64, $p < 0.05$) presented better recovery when compared to the LTT (3.50±13.62, $p < 0.05$) and LST. This PTT better performance is in accord by ENMG results, that shows compound muscle action potential (CMAP) with higher amplitude (PTT6.438±0.276. LTT 2.693±0.946, $p < 0.05$); and lower latency (PTT 0.001±0.022; LTT 0.145±0.336, $p < 0.05$). Also, these functional data combined with the morphological analyses, from the semithin cross-sections, showing better nerve cytoarchitecture organization and myelin nerve fibers preserved suggest that exercise can optimize nerve regeneration and recovery of neuromotor function. And previously exercised individuals present better use of this therapy.

Palavras-chaves: crush, exercise, Sciatic nerve
Agência Fomento: CAPES E FAPERJ

16.017 - AVALIAÇÃO IN SÍLICO DA CURCUMINA UTILIZANDO DOCKING MOLECULAR NA BUSCA DE NOVOS ALVOS TERAPÊUTICOS A DOENÇA DE ALZHEIMER ATRAVÉS DA INIBIÇÃO DA APOE4

IN SILICO EVALUATION OF CURCUMIN USING MOLECULAR DOCKING IN THE SEARCH FOR NEW THERAPEUTIC TARGETS FOR ALZHEIMER'S DISEASE THROUGH THE INHIBITION OF APOE4

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Introdução:

Alzheimer's disease (AD) is a chronic neurodegenerative disorder. Abnormal deposition of β-amyloid peptide, a major component of senile plaques, has been reported as the leading cause of neuronal cell death and cognitive impairment (memory, orientation, attention and language). According to previous studies curcumin, which is a neuroprotective agent, and has a low cerebral bioavailability and presents an acceptable pharmacokinetic profile for studies of molecular dynamics. In this study, approaches based on ligands and structures were tested to identify inhibitors.

Objetivos:

Therefore, the goal of the study was to evaluate biological processes that are associated to the development of AD and to test in silico means of the curcumin ligand using molecular docking in order to verify a new way of attack that could slows the progression of the symptoms of this disease.

Métodos:

A search of the biological processes in Databank's was carried out, thus constructing a network of protein-protein interaction (IPP) in Ingenuity software and verified the presence of Apolipoprotein E4 (apoE4) - (APP set) as a greater number of connections to other processes that cause AD. In another software (Avogadro, ArgusLab and ChemSketch), structure optimization, molecular properties calculations and electrostatic potential mapping were performed. Finally, the molecular docking method was performed to verify the level of interaction between the curcumin linker and the apoE4 receptor being analyzed for it's energy and binding length.

Resultados e Conclusões:

The method discovered that the biology of the systems, which is, the networks of the interac- tors, were able to identify that the apoE4 of the APP group was the one with the highest connection in the network, and the docking presented a rigid connection with a destructive character by the dynamic simulations, presenting results according to the properties of the interaction between the curcumin linker and the apoE4 receptor. This interaction was selected by it's minimum approximation value, and the full suitability of -1093.55kcal / mol and free energy variation (ΔG) of -6.96kcal/mol, determined in the Swissdock. Curcumin shows in fact a new promise of treatment for AD, acting through the new target of attack (apoE4) and attacking the entire network connected to APP that accounts for most of the evolutionary connections of the disease. It is considered that the protocols and tests used in this study have produced virtual correct answers and are of great relevance in the search for new forms of AD treatments, and may regress the pathology development process through the inhibition of apoE4 and, in the future, facilitate the treatment in initial conditions. The bioinformatics software used in this research is extremely important for the production of new drugs for the treatment of diseases, allowing an optimization with respect to time and resources, as well as reducing the use of animals for mimicry.

Palavras-chaves: β-amyloid, Apolipoprotein E4, Curcumin
Agência Fomento: CAPES

16.018 - TRANSPORTE DE GLICOSE PELA MEMBRANA PLASMÁTICA AFETA A REMOÇÃO E A CONCENTRAÇÃO DE CA2+ EM REPOUSO EM NEURÔNIOS - IMPLICAÇÕES PARA UMA CONDIÇÃO PRÉVIA À DOENÇA DE ALZHEIMER.

TRANSPORT OF GLUCOSE BY THE PLASMA MEMBRANE AFFECTS THE REMOVAL AND CONCENTRATION OF CA2+ AT REST IN NEURONS – IMPLICATIONS OF A CONDITION PRIOR TO ALZHEIMER'S DISEASE.

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Introdução:
Neuronal glucose hypometabolism and Ca2+ deregulation have been separately implied in the genesis and progress of the neurodegenerative process of Alzheimer's disease (AD). It is known that in AD there is a decline in glucose uptake/metabolism which starts years the onset of the disease. Besides, the expression of glucose transporters 1 and 3 (GLUT1 and GLUT3) are reduced in AD. It's well established in the literature a straight relationship between glucose availability and ATP production. In turn, the decreased ATP levels could compromise the intracellular Ca2+ removal by the malfunction of ATP-dependent mechanism, therefore, ultimately, the reduction of intracellular glucose would affect the removal of cytoplasmic Ca2+.
Objetivos:
The goal of this study was to investigate if modifications in the cytoplasmic glucose concentration would influence the cellular viability and would be involved with the activity of Ca2+ removal from the neuron.
Métodos:
The total levels of plasma membrane Ca2+-ATPase (PMCA), GLUT1 and 3 were quantified, as well as plasma membrane glucose transport and intracellular Ca2+ dynamics in neurons. All these quantifications happened following modulation on external glucose concentration or punctual RNA interference for GLUT3.
Resultados e Conclusões:
The results showed that reduced extracellular glucose impaired neuronal viability from day 8 (5mM: 100 ?13%, n=3; 25mM: 127 ?3.4%, n=3; 2.5mM*: 25 ?6.2%, n=3; One-way ANOVA with Tukey's multiple comparisons test, *p < 0.05), but didn't change the total protein levels of GLUT1, GLUT3 and PMCA before the onset of the cell death. The point reduction of GLUT3 on plasma membrane led to lower glucose transport (siRNA*= 2081±273, n=37; DsRed= 6340±2087, n=19; Non-transfected: 7781±936, n=29, *p < 0.05; One-way ANOVA with Tukey's multiple comparisons test) and intracellular Ca2+ accumulation ([Ca2+]rest: DsRed= 287±147, n=8; siRNA*= 1281±404, n=8; and [Ca2+]activity: siRNA*= 4654±1422, n=8; DsRed= 797±397, n=8; Unpaired t-test, *p < 0.05). We concluded that low cytoplasmic glucose concentrations impair neuronal viability and compromise the neuronal Ca2+ removal activity. Thus, it is expected that changes in glucose transport/metabolization may lead to a more susceptible condition or trigger a neurodegenerative condition resulting in accumulation of intracellular Ca2+.
Palavras-chaves: Cálcio, Hipoglicemia, Neurodegeneração, Transportador de glicose, Viabilidade celular
Agência Fomento: CAPES. FAPESP.

16.019 - ROTENONA INDUZ PARKINSONISMO EM RATOS NUMA LINHA TEMPORAL SIMILAR A DOS SINTOMAS OBSERVADOS NA DOENÇA DE PARKINSON.

ROTENONE INDUCES PARKINSONISM IN RATS ON TIMELINE SIMILAR TO SYMPTOMS OBSERVED IN PARKINSON'S DISEASE.
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Introdução:
Parkinson's disease (PD) affects about 1.6% of the world's population over 65 years old. PD is characterized by the progressive loss of dopaminergic neurons of the substantia nigra, leading to a severe reduction of dopamine levels, which results in several motor symptoms (resting tremor, bradykinesia, postural abnormalities and akinesia) and non-motor symptoms (anosmia, depression, dementia, anxiety, gastrointestinal problems). Treatment of rats with rotenone has been proposed in the year 2000 to provide an model of idiopathic PD.
Objetivos:
The aim of this study was to establish the timeline of occurrence of motor and non-motor symptoms in rats submitted to parkinsonism induced by rotenone.
Métodos:
Wistar rats were divided into two groups: ROT (receiving rotenone 2.75 mg/kg, i.p. for 21 days) and CTL (receiving vehicle – DMSO + sunflower oil, i.p for 21 days). Concomitant with the administration of rotenone, animals were submitted to tests to assess motor, olfactory and memory deficits and depressive behavior at 0, 3, 7, 14 and 21 days. All procedures in this study were approved by the ethics committee of the Institution (registration number 54/2017). At the day 21, animals were euthanized to evaluate gastric

emptying. The data were analyzed using the Mann-Whitney test.
Resultados e Conclusões:
The results showed that rotenone in the open field test was able to induce significantly motor deficits after 14 and 21 days, as measured by horizontal (CTL 14: 56.80 ± 6.54; ROT 14: 20.25 ± 4.32; CTL 21: 59.10 ± 5.03; ROT 21: 17.50 ± 3.02; $p < 0.001$) and vertical exploration (CTL 14: 19.10 ± 2.93; ROT 14: 10.83 ± 2.76, $p < 0.05$; CTL 21: 16.40 ± 2.78; ROT 21: 6.66 ± 1.50, $p < 0.01$) and mean velocity (m/s) (CTL 14: 88.90 ± 10.92 m/s; ROT 14: 54.54 ± 18.47 m/s $p < 0.01$. Rotenone decreased motor coordination in the rotarod test, observed by the decrease in latency (s) to fall (CTL 14: 88.90 ± 10.92s; ROT 14: 54.54 ± 18.47s, $p < 0.05$; CTL 21: 99.00 ± 14.02s; ROT 21: 79.00 ± 13.39s, $p < 0.01$). The deficit observed after 21 days in the rotarod test was responsive to apomorphine, that improving the performance of the animals (CTL 21: 99.00 ± 14.02s; ROT 21: 64.25 ± 12.97s; ROT+APO: 106.8 ± 11.69s, $p < 0.01$). Rotenone also induced olfactory impairment in the buried pellet test after 7 and 21 days, as observed by the increasing in time (s) to find the pellet (CTL 7: 47.10 ± 9.19s; ROT 7: 169.00 ± 33.23s, $p < 0.01$; CTL 21: 40.20 ± 4.63s; ROT 21: 116.30 ± 28.17s, $p < 0.05$), and depressive-like behavior in the sucrose preference test after 14 and 21 days, observed by the decrease in sucrose consumption (%) (CTL 14: 91.90 ± 1.70%; ROT 14: 72.44 ± 4.70%; CTL 21: 82.06 ± 3.30%; ROT 21: 70.30 ± 2.69%, $p < 0.05$), At 21 days of administration, rotenone also reduced gastric emptying in the dye emptying test (CTL 21: 27.7 ± 1.45%; ROT 21: 36.09 ± 2.72%, $p < 0.01$). We concluded that rotenone can induce non-motor and motor symptoms in a timeline similar to the symptoms observed in PD, and it is useful to search new neuroprotective drugs.
Palavras-chaves: Rotenone, Parkinson's disease, Olfactory Deficit, Depression
Agência Fomento: Conselho Nacional de Desenvolvimento Científico e Tecnológico-CNPq

16.020 - PROTECTIVE EFFECT OF COPAIBA OIL-RESIN (Copaifera reticulata Ducke) PRIMARY CROPS MIXED OF CEREBRAL CORTEX, HIPPOCAMPUS AND MIDBRAIN SUBMITTED TO DEGENERATION MODEL INDUCED ROTENONE

PROTECTIVE EFFECT OF COPAIBA OIL-RESIN (Copaifera reticulata Ducke) PRIMARY CROPS MIXED OF CEREBRAL CORTEX, HIPPOCAMPUS AND MIDBRAIN SUBMITTED TO DEGENERATION MODEL INDUCED ROTENONE

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Introdução:
Therapeutic tools available for the treatment of neurodegenerative diseases only soften the symptoms without impeding the progression of the disease. In this way, Amazonian's plants, from your great diversity, represent potential sources of protective compounds or molecules that can help to stop the degenerative process.
Objetivos:
Therefore, we propose to investigate the protective effects of oil-resin from copaiba (Copaifera reticulata Ducke - ORC) in mixed primary cultures of the cerebral cortex (CC), hippocampus (HC) and mesencephalon (MSC) submitted to the in vitro model of rotenone-induced degeneration (ROT).
Métodos:
The cultures were made from Wistar (P1-P4) neonatal rats from the UFPA Central Vivarium facilities with all procedures approved by the Ethics Committee (CEPAE-UFPA nº 216-14). CC and HC were exposed to ROT (30 to 60nM) for 24 or 48 hours, concomitantly treated with 2.5 µg / mL ORC, MSCs were exposed for 72 hours to ROT (20 to 100nM), to ORC (1 at 20 µg / mL) and concomitantly, at the end of each exposure the cell viability assay was performed by the MTT colorimetric method The statistical analysis was performed using the Prism 8 software, where we obtained the mean and standard error values and the one-way ANOVA test was used, with values of $p \leq 0.05$ as significant.
Resultados e Conclusões:
In CC, there was a reduction in viability at all tested concentrations of ROT for both 24 h (up to 21.5 ± 4.1%, for 60 nM) and 48 h (up to 37.7 ± 5.2% for 60 nM). On the other hand, 24 h of exposure reduced cell viability from 40 nM (up to 25.8 ± 1.6%, to 60 nM), and at all concentrations tested for 48 h exposure (up to 36.8 ± 4, 4%, to 60 nM). For the 72-hour MSC there was a reduction in cell viability for all the test concentrations

(up to 51.1 ± 4.5%, to 100 nM) for the dose-response curve of the ORC after 72 hours of exposure there was a reduction only in the concentrations of 10 and 20 µg / mL (31.1 ± 7.6% and 34.6 ± 7.8%, respectively). When we analyzed the possible cytoprotective effect of ORC against ROT-induced degeneration, we observed that only in the 24-hour condition of concomitant exposure to ROT + ORC for HC and in concomitant 72 exposure to MSC was there a protective effect of ORC. For HC 24 hours (39.8 ± 4.4% for ROT and 26.2 ± 2.7% for ROT + OC) and in the MSC 72 hours (52.3 ± 7.6% for ROT and 32.2 ± 5.8% for ROT). Our results showed that cerebral cortex, hippocampal and midbrain mixed cells cultures are susceptible to ROT. Furthermore, they showed that concomitant treatment with ORC only at 24 hours CH and MSC at 72 hours exposure was effective against ROT induced injury, suggesting a cytoprotective role of ORC under our experimental conditions.

Palavras-chaves: Neurodegeneration, Cytoprotection, Pesticide

Agência Fomento: CAPES, CNPq, FAPESPA, UFPA

16.021 - TERAPIA GÊNICA NEUROPROTETORA E REGENERATIVA PARA NEURODEGENERAÇÃO GLAUCOMATOSA BASEADA NA SUPEREXPRESSÃO DO miR-17

NEUROPROTECTIVE AND REGENERATIVE GENE THERAPY FOR GLAUCOMATOUS NEURODEGENERATION BASED ON THE OVEREXPRESSION OF miR-17

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Introdução:

Glaucoma is a complex neurodegenerative disease, characterized by the progressive degeneration of optic nerve axons and retinal ganglion cells (RGCs) bodies. It is currently the leading cause of irreversible blindness worldwide. The main therapeutic strategy focuses on reducing intraocular pressure, however, in a certain group of patients, the disease continues to progress. This suggests that new therapeutic approaches, focused on protecting RGCs and their axons from degeneration, as well as promoting the regeneration of injured axons are necessary. However, neurons of the central nervous system (CNS), like the RGCs, are not able to regenerate their axons. For neuroprotection and regeneration to occur it is necessary to modulate a large number of genes. Therefore, modulation of molecules that regulate gene expression, such as microRNAs, is an interesting therapeutic strategy to promote neuroprotection and regeneration.

Objetivos:

The objective of this work is to develop a neuroprotective and regenerative gene therapy for glaucoma, based on the overexpression of miR-17, which is associated with neuronal survival and neuritic outgrowth in the peripheral nervous system.

Métodos:

Experiments involving animals were approved by the UFMG Ethics Committee for Animal Use (protocol 4/2017 and 237/2018). First, a bioinformatics analysis was performed to analyze the predicted and validated messenger RNAs (mRNAs) targets of miR-17. Then, recombinant adeno-associated virus (rAAV) vectors were generated to overexpress miR-17 (rAAV-miR-17) together with the mCherry fluorescent protein to identify the transduced neurons. As control, vectors expressing only mCherry (rAAV-mCherry) were produced. The efficiency of these vectors was tested in primary culture of cortical neurons in vitro, as well as, their ability to transduce RGCs in vivo. For neurite regeneration analysis, primary cortical neurons were transduced with rAAV-miR-17, 5 days later a scratch lesion was made and neurite regeneration was assessed 24 h later by fluorescence microscopy.

Resultados e Conclusões:

We found in the bioinformatics analysis of miR-17, 166 target mRNAs, of which 51 were validated and 115 were predictive targets. The viral vectors transduction results showed that rAAV-miR-17 and rAAV-mCherry are able to efficiently transduce neurons in vitro and in vivo. Then, we tested whether overexpression of miR-17 is able to enhance neurite regeneration. The results, still preliminary, point to an increase in neurite length from 66,26 µm per neuron in the control (rAAV-mCherry) to 119,53 µm per neuron in the rAAV.miR-17 group (N=1). However, further experiments are still needed to confirm this result and also to test whether miR-17 is capable of promoting neuroprotection and regeneration of RGCs in glaucoma models. In conclusion, this work may identify the role of miR-17 in neuroprotection and regeneration in the CNS and may be important for the development of new therapies for neurodegenerative disorders, particularly glaucoma.

Palavras-chaves: central nervous system, neuroprotection, axonal regeneration, gene therapy, microRNAs
Agência Fomento: Conselho Nacional de Desenvolvimento Científico e Tecnológico (CNPq); International Society for Neurochemistry (ISN)

16.022 - EFEITOS DO EXTRATO DE CENOURA ROXA EM UM MODELO PROGRESSIVO DA DOENÇA DE PARKINSON.

EFFECTS OF PURPLE CARROT EXTRACT IN A PROGRESSIVE MODEL OF PARKINSON'S DISEASE.

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Introdução:
Parkinson's disease (PD) is a progressive neurodegenerative disease characterized by death of dopaminergic neurons in the Substantia Nigra pars compacta. Etiology of PD is unclear but evidence showed that the oxidative stress process plays an important role. Therapeutic approaches used for the PD treatment have been ineffective in the symptom control. Previous studies have shown that antioxidant substances have a neuroprotective effect in PD. The plant species Daucus carota, popularly known as purple carrot, contains compounds such as anthocyanins with antioxidant properties.

Objetivos:
This study evaluate the potential neuroprotective effect of the purple carrot extract (Daucus carota ssp. Sativus var. Atrorubens Alef.) in rats submitted to the progressive parkinsonism model by repeated administration of reserpine (RES).

Métodos:
Wistar male rats (6-7 months and weight 350-500g) received RES (0.1 mg/kg, s.c.) every other day, for 28 days, with or without a concomitant treatment with daily administration of C400 (purple carrot extract 400 mg/kg p.o). Catalepsy, orofacial movements and novel object recognition task were performed across treatment, and immunohistochemistry for tyrosine hydroxylase (TH) was conducted at the end behavioral tests. All procedures were approved by the Ethics Committee (CEUA 451410018).

Resultados e Conclusões:
Our main results showed that repeated treatment with C400 delayed the onset of catalepsy (RES-CTR = 6.1 ± 2.0s and RES-C400 = 3.2 ± 1.7s, $p < 0.05$). Furthermore, C400-treated rats decreased frequency of the tongue propulsion (RES-CTR = 14.7 ± 7.0 and RES-C400 = 108 ± 5.0, $p < 0.05$), duration of the vacuous jaw movements (RES-CTR = 57.3 ± 37.0 s and RES-C400 = 28.6 ± 19.0 s, $p < 0.05$) and vacuous chewing movement (RES-CTR = 44.5 s ± 11.2 and RES-C400 = 30.9 ± 6.2, $p < 0.05$). Moreover, C400-treated animals had protection against memory deficit. These findings showed that the C400 has a potential neuroprotective effect in a progressive animal model of PD. New studies are need to elucidate the action mechanisms involved in this neuroprotective effect.

Palavras-chaves: Anthocyanin, Parkinsonism, Neuroprotection, Flavonoid, Natural products
Agência Fomento: FAPESP (#2015/20785-8); CNPq (#425694/2016-0); CAPES (Finance Code 001, Custódio ACS, Beserra-Filho JIA, Macêdo AM, Silva SP).

16.023 - EFEITO PROTETOR DO β - CARIOFILENO NO MODELO DA DOENÇA DE PARKINSON INDUZIDA POR LPS EM RATOS

THE PROTECTIVE EFFECTS OF β-CARYOPHYLLENE ON LPS-INDUCED RAT MODEL OF PARKINSON DISEASE

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Introdução:
Parkinson's disease (PD) is the second most prevalent neurodegenerative disease, characterized by the loss of dopaminergic neurons from substantia nigra pars compacta of basal ganglia caused due to misfolded protein aggregation, reactive oxygen species

generation and inflammatory stress. Currently, levodopa (L-DOPA) administration is the most widely used therapy for PD. But prolonged administration of L-DOPA is associated with the symptoms of dyskinesia. Emerging evidences suggest the role of cannabinoid receptors (CBRs) in curtailing the progression of PD by activating neuroprotective pathways. β-Caryophyllene (BCP), an important cannabinoid derived from the essential oils of different species, has displayed pharmacological properties in different kinds of tissues and cells.
Objetivos:
The present study aimed to investigate the antioxidant effects of BCP in the LPS rat model of Parkinson's disease.
Métodos:
Male Wistar rats (250-300g) were submitted to unilateral intra-nigral injection of LPS (2 µg/ animal) or 0.9% saline for the sham-operated group. Starting one hour after surgery the animals were treated with BCP (15, 50 e 150 mg/kg, po) during 14 days. After treatment, the animals were submitted to rotarod test, sacrificed and the brain areas were used for determination of lipid peroxidation (MDA). The study was approved by CEUA /UFC-Sobral, (n°03/2018).Data statistics were performed by one-way ANOVA, followed by Newman-Keuls post hoc test $p < 0.05$.
Resultados e Conclusões:
Comparing with untreated group, behavioral symptoms of the rats were significantly less in the rats that received BCP treatment. In rota rod test, LPS attenuated retention activity while BCP at the doses of 15 and 50 mg/kg increased this parameter (SHAM: 192,4 ± 9,3; LPS: 73,5 ± 10,2(; BCP15: 174,2 ± 8,4; BCP50: 154,3 ± 6,2 s - n=8). The MDA levels in striatum and prefrontal cortex were significantly decreased ($P < 0.05$) in BCP group treated with lower doses compared to untreated group (Striatum- SHAM: 63,4 ± 9,3; LPS: 192,4 ± 9,3; BCP15: 74,6 ± 9,2; BCP50: 98,3 ± 5,7 – n=8). We conclude that BCP might act as a promising therapeutic agent against LPS toxicity improving motor deficit and reducing oxidative stress.
Palavras-chaves: Parkinson, β-cariofileno, Neuroproteção
Agência Fomento: Coordenação de Aperfeiçoamento de Pessoal de Nível Superior - CAPES

17. Distúrbios Neurológicos

17.001 - G1, AGONISTA GPER, DIMINUI A MORTE NEURONAL, RESPOSTA INFLAMATÓRIA GLIAL E PROMOVE MELHORA COMPORTAMENTAL APÓS OCLUSÃO DA ARTÉRIA CEREBRAL MÉDIA

GPER AGONIST G1 DECREASES NEURONAL DEATH, GLIAL INFLAMMATORY RESPONSE AND PROMOTES BEHAVIORAL IMPROVEMENT AFTER MIDDLE CEREBRAL ARTERY OCCLUSION
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Introdução:
Ischemic stroke is a significant public health problem. Epidemiologic data have shown that women of reproductive age have a better prognosis than men. In addition, this factor decreased post-menopause, suggesting a strong estrogen involvement.
Objetivos:
Our aim was to investigate the effects of G protein-coupled estrogen receptor 1 (GPER) agonist G1 in ischemic stroke model.
Métodos:
In this study, 12 male Wistar rats (280-320g and aged 10-12 weeks) were divided into four groups: sham, sham-G1, ischemia and ischemia+G1 (CEUA-UFPA 4751150916). The animals were subjected to middle cerebral artery occlusion (MCAO) for 30 minutes. Afterwards, they were followed-up to 7 days of reperfusion and received 30 ug/kg (subcutaneously) of G1 for four hours after MCAO and during six consecutive days. Furthermore, counting of neurons (a square of 2500 um2 per cortical layer), glial activation and neurological deficit scoring (on second and seventh days after MCAO) were evaluated.
Resultados e Conclusões:
Our results showed that control-groups (sham and sham+G1) presented score 0 (normal motor function) in both evaluation. However, the group subjected to MCAO presented neurological deficit (score 2, loss of

muscle tone in forelimbs contralateral to the lesion when rat is lifted by the tail) on both day evaluation and GPER agonist treatment decreased the score to 1 (mild muscle weakness of contralateral forelimbs) in both tests ($p < 0.05$). Moreover, there were no differences between control-groups in relation to number of NeuN+ cells on the somatomotor cortical layers. However, G1 treatment was able to partially prevent loss of neurons in IV layer (ischemia: 2.6 ± 2.5 cells and ischemia + G1: 11.6 ± 4.0 cells; $p = 0.0247$) and VI layer (ischemia: 5.3 ± 1.5 cells and ischemia + G1: 20.6 ± 2.5 cells; $p = 0.0005$). There was no morphological alteration in astrocytes of control-groups, while G1 agonist reduced the astrogliosis reactive and glial scar formation triggered and evidenced in ischemia group. In addition, the ischemia induced an important microgliosis and the use of GPER agonist attenuated this phenomenon. Thus, our findings indicate that GPER activation plays a key role in the regulation of neuronal and glial response after ischemic stroke, resulting into neuroprotection and improve clinical performance of animals. These outcomes are valuable because they increase the understanding of the GPER function on the brain, and even suggest that this receptor may be a potential therapeutic target to treatment of ischemic stroke.

Palavras-chaves: ischemic stroke, GPER, neuroprotection
Agência Fomento: Universidade Federal do Pará

17.002 - PRÉ-CONDICIONAMENTO COM SARCOSINA PROMOVE NEUROPROTEÇÃO EM MODELO ANIMAL DE ISQUEMIA FOCAL

SARCOSINE PRECONDITIONING PROMOTES NEUROPROTECTION IN MOUSE MODEL OF FOCAL ISCHEMIA

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Introdução:

Stroke is characterized as a neurologic disease caused by an abrupt disruption in the cerebral blood flow, which can cause cognitive and motor impairments. Stroke physiopathology is related to excitotoxicity-mediated neuronal death, essentially driven by NMDA receptors and glutamatergic pathways. NMDA receptors activation requires the binding of glutamate (agonist) and glycine or d-serine (co-agonists). The glycine transporters type 1 (GlyT1) are highly expressed in glutamatergic synapses and it is responsible to maintain unsaturated levels of glycine in synaptic terminal, therefore modulating NMDA activity. Due that, we hypothesized that inhibition of GlyT1 may exert neuroprotective effects upon excitotoxicity-mediated neurodegeneration.

Objetivos:

The purpose of this work was to evaluate the neuroprotective effect of sarcosine, a GlyT1 inhibitor, in a mouse model of focal cerebral ischemia, assessing post-stroke behavioral deficits and infarct

Métodos:

8-week-old male Swiss mice (40-45g) were used in this study. They were randomly divided into 5 groups (control, sham, 125 mg/kg, 250 mg/kg, 500 mg/kg) with 5 animals in each one of them. Regarding to the surgical procedures, we performed the occlusion of the left common carotid artery by ligation with non-absorbable silk suture, and then the contralateral medium cerebral artery (MCA) occlusion, by electrocauterization. To analyze the infarct area, brain slices were cut into 2-mm-thick consecutive sections to perform the 2% TTC staining. To assess motor asymmetry and functional motor activity, we used the Cylinder Test and the Limb Clasping Test.

Resultados e Conclusões:

The 2% TTC staining have shown significant reduction in the infarct area in the higher dose group (500 mg/kg), whereas in the lower dose group (125 mg/kg) this reduction was not significant. Regarding to the behavioral tests, our results have shown that the higher dose of sarcosine reduced the motor asymmetry and functional motor activity impairment in the mice, whereas it is not possible to see this reduction in the lower dose group. We conclude, therefore, that sarcosine produces neuroprotective effects on a dose-dependent mechanism in the MCAO mouse model of focal ischemia.

Palavras-chaves: Neuroprotection, Ischemia, Sarcosine
Agência Fomento: CNPq, FAPEMIG, FAPEG

17.003 - INFLUÊNCIA DA CINESIOTERAPIA ASSOCIADA À APLICAÇÃO DE ZICLAGUE® NOS DISTÚRBIOS MOTORES DA PARALISIA CEREBRAL.

INFLUENCE OF KINESIOTHERAPY ASSOCIATED WITH APPLICATION OF ZICLAGUE® IN MOTOR DISTURBANCE CEREBRAL PALSY.

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Introdução:
Cerebral palsy is a neurodevelopmental disorder resulted from a brain injury, characterized by persistent disturbances in the motor system. Muscle spasticity is the main finding that causes functional limitations with reductions in daily living. However, Ziclague® is a phytomedication used as a support for muscle spasticity treatment, preparing the muscle for a better contraction. Physical therapy will act improving the muscle force and suiting the subjects to the daily living.
Objetivos:
To assess the influence of kinesiotherapy associated with Ziclague® application on the muscle spasticity degree, gross motor function degree and trunk oscillation during gait.
Métodos:
This two-year study has been approved by the Ethics and Research Committee on Human Beings, number 2.231.452. The research participants (n=14) were both male and female, between 1 and 7 years old, and with a cerebral palsy diagnosis. The treatment was conducted along ten physical therapy sessions, three times a week, with fifty minutes each. The assess methods applied in this study was the Modified Ashworth Scale – MAS, Gross Motor Function Classification System – GMFCS, and CvMob software. First, Ziclague® was applied topically under spastic muscles. Then, a series of functional exercises was accomplished, using postures of neuroevolutionary sequence. All participants were submitted for the same treatment and they formed their own control group, using the data both from before and after the treatment for comparison. This study uses the software GraphPad Prism, to statistics analysis and graphing, the Shapiro-Will test, to data normalization, the Wilcoxon test, to nonnormal data, and the T-Student test, to normal data. Data are presented as mean±SD. $P < 0.05$ was considered significant.
Resultados e Conclusões:
The analysis of trunk oscillation during gait showed a significant reduction in the right body hemisphere. Before the treatment, the angulation mean was 38.73±4.79, and after the treatment 27.36±8.82. In the left body hemisphere, it was not found a significant reduction in oscillation ($p < 0.05$). Before the treatment, the angulation mean was 69.15±20.24, and after the treatment 61.09±14.10 ($p < 0.05$). Through the MAS, it was detected a significant reduction in muscle spasticity degree. The right body hemisphere was 1.63±1.62, changing to 0.99±1.16, while the left hemisphere was 1.81±1.61, changing to 0.94±1.05 ($p < 0.05$). By comparing the averages, there was a decrease in the GMFCS levels: before the treatment GMFCS level was 4.14±0.31, and after, 3.64±0.41 ($p < 0.05$). Thus, it was possible to observe that kinesiotherapy treatment, associated with Ziclague® application, improved trunk balance that may help in a better movement of upper limbs, the muscle tone was modulated, and possibly increased the motor control, once it was detected an improvement in gross motor function through decrease in levels of GMFCS.
Palavras-chaves: Cinesioterapia, Espasticidade muscular, Paralisia cerebral , Ziclague®
Agência Fomento: CAPES; FAPITEC.

17.004 - EXPOSIÇÃO SUBAGUDA AO ORGANOSSELÊNIO P-CLORO-DIFENIL DISSELENETO CAUSA TOXICIDADE HIPOTALÂMICA EM RATOS.

SUB-ACUTE EXPOSURE TO ORGANOSELENIUM P-CHLORO-DIPHENYL DISELENIDE CAUSES HYPOTHALAMIC TOXICITY IN RATS

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Introdução:
Efforts have been directed toward the synthesis of stable organoselenium compounds with

pharmacological applications. Molecular and behavioral studies have demonstrated that p-chloro-diphenyl diselenide [(p-ClPhSe)2] elicits anorectic-like action in rats through a satiety-enhancing action partially mediated by hypothalamic serotonin uptake inhibition1 and lower orexin levels. In vivo studies also revealed that food intake reduction by (p-ClPhSe)2 is related to specific flavor and malaise induction. In this sense, studies suggest that endoplasmic reticulum (ER) stress could be an important event involved in adverse effects of different drugs.
Objetivos:
The aim of the present study was to verify if repeated exposure to (p-ClPhSe)2 causes toxicity in hypothalamus of rats by a mechanism linked to drug-induced ER stress.
Métodos:
Male adult rats were treated with (p-ClPhSe)2 (10 mg/kg; intraperitoneal) or vehicle (mineral oil) for seven days (n=7 rats/group). Two hours after the last administration, rats were killed and the hypothalamus was removed for western blotting analysis. Total protein lysate (20µg) were subjected to SDS-PAGE, electrotransferred onto a polyvinylidenedifluoride membrane, and probed with the following antibodies: BiP (GRP78), p-PERK (Thr 981), GADD 153 (CHOP), IRE1 and p-IRE1, eIF2 α and p-eIF2 α1. Protein levels were normalized to β-actin. For protein detection, we used horseradish peroxidase-conjugated secondary antibodies and chemiluminescence. Membranes were then exposed to X-ray film and developed with developer and fixing liquids under appropriate dark-room conditions. The study was approved by the Ethics Committee of the University of Santiago de Compostela and by the Institutional Ethics Committee on Care and Use of Experimental Animal Resources from the Federal University of Santa Maria, RS, Brazil (050/2012). Data were analyzed by GraphPad Prism® software. To compare pair groups, unpaired-t test or Mann Whitney test was employed. A value of $p < 0.05$ was considered to be significant.
Resultados e Conclusões:
The results showed an up-regulation of ER stress-related proteins in hypothalamus of rats repeatedly exposed to (p-ClPhSe)2 (10 mg/kg, i.p.). The hypothalamic ER stress was evidenced by increasing of p-PERK (89%, p=0.0018) and CHOP (37%, p=0.0242) levels. Also, the ratios of p-IRE1/IRE1 (26%, p=0.0250) and p-eIF2 α/eIF2 α (37%, p=0.0364) were raised by (p-ClPhSe)2 injections. BiP levels were similar to those of the control group ($p > 0.05$). Repeated exposure to (p-ClPhSe)2 induces ER stress in hypothalamus of rats, a key brain structure involved in several homeostatic functions. Corroborating the previous aversion findings, the present data suggest that food intake suppression by (p-ClPhSe)2 could be partially related to its toxic effects.
Palavras-chaves: Endoplasmic reticulum, Toxicity, Hypothalamus
Agência Fomento:

17.005 - PRANLUKAST RESGATA PARCIALMENTE A FUNÇÃO SENSORIAL E MIELINIZAÇÃO APÓS DIETA COM CUPRIZONA EM CAMUNDONGOS

PRANLUKAST PARTIALLY RESCUES SENSORY FUNCTION AND MYELINATION AFTER CUPRIZONE DIET IN MICE

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Introdução:
Multiple sclerosis (MS) is a disease that predisposes to imbalances of excitability, leading to sensory and motor deficiencies. Understanding protective mechanisms of demyelination and neuronal death, stimulants of remyelination and normalization of electrical activity may generate new therapies. GPR17 antagonism has been shown to potentiate remyelination after lysolecithin-induced demyelination.
Objetivos:
The overall goal of this work was to investigate the relation between demyelination and sensory function in a MS mouse model.
Métodos:
Mice (n=8 for each group) were submitted to 0.2% cuprizone diet, with concomitant treatment with Pranlukast (a GPR17 antagonist) for five weeks (CEUA-UFRJ 69). Digital analgesimeter test were performed after treatment in order to access sensory function. The analysis of demyelination, myelin repair after cuprizone diet, the organization of axons excitable domains were analysed through immunohistochemistry.

Resultados e Conclusões:
Our results indicated that immunostaining anti-MBP did not reveal significant difference in myelin density in somatosensory cortex between groups (control=149,3±8,264; cuprizone=144,5±6,702; pranlukast=149,4±4,216). In the corpus callosum, the myelin density decreased significantly in the cuprizone group; however, treatment with Pranlukast partially recovers the level of myelination (control=168,4±3,983; cuprizone=153,2±2,445; pranlukast=159,9±6,794). Immunohistochemistry anti-CC1 in the somatosensory cortex showed that the cuprizone group have a significantly lower percentage of oligodendrocytes than control, that were not reversed by pranlukast treatment (Control= 13,5±7,594; Cuprizone=7,857±7,081; Pranlukast=5,4±3,05). In the corpus callosum, the cuprizone group have a lower amount of oligodendrocytes compared to the control group, and treatment with Pranlukast partially recovers the number of oligodendrocytes (control=32,25±6,994; Cuprizone=9,857±3,338; Pranlukast=18,8±8,927). Immunohistochemistry anti-MRF showed that the cuprizone group have a percentage of cell nuclei with active transcription for oligodendrocyte myelin genes significantly lower than the control group in the somatosensory córtex (Control=52,67±7,024; Cuprizone=34,57±8,696; Pranlukast=36±7,842). In the corpus callosum, the cuprizone group has a lower amount of oligodendrocytes compared to the control group; and the treatment with Pranlukast partially recovered the percentage of nuclei of MRF positive oligodendrocytes without significant differences in relation to the control group (Control=64,33±6,429; Cuprizone=44,71±5,823; Pranlukast=53,2±14,72). Finally, we have shown that the somatosensory response was impaired in Cuprizone group, that were partially recovered by pranlukast treatment (Control=0,4088±0,153; Cuprizone=1,966±0,4348; Pranlukast=1,506±0,2022). We concluded that treatment with Pranlukast rescues myelination of the corpus callosum and the sensory function, providing a new therapeutic target to MS and other demyelinating diseases.
Palavras-chaves: desmielinização, excitabilidade, cuprizona, pranlukast, fingolimod
Agência Fomento:

17.006 - INFLUENCE OF DEPRESSIVE SYMPTOMS ON THE PERFORMANCE OF VERBAL FLUENCY IN PATIENTS WITH PARKINSON'S DISEASE

INFLUENCE OF DEPRESSIVE SYMPTOMS ON THE PERFORMANCE OF VERBAL FLUENCY IN PATIENTS WITH PARKINSON'S DISEASE
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Introdução:
Parkinson's disease (PD) is characterized by the selective death of dopaminergic neurons in nigrostriatal structures, which has repercussions on motor and non-motor changes. Executive dysfunctions such as alteration in verbal fluency have been reported in PD. Verbal fluency is a measure of the integrity of cognitive functions, especially the frontal and temporal lobes.
Objetivos:
To evaluate the relationship between depressive symptoms and verbal fluency performance in patients with PD.
Métodos:
This was a cross-sectional observational study, performed at the Movement Disorders Outpatient Clinic of the Hospital de Clínicas de Porto Alegre - RS. The sample was of non-probabilistic type by accessibility composed by 70 patients with PD. Depressive symptoms were assessed using the Beck II Depression Inventory (BDI-II) and verbal fluency through the Verbal Fluency Task (FAS). Data were analyzed using the Pearson correlation test and Simple Linear Regression model. This work was approved by

the Ethics Committee on Research in Humans of the Hospital de Clínicas of Porto Alegre (n°:2052088).
Resultados e Conclusões:
The average age of patients with PD was 63.71 ± 1.10 years and 50% (35) were males. There was a negative correlation between BDI-II and semantic FAS (r = -0.438, p < 0.0001) and total FAS (r = -0.359, p = 0.002). The results of linear regression show that depressive symptoms contribute to the performance of semantic verbal fluency (r2 = 0.1829; p = 0.0002) and total (r2 = 0.11290; p = 0.0023). Depression seems to influence the impairment of semantic verbal fluency in patients with Parkinson's disease.
Palavras-chaves: Parkinson's Disease, Verbal Fluency, Depression
Agência Fomento: CAPES e FIPE

17.007 - NEUROPSICOLOGIA DO LOBO TEMPORAL: LURIA E CONCEPÇÕES CONTEMPORÂNEAS.

NEUROPSYCHOLOGY OF THE TEMPORAL LOBE: LURIA'S AND CONTEMPORARY CONCEPTIONS.
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Introdução:
Nowadays, brain lesion studies implement techniques such as Computerized To¬mography, Functional Magnetic Resonance Imaging, Single Photon Emission Tomography and Positron Emission Tomography. Famous neuropsychologist Alexander Romanovich Luria's studies were carried out, without the use of imaging technology during many years of cognitive studies, with a high quantity of patients with cerebral lesions, covering complex behavior and brain functions specifically regarding the lobes and their subareas. For instance, he performed several specific studies on memory and mental organization in some of his books.
Objetivos:
The goal of this work is to associate recent studies in neurophysiology with Luria's work regarding the Temporal Lobe, in specific.
Métodos:
For the purposes of this manuscript, articles from 1992 with both of the key-words temporal lobe and neuropsychology were researched. The search was performed using PubMed, Scopus, Medline, Elsevier, and Google Scholar to confection of a systematic revision. The articles were separated into the key words and counted to generates data for comparison.
Resultados e Conclusões:
The most common subject discussed in recent papers analyzed in this manuscript was epilepsy, followed by memory and the association between epilepsy and memory. In older articles, the most common subject was hearing and cortical lesions, followed by memory and neuropsychology. The qui-square test indicated a significant difference [H0 accepted] among the subjects of recent papers of $p < 0,05$, the same occurred with the subjects of older papers for the same value of p, i.e. as the number of papers do not generate a normal distribution, they were organized in group [discrete variables] for to permit a non-parametric study into qui-square test. When comparing the subjects of recent and older papers, H0 was accepted, therefore, indicating a significant difference for the group of subjects of $p < 0,05$. According to the data studied here, Luria's basis for hodiern neuropsychological studies remains foundational, but new data on the temporal lobe in relation to epilepsy and hippocampus analysis were introduced into the scope of neurophysiology. On the other hand, this work prioritized the studies of the neurophysiological functions of the temporal lobe in the relation to older and recent data however, for the purposes of improved clinical performance, a detailed study on the neuropsychological tests used on the temporal lobe should be performed.
Palavras-chaves: Behavior, Cerebral lesions , Neurophysiology, Neuropsychology
Agência Fomento:

17.008 - CONEXINA 36 REGULA A ATIVIDADE EPILEPTIFORME NO MODELO DA EPILPESIA DO LOBO TEMPORAL INDUZIDO POR PILOCARPINA

CONNEXIN 36 REGULATES THE EPILEPTIFORM ACTIVITY IN THE PILOCARPINE MODEL OF TEMPORAL LOBE EPILEPSY
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Introdução:

Gap junction channels (GJC) are intercellular conduits that enable the exchange of small molecules between two adjacent cells, allowing the occurrence of electrical synapses. These channels are composed by protein subunits called connexins (Cx). The involvement of these channels in the synchronization of neuronal oscillations has been increasingly demonstrated, which in turn is a recognized feature underlying the epileptiform activity. Although data reinforce the idea that GJC play a central role in epilepsy, their importance in this pathology still needs further elucidation.

Objetivos:

This study aims to evaluate, using immunofluorescence (IF) analysis, the distribution of the neuronal Cx36 in the hippocampus of rats submitted to pilocarpine-induced status epilepticus (SE). Additionally, our goal is to elucidate the participation of GJC in the epileptiform activity (EA) after pilocarpine-induced SE, by evaluating the effects of intrahippocampal administration of the Cx36-composed GJC blocker mefloquine, through in vivo local field potentials (LFP) recordings.

Métodos:

Male Wistar rats weighing between 250-300g were used. For IF assays, animals were previously treated with methyl-scopolamine (MS) (1mg/kg; subcutaneous) followed by intraperitoneal pilocarpine (360mg/kg) injection. Control animals received saline instead of pilocarpine. Ninety minutes after the establishment of SE brains were collected and processed for Cx36 immunostaining. For acquisition of LFP recordings, animals were submitted to stereotaxic surgery for implantation of hippocampal cannula (CA1) and electrodes (CA1 and CA3). After period of recovery, animals were submitted to thirty minutes of recording of the basal activity. After that, animals were treated with MS (1 mg/kg; subcutaneous) followed by intraperitoneal pilocarpine (360mg/kg) injection. Thirty minutes after the establishment of SE, animals received intrahippocampal mefloquine (10 µM in 1 µL).

Resultados e Conclusões:

The pattern of distribution of Cx36 in the hippocampus did not change after induction of EA. We observed Cx36 immunostaining in all strata of CA1 and CA3 regions of both control and SE animals. In the dentate gyrus (DG), Cx36 was found in great amount in the molecular layer, followed by granular cell layer and hilus. The pattern of distribution in the DG remained stable after SE induction. Regarding the LFP recordings, the power spectrum density and spectrogram analysis revealed that the basal recordings from both CA1 and CA3 hippocampal areas presented potentials that oscillated in the theta, beta and gamma frequencies, pattern that was not changed after MS administration. After pilocarpine injection, evident increase of the power of all the frequencies evaluated was observed, from delta to gamma ranges. After mefloquine administration, large reduction of power of all frequency ranges was achieved, evidencing that GJC has a fundamental participation in the ictal activity and might be a good target for novel therapeutic approaches.

Palavras-chaves: Sinapse elétrica , Epilepsia , Hipocampo

Agência Fomento: FAPESP / CNPq / CAPES

17.009 - GALACTOSE OCASIONA DANO MOTOR EM RATOS JOVENS: PAPEL DO Trk-B?

Galactose impairs motor functions in young rats: role of Trk-B?

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Introdução:

Galactosemias are genetic disorders of galactose (Gal) metabolism, leading to accumulation of Gal in patients. Although, asymptomatic at birth, after milk ingestion, galactosemic children signs of acute intoxication which can evolve into death. Even with treatment (based on diet exclusion of Gal), chronically, patients present cerebral signs, such as low intelligence quotient, memory, motor and speech disorders and dysfunction in white and grey matter. Brain-derived neurotrophic factor (BDNF) play an important role in motor structures and its loss is linked with severe motor

diseases. Neurotrophic effects of BDNF are signaling through tropomyosin receptor kinase B (Trk-B).
Objetivos:
The main of the current work was investigate an interaction between acute Gal exposure in motor performance and Trk-B signaling pathway.
Métodos:
For evaluate motor skills, 30-day-old Wistar rats performed Rotarod test. Animals are subjected to 3 training section (30 min break between sections). The test section was performed 24 hours after training. Animals (n=9 per group, per time) are dived into groups that receive one single subcutaneous injection of Gal 5 µmol/g of weight or 0,9% NaCl in same conditions (i) 1 hour, (ii) 3 hours or (iii) 24 hours before test. For evaluate immunocontent of TrkB-full length (TrkB-FL), truncated TrkB (TrkB-T) and p-CREB (Ser133), animals receive one single Gal injection (5 µmol/g) or 0,9% NaCl and were euthanize 3 hours after injection (n=6 per group). Cerebellar vermis and hemispheres were dissected and prepared for Western Blotting analysis. Animals that did not performed Rotarod test were used. This project was approved by CEUA of Federal University of Rio de Janeiro (061/2018). Data were analyzed using Student's t test for independent samples and are expressed in mean ± SEM of control group vs Gal group. Values of $p < 0.05$ were considered to be significant.
Resultados e Conclusões:
Gal diminish latency to fall after 3 hours of administration (261.2± 24.5 vs 177±23.6; p=0.02). Nevertheless, Gal injection did not alter time spent in Rotarod 1 hour (182.1±14.11 vs 232.1±26.64; p=0.12) and 24 hours (211.2±23.29 vs 243.1±21.44; p=0.33) after injection. In cerebellar hemispheres acute Gal exposure diminish TrkB-FL (0.12±0.01 vs 0.08±0.01; p=0,003) and p-CREB (0.31±0.03 vs 0.16±0.01; p=0,002), without alter TrkB-T (0.47±0.02 vs 0.46±0.03; p=0,8). In cerebellar vermis, TrkB-T was increase in Gal group (3.1±0.42 vs 4.4±0.28; p=0,03), however, TrkB-FL (0.79±0.1 vs 0.89±0.08; p=0,44) and p-CREB (0.41±0.04 vs 0.44±0.03; p=0,5) were not altered. This work suggests that neurotrophins impairment may play a role in motor pathophysiology of galactosemia and if this correlation is confirmed, may be an interesting therapeutical target in the disease.
Palavras-chaves: Galactosemia, Cerebelo, Trk-B, Erros Inatos do Metabolismo
Agência Fomento: Conselho Nacional de Desenvolvimento Científico e Tecnológico (CNPq); Fundação de Amparo à Pesquisa do Estado do Rio de Janeiro (FAPERJ)

17.010 - SMALL CONDUCTANCE CALCIUM-ACTIVATED (SK3) POTASSIUM CHANNELS OVEREXPRESSION ARE INVOLVED IN L-DOPA INDUCED-DYSKINESIA AND PARKINSON'S DISEASE

SMALL CONDUCTANCE CALCIUM-ACTIVATED (SK3) POTASSIUM CHANNELS OVEREXPRESSION ARE INVOLVED IN L-DOPA INDUCED-DYSKINESIA AND PARKINSON'S DISEASE

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Introdução:
The most effective treatment for Parkinson's Disease (PD) motor symptoms is through administration of L-DOPA. However, the chronicity of this treatment leads to the development L-DOPA-induced dyskinesia (LID). Recent data showed that SK3 (small-conductance calcium-activated K+channel 3) modulates electrophysiological properties of dopaminergic cells of the substantia nigra compacta. Alterations of potassium channel expression and function in the basal ganglia have been linked to the pathogenesis of PD.
Objetivos:
Our aim is to determine the impact of SK3 channels in neurodegenerative and neuroimmune responses in mice model of PD and LID.
Métodos:
First, in order to determine SK3 channel expression related to dopaminergic system in naive SK3 overexpressing (T/T) mice, we performed immunohistochemistry analysis of double labelling of Tyrosine Hydroxylase (TH) and SK3 channel in the substantia nigra (SN). Then, SK3 knockout (SK3/KO), SK3 T/T and wild-type (WT) mice, with lesion of dopaminergic neurons induced by unilateral 6-hydroxydopamine microinjection in the striatum, received daily administration of L-DOPA (25mg/kg; i.p.)

for 14 days. The mice were evaluated for AIMs. To confirm the lesion, we evaluated immunostaining for TH in the striatum and substantia nigra compacta (SNc). For statistical analysis, we used Student's t-test and Two-way ANOVA, followed by Tukey's post-hoc test (n=5-7 per group).
Resultados e Conclusões:
In unlesioned mice, we found SK3-staining increased in SN reticulata and decreased in the SN compacta, compared to WT. After surgery, the mice were tested for spontaneous forelimb use in the cylinder test where they showed similar asymmetry (30% of contralateral paw use). Chronic treatment with L-DOPA (25mg/kg; i.p) was able to induce abnormal involuntary movements in both KO and WT groups since the first day of treatment but it was absent in T/T mice. We observed in all groups loss of 50% of the dopaminergic fibers in the striatum and loss of 47% of dopaminergic neurons in SNc, by immunofluorescence for TH. Further analysis will analyze the presence of neuroinflammatory markers in striatum. Our findings can indicate that ion channels, more specifically SK3, may represent a new pathway to try to unveil the molecular mechanisms responsible for the development of LID in mice model.
Palavras-chaves: Parkinson's disease, Dyskinesia, Potassium channels
Agência Fomento: FAPESP

17.011 - EFEITOS DO BETA-CARIOFILENO EM RESPOSTA À ALTERAÇÕES COMPORTAMENTAIS INDUZIDAS POR LIPOPOLISSACARÍDEO.

BETA-CARIOPHYLLENE EFFECTS IN RESPONSE TO BEHAVIORAL ALTERATIONS INDUCED BY LIPOPOLYSACCHARIDE.
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Introdução:
Cognitive deficits were demonstrated in neurodegenerative diseases and sepsis induced by infections. Lipopolysaccharide (LPS) is an endotoxin which induce systemic inflammation with behavioral changes known as sickness behavior by cytokines released. The search for pharmacological interventions could prevent or delay central nervous system dysfunction. Beta-caryophyllene (BCP), a cannabinoid receptor type II agonist has shown a promise pharmacological target with several anti-inflammatory and anxiolytic effects.
Objetivos:
Therefore, the aim of this study was to evaluate whether BCP has effects on sickness behavior induced by LPS.
Métodos:
Female Swiss mice (32) (CEUA-UFPA nº: 5819011118), were randomly separated in different groups: Vehicle/Vehicle (N:6); LPS/Vehicle (N:7); Vehicle/50mg BCP (N:4); LPS/25mg BCP (N:4); LPS/50mg BCP (N:7); LPS/75mg BCP (N:4). All animals were submitted a fasting 90 minutes before LPS administration. The BCP or vehicle (Olive Oil) were administrated 30 min before LPS or saline inoculation (i.p). The open field test (OF) was performed 2 h after LPS or saline administration to motricity evaluation and anxiety-like behavior. The ANOVA post hoc Bonferroni test was used to statistical analyses
Resultados e Conclusões:
Motor analysis showed that LPS/Vehicle presented an increase in the number of immobile episodes in relation to the Vehicle/50mg, while the LPS/50mg not showed differences with the Vehicle/50mg (LPS/Vehicle: 8,57±1,29; Vehicle/50mg: 2,25±0,48; LPS/50mg: 7,85±1,55; $p > 0,05$ between Vehicle/50mg and LPS/50mg, but the treatment showed statistically difference between LPS/Vehicle and Vehicle/50mg, $p < 0,05$). The analysis per minute of OF revealed that the LPS/Vehicle presented a decrease in the distance in all minutes when compared to the Vehicle/50mg (LPS/Vehicle: 1º min: 106,9±23,95 cm; 2º min: 78,19±21,47 cm; 3º min: 27,81±10,81 cm; 4º min: 56,77±18,34 cm; 5º min: 22,73±13,34 cm; Vehicle/50mg; 1º min: 164,9±24,23 cm; 2º min: 105,7±26,34 cm; 3º min: 74,83±21,63 cm;4º min: 85,49±24,97 cm ;5º min: 46,96±22,91 cm; $p < 0,01$ between groups). On the other hand, LPS/50mg not showed difference with the Vehicle/50mg from the 2nd to 4th min (LPS/50mg: 2º: 105,7±26,34 cm; 3º: 74,83±21,63 cm; 4º: 85,49±24,97 cm; $p > 0,05$ from the 2nd to 4th min). The anxiety-like behavior was observed, the LPS/Vehicle presented a thigmotaxis behavior compared to the Vehicle/50mg (Vehicle/50mg: 176,57±53,76 sec; LPS/Vehicle: 270,36±25,08 sec; $p < 0,05$ between Vehicle/50mg and LPS/50mg). The BCP treatment improved the motricity of behavioral changes caused by the inflammatory process induced by LPS, in addition to attenuating anxiety-like behavior.

Palavras-chaves: Beta-cariophyllene, lipopolysaccharide., Sickness behavior
Agência Fomento: CAPES, CNPq

17.012 - DINÂMICA LIPÍDICA CEREBRAL POR IMAGENS DESI-MS EM MODELO DE NEUROINFLAMAÇÃO INDUZIDA POR LPS

BRAIN LIPID DYNAMICS BY DESI-MS IMAGING IN LPS-INDUCED NEUROINFLAMMATION MODEL

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Introdução:
It is well-established that bacterial lipopolysaccharides (LPS) can promoteneuroinflammation through receptor Toll-like 4 and induces sickness behavior in mice. This phenomenon triggers changes in membranes lipid dynamics to promote the intracellular cell signaling. Desorption electrospray ionization mass spectrometry (DESI-MS) is a powerful technique that can be used to image the distribution of lipids in the brain tissue directly.

Objetivos:
The aim of this work was firstly to evaluate the behavioral changes, inflammatory mediators and microglial activation in C57BL/6 mice after LPS challenge and then to evaluate the brain lipid dynamics by DESI-MS imaging in LPS-induced neuroinflammation model.

Métodos:
The neuroinflammation was induced in 8-12 week-old C57Bl/6 wild type mice (WT) by intraperitoneal injection of LPS (5mg/Kg). The experiments were performed at 3 and 24 hours after LPS challenge. The behavioural changes were evaluated using the folowing tests: open field, social interaction, marble buryng and the nest building test. The brain levels of pro- and antiinflammatory cytokines were evaluated by ELISA and the microglial activation was evaluated by immunofluorescence. The brain lipid dynamics were evaluated by desorption electrospray ionization mass spectrometry (DESI-MS) imaging. The animal protocols were approved by the Animal Ethics Committee of UFMG (Protocol: 259/2012).

Resultados e Conclusões:
We have observed that LPS challenge induces sickness behavior and triggers an increase in the pro-inflammatory cytokines levels in the brain 3h after LPS injection (TNF: control 11,77 ± 0,0; LPS 295,0 ± 0,0 pg/mL) (IL1- β: control 502,9 ± 30,32; LPS 728,3 ± 36,21 pg/mL) (IL-6: control 209,7 ± 15,63; LPS 1642 ± 94,47 pg/mL) (MCP-1: control 158,9 ± 62,69; LPS: 4093 ± 631,9 pg/mL) (CXCL/2 control 593,4 ± 25,50 pg/mL; LPS 1415 ± 129,2 pg/mL). However, only the anti-inflammatory cytokine IL-10 was upregulated 24 hours after LPS injection (control 732,1 ± 51,83; LPS 2382 ± 170,1 pg/mL) (Data are expressed as mean ± SEM, n = 5/group). Morphological analysis of hypothalamus, cortex and hippocampus demonstrated that microglial activation was present 24 hours after LPS challenge, but not 3 hours. DESI-MS revealed a total of 14 lipids significantly altered after 3 and 24 hours and as well as their neuroanatomical distribution. Multivariate statistical analyzes have shown that ions associated with phosphatidylethanolamine [PE(38:4)] and docosatetraenoic acid [FA (22:4)] could be used as biomarkers to distinguish samples from the control or LPS treated groups. Finally, our data demonstrated that monitoring cerebral lipids dynamics and its neuroanatomical distribution can be helpful to understand sickness behavior and microglial activation after LPS administration.

Palavras-chaves: Neuroinflamação, Dinâmica lipídica cerebral, DESI-MS, Comportamento doentio, Lipopolissacarídeo
Agência Fomento: FAPEG, CNPQ, CAPES, FAPEMIG

17.013 - INVESTIGAÇÃO DOS EFEITOS DA ADMINISTRAÇÃO DE MELITINA EM MODELO DE CRISES CONVULSIVAS EM RATOS.

INVESTIGATION OF THE EFFECTS OF THE ADMINISTRATION OF MELITTIN IN A RAT MODEL OF SEIZURES.

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São Paulo (Edificio José Leal Prado, Rua Botucatu, 862, CEP 04023-062, São Paulo-SP)

Introdução:

Epilepsy is a neurological disorder characterized by an abnormal brain activity, causing convulsive seizures or periods of unusual behavior. There is evidence that epilepsy results from an imbalance between excitatory and inhibitory neurotransmissions. Clinically approximately 30% of the epileptic patients develop pharmacoresistance, thus there is a need for the development of new antiepileptic drugs. Substances from venoms may be an excellent source of new molecular models for medicinal chemistry. Melittin is a compound isolated from bee venom (Apis mellifera) that shows high affinity by the nervous system. Previous studies showed anti-inflammatory and antioxidant effects of mellittin (MEL), indicating a potential role of this substance as a therapeutic agent for brain diseases.

Objetivos:

The aim of this study was to investigate the potential anxiolytic and anticonvulsant effect of the administration of melittin in rats.

Métodos:

The melittin (0.1 mg/µL) was microinjected into the lateral ventricle of Wistar rats (3-month-old). After, each animal was placed in the open field (OF, 20 min, n = 7/group) and next in the elevated plus maze (EPM, 5 min, n= 7/group). For evaluation of anticonvulsant effect, animals received MEL prior to the administration of bicuculline (1 mg/mL), afterwards they were placed in the OF. All procedures were approved by local ethics committee (CEUA nº 4651140918). Data were analyzed by independent samples t test.

Resultados e Conclusões:

The results show that acute treatment with MEL increased the traveled distance (MEL = 7.95 ± 0.93 and CTR = 4.08 ± 0.72 m; $p < 0.05$) and mean speed (MEL = 0.026 ± 0.003 and CTR = 0.013 ± 0.002 m/s; $p < 0,05$) when evaluated in the OF. Moreover, there was increase in the assessment risk (Protected diving: MEL = 23.56 ± 2.62; CTR = 6.34 ± 2.01; $p < 0.05$) when evaluated in the EPM. These findings indicate that mellitin can presented hyperlocomotor effect in rats. Further studies are needed to improve understanding of MEL effect and its therapeutic potential.

Palavras-chaves: Natural products, epilepsy, Bicuculline, tonic-clonic seizures, peptide

Agência Fomento: FAPESP (Proc. 2015/20785-8, Ribeiro AM), CNPq (Proc. 425694/2016-0)

17.014 - ÁCIDO ARÚNDICO, UM INIBIDOR DA S100B, PREVINE DANO TECIDUAL, MELHORA A FUNÇÃO MOTORA E PARÂMETROS INFLAMATÓRIOS EM RATOS SUBMETIDOS À HEMORRAGIA INTRACEREBRAL

ARUNDIC ACID, A S100B INHIBITOR, PREVENTS TISSUE DAMAGE, IMPROVES MOTOR FUNCTION AND INFLAMMATORY PARAMETERS IN RATS SUBMITTED TO INTRACEREBRAL HEMORRHAGE

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Introdução:

Intracerebral hemorrhage (ICH) is a severe stroke subtype. ICH pathology leads to an increase in astrocyte synthesis of S100B (a Ca2+ binding protein) that in high levels exerts neurotoxic effects, resulting in neuronal apoptosis, reactive astrogliosis and microglial activation, thus contributing to neuroinflammation. Arundic acid (AA) has exerted beneficial effects on various central nervous system disorders by inhibiting astrocytic synthesis of S100B.

Objetivos:

Evaluate the effects of AA treatment on motor function, striatal lesion volume, S100B levels, astrocytic and microglial activation in the rats' striatum.

Métodos:

A total of 58 male Wistar rats were used and all procedures were approved by CEUA (30944). ICH was induced by stereotactic injection of collagenase in the left striatum and AA (0.2 µg/ µl) was administrated in the left lateral ventricle. The analyses were performed 3 and 7 days after surgery. Rats were divided into the groups: SHAM (n=12 in 3 days; n=10 in 7 days), ICH (n=8 in 3 days; n=10 in 7 days) and ICH+AA (n=10 in 3 days; n=8 in 7 days). Neurological score evaluated motor function. Hematoxylin–eosin staining was used to measure striatal lesion volume. S100B, GFAP (reactive astrogliosis marker) and CD11B (microglia/macrophages marker) were assessed by immunofluorescence. Statistics were run in SPSS. ANOVA followed by Duncan's post hoc were used. Data are expressed as mean ± SEM.

Resultados e Conclusões:

ICH+AA had less motor dysfunction compared to ICH group on days 3 (3.2±0.80 and 6±0.92, $p < 0.0001$) and 7 post-injury (1.87±0.39 and 3.11±0.53, $p < 0.01$), being similar to the SHAM group on day 7 (1 ±0.21). Striatal lesion volume was similar between ICH and ICH+AA

groups (19.30±3.03 and 18.98±2.61, respectively) and different from SHAM (0±0) 3 days after surgery ($p < 0.0001$). At 7 days, ICH+AA (2.03±1.14) lesion volume was similar to the SHAM (0±0) and smaller than ICH (5.20±1.08) ($p=0.00$). Arundic acid prevented S100B overexpression in the damaged striatum 3 days (ICH: 2.08±0.07, ICH+AA: 1.87±0.06, SHAM: 1.13±0.04; $p < 0.0001$) and 7 days after injury (ICH: 1.10±0.05, ICH+AA: 0.94±0.03, SHAM: 0.94±0.04; $p < 0.05$). GFAP levels were increased in both ICH (2.46±0.08) and ICH+AA (2.41±0.09) groups compared to SHAM (1.19±0.06) 3 days after injury ($p < 0.0001$). At 7 days, ICH+AA (1.38±0.08) had decreased GFAP levels compared to ICH group (2.05±0.20), being similar to SHAM (1.28±0.23) ($p < 0.05$). CD11B levels were similar between ICH (2.72±0.20) and ICH+AA (2.22±0.18) groups and increased compared to SHAM (1.07±0.07) 3 days after injury ($p < 0.0001$). At 7 days, ICH+AA (1.24±0.12) had lower CD11B levels compared to ICH (1.63±0.08), being similar to the SHAM group (1.11±0.14) ($p < 0.05$). These results suggests that AA may be a potential neuroprotective agent in ICH pathology, as the treatment improved motor function and decreased lesion volume in injured rats. Its beneficial effect is possibly due to inhibition of S100B overexpression, thereby decreasing astroglial and microglial activation.

Palavras-chaves: Arundic acid, Intracerebral hemorrhage, S100B
Agência Fomento: CAPES

17.015 - EFEITOS DA ADMINISTRAÇÃO INTRACEREBRAL DE SAKURANETINA EM CAMUNDONGOS

EFFECTS OF THE INTRACEREBRAL ADMINISTRATION OF SAKURANETIN IN MICE

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Introdução:

The use from natural products such as plant extracts and animal venoms for the treatment of various diseases is the oldest and most traditional form of therapeutic model. Brazil has a vast biodiversity of plants, resulting in a wide heterogeneity of bioactive chemicals that can be isolated and used for therapeutic purposes. Isolated molecules from plant extracts are bioactive substances with antioxidant and neuroprotective action on nerve tissue. Previous studies have shown that the flavonoid sakuranetin has antinociceptive, antioxidant and anti-inflammatory activity in animal models. However, so far to our knowledge, there are no studies on the effect of this flavonoid and its potential use in the treatment of brain diseases.

Objetivos:

The aim of this study was to evaluate the effect of the intracerebral administration of sakuranetin (SAK) on the behavior of mice.

Métodos:

Male Swiss mice (3 months) were implanted with a cannula in the lateral ventricle. After the recovery period, animals were previously microinjected with saline solution (SAL, n = 8), DMSO (n = 8) or sakuranetin (SAK1, 1 mg/kg, n = 8). Afterwards, each animal was observed in the open field (CA, 20 min) and elevated plus maze (EPM, 5 min). For the evaluation of anticonvulsant activity, mice were preciously microinjected with saline solution (n = 6), DMSO (n = 6) or SAK1 (n = 6), after 30 min animals were microinjected with bicuculline (1 mg/mL) and observed in CA (30 min). All procedures were approved by the Ethics Committee (CEUA 5705251117).

Resultados e Conclusões:

Our main results showed that SAK-treated animals increased the distance traveled (SAK = 88.5 ± 6.0 and SAL = 48.1 ± 5.7, $p < 0.05$), mean speed (SAK = 0.074 ± 0.005 and SAL = 0.004 ± 0.005 cm/s, $p < 0.05$), and distance traveled in the central zone (SAK = 30.0 ± 2.8 and SAL = 17.3 ± 2.9, $p < 0.05$) in the OF. Furthermore, SAK-treated rats showed decreased the risk assessment behaviors ($p < 0.05$) in LCE. No differences were observed in the anticonvulsant test. These findings showed that SAK has a potential anxiolytic effect. However, new studies are need to elucidate the action mechanisms involved in this effect.

Palavras-chaves: Natural products, flavonoid, anxiety, convulsions, epilepsy
Agência Fomento: FAPESP (#2015/20785-8 and #2018/26609-5); CNPq (#425694/2016-0); CAPES (Finance Code 001, CARVALHINHO-LOPES PS; SILVA SP; BESERRA-FILHO JI).

18. Transtornos Psiquiátricos e Comportamentais

18.001 - ALTERATIONS OF TESTOSTERONE LEVELS CHANGES BRAIN WAVES ACTIVITY PATTERN AND INDUCES AN AGGRESSIVE BEHAVIOR

ALTERATIONS OF TESTOSTERONE LEVELS CHANGES BRAIN WAVES ACTIVITY PATTERN AND INDUCES AN AGGRESSIVE BEHAVIOR

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Introdução:

Testosterone is responsible for many changes that occur within a brain including changes behavioral, emotional, memory or cognition.

Objetivos:

Consequently, the present work aimed to study the effects of testosterone supplementation in not castrated and castrated rats, in order to evaluate the electrocorticographic (ECoG) activity, behavioral, biochemical and hormone analyses from these animals.

Métodos:

Sixty-three adult males Wistar rats (280 ± 20g) were used in this study (CEUA number 7338220818). The animals were divided into 4 groups: 1) not castrated (NC), 2) castrated (C), 3) NC + testosterone (NC+TST) and 4) C + testosterone (C+TST). The treated groups received testosterone esters at a dose of 25 mg/kg via intraperitoneal (i.p.) every 24 hours for four days and 24 hours after last application the electrocorticographic recording was made. The control groups received a 0.9% physiological solution in an equivalent volume. To evaluate the behavior, elevated plus maze (EPM) test was performed in animals to determine locomotor and anxiolytic activities and resident-intruder paradigm to agonistic behavior. The biochemical profile (renal function, lipids and liver enzymes) and testosterone levels were analyzed.

Resultados e Conclusões:

Our results showed that in ECoG evaluation, the absence of TST (C group) showed lower alpha power among all groups with an average of 0.002703 ± 0.0003969 mV2/Hz x 10-3 ($p < 0.001$ compared to NC, NC+TST and C+TST groups) and NC+TST and C+TST groups presented increase of beta wave oscillation, with highest response to castrated rats (NC+TST: 0.01386 ± 0.0009710 mV2/Hz x 10-3; C+TST: 0.02819 ± 0.004250 mV2/Hz x 10-3; $p < 0.001$ to both groups compared to vehicle groups and $p < 0.001$ between TST groups). In addition, it was observed in EPM that C group stayed for less than 300 seconds on the test (NC: 300.00 ± 0.00 s; C: 39.75 ± 42.12 s; NC+TST: 300.00 ± 0.00 s; C+TST: 183.95 ± 147.3 s; $p < 0.05$). In resident-intruder paradigm, the number of aggressive events was increased to rats NC+TST compared to C group (C: 15.67 ± 2.30; NC+TST: 20.33 ± 5.03; $p < 0.05$). The animals did not present clinically relevant changes in the biochemical profile and testosterone supplementation only changed significantly the testosterone levels, C group (0.14 ± 0.03 ng/mL) presented a decrease compared to the NC group (4.24 ± 2.38 ng/mL; $p < 0.05$) and NC+TST (8.54 ± 2.14 ng/mL) presented an increase compared to the same group ($p < 0.01$). Concluding, low alpha wave amplitude was responsible for the animal behavior in EPM (fall), because alterations in alpha wave have been related to failures in the execution and visualization of motor processes. Furthermore, the aggressive behavior and a higher beta wave oscillation suggest that testosterone supplementation may be related to an increase in impulsive action.

Palavras-chaves: Behavior, Brain wave, Electrocorticographic, Supplementation, Testosterone

Agência Fomento:

18.002 - ETANOL TEM EFEITO MOTOR MAS NÃO ANSIOLÍTICO EM LARVAS DE GUPPY

ETHANOL HAS MOTOR EFFECT BUT NOT ANXIOLYTIC IN GUPPY LARVAE.

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Minas Gerais (Núcleo de Neurociências, ICB/Campus Pampulha, Belo Horizonte/MG)

Introdução:

Ethanol is one of the most widely consumed licit drugs in the world. Depending on the amount ingested, its effect may be anxiolytic or sedative. Such effects are clearly described in adult experimental animals, but little bit hás been described about the effect in larvae and juveniles, which are good tools for developmental studies.

Objetivos:

Considering that in adult guppies different doses of alcohol can promove different effects about behavior of this animals and larvae of this specie have been used for studies of development, the aim of this study has verify the effect of alcohol exposure about anxiety-like behavior in guppy larvae.

Métodos:

We used 48 guppy larvae (Poecilia reticulata, n = 12) with 40 days of life, exposed to ethanol diluted in water for five minutes at doses pharmacologically effective for adults (0, 0.5, 1.0 and 2.0%). After the exposure, the animals were tested in the plus maze with ramps, adapted for larvae, for ten minutes at a water column height of 1.2cm. The arms had 1cm of length and 1cm of width.The arms with ramp, opposite each other, had a ramp that rose from the center to the end of the arm, where it reached the height of 1cm.We measured: a) total time in the compartments (center, flat arms and arms with ramp); b) number of entrances (flat arms and arms with ramp). ANOVA (post-test: Tukey) was used and $p \leq 0.05$ was considered. All procedures were approved by the Ethical Committee for Animal Research of the IFPA/Tucuruí (protocol 001/2017)

Resultados e Conclusões:

The doses used did not indicate differences in the permanence times in the labyrinth compartments in relation to the control group. As for the number of entries, there were differences. In the flat arms, the control group (19 ± 3.13) differed from the groups 0.5% (33 ± 7.69) and 2.0% (53 ± 15.26), as well group 1.0% (29 ± 14.04) differed from 2.0%, always with $p < 0.05$.For the entries in the with ramp arms, the control group (8.00 ± 4.01) differed from the groups 0.5% (22.00 ± 7.01), 1.0% (24 ± 12.47) and 2.0% (55.00 ± 17.12).In addition, 2.0% also differed from 0.5% and 1.0%. Similar to the differences in the entrances to the with ramp arms were the total entries in the arms.In all cases, the differences indicated $p < 0.05$. Although no differences were found in the anxiety-like behavior of the larvae exposed to ethanol, even in the lowest dose of intoxication, the motor response of the individuals increased significantly.Doses of 0.5 and 1.0% appear to be equivalent, where as at 2.0% the locomotor activity seems to double in relation to the other doses. We concluded that alcohol doses 0.5% and 1.0% are sufficient to promove elevation of motor activity in guppy larvae, similar to that observed in adults. However, while doses of 2.0% cause sedation in adults, guppies larvae manifested even more locomotor activity.

Palavras-chaves: anxiety, plus maze with ramps, guppy, larvae, ethanol

Agência Fomento: IFPA Campus Tucuruí

18.003 - TARTRAZINA ALTERA ATIVIDADE MOTORA DE LARVAS DE GUPPIES NO LABIRINTO EM CRUZ COM RAMPA: POSSÍVEIS EFEITOS ANSIOGÊNICOS

TARTRAZINE ALTERS MOTOR ACTIVITY OF GUPPIES LARVAE IN THE PLUS MAZE WITH RAMPS: POSSIBLE ANXIOGENIC EFFECTS

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Introdução:

Tartrazine is a synthetic lemon-yellow pigment often used as a food, pharmaceutical or cosmetic dye. Some studies indicate an allergenic and potentially mutagenic effect. Others suggest anxiogenic effect in rats, which when exposed to tartrazine in the diet manifested motor hyperactivity. Considering guppies as a model organism for biological research, we search to study the effect of the dye on the behavior of the animal.

Objetivos:

To verify the effect of the exposure of tartrazine on the behavior of guppy larvae.

Métodos:

We used 24 guppy larvae (Poecilia reticulata) with 40 days of life were separated into groups (n = 12): control

and tartrazine. The animals exposed to tartrazine were left in solution containing 7.5 mg / kg (maximum daily dose, according to ANVISA) for 10 minutes, and then tested. The animals were tested in the plus maze with ramps, adapted for larvae, for ten minutes at a water column height of 1.2cm. The arms had 1cm of length and 1cm of width. The arms with ramp, opposite each other, had a ramp that rose from the center to the end of the arm, where it reached the height of 1cm. We measured: a) total time in the compartments (center, flat arms and arms with ramp); b) number of entrances (flat arms and arms with ramp). Student's t-test was used and p ≤0.05 was considered. All procedures were approved by the Ethical Committee for Animal Research of the IFPA/Tucuruí (protocol 001/2017)
Resultados e Conclusões:
Comparison between groups revealed statistical differences for time in the flat arms (control: 348.17 ± 41.57 x tartrazine: 296.83 ± 72.05, p = 0.034) and with ramp arms (control: 90.83 ± 18.40 x tartrazine: 144.28 ± 66.88, p = 0.012), and in the number of entries in the ramp arms (control: 40.75 ± 12.51 x tartrazine: 31.01 ± 9.82, p = 0.024). Our results, although preliminary, suggest that tartrazine has an anxiogenic effect on guppy larvae, as exposed animals show less exploration in potentially dangerous environments (with ramp arms) and more time to make decisions about which arms to explore.
Palavras-chaves: anxiety, plus maze with ramps, guppy, larvae, tartrazine
Agência Fomento: IFPA Campus Tucuruí

18.004 - EFEITOS DO CATIVEIRO SOBRE A RESPOSTA DE ANSIEDADE DE LARVAS DE GUPPIES

EFFECTS OF CAPTIVITY ON THE ANXIETY-LIKE RESPONSE OF GUPPIES LARVAE
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Introdução:
Studies report that it is not uncommon for captive animals to present more or less intense responses to particular behavior when compared to wild subjects. Thus, the captive environment may impact positively or negatively on the model organism of study. The Plus maze with Ramps is a new apparatus to study of anxiety-like behavior in adult fishes and, is in the adaptation phase for larvae study.
Objetivos:
To compare the behavioral response between wild and captive larvae of guppies exposed to the plus maze with ramps.
Métodos:
We used 36 larvae (n = 12) of guppy (Poecilia reticulata) with 30 days of life. The wild individuals (R0) formed a group and the captives represent the first generations (F1 and F2) created in our biotery from wild matrices. The animals were tested in the plus maze with ramps, adapted for larvae, for ten minutes at a water column height of 1.2cm. The arms had 1cm of length and 1cm of width. The arms with ramp, opposite each other, had a ramp that rose from the center to the end of the arm, where it reached the height of 1cm. We measured: a) total time in the compartments (center, flat arms and arms with ramp); b) number of entrances (flat arms and arms with ramp). ANOVA (post-test: Tukey) was used and p ≤0.05 was considered.
Resultados e Conclusões:
No differences were found in the lengths of stay in the arms, only in the central area, in the comparison between R0 and the F1 ($p < 0.001$) and F2 ($p = 0.022$), where captive groups spent less time in the center than the wildlings. For the entries, once again differences were found between R0 and F1 and F2, either for the flat arms ($p = 0.001$ and $p = 0.028$), arms with ramp ($p < 0.001$ and $p < 0.001$) and total entries ($p < 0.001$ and < 0.001), always with lower number of entries for the R0. Captive animals (F1 and F2) show the same pattern of anxiety responses as wild individuals (R0), however, the decision time for risk assessment appears to be lower and general locomotor activity is higher. These results suggest that captive animals are more explorers and may manifest less intense stress responses than wild animals.
Palavras-chaves: anxiety, plus maze with ramps, guppy, larvae, captive animals
Agência Fomento: IFPA Campus Tucuruí

18.005 - COMPORTAMENTO DE LARVAS DE GUPPIES NO LABIRINTO EM CRUZ COM RAMPA: DADOS INICIAIS

BEHAVIOR OF GUPPIES LARVAE IN PLUS MAZE WITH RAMP: INITIAL DATA

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Introdução:

The plus maze with ramps, analogous to the elevated plus maze, has been shown to be a good tool not only to indicate the anxious response of the animals tested, but also to measure the level of anxiety due to the extension of the arms and the slope of the ramps. In adult guppies there is a tendency for the animals to remain most of the testing time in the final third of the flat arms, while a smaller part of the time is spent in the final third of the arms with ramps.

Objetivos:

To analyze the anxiety-like response profile of larvae of guppies exposed to plus maze with ramp.

Métodos:

We used 24 (n=12) larvae of guppies (Poecilia reticulata), forming the following groups: 7-day and 28-day old larvae. The animals were tested in the plus maze with ramps, a new apparatus to study of anxiety-like behavior, analogous to the elevated plus maze. The apparatus is formed by four arms and a central area. Two arms opposite each other have ramps that ascend of the center to the end of the arm. Two other arms are flat. The larvae aquarium had a scale of 1:10 relative to the version for adults. During the analysis, each arm was divided into three equal parts (distal, medial, proximal to the center) for diagnosis of anxiety-like level. We measured: a) total time in the compartments (center, flat arms and arms with ramp); b) number of entrances (flat arms and arms with ramp). ANOVA (post-test: Tukey) was used and $p \leq 0.05$ was considered.

Resultados e Conclusões:

No differences were found in the time spent in the compartments and number of entrances in the arms between the larvae, even considering the arms divided in three thirds. Only in intragroup analyzes we found statistical differences. For 7-day larvae, differences in length of stay in the distal portion of the flat arms (greater time) were found in comparison to all other environments ($p < 0.05$). For 28-day larvae, the results of permanence time were equivalent to that described for those of 7-days, except that no differences were found between the distal portion of the flat arms and the central area of the aquarium. For 7-day larvae, the entries in the arms as well indicate clear preference of the animals by the distal portion in th flat arms in relation to the more proximal portions in this arms or in all portions of with ramp arms. Furthermore, the number of entries is significantly lower in the distal portion of the ramp arms compared to the medial and proximal portions (always $p < 0.05$). For 28-day larvae, differences in the number of entries were less evident, but they were larger in the distal portion of the flat arms relative to the center and portions of the with ramp arms ($p < 0.05$). As for 7-day, the entries in the distal portion of the ramp arms are significantly smaller relative to the other portions of the same arm type ($p < 0.05$). Larvae of 7-day and 28-day old of guppies presents equivalent responses to adults in the plus maze with ramp, indicating preference for the safer portions of the aquarium and avoiding those with higher risk of exposure.

Palavras-chaves: anxiety, plus maze with ramps, guppy, larvae, animal behaviour

Agência Fomento: IFPA Campus Tucuruí

18.006 - LARVAS DE GUPPY MANIFESTAM EFEITO ANSIOLÍTICO SOB ENRIQUECIMENTO AMBIENTAL

GUPPY LARVAE SHOW ANXIOLYTIC EFFECT UNDER ENVIRONMENTAL ENRICHMENT

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Introdução:

Environmental enrichment represents an effective strategy for the welfare of captive animals. Different forms of environmental enrichment contribute to optimize the quality of life of isolated or social animals, since they tend to stimulate natural behaviors of the species. During development, exposure to certain types of stimuli may increase or decrease stress responses in laboratory animals.
Objetivos:
To verify the effect of different forms of environmental enrichment on the anxiety-like behavior of guppy larvae.
Métodos:
We used 48 larvae of guppy (Poecilia reticulata, n = 12), which were born in our biotery. They spent the first 7 days of life on different types of enrichment: poor (river gravel only), medium (river gravel and underwater plants) or rich (river gravel, underwater plants and constant aeration). In addition, there was also a group without enrichment (control). On the seventh day, the animals were tested for ten minutes in the plus maze with a ramp, where each arm had 1cm of legth and 1cm of width, for tem minutes. The arms with ramp, opposite each other, had a ramp that rose from the center to the end of the arm, where it reached the height of 1cm. It measured: a) total time in the compartments (flat arms, with ramp arms and center); b) number of entrances (flat and with ramp arms). We used ANOVA (post-test: Tukey) and $p \leq 0.05$ was considered.
Resultados e Conclusões:
Were differences in time of permanence in with ramp arms, between rich group (214.92 ± 37.60) and control (166.42 ± 37.90, $p < 0.05$) and between rich and medium (154.83 ± 45.30, $p < 0.05$) and medium and poor (200.08 ± 39.81, $p < 0.05$). The number of entries in the arms indicated an increase between the enriched groups and the control group. In the flat arms, the control (19.00 ± 3.13) differed from the groups: poor (33.75 ± 4.71), medium (26.08 ± 8.39) and rich (33.25 ± 4.48). In addition, the poor and rich groups also differed from the medium group, always with $p < 0.05$. In the arms with ramp, the control (8.00 ± 4.01) differed from the groups: poor (34.91 ± 5.56), medium (25.00 ± 8.68) and rich (31.01 ± 4.18), again always with $p < 0.05$. The same profile of arms entrances with ramp was observed in the total entrances. It is observed that even with only seven days of life, the environmental enrichment is already able to induce an increase in the motor activity of guppy. In addition, the more enriched the environment, the lower the observation of anxiety type responses.
Palavras-chaves: anxiety, plus maze with ramps, guppy, larvae, environmental enrichment
Agência Fomento: IFPA Campus Tucuruí

18.007 - EFEITO DA CONTENÇÃO SOBRE PADRÕES DE ANSIEDADE EM LARVAS DE GUPPY

EFFECT OF CONTENTION ON ANXIETY PATTERNS IN GUPPY LARVAE

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Introdução:
Physical contention in microtubes is effective in inducing posttraumatic stress in zebrafish and guppies. Considering the use of these model organisms in the study of psychopathologies, the use of larvae of these species can contribute to the understanding of the effect of substances and manipulations on the development of individuals.
Objetivos:
To verify if microtube physical contention is an effective protocol to induce post-traumatic stress in guppy larvae.
Métodos:
We used 48 40-day old guppy (Poecilia reticulata) larvae formed the groups (n = 12): control (0 minutes), 30, 60 and 120 minutes of contention. The animals contained were placed in microtubes with openings at the ends, in a way that allowed the circulation of water, but prevented their movement, according to the time of their group. At the end of the containment, the animals were left in aquariums, to be exposed to the plus maze with ramps (PMR) in the next day. The animals were tested in the PMR, adapted for larvae, for ten minutes at a water column height of 1.2cm. The arms had 1cm of length and 1cm of width. The arms with ramp, opposite each other, had a ramp that rose from the center to the end of the arm, where it reached the height of 1cm. We measured: a) total time

in the compartments (center, flat arms and arms with ramp); b) number of entrances (flat arms and arms with ramp). ANOVA (post-test: Tukey) was used and p ≤0.05 was considered. The protocol was approved by the Ethics Committee of the Instituto Federal do Pará (IFPA) under the number 001/2017-CEUA/IFPA - Tucuruí

Resultados e Conclusões:

For the temporal variables, differences were found only for the time in the flat arms, between control (332.01 ± 68.73) and 60min (298.45 ± 63.07, p = 0.001) and in the center of apparatus, between control (131.15 ± 45.20) and 60min (227.03 ± 74.46 , p = 0.001). For the number of entries, no differences were found between the groups contained and the control group. The physical contention times were not sufficient to determine stress responses in guppy larvae. Considering that adults of the species require 4h of containment, containment times greater than 120 minutes should be tested on guppies larvae.

Palavras-chaves: anxiety, plus maze with ramps, guppy, larvae, stress for contention

Agência Fomento: IFPA Campus Tucuruí

18.008 - GLUTATIONA PREVINE O COMPORTAMENTO TIPO-ANSIEDADE INDUZIDO POR ESTRESSE AGUDO DE CONTENÇÃO: POSSÍVEL EFEITO SINALIZADOR?

GLUTATHIONE PREVENTS ANXIETY-LIKE BEHAVIOR INDUCED BY ACUTE RESTRAINT STRESS: POSSIBLE SIGNALING FUNCTION?

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Introdução:

It is well known that stressful stimuli are able to induce behavioral disorders, such as anxiety-like behavior, and physiological dysfunctions, such as oxidative stress. Although many dysfunctions related to anxiety-like behavior have been described in the literature, the behavior's etiology is not fully elucidated. Once oxidative stress is able to induce many neurochemical dysfunctions, our group hypothesize that this phenomenon mediates anxiety's genesis. To evaluate that hypothesis, we chose Danio rerio (Zebrafish) as our experimental model, once it has neuroendocrine's homologies to humans, and we did a pretreatment with two antioxidants from the thiol class: Glutathione (GSH) and N-acetylcysteine (NAC)

Objetivos:

The aim of this work is to verify if glutathione has an anxiolytic property and if there is, if this effect is dependent of the thiol moiety.

Métodos:

We used 48 short-fin zebrafish from both sexes (50:50) obtained from a local distributor (Ananindeua-PA). Animals were submitted to intraperitoneal injection (Hamylton, 5uL) of saline 0.9% (SAL) or the drug of interest (GSH 200mg/kg, NAC 500mg/kg). After 30 minutes, control groups were individually transferred to the Novel Tank test behavioral apparatus, which consists in an aquarium virtually divided in "top" and "bottom" zone where the following parameters were analyzed: Time on top (TT), squares crossed(SC), freezing(F), latency to top (LT) and erratic swimming(ES). Stress groups were first submitted to acute restraint stress (ARS), which consists in inserting the animal in a 2mL microtube for 90 minutes, and later were transferred to the behavioral apparatus. The test had a duration of 10 minutes and was recorded by a digital camera. Videos were analyzed in X-Plo-Rat software. For statistical analysis, we chose One-way ANOVA followed by Tukey's test. A value of $p < 0.05$ was considered significant. Data is expressed as mean ± SEM. All experiments were done in accordance to ethics committee CEPAE 213-14.

Resultados e Conclusões:

Our results show that ARS induces anxiety-like behavior (SAL: 104.1±21.5s vs ARS: 4.1±1.3s $p < 0.05$/ SQ: SAL:716.2±60.2s vs ARS: 449.2±46.9s $p < 0.01$/ LT: SAL: 282.5±61.0s vs ARS: 517.3±58.3s $p < 0.01$), and this effect is prevented by glutathione (TT: ARS:4.1±1.3 vs GSH+ARS:456.6±26.0s $p < 0.01$/ SQ: ARS: 449.2±46.9 vs GSH90±645.2±83.1 $p < 0.01$, there was not a statistical difference between the other groups / LT: ARS: 517.3±51.8 vs GSH+ARS:118.3±37.57 $p < 0.01$), while N-acetylcysteine failed to prevent this behavior (TT: ARS: 4.1±1.3 vs NAC+ARS: 50.6±10.3 / SQ: ARS: 449.2±46.9 vs NAC+ARS: 349.8±126.3 / F: ARS: 56.8±32.7s vs NAC+ARS: 232.1±198.7s / ES: ARS: 5±1.4 vs NAC+ARS: 2±0.9, $p < 0.01$).

Palavras-chaves: Anxiety, Glutathione, Zebrafish

Agência Fomento: CNPq

18.009 - CAFETERIA DIET, TREADMILL PHYSICAL TRAINING AND ESTROUS CYCLE MODULATE ANXIOUS-LIKE BEHAVIOR IN FEMALE WISTAR RATS.

CAFETERIA DIET, TREADMILL PHYSICAL TRAINING AND ESTROUS CYCLE MODULATE ANXIOUS-LIKE BEHAVIOR IN FEMALE WISTAR RATS.

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Introdução:

Cafeteria diet (CAF) intake is associated to the development of obesity and low-grade chronic inflammation, which is combined with adiposity increase. These modifications can alter anxiety and depression-like behaviors, and they might be influenced by sexual hormones. Moderate aerobic physical training (TR) can amend the deleterious effects of CAF consumption.

Objetivos:

To investigate the effects of CAF consumption combined or not with TR on relative body weight gain (BWG%) and adiposity on female rats in different estrous cycle phases and their influence on anxiety-like behavior.

Métodos:

Adult female Wistar rats were allocated in four groups: STD-NT (standard-diet/non-trained), STD-TR (standard-diet/trained), CAF-NT (cafeteria-diet/non-trained) and CAF-TR (cafeteria-diet/trained). The estrous cycle was analyzed daily and treadmill training was held 5 days/week with weekly adjusted load by each rat's performance in maximal aerobic speed test (MAS). The rats undergone open field test (OFT) and elevated plus maze (EPM) behavioral tests and then reassigned according to their estrous cycle phase on that day, the two groups being high estradiol (PE – proestrous and estrous) and low estradiol (MD – metestrous and diestrous). Were analyzed: anxiety-like behaviors e its correlation to estradiol score (ES), adiposity index (ADI), final body weight (FBW) and BWG% (CEUA n° 8915090418).

Resultados e Conclusões:

The FBW (p=0,016), BWG% (p=0,000) and ADI (p=0,000) were higher on rats that consumed CAF, despite physical training. In the OFT the PE rats spent more time (p=0,027) and travelled a greater distance on the central zone (CZ) (p=0,023), despite the physical training and diet consumed. The number of line crossings on the CZ were higher in trained rats than in nontrained rats, both of them in PE (p=0,045), despite the diet consumed. The CAF-NT group showed moderate positive correlations between ES and travelled distance in the OFT (p=0,044; r=0,4547) and in the outer zone (OZ) (p=0,0265; r=0,4949) as well as average speed in the OFT (p=,0369; r=0,4692) and in the OZ (p=0,02; r=0,5154). In EPM there was an increase on average (p=0,008) and maximal speed (p=0,009) of trained rats when compared to nontrained, both of them in PE. The STD-NT group showed moderate positive correlations between ES and open arm entries (OAE) (p=0,048; r=0,459), as well as % of time spent in the open arms (%TOA) (p=0,0446; r=0,4654). The current study showed, after 28 days of protocol, obesogenic effects of CAF consumption and an increased locomotor activity on trained rats. The behavioral test analyses didn't show any effects related to the diet or physical training. Nonetheless, on PE rats of all groups an anxiolytic effect was observed.

Palavras-chaves: Cafeteria-diet, Physical training, Estrous cycle, Anxiety-like behavior, Female
Agência Fomento: FAPESP - 2017/25420-3

18.010 - ENRIQUECIMENTO AMBIENTAL PREVINE ALTERAÇÕES COMPORTAMENTAIS INDUZIDAS PELA PRIVAÇÃO MATERNA EM RATOS MACHOS E FÊMEAS

ENVIRONMENTAL ENRICHMENT RESCUES BEHAVIORAL ALTERATIONS INDUCED BY MATERNAL CARE DEPRIVATION IN MALE AND FEMALE RATS

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Introdução:

Major depressive disorder (MDD) is one of the main causes of disability and affects around 12% of the world population. Although there are several antidepressant drugs, a significant number of patients did not respond to classical treatment. Therefore, studies involving this disorder that evaluate alternative strategies for treatment are very important. It is known that the quality of the environment, affect the well-

being of the individual and are associated with the development of MDD and anxiety. Thus, exposure to an enriched environment (EE) could improve learning and memory impairment in psychiatric disorders.
Objetivos:
This study was aimed to investigate if an EE could improve depressive- and anxiety-like behaviors, and cognitive impairment induced by an animal model of depression induced by maternal deprivation.
Métodos:
Maternal deprivation was performed during the first 10 days of life of the rats, three hours/day. The control group remained with the mothers. After weaning, on the 21st day, the male and female Wistar rats were divided into three groups: control (non-deprived; n=12); deprived (n=12); and deprived+EE (n=12). Different groups of male and female rats were evaluated on days 41 and 61 after birth, being submitted to EE for 20 or 40 days, respectively. Then, the animals were submitted to behavioral tests (memory habituation in the open field test, depression in the forced swimming test and anxiety in the plus-maze). The data were analysed by one-way ANOVA and statistical significance was set at $p < 0.05$. The experimental protocol was approved by ethics committee on the use of animals (016/2017-2).
Resultados e Conclusões:
The results demonstrated that EE reversed cognitive deficits in the memory habituation induced by maternal deprivation in male and female rats at 61 days ($p < 0.05$). In females with 41 days of life, there was an increase in the time of immobility in the deprived group, however, EE reversed depressive-like behavior induced by maternal deprivation ($p < 0.05$). In males with 61 days, there was an increase in the immobility time in the deprived. On the other hand, EE reversed this change in the male rats ($p < 0.05$). In deprived females with 61 days exposed to EE it was found a reduction in immobility time ($p < 0.05$). EE showed anxiolytic effects in females with 41 days and 61 days exposed to maternal deprivation ($p < 0.05$). In conclusion, EE had antidepressant and anxiolytic effects, besides reversing the memory impairment induced by maternal deprivation. However, such effects were dependent on age, sex, and time of exposure to EE. EE can be considered a novel non-pharmacological strategy for the treatment of MDD and its comorbidities, mainly due to trauma early in life.

Palavras-chaves: Anxiety, Environmental enrichment, Major depressive disorder, Maternal deprivation, Memory
Agência Fomento: CNPq, CAPES, FAPESC, UNESC e Instituto Cérebro e Mente

18.011 - EFEITO DA SEPSE NAS ALTERAÇÕES BIOQUÍMICAS EM MODELO ANIMAL DE DEPRESSÃO INDUZIDO POR ESTRESSE

EFFECT OF SEPSIS ON BIOCHEMICAL CHANGES ON THE STRESS-INDUCED ANIMAL MODEL OF DEPRESSION

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Introdução:
The systemic inflammation that occurs during sepsis causes long-term consequences. Studies demonstrate a possible correlation between the neuroinflammatory process and depression.
Objetivos:
The objective of this study is to evaluate the effect of sepsis on behavioral and biochemical changes on the stress-induced animal model of depression.
Métodos:
To do this, adult male Wistar rats were submitted to cecal ligation and perforation and after 30 days it was submitted to the chronic mild stress protocol (CMS). The animals were submitted to stressors during 40 days. To evaluate the efficacy of CMS induction anhedonia was determined as the amount of sweet food consumption after CMS induction, anhedonia test took 7-days in total.
Resultados e Conclusões:
The levels of neurotrophins and oxidative damage were evaluated. It is observed that sepsis improved depressive-like behavior after CMS protocol associated to an increase of neurotrophins levels and a decrease in the oxidative damage in hippocampus ($p < 0.05$). In conclusion our data suggests that a previous systemic inflammation caused by the induction of sepsis could decrease consequences in central nervous system (CNS) induced by CMS protocol.
Palavras-chaves: sepsis, inflammation, depression

Agência Fomento:

18.012 - EFEITOS COMPORTAMENTAIS DE UM MODELO DE ESTRESSE CRÔNICO PSICOSSOCIAL EM CAMUNDONGOS FÊMEAS

BEHAVIORAL EFFECTS OF A CHRONIC PSYCHOSOCIAL STRESS MODEL IN FEMALE MICE

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Introdução:

The major depressive disorder (MDD) stands out as one of the main incapacitating disorders, characterized by loss of interest in hedonic activities and persistent sadness. One of the main causes of depression is the susceptibility to chronic stress. In addition, it is known that this disorder reaches up to twice as many women as men. Despite this proportion, preclinical studies involving female rodents are less frequent in relation to research with males. To reduce this imbalance, several groups have sought ways to induce psychosocial stress in females, in order to provide a reliable model for the study of depression in female.

Objetivos:

To model a chronic social defeat (SD) stress in female mice and to analyze its effects on emotional behaviors.

Métodos:

48 adult female mice were divided into three groups: F/F control (females paired between them with sensory contact only, n=12), F/M control (females paired with CD1 males, with only sensory contact, n=18) and subjugated (females paired with CD1 males, with sensory and physical contact, n=18). The subjugated females were submitted to social defeat stress (SDS) as described by Harris et al (2018) and their effects were evaluated through behavioral tests of anhedonia (sucrose preference); social avoidance (social interaction); and anxiety (open field and elevated plus maze). The analyzes were performed using one-way ANOVA and Tukey's test, considering differences with $p < 0.05$ as significant and the data is presented as mean ± SEM. *IACUC approval #: 7466230518.

Resultados e Conclusões:

A significant increase in the weight gain was observed in the subjugated group (0,12g ± 0,23; n=17) in comparison to F/F control mice (-0,98g ± 0,16; n=11) (**p=0,006). In the sucrose preference test (SPT), we observed anhedonic behavior in F/M control (76,24% ± 1,85; n=18) and subjugated mice (74,38% ± 1,83; n=18) when compared to F/F control group (84,35% ± 2,16; n=12) (**p=0,004). In the social interaction test, we didn't obtain any significant difference between groups ($p > 0,05$). The total distance traveled in the open field by the subjugated females (2340,0cm ± 123,5; n=18) was significantly lower in relation to the F/F control (3205,0cm ± 247,7; n=12), which indicates reduced locomotor activity (**p=0,0025). In the elevated plus maze test (EPM), we found that the subjugated females (76,78sec ± 7,55; n=18) spent less time in the open arms than the F/F control group (112,90sec ± 13,23; n=12), which suggests higher anxiety of the defeated ones (*p=0,02). Therefore, the social subjugation model proved to be efficient in the development of a depressive-like phenotype in female mice. Although we did not observe the social avoidance component, we verified the presence of depressive (SPT) and anxious-like (EPM) behaviors, which suggest SDS as a potential model for the study of depression in female mice. Harris AZ, Atsak P, Bretton ZH, et al. A Novel Method for Chronic Social Defeat Stress in Female Mice. Neuropsychopharmacology. 2018;43(6):1276–1283.

Palavras-chaves: fêmeas, depressão, social defeat
Agência Fomento: Fapesp 2017/06100-8 e CNPq

18.013 - INVESTIGAÇÃO DE MARCADORES DE NEUROINFLAMAÇÃO NO HIPOCAMPO EM RATOS MAM TRATADOS COM O ANTIOXIDANTE N-ACETIL-L-CISTEÍNA

INVESTIGATION IN HIPPOCAMPUS OF NEUROINFLAMMATION MARKERS IN MAM RATS TREATED WITH THE ANTIOXIDANT N-ACETYL-L-CYSTEINE

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Introdução:

Neurochemical evidences show reductions of GABAergic interneurons expressing parvalbumin (PV) in hippocampus of both human and animal models of schizophrenia. Analysis of schizophrenic encephalon showed reduction in glutathione (GSH), the main antioxidant of the nervous system. Studies showed reduction of some symptoms in schizophrenic patients after treatment with the GSH precursor, N-acetyl-L-

cystein (NAC). GSH synthesis occurs mainly on astrocytes, which cell marker is the protein GFAP, cells involved in inflammatory processes. The methylazoxymethanol acetate (MAM) schizophrenia model is based on the disruption of the neurodevelopment when it is administrated on pregnant rats on the 17º gestational day (GD). MAM offspring present several alterations similar to those observed in schizophrenia. Despite that, there are not reports concerning the expression of GFAP in that model. Recent studies of our group showed that treatment with NAC in MAM rats reverted some behavioral deficits in MAM rats.
Objetivos:
Our aims were to investigate whether the chronic treatment with NAC alters: i) PV expression; ii) GFAP expressions in the dorsal hippocampus of MAM-treated offspring.
Métodos:
All procedures were approved by CEUA-UFABC (007/2014). Pregnant rats were treated with MAM (25mg/kg; i.p.) or saline (vehicle, Veh) at GD 17 (treatment1) and their male offspring was treated with NAC (250mg/ kg; i.p.) or saline (vehicle, Veh) during 15 days starting at PD75 (treatment2). Animals were divided in four groups: Veh/Veh, MAM/Veh, Veh/NAC and MAM/NAC (n=4-6/group). After behavioral tests, animals were euthanized and their brains were removed for analysis. Immunohistochemistry with 3,3'-Diaminobenzidine was made to detect the expression of PV and GFAP in the dorsal hippocampus slices. Total density of the cells was evaluated in CA1, CA2, CA3 and DG.
Resultados e Conclusões:
Analysis were carried by two-way ANOVAs with the software JASP, presented by mean±SE(cells/mm²).There were only marginal effects for treatment1 on the density of GFAP in CA2 (Veh: 150.0±12.1, MAM: 183.1±14.1, p=0.096), CA3 (Veh: 129.3±11.9, MAM: 164.5±13.9, p=0.073) and DG (Veh: 93.3±8.5, MAM: 118.9±9.9, p=0.068), and no effect of treatment2 (Veh: 135.0±10.0, NAC: 114.4±10.4, p=0.173). There were no significant effects in the dorsal hippocampus PV density of treatment1 (Veh: 5.3±0.3, MAM: 5.1±0.4, p=0.805) nor treatment2 (Veh: 5.0±0.3, NAC: 5.3±0.3, p=0.489). Our results suggest that MAM treatment increased (marginally) astrocytes (CA2: 22,1%; CA3: 27,2%; DG: 27,4%; percentage of increase from control) which may be related to a neuroinflammatory process, but did not affect PV expression in dorsal hippocampus. However, treatment with NAC did not present a significant change on astrocytes marker nor PV. Further investigations are necessary to evaluate the mechanisms of action by NAC.
Palavras-chaves: Esquizofrenia, GFAP, Hipocampo, MAM, Parvalbumina
Agência Fomento: FAPESP e CNPq

18.014 - EFEITOS DO ESTRESSE NO INÍCIO DA VIDA E DE UM DESAFIO IMUNOLÓGICO NA VIDA ADULTA NO COMPORTAMENTO DO TIPO DEPRESSIVO, ATIVAÇÃO MICROGLIAL E ATROFIA DE ASTRÓCITOS

EFFECTS OF EARLY LIFE STRESS AND IMMUNE CHALLENGE IN ADULTHOOD ON DEPRESSIVE-LIKE BEHAVIOR, MICROGLIAL ACTIVATION, AND ASTROCYTE ATROPHY
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Introdução:
Maternal deprivation (MD) at crucial stages of development is known to be related to long-term changes that could influence the onset of psychiatry disorders such as depression. Studies have been shown that after a first insult, the cells in the brain would be more sensitive to a second stressor. In addition, several studies have demonstrated a neuroinflammatory status associated to the pathophysiology of depression, reported by an increase in the inflammatory cytokines and microglial activation.
Objetivos:
Thus, the aim of this study was to evaluate if the effects of MD early in life could be potentiating by an inflammatory insult induced by lipopolysaccharide (LPS) in adulthood rats.
Métodos:
Wistar male rats were subjected to the animal model of MD, conduced from postnatal day (PND) 1 to 10. MD was performed removing the mother from the residence box by three hours/day. Control (non-deprived) rats were kept with their mothers. Deprived

and control groups were randomized to receive LPS at 5 mg/kg or saline solution intraperitoneally at PND 50. Then, it was evaluated the behaviour in the forced swimming and open-field tests (n=10 each group) from PND 51 to 53. After the animals were killed and evaluated microglial activation, and astrocyte atrophy by immunohistochemistry (n=5 each group) in the rat brain at 53 PND. The data were analysed by two-way ANOVA and statistical significance was set at $p < 0.05$. The experimental protocol was approved by the Animal Welfare Committee (AWC-15-0133).
Resultados e Conclusões:
There was an increase in the immobility time in the forced swimming teste in the MD+saline (160.33±42.61) and MD+LPS (156.37±27.04) groups ($p < 0.05$), compared to control+saline (39.14±12.61) group. The spontaneous locomotor activity in the open-field teste was not change in all groups ($p > 0.05$). The number of ionized calcium-binding adapter molecule 1 (Iba-1)-positive cells/field was elevated in the control+LPS (58.45±3.91) and MD+LPS (61.82±6.26) groups ($p < 0.05$), control+saline group (28.45±3.59). Also, in the MD+LPS group it was found an increase in Iba-positive cells, compared to MD+saline (41.70±2.12) group ($p < 0.05$). The glial fibrillary acidic protein (GFAP)-positive cells/field were increased in the MD+LPS (77.07±8.05), compared to control+saline (29.52±5.42), control+LPS (56.4±1.49), and MD+saline (47.02±2.52) groups ($p < 0.05$). Immune challenge by LPS in adult rats, which were subjected to MD, did not influence depressive-like behavior, but exerted a pronounced effect in the microglial activation and astrocyte atrophy in the rat brain.
Palavras-chaves: Astrocyte, Microglial Activation, Maternal Deprivation, Liposaccharide, Major Depressive Disorder
Agência Fomento: CNPq, CAPES, FAPESC, UNESC, Instituto Cérebro e Mente

18.015 - ENRIQUECIMENTO AMBIENTAL PROMOVE EFEITOS ANTIOXIDANTES AO LONGO DO DESENVOLVIMENTO DE RATOS MACHOS E FÊMEAS EXPOSTOS A SEPARAÇÃO MATERNA

ENVIRONMENTAL ENRICHMENT PROMOTES ANTIOXIDANT EFFECTS THROUGHOUT DEVELOPMENT OF MALE AND FAMALE RATS EXPOSED TO MATERNAL SEPARATION

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Introdução:
Maternal separation (MS) affects brain areas involved with mood and cognition, and could lead to behavior changes culminating in major depressive disorder (MDD). The environmental enrichment (EE) through social interaction and recreational activities is able to reduce disturbances induced by MS. Studies have been shown that oxidative stress is involved in the pathophysiology of MDD.
Objetivos:
Identify if MS in Wistar rats could induce oxidative stress in different phases of development.
Métodos:
Male and female Wistar rats were subjected to MS. MS protocol was performed during the first 10 postnatal days (PND) by three hours/day. The control group remained with the mothers. After weaning, on the 21st day, the male and female Wistar rats were divided into three groups: control (non-deprived; n=5); deprived (n=5); and deprived+EE (n=5). Different groups of male and female rats were evaluated on 41 and 61 PNDs, then subjected to EE for 20 or 40 days, respectively. In each phase rats of different groups were killed and serum was used for oxidative stress parameters analysis. The data were analysed by one-way ANOVA and statistical significance was set at $p < 0.05$. The experimental protocol was approved by ethics committee on the use of animals (016/2017-2).
Resultados e Conclusões:
On 41 PND male rats that were submitted to MS have an increase in carbonyl ($p < 0.05$) and in nitrite/nitrate levels ($p < 0.05$); however, a significant reduction was observed when they were exposed to EE for 20 days ($p < 0.05$). A concentration of sulfhydryl ($p < 0.05$) was decreased in male rats that were submitted to MS and it was increased in rats subjected to EE for 20 days. The superoxide dismutase (SOD) was elevated in males ($p < 0.05$) and females ($p < 0.05$) subjected to MS and after exposure to EE during a period of 20 days. The catalase (CAT) was decreased in males ($p < 0.05$) and females ($p < 0.05$) subjected to MS and the CAT increased with the exposure of EE by 20 days. Males with 61 days had

higher levels of carbonyl ($p < 0.05$) and when exposed to EE during 40 days protein damage was decreased. The lipid damage was increased on PND 61 in females ($p < 0,05$) and males ($p < 0.05$) and it was decreased in males after exposure to EE by 40 days. The concentration of sulfhydryl was reduced in males ($p < 0,05$) and females ($p < 0,05$) that were subjected to MS, and it was increased in females exposed to EE by 40 days. The SOD was increased on PND 61 in females ($p < 0,05$) that were subjected to MS and the SOD was decreased in females exposed for EE by 40 days. The CAT in males ($p < 0,05$) was reduced in the MS group and the EE was able to increase CAT activity. In conclusion, MS can induce oxidative stress throughout development, as shown by increase in lipids and protein damage and by imbalance in the antioxidant enzymes activities. Although, these effects were sex and age-dependent. The EE can be considered a strategy for treatment for early life trauma due its antioxidants effects.

Palavras-chaves: Environmental enrichment, Major depressive disorder, Maternal deprivation, Oxidative stress

Agência Fomento: CNPq, CAPES, FAPESC, UNESC e Instituto Cérebro e Mente

18.016 - MODELO ANIMAL DA DOENÇA DE PARKINSON POTENCIALIZA ESTRESSE OXIDATIVO EM CÉREBRO DE RATOS SUBMETIDOS AO MODELO DE ESTRESSE CRÔNICO MODERADO

ANIMAL MODEL OF PARKINSON DISEASE POTENTIALIZES OXIDATIVE STRESS IN THE BRAIN OF RATS SUBJECTED TO THE CHRONIC MILD STRESS

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Introdução:

Major depressive disorder (MDD) is one of the most prevalent form of mental illnesses. Recent evidence suggests a relationship between MDD and neurodegenerative diseases, including Parkinson's disease (PD). Patients with PD have a predisposition to the development of MDD, and both neurobiological conditions are associated to elevated oxidative stress.

Objetivos:

Thus, we conducted a study to investigate oxidative stress is a pathological mechanism involved with PD in MDD using both animal model of PD and stress.

Métodos:

For that, adult male Wistar rats were subjected to chronic mild stress (CMS) protocol by 40 days, and then it was induced PD using 6-hydroxydopamine into striatum. The experimental groups were: 1) Control+Sham; 2) CMS+Sham; 3) Control+PD); and 4) CMS+DP. Oxidative stress parameters were measured in the striatum, hippocampus and prefrontal cortex (PFC) (n=5 each group). The data were analysed by two-way ANOVA and statistical significance was set at $p < 0.05$. The experimental protocol was approved by ethics committee on the use of animals (482015/2).

Resultados e Conclusões:

The results showed that lipid peroxidation was increased in the hippocampus ($p=0.001$) in stress + sham (0.0049±0.0007), control+Parkinson (0.0066±0.0007), and stress+Parkinson (0.0079±0.00105) and in the striatum ($p < 0.001$) also it was found an increase in the lipid peroxidation in the stress+sham (0.006±0.00059), control+Parkinson (0,0048±0.00135) and stress+Parkinson (0.0101±0.00124) compared to control+sham (0.0013±0.00005). Carbonyl protein levels increased in the PFC (0.0155±0.00372; $p=0.019$) and striatum (0.0277±0.00725; $p=0.015$) in CMS+PD group. Nitrite/Nitrate concentration was elevated in the PFC ($p = 0.015$) of CMS group (0.0134±0.00044) and in the striatum ($p < 0.001$) in stress+sham (0.0125±0.00039), control+Parkinson (0.0102± 0.00099) and stress+Parkinson (0.0141±0.001). Myeloperoxidase activity was increased in the PFC ($p=0.606$) of PD (0.5217±0.05275) and CMS+PD groups (0.5823±0.04273) and in the striatum ($p=0.001$) in the CMS+PD group (0.9053±0.0874). The activities of antioxidant enzymes catalase (CAT) and superoxide dismutase (SOD) ($p < 0.001$) were decreased in the PFC of CMS (SOD=0.0011± 0.00004 and CAT=0.0024±0.00093) and CMS+PD groups (SOD=0.0009±0.00005 and CAT=0.0009±0.00025). Also, SOD was decreased in the hippocampus($p < 0.001$) and striatum ($p= 0.004$) of PD (0.0011±0.00013 and 0.001±0.00013, respectively) and CMS+PD groups (0.0005±0.0001 and 0.0012±0.00012, respectively). These findings suggest that CMS plus PD may induce a more pronounced oxidative stress in the brain, mainly

in the striatum. These results may help to explain, at least in part, the common point of the mechanisms involved with the pathophysiology of PD and MDD.
Palavras-chaves: Major depressive disorder, Oxidative Stress, Parkinson's disease
Agência Fomento: CNPq, CAPES, FAPESC, UNESC E Instituto Cérebro e Mente

18.017 - INVESTIGAÇÃO DA EXPRESSÃO DE GFAP E PARVALBUMINA NO CÓRTEX PRÉ-FRONTAL DE RATOS DO MODELO MAM.

INVESTIGATION OF GFAP AND PARVALBUMIN EXPRESSION IN THE PREFRONTAL CORTEX OF MAM RATS
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Introdução:
Despite the causes of schizophrenia remain unknown, it has been associated with neuroinflammation, defective neurodevelopment and oxidative processes, like the reduction of glutathione (GSH) in prefrontal cortex (PFC). Defective PFC processing has been related to positive and negative symptoms of this pathology. An important schizophrenia animal model is the treatment with methylazoxymethanol acetate (MAM), on the 17th day of gestation of Wistar rats, causing damage to the neurodevelopment of the offspring. In their adult phase, these animals present behavioral deficits and neurochemical alterations that resemble some schizophrenia symptoms, including the loss of parvalbumin positive (PV+) interneurons in hippocampus and in PFC. However, the expression of glial fibrillary acid protein (GFAP), important for neuroinflammation process, has not been evaluated in this model. Our previous studies showed that the treatment with antioxidant N-acetyl-L-cysteine (NAC), the precursor of GSH, reversed behavioral deficits caused by MAM.
Objetivos:
Our aim was to investigate the effects of NAC treatment in the expression of PV and GFAP in MAM rats PFC.
Métodos:
Immunohistochemical protocol was performed to detect the expression of the astrocytes (GFAP) and PV+ in the PFC of male rats treated with MAM (25mg/kg) or saline (Sal) on GD17 and with NAC (250mg/kg) or vehicle (Veh) at PD75-90, approved by CEUA-UFABC (007/2014). Two-way analysis of variance (ANOVA) and post-hoc Turkey test were developed with factors Treat1 (SalXMAM) and Treat2 (SalXNAC) for the medial orbital cortex (MO) and prelimbic cortex (PrL) (N=4-6 per group).
Resultados e Conclusões:
RESULTS: There was no effect of Treat2 but a main effect of Treat1 ($p=0,006$; $F[1,15]=10,14$) on GFAP density (cells/mm²) of PFC. Post-hoc test showed an increase of this expression in MAM-treated groups compared to controls in both areas (MO and PrL) and in total PFC (mean±SE; Sal:60,89±3,05; MAM:75,84±3,56). In contrast, there was no effect of the Treat1 in the PV+ density, but a main effect of Treat2 in the MO ($p=0,028$; $F[1,15]=2,46$) and a marginal difference in PFC ($p=0,074$; $F[1,15]=3,69$), with an increase of this expression in NAC-treated groups compared to controls on MO (Veh:13,64±1,83, NAC:19,20±1,64) and total PFC (Veh=12,80±1,48, NAC=16,90±1,54), but not in the PrL. CONCLUSIONS: MAM rats had a significant increase in GFAP expression on PFC. It is known that astrocytes play a fundamental role in inflammatory response of nervous system, this increase may be related with the inflammatory hypothesis in schizophrenia and in the MAM model. As expected, treatment with the antioxidant NAC increased PV+ density in PFC, although MAM treatment did not present any effect on it. Results suggest that MAM treatment increases an inflammatory process in PFC and the increase on PV+ expression on PFC with NAC chronic treatment may contribute to behavior benefits.
Palavras-chaves: Esquizofrenia, Neuroinflamação, parvalbumina, GFAP, MAM
Agência Fomento: FAPESP

18.018 - INFLUÊNCIA DO HIPOTIREOIDISMO NO DESENVOLVIMENTO DO TRANSTORNO DO ESTRESSE PÓS-TRAUMÁTICO

INFLUENCE OF HYPOTHYROIDISM IN THE DEVELOPMENT OF POST-TRAUMATIC STRESS DISORDER
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Introdução:

It is known that Post-traumatic Stress Disorder (PTSD) can lead to metabolic disorders. However, it is not yet known whether the metabolic disorders already established, such as the hypothyroidism, can influence the development of PTSD.

Objetivos:

To evaluate the influence hypothyroidism in the development of PTSD.

Métodos:

Adult Wistar male rats were randomly divided into two groups: group 1 (control): rats received water and group 2 (Methimazole): rats received methimazole 0,03 % diluted in the water for 30 days. The groups received standard commercial "ad libitum". After 30 days, animals from both groups were divided into: a) Control -unexposed (C-UNEXP), b) hypothyroidism - unexposed (H-UNEXP), c) control -exposed (C-EXP), d) hypothyroidism-exposed (H-EXP), being UNEXP: not exposed to shock e EXP: exposed to shock. EXP rats were individually placed in the apparatus of footshock and were left undisturbed for 2 min, after that, five footshocks (2 s, 0.8 mA) were randomly. Then, all experimental groups remained in isolated boxes and after 14 days of retention they were reexposed in apparatus of footshocks to evaluate freezing time (n = 10 per group). On consecutive days, the animals (n = 10 per group) were evaluated in different behavioral tests of social interaction (SI), forced swimming (FS) and open field. Statistical comparisons were made by two-way repeated measures ANOVA followed by the Bonferroni test. All experimental procedures were aproved by the Ethics Committee on the Use of Animals of the Federal University of Alfenas (protocol 48/2018).

Resultados e Conclusões:

Animals from the C-EXP and H-EXP groups showed an increase in the freezing time (35.60±26.28 to 270.68 ±77.26s; $p < 0,001$ and 30.80±28.61 to 388.20±127.90s; $p < 0.001$, respectively) when compared to their respective controls C-UNEXP and H-UNEXP. This increase was more accentuated in the H-EXP group (270.68±77.26 to 388.20±127.90s $p < 0.05$) when compared to the C-EXP group. There was a reduction in the SI time in C-EXP and H-EXP groups (152.40±23.01 to 119.50±22.09s, $p < 0.01$ and 129.30±19.20 to 94.40±14.89s; $p < 0.01$, respectively) when compared to their respective controls (C-UNEXP and H-UNEXP). The H-EXP showed a accentuated reduction in SI time (119.50±22.09 to 94.40±14.89s, $p < 0,05$) when compared to C-EXP. In the FS test there was an increase in the immobility time (s) in C-EXP and H-EXP groups (45.10±29.14 to 127.00±59.31 and 131.20±47.74 to 205.70±45.70s, $p < 0.01$, respectively) when compared to their respective controls C-UNEXP and H-UNEXP. This increase was more accentuated in the group H-EXP when compared to the C-EXP group (127.00±59.31 for 205.70±45.70s, $p < 0.01$). Our results show that animals with hypothyroidism appear to be more susceptible in develop PTSD.

Palavras-chaves: Avaliações comportamentais, Hipotireoidismo, Transtorno do Estresse Pós-traumático

Agência Fomento: Capes, Fapemig, CNPq.

18.019 - EFEITOS DO TRATAMENTO COM DIFERENTES CLASSES DE MEDICAMENTOS COM AÇÕES ANTIDEPRESSIVAS E ANTI-INFLAMATÓRIAS DURANTE O DESENVOLVIMENTO DE RATOS SUBMETIDOS AO ESTRESSE PRECOCE

EFFECTS OF THE TREATMENT WITH DIFFERENT CLASSES OF MEDICATIONS WITH ANTIDEPRESSANT AND ANTI-INFLAMMATORY ACTIONS DURING DEVELOPMENTAL PROGRAMMING OF RATS SUBJECTED TO EARLY LIFE STRESS

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Introdução:

Factors such as abandonment, neglect, and maternal separation are related to the development of major depressive disorder (MDD). Previous studies demonstrated that rats subjected to a maternal deprivation (MD) had behavioral alterations that persist into adulthood, however, oxidative damage was detected early. We hypothesized that antidepressants could prevent the damage caused by MD throughout development

Objetivos:

To investigate the effects of ketamine, minocycline, and escitalopram on depressive-like behavior and protein damage induced by MD
Métodos:
Male Wistar rats were subjected to MD. MD protocol was performed during the first 10 days of life of the rats, three hours/day. The control group remained with the mothers. Wistar rats were divided into five groups: control+saline (non-deprived; n=12); deprived+saline (n=12); and deprived+ketamine (n=12); deprived+minocycline (n=12); deprived+escitalpram (n=12). Ketamine was injected intraperitoneal (i.p.) at the dose of 15 mg/kg once every 14 days; minocycline was injected i.p. at the dose of 25 mg/kg once a day; and escitalopram was injected at the dose of 10 mg/kg i.p. once a day. Different groups of rats were evaluated on days 21, 31 and 61 after birth. In each phase rats of different groups were subjected to the forced swimming test (FST) and open-field test. Then, prefrontal cortex (PFC) and hippocampus (HIP) were used for protein damage analysis. The data are presented as mean and standard error of mean, were analysed by one-way ANOVA and statistical significance was set at $p < 0.05$. The experimental protocol was approved by ethics committee (069/2018-1)
Resultados e Conclusões:
The treatment with ketamine increased the spontaneous locomotor activity in deprived rats with 21 days (101.00,2.87; $p < 0.0001$), compared to control (14.43,2.87). At 31 days rats deprived treated with minocycline it was observed a reduction in the immobility time (108.64,11.20; $p = 0.034$), compared to control (192.50,18.08). In rats with 61 days subjected to maternal deprivation was demonstrated an increase in the immobility time (140.90,23.65; $p = 0.001$); the treatment with ketamine was able to reverse this change (16.14,10.01). In the PFC and HIP of rats subjected to the MD was observed an increase in the protein carbonyl at 31 (PFC 0.250,0.0021; $p = 0.001$; HIP 0.022 ?0.003; $p < 0.0001$) and 61 days (PFC 0.0246,0.008; $p = 0.019$; HIP 0.051,0.020; p 0.008). Treatment of ketamine decrease protein damage in the PFC and HIP at 31 (PFC 0.0058,0.0033; HIP 0.0041,0.0017) and 61 days (PFC 0.0033,0.013; HIP 0.0069,0.0016), and the treatment with escitalopram decreased protein damage in the PFC (0.0012 ?0.0008) and HIP (0.0007,0.0002) at 31 days, and in the HIP at 61 days (0.0031,0.001). MD can induce behavioural alterations that persist into adulthood and increase damage to proteins during development. Drugs with different actions mechanism, mainly ketamine could be considered a strategy treatment to the effects induced by early life trauma
Palavras-chaves: Oxidative stress, ketamine, minocycline, maternal deprivation, major depressive disorder
Agência Fomento: CAPES, FAPESC, CNPq, UNESC, Instituto Cérebro e Mente

18.020 - ALTERAÇÕES COMPORTAMENTAIS EM MODELO MURINO DE DIABETES INDUZIDA POR ALOXANA

BEHAVIORAL CHANGES IN MURINE MODEL OF ALLOXAN-INDUCED DIABETES

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Introdução:
Diabetes Mellitus (DM) is a common chronic metabolic disorder characterized by high blood glucose levels and it is a predisposing factor for development of several complications. DM has been related with neurophysiological alterations. SHIRPA is a protocol widely utilized to characterize behavioral alterations in mice developing cerebral diseases. Although DM are close associated with brain alterations there are no studies describing the evolution of cognitive impairments related with DM.
Objetivos:
The aim of this study is to evaluate the behavioral alterations in mice model of alloxan-induced diabetes.
Métodos:
For this, BALB/C mice were divided into two groups: Control (CTRL, n = 3), 200 mg/Kg Alloxan (ALX, n = 6). All groups had the blood glucose levels (BGL) and body weight monitored during 3 days. The behavioral tests, open field and SHIRPA, were started in the first day before injection. Statistical analyzes were performed by ANOVA one-way with post hoc Tukey in the Software BioEstat 5.3. Data are expressed as mean±standard deviation for BGL and as means±standard error for open field test, considering significant difference when $p < 0.05$.
Resultados e Conclusões:

For the BGL, animals with glycemia higher than 200 mg/dL was considered diabetic (mean: day 1: CTRL = 133 ± 8, DM = 271 ± 130; on day 3: CTRL = 107 ± 13, DM = 644 ± 97). In the open field test, DM group showed a lower performance than CTRL on the 3rd day in squares crossed (DM = 31 ± 15, $p < 0.01$ vs CTRL = 220 ± 8), hearing (DM = 3 ± 0.3, $p < 0.05$ vs CTRL = 23 ± 6) and grooming (DM = 1.7 ± 1.3, $p < 0.05$ vs CTRL = 9 ± 1.7) parameters. The performance in the neuropsychiatric domain of SHIRPA protocol revealed a difference between the DM and CTRL groups on the 3rd day (DM= 9 ± 0.8 vs CTRL = 15 ± 0.8, $p < 0.05$). No significant difference in the body weight of the animals in the firsts 3 days was observed. The SHIRPA protocol is able to detect neurological and behavioral changes in a short time diabetic state.

Palavras-chaves: Diabetes, Alloxan, SHIRPA, Behavior
Agência Fomento: CNPq

18.021 - ENRIQUECIMENTO AMBIENTAL MODULA O EFEITO DA CONTENÇÃO FÍSICA EM FÊMEAS DE GUPPIES

ENVIRONMENTAL ENRICHMENT MODULATES THE EFFECT OF PHYSICAL CONTAINMENT ON FEMALE GUPPIES

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Introdução:

Post-traumatic stress disorder (PTSD) represents an important and increasingly studied disorder. An effective model for fishes study of PTSD is physical containment in microtubes. In our laboratory, we identified that variations in social arrangements were not effective in treating the disease. Only the use of anxiolytic and hypnotic drugs showed treatment efficacy. Considering the impact of the environment on individuals' behavior, we compared guppies from enriched environments to those from poor settings to see if environmental enrichment may influence PTSD.

Objetivos:

To verify the effect of environmental enrichment on the anxiety-like behavior of guppies exposed to the protocol of physical containment stress.

Métodos:

48 adult guppies (Poecilia reticulata), separated by sex and environment, thus forming 4 groups (n = 12). Enriched individuals were placed in aquaria containing gravel, aquatic plants and aerator for water since the day they were born. Those from non-enriched environments were placed in aquariums only with an aerator. The experiments were performed after six months. For physical containment, the animals were placed in microtubes with openings at the ends, so as to allow water circulation, but to prevent their movement, for 4 hours. At the end of the containment, the animals were left in their respective aquariums to be exposed to the plus maze with ramp (PMR) in the next day. In the PMR, two arms opposite each other have ramps that ascend from the central area to the end of the arm where they reach 6cm, while the other arms are flat. Each animal was tested for 5 minutes and the water column was 8cm. We measured: a) total time in the compartments (center, flat arms and arms with ramp); b) number of entrances (flat arms and arms with ramp). ANOVA (post-test: Tukey) was used and $p \leq 0.05$ was considered. All procedures were approved by the Ethical Committee for Animal Research of the IFPA/Tucuruí (protocol 001/2017)

Resultados e Conclusões:

Statistical differences were found between enriched and non-enriched individuals, indifferent to gender, for the locomotor variable, always with higher activity to enricheds: flat arms, with ramp arms and total entries, always with $p < 0.001$. Also regarding the locomotor activity, but now indifferent to the environment, males and females also differed, again always with $p < 0.001$ and more activity for males: flat arms (16±4.44vs18±4.87), with ramp arms (13±3.76vs16±5.25), and total entries (29±8.01vs34±10.01). As for the temporal variable, only the enriched females differed from those not enriched in the time of stay in the flat arms (152.2±22.45vs182.1±38.1,p=0.014) and with ramp arms (101.3±26.55vs54.3±33.11,p=0.002). These results allow us to conclude that environmental enrichment increases the exploratory activity of guppies exposed to physical containment stress. Females exposed to physical containment stress and enriched environment, present an anxiolytic effect in relation to non-enriched females or to males.

Palavras-chaves: Post-traumatic stress disorder, Stress for contention, Anxiety, Plus maze with ramps, Guppy
Agência Fomento: CAPES

18.022 - EFEITO ANSIOLÍTICO DO CARVACROL NO TESTE DE LABIRINTOTO EM CRUZ ELEVADO EM CAMUNDONGOS: EVIDÊNCIAS PARA O ENVOLVIMENTO DE RECEPTORES GABAA

ANXIOLYTIC-LIKE EFFECT OF CARVACROL IN MICE BY ELEVATED PLUS MAZE: EVIDENCE FOR THE INVOLVEMENT OF GABAA RECEPTORS

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Introdução:

Depression and anxiety are psychological diseases, characterized by mood and emotional disturbance, that causes extreme economic loss and social problems. However, the conventional medications typically cause side effects that result in patients opting to out of therapy. Thus, the search for new compounds with therapeutic potential has been constant and medicinal herbs and their derivatives may be important options in terms of reduced side-effects and improved efficacy of the treatment.

Objetivos:

The objective of this study was to determine the anxiolytic effect of carvacrol (CVC) in mice and to evaluate the involvement of the GABAA receptors in this effect.

Métodos:

Male Swiss mice were divided into five groups, treated with vehicle, fluvoxamine (FLUV) (50 mg / kg), CVC (6.25 or 12.5 mg / kg), via gavage for 7 days or diazepam (DZP) (1mg / kg, ip). To assess the GABAA receptor involvement, animals were pre-treated with flumazenil (2.5 mg / kg, ip). After 60 minutes of the last treatment, the animals were submitted to elevated plus maze test (EPM), during which the percentage of time spent (PTOA) in, percentage of entries (PEOA) into and the number of entries into the open arms (NEOA) were measured. The study was approved by CEUA /UFC-Sobral, (n° 08/17).

Resultados e Conclusões:

Results showed that only CVC at the dose of 12.5 mg/kg was able to increase all the parameters analyzed when compared to control group (PTOA- CVC 12.5: 27.65 ± 6.16; Control11.13 ± 2.90, $p < 0,05$; PEOA- CVC 12.5: 32.13 ± 8.05; Control: 13.41 ± 3.84, $p < 0.05$ and NEOA- CVC 12.5: 6.50 ± 1.33; Control: 1.42 ± 0.57, $p < 0.05$). Flumazenil blocked significantly the effects of CVC at the NEOA and PEOA parameters. This study indicate that acute treatment with CVC at a high dose has anxiolytic-like effects in the EPM test similar to those of DZP. The mechanism responsible for the anxiolytic-like effect of CVC is probably related to GABAA receptors.

Palavras-chaves: ANSIEDADE, CARVACROL, DEPRESSÃO
Agência Fomento: FUNDAÇÃO CEARENSE DE APOIO AO DESENVOLVIMENTO CIENTÍFICO E TECNOLÓGICO-FUNCAP

18.023 - PARÂMETROS RELACIONADOS À DEPRESSÃO EM ANIMAIS ADULTOS SUBMETIDOS À ATIVAÇÃO IMUNE NEONATAL

PARAMETERS RELATED TO DEPRESSION IN ADULT ANIMALS SUBMITTED TO NEONATAL IMMUNE ACTIVATION

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Introdução:

The pathophysiology of depressive disorders still remains misunderstood. Despite the all the contributions of the monoaminergic hypothesis, several studies have evidenced the role of neuroinflammation into the development of depression. A neuroinflammation can modulate permanent or encephalic development, the immune and endocrine regulation as well as neural circuits, which canresul in physiological and behavioral changes.

Objetivos:

Evaluate parameters related to depression in adult mice submitted to immune activation in the neonatal period.
Métodos:
Two-day C57BL / 6 animals were exposed to lipopolysaccharide (LPS) - single subcutaneous administration of 25 µg / kg LPS or phosphate buffered saline (PBS) and at 46 days of age received either PBS or Imipramine once per day for 14 days. At 60 days of life, the consumption of sucrose was evaluated; the time of immobility; the weight of the animals, the adrenal gland and the hippocampus; plasma corticosteroid levels and levels of brain-derived neurotrophic factor (BDNF) in the hippocampal tissue.
Resultados e Conclusões:
: It can be observed that the animals exposed to LPS in the neonatal period and evaluated in adult life showed a decrease in sucrose consumption; an increase in immobility time; a reduction in weight and hippocampus; an increase in the weight of the adrenal gland and an increase in plasma levels of corticosteroids ($p < 0.001$). Among the evaluated parameters, only the weight of the hippocampus was not reversed with the use of the antidepressant. Regarding hippocampal BDNF levels ($p > 0.05$), no significant difference was observed between the groups. The results of this study suggest that activation immunites in the neonate period may be associated with parameters related to depression in adult life. Taken together, the results of this study suggest that endotoxemia in early life may increase vulnerability to long-term development of depression.
Palavras-chaves: Endotoxemia, depression-like behavior, inflammation;, neurodevelopment
Agência Fomento: CNPq

18.024 - A ATIVIDADE FÍSICA DIMINUI A NEUROINFLAMAÇÃO E O COMPORTAMENTO TIPO DEPRESSIVO INDUZIDOS PELO LPS EM CAMUNDONGOS

PHYSICAL ACTIVITY DECREASES LPS-INDUCED NEUROINFLAMMATION AND DEPRESSIVE-LIKE BEHAVIOR IN MICE
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Introdução:
A persistent inflammatory response causes brain damage, a common mechanism of neurological diseases. Neuroinflammation triggers an increase in pro-inflammatory agents and leads to a depressive-like behavior, characterized by anhedonia, social isolation and decreased food intake. While physical activity has anti-inflammatory and antioxidant effects, contributing to normal neuronal functions and mental health.
Objetivos:
We investigated the effects of 6 weeks of physical activity before acute lipopolysaccharide (LPS) in mice, an animal model for neuroinflammation and depressive-like behavior.
Métodos:
Ethics committee approval number 1958010616. Male Swiss mice (N=335, 12-15 weeks old, body mass 47.1±0.7g) were initially divided into two experimental groups: sedentary control group (SED); and physical activity group (free access to running wheels, RC, 6 weeks). After, half of animals were treated with LPS (0.33mg/kg, intraperitoneal) or vehicle (0.9% saline, SAL). Animals were evaluated for physiological parameters and submitted to locomotor and behavioral tests. Prefrontal cortex was collected after behavior experiments.
Resultados e Conclusões:
The animals ran 2,4±0,9km/day. LPS increased interleukins IL-1 β ($F_{1,20}=5,9$; $P < 0,05$) and IL-6 levels ($F_{1,20}=7,1$; $P < 0,05$), and decreased dopamine (DA) ($F_{1,24}=5,4$; $P < 0,05$] and its metabolite 3,4-dihydroxyphenylacetic acid levels (DOPAC) ($F_{1,27}= 11,2$; $P < 0,05$) in the in the prefrontal cortex. In addition, LPS induced sickness behavior in the open field ($F_{1,26}=11,6$; $P < 0,05$), splash test ($F_{1,26}=15,1$; $P < 0,05$), tail suspension ($F_{1,28}=3,2$; $P < 0,05$) and social interaction test ($F_{1,26}=27,2$; $P < 0,05$). Regular running protected against the LPS-increased IL-6 ($F_{1,20}=7,2$; $P < 0,05$) and partially prevented the LPS-increased IL-1 β and LPS-decreased DA e DOPAC. 6 weeks of physical activity also protected against LPS-induced depressive-like behavior in mice. Our results support the indication of physical activity in the treatment of neuroinflammatory diseases, including the behavioral impairments.
Palavras-chaves: Neuroinflammation, Lipopolysaccharide, Physical activity, Running wheels, Depressive-like behavior
Agência Fomento: CAPES; CNPq; FAPESC

18.025 - FALHA NO ENGAJAMENTO EM PISTAS DE SEGURANÇA NO TEPT: UM ESTUDO DE REATIVIDADE CARDÍACA

DEFICIENT SAFETY CUES ENGAGEMENT IN PTSD: A CARDIAC REACTIVITY STUDY

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Introdução:
The ability to identify threat and safe signals is central to survival and mental health. Impaired engagement on safety signals is considered a possible biomarker for Post-Traumatic Stress Disorder (PTSD).
Objetivos:
To investigate whether PTSD patients would fail to engage in a safe context by probing cardiac reactivity to mutilation pictures.
Métodos:
Participants were 19 non-clinical trauma-exposed (control group) and 13 PTSD patients (PTSD group). Electrocardiogram was recorded during the presentation of 120 pictures, 60 of mutilated bodies and 60 of matched non-injured bodies, presented in two contexts. In the "real" context, a text informed that the forthcoming pictures were real-life scenes. In the “safe” context, a text informed that pictures were fictitious. Heart rate (HR) was interpolated at 200ms periods and measured during the 2s period following picture onset. HR responses was subtracted from baseline (4s period after a detection of a circle over a black screen, randomly presented) and averaged for each valence, across each context. PTSD Symptoms were assessed. A repeated-measures 2x2 ANOVA was conducted separately for each group, including CONTEXT (safe x real) and VALENCE (neutral x mutilation) as within-subject factors, followed by Fisher LSD post-test. Spearman’s correlations were used to investigate the association between PTSD symptoms and HR change (mutilation minus neutral), in each context separately.
Resultados e Conclusões:
In the control group, there was a significant CONTEXT × VALENCE interaction (F(1,18)=5.05, p=0.037). It was observed the expected reaction to a potential threat – HR deceleration to mutilation compared to neutral pictures in the real context (p=0.002). The differential reaction to mutilation versus neutral pictures was not present in the safe context (p=0.685), evidencing they had captured the indications that injuries were fictitious. In the PTSD group, there was a main effect of VALENCE (F(1,12)=7.08, p=0.021). Patients showed a different reaction – HR acceleration to mutilation compared to neutral pictures – regardless of contexts. The association of mutilation pictures with higher threat in PTSD patients was corroborated by a significant correlation between HR change and PTSD symptoms for the whole sample (rho=0.53; p=0.002). In the real context, higher symptoms scores were associated with a shift from bradycardic to tachycardic reaction. Cardiac reactivity to mutilation pictures seems to be an important correlate of PTSD symptoms severity. In the control group, the safe context reduced the aversiveness of highly unpleasant stimuli reflected by the attenuation of cardiac reactivity to mutilation pictures. PTSD patients seemed to associate pictures to a more realistic threat and showed no signs of engagement in the safe context.
Palavras-chaves: PTSD, heart rate, safety signals, cardiac reactivity
Agência Fomento: CNPq; FAPERJ; CAPES (Código financiamento 001); Financiadora de Estudos e Projetos (FINEP – Apoio Institucional 03/2016 – Ref 0354/16)

18.026 - "DISFUNÇÃO LOCOMOTORA ESTÁ ASSOCIADA À ALTERAÇÕES NOS NÍVEIS CEREBRAIS DE NGF E FRAQUITALQUINA DURANTE A ENCEFALOPATIA HEPÁTICA EM CAMUNDONGOS"

"LOCOMOTOR DYSFUNCTION IS ASSOCIATED WITH ALTERATIONS IN THE BRAIN LEVELS OF NGF AND FRACTALKINE DURING HEPATIC ENCEPHALOPATHY IN MICE"

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Introdução:
Hepatic encephalopathy (HE) is a neuropsychiatric syndrome which can lead to cognitive and motors dysfunctions as a consequence of the hepatic failure. CX3CL1/fractalkine is expressed by neurons and can

regulate microglial activation, neuronal survival and synaptic function. CX3CL1/CX3CR1 axis influences the interaction between microglia and neurons and changes the concentrations of neurotrophic factors (NTFs). Brain-derived neurotrophic factor (BDNF), glial cell line derived neurotrophic factor (GDNF), and neural growth factor (NGF) are polypeptides involved in the brain development and neuronal plasticity. To best of our knowledge, there are no studies evaluating the participation of CX3CL1 and these neurotrophic factors during hepatic encephalopathy.
Objetivos:
The present work investigated the locomotor activity and the expression of neurotrophic factors and fraktalkine in the prefrontal cortex and hippocampus after induction of hepatic encephalopathy in mice.
Métodos:
Male C57BL/6 mice, aged 8-10 weeks were used and kept in an animal house with constant temperature and a 12 h light/dark cycle. The hepatic encephalopathy was induced by intraperitoneal administration of thioacetamide (TAA) at a single dose of 600mg/kg. The control animals received saline solution. After 24 hours, the locomotor activity was evaluated by open field test. Then, all animals were euthanized, and fragments of prefrontal cortex and hippocampus were collected for determination of BDNF, NGF, GDNF and fractalkine levels by ELISA. The project was approved by the Ethical Committee of UFMG (Protocol Number 341/2018).
Resultados e Conclusões:
HE-induced mice had decreased locomotor activity, compared to controls ($p < 0.0005$). In addition, HE-induced animals had lower levels of NGF in the cerebral cortex ($p < 0.005$) and higher levels of CXCL3 ($p < 0.005$) in the hippocampus. The levels of BDNF, GDNF was similar all evaluated groups. Changes in CX3CR1 expression has been related to neuroprotective and neurotoxic actions in different brain injuries. The present result corroborates with other studies that observed locomotor impairment as a common symptoms of HE. Moreover, lower levels of NGF and changes in locomotion were also observed in animal models of mood disorders. The present work showed that impairment of locomotion was associated with changes in the levels of NGF as well as chemokine CXCL3 in specific brain regions during experimental hepatic encephalopathy.
Palavras-chaves: hepatic encephalopathy, fraquitalquine , NGF
Agência Fomento: CNPq, Fapemig

18.027 - BEHAVIORAL EFFECTS OF CHRONIC STRESS IN HIGH AND LOW-CONDITIONED FREEZING RAT STRAINS

BEHAVIORAL EFFECTS OF CHRONIC STRESS IN HIGH AND LOW-CONDITIONED FREEZING RAT STRAINS
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Introdução:
Anxiety disorders are the second most prevalent mental health condition in the world, affecting 3.6% of the population; in the Americas, anxiety surpasses depression, reaching 5.8% of the people. Given that chronic socio-environmental stressors influence the development of anxiety and depression, animal models have been developed to explore the psychobiological mechanisms underlying mood disorders. Among them is that of chronic unpredictable mild stress (CUMS), which occurs through the daily presentation of stressors in a random manner.
Objetivos:
The objective of this work is to investigate in animal models how the association between anxiety disorder and chronic stress occurs, in order to establish a cause-effect relationship considering possible behavioral aspects involved.
Métodos:
The work herein presented consisted in applying the CUMS protocol for 21 days in rats of three different lines, which were previously established according to different levels of freezing responses to contextual fear, namely: CAC (high-freezing Cariocas), CBC (low-freezing Cariocas) and Ctrl (controls not selected by breeding) (N=18). Weight and freeze response of these animals were measured and their performance was evaluated in the open field, elevated plus maze (EPM) and forced swim tests. Experiment protocols approved by CEUA 036/2013.
Resultados e Conclusões:
Results showed that CAC significantly reduced it's freezing after treatment when compared to the control group (63.28±0.27 vs 51.56±2.38; $p < 0.01$). Regarding weight, CBC rats were unable to increase their mass when submitted to chronic stress (control: 284.38±9.62 vs 323.89±8.98; $p < 0,0001$). In the open field test, a reduction in periphery crossings (19.17±3.48 vs 9.89±2.37; $p < 0.05$) and entrances (1.17±0.28 vs 0.06±0.06; $p < 0.01$) in the center of the environment was observed, and there was an increase in the latency

to the initial immobility of CAC rats (4.14±0.80 vs 15.56±6.93; p < 0.05). In the EPM, they showed a significant reduction in the entries in the open arms (38.48±5.81 vs 17.78±4.97; p < 0.05), in the time spent in the center (32.33±10.26 vs 7.28±1.86; p < 0.05) and in the latency of movement (11±5.47 vs 1.78±0.6; p < 0.05), accompanied by an increase in the present time in the closed arms (220.96±17.96 vs 280.06±5.80; p < 0.01). In addition, in the forced swim test, CAC rats showed increased latency (178.33±16.29 vs 265.56±14.89; p < 0.001) and decreased immobility (18.56±6.6 vs 3.56±1.45; p < 0.01), while Ctrl and CBC attained ceiling and floor responses. Therefore, increased fear and despair responses was observed in rats that previously presented greater contextual fear, CAC. On the other hand, CBC rats did not seem to respond or had a low response to chronic stress. Taken together, the data herein obtained point to the correlation between behavioral and biological patterns and the susceptibility to continuous stress, contributing to the establishment of a causal relationship between human anxiety and exposure to socio-environmental stressors.

Palavras-chaves: Anxiety, Stress, Behavior, Animal models
Agência Fomento:

18.028 - AVALIAÇÃO DO ENVOLVIMENTO DO RECEPTOR NMDA E DA VIA DO ÓXIDO NÍTRICO/GUANOSINA MONOFOSFATO CÍCLICO NO EFEITO DO TIPO ANTIDEPRESSIVO DA VILAZODONA EM CAMUNDONGOS

EVALUATION OF THE INVOLVEMENT OF NMDA RECEPTOR AND NITRIC OXIDE/CYCLIC GUANOSINE MONOPHOSPHATE PATHWAY IN THE ANTIDEPRESSANT-LIKE EFFECT OF VILAZODONE IN MICE

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Introdução:

Vilazodone (VZD) is a selective serotonin reuptake inhibitor (5-HT) and a partial 5-HT 1A receptor agonist used in the treatment of depressive disorder. In recent years, a large number of studies have demonstrated the importance of the role of the N-methyl-D-aspartate (NMDA) receptor and the nitric oxide (NO) pathway and cyclic guanine monopostat (cGMP) neurobilogy of depression. However, no study evaluated the participation of NMDA receptors and the NO-cGMP pathway in the antidepressant-like effect of VZD.

Objetivos:

To investigate the involvement of NMDA receptors and the NO/GMPc pathway in the antidepressant-like effect of VZD in vivo.

Métodos:

Female Swiss mice (40-55 days, 30-40g) were treated with VZD (0.3-3 mg/kg, intraperitoneal (i.p.), 10ml/kg) or 0.9% saline (control) 30 minutes prior to testing, tail suspension (TST) and open field (OFT). Ketamine (NMDA receptor antagonist), L-arginine (L-ARG, 50 mg/kg, i.p., precursor NO) and sildenafil (5 mg/kg, i.p., phosphodiesterase 5 inhibitor) were given 30 min before treatment with VZD. L-NAME (10 mg/kg, i.p., nonspecific nitric oxide synthase inhibitor) and methylene blue (MB, 3.75 mg/kg i.p, nitric oxide synthase and soluble guanylate cyclase inhibitor) were given 15 min before treatment with VZD. 30 minutes after treatment with VZD the animals were submitted to behavioral tests. All procedures were approved by the Research Ethics Committee, CEUA/UFMT, (protocol 23108.9389/2018-82). Analysis between groups was performed by one-way or two-way ANOVA, followed by the Newman-Keuls test when appropriate. Significant differences expressed at P < 0.05.

Resultados e Conclusões:

VZD administration reduced immobility duration in the TST only at the dose of 3mg/kg. Combination of a subeffcetive dose of VZD (0.3 mg/kg) with a subeffective dose of ketamine reduced the immobility time in TST. Pre-treatment with L-ARG or sildenafil was not able to reverse the reduction in immobility time caused by VZD (3 mg/kg) in TST. TST immobility time did not decrease after administration of L-NAME, or MB combined with subeffective dose of VDZ (0.3 mg/kg). None of the treatments altered the locomotor activity in the OFT. Conclude this study demonstrates the involvement of NMDA receptor in the VZD antidepressant-like effect in the TST. VZD anti-immobility effect in the TST does not seem to involve modulation of the nitric oxide/cyclic guanosine monophosphate pathway.

Palavras-chaves: Depressive, mice, N-methyl-D-aspartate , nitric oxide , vilazodone
Agência Fomento:

20. Neurotecnologias (interfaces neurorobóticas, nanotecnologia, etc)

20.001 - THE USE OF A LOW-COST MULTISENSORY GLOVE FOR THERAPEUTIC REHABILITATION ACTIVITY IN PATIENTS WITH PARETIC HAND AFTER A STROKE

THE USE OF A LOW-COST MULTISENSORY GLOVE FOR THERAPEUTIC REHABILITATION ACTIVITY IN PATIENTS WITH PARETIC HAND AFTER A STROKE

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Introdução:
Stroke is caused by disruption of blood supply to nerve tissue or blockage caused by a clot in a blood vessel, inducing of the decreasing the oxygen and glucose levels in a determined area of the Nervous System Central (CNS), and causing damage to nervous tissue.
Objetivos:
To investigate of the rehab effects on the hand's movement of the low-cost electronic device (multisensory glove) application in the therapeutic rehabilitation (ART) of patients with the stroke and who have paretic hand.
Métodos:
The study is registered in the Health Science Institute (HSI) / Federal University of Pará (UFPA) Research Ethics Committee under Certificate of Presentation for Ethical Consideration (CAAE) 98937018.4.0000.0018 and approval 3.236.691. Goniometry was used to assess the range of motion. Participated Three patients. Two had an ischemic stroke, one with a lesion in the supratentorial system and another in the left internal capsule. The last had a haemorrhagic stroke, with lesion area in the basal ganglia, internal capsule and thalamus. The patients after underwent 20 sessions of 1 hour by day using the multisensory glove with five flex sensors, an inertial measurement unit, an Arduino Uno are connected by a USB cable, control a play game in the computer when performing flexion and extension movements of the hands. The glove gives tactile feedback, through piezoelectric crystals that vibrate. The evaluations were divided into the Evaluation (Ev.), Reevaluation 1 (Ree. 1) and Reevaluation 2 (Ree. 2).
Resultados e Conclusões:
The one-way ANOVA test showed statistically significant differences ($p < 0.05$) in the metacarpophalangeal joints in flexion movements (Ev 1: 44.67 ⍰9.775; Rv 2: 68.87 ⍰9.642; Rv.3: 78.93 ⍰6.808) and extension (Ev 1: 30.80 ⍰9.723; Rv 1: 39.93 ⍰6.366; Rv 2: 45.53 ⍰ 6.332); in the proximal interphalangeal joints in the flexion movement (Ev 1: 52,13 ⍰7,206; Rv 1: 77,73 ⍰6,366; Rv 2: 83,13 ⍰13,89) and in distal interphalangeal joints in the flexion movement (Ev 1: 57.08 ⍰5.439; Rv 1: 80.00 ⍰2.539; Rv 2: 87.17 ⍰1.374) and extension (Ev 1: 1,250 ⍰0,3191; Rv 1: 1,833 ⍰0.7935; Rv 2 2.667 ⍰0.8165). CONCLUSION: The use of the multisensory glove was effective in the therapeutic rehabilitation of the paretic hand in patients after stroke with better results in finger flexion and extension movements.
Palavras-chaves: MULTISENSORY GLOVE, NEUROTECHNOLOGY, REHABILITATION
Agência Fomento: CNPq, CAPES, FAPESPA, UFPA.

20.002 - A INTERFACE CÉREBRO-MÁQUINA NA MELHORA DO MOVIMENTO DE EXTENSÃO DA MÃO EM UM PACIENTE PÓS-AVE SUBAGUDO: RELATO DE CASO

ACUTE IMPROVEMENT OF BRAIN-MACHINE INTERFACE ON OPEN HAND MOVEMENT IN A SUB-ACUTE POST-STROKE SUBJECT: CASE REPORT

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Introdução:
Some of the most difficult impairment to treated in stroke is voluntary motor deficit, spasticity on hand and functional disability, for example, finger extension (IEEE Trans Biomed Eng. 65:2790, 2018). The brain-machine interface, through electroencephalography and functional electrical stimulation (EEG-FES) techniques, register a motor intention and active the affected muscle group (Curr Dir Biomed Eng. 3:161, 2017).
Objetivos:
Verify effects of brain-machine interface on open hand movement in a sub-acute post-stroke subject.
Métodos:
Methods: This case report was approved by research ethics committee under protocol nº 3.004.069 at State University of Londrina. The participant (44 years old) with post-stroke (five months) presents upper limb

deficit on left side. The assessments were performed on (i) cognitive ability, (ii) spasticity, (iii) hand extension and flexion motion range and (iv) electromyography. The applied tests involved (i) mini-mental state evaluation, (ii) modified Ashworth scale, (iii) range of movement (RM) by SAPO® software and (iv) neuromuscular activation during by Bitalino® electromyography in temporal (EMGRMS) and spectral (EMGMDF). For EEG (OpenBCI®), 250 Hz acquisition rate, were registered CP2, FC2, C2, and C4 (international 10-10 standard) channels. For FES, two 5x9cm electrodes, were applied on hand extensors muscles. The participant did calibration to synchronize software (OpenVibe) to differentiate hand open motor intention (10 trials) and relax state (10 trials). The algorithms used were common spatial pattern and linear discriminant analysis. For this, the participant was requested to imagine and extend the hand simultaneously, through command of the software. Subsequently, the EEG-FES interface was executed for approximately 20 minutes. FES magnitude was adjusted to evoke submaximal contraction (almost full extension). After EEG-FES interface protocol, reevaluation was applied.
Resultados e Conclusões:
(i) mini-mental was not asses after the protocol. (ii) MAS decreased from 1 to +1, indicating a reduction in spasticity. (iii) RM increased hand extension from 144.4° to 153.9° and hand flexion from 81.7° to 88.8°. (iv) EMGMDF increase in from 156 to 165 Hz and EMGRMS not changed with 32 mVrms. The electromyography indicates that neural firing was improve, as do not have changes in muscular tissue, without hypertrophy, the EMGRMS do not change with just one EEG-FES interface session. Even with one session, the EEG-FES interface improve open hand movement in a post-stroke subject. Our results were confirmed through motor neuron firing rate and movement amplitude increase, moreover, reduction of spasticity.
Palavras-chaves: Stroke, Rehabilitation, Brain-Computer Interfaces, Electric Stimulation, Electroencephalography
Agência Fomento:

20.003 - AVALIAÇÃO E CARACTERIZAÇÃO DA INTERAÇÃO NEURAL COM ARCABOUÇOS POLIMÉRICOS, VISANDO REGENERAÇÃO MEDULAR

EVALUATION AND CHARACTERIZATION OF NEURAL INTEGRATION WITHIN POLYMERIC SCAFFOLD AIMING SPINAL CORD REGENERATION

Autores: Victor Alisson da Silva 1, Felipe Fernandes Correia 1, Christiane Bertachini Lombello 1, Sônia Maria Malmonge 1, Alexandre Hiroaki Kihara 1, Vera Paschon 1
Instituição: 1 UFABC - Universidade Federal do ABC (Alameda da Universidade, s/n, - Anchieta, São Bernardo do Campo - SP)
Introdução:
Tissue therapy in cases of spinal cord injury is of great importance for the development of treatments aimed to nerve regeneration. One of the main methods is the use of polymeric scaffolds, which are structured biomaterials that promote cell support and stimulate cell differentiation at injured sites. However, cellular responses may vary according to the macro and microstructure of these materials. Regarding macro configurations, one can obtain scaffolds ranging from films, cylinders, tubes, channels, and even hydrogels. In addition, the microstructural conformations may be unique, allowing variations in the mean pore diameter, hydrophilicity, composition and other surface characteristics of the biomaterials. However, these properties should be evaluated in vitro before proceeding to the in vivo application.
Objetivos:
The aim of this study was to evaluate and characterize the cytotoxicity and development of spinal cord cells in contact of polymeric biomaterials films based in chitosan (CHI); poly-L-lactic acid (PLLA); polycaprolactone (PCL) and fibrous polycaprolactone (PCLf) for spine regeneration.
Métodos:
The sterilization method used was ultraviolet (254 nm, 30 minutes) on each side of the biomaterial. With each polymer were performed: a) VERO cell cultures for cytotoxicity analysis, through direct and extract contact, in addition to MTT tests; b) mixed primary cultures of spinal cord of neonatal rats with 0-3 days postnatal (P0-P3) for evaluation of fixation, cytotoxicity, differentiation, dendritic branching and connectivity through light microscopy and transmission electronics. All experiments were carried out according to protocol 4509160816 approved by CEUA/UFABC.
Resultados e Conclusões:
Based on the cell viability assays (MTT test), it was observed that the PCL (1.067±0.013), PCLf (1.089±0.028), PLLA (1.169±0.066) and CHI (1.068±0.014) composites obtained similar results to

the negative control (1.000±0.042) , where the cells developed properly within 24 hours after incubation, demonstrating no cytotoxicit. With the result of non-cytotoxicity of the polymers, the cells of the spinal cord of neonates were incubated on them, allowing observations on the differentiation and development of this culture in direct contact with the biomaterials. In comparison to the negative control, the biomaterials resulted in similar morphologically cells. With all of this in mind, we suggests that the polymeric films of PCL, PCLf, PLLA and CHI allow adhesion and correct differentiation for both Vero cell lines and spinal cord cells. Thus, all the information suggests that the use of scaffolds may be a great alternative for spinal regeneration.

Palavras-chaves: cellular viability, spinal cord injury, scaffolds, biomaterials
Agência Fomento: FAPESP

20.004 - ANÁLISE DA EXPRESSÃO DE GFP PROMOVIDA POR DIFERENTES MINI-PROMOTORES EM CÉLULAS GANGLIONARES DA RETINA DE RATOS ADULTOS

ANALYSIS OF GFP EXPRESSION PROMOTED BY DIFFERENT MINI-PROMOTERS IN ADULT RAT RETINAL GANGLION CELLS

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Instituição: 1 IBCCF-UFRJ - Instituto de Biofísica Carlos Chagas Filho, UFRJ (Av. Carlos Chagas Filho , 373. CCS, Bloco G, sala G2-004/019)

Introdução:

Promoters are DNA sequences capable of promoting gene transcription. A critical step for human gene therapy is the availability of a small promoter for specific gene expression in cell type of therapeutic interest. Furthermore, promoting expression at appropriate levels is a challenge, since human gene promoters are generally large, becoming incompatible with space-restricted molecular constructs, such as adeno-associated viral vectors (rAAV). Gene therapy is a promising therapeutic strategies not just monogenic but also for multifactorial diseases, such as neurodegenerative diseases. In the central nervous system, the retina is a tissue made up of multiple layers of cells, and the ganglion cell layer is responsible for bringing visual information from the retina to the brain. Damage to retinal ganglion cells (RGCs) can lead to blindness and is related to several pathologies, including glaucoma. Between the promoters designated for RGCs, there are some restrictions: too large, not specific, and not strong in promoting expression.

Objetivos:

The aim of this work was to analyze 6 different synthetic mini-promoters (MiniPs) about their capacity of transgene expression in retinal ganglion cells (RGCs). These promoters are called Ple (Pleiade Promoter Project) and consist of promoter regions and regulatory sequences predicted bioinformatically through the software Vista Enhancer Browser

Métodos:

We used adeno-associated virus vectors (rAAV2 quad.Y-F) containing the transgene reporter GFP (Green fluorescent protein) under the control of each MiniPs. Lister Hooded rats of the 30-day old had intravitreal injection of rAAV vectors as approved by Ethics Commitee from The Health Sciences Center of the Federal University of Rio de Janeiro #057/16. Retinas were processed 4 weeks post-injection for whole mount, followed by immunofluorescence and analyzed by confocal microscopy. To quantify the number of RCGs expressing GFP under the control of each MiniP, we used the RCGs marker, anti-Brn3a, together with anti-GFP.

Resultados e Conclusões:

After analysis of one-way ANOVA and Dunnett's post-test we found that 2 of the 6 MiniPs, Ple 25 2kb (767.6±117.7; n=5) and Ple 53 (939.8±77.77; n=5) had more RCGs transduced per mm2 compared to the ubiquitous promoter CBA/CMV (414.9±33.42; n=5). In addition, we observed that the expression pattern promoted by these 2 MiniPs went beyond the nasal quadrant, site of rAAV injection, with an extensive number of cells expressing GFP also in the lower and upper quadrants. Meanwhile, CBA/CMV promoter had its expression restricted to the injection site, nasal quadrant. The MiniP, Ple 53, also showed the highest intensity of GFP fluorescence in Brn3a+ cells (11107±156.8; n=305 cells) compared to other promoters, including the ubiquitous one (9447±238.8; n =156 cells). Thus, the use of MiniPs with higher level of transgene expression can be used to improve transgene expression into RGCs.

Palavras-chaves: mini-promoters, rAAV, retinal ganglion cell
Agência Fomento: PIBIC-CNPq

20.005 - NEUROFEEDBACK TRAINING IMPROVES THE SENSORIMOTOR RHYTHM REGULATION OF PATIENTS WITH REFRACTORY EPILEPSY

NEUROFEEDBACK TRAINING IMPROVES THE SENSORIMOTOR RHYTHM REGULATION OF PATIENTS WITH REFRACTORY EPILEPSY

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Instituição: 1 UFPA - Federal University of Pará (Rua Augusto Corrêa, 01 - Guamá. Belém/PA/Brazil, 66075-110), 2 ITEC - Institute of Technology (Federal University of Pará), 3 ICB - Institute of Biology (Federal University of Pará), 4 GEN - Epilepsy North Group (Trav. 14 de Março, 1909 - Marco. Belém/PA/Brazil, 66040-270.)

Introdução:

Epilepsy is a chronic brain disorder characterized by abnormal and hypersynchronized electrical discharges from neuronal groups that causes biological, psychological, and social impairment. An alternative treatment for reducing the frequency of seizures in refractory epilepsy (RE) patients is neurofeedback, which is a technique used to reinforce or inhibit specific frequency bands of the human brain electrical activity.

Objetivos:

The aim of this work is to develop protocols of neurofeedback training to improve the capacity of desynchronization of the brain electrical activity in the sensorimotor rhythm (SMR) through operant conditioning.

Métodos:

Prior neurofeedback training, nine minutes of resting state EEG was recorded from 2 refractory epilepsy (RE) patients. A control group comprised of 2 sex- and age-matched healthy subjects was submitted to the same procedure. EEG was recorded with a 22-channel system (Neuromap40i, Neurotec, Brazil) with a sampling frequency of 256 Hz and using Fpz as ground. Channels were referenced to the linked mastoids. The recordings were pre-processed in Python to remove biological artifacts, and the power spectrum was also estimated. We also implemented an audio and visual feedback toolbox using BioExplorer v1.6. This toolbox displayed three bars on a 24 inches flat screen, one bar corresponding to the SMR regulation, and the other to assure the participants were awake. The bars indicated whether the participants were correctly regulating their brain rhythms, which was reinforced by an audio beep. A total of five 30-minute sessions for each participant were conducted. After the sessions, the resting state EEG was once more recorded. This work was approved by the Ethics Committee of the João de Barros Barreto Hospital (Number: 2.432.373).

Resultados e Conclusões:

RESULTS The SMR prior and post the neurofeedback training differed significantly solely for the RE patients for the frontal electrodes ($p = 0.04$), central ($p = 0.02$), occipital ($p = 0.01$). Specifically, the SMR of channel C3 greatly differed for the RE group ($p < 0.01$). CONCLUSIONS Our results showed that neurofeedback training may improve the regulation of SMR in RE patients. Therefore, this technique may be a valuable tool in the regulating the brain rhythms of patients with refractory epilepsy.

Palavras-chaves: Neurofeedback, Epilepsy, Sensoriomotor Rhythm
Agência Fomento:

21. História, Educação e Arte

21.001 - OS NEURÔNIOS NA PONTA DO LÁPIS: A CONSTRUÇÃO DO CONHECIMENTO PELO FAZER DISCENTE

THE NEURONS ON THE TIP OF A PENCIL: THE CONSTRUCTION OF KNOWLEDGE BY STUDENTS

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Introdução:

The active methodologies support the teaching and learning approach by allowing the students to be an active element in the construction of their own knowledge. These processes are of great importance in the certain disciplines with a higher level of complexity such as human morphology, which presents an endless number of terms and structures to be memorized. The use of coloring illustrations enables the students to mentally construct the object of study. The painting used as method is both didactic and fun, that involves our emotions, which turns on memorization more efficient.

Objetivos:

The aim of this work was to evaluate the use of coloring illustrations with predetermined colors in the

study of the nervous tissue and analyze if realization of pleasure activities turns teaching-learning process more efficient.
Métodos:
Activities with illustrations of the nervous tissue were applied to 49 students enrolled in the disciplines as histology and neuroanatomy of the undergraduate courses at the UESB. These illustrations were produced in such a way to clarify the understanding of the studied structures, considering form, position and their interrelationships. The colors that were to be used for each cell type were indicated in the activities script. A questionnaire was applied afterward to the students to evaluate the activity. There was no indication from the UESB research committee for the work to be submitted to the ethics committee. This is because the illustrations were proposed as part of the activities of the mentioned disciplines.
Resultados e Conclusões:
The results showed that 86% of the activities were successfully completed and 90% of the students who fulfiled considered the accomplishment of the work was pleasurable. The use of pre-defined colors to paint the different elements of the nervous tissue was pointed out by 100% of students as being more efficient for learning than the random choice of colors by the students their self and 96% affirmed that the activity contributed to a greater understanding of the content studied. All recommended that the exercise should be applied in the next semesters. Interactive methodologies such as coloring illustrations are of great importance in the teaching and learning of human morphology. Therefore, it is important that student perform activities that stimulate pleasure, this will motivate him to study this science, considered difficult to learn by its large number of structures and terminologies. The fact that these activities present a color orientation to be followed was fundamental for the success of the work, in this way we prevented that painting was performed at random. Base in the questionnaire according to them: "... a conversation between the theoretical and the practical is good for clarifying doubts and fixing the content". We can infer that being an agent of one's own knowledge is fundamental to efficient learning. This work was not designated by the UESB research committee for submission to the ethics committee.
Palavras-chaves: Active methodologies, Nervous tissue, Morphology, Coloring illustrations, Teaching and learning
Agência Fomento: UESB

21.002 - "KNOWING THE BRAIN": POPULARIZING NEUROSCIENCE FOR CHILDREN THROUGH DIDACTIC MODELS AND PLAYFULNESS

"KNOWING THE BRAIN": POPULARIZING NEUROSCIENCE FOR CHILDREN THROUGH DIDACTIC MODELS AND PLAYFULNESS
Autores: Pollyanna Ferreira de Moura 1, Millena Lana Correia de Carvalho 1,1, Ingrid Luiz 1, Larissa Zeggio Perez Figueredo 3, Orlando Francisco Amodeo Bueno 2, Roberta Ekuni de Souza 1
Instituição: 1 UENP - Universidade Estadual do Norte do Paraná (s/n Rodovia BR - 369, Bandeirantes - PR, 86360-000), 2 UNIFESP - Universidade Federal de São Paulo (R. Sena Madureira, 1500 - Vila Clementino, São Paulo - SP, 04021-001), 3 IBIES - Instituto Brasileiro de Inteligência Emocional e Social (R. Santa Maria, 491 - Parque São Jorge, São Paulo - SP, 03085-000)
Introdução:
Teaching neuroscience to kids is a challenge. The apprenticeship in a non-formal environment combined with creation/use of ludic teaching material can contribute to neuroscientific disclosure. Thus, the Extention Program Group of Studies in Neuroscience (GEN), used the children's book "Caçadores de Neuromitos KIDS: em busca da verdade sobre o cérebro" as a guiding material to organize an action of scientific dissemination for children.
Objetivos:
Use ready-made and constructed didactic models to teach neuroscience in an action of scientific divulgation for children.
Métodos:
During the free event, "Konowing the brain 2018: reducing social inequalities", two stands presented neuroanatomic activities: I) Learn Neuroanatomy: Real anatomic parts (brain and skull, provided by the UENP's laboratory) and a didactic anatomical model of the brain (3B Scientific) were used to explain the lobes and meninges. II) Teaching Neuroscience with artistic practices: Three didactic models of glial cells (astrocyte, oligodendrocyte and microglia), a didactic brain model in biscuit with tissue-made meninges and a puzzle of brain lobes (manufacturing manual available free of charges in e-book) were used to explain about the Nervous System. Evaluation of the experience by the children was performed with a likert scale with emoticons (hated, disliked, indifferent, liked, really enjoyed).
Resultados e Conclusões:

570 people signed the guestbook, of these, 210 visited the neuroanatomy stand. On this stand, 98,09% marked “Really Enjoyed”, 1,43% “Liked” and 0,48% “Indifferent”. The artistic stand received 165 visitors who completed the evaluation (93,33% “Really Enjoyed”, 5,45% “Liked” and 1,21% “Indifferent”). The options “disliked” and “hated” were not marked in any of the stands. It was observed that the children asked questions about the brain, smiled while interacting with the glia models, as well as with the other didactic materials used. The use of didactic models, anatomical or constructed through artistic practices, aid in the explanation of complex concepts for children. Visitors could touch them and visualize the anatomy in 3D, rather than viewing 2D figures as generally presented in textbooks in the classroom. In addition, the playfulness of the activities fostered pleasant experiences for learning. In general, all practices contributed to the neuroscientific dissemination to children. Ethical Approval not informed: The event was a learning-service which aims teaching outcomes (See RESOLUTION 510/2016 from CNS).

Palavras-chaves: Artistic practice, Education, Scientific disclosure, Teaching
Agência Fomento: Fundação Araucária - Bolsista PIBIS

21.003 - A IMPORTÂNCIA DA MONITORIA NO PROCESSO ENSINO-APRENDIZADO EM NEUROCIÊNCIAS.

THE IMPORTANCE OF MONITORIES IN THE NEUROSCIENCE TEACHING-LEARNING PROCESS.

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Instituição: 3 UFPA - Universidade Federal do Pará (Rua Augusto Corrêa, Nº 1, Belém, Pará)

Introdução:

Monitories constitutes an important tool for the acquisition of knowledge in teaching within the academic environment. This type of mutual learning between students is one of the practices offered to improve the use of theoretical and practical classes, where the monitor assists the student's communication with the teacher and thereby acquires knowledge and experience in the contents taught. During the II Paraense Neuroscience Olympics, organized and executed by the Academic League of Neuroscience and Behavior (LANeC), It was sought to promote monitoring activities performed by undergraduate and graduate students as the main teaching apparatus for elementary and high school students who participated of the competition. The monitoring occurred in February, at the Institute of Biological Sciences of the Federal University of Pará (ICB - UFPa) for 2 weeks, and the classes were taught based on the materials developed by the monitors themselves and reviewed by PhD professors in the area of Neuroscience and Cell biology.

Objetivos:

The aim of this work is to report the contribution and challenges of the exercise of monitoring in the professional performance of the course monitors.

Métodos:

The monitoring was carried out in three phases: preparation of materials, theory classes and practical classes. The contents taught during the classes were Cellular Biology, Neurochemistry, Anatomy, Histology, Physiology and Clinic, with up to 2 monitors per subject. All the monitors presented a preview of the classes to postgraduate students with didactic experience, which discussed the best ways to teach the contents and relate them to each other throughout the course.

Resultados e Conclusões:

The main difficulty encountered in the monitoring phases was communication with the enrolled student, since neurosciences are hardly worked in schools in the region and there is no prior knowledge base of this student, especially those coming from public schools. The short time of 2 weeks of course was also an obstacle, making it difficult to consolidate the contents taught. Because of this, the monitors sought to improve didactics, rhetoric, organization, and use alternative methodologies such as the telencephalon workshop, held at the Anatomy Laboratory of ICB - UFPa, in which students were able to gain practical knowledge about neuroanatomy. In this sense, the relevance of the monitoring in the undergraduate is notorious since the students acquire not only a thorough knowledge in the taught subjects, but also a greater experience regarding the difficulties of the teaching-learning process, which often requires the use of alternative methodologies to be consolidated.

Palavras-chaves: Educação, Neurociências, Monitoria
Agência Fomento:

23. Neurobiologia do Estresse

23.001 - EFEITO PROTETOR DO α-TOCOFEROL NO COMPORTAMENTO TIPO-ANSIEDADE E DANO OXIDATIVO INDUZIDO POR ESTRESSE AGUDO DE CONTENÇÃO EM Danio rerio (ZEBRAFISH).

THE PROTECTIVE EFFECT OF α –TOCOPHEROL IN ANXIETY-LIKE BEHAVIOR AND OXIDATIVE INJURY INDUCED BY ACUTE RESTRAINT STRESS IN Danio rerio (ZEBRAFISH).

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Instituição: 1 UFPA - Federal University of Pará (R. Augusto Corrêa, 1 - Guamá, Belém - PA, 66075-110), 2 UDE - University of Duisburg-Essen (Forsthausweg 2, 47057 Duisburg, Germany), 3 NMT - Tropical Medicine Center (Avenida Generalíssimo Deodoro, 92, Umarizal), 4 UM - University of Michigan (500 S State St, Ann Arbor, MI 48109, EUA)

Introdução:

The α-tocopherol is a substance with potent antioxidant action with the ability to neutralize free radicals in non-enzymatic form. Many articles in the literature show the protective effects of this molecule against some pathological manifestations, including behavioral disorder such as anxiety. The complete neural mechanism behind this remains unknown, but it is recognized that among the several alterations present, there is a considerable increase of free radicals in the brains of the animals, which shows signs related to anxiety. However, little is known about how oxidative stress participates in the modulation of this behavior.

Objetivos:

Hence, the aim of this work is to evaluate whether the pretreatment with α-tocopherol is able to avoid the behavioral and biochemical changes induced by the acute restraint stress (ARS) in Danio rerio (zebrafish).

Métodos:

For this, 32 adult animals of the short fin line were randomly assigned to control group (CRTL and ARS control) and α-tocopherol group (TOC, 2 mg / kg and TOC, 2 mg / kg + ARS). The ARS protocol consists of allocating the animals individually in 2 ml microtubes for 90 minutes, limiting their locomotion. Drugs were previously administered intraperitoneally. These procedures were followed by the vertical distribution test elicited by the novelty, where the behavior of the animals was evaluated through the following parameters: Time on top (TT), locomotion (LC), erratic swimming (ES) and freezing (FR). Animals were then decapitated after cryoanesthesia and their brains were dissected and processed for the biochemical analysis of lipid peroxidation levels, proposed by Esterbauer and Cheesseman in 1990. A one-way ANOVA was used and the data were expressed as mean ± standard deviation. The whole experiment was carried out according to the Ethics Committee of the Federal University of Pará (CEPAE 213-14).

Resultados e Conclusões:

Our results demonstrated that ARS induced the anxiogenic effect based on all behavioral parameters: TT ($p < 0.05$; 61.7 ± 28 Control vs. 4.9 ± 2 ARS), ES ($p < 0.01$, 1 ± 1 Control vs. 7.6 ± 4 ARS), FR ($p < 0.01$, 1.8 ± 1 Control vs. 21.6 ± 8 ARS), as well as induced increase in lipid peroxidation levels in the brains of these animals ($p < 0.01$, 100 ± 46 Control vs. 235 ± 10). This effect was prevented by pretreatment with α-tocopherol ($p < 0.01$, 235 ± 42 ARS vs. 131 ± 19 TOC + ARS), which also decreased the behavioral changes: TT ($p < 0.05$, 4.9 ± 2 ARS vs. 54.3 ± 45 TOC + ARS), ES ($p < 0,01$; 7,6 ± 4 ARS vs. 2 ± 2 TOC+ARS) e FR ($p < 0,01$; 21,6 ± 8 ARS vs. 3,6 ± 4 TOC+ARS). Therefore, we conclude that α-tocopherol pretreatment prevents anxiety-like behavior, as well as oxidative stress, induced by ARS in zebrafish.

Palavras-chaves: α-tocopherol, Anxiety, Oxidative Stress, Zebrafish

Agência Fomento: CNPq

23.002 - Cafeina induz comportamento tipo-ansiedade e estresse oxidativo no cérebro de Zebrafish

Caffeine induces anxiety-like behavior and oxidative stress in Zebrafish brain.

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Universidade Federal do Oeste do Pará (Santarém, Pará, Brasil), 4 ICS-UFPA - Instituto de Ciências da Saúde (Belém, Pará, Brasil), 5 NTPC - UFPA - Núcleo de Teoria e Pesquisa do Comportamento (Belém, Pará, Brasil), 6 NMT - UFPA - Núcleo de Medicina Tropical (Belém, Pará, Brasil)

Introdução:
Caffeine is a psychoactive drug widely consumed around the world. Although its large consumption, high caffeine intake is associated with anxiety disorder and hyperactivity, but its neurochemical mechanism remain unclear. Furthermore, zebrafish has emerged as a model for studying anxiety-like behavior, due to its neurotransmitter systems and genetic homology to humans.
Objetivos:
The purpose of this work consists in evaluate the behavioral and neurochemical alterations induced by high caffeine intake.
Métodos:
Animals were treated with caffeine (100mg/kg), and divided in subgroups: control (CTRL) and caffeine group (CAFF) After drug treatment, animals were submitted to Light-dark preference test (LDP) to assess behavioral analysis. The parameters evaluated were: time spent on white compartment, thigmotaxis, erratic swimming, risk assessment, entries in white compartment, latency to white and squares crossed. After behavioral assessment, the animals were cryoanesthetized and subsequently sacrificed for doing MDA essay, in order to assess oxidative stress. One-way ANOVA followed by Tukey post-hoc test was performed for differences among the averages. The data were expressed as mean ± standard error. Experimental procedures have been done according protocol number 213-14 CEPAE, UFPA.
Resultados e Conclusões:
Our results showed anxiogenic effect induced by high caffeine intake in LDP test, by decreasing the animal's time spent in white compartment (62.24±11.71% CTRL vs 9.42 ±2.50% CAFF, $p < 0.01$), and by increasing its frequency of erratic swimming (2.43±0.26 CTRL vs 9±2.34 CAFF, $p < 0.05$). Otherwise, caffeine rises the latency in the white side of apparatus (70.14±8.75s CTRL vs 145±23.7s CAFF, $p < 0.05$), besides hiking thigmotaxis when compared to control (0 CTRL vs 4.8±0.2 CAFF). There were no differences in the others parameters. In accordance to LDP test, our biochemical essay demonstrates that caffeine intake is associated with increased MDA levels in zebrafish brain (100 ±8% CTRL vs 154 ±20% CAFF). Therefore, our data show that caffeine evokes anxiety-like behavior and oxidative stress in zebrafish brain.
Palavras-chaves: Anxiety-like behavior, Oxidative Stress, Caffeine
Agência Fomento: CNPq e CAPES Pro-Amazônia

23.003 - RETIRADA DE UMA DIETA COM ALTO TEOR DE AÇÚCAR E GORDURA AUMENTA A NEUROINFLAMAÇÃO E INDUZ COMPORTAMENTO TIPO ANSIOSO

WITHDRAWAL FROM A HIGH-SUGAR AND HIGH-FAT DIET UPREGULATES NEUROINFLAMMATION AND INDUCES ANXIETY-LIKE BEHAVIOR

Autores: Breno Picin Casagrande 1, Amanda Maria de Macêdo 1, Aline Boveto Santamarina 1, Alessandra Mussi Ribeiro 1, Luciana Pellegrini Pisani 1, Debora Estadella 1
Instituição: 1 UNIFESP - Universidade Federal de São Paulo (Rua Silva Jardim, 136, Vila Matias, Santos-SP)
Introdução:
Throughout the last decades, the time-sensitive lifestyle, built on the needs of westernized society, brought with it a new dietary pattern. This westernized way of feeding – based on sugary and fatty products/foods – has been linked to several conditions, mainly by its relationship with increased inflammation. The nutritional approach indicated to western diet consuming population is the cessation of intake. Consuming and withdrawing from western-like diets were linked to an increase in anxiety-like behavior, but no relationship has been established with inflammation when withdrawing.
Objetivos:
To evaluate the effects of consuming and withdrawing from a high-sugar and high-fat diet on anxiety-like behavior and inflammatory status at the hippocampus, besides assessing a possible relation between factors.
Métodos:
Sixty-day-old male Wistar rats were fed standard (Ct, n=16) or a high-sugar-high-fat diet (n=32) for four weeks. After this period, animals consuming the modified diet were subdivided (Hd, n=16; Hw, n=16), and a cohort of those animals (Hw, n=16) was withdrawn from the high-sugar-high-fat diet and kept on the standard diet for 48h. At the end of the protocol, open field and elevated plus maze paradigms were performed. Hippocampal MyD-88 protein content was assessed by Western Blotting. Food intake was monitored every two days. Results are expressed as

means, it was reported the p-value for statistical significance ($p < 0.05$), and Hedges' g for effect size. The study was approved by UNIFESP Animal Ethics Committee under the number 4641210318.

Resultados e Conclusões:

In the Open Field, we observed decreased overall distance in the withdrawal group (Ct 10.31 vs. Hw 7.37, p=0.02, g=1.40), mainly in the peripheral zone (Ct 9.24 vs. Hw 6.41, p=0.003, g=1.61). In the Elevated Plus Maze we found for Hw compared to Ct and to Hd, decreased traveled distance (Ct 14.88 vs. Hw 10.80, p=0.008, g=1.22), traveled distance (Ct 3.73 vs. Hw 2.24, p=0.049, g=1.06; Hd 3.90 vs. Hw, 2.24 p=0.04, g=1.06) and time in open arms (Ct 83.83 vs. Hw 51.00, p=0.03, g=1.21; Hd 96.09 vs. Hw 51.00, p=0.003, g=1.49), and increased percentage of time immobile in closed arms (Ct 24.50 vs. Hw 45.76, p=0.002, g=-1.47; Hd 28.40 vs. Hw 45.76, p=0.02, g=-1.25). Even, there was an increase in caloric intake (Withdrawal 94.78 vs. no-withdrawal 84.23, p=0.03, g=-1.86), besides an increase in MyD-88 protein expression in hippocampus (Ct 100.00 vs. Hw 161.10, p=0.01, g=-1.69; Hd 84.84 vs. Hw 161.1, p=0.004, g=-2.71), which presented an overall negative correlation with the percentage of distance traveled in the central zone of the open field (p=0.03, r^2=0.73), and with the percentage of time spent in the open arms of the elevated plus maze (p=0.03, r^2=0.82). In summary, withdrawal, but not short-term intake, of a high-sugar and high-fat diet, causes an increase in anxiety-like behavior together with a pro-inflammatory regulation in the hippocampus. Moreover, it is important to note that both alterations may be related.

Palavras-chaves: Anxiety, Neuroinflammation, Withdrawal

Agência Fomento: CAPES e CNPq

23.004 - ATIVAÇÃO DO RECEPTOR CANABINOIDE CB1 PREVINE O COMPORTAMENTO TIPO ANSIEDADE, ESTRESSE OXIDATIVO E DIMINUIÇÃO DOS NÍVEIS DE GABA GERADOS PELO ESTRESSE AGUDO DE CONTENÇÃO.

ACTIVATION OF CANNABINOID CB1 RECEPTOR PREVENTS ANXIETY-LIKE BEHAVIOR, OXIDATIVE STRESS AND DECREASE IN GABA LEVELS EVOKED BY ACUTE RESTRAINT STRESS.

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Introdução:

Acute restraint stress (ARS) is know to induce oxidative stress and anxiety-like behavior in Danio rerio (zebrafish), which represents an animal model for behavior and neurochemical studying. The cannabinoid system has emerged as an important regulator of behavior as well as modulator of neurotransmitter levels in the synaptic cleft. GABA is a neurotransmitter involved in anxiety-like behavior; however, no studies have shown if CB1 activation prevents alterations caused by acute restraint stress in zebrafish.

Objetivos:

The aim of the present study was to evaluate whether changes evoked by acute restraint stress is prevented by activation of the CB1 receptor in zebrafish.

Métodos:

Animals were divided into the following groups: SHAM, VEHICLE; ACEA (CB1 agonist); ARS; ARS+ VEHICLE; ARS+ACEA. The ARS protocol places the animal in tubes for 90 minutes. The ACEA was administrated 30 minutes before the test or ARS. After, the novel tank diving task was performed and the following parameters were measured for behavioral analysis: time on top, squares crossed and erratic swimming. After that, the brains were dissected for lipid peroxidation assessment (LPO), non-protein thiols (NPSH) and quantification of GABA levels by high performance liquid chromatography in telencephalic and mesencephalic regions. Two-way ANOVA followed by Bonferroni post-hoc was performed for behavioral and biochemical analysis, whenever $p < 0.05$. All experiments were carried out according to the ethics committee of the Federal University of Pará (CEPAE 213-14).

Resultados e Conclusões:

Our data showed that ARS decreases time spent on top (135.8±21.8 control vs 72.1±20.7 ARS; $p < 0.05$) and increases erratic swimming (1.1±0.3 control vs 3.7±0.9 ARS; $p < 0.05$), which were blocked by CB1 activation (time on top: 72.1±20.7 ARS vs 245.6±27.6 ARS+ACEA, $p < 0.05$; erratic swimming: 3.7±0.9 ARS vs 0.2±0.2 ARS+ACEA, $p < 0.05$). No difference was seen in squares crossed for all groups (p=0.4974). Also, ARS

induces LPO (17.02±3.5 control vs 28.2±2.7 ARS; p < 0.05) and decreases the NPSH (9.4±3.0 control vs 5.5±2.0 ARS; p < 0.05), but only LPO is normal in the ARS+ACEA group (LPO: 28.2±2.7 ARS vs 15.5±3.8 ARS+ACEA, p < 0.05; NPSH: 5.5±2.0 ARS vs 8.0±1.6 ARS+ACEA, p=0.657). We also observed that GABA level, specifically in telencephalon area, is decreased in the ARS group (0.14±0.002 control vs 0.12±0.002 ARS), but not in ARS+ACEA group (0.12±0.002 ARS vs 0.15±0.004 ARS+ACEA). Taken together, our data suggests that the acute restraint stress induces anxiety-like behavior, increases oxidative stress and decreases GABA levels in the zebrafish brain, which are avoided when CB1 receptor is activated before the stress submission.

Palavras-chaves: ACUTE RESTRAINT STRESS, GABA, Zebrafish, HPLC, OXIDATIVE STRESS
Agência Fomento: CNPq/CAPES

23.005 - ESTRESSE CRÔNICO DE DERROTA SOCIAL PROMOVE DÉFICITS DE INTERAÇÃO SOCIAL E AUMENTO DA LIBERAÇÃO DE DOPAMINA NO NÚCLEO ACCUMBENS EM RESPOSTA À SACAROSE

CHRONIC SOCIAL DEFEAT STRESS PROMOTES SOCIAL INTERACTION DEFICITS AND INCREASED ACCUMBAL DOPAMINE RELEASE IN RESPONSE TO SUCROSE REINFORCEMENT

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Introdução:

Chronic stress is a primary factor that promotes persistent depressive symptoms in both humans and animal models. In rodents, exposure to chronic social defeat stress (CSDS) seems to promote depressive-like behavior, such as anhedonia and social deficits. CSDS also leads to functional changes in the dopaminergic mesolimbic pathway that underlie, at least partially, behavioral impairments.

Objetivos:

This study aimed to broaden the characterization of CSDS as a model of emotional and motivation impairment in mice. In addition, we investigated the effects of CSDS on accumbal dopamine release during a motivated behavior.

Métodos:

In Experiment 1, male C57BL/6J mice were exposed to a 10-day CSDS protocol, in which they were daily confronted by aggressive conspecifics, and then evaluated during operant responding for sucrose pellets on a progressive ratio schedule, social interaction, saccharin preference, sucrose splash and forced swim tests (control n=6; CSDS n=7). In addition, in Experiment 2, another cohort of mice was used to record accumbal dopamine release during operant responding for sucrose pellets on a progressive ratio schedule (control n=6, CSDS n=10) using fast scan cyclic voltammetry, a technique that provides high temporal resolution (Institutional Animal Care and Use Committee protocol #0617002). One-way ANOVA and two-way ANOVA for repeated measures were used to analyze data. When significant effects were detected by ANOVA, post hoc Newman Keuls tests were run. Significance level was set at p < 0.05. Data are presented as mean ± standard error of mean.

Resultados e Conclusões:

Mice exposed to CSDS spent less time (s) interacting with a social target relative to controls (control=74.04 ± 3.45, CSDS=44.22 ±11.73, F[1,10]=5.94, p=0.034) a social avoidance behavior that lasted 3 weeks after termination of defeats. However, CSDS did not promote alterations in achieved breakpoints (control=160.79 ± 29.14, CSDS=142.00 ± 37.63) or number of rewards (control=15.79 ± 1.10, CSDS=15.00 ± 1.08) during operant responding for sucrose pellets, preference (%) for a saccharin solution (control= 69.79 ± 9.86, CSDS=64.21 ± 11.60), grooming time (s) during a sucrose splash test (control=112.90 ± 8.68, CSDS=113.56 ± 11.48) and immobility time (s) during a forced swim test (control=193.24 ± 11.40, CSDS=184.18 ± 13.83). Interestingly, although CSDS did not alter sucrose reinforcement behavior, it increased dopamine concentration (nA) in response to sucrose pellets (control = -0.0047 ± 0.038, CSDS=0.22 ± 0.043, F[1,14]=7.94, p=0.013) during the progressive ratio sessions. Taken together, our results suggest that CSDS selectively promotes social interaction impairment despite not promoting alterations on hedonic, motivation, self-care or despair behaviors. Furthermore, CSDS seems to promote increased accumbal dopamine release in response to sucrose.

Palavras-chaves: dopamine, motivation, stress
Agência Fomento: CAPES/PDSE (Processo no. 88881.187105/2018-01); CNPq (Processo no. 141532/2016-5); NIH DA022340

23.006 - PARTICIPAÇÃO DOS GLICOCORTICOIDES NA INSTALAÇÃO DO COMPORTAMENTO TIPO DEPRESSIVO INDUZIDO POR ESTRESSE CRÔNICO PREVISÍVEL EM RATOS WISTAR.

ROLE OF GLUCOCORTICOIDS IN THE DEVELOPMENT OF DEPRESSIVE-LIKE BEHAVIOR INDUCED BY CHRONIC RESTRAINT STRESS IN WISTAR RATS.

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Introdução:
Depression is a chronic and debilitating disorder with an increasing incidence over the next years. The interaction of genetic, epigenetic, and environmental factors plays an important role in the development of this disease. Among these, stress represents the main environmental risk factor associated with the symptoms of depression.
Objetivos:
In this context, this study investigated the role of glucocorticoids in the effects induced by the chronic restraint stress model for 14 days in male Wistar rats.
Métodos:
Metyrapone (50mg/kg) – a corticosteroid synthesis inhibitor - was chronically administered to 40 male Wistar rats 30 minutes prior restraint to avoid the increase in circulating stress-induced glucocorticoid levels. The effects of the treatment were evaluated on the anhedonic behavior induced by stress, as well as on the expression of proteins related to the MAPKs signaling cascade (MAPKs/CREB/EGR-1) – which is activated by the glucocorticoid receptor (GR) – in brain areas related to control of HPA axis, such as the frontal cortex and hippocampus. Saline solution (0,9%) was administered to the control group 30 minutes prior to restraint. Control groups for both treatments were not exposed to chronic restraint stress, only to intraperitoneal drug/solution administration. The data are presented as the mean ± standard error (SEM). The statistical significance of differences between groups was analyzed with a two-way ANOVA followed by the Tukey HSD. The statistical significance level was set at $p < 0.05$. Ethics committee protocol number: 85/2016.
Resultados e Conclusões:
Our molecular findings indicated an increase in GR phosphorylation in the frontal cortex due to stress ($F(1,18) = 4,844$, $p = 0,0410$), which was not observed in the hippocampus ($F(1, 8) = 0,0262$, $p = 0,8754$). No changes were observed in GR translocation from cytoplasm to the nucleus in both brain regions ($p > 0.05$). Regarding the MAPKs signaling cascade, a decrease in ERK1/2 phosphorylation was observed in the frontal cortex due to stress ($F(1, 18) = 5,307$, $p = 0,0334$) and metyrapone treatment ($F(1, 18) = 6,765$, $p = 0,0181$); no differences were observed in the hippocampus ($p > 0.05$), possibly explaining the reduction in CREB-induced transcriptional activity, culminating in the absence of EGR-1 activation in those areas. Reduced activation of these brain regions could explain failures in the negative feedback control exerted over the HPA axis. Based on the behavioral analysis, metyrapone-treated animals showed the absence of anhedonic-like behavior after exposure to chronic stress ($p < 0.0001$, $F(1, 22) = 22,89$). Nevertheless, metyrapone treatment itself induced a depressive-like behavior ($p < 0.01$). In summary, chronic inhibition of corticosteroids peak in face of stressful events seems to exert a positive effect on behavior, inducing an antidepressive effect.
Palavras-chaves: Chronic stress, Depression, Frontal cortex, Glucocorticoids, Hippocampus
Agência Fomento: Capes, Fapesp, CNPq

23.007 - ARENA WITH LANES TO PREFERENCE TEST IN DROSOPHILA MELANOGASTER: PROPOSAL AND VALIDATION OF A BEHAVIORAL CATALOG

ARENA WITH LANES TO PREFERENCE TEST IN DROSOPHILA MELANOGASTER: PROPOSAL AND VALIDATION OF A BEHAVIORAL CATALOG

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Introdução:

Scientific community has been seeking to implement "3Rs" (reduction, refinement, replacement) in basic biomedical research. Our research group is developing behavioral tests in D. melanogaster to replace vertebrates in basic psychopharmacology. Present project aims to adapt to the flies the paradigm “sucrose preference with two bottles in 24 h” used to measure the effects of stress on appetitive drive of laboratory rodents. Due to the low intake of fluids intake in 24 h (nearly 1 microliter), sucrose intake in flies is an inaccessible information precluding the calculation of an index for preference.
Objetivos:
Thus, the aims in the present study were create, describe a behavioral test and validate a stable behavioral catalog to estimate sucrose preference in D. melanogaster.
Métodos:
Based on pilot trials, an apparatus named “arena with lanes” (AWL) was conceived and built. AWL contains ten parallel lanes separated by walls and covered with a transparent lid. Each lane has a capillary filled with water or sucrose 5% attached to the right or left (random) extremities. Adult flies (both sex, N=23) explored the lane freely for 60 min while videotaped with a webcam connected to a laptop for further analysis. Qualitative evaluation was performed to create the behavioral catalog. Number of videos displaying a given behavior (frequency) was used to calculate the intra-observer concordance indexes (Cohen’s Kappa, “agreement by chance” and “total frequency-based % agreement”, software Ethowatcher BetaOS48) between data of two registrations performed by the same observer 6-7 days apart.
Resultados e Conclusões:
AWL allowed to test up to ten individual flies in the same time. Qualitative examination of the videos provided sixteen mutually exclusive categories based on immobility, locomotion, movements of legs or wings in different sectors of the lane (wall, floor or capillary). The overall intra-observer concordances were (mean ± SEM): 87.75 ± 2.56 “total frequency-based % agreement”, 0.56±0.04 “agreement by chance” and 0.75±0.025 Cohen’s Kappa. Frequencies and concordances varied across categories. No index was calculated to null-frequency categories (“move legs” and “move wings”, on the capillary; “move legs”, “on the roof” or “on the floor”). Low-frequency categories (below 10) had concordances lower than 50%: “locomotion on the roof”: 13.3±5.7; “immobility on the roof”: 38.4±32. High-frequency categories (above 10) had concordances higher than 50%: “Immobility on the wall” (90±2.4%) or “on the floor” (84.4±4.5%) or “on the capillary"(67±7.8%); “locomotion on the wall” (77±2%) or “on the capillary“ (68±2.5%). AWL seem suitable for high throughput examination of behavior in flies. Although overall intra-observer agreement may be considered “substantial” low frequency categories brought uncertainty to the measures. Data suggest that quality of the videos and definitions of behavioral categories should be improved before being used to estimate sucrose preference in D. melanogaster.
Palavras-chaves: Invertebrates, Replacement, Sucrose preference
Agência Fomento: CNPq

23.008 - AVALIAÇÃO DO PAPEL DA CORTICOSTERONA NO EFEITO PRÓ-RESILIÊNCIA DA INOCULAÇÃO DE ESTRESSE EM CAMUNDONGOS

INVESTIGATION OF THE ROLE OF CORTICOSTERONE IN THE PRO-RESILIENCE EFFECT OF STRESS INOCULATION IN MICE

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Introdução:
Stress has a major role in the aetiology of psychiatric disorders, especially major depressive disorder. However, exposure to moderate amounts of stress, known as stress inoculation (SI), can actually promote resilience. SI might act upon the hypothalamic pituitary adrenal axis, modulating its response to future stressors.
Objetivos:
Therefore, the objective of this work was to evaluate the involvement of corticosterone in the pro-resilience effect generated by SI.
Métodos:
Adult male C57BL/6 mice were exposed for 15 min to an older, sexually experienced, male Swiss mouse every other day for 21 days (SI). In parallel, a group of animals received saline injections (IP) and another group was simply transported to the experimental room (T) to evaluate the effects of intraperitoneal injections and transportation. Controls (CON) were left undisturbed. After the stress inoculation period, mice were tested in the open field (OF), elevated plus maze (EPM) and forced swim test (FST). Trunk blood was

collected 30 min after FST for corticosterone dosage. Another cohort of mice was euthanized 20 min after the first inoculation session for corticosterone quantification. All animal procedures were approved by the Ethics Committee for Animal Use from UFPR (CEUA nº 1207).
Resultados e Conclusões:
Stress inoculation led to an increase in locomotion in the OF, with no effect of IP injections or transportation (F(3, 69)=5.7, p=0.0016; CON 15.6 ± 4.0; T 16.7 ± 5.2; IP 17.3 ± 4.2; SI 20.9 ± 3.17; unit is meters, mean ± SD, n=15-20/group). No differences between any of the groups were observed in % of time in the open arms in the EPM (H(3, N= 70)=6.8, p=0.08; n=15-19/group) nor in immobility time in the FST (F(3, 34)=0.9, p=0.4; n=8-10/group). Corticosterone was robustly increased following FST (F(1, 63)=214.1, p=0.0) and there was also an effect of group (F(3, 63)=4.0, p=0.01), but post-hoc comparisons pointed no differences between treatment groups within FST or control (CON-con 52.1 ± 26.1; T-con 30.2 ± 30.5; IP-con 15.3 ± 8.3; SI-con 13.6 ± 10.5; CON-FST 170.8 ± 58.2; T-FST 170.7 ± 40.7; IP-FST 150.1 ± 41.8; SI-FST 130.1 ± 42.8; unit is ng/ml, mean ± SD, n=7-10/group). Corticosterone was also increased following the first inoculation session and IP injection, but not after transportation (H(3,N= 35) =24.5, p=0.0; CON: 11.6, 4.4-13.5; T: 17.4, 11.9-20.3; IP: 53.1, 20.6-110.7; SI: 157.7, 107.4-181.5; unit is ng/ml, median and IQR, n=6-10/group). IP injections and transportation are not enough to alter locomotion in the OF, anxiety in the EPM and coping in the FST. Despite the increase in locomotion, SI did not reduce anxiety-like behaviour or altered coping in the FST, therefore, an inoculation protocol that induces changes in these parameters is still needed to study the role of corticosterone in SI. However, corticosterone was increased after inoculation, suggesting that its secretion alone is not sufficient to promote resilience.
Palavras-chaves: Coping, Depression, HPA axis, Resilience, Stress inoculation
Agência Fomento: CNPq - Conselho Nacional de Desenvolvimento Científico e Tecnológico

24. Dependência de Drogas

24.001 - AVALIAÇÃO DA ADMINISTRAÇÃO NÃO-PAREADA DE BACTÉRIAS DA ESPÉCIE LACTOBACILLUS PLANTARUM NA AQUISIÇÃO DA PREFERÊNCIA NO PROTOCOLO DE PREFERÊNCIA CONDICIONADA POR LUGAR INDUZIDA POR ETANOL EM CAMUNDONGOS.

EVALUATION OF UNPAIRED ADMINISTRATION OF BACTERIA OF THE SPECIES LACTOBACILLUS PLANTARUM IN THE ACQUISITION OF PREFERENCE IN THE ETHANOL-INDUCED CONDITIONED PLACE PREFERENCE PROTOCOL IN MICE.
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Introdução:
Recent studies have shown that the modulation of the microbiota is capable of influenciate the host's mental health. At the same time, previous data have shown that L. plantarum 286 (Lp286) and L. plantarum 81 (Lp81) strains, extracted from the fermentation of cocoa (Theobroma cacao) and cupuaçu (Theobroma grandiflorum) respectively, are potentially probiotic.
Objetivos:
Thus, this study aims to verify the influence of administration of L. plantarum bacteria in the acquisition of preference in the ethanol-induced Conditioned Place Preference (CPP) protocol in Swiss mice.
Métodos:
For this, 3 groups of animals (N=8) were treated in the afternoon (16-17h) with vehicle (0.1 mL of 0.85% saline + 15% skim milk) or vehicle + 10e9UFC Lp286 or vehicle + 10e9UFC Lp81 (gavage). The animals were then submitted to the CPP protocol induced by 1.0g/kg of ethanol (gavage) in the morning (8-10h). Thus, all animals were pre-conditioned (1 day), conditioned with saline in the non-drug compartment (even days) and with ethanol in the drug compartment (odd days) for 8 days. In the next day, the animals were submitted to the post-conditioning test: in absence of the drug, they had free access to the compartments previously conditioned to the drug or saline. The tests were filmed and analyzed with the Anymaze® software. This study was approved by the Institutional Animal Care and Use Committee of UESC (protocol #012/2017).
Resultados e Conclusões:

Regarding the analysis of the Compartment Time of Permanence (CTP) parameter, the two-way ANOVA indicated interaction between the Treatment and Phases (pre and post conditioning) factors [F(2,21)=4.874; p=0.0182]. The Bonferroni test indicated difference between the Phases for the vehicle group (p=0.0004) and Lp286 (p=0.0084), but not for the Lp81 group. In the analysis of the post-conditioning phase the Bonferroni test indicated difference in the CTP of the vehicle and Lp81 groups (p=0.0100). Regarding the analysis for the Number of Entries in Compartments (NCE) and Distance Traveled in Compartments (DTC), the two-way ANOVA indicates difference only in the Phase factor for NCE [F(1,21)=6.597; p=0.0179] and for DTC [F(1,21)=16.22; p=0.0006]. The Bonferroni test indicated difference between the phases only in the vehicle group for NCE (p=0.0125) and DTC (p=0.0166). In the analysis of the post-conditioning phase the Bonferroni test indicated difference only between the vehicle and Lp81 groups for the NCE parameter (p=0.0125). Our data suggest that treatment with the Lp81 strain was useful to prevent impulse search by the compartment associated with the use of ethanol resulting in the absence of the ethanol-induced CPP in the tested conditions. Therefore, additional studies are valid to confirm the protective effect of this strain of Lactobacillus. In addition, our results may be opening up ideas for therapeutic strategies against alcoholism involving modulation of the microbiota.

Palavras-chaves: Probiotics, Conditioned Place Preference, Ethanol, Lactobacillus plantarum
Agência Fomento: FAPESB; CAPES; CNPQ

24.002 - AYAHUASCA PREVENTS THE EXPRESSION OF COCAINE-INDUCED BEHAVIORAL SENSITIZATION IN C57BL/6 MICE

AYAHUASCA PREVENTS THE EXPRESSION OF COCAINE-INDUCED BEHAVIORAL SENSITIZATION IN C57BL/6 MICE

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Introdução:
Considered the second most used illicit drug in Brazil, cocaine is a substance with psychostimulant properties that induces robust neuroplastic changes, that may lead to addiction. Currently, there are some harm reduction measures aimed at preventing relapse and reducing comorbidities. In this context, research with psychedelics resurfaces with a new focus: treatment of drug addiction, since they don't induce addiction and have a higher safety profile of use when compared to other drugs. Used in religious contexts such as Santo Daime, ayahuasca (AYA), which the main active principle is dimethyltryptamine (DMT), has been investigated as a proposal of alternative treatment to cocaine addiction.
Objetivos:
To evaluate if AYA can prevent the expression of cocaine-induced locomotor sensitization (BS).
Métodos:
Six-week-old C57Bl/6 mice were habituated in the open field (OF) for 3 consecutive days after administration of saline 0,9% i.p. Next day, the BS induced by cocaine protocol was started, in which animals received, for 5 alternate days, cocaine 10 mg/kg or saline 0,9% i.p. and were directly submitted to a 30 min evaluation of the locomotor activity in the OF. After BS protocol, mice received, during 8 consecutive days, water or AYA (3 or 15 mg of DMT/kg) v.o. and after 30 min of the administration they were placed in the OF for 30 min. A challenge with saline was performed 24h later and, one day after, it was made a cocaine challenge, always placing the animal in the OF for 30 min. At the end of the protocol, the animals were euthanized (CEUA/FCF 33.2016-P518).
Resultados e Conclusões:
Acquisition of BS was perceived on the second cocaine administration day, since the locomotor activity of the animals was significantly higher when compared to the previous day (****$p < 0,0001$). Ayahuasca at the dose of 15 mg DMT/kg (but not 3 mg DMT/kg) was able to prevent the expression of cocaine-induced BS when the animals were challenged with cocaine when compared to group challenged with saline (**$p < 0,01$). Our study showed that 8 days of treatment with AYA (15mg of DMT/kg) prevented the expression of cocaine-induced behavioral sensitization, being an interesting alternative for the clinical application as a therapeutic strategy for cocaine addiction.

Palavras-chaves: alucinógenos, dependência, DMT

Agência Fomento: FAPESP, Senad

24.003 - DETERMINATION OF FETAL ALCOHOL EXPOSURE THROUGH BIOMARKERS FAEES IN MECONIUM- SYSTEMATIC REVIEW

DETERMINATION OF FETAL ALCOHOL EXPOSURE THROUGH BIOMARKERS FAEES IN MECONIUM- SYSTEMATIC REVIEW

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Introdução:

Introduction: Alcohol consumption by pregnant women, which leads to prenatal alcohol exposure to the fetus, is the main factor for the occurrence of neurodevelopmental disorders related to prenatal exposure to alcohol. In Brazil, it is estimated that the prevalence rate of any alcohol consumption during pregnancy is around 50%. Alcohol is a known teratogen with evidence that its consumption during pregnancy is associated with risk and injury to the fetus, including restriction of intrauterine growth, low birth weight and congenital malformations. For the newborn, the verification of maternal alcohol consumption in gestation through objective means of measurement, by the measurement of biomarkers of alcohol consumption, may help in the diagnosis and the introduction of early interventions. The main biomarkers for gestational alcohol consumption measurable in meconium of the newborn are the fatty acid ethyl esters (FAEEs). To the best of our knowledge, there are no Brazilian studies about or systematic reviews of the most commonly used extraction, detection and measurement techniques and the measurements of FAEEs in meconium, as well as about the reliability of cut-off values of FAEEs in meconium in relation to its use as biomarker of the risk of maternal consumption of alcohol during pregnancy.

Objetivos:

Objective: In the present study, we attempted to fill in some of these gaps, seeking to identify the evidence in the literature about methods of quantification, extraction and cutoff points of FAEEs biomarkers present in the biological matrix of meconium most commonly used to identify prenatal exposure to alcohol.

Métodos:

Methods: The study design consisted of a systematic review of three databases, using the search expression “ethyl esters of fatty acids in meconium”. The articles published until July 2018 were selected.

Resultados e Conclusões:

Results: Among the 201 references found, 27 articles fulfilled the inclusion criteria, extracting data from selected articles, such as: quantification methods, extraction, analyzed biomarkers, cut points, internal standard and quantity of meconium. Conclusion: The most commonly used quantification methods in the literature are: GC-MS; LC-MS; followed by extraction methods LLE-SPE; HS-SPME. The biomarkers found in higher concentrations of FAEEs in meconium were: Linoleate, Palmitate ,Stearate and Oleate. Regarding the cutoff determination, there is a considerable variation in the concentration of FAEEs used to determine positive cases of fetal alcohol exposure. It is important to use a limit of 600 ng/g for the supposition of excessive alcohol consumption in pregnancy. This study reinforces the importance of using laboratory methods to identify fetal alcohol exposure in relation to questionnaires already used in the clinic.

Palavras-chaves: Alcohol, Biomarkers, FAEEs, Meconium
Agência Fomento: CAPES

24.004 - EFEITOS DO EXERCÍCIO FÍSICO SOBRE FUNÇÕES COGNITIVAS EM INDIVÍDUOS DEPENDENTES DE ÁLCOOL E OUTRAS DROGAS ASSOCIADAS

EFFECTS OF PHYSICAL EXERCISE ON COGNITIVE FUNCTIONS IN INDIVIDUALS DEPENDENT ON ALCOHOL AND OTHER ASSOCIATED DRUGS

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Instituição: 1 UNIFESP - Universidade Federal de São Paulo (Rua Sena Madureira, 1.500 -CEP 04021-001 Vila Clementino - São Paulo)

Introdução:

The dysfunctions caused by alcohol and other drugs involve morphofunctional changes in the central nervous system associated with cognitive deficits. On the other hand, it has been shown that the beneficial effects of physical exercise on cognitive function are related to the biochemical changes involved in the release of neurotransmitters and neural factors, such as Brain Derived Neurotrophic Factor (BDNF) and others.

Objetivos:
To evaluate the effects promoted on cognitive function in response to an exercise protocol applied to individuals dependent on alcohol and other associated drugs.
Métodos:
Approved by the Research Ethics Committee of UNIFESP (CEP 0194/2016), this study is composed of 4 groups with 30 sedentary participants in each, being G1 = non-dependent control group that will be submitted to the intervention with social table games; G2 = non-dependent subjects who will be submitted to a protocol of aerobic physical exercises; G3 = control group dependent on alcohol and other drugs that will be submitted to intervention with social table games; and G4 = with dependence on alcohol and other drugs and who will be submitted to a protocol of aerobic physical exercises. Both interventions have duration of 5 weeks (3x per week) and the instruments of analysis will be: Borg scale for the monitoring and perception of effort threshold; Physical Activity Readiness Questionnaire-PAR-Q to identify possible risks in the practice of physical exercises; International Physical Activity Questionnaire-IPAQ that estimates the weekly time spent by the individual in daily physical activities; 6-minute walk test to assess functional capacity; Alcohol Smoking and Substance Involvement Screening Test- ASSIST to assess the pattern of drug abuse; State-Trait Anxiety Inventory -IDATE to assess anxiety; Beck Depression Inventory-BDI to measure depression; Rey Auditory Verbal Learning Test-RAVLT to evaluate functions of short-term verbal auditory memory, learning index, memory and information retention; Stroop test to evaluate mental flexibility, working memory, information processing speed, semantic activation and the ability to resist a characteristic response, and the Brunel Humor Scale to assess mood states. The blood levels of BDNF and dopamine will be analyzed through the Elisa test.
Resultados e Conclusões:
The study is currently in the data collection period, so only preliminary results are listed. Group G2(29 participants currently)had improved vigor (p=0.00; EPMD =0.702),short-term memory and learning (p=0.00/EPMD =2.305;p=0.01/EPMD =0.588), performance on mental flexibility (p=0.05/EPMD= 3.151) and reduction of fatigue and confusion(p=0.00; EPDM=0,645/P= 0.05 /EPMD=0,814),depression (p=0,04/EPMD=2,664)and anxiety(p=0,05/EPMD=2,351).Preliminary results indicate that until the present moment of data collection and analysis, the exercise protocol proposed here for a period of 5 weeks showed an effect. positive in improving cognitive and emotional skills in people with alcohol and other drug use disorders.
Palavras-chaves: alcoolismo, exercício físico, capacidades cognitivas, neuroplasticidade
Agência Fomento: CAPES

24.005 - AVALIAÇÃO DA PROGESTERONA SOBRE O EFEITO PSICOESTIMULANTE DA ANFETAMINA NO COMPORTAMENTO DE RATOS WISTAR MACHOS.

EVALUATION OF PROGESTERONE ON PSYCHOSTIMULANT EFFECT OF AMPHETAMINE ON THE BEHAVIOR OF MALE WISTAR RATS.

Autores: Letícia Trein Medeiros 1, Roberto Andreatini 1
Instituição: 1 UFPR - Universidade Federal do Paraná (Av. Cel. Francisco H. dos Santos, 100 - Curitiba, PR)
Introdução:
Drug abuse is a big concern nowadays, leading to population health, criminal rates, public safety and economic problems. According to the UN issued report, in 2017, it is estimated that about 5% of the world's adult population made or makes use of some illicit drug for recreational purposes. Of these, about 30 million users are classified as being dependant. Amphetamine-type stimulants are the second most used type of drug. They have a high potential to become addictive, due to their capacity of them to increase dopaminergic release on reward pathway. Drug dependence is a difficult disease to treat. There are few options, and most of them are not effective for all types of drugs. Dopamine is a neurotransmitter involved in drug abuse. Recently, it was found that ovarian hormones influences on the release of monoamines, which includes dopamine. Progesterone has been used in some clinical and preclinical studies as a potential drug to the treatment of drug abuse disorder, but results are controvertial due to incongruent findings.
Objetivos:
In this context, this study aims to understand the role of acutely administrated progestone in the behavior of amphetamine psychostimulated animals.
Métodos:
Male wistar rats (n = 10 per treatment) were used to evaluate the following parameters: (a) locomotion, (b) rearing, (c) emission of 50-kHz ultrasonic vocalizations (USVs), (d) potential stereotyped behaviors of the animals psychostimulated by amphetamine (2.5 mg/ kg) and (e) reduction or reversion of increase in these

parameters on the presence of progesterone (15 and 30 mg/ kg). All experiments were analyzed by two factor ANOVA.
Resultados e Conclusões:
Results indicate that amphetamine alone increased locomotion and emission of 50-kHz USVs ($p > 0.05$ for all parameters comparing to control). Progesterone, on the highest dose treatment, did not show a significant reduction to these increased behavior. Rearing and stereotyped behaviors are still being evaluated. Treatment with both amphetamine and progesterone showed no significant correlaction for locomotion ($p=0.23$) and USVs emission ($p=0.31$). Progesterone did not show influence on the behavior of psychostimulated animals by amphetamine, and is possibly not reducing the release of monoamines enough to reflect the behavior of these animals.
Palavras-chaves: Anfetamina, Drogas de Abuso, Progesterona, Psicoestimulante, Vocalizações Ultrassônicas
Agência Fomento: CNPq

24.006 - HIGH ETHANOL CONSUMPTION IS RELATED TO ELEVATED BLOOD PRESSURE IN FEMALES FROM SHR AND SLA16 RAT STRAINS

HIGH ETHANOL CONSUMPTION IS RELATED TO ELEVATED BLOOD PRESSURE IN FEMALES FROM SHR AND SLA16 RAT STRAINS
Autores: Pâmela Andressa Ramborger dos Anjos 1, Renata Cristina Nunes Marchette 1, Rafael Kremer 1, Thalita Mello Alves 1, Guilherme Pasetto Fadanni 1, Fernando Gabriel Mazur 1, Elaine Anton 1, José Eduardo da Silva Santos 1, Áurea Elizabeth Linder 1, Geison Souza Izídio 1
Instituição: 1 UFSC - Universidade Federal de Santa Catarina (R. Eng. Agronômico Andrei Cristian Ferreira, s/n - Trindade, Florianópolis - SC)
Introdução:
Although there is increasing evidence in humans and laboratory animals for sex differences based on the biology of ethanol consumption and health problems, current preclinical animal models are mostly male. About 2 billion people consume some type of alcoholic beverage and women have increased their consumption in both volume and frequency. High alcohol consumption causes health problems including increased risk of hypertension.
Objetivos:
Investigate the correlation of Spontaneous Ethanol Consumption (SEC) with blood pressure (BP) levels in female rats.
Métodos:
We submitted females from SHR (Spontaneously Hypertensive Rats) and SLA16 (SHR.LEW.Anxiety-related response 16) rat strains to the following experimental procedures: i) SEC during 10 days with 10% ethanol solution and subsequent BP measurement with invasive and non-invasive, tail-cuff, methods (n=20 rats/strain); and ii) Treatment for 12 days with losartan potassium (antihypertensive drug) and subsequent SEC and BP measurement (N=18 rats/strain). All procedures have complied with the animal care guidelines of the local Ethics Committee on the Use of Animals (Protocol #00903).
Resultados e Conclusões:
Procedure i) The unpaired T-test has shown a significant difference in ethanol, but not in water consumption. SEC was higher in the SHR than in the SLA16 strain [$T(18)=4.63$; $p=0.0002$]. There was no significant difference between the strains in the systolic BP [non-invasive method, $T(6)=1.93$; $p=0.10$], but the basal systolic BP was significantly lower in the SLA16 strain [invasive method, $T(10)=3.07$; $p=0.01$] without any change in the basal heart rate [$T(10)=0.06$, $p=0.95$]. Procedure ii) We have observed that the losartan treatment was effective in diminishing SEC only in SHR rats [interaction: $F(1,32)=3.94$; $p=0.05$]. Losartan treatment also reduced the systolic BP in both strains [treatment: $F(1,30)=37.52$; $p=0.0001$]. Conclusion: Female SHR rats consumed elevated amounts of ethanol and presented higher BP levels. This pattern diminished after treatment with losartan, indicating a correlation of the renin-angiotensin system with SEC. Considering these data, we suggest that females SHR are an excellent model for future studies regarding the biological bases of high ethanol consumption and their relationship with elevated BP.
Palavras-chaves: BLOOD PRESSURE , ETHANOL, RAT , SHR , SLA16
Agência Fomento:

Quarta-feira, 02 de outubro de 2019
16:30 às 18:00 - Sessão de Painéis II

01. Desenvolvimento do Sistema Nervoso & Distúrbios do Desenvolvimento

01.011 - NEONATAL ANOXIA CAUSES DECREASE IN THE NUMBER OF HIPPOCAMPAL PARVALBUMIN INTERNEURONS THAT CORRELATES WITH DEFICITS IN SPATIAL MEMORY IN JUVENILE RATS

NEONATAL ANOXIA CAUSES DECREASE IN THE NUMBER OF HIPPOCAMPAL PARVALBUMIN INTERNEURONS THAT CORRELATES WITH DEFICITS IN SPATIAL MEMORY IN JUVENILE RATS

Autores: Débora Sterzeck Cardoso 1, Juliane Midori Ikebara 1, Natália Myuki Moralles Dias 1, Silvia Honda Takada 1, Alexandre Hiroaki Kihara 1
Instituição: 1 UFABC - Universidade Federal do ABC (Alameda da Universidade, s/n, Bairro Anchieta, São Bernardo do Campo - SP)Introdução:
Neonatal anoxia (ANX) is an important public health concern worldwide, once it may lead to serious permanent sequels, as memory and learning deficits. Among the brain structures, the hippocampus, important to mnemonic processes, is one of the most sensitive areas to ANX and it is characterized by a prominent post-natal development, well-known morphology and neuronal circuits, conferring to this structure an important excitatory-inhibitory (EI) balance. Its cell variety is largely composed by interneurons, inhibitory cells that form local circuits. Parvalbumin-positive (PV+) interneurons, postnatal developed cell class, corroborate to hippocampal electrophysiological maturity by their well-defined fast-spiking electrophysiological signature. However, the impact of ANX in the EI balance and PV+ interneurons are not well known.
Objetivos:
We evaluated GABAergic hippocampal population, specifically PV+ interneurons, and related spatial memory deficits caused by neonatal ANX in juvenile rats, a critical period in PV+ interneurons development and hippocampal maturity.
Métodos:
P1-P2 neonate Wistar male rats (Rattus novergicus) were maintained in a non-hermetic chamber for 25mins, at 37°C, saturated by 100% nitrogen gas (Takada et al., 2011); control (CTR) groups were exposed to room air. Immediately after stimulus, an adapted APGAR score (n=8) were applied to assess ANX effects on neonates. P30 rat brains (n=5) were processed to immunohistochemistry and hippocampal GAD67+ and PV+ cells were count using stereology. GAD67 and SynII protein levels were measured by western blot (n=8). To Barnes maze test (n=8), P32 – P44 rats were trained then tested. CEUA 176816116.
Resultados e Conclusões:
APGAR score of CTR group was scored as generally normal in both first and fifth minutes after stimulus (8±0, both). Otherwise, ANX group presented severe impairments, and were scored as a critically low status in both first (0±0) and fifth (1.88±0.3) minutes after ANX. Protein levels of GAD67 (P=0.204) and Syn II (P=0.732), revealed no differences, as estimated GAD67+ number of cells (P=0.086). ANX estimated PV+ cells number decreased (CTR: 4691.24±356.06; ANX: 3265.37±318.47; P=0.007), specifically on CA3 (CTR: 5836.41±616.71; ANX: 3337.98±551.61; P=0.007). In Barnes Maze training, path length and latency differed within CTR and ANX (RM Two-way ANOVA, $F(3,42)=5.821$, $P=0.002$; $F(3,42)=9.692$, $P < 0.001$). While CTR latency decreased progressively over the trials and days of training, the same decrease was not observed in ANX, suggesting spatial memory impairments. In this way, we were able to show that PV+ cells population, which are fundamental to hippocampal activity and local rhythmicity, are altered at specific hippocampal regions by neonatal ANX. Together with the impairment in spatial memory in juvenile rats, these results might be due to maturation delay of the PV+ interneurons, reflecting in an EI misbalance. It can contribute to a better understanding of the pathophysiology of neonatal ANX sequelae.
Palavras-chaves: parvalbumin-positive, perinatal asphyxia, hippocampus, GABAergic system
Agência Fomento: FAPESP 2016/16892-6

01.012 - EXERCÍCIO ACROBÁTICO COMO ESTRATÉGIA DE APOIO PARA O TRATAMENTO DE DÉFICITS COGNITIVOS RELACIONADOS À HIPÓXIA-ISQUEMIA NEONATAL EM RATOS

ACROBATIC EXERCISE AS A SUPPORTING STRATEGY FOR THE TREATMENT OF COGNITIVE DEFICITS RELATED TO NEONATAL HYPOXIA-ISCHEMIA IN RATS

Autores: Wellington de Almeida 1, Heloísa Deola Confortim 1, Bruna Ferrary Deniz 1, Patrícia Maidana Miguel 1, Loise Peres Bronauth 1, Milene Cardoso Vieira 1, Adriana Souza dos Santos 1, Lenir Orlandi Pereira 1

Instituição: 1 UFRGS - Universidade Federal do Rio Grande do Sul (Av. Paulo Gama, 110 - Farroupilha, Porto Alegre - RS, 90040-060)Introdução:
Neonatal hypoxia-ischemia (HI) can lead to severe cognitive and motor dysfunction. Motor learning, which can be performed through acrobatic exercises (ACR), appears as a therapeutic option to manage the deficits caused by HI in humans. In preclinical studies ACR has been already used, however cognitive benefits have not yet been evaluated after this therapeutic modality.
Objetivos:
The aim of this study was to evaluate the effects of an ACR protocol on memory and hippocampal and striatal plasticity of male Wistar rats submitted to neonatal HI.
Métodos:
This study was approved by the Ethics Committee of the Universidade Federal do Rio Grande do Sul, Brazil (nº 29230). Seven days old pups were submitted to the Rice-Vannucci HI model and after weaning, they were separated into the following groups: control sedentary (CTSED); CT submitted to ACR (CTACR); HI sedentary (HISED) and HI submitted to ACR (HIACR). After five weeks of ACR protocol, the animals were evaluated on the novel-object recognition (NOR) and the Morris water maze tasks (WM) (N=11-14/group). After, the brains were collected for quantification of the synaptophysin and brain-derived neurotrophic factor (BDNF) levels on hippocampus and striatum (N=5-6/group).
Resultados e Conclusões:
In the acquisition phase of WM, it was observed effect on lesion ($F(1,47)=19.89$, $p < 0.05$), and day factors ($F(4,188)=36.85$, $p < 0.05$). In the probe trial, two-way ANOVA and Tukey's test demonstrated a lesion effect in the latency ($F(1,47)=5.98$, $p < 0.05$); HI groups took more time to achieve the platform area. In the WM working memory protocol there were significant differences in the escape latency for lesion, in the 3rd and 4th trials ($F(1, 47)=11.70$, $p < 0.05$ and $F(1, 47)=10.60$, $p < 0.05$, respectively); HI animals had higher latencies than CTs. These results demonstrate a memory impairment consequent to HI without recovery in trained animals. In the NOR, lesion ($F(1,47)=5.07$, $p < 0.05$) and training ($F(1,47)=5.06$, $p < 0.05$) effects were observed. HISED group had lower preference index (0.03 ± 0.09) when compared to CTSED (0.34 ± 0.05); CTACR (0.39 ± 0.10) and HIACR (0.34 ± 0.07) groups. HIACR group had similar preference index to controls, showing a recovery of object recognition memory. No differences in synaptophysin optical density quantification on hippocampus and striatum were found. The BDNF quantification evidenced difference only in the right hippocampus with training or lesion*training interaction effect ($F(1,17)=62.25$, $p < 0.05$). Thus, this study suggests that acrobatic exercise may be a supporting strategy for the treatment of HI-induced cognitive deficits, however more studies are needed to understand the possible mechanisms related to this beneficial effect.
Palavras-chaves: motor skill learning, neurodevelopment, physical exercise, Perinatal asphyxia
Agência Fomento: CAPES, CNPq

01.013 - ESTUDO DA NEUROINFLAMAÇÃO NA PREDISPOSIÇÃO A CONVULSÕES FEBRIS NA INFÂNCIA DE ROEDORES COM MICROGIRIA.

STUDY OF NEUROINFLAMATION IN PREDISPOSITION TO FEBRILE SEIZURES IN INFANCY OF RODENTS WITH MICROGYRIA.

Autores: Laura Maria Borges Savoldi 1, Luiza Dos Santos Heringer 1, Ana Maria Blanco Martinez 1, Henrique Rocha Mendonça 1,2
Instituição: 1 UFRJ - Universidade Federal do Rio de Janeiro (R. Prof. Rodolpho Paulo Rocco, 225 - Cidade Universitária, Rio de Janeiro- RJ), 2 UFRJ - Universidade Federal do Rio de Janeiro (Av. São José Barreto, 764 - São José do Barreto, Macaé - RJ)Introdução:
Cortical malformations, such as microgyria, generates hyperexcitable surrounding areas, leading to seizures. It has already been seen that inflammation is capable of producing plasticity in the Central Nervous System. It is believed that the plasticity that occurs after microgyria, making the neocortex hyperexcitable, may also depend on inflammation.
Objetivos:
Thus, our objective is to investigate whether neuroinflammation participates in the predisposition to febrile seizures in mice with microgyria.
Métodos:
Therefore, we induced microgyria by a transcranial lesion with a copper probe at -55 ° C in C57bl6 mice, anesthetized by hypothermia on postnatal day (PND) 0. In PND12, animals submitted (microgyria) or not (control) to the lesion were subjected to febrile seizure by exposure to dry air at 47-48 ° C. Latency to crisis was verified in minutes for seizures onset, and oral temperature at the time of seizure of both control and

microgyria groups were analyzed. After being anesthetized by ketamine and xilazine and perfused transcardially with 4% PFA, brains were haversted, cyosectioned and submitted to immunohistochemical analysis (IHC). The procedures were approved in the animal ethics committee with protocol MAC040. The statistical analysis were performed by Student's t-test. The results were considered significant when $p < 0.05$.
Resultados e Conclusões:
Our results show that the latency in minutes of the microgyria group was significantly lower (n = 12; 3.332 ± 0.1235) compared to the control group (n = 5; 4,324 ± 0.4942), but there was no difference in temperature (control n = 5; 39.42 ± 0.5722 and microgyria n = 12; 40.38 ± 0.2879). In the analysis of the inflammatory environment by Ly6-G IHC, the microgyria group presented a significant increase in the neutrophil count (n = 3, 27.33 ± 6.566) compared to the control (n = 4, 5,250 ± 1,887). In the F4 / 80 IHQ analysis, there was no difference between microglia/macrophage number the control (n = 4, 1279 ± 136.5) and microgyria (n = 4 2508 ± 506.2) groups. Arginase1 IHC, presented no significant difference between the control (n = 3, 1453 ± 67.82) and microgyria (n = 4, 2483 ± 479.1), whereas TNF-alpha staining revealed a significant increase in the group with microgyria (n = 3, 3004 ± 910.4) when compared to control group (n = 4, 895 ± 108.8), suggesting an increase in pro-inflammatory activity. Thus, we conclude that animals with microgyria convulse faster and at the same temperature compared to the control group, and that the increase of cells and inflammatory mediators may be responsible for an increase in neural plasticity in the cortex adjacent to the lesion, predisposing for seizures.
Palavras-chaves: FEBRILE SEIZURES, NEUROINFLAMATION, MICROGIRYA
Agência Fomento: CAPES

01.014 - MATERNAL MELATONIN AND THE PROGRAMMING OF THE BRAIN AND BEHAVIOR

MATERNAL MELATONIN AND THE PROGRAMMING OF THE BRAIN AND BEHAVIOR

Autores: Lívia Clemente Motta-Teixeira 1,2, Daniella S .Battagello 1, Sinésio Silva-Junior 1, Patricia R. L. Gomes 1, Eduardo A. Leite 1, Giovanne B. Diniz 1, Gilberto F. Xavier 1, Paul J. Lucassen J. Lucassen 2, Aniko Korosi 2, Russel J Reiter 3, Jackson C. Bittencourt 1, José Cipolla-Neto 1

Instituição: 1 USP - Universidade de São Paulo (Av. Prof. Lineu Prestes, 1524 - ICB1 Sala 118 Cidade Universitária, São Paulo), 2 UVA - Universiteit van Amsterdam (Science Park904 1098 XHAmsterdam), 3 UT HSC - University of Texas Health Science Center at San Antonio (7000 Fannin St #1200, Houston, TX 77030, EUA)Introdução:
Modern life involves several social situations as artificial light illumination at night and night/shift work that disrupt maternal circadian rhythms and/or reduce maternal melatonin (ME) and have been associated with an increased risk of cancer and metabolic disturbances. ME provides photoperiodic information to the fetus and thus influences the regulation and timing of the o ffspring's internal rhythms and preparation for extra-uterine development.
Objetivos:
To unveil the contribution of maternal melatonin during gestation on lactation on the programming of brain and behavior, we assessed the effects of the absence of maternal melatonin during gestation and lactation (MMD) and its therapeutic replacement on the offspring neurodevelopment and cognition.
Métodos:
Female Wistar rats were submitted to pinealectomy (PINX) or SHAM surgery (CTL).The PINX rats were divided into two groups and received either melatonin (PINX+MEL) or vehicle (PINX).After 4weeks,the rats were allowed to mate and received the treatment melatonin/vehicle until the end of lactation.Body weight,physical(pinna detachment,auditory conduit opening,eruption of the incisors,eye opening,sexual maturation)development and consolidation of reflex responses (palm grasp,righting,cliff avoidance,auditory startle response,free-fall righting and walking)of female and male offspring were determined during lactation.Spatial memory was tested on Morris Water maze(MWM) on day 61.On PND 90 body weight, fasting glycemia and glucose tolerance were measured and five days later an insulin tolerance test was performed.The effects of MMD on anxiety and recognition memory:elevated plus maze was performed on PND100, and after five days the same animals were tested for spatial object recognition (SOR) and novel object recognition (NOR).We also evaluated the effects of MMD on adult neurogenesis.
Resultados e Conclusões:
We demonstrated that MMD significantly delayed male o ffspring's physical development ($F(2,98) = 4.14, p \leq 0.01$)and the time of maturation of palmar grasp,righting reflex,free-fall righting and

walking(F(2,98) = 10.544, p ≤ 0.01).Female o ffspring was not affected. PINX-F1 males exhibits disrupted spatial memory in the MWM and decreased adult neurogenesis (F(2,54) = 7.40, p < 0.05) .On PND90,PINX-F1 had increased body weight,increased fasting glycemia,insulin resistance((F[2,23]= 12.76; p=0.01).These animals also exhibited object recognition impairments and increased anxiety-like behavior and mitochondrial alterations. Contrary, PINX+MEL-F1 exhibited increased neurogenesis, reduction of increased anxiety-like behaviorF[2,15]=5.47; p = 0.01) and improvements in spatial memory (F[2,15]=4.60; p = 0.02). MMD does not induce neuroinflammation in adult hippocampus and hypothalamus and no changes in microglia related proteins (F[2, 13] = 0.15, p > 0.05).These programming effects from MMD disappear with the appropriate schedule of melatonin replacement therapy during pregnancy and lactation

Palavras-chaves: Adult neurogenesis, hippocampal dependent memory, programming
Agência Fomento: FAPESP

01.015 - CARACTERIZAÇÃO DA PRESENÇA DE LINFÓCITOS NO DESENVOLVIMENTO CEREBRAL EM CAMUNDONGOS

CHARACTERIZATION OF THE PRESENCE OF LYMPHOCYTES DURING MURINE BRAIN DEVELOPMENT

Autores: Danillo Pereira Dantas 1, Lukas Gonçalves Bolini 1, Rosália Mendez Otero 3, André Macedo Vale 3, Pedro Moreno Pimentel Coelho 3
Instituição: 3 IBCCF - Intituto de Biofísica Carlos Chagas Filho (Av. Carlos Chagas Filho, 373 - G1-019 - Ilha do Fundão, Rio de Janeiro - RJ, 219)Introdução:
The central nervous system, especially the brain, has always been considered immunoprivileged. This belief was related to the structural organization of the neuro vascular unit. This structure composed of blood vessels, astrocytes and neuronal cells has the important function of controlling the passage of molecules and circulating blood cells to the brain parenchyma. However, recent studies have characterized the glymphatic system as well as the presence of lymphatic system in meninges. This characterization has opened new questions about this interaction between the immune and nervous systems, such as the possibility of lymphocyte entry into the brain parenchyma at specific times in brain development.

Objetivos:
To characterize the presence and localization of lymphocytes in the brain during mouse nervous system development using immunohistochemistry.
Métodos:
C57BL6 mice aged P0 (day of birth) and P14 (14 days after birth) were used, as well as 3-month-old adult animals. The animals were euthanized, perfused and fixed for post processing. The brains were cryodissected and subjected to immunofluorescence assay. Then analyzed by Zeiss confocal microscope. The experiments were performed according to the ethics committee under protocol CEUA / CCS-UFRJ 080/17.
Resultados e Conclusões:
Using specific antibodies, the presence of T (CD3 +) and B (B220 +) lymphocytes in the brain was analyzed. From P0 to P14 it was possible to detect the presence of T and B lymphocytes in different brain regions, such as the cortex and hippocampus. As for location, we found the vast majority of cells in association with the basal membrane of blood vessels, using an anti-laminin antibody as a marker. IgM expression was also analyzed for phenotypic characterization of B lymphocytes, which could indicate the subtype of these cells. Already on the first day of life IgM positive cells were present in the brain, and on the 15th day of life they remained in the tissue, especially in laminin-labeled blood vessels. IgM + B lymphocytes are present in the brain development of mice, mostly present in the basal membrane of blood vessels. As perspectives, cells will be quantified and other markers will be used to promote the classification of lymphocyte subtypes.

Palavras-chaves: Neuroimunologia, Neurodesenvolvimento, Neuroanatomia
Agência Fomento: CAPES

01.016 - FATORES DE RISCO GESTACIONAL EM MÃES DE CRIANÇAS DIAGNOSTICADAS COM AUTISMO.

FACTORS OF GESTATIONAL RISK IN AUTISM DIAGNOSED CHILDREN'S MOTHERS

Autores: Hione Tavares Dos Santos 1, Laiane Pinheiro De Sousa 1, Karen Renata Herculano Matos Oliveira 2, Adelaide Da Conceição Fonseca Passos 1
Instituição: 1 CESUPA - centro universitário do pará (av. Nazaré, número 630), 2 UFPA - Universidade Federal Do Pará (Avenida Perimetral, Guamá.)Introdução:
INTRODUCTION: The present study aims to identify the probable gestational risk factors for the development of Autism Spectrum Disorder (ASD) in children

registred in a Child Development Reference Service. The etiology of autism is still quite complex and poorly established, but studies indicate an association among neurobiological and environmental factors.
Objetivos:
OBJECTIVES: Identify the probable prenatal risk factors in mothers of children diagnosed with ASD. Analyze the sociodemographic profile of these mothers; Investigate the obstetric background; List the main gestational complications that may be associated with ASD.
Métodos:
METHODS: The study is of the quantitative, descriptive, documentary type, with an exploratory analysis of the data. The research was carried out at the Centro de Atenção à Saúde da Mulher e da Criança do Instituto de Ciências da Saúde da Universidade Federal do Estado do Pará (CASMUC/ICS/UFPA). In order to carry out the study, we used secondary data from thirty-two medical records of children diagnosed with ASD, classic Autism category, aged between 03 and 12 years old, living in the city of Belém and metropolitan area. A date collection script was developed, based mainly on the information contained in the medical records regarding the sociodemographic conditions and the obstetric history of the mothers. The work was submitted and approved by the Comitê de Ética em Pesquisa (CEP) do Núcleo de Pesquisas em Oncologia da UFPA. (CAAE: 66743116.4.0000.5634 / Opinion Number: 2.033.2017).
Resultados e Conclusões:
RESULTS: Sociodemographic variables were initially analyzed. Regarding the age of the parents at conception, the highest percentage of mothers was between 20 and 30 years old (56.25%) and of parents between 32 and 45 years old (59.38%). For education, the study showed that 84.38% of the mothers concluded high school. Regarding to occupation of the participants, the majority practiced several functions (46.88%). A significant number of mothers had only the function of housewife (25.00%). Subsequently, the obstetric variables were analyzed. Urinary Tract Infections (UTI) were the most common infections (43.80%). Regarding to the other prenatal clinical intercurrences, different types of intercurrences predominated (40.63%), followed by metabolic disorders (25.00%). The uterine bleeding of the first half of pregnancy corresponded to a percentage of 18.75%, but when added to pre-eclampsia reaches a frequency of 21.88%. CONCLUSIONS: Thus, to know the probable environmental factors involved in the etiology of ASD, enabling nurses to identify the most susceptible pregnant women and opportune intervention strategies in the prenatal care, targeting actually the prevention of diseases.
Palavras-chaves: AUTISM, GESTATIONAL, RISK
Agência Fomento:

01.017 - PREGNANCY SWIMMING CAUSES SEXUALLY DIMORPHIC NEUROPROTECTION IN THE OFFSPRING FOLLOWING NEONATAL HYPOXIA-ISCHEMIA

PREGNANCY SWIMMING CAUSES SEXUALLY DIMORPHIC NEUROPROTECTION IN THE OFFSPRING FOLLOWING NEONATAL HYPOXIA-ISCHEMIA
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Instituição: 1 UFRGS - Universidade Federal do Rio Grande do Sul (Ramiro Barcelos 2600, Depto de Bioquímica)Introdução:
Hypoxia-ischemia (HI) is a leading cause of mortality and morbidity in infants. Levine-Rice model has been a useful tool to pursue new therapeutic targets. Pregnancy swimming (PS) alters offspring's brain development and protects it in case of perinatal injury. However, the molecular mechanisms through which exercise during pregnancy causes neuroprotection can be modified depending on animals' sex.
Objetivos:
We tested the effects of PS on early phase after injury on mitochondrial function, electron transport chain and ROS production and if the neuroprotection effects remain until adult age.
Métodos:
All procedures were approved by the Ethics Committee (CEUA/UFRGS 35785). Adult female rats were adapted to the swimming before mating in a tank filled with water at 32°C. From pregnancy confirmation to gestational day 21, rats swam for 20 minutes daily. After delivery, at post natal day seven (PND7) Wistar rats offspring (both sexes) were subjected to unilateral cerebral hypoxia-ischemia (right carotid permanent occlusion) followed by hypoxia exposure (FiO O2 8% for 60min). Following hypoxia-ischemia, animals were divided in 8 experimental groups according sex, treatment and HI. Mitochondrial function and ROS were assessed by flow citometry (n = 12 to 24 animals/ group) as well as electron transport chain complexes (n = 5 to 8 animals/ group) were assessed in the cortex and hippocampus 24h after HI. As from PND45, spatial memory was tested in the Morris water maze

(reference and working memory protocols) (n = 14 to 18 animals/ group).
Resultados e Conclusões:
At PND8 (24h after HI), injury induced mitochondrial swelling (decreased mitochondrial potential without mass decrease) in the right cortex and hippocampus and increased ROS formation in both structures (irrespective of animal's sex). PS was able to prevent HI-induced increase in ROS formation (especially in the females' hippocampi). PS altered electrons transport chain in the offspring brains; however, it was not able to reduce HI-induced dysfunction in the hippocampus. Despite the absence of neuroprotective effects in the hippocampus, in the right cortices, PS was able to preserve electron transport chain activity disturbances in males (namely in the complex II). At adult age, reference and working memory impairments were observed in HI rats. PS decreased the cognitive impairments in the reference memory in both sexes, however in males reduced also the working memory deficits, without effects in females. Present results show that PS prevents HI-induced mitochondrial dysfunction in a sex-dependent manner, recovered impairments in the electrons chain transport despite animals' sex and had protector effects in the behavioral impairments in the males. Altogether our results show that maternal exercise modulates brain injury following neonatal HI in a sex-dependent manner. Females were more severely damaged and pregnancy swimming has greater effects on males' mitochondrial function.
Palavras-chaves: hypoxia-ischemia, neuroprotection, gestational swimming, sexual dimorphism, spatial memory
Agência Fomento: FAPERGS, CAPES and CNPq

01.018 - MODELO DE ESQUIZOFRENIA INDUZIDO PELO PRIMING DE RECEPTORES D2 EM CAMUNDONGOS: INFLUÊNCIA DO SEXO E DO ESTRESSE PERIPUBERAL

ANIMAL MODEL OF SCHIZOPHRENIA INDUCED BY DOPAMINE D2 AGONIST PRIMING: INFLUENCE OF SEX AND PERIPUBERTAL STRESS

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Instituição: 1 UFC - Universidade Federal do Ceará (Rua Coronel Nunes de Melo, nº 1000)Introdução:
Schizophrenia is widely acknowledged to be a polygenic disorder with environmental factors mediating the probability of developing schizophrenia (Nat Rev Dis Primers. 1:15067, 2015). A pathophysiological finding in patients with schizophrenia is the increased sensitivity of the dopamine D2 receptor. Neonatal quinpirole, a dopamine D2-like receptor agonist, produces long-term D2 receptor supersensitivity in rodents, a phenomenon referred to as D2 priming. Consistent evidence from several studies has identified childhood trauma as a putative risk factor for the development of schizophrenia (Neurosci Biobehav Rev. 45:233, 2014). Here we raised a hypothesis that the D2 receptor supersensitivity may lead to a greater susceptibility to environmental stressors as a model to investigate the development of schizophrenia-like phenotype.
Objetivos:
We aimed to investigate the behavioral changes in adult mice submitted to D2 receptor priming induced by neonatal quinpirole administration in addition to exposure to peripubertal stress.
Métodos:
Male and female Swiss mice were treated with quinpirole (QNP 1 mg/kg; i.p.) or saline (SAL) during the postnatal day (PND) 3 to 13. Following exposure to stressful events or not during childhood (PND 22-32). The animals were divided into the following groups: SAL; quinpirole (QNP); saline+stress (ST); quinpirole+stress (QNP+ST) for both male and female animals. In the DPN 50 the animals were submitted to the open field (OF), elevated plus-maze (EPM), and pre-pulse inhibition (IPP) tests. The experiments were approved and registered by the protocol number 5233310118.
Resultados e Conclusões:
The analyses of crossing behavior in the OF showed a three-way statistical interaction between "sex", "treatment" and "stress" [$F(1, 72)=8.706$, $P=0.004$]. Posthoc test showed that the male and female QNP groups presented hypolocomotion when compared to SAL (males: $P < 0.0001$; females: $P < 0.0001$). There was a three-way interaction considering the variable "fecal boli" [$F(1, 72) = 85.99$, $P < 0.0001$]. QNP male and female groups showed an increase in fecal boli

compared to SAL groups (males and females: P < 0.0001). In the EPM test, there was a three-way interaction considering the time spent in the open arms (TSOA) [F(1, 72) = 15.55, P < 0.0001). QNP animals presented an increase in TSOA compared to SAL groups (males: P < 0.01; females: P < 0.0001). QNP+ST male group showed a decrease in TSOA compared to QNP+ST female group. The QNP+ST females continued to exhibit hypolocomotion compared to QNP females. Considering the IPP test, there was no three-way interaction [F(1, 72)=0.155, P=0.695]. Otherwise, post hoc test showed that QNP administration caused IPP deficits compared to SAL groups (males and females: P < 0.0001). QNP+ST male group presented worse IPP deficits compared to QNP+ST female group (P < 0.0001). Taken together, our findings suggest that D2 receptor priming induces behavioral changes like schizophrenia when adults and there was an influence of sex.

Palavras-chaves: schizophrenia, quinpirole, D2 receptor, neurodevelopment, stress
Agência Fomento: CNPq

01.019 - EFEITOS DA HIPOTERMIA NA PROLIFERAÇÃO CELULAR HIPOCAMPAL APÓS ANÓXIA NEONATAL

EFFECTS OF HYPOTHERMIA IN HIPPOCAMPAL CELL PROLIFERATION AFTER NEONATAL ANOXIA

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Neonatal anoxia, considered a worldwide clinical problem, is one of the most important cause of brain injury in neonates, which can present serious and permanent consequences in adult life, such as cognitive and behavioral deficits, cerebral palsy, epilepsy, visual and hearing impairments. The sequelae caused by neonatal anoxia directly affect public health worldwide, and current studies have failed to find an effective therapeutic strategy for the prevention or minimization of these sequelae. Therapeutic hypothermia has been shown to be the only effective strategy to minimize sequelae following oxygen deprivation in term infants, although in preterm infants the beneficial effects were not determined. In the present project, we used a model of neonatal anoxia in rodents that promotes lesion in immature brain, similar to the brain of premature human. In this model, hippocampal volume reduction and neurogenesis occur, in addition to neuronal death with peak in the 24 hours after insult.
Objetivos:
The objective of this study was to evaluate whether therapeutic hypothermia influences hippocampal cell proliferation after neonatal anoxia and, indirectly, in hippocampal neurogenesis.
Métodos:
We performed anoxia or control stimuli in 20 male neonates (Rattus novergicus, Wistar lineage, n=5/group) with about 30 hours of life, weighing between 6 and 8g, with an adapted and validated system (Takada et al., 2011). Shortly after the experimental procedure (Anoxia or control), the animals were kept on the same heating plate, but their temperature was reduced to 30 º C for 5 hours (Control Hypothermia – CH – group and Anoxia Hypothermia – AH – group) or maintained at 37 º C (Control Normothermia – CTL – group and Anoxia Normothermia – AN – group). After 24 hours, we submitted the animals to the transcardial perfusion, and their brains were dissected and processed for cryomicrotomy. To verify the neural cell proliferation, we analyzed the distribution of Ki-67, an endogenous protein that is only expressed in activity mitotic cells, in the hippocampal subgranular zone, an important neurogenic niche, by the immunofluorescence technique. CEUA UFABC: 8852240517.
Resultados e Conclusões:
Two-way ANOVA showed that hypothermia did not influence the amount of Ki-67 cells after neonatal anoxia (CTL = 7 ± 3; AN = 13 ± 6; CH = 13 ± 1; AH = 16 ± 8; p > 0.05). Hypothermia did not seem to influence cell proliferation occurring in the subgranular zone. Although the statistical analysis did not show differences between the groups, a high standard error was observed. We believe that the analysis can be improved with the bright-field DAB immunohistochemistry and not fluorescent, allowing

better visualization of Ki-67 positive cells. Further analysis of cell survival, maturation and differentiation are in progress.
Palavras-chaves: Asfixia perinatal , Desenvolvimento , Neurogênese
Agência Fomento:

01.020 - EFFECT OF INTERLEUKIN-6 IN A MOUSE MODEL OF RETINITIS PIGMENTOSA

EFFECT OF INTERLEUKIN-6 IN A MOUSE MODEL OF RETINITIS PIGMENTOSA
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Instituição: 1 UFF - Universidade Federal Fluminense (Campus do Valonguinho, Instituto de Biologia, Dept. Neurobiologia,Niterói/RJ)Introdução:
Retinitis Pigmentosa (RP) is a hereditary disease without cure that leads to blindness. It is caused by several genetic mutations that induce a gradual degeneration of photoreceptors. Several models, including RD10, have been used in order to understanding the cellular and molecular mechanisms involved in the development and progression of the disease. Interleukin-6 is a cytokine with different effects on the nervous system, including neuroprotection and neuroplasticity.
Objetivos:
Therefore, the aim of our work is to investigate whether intravitreous injections of IL-6 lead to cell survival in a mouse model of RP.
Métodos:
Experiments were approved by the Local Animal Care Committee (CEUA-UFF) under protocol number 00129/09. RD10 mice were injected in both eyes with IL-6 (50 ng/mL) or PBS as vehicle in postnatal day (P) 14, one day before the beginning of the photoreceptor death.
Resultados e Conclusões:
Retinas were processed for Nissl staining at P15 and P25. Retinas from untreated C57BL/6J (Bl6) mice were used in both ages as control group. Photomicrography apparently showed no difference in retinal thickness in all treatments at P15. On the other hand, RD10 animals presented outer nuclear layer (ONL) thicker comparing to Bl6 animals at P25 in accordance to the literature. In that same age, PBS and IL-6-treated animals presented ONL layers larger than RD10 animals without treatment. We than conclude that injections with PBS or IL-6 seems to increase the survival of photoreceptors. At P15 or P25 retinas and superior colliculus were processed to western blot for EGR1 and GFAP proteins in order to analyze neuronal and astrocytic activity, respectively. Our preliminary data did not show a significant difference in the EGR of all the animals analyzed. However, a difference in the GFAP content in the retina of both PBS- and IL-6-treated animals at P15 was observed (Mean ± SE: Bl6 = 1733±317,6, n=3; RD10 =1958±765,1, n=3; PBS = 5642±2276, n=3, Significant $P < 0.05$; IL-6 = 4937±1297, n=3, Significant $P < 0.05$). Although at this age the astrocyte appears to be no longer activated in the RD10 animals compared to the Bl6, in the animals that received both injections it appears to increase the glial activity one day after the treatments. At P25 black/white transition box was used to detect the ability of animal to respond to illuminance. RD10 animals spend less time in black box compared to Bl6. Moreover, RD10 animals treated with both PBS or IL-6 presented the same behavior. Collectively these data indicate that this mutated animal had damaged vision and lost the ability to respond the illuminance, which is not improved by a single intravitreous treatment. Our data suggest that the intravitreous injection itself could lead to an inflammatory response which could in turn induces astrogliosis in the retina. Together, we conclude that although IL-6 increases RGCs survival, this increase did not improve the vision of these animals.
Palavras-chaves: Retinitis Pigmentosa, Interleukin-6, RD10
Agência Fomento: CNPq

03. Glia

03.001 - EFEITO DA PROGRAMAÇÃO FETAL E PERINATAL POR RESTRIÇÃO CALÓRICA NA IMUNORREATIVIDADE ASTROCITÁRIA DO NÚCLEO DO TRATO SOLITÁRIO EM RATOS WISTAR

EFFECT OF FETAL AND PERINATAL PROGRAMMING BY CALORIC RESTRICTION ON ASTROCYTIC IMMUNOREACTIVITY OF THE SOLITARY TRACT NUCLEUS IN WISTAR RATS

Autores: Gabriela Larissa Lima da Silva 1, Isabella Zacarin Guiati 1, Carla de Moraes Machado 1, Marina Galleazzo Martins 1, José de Anchieta de Castro e Horta Júnior 1
Instituição: 1 IBB - Instituto de Biociências de Botucatu UNESP - SP (Rua Prof. Dr. Antonio Celso Wagner Zanin, nº 250 CEP 18618-689)Introdução:
The food restriction during pregnancy and lactation is an important inductor of programing, promoting changes in weight, energy balance, food intake, neuropeptide expression and in the neuroglia. The satiety signaling is processed by neurons in the nucleus tractus solitarii (NTS), however, there is little information about the neuroglia.
Objetivos:
The objective of this work was to analyze the effects of programing by caloric restriction on the NTS astrocytes, comparing in young adult rats the immunoreactivity to the glial fibrillary acid protein (GFAP) between control and restrict rats,whose mothers were subjected to the caloric restriction.
Métodos:
Adult Wistar rats were put to mate in order to obtain the offspring, of which the males with 90 days old were the subject of study (Protocol CEUA 722). After the detection of pregnancy, the females were separated in two experimental groups: control group (CG, n=5), normal diet ad libitum; and the caloric restriction group (RG, n=5), with a 50% mother dietary restriction in relation to the control group during the pregnancy and lactation periods. All animals, were subjected to transcardiac perfusion for fixation. The encephalons of all animals were cut with freezing microtome and the sections were subjected to the immunohistochemical protocol to GFAP and Calbindin D-28k. The immunoreactivity was analyzed in the NTS semi-quantitatively, by means of astrocyte's profile counting and optical density, both mean and integrated. The data were compared and analyzed statistically for its significance ($P < 0.05$).
Resultados e Conclusões:
There's no difference between the CG (343,2 ± 38,38) and the RG (327,6 ± 22,1) for the average number of astrocytes by section level. On the other hand, the total number of astrocytes was higher in the CG (2059 ± 230,3) then the RG (1310 ± 88,4). The same effect can be observed for optical density analysis, which didn't show difference of mean density between the CG (0,2734 ± 0,01471) and the RG (0,3189 ± 0,0577), but the integrated density was higher in the CG (2151000 ± 292200) then the RG (1616000± 161700). The differences found corroborate the results obtained in the analysis of the biometrical parameters, that demonstrate that the weight and the naso-anal distance are bigger in the CG (352,6 ± 30,34g; 22,4 ± 0,5244 cm) then the RG (257,8± 21,34g; 20,25± 0,6344 cm). We concluded that the caloric restriction of 50% during the pregnancy and lactation periods produced alteration in the general development of the offspring, which reflected in the absolute number of astrocytes in the NTS. However, the mean optical density and the number of astrocytes were proportional to the general development of the NTS.
Palavras-chaves: astrócitos, Programação por restrição alimentar , Núcleo do trato solitário, imuno-histoquímica com GFAP, rato Wistar
Agência Fomento: Fundação de Amparo à Pesquisa do Estado de São Paulo - FAPESP

03.002 - PAPEL DA SINALIZAÇÃO HIF-1alfa/VEGF NA NEUROPROTEÇÃO MEDIADA PELO RECEPTOR DE ESTRÓGENO ACOPLADO À PROTEÍNA G EM MODELO IN VITRO DE PRIVAÇÃO DE GLICOSE E OXIGÊNIO EM CÉLULAS CORTICAIS CEREBRAIS DE RATOS NEONATOS

ROLE OF THE HIF-1α/VEGF SIGNALING IN THE GPER-1-INDUCED NEUROPROTECTION IN A CORTICAL BRAIN IN VITRO MODEL OF OXYGEN/GLUCOSE DEPRIVATION

Autores: Sabrina de Carlis Miranda 1, Nilton Barreto dos Santos 1, Wesley Nogueira Brandão 1, Jean Pierre Schatzmann Peron 1, Carolina Demarchi Munhoz 1
Instituição: 1 ICB-USP - Instituto de Ciências Biomédicas - Universidade de São Paulo (Av. Lineu Prestes 1524, Cidade Universitária, São Paulo SP)Introdução:
The G-protein-coupled estrogen receptor (GPER-1) is responsible for estrogen's non-canonical actions and several studies addressing its role in critical pathologies such as neurodegenerative diseases and cancer have emerged. The receptor activation was associated to the revascularization of the tumor microenvironment via HIF-1 α/VEGF, worsening the disease prognosis. This pathway, however, if present in the context of stroke, could restore the blood flow of the affected area, limiting ischemic damages.
Objetivos:
Our study aims to elucidate the participation of the HIF-1 α/VEGF pathway in the GPER-1-mediated estrogen-induced neuroprotection related to revascularization in ischemic processes.
Métodos:

Primary cells from the brain frontal cortex of newborn female rats (P1/P4, Wistar) were cultured and exposed to oxygen/glucose deprivation (OGD). For OGD, cell cultures were incubated with a deoxygenating agent (sodium dithionite) diluted in a glucose-free medium. GPER-1 activity was analyzed by treating cultures with its agonist (G1; 10nM) and its antagonist (G15; 50nM) during the whole OGD/reperfusion process, making it a total of 3 hours and 15 minutes of drug exposure. To assess whether the local production of estrogens interfered in our results, cells were treated with an inhibitor (Letrozole; 100nM) of the enzyme aromatase activity, responsible for the conversion of androgens to estrogen. To analyze HIF-1 α and VEGF protein expression, immunofluorescence and Western Blot were performed, respectively. Cell viability was assessed by MTT and flow cytometry for the detection of apoptosis and necrosis. Statistical analysis was performed using 1-way ANOVA followed by the post-hoc test Tukey.
Resultados e Conclusões:
G1 exposure did not modulate HIF-1 α and VEGF when compared to control. However, when cells were treated with G15, expression of HIF-1 α ($F_{5,6}=5.539$; $P < 0.05$) and VEGF ($F_{5,20}=4.198$; $P < 0.01$) reduced significantly. Cell viability post-OGD and treatments followed the same response pattern ($F_{5,12}=16.49$; $P < 0,001$). With the addition of Letrozole, cell viability worsened post-OGD and G1 reversed the process ($F_{3,14}=12.11$; $P < 0,001$). Our data suggest that basal activation of GPER-1 by local estrogens activates the HIF-1 α/VEGF pathway, as treatment with G1 did not alter the activation of the pathway's elements up until the moment of inhibition of the aromatase enzyme. Because the blockage of GPER-1 with G15 decreased protein expression of the HIF-1 α/VEGF pathway and cell viability post-OGD, it's possible that the absence of GPER-1 activation affects more drastically the system's ability to recover, rather than exogenous stimulation with G1.
Palavras-chaves: GPER, Angiogenesis, Ischemia, Aromatase, Neuroprotection
Agência Fomento: FAPESP

03.003 - ULTRARRESISTÊNCIA EXAUSTIVA ASSOCIADA AO EXERCÍCIO MODERADO EM RATOS INDUZ A INFLAMAÇÃO SISTÊMICA, LIPOPERXIDAÇÃO CEREBELAR E PREJUDICA O PERFIL DA ISOFORMA DO GFAP REATIVO.

EXHAUSTIVE ULTRA-ENDURANCE ASSOCIATED TO MODERATE EXERCISE IN RATS INDUCES SYSTEMIC INFLAMMATION, CEREBELAR LIPOPEROXIDATION AND IMPAIR ITS REACTIVE GFAP ISOFORM PROFILE
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Instituição: 1 UFPE - UNIVERSIDADE FEDERAL DE PERNAMBUCO (Av. Prof. Moraes Rego, 1235 - Cidade Universitária, Recife - PE, 50670-901), 2 UFAL - UNIVERSIDADE FEDERAL DE ALAGOAS (Av. Lourival Melo Mota - Tabuleiro do Martins, Maceió - AL, 57072-970), 3 UFS - UNIVERSIDADE FEDERAL DE SERGIPE (Av. Marechal Rondon, s/n - Jardim Rosa Elze, São Cristóvão - SE, 49100-000)Introdução:
Aerobic exercise performed with moderate intensity and volume improves physical fitness and protects the brain. However, epidemiological data suggest that ultra-endurance race (UE) may be associated with decreased brain health, but the mechanisms involved in these effects and which regions are more vulnerable are still unknown.
Objetivos:
The present study investigated in rodents whether high race volumes, even if performed under moderate intensity, but followed by UE simulation, can induce systemic alterations, lipoperoxidation (LP) and glia reactivity impairment in the cerebellum.
Métodos:
All procedures with animals were approveded by the Ethics Committee on Animal Use of the Federal University of Pernambuco (no. 0035/2017). Forty-five adult male rats were randomly subdivided into 6 groups according to the training volume followed or not by UE race: control (C), control + UE (C + UE), moderate training volume (MV), MV+ UE, high training volume (HV) and HV + UE. A continuous treadmill run was performed 5 times a week at moderate intensity. The training period was gradually increased to 30 (MV) and 90 (HV) min/day for 3 months. Twenty four hours after the training, the UE was performed and the animals were sacrificed to obtain serum and cerebellar homogenates. LP levels and the GFAP isoforms expression profile as well as serum corticosterone and creatine kinase (CK) levels were evaluated.
Resultados e Conclusões:
Four GFAP isoforms were identified in the cerebellum. Increased levels of the 50 kDa isoform were seen in the C-UE and MV-UE groups compared to C and MV. This

increase was accompanied by a reduction in the 42 KDa isoform (8.7 ± 2.4 CT-UE vs 23.1 ± 2.43%, CT, p = 0.001) and (10.7 ± 6.14 MV-UE vs 23.1 ± 2.43% MV, p = 0.02) and 39 KDa isoform (3.5 ± 2.0 C-UE vs 13.2 ± 4.0%, C, p = 0.004) (4.4 ± 1.6 MV-UE vs 13.2 ± 4.0%, MV, p = 0.008). An opposite effect was found in the HV-UE group where the 50KDa isoform was about 40% of the C value and 50-60% of the values in C-UE, MV-UE and HV groups. Increased LP levels (~40%) were detected in the cerebellum of the MV-UE, HV and HV-UE groups compared to the other groups. Serum corticosterone levels were 3 times higher in the HV and HV-UE groups compared to C (298830.8 ± 174177.4 and 359587.1 ± 21451.5 vs 104783.7 ± 94599.6 pg / mL; p=0.05) and the other groups. CK levels were higher in the MV-UE, HV and HV-UE versus C group (525.0 ± 261.3; 330.19 ± 164.5; 403.4 ± 230.5 vs 169.9 ± 39.76 U/L; p = 0.03). The data show that UE after moderate training volume increases systemic levels of CK as well as LP levels in the cerebellum concomitant to a typical glia reactivity, indicative of astrogliosis. The high training volume per se was able to induce cerebellar LP and systemic inflammation but when associated to UE, this training volume modified GFAP reactive profile increasing the levels of non-phosphorylated isoforms. This finding suggests morphological modifications and impairment in the functional plasticity of astrocytes.

Palavras-chaves: cerebellum, volume of exercise, lipoperoxydation
Agência Fomento:

03.004 - AVALIAÇÃO DAS MUDANÇAS MORFOLÓGICAS DE MICRÓGLIAS DO HIPOCAMPO DE RATOS SUBMETIDOS A ANOXIA NEONATAL E FOTOBIOMODULAÇÃO

EVALUATION OF MORPHOLOGICAL CHANGES IN HIPPOCAMPAL MICROGLIA AFTER NEONATAL ANOXIA AND PHOTOBIOMODULATION IN RATS

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Instituição: 1 UFABC - Universidade Federal do ABC (Alameda da Universidade, s/n - Anchieta, São Bernardo do Campo - SP, 09606-045)Introdução:

Neonatal anoxia (ANX) is one of the major causes of death and/or lifelong neurobehavioral and cognitive impairment. The injury following ANX insult have been correlated to a number of others conditions, like memory and learning deficits, cerebral palsy, hyperactivity, etc. Among the brain structures affected by ANX the hippocampus (HPC) is one of the most sensitive areas. The brain damage, in this context, is a process with multiple contributing mechanisms and pathways resulting in both early and delayed injury, but we can highlight the excitotoxicity, oxidative stress and, mostly, the neuroinflammation, as underlying products of ANX. The main, and only, immune cell resident in the brain tissue is the microglia, and it is the primary cell responsible for the neuroinflammation. When the microglia is stimulated, there is a switch in the phenotype of the cell, from a homeostatic microglia to an activated microglia, step in which occurs a change in the physiological role of the cell, as well as its morphology. The activation of microglia results in the progressive withdrawal of its branches, making an amoeboid shape.

Objetivos:

The aim of this study was investigate the morphological changes in HPC microglia, evaluating the low intensity laser therapy as a potential intervention for ANX, especially as an anti inflammatory strategy, inhibiting the microglia activation.

Métodos:

P1-P2 neonate Wistar male rats were maintained in a 100% N2 non hermetic chamber (25 min, 37ºC); control groups were exposed to room air. Some of them were, immediately after the ANX or Control stimuli, exposed to the low intensity laser therapy for 1 min (λ = 808nm); sham groups were not exposed to the laser stimuli. The rats were perfused 24h after the stimuli, and their brains were immunohistochemically reacted against Iba1 (CEUA 8852240517). Microglia morphology were evaluated using the software ImageJ, the analysis consisted in converting the fluorescence photomicrographs into binary and skeletonized images and analyzing them using software plugins AnalyzeSkeleton. The parameters used were the end-points, branches and extension of the skeletonized cells

Resultados e Conclusões:

Results revealed that the laser irradiation, without anoxia stimuli, implicate in an activation of microglia, given that we observed differences in the values of cell ramification (RAM)(P=0.0034) and end-points (ENDP)(P=0.0024) between group Control Laser

(ENDP=170.6±15.5;RAM=282.6±29.5; N=4) vs. group Control Sham (ENDP=217.9±11.3;RAM=405.6±30.7; N=4). The CA3 were an especially sensitive area to the laser therapy in comparison to CA1 and DG, presenting differences in cell extension (EXT)(P=0.003) and RAM (P=0.005) comparing the same past two groups, CL (EXT=3009.7±429.3;RAM=256±48) and CS (EXT=4950.3±429.3;RAM=442±48). These findings reveal that, even though the laser does not clearly induce morphological changes in ANX condition, we can confirm its influence over microglia phenotype.

Palavras-chaves: Development, Glia, Inflammation, Perinatal Asphyxia
Agência Fomento: FAPESP 2018/14072-7

03.005 - NOCICEPTIVE RESPONSE AND THE ASTROCYTES ACTIVATION IN SPINAL CORD OF TENOTOMIZED MICE

NOCICEPTIVE RESPONSE AND THE ASTROCYTES ACTIVATION IN SPINAL CORD OF TENOTOMIZED MICE

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Instituição: 1 UFPA - Universidade Federal do Pará (Rua Augusto Correa 1 - Campus Universitário Guamá 66075-110 Belém-PA), 2 UMICH - University of Michigan (State Street, Ann Arbor, MI 48109 USA)Introdução:

Tendon ruptures evoke an inflammatory condition that commonly culminates in persistent chronic pain. It is the most common symptoms that severely affect the patients' life quality. The pathophysiological mechanisms of pain evoked by tendon rupture are not fully elucidated. Previous reports already suggest the role of glial cells present in spinal cord dorsal horn on the central processing of nociceptive signaling.

Objetivos:

This study aims to investigate the correlation between nociceptive response elicited by total rupture of the right-Achilles tendon and astrocytes activation in mice spinal cord.

Métodos:

29 Balb/c mice (Males, at 6-8 weeks old, weighing 25-30g) underwent the Achilles tendon tenotomy, divided into 3 groups: control (CTRL n=7), Rupture animals (RUP n=11, tenotomy) and RUP+suture (RUP+SUT n=11). Nociceptive responses were performed using von Frey method (1896) and nociceptive mechanical threshold was determinated as previously described by the method. The tests were applied on day 0, before the injury, and on the 3rd, 7th, 10th and 14th dpt. Immunostainings in the spinal cord lumbar L5 segment were performed for astrocytes (anti-GFAP) at 7th and 14th days post tenotomy (dpt). GFAP positive cell count was performed by ImageJ® software. Statistical analysis was performed by the ANOVA-two way test followed by the Kruskal-wallis test, $p < 0.05$. The data are expressed by the mean ±SD. All these experimental procedures were previously approved by the ethical committee for care and use of laboratory animals from the UFPA (Protocol number 8179020318).

Resultados e Conclusões:

The Von Frey test showed decrease in the paw withdrawal threshold (PWT) in both the tenotomized groups on the 3dpt RUP (0.0875g±0.0694) and RUP+SUT (0.175g±0.056) in relation to the CTRL (3g±1.154). On the 14dpt only the RUP group (0.0687g±0.0530) has maintained the decreased values of PWT. RUP+SUT group (1.207g±1.0147) did not show significant difference with the CTRL(3g±1.06). Immunohistochemistry for GFAP showed a significant increase at the count of astrocyte positive cells in L5, with classic features of astrogliosis, on the ipsilateral side of the injury on the 7th(909.5±28.9) and 14th(858.5±19.0) dpt of the RUP group in relation to CTRL group(412±53.7). This glial activation accompany the changes in PWT in the RUP group. Our findings showed for the first time that tendon rupture evokes a Glial activation in the spinal cord on the 7th and 14th dpt and this occurs concomitantly with the decrease of PWT. Our data strongly suggests that activated astrocytes can be related to nociceptive alterations evoked by Achiles tendon ruptures.

Palavras-chaves: Tendon rupture, Pain, Glia
Agência Fomento: CAPES, CNPQ, FAPESPA, UFPA

03.006 - ALTERAÇÕES DA GLIA EM MODELO DE GLAUCOMA POR CAUTERIZAÇÃO DO PLEXO LÍMBICO

GLIAL ALTERATIONS IN A GLAUCOMA MODEL BASED ON LIMBAL PLEXUS CAUTERY

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Instituição: 1 UFRJ - Universidade Federal do Rio de Janeiro (Avenida Carlos Chagas Filho, 373), 2 UFMG - Universidade Federal de Minas Gerais (Av. Antônio Carlos, 6627)Introdução:

Glaucoma is a neurodegenerative disease characterized by optic nerve injury and degeneration of retinal ganglion cells (RGCs). It is the major cause of irreversible blindness in the world and has no effective treatment. Furthermore, the pathophysiology and progression of this disease is still unknown. An important risk factor for glaucoma is high intraocular pressure (IOP), that might contribute to stress injury in the optic nerve head, including axonal transport blockage, ischemia, oxidative stress and reactive gliosis, which leads to cell death. Even though the activation of glial cells has been identified during neurodegeneration, there is no certainty about its responses and roles in axon degeneration in glaucoma.
Objetivos:
In this work, we evaluated the responses of astrocytes and microglia in the optic nerve in a glaucoma model based on limbal plexus cautery, developed recently in our laboratory, that leads to subacute ocular hypertension (OHT).
Métodos:
OHT was induced in adult (2-3 months) pigmented Lister-Hooded rats anesthetized by ketamin (75 mg/kg) and xylazine (5 mg/kg), as approved by the Ethics Committee from The Health Sciences Center of the Federal University of Rio de Janeiro (#083/17). Optic nerves were collected for analyses after either 3, 7, 14, 28 or 56 days of OHT.
Resultados e Conclusões:
Glial responses were initially evaluated by western blot analysis of astrocytic GFAP and microglial Iba1 proteins in optic nerve pools (3 nerves per pool) after 3, 7, 14 and 28 of OHT induction. There was no significant GFAP protein upregulation in all groups (n=3 pools). However, analysis of Iba1 expression showed an upregulation in the optic nerve, mainly at 28 days, which was higher than contralateral control (10.11±1.38 x 4.56±1.32 as normalized to naïve control; p=0.0112; n=3 pools), and to OHT 3 (4.370±0.09897; p=0.0084; n=3 pools), 7 (4.947±1.045; 0.0199; n=3 pools) and 14 (5.52±1.06; p=0.0455; n=3 pools) days. Microglial response was confirmed by immunofluorescence and quantification of Iba1+CD68+ cell density in transversal sections of the optic nerve, with a significant increase at 28 (38496±6464 cells/mm3; p= 0.0033; n=6) and 56 (47241±6578; p=0.0001; n=6) days after OHT when compared to naïve control (5817±164.9; n=4). Interestingly, CD68 reactivity in cross sections of the eye plus optic nerve appeared only distally to the glial lamina. Those results show that microglia is highly responsive to OHT after limbal plexus cautery, and specially in time points previously described to have major drops in axon counts. This points to the microglia as the focus of future studies and highlights the association of this cell type with axon degeneration in glaucoma.
Palavras-chaves: glaucoma, neurodegeneração, glia
Agência Fomento: CNPq e FAPERJ

05. Neurogenética

05.001 - EFEITO DO CONSUMO DE ÁLCOOL NA METILAÇÃO DO GENE NR3C1

ALCOHOL CONSUMPTION EFFECTS ON NR3C1 GENE METHYLATION
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Instituição: 1 UFES - Universidade Federal do Espírito Santo (Av. Fernando Ferrari, 514 - Goiabeiras, Vitória - ES, 29075-910)Introdução:
NR3C1 gene encodes glucocorticoid repector and it is envolved in HPA axis function, main neuroendocrine system which controls reactivity to stress and its hormonal levels by production of glucocorticoids, mainly cortisol. This gene expression seems to me strongly influenced by epigenetic mechanisms, specifically by methylation in its promoter region. Epigenetic factors are reported as a potential mechanism involved in the pathogenesis of alcohol-related diseases so that alcohol consumption may influence the degree of genomic DNA methylation. Data show a relationship between depressive symptoms and volume of alcohol consumption, often with comorbidity between alcoholism and depression. Thus, evidence suggests a possible relationship between HPA axis dysregulation under methylation of the NR3C1 gene regulated by the drinking habit.
Objetivos:
The present study aimed to evaluate methylation levels of the NR3C1 gene in individuals in absent or present alcohol use.
Métodos:
The present study aimed to evaluate methylation levels of the NR3C1 gene in individuals in absent or present alcohol use.
Resultados e Conclusões:

Our results showed a significant difference in NR3C1 gene methylation in individuals in absence or present alcohol consumption when mean of CpG 40-47 were analyzed (Mann Whitney test, $p < 0.0001$). When analyzed each CpG individually, significant difference were showed in CpG 41 (Mann Whitney test, $p=0.00275$) and in CpG 46 $p=0.0042$). In each analysis individuals in present alcohol consumption showed lower levels of NR3C1 gene methylation when compared to individuals in absence of alcohol consumption. Thus, this data suggest that present alcohol consumption is associated with lower levels of NR3C1 gene methylation.
Palavras-chaves: Eixo HPA, Epigenética, Hábito Etilista, Receptor de Glicocorticoide
Agência Fomento: FAPES e CAPES

08. Plasticidade Neural

08.001 AVALIAÇÃO DOS EFEITOS DA CAFEÍNA NO COMPORTAMENTO E NA MICROGLIA EM MODELO ANIMAL DE RATOS SELECIONADOS PELO CONGELAMENTO

EVALUATION OF CAFFEINE EFFECTS ON BEHAVIOR AND MICROGLIA IN ANIMAL MODEL OF RATS SELECTED BY FREEZING
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Instituição: 1 UFF - Universidade Federal Fluminense (Outeiro São João Batista, S/N - Centro/Niterói - Instituto de Biologia), 2 PUC-RJ - Pontifícia Universidade Católica do Rio de Janeiro (Rua Marquês de São Vicente, 225 - Gávea/RJ - Departamento de Psicologia)Introdução:
Anxiety is the emotional dysfunction that affects the quality of human life. It is characterized by the feeling of fear against danger and it's pathological state is typified by the deregulation of stress. Several mechanisms are involved in the regulation of anxiety, including microglial activation. The caffeine is the most consumed psychoactive substance in the world and their effects are mostly due to their antagonism at A1 and A2a adenosine receptors, present in both neurons and glial cells.
Objetivos:
The aim of this study was to investigate the effect of a moderate dose of caffeine in different behavioral response as well as in glial cells in rats with high (CAC) and low (CBC) freezing rates relative to control animals of the same species.
Métodos:
Male Wistar rats with low (CLF), high (CHF) freezing and control (CTL) were submitted to caffeine treatment (0,3g/L) for two weeks. After a period of 3 days, we evaluated the anxiety-like behavior (elevated plus maze – EPM and open field), declarative memory (object recognition) as well as the expression of Iba-1 and GFAP proteins in order to examine microglia and astrocytes in the different groups.The statistical analysis was performed using one-way ANOVA with Tukey's post test, and differences were considered significant when $P < 0.05$. The present study was approved by the UFF ethics committee (803/2016).
Resultados e Conclusões:
Our results indicate that the CHC group presented an anxious-type phenotype in the EPM and open field tests compared to the control group. No statistical differences were found after caffeine treatment neither in EPM ($p = 0.9262$) nor in the open field test ($p = 0.7012$) between groups ($n = 3$ for each group). In the object recognition test, caffeine treatment seems to induce a slight increase in memory performance but this effect was not significantly different between groups ($p = 0.5321$). Previous analysis for Iba-1 showed no difference. Concerning previous analyzes for GFAP protein, the CHF and CLF groups showed a qualitative change in GFAP expression after caffeine consumption.
Conclusion: The data indicate that the dose of caffeine used did not lead to anxiogenic behavior but could lead to a cognitive improvement in all groups. The glial reaction in animals with altered anxiety traits possibly reflect a functional alteration of astrocytes in anxious group treated with caffeine.
Palavras-chaves: Anxiety, Behavior, Caffeine, Microglia
Agência Fomento: FAPERJ, CNPq, UFF-PIBIC

08.002 - VARENICLINA, COMO A NICOTINA, PROMOVE PLASTICIDADE NA VIA RETINOCOLICULAR DE RATOS

VARENICLINE, LIKE NICOTINE, PROMOTES PLASTICITY IN THE RETINOCOLLICULAR PATHWAY OF RATS
Autores: Luciana Gavina 1, Renata Guedes 1, Wandilson Rodrigues Junior 2, Alex Christian Manhães 2, Adriana Melibeu 1
Instituição: 1 UFF - Universidade Federal Fluminense (Alameda Barros Terra, s/n - Centro, Niterói - RJ, 24020-150), 2 UERJ - Universidade do Estado do Rio do

Janeiro (R. São Francisco Xavier, 524 - sala 1006 - Maracanã, Rio de Janeiro - RJ, 20550-)Introdução:
Amyloid Precursor Protein (APP) is a transmembrane glycoprotein widely expressed in the nervous system, where it can influence different stages of neuronal development. In the visual system, APP regulates the natural plasticity of the retinocollicular projections during the postnatal period. APP can be cleaved by the nonamyloidogenic pathway, where α-secretase promotes a release of a soluble neurotrophic fragment, αAPPs, or through the amyloidogenic pathway, where sequential proteolysis of APP by beta- and gamma-secretases generates the amyloid-beta peptide (A β), the main component of senile plaques seen in Alzheimer's Disease. Previous data show that local exposure to nicotine within the critical period increases the APP content and its soluble neurotrophic fragment, αAPPs, in the visual superior colliculus (SC) layers in detriment of the amyloidogenic pathway. It was also observed that local nicotine exposure generates a robust and transitory sprouting of uncrossed retinal axons outside their main terminal zones in the visual layers of SC. Varenicline behaves like nicotine and is a partial agonist of α4 β2 nicotinic acetylcholine receptor subtype that is used to treat nicotine dependence, which may also improve attention and learning.
Objetivos:
In this work, we investigated the effect of exposure to varenicline during the development of the retinocollicular pathway.
Métodos:
All experiments were approved by the local Animal Care Committee (Protocol No. 00205-CEPA-UFF). Lister Hooded rats (Postnatal day 7) were submitted to the subpial implant of Elvax loaded with nicotine (100mM); varenicline (10mM); varenicline (100mM) or vehicle (PBS). The distribution of the retinal terminals was evaluated in cerebral sections after the intraocular injection of HRP. Statistical analyzes were performed through Student's unpaired t-test, used for comparisons between varenicline and PBS groups.
Resultados e Conclusões:
Our results indicate that animals treated with varenicline had a significant arborization of the retinal terminals (n=4, p=0.014) when compared with the control group, similar to the previously effect observed with nicotine treatment (n=4, p=0.016). These data suggest that the plasticity promoted by nicotine in the retinocollicular pathway could be partialy mediated by α4 β2 receptors, and that varenicline might provide a better understanding in the currently unsolved neuropsychiatric conundrum underlying Alzheimer's Disease.
Palavras-chaves: Plasticidade Induzida, Vareniclina, Sistema Visual
Agência Fomento: CAPES, CNPQ, FAPERJ, PROPPI-UFF

08.003 - MODULAÇÃO DO FENÓTIPO MICROGLIAL NÃO MELHORA A PLASTICIDADE SINÁPTICA NA MEDULA ESPINAL E COMPORTAMENTO MOTOR APÓS LESÃO PERIFÉRICA

MODULATION OF MICROGLIAL CELLS PHENOTYPE DOES NOT IMPROVE SPINAL CORD SYNAPTIC PLASTICITY AND MOTOR BEHAVIOR AFTER PERIPHERAL INJURY
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Instituição: 1 UFRJ - Universidade Federal do Rio de Janeiro (UFRJ/CCS; Bloco C sala: C1-027; Lab. de Neuroquímica; AV. CARLOS CHAGAS FILHO), 2 IOC Fiocruz - Instituto Oswaldo Cruz (Av. Brasil, 4365 - Manguinhos, Rio de Janeiro - RJ, 21040-900)Introdução:
One of the key features of PNS is their regenerative potential, allowing axons to regrow, depending on the severity of the injury. Many cell events are triggered in the spinal cord to support motoneurons to survive and axonal regeneration after nerve injury. Changes in the synaptic plasticity around motoneurons are often observed, where old connections are removed, and new ones are created. Microglial cells are primitive macrophages that invade Central Nervous System (CNS) in early states and are responsible to eliminate synapses during the development.
Objetivos:
. In this study, we investigate the synaptic plasticity after different kind of injuries in Peripheral Nervous System (PNS) as well as the role of microglial cells in this process.
Métodos:
Adult male C57Bl6 mice were employed as the experimental model where the uninjured group had no surgery (control, n=10) and other groups had an incision made in the right mid-thigh level followed by sciatic nerve isolation. The protocol were previously accepted by the Institutional Animal Care and Use Committee under protocol #175-18.The crush group (n=36) had, after isolation, the sciatic crushed for 15s and the transection group(n=36) had 5 mm of the

nerve cut off at the same region. To evaluate microglial influence, animals received minocycline 45mg/Kg intraperitonially daily. All experimental conditions were evaluated by walking track test to study their motor function

Resultados e Conclusões:

Lesioned groups had deficient performance compared to Control group, although Crush animals demonstrate significant improvements through the time points evaluated (1,4,7 and 14 days after lesion, DAL) ($p < 0,0001$). There was no difference between animals in crush groups which received minocycline or not ($p > 0,5$). Although there was significant difference between transection groups that received, or not, minocycline ($p < 0,01$). Quantitative analysis of Sinaptophysin staining in motoneurons reveled significant decrease of synapses in lesioned groups when compared to Controls ($p=0,065$). After the same period, both lesioned groups showed increased number of reactive microglial cell (Iba-1+) ($p < 0,001$). The use of minocycline retarded this increase up to 4 DALand modulated microglial morphology, altering the number of microglial branches ($p=0,0286$). Same changes were not observed in astrocytes, indicating that minocycline only influenced microglial cells. There was no significant difference between transection and crush lesion in synaptophysin and Iba1 quantifications. Taken together, we correlated here synapse plasticity with the recruitment of microglial cells in the spinal cord tissue after sciatic nerve crush or transection lesion.

Palavras-chaves: lesão, microglia, plasticidade

Agência Fomento: CAPES

08.004 - CARACTERIZAÇÃO DA NEUROGÊNESE HIPOCAMPAL ADULTA EM RATOS DA LINHAGEM SHR E SLA16

CHARACTERIZATION OF ADULT HYPOCAMPAL NEUROGENESIS IN SHR AND SLA16 STRAIN RATS

Autores: Ana Carolina da Silva Vieira 1, Cilene Lino de Oliveira 1, Gustavo Jorge dos Santos 1, Geison Souza Izídio 1, Fernanda Barbosa Lima 1

Instituição: 1 UFSC - UNIVERSIDADE FEDERAL DE SANTA CATARINA (R. Eng. Agronômico Andrei Cristian Ferreira, s/n - Trindade, Florianópolis - SC,)Introdução:

Attention Deficit Hyperactivity Disorder (ADHD) is a neuropsychiatric problem characterized by inattention and hyperactivity. The Spontaneously Hypertensive Rats (SHR) strain has been used as an experimental model for hyperactivity and it is known that a region of chromosome 4 in this strain, known as Anxrr16, can modulate anxiety, learning and locomotion. The effect of the Anxrr16 region was isolated in a congenic strain called SHR.LEW-Anxrr16 (SLA16), which can be used to deepen studies on the genetic and neurobiological bases of emotionality, learning and memory. SLA16 and SHR genome are identical, except by a portion of chromosome 4 from the Lewis line (LEW). SLA16 rats present low levels of anxiety and greater locomotion compared to SHR rats. Adult hippocampal neurogenesis contributes to memory/learning but is also involved with neuropsychiatric disorders

Objetivos:

We aim to characterize different phases of hippocampal neurogenesis in the SHR and SLA16 strains

Métodos:

Six males and six females from each strain, which use was approved by the ethics committee under protocol PP00903, will be housed with free water and food, light/dark cycle of 12h and temperature of 22ºC ±2. Animals will be euthanized at 60 days of age. Hippocampus will be dissected and prepared for the quantification, by Western Blotting, of the following neurogenesis markers: SOX2, NeuN, doublecourtin (DCX) and Ki67. Statistical comparisons will be done by Student t-test (parametric data) or Mann-Whitney test (non-parametric data); $p > 0.05$ will be considered significant.

Resultados e Conclusões:

Preliminary results evaluating the presence of DCX in rat's hippocampus revealed that males and females of SHR and SLA16 strains did not show statistical difference regarding the expression of this protein among themselves, with p values of 0,7 for males and 0,55 for females. Considering that these results are still preliminary, more analysis of several steps of neurogenesis are required to characterize if there are differences between strains. Since previous studies showed that SLA16 rats present a lower performance in learning tests, we expect to find a reduced expression of hippocampal neurogenesis markers in this strain compared to SHR rats. Considering that anxiety and hyperactivity are related to the worsening of memory and learning, we expect to find different rates of neurogenesis between both strains. Since both strains are genetically identical, except by one region, differences between them can be related to that specific genome section and its correlation to anxiety, learning and neurogenesis can contribute to clarifying

part of the mechanisms by which emotionality and cognition are regulated.
Palavras-chaves: Behavior, inattention, neural modulation, neuroplasticity
Agência Fomento: CNPQ

08.005 - EFEITOS DE PROTOCOLOS DE EXERCÍCIO NA RECUPERAÇÃO FUNCIONAL E REGENERAÇÃO NEUROMUSCULAR EM MODELO ANIMAL DE LESÃO MEDULAR COMPRESSIVA

EFFECTS OF EXERCISE PROTOCOLS ON FUNCTIONAL RECOVERY AND NEUROMUSCULAR REGENERATION IN ANIMAL MODEL OF COMPRESSIVE SPINAL CORD INJURY
Autores: Anne Caroline Rodrigues dos Santos 1, Renata Pereira Laurindo 1, Fernanda Marques Pestana 1, Nathalie Henriques Silva Canedo 1, Ana Maria Blanco Martinez 1, Suelen Adriani Marques 2,1
Instituição: 1 UFRJ - FEDERAL UNIVERSITY OF RIO DE JANEIRO (R. Prof. Rodolpho Paulo Rocco, 255 - Ilha do Fundão,), 2 UFF - Fluminense Federal University (Alameda Barros Terra, s/n - Centro, Niterói)Introdução:
Traumatic spinal cord injury promotes sensory and motor deficits that impair functional performance; physical rehabilitation is the only established therapeutic reality in the human clinical set. The physical activity has been presented as a good therapeutic strategy to treat various nervous system pathologies. Physiotherapy is currently the only therapeutic approach regularly established to treat SCI in humans and seeks to improve function and also to minimize possible complications and sequelae. Regular physical activity improves sensory and motor function in rats and humans, prevents muscular atrophy and preserve the function of motor neurons. There are many ways to perform a physical activity, both passive and active; voluntary or forced exercise has been investigated in different forms of SCI.
Objetivos:
This study aimed to evaluate the effect of exercise protocols with different intensity on functional recovery, and neuromuscular regeneration in a mice model of compressive spinal cord injury.
Métodos:
We used young female C57BL/6 mice, submitted to spinal cord extradural compression (vascular clip, 30g / 10 seconds compression) after T9 laminectomy. This study was developed in 2 phases (first phase: to compare TMT1 and TMT2; second phase: to compare TMT1 and TMT3), and 5 groups were analyzed: SHAM (laminectomy only); SCI (injured, without treadmill training); TMT1 (injured, treadmill trained for 10min), TMT2 (injured, treadmill trained for two 10-minute cycles, with a 10-min pause between them), and TMT3 (injured, treadmill trained during 28 days with the TMT2 protocol and, after that period, with the TMT1 protocol). The 8-weeks treadmill training starting 7 days after injury and performed 3 times a week. Functional evaluations (Basso Mouse Scale - BMS, Ladder Walking Test - LWT, Rotarod, digital analgesimeter, n=6/group) were assessed weekly, and electroneuromyography was made 8 weeks after injury. After perfusion, morphological evaluations were performed.
Resultados e Conclusões:
. SHAM group did not show alteration after injury and was used as a normal pattern. In the first stage, we compared the results of TMT1 and TMT2 groups and, although the TMT2 showed earlier functional recovery, TMT1 group was better than TMT2 during the chronic phase of the injury, as seen by functional (BMS, LWT and Digital Analgesimeter, $p < 0,01$) and morphometric analyses. In stage two, we compared TMT1 protocol with TMT3, a combination of TMT2 and TMT1 protocols. The best results in terms of regeneration, functional recovery (BMS, LWT, Rotarod, Digital Analgesimeter and Electroneuromyography, $p < 0,01$) and muscle plasticity ($p < 0,001$) were observed in the TMT3 group. We concluded that, the intensity of the exercise can modulate the quality of the regenerative response, and if this intensity (training time) is adjusted according to the clinical phase of the injury, the results can be further improved.
Palavras-chaves: SPINAL CORD INJURY, EXERCISE PROTOCOL, TREADMILL TRAINING
Agência Fomento:

08.006 - 5HT2C EXPRESSION IN THE CORTEX AND HIPPOCAMPUS OF RATS IS NOT ALTERED BY EXPOSITION TO MATERNAL SEPARATION

5HT2C EXPRESSION IN THE CORTEX AND HIPPOCAMPUS OF RATS IS NOT ALTERED BY EXPOSITION TO MATERNAL SEPARATION
Autores: Matheus Azevedo Barbosa 1, José Francis Oliveira 1, Roberto de Pasquale 1

Instituição: 1 ICB - I - Instituto de Ciências Biomédicas I (Avenida Professor Lineu Prestes, 1524 - USP/SP)Introdução:
Serotonin receptors are involved in many cognitive and emotional processes. The 5HT2C receptor is poorly invetigated and may be related to mood behavior. 5HT2C receptor activates the DAG/IP3 intracellular pathway, raising intracellular Ca2+ levels, and consequently activating some intracellular neuronal signaling involved in synaptic plasticity, such as PKC and ERK. Because of this property, 5HT2C receptors have been thought as a modulatory factor participating in synaptic reorganization of brain structures. It has been observed that 5HT2C favors long-term potentiation (LTP) in the hippocampus, while its absence in knockout animals reduces LTP and impairs performance in memory tests. The mechanism for this effect may involve AMPA receptors insertion in the post-synaptic membrane. Chronic stress is a key factor in the development of neuropsychiatric diseases, and there is evidence that stress exposure affects the Prefrontal Cortex (PFC) reducing 5HT2C expression, which is associated with loss of dendritic spines. These findings suggests that perturbation of 5HT2C expression could underlie stress-dependent synaptic changes that participate in the development of anxious and depressive behavior.
Objetivos:
This work aimed to evaluate whether the exposition to early life stress (maternal separation) modifies 5HT2C receptor expression in the PFC and hippocampus. Furthermore, we investigated whether such changes are correlated to anxious-like behavior.
Métodos:
Male and female Wistar rats were submitted to a maternal separation protocol, consisting in the separation of the dam from the pups for 3h/day from PND2 through 14. At PND24-26, prefrontal cortex and hippocampus samples were collected, snap-frozen and stored in -80°C until use. The protein in the samples collected was then extracted, quantified and applied on a 10% polyacrylamide gel for the execution of the Western Blotting technique with 5HT2C antibody (ThermoFisher, Waltham, MA USA). Another part of the litter was destined to the Open Field Test, where animals were put in a round arena with 58cm of diameter and their activities were recorded and analyzed. The Ethics Committee of ICB-USP approved all procedures (CEUA 4182140818).
Resultados e Conclusões:
Concerning the cortex, there were no differences in staining when comparing exposure to stress (p=0,69), nor sex (p=0,61) nor the interaction (p=0,82), analyzed by ANOVA two way. Meanwhile, in the hippocampus there was no difference for stress (p=0,16) nor interaction (p=0,87), but a difference was found when comparing males and females, showing that females have more 5HT2C receptors in the hippocampus (p=0,02). Concerning the Open Field Test, there was no significance in locomotion nor anxiety (p=0.07/p=0.41), but there was a reduction in grooming on stressed females (p=0.003). Considering the results above, 5HT2C does not change in stressed animals on PND25, but there were differences between male and female rats, indicating sex-differences in the expression of this receptor.
Palavras-chaves: Plasticidade Sináptica, Comportamento, 5-HT2C, Western Blotting, Anxiety
Agência Fomento: Coordenação de Aperfeiçoamento de Pessoal de Nível Superior - CAPES

10. Sono e Ritmos Circadianos

10.001 - COMO SÃO OS RITMOS DOS TRABALHADORES NOTURNOS?

HOW ARE THE RHYTHMS OF NIGHT WORKERS?
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Instituição: 1 UNIVASF - Universidade Federal do Vale do São Francisco (Rua José de Sá Maniçoba S/N. Petrolina/PE), 5 UFAL - Universidade Federal de Alagoas (UFAL Arapiraca)Introdução:
The 24h society is chronic sleep depriving almost 1/3rd of the population. This causes serious impairment to people health. We already saw that rodents under forced desynchronization present mental, cardio and metabolic predisposition to diseases. The main issue is the internal misalignment of biological rhythms. The night workers are constantly exposed to shifts concerning the rest-activity cycle.
Objetivos:
We investigated the rhythms of these workers and, obviously, the sleep is fragmented as well as the rest-activity cycle.
Métodos:

The actimetry was used to measure the rest-activity rhythm. We collected peripheral blood every 6h, for 48h, in order to evaluate the gene expression cycle. And the polissomnography was done to investigate the diurnal or nocturnal sleep.
Resultados e Conclusões:
The mean, duration, acrophase, start and stop time of activity are the same comparing night and day workers. However, it doesn't occur concerning the temperature rhythm, demonstrating the internal circadian misalignment. The ongoing experiments are comparing the hallmarks of cancer and clock-gene biomarkers between night and day workers in order to identify differential gene expression levels that controls or contribute to mechanisms by which circadian rhythm disruption may lead to cancer. We intend to identify potential markers of cancer development to anticipate the prognostic of this disease.
Palavras-chaves: Cronoterapia, Sono, Trabalho noturno, Expressão Gênica, Actigrafia
Agência Fomento: FAPEAL

10.002 - ALTERAÇÕES NO RITMO SONO-VIGÍLIA ESTÃO RELACIONADAS COM A MEMÓRIA VISUOESPACIAL DE CURTA DURAÇÃO EM INDIVÍDUOS COM MIGRÂNEA CRÔNICA?

ARE CHANGES IN THE SLEEP-WAKE RHYTHM RELATED TO SHORT-TERM VISUOSPATIAL MEMORY IN INDIVIDUALS WITH CHRONIC MIGRAINE?
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Instituição: 1 UFPE - Universidade Federal de Pernambuco (Avenida da Engenharia, S/N, Cidade Universitária, Recife-PE.), 2 UESPI - Universidade Estadual do Piauí (Rua Olavo Bilac, 2335, Centro, Teresina-PI), 3 UEPB - Universidade Estadual da Paraíba (Avenida das Baraúnas, 351, Campus Universitário, Bodocongó, Campina Grande-PB.), 4 UNIFACISA - Faculdade de Ciências Médicas de Campina Grande (Avenida Senador Argemiro de Figueiredo, 1901, Itararé, Campina Grande-PB), 5 UFRN - Universidade Federal do Rio Grande do Norte (Campus Universitário Lagoa Nova, Natal-RN.), 6 CAV-UFPE - Centro Acadêmico de Vitória - UFPE (Rua do Alto do Reservatório S/N, Bela Vista, Vitória de Santo Antão-PE)Introdução:
Migraine sufferers present lower memory performance when compared to non-migraine individuals. Decline in memory is seen in individuals with more frequent attacks and a prolonged history of migraine. Among the affected memory types, visuospatial memory may be impaired even in the attacks interval in individuals with Chronic Migraine (CM). Thus, other factors could be associated with the memory impairment of these individuals, among them the poor quality of sleep, leading to impairment in attention, memory consolidation and learning.
Objetivos:
To verify the correlation between associative and visuospatial memory of short duration with the sleep-wake rhythm of individuals with CM.
Métodos:
Cross-sectional study with a qualitative-quantitative approach. Individuals of both sexes with ages between 20 and 40 years and CM diagnosis were selected, excluding individuals with other types of neurological, psychological or psychiatric diseases, as well as pregnant women. The sample consisted of 12 individuals, however 16 individuals were considered for the non-actimetric variables. Subjects used the ACT10®/Mini Mitter acrometer (15-day recording) as well as filled headache and sleep diaries for 30 days. After 30 days, the individuals returned the actimeters and diaries, as well as answered the instruments: Sociodemographic and Clinical Characterization Sheet, Visual Analog Scale (for pain and discomfort), and Rey-Osterrieth Complex Figure Test). For data analysis, the Shapiro-Wilk normality test was used. For the parametric data, the Pearson's Correlation Test was used; and, for the non-parametric data, the Spearman test was applied, assuming $p < 0.05$. The study was approved by the Ethics and Research Committee of Universidade Federal de Pernambuco (CAAE: 92552318.6.0000.5208).
Resultados e Conclusões:
CM patients had a mean of 28.2 ± 6.6 years, predominantly female (93.7%), incomplete higher education (37.5%) and salaried workers (37.5%). A moderate negative correlation ($r = -0.50$; $p = 0.041$) was observed between the discomfort intensity of the individuals and the latency period for the Rey de Rei copy. Regarding the actimetric variable L5, corresponding to the five least active hours of the subject, there was a negative correlation ($r = -0.58$, $p =$

0.048) with the copy time of Rey figure. Similarly, there was a moderate negative correlation (r = -0.59, p = 0.044) of the variable L5 and the memory time (time to reproduce the image after three minutes of its copy). On the other hand, sleep fragmentation (IV) was related to better copy quality of the figure (r = 0.64, p = 0.028). Conclusions: It can be suggested that individuals with CM modify their visuospatial function and motor activity during sleep. In addition, it was observed that the fragmentation of sleep in these individuals is related to the copy quality of the Rey Figure.

Palavras-chaves: Chronic Migraine, Chronobiology, Circadian Rhythm, Sleep, Memory
Agência Fomento: FACEPE-CNPq

10.003 - HÁ RELAÇÃO ENTRE A PRESENÇA DE SINTOMAS DE ANSIEDADE E DEPRESSÃO E O RITMO SONO-VIGÍLIA EM PORTADORES DE MIGRÂNEA CRÔNICA?

IS THERE A RELATION BETWEEN THE PRESENCE OF ANXIETY AND DEPRESSION SYMPTOMS AND THE SLEEP-WAKE RHYTHM IN PATIENTS WITH CHRONIC MIGRAINE?

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Anxiety and depression are more common in migraine patients when compared to the general population. In addition, changes in the sleep-wake cycle are often reported by individuals with Chronic Migraine (CM); this in the long term may increase the risk for emotional impairment, specifically, anxiety and depression;
Objetivos:
To investigate the presence of symptoms of anxiety and depression associated with CM and whether there is an association of these symptoms with the sleep-wake rhythm.
Métodos:
It was a cross-sectional, descriptive and analytical study with a qualitative and quantitative approach. Regarding the eligibility criteria, individuals of both sexes between 20 and 40 years old with a diagnosis of CM were included, excluding individuals with other types of neurological, psychological or psychiatric diseases, and pregnant women. The sample consisted of 12 individuals, however 16 individuals were considered for the non-actimetric variables. Subjects were submitted to ACT10®/Mini Mitter with a 15-day recording and to headache and sleep diaries for 30 days. After this interval, the individuals answered the instruments: Sociodemographic and Clinical Characterization Sheet; Visual Analog Scale for investigating the intensity of pain and discomfort; Beck Depression Inventory; and Trait-State Anxiety Inventory. For data analysis, the Shapiro-Wilk normality test was used. In the case of parametric data, the Pearson Correlation Test was used; in the case of non-parametric data, the Spearman test was applied, considering $p < 0.05$. The research was approved by the Ethics and Research Committee of the Universidade Federal de Pernambuco (CAAE: 92552318.6.0000.5208).
Resultados e Conclusões:
CM patients presented a mean of 28.2 ± 6.6 years old, predominantly female (93.7%), 56.2% were single while 37.5% were married. Incomplete higher education (37.5%) and salaried (37.5%) individuals prevailed. As for the symptoms of depression, the individuals presented values of 15.6 ± 10.0 points, representing symptoms of mild to moderate depression. As for anxiety symptoms, there were moderate symptoms of trait (46.9 ± 5.3) and state (46.4 ± 5.3) anxiety. As for the interaction with the actimetric variables, it was observed a moderate negative correlation of the depressive symptoms with the average activity of the individuals (r = -0.59, p = 0.041) and the relative amplitude (r = -0.41; p = 0.025). On the other hand, no relation of anxiety symptoms, either trait (r = 0.03, p = 0.509) or state (r = 0.02, p = 0.951) was observed with the actimetric variables. Therefore, it is suggested that individuals with CM

presented symptoms of anxiety and depression. These depressive symptoms are related to a lower motor activity during the sleep-wake cycle, with a smaller difference between the movement in sleep and in wakefulness. However, there is no correlation between anxiety symptoms and sleep-wake rhythm.
Palavras-chaves: Chronic Migraine, Chronobiology, Circadian Rhythm, Depression, Anxiety
Agência Fomento: FACEPE-CNPq

12. Sistemas Motores

12.009 - NEUROPROTEÇÃO E RECUPERAÇÃO FUNCIONAL PELO DIMETIL-FUMARATO APÓS AVULSÃO DE RAIZ VENTRAL E REIMPLANTE

NEUROPROTECTION AND GAIT RECOVERY BY DIMETHYL FUMARATE AFTER VENTRAL ROOT AVULSION AND REIMPLANTATION
Autores: Paula Regina Gelinski Kempe 1, Gabriela Bortolança Chiarotto 1, Benedito Barraviera 2, Rui Seabra Ferreira Jr. 2, Alexandre Leite Rodrigues de Oliveira 1
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Avulsion of spinal cord roots is a recurrent outcome of high-energy trauma. Ventral root avulsion (VRA) can be obtained in rats after an abrupt separation of the motor roots from the surface of the spinal cord, what results in ipsilateral paralysis of the hindlimb. As a result, most of the axotomized motoneurons degenerate up to the second week post-injury, combined with a significant loss of synapses and increased glial reaction, triggering a chronic inflammatory state. It is believed that pharmacological treatment associated with roots reimplantation can overcome the degenerative effects of VRA.
Objetivos:
Therefore, our goal was to test if dimethyl-fumarate (DMF), an FDA approved drug with neuroprotective and immunomodulatory effects, associated with fibrin sealant (FS), a biological glue used for tissue repair, could improve regenerative response and lead to motor function recovery.
Métodos:
Thus, adult female Lewis rats were subjected to unilateral VRA of L4-L6 roots followed by reimplantation with FS and daily treatment with DMF (15 mg/Kg; gavage) for one or four weeks; evaluated survival times post-surgery were 1 and 12 weeks, respectively. Control group was VRA + vehicle treatment. Experimental groups were: VRA, VRA+DMF, VRA+FS, VRA+FS+DMF (n=5-7). All experiments were approved by the Committee for Ethical Use of Animals from the University of Campinas (CEUA/UNICAMP: 4500-1/2017). The analysis involved neuronal survival by Nissl staining, glial reactivity by immunofluorescence (anti-GFAP for astrocytes and anti-Iba-1 for microglia), synapse preservation (anti-VGLUT1 for glutamatergic inputs and anti-GAD65 for GABAergic inputs), gene expression (pro- and anti-inflammatory cytokines and interleukins) and motor function recovery (Catwalk system). Data are presented as the mean ± SEM and compared by one-way or two-way ANOVA. Means were considered significantly different when $^{**}p < 0.01$, $^{***}p < 0.001$ and $^{****}p < 0.0001$.
Resultados e Conclusões:
Our results indicate that after 1 week, DMF treatment and FS reimplantantion present an immunomodulatory effect since it downregulated pro-inflammatory state gene transcripts. After 12 weeks, we observed that DMF treatment is neuroprotective since it preserves 36% of motoneurons (****) and around 70% of GABAergic and glutamatergic synapses (**). DMF also decreased astrogliosis (**) and microglial reaction (*) reinforcing its immunomodulatory effects. Importantly, the pharmacological treatment was further enhanced when associated with root reimplantation using FS, reaching 70% of motoneuron survival (****) and more than 80% of glutamatergic synaptic inputs preservation (****). Also, glial reaction, microgliosis and astrogliosis, decreased almost by half when DMF was combined to FS (**** and ***, respectively). Conversely, such protective effects observed after 1 and 12 weeks reflected in 50% motor function improvement as compared to the VRA alone (**), showing the efficacy of employing combined regenerative approaches following spinal cord root injury.
Palavras-chaves: Dimethyl-fumarate, Neuroregeneration, Spinal cord lesion
Agência Fomento: FAPESP

12.010 - MODULAÇÃO DA ATIVIDADE CORTICAL PELO PEDALAR E PELA ESTIMULAÇÃO VISUAL

MODULATION OF CORTICAL ACTIVITY BY PEDALING AND VISUAL STIMULATION

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Patients with Parkinson Disease (PD) have a damaged reward circuitry and so they have severe difficulties in walking. However, they remain able to ride a bicycle, probably because a sensorial feedback from the legs to the basal nuclei while pedaling. It is known that this sensorial facilitation reduces the cortical activity, especially in the beta band (13-35Hz). So, it is possible that a visual deprivation and its resulting lower sensorial stimulation would further reduce the cortical activity.
Objetivos:
To evaluate the magnitude of cortical electroencephalographic activity in the alfa and high and low beta bands, in the rest and pedaling conditions, and with and without visual interruption.
Métodos:
Twenty-eight undergraduate students (15 women) aged 18-28 years participated in the study. The task consisted in alternating phases of rest and pedaling while seated on an ergometric horizontal bicycle, each phase for 10s, with a total of 50 phases. All the participants performed the task two times, one with and another without visual interruption (by wearing a blindfold). During the experiment, we made a bilateral electroencephalographic record in four cortical regions: frontal, central, parietal and occipital. We calculated the values of maximum power (in $\mu S.10^{12}$) for the three frequency bands of interest: alfa (8-12Hz) low beta (13-22) and high beta (22-35). To data statistical analysis we used the Wilcoxon test (for related samples). This study was approved by the institutional ethics committee, nº 02979318.0.0000.5537.
Resultados e Conclusões:
Regarding alfa power, we found a statistically significant difference only in the frontal region with eyes closed (p=0,044), with a lower power in the pedaling condition (M=24,2; SE=3,21) than in the rest (M=27,49; SE=3,27). Regarding low beta power, we found no statistically significant difference between the rest and pedaling conditions, neither with open eyes (p=0,133), nor with eyes closed (p=0,369). On the other hand, for the high beta band, we found a significant difference: in the open eyes state, there was a lower power in the pedaling condition (M=9,03; SE=0,58; p=0,006) than in the rest condition (M=10,68; SE=0,98); and a more consistent difference was found in the closed eyes state (pedaling: M=9,67; SE=0,74; rest: M=10,89; SE=0,95; p < 0,001). Conclusion: The movement of pedaling reduced the cortical activity in the high beta band, mainly with eyes closed. It also reduced the frontal activity in the alfa band with eyes closed. Our prediction about a further effect of visual deprivation was largely observed. We hope that this and other studies in this field of research will improve our understanding of the PD pathology and help the future development of therapeutic procedures.
Palavras-chaves: Parkinson disease, EEG, bicycle
Agência Fomento: CNPQ

12.011 - A INJEÇÃO DE MUSCIMOL NA SUBSTÂNCIA NEGRA MAS NÃO NO GLOBO PÁLIDO MODULA A INIBIÇÃO PRÉ-PULSO E O REFLEXO DO SOBRESSALTO

MUSCIMOL INJECTION INTO THE SUBSTANTIA NIGRA BUT NOT GLOBUS PALLIDUS MODULATES PREPULSE INHIBITION AND STARTLE REFLEX

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The acoustic startle reflex (ASR) is a striking and involuntary skeletal musculature contraction in response to an unexpected auditory stimulus and can be modulated by prepulse inhibition (PPI) phenomenon. Patients of diverse neuropsychiatric diseases present this sensorimotor filter impaired. Basal ganglia (BG) are a group of subcortical nuclei classically related to motor control, learning and memory, action selection and emotion. Previous study from our laboratory showed that the main input structure of BG – the dorsal striatum (DS) – is involved with PPI.
Objetivos:
In this study, we investigated the role of the DS outputs - globus pallidus (GP), entopeduncular nucleus (EPN) and substantia nigra pars reticulata (SNr) - in the regulation of PPI, ASR, and exploratory behavior. Also, we investigated the BG projections to structures related to these behaviors into the brainstem, the

pedunculopontine tegmental nucleus (PPTg) and the caudal pontine nucleus (PnC).
Métodos:
First, male Wistar rats (n = 62) were submitted to bilateral microinjections of the GABAA agonist muscimol or vehicle into the aimed areas (GP, EPN or SNr). Then, tested for PPI, ASR, and locomotion (approved by the Ethics Commission on Animal Use at Universidade Federal do ABC, Brazil, protocol #008/2016). Later, D1-Cre and VGAT-ires-Cre mice were injected with polysynaptic anterograde (HSV129) or retrograde (PRV-614) viruses - HSV129 into DS (n = 2) and PRV-614 into PPTg (n = 2) or PnC (n = 2) . After immunohistochemistry labeling, the viruses transport was analyzed by fluorescence microscopy (approved by the Institutional Animal Care and Use Committee at J.B. Pierce Laboratory, Yale University, USA).
Resultados e Conclusões:
The temporary inhibition of the SNr interfered in all measured behaviors: decreased the %PPI (Mean ± SEM: 53.9 ± 2.7 saline, n = 11; 39.8 ± 3.9 muscimol, n = 11; $p < 0.001$), increased ASR (113.8 ± 11.1 saline; 185.8 ± 15.4 muscimol; $p = 0.02$) and impaired the ambulation (22.0 ± 2.6 saline; 2.4 ± 0.9 muscimol; $p < 0.001$). However, the inhibition of EPN (11 saline and 10 muscimol) and GP (11 saline and 8 muscimol) caused only an ambulation impairment ($p < 0.05$). The histological analysis of the viruses injections in the genetically modified mice confirmed projections to structures classically related to PPI: the superior colliculus (SC), periaqueductal gray (PAG) and PPTg. In summary, our results support the idea that PPI is modulated by DS-SNr projections. Probably, it occurs via the SNr connections with relevant structures for PPI into the brainstem. This study contributes to elucidating the BG role in inhibitory behaviors.
Palavras-chaves: basal ganglia, startle, prepulse inhibition, direct pathway, brainstem
Agência Fomento: UFABC, CAPES (# 88881.132900/2016-01) and CNPq (# 305776/2018-5)

12.012 - A RUPTURA DO TENDÃO DE AQUILES INDUZ APOPTOSE NA MEDULA ESPINHAL DE RATOS TENOTOMIZADOS

ACHILLES TENDON RUPTURE INDUCES APOPTOSIS IN THE SPINAL CORD IN TENOTOMIZED RATS

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Instituição: 1 UFPA - Universidade Federal do Pará (Rua Augusto Correa, 01. Guamá), 2 IEC - Instituto Evandro Chagas (Rodovia BR316, km 7 s/n)Introdução:
Achilles tendon rupture is a common accident observed in high performance or recreative athletes and causes structural and functional changes. Several studies described that tendon repair is characterized by painful, however, few reports describe the changes in central nervous system (CNS) evoked by tendon rupture. Previous studies demonstrated that peripheral lesions can cause axonal death in the lumbar segment of spinal cord, but the effect of tendon lesion on it remains unclear.
Objetivos:
This study aimed to investigate if Achilles tendon rupture induces apoptosis in spinal cord of rats.
Métodos:
Male Wistar rats were used and subjected to right-Achilles tendon rupture and divided in two groups (n=6/group): Rupture (tenotomy) and compared to Control group (no intervention). The animals were anesthetized, sacrificed and they had their spinal cord L5 lumbar segment dissected. Apoptosis in the rat spinal cord were evaluated by immunofluorescence to Caspase-3. Functional analysis was performed by the Achilles functional index (AFI) at 7 and 14 days post injury (dpi). For the statistic, the ANOVA-1 and Tukey post-test was used ($p \leq 0.05$/ mean ± SD). The study was approved by the local ethics committee (CEUA-UFPA 8179020318).
Resultados e Conclusões:
Immunofluorescence to Caspase-3 showed intense immunoreactivity in Rupture group with predominance on sensory region (dorsal horns) of L5 when compared to Control group. The AFI values also indicate that tendon lesion declines significantly its functionality (Rupture: -85.7 ± 29.5; Control: -5.290 ± 12.3, $p < 0,01$) and 14 (Rupture: -54.4 ± 18.2; Control: -4.70 ± 5.53, $p < 0,01$) dpi. These results show for the first time that tendon rupture induces cell death in spinal cord and correlates it with decline of gait functionality.
Palavras-chaves: Apoptosis, Spinal Cord, Tendon Rupture
Agência Fomento: Capes

12.013 - EFEITOS DEPENDENTES DA DOSE DA INIBIÇÃO DA FOSFODIESTERASE 10A EM DISCINESIAS INDUZIDAS POR L-DOPA

DOSE-DEPENDENT EFFECTS OF PHOSPHODIESTERASE 10A INHIBITION ON L-DOPA-INDUCED DYSKINESIAS

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Instituição: 1 USP - Ribeirão Preto - Universidade de São Paulo (Av. Bandeirantes, 3900, Monte Alegre - Ribeirão Preto - SP)Introdução:

Pharmacotherapy of Parkinson's disease (PD) is based mainly on the dopamine precursor L-DOPA. However, long-term treatment with L-DOPA has been associated with unwanted side effects called L-DOPA-induced dyskinesias (LIDs). The striatum is a key basal ganglia structure related to the LIDs. Medium spiny neurons (MSNs) make up approximately 95% of the neurons in the striatum and constitute the direct or indirect pathways. Chronic treatment with L-DOPA is able to modulate these pathways. Many evidences suggest that LIDs would arise as a result of an imbalance between the direct and indirect pathways. The enzyme phosphodiesterase 10A (PDE10A) is mostly expressed within MSNs in the striatum. They metabolize second messengers (cAMP and cGMP) and exert a strong modulation of MSNs activity.

Objetivos:

The present study aimed to determine the potential antidyskinetic effects of a novel PDE10A inhibitor (ME3398) in a rat model of PD.

Métodos:

All procedures were approved by the local ethic committee (CEUA-FFCLRP/USP (18.5.35.59.5). 6-OHDA lesioned rats were chronically treated once daily for one week with L-DOPA (5 mg/kg/day plus benserazide 12.5 mg/kg/day, subcutaneously). After this period, dyskinetic rats were selected (n=11) and received either vehicle (n=6) or the PDE10A inhibitor ME3398 (1 or 3 mg/kg/day, oral gavage; n=3 and 2, respectively) one hour before L-DOPA, once daily for two additional weeks. Animals were recorded for 3 hours after administration of L-DOPA, three days a week during the treatment, for behavioral analysis of axial, limb and orofacial dyskinesias. The stepping test was performed once a week, 1 hour after administration of L-DOPA to monitor the effect of L-DOPA antiparkinsonian activity on animals.

Resultados e Conclusões:

ME3398 3 mg/kg increased axial, limb and orofacial dyskinesias during the third week of treatment ($P < 0.05$ vs. vehicle-DOPA-treated control group). In contrast, ME3398 1 mg/kg decreased axial (weeks 2 and 3), limb (week 3) and orofacial (week 2) dyskinesias ($P < 0.05$ vs. vehicle-DOPA-treated control group). There were no group differences in the stepping test results. These data reinforce the discussion that PDE10A inhibitors may stimulate or inhibit motor behaviors depending on the level of activation of the direct and indirect pathways the striatum. Therefore, depending on the dose, PDE10A inhibitors could be used in combination with L-DOPA either to reduce L-DOPA dosage or to attenuate LIDs.

Financial support: this work was funded by FAPESP (award numbers 2017/00003-0 and 2018/12956-5).

Palavras-chaves: Discinesia, L-Dopa, Parkinson, Fosfodiesterase 10A

Agência Fomento: FAPESP

12.014 - INTERAÇÕES ENTRE FACE E MÃO REVELADAS ATRAVÉS DA INIBIÇÃO AFERENTE.

FACE-HAND INTERACTIONS REVEALED BY AFFERENT INHIBITION

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Instituição: 1 UFRJ - Universidade Federal do Rio de Janeiro (Av Carlos Chagas FIlho, 373, Cidade Universitária - Rio de Janeiro 21941-902, RJ), 2 UCBL1 - Université Claude Bernard Lyon 1 (F-69373 Lyon, France.)Introdução:

Face and hand cortical sensorimotor representations are organized in an adjacent manner. Although there is no evidence of fibers crossing between these areas, reorganization of the sensorimotor cortex following amputation has revealed large-scale plastic changes between the hand and face representations (Flor et al. Nature 375:482, 1995).

Objetivos:

To investigate whether hand-face interactions are present in healthy subjects we measured sensorimotor interactions between these two areas using an afferent inhibition transcranial magnetic stimulation (TMS) protocol. This approach consists in inducing an inhibition of motor evoked potentials (MEP) response by pairing a tactile stimulus with a TMS pulse at specific inter-stimulus time intervals (Tokimura et al. J Physiol, 523:503, 2000). We hypothesized that if hand-face interactions exist, then stimulation of the face would inhibit hand MEPs. CAAE: 76109317.0.0000.5261.

Métodos:

We delivered an electrocutaneous stimulus to the right upper lip (Experiment 1) and recorded muscular activity from the right first dorsal interosseous (FDI) in 16 (7 male) right handed subjects, 23.4±4.5 years old. The control condition consisted in delivering the cutaneous stimulation to the tip of the right second finger and recording the muscular activity from the right FDI (Experiment 2) in 14 (6 male) right handed subjects, 23.8±4.7 years old. ISIs ranged from 15 to 250 ms. Peak-to-peak MEP amplitudes (mV) were measured off-line using custom-written MatLab script. D'AgostinoPearson omnibus tests were applied and a Friedman repeated measures non-parametric rank test with one factor (ISI) was applied. Dunn's Multiple Comparison post-hoc tests comparing the control condition (TMS-only) with each ISI (15 to 250ms) were applied with a significance level of 0.05.
Resultados e Conclusões:
The Friedman test applied on the amplitude values of the MEPs showed a main effect of ISI in Experiments 1 (χ^2 (10)=28,31; p=0,002) and 2 (χ^2 (10)=49,40; p < 0,0001). MEPs of the first dorsal interosseous were significantly inhibited by face electrostimulation at 55 ms ISI (Dunn's post-hoc test p = 0.02), showing evidence for face-to-hand afferent inhibition. For the control condition, Dunn's post-hoc tests revealed that the electrostimulation of the index finger inhibited the MEPs of the first dorsal interosseous at 150 (p = 0.009), 200 (p = 0.001), 250 ms (p = 0.02) ISIs. These results show face-to-hand sensorimotor interactions in healthy subjects, indicating that the mechanisms underlying these interactions could contribute to the phenomenon of face invasion of the hand territory observed after upper limb amputation.
Palavras-chaves: sensorimotor interactions, afferent inhibition, face, hand, reorganization
Agência Fomento: Finep, CNPq, CAPES, FAPERJ, NeuroMat FAPESP (processo nº 2013/07699-0)

12.015 - ESTUDO ANATÔMICO DOS PRINCIPAIS SULCOS E GIROS DO CÉREBRO DE CEBUS LIBIDINOSUS (RYLANDS, 2000)

ANATOMICAL STUDY OF THE MAIN SULCI AND GYRI OF THE CEBUS LIBIDINOSUS BRAIN (RYLANDS, 2000)
Autores: Júlia Soares de Moraes Siqueira 1, Tales Alexandre Aversi-Ferreira 1, Jarbas Pereira-de-Paula 3, Carlos Tomaz 2
Instituição: 1 UNIFAL - Universidade Federal de Alfenas (R. Gabriel Monteiro da Silva, 700 - Centro, Alfenas - MG, 37130-000), 2 Unb - Universidade de Brasília (UnB - Brasília, DF, 70910-900), 3 UFAM - Universidade Federal do Amazonas (Av. General Rodrigo Octavio Jordão Ramos, 1200 - Coroado I, Manaus - AM, 69067-0), 5 UNIFAL - Universidade Federal de Alfenas (Rua Gabriel Monteiro da Silva, 700 - Centro, Alfenas - MG, 37130-000)Introdução:
The Sapajus sp is a genus featuring the largest geographical distribution among neotropical primate species. Cognitive and very skillful, they display an immense capacity to handle tools for obtaining food and amusement, and such activities are observed in both captivity and in the wild. And this capacity makes them similar to Old World primates in relation to the use of tool social organization capacity based on information transmission and learning. Sapajus, human and Old World primates have the same basic neural substrate for memory, and learning tests indicate a long term convergence of the development of these species. The knowledge on the macroscopic internal structure of Sapajus would provide data to contribute in physiological, ethological and behavioral studies.
Objetivos:
To study the brain of the Sapajus genus in morphological terms to evidence the main gyri and sulci anatomy and general features of the brain compared with other primates, mainly, baboons, chimpanzees and humans.
Métodos:
No one animal was dead for purpose this work. Four specimens of adult Sapajus were used and conserved on formaldehyde. The brains were removed, studied and registered with a camera. Institutional Ethical Committee CoEP-UFG 81/2008, and authorization from the IBAMA No. 15275. To verify the similarities and differences among the brains of the species were made sinuous and straight measures of the main sulci and the distances form a sulcus to the frontal and temporal poles. For sinuous measures was used an inextensible nylon line and for straight one a caliper. Other analysis was effectuated in qualitative terms as morphological analysis because the absence of data form literature. Indeed, this kind of quantitative analysis development here, not is common in the literature.
Resultados e Conclusões:
Generally convex face lissencephaly of the occipital lobe and insula, the few sulci and gyri of the frontal lobe of Sapajus have no similarity to baboon, chimpanzee and man considering the effectuated measures for Sapajus and modern humans and morphological comparative analysis for the others. For

instance, for the central sulcus the relative value for Sapajus was 0.97 and for humans, 0.76, what indicates a more sinuous central sulcus for humans than Sapajus. However, the convex faces of the parietal and temporal lobes are similar to descriptions for morphological description for baboon, with few sulci and gyri, they are well defined but small in Sapajus. In general, the morphology of the gyri and sulci of the Sapajus brain is closer to baboons than to chimpanzees and humans, in morphological terms. Nevertheless, articles about behavior and cognition placed Sapajus closer to chimpanzees.

Palavras-chaves: anatomy, Sapajus, brain, gyri and sulci, Cebus

Agência Fomento:

12.016 - UM PROTOCOLO DE PERFUSÃO NÃO TRADICIONAL PARA A DETECÇÃO IDEAL DE NEUROPEPTÍDEOS NO ESTRIADO

A NON-TRADITIONAL PERFUSION PROTOCOL FOR OPTIMAL DETECTION OF NEUROPEPTIDES IN THE STRIATUM

Autores: Mirella Rosine Corrêa 1, Lívea Dornela Godoy 1, Fernando Eduardo Padovan Neto 1

Instituição: 1 FFCLRP-USP - Departamento de Filosofia, Ciências e Letras de RP (Av. Bandeirantes, 3900 - Vila Monte Alegre, Ribeirão Preto - SP)Introdução:

The striatum is a key basal ganglia structure involved on motor control. The majority of MNSs that project to substantia nigra reticulate and the internal portion of globus pallidus express D1 dopaminergic receptors, as well as the neuropeptides dynorphin and substance P(direct pathway). On the other hand, the majority of MSNs that project to the external portion of the globus pallidus express D2 dopaminergic receptors and the neuropeptide enkephalin (indirect pathway). Therefore, neuropeptides are important markers that can be used to dissect striatal direct and indirect pathways. However, the identification of neuropeptides using immunofluorescence (IF) protocols is challenging. Thus, the establishment of new protocols for the identification of neuropeptides using IFprotocols is necessary, especially for the investigation of mechanisms associated with Parkinson's disease and related basal ganglia disorders.

Objetivos:

The objective of this study was to use an alternative perfusion protocol to label substance P and Enkephalin in the striatum of male Sprague-Dawley rats.All procedures were approved by the ethics committee (CEUA-FFCLRP/USP18.5.35.59.5).

Métodos:

A group of rats (n=4) were perfused with oxygenated artificial cerebrospinal fluid (ACSF) containing glucose to keep brain tissue alive. Brains were then removed andimmersion-fixed for 90 min in 4% paraformaldehyde (PFA). Another group of rats (n=4) were perfused transcardially with 150 mL of phosphate-buffered saline (PBS) followed by 300 mL 4% PFA. The brains were then extracted and post fixed for 2 h in the same fixative. All brains were cryoprotected in 30% sucrose in PBS and flash frozen in isopentane cooled on dry ice. Striatum Coronal sections (50 µm) were tested in IF protocols. The following variables were evaluated: perfusion protocol, primary antibody concentration and primary antibody incubation time. For Enkephalin labeling the Abcam (USA) rabbit-produced primary antibody was tested (1:1000 and 1:2000) with incubation times of 24h or 48hs. ImmunoStar (USA) anti-rabbit Enkephalin (1:1000 for 24 hours).We obtained a positive result for ImmunoStar antibody. For Substance P labeling, the Abcam (USA) mouse primary antibody was tested (1:1000 and 1:500) with incubation times of 24h and 48hrs. Both labeling protocols were also evaluated and with or without antigen retrieval. We obtained a positive result in both incubation times, but a better signal-to-noise ratio was observed with 24h incubation with antigen retrieval. Importantly, the ACSF perfusion protocol resulted not only in a better signal with optimal sensitivity and preservation of tissue structure compared to the conventional perfusion protocol, but also Enkephalin labeling was not observed in the traditional protocol with PBS-PFA solutions.

Resultados e Conclusões:

Therefore we conclude that ACSF perfusion followed by a short post-fixation with 4% PFA is a better option than conventional perfusion protocols for the detection of neuropeptides in the striatum.

Palavras-chaves: Estriado, Imunofluorêscencia, Neuropeptídeos, Perfusão

Agência Fomento: FAPESP (Processo 2017/00003-0) e CNPq

13. Memória & Aprendizado

13.020 - BRILLIANT BLUE G, UM ANTAGONISTA DO RECEPTOR P2X7, PROTEGE CAMUNDONGOS DE DÉFICITS DE MEMÓRIA E ESTRESSE OXIDATIVO EM UM

MODELO DE DOENÇA DE ALZHEIMER INDUZIDO POR ESTREPTOZOTOCINA.

BRILLIANT BLUE G, A P2X7 RECEPTOR ANTAGONIST, PROTECTS MICE FROM MEMORY DEFICITS AND OXIDATIVE STRESS IN A ALZHEIMER'S DISEASE MODEL INDUCED BY STREPTOZOTOCIN.

Autores: Priscila Caracas 1,2, Marta Carmo 1,2, Jessica Rabelo 1,2, Tyciane Souza 1, Amanda Alves 1,2, Geanne Andrade 1,2,3
Instituição: 1 UFC - Federal University of Ceará (Fortaleza, Ceará, Brazil), 2 DFF - Department of Physiology and Pharmacology (Fortaleza, Ceará, Brazil), 3 DCM - Department of Clinical Medicine (Fortaleza, Ceará, Brazil)Introdução:
Alzheimer's disease (AD) is an age-related neurodegenerative disease characterized by a progressive decline in cognitive functions. Intracerebroventricular (icv) injection of streptozotocin (STZ) in a sub-diabetogenic dose has been likened to sporadic dementia of Alzheimer's type (Liu et al., 216; Brain Res. 1631:137-146).
Objetivos:
Since accumulating evidence demonstrates the neuroprotective effect of Brilliant Blue G (BBG) in different models of neurodegenerative diseases, we now tested the effect of this P2X7R antagonist on memory deficits and oxidative stress induced by STZ.
Métodos:
Male Swiss mice received bilateral icv injections of STZ (3 mg/kg) dissolved in artificial cerebrospinal fluid (Ethics Committee Aproval Number 39/217). Two days after the first STZ administration, injections were repeated and the animals were treated with BBG (50 mg/kg, i.p.) 1 h after surgery and once a day until the last day of behavioral evaluation (18th day after the first STZ injection).
Resultados e Conclusões:
The animals subjected to STZ administration showed significant recognition memory deficits evaluated by the object recognition task, and early and late memory deficits in the passive avoidance test. No differences of locomotor activity in the open field test were observed between groups. STZ also increased malonaldehyde and nitrite contents in the prefrontal cortex and hippocampus. BBG treatment was able to prevent the early memory deficits (latency- sham: 155.2±28.2 s; STZ: 69.9±14.9 s; STZ+BBG: 173.8±55.0 s, $p < 0.05$) and the increase of nitrite production in the hippocampus (sham: 15.6±2.0 µM; STZ: 28.0±3.6 µM; STZ+BBG: 24.2±1.7 µM, $p < 0.05$). These data highlight the therapeutic potential of P2X7R antagonists in AD, however the role of P2X7R on STZ-induced AD model requires more investigation.
Palavras-chaves: Alzheimer's disease, Streptozotocin, Brilliant Blue G, Memory, P2X7 antagonist
Agência Fomento: Supported by CNPq, CAPES and Funcap

13.021 - DINÂMICA DOS RECEPTORES IONOTRÔPICOS GLUTAMATÉRGICOS NA RESPOSTA DEFENSIVA INCONDICIONADA E CONDICIONADA DE RATOS.

DYNAMIC OF IONOTROPIC GLUTAMATERGIC RECEPTORS IN UNCONDITIONED AND CONDITIONED DEFENSIVE BEHAVIORS IN RATS.

Autores: João Guilherme Tassoni Bortoloci 1,2, Antonio de Pádua Carobrez 1
Instituição: 1 UFSC - Universidade Federal de Santa Catarina (Av. Prof. Henrique da Silva Fontes, 321 - Trindade, Florianópolis - SC), 2 USP - Universidade de São Paulo (Av. Prof. Lineu Prestes, 2415 - Butantã, São Paulo - SP)Introdução:
Early studies using the removal of cortical brain area, and electrical stimulation of mesencephalon revealed the role of dorsal periaqueductal gray matter (dPAG) in the generation and modulation of defensive behavior (DB). Furthermore, neuroanatomical combined with aversive conditioning studies demonstrated that N-methyl-d-aspartate (NMDA) applied in the dPAG could replace aversive electrical foot shock, suggesting the influence of dPAG, acting as unconditioned stimulus (US) through ascending pathways to prosencephalic areas related to aversive memory formation.
Objetivos:
Study the effects of AMPA stimulation in dPAG, on unconditioned and conditioned responses.
Métodos:
Based on these facts, we tested if quisqualic acid (QUIS), an agonist of AMPA and metabotropic subtypes of glutamate receptors, injected into the dPAG of Wistar rats would serve as US in an olfactory aversive conditioning (OAC) paradigm. Ten days after neurosurgical recovery, rats were exposed to the OAC protocol, consisting of two phases, 1) acquisition phase in the conditioning chamber, and 2) expression phase in the odor box.
Resultados e Conclusões:
QUIS applied (0.2 µl) at non-neurotoxic doses (62,5; 125, 250, 500 and 1000 pmol) resulted in an immediate increased ($p=0.000041$) %freezing+crouch-sniff

response (PBS : 12,89 ± 4,83 (n=6); QUIS250: 71,78 ± 7,1 (n=11), an effect that was blocked (p=0,0016) by the AMPA selective antagonist DNQX (31,67 ± 5,79 (n=6). Two days later, when exposed to the olfactory conditioned stimulus (CS), neither one of the QUIS doses applied supported OAC. Therefore, QUIS was able to induce an immediate DB, an effect due to its binding to AMPA receptor site. On the other hand, this DB failed to promote the olfactory association serving as a US, an effect consistently obtained when stimulating NMDA receptors. Analyzing the dynamics of glutamate receptors stimulation, the results suggest that the dPAG AMPA stimulation, alone, is not enough to promote aversive learning.

Palavras-chaves: Periaqueductal gray matter, Ionotropic glutamatergic receptors, Defensive Behavior, Olfactory aversive conditioning, Fear conditioning
Agência Fomento: CNPq

13.022 - ATIVIDADE NEURAL DO CÓRTEX PRE-FRONTAL MEDIAL E ESTRIADO DE RATOS DURANTE O APREDIZADO DA TAREFA REFORÇAMENTO DIFERENCIAL DE DURAÇÃO DE RESPOSTAS.

MEDIAL PREFRONTAL CORTEX AND STRIATUM NEURONAL ACTIVITY OF RATS DURING THE LEARNING OF THE DIFFERENTIAL REINFORCEMENT RESPONSE DURATION TASK.

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Instituição: 1 UFABC - Universidade Federal do ABC (Alameda da Universidade, s/n - Anchieta, São Bernardo do Campo - SP, 09606-045)Introdução:
Although time is a fundamental dimension of life, we don’t know yet how and where it is encoded in the brain. Ramping neurons and time cells are currently described as time-related neuronal activity. An alternative to better understand this time-related activity is to study a group of neurons during learning. Typically individuals take several days (sometimes weeks) to learn temporal tasks, which makes it hard to study temporal learning. However, we recently modified the training protocol of a temporal task, the Differential Reinforcement Response Duration (DRRD), allowing rats to learn in a single session.
Objetivos:
We aim to study how the neural activity of the prefrontal cortex and striatum changes as the rats learn a temporal task.
Métodos:
We recorded the electrophysiological activity of both exclusively in the prefrontal cortex (PFC, n=4) and simultaneously in the PFC and striatum (STR, n=4). Also, we inactivated the PFC using muscimol (n=8 rats) during the learning and performance of the task DRRD (CEUA - 2905070317).
Resultados e Conclusões:
We identified patterns of neural activity correlated with time perception as ramping neurons, both before and after learning (Nbefore=101; Nafter=70) in the PFC, and in some cases, the ramp-related activity was reduced after learning (Ndiff=31). When we compared the predictive power of the population before and after learning, we noted that the performance of prediction decreases as the rats learn for the PFC, while increases for STR. Moreover, preliminary results, of the pharmacological approach indicated that such inactivation impaired the learning of the task in the three first session, but not the performance after learning (Mmus=1.17; Msal=1.43, fourth session, Mmus=1.18; Msal=1.44, fifth session). These results support that the PFC is engaged during learning, but not during the performance of the task. At the same time, the STR is less involved in coding the interval on the first day and more involved in the second day. Therefore, our data suggest that the time-encoding information flows from the PFC to STR during learning.

Palavras-chaves: Timing , Learning, Prefrontal Cortex, Striatum, Rats
Agência Fomento: FAPESP

13.023 - Reconsolidação da memória no condicionamento de preferência por local induzido por etanol: papel da duração da reativação e dos receptores D1

Triggering reconsolidation of an ethanol conditioned place preference (CPP) memory: the role of reactivation`s length and D1 receptors

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Instituição: 1 UNIFESP - Universidade Federal de São Paulo (Rua Botucatu, 862. Bairro Vila Clementino. São Paulo - SP)Introdução:

Following recall, memory can enter in a labile state (labilization) and can be updated through the reconsolidation process. It has been proposed that the occurrence of prediction error during recall is important to induce labilization, which involves dopamine signaling. In the Conditioned Place Preference (CPP) literature, reactivation sessions successful to induce labilization are conducted in a drug-free state. Importantly, studies suggest that dopamine can be either increased by contextual cues related to the drug or decreased by prediction error if the drug was absent.
Objetivos:
Here, our goal was to study the involvement of D1 receptors (D1R) in labilization of a CPP memory.
Métodos:
To investigate this, adult male Swiss mice underwent preconditioning (day 1), conditioning (days 2-5, 2/day, ethanol 2g/kg i.p.), and 24h later the memory was reactivated by allowing the animals to freely explore the contexts in a drug-free state for 5 or 10min (day 6). Immediately after reactivation, animals received a protein synthesis inhibitor injection (cicloheximide i.p., CHX, 100mg/kg) to block reconsolidation, or saline 0,9% (vehicle i.p., VEH) as a control (2 groups in which n=10-11/group). The preference was evaluated in a test session at day 7. Next, to assess the D1R involvement in memory labilization, we repeated the same protocol but also administered the D1R antagonist SCH 23390 (0,22mg/kg), D1R agonist SKF 38393 (8mg/kg), or VEH i.p. 30min pre-reactivation and VEH or CHX immediately after reactivation (6 groups, n=9-11/group). This project was approved by CEUA/UNIFESP (n° 9701271017).
Resultados e Conclusões:
We found that CHX disrupted reconsolidation when injected after the 10min reactivation session (preference index at test, mean[SD]: VEH 0.74[0.11]; CHX 0.59[0.14]; repeated measures ANOVA, posthoc Newman-Keuls, $p < 0.05$), but not after the 5min one ($p > 0.05$). In the next experiment, SCH and SKF treatments did not affect recall (repeated measures ANOVA, posthoc Newman-Keuls, $p > 0.05$), and the 10min session unexpectedly decreased preference in most of the groups during the test ($p > 0.05$ vs preconditioning), including VEH-VEH, suggesting that extinction took place. These preliminary results indicate that the CPP memory is not labilized by a 5min reexposure, but reconsolidation is triggered following a longer 10 min session. However, a 10min reactivation may be in between the time window effective to induce reconsolidation and extinction, and additional studies will be required to infer the role of D1R in labilization.
Palavras-chaves: ethanol, conditioned place preference, memory reconsolidation, dopamine, D1 receptors
Agência Fomento: CNPq, CAPES, AFIP, FAPESP

13.024 - O METILFENIDATO PROMOVE A ATENUAÇÃO DA MEMÓRIA DO MEDO ATRAVÉS DOS MECANISMOS DE ATUALIZAÇÃO

METHYLPHENIDATE PROMOTES FEAR MEMORY ATTENUATION THROUGH MEMORY UPDATING MECHANISMS
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Instituição: 1 UFRGS - Universidade Federal do Rio Grande do Sul (Avenida Bento Gonçalves 9500 Prédio 43422, Instituto de Biociências)Introdução:
The ability to update memories through new experiences is a crucial phenomenon for survival, requiring a flexible mnemonic system such as memory reconsolidation and extinction. Nevertheless, strong aversive memories may develop into psychiatric disorders such as phobias and post-traumatic stress disorder (PTSD), which are less sensitive to extinction and reconsolidation. Several studies showed that fear memories can be attenuated by interfering with reconsolidation, intervening in their labile state during reactivation, allowing the update of its content and strength
Objetivos:
We investigated the effect of methylphenidate (MPH) as a possible psychostimulant agent, to modify emotional valence of memory, through the mechanisms of reconsolidation and extinction
Métodos:
In the conditioning session (training), during the contextual aversive conditioning task (CAC), rats were placed in the chamber for 3-min for habituation and then received two 2-s foot-shocks (1 mA), separated by a 30-s interval. After, in additional 30-s animals were taken. We also performed conditioned place preference (CPP) to assess the pleasurable effect of the drug. MPH was administered at doses of 3 mg/Kg and 10 mg/Kg (i.p.), 10 minutes before or immediately after depending on the task
Resultados e Conclusões:

In the reconsolidation paradigm, we used a three-reactivation protocol and MPH was administered 10 min before each reactivation. We found reduced freezing in the test, for both doses compared to the control group (F2,19=4,085; p=0.03). Moreover, its effect prevented spontaneous recovery (F2,19=6,615; p=0.006). Similarly, using the same protocol, we showed that this effect does not occur when the drug is administered after reactivation (F2,22=2,679; p=0.09), suggesting that MPH favors the mechanisms underlying reconsolidation. On the other hand, using a similar protocol with only one reactivation and MPH infusions pre- and post-reactivation, we demonstrated that this protocol was not enough to induce labilization of the memory (F2,21 = 3.460; p = 0.05; F2,15 = 0.4015; p = 0.67; respectively). During the extinction protocol, we showed that the drug prevented the formation of the extinction memory at the dose of 3mg/Kg (F2,21=4,654; p=0.02), but did not interfere in the consolidation of this memory (administered after extinction session, F2,26=0.9550, p=0.39). Finally, in the CPP task we showed that MPH (3 and 10 mg/Kg) induced a contextual preference (one-sample t-test; control group T9 = 0,9256; p = 0.38; 3mg/kg group T7 = 4,443; p = 0.003; 10mg/kg group T7 = 4,162; p = 0.004), suggesting the drug had exerted a pleasurable effect in the rats. The results of this study indicate that MPH attenuated an aversive memory by updating the original memory feature, when administered before reactivation session. This effect is involved in reconsolidation processes rather than in memory extinction, suggesting that MPH can act as an agent to modify the emotional valence of memory, given its properties to generate place preference.

Palavras-chaves: Methylphenidate, Reconsolidation of fear memories, extinction of fear memories
Agência Fomento: CAPES

13.025 - EFFECTS OF EMOTION ON EPISODIC MEMORY IN PARKINSON'S DISEASE

EFFECTS OF EMOTION ON EPISODIC MEMORY IN PARKINSON'S DISEASE

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Instituição: 1 UFMG - Universidade Federal de Minas Gerais (Av. Pres. Antônio Carlos, 6627 - Pampulha, Belo Horizonte - MG, 31270-901)Introdução:
Striatal circuits are critical for emotional processing and for emotional reinforcement of episodic memory. These circuits are affected in Parkinson's disease (PD). However, it remains unclear whether PD-related striatal dysfunction may affect episodic memory for emotional stimuli.
Objetivos:
We aimed to verify whether PD patients show impaired Item Memory (IM) and Source Memory (SM) performance for emotional information in comparison to healthy subjects.
Métodos:
Thirty PD patients (15/15 male/female, mean age = 62.7 years-old, mean disease duration = 13.2 years) and 30 healthy controls ([HC]; 15/15 male/female; mean age = 62.9 years-old) were recruited for the study. The PD and HC groups were matched for gender, age and educational level. All participants underwent a cognitive assessment including the Mini Mental State Examination (MMSE) and the Frontal Assessment Battery (FAB). In the emotional memory task, participants initially encoded three sets of pictures from the International Affective Picture System (IAPS), each set containing 15 pictures (5 negative, 5 positive and 5 neutral). At test, participants performed an item and a source memory test for each of the 45 studied pictures, plus 15 new pictures (5 for each emotional category). On each trial, a picture was shown in the center of the computer screen, and participants initially judged whether it was "old" or "new". For each "old" judgment, a source judgment was required (i.e., the item was seen in set 1, 2 or 3?). The pictures were presented in a random order.
Resultados e Conclusões:
PD patients scored worse than HC on MMSE (PD vs HC: 28 vs. 25, $p < 0.001$) and FAB (PD vs HC: 16 vs. 16, $p < 0.01$), and showed impaired performance relative to HC on both the IM (proportion correct of 0.79 and 0.88, respectively, $p = 0.002$) and the SM tasks (proportion correct of 0.34 and 0.43, respectively, $p = 0.007$). Whereas HC showed greater item memory performance for emotionally negative and emotionally positive items in comparison to neutral items (d's of 3.18, 2.87, and 2.54, respectively), such emotional advantage was absent for PD participants (d's of 2.26, 2.18, and 2.10, respectively). For source memory, no emotional advantages were evident for both groups. The current findings suggest that the striatal circuits affected by PD have an important role in the memory advantage often showed for emotional information. Importantly, however, such pattern was not replicated in the source memory task.

Palavras-chaves: Emotion, Episodic Memory, Parkinson's
Agência Fomento:

13.026 - A MEMÓRIA TOMA LADOS? O PAPEL DO CORTÉX PRÉ-LÍMBICO DIREITO E ESQUERDO NO PROCESSAMENTO DE MEMÓRIAS EPISÓDICAS.

DOES MEMORY TAKES SIDES? THE ROLE OF THE LEFT AND RIGHT PRELIMBIC CORTEX IN PROCESSING EPISODIC MEMORIES.

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The prelimbic cortex (PL) is a subregion of the medial prefrontal cortex with reciprocal connections with the hippocampus, forming what is known as the hippocampo -prefrontal cortex pathway. Several studies have shown that the PL is essential for processing episodic memories. Most recently, evidence points to a lateralized function of the PL, specially for exhibition of anxiogenic/anxiolytic behaviors and modulation of stress responses in rodents.
Objetivos:
Thus, the present study aimed to assess the role of the PL in processing (acquisition, consolidation and recall) recent and remote memories, and also recognition memory. For the first time, a study investigated if the PL plays a lateralized function in the processing of episodic memories recently or remotely acquired
Métodos:
The protocols used were Morris Water Maze (MWM), spontaneous object recognition test (SOR) and T maze paradigms. Two MWM probe trials were performed: probe trial 1 occurred on experimental day 8 to access recently acquired memory; whereas probe trial 2 was performed four weeks after probe trial 1, to evaluate remotely acquired memory. The experimental procedures for SOR and T maze were performed between probe trials 1 and 2. Rats were distributed in experimental groups that received bilateral injection of vehicle in both PL (vehicle group - VeG); or unilateral injection of ibotenic acid (IBO-10 µg/ µL) into the left PL (left group - LeG), or right (right group - RiG); or bilateral injection of IBO in both PLs (bilateral group - BiG) - (CEUA approval number 134/2016).
Resultados e Conclusões:
In the MWM test, groups did not differ from each other when escape latency was compared ($F(3,32)= 1.96$ and $P > 0.05$ – VeG= 11.6 ± 0.7; LeG= 14.6 ± 1.4; RiG+ 14.2 ± 1.4; and BiG= 16.1 ± 1.7). Regarding retention time, groups with PL lesion (LeG, RiG and BiG) had impaired performance compared to VeG in probe trial 2 ($F(3,32)= 3.2$ and $P < 0.05$ - VeG = 23 ± 1.1; LeG = 17.2±1.5; RiG = 17.2±1.2; BiG = 17.9±2.2. Whereas during probe trial 1 the groups did not differed between them ($F(3,32)= 0.6$ and $P > 0.05$ - VeG = 20.1 ± 1.2; LeG = 23.4 ± 2.5; RiG = 21.1 ± 1.3; BiG = 23.5 ± 3;). In the T maze, BiG showed significantly lower percentage of correct choices compared to VeG ($F(3,30)=3.5$ and $P < 0.05$ - VeG = 68.3 ± 2; BiG = 39.8 ± 2.2;). Meanwhile, no difference between groups was observed during probe trials ($H1 = 2.5$, $P > 0.05$ – VeG: 22.5 ± 8%; LeG: 48.2 ± 9.8%, RiG: 41.7 ± 10% and BiG: 54.2 ± 10%). Also, in the ORT, there was no evidence of difference between groups. Thus, results demonstrate that the PL plays an important role in the processing of episodic memories, especially for working memory (in the T Maze) and the retrieval of remote memories (probe trial 2 of MWM), without affecting recently acquired memory (probe trial 1 of MWM). Still, no evidence of functional lateralization was observed.
Palavras-chaves: lateralization, consolidation, prelimbic cortex, remote memory, recent memory
Agência Fomento: Fundação de Amparo a Pesquisa do Estado de São Paulo (FAPESP) e Conselho Nacional de Desenvolvimento Científico e Tecnológico (CNPq)

13.027 - OUABAIN ALTERS HIPPOCAMPAL NEURONAL MORPHOLOGY AND IMPROVES SPATIAL MEMORY.

OUABAIN ALTERS HIPPOCAMPAL NEURONAL MORPHOLOGY AND IMPROVES SPATIAL MEMORY.

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Instituição: 1 ICB- USP - Instituto de Ciências Biomédicas- Universidade de São Paulo (Avenida Professor Lineu Prestes, 1524 - ICB I, Campus SP-Butantã CEP 05508-000), 2 IB-USP - Instituto de Biociência, Universidade de São Paulo (Rua do Matão,

Travessa 14, 101 São Paulo-Brasil 05508-090)Introdução:
Na, K-ATPase (NKA) is a heterodimeric integral plasma membrane protein of vital importance due to its establishment of plasma membrane electrochemical gradient, including the maintenance of the rest membrane potential in excitable cells, however in the presence of ouabain (OUA), NKA may also act as a receptor triggering signaling pathways activation.
Objetivos:
To investigate the effects of OUA 10 nM in the modulation of spatial memory and in neuronal morphology, as well as molecular mechanisms involved.
Métodos:
Adult Male Wistar rats provided by ICB-USP (CEUA 74/2017) were submitted to stereotaxic surgery to receive the intrahipocampal injection of OUA 10 nM or saline. After 1, 10 and 24 hours of injection, hippocampus were removed and used in Western Blot, PCR, Imunofluorescence, EMSA or ELISA assays. For Golgi Cox Staining animals were euthanized after 7, 14 and 21 days of injections. Spatial memory was analyzed by Morris Water Maze test.
Resultados e Conclusões:
The results suggest that after 7 and 14 days of OUA infusion an increase in dendritic ramification was observed [OUA (7.583±0.5490, n=22) vs. SAL (5.761±0.3381, n=21), p=0.0286] and it was still observed after 14 days [OUA (6.413± 0.1893, n=60) vs. SAL (4.090± 0.1286, n=59), p < 0.0001]. At the same time course OUA group presented a better performance in spatial memory task. Results suggest that the OUA group spend more time (in seconds) in platform quadrant after 24h of last training session [OUA (49.60 ±3.487, n=10) vs. SAL (36.20 ±3.241, n=11) p=0.0115] and can still remember the exact platform position after 48 h [OUA (33.11± 6.277, n=10) vs. SAL (18.40± 2.986, n=11). p=0.0429]. Biochemical analysis showed that OUA modulates proteins related to Wnt/ β-Catenin signaling pathway as observed by increased pGSK-3 β levels at 10 h [OUA (2.402 ± 0.55) compared to Saline (0.9993 ± 0.1642) n = 15, p = 0.042], and decreased β-Catenin phosphorylation after 10 h [OUA (0.5678 ± 0.1672) vs. SAL (0.9988 ± 0.1986) n = 9], and after 24 h [OUA (0.7106 ± 0.1550) vs. SAL (1.00 ± 0.2181) n = 12, p < 0.0001]. Furthermore, intrahippocampal OUA injection activates NF κB signaling pathway at 1h and 10h [1h OUA (10.526 ± 740) vs. SAL (7569 ± 571), n = 4] and [10 h: OUA (11378 ± 790) vs. SAL (7941 ± 408) n = 4, p=0.0001]. CREB and BDNF were also activated after 10h [CREB: OUA (7790 ± 925.5) vs. SAL (3181 ± 1264), n = 3, p = 0.0423] and BDNF [OUA (0.1289 ± 0.006334, n = 9) vs. SAL (0.1038 ± 0.004605, n = 8), p < 0.05]. Conclusion: OUA can modulate the activation of signaling pathways that are important in synapse regulation, favoring neuronal arbor branching in CA1 and improving spatial reference memory.
Palavras-chaves: Ouabain, Na,K-ATPase, BDNF, spatial memory
Agência Fomento: FAPESP 2011/22844-0

13.028 - O BLOQUEIO DOS RECEPTORES SEROTONINÉRGICOS 5-HT5A, 5-HT6 E 5-HT7 NA AMIGDALA BASOLATERAL, MAS NÃO NO HIPOCAMPO, FACILITA A EXTINÇÃO DA MEMÓRIA DE MEDO

THE BLOCKADE OF THE SEROTONINERGIC RECEPTORS 5-HT5A, 5-HT6 AND 5-HT7 IN THE BASOLATERAL AMYGDALA, BUT NOT IN THE HIPPOCAMPUS FACILITATE THE EXTINCTION OF FEAR MEMORY
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Instituição: 1 PUCRS - Pontifícia Universidade Católica do Rio Grande do Sul (Av. Ipiranga, 6681 Partenon - Porto Alegre / RS), 2 INNT - Instituto Nacional de Neurociência Translacional (Av. Carlos Chagas 373, Bl. F,rm 1-31 - Rio de Janeiro/RJ)Introdução:
Extinction memory is the inhibition of retrieval of a previously acquired memory through overlapping of a new memory. It is the mainstay of exposure therapy, which is widely used to treat drug addiction, phobias and fear-related pathologies such as post-traumatic stress disorder. The serotonin (5-HT) system is positioned to modulate the extinction memory circuitry via ascending 5-HT projections that innervate certain brain structures including the hippocampus and the basolateral amygdala (BLA) [1].
Objetivos:
Investigate the participation of 5-HT5A, 5-HT6 and 5-HT7 receptors of the CA1 region of the hippocampus and BLA on the consolidation of extinction of contextual fear conditioning (CFC) memory, through local administration of agonists and antagonists of these receptors.
Métodos:

Male Wistar rats (300-330g) were subjected to CFC task and 24h later they were submitted to an extinction memory training (Ext). The retention test occurs 24h later. Animals received intra-CA1 or intra-BLA infusions of SB699551 (10 µg/side), 5-HT5A antagonist; WAY-208466 (0.04 µg/side), 5-HT6 agonist; SB-271046A (10 µg/side), 5-HT6 antagonist; AS-19 (5 µg/side), 5-HT7 agonist; SB-269970 (5 µg/side), 5-HT7 antagonist, immediately or 3h after the Ext. CEUA/PUCRS 8010

Resultados e Conclusões:

The infusion immediately after extinction memory training of 5- HT5A (BLA $p < 0.001$; CA1 $p > 0.05$), 5-HT6 (BLA $p < 0.001$; CA1 $p > 0.05$) and 5-HT7 (BLA $p < 0.001$; CA1 $p > 0.05$) antagonists, and 3 h after extinction memory training of 5-HT5A (BLA $p < 0.001$; CA1 $p > 0.5$) and 5-HT7 (BLA $p < 0.01$; CA1 $p > 0.05$) antagonists in the BLA region, but not in CA1, facilitates the extinction of CFC memory. The antagonism of 5-HT5A, 5-HT6 and 5-HT7 receptors in BLA is beneficial for the consolidation of extinction memory in different time-points, an effect not seen in the CA1 region of the dorsal hippocampus. Specific time-related effects of serotonin on extinction memory unfold new prospects regarding the operation of this system and widens the range of possible therapeutic approaches, begetting new evidences in memory research that encourage new lines of investigation.

Palavras-chaves: AMYGDALA, EXTINCTION MEMORY, HIPPOCAMPUS

Agência Fomento:

13.029 - MEMÓRIA DE EXTINÇÃO É FACILITADA POR METILFENIDATO E REGULADA POR RECEPTORES DE DOPAMINA E NORADRENALINA

EXTINCTION MEMORY IS FACILITATED BY METHYLPHENIDATE AND REGULATED BY DOPAMINE AND NORADRENALINE RECEPTORS

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Instituição: 1 PUCRS - Pontifícia Universidade Católica do Rio Grande do Sul (Avenida Ipiranga, 6690)Introdução:

Extinction is defined as the learned inhibition of retrieval and is the mainstay of exposure therapy, which is widely used to treat fear disorders. The psychostimulant methylphenidate (MPH) increases the extracellular levels of noradrenaline and dopamine by blocking their reuptake and can modulate hippocampal physiology and functions including long-term potentiation, learning and memory.

Objetivos:

We investigated the effect of MPH infused into the CA1 region of the hippocampus on extinction memory in animals normally incapable of showing contextual fear conditioning (CFC) extinction because of weak training, and the possible mechanisms through which it acts during this process.

Métodos:

Male adult Wistar rats (300-330 g) were submitted to stereotaxic surgery in order to implant bilateral infusion cannulae targeting CA1. On day 1 (CFC Training), animals were placed in the conditioning chamber for 2 min, then received 3 scrambled footshocks (0.5 mA/2s, 30s interval). On day 2, animals were placed in the same chamber for a weak 10-min extinction training (Ext Tr), without electric stimulation. On day 3, animals were placed again in the same apparatus for a 3-min Ext Test. Vehicle (Veh; saline 0.9%), methylphenidate (MPH; 12.5 µg/side), the β-adrenergic receptor antagonist timolol (Tim; 1.0 µg/side), the D1-family dopamine receptor antagonist SCH23390 (SCH; 1.5 µg/side), or coinfusions of MPH plus Tim or plus SCH were administered into CA1 20 min before or immediately after Ext Tr. Data are expressed as mean ± SEM and were analyzed by one-way ANOVA followed by Newman–Keuls Test (n = 8–12 animals per group). Protocol approved by CEUA/PUCRS 11/00262.

Resultados e Conclusões:

Animals that received MPH into CA1 before Ext Tr expressed less freezing behavior during Ext Tr and during Ext Test, indicating that animals were able to learn the Ext of CFC, while Veh-treated animals were not [$F(5,54)=12.48$, $P < 0.0001$; Ext Tr MPH vs. Ext Tr Veh $P < 0.0001$; Test MPH vs. Test Veh $P < 0.001$]. Animals that received MPH intra-CA1 immediately after Ext Tr expressed the same freezing behavior in Ext Test as the Veh group, indicating that none of the groups were able to learn the Ext of CFC [$F(3,65)=2.44$; $P > 0.05$]. Animals that received MPH+Tim and MPH+SCH into CA1 before Ext Tr expressed less freezing compared with Veh-treated animals during Ext Tr [$F(8,87)=13.68$, $P < 0.0001$; Ext Tr MPH+Tim vs. Ext Tr Veh $P < 0.0001$; Ext Tr MPH+SCH vs. Ext Tr Veh $P < 0.0001$; Test MPH vs. Test Veh $P < 0.001$]. However, during Ext Test, all groups (Veh, MPH+Tim and

MPH+SCH) exhibited similar levels of freezing, indicating that blockade of β-adrenergic and D1-family receptors reversed the effect induced by MPH (Veh vs. MPH+Tim:P > 0.05 Veh vs. MPH+SCH P > 0.05). These results suggest that MPH in the CA1 region of the hippocampus induces extinction memory consolidation and this process occurs through both β-adrenergic and D1/D5 dopaminergic receptors.

Palavras-chaves: Contextual fear conditioning, Dopamine, Extinction, Hippocampus, Noradrenaline
Agência Fomento: CNPq e CAPES

13.030 - CONDICIONAMENTO AO MEDO ESPECÍFICO NOS RATOS CARIOCAS DE ALTO E BAIXO CONGELAMENTO

CUED FEAR CONDITIONING IN CARIOCA HIGH- AND LOW-CONDITIONED FREEZING RATS

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Instituição: 1 PUC-Rio - Pontifícia Universidade Católica do Rio de Janeiro (Rua Marquês de São Vicente, 225, Gávea - Rio de Janeiro, RJ, 22451-900, Brasil.)Introdução:

Anxiety disorders comprise a broad range of psychiatric conditions, including general anxiety (GAD) and specific phobias (SP). For the last decades the use of animal models of anxiety has offered important insights into the understanding of the association between these psychopathologies.

Objetivos:

The aim of this study was investigate whether Carioca high and low conditioned freezing rats (CHF and CLF, respectively), a GAD animal model of anxiety, show similar high and low freezing behavioral phenotypes for cued auditory fear conditioning (SP model).

Métodos:

In this study were used adult CHF (n=16), CTL (n=16) and CLF (n=16) male rats obtained from the F28 outbreeding generation of the CHF, CTL and CLF lines. We used different sets of chambers to study auditory fear conditioning (chambers A and B). On the conditioning day (chamber A), CHF, CTL and CLF rats were evenly assigned to Shock+tone (n=24) and Tone only (n=24) conditions. Fear acquisition was next elicited in the Shock+tone groups by administering 3 unsignaled foot-shocks of 1mA each and 1s in duration while presenting a 30s audible cue, a 1000kHz pure tone of 67dB. All experimental groups were habituated to the new chamber B context for 8 minutes 24hrs after the auditory cue fear session (day 1). The next day, all experimental groups were tested by the same pure tone presented on day 1 (CS). Procedures were performed in compliance with the Animal Care and Use Committee of the State University of Rio de Janeiro (CEUA 036/2013).

Resultados e Conclusões:

On day 1, all Shock+tone groups displayed significant more freezing time than all Tone only groups (two-way ANOVA: treatment, F (1.48) = 379.52, P < 0.001). CHF and CTL (Shock+tone) exhibited significantly more freezing than CLF ones in the same experimental condition (FPLSD post hoc tests, P < 0.001). As expected, there were no significant differences of freezing between all experimental groups in baseline (FPLSD post hoc tests, all P > 0.05). On the day 2, CHF presented significantly more freezing than the other groups (two-way ANOVA: treatment, F(1.48)= 7.31, P < 0.05; lineage, F(2.48)= 9.19, P < 0.001; lineage x treatment, F(2.48)= 3.27, P = 0.05). On the day 3, the baseline did not reach statistical significance (FPLSD post hoc tests, P = 0.07). All Shock+tone groups were conditioned to the cued auditory stimulus that was presented on day 1 (FPLSD post hoc tests, All P < 0.05). Conclusions: Compared to previous findings of contextual fear in CHF and CLF rats, the current results clearly show a different conditioning pattern for the Carioca line in the cued auditory fear conditioning. In the contextual fear, CHF animals freeze more than CTL rats and these more than CLF ones when returned to the same context used for fear acquisition. Instead, in the cued auditory fear conditioning, no differences in the amount of freezing were observed between CHF and CTL groups during the auditory CS presentation and, for the first minute of the testing session, CLF rats also presented comparable freezing values.

Palavras-chaves: Implicit memory, Aversive learning, Animal anxiety model, Specific fear conditioning, Contextual fear strains
Agência Fomento: CNPq e CAPES

13.031 - PREVENTING ADOLESCENT STRESS-INDUCED COGNITIVE AND MICROBIOME CHANGES BY DIET

PREVENTING ADOLESCENT STRESS-INDUCED COGNITIVE AND MICROBIOME CHANGES BY DIET

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Busca 5, Alessia Costa 2, Fiona Fouhy 5, Conall Strain 5, Catherine Stanton 5, Patrizio Blandina 2, Jociane de Carvalho Myskiw 1,4, Ivan Izquierdo 1,4, John F. Cryan 3, Maria Beatrice Passani 2
Instituição: 1 PUCRS - PUCRS (Brazil), 2 University of Floren - University of Florence (Italy), 3 UCC - University College Cork (Ireland), 4 NITN - National Institute of Translational Neuroscience (Brazil), 5 FBD - Teagasc Food Research Centre, Food Biosciences Department (Ireland)Introdução:
Psychological stress during adolescence may cause enduring cognitive deficits and anxiety in both humans and animals, accompanied by rearrangement of numerous brain structures and functions. A healthy diet is essential for proper brain development and maintenance of optimal cognitive functions during adulthood. Furthermore, nutritional components profoundly affect the intestinal community of microbes that may affect gut-brain communication.
Objetivos:
Evidence suggests that a healthy diet, rich in vitamins and omega-3 polyunsaturated fatty acids (-3 PUFAs) exerts favorable effects on stress reactivity and cognitive performance. This study aims to investigate the effects of an -3 PUFAs/Vitamin-A enriched diet in the negative effects of chronic stress.
Métodos:
Male Wistar rats were randomly divided into in three groups: non-stressed fed with control diet (NSCD), stressed fed the control diet (SCD) and stressed fed with enriched diet (SED). The social instability stress (SIS) protocol was used, which consisted of combination of repeated 1h daily isolation in a small container followed by pairing with a new partner and new cage. The stressful procedure was repeated for 15 days starting on post-natal day 30. Contextual fear conditioning (CFC) memory, brain-derived neurotrophic factor (BDNF) expression and gut microbiome composition were evaluated at adolescence and adulthood.
Resultados e Conclusões:
One-way ANOVA and Bonferroni showed that SCD rats froze less during the retention test compared with NSCD at adolescence ($P < 0.001$) and adulthood ($P < 0.001$). The enriched diet restored the fear memory expression, once SED rats spent significantly more time freezing at retention test compared with SCD rats, at adolescent ($P < 0.05$) and adulthhod ($P < 0.001$). One-way ANOVA and Bonferroni revealed that SIS led to a decrease in hippocampal BDNF expression in the SCD group compared with NSCD group at adolescence ($P < 0.01$) and adulthood ($P < 0.05$). Interestingly, the enriched diet prevented this effect in both ages (adolescence: $P < 0.001$; adulthood: $P < 0.01$). A principal component analysis identified structural differences in the microbial community between adolescent NSCD and SCD rats ($P < 0.05$, pairwise permutational multivariate ANOVA), indicating a shift of the microbiome composition following SIS, that was almost entirely prevented in the SED rats ($P < 0.1$). No long-lasting impact of stress on the composition of the gut microbiota was identified in adult rats. Conclusions: Our findings highlight the beneficial effects of enriched diet on the memory impairment, on the decline in the BDNF expression in the hippocampus and on the changes in the gut microbiota composition induced by SIS. Taken together, these results strongly suggest a beneficial role of nutritional components in ameliorating stress-related behaviors and associated neurochemical and microbiota changes, opening possible new venues in the field of nutritional neuropsychopharmacology.
Palavras-chaves: contextual fear conditioning, novel object recognition, memory
Agência Fomento:

13.032 - MONITORANDO ESTADO ATENCIONAL NA EDUCAÇÃO COM UTILIZAÇÃO DE fNIRS

MONITORING ATTENTIONAL STATE IN EDUCATION WITH fNIRS

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Instituição: 1 UFABC - Universidade Federal do ABC (Av. dos Estados, 5001 - Bangú, Santo André - SP, 09210-580)Introdução:
The advances in functional near-infrared spectroscopy (fNIRS) acquisition systems make it possible to collect the data of hemodynamic states in several brain regions in a naturalistic, comfortable and safe manner for participants. E-learning has been an established teaching modality and with the popularization of internet access, the interactivity in the virtual environments of teaching has begun to reinforce the concepts learned. As the exercises present in the in the modality of student interaction hold attention of the students, increasing the learning capacity, but little is known about the effectiveness of this kind of activity.
Objetivos:
We collected data from functional near-infrared spectroscopy (fNIRs), over the prefrontal cortex region (responsible for planning complex cognitive behavior,

decision making, and moderating social behavior) of 18 undergraduate and graduate students using NIRSport equipment (company NIRx Medical Technologies) while watching a free recorded lecture, with interactive lesson with 10 multiple choice exercises. We used the students' brain hemodynamic signals to predict their hits and errors for each question answered training two machine learning models: Logistic Regression with Lasso regularization and Random Forest.
Métodos:
With the signals of oxyhemoglobin and deoxyhemoglobin collected, we divided them by highlighting the signal corresponding to the content of each exercise solved by the students. We used the average of the signal from each of the 20 channels collected for each video excerpt, totaling 180 input data. We implemented supervised learning algorithm with k-fold cross-validation to classify correct answers and errors in exercises as a function of oxyhemoglobin and deoxyhemoglobin. From the signal collected from each stretch, the trained models could predict whether the students would hit or miss each question in function of each channel collected. The research approved by the Ethics Committee: 41837515200005594
Resultados e Conclusões:
The random forest and logistic regression with lasso obtained satisfactory results, respectively 0.655 and 0.668 area of the ROC curve, result considered good and by p-value < 0.005 determined by permutation test. In addition to the result of the ROC curve and acceptable p-value, we also analyzed the confusion matrix, which resulted in the Kappa index: 0.27 for Random Forest and 0.22 for logistic regression with lasso (both considered as “fair” results on the Kappa scale). Also, both models indicated that the information from the channels F6 and F8 (based on the EEG 10-20 system) are the ones with the greatest impact on the predictive model, suggesting a significant contribution to the language understanding and semantic decision tasks. With this research, it was possible to make an acceptable predictive model to identify whether a student gets the exercises right or wrong in an interactive class, as well as to identify which regions of the prefrontal cortex are most relevant and influence the results.
Palavras-chaves: attention, fNIRS, machine learning
Agência Fomento: CAPES

13.033 - HABILIDADES DE MEMÓRIA DE CURTO PRAZO E DE TRABALHO EM CRIANÇAS DE 6-12 ANOS COM AQUISIÇÃO DE LEITURA TÍPICA E COM ATRASO: UM ESTUDO COM fNIRs.

SHORT-TERM AND WORKING MEMORY SKILLS IN 6-12 CHILDREN IN TYPICAL AND DELAYED READING ACQUISITION: A fNIRS STUDY
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Instituição: 1 UFABC - Federal University of ABC (Alameda Universidade, s/n, bairro Anchieta -SBC - SP), 2 HIAE - Instituto do Cérebro, Hospital Israelita Albert Einstein (Av. Albert Eistein 627 - Jd. Leonor - SP - SP)Introdução:
Phonological working memory is a important function for reading acquisition. Studies have shown that digit span performance strongly relates to language learning (Gathercole et al., 1997, Holzman & Payne, 1983). In fact, a poor digit span performance indicates deficit in associative memory and a verbal short-term memory (Jones & Macken, 2015). Imaging method of functional near-infrared spectroscopy (fNIRS) is a indirect measure of brain activity using concentration changes of oxygenated and deoxygenated hemoglobin. By measuring prefrontal cortex, it’s possible to obtain a robust quantification of cognitive activity related to digit span performance.
Objetivos:
The aim of this study was to assess verbal working memory in a group of 127 children in typical and delayed reading acquisition (atypical) using fNIRS.
Métodos:
A cap with 28 channels, 8 sources and 15 detectors - which 8 were short channel- was placed over the participant's frontal lobe, following the 10-20 system. Forward (FD) and Backward (BD) Digit Span tasks were performed while brain hemodynamic activity signal was recorded with fNIRS. Children heard a recorded sequence of numbers and were asked to repeat them in the same or reverse order according to the block. Before the experiment, spans in the direct and reverse order were determined for each participant, in order to adjust for task complexity level. We used nirsLAB for data analysis. The research was approved by UFABC Ethics Committee (number 2886946).
Resultados e Conclusões:

Performance was better in direct than reverse order for typical (FD:98±4.25%, BD:74.9±24.1%) as well as atypical (FD:97.5±7.21%, BD:68.6±30.9%) group. Concentration of oxygenated hemoglobin was compared between direct and reverse order tasks and typical (n=75) and atypical (n=42) groups. SPM results showed greater concentrations of oxy-Hb for reverse order task. Channels located at the right and left anterior prefrontal cortex exhibited significant thresholded activation ($p < 0.05$). We observed a significant different activation ($p < 0.05$) between atypical and typical group in anterior prefrontal right cortex for FD task, but not in BD task. These results indicate that forwards digit span only was able to differentiate between the groups and was possibly more cognitively demanding for atypical group. Children with difficulties in reading acquisition engaged more the prefrontal lobes in the short-term phonological memory task. This pattern of activation may be a marker of atypical language development.

Palavras-chaves: fnirs, reading aquisition, working memory, digit span

Agência Fomento: UFABC, CAPES, FAPESP

13.034 - ABORDAGEM FARMACOLÓGICA DE ÁREAS CORTICAIS PARA AVALIAÇÃO DE RISCO DURANTE UMA TAREFA TEMPORAL

PHARMACOLOGICAL APPROACH OF CORTICAL AREAS TO RISK ASSESSMENT DURING AN INTERVAL TIMING TASK

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Instituição: 1 UFABC - Universidade Federal do ABC (Alameda da Universidade, s/n - Anchieta, São Bernardo do Campo - SP), 2 WPU - William Paterson University (300 Pompton Rd, Wayne, NJ 07470, USA)Introdução:

The anterior portion of the insular cortex (AIC) comprises a region of sensory integration that appears to detect salient events to guide goal-directed behavior, code error awareness, and estimate the passage of time. Temporal processing in this region could occur by the integration of representations of body states. Projections between the AIC and medial prefrontal cortex (mPFC) - found both in rats and humans - also suggest a possible role of these structures in the integration of autonomic responses during ongoing behavior. Few studies investigated the role of AIC and mPFC in decision making and time estimation tasks. However, their findings are not consistent and a possible causal relationship between those areas remains unclear.

Objetivos:

This study explored the role of the AIC and mPFC in temporal decision-making in rats during a switch paradigm.

Métodos:

In this task, the simultaneous presentation of two lever options that predict reinforcement after a fixed interval (short 3 s in one lever and long 6 s in the other) leads to the emergence of a switch behavior, defined as the moment in a trial in which the rat stops pressing the short lever and starts pressing the long lever in search of a reward. Eighteen male Wistar rats were trained in this switching paradigm for a total of 41 sessions. Then, they received bilateral microinjections of muscimol (a GABA-A agonist) or vehicle into mPFC or AIC before the switch task (i.e., 4 test sessions, one for each combination of drug/area).

Resultados e Conclusões:

Results showed that the rats switched levers in order to maximize their expected gains. In the last five sessions of training before surgery (asymptotic performance), rats performed correct switches (i.e., switches between 3 s and 6 s) in 95% of the long trials. Mean rate (and standard error) of the switch latency (a measure of timing accuracy) was 5.58 (0.29) seconds. The coefficient of variation, a measure of timing precision, was 0.21 (0.02). Preliminary results of mPFC inactivation revealed a change in the switch latency distribution, impairing interval timing accuracy and precision. Mean rate (and standard error) of the switch latency was 8.33 (2.03) seconds and the coefficient of variation was 0.93 (0.18). The next steps of this study include the manipulation of the probability of short and long trials to evaluate the involvement of these areas in risk assessment. Our results should contribute to the understanding of the neural mechanisms underlying the encoding of uncertainty as a function of time. This experiment has been approved by the Ethics Commission on Animal Use at UFABC, protocol #5758060918).

Palavras-chaves: switch task, probability estimation, decision under uncertainty, insular and prefrontal cortex, rats

Agência Fomento: UFABC, CAPES and FAPESP (# 2017/13904-6)

13.035 - NEONATAL ANOXIA IN RATS: INCREASE IN SYNAPSIN I PROTEIN LEVELS, NUMBER OF PARVALBUMIN INTERNEURONS IN HIPPOCAMPUS AND SPATIAL MEMORY IMPAIRMENT IN ADULT RATS

Neonatal anoxia in rats: increase in synapsin I protein levels, number of parvalbumin interneurons in hippocampus and spatial memory impairment in adult rats

Autores: Juliane Midori Ikebara 1, Débora Sterzeck Cardoso 1, Renata Silva Jorge 1, Caio Isaias Braga 1, Mariana Sacrini Ayres Ferra 1, Silvia Honda Takada 1, Alexandre Hiroaki Kihara 1
Instituição: 1 UFABC - Universidade Federal do ABC (Rua Arcturus, 3 - São Bernardo do Campo, SP)Introdução:
The neonatal anoxia is one of the most common causes of morbidity and mortality in neonates. This injury in early life corresponds to 23% of neonatal deaths in the entire world being an important issue for public health. The longlasting sequelae include motor deficits, behavioral and sensory and /or cognitive impairments, such as memory and learning deficits. The hippocampus is a vulnerable structure to oxygen deprivation due its high metabolic demand and capacity for synaptic plasticy. The present model of neonatal anoxia has showed, in previous work, cell death in hippocampus 24 hours after oxygen deprivation, and in adult life, it was observed decrease of neurogenesis and impairments in spatial and working memory. In this work, we hypothesize that oxygen deprivation may cause alteration in synaptic proteins and number of interneurons. These interneurons are related to memory consolidation and electrophysiologic modulation and can be altered due the oxygen deprivation in early life.
Objetivos:
In this way, the aim of this study was to evaluate if neonatal anoxia causes alterations in protein levels of proteins related to synapsis, such as synapsin I and synaptophysin and in distinct hippocampal interneurons number cells, such as parvalbumin (PV), calretinin (CR), and if the animals submitted to neonatal anoxia present deficits in working memory using novel object recognition task in adult rats.
Métodos:
P1/P2 neonates Wistar rats (Rattus norvegicus) were divided in anoxia (ANX) and control (CTL) groups. Anoxia was performed according to described system of neonatal anoxia, composed by 25 minutes of 100% nitrogen gas exposure at 37°C. At P60, the rats were euthanized, brains were collected to immunohistochesmitry and the hippocampi were removed for western blotting analysis. In working memory task, we performed the novel object recognition task using two pairs of previously standardized objects with simultaneous electrophysiological recordings. The procedures described were approved by the Animal Use Ethics Committee UFABC (1768161116).
Resultados e Conclusões:
Our preview results showed an increase of synapsinI protein levels in ANX (CTL: 0.37 ± 0.05; ANX:0.59 ± 0.05; p=0.017). However, we detected no difference in protein levels to synaptophysin (CTL: 0.67 ± 0.14; ANX: 0.75 ± 0.08; p=0.66). We observed difference in number of PV cells in CA3 region(CTL = 4055,10 ± 467,43; ANX = 5807,71 ± 79,75; p=0,029), but no differences in CA1 and GD. Novel object recognition task showed that ANX did not differentiate the novel (NO) and familiar object (FO), while control group spent more time in the NO (NO, sec: CTL: 50.56 ± 7.89; ANX: 31.77 ± 3.88; p=0,029). The discrimination index was higher in CTL than ANX (CTL: 0.37 ± 0,085; ANX: 0.08 ± 0.05; p=0.09). A qualitative analysis of electrophysiological data showed differences in profile of frequencies power. These results showed that anoxia neonatal affects working memory in adult life, number of PV interneurons and protein related with synapsis.
Palavras-chaves: electrophysiology, theta, hypoxia
Agência Fomento: FAPESP 2016/17329-3 and FAPESP 2014/16711-6

13.036 - A RESILIÊNCIA AFETA A PERFORMANCE EM JOGOS?

DOES RESILIENCE AFFECT THE PERFORMANCE IN GAMES?

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Instituição: 1 UFRJ - Universidade Federal do Rio de Janeiro (21941-902 - Cidade Universitária - Rio de Janeiro - RJ), 2 USP - Universidade de São Paulo (05508-900 - Cidade Universitária - São Paulo - SP)Introdução:
In the present study, we used an electronic game developed by the Neuromat - Research, Innovation and Dissemination Center for Neuromathematics in which

the volunteer plays the role of a goalkeeper in a series of penalty kicks. The strategy of the kicker was defined by a stochastic chain with memory of variable length [Duarte et al., Mathematics;7(5):427, 2019].
Objetivos:
Our goal was to assess if tolerance for errors in the game influenced the performance of the participants.
Métodos:
The sample was composed of 37 healthy subjects (20 males) with age 23.59 (SD=4.27). The study was approved by the ethics committee of the Instituto de Neurologia Deolindo Couto (CAAE: 54118116.6.0000.5261). The subjects played six different stochastic chains, three per day, in two days of the same week. The subject's responses were collected with a standard P2-keyboard and the game was interfaced through a 15'' LCD monitor. The participants should choose to defend to the left, middle or right by pressing the left, down or right arrow keys, respectively. Before playing the game, the participants filled a portuguese version of the Connor-Davidson resilience scale [VR Lopes; MCF Martins. Rev. Psi: Org e Trab R. Eletr. Psico. 11:36, 2011]. The responses of the participants were transformed in an index of performance by dividing the number of successful defenses by the number of kicks for the stochastic chain, resulting in a number between 0 and 1 for each. The global success rate was calculated by summing the success rates of each stochastic chain. The resilience scale resulted in a number between 14 and 56 obtained by summing the points for each question, the higher the sum, more resilient was considered the subject.
Resultados e Conclusões:
A correlation coefficient was calculated between the performance in the game, for each stochastic chain, and the resilience scale results. The same was done for the sum of the performances. The correlation coefficients were negative for all six stochastic chains (r1=- 0.217, df=35, tcrit=1.689, t1=1.316, p1=0.098; r2=-0.082, df=35, tcrit=1.689, t2=0.487, p2=0.314; r3=-0.101, df =35, tcrit=1.689, t3=0.6, p3=0,27; r4=-0.257; df=35, tcrit=1.689, t4=1.577, p4=0.061; r5=-0.022, df=35, tcrit=1.689, t5=0.132, p5=0.447; r6=-0.139, df=35, tcrit=1.689, t6=0.835; p6=0.20), as well as the global success rate (r=-0,139, tcrit=1.689, df=35, t=0.835, p=0.20), however none of them were statistically significant. We found no significant correlation between the resilience scale values and the capacity of the subjects in predicting the unfolding sequence of kicks.

Palavras-chaves: resilience, stochastic processes, performance
Agência Fomento: FAPESP(2013/07699-0), FINEP, CAPES, FAPERJ e CNPq

13.037 - CAMINHADAS ALEATÓRIAS COM MEMÓRIA ENVIESADA E SUAS APLICAÇÕES EM SISTEMAS BIOLÓGICOS

RANDOM WALK MODELS WITH BIASED MEMORY AND ITS APPLICATION IN BIOLOGICAL SYSTEM

Autores: Kleython José Coriolano Cavalcanti de Lacerda 1, Lucas Vinicius Garlet Werlang 2, Vinicius Flora Dugaich 3, Fernando Eduardo Padovan Neto 2, Marco Antonio Alves da Silva 4
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A Random Walk (RW) Model is a stochastic process formed by a succession of random steps that may be used to represent some micro- or macroscopic process. Cressoni et al [PRL 98, 070603 (2007)] introduced the Alzheimer RW (ARW) model which consist in two fundamental parameters p and f, where they represent respectively the decision-making process of the system and the fraction of available memory. In this model the walker is able to remember a specific event into a fraction "f*t" of your full trajectory (i.e., the recent memory "(1-f)*t" becomes unavailable) and, with probability p he makes the same decision from the past, and the otherwise with probability 1-p. Persistent, anti-persistent and random walkers are described, respectively, by the parameters $p > 0.5$, $p < 0.5$ and $p = 0.5$. Inspired by this model, we observed that it has characteristics similar to those observed in neurodegenerative diseases such as Alzheimer's, Huntington's and Parkinson's disease, for example, where the patient loses the capacity to retain new information due to severe brain cell loss.
Objetivos:
The aim of this research is to characterize groups of mice subjecting them to psychological tests that return a dichotomous variable as a response, such as active avoidance test, to construct spectra with the results

obtained, considering +1 success and −1 failure, to model them based on RW models.
Métodos:
Initially, we submitted seven healthy mice (approval number of the Animal Ethics Committee 18.5.35.59.5) to the active avoidance test during a 4-day pretest (3-day to consolidate the old memory (discriminatory sound stimuli) and 1-day to consolidate the recent memory (discriminatory light stimuli)) with 40 procedures per day. The test is applied only one day with the two alternating stimuli, totaling 60 randomly distributed procedures (30 sound/30 light). With the spectra obtained, we perform an analysis that maps such spectrum in the ARW model, with a model developed by us, in order to obtain an average p-parameter that characterizes the group.
Resultados e Conclusões:
Our preliminary results showed that the group in question has an average p-parameter equal to 0.95 ± 0.02 which is expected, considering that the group does not present memory failure and should present a persistent behavior, i.e., $p > 0.5$. As the result with the healthy mice was expected, we will perform this analysis with mice genetically modified with Hundington's disease, to characterize the p-parameter of each stage of the disease. Thus, through psychological tests for memory evaluation, time series can be constructed and analyzed in order to map them into the ARW model, to obtain the parameters of the model and characterize groups under analysis, for a possible application in the clinical diagnosis.
Palavras-chaves: non-Markovian Random Walk Models, Neurodegenerative Disease, Hundington's disease, Statistical Physics
Agência Fomento: CNPq / FAPESP / CAPES

13.038 - MIGRAÇÃO DE REPRESENTAÇÃO IDENTIFICADA ATRAVÉS DE APRENDIZADO DE MÁQUINA

CODE MIGRATION IDENTIFIED BY A MACHINE LEARNING TECHNIQUE
Autores: Estevão Uyrá Pardillos Vieira 1,2, Gabriela Chiuffa Tunes 1, Eliezyer Fermino de Oliveira 1, Marcelo Salvador Caetano 1, Marcelo Bussotti Reyes 1
Instituição: 1 UFABC - Universidade Federal do ABC (Alameda da Universidade), 2 DataLab - Serasa Experian DataLab (Alameda Vicente Pinzon, 51)Introdução:
When counting time is essential for optimal behavior, animals must make use of some internal temporal representation to guide responses. Machine learning techniques can help researchers to investigate this temporal representation. However, neural activity related to time is generally assessed in well-trained animals because learning temporal tasks usually takes several days. However, comparing the neural representation of time before and after training could give new insights into time learning.
Objetivos:
We aimed to shed some light on the process of learning to time by studying how time representations develop in relevant brain regions. Specifically, we wanted to compare the quality of representation before and after training.
Métodos:
Our group developed a training protocol for the Differential Reinforcement of Response Duration task that allows rats to learn in a single session. Hence, we recorded the neural activity in two regions: the medial Pre Frontal Cortex (mPFC) and the Striatum. We used machine learning (Bayesian Ridge) regression to predict the time elapsed since each sustained response had started, using as input the instantaneous neuronal spiking activity. We then measured the performance of the regression algorithm, calculated as the Pearson correlation between correct times and predicted times, and we associated higher performance with better time representation.
Resultados e Conclusões:
We found that the algorithm can decode the time from the spiking activity from neurons in the mPFC a the beginning of the training session. However, such performance decreases both during the first training session and on the second day of training. In the opposite direction, the representation of time in the Striatum, also measured in terms of decoding performance, enhances with training ($p=10^{-21}$). Such evidence indicates that the mPFC is necessary only for learning and progressively disengages the task, while there is a progressive involvement of the STR throughout learning. Our findings are consistent with the hypothesis that training drives rats into a process of habituation and may help to elucidate the role of the mPFC and the STR in the internal representation of time. Moreover, our machine learning methodology is a simple way to assess neural representations and can be used in other contexts unrelated to timing.
Palavras-chaves: single-unit recording, machine learning, Time representation

Agência Fomento:

14. Cognição & Emoção

14.021 - NEUROIMAGING PATTERN RECOGNITION TO EVALUATE EMOTIONAL CHRONIC EFFECTS IN AYAHUASCA EXPERTS

NEUROIMAGING PATTERN RECOGNITION TO EVALUATE EMOTIONAL CHRONIC EFFECTS IN AYAHUASCA EXPERTS

Autores: Lucas Rego Ramos 1, Orlando Fernandes Junior 1, Tiago Arruda Sanchez 1

Instituição: 1 UFRJ - UNIVERSIDADE FEDERAL DO RIO DE JANEIRO (R. Prof. Rodolpho Paulo Rocco, 255, Ilha do Fundão, Rio de Janeiro-RJ, 21941-590)Introdução:

Ayahuasca is an Amazonian psychedelic brew which contains dimethyltryptamine (DMT) and beta-carbolines that are pharmacologically associated with synergetic serotonin action. It has been repeated that exogenous DMT administration is related in part to the activity of a Trace Amine Receptor (TA). In addition, the TA to produce a state of relaxation and calm, which can suppress rather than promoting the symptoms of psychosis. Therefore, the components of Ayahuasca can act directly on these receptors and, thus, intrinsically modifying the functioning of the neural circuits associated with this interaction. Functional magnetic resonance imaging (fMRI) has been a tool capable of identifying these changes.

Objetivos:

Using psychometric scales and fMRI with pattern recognition analyzes, the aim of this study is to decode patterns of cerebral and behavioral activity in experienced Ayahuasca user and nonuser.

Métodos:

Thirty-eight (38) healthy male volunteers, nineteen (19) regular ayahuasca users (mean age=31.5 years; SD=10.7) and nineteen (19) nonuser (mean age=33.1; SD=12.5) were evaluated by resilience scale (BAASCH et al., 2015) and by implicit emotional recognition task in fMRI. This task consisted to recognize genre, so the faces of neutral and aversive emotional (disgust and fear) were present in 15 blocks pseudo-randomized design each run (disgust and fear). The procedures and experimental paradigm of this study were approved by the research ethics committee of the University Hospital Clementino Fraga Filho of the Federal University of Rio de Janeiro - CAAE: 34772414.9.0000.5257. Here we investigate the chronic effect of ayahuasca on brain activation using the pattern recognition analysis (PRA). PRA used for discrimination Support Vector Machine (SVM) and Gaussian Process Classification (GPC) model with "leave one subject per group out" cross-validation strategy. PRA used Gaussian Process Regression (GPR) model with "leave one subject out" to infer psychometric parameters.

Resultados e Conclusões:

In the classification models, the algorithm was trained to discriminate the groups with the aversive face processing and successfully discriminated patterns of brain activation between those groups (SMV: 81.58%, p=0.001; GPC: 78.95%, p=0.003). In the regression model, the algorithm was trained by patterns of brain activation in aversive stimuli to predict a self-report resilience scale (GPR: r=0.38, p=0.01). Also, regular ayahuasca users present higher resilience than non-users (users: mean=43.89 , SEM=1.29; non-users: mean=39.05 , SEM=1.22 ; p=0,01). These results suggest that PRA can effectively discriminate between both patterns of brain activation, also infer about psychometric resilience feature. A possible explanation about the discrimination is that ayahuasca modulates brain activation to aversive stimuli in a pattern similar to emotion regulation process by changing defensive response to aversive stimuli as much as resilience improves.

Palavras-chaves: Ayahuasca, Emotion, fMRI, Machine Learning

Agência Fomento: CAPES, FAPERJ

14.022 - Effects of cardiorespiratory biofeedback in heart rate variability (HRV) as a strategy to evaluate urban violence impact in Athletes and Non-athletes.

Effects of cardiorespiratory biofeedback in heart rate variability (HRV) as a strategy to evaluate urban violence impact in Athletes and Non-athletes.

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Instituição: 1 UFRJ - Universidade Federal do Rio de Janeiro (R. Prof. Rodolpho Paulo Rocco, 255 - Ilha do Fundão, Rio de Janeiro, 21941-590), 2 UFOP - Universidade Federal de Ouro Preto (R. Quatro, 786 - Bauxita, Ouro Preto - MG, 35400-000)Introdução:

People living in slum areas are submitted to high levels of violence and lack of primary health assistance.

Athletes' physical capacity and emotion regulation strategies are supposed to be adapted differently from non-athletes living in the same area.
Objetivos:
The aim of this study is to examine the effects of heart rate variability (HRV) biofeedback (BFB) training on athletes and non-athletes living in slum areas with urban violence (Rocinha, Rio de Janeiro).
Métodos:
The groups of study were composed of twenty-four (24) expert jiu-jitsu athletes and nineteen (19) non-athletes. The participants were evaluated by Positive and Negative Affect Scale (PANAS - Watson et al., 1988) and Trauma History Questionnaire (THQ - Fiszman et al. 2005) and performed a BFB session. The BFB session and physiological data collection (HRV and respiratory frequency) begins with a 7 minutes basal-HRV, followed by 12 minutes of BFB training and a final period of 7 minutes post-HRV. The BFB training consists of respiratory maneuvers: participants were asked to do a slow deep breathing while watching a visual feedback of their performance on the computer screen. The visual feedback changes as much as the cardiorespiratory coherence change. The physiological data was acquired with Nexus-10 hardware. Ethics approval was granted by the Research Ethics Board at the authors' institution, Hospital Universitário Clementino Fraga Filho (HUCFF) da Universidade Federal do Rio de Janeiro (UFRJ) (CAAE: 08267419.1.0000.5257) and consent was obtained from all participants.
Resultados e Conclusões:
The group of athletes showed a higher SD2 parameter post-HRV after BFB training (basal mean=83.37, SD=31.68; post-HRV mean=90.69, SD=31.47; p=0.02), similar results were found on non-athletes (basal mean=60.45, SD=15.48; post-HRV mean=73.33, SD=26.09; p=0.04). A difference was also observed in SD2 parameter between athletes and non-athletes during basal period (athletes mean=83.37, SD=31.68; non-athletes mean=60.45, SD=15.48; $p < 0.01$) and post-HRV BFB (athletes mean=90.69, SD=31.47; non-athletes mean=73.33, SD=26.09; p=0.05). The sum of trauma history showed presence of violence and stressful situations in both groups with no difference between the groups (p=0.24). The athletes presented higher positive affect (mean=35.79, SD=5.77) than non-athletes (mean=30.52, SD= 5.71; $p < 0.01$), while no difference in negative affect was observed (athletes mean=19.75, SD=4.25; non-athletes mean=20.24, SD=7.18; p=0.79). Although both groups live in the same violent area and had similar trauma history, the athletes showed higher basal HRV for SD2 parameter and positive affect than non-athletes. The BFB training showed an improvement in SD2 parameter of HRV, thus demonstrating the effect of cardiac coherence training in autonomic control.
Palavras-chaves: biofeedback, cardiac coherence training, emotion regulation, heart rate variability, risk areas
Agência Fomento: CAPES

14.023 - TRATAMENTO COM ÔMEGA-3 REVERTE O COMPORTAMENTO DO TIPO ANSIOSO EM RATOS OBESOS.

OMEGA-3 TREATMENT REVERT THE ANXIETY-LIKE BEHAVIOR IN OBESE RATS.
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Instituição: 1 UFCSPA - Universidade Federal de Ciências da Saúde de Porto Alegre (Rua Sarmento Leite, 245)Introdução:
Obesity is a worldwide spread disease that will affect around 2 billion people in 2025. This pathology leads to a neuroinflammation, affecting several brain areas, causing atrophy and cognitive impairments. The omega-3 fatty acid supplementation diminishes the inflammation in others diseases models and increase some anti-inflammatory cytokines.
Objetivos:
Thus, the aim of this study was to evaluate the effects of omega-3 treatment in anxiety-like behavior and some epigenetics and neuroinflammatory parameters of obese rats.
Métodos:
This study was approved by the Ethics Committee of the UFCSPA (nº570/18). Wistar male rats (60 days old) were used and they maintained in standard conditions (20±2°C, 12h/12h light/dark cycle and food and water ad libitum). The animals received a cafeteria diet (plus standard chow and water) during 20 weeks to induce obesity. In the last 4 weeks, the rats were treated with omega-3 by gavage (0.5 mg/kg), resulting in 4 groups (n = 8-10/ group): 1) control (CT) treated with saline (vehicle), CTVeh; 2) CT treated with omega-3 (n-3), CTn-3; 3) cafeteria diet (CAF) treated with vehicle, CAFVeh; and 4) CAF treated with n-3, CAFn-3. The rats

performed the elevated plus-maze (EPM) and then they were euthanized and their pre-frontal cortices were dissected. Histone H4 acetylation and TNF α levels were evaluated.
Resultados e Conclusões:
In the EPM, a treatment effect was observed ($F(1,34)=2,316$, $p < 0.05$), OBVeh animals spend less time in the open arms when compared to OBn-3 group. No differences were observed in the histone H4 acetylation levels among the groups. An interaction between the diet and the treatment was found in the TNF α levels in the cortex ($F(1,20)=4,795$,p < p0.05). The OBn-3 group had decreased TNF α levels when compared to OBVeh group. These results evidenced an anxiety-like behavior by the diet that was reverted by the omega-3 treated that was also able to reduce the TNF α levels in the cortex of obese rats.
Palavras-chaves: Obesity, Cognition, Neuroinflammation, Epigenetics
Agência Fomento: FAPERGS

14.024 - A INFLUÊNCIA DO RITMO NO SINAL DECISONAL EM TOMADA DE DECISÃO PERCEPTUAL

THE RHYTHMIC INFLUENCE ON DECISION SIGNAL DURING PERCEPTUAL DECISION MAKING
Autores: Pedro Teodoro Cardoso Canário 1, Julia Valverde 1,1, André Mascioli Cravo 1,1,1
Instituição: 1 UFABC - Universidade Federal do ABC (Rua arcturus, n3)Introdução:
Perceptual decision making is a key process for animals in their interaction with the environment. In recent years, many studies had focused on decisions based on the integration of multiple successive pieces of information, the sequential sampling tasks. Some of these studies have suggested the existence of an endogenous low-frequency rhythm that modulates the perceptual integration and its build-up toward the decision execution.
Objetivos:
In the present study, we investigated how the speed in which evidence is presented modulated the neurophysiological encoding of perceptual information and the build-up of the signal decision on over the motor cortex on the beta frequency range.
Métodos:
Twenty volunteers performed a sequential decision task in which they had to judge whether a sequence of eight Gabor patches had an average orientation clock or anti-clockwise to a reference line (CEP Number: 42809115.0.0000.5594). Stimuli were presented at two different rates (2.0 Hz and 5.0 Hz) and two contrast conditions (High and Low). During the experimental procedure, electrophysiological recordings were acquired continuously from 64 electrodes positioned at 10/10 system. For the EEG analysis, we used a multiple linear regression between perceptual and decisional information and broadband EEG signal to investigate how evidence information was encoded along with time samples after stimulus presentation. Additionally, we evaluated how the decisional information modulated the lateralization on the beta band frequency.
Resultados e Conclusões:
The behavioural results showed an influence of contrast but not of speed rate on performance (ANOVA Repeated Measures, Speed: $F(1.00,19.00) = 0.016$, $p = 0.901$; Contrast: $F(1.00,19.00) = 42.79$, $p < 0.01$). For the broadband signal, we found that decisional information modulated activity roughly 400 ms after the presentation of each sample (Cluster Analysis, t-values, time = [351 - 465 ms]; $p < 0.01$). Although this modulation was influenced by target contrast, it was not modulated by the rate of presentation. On the other hand, presentation rate modulated beta lateralization (10.0-30.0 Hz), (Cluster Analysis, t-values frequency = [8 - 30 Hz], time > 200.0 ms]; $p < 0.01$) suggesting that decisional information was transformed into a motor signal earlier when participants had less time to evaluate each sample.
Palavras-chaves: Decision Making, Rhythm, Beta Frequency
Agência Fomento: FAPESP

14.025 - IDENTIFICAÇÃO DE CORRELATOS NEURAIS DE INTERVALOS DE TEMPO E MAGNITUDE NUMÉRICA

IDENTIFYING NEURAL CORRELATES OF TIME-INTERVALS AND NUMERICAL MAGNITUDES
Autores: Janine Camatti 1, Yossi Zana 1
Instituição: 1 UFABC - Universidade Federal do ABC (Rua Arcturus, 3. São Bernardo do Campo-SP)Introdução:
In 2003 Walsh identified the inferior parietal cortex (IPC) as the most relevant for time, space and quantity magnitude estimation, proposing the A Theory of Magnitude (ATOM). Many studies supported the ATOM, however, only short-range time perception and quantity of elements were considered.
Objetivos:

To establish the experimental setup and design for the behavioral and neurophysiological investigation of the predictions of ATOM regarding long-range time perception and numerical magnitude.
Métodos:
The study was approved by the Ethics Committee Board (No. 2.991.211). The data included behavioral measurements and fNIRS recording. Twenty-one participants performed two magnitude estimation tasks and a control task: (I) estimation of abstract numbers; (II) estimation of time interval durations (abstract number+time unit); (III) positioning direction for the mouse cursor signaled by "right/left" instructions. For tasks I and II, participants marked on a horizontal line the length that corresponded to perception in relation to the duration of the time interval or number magnitude. fNIRS was used to measure local concentration change of oxyhemoglobin in response to functional brain activity during tasks. The cap montage comprehended the frontal and parietal regions in both hemispheres covered by 28 channels. NIRS signal was filtered using band-pass filter of 0.01 and 0.20 Hz, and electromagnetic wave frequencies converted to concentration of oxy-hemoglobin (HbO). The statistical analysis was performed using the mean values of HbO concentration. The effect of experimental condition was tested using repeated measures ANOVAs and Bonferroni post-hoc test for multiple comparisons. Machine learning (linear SVM classifier, 5-folds, 100 repetitions) and Bayesian one-sample t-test were used for pair-wise comparison between conditions. In the frequentist analysis, alpha=.05 was set as a significance criteria while in the Bayesian tests BF10 > 10 was considered as strong evidence in favor of the alternative hypothesis (accuracy above chance). Behavioral data was fit to linear and power functions for comparison.
Resultados e Conclusões:
ANOVA did not show effect of condition for any channel, except the right supramarginal gyrus correspondent channel. Post hoc comparisons showed that condition I differed from III (p=.033), with greater cortical activation in condition I. Bayesian analysis showed that conditions I and II differed in regions of right dorsolateral prefrontal cortex, left angular gyrus, left and right supramarginal gyrus and somatossensory cortex. Discriminative accuracy was above chance level for most channels when comparing conditions I or II with condition III. Behavioral data of conditions I and II were fit better by linear or power functions, respectively, using BIC > 2 as criterion. This is the first study that presents the differences in brain activity during numerical and time magnitude estimation. The robust analysis allows for detailed evaluation of the results from different approaches.
Palavras-chaves: fNIRS, Magnitude, Time perception
Agência Fomento: FAPESP

14.026 - CONTEÚDO EMOCIONAL MODULA O JULGAMENTO DO AFFORDANCE DE OBJETOS

EMOTIONAL CONTENT MODULATES THE JUDGEMENT OF OBJECTS' AFFORDANCE

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Instituição: 1 UFJF - UNIVERSIDADE FEDERAL DE JUIZ DE FORA (Campus Universitário, Rua José Lourenço Kelmer, s/n - São Pedro, MG, 36036-900), 2 UFPA - UNIVERSIDADE FEDERAL DO PARÁ (R. Augusto Corrêa, 1 - Guamá, Belém - PA, 66075-110), 3 UMES - UNIVERSITY OF MARYLAND EASTERN SHORE (11868 College Backbone Rd, Princess Anne, MD 21853, EUA)Introdução:
The concept of affordances refers to the motor representations that the observation of objects evokes. It has been widely investigated in psychology and neurophysiology to understand visuomotor processing and movement planning. Another important factor in these processes, emotion, has been shown to lead to certain modulations in the motor system, and thus it is reasonable to question whether emotion can influence affordance processing. However, most studies in that domain have relied upon emotional contexts and physical features of objects rather than in their intrinsic emotional value.
Objetivos:
In this study we assessed whether the inherent emotional content of objects influences its affordance judgment.
Métodos:
We designed an experiment (CAAE: 64960417.8.0000.5147) in which thirty-two adult volunteers were instructed to use a numerical digital-scale ranging from 1 to 9, in which 1 was the greatest possibility of the observed object to be manipulated by a precision grip and 9 by a power one. They had to choose the number that best matched their judgment on how each of 102 objects should be grasped, which could be pleasant, unpleasant or neutral, and ranged

from 2 cm to 7 cm in size. We collected grasping scores and compared mean values across the emotional categories of objects.
Resultados e Conclusões:
Judgment of unpleasant objects (2.43±0.22, $p < 0.01$) was found to be smaller (indicating preference for precision grasp) than pleasant (5.08±0.27) and neutral (5.37±0.18) objects. We then classified these stimuli based on their real size as small (2 to 4 cm) or big (5 to 7 cm), since these values reflect thresholds for kinematically defining precision and power grips (Applied Ergon. 56:52, 2016). Restricting our analysis to only this set (69 objects), we still found that unpleasant objects had lower grasping scores (2.56±0.26) than neutral (5.50±0.22) and pleasant ones (4.76±0.31). The same finding was also present when we analyzed each of these two groups individually. Our data suggest that the emotional content of objects can modulate the motor representations necessary to interact with them in a way that favors careful manipulation and minimal physical contact with aversive stimuli.
Palavras-chaves: Affordance, Emotion, Grasping, Motor cognition, Neurophysiology
Agência Fomento: Conselho Nacional de Desenvolvimento Científico e Tecnológico (CNPq)

14.027 - A PREFERÊNCIA UNIVERSAL DO AZUL SE ESTENDE A AMBIENTES VIRTUAIS?

DOES UNIVERSAL PREFERENCE FOR BLUE COLOR EXTEND TO VIRTUAL ENVIRONMENTS?
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Instituição: 1 UFABC - Universidade Federal do ABC (Alameda da Universidade, s/n - Anchieta, São Bernardo do Campo - SP), 3 CEPsiCon - Centro de Estudos em Psicologia do Consumo (Rua Alves Guimarães, 408 – Pinheiros – São Paulo/SP), 4 NDH - Neurociência para Desenvolvimento Humano (São Paulo, Brasil)Introdução:
Neuroaesthetics is a field of study that proposes to understand what biological and neural aspects contribute to the contemplation and interaction with different visual components. Color, in turn, is a mental construct that influences behavior, from emotions until decision making. The literature indicates that there is a universal preference for the blue color in adults, which can be explained by the Ecological Valence Theory (PALMER & SCHLOSS. PNAS 19:8877, 2010), associated emotions (OU et al. Col Res Appl, 29:232, 2004), and the sensation of relaxation about blue hue and high brightness colors (GORN et al. JMKR 41:215, 2004). Other studies show how color plays an important role in perception and decision making in the virtual world. However, there are no empirical studies and theoretical models explaining the choice of color on the Web, and together with the lack of analysis about color preference and its influence on the different possible contexts in virtual environments, the importance of this study is justified.
Objetivos:
Check whether the universal preference for blue extends to web pages with different content.
Métodos:
We created two types of web pages (an electronics store and a news portal) in five colors each: yellow, blue, gray, green and red. We tested 40 volunteers without color vision deficiency (age = 24 (± 8,3), 26 women, 14 men, 38 right-handed, 2 left-handed), who signed the Free Consent and Clarified Term approved by the UFABC Ethics Committee (No. 77639217.0.0000.5594). Participants were instructed to look at the computer screen, where two stimuli were presented side by side, and to click on the stimulus that pleased them most in Part I and on what pleased them less in Part II. Color combinations were presented in random order. Each participant responded to 120 trials. Frequency and duration of fixations by eye-tracking and the number of mouse clicks were collected for analysis.
Resultados e Conclusões:
We calculated the proportion of participants' clicks and fixation time from eye-tracking on each color in both contents. A proportion of 0.2 or less was taken indicate a non-preference. We found that the blue (M=0.257 (s.e. 0.077)) tends to be chosen as preferred also in the context of virtual environments in both studied contents [$t(39) = 4.648$; $p < 0.001$, $d = 0.735$], while there was no statistically significant preference for other colors. However, eye-tracking data showed a significant trend to look less time at a gray color stimulus (M=0.188 (0.035); $t(39) = -2.176$; $p=0.036$; $d=-0,344$), but there is no difference between time and quantity of fixations related to preference or intention to choose during the task performed. In the task proposed in this work, it was not possible to verify the relation between reported preference and fixation measures. However, the short duration of fixation on gray can be explained by the neutrality of this color. At

final, we conclude that the blue color is preferred over the others in different virtual contexts.
Palavras-chaves: Eye-tracking, Páginas da Web, Percepção de cor, Preferência pelo azul, Neuroestética
Agência Fomento: Programa de Iniciação Científica da Universidade Federal do ABC

14.028 - ILMPLICITLY ATTRIBUTING EMOTION TO NEUTRAL FACES: EFFECT ON BEHAVIOR.

ILMPLICITLY ATTRIBUTING EMOTION TO NEUTRAL FACES: EFFECT ON BEHAVIOR.
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Instituição: 2 UFF - Universidade Federal Fluminense (Rua Hernani de Melo, 101, Niterói, Rio de Janeiro)Introdução:
Previous studies suggest that facial expressions perception can be modulated by individual traits and by the context they are inserted (1;2). However, it is not well known whether the perception of the emotional face can be implicitly influenced by information incidentally encountered at a prior time, for example using priming paradigms (3;4).
Objetivos:
The aim of this study was to investigate whether it is possible to attribute emotion to neutral faces in a healthy sample primed by an emotional text previously presented.
Métodos:
The sample was composed of 69 healthy college students (mean age=21 and s.d.=4.1, all females) that were randomly allocated in two groups. In one group, participants reada negativetext about child sexual abuse (negative context, n=36). The other group, participants read a neutral text about identity card (neutral context, n=33). At the end of the reading participants should evaluate the negativity of the text. After this stage, all participants were invited to perform a second and independent experiment. Participants performed a behavioural task widely used in the literature (5). The task consisted of a forced-choice test to judge the valence of the neutral faces (all males) and objects presented by 200 ms. Participants should press a key if the picture (face or object) was considered negative or another key if the picture was considered neutral. We analysed the percentage of the number of h faces and objects judged as negative or neutral after the negative and neutral priming text. We performed an ANOVA with condition stimulus category (face and object) as within factors and context (neutral and negative) as between factors. The alpha level for statistical significance was p=0.05.and all the procedures and experimental protocols used were approved by the Research Ethics Committee of CCM / UFF, opinion no. 2,069,723 dated 05/17/2017.
Resultados e Conclusões:
We found a main effect of context (F (1,65)=4.0, p=0.05),which reflect that after the negative text more stimulus was judged as negative than after the neutral context, and a main effect of stimulus (F (1,65)= 88.5, P < 0.001), which reflect that faces were judged as more negative than object independently of the context.An interaction was also found (F 1,65=4.7, P=0.03).Post-hoc analysis revealed that the negative priming text presented in the first experiment increased the number of neutral faces judged as negative when compared to the effect generated by the neutral text (p=0.004). The percentage of the judgement was 48,9% (s.d =38,7) for faces at the negative context and 31,9% (s.d =25,8) for faces at neutral context. These results show that information presented in a previous and independent experiment could inducean implicit attribution of emotion to neutral faces. Therefore, the present study adds to the literature an important evidence that our behaviour and actions are modulated by previous information in an implicit or low perceived way.
Palavras-chaves: Priming, Neutral Face, Modulation
Agência Fomento: Capes

14.029 - CORRELATOS BIOLÓGICOS E PSICOLÓGICOS DE PREDITORES DE ÍNDICE DE MASSA CORPORAL (IMC) DE MENINAS DE 10 A 14 ANOS DE IDADE

BIOLOGICAL AND PHYSIOLOGICAL CORRELATES PREDICTORS OF BODY MASS INDEX (BMI) FROM GIRLS 10 TO 14 YEARS OLD
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Negative body image and disordered eating are generally associated with poor physical and psychological outcomes, including one's nutritional status. Understanding the aspects that influence individuals' body weight through the different phases

of life may favor early intervention strategies, that could minimize its impact on health-related issues.
Objetivos:
To evaluate the influence of menarche, self-esteem, body appreciation and eating behavior as predictors of girls' Body Mass Index (BMI).
Métodos:
The study was conducted in an elementary school with 88 girls, aged from 10 to 14 years old. Girl's weight and height were measured, and BMI was calculated by dividing the weight by the squared height. Information related to menarche was provided by girls, who informed if they had already menstruated and at which age. Self-esteem was assessed using the Rosemberg Self-Esteem Scale, a 10-items scale that covers positive or negative feelings that reflect overall self-esteem. This is a 4-point scale ranging from "strongly agree" to "strongly disagree". The total score is obtained by summing the values of the items. Body appreciation was assessed using the Body Appreciation Scale (BAS), a 13-items questionnaire rated on a 5-point scale (1= never, 5= always). The total score is obtained by the mean of the answers. Eating behavior was assessed using the Children's Eating Attitudes Test (ChEAT) consisting of 26 items, grouped into 3 factors: diet; bulimia and concern for food; and oral control. This is a 6-point scale, ranging from "never" to "always". The total score is obtained after the sum of all recoded items. The study was approved by the local Institutional Review Board (Protocol n.2.932.029).
Resultados e Conclusões:
Results: The mean (±SD) for children's BMI was 20.28 kg/m² (±4.04). The frequency of girls who have already had menarche was 68.2% (±0.46). The mean score (±SD) of the Rosemberg Self-Esteem Scale was 17.14 (±6.31). The mean score (±SD) of the BAS Scale was 3.64 (±0.74). The mean scores (±SD) of the three ChEAT factors were: oral control 10.05 (±3.31), bulimia and food concern 5.96 (±0.28), and dieting 22.80 (±7.97). In the stepwise multiple regression model, menarche, global self-esteem, BAS scores, and the three factors of the ChEAT were included as independent variables and children's BMI as the dependent variable. The model was statistically significant [(F (3, 86) = 17.57, $p < 0.001$] and three variables emerged as predictors: the dietary factor (ChEAT) ($\beta = -0.57$, $t = -6.08$, $p < 0.001$); the menarche ($\beta = 0.28$, $t = 3.15$, $p < 0.01$) and oral control (ChEAT) ($\beta = 0.29$, $t = 3.11$, $p < 0.01$). Conclusion: BMI tend to be lower the higher the dieting behavior. Girls who had already menstruate tended to present higher BMI. Finally, BMI tended to be higher the higher oral control. These results implicates that this may be a group that requires more attention in terms of nutritional and psychological intervention strategies. Financial support: CAPES/PROEX.
Palavras-chaves: body image, eating behavior, puberty, self-esteem
Agência Fomento: CAPES/PROEX

14.030 - EFEITOS DA PRÁTICA DE YOGA NOS SINTOMAS DE ANSIEDADE E TRANSTORNO DE ESTRESSE PÓS-TRAUMÁTICO (TEPT)

EFFECTS OF YOGA PRACTICE ON ANXIETY AND POST-TRAUMATIC STRESS DISORDER (PTSD) SYMPTOMS

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Instituição: 1 UFOP - Universidade Federal de Ouro Preto (Rua Professor Paulo Magalhães Gomes, 122 - Bauxita, Ouro Preto MG, 35400-000)Introdução:
Yoga, an ancient science originated in India and throughout the passage of time transcended its geographical boundaries. Hundreds of studies conducted under rigorous scientific protocols around the world have established many preventative, promotional, and curative health benefits, especially for psychosomatic diseases. Yoga has shown to reduce the physiological excitation in patients with PTSD.
Objetivos:
Our aim was to investigate if yoga practice reduce anxiety and post-traumatic stress disorder
Métodos:
The sample consisted of 40 healthy young adults (78,9% female) divided into: Group C (n = 19) non-practicing individuals, Group Y0 (n = 15) non-practitioners who started training for 10 weeks, twice a week for 60 minutes and Group Y1 practicing individuals for at least 6 months (n = 6). The study was approved by the Ethics Committee of UFOP (CAAE: 90012318.1.0000.5150). Participants filled out questionnaires of anxiety and PTSD symptoms.
Resultados e Conclusões:
Preliminary results show that before the training, the group Y0 (21.93 ± 13.84) showed values of PTSD higher than C (12.32 ± 7.535) and Y1 (9.000 ± 6.099) (ANOVA, $p = 0.0113$). After training, there was a reduction of PTSD values in group Y0 (20.75 ± 15.56) at group C

level (11.82 ± 6.217), but this reduction was not at the level of group Y1 (6,000 ± 5,099) (ANOVA p = 0.0366). The anxiety values for the group YO (18.53 ± 9.687) remained higher than C (12.79 ± 7.613) and Y1 (8.667 ± 3.141). After training, there was no difference between the three groups; C (12.76 ± 7.937) Y0 (14.50 ± 6.547) and Y1 (6,750 ± 2,872) (ANOVA p = 0.0293). We concluded that yoga practice promoted reduction in anxiety and PTSD systems, and therefore could be used as complementary treatment to mental disorders. Thanks to CAPES and the Federal University of Ouro Preto.
Palavras-chaves: Yoga, Anxiety , Post-Traumatic Stress
Agência Fomento: CAPES

14.031 - IMPACTO DA PRÁTICA DE YOGA NA DEPRESSÃO E ANSIEDADE

IMPACT OF YOGA PRACTICE ON DEPRESSION AND LONELINESS

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Instituição: 1 UFOP - Universidade Federal de Ouro Preto (Campus Morro do Cruzeiro, Ouro Preto, MG)Introdução:
Yoga is an ancient practice that generates health and well-being, both physically and mentally. It has action in the physiological systems, acting in a complex and integrated way through physical, respiratory and meditative exercises. Recent studies show that yoga is capable of improving mental health and can be a coadjuvant in the treatment of some disorders.
Objetivos:
The aim of the present study is to evaluate the impact of yoga practice on depression and loneliness.
Métodos:
The study was approved by the Ethics Committee of UFOP (CAAE: 90012318.1.0000.5150). The sample consisted of healthy young adults (n=29) divided into: Group C (n=17) non-practitioners, Group Y0 (n=4) non-practitioners who began training and group Y1 (n=4) for more than 6 months. Practices were offered to groups Y0 and Y1 for 10 weeks, twice a week for 60 minutes. Before and after the yoga practice period, questionnaires were applied to assess the symptoms of depression and loneliness.
Resultados e Conclusões:
The results showed that Y0 group (21.38±4.4660) exhibited similar values than group C (12.06±1.714) and higher than the Y1 group (9.750±1.887), (ANOVA, p=0.0132). After the training, there were no significant differences between groups (C=11.24±1.897; Y0=14.13±4.299; Y1=7.750±2.213), (ANOVA, p=0.7892). The Y0 group showed reduction of the depression scores when compared before and after the training period (Y0-pre = 21.38±4.460), (Y0-post=14.13±4.299), (teste T; p=0.0156). Before training, the Y0 group (33.13±5.218) presented values of loneliness superior to the groups C (21.41±2.22) and Y1 (16.50±3.106), (ANOVA, p=0.0147). There were no significant differences in mean loneliness in the groups after training (C = 20.82 ± 2.899, Y0 = 27.75 ± 6.576, Y1 = 24 ± 4.183), (ANOVA, p = 0.6065). We conclude that short-term yoga practice shows to be effective in reducing symptoms of depression and loneliness indices.
Palavras-chaves: Yoga, Depression, Loneliness
Agência Fomento: CAPES

14.032 - CATEGORIZAÇÃO EMOCIONAL DE OBJETOS QUE DISPÕEM MANIPULAÇÃO: O EFEITO DO TRAÇO DEPRESSIVO

EMOTIONAL CATEGORIZATION OF OBJECTS THAT AFFORD TO BE-GRASPED: THE EFFECT OF DEPRESSION TRAIT

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Most of actions that everyone does in daily-living imply in interaction with meaningful emotional stimulus.
Objetivos:
This study aimed to select pictures of objects that afford to be grasped as emotional stimuli.
Métodos:
Sixty-three adult volunteers participated of this study, with the approval of local the ethical committee (CAAE: 64960417.8.0000.5147). The Self-Assessment-Manikin (J Behav Ther Exp Psychiatry, 25:49 , 1994) scale was used to classify pictures of objects in valence and arousal dimensions. Cluster analysis were applied to

run emotional classification of 123 pictures of objects based on valence and arousal values assigned by the volunteers.
Resultados e Conclusões:
Analysis of Cluster agreed in the classification of the pictures into 3 categories in 90% of cases, namely: pleasant (21), neutral (48) and unpleasant (33). The pleasant pictures presented the highest valence value (7.00±0.61), while the unpleasant pictures the lowest one (3.17±0.06). In addition, both categories had the highest levels of arousal (pleasant= 4.61±0.80, unpleasant= 4.78±0.73). On the contrary, the neutral stimuli had valence around 5 (5.33±0.027), and low arousal level (2.83±0.35). When the classifications made by the Cluster analysis did not agree about the emotional category, the pictures were excluded from the database (21). Participants were slower to classify unpleasant pictures in the valence rating. However, they were faster to classify neutral pictures in the arousal rating. An additional analysis was run by dividing the volunteers according to their score in Beck Depression Scale (BDI-II)(Rev. Bras. Psiquiatr., 34:389, 2012) as depressed (n=32) and non-depressed (n=31) groups. No effect of depression was found on the classification of pictures for valence (p = 0.84), neither for arousal (p = 0.42). Also, there was no effect of depression trait on time spent to classify pictures in valence (p=0.86) and arousal (p=0.96) ratings. Thus, a bank of 102 emotional pictures of objects that afford to be grasped was selected. Finally, the emotional classification ran herein was not outlined by the depression trait.
Palavras-chaves: Sel-Assesment-Manikin, Depressão, Algorítimo de grupos
Agência Fomento: Conselho Nacional de Desenvolvimento Científico e Tecnológico – CNPq

14.033 - ASSIMETRIA VERTICAL NA ORIENTAÇÃO ENCOBERTA DA ATENÇÃO VISUAL

VERTICAL ASYMMETRY ON COVERT ORIENTATION OF VISUAL ATTENTION
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Instituição: 1 Unoeste - Universidade do Oeste Paulista (Presidente Prudente-SP)Introdução:
Attention is a set of processes that leads to the selection or prioritization of information, in order to filter it and avoid perceptual overload in the processing of tasks. Many brain functions are known to be lateralized, for example the act of speech (in the left hemisphere) and the spatial processing (in the right). Attention has greater processing in the right brain hemisphere and is also asymmetric in its phenomenology, favoring the right side of visual space.
Objetivos:
The objective of the present study was to investigate attention's vertical asymmetries similar to its lateralized ones.
Métodos:
This study was registered and approved by the National Research Ethics Committee under CAAE number 88358418.8.0000.5515. Forty university students were selected at random from easy access at the university campus. Minimal age selected was of 18 years old, and maximum of 30 years old, with 18 of the participants being men and 22 women. A modified version of Posner's Attention Paradigm (Posner, 1980) was used, with targets displayed in the vertical peripheral field of vision. Central cues, also vertical, were predictive (80:20) and Stimulus Onset Asynchrony (SOA) were 100, 300 and 700 ms. Analysis of variance for repetitive measures (ANOVA) were used to compare reaction times and accuracy (percentage of correct responses in relation to total responses), considering Gender, SOA, Position (of the target) and Validity as factors. When needed, Tukey HSD post-hoc tests were performed.
Resultados e Conclusões:
The ANOVA showed for the reaction times (RT) significant differences for target position ($F_{1,34}=4,751$; $p=0,036$), revealing that attention is vertically asymmetric, besides significant differences for SOA ($F_{2,68}=76,559$; $p < 0,001$), and validity ($F_{1,34}=54,378$; $p < 0,001$) as expected. There are no Gender differences ($F_{1,34}=1,952$; $p=0,171$). For the interactions, results showed a significant interaction between validity and SOA ($F_{2,68}=20,368$; $p < 0,001$) because there is no validity effect for the last SOA. The ANOVA for anticipation errors showed lack of significant differences between gender ($F_{1,34}=0,212$; $p=0,648$) and for Position ($F_{1,34}=0,193$; $p=0,663$), and a significant difference for SOA ($F_{2,68}=65,991$; $p < 0,001$). Therefore, the present study's results add an important contribution to research literature by reaffirming that attention orienting, evidenced by reaction times, is asymmetrical even on the vertical plane.
Palavras-chaves: Attention, Cognition, Functional Laterality, Psychophysics
Agência Fomento: Unoeste

14.034 - AFINAÇÃO EM CANTORES: UMA INVESTIGAÇÃO SOBRE IMAGENS AUDITIVAS

SINGING IN TUNE: AN INVESTIGATION ON AUDITORY IMAGERY

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Instituição: 1 UFABC - Universidade Federal do ABC (Rua Arcturus, 03 São Bernardo do Campo – SP 09606-070)Introdução:
Singing is a complex activity that engages several cognitive and physiological processes and involves a sensorimotor translation. At the same time, it is well known that auditory imagery may aid this essential translation process in vocal imitation mechanism.
Objetivos:
The main goal of this project is to verify whether auditory imagery is related to a better performance in tasks of vocal imitation with regard to tuning accuracy. We hypothesize that the practice of auditory imagery prior to vocalization should contribute to a more adequate tuning in vocal imitation tasks.
Métodos:
Participants (n=60) will perform a vocalization task of different 4-note melodies in two conditions: i) imitation immediately after listening to the model melody and ii) imitation after a silence interval of four seconds (during which participants will form an auditory image of the melody they have just heard). Correlational analysis will be conducted between the results provided by the acoustic analysis of vocalized fundamental frequencies (f0) and scores on the following questionnaires adapted to Portuguese: i) Modern Singing Handicap Index (MSHI), in order to assess the perception of one's own voice; ii) Goldsmiths Musical Sophistication Index (Gold-MSI-P), as a measure of musicality; iii) Bucknell Auditory Imagery Scale (BAIS), for the assessment of imagery vividness; iv) Revised Self-Consciousness Scale Revised (SCS-R) and Kenny Music Performance Anxiety Inventory (K-MPAI), in order to assess the role of anxiety in general context and in the musical context, respectively. The imitation task will be randomised with a control visual task. The experimental group will consist of 30 individuals recruited from amateur choral groups and the control group will consist of 30 individuals without any experience in singing.
Resultados e Conclusões:
We expect to find a positive correlation between scores in the singing imitation task and the creation of vivid auditory images. Deviation of f0 should be smaller after the auditory imagery task. We also expect to find a positive correlation between accuracy in tuning and scores on the musicality test.
Palavras-chaves: auditory imagery, music cognition, voice accuracy
Agência Fomento: UFABC

14.035 - THE IMPACT OF EXPERTISE ON THE EMOTIONAL EVALUATION OF IMAGES OF CERVICAL CYTOLOGY

THE IMPACT OF EXPERTISE ON THE EMOTIONAL EVALUATION OF IMAGES OF CERVICAL CYTOLOGY

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Instituição: 1 UFOP - Universidade Federal de Ouro Preto (Campus Morro do Cruzeiro s/n. Bairro Bauxita. Ouro Preto - MG), 2 UFF - Universidade Federal Fluminense (Universidade Federal Fluminense, Rio de Janeiro, RJ)Introdução:
Pleasant or unpleasant stimuli cause emotional reactions related to the motivational appetitive or defensive system, respectively. It is known that emotional reactions to stimuli might be modulated by the individual's previous knowledge.
Objetivos:
Our aim was to evaluate the emotional pleasantness (valence) and arousal from images of cervical cytology with different lesion levels on individuals with and without previous knowledge about the subject.
Métodos:
The sample was composed by 146 students from Federal University of Ouro Preto (UFOP) from Medicine and Law courses (M=21,29 years old; SD=3,04) and 34 cytopathologists with at least 2 years of experience (M=45,56 years old; SD=11,13). Participants viewed 60 images from the International Affective Picture System (IAPS) catalogue (20 negative, 20 positive and 20 neutral) and 20 images of cervical cytology (10 with some alteration and 10 without any alteration). The evaluation of the images followed IAPS recommendation. After turning off each image, the subjects filled the scale of valence and emotional

activation using the paper-and-pencil version of the Self Assessment Manikin. This study was approved by the Ethics Committee of UFOP (CAAE: 80670217.3.0000.5150).
Resultados e Conclusões:
The students, as well as the cytopathologists, classified the positive images (Medicine students: M = 7,1; Law students: M = 6,6 ; Cytopathologists: M=6,5) as more pleasant and the negative images (Medicine students: M= 2,7; Law students: M= 2,9; Cytopathologists M= 3,0) as more unpleasant than the neutral images (Med students: M= 5,2; Law students: M= 5,1; Cytopathologists: M= 5,2; $p < 0,001$ for all comparisons). The students classified the pictures of cervical cytology without (Medicine students: M= 4,7; Law students: 4,9) and with alteration (Medicine students: M= 4,5; Law students: 4,6) with the same valence ($p = 0,9$ for both). The Cytopathologists also classified the pictures without alteration (M= 6,3) and the pictures with alteration (M= 5,7) with the same valence (p=0,1). Regarding emotional activation, both the students and cytopathologists classified the positive images (Medicine students: M = 4,8; Law students: M = 4,2; Cytopathologists: M = 4,3) and negative images (Medicine students: 5,3; Law students: M= 5,0; Cytopathologists: M=5,6) as more activating than the neutral pictures (Med students: M=2,3; Law students: M=2,2; Cytopathologists: M=3,1; $p < 0,001$ for all comparisons). The students classified the images with alteration (Law students: M=2,63; Med students: M = 2,80) and the images without alteration (Law students: M=1,78; Med students: M=2,80;) with the same arousal ($p = 0,5$; $p= 0,6$, respectively). The cytopathologists classified the pictures with alteration (M=5,2) as more activating than those without alteration (M=4,1; $p = 0,006$). We concluded that the previous knowledge about the content of images of uterine cervix cytologic smears did influence the emotional evaluation of valence and activation.
Palavras-chaves: Activation, Emotion, Valence and health
Agência Fomento: CAPES; UFOP

14.036 - AVALIAÇÃO DAS DIMENSÕES DE PERSONALIDADE EM DANIO RERIO

ASSESSMENT OF PERSONALITY DIMENSIONS IN DANIO RERIO
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Instituição: 1 UFPA - Universidade Federal do Pará (R. Augusto Corrêa, 1 - Guamá, Belém - PA)Introdução:
Personality is the result of a set of factors, namely: gene expressions, behavioural traits, life experiences and environmental stimulus. Based on the model of the Big Five Factors, researchers observed five traits in Guppy (Poecilia reticulata) using a battery of tests (Open-field test, Predator inspection test, Schooling tendency test and Mirror test), and grouped those traits in two big dimensions called approach and avoidance of fear. The aforementioned tests are widely applied for the evaluation of traits, but most studies are not directed to dimensions. The Zebrafish (Danio rerio) is a species well known in the scientific world for their physiological and behavioral analogies with mammals and their maintenance facilities.
Objetivos:
Therefore, the present study sought to assess the personality and extract the dimensions of approach and avoidance of fear in Danio rerio.
Métodos:
Using the test battery 23 Zebrafish males were subjected to three consecutive days of each test with a 30-day interval and behaviors (immobility, mobility, freezing, skittering, erratic swimming, predator inspection, schooling, looking fixedly at the reflected image, hitting the mirror) analyzed and tabulated.
Resultados e Conclusões:
The results of ANOVA between days did not show significant differences ($p > 0,05$), so they were reduced to the mean and submitted to Cluster analysis that generated 2 groups which indicated two behavioral profiles similar to personality dimensions: group more daring (entries in the periphery [$F(1,19)=13,800, p=0,001$]), active (locomotion time [$F(1,19)=9,986, p=0,005$] and number of quadrants traveled [$F(1,19)=15,222, p=0,001$]), aggressive [$F(1,19)=5,285, p=0,033$], sociable [$F(1,19)=10,199, p=0,005$] and more reactive to stimuli (locomotion time without conspecifics [$F(1,19)=0,032, p=0,860$] and locomotion time with conspecifics [$F(1,19)=6,119, p=0,023$]), and another group, timider, less active, less aggressive and less sociable, furthermore, both groups showed behavioral consistencies over time and through situations. Such behavioral phenotypes can be associated with the dimensions proposed for Guppy: Approach, characterizing daring individuals, explorers, sociable and active and Fear Avoidance, represented by individuals anxious, timid, less active and little explorers. We conclude that the species Danio rerio,

when submitted to the battery of tests, presents similar responses to the species Poecilia reticulata, showing to be a valid model for personality analysis and its dimensions. This research complied with the requirements of the animal care use protocols of the guidelines established by the National Council for the Control of Animal Experimentation (CONCEA/2016) and approved by the Ethics Committee for the Use of Animals of the Federal University of Pará. (CEUA/UFPA) Protocol No. 6234250216

Palavras-chaves: Diferenças individuais, Personalidade, Traços comportamentais, Zebrafish
Agência Fomento: CNPq

14.037 - VISUAL STIMULI OF SOCIAL INTERACTION MODULATES ULTRA-SHORT TERM HEART RATE VARIABILITY

VISUAL STIMULI OF SOCIAL INTERACTION MODULATES ULTRA-SHORT TERM HEART RATE VARIABILITY

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Instituição: 1 UFOP - Universidade Federal de Ouro Preto (Universidade Federal de Ouro Preto, Campus universitário Morro do Cruzeiro, s/n.)Introdução:

Sociality is an important occurrence in evolutionary history of many species, and humans are often described as essentially being social animals. From a bio-behavioral perspective, several studies investigate how neural mechanisms can regulate sociality. The autonomic nervous system plays a fundamental role in understanding these relationships, and can be measured by the heart rate variability (HRV), a promising tool for psychophysiological research.

Objetivos:

The aim of this study was to investigate whether visual stimuli of social interactions can modulate the root mean square of the successive differences (RMSSD) of the RR intervals, an ultra-short term heart rate variability (HRV). Specifically, the RMSSD was evaluated as a measure for reactivity and recuperation regarding to “social interaction stimuli” in comparison with “control stimuli”.

Métodos:

This study was approved by the Federal University of Ouro Preto's Ethical Commission, reference number CAAE: 32885314.2.0000.5150. The sample consisted of 72 undergraduate students (35 women, M = 23.4 years, SD = 2.9). The volunteers were exposed to 14 pictures displaying social interaction (composed of scenes with people in direct social interactions, involving touch and look), paired with 14 control pictures, (composed of scenes with people in indirect social interaction, without touch or look). Both blocks of pictures was preceded and succeeded with a non-stimuli period of 3 minutes. The electrocardiogram signal was recorded throughout the experiment to collect data on HRV. The blocks of pictures were displayed in a randomized order. Each picture was shown on a computer screen for 4s, with intervals of 4 to 5s, and controlled automatically via E-prime. The first non-stimuli period was the baseline. The reactivity of HRV was calculated as the mean of RMSSD during stimuli period minus the baseline period. The recuperation of HRV was calculated as the mean of RMSSD during the post non-stimuli period minus baseline period. For statistical analysis, a t-test for dependent samples was used to compare reactivity of HRV to social interaction stimuli with reactivity of HRV to control stimuli. This test was also used to analyze the recuperation of HRV.

Resultados e Conclusões:

Results showed that reactivity of HRV to social interaction stimuli was significantly lower compared to control stimuli ($t(72)=2.14$, $p < 0.05$). The same was found regarding the recuperation of HRV reactivity ($t(72)=2.13$, $p < 0.05$). Cues of social interaction such as look and touch may have a higher cognitive cost of processing than pictures lacking these resources because of its attentional demands as a highly relevant stimulus. Such demands may have an influence on HRV leading to its decrease. To conclude, visual stimuli of social interactions were capable of modulating HRV, probably because of its cognitive costs.

Palavras-chaves: Heart rate variability, Social interaction, Visual stimuli
Agência Fomento: CAPES

14.038 - INFLUÊNCIA DO EXERCÍCIO FÍSICO E ESCOLARIDADE SOBRE ASPECTOS COGNITIVOS DE IDOSAS DO MUNICÍPIO DE CASTANHAL-PA

INFLUENCE OF PHYSICAL EXERCISE AND SCHOOLING ON COGNITIVE ASPECTS OF ELDERLY IN THE MUNICIPALITY OF CASTANHAL-PA

Autores: Brenda Cavalcante Sarmento 1, Carla Luana Alves Costa 1, Rayane de Paula Cantão Gomes 1, Vanessa do Nascimento Silva 1, Vinicius do Nascimento Cunha 1, Alessandra Mendonça Tomás 1, Rafael Oliveira da Silva 1

Instituição: 1 FEF/UFPA/CUSCAST - Faculdade de Educação Física (Av. dos Universitários, s/n - Jaderlândia, Castanhal - PA, 68746-630)Introdução:
Aging is a complex process, accompanied by physiological changes such as cognitive decline and functional capacity. It has already been shown that education can influence cognition and that low levels of schooling are attributed to cognitive decline in aging. On the other hand, physical exercise is an important tool for coping with declines related to aging.
Objetivos:
To evaluate the influence of schooling on the cognitive performance of practicing and non - exercising elderly women.
Métodos:
Healthy elderly volunteers participating in SESC projects in the municipality of Castanhal-PA answered the socioeconomic questionnaire and performed a neuropsychological evaluation through the Mini Mental State Examination (MMSE), which evaluates the orientation of temporal space, immediate memory, recall, memory of procedure and language. Statistical analysis was performed by the GhaphPad Prisma program, 8.01 (Normal test - Shapiro-Wilk; Student's T-test - $p \leq 0.05$).
Resultados e Conclusões:
The sample consisted of 82 elderly women grouped in years of education (1 to 7 and ≥ 8 years of schooling) and age (60-69 and ≥ 70 years), of which 17 were sedentary and 65 were active. The results showed that in the active group, the age group of 60 years obtained schooling of 10.2 ± 3.9 years. In individuals over 70 years of age, 9.9 ± 5.3 years were obtained. In the sedentary group, the age group of 60 years obtained 13.2 ± 6.3 years and individuals with more than 70 years presented 10.7 ± 8.6 years of schooling. These results were not statistically significant. On the other hand, the MMSE performance was considered as mean (24.7 ± 3.0 points) in both groups and age groups. Active and sedentary elderly did not present cognitive impairment, because the MMSE performance was considered median. The relation between study time and physical exercise did not present any difference in cognitive aspects in this sample. The present research was submitted to the approval of the ethics committee at Plataforma Brasil, and we are currently awaiting the final opinion, which makes it impossible for us to present a supporting document for this congress.
Palavras-chaves: Cognição, Escolaridade, Envelhecimento, Memória

Agência Fomento:

14.039 - O PAPEL DO CEREBELO EM CAMUNDONGOS EXPOSTOS AO MODELO DE ESTRESSE PÓS-TRAUMÁTICO

THE ROLE OF CEREBELLUM IN MICE EXPOSED TO POSTTRAUMATIC STRESS DISORDER MODEL

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Cerebellum structure has attracted the attention for modulation of anxiety-like higher order behavior because the presence of limbic areas connections, called “limbic cerebellum”, where vermal cerebellum appears to be involved in the emotionally related defensive behavior. Several studies have demonstrated cerebellar alterations in neuropsychiatric diseases like post-traumatic stress disorder (PTSD), both humans and animals. Since the most important characteristic in PTSD is the aversive memory recall, evidences have shown that cerebellar lesions trigger PTSD-related symptoms such as intrusion, avoidance, hyperarousal and anxiety.
Objetivos:
In this sense, we investigated a cerebellar participation in PTSD anxiety using a non-selective synaptic inhibitor, cobalt chloride ($CoCl_2$), in a light-dark box (LDB) conditioning model in mice.
Métodos:
Male Swiss mice (n=10/group), CEUA 7044181218, were exposed on day 1 to inescapable footshock (0.5 mA/10 s) into the dark side of a light-dark box, followed by three weekly situations remembers (SR) to the light side of the box (2 min, without footshock). Forty-eight hours after the last session, all animals were stereotaxically implanted with guide cannula directed towards the cerebellum according to Paxinos and Franklin atlas. On the 28th day, 10 minutes after intra-cerebellar injections of saline (0.1 µl) or $CoCl_2$ (1 mM/0.1 µl), all animals were tested in the elevated-plus maze (EPM) for 5 minutes. On the 34th day, the

same mice following the same injection procedure and explore both sides of the LDB for 5 minutes.
Resultados e Conclusões:
Our results demonstrated that temporary chemical inactivation of the cerebellum increased the percentage of open arms time [saline (19.1 ± 5.7), CoCl2 (39.0 ± 7.3); t15=-2.17, p < 0.05)], while decreased percentage protected stretch-attend posture (SAP) [saline (80.2 ± 6.0), CoCl2 (55.1 ± 8.6); t15= 2.42, p < 0.05)], and percentage protected head-dipping [saline (64.7 ± 8.2), CoCl2 (38.8 ± 9.0); t15= 2.14, p < 0.05)]. However, there was no observed significant difference in the percentage of open arms entries [saline (34.9 ± 5.2), CoCl2 (49.3 ± 6.3); (t15=-1.76, p > 0.05)], closed arms entries [saline (7.5 ± 0.7), CoCl2 (6.6 ± 0.9); t15=0.77, p > 0.05)], total SAP [saline (48.3 ± 7.6), CoCl2 (57.2 ± 7.9); t15= -0.80, p > 0.05)] and total head-dipping [saline (43.2 ± 8.5), CoCl2 (54.8 ± 9.9); t15= -0.89, p > 0.05)]. Furthermore, in the dark-light box, there was no difference in the latency time to dark side entry (t15=-0.43, p > 0.05) and in the percentage of the time spent on the light side (t15=-0.75, p > 0.05). These data suggest that temporary inactivation of the cerebellum produced an anxiolytic-like effect in the elevated plus-maze and do not change the evocation of the aversive memory in the LDB in mice.
Palavras-chaves: Anxiety, Cerebellum, Post-Traumatic Stress Dissorder
Agência Fomento: CNPq (164865/2018-7)

14.040 - PREFERÊNCIA EM ZEBRAFISH (DANIO RERIO): NÍVEIS DE EXPLORAÇÃO AMBIENTAL EM EXPOSIÇÃO A ESTIMULO AVERSIVO E APETITIVO.

PREFERENCE IN ZEBRAFISH (DANIO RERIO): LEVELS OF AMBIENTAL EXPLORATION IN EXPOSURE TO AVERSIVE AND APPETITIVE STIMULI.
Autores: Igor Nascimento 1, Amauri Gouveia 1, Erica Sanches 1
Instituição: 1 UFPA - Universidade Federal do Pará (Guamá, Belém - PA, 66075-110)Introdução:
Preference is the time of permanence and the length that an animal keep of the stimuli. This Is an effective manner to understand to which stimuli the animal direct its behavior .In this study, we use two stimulus, one appetitive (shoal) and another aversive (dead fish).
Objetivos:
The objective of the present study was to verify the preference for an aversive stimulus or appetitive in zebrafish.
Métodos:
It was used adult Zebrafish (n=23), from pet shops places; sex and age were undetermined. They were keep individually in fish compartment (Tecnipast, Italia), with regular alimentation, (1 x day, Tetra, Germany) and temperature (28°C) and controlled light-dark cycle (14 x 10h, starting at 6:00h). This research was approved by the “Comissão de Ética no Uso de Animais da Universidade Federal do Pará” (CEUA nº 6234250216).: The exposition device has the next dimensions 45x10x15; it has two arms and it was place either a dead zebrafish in one or a little shoal (n=5)- in the other . The stimulus was in a transparent recipient allowing visual contact.Each animal was submitted to a single exposure session to each stimuli. For the analysis of the data, the apparatus was divided in 4 quadrants (Q) in relation to the distance of the stimulus: (Q1: 0.00 cm, Q2: 11.25 cm, Q3: 22.5 cm, Q4: 33.75 cm). The passages and durations between these were calculated using the software x-plo rat 2005. The data was compared by Kruskal-Wallis, followed by Tukey's test.
Resultados e Conclusões:
Preference for shoal : The average time in each quadrant Q1, Q2, Q3 and Q4 was respectively equal to 94.5; 330.6; 142.0; 32.7s and standard deviation 168.7; 139.8, 103.5; 38.4s. With a significant difference between them (H (3) = 23,228, p = < 0.001), with significant proximity to the school in relation to the others (Q1 and Q2). The tukey test demonstrates the following values for differences between quadrants Q2, Q4; Q2, Q1; Q2, Q3; Q3, Q4 p = < 0.001 and quadrants Q3, Q1 p = > 0.05. Preference for dead fish: The mean time in the Q1, Q2, Q3 and Q4 quadrants were respectively 88.6; 186.6; 232.3; 92.2s, and standard deviation 112; 72.5; 85.6 and 65.9, with a significant difference between them (H (3) = 43.2, p = 0.001) with significant difference for permanence in the distant quadrants of the stimulus. The tukey test demonstrates the following values for differences between quadrants Q2, Q4; Q2, Q1; Q2, Q3, Q3, Q4, p = 0.001 and Q2, Q1; Q1, Q4 p = > 0.05. As for the level of ambient exploration with the highest exposure to dead fish, the mean number of entries in the various quadrants was 258.3 and in the school of 145 entries, with a significant difference (F (1.44) = 19,784, p < 0.001).The data indicates that Zebrafish prefer to explore the central quadrants of the apparatus, maintaining a greater distance from the aversive

stimulus, and larger approximation to the appetitive stimulus.As to the level of ambient exploration, the subjects explore more the environment when exposed to the aversive stimulus than when in the presence of appetitive stimuli.
Palavras-chaves: Preference, ambiental exploration , Zebrafish (Danio rerio)
Agência Fomento: CNPQ

14.041 - O TESTE DE CAMPO ABERTO E A PERSONALIDADE EM ZEBRAFISH

OPEN FIELD TEST AND ZEBRAFISH PERSONALITY
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Animal personality is defined as the differences, which have the characteristic of being consistent over time and different contexts, in behavior between individuals. Traits such as shyness, neophobia, exploration, and sociability, vary among individuals of the same species. This research is interesting because of the impact that individual differences can have on the survival and reproductive success of individuals, from a biological and ecological perspective. Also, for psychology and medicine, this is a current issue because it is essential to recognize the influence that such differences may have, for example, in the use of animal models. The analysis questions frequently seek to recognize the depth, the scope, and structure of the individual differences in behavior; understanding the evolutionary consequences of such variations and provide predictions. In fish, a personality is categorized into two large dimensions: approach and avoidance of fear; or according to the level of exploration: proactive and reactive individuals. The Open Field Test (OFT) has been used to separate fearful individuals from the bold and fast explorers from the slow ones.
Objetivos:
Evaluate which variables derived from OFT can be analyzed to initially separate a group of individuals, of the Danio rerio species, using the Zebratrack software.
Métodos:
We perform this test with forty individuals (females=15; males=25) in a circular opaque white aquarium (Diameter=23 cm; height=10 cm; water column=8 cm) (Sanches,2018). A grid of nine quadrants (one central and eight peripheral) was drawn to analyze the locomotion index. We explore variables such as velocity, inmove, and move time, distance, the number of quadrants traveled, and thigmotaxis.
Resultados e Conclusões:
The ANOVA between days does not show significant differences. Zebratrack images show the characteristic exploration patterns of fish and other animal species in OFT. Two groups were generated with the cluster analysis: Group A (n= 17) showed greater exploratory behavior and less fear. In contrast, group B (n = 23) presented more fear and less exploratory behavior. The ANOVA indicated significant differences between the groups, in variables such as: Center time (GA=98,8±34,3; GB=33,41±17,18; $\bar{x}$±SD), [F=62,43 p = 0,000], and Thigmotaxis Time(GA=33,60±25,36s and GB=126,28±41,26; $\bar{x}$±SD), [F= 66,88, p=0,000]. These results highlight the possibility to predict individual personality traits in zebrafish, using variables as center time and thigmotaxis in the Open Field as fast test. The CEUA/UFPA Protocol No.6234250216 approved this research
Palavras-chaves: Animal Personality, Open Field Test, Zebrafish, Danio rerio
Agência Fomento: CNPq

15. Dor

15.007 - A PROTEÍNA QUINASE DEPENDENTE DE RNA DE CADEIA DUPLA MEDEIA A DOR E A NEUROPLASTICIDADE NO SISTEMA NERVOSO

DOUBLE-STRANDED RNA-DEPENDENT PROTEIN KINASE MEDIATES PAIN AND NEUROPLASTICITY IN THE NERVOUS SYSTEM
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Double-stranded RNA-dependent serine/threonine-protein kinase (PKR) is a sentinel molecule activated by several cellular processes including immune responses, cell growth control, and metabolic stress. These data have argued for a broader role of PKR in the regulation

of transcription and signal transduction associated with several neurological diseases, including chronic pain.
Objetivos:
To reveal the role played by PKR in the mechanisms of chronic pain by combining genetic and molecular tools with pharmacological and behavioral paradigms.
Métodos:
All procedures were approved by the local Research Ethics Committee (protocol #138/2007). PKR+/+, PKR-/- and C57bl/6 male mice, aged 3-4 months old were used. Inflammatory pain models consisted of intraplantar injection of Complete Freund Adjuvant or a plantar incision made through skin, fascia and muscle of the left hind paw. RNA expression was investigated by RT-PCR, proteins were analyzed by immunohistochemistry or western blot. Thermal hyperalgesia and mechanical allodynia was monitored by the Hargreaves test and von Frey filaments test. Behavioral data were analyzed by two-way ANOVA followed by Tukey HSD post-hoc analysis, while the RNA expression and western blotting data were analyzed by unpaired Student's t-test. $p < 0.05$ were considered statistically significant.
Resultados e Conclusões:
PKR is expressed in the dorsal root ganglion (DRG) neurons and co-localize with TRPV1, NaV1.7, and TRPA1 ion channels. In the spinal cord dorsal horn (SCDH), PKR is expressed in neurons, but not in astrocytes and microglia. Under inflammatory conditions the expression of PKR mRNA increased at least 3-fold in the DRG and SCDH ($p < 0.05$, Student t-test, n = 6-7/group). Similarly, PKR phosphorylation in the DRG and SCDH is also marked increased during peripheral inflammation (n = 7-9/group). After CFA injection PKR-/- mice showed mechanical allodynia but not thermal hyperalgesia. Pharmacological inhibition of PKR completely reverses both CFA- and incision-induced thermal hypersensitivity in a dose-dependent manner (n = 10-12/group). In addition, PKR inhibition reverses CFA-induced phosphorylation of p38 and JNK MAPkinases as well as IKK β, a precursor of NF κB transcription factor ($p < 0.05$, Student t-test, n = 7-10/group). Capsaicin, a TRPV1 agonist, and heat-induced pain are not influenced by PKR inhibition. On the contrary, TNF α, IL1 β, NGF and LPS-induced thermal hyperalgesia are completely blocked by pharmacological inhibition of PKR ($p < 0.01$, two-way ANOVA, n = 10-12/group). We show for the first time that PKR plays an essential role in neurons, mediating inflammatory pain. Thus, PKR represents a promising target for the development of new analgesic drugs. Most importantly, PKR signaling can be triggered by a number of pro-inflammatory mediators in the nervous system and may act on transcription factors and ion channels, changing neuronal phenotype, excitability and synaptic function.
Palavras-chaves: Inflammation, Neuroplasticity, Pain, PKR
Agência Fomento: FAPESP, CNPq, and CAPES

15.008 - ENVOLVIMENTO DOS RECEPTORES OPIÓIDES E CANABINÓIDES DO TIPO I NA ANALGESIA INDUZIDA PELA ESTIMULAÇAO ELÉTRICA CRÔNICA EXPERIMENTAL DO CORTEX INSULAR

INVOLVMENT OF OPIODID AND TYPE I-CANNABINOID RECEPTORS IN EXPERIMENTAL CHRONIC ELECTRIC STIMULATION OF INSULAR CORTEX-INDUCED ANALGESIA
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Instituição: 1 USP - Department of Anatomy of Institute of Biomedical Sciences o (AVENIDA LINEU PRESTES 2415 SÃO PAULO BRASIL), 2 FMUSP - Department of Neurology of Faculty of Medicine of Universit (AV. DR. ENÉIAS CARVALHO AGUIAR, 225 CERQUEIRA CÉSAR)Introdução:
Insula has connections to descending pain pathways and it is the place where painful sensation is interpreted by its intensity, being a potential target for chronic pain treatment. Electrical Stimulation of Insular Cortex (ESIC) induces antinociception in rats submitted to Chronic Constriction of the Sciatic Nerve (CCSN).
Objetivos:
Evaluate the involvement of both opioids and type 1cannabinoid (CB1R) receptors in the antinociceptive effect induced by ESIC, as well as evaluate the effectiveness of different frequencies applied.
Métodos:
Male Sprague Dawley rats (280-340g- CEUA 5874130618) were submitted to CCSN in the right thigh, using concentric electrodes implanted in the left insula and then, submitted to 5 sessions of ESIC for 15 min. Paw pressure test was applied before any procedure (baseline), before stimulation session (Pre-ESIC) and after stimulation session (Post-ESIC) ate the 1st, 3rd and 5th days of evaluation. General activity was evaluated after the last ESIC session by the open-field test. Different frequencies of ESIC were evaluated:

10 Hz (n=3), 60Hz (n=3), 80Hz (n=3) and sham (n=3). Administration of Naloxone a non-selective opioid receptor antagonist or SR141716A an antagonist of CB1R was used to pharmacologically evaluate the involvement of both opioids and CB1 receptors in ESIC-induced analgesia. Results were analyzed by two-way ANOVA followed by the Bonferroni post-test and represented by mean±standard error; $p < 0.05$.
Resultados e Conclusões:
Data demonstrated that ESIC at the frequencies of 10Hz and 80Hz did not induce antinociception to CCSN-rats, while 60Hz was effective in inducing analgesia in all evaluated times ($p < 0.0001$ - Pre1 ESIC 60Hz vs Post 1 ESIC 60 Hz; $p=0.0001$ – Pre 1 ESIC 60Hz vs Post 5 ESIC 60Hz; p=0,0008 - Post 5 Sham vs Post 5 ESIC 80Hz.). Both Naloxone (mean: ESIC+NAL Pre:42,57±4,63; Post:28,14,0±3,59; p=0,0010) and SR141716A (mean: ESIC+SR Pre: 52,50±3,88; Post: 35,75,0±3,27; $p <$ 0,0001) treatments reversed 60Hz ESIC-induced analgesia. Conclusion: ESIC at 60Hz induces analgesia in an experimental model of refractory pain, without interfering with general activity of animals. Also ESIC-induced analgesia involves both opioid and CB1R.
Palavras-chaves: CANNABINOID RECEPTORS, ELECTRIC STIMULATION, INSULAR CORTEX, NEUROPATIC PAIN, OPIODID RECEPTORS
Agência Fomento: CAPES

15.009 - EXERCÍCIO FORÇADO E ESTIMULAÇÃO TRANSCRANIANA POR CORRENTE CONTÍNUA (ETCC) PROMOVEM EFEITOS ANTINOCICEPTIVOS E MODULAM PARÂMETROS INFLAMATÓRIOS E NEUROTRÓFICOS NA MEDULA ESPINAL EM UM MODELO DE DOR CRÔNICA: EFEITOS EM LONGO-PRAZO

FORCED-EXERCISE AND TRANSCRANIAL DIRECT CURRENT STIMULATION (tDCS) PROVIDE ANTINOCICEPTIVE EFFECTS AND MODULATE INFLAMMATORY AND NEUROTROPHIC PARAMETERS IN THE SPINAL CORD IN A CHRONIC PAIN MODEL: LONG-TERM EFFECTS

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Introduction: Chronic pain management remains a challenge due the refractory response to the drug treatment. Evidences suggest that the exercise plays an important antinociceptive role, as well as, the transcranial direct current stimulation (tDCS) therapy in different chronic pain conditions. However, the effect of association between exercise and tDCS needs to be elucidated.
Objetivos:
Aim: Our objective was to investigate the antinociceptive and neuromodulatory effects of the association between exercise and/or tDCS in a chronic neuropathic pain model (NP) in rats.
Métodos:
Methods: 78 male Wistar rats (60 days-old) were randomized into 13 groups: Control, Control, Sham-Pain; Sham-Pain+Exercise; Sham-Pain+Sedentary+Sham-tDCS; Sham-Pain+Sedentary+tDCS; Sham-Pain+Exercise+Sham-tDCS; Sham-Pain+Exercise+tDCS; Pain; Pain+Exercise; Pain+Sedentary+Sham-tDCS; Pain+Sedentary+tDCS; Pain+Exercise+Sham-tDCS; and Pain+Exercise+tDCS. NP was induced by sciatic chronic constriction (CCI). Mechanical and thermal hyperalgesia were assessed using von Frey (VF) and Hot Plate (HP) tests at: baseline, 7th and 14th days after CCI surgery; and immediately, 24h and 7 days after treatment. Rats were subjected to treadmill and/or tDCS (0.5mA) for 20min/day/8days from 15th day to 22nd day. At 48h or 7 days after the end of treatments, rats were decapitated, and the spinal cord was collected to measure BDNF and IL-4 levels. Behavioral data were analyzed by GEE/Bonferroni and biochemical data by one-way ANOVA/SNK, and $P < 0.05$ was considered significant. This experiment was approved by CEUA-HCPA (#20170061).
Resultados e Conclusões:
Results: At baseline we found no difference in the nociceptive response between groups ($P > 0.05$). We observed interaction between group vs time upon mechanical and thermal hyperalgesia (Wald χ^2=1456.094 e Wald χ^2=3419.908; respectively; n=78; $P < 0.05$). On 7th day after CCI, Sham and Pain groups exhibited hypernociceptive behavior response ($P <$ 0.05); and at 14th day, only Pain groups exhibited that behavior. Immediately, 24h and 7 days following the last treatment session, exercise or tDCS partially

reverted mechanical hyperalgesia in the Pain groups; however at 7 days after the end of treatments, the association between tDCS+Exercise in Pain group showed more pronounced reversion in this behavior (P < 0.05). tDCS and/or exercise completely reverted the thermal hyperalgesia at immediately, 48h and 7 days following the treatment (P < 0.05). In the spinal cord, the Pain and Pain+Sedentary+Sham-tDCS groups displayed an increased BDNF levels at 48h and 7 days compared to other groups (F(12,65)=2.542; P < 0.05). The IL-4 levels were increased in Sham-Pain+tDCS and Pain-sedentary+tDCS groups in comparison to others at 48h (P < 0.05). At 7 days after treatment, the IL-4 levels were reduced in the Pain group (F(12,65)=3.915; P < 0.05). Conclusions: We point out that the exercise and tDCS, trigger antinociceptive effect in NP model in rats; with possible involvement of BDNF and IL-4 levels in the spinal cord.

Palavras-chaves: TRANSCRANIAL DIRECT CURRENT STIMULATION, PHYSICAL EXERCISE, NEUROPATHIC PAIN, BDNF, IL-4

Agência Fomento: CNPq, CAPES, FIPE-HCPA, FAPERGS

15.010 - EFEITO TERAPÊUTICO E PREVENTIVO DO EXERCÍCIO VOLUNTÁRIO EM RODA DE ATIVIDADE NA DOR CRÔNICA E NO COMPORTAMENTO DO TIPO DEPRESSIVO INDUZIDOS POR ESTRESSE POR SUBJUGAÇÃO SOCIAL REPETIDA

PREVENTIVE AND THERAPEUTIC EFFECT OF VOLUNTARY RUNNING EXERCISE ON SOCIAL DEFEAT STRESS (SDS)-INDUCED CHRONIC PAIN AND DEPRESSIVE-LIKE BEHAVIOR IN MICE.

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Major depressive disorders (MDD) and chronic pain (CP) affect significant portion of the world's population, generating a great economic burden on public health. Given the high prevalence of those both pathological conditions, it is not a surprise epidemiological studies showing great relationship between them. In this context, the social defeat stress (SDS) model was standardized in mice and trigger depressive-like behavior and chronic pain.

Objetivos:

Based especially on clinical trials showing an effective preventive and therapeutic effect of physical exercise on chronic pain and MDD symptoms, we aimed to investigate if the voluntary running wheel exercise (RWE) can exert preventive and therapeutic effects in mice submitted to the SDS, using antidepressant fluoxetine as positive control.

Métodos:

We first evaluated the therapeutic effect of physical exercise on hyperalgesia (electronic von Frey test) and depressive-like behavior of social avoidance (social interaction test) induced by chronic SDS. For this, mice started performing RWE after submitted to the chronic SDS (10 days) followed by weekly assessment of the mechanical nociceptive threshold and social interaction. We next evaluated the preventive effect of physical exercise. For this, mice performed RWE before and during chronic SDS followed by assessment of the mechanical nociceptive threshold and social interaction.

Resultados e Conclusões:

Our results showed that 14 days of RWE, but not fluoxetine, can reverse SDS-induced hyperalgesia in susceptible (Sus) and resilient (Res) mice (variation of the mechanical nociceptive threshold □ control: -0.2 ± 0.1; Res/Sed:1.6 ± 0.3; Res/Ex: 0.1 ± 0.3; Res/Flu: 0.9 ± 0.4; Sus/Sed: 2.1 ± 0.1; Sus/Ex: 0.2 ± 0.3; Sus/Flu: 1.2 ± 0.5; N=5-15; p < 0.0001 between control and all groups except for the Res/Ex and Sus/Ex). Our results also showed that 28 days of RWE, as well as fluoxetine treatment, can reverse social avoidance-induced by SDS (time in interaction zone □ control: 58.4 ± 1.8; Res/Sed: 62.6 ± 3.3; Res/Ex: 50.7 ± 9.0; Res/Flu: 52.6 ± 4.3; Sus/Sed: 24.0 ± 4.6; Sus/Ex: 48.0 ± 8.6; Sus/Flu: 47.3 ± 8.8; p < 0.01 between control and Sus/Sed). In addition, RWE was effective preventing both hyperalgesia and social avoidance induced by SDS (time in interaction zone □ Sed/NS: 2.1 ± 0.2; Ex/NS: 1.7 ± 0.2; Sed/SDS: 0.7 ± 0.1; Ex/SDS: 1.6 ± 0.4; p < 0.01between Sed/NS and Sed/SDS; variation of the mechanical nociceptive threshold □ Sed/NS: 0.1 ± 0.1;

Ex/NS: 0.3 ± 0.2; Sed/SDS: 2.8 ± 0.3; Ex/SDS: 0.4 ± 0.2; p < 0.0001 between Sed/NS and Sed/SDS; n=10 for all groups). Based on our results we can conclude that chronic SDS induce chronic pain regardless inducing social avoidance. In addition, we can also conclude that physical exercise should be considered as a preventive and therapeutic clinical intervention for chronic pain and depression triggered by chronic social stress. The study was approved by the Ethics Committee in the Use of Animals of UNICAMP (CEUA/UNICAMP), protocol number 4249-1.

Palavras-chaves: Exercício, Dor, Estresse social, Depressão, Dor crônica
Agência Fomento: FAPESP e CAPES

15.011 - O PEPTÍDEO PHTX4(5-5) DO VENENO DE ARANHA COMO UMA NOVA PROPOSTA TERAPÊUTICA PARA O TRATAMENTO DA DOR NEUROPÁTICA INDUZIDA POR QUIMIOTERÁPICOS

THE SPIDER VENOM PEPTIDE PHTX4(5-5) AS A NEW THERAPEUTIC PROPOSAL FOR THE TREATMENT OF CHEMOTHERAPY-INDUCED NEUROPATHIC PAIN

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Instituição: 4 UFMG - Universidade Federal de Minas Gerais (Minas Gerais), 5 SCBH-EP - Santa Casa Belo Horizonte Ensino e Pesquisa (Minas Gerais), 6 UFOP - Universidade Federal de Ouro Preto (Minas Gerais), 7 UESC - Universidade Estadual de Santa Cruz (Bahia)Introdução:
Vinca alkaloids, chemotherapeutics such as Vincristine and Vinblastine, have significant efficacy in the treatment of malignant tumors. However, hyperalgesia and allodynia can occur as adverse effects, with latencies lasting from days to weeks, which limits dosage, duration of treatment and impairs patients' quality of life. Several studies have demonstrated the participation of the NMDA receptor in chemotherapy-induced neuropathic pain (CNP) models as a result of a chain of release of reactive oxygen species, activation of astrocytes, production of interleukin-1 β (IL-1 β) and its phosphorylation (Ji et al., 2013). This makes the PnTx4 (5-5) toxin suitable to have its antinociceptive activity tested in this model neuropathy, because it is an NMDA-induced current blocking agent.
Objetivos:
In this way, the objective of the present work is to evaluate the antinociceptive potential of the PnTx4 toxin (5-5) in the CNP model, verify its capacity to treat painful symptoms and to explore the mechanisms involved in such actions.
Métodos:
The CNP model was induced according to a Weng´s study published in 2003. Male adult Swiss mice (25-35 g) were acclimatized in the laboratory for at least 1 h before mechanical allodynia testing. The PhTx4(5-5) was intrathecal injected between L4-L5 spinal segment. Nociception was evaluated in response to von Frey filaments. Statistical analysis was carried out by 1-way or 2-way analysis of variance followed by Student-Newmann Keuls post-test. Further, is going to be tested astrocyte activation, IL-1 β levels and NMDA receptor phosphorylation.
Resultados e Conclusões:
The PhTx4(5-5) (30-1000 pmol/site) reversed mechanical hypersensitivity induced by vincristine after 15 days after first i.p injection, (p < 0,001, n= 6-7) with 87,548±12% of maximum inhibition (500 pmol/site). In this way, it is clarified that CNP is the main limiting adverse effect on the cancer cure potential, making it necessary to find drugs capable of preventing or reversing it. So, toxins purified from animal poisons such as PhTx4(5-5) has demonstrated analgesic efficacy in the neuropathic pain model acting as a new therapeutic proposal for the treatment of CNP.

Palavras-chaves: Dor neuropática, PnTx4(5-5), Quimioterápicos, Peptídeo
Agência Fomento: CNPq, CAPES e FAPEMIG

15.012 - 5-HT3 RECEPTORS ACTIVATION IMPAIRS EMPATHY-LIKE BEHAVIOR ON HYPERNOCICEPTION INDUCED BY LIVING WITH A CONSPECIFIC IN NEUROPATHIC PAIN CONDITION IN MICE.

5-HT3 RECEPTORS ACTIVATION IMPAIRS EMPATHY-LIKE BEHAVIOR ON HYPERNOCICEPTION INDUCED BY LIVING WITH A CONSPECIFIC IN NEUROPATHIC PAIN CONDITION IN MICE.

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Introduction: Empathy is an essential component for socialization, it is a product of affective and cognitive processes and behavioral responses, in which an individual witness other's emotional state activates the same emotion in observer and could lead to spontaneous pro-social behaviors. The presence of an animal in injury could modulate the physiological response to pain.in cagemates. We have showed that blockade of the systemic and intra-amygdala 5-HT3 receptors promotes hypernociception decrease in cagemates submitted to neuropathic pain model.
Objetivos:
Aim: Here, we evaluate the effects of m-chlorophenylbiguanide (mCPBG); a 5-HT3 receptor agonist systemically injected in mice submitted on acetic acid-induced writhing test, that cohabitation with a conspecific in neuropathic pain model.
Métodos:
Methods: Male Swiss mice (n=7-11/group), CEUA: 8863220217, were housed in pairs for 28 days since weaning. On the 14th day, they were grouped as follow: cagemate nerve constriction [CNC ; i.e. one animal from each pair was subjected to sciatic nerve constriction (SNC) surgery] or cagemate sham (CS ; i.e. one animal from each pair was subjected to (SS) sham surgery). After that, each pair was returned to its homecage to live together for further 14 days. On the 28th day, they received systemic injections of vehicle (physiological saline with 2% Tween 80) or mCPBG (3.0 or 10.0mg/kg, s.c.) and 25min after were submitted to acetic acid-induced writhing test, induced by intraperitoneal injection of 0.6% acetic acid (0.1 mL/10g).
Resultados e Conclusões:
Results: For abdominal writhes, two-way ANOVA [Factor 1: condition (SNC or SS), Factor 2: treatment (vehicle or mCPBG)] revealed significant difference for condition ($F_{1,46}$= 11.86, $P < 0.01$), treatment ($F_{2,46}$= 76.18, $P < 0.01$), and for interaction between treatment versus condition factor ($F_{2,46}$= 9.67, $P < 0.01$). The Duncan test confirmed the CNC groups displayed higher number of abdominal writhes compared to the CS group. Both doses of mCPBG attenuated the hypernociception induced by living together with a cagemate in chronic pain condition and sham group compared to the respective vehicle CNC group. For immobility, two-way ANOVA showed a difference for condition factor ($F_{1,46}$= 3.49, $P < 0.05$), treatment factor ($F_{2,46}$= 71.08, $P < 0.01$), and interaction between treatment versus condition factor ($F_{2,46}$= 3.76, $P < 0.05$). Duncan test showed that both doses of mCPBG increased immobility in a cagemate in CNC and CS group compared to vehicle group. At high dose, immobility time was longer in the cagemate who lived with the CNC group, suggesting impair of social interaction between animals. Conclusion: Our results showed that the cohabitation with a pair in neuropathic pain condition induced hypernociception, and the activation of 5-HT3 serotonergic receptor using mCPBG, increased immobility and impairs the empathy for pain induced by living with a conspecific submitted to sciatic nerve constriction in mice.
Palavras-chaves: Empathy, Nociception, 5-HT3
Agência Fomento: UFSCar, CNPq (153163/2016-0), FAPESP (2015/00006-4)

16. Neurodegeneração e Envelhecimento

16.024 - AVALIAÇÃO DO COMPORTAMENTO FRENTE A UMA SITUAÇÃO DE RISCO EM MODELO ANIMAL DA DOENÇA DE ALZHEIMER

EVALUATION OF THE BEHAVIOR OF A RISK SITUATION IN AN ANIMAL MODEL OF ALZHEIMER'S DISEASE
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Instituição: 1 UFMG - Universidade Federal de Minas Gerais (Belo Horizonte - Minas Gerais)Introdução:
Alzheimer's disease (AD) is the largest cause of dementia in the world, characterized by behavioral changes, cognitive impairment and progressive loss of memory (Alzheimers Res Ther. 9:71, 2017). Despite their relevance, the pathophysiological mechanisms of the disease continue to be elucidated. In this way, the use of animal models may help to a better understand of the neurodegenerative process, as well as the neurocognitive changes that occur in AD (Alzheimers Res Ther. 5: 28, 2013).
Objetivos:
Evaluate the behavior of a double transgenic mouse model for Alzheimer's Disease, the APP/PS1, which overexpress the amyloid precursor protein (APP) and the presenilin-1 (PS1) protein, in response to a potentially dangerous environment.

Métodos:
The elevated plus maze test was performed with the same APP/PS1 (n = 7) and wild type (WT, n = 7) mice at 8 and 10 months of age. The animals were exposed to the maze for 5 minutes. T-test for paired observation was used to investigate the total time of the animals in the open and closed arms was evaluated, and the results were expressed by the mean (± standard deviation) time in seconds. GraphPad Prism 6.01 software was used for statistical analysis, and values of $p < 0.05$ were considered significant. All the experiments followed the principles of animal experimentation adopted by the Animal Use Ethics Committee of the Federal University of Minas Gerais (UFMG), approved under the number 200/2017.
Resultados e Conclusões:
Regarding the total time in the open arms of the labyrinth, no significant differences were observed comparing the APP/PS1 and WT animals, at 8 and 10 months of age, possibly because the animals remained at the center of the apparatus. However, APP/PS1 animals remained less time in the closed arms of the labyrinth compared to WT animals, both at 8 months of age (77.30 s ± 28.96 vs. 50.14 s ± 27.60, $p = 0.0012$), and at 10 months (66.89 s ± 34.87 vs. 45.14 s ± 35.49, $p = 0.026$). Conclusion: In view of the above, APP/PS1 animals may be considered deficient in recognizing the dangerous stimulus, demonstrated by the shorter residence time in the closed arms of the labyrinth. The fear inhibition observed in this model, in turn, may be associated with a possible impairment of aversive memory in these animals (Cell Rep. 14: 1930, 2016). Based on this, this animal model can provide a better understanding of the behavioral changes that succeed in AD, helping to elucidate the pathological processes that occur in the disease.
Palavras-chaves: Alzheimer´s Disease, Behavior, Memory, Elevated plus maze test
Agência Fomento: Capes

16.025 - VITAMIN D (VD3) SIGNIFICANTLY IMPROVES BRAIN MITOCHONDRIAL RESPIRATION FROM HEMIPARKINSONIAN RATS

VITAMIN D (VD3) SIGNIFICANTLY IMPROVES BRAIN MITOCHONDRIAL RESPIRATION FROM HEMIPARKINSONIAN RATS

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We previously showed that VD3 exerts a neuroprotective action on a Parkinson's disease (PD) model. PD is characterized by the selective loss of dopaminergic neurons of the substantia nigra pars compacta, and evidence indicates that mitochondrial dysfunction is a central factor in neurodegenerative diseases. Thus, mitochondria represent a highly promising target for the development of therapeutic strategies focusing upon PD.
Objetivos:
Our objectives were to evaluate the possible effects of VD3, on brain mitochondria from hemiparkinsonian rats.
Métodos:
For that, adult male Wistar rats (250 -300g) were divided into the following groups: Sham-operated (SO, control), 6-OHDA-lesioned and 6-OHDA-lesioned and treated, before lesion (pre-treatment, 7 days) and after lesion (post-treatment, 14 days) with 1 µg/kg VD3, p.o. Afterwards, the animals were euthanized for brain dissection, mitochondria isolation and measurements of respiration rates, as follows: 1 ml oxygraph (Oxygraph Clark-type electrod) chamber was washed with 70% ethanol, rinsed 3 times with distilled water, then filled with the respiration buffer (75 mM mannitol, 25 mM sucrose, 100 mM KCl, 20 mM Tris–HCl, pH 7.2), 5 mM KH 2 PO 4 , and 1 mg/ml fatty acid free BSA. Then, 10 µl of an aliquot of brain mitochondria (isolated from each of the tested groups) were added to the chamber, together with succinate (10 mM). Next, state 3 was induced by the addition of 500 µM ADP. In order to induce state 4, we added 1µg/ml oligomycin. Respiration rates (O 2 flux) were calculated as the negative time derivative of the oxygen concentration. The data were analized by ANOVA and the Tukey test for multiple comparisons, and considered significant for p & lt;0.05.
Resultados e Conclusões:
We showed that mitochondria from the 6-OHDA group presented respiration rates half of those shown by the SO group. Importantly, the 6-OHDA group pretreated with VD3 had respiration rates more than double of

those of the SO group. In addition, respiration rates of the 6-OHDA group post-treated with VD3 were slightly higher, but not significantly different from those of the SO group [F(3,10)=22.54, p & lt;0.0001]. In conclusion, VD3 improves respiration rates of brain mitochondria isolated from hemiparkinsonian rats.
Palavras-chaves: Vitamin D, Parkinson's disease, Mitochondrial respiration
Agência Fomento: Brazilian National Research Council (CNPq)

16.026 - α-SYNUCLEIN INDUZ SINAPTOPATIA EM UM MODELO DE DOENÇA DE PARKINSON EM DROSOPHILA

α-SYNUCLEIN INDUCED SYNAPTOPATHY IN A DROSOPHILA MODEL OF PARKINSON'S DISEASE
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Parkinson's disease (PD) is characterised by intracellular inclusions of aggregated and misfolded alpha-synuclein (a-syn), and the loss of dopaminergic neurons in the brain. The resulting motor abnormalities mark the progression of PD, while non-motor symptoms can already be identified during early, prodromal stages of disease. PD has therefore been described as a synaptopathy that exhibits early synaptic deficits which occur prior to neurodegeneration.
Objetivos:
To investigate the mechanisms of a-syn induced synaptopathy in a Drosophila model of PD.
Métodos:
1- Drosophila husbandry: Flies were raised in standard cornmeal at 25°C. The Gal4/UAS system was used to overexpress human a-syn-EGFP in flies. 2- Immunohistochemistry: Briefly, flies were dissected in PBS and fixed in formaldehyde. Samples were washed in PBS, blocked in 10% NGS and incubated with primary antibodies overnight (anti-CSP-1:200; BRP-1:50; TH-1:50 a-syn-1:200). Next, the samples were incubated in secondary antibody for 3 hours, washed in PBT and left in vectashield until imaged with A1R confocal or iSIM microscope. 3- Drosophila ARousal Tracking System (DART): flies were placed into 65x5 mm tubes and recorded for 2 hours with DART software. 4- Statistical analysis: Comparison of 2 groups was performed with unpaired parametric two-tailed Student's t-test. Comparison of multiple groups was performed with ANOVA, when normally distributed, followed by Dunkey test. Samples not normally distributed were assessed by Kruskal-Wallis test followed by Dunn's multiple comparison.
Resultados e Conclusões:
Results: Video-assisted motion tracking revealed that a-syn accumulation caused impaired motor behaviour characterised by decreased overall motor activity $p < 0.0001$ (9.82±0.44 X 6.49±0.32, n=90) and speed $p < 0.0001$ (4.65±0.06 X 4,17±0.05, n=90) compared to control, accompanied by decreased maintenance of activity bouts $p < 0.0001$ (0.73±0.01 X 0.60±0.01, n=90). Structural analyses revealed these early behavioural deficits in a-syn flies are neither caused by loss of synaptic arborisations nor degeneration of neurons. Thus, suggesting that accumulating a-syn observed in these flies impaired synaptic function. Accordingly, qualitative downregulation of the synaptic vesicle protein CSP was found in the presynaptic terminals of the Drosophila neuromuscular junction. Moreover, a-syn caused reduction in the number of active zones (AZ) labelled with BRP, compared to control group p=0.0001 (1±0.03 X 0.80±0.02, n=15), a protein required for structural integrity and function of synaptic AZ in Drosophila. Conclusion: These findings demonstrate that accumulating a-syn specifically impairs the integrity of the presynaptic AZ, ultimately triggering synaptopathy and the progressive loss of neurons, thus causing early cytological and behavioural phenotypes that characterise the onset and progression of PD. Note: Research carried out with Drosophila melanogaster does not require ethical committee approval.
Palavras-chaves: Parkinson's disease, α-Synuclein, Synaptopathy, Drosophila, Neurodegeneration
Agência Fomento: CAPES, UK Medical Research Council, UK Biotechnology and Biological Sciences Research Council, UK Motor Neuron Disease Association and Royal Society

16.027 - SPIRULINA PLATENSIS PROTEGE CAMUNDONGOS SUBMETIDOS A ISQUEMIA CEREBRAL PERMANENTE DOS DÉFICITS DE MEMÓRIA POR MECANISMOS QUE ENVOLVEM SUA AÇÃO ANTI-INFLAMATÓRIA

SPIRULINA PLATENSIS PROTECTS MICE SUBMITTED TO PERMANENT CEREBRAL ISCHEMIA FROM MEMORY DEFICITS BY MECHANISMS THAT INVOLVE ITS ANTI-INFLAMMATORY ACTION

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Instituição: 1 UFC - Universidade Federal do Ceará (Rua Coronel Nunes de Melo, 1000 - Rodolfo Teófilo,)Introdução:
Stroke is one of the main causes of disability in adults and the third cause of death worldwide. The majority of all stroke events are ischemic (80–85%) and caused by cerebral arterial thrombosis or embolism. The pathophysiology of ischemic stroke involves multiple events such as inflammation and oxidative stress which will lead to neuronal death and cognitive deficits. Spirulina platensis (SPI) is a cyanobacterium used in many countries as a nutritional supplement which exerts antioxidant, anti-inflammatory, and anti-apoptotic activities.
Objetivos:
The aim of this work was to investigate the effects of SPI on neuronal damage and memory in mice underwent permanent occlusion of the middle cerebral artery (pMCAO).
Métodos:
Male Swiss mice weighing 25–35g (n= 8/group) divided between the sham-operated (SO) groups treated with vehicle (Saline), vehicle-treated ischemia (pMCAO) and SPI-treated at 90 and 180 mg/kg orally. Animals were treated with SPI 3h after pMCAO and the treatment continued once daily until the last test day. The TTC (2,3,5-Triphenyltetrazolium chloride) staining was used to quantify the infarct area, the neurological evaluation test to evaluate the motor performance and Sensory function, open-field test to evaluate locomotor activity and the Y-maze test to evaluate the working memory. TNF- α and iNOS immunoreactivity in the temporal cortex and striatum was evaluated. All procedures in this study were approved by the ethics committee on animal experimentation of the Federal University of Ceará (registration number: 16/2017). The data were analyzed with one-way ANOVA, followed by Bonferroni post hoc test and immunohistochemical tests were performed using the lowest effective dose of SPI (90 mg/kg). Data are presented as mean ± S.E.M., and significant diferences were considered at $P < 0.05$.
Resultados e Conclusões:
In the open-field test pMCAO decreased the number of rearings (SO: 37.33±2.97; pMCAO: 27.50±4.02) but not crossings (SO: 104.1±6.10; pMCAO: 115.3±7.59) compared with SO 72 h after surgery and the treatment with SPI not prevented this reduction (rearings: SPI90: 30.33±48.49; SPI180:24.33±8.97). SPI significantly reduced the infarcted area (% infarcted area: pMCAO: 12.65±1.13%; SPI90: 5.37±1.09%; SPI180: 4.33±1.03%), the neurological déficits (scores- SO: 18; pMCAO: 13; SPI90: 16; SPI180: 15) and improved working memory (spontaneous alternation (%)- SO: 67.23±2.61; pMCAO: 56.29±2.77; SPI90: 61.50±4.91, SPI180: 71.38±2.88) caused by pMCAO. SPI significantly prevented the increase of TNF- α immunoreactivity (SO: 31.63±2.14; pMCAO: 86.49±6.86; SPI 90: 49.83±2.92) and iNOS (SO:100.0±1.36; pMCAO: 56.64±6.25; SPI 90:66.52±2.83) in the temporal cortex but not in the striatum. These data showed that Spirulina platensis provides neuroprotective action probably due to its anti-inflammatory activity.
Palavras-chaves: Spirulina platensis, cerebral ischemia, memory, neuroprotection
Agência Fomento: CAPES, CNPq and FUNCAP

16.028 - THE NEUROPROTECTION OF ACE2-ANG-(1-7)-MAS AXIS IN THE NON-MOTOR SYMPTOMS OF PARKINSON'S DISEASES

THE NEUROPROTECTION OF ACE2-ANG-(1-7)-MAS AXIS IN THE NON-MOTOR SYMPTOMS OF PARKINSON'S DISEASES

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Parkinson's diseases (PD) is a neurodegenerative disorder characterized by bradykinesia,rigidity and resting tremor. However, non-motor symptoms such as anxiety and depression have been also reported. The mechanisms underlying PD physiopathology remain to be fully revelaed, and might involve several factors such as genetic aspects, senescence, oxidative stress, neuroinflammation, amongh others. Over the past years, emerging studies have reported a local expression of components of the Renin Angiotensin System (RAS) in the brain tissue. The discover of RAS components expression in the brain opened a road for the hypothesis that RAS molecules might participate in the pathogenesis of some neuropsychiatric and neurodegenerative conditions, as Alzheimer's Disease and PD. However, the RAS counter-regulatory axis composed by the angiotensin-converting enzyme 2 (ACE2), Angiotensin (1-7) [Ang (1-7)] and Mas receptor frequently have opposing actions of the classical RAS arm (angiotensin-converting enzyme (ACE), Angiotensin II (AngII)- Angiotensin typer 1 (AT1) receptor), wich mediate anti-inflammatory, anti-thrombotic and anti-fibrotic processes
Objetivos:
Herein, we aimed to investigate the mechanisms related to the development of cognitive and behavioural changes during a preclinical phase of PD as well as the effects of pharmacological strategies able to modulate RAS on those changes
Métodos:
The parkinsonism was induced in C57BL/6 mice by intranasal infusion of the neurotoxin MPTP (1mg/nostril). MPTP-mice received saline 0,9%, Perindopril (5mg/Kg, an atagonist of ACE) Telmisartan (10mg/Kg, an antagonist of AT1 receptors) and AVE099 (10mg/Kg, an agonist of Mas receptors) by gavage. The treatments initiated 5 days before the MPTP infusion (dpi) and remained until the 11th-dpi. Control animals received saline. Standardized behavioural tests and immune assays were performed in the key areas of PD, such as substantia nigra, striatum, cortex and hippocampus. Statistical testOne wayANOVA COMISSAO DE ETICA NO USO DE ANIMAIS/UFMG protocol 255/2017
Resultados e Conclusões:
The treatment with AVE099 prevented olfactory memory loss at 5 dpi (n=8) (p=0,0044). Interestingly, AVE099 also prevented anxiety-like behaviour at 6(n=8) (p=0,001) and 11 (n=6) (p=0,0001) dpi. No significant differences were found in locomotor activity (n=8) (p=0,2211) work memory (n = 8per group) (p = 0,8365) or in depressive-like behavior (n=8) (p=0,2467). A significant increase of IL-6 (p=0,0001), IL-10(p =0,001) and TNF(p=0,0001) levels was found in the substantia nigra and IL-6 (p=0,0080) in the hippocampus following AVE099 treatment. Interestingly MPTP decreases the TNF(p=0,0098) levels in the hippocampus. Furthermore, Telmisartan treatment decreases the IL-6 (p=0,0451) levels in the cortex. Therefore, our result suggests that the potentiation of the contra-regulatory axis of the renin-angiotensin system might play a crucial role in the neuroprotection of the pre-clinical signs of PD, including loss of olfactory memory and anxiety.
Palavras-chaves: Parkinson's disease, MPTP, Renin-Angiotensin System, Anxiety-like behavior, Olfactory Memory
Agência Fomento: CAPES, CNPq, FAPEMIG

16.029 - AVALIAÇÃO DOS EFEITOS DA GELEIA REAL NA COGNIÇÃO DE RATOS SUBMETIDOS À ICV-STZ, UM MODELO DA DOENÇA DE ALZHEIMER ESPORÁDICA

EVALUATION OF THE ROYAL JELLY EFFECTS ON COGNITION IN AN ICV-STZ RAT MODEL OF SPORADIC ALZHEIMER'S DISEASE
Autores: Jeferson Mamona 2, Tiago Guardia 2, Maria Sandoval 2
Instituição: 2 IB - Instituto Butantan (Av. Vital Brasil, 1500)Introdução:
The icv injection of streptozotocin (icv-STZ) has been shown to be an experimental model of sporadic Alzheimer's disease in rodents, reproducing many of the behavioral and molecular characteristics of this disease. Royal jelly (RJ) is a substance secreted by the hypopharyngeal and mandibular glands of worker bees of the species Apis mellifera. Previously we showed that prolonged ingestion of RJ improves learning and memory; reduce neurodegeneration and oxidative stress induced by icv-STZ.
Objetivos:
To investigate the effects of oral and long-term consumption of RJ on rats submitted to the icv-STZ model on learning and memory by the object recognition (OR) test and Morris Water Maze (MWM) task.
Métodos:
Adult male Wistar rats (220g to 250g) were divided into four groups (CTR, STZ, CTR-RJ, STZ-RJ). Stereotactic surgery for bilateral icv administration of streptozotocin (STZ) (3 mg / kg / rat) or control solution

was performed. The animals received daily RJ (200 mg / kg) or control solution by gavage for 14 consecutive days from the 7th day after surgery. The MWM Task was performed before (P1), 4-6 days after (P2) the ICV-STZ injection and during the RJ administration for eleven days (P3). In each session (one session per day) the rats were submitted to four trials - inter-trial interval [ITI] = 5 min. Parameters analyzed Latency (LAT), Distance (DIST) % time within the critical counter (% T-A_CONT). The OR test, was performed in the 14th day after icv-STZ surgery. ANOVA followed by Bonferroni post-test and Dunnett's test $p < 0.05$ was employed.

Resultados e Conclusões:

Object recognition (OR) test: STZ-treated rats (5.0 ± 1.47) spent less time exploring the novel object than the familiar object when compared to the CTR (21.5 ± 2.98), RJ (20.0 ± 3.65) STZ-RJ (8.0 ± 4.19) groups following a 24-h delay indicating that STZ induced an impairment in the long-term memory and that the RJ did not revert this effect. Work memory in MWM: Period P2: icv-STZ induced an increase in the LAT, DIST and decrease in the % T-A_CONT, indicating a work memory disruption. Period P3: analyzed the effects of icv-STZ and the effects of the RJ on the performance of rats in working memory tasks in the MWM. ANOVA revealed a significant effect for the Group Factor and Trial Factor [$F(3,736) = 8,888\text{-}126,6$; $p < 0,0001$]. The significant effect for the Trial Factor indicates that the animals learned the task and memorized the platform location throughout the trials. It was observed an increase in the LAT of the animals in the groups receiving icv-STZ (STZ=115.8; STZ-RJ=86.7) when compared to the animals of the groups icv-Ringer's solution injection (CTR=19.0 and RJ=20.6) indicating that the oral treatment with RJ was able to improve the performance of the animals. Animals of the STZ group presented reduced performance when compared to the other groups, and that the treatment with RJ produced a marked improvement in the performance of the animals of the STZ-RJ group. CEUA n°001398

Palavras-chaves: Alzheimer, Cognição, Geleia Real, Memória e Aprendizado, Neurodegeneração

Agência Fomento: CAPES/CNPq

16.030 - ESTUDOS MORFOMÉTRICOS E HISTOLÓGICOS DO TECIDO CEREBELAR DE RATOS CONFINADOS EM CAIXA DE ACRÍLICO E EM AMBIENTE ENRIQUECIDO

MORPHOMETRIC AND HISTOLOGIC STUDY OF CEREBELLAR TISSUES OF RATS CONFINED IN AN ACRYLIC BOX AND ENRICHED ENVIRONMENT

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Neurodegeneration is characterized by excessive loss of neurons causing changes that lead individuals to debilitating conditions. The most common of this type is Alzheimer's Disease (AD) that is related to cognitive impairment. The enriched environment (AE) induces experience-dependent plasticity mechanisms, improving the performance of the animals in learning and memory tests.

Objetivos:

This study evaluated the effects of enriched environment (AE) on histological parameters of the cerebellum in intracerebroventricular (icv) injection of Streptozotocin (STZ) – treated animals.

Métodos:

The experiments were approved by The Ethics Committee on Animal Use in Research of Universidade Positivo under protocol number 227. For this, Wistar rats were divided into groups of different environments and received STZ through intracerebroventricular surgery: GP control (n = 4); Enr control (n = 4); STZ GP (n = 4) and STZ Enr (n = 4). The animals were sacrificed at 11 months and the cerebellum were cleaved in transverse sections and embedded in paraffin. Histological sections (6 µm thick) stained with hematoxylin and eosin (H & E). For the morphological and morphometric analyzes the level of significance was calculated at $p < 0.05$. Inter-group comparisons were made by ANOVA with the Tukey post-hoc significance test.

Resultados e Conclusões:

No significant differences among groups were detected with respect to the length of the cellular layers in the cerebellum (granular, Purkinje and molecular cells layers). The results showed a reduction significant ($F=3,376$; $p=0,0113$) in Purkinje cell density were in the group standard environment with STZ. In addition, it was observed that the mean number of Purkinje cells in enriched environments was not reduced, even with STZ. These facts demonstrate that the enriched

environment appears to protect the cerebellum from possible neurodegeneration.
Palavras-chaves: Neurodegeneration, Alzheimer's, Enriched Environment, Cerebellum, Purkinje cell
Agência Fomento:

16.031 - PLASTICIDADE NEURONAL ENTÉRICA EM CAMUNDONGOS MODELO DA DOENÇA DE PARKINSON

ENTERIC NEURONAL PLASTICITY IN A PARKINSON'S DISEASE MODEL
Autores: Luisa Valdetaro 1, Beatriz Thomasi 1, Mayara da Silva 1, Paula Campello 1, Adriana Melibeu 1, Manuel Gustavo Ribeiro 1, Vivaldo Moura Neto 2, Ana Lucia Tavares Gomes 1
Instituição: 1 UFF - Universidade Federal Fluminense (Alameda Barros Terra s/n- Centro, Niterói), 2 IEC - Instituto Estadual do Cérebro Paulo Niemeyer (Rua do Rezende, 156 - Centro, Rio de Janeiro)Introdução:
Parkinson's disease (PD) is a multicentric disease which affects several areas of the nervous system such as the enteric nervous system (ENS). The ENS impairment induces a gastrointestinal dysfunction that leads to gastroparesis, constipation, and defecation disorder. Such symptoms are capable of compromising patients' life quality and may appear up to 20 years before the classic motor. Despite neuronal death is controversial in the ENS of PD patients, many studies report enteric neuronal dysfunction. The enteric neurochemical code is altered in this patients, which is related to the gastrointestinal. Nevertheless, information about enteric neuroplasticity, such as synaptic modifications, remains unclear in the ENS of patients and PD experimental models. Striatal 6-hydroxydopamine (6-OHDA) injection is a classic animal model which presents the main aspects of the disease, including gastrointestinal dysfunction.
Objetivos:
Our aim is to investigate the enteric neuronal plasticity and its association with gastrointestinal symptoms in the ENS of the 6-OHDA model of DP.
Métodos:
CEUA UFF 617/2014. Male C57Bl6 mice 2 or 3 months old underwent stereotaxic surgery for unilateral administration of 6-OHDA in the striatum and another group of uninjured operated mice was used as control. The analysis were performed 2 weeks after surgery. Gastric emptying assay was used to determine the percentage of gastric residual food. Animals had their colons removed, fixed in 4% paraformaldehyde and then paraffin-embedded for slides preparation. Immunofluorescence technique was performed for synaptophysin. For Western blotting technique, the muscle and mucosal layers of the colon were separated. Samples' proteins were separated by gel electrophoresis and then transferred to a PVDF membrane, which was incubated with an anti-synaptophysin, anti-drebrin A/E and anti-GAP-43, antibodies.
Resultados e Conclusões:
6-OHDA animals showed higher percentage of residual gastric food, indicating a slower gastric transit (p=0,0302; n=6). The presynaptic markers synaptophysin showed a tendency to be reduced the immunolabelling in the muscle layer and this result was also seen in the content analysis (4889 ± 1453, N=3, p=0,0719). The post-synaptic marker Debrin displayed an increased in the content of the muscle layer of the colon of 6-OHDA mice (20156 ± 2990 N=5, p=0,0456). The neuronal growth-associated protein GAP-43 expression had no significant changes in the muscle layer but was increased in the mucosa (1,248 ± 0,1096, N=2, p=0,0056). 6-OHDA mice's colon displays neuronal changes associated with enteric plasticity, such as synaptic and axonal growth changes, in both muscle and mucosal layers analyzed 2 weeks after the model induction. These results can be related to the functional changes observed in this PD model.
Palavras-chaves: doença de Parkinson, sistema nervoso entérico, plasticidade sináptica
Agência Fomento: CAPES, CNPQ

16.032 - CURSO TEMPORAL DO CONTEÚDO DE GFAP E POSSÍVEL MEDIADOR GLIAL ATUANDO NA HOMEOSTASE DA BARREIRA EPITELIAL INTESTINAL NO MODELO DE RATO DA DOENÇA DE PARKINSON INDUZIDA POR 6-OHDA

TEMPORAL-COURSE OF GFAP CONTENT AND POSSIBLE GLIAL-MEDIATOR ACTING IN INTESTINAL EPITHELIAL BARRIER HOMEOSTASIS IN THE MOUSE MODEL OF PARKINSON'S DISEASE INDUCED BY 6-OHDA
Autores: Beatriz Thomasi 1, Luisa Valdetaro 1, Mayara Lídia Silva 1, Paula Campello 1, Adriana Melibeu 1, Manuel Gustavo Ribeiro 1, Vivaldo Moura-Neto 2, Ana Lucia Tavares Gomes 1
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Cérebro Paulo Niemeyer (R. do Rezende, 156 - Centro, Rio de Janeiro - RJ)Introdução:
Parkinson's disease (PD) became considered a gastrointestinal disorder in the last years. The enteric nervous system (ENS) present along the gastrointestinal tract shows dysfunctional patterns and affect almost every patient at some stage of the disease. Enteric glia (EG) perform immunomodulation and regulation of intestinal epithelial barrier(IEB) and is founded altered in PD patients. Our previous results working with the mouse model of PD induced by 6-hydroxydopamine (6-OHDA) showed a colonic inflammatory response with increased immunoreactivity of IBA1 and GFAP in colonic mucosal layer one and two weeks post-lesion. We also identify one week post-lesion an increase of IEB protein occludin and GDNF content in the gut layers.
Objetivos:
The objective of this current work was to study the GFAP – a biomarkers of glial cells, GDNF as well as the content of TNF- α and occludin protein in the colon of the animals submitted to the model of PD in different survival times.
Métodos:
The animal model of PD was performed through the unilateral striatal injection of 6-OHDA in adult (2-3months) C57Bl6 mice. 6-OHDA promotes specific dopaminergic neuron death mimetizing the degeneration of the nigrostriatal pathway of PD. Another group of animals operated uninjured was used as the control. The animals had 48 hours and 2 weeks of survival time post-lesion. The muscle and mucosal layers were separated in order to obtain samples mainly enriched in neuromuscular and mucosal content and were submitted to Western blotting.CEUA UFF 617/2014.
Resultados e Conclusões:
We detected 48h after lesion an increase of GFAP content in neuromuscular layer compared with the control group (11772 ± 2855, N=3, p=0.0358). In this time, we have not yet identified alterations of GDNF (8942 ± 8926 N=2, p=0.8013) and TNF- α (8750 ± 2027, N=2, p=0.7283) content. One week post-lesion, we identify an increase in TNF- α content in the mucosal layer (19998 ± 1023 N=3, p=0.0037). Two weeks post-lesion there is a decrease of occludin (5598 ± 517,7 N=3, p=0.0589) and GDNF (10460 ± 1453 N=4, p=0.0407) in mucosal layer and no alterations in TNF- α content (15352 ± 448,0 N=2, p=0.9060). The enteric response elicited by 6-OHDA promoted a glial response and modulation of occludin protein during the period analyzed. These features became associated with an inflammatory environment after one week post-lesion. It is important to highlight that EG seems to be sensitized only 48h after model induction and could be a precocious enteric reaction. EG is a complex cell that regulates immune interactions in the gut contributing to the inflammatory response. Different from the possible protective response through EG and GDNF detected one week post-lesion, two weeks post-lesion occurs a decrease of GDNF and occludin content which could reflect a compromising of IEB. So, based on our findings it is possible that EG reacts collaborating in different ways for gut physiology during neurodegeneration – which can demonstrate the dual role that EG can manifest in ENS.
Palavras-chaves: Parkinson disease, Enteric Glia, GFAP
Agência Fomento:

16.033 - EFEITOS DO EXERCÍCIO EM ESTEIRA NA BIOGÊNESE MITOCONDRIAL EM MODELO ANIMAL DA DOENÇA DE PARKINSON

EFFECTS OF TREADMILL EXERCISE ON MITOCHONDRIAL BIOGENESIS IN A PARKINSON DISEASE ANIMAL MODEL
Autores: Ana Flávia Fernandes Ferreira 1, Karina Henrique Binda 1, Caroline Cristiano Real 1, Luiz Roberto Giorgetti Britto 1
Instituição: 1 USP - Universidade de São Paulo (Av. Prof. Lineu Prestes, 1374 - Butantã, São Paulo - SP, 05508-900)Introdução:
Parkinson’s disease is a common elderly neurodegenerative disease. It is characterized by loss of dopaminergic neurons from substantia nigra pars compacta (SNc) and a decrease in dopamine release in striatum (CPu). Among several known disorders of the Parkinson’s disease, previous studies described a mitochondrial dysfunction and downregulation in biogenic transcriptional factors, such as PGC-1 α, NRF1 and TFAM. On the other hand, new therapeutic approaches has been studied, like physical exercise which has demonstrated great improve on motor and behavioral symptoms and a dopaminergic system neuroprotection.In addition, physical exercise also leads to an increase in mitochondrial function and biogenesis in healthy subjects, however little is known about this effect in Parkinson’s disease.
Objetivos:
Evaluate the effects of treadmill exercise, in two different periods of the protocol, on the expression of

mitochondrial biogenesis proteins in a rat model of Parkinson's disease.
Métodos:
Male wistar rats were used (n=6). 18µg of 6-hydroxydopmine (6-OHDA) were injected into right striatum by stereotaxic surgery to induce Parkinson's disease model. Two days after Parkinson's disease model induction exercised animals were submitted to treadmill exercise protocol (40 min, 10m/min, 3x/week) during one or four weeks every other day, that is 3 sessions or 12 sessions. The levels of mitochondrial proteins related to biogenesis (PGC-1 α, NRF1 and TFAM) were measured in substantia nigra pars compacta by immunohistochemistry. Data were analyzed by Three-way analyses of variance (ANOVA) and Bonferroni pos-test when appropriated ($p < 0,05$). All the experiments were approved by animal ethical committee, number 9196020318.
Resultados e Conclusões:
Data analysis revealed that 6-OHDA injection promoted a reduction on PGC-1 α, NRF1 and TFAM protein expression, one (approximately -40%; $p < 0,01$) and four weeks (approximately -50%; $p < 0,01$; in the order given) after the Parkinson's disease model induction, indicating impaired mitochondrial biogenesis in that animals. Nevertheless, three days of training (one week of exercise protocol) was able to prevent the decrease in PGC-1 α levels ($p < 0,01$), suggesting that in a short period of training it is able to promote beneficial effects. In addition, four weeks of treadmill exercise maintain PGC-1 α ($p < 0,01$), NRF1 ($p < 0,01$) and TFAM ($p < 0,01$), revealing better effects on Parkinson's disease model. Our data provides evidences that treadmill exercise has positive effects on mitochondrial biogenesis (PGC-1 α, NRF1 and TFAM) in a rat model of Parkinson's disease, regardless of the exercise protocol (three or twelve sessions). It also shows that a longer protocol promotes improved benefits. Thus, this work highlight the importance of this therapy and identify mechanisms that can be useful in the establishment of therapeutic strategies.
Palavras-chaves: Biogênese mitocondrial, Doença de Parkinson, Exercísio físico
Agência Fomento: CAPES

16.034 - EEG SOURCE OF BRAIN COMMUNICATION ABNORMALITIES DURING WORKING MEMORY TASK IN MILD COGNITIVE IMPAIRMENT PATIENTS

EEG SOURCE OF BRAIN COMMUNICATION ABNORMALITIES DURING WORKING MEMORY TASK IN MILD COGNITIVE IMPAIRMENT PATIENTS
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Detection of mild cognitive impairment (MCI) patients that will convert to Alzheimer's disease (AD) is a primary target in ongoing research. We recently showed that changes in event-related potentials (ERP) and (de)synchronization (ERD/S) evaluated by electroencephalography (EEG) during working memory task can be used to detect subtle differences in these patients. Spontaneous firings abnormalities, that are usually evaluated in a longer time window than task-based EEG, are also a consistent finding in MCI/AD studies. Here, we hypothesized that evaluating the source localization of brain oscillations during working memory task in a long time window would reveal robust abnormalities in MCI patients.
Objetivos:
The present study sought to determine the source location of brain communication dynamics abnormalities in MCI patients compared to healthy elderly (HE) during working memory task.
Métodos:
EEG was recorded during n-back task in MCI (N = 19) and HE (N = 22). Epochs were extracted in the time window of 1000 ms before and after the task. Current Source Density (CSD) was determined in delta, theta, alpha, beta and gamma bands with low resolution brain electromagnetic tomography. Group comparisons were performed with Statistical non-Parametric Mapping (alpha = 0.01). Lastly, the 30% most relevant features were classified using Support Vector Machine (SVM). The performance metrics were accuracy and the F1 score.
Resultados e Conclusões:
MCI displayed increase in delta and theta and decrease in alpha and beta bands CSD when compared to HE. SVM group prediction displayed accuracy and F1 score of 0.95 (0.94 - 0.96). Present findings may reflect early AD abnormalities that cannot be detected with lower

time resolution neuroimaging tools, representing a clinically relevant tool supporting clinicians early AD diagnosis.
Palavras-chaves: Alzheimer's Disease, Event Related Oscillations, Machine Learning, Mild Cognitive Impairment, Working Memory Oscillations
Agência Fomento: FAPESP, CAPES

16.035 - VITAMINA D (VD3) ASSOCIADA AO EXERCÍCIO EM ESTEIRA INTENSIFICA A REDUÇÃO DO ESTRESSE OXIDATIVO CEREBRAL EM RATOS HEMIPARKINSONIANOS

VITAMIN D (VD3) ASSOCIATED TO TREADMILL EXERCISE INTENSIFIES THE REDUCTION OF BRAIN OXIDATIVE STRESS IN HEMIPARKINSONIAN RATS
Autores: Roberta Oliveira da Costa 2, Carlos Venicio G. Jatai 2, Francisco Arnaldo V. Lima 2, Kelly Rose T. Neves 2, Pedro Everson Alexandre de Aquino 2, Geanne M. de Andrade M. de Andrade 2, Glauce S. de B. Viana 2
Instituição: 2 UFC - Universidade Federal do Ceará (Rua Coronel Nunes de Melo, 1000 - Rodolfo Teófilo, Fortaleza - CE, 60430-275)Introdução:
We previously showed that the treadmill exercise reduces the brain damage after the 6-OHDA lesion. In addition, the VD3 treatment of hemiparkinsonian rats significantly attenuated the behavioral, neurochemical and immunohistochemical changes demonstrated in the lesioned animals.
Objetivos:
The objectives were to evaluate the benefits of the 6-OHDA plus VD3 treatment in the absence or presence of the treadmill exercise, on the behavior and oxidative stress in hemiparkinsonian rats.
Métodos:
For that male Wistar rats were subjected (W/E) or not (N/E) to treadmill exercise for 3 weeks (30 min/day). The groups were: SO, 6-OHDA and 6-OHDA+VD3, 1 µg/kg, 3 weeks). The SO was not lesioned and the lesioned group was injected with 6-OHDA into the striatum. After 3 weeks, the animals were subjected to apomorphine-induced rotations and euthanized for nitrite and lipid peroxidation measurements (prefrontal cortex). The data were analyzed by Anova and Tukey, for multiple comparisons and results considered .significant for $p < 0.5$.
Resultados e Conclusões:
We showed that the exercise reduced the number of rotations in the 6-OHDA W/E. In addition, the effect of exercise was intensified in the 6-OHDA+VD3 W/E. Furthermore, the 6-OHDA N/E group presented an increase in nitrite contents, comparatively to both SO groups (N/E and W/E). The nitrite values in the other groups (6-OHDA with exercise and + or – VD3) were not different from those of both SO groups in the presence or absence of exercise. A high increase was also observed for lipid peroxidation in the 6-OHDA N/E, relatively to all other groups (SO N/E, SO W/E, 6-OHDA+VD3 N/E and 6-OHDA+VD3 W/E). We concluded that the treadmill exercise improves brain alterations observed in the 6-OHDA W/E group, what may be even intensified in the presence of VD3. Evidence indicates the deficiency of VD3 to be relevant for the development of neurodegenerative diseases. VD3 is known to increase isometric strength in the presence of exercise, which appears to modulate the brain redox state. Furthermore, exercise may increase the resistance against oxidative stress. However, more studies are needed to clarify the importance of VD3 for the reduction of brain oxidative stress and neurodegeneration.
Palavras-chaves: hemiparkinsonian, Vitamin D , treadmill exercise , oxidative stress
Agência Fomento: Brazilian National ResearchCouncil (CNPq), Coordination for Higher Education Personnel (CAPPES)

16.036 - A NEW OLFACTORY TEST TO ASSESS OLFACTION IN PARKINSON'S ANIMAL MODEL

A NEW OLFACTORY TEST TO ASSESS OLFACTION IN PARKINSON'S ANIMAL MODEL
Autores: Jessica L. Ilkiw 1, Lais Soares Rodrigues 1, Flavia Dorieux 1, Patricia Dominico dos Santos 1, Ana Paula Chuproski 1, Jaqueline Alves Zwierzikowski 1, Daniel Araujo de Macedo 1, Kamily Sara Turt 1, Guilherme Eiji Yamaguto 1, Jessica Miloch 1, Marcelo de Meira Santos Lima 1
Instituição: 1 UFPR - Universidade Federal do Paraná (Av. Cel. Francisco H. dos Santos, 100 - Jardim das Américas, Curitiba - PR)Introdução:
Hyposmia is a major non-motor symptom of Parkinson's disease (PD) and affects about 90% of patients. To evaluate hyposmia in animal models there are several tests that can be used to evaluate detection, discrimination and olfactory memory. However, many of these tests are based on whether or not the animal stays in a odorized compartment, which may be affected by freezing behaviors and changes in the animal's locomotion. Thus, we implemented a new

test to assess olfactory discrimination by uniting two tests: olfactory discrimination task and object recognition test.
Objetivos:
To implement and standardize the olfactory recognition test for PD animal models evaluation.
Métodos:
Five groups were established (n = 10/group): Naive (animals without any manipulation), Sham (operated but not injured animals), 6-OHDA, Rotenone and Zicam. 6-OHDA and Rotenone are PD mimicking neurotoxins, which were administered by stereotactic surgery on substantia nigra pars compacta. Zicam is a zinc gluconate + zinc acetate formulation that causes anosmia, acting as a positive control for olfactory impairment. For the test, rats were placed individually in a box containing 2 similar falcons with small holes along its surfaces. The test was performed in two stages, the first (called “training”) was performed as a box habituation. The animals were placed in the box containing clean sawdust inside the two falcons and the exploration of both falcons was observed for 3 minutes. In the second stage, a falcon was randomly chosen and the clean sawdust was replaced for a sawdust collected from the animal isolated cage (familial odor) and in the other falcon the clean sawdust was maintained (non-familial odor). The two steps were recorded for further analysis. This test was performed by in accordance with the guidelines of the Committee for the Care and Use of Laboratory Animals, United States National Institutes of Health. In addition, the protocol complies with the recommendations of Federal University of Paraná and was approved by the institutional ethics committee (approval ID no. 1162).
Resultados e Conclusões:
For test habituation, all groups showed no preference for locating or exploiting the falcons. Already during the test, the groups that did not present olfactory impairments (Naive and Sham) explored significantly the family time compared to the unfamiliar one [Naive ($p=0.0107$) and Sham ($p=0.0429$)], while the hyposmia groups explored similarly both falcons [6-OHDA ($p=0.9854$), Rotenone ($p=0.4586$) and Zicam ($p=0.9804$)]. Thereby, we conclude that the olfactory recognition test is effective for evaluating olfactory impairment in PD models.
Palavras-chaves: Parkinson's disease, olfactory impairment, animal model, 6-hydroxidopamine, Rotenone
Agência Fomento:

16.037 - ATIVIDADE DA HEXOQUINASE ESTRIATAL EM MODELO MURINO DE DOENÇA DE PARKINSON INDUZIDO POR 6-HIDROXIDOPAMINA

STRIATAL HEXOKINASE ACTIVITY IN A MURINE MODEL OF PARKINSON'S DISEASE INDUCED BY 6-HYDROXYDOPAMINE
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Parkinson’s disease (PD) is a neurodegenerative disease characterized by a severe motor impairment due to progressive and specific degeneration of dopaminergic neurons of the substantia nigra compacta. Some hallmarks of PD pathogenesis are mitochondria (Mit) dysfunction and oxidative stress. Hexokinase (HK) is a limiting enzyme of glucose (Glu) metabolism, responsible for phosphorylating Glu upon its entering the cell. Its activity is regulated by negative feedback and subcellular location: in cytoplasm (Cyt) or associated to Mit. Mit HK has a role in neuron protection against oxidative stress (OS).
Objetivos:
Since OS plays an important role in the pathogenesis of PD, we aimed to investigate HK activity in subcellular striatum (Str) fractions in a PD murine experimental model.
Métodos:
C57Bl6 male mice aging 2-3 months were anesthetized and submitted to unilateral injection of 6-hydroxydopamine (6-OHDA) (2 µl of a 2mg/µL solution) into the left Str using stereotaxic procedures. SHAM mice submitted to surgical procedures did not receive 6-OHDA injection and were used as control. After 48h, 1, 2 or 4 weeks (w), mice were euthanized, left (injured) and right (control) Str were dissectioned and homogenized. The homogenate (H) was submitted to differential centrifugation and fractions were used for determination of HK activity (Wilson, 1989), expressed as µmols G6P/mg ptn/min. Protein was determined according to Lowry et al. (1951). Significance was assessed by t-test and ANOVA, followed by Turkey’s t-test, and $p < 0.05$ was taken as statistically significant.

All procedures were approved by the UFF's Ethics Committee on Animal Use (617/2014).
Resultados e Conclusões:
We analyzed HK activity in H, Mit and Cyt fractions. 48h after 6-OHDA lesion HK activity from Mit fraction in lesioned (L) Str was lower (0,034±0,0059) when compared to control (C) (0,038±0,0096 p=0,58 n=3). We observed a similar behavior in 1w (L: 0,031±0,016 C: 0,042±0,014 p=0,27 n=5), 2w (L: 0,044±0,029; C: 0,052±0,024 p=0,71 n=4) and 4w (L: 0,0365±0,011; C: 0,047±0,035; p=0,60 n=4). No pattern was observed on Cyt (4wL: 0,022±0,0063; L: 0,022±0,00789 p=0,23 n=4; 2wL: 0,024±0,0032 2wC: 0,026±0,012 p =0,689 n=5; 1wL: 0,027±0,0062 1wC: 0,024±0,0027 p= 0,45 n=5; 48hL: 0,066±0,047 48hC: 0,034±0,0036 p=0,31 n=3) and H (4wL: 0,037±0,0058 4wC: 0,032±0,0079 p=0,29 n=4; 2wL: 0,030±0,0065 2wC: 0,039±0,014 p=0,27 n=5; 1wL: 0,028±0,0063 1wC: 0,033±0,0064 p=0,27 n=5; 48hL: 0,039±0,0042 48hC: 0,032±0,015 p=0,48 n=3) 6-OHDA fractions, nor on SHAM fractions. The small decrease in HK activity in Mit (but not in Cyt or H) fraction of injured Str that remained over time (48h, 10.33%; 1w, 25.97%; 2w, 12.06%; 4w, 21.56%), although not significant, may indicate a considerable change in Glu oxidation and ATP formation and might be a result of OS. Analysis of other enzymes involved in Glu oxidation are currently being performed. The study of Glu oxidation after 6-OHDA treatment may bring information about how energy metabolism is related to PD.
Palavras-chaves: Doença de Parkinson, Hexoquinase, Metabolismo, 6-hidroxidopamina
Agência Fomento: CAPES

16.038 - RETROGÊNESE PSICOMOTORA: AVALIAÇÃO DAS PRAXIAS EM IDOSOS

PSYCHOMOTOR RETROGENESIS: EVALUATION OF PRAXES IN THE ELDERLY.
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Instituição: 1 UFJF - Universidade Federal de Juiz de Fora (Rua José Lourenço Kelmer, s/n - São Pedro, MG, CEP 36036-900)Introdução:
Human development is a continuous process, initiated at conception, followed by sequenced transformations until death (Velasco, 2006). According to the principles of psychomotricity, this process approaches the periods of ontogenesis and retrogenesis. The first is organized in a vertical process, from the medulla to the cerebral cortex, passing through the development (tonus, balance, lateralization, body notion, space - time structure and global fine praxes). The retrogenesis, which happens with aging, occurs regressive manifestations of ontogenesis, assuming a descending vertical disorganization (Fonseca, 2009).Therefore, praxes are the first to suffer a decline.
Objetivos:
To evaluate the effect of advancing age on the psychomotor factors of praxes, body mobility and manual ability, in the elderly
Métodos:
The research was carried out in coexistence centers for the elderly, in the city of Juiz de Fora, Brazil. The instruments were applied: Mini Mental State Examination, Barthel Index, Sociodemographic questionnaire, Timed up and go test, and the Nine Hole Peg test. The research was approved by the Ethics Committee of UFJF-MG (nº 238.469 / 2013). The elderly were divided according to age, Group I (60 to 69 years), Group II (70 to 79 years), and Group III (equal and above 80 years). Statistical analysis was performed by SPSS version 20.0.
Resultados e Conclusões:
A total of 97 elderly people aged 60 to 92 years were evaluated, average age Group I (65.73 ± 2.56), Group II (74.36 ± 2.95) and Group III (84.40 ± 3.79). Differences were found between age groups regarding the manual ability, $p < 0.05$ between groups. Group I (21.40 sec ± 2.49) Group II (24.25 sec ± 3.75) and Group III (30.15 sec ± 3.90). Group I presented a better performance than Group II ($p < 0.05$) and Group III ($p < 0.05$). Group II performed better than Group III ($p < 0.01$). Regarding body mobility, the time spent in the body mobility test ranged from 4.4 to 15.2 seconds, presenting differences between groups I and III ($p < 0.001$) and between Groups II and III ($p = 0.003$), and there was no difference observed between Groups I and II ($p = 0.191$). The participation of the elderly in social centers allowed a maintenance of the body mobility for a longer time, presenting a decline only in the eldest, but the manual ability presented a decline with the advancing age corroborating with the retrogenetic theory.
Palavras-chaves: aging, praxes, psychomotricity
Agência Fomento:

16.039 - CARACTERÍSTICAS CLÍNICAS E FUNCIONAIS DE PESSOAS COM DOENÇA DE PARKINSON QUE APRESENTAM E NÃO APRESENTAM QUASE QUEDAS.

CLINICAL AND FUNCTIONAL CHARACTERISTICS OF PEOPLE WITH PARKINSON'S DISEASE WHO PRESENT AND DO NOT PRESENT NEAR FALLS.

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Postural instability is a common condition in individuals with Parkinson's disease (PD) and may result in near falls and falls. It is important to verify if there are differences between the individuals who present and do not present near falls to guide strategies to reduce the risk of falls.
Objetivos:
To compare clinical and functional characteristics of individuals with PD who present and do not present near falls.
Métodos:
Cohort with individuals with PD and independent gait ability who were recruited from the Movement Disorders and Parkinson's Disease Clinic of the Roberto Santos General Hospital (HGRS), Salvador-Bahia. Besides demographic and clinical data, participants were assessed with the Unified Parkinson's Disease Rating Scale (UPDRS), activities of daily life and motor examination sections, modified Hoehn and Yahr scale (H & Y), Schwab and England (S & E) scale, Gait Speed (4 meters), Nutt Retropulsion Test (NRT), Berg Balance Scale (BBS) and Tandem Gait (TG). Participants were followed-up for six months, with a falls diary, to verify the occurrence of near falls. T-Student, Mann-Whitney or Chi-square tests were performed to compare the groups. The study was approved by the research ethics committee of the HGRS (CAAE 57780216.8.0000.5028)
Resultados e Conclusões:
Of the 75 individuals evaluated, 47 (63%) had near falls. There were no differences between the groups regarding age, PD severity and duration, functional capacity, gait speed and TG ($p > 0.05$). However, individuals who presented near falls had in the BBS a median of 51 points (min-max: 38-56), while for those who did not present near falls the median was 55 points (min-max: 45-56) ($p=0.02$). Conclusion: There was a high incidence of near falls among individuals with PD, highlighting the importance of evaluating balance during the performance of functional activities to identify individuals who are more likely to present near falls. Future studies should investigate the transition from the status of "near faller" to "faller".
Palavras-chaves: Parkinson's disease, Postural balance, Accidental falls
Agência Fomento: FABESP

16.040 - EFEITOS COMPORTAMENTAIS E NEUROQUÍMICOS INDUZIDOS PELA INJEÇÃO BILATERAL DE 6-HIDROXIDOPAMINA NO ESTRIADO DE RATOS SHR E SLA16

BEHAVIORAL AND NEUROCHEMICAL EFFECTS INDUCED BY BILATERAL INJECTION OF 6-HYDROXYDOPAMINE INTO THE STRIATUM OF SHR AND SLA16 RATS

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SHR and SLA16 isogenic rats show contrasting emotional, cognitive and motor behavior. Both strains share the same genetic background except for a region located in chromosome 4. This region comprises a Quantitative Trait Locus that is critical to the expression of anxiety-like, learning/memory and locomotor behaviors in rats, named anxiety-related response 16 (Anxrr16). 6-Hydroxydopamine (6-OHDA) intrastriatal injections are used to induce behavioral and neurochemical impairments in rats, and therefore may reveal new insight on the SHR and SLA16 comparison.
Objetivos:
To investigate a putative differential susceptibility of SHR and SLA16 rats to 6-OHDA.
Métodos:
SHR and SLA16 rats were divided into control and 6-OHDA-lesioned groups. Experiments 1 (n=12-14/group) and 2 (n=11-13/group) were performed. Lesioned animals received 10 ug of 6-OHDA bilaterally injected

into the dorsolateral striatum (10 µg/site). All animals received an injection of desipramine (20 mg/kg i.p.) prior to surgery in order to protect noradrenergic terminals against 6-OHDA uptake and toxicity.
Resultados e Conclusões:
In experiment 1, SLA16 rats showed higher central locomotion [F(1,45)=18,427, p < 0.0001] and center entries [F(1,45)=7,1053, p=0.0106] in the open-field test, as well as increased discrimination index in the object recognition task [F(1,45)=7,8643, p=0.0074]. In experiment 2, 6-OHDA-lesioned rats showed reduced grooming behavior in the splash test [F(1,44)=4,2497, p=0.0452] in addition to increased immobility [F(1,42)=5,5949, p=0.0227] and reduced climbing time [F(1,42)=4,2147, p=0.0463] during the forced swimming test. Neurochemical analysis revealed reduced dopamine turnover in the prefrontal cortex (PFC) [F(1,14)=7,9600, p=0.0136] of 6-OHDA-lesioned animals and higher level [F(1,14)=11,092, p=0.0049] and reduced turnover [F(1,14)=8,9631, p=0.0096] of 5-HT in the striatum of SLA16 rats compared to SHR. This study showed 6-OHDA-induced strain-independent behavioral and neurochemical impairments. In addition, an association between 6-OHDA-induced emotional impairment and dopaminergic transmission disturbance in the PFC is suggested.
Palavras-chaves: Dopamina, Estresse oxidativo, Cromossomo 4, Ratos isogênicos
Agência Fomento:

16.041 - AVALIAÇÃO DOS EFEITOS DA TERAPIA POR ONDAS DE CHOQUE NAS RESPOSTAS INFLAMATÓRIAS, PLACAS β-AMILOIDE E NEUROGÊNESE EM CAMUNDONGOS DUPLO-TRANSGÊNICOS (APP/PS1) PARA DOENÇA DE ALZHEIMER.

EVALUATION OF THE EFFECTS OF SHOCK WAVE THERAPY IN INFLAMMATORY RESPONSES, AMYLOID-β PLAQUES AND NEUROGENESIS IN DOUBLE-TRANSGENIC MICE (APP/PS1) FOR ALZHEIMER'S DISEASE.

Autores: Mariana Mendes Justiça 1, Beatriz de Oliveira Monteiro 1
Instituição: 1 UNIFESP - Universidade Federal de São Paulo (Rua Pedro de Toledo, 781)Introdução:
Alzheimer's disease (AD) is the most common form of dementia with high prevalence and incidence in the world. Amyloid- β (A β) plaque formation due to accumulation of A β peptide in the brain is extensively associated with synaptic degeneration and neuronal death, promoting an inflammatory state and contributing with AD symptoms of memory loss and cognitive dysfunction. One emerging strategy that can be studied as a possible therapy for AD is the shock wave treatment, applied by an ultrasound focusing equipment (STRATTNER Company). This stimulation with shock waves reduces inflammation, increases production of BDNF and expression of VEGF.
Objetivos:
Based on these ideas, we hypothesized that the shock wave therapy would reduce inflammation and plaques formation, increase neurogenesis, and thus could be proposed as an alternative treatment for AD. Here, we verified the impact of shock wave therapy in the formation of A β plaques, neurogenesis and inflammation in a double transgenic mice model for Alzheimer's disease (APP/PS1)(CEUA 6833120917).
Métodos:
APP/PS1 mice and their littermates wild type mice (WT) were divided into four groups (n=10 each), where two groups received shock wave stimulation (SWAD; SWWT) on the scalp for 20 seconds (100 pulses with energy flux density of 0.2 mJ / mm2 at the frequency of 4 Hz), and the other two groups were not stimulated (NSWAD; NSWWT). On the following day, the animals had their brains fixed by perfusion for immunohistochemical procedures for A β plaques (6E10), microglia (Iba1), astrocytes (GFAP) and neurogenesis (DCX).
Resultados e Conclusões:
Stimulated APP/PS1 group (SWAD) showed increased numbers of A β plaques in the hippocampus compared with non-stimulated APP/PS1 (NSWAD) (SWAD 1.45 ± 0.15 versus NSWAD 1.06 ± 0.11)(Student t test p=0.0449). DCX cells (young neurons) in the dentate gyrus were reduced for the two APP/PS1 groups (1.53 ± 032) when compared with WT groups (2.27 ± 0.15) (ANOVA two way, p=0.0151). The number of hippocampal microglia (Iba1) increased in APP/PS1 groups (120.4 ± 1.91) when compared with WT groups (95.91 ± 2.91) (ANOVA two way, p=0.0006). In the cortex we found the same results when APP/PS1 was compared with WT groups regardless the SW treatment (SWAD 122.4 ± 7.88 and NSWSD 118.55 ± 7.96 vs SWWT 98.91 ± 4,52 and NSWWT 93.11±5.32) (ANOVA one way, p=0.001). For astrocyte quantification, ANOVA one way indicated significant difference only in the cortex showing increased values for APP/PS1 when compared with WT groups regardless the SW treatment (p < 0.0001)(SWAD 70.75 ± 8.32 and NSWAD 42.18 ± 4.0 vs SWWT 19.31 ± 472

and NSWWT 13.20 ± 2.16). In conclusion, significant differences were found for APP/PS1 groups indicating reduced neurogenesis and increased inflammation, regardless the shock wave therapy, suggesting important differences regarding genotype, which is expected due to the pathophysiology of Alzheimer's disease. Moreover, the shock wave treatment induced a compromised response of increased A β plaques formation in APP/PS1 mice.
Palavras-chaves: Alzheimer, Terapia por ondas de choque, camundongos duplo-transgênicos APP/PS1
Agência Fomento: Fapesp

16.042 - AVALIAÇÃO DA NEUROPROTEÇÃO DE HEPARINA DE Styela plicata APÓS LESÃO QUÍMICA POR ROTENONA EM LINHAGEM DE NEUROBLASTOMA HUMANO SH-SY5Y

EVALUATION OF NEUROPROTECTION OF Styela plicata HEPARIN AFTER CHEMICAL INJURY BY ROTENONE IN HUMAN NEUROBLASTOMA LINES SH-SY5Y
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Instituição: 1 UFRJ - Universidade Federal do Rio de Janeiro, Campus Macaé, NUPEM (Av. São José Barreto, 764 - São José do Barreto, Macaé - RJ, 27965-045)Introdução:
Rotenone is a natural pesticide widely used in agriculture because of its toxic potential in target cells, by blocking the I complex of the electron transport chain causing oxidative stress. It becomes harmful to humans since, at higher concentrations, it is able to cross natural barriers such as the blood-brain barrier leading to preferential degeneration of dopaminergic neurons, which characterizes parkinsonism conditions. Thus, the molecule mimics the pathology of Parkinson's disease (PD) and can be observed in vitro in neurological model studies, such as SH-SY5Y. Although PD has no defined etiology, it is recognized that genetic and environmental changes culminate in the disease, such as exposure to rotenone. It is believed that such factors cause a neuroinflammatory process leading to the progressive and selective loss of dopaminergic neurons of the nigrostriatal pathway. Since exposure to such everyday factors is capable of performing a high level of degeneration, studies on molecules that minimize such an inflammatory process are of paramount importance. For this, it is proposed the heparin, a glycosaminoglycan found in various organisms like the asicidia Styela plicata, an option of use since it is rich in its anti-inflammatory properties.
Objetivos:
It is sought to evaluate the role of heparin in minimizing the inflammation that contributes to Parkinson's disease.
Métodos:
The molecule was extracted by proteolytic digestion, purified by HPLC on DEAE-cellulose column and precipitated in order to be applied in culture and evaluated for its ability to maintain cell viability in the degenerate cell after application of rotenone. To confirm the presence of heparin at the end of the extraction processes, the dosage of uronic acid was performed. The cytotoxic injury and possible neuroprotection effect of heparin was evaluated by cell viability assay (MTT).
Resultados e Conclusões:
The results obtained in the evaluation of rotenone cytotoxicity (0.01 - 0.2 µg / mL) showed EC 50 values in SHSY-5Y cells (1 x 10^{5} cells / well) 1 µg / mL after 48 hours of treatment and did not present cytotoxicity at low concentrations. The protective effect of hep present in the viscera of S. plicata (0.003-0.02 µg / mL) was characterized by the decrease in the cytotoxicity of rotenone (1.0 µg / mL) at the concentration of 0.01 µg / mL hep in dose-dependent SHSY5Y cells. Data were obtained through analysis of variance (ANOVA) and Tukey's multiple comparison test ($p < 0.05$). The analyzes were done in GraphPad-Prism7 software with graphical construction based on the average of three independent experiments. Determining possible hep effects in a neuronal model is important for elucidating neuroprotection strategies that can be applied in patients with neurodegenerative conditions, as well as understanding the role of GAGs in such processes.
Palavras-chaves: Glycosaminoglycans, Neuroinflammation, Neuroprotection, Parkinson's disease
Agência Fomento:

16.043 - PROTECTIVE EFFECT OF α-BISABOLOL ON MEMORY DEFICITS IN SPORADIC ALZHEIMER'S DISEASE MODEL INDUCED BY STREPTOZOTOCIN IN MICE.

PROTECTIVE EFFECT OF α-BISABOLOL ON MEMORY DEFICITS IN SPORADIC ALZHEIMER'S DISEASE MODEL INDUCED BY STREPTOZOTOCIN IN MICE.
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Regina Santos Do Carmo 1, Amanda Aragão Alves 1, Geanne Matos De Andrade 1
Instituição: 1 UFC - Universidade Federal Do Ceará (Av. da Universidade, 2853 - Benfica, Fortaleza - CE, 60020-181)Introdução:
Alzheimer's disease (AD) is the most common form of dementia among the elderly. Intracerebroventricular (icv) injections of streptozotocin (STZ) have been used as an experimental model of sporadic AD in rodents causing impairment in insulin signaling, oxidative stress, neuroinflammation, and neurogenesis-related dysfunctions, which are hallmarks of AD and result in cognitive decline. α-Bisabolol is a monocyclic sesquiterpene alcohol, which exerts antioxidant, anti-inflammatory, and anti-apoptotic activities.
Objetivos:
Thus, the aim of this study was to investigate the effects of α-bisabolol on memory deficits in mice submitted to an experimental model of sporadic AD induced by STZ in mice.
Métodos:
The study was approved by the ethics committee on animal experimentation of the Federal University of Ceará, under the registration number 39/2017. Male Swiss mice (25-35 g, n = 120) received bilateral icv injections of STZ (3 mg/kg), dissolved in artificial cerebrospinal fluid. Two days after the first STZ administration, injections were repeated, and the animals were treated with α-bisabolol (50, 100 and 200 mg/kg) or vehicle (3% tween 80 + saline) orally 1 h after surgery and once a day for the following 16 days (until the last day of behavioral evaluation). Blood samples were collected for analysis of glucose levels, before and after surgeries.
Resultados e Conclusões:
The results showed that there was no significant change in glucose levels before and after surgeries. No differences in the locomotor activity in the open field test were observed between groups. The treatment with α-bisabolol at the 100 mg/kg dose significantly improved aversive memory (aCSF: 278,6 ± 10,04; STZ: 112,1 ± 32,47; STZ + BIS 100: 297,2 ± 2,78, $P < 0,05$), object recognition (aCSF: 0,52 ± 0,03; STZ: 0,26 ± 0,06, STZ + BIS 100: 0,42 ± 0,08, $P < 0,05$) and spatial memory deficits (aCSF: 10,91 ± 2,85; STZ: 20,71 ± 2,90; STZ + BIS 100: 8,99 ± 2,76, $P < 0,05$) caused by STZ. α-Bisabolol at 200 mg/kg significantly reduced the working memory deficits (aCSF: 70,03 ± 2,359; STZ: 59,03 ± 2,404, STZ + BIS 200: 66,32 ± 2,226, $P < 0,05$). These results suggest the neuroprotective activity of α-bisabolol, highlighting its therapeutic potential for the treatment of sporadic AD.
Palavras-chaves: Alzheimer, streptozotocin, α-bisabolol, memory
Agência Fomento:

16.044 - EFEITOS NEUROPROTETORES DO EXTRATO AQUOSO DA CASCA DO FRUTO DE Punica granatum SOBRE LESÃO MEDULAR EM RATOS

THE NEUROPROTECTIVE EFFECTS OF THE FRUIT BARK AQUEOUS EXTRACT OF Punica granatum ON THE SPINAL CORD INJURY IN RATS

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Instituição: 1 UNIT - Tiradentes University (Av. Murilo Dantas, 300 - Farolândia, Aracaju - SE, Zip Code 49032-490), 2 ITP - Research and Technology Institute (Av. Murilo Dantas, 300 - Farolândia, Aracaju - SE, Zip Code 49032-490)Introdução:
Treatments for spinal cord injury (SCI) aim to counteract the underlying pathophysiological events such as oxidative stress and neuroinflammation. The extracts of Punica granatum present anti-inflammatory, antioxidant and neuroprotective activities. Thus, they could be promising therapeutics for SCI.
Objetivos:
To evaluate the effects of oral administration of the fruit bark aqueous extract of Punica granatum (AEPG) on spinal cord injury in rats
Métodos:
The AEPG was obtained by maceration, and chemically evaluated by high performance liquid chromatography. In the biological assay (approved by the Ethics Committee on Animal Use of Tiradentes University: 010716R), 40 female adult Wistar rats (300 g) were divided into groups, after the procedures of laminectomy (LAM group) only or laminectomy followed by hemisection at the thoracic level, and treated as follows: AEPG 100 (SCI/AEPG 100 mg/kg), AEPG 300 (SCI/AEPG 300 mg/kg) and Methyl (SCI/Methylprednisolone 30 mg/kg) and Lesion group (SCI/vehicle). Treatments (p.o.) were given for 28 days from the surgical procedures . The sensorimotor

evaluation was performed at 24 h and 7, 14, 21 and 28 days, by using the Basso, Beattie and Bresnahan (BBB) scale. The animals were euthanized for histological analysis, for the analysis of the density of neurons and glial cells stained with hematoxylin-eosin in the ventral horn of the injured side of the spinal cord. Data were submitted to multiple variance analysis with repetitive measures and Bonferroni post-test (behavior), or one way analysis of variance followed by the Tukey post-test (histology) ($p < 0.05$).
Resultados e Conclusões:
Chromatographic analysis revealed the presence of gallic acid (3.83 mg/g AEPG) and ellagic acid (11.8 mg/g). Hemisection resulted in decreased sensorimotor performance and the treatments [$F(16,136) = 19,86$; $p < 0,0001$] with AEPG 100, AEPG 300 and Methyl promoted functional recovery in relation to the Lesion group at the 7° ($p < 0.001$), 14º ($p < 0.001$) and 21° days ($p < 0.05$), and at day 28 AEPG 100 and Methyl groups presented significant differences from Lesion group ($p < 0.05$). Loss of neurons was observed [$F(4, 87) = 8.716$; $p < 0.0001$]in the Lesion group ($p < 0.05$ X LAM) and the groups AEPG 100 and Methyl presented an increase in the amount of remaining neurons ($p < 0.001$ X Lesion). It was observed glial reaction [$F(4, 77) = 4.594$; $p = 0, 0022$] in Lesion group ($p < 0.05$ X LAM) that was reduced with AEPG 100 and Methyl treatments ($p < 0.001$ X lesion). The results suggest that AEPG at 100 mg/kg presents neuroprotective and anti-neuroinflammatory action on spinal cord injury.
Palavras-chaves: Phenolic Compounds, Hemisection, Spinal cord
Agência Fomento: Fundação de apoio à pesquisa e à inovação tecnológica do Estado de Sergipe (FAPITEC-SE), Coordenação de Aperfeiçoamento de Pessoal de Nível Superior - Brasil (CAPES) – Código de financiamento 001.

16.045 - EFEITO NEUROPROTETOR DO EXTRATO AQUOSO DE TRADESCANTIA SPATHACEA SOBRE LESÃO DA VIA NIGROESTRIATAL INDUZIDA POR 6-OHDA EM RATOS

THE NEUROPROTECTIVE EFFECT OF TRADESCANTIA SPATHACEA AQUEOUS EXTRACT ON 6-OHDA-INDUCED LESION OF RAT NIGROSTRIATAL PATHWAY
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Instituição: 1 UNIT - Universidade Tiradentes (Av. Murilo Dantas, 300 - Farolândia, Aracaju, Sergipe, Brasil, CEP 49032-490), 2 ITP - Instituto de Tecnologia e Pesquisa (Av. Murilo Dantas, 300 - Farolândia, Aracaju, Sergipe, Brasil, CEP 49032-490)Introdução:
The oxidative stress contributes to dopaminergic neuron loss in the mesencephalon, which is the hallmark of Parkinson's diseases (PD). Since the aqueous extract of Tradescantia spathacea (AETS) presents antioxidants proprieties, it could be neuroprotective against dopaminergic nigrostriatal pathway.
Objetivos:
To evaluate the neuroprotective effects of the aqueous extract of Tradescantia spathacea in a rat model of Parkinson's disease.
Métodos:
The Ethical committee of University Tiradentes (CEUA, protocol number 020517) approved the study. Male Wistar rats received intrastriatal stereotaxic injections of vehicle (ascorbate saline, Control group) or 6-hydroxydopamine (6-OHDA, 20 µg/3 µL; Lesion group) at the right striatum. Then they were divided in 5 groups (n=8) treated daily with distilled water (1 mL) or AETS at 10, 30 or 100 mg/kg, for 30 consecutive days (groups anmed AETS 10, 30 and 100). The apomorphine-induced (0.5 mg/kg, i.p.) rotational behavior was assessed at 30° day, followed by euthanasia. Brain sections were obtained and stained by immunohistochemistry for tyrosine hydroxylase (TH), a marker for dopaminergic neurons, and for glial fibrillary acidic protein (GFAP). Neurons in the substantia nigra pars compata (SNc) and the relative optical density in the striatum were quantified by optical microscopy. Data were analyzed by one-way analysis of variance followed by Bonferroni post-test ($p < 0.05$).
Resultados e Conclusões:
The 6-OHDA induced contralateral rotations and this effect was significantly decreased in groups treated with AETS 100 mg/kg [$F(3, 28) = 4.201$; $p = 0.0142$; LES = 25.13±4.5; AETS 10 = 10±3.9; AETS 30 = 16.5±3.5; AETS 100 = 7.9±3.1]. The AETS, in all doses, was protective against histological alterations induced by 6-OHDA. i.e.: decreased mean number of TH+ neurons in SNc [$F(4,35) = 91,1$; $p < 0,0001$; CTL = 90,3±10,1; LES = 6,8±3,4; AETS 10 = 49±7,4; AETS 30 = 48±16,3; AETS 100 = 79,5±5,8]; decreased TH+ fiber density in the striatum [$F(4,25) = 13,9$; $p < 0,0001$; CTL= 118,1±15,3; LES = 79,2±5,2; AETS 10 = 104,8±11,8; AETS 30 = 106,2±5,1; AETS 100 = 106,3±3,9] and increased

expression of GFAP in the striatum [F (4,25) = 24,1; p < 0,0001; CTL= 64,2±4,7; LES = 81,3±4,3; AETS 10 = 65,5±3,5; AETS 30 = 65±2,4; AETS 100 = 67,1±2,4]. These results in point to a neuroprotective effect of AETS against dopaminergic degeneration.

Palavras-chaves: Commelinaceae, Parkinson's disease, Striatonigral degeneration

Agência Fomento: Coordenação de Aperfeiçoamento de Pessoal de Nível Superior - Brasil (CAPES) – Código de financiamento 001

16.054 - EFEITO NEUROPROTETOR DA SPIRULINA PLATENSIS EM UM MODELO DE DOENÇA DE PARKINSON INDUZIDO PELA 6-HIDROXIDOPAMINA ESTÁ RELACIONADO À SUA AÇÃO ANTI-INFLAMATÓRIA

NEUROPROTECTIVE EFFECT OF SPIRULINA PLATENSIS IN A 6-HYDROXYDOPAMINE MODEL OF PARKINSON DISEASE ARE RELATED TO ITS ANTI-INFLAMMATORY ACTION

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Instituição: 1 UFC - Federal University of Ceará (Rodolfo Teófilo, Rua Coronel Nunes de Melo, 1000 - Fortaleza, Ceará, Brasil)Introdução:

Parkinson's disease (PD) is a neurodegenerative movement disorder affecting 1% of the population in the 65-year age group, characterized by the degeneration of dopaminergic nigrostriatal neurons in the pars compacta substantia. The current treatment of PD is restricted to symptomatic relief, and to date there are no agents capable of reducing neuronal degeneration. Spirulina platensis (SPI) is a cyanobacterium presenting anti-inflammatory and antioxidant actions.

Objetivos:

Considering the importance of inflammation and oxidative stress in Parkinson's disease (PD), the aim of this study was to investigate the SPI neuroprotective effects in a rat model of PD.

Métodos:

The study was approved by the ethics committee on animal experimentation of the Federal University of Ceará (protocol number 27/2013). Male Wistar rats (220-250g, n = 150) were divided into: sham-operated (SO), 6-OHDA and 6-OHDA treated with SPI (25 and 50 mg/kg, p.o.). The 6-OHDA (18 µg/3µl) was injected into the right striata and SPI treatments started 24 h later for 2 weeks. Afterwards, the animals were subjected to the apomorphine-induced rotational test. Tyrosine hydroxylase (TH), DAT, iNOS and COX-2 immunoreactivity, and dopamine, DOPAC and nitrite, TBARS content were evaluated.

Resultados e Conclusões:

SPI reduced significantly the apomorphine-induced rotational behavior (SO: 1.23 ± 0.87; 6-OHDA: 309.10 ± 42.33; 6-OHDA+SPI25: 218.90 ± 70.83; 6-OHDA+SPI50: 157.80 ± 19.71, P < 0.05). DA and DOPAC depletions (DA: SO: 3611 ± 584.0; 6-OHDA: 328.3 ± 26.72; 6-OHDA+SPI25: 1136 ± 110.6; 6-OHDA+SPI50: 990.4 ± 171.4; DOPAC: SO: 1062 ± 129.9; 6-OHDA: 291.5 ± 62.74; 6-OHDA+SPI25: 674.9 ± 126.3; 6-OHDA+SPI50: 715.5 ± 143.0, P < 0.05) and nitrite (SO: 145.7 ± 38.36; 6-OHDA: 447.2 ± 64.44; 6-OHDA+SPI50: 116.4 ± 50.56, P < 0.05) and TBARS (SO: 10.08 ± 1.248; 6-OHDA: 16.03 ± 2.132; 6-OHDA+SPI50: 8.822 ± 0.5709, P < 0.05) increases, at its high dose. Furthermore, TH (SO: 241635 ± 2748; 6-OHDA: 2043 ± 298.2; 6-OHDA+SPI50: 140747 ± 6091, P < 0.0001) and DAT (SO: 150190 ± 5633; 6-OHDA: 2877 ± 573.2; 6-OHDA+SPI50: 52982 ± 11278, P < 0.0001) immunoreactivities in the lesioned striatum of the untreated 6-OHDA-lesioned group were attenuated by SPI. Similarly,immunoreactivities for iNOS (SO: 12834 ± 714.4; 6-OHDA: 120094 ± 1658; 6-OHDA+SPI50: 10008 ± 409.3, P < 0.0001) and COX-2 (SO: 13479 ± 3347; 6-OHDA: 201648 ± 5889; 6-OHDA+SPI50: 7026 ± 920.9, P < 0.0001) were also decreased after SPI treatments. In conclusion, we showed that behavioral and neurochemical alterations in hemiparkinsonian rats were partly inhibited by SPI, characterizing the neuroprotective potential of Spirulina. These results stimulate translational studies focusing on its use as an alternative treatment for PD.

Palavras-chaves: Neuroinflammation, Oxidative stress, Parkinson's disease, Spirulina platensis

Agência Fomento: CAPES, CNPq e FUNCAP

17. Distúrbios Neurológicos

17.016 - N-methyl-(2S,4R)-trans-4-hydroxy-L-proline (NMP) from Sideroxylon obtusifolium shows beneficial effects on brain mitochondria exposed to pilocarpine, preventing mitochondria swelling and damage

N-methyl-(2S,4R)-trans-4-hydroxy-L-proline (NMP) from Sideroxylon obtusifolium shows beneficial effects on brain mitochondria exposed to pilocarpine, preventing mitochondria swelling and damage

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Instituição: 1 UFC - UNIVERSIDADE FEDERAL DO CEARÁ (CEL NUNES DE MELO 1000), 2 UFCA - UNIVERSIDADE FEDERAL DO CARIRI (Av. Tenente Raimundo Rocha Nº 1639)Introdução:
We show that NMP exerts neuroprotective actions on a model of pilocarpine-induced convulsions, that mimics the temporal lobe epilepsy (TLE) in humans. Mitochondrial dysfunction is known to contribute to several neurologic disorders and has been implicated in TLE.
Objetivos:
The objective was to study the NMP effects on brain mitochondria swelling, in order to investigate whether it was able to block Ca2+-induced opening of the mitochondrial permeability transition pore (mPTP) in isolated rat brain mitochondria.
Métodos:
Mitochondria were obtained from Wistar rats as described elsewhere (Tahara et al., 2009. Free Radic Biol Med. 46:1283-97). Changes in light scattering due to Ca2+ uptake and swelling were measured as a decrease over time in 540 nm. In addition, in order to investigate whether NMP was able to block Ca2+-induced opening of the mPTP, brain mitochondria were treated with increased concentrations of NMP (10, 50 and 100 ng/mL) in the presence of a Ca2+ bolus (2 µM). The study was approved by the Institutional Ethics Committee on Animal Research (CEUA/UFC), under the number 59/17
Resultados e Conclusões:
We showed that isolated brain mitochondria had decreased susceptibility to mPTP opening upon NMP exposure, indicating a beneficial regulatory effects against Ca2+-induced mitochondrial swelling, and ultimately avoiding mitochondrial damage [F(3.116)=50.21]. To further address the beneficial effects of NMP, we treated brain mitochondria with pilocarpine (Pilo, 10 ng/mL). We found that Pilo induces a massive Ca2+-induced mitochondrial swelling (two-tailed t test, t=6.93, df=59). Considering that NMP blocked mitochondrial swelling on control conditions, we hypothesized that NMP could protect mitochondria from Pilo-induced mitochondrial damage. Thus, we treated mitochondria with Pilo, in the absence and in the presence of NMP (10, 50 and 100 ng/mL) followed by the Ca2+-induced mitochondrial swelling assay. We showed that NMP significantly blocked mitochondrial swelling on all concentrations tested ($p < 0.05$, df=3, MS=0.007719, ANOVA and Newman-Keuls test). We conclude that NMP presents a neuroprotective action on mitochondrial function what could, at least in part, explain its effects on the pilocarpine-induced convulsion model.
Palavras-chaves: temporal lobe epilepsy , NMP, mitochondria
Agência Fomento: Financial support: Brazilian National Research Council (CNPq)

17.017 - RAPID KINDLING OF BASOLATERAL AMYGDALA INCREASES THETA-GAMMA PHASE-AMPLITUDE COUPLING DURING REM SLEEP AND LEADS TO COGNITIVE DEFICITS

RAPID KINDLING OF BASOLATERAL AMYGDALA INCREASES THETA-GAMMA PHASE-AMPLITUDE COUPLING DURING REM SLEEP AND LEADS TO COGNITIVE DEFICITS
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Instituição: 1 USP RP - Universidade de São Paulo (Av. Bandeirantes 3900 - Ribeirão Preto), 2 UFMG - Universidade Federal de Minas Gerais (Av. Pres. Antônio Carlos, 6627 - Belo Horizonte)Introdução:
Complementary electrophysiological mechanisms are necessary for hippocampal memory consolidation, such as Sharpwave Ripples (SWRs) in slow-wave sleep (SWS) and theta-gamma coupling during REM sleep. In kindling models of epileptogenesis, daily electrical stimulation applied to temporal structures develop pathological events such as Interictal Epileptiform Discharges (IEDs) during SWS, which gradually replace the SWRs and seems to be necessary for observed cognitive impairments. However, alterations in REM sleep during the epileptogenesis are poorly investigated.
Objetivos:
Test the hypothesis that memory deficits during epileptogenesis are associated with dysfunctions of theta and gamma oscillation during REM sleep in addition to SWS alterations.
Métodos:

Adult male Wistar rats were submitted to a rapid kindling protocol (RK, 10 stimulation at 50 Hz with 10 s duration, current capable of inducing after-discharge of, at least, 5 s, 3 days) on the basolateral amygdala (BLA). Electrodes were implanted for the local field potentials (LFP) recording in CA1 and medial prefrontal cortex (mPFC), as well stimulation electrodes in BLA for both kindling (KD, n = 8) and control (CT, n = 5) groups. To investigate cognitive impairment caused be kindling protocol, object recognition (OR) tasks were performed before and after RK. Sleep recordings were performed daily after the OR or RK, assessing the incidence of hippocampal IEDs and SWR and cortical delta-waves and spindles during non-REM (NREM) sleep. We evaluated theta and gamma oscillations during REM sleep through power density and phase-amplitude comodulation analysis. All protocols were approved by the Ethics Committee of FMRP (#016/2016).
Resultados e Conclusões:
We observed an impairment on OR discrimination index (DI) after RK (DI before and after RK for KD group: 0.68±0.08 and 0.51±0.02, p = 0.024; CT group: 0.73±0.02 and 0.66±0.03, p = 0.936; Mann-Whitney Test). During REM sleep a reduction of 7,32±0.40% theta power was observed compared to control (CI: [-8,11; -6,57]), and an increase of theta and low-gamma comodulation after RK application (54.1±11.3, 48.3±9.6 and 58.3±15.6 % increase of Modulation Index (MI) in KD group compared to CT). We observed a negative correlation (r = -0.55, p = 0.03) between average MI and the average after-discharge duration (AD) induced by RK. During SWS the IEDs incidence increased along RK (tau = 0.83, Mann-Kendall; p < 0.001, z-test) while SWR decreased (tau = -0.70, p < 0.01). We observed memory deficits simultaneously to electrophysiological alterations during REM and SWS. Given the important role of SWR and theta-gamma coupling for memory consolidation, our findings suggest that epileptogenesis may hijack these learning mechanisms, which is supported by the correlation between AD duration and MI. Our findings expand the comprehension of electrophysiological changes in sleep during kindling, suggesting possible mechanisms for epileptogenesis and memory deficits in Temporal Lobe Epilepsy.
Palavras-chaves: Electrophysiology, Epileptogenesis, Kindling, Memory, Sleep
Agência Fomento: CAPES, CNPq, FAPESP

17.018 - EARLY-LIFE STATUS EPILEPTICUS WITHOUT NEURON LOSS: BEHAVIORAL ABNORMALITIES ARE RELATED WITH CHANGES IN HIPPOCAMPAL-PREFRONTAL CONNECTIVITY

EARLY-LIFE STATUS EPILEPTICUS WITHOUT NEURON LOSS: BEHAVIORAL ABNORMALITIES ARE RELATED WITH CHANGES IN HIPPOCAMPAL-PREFRONTAL CONNECTIVITY
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Early-life seizures are associated with cognitive and psychiatric impairments later in life. Since animals subjected to early-life Status Epilepticus (SE) do not show the neuropathological features classically associated with temporal lobe epilepsy, the neural mechanisms for these deficits are not known. Our hypothesis is that these behavioral dysfunctions could emerge from functional connectivity alterations between hippocampal CA1 and prefrontal cortex (PFC) since they are pathologically involved in psychiatric comorbidities of adult limbic epilepsy.
Objetivos:
Our aim was to investigate how early-life SE affects synaptic plasticity and the oscillatory activity of the CA1-PFC pathway, and how these effects relate to behavioral abnormalities.
Métodos:
We induced a 2 h SE by means of lithium-pilocarpine in P12 male Wistar rats. Once adults, they were tested for spatial working memory (radial arm maze), exploratory behavior (open field), and sensorimotor gating (pre-pulse inhibition of the acoustic startle, PPI). They were submitted to an acute electrophysiological session, with PFC field responses being recorded upon electrical pulses (200 μs, 0.05 Hz, 150–300 μA) into CA1, both before (30 min) and after (240 min) CA1 high-frequency stimulation (HFS, 2 series of 10 trains, each train with 50 pulses at 250 Hz). In a second experiment, SE and control (Ctrl) animals were chronically implanted with microwire bundles in the

PFC and CA1 for extracellular recordings (1000x gain, 0.03–3 kHz band pass and digitized at 10 kHz) during free behavior for 48 h. Stages of wake/sleep cycle were classified as slow wave sleep (SWS), rapid eye movement (REM) sleep, active wake and quiet wake using a machine learning algorithm. The protocol was approved by the Ethical Committee on Animal Research (159/2014).
Resultados e Conclusões:
SE rats showed impaired radial arm maze performance (Student t-test, $t(23)=-2141$, $p < 0.05$, n=11/14), hyperlocomotion (Student t-test, $t(23)=-2,886$, $p < 0.05$, n=11/14), PPI deficit (Student t-test, $t(23)=3,693$, $p < 0.05$, n=11/14), and a stronger long-term potentiation (two-way repeated measures ANOVA, $F(1,12)=19,687$; $p < 0,001$, n=7/7). In the chronic recording session SE animals showed a disruption in CA1-PFC synchrony (HFO, Student t-test, $t(14)=3.59$, $p < 0.05$, n=7/9) during active exploration. Interestingly, no changes in power were observed across wake/sleep cycle. Specifically during REM sleep we observed a disruption in hippocampus and CA1-PFC cross-frequency coupling), between theta (5-10 Hz) frequencies and high-gamma frequencies (65-100 Hz, Student t-test, $t(14)=1.66$, $p < 0.05$, n=7/9. No changes in neuronal density were detected with NeuN immunohistochemistry. Our results indicate that typical behavioral abnormalities after early-life SE can occur independently of neuronal loss and are related to long-lasting CA1-PFC alterations. These data suggest possible functional impairments that can underlie psychiatry comorbidities in limbic epilepsy.
Palavras-chaves: early life seizure, epilepsy, hippocampus, prefrontal cortex, synaptic plasticity
Agência Fomento: CNPq, CAPES and FAPESP

17.019 - EFEITOS DA MEMANTINA EM CRISES EPILÉPTICAS INDUZIDAS POR PENTILENOTETRAZOL EM UM MODELO DE CRIOLESÃO

EFFECTS OF MEMANTINE ON PENTYLENETETRAZOLE-INDUCED SEIZURES IN THE FREEZE-LESION MODEL

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Developmental cortical malformations (DCM) are one of the main causes of refractory epilepsy in children worldwide. Despite the availability of several antiepileptic drugs (AED), refractory epilepsy in these patients remains a significant problem. The search for new therapies, besides surgical procedure is rising.
Objetivos:
We aimed to evaluate the controversial repositioning of a non-competitive NMDA receptors antagonist, memantine, as a potential AED, using pentylenetetrazole (PTZ)-induced seizures in the freeze-lesion (FL) model.
Métodos:
Microgyria in the somatosensory cortex (bilateral) were induced in P0 male Wistar rats by FL. Sham animals underwent to same procedure without FL. At P30, animals were anesthetized for cortical electrodes implantation. Seven days later video-EEG was recorded during baseline (10min), after memantine (20mg/kg, i.p) or 0.9% saline (30min) and after PTZ (70mg/kg, i.p - 1 hour) to evaluate the latency, duration, severity (Racine Scale) and number of seizures in FL and Sham animals. EEG power spectrum analysis was performed for delta (D), theta (T), slow (SG), middle (MG) and fast gamma (FG), ripples and fast ripples oscillations. Parameters were analyzed using two-way ANOVA, independent T-test and Repeated Measures ANOVA with significance level of $p < 0.05$. All procedures were approved by the Institutional Ethical Committee (31727).
Resultados e Conclusões:
PTZ induced seizures in all animals. The latency for the first seizure and the seizure duration were similar for all groups and were unaffected by memantine. FL animals had increased number of seizures II-III [$F(1,34)=5.2$ $p=0.029$]. Both memantine groups (sham-M and FL-M) had increased number of seizures stages II-III and IV-V than saline groups [II-III: $F(1,34)=31.2$ $p < 0.001$; IV-V: $F(1,38)=18.76$ $p < 0.001$]. During the basal period, theta, SG and MG power were lower in FL group when compared to sham group [T: $t(28)=2.8$ $p=0.009$; SG: $t(28)=3.75$ $p=0.001$; MG: $t(28)= 2.983$ $p=0.006$]. SG, MG and FG power were higher in memantine-treated animals than saline-treated animals, independent of the group (sham or FL) and remained higher until the pre-ictal period. [SG: $F(1,26)=88.55$ $p < 0.001$; MG: $F(1,26)=79.30$ $p < 0.001$; FG: $F(1,26)=33.99$ $p < 0.001$]. Other oscillations were similar for all groups. The FL animals have lower T, SG and MG power before treatment that could be related to the cortical network reorganization. Memantine worsened the seizure frequency of all stages of severity and increased the power of gamma oscillations. Careful

evaluation should be considered before suggesting the use of memantine as a potential AED.
Palavras-chaves: epilepsia, malformação cortical, memantina
Agência Fomento:

17.020 - SLEEP IMPAIRMENT IS INFLUENCED BY DEPRESSIVE SYMPTOMS IN PATIENTS WITH PARKINSON'S DISEASE

SLEEP IMPAIRMENT IS INFLUENCED BY DEPRESSIVE SYMPTOMS IN PATIENTS WITH PARKINSON'S DISEASE
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Parkinson's disease (PD) consists of the selective death of dopaminergic neurons in nigrostriatal structures, which reflects on motor and non-motor changes. Depressive symptoms have been reported in PD, mainly due to alterations in areas that produce dopamine, a substance directly related to mood.
Objetivos:
To evaluate the relationship between depressive symptoms and the manifestation of sleep disorders in PD patients.
Métodos:
This was a cross-sectional observational study, performed at the Movement Disorders Outpatient Clinic of the Hospital de Clínicas, Porto Alegre - RS. The sample was selected non-probabilistic by accessibility and composed of 71 patients with PD. Sleep quality was measured using the Parkinson's Disease Sleep Scale (PDSS). Depressive symptoms were assessed using the Beck Depression Inventory II (BDI - II). Data were analyzed using the Pearson correlation test and a simple linear regression model to evaluate the relationship between the variables. This project was approved by the Ethics Committee on Research with Humans of the Hospital de Clínicas of Porto Alegre (opinion no. 2,052,088).
Resultados e Conclusões:
The average age of the patients was 63.05 ± 1.15 years, and 53.5% (n = 38) of the participants were males. A negative correlation was found between sleep and depressive symptoms in patients with PD ($r = -0.552$; $p < 0.0001$). The linear regression showed that 30% ($r2 = 0.3044$, $p < 0.0001$) of the variation in sleep disorders in PD patients is related to depressive symptoms, the other 70% are related to other conditions. The data show that sleep quality impairment is associated with the presence of depressive symptoms in patients with PD. This indicates that there is a need for attention to the management of these symptoms to maintain sleep quality in this population.
Palavras-chaves: Parkinson's disease, Sleep Quality, Depression
Agência Fomento:

17.021 - PAPEL DO RECEPTOR TRPA1 EM CRISES CONVULSIVAS INDUZIDAS POR PILOCARPINA EM CAMUNDONGOS

ROLE OF TRPA1 RECEPTOR IN SEIZURES INDUCED BY PILOCARPINE IN MICE
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Instituição: 1 UFMG - Universidade Federal de Minas Gerais (Av. Presidente Antônio Carlos, 6627)Introdução:
Epilepsy is a neurological disorder that affects millions of people around the world (Fisher et al., 2014). Family of transient potential receptors (TRP) are a group of highly conserved cation channels found on the cellular membrane in various tissues, whose channels are highly permeable to calcium, which is involved in different physiological processes, such as sensations related to different stimuli or ion homeostasis (Clapham, 2003; Naziro ğlu et al., 2015; Nilius et al., 2005; Nishida et al., 2015). TRPV1 channels are expressed in the dentate gyrus of hippocampus and the increase of Ca2+ entry in hippocampal neurons has

been associated to epilepsy's etiology (Gonzalez-Reyes et al., 2013; Manna and Umathe, 2012). There is still no conclusive evidence showing the involvement of the TRPA1 channel in seizures.
Objetivos:
We aimed to evaluate the role of TRPA1 in the modulation of seizures and glutamate release in hippocampus of mice.
Métodos:
C57Bl/6 animals (10-12 weeks, n= 7-10) received intrahippocampal pilocarpine injection (40 µg), 30 minutes after intraperitoneal injection of vehicle (DMSO 1%, tween 80 5%, saline 94%) or TRPA1 modulator. TRPA1 receptor blocker, AP18 was administered at doses of 1, 3 and 10 mg/Kg for in vivo experiments and 0,1; 1; 10 and 30 µM for synaptosomes preparations. The seizures were evaluated for 90 minutes after pilocarpine injection, according to the Racine's scale of seizures and synaptossomes of hippocampus were prepared to evaluate glutamate release (n=3). This work was approved by the Ethics Committee on Animal Use of UFMG: 197/2017.
Resultados e Conclusões:
Chi-square statistical analysis revealed a strong association between AP18 and the development of Status Epilepticus (SE) as well as AP18 and tonic-clonic seizures. Sixty percent of pilocarpine group developed SE. AP18, 1, 3 and 10 mg/Kg, enhanced the SE to 85%, 75% and 70%, respectively (chi-square=26,65; $p < 0,0001$). Twenty percent of the pilocarpine group developed tonic-clonic seizures, while 1, 3 and 10 mg/Kg of AP18 enhanced the frequency of tonic-clonic seizures to 71%, 63% and 70%, respectively (chi-square=71,67; $p < 0,0001$). AP18 (3 mg/Kg) increased the seizures classified as 3, 4 and 5 ($F(3, 29)=3,549$; $p= 0,0265$). On the other hand, AP18 (10 mg/Kg) increased the median latency for the animals to develop the SE (21 minutes; IC=15-29) as compared with pilocarpine group (11 minutes; IC=8,5-15,25; $p=0,0342$). Finally, AP18 (10 and 30 µM) increased the release of glutamate in synaptosome preparations ($F(1,19)=23,68$; $p=0,0001$ and $F(4,19)=2,566$; $p=0,0716$, respectively). Until now, our results suggests that TRPA1 may be involved in the release of glutamate which possibly explain the greater intensity of seizures with its blockade. Therefore, further studies are necessary to characterize the role of this drug in neurodegeneration and in glial activation.
Palavras-chaves: Pilocarpine, Seizure, TRPA1
Agência Fomento: CNPq, FAPEMIG

17.022 - EFEITO NEUROPROTETOR DA RIPARINA II EM MODELO MURINO DE MALÁRIA CEREBRAL

NEUROPROTECTIVE EFFECT OF RIPARIN II IN MURINE MODEL OF CEREBRAL MALARIA
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Instituição: 1 UFPA - Universidade Federal Do Pará (Augusto Correa, Nº1), 2 NMT - Núcleo De Medicina Tropical (av. Generalissimo Deodoro, 92)Introdução:
Cerebral Malaria (CM) is the main complication resulting from Plasmodium falciparum infection, presenting symptoms such as respiratory failure, ataxia, seizures e coma, resulting in cerebral compromise and consequent sequelae in the central nervous system. Animal models have been widely used an attempt to find new therapies that ameliorate the neurological and behavioral damages resulting from the infection. In this way, we propose the use of Riparin II (RIP II) as a possible protective agent, since it has been reported as a potential neuroprotective factor, considering its anti-inflammatory and neurotropic properties already described in the literature.
Objetivos:
Thus, the objective of the present study was to analyze the effect of the RIP treatment on the evolution of experimental cerebral malaria induced by infection with Plasmodium berghei ANKA (PbA).
Métodos:
For this, both male and female swiss mice aging 7 weeks were divided into the following groups: Infected (PbA) (n = 4), RIP II (n = 3), and PbA + RIP II (n = 8) groups. The experiment was approved by the UFPA ethics committee (nº 6211241117). The treated groups received the dose of 10mg /Kg of the drug for 4 days prior to infection and 4 days post infection. To monitor the development of CM, the animals were monitored by Behavioral tests such as the Open Field test and Rapid Murine Coma and Behavior Scale (RMCBS), analysis of parasitemia and body weight on days 3, 5, 7, 9 and 12 post infection, in addition to the survival curve of the animals. Statistical analyzes were performed by one-way ANOVA, using the Bonferroni post-test in BioEstat 5.0 software. The data is expressed as mean ± standard deviation and was considered significant $p < 0.05$.

Resultados e Conclusões:
Furthermore, the survival rate of the 8-days treated group with Riparin II was higher when compared to the PbA group; there was also no significant difference in the body weight of the animals throughout the course of the experiment. The parasitemia of the group PbA + RIP II remained below the PbA group during the days of analysis, but without statistical significance. The performance in the open field test of the PbA + RIP II group was higher than the PbA group, revealing a significant difference on the 5th and 7th day after infection (PbA=57,2 ± 27,78 vs PbA+RIP II= 87± 28 at 5th d.a.i.; e PbA= 27,8± 26,9 vs PbA+RIP II= 57,8± 35 at 7º d.a.i.). The performance in the motor and sensory parameters analyzed by the RMCBS test revealed a difference between the PbA and PbA + RIP II groups on the 7th day after infection (PbA= 13,5± 1,65 vs PbA+RIP II= 18,5± 1,5). Therefore, we can show that there is a protective effect of Riparin II against the experimental condition of cerebral malaria.
Palavras-chaves: CEREBRAL MALARIA, RIPARIN II, PLASMODIUM BERGHEI
Agência Fomento: CAPES

17.023 - A MANGIFERINA DIMINUI APOPTOSE CEREBRAL E DANOS NEUROLÓGICOS INDUZIDOS PELA MALÁRIA CEREBRAL MURINA

MANGIFERIN DECREASES BRAIN APOPTOSIS AND NEUROLOGICAL IMPAIRMENTS INDUCED BY MURINE CEREBRAL MALARIA
Autores: Nívia Mendes 1, Larissa do Anjos 1, Brenda Ataíde 1, Marjorie Torres 1, Nayara Kauffmann 1, Adelaide Passos 1, Suellen Moraes 1, Evander Batista 2, Anderson Herculano 1, Rosivaldo Borges 3, Karen Oliveira 1
Instituição: 1 (UFPA) - Federal University of Pará (Augusto Corrêa Street, 01), 2 (NTM) - Nucleus of Tropical Medicine (Generalissimo Deodoro Street, 92), 3 NesBio - Nucleus of Selection and Study of bioactive molecules (Augusto Corrêa Street, 01)Introdução:
Cerebral malaria (CM) is the most common clinical of P. falciparum infection. The accentuated cytoadherence and inflammatory response that occurs during CM pathogenesis induces changes in the blood-brain barrier. Mangiferin, a molecule present in Mangifera indica plant, that has antioxidant and anti-inflammatory activity, appears as a possible ally in the modulation of behavioral changes caused by the disease severity.
Objetivos:
Therefore, this study aimed to investigate the effect of mangiferin (50mg / kg) on the neurological changes induced by murine cerebral malaria.
Métodos:
The present study was performed using Swiss mice at 6-8 weeks old, weighing 25-30g (Ethics Statement: 6211241117) and infection was then induced in experimental mice with Plasmodium berghei ANKA (PbA). The experimental groups were randomly divided into: Control, Mangiferin (Mgf), PbA and Mgf+PbA. The treated group received intraperitoneal injection with mangiferin for 8 days. The Rapid Murine Coma and Behavior Scale (RMCBS) test was used to evaluate the clinical signs and severity of the disease. A blood-brain barrier analysis was performed by the vascular permeability assay and the cell death was assessed by Caspase-3 expression.
Resultados e Conclusões:
Our RMCBS results showed that mangiferin treatment reduced neurological damage associated to the parameters as coordination (Control=2±0; PbA=0.66±0.25 vs Mgf+PbA = 1.21±0.39 F[29.05] $p < 0.01$), self-preservation (Control=2±0; PbA=0.83±0.15 vs Mgf+PbA= 1.25±0.25 F[26.39] $p < 0.01$), strength and tone (Control=2±0; PbA=0.83±0.25 vs Mgf+PbA=1.42±0.18 F[29.94] $p < 0.05$). The vascular permeability assay showed that there was less extravasation of Evans Blue dye in the treated group when compared to the PbA group (PbA:62,67±14,70 vs Mgf+PbA: 31,04±5,42F [16,31] $p < 0,01$). In the immunofluorescence assay the mangiferin group showed a lower expression of Caspase-3 in relation to the PbA group, demonstrating that the treatment with manjiferin attenuated cell death induced by the infection. Therefore, we conclude that mangiferin treatment attenuated brain damage induced by cerebral malaria, showing the neuroprotective effect of mangiferin during the development of this disease.
Palavras-chaves: Cerebral malaria, Mangiferin, Plasmodium berghei, Caspase-3
Agência Fomento: CNPq

17.024 - MELATONINA ATENUA A RESPOSTA INFLAMATÓRIA EM INFECÇÃO COM A CEPA Plasmosdium berghei ANKA EM MODELO MURINO DE MALÁRIA CEREBRAL

MELATONIN ATTENUATES THE INFLAMMATORY RESPONSE INFECTION WITH Plasmodium Berghei ANKA IN THE MURINE MODEL OF CEREBRAL MALARIA

Autores: Brenda Ataide 1, Nayara Kauffmann 1, Nivia Mendes 1, Marjorie Torres 2, Larissa Anjos 2, Suellen Moraes 1, Adelaide Passos 1, Evander Batista 1,2, Anderson Herculano 1, Karen Oliveira 1
Instituição: 1 UFPA - Federal University of Pará (August Correa Street 01), 2 NMT - UFPA - Nucleus of Tropical Medicine (Av. Generalíssimo Deodoro, 92)Introdução:
Cerebral malaria (CM) is a neurological dysfunction associated with neuroinflammatory mechanisms that culminate in the breakdown of the blood-brain barrier (BBB), leading to dysfunctions in the cerebral parenchyma. TNF- α is a major proinflammatory mediator and one of the main cytokines involved in the disease outcome. Currently, several studies seek new therapies in order to reduce the damage resulting from the infection. Melatonin is described as a hormone capable of modulating inflammation, presenting itself as a molecule with a high capacity of neuroprotection. Our previous results demonstrated that melatonin was able to attenuate damages associated with BBB rupture, protecting against the formation of cerebral edema, histopathological changes in the frontal cortex and behavioral changes. In light of this, we sought to evaluate the participation of the molecule in the inflammatory process associated with CM.
Objetivos:
The aim of this work was to investigate the role of melatonin as a protective agent against the inflammatory response induced by cerebral malaria in murine model.
Métodos:
Adult swiss mice were used (20-25g) (ethics committee: 6211241117), inoculated intraperitoneally with ~106 parasitized erythrocytes with ANKA strain of Plasmodium berghei (PbA). The groups were divided into: Control; PbA; PbA+Melatonin 5mg/kg (PbA+Mel5); PbA+Melatonin 10mg/kg (PbA+Mel10) treated for four consecutive days. On the 6th post-infection day (d.p.i.) the levels of TNF- α in the brain and plasma were evaluated, as well as the cell counting by DAPI (4',6-diamidino-2-phenylindole) staining in the cortex tissue. The results were expressed as mean and standard deviation, using ANOVA followed by post-test of Tukey-Kramer, considering $p < 0.05$.
Resultados e Conclusões:
Our results demonstrated that the treatment with melatonin promoted an evident protective effect against neuroinflammation mediated by the release of TNF- α in the brain of infected animals (Control: 0.197± 0.046; PbA: 1.208±0.284; PbA+Mel5: 0.252±0.0336; PbA+Mel10: 0.245±0.032; $F[3,15]=14,33$; $p < 0.01$), as well as attenuated the blood peripheral inflammatory response (Control: 6.82±1.93; PbA: 17.63±1.38; PbA+Mel5: 10.04±1.66; PbA+Mel10: 7.42±1.98; $F[3,16]=45,33$; $p < 0.01$). We also observed that the treatment with melatonin protected against cell loss in the cortex of animals infected with the PbA strain (Control: 1017±38.19; PbA: 626.33±40.5; PbA+Mel5: 887±23.81; PbA+Mel10: 919±19.31; $F[3,8]=82.62$; $p < 0.01$). In conclusion, we demonstrated that melatonin is a potential protective agent capable of attenuating the inflammatory response resulting from CM.
Palavras-chaves: Cerebral Malaria, Plasmodium berghei, Inflammation, Melatonin
Agência Fomento: UFPA, CNPq e CAPES

17.025 - AUMENTO DA RESPOSTA INFLAMATÓRIA CEREBRAL E ALTERAÇÕES NEUROCOMPORTAMENTAIS EM MODELO MURINO DE MALÁRIA NÃO COMPLICADA

BRAIN INFLAMMATORY RESPONSE AND NEUROBEHAVIORAL CHANGES IN MURINE MODEL OF UNCOMPLICATED MALARIA

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Instituição: 1 UFPA - Universidade Federal Do Pará (Rua Augusto Corrêa, 01), 2 NMT - Núcleo De Medicina Tropical (av. Generalíssimo Deodoro, 92)Introdução:
Malaria is an infectious disease responsible for innumerous death in tropical countries. Several studies describe that malaria induces significant impairment in specific organs such as the lung, kidney and liver. However, the effect of uncomplicated malaria in the brain tissue remains unclear. Previous studies have shown that malaria infection evokes elevation of pro-inflammatory cytokines such as IL-1 and TNF- α in the blood plasma, but it is not demonstrated whether this phenomenon occur in the brain tissue.
Objetivos:
Based in this evidence, the aim of the current study is to evaluate if uncomplicated malaria evokes alteration in the behavior, brain histology and levels of pro-inflammatory cytokines in mice brain.
Métodos:

The Balb-c mice strain was used (20-25g) between 45-54 postnatal days (ethics committee nº 2229290317) and inoculated with ~106 erythrocytes parasitized intraperitoneally. The groups were divided into the following: Control group and PbA group (Plasmodium berghei ANKA), in which the quantification of cytokine TNF- α, histological changes by staining with hematoxylin and eosin and locomotor activity by the open field test were evaluated. The results were expressed as mean ± standard deviation. One-way ANOVA followed by Tukey post-test was performed, considering as significant $p < 0.05$.
Resultados e Conclusões:
Our data demonstrated that PbA group showed increased values of TNF- α in the plasma (413,71 ±11,54) and Cortex (148.79 ±8.22) when compared with plasma (107,27 ±9.16) and cortex (66.41 ±11.2) of unaffected group. According to the motor activity, the PbA group presented a decrease of exploration and a lower number of squares crossed in the apparatus (52.25 ±18.86) when compared with unaffected group (211.75 ±5.32), thus demonstrating that the Plasmodium berghei ANKA strain infection causes locomotor impairment when compared to the control group. In addition, the histology of the prefrontal cortex, an area related to locomotion, also presented change in its structure, as well as the presence of cellular infiltrates. In view of this, we can conclude that infection with the PbA strain in murine model of uncomplicated malaria causes an increase in the inflammatory response, impairment in locomotion, as well as a change in the cerebral parenchyma.
Palavras-chaves: UNCOMPLICATED MALARIA, NEUROBEHAVIORAL CHANGES, INFLAMMATORY RESPONSE
Agência Fomento: FAPESPA, CAPES PRÓ AMAZÔNIA

17.026 - INIBIÇÃO DO RECEPTOR A2A-ADENOSINA PREVINE PREJUÍZOS NEUROLÓGICOS EVOCADOS PELA MALÁRIA CEREBRAL EM CAMUNDONGOS

INHIBITION OF A2A-ADENOSINE RECEPTOR PREVENTS NEUROLOGICAL IMPAIRMENTS EVOKED BY CEREBRAL MALARIA IN MICE

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Instituição: 1 UFPA - Universidade Federal Do Pará (Rua Augusto Corrêa, 1 - Guamá, Belém - PA, 66075-110), 2 NMT - Núcleo De Medicina Tropical (Av. Generalíssimo Deodoro, 92 - Umarizal, Belém - PA, 66055-240)Introdução:
Cerebral malaria (CM) is the most serious neurological manifestation caused by Plasmodium falciparum infection. The central damage related to the disease comes from hemorrahagic events in the brain whose ontogeny has not yet been fully elucidated. The use of animal models has become an important strategy to elucidate the pathophysiology of CM. Recent results in our laboratory have demonstrated that caffeine treatment increases the survival of animals and protects against the neurological damage induced by PbA infection. Caffeine acts pharmacologically as a non-selective inhibitor of adenosine receptors (A1, A2a, A2b, A3). The literature demonstrates that such receptors act to maintain the homeostasis of the blood-brain barrier (BBB).
Objetivos:
The present study aimed to characterize whether adenosine receptor blockade (A2a) is involved in caffeine-induced neuroprotection in Swiss albino mice inoculated with Plasmodium berghei (PbA) ANKA strain.
Métodos:
Swiss mice (20-25g) were used between 45-54 postnatal days (Ethics Statement: 6211241117), inoculated with 106 erythrocytes parasitized intraperitoneally. The groups were divided into: Control, SCH-58261 (0.05mg / kg), PbA and PbA + SCH-58261 group (0.05mg / kg), the adenosine receptor antagonist (A2a) was administered for 4 days before and 4 days after inoculation with PbA.
Resultados e Conclusões:
Our results demonstrated that in the control and SCH-58261 (0.05mg / kg) groups, the animals obtained a 100% survival, however, the Swiss mice inoculated with the PbA strain presented acute and lethal infection that began in the 7th day post infection (d.p.i) to 8th d.p.i, with a significant (14%) decrease in the 8th d.p.i survival rate. The animals in the group PbA + SCH-58261 (0.05mg / kg) showed an increase in the survival of the infected animals, with a survival of 66% in the 7th d.p.i., remaining alive until the 22nd d.p.i. In relation to parasitemia, infected animals treated with SCH-58261 (0.05mg / kg) showed no significant difference (3º dpi 2.29 ± 0.45, 5º dpi 12.20 ± 2.71, 7º dpi 19.56 ± 0.83, 9º dpi 19.97 ± 1; 12º dpi 20.62 ± 1.69) when compared to the PbA group (3rd dpi 3.65 ± 0.54; 5th dpi 13.85 ± 3.13 7th dpi 22.01 ± 1.91). Thus, we conclude that the characterization of these pathways

opens new perspectives for other preclinical trials that may contribute to the understanding and development of effective drugs in the fight against malaria-induced brain damage.
Palavras-chaves: Adenosine Receptor A2A, Plasmodium berghei (ANKA), Experimental Cerebral Malaria
Agência Fomento: CNPq

17.027 - RECEPTORES DA RIANODINA CAUSAM PERDA NEURONAL E REGULAM AS PROTEÍNAS SINÁPTICAS DURANTE A EPILEPTOGÊNESE

RYANODINE RECEPTORS DRIVE NEURONAL LOSS AND REGULATE SYNAPTIC PROTEINS DURING EPILEPTOGENESIS
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Instituição: 1 UFABC - Universidade Federal do ABC (Alameda da Universidade, S/N. Bairro Anchieta. São Bernardo do Campo, SP.)Introdução:
The development of temporal lobe epilepsy is linked to Ca+2-dependent processes such as pathological synaptic plasticity and neuronal cell loss. It has been shown that status epilepticus (SE) produces increase in ryanodine receptor (RyR) dependent intracellular Ca+2 levels in neurons.
Objetivos:
We Investigated the role of RyRs on the expression of synaptic and plasticity-related proteins during epileptogenesis, as well as the effects of the RyRs blocker dantrolene (DAN) on the epileptiform activity.
Métodos:
Male Wistar rats (250-300 g) were used (CEUA 13/2014). Rats were submitted to stereotaxic surgery for implantation of hippocampal cannula and electrodes. For immunofluorescence (IF; n=4/vehicle; n=4/DAN) and western blot (WB; n=8/vehicle; n=8/DAN) assays, rats were treated with methyl scopolamine (1 mg/kg; sc) followed by pilocarpine (360 mg/kg; ip) or saline. Thirty minutes after establishment of SE, animals received intrahippocampal administration of DAN, and 48 h later hippocampal samples were collected. For LFP recordings, animals were submitted to 30 m of recording of basal activity. After that, SE was induced, and 30 m after establishment of SE, animals received intrahippocampal injection of DAN (n=4) or vehicle (n=4) (1 mM; 1 µL), and recordings were acquired for at least 2 h. Quantification of neurodegeneration (Fluoro-Jade C labelling) and WB was entered into unpaired two-sample t-tests with the significance level set at 5%.
Resultados e Conclusões:
Intrahippocampal injection of DAN caused increase of the protein synapsin I (SYN; WB: 181%; $P < 0.05$), revealing that RyRs could be involved in network changes and/or neuronal protection after SE. In order to investigate whether the changes in SYN were related to synaptic plasticity, we evaluated the levels of activity-regulated cytoskeleton-associated protein (ARC). We observed that although SE induced the appearance of intense ARC-positive cells, DAN treatment did not change the levels of ARC in WB analyses. Regarding neurodegeneration, DAN promoted neuroprotective effects by decreasing neuronal cell loss in CA1 (44%, $P < 0.05$) and CA3 (33%, $P < 0.01$). Regarding the LFP recordings, power spectrum analysis were performed using Welch's method, window 128 and overlap 516. The preliminary power spectrum density and spectrogram results so far indicate that the basal recordings from both CA1 hippocampal areas presented potentials that oscillated in theta, beta and gamma frequencies. After SE, evident increase of power of all the frequencies evaluated was observed, from delta to gamma ranges. After DAN administration, reduction of power of all frequency ranges was achieved, notably in the highest frequencies, suggesting a possible involvement of RyRs in the occurrence of high frequency oscillations during epileptiform activity. Taken together, our results revealed neuroprotective effects of the RyRs blocker DAN during SE, besides evidencing a fundamental role of intracellular Ca2+ in the ictal activity, especially in highest frequencies.
Palavras-chaves: temporal lobe epilepsy, status epilepticus, intracellular calcium, neurodegeneration
Agência Fomento: CAPES, CNPQ e FAPESP

17.028 - AUMENTO DA SUSCEPTIBILIDADE A CRISES EPILÉPTICAS INDUZIDAS POR ÁCIDO QUINOLÍNICO EM UM MODELO ANIMAL DE ACIDEMIA GLUTÁRICA TIPO I

INCREASED SUSCEPTIBILITY TO QUINOLINIC ACID-INDUCED SEIZURES IN AN ANIMAL MODEL OF GLUTARIC ACIDEMIA TYPE I
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Glutaric acidemia type I (GA-I) is an inborn error of metabolism caused by glutaryl-CoA-dehydrogenase (GCDH) deficiency and characterized by striatal degeneration, encephalopathy and seizures. GCDH deficient mice (Gcdh-/-) treated with overload lysine diet (4.9%) (Gcdh-/--Lys) replicates genotype and phenotype of GA-I patients. It has been postulated that a buildup of organic acids, including quinolinic acid (QA), could cause hyperexcitability and seizures in GA-I patients.
Objetivos:
To address this issue we evaluated the video-EEG recordings of Gcdh+/+and Gcdh-/- mice with QA-induced seizures.
Métodos:
At P28, Gcdh+/+and Gcdh-/- mice were implanted with two subdural electrodes in parietal cortex (2.0mm AP, ±1.2mm LL) and two intrastriatal cannulae (0mm AP, ±2.5mm LL, 2.5mm DV) for QA or vehicle injection. At P30, a baseline video-EEG was recorded for 20min, then all Gcdh+/+ and some Gcdh-/- mice started high lysine dietintake. At P32, all mice received1 µL intrastriatal injection of either QA (50mM) or vehicle, being then separated in 6 groups: Gcdh+/+-Lys-V (n=12), Gcdh+/+-Lys-QA (n=14), Gcdh-/--ND-V (n=9), Gcdh-/--ND-QA (n=9), Gcdh-/--Lys-V (n=9) and Gcdh-/--Lys-QA (n=13). Video-EEG was recorded for 1h after the injection. Mortality was evaluated at P34. EEG data were analyzed using the pCLAMP software and seizure latency, duration and frequency were evaluated. Seizure severity was classified according to Racine scale. Data were expressed as percentage or mean±SD and analyzed using chi-square, Kruskal-Wallis or Log-rank (Mantel Cox) Tests, considering $p < 0.05$. All procedures were performed in accordance with Brazilian ethical guidelines (CEP-HCPA #14-0544).
Resultados e Conclusões:
Gcdh-/--Lys-QA mice had shorter latencies for the first QA-induced seizure when compared to other groups (Gcdh-/--Lys-QA: 13.4±10.5min; Gcdh+/+-Lys-QA: 27.5±6.25min; Gcdh-/--ND-QA: 14.25±6.8, p=0.0093). Gcdh+/+-Lys-QA mice also had shorter seizure duration than both Gcdh-/--QA groups (Gcdh+/+-Lys-QA: 7.7±7.5s; Gcdh-/--ND-QA: 14.5±10.5s; Gcdh-/--Lys-QA: 22.6±28.2s, $p < 0.0001$). Number of seizures was similar for all groups (p=0.398). Seizure severity was higher in Gcdh-/--Lys-QA mice (IV-V seizures: Gcdh-/--Lys-QA, 55%; Gcdh+/+-Lys-QA, 26%; Gcdh-/--ND-QA, 32%; $p < 0.0001$). Mortality rate was higher in Gcdh-/--Lys-QA than other groups (Gcdh-/--Lys-QA: 4/13 mice, 33%; Gcdh+/+-Lys-QA: 1/10 mice, 10%; Gcdh-/--ND-QA: 1/9 mice, 12%, p=0.009). Preliminary data show that the animal model of GA-I had increased seizure susceptibility to QA-induced seizures.
Palavras-chaves: Acidemia glutárica tipo I, Ácido quinolínico, Crises epilépticas, Estriado, Eletroencefalograma
Agência Fomento: Conselho Nacional de Desenvolvimento Científico e Tecnológico (CNPq)

17.029 - EFEITOS DO TRATAMENTO COM NANOPARTÍCULAS DE OURO SOBRE ALTERAÇÕES COMPORTAMENTAIS E NEUROQUÍMICAS ASSOCIADAS À DOENÇA DE PARKINSON EM UM MODELO EXPERIMENTAL DE HIPERCOLESTEROLEMIA

EFFECTS OF GOLD NANOPARTICLES TREATMENT ON BEHAVIORAL AND NEUROCHEMICAL ALTERATIONS ASSOCIATED TO PARKINSON'S DISEASE IN AN EXPERIMENTAL MODEL OF HYPERCHOLESTEROLEMIA
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Instituição: 1 UNESC - Universidade do Extremo Sul Catarinense (Av. Universitária, 1105 - Bairro Universitário CEP: 88806-000 - Criciúma-SC), 2 UFRGS - Universidade Federal do Rio Grande do Sul (Av. Paulo Gama, 110 - Bairro Farroupilha - Porto Alegre - Rio Grande do Sul CEP)Introdução:
Parkinson's disease is a neurodegenerative and progressive disorder, which occurs in 1%–2% of people over the age of 60 years. Parkinson's disease is the second most common cause of dementia. Recent studies indicate hypercholesterolemia as a risk factor for Parkinson's disease development. High plasma cholesterol levels have been associated which blood-brain barrier (BBB) breakdown and neuroinflammation. The oxidant and anti-inflammatory properties of gold nanoparticles (AuNPs) have been well-described in the literature.
Objetivos:

In this regard, we hypothesized that the chronic treatment with AuNPs could be able to prevent the cerebral alteration, characteristic of Parkinson's disease, induced by hypercholesterolemia.
Métodos:
Three-month-old Swiss male mice were fed with standard or hypercholesterolemic diet (1.25% of cholesterol) for eight weeks. In addition, the animals were treated via gavage with vehicle (water) or AuNPs (2.5 mg/kg), totalizing four experimental groups. After this period, the animals were subjected to behavioral tests (catalepsy test, tail suspension test and splash test). Moreover, we evaluated total plasma cholesterol levels and BBB permeability in brain structures, olfactory bulb and striatum, of the experimental groups. The present study was approved by ethics committee of the UNESC (protocol number 007/2018-1).
Resultados e Conclusões:
The animals exposed to hypercholesterolemic diet presented an increase in the levels of plasma cholesterol ($p < 0.05$), which were not modified by AuNPs treatment. In addition, hypercholesterolemia in mice was associated with a cataleptic posture ($p < 0.05$) and depressive behavior ($p < 0.05$). Notably, treatment with AuNPs prevented cataleptic posture ($p < 0.05$), as well as decreased immobility time in tail suspension test ($p < 0.05$) of the hypercholesterolemic animals. The hypercholesterolemia exposure in mice caused an increase in the BBB permeability in olfactory bulb ($p < 0.05$), but not in striatum. The treatment with AuNPs ameliorated these BBB dysfunction induced by hypercholesterolemia in olfactory bulb of animals ($p < 0.05$). The treatment with AuNPs prevented behavioral and neurochemical alterations characteristics of Parkinson's disease induced by hypercholesterolemia in mice, however, more studies are needed to better understand the mechanisms involved in this neuroprotection.
Palavras-chaves: Parkinson's disease, Hypercholesterolemia, Gold nanoparticles, Blood-brain barrier, Behavioral alterations
Agência Fomento: UNESC, CNPq, CAPES, FAPESC

17.030 - BEHAVIORAL EVALUATION AND CHOLINERGIC ALTERATIONS IN ZEBRAFISH EXPOSED TO HIGH CONCENTRATIONS OF LEUCINE

BEHAVIORAL EVALUATION AND CHOLINERGIC ALTERATIONS IN ZEBRAFISH EXPOSED TO HIGH CONCENTRATIONS OF LEUCINE
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Instituição: 1 UNESC - Universidade do Extremo Sul Catarinense (Av. Universitária, 1105 - Bairro Universitário CEP: 88806-000 - Criciúma-SC)Introdução:
Maple Syrup Urine Disease (MSUD) is an autosomal recessive inherited disorder, caused by a deficiency on branched chain α-ketoacid dehydrogenase complex activity, resulting on an accumulation of branched-chain amino acids (BCAA), such as leucine. The treatment of patients with MSUD increases patient's survival. Thus, it is possible to find a crescent number of adolescents and adults with MSUD. Relevant studies have been reported behavioral alterations in these patients, i.e. high risk of chronic neuropsychiatric problems, such as attention deficit disorder, depression and anxiety. Moreover, MSUD is associated to neurotransmitters deficiency.
Objetivos:
Herein, we aimed at investigating whether the toxicity of leucine is associated to anxiety-like behavioral, using zebrafish acutely exposed to leucine as experimental model of MSUD. In addition, we investigated the effects of high levels of leucine in the acetylcholinesterase (AChE) and choline acetyltransferase (ChAT) activities, components of cholinergic neurotransmission system.
Métodos:
Young zebrafish were exposed to 2mM and 5mM concentration of leucine for 24 hours. After that, the animals were submitted Novel Tank test, and then the brains were collected to enzymatic determination.The present study was approved by ethics committee of the Universidade do Extremo Sul Catarinense - UNESC (protocol number 062/2018-1 and 061/2018-1).
Resultados e Conclusões:
The exposure to 2mM and 5mM concentrations of leucine caused behavioral and brain cholinergic activity alterations in young zebrafish, indicating an anxiety-like behavior and cholinergic dysfunction. Therefore, this animal could be considered a promising organism to study the BCAA neurotoxic effects, assisting in a better comprehension of the neurobehavioral and biochemical alterations found in patients with MSUD.

Palavras-chaves: Maple Syrupe Urine Disease; , Danio rerio, Branched-Chain Amino Acids, Behavior, Cholinergic System
Agência Fomento: UNESC, FAPESC, CNPq

17.031 - EVALUATION OF GLUTAMATERGIC LEVELS IN ZEBRAFISH EXPOSED TO HIGH LEVELS OF LEUCINE: CHARACTERIZING A MODEL OF MAPLE SYRUP URINE DISEASE

EVALUATION OF GLUTAMATERGIC LEVELS IN ZEBRAFISH EXPOSED TO HIGH LEVELS OF LEUCINE: CHARACTERIZING A MODEL OF MAPLE SYRUP URINE DISEASE

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Instituição: 1 UNESC - Universidade do Extremo Sul Catarinense (Av. Universitária, 1105 - Bairro Universitário CEP: 88806-000 - Criciúma-SC)Introdução:
Maple syrup urine disease (MSUD) is an error inborn of metabolism caused by decreased activity of branched-chain α-ketoacid dehydrogenase (BCKAD) which leads to an accumulation of branched-chain amino acids (BCAA) leucine, isoleucine and valine. Leucine is considered the main neurotoxic metabolite since increased plasma concentrations of this substance are associated with the appearance of neurological symptoms. Moreover, it is known that the neurotransmitter glutamate is decreased in this disease.
Objetivos:
The objective of this study is to evaluate glutamate levels and uptake in cerebral tissue of zebrafish exposed the high concentrations of leucine.
Métodos:
Zebrafish were divided into three groups (n=6). The animals were exposed 24 hours to 2mM and 5mM of leucine or water (control). Twenty-four hours after exposure, the animals were submitted to euthanasia with tricaine dissolved in water and brain was isolated. Glutamate levels were measured by high performance liquid chromatography, and glutamate uptake was measured by scintillation. The data were expressed as means ± standard deviation, analyzed by ANOVA of a Tukey post hoc. This study was approved by ethics committee of the UNESC (protocol number 074/2018/2).
Resultados e Conclusões:
Glutamate levels decreased in 5 mM of leucine when compared of control group; glutamate uptake was reduced in 2mM leucine and increased in 5mM when compared to control group. Our findings suggest that high levels of leucine were able to alter the alter glutamate in cerebral tissue of zebrafish; this is a possible explanation for the neuronal damage present in MSUD.
Palavras-chaves: Maple syrup urine disease , Zebrafish, Glutamate
Agência Fomento: FAPESC, UNESC, CNPQ

18. Transtornos Psiquiátricos e Comportamentais

18.029 - TRANSTORNO DE ESTRESSE PÓS-TRAUMÁTICO DURANTE A GESTAÇÃO E O IMPACTO NAS RESPOSTAS COMPORTAMENTAIS DA PROLE.

POST TRAUMATIC STRESS DISORDER DURING THE GESTATION AND THE IMPACT ON THE BEHAVIORAL RESPONSES OF OFFSPRING.

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Instituição: 3 UNIFAL-MG - Universidade Federal de Alfenas-MG (Av. Jovino Fernandes Sales ,2600,Santa Clara,CEP 37133-840,Alfenas-MG)Introdução:
Stressful events in the pre and postnatal periods, such as posttraumatic stress disorder (PTSD), can influence the structure and brain function of the pups, leading to permanent behavioral changes throughout the life of the offspring.
Objetivos:
To evaluate the influence of PTSD during gestation on the behavioral responses of mother and offspring.
Métodos:
The pregnancy rats, in the 10th gestational day were divided into: Control (C, no shock) and Shock (S). They were individually placed in the apparatus of footshock, being exposed or not to five foot shocks (2 s, 0.8 mA) (n= 10 per group). One day after birth (PND1) the pups were culled on 4 males and 4 females and the lactating rats were reexposed to the footshocks apparatus for evaluate of the freezing time (s). The maternal behavior (MB) was evaluated of the 2nd to 8th lactational day and object recognition tests (OR) in the 5. The offspring was evaluated in the following

behavioral tests (n =10 per group): quantification of ultrasonic vocalization (PND5) and homing behavior test (PND13). In the adolescence (PND 28-32): elevated plus maze (EPM), play behavior (PB) and hole board tests (HB). Statistical comparisons were made using the Student's t-test. All the experimental procedure were approved by CEUA (protocol 50/2018).
Resultados e Conclusões:
Results: The S group showed an increase in the freezing time (92.00 ± 68.33 to 506.00 ± 36.48s, $p < 0.001$); reduction of MB as percent of licking pups (8.75 ± 2.80 to 4.14 ± 1.99, $p < 0.001$) and reduction Index short-term memory (0.73 ± 0.13 to 0.52 ± 0.21, $p < 0.05$) in the OR when compared the C group. Pups from mothers with PTSD, showed an increase in the number of ultrasonic vocalizations (male:103.30 ± 68.72 to 351.50 ± 67.27, $p < 0.001$; female: 153.80 ± 113.10 to 291.80.00 ± 159.94, $p < 0.05$) and the latency to reach the nest bedding area in the HB (male:32.90 ± 15.56 to 75.50 ± 50.14s, $p < 0.01$; female:35.60 ± 22.40 to 76.50 ± 56.56s, $p < 0.01$). In the adolescence, there was an reduction in the PB (male:438.30 ± 63.79 to 296.25 ± 41.55, $p < 0.001$; female: 446.90 ± 52.85 to 305.37 ± 53.24, $p < 0.001$), increase in the number of head dips in the holes (female: 4,75 ± 1,03 to 9.62 ± 1.40, $p < 0.001$) in the hole board test; an increase in permanence time on the open arms (female: 62,80 ± 18.03 to 40.90 ± 12.36s, $p < 0.01$) in the EPM when compared C. CONCLUSION: PTSD reduces maternal behavior and negatively impacts in offspring behavior.
Palavras-chaves: Gestação , Prole , Transtorno do Estresse Pós-Traumático
Agência Fomento: Capes, CNPq, Fapemig.

18.030 - INDIVIDUAL PREDISPOSITIONS MODULATE THE ENGAGEMENT IN SAFE CONTEXT: AN fMRI STUDY

INDIVIDUAL PREDISPOSITIONS MODULATE THE ENGAGEMENT IN SAFE CONTEXT: AN fMRI STUDY
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Instituição: 1 UFRJ - Universidade Federal Do Rio De Janeiro (Avenida Carlos Chagas Filho, 373 Bloco G - Cidade Universitária), 2 UFF - Universidade Federal Fluminense (R. Prof. Hernani Melo, 101 - São Domingos, Niterói)Introdução:
Survival and mental health depends on the ability to identify and respond adequately to signals of threat and safety. Danger prompts the activation of the defensive system but concomitant contextual signals of safety can modulate these defensive reactions.
Objetivos:
To investigate if individual predispositions can modulate the engagement in a safe context.
Métodos:
Twenty-three non-clinical trauma-exposed participants (15F; age 29±12,70) viewed images of mutilated (n=60) and non-injured bodies (n=60) in two contexts. In the "real" context, before image viewing, participants read a text informing that the forthcoming images were real-life scenes. In the "safe" context, the text informed that images were fictitious. Trait resilience, Post-traumatic stress disorder (PTSD) symptoms and the magnitude of peritraumatic tonic immobility were assessed. Second-level factorial analysis was conducted (SPM12), with CONTEXT (real x safe) and VALENCE (neutral x mutilated) as within factors. Conditioned on significant CONTEXTxVALENCE interaction ($p=0.001$ uncorr., $k > 10$), Spearman's correlations were performed between psychometric scores and an index of engagement in safety signals (subtracting beta values of mutilated picture viewing between contexts [Safe_Mut - Real_Mut]). Approval from the Ethics Institutional Review Board n. 1,749,604 – September 28, 2016 - IPUB/UFRJ.
Resultados e Conclusões:
Significant CONTEXTxVALENCE interaction was observed at the supramarginal gyrus (SMG - $F=26.52$, $p < 0.001$), insula (INS - $F=15.01$, $p=0.001$) and midcingulate cortex (MCC - $F=14.06$, $p=0.001$). Posthoc analysis showed higher BOLD responses to mutilation relative to neutral pictures in the SMG ($p < 0.001$), INS ($p=0.002$) and MCC ($p =0.015$), in the real context, corroborating the typical pattern of response to aversive emotional stimuli. In the safe context, there was no significant difference between mutilated and neutral pictures (SMG: $p =0.152$; INS: $p=0.208$; MCC: $p =0.051$), evidencing effective engagement in safety signals, reflected by attenuated brain responses to aversive stimuli. Significant negative correlations were observed between the index of engagement in safety context and trait resilience in insula (rho=-0.57; $p=0.004$) and MCC (rho=-0.70; $p < 0.001$); and positive correlations between this index and tonic immobility in the SMG (rho=0.44; $p=0.034$) and MCC (rho=0.47; $p=0.025$). Higher resilience (and lower magnitude of tonic immobility) were associated with higher

attenuation of responses to aversive stimuli between contexts. PTSD symptoms correlations did not reach statistical significance. Trait resilience seem to prone individuals to engagement in safety cues, whereas the occurrence of peritraumatic tonic immobility during a previous traumatic event seems to be related to impairment in this engagement. These results may relate to vulnerability to PTSD – the main psychiatric sequelae of trauma exposure, since impaired safety engagement can be considered as a biomarker of this disorder.

Palavras-chaves: fMRI, PTSD, safety, defensive system
Agência Fomento: CNPq; FAPERJ; CAPES (Finance Code 001); FINEP (Apoio Institucional 03/2016 – Ref 0354/16)

18.031 - INFLUÊNCIA DE ALTERAÇÕES METABÓLICAS NO DESENVOLVIMENTO DO TRANSTORNO DO ESTRESSE PÓS-TRAUMÁTICO.

INFLUENCE OF METABOLIC ALTERATION IN THE DEVELOPMENT OF POST-TRAUMATIC STRESS DISORDER.

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Instituição: 1 UNIFAL-MG - Universidade Federal de Alfenas-MG (Av. Jovino Fernandes Sales, 2600, Santa Clara, CEP: 37.133-840, Alfenas-MG.)Introdução:
Post-traumatic Stress Disorder (PTSD) can lead to metabolic disorders. However, it is not yet known whether the metabolic disorders already established can influence the development of this disorder. In addition, we quantified the GFAP glial fibrillary acidic protein (astrocyte-specific biomarker) in the cortex and hippocampus of the experimental animals. This because, reported changes in GFAP expression related to psychiatric disorders including depression, stress and anxiety have been remarkably consistent.
Objetivos:
To evaluate the influence of metabolic alterations in the development of PTSD.
Métodos:
To induce the metabolic syndrome (MS), the male rats received fructose solution (10%) for seven weeks and, diabetes (D) received an intraperitoneal injection of alloxan (150 mg/kg). After the treatments, the rats were individually placed in the apparatus of footshock, being exposed or not to five foot shocks (2 s, 0.8 mA). The groups of animals were divided: MS or D or Control (C) and U: not exposed to shock and E: exposed to shock (C-U, C-E, MS-U, MS-E, D-U, D-E / n = 10 per group). Then, all experimental groups remained in isolated boxes and after 14 days of retention and behavioral evaluations were performed: social interaction test (SI), forced swimming (FS), elevated plus maze (EPM), object recognition (OR). In addition, protein quantification was verified by Western blotting to evaluating the expression of GFAP. Statistical comparisons were made by two-way repeated measures ANOVA followed by the Bonferroni test. All experimental were aproved by CEUA (protocol 24/2017).
Resultados e Conclusões:
The animals showed a accentuated reduction of SI in the goups MS-E (373.00±26.27 to 235.80±35,99s; $p < 0.001$) and D-E (361.12±43.05 to 188.75±34,97s; $p < 0.001$); showed an increase accentuating in the immobility time in test FS in MS-E (144.60±61.09 to 225.10±69.65s, $p < 0.05$) and D-E (215.75±40.71 to 282.50±13.52, $p < 0.05$); reduction was more accentuated permanence in the time of open arms n EMP MS-E (35.30±17.08 to 18.00±14.17s, $p < 0.05$) and D-E (31.00±12.71 to 5.50±3.78s, $p < 0.01$); reduction was more accentuated Index of short-term memory in the MS-E (0,65±0,12 to 0,53±0,05, $p < 0,05$) and D-E (0,67±0,17 to 0,44±0,17, $p < 0,01$); reduction was more accentuated Index of long-term memory in the MS-E (0,70 ±0,06 to 0,58±0,09, $p < 0,05$) and D-E (0,64±0,15 to 0,48±0,09, $p < 0,05$); of the when compared to the C-E group. The protein quantification showed an increase was more accentuated in (GFAP/Actin)% hippocampus and córtex in the MS-E group (189.26±30.02 to 243.93±41.5, $p < 0,05$ and 158.88±19.96 to 205.93±31.22, $p < 0.05$, respectively) when compared to the C-E group.In view of our results, we can conclude that MS or diabetes pre-existing accentuates symptoms related to PTSD. And in the MS PTSD group, this may be due to the increase of GFAP in the cortex and hippocampus.

Palavras-chaves: Diabetes, Síndrome Metabólica, Transtorno do Estresse Pós-traumático
Agência Fomento: Capes, CNPq e Fapemig.

18.032 - EFEITOS DA RITALINA EM UM NOVO MODELO GENÉTICO DE TDAH EM RATOS

EFFECTS OF RITALIN IN A NEW GENETIC MODEL OF ADHD IN RATS

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Instituição: 1 UFSC - Universidade Federal de Santa Catarina (Córrego Grande - Florianópolis, SC)Introdução:
Attention Deficit Hyperactivity Disorder (ADHD) is a neurobehavioral disorder that is usually diagnosed in children and adolescents and may persist during adulthood. One of the strategies for the study of neurobiological bases of this disorder are animal models. Among them, SHR rats (Spontaneously Hypertensive Rats) are considered the "golden standard" and are the most commonly used strain in ADHD basic research. However, they present some limitations that undermine its validation as a model of ADHD. SLA16 rats (SHR.LEW-Anxrr16) have the same genetic profile as SHR, except for one part of chromosome 4, which results in increased hyperactivity and lower basal blood pressure in SLA16 animals.
Objetivos:
the present study aims to evaluate SHR and SLA16 strains after first-choice drug treatment for the ADHD (Ritalin®).
Métodos:
SHR and SLA16 female and male rats were treated chronically in adolescence with Ritalin® (2 mg/kg; twice a day). At 1 or 4 months old, the animals were submitted to behavioral tests to evaluate hyperactivity/impulsivity and learning/memory.
Resultados e Conclusões:
At one month old, in the open field test, the results showed a higher locomotor activity in the SLA16 strain, regardless of sex [total distance: females ($F(1, 44) = 23.3$; $p = 0.0002$; SLA16 > SHR); males ($F(1, 42) = 18.0$; $p = 0.00012$; SLA16 > SHR)], as well as a larger number of entries in the center of the apparatus only in females ($F(1, 44) = 11.6$; $p = 0.0143$; SLA16 > SHR). In the object recognition test, Ritalin® improved the discrimination of new objects only in SLA16 females ($t(11)=5.48$, $p=0.000191$). At four months old, again it is possible to observe higher locomotor activity, regardless of sex, in the SLA16 strain [females ($F(1, 41)=15.10$; $p=0.000036$; SLA16 > SHR); males ($F(1, 42)=32.92$; $p=0.00001$; SLA16 > SHR)] and higher number of entries in the center of the open field [females ($F(1, 41)=10.58$; $p=0.00229$; SLA16 > SHR); males ($F(1, 42)=47.29$; $p=0.00001$; SLA16 > SHR)]. Besides that, Ritalin® improved the discrimination of new objects in females of both strains [($F(1, 43) = 13.78$; $p = 0.00060$; RIT > SAL]. Thus, it is possible to conclude that the SLA16 strain is potentially interesting to study endophenotypes of ADHD. Emphasis on females, in future studies, since they showed significant improvements in aspects related to learning/memory after Ritalin® treatment should be considered.
Palavras-chaves: Ritalin®, Hyperactivity, Learning/memory, SHR, SLA16
Agência Fomento: CAPES e CNPq

18.033 - A ENTERECOCCUS FAECALIS É IMPORTANTE NA PRESSÃO ARTERIAL E COMPORTAMENTO DIFERENCIAL DE UM MODELO GENÉTICO

THE ENTEROCOCCUS FAECALIS IS IMPORTANT FOR THE DIFFERENTIAL BLOOD PRESSURE AND BEHAVIOR OF GENETIC MODEL

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Instituição: 1 UFSC - Universidade Federal de Santa Catarina (Florianópolis, Santa Catarina)Introdução:
The gut microbiome has been increasingly suggested with an important role in modulating blood pressure, brain functions and mental health. Gut dysbiosis has been linked to hypertension in SHR (Spontaneously Hypertensive Rats) strain, although, it is not known if the neurobiological alterations presented by this strain (i.e. hyperactivity/impulsiveness, deficient sustained attention) are also associated with its microbiome. Rats of the SLA16 (SHR.LEW-Anxrr16) strain present higher hyperactivity/impulsivity and lower basal blood pressure, than SHR strain, even though genetic differences between them are only in chromosome 4.
Objetivos:
This work aimed to investigate the microbiota and its participation in the development of behavioral and physiological differences between the SHR and SLA16 strains.
Métodos:
4-month-old female rats SHR and SLA16 were used in three experiments: antibiotic treatment (ATT); antibiotic followed by fecal microbiota transplantation (FMT); and probiotic treatment (PRT; Enterococcus faecalis). During and at the end of the treatments, the animals were submitted to the evaluation of systolic blood pressure (SBP), open field (OF), elevated plus maze (EPM) and activity cage (AC). The data was evaluated through two-way ANOVA, or ANOVA with repeated measures and, when necessary, Duncan's

post hoc test. The experiments were approved by the Ethics Committee on the Use of Animals of the UFSC under the number PP00903.
Resultados e Conclusões:
ATT decreased SBP of SHR [Control=178.4±2.5; ATT=167.8±2.1; post hoc p=0.037] and marginally increased SBP in SLA16 [Control=163.7±2; ATT=173.3±2.7; post hoc p=0.059]. ATT also decreased the locomotion in the AC in both strains [F(1,33)=4.1; p=0.049]. After ATT, the total microbiota was reduced [F(3,21)=4.5; p=0.01] and was identified the presence of E. faecalis in both strains. FMT only increased SBP of SLA16 [Control=160.9±2.7; FMT=171.7±3.0; post hoc p=0.033], but no behavioral effects were found in both strains. PRT also increased SBP in SLA16 [Control=156.4±1.1; PRT=164.83±1.94; post hoc p=0.001] and increased number of entries in the center of OF in SHR [Control=15.2±1.1; PRT=23.1±1.4; post hoc p=0.001]. In conclusion, for the first time, we showed the microbiota as important in the regulation of SBP and behavior in SHR and SLA16 strains. More important, the bacterium E. faecalis is now suggested to be related in the behavioral and physiological differences between these strains of rats.
Palavras-chaves: Isogenic strains, microbioma, hypertension, behavior
Agência Fomento: Capes e CNPq

18.034 - CAFFEINE PREVENTS BEHAVIORAL ALTERATIONS RELATED TO SCHIZOPRENIA CAUSED BY CHEMICAL HYPOXIA IN NEONATAL PERIOD.

CAFFEINE PREVENTS BEHAVIORAL ALTERATIONS RELATED TO SCHIZOPRENIA CAUSED BY CHEMICAL HYPOXIA IN NEONATAL PERIOD.
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Instituição: 1 UNIFESP - Universidade Federal de São Paulo (Rua Pedro de Toledo, 669), 2 FCMSCSP - Faculdade de Ciências Médicas da Santa Casa de São Paulo (Rua Dr. Cesário Motta Jr., 61)Introdução:
Normal brain development is crucial for healthy life and disruptions in theses process can lead to psychiatry disorders. Neonatal hypoxia is a risk factor for the development of schizophrenia in later life. It is known that hypoxia can disrupt the neurodevelopment leading to permanent alterations in brain and neuropsychiatric disorders, like schizophrenia, since dopaminergic system is very sensitive to hypoxic conditions. Also, hypoxia increases the levels of adenosine, which plays a role in normal brain development. Caffeine, an antagonist of adenosinergic receptors, is the most consumed psychoactive substance worldwide. Caffeine is also a clinical useful tool in preterm birth in cases of birth apnea, however it can interfere in normal neurodevelopment. We observed that chemical hypoxia induced by cobalt chloride (CoCl2) – a compound that stabilizes HIF levels – in rats during neonatal period cause behavioral alterations related with schizophrenia, like hiperlocomotion and increasing in rearing behavior in young and adult ages, deficit in social interaction and deficit in freezing behavior in contextual fear conditioning test in adult age.
Objetivos:
The aim of this work was to evaluate if caffeine can prevent the effects of neonatal treatment with CoCl2 on behavioral parameters.
Métodos:
Wistar male rats were treated with caffeine (CA-10 mg/kg) or saline (S-control group) on PND 6. On PND 7 rats received cobalt chloride (CL-60 mg/kg) or saline (control group). So, we had four groups: S-S(n=11-12), S-CL(n=8), CA-S(n=8-9) and CA-CL(n=7-10). On PND 90 rats were submitted to social interaction (S), where we analyzed their locomotor activity (L) and rearing behavior (R) and contextual fear conditioning (C) tests. CEUA 1115120416.
Resultados e Conclusões:
As expected, CoCl2 treatment (S-CL) increased locomotion (S-S:58.18,S-CL:102.87;p=0.001) and rearing behavior (S-S:6.09,S-CL:14.62;p=0.001) and impaired SI (S-S:333.45,S-CL:261.0;p=0.006) and CFC (S-S:163.17,S-CL:72.00;p=0.003) compared with S-S group. Similarly, caffeine (CA-S group) caused the same alterations, compared with S-S group (L–S-S:58.18,CA-S:112.75;p=0.0001; R–S-S:6.09,CA-S:14.0;p=0.0001;S–S-S:333.45,CA-S:233.62;p=0.0001;C–S-S:163.17,CA-S:74.22;p=0.003). When we gave caffeine prior to CoCl2, the alterations in locomotion (S-CL:102.87,CA-CL:24.14;p=0.0001), rearing (S-CL:14.62,CA-CL:2.57;p=0.0001), S (S-CL:261.0,CA-CL:508.86;p=0.0001) and C (S-CL:72.0,CA-CL:148.70;p=0.02) were abolished, compared with group treated only with CoCl2 These data indicate that caffeine can prevent behavioral alterations caused by chemical hypoxia in neonatal period, but it can cause them in situations without hypoxia, so caution is needed when using caffeine during critical periods of development. We suggest that adenosine levels must

be properly regulated for normal neurodevelopment and prevention of psychiatric disorders like schizophrenia and it provides additional evidence for a role of adenosine in schizophrenia-like symptoms.
Palavras-chaves: adenosine, caffeine, hypoxia, neonatal, schizophrenia
Agência Fomento: FAPESP

18.035 - EFEITOS DO SEXISMO NO AMBIENTE DE TRABALHO SOBRE A SAÚDE MENTAL DE MULHERES: RESULTADOS PARCIAIS DE UMA REVISÃO SISTEMÁTICA

EFFECTS OF SEXISM IN THE WORKPLACE ON WOMEN'S MENTAL HEALTH: PARTIAL RESULTS OF A SYSTEMATIC REVIEW
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Instituição: 1 UNIFESP - Universidade Federal de São Paulo (Rua Botucatu nº 862, Edifício de Ciências Biomédicas 1o andar)Introdução:
The incidence of emotional disorders such as anxiety and depression is approximately two times higher in women than in men. The causes for this difference are still unknown and may involve biological and socio-cultural factors. Exposure to prejudice in all of its forms, as well as exposure to workplace stress, may increase the odds to develop psychiatric disorders.
Objetivos:
Knowing that sexism is still a recurrent issue on women's daily life, this study sought to perform a systematic review of the biomedical literature to evaluate the relationship between exposure to workplace sexism and depression.
Métodos:
A search strategy to be applied in five databases (MEDLINE (PubMed), APAPsycNET (PsycInfo), Web Of Science, LILACS and CINAHL) was developed using MeSH terms and keywords related to working women, sexual and workplace harassment, gender pay gap, career mobility and depressive disorders. The title and abstract analysis of all the retrieved articles in these databases is being carried out. In the final version of the study only papers of observational studies about workplace sexism, sexual and workplace harassment, gender pay gap or career progression will be included. In addition, for inclusion studies must have also evaluated depression and its comorbidities and should have been read in full and approved separately by two researchers.
Resultados e Conclusões:
Preliminary search was performed and retrieved the following amount of papers: 535 in MEDLINE, 859 in APAPsycNET, 472 in Web Of Science, 160 in LILACS and 175 in CINAHL, without considering duplicates. Until now, all the abstracts retrieved from MEDLINE were analyzed, from which 148 were selected for complete reading. The next steps of the study will be: to complete the title and abstract analysis of retrieved articles, then follow to the full reading and selection for inclusion in the final study; to perform a quality assessment of the selected articles and finally the extraction of data to, if possible, carry out a metanalysis. This study was supported by CAPES, CNPq and AFIP.
Palavras-chaves: depressive disorder, occupational stress , sexism, systematic review, workplace
Agência Fomento: CAPES

18.036 - VALIDAÇÃO DOS RATOS ESPONTANEAMENTE HIPERTENSOS (SHR) PARA INVESTIGAÇÃO DOS EFEITOS EM LONGO PRAZO DO TRATAMENTO COM METILFENIDATO

VALIDATION OF THE SPONTANEOUSLY HYPERTENSIVE RATS (SHR) FOR THE INVESTIGATION ON THE LONG-TERM EFFECTS OF METHYLPHENIDATE TREATMENT
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Instituição: 1 UFPR - Universidade Federal do Paraná (Av. Cel. Francisco H. dos Santos, 100 - Jardim das Américas, Curitiba)Introdução:
Attention deficit hyperactivity disorder (ADHD) is the most common psychiatric disease in children. Its core symptoms are hyperactivity, impulsivity and inattention. Stimulants, such as methylphenidate, are the gold standard treatment for ADHD. They act by blocking dopamine transporter (DAT). The long-term effects of stimulants are still unknown. Many studies addressed this question; however, most of them did not use animal models of ADHD. Spontaneously hypertensive rats (SHR) are one of the most used animal models of ADHD.
Objetivos:
Considering that, the aim of this study is to investigate the long-term effects of chronic treatment with methylphenidate on emotion and cognition, using the SHR model. Before starting the chronic treatment, we validated the SHR located in our laboratory to verify if they show ADHD-like behavior.
Métodos:

We used the open field test (OFT) to measure locomotor activity, the object recognition test (ORT) to evaluate cognitive deficits, and the elevated plus maze (EPM) to assess risk-taking behavior. Wistar rats (WIS) were used as the control strain. All animal procedures were approved by the Ethics Committee for Animal Use Research of UFPR, #993.
Resultados e Conclusões:
The OFT was performed in three different days. There was a interaction between day of the test and strain ($F(2, 66) = 5.84$, $p < 0.005$). In a post-hoc analysis, it was observed that in the first day of OFT, SHR and WIS did not show any statistical difference (mean ± sd, WIS (n=15) = 4.28 m ± 0.70, SHR (n=20) = 4.08 m ± 0.68, $p > 0.05$). In the third day, however, WIS decreased their locomotion compared to the first day (WIS = 3.42 m ± 1.16, $p < 0.001$), whereas SHR did not (SHR = 3.76 m ± 0.74, $p > 0.05$). This suggests that SHR are not hyperactive when compared to WIS, but they have impaired habituation in novel environments. SHR and WIS did not differ in the ORT as well. The discrimination index, a calculated proportion of the time spent in the novel compared to the familiar object, were not significantly different between groups (median and IQR; WIS (n=5) = 0.18, 0.12-0.25; SHR (n=4) = -0.015, -0.022-0.30, $U = 5.00$, $p = 0.27$). This probably happened because the sample size was too small. In the EPM, SHR spent more time in the open arm than WIS (mean ± sd; WIS (n=9) = 41.80 s ± 30.86, SHR (n=15) = 101.45 s ± 38.75; $t(22) = 3.92$, $p < 0.001$), and head dipping was higher in SHR than controls (mean ± sd; WIS = 4.08 s ± 4.40, SHR = 10.71 s ± 4.69; $t(22) = 3.42$, $p < 0.001$). This indicates that SHR engage in more risk-taking behavior than WIS. Likewise, SHR explore more the open arm, as indicated by the increased head dipping. To conclude, the SHR did not show hyperactivity when compared to WIS. Yet, they had habituation impairment, indicating cognitive deficits. Also, they showed more risk-taking behavior. Based on these evidences, we are using SHR as an animal model of ADHD, and the next steps of the study are to evaluate the long-term effects of chronic methylphenidate treatment on behavior.
Palavras-chaves: SHR, methylphenidate, emotion, cognition
Agência Fomento: Fundação Araucária

18.037 - ANXIETY AND DEPRESSION-LIKE BEHAVIORS ARE ASSOCIATED WITH NEUROINFLAMMATORY PROCESSES FOLLOWING EXPERIMENTAL MODEL OF MILD TRAUMATIC BRAIN INJURY

ANXIETY AND DEPRESSION-LIKE BEHAVIORS ARE ASSOCIATED WITH NEUROINFLAMMATORY PROCESSES FOLLOWING EXPERIMENTAL MODEL OF MILD TRAUMATIC BRAIN INJURY
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Instituição: 1 UFMG - Universidade Federal de Minas Gerais (Avenida Presidente Antônio Carlos, 6627 - Pampulha, Belo Horizonte, Minas Gerais), 2 UTHealth - University of Texas Health Science Center at Houston (7000 Fannin St #1200, Houston, Texas 77030, Estados Unidos)Introdução:
Traumatic brain injury (TBI) is defined as a cerebral lesion caused by an external mechanical force against the skull. TBI is one of the leading causes of disability and mortality among young adults worldwide. Mild TBI is the most recurrent form of this fatality and can reach up to more than 70% of the cases in most studies. Moreover, anxiety and depression have been also associated with TBI. The pathophysiology of TBI remains unclear, but there is evidence that inflammatory processes may be involved in psychiatric sequelae post-TBI.
Objetivos:
In this context, we aim to investigate the role of neuroinflammatory processes in behavioral alterations in an experimental model of mild TBI.
Métodos:
Male C57BL/6 wild type mice, 10-12 weeks old, weight between 20-30g, were obtained from the Centro de Bioterismo at Universidade Federal de Minas Gerais (UFMG), Belo Horizonte, Brazil. The study was conducted according to the Ethics Committee on Animal Experimentation of UFMG, under the protocol number 250/2017. The animals were conditioned with a 12-hour light-dark cycle, with food and water ad libitum. The mild TBI was induced by employing the weight-drop model. The control group was submitted to all procedures except to the trauma. The open field test (OFT), performed mainly to test locomotor activity, and the hematoxylin and eosin staining were employed at 6, 12 and 72 hours, and 30 days post-TBI. The forced

swim test (FST), which evaluates the depression-like behavior, was performed in animals at 12 and 72 hours, and 30 days after TBI. The animals were also submitted to the elevated plus maze test, a gold standard test to analyze anxiety-like behavior, in the same time points of FST. The evaluation of inflammatory mediators, interleukin (IL)-10 and tumor necrosis factor (TNF) was performed in the ipsilateral and contralateral prefrontal cortex (PFC) and hippocampus through Cytometric Bead Array (CBA) at 6,12, 24 and 72 hours and 30 days after injury.
Resultados e Conclusões:
We found significant locomotor activity impairment at 6 hours after TBI, compared to control ($p < 0.05$), along with neutrophil infiltration and local hemorrhage in the cerebral cortex. Moreover, TBI-mice also presented depression-like behavior at 72 hours after injury, and anxiety-like behavior at 12 and 72 hours and 30 days post-TBI, compared to controls ($p < 0.05$). Associated with these behavioral changes, was found reduction of TNF levels, in relation to control ($p < 0.05$), in the contralateral PFC at 72 hours and 30 days and in the contralateral hippocampus at 30 days post-TBI. We also observed an increase of IL-10 levels, compared to controls ($p < 0.05$), in the ipsilateral PFC at 12 and 24 hours after TBI. Also was found a decreased of IL-10 levels in the contralateral PFC at 72 hours and 30 days and in the contralateral hippocampus at 6, 24 and 72 hours and 30 days post-TBI, when compared to controls ($p < 0.05$). Our results suggest that neuroinflammatory processes might play a role in behavioral changes after mild TBI.
Palavras-chaves: Traumatic Brain Injury, Behavior Changes, Inflammation, Cytokines
Agência Fomento: CAPES/FAPEMIG/Brain & Behavior Research Foundation

18.038 - EFEITOS DA COMBINAÇÃO DA ELETROCONVULSOTERAPIA E FÁRMACOS ANTIDEPRESSIVOS EM PARÂMETROS INFLAMATÓRIOS E DE ESTRESSE OXIDATIVO

EFFECTS OF THE COMBINATION OF ELECTROCONVULSIVE THERAPY PLUS ANTIDEPRESSANTS DRUGS ON OXIDATIVE STRESS AND INFLAMMATORY PARAMETERS

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Instituição: 1 UNESC - Universidade do extremo sul catarinense (Av. Universitária, 1105 - Universitário, Criciúma - SC, 88806-000), 2 UNIDAVI - Centro Universitário para Desenvolvimento d Alto Vale Itajaí (R. Guilherme Gemballa, 13 - Jardim América, Rio do Sul - SC, 89160-932), 3 UNISUL - Universidade do Sul de Santa Catarina (Av. José Acácio Moreira, 787 - Dehon, Tubarão - SC, 88704-900), 4 UFFS - Universidade Federal da Fronteira do Sul (SC-484, Fronteira Sul - SC, 89815-899), 5 UTHealth - University of Texas Health Science Center at Houston (7000 Fannin St #1200, Houston, TX 77030, EUA)Introdução:
Major Depressive Disorder (MDD) is the most prevalent mood disorder in the world. In fact, more than 300 million people are affected. The antidepressants drugs are generally effective, however, the latency for antidepressant response could is relatively long (3-6 weeks), and a significant number of patients (30-40%) do not respond to pharmacological treatments. In this sense, studies that investigate new antidepressants with fast action and robust efficacy in patients who are refractory to traditional antidepressants are crucial.
Objetivos:
The aim of this study was to examine the synergistic effects of electroconvulsive therapy (ECT) combined to the antidepressants fluoxetine, bupropion, lamotrigine and ketamine.
Métodos:
For the study, adult male Wistar rats were divided into the following experimental groups (n=5 each group): 1) saline + sham (the electrodes were placed in the ear for 5 seconds, but without shock application); 2) saline + ECT (1mA; 100V); 3) ketamine (5 mg/kg) + sham; 4) ketamine + ECT; 5) fluoxetine (1 mg/kg) + sham; 6) fluoxetine + ECT; 7) lamotrigine (5 mg/kg) + sham; 8) Lamotrigine + ECT; 9) bupropion (4 mg/kg) + sham; 10) bupropion + ECT. Treatments were performed once a day for five days. Then, oxidative damage and antioxidant capacity were assessed in the prefrontal cortex (PFC) and hippocampus, and pro-inflammatory cytokines levels were evaluated in the serum. The data were analyzed by one-way ANOVA and statistical significance was set at $p < 0.05$. The experimental protocol was approved by ethics committee on the use of animals (105-2014-01).
Resultados e Conclusões:
It was observed that ECT alone increased the lipid peroxidation in the PFC and hippocampus ($p < 0.05$);

however, it was demonstrated that rats treated with ketamine, fluoxetine, lamotrigine and bupropion even in combination with ECT or alone had a reduction in the lipid peroxidation ($p < 0.05$). The nitrite/nitrate concentration was increased with fluoxetine, lamotrigine and bupropion in combination with ECT in PFC and hippocampus ($p < 0.05$). In both superoxide dismutase (SOD) and catalase (CAT) activities, the treatments with ketamine, lamotrigine, fluoxetine and bupropion administrated alone increased these enzymes activities ($p < 0.05$); however, when these drugs were administered with ECT, they were able to potentiate the effect of ECT ($p < 0.05$). ECT alone increased interleukin- 1 β (IL-1 β) and the administration of ketamine, fluoxetine, lamotrigine and bupropion were able to reverse this increase ($p < 0.05$). The IL-10 was increased with fluoxetine, lamotrigine and bupropion treatments when administrated alone, fluoxetine and bupropion in combination with ECT decreased IL-10 ($p < 0.05$). In conclusion, ECT lead to an increase on oxidative damage and alter immunological system. However, when fluoxetine, ketamine, lamotrigine and bupropion were administrated alone, they were able to protect against oxidative damage and the immunological response induced by ECT.

Palavras-chaves: Electroconvulsive therapy, major depressive disorder, ketamine, oxidative stress, neuroinflammation

Agência Fomento: CNPq, FAPESC, CAPES, UNESC and Instituto Cérebro e Mente

18.039 - INFLUÊNCIA DE ENDOCANABINÓIDES E DO JEJUM EM CRISES EPILÉPTICAS INDUZIDAS FARMACOLOGICAMENTE

INFLUENCE OF FASTING AND ENDOGENOUS CANNABINOIDS ON EPILEPTIC SEIZURES

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Instituição: 1 UnB - Universidade de Brasília (Campus Universitário Darcy Ribeiro - Asa Norte, Brasília, DF.)Introdução:

Epilepsy is a chronic disease characterized by recurrent seizures of variable severity. In a preliminary study from our group, we were able to modulate seizure through fasting. Fasting reduced latency and increased intensity of behavioral seizures induced by pentylenetetrazol (PTZ) convulsant. These fasting effects were reversed by the CB1 receptors antagonist AM251. Thus, we suspect there is a cannabinoid regulation mechanism involved. Although it is exciting to relate endogenous cannabinoids to fasting effects on seizures, there is a need for more thorough evaluation of these effects both in neural and ethological aspects.

Objetivos:

The present work aims to evaluate the effects of fasting on electroencephalographic (EEG) data during pharmacologically induced epileptic seizures.

Métodos:

Behavioral and EEG data used in the present study were collected at a 2011 experiment on rats, which was approved by the Ethics Committee on Animal Use (CEUA) at the University of Brasília (UnBDoc nº 44987/2011). In brief, thirty-two Wistar rats (230g) were divided in four experimental groups and given 70mg/kg doses of PTZ convulsant (GABA A receptors blocker). For bioassays, a cannula was surgically implanted at each rat left lateral ventricle and six electrodes were placed at the coordinates: AP: +2; -2; -6mm, ML: -3mm, based on bregma. After surgery recovery, the rats were connected to a monitoring video-EEG recording system (Pinnacle Technologies). The total number of animals analysed (initially 8 animals per group) was reduced due to premature loss of some animals by surgery infections, miss-implanted cannulas and dosage errors and the remaining fourteen animals composed the groups PTZ (n=5), PTZ + Fasting (n=5), PTZ + Leptin (n=2) and PTZ + AM251 antagonist (n=2). For the current analyses, behavioral data was classified according to Racine's index (1971, modified by Pinel & Rovner at 1978) and associated to EEG recording profiles. EEG analysis was performed by visual inspection and in-house code using MATLAB and compared to behavioral classification. Latency to seizure onset as well as seizure frequency and severity were compared across treatments and between analysis methods.

Resultados e Conclusões:

Latency times for maximum behavioral crisis were significantly different among PTZ + Fasting and PTZ (control) groups, revealed by one-way ANOVA [$F(3,11) = 6,257$, $P = 0,0098$] and post-hoc T-test ($P < 0,05$). The EEG analysis showed no association with the reduced latency and increased frequency of seizures that was observed in behavioral results, perhaps due to high PTZ doses and reduced sample size. The lack of statistical significance in the EEG data will be further investigated in novel experiments. Nevertheless, fasting reduces

latency and increases intensity of behavioral seizures induced by PTZ, which may be indicative of higher susceptibility to seizures during fasting.
Palavras-chaves: Endocanabinóides, Epilepsia, Jejum, Anticonvulsivante
Agência Fomento:

18.040 - MAPEAMENTO DA ATIVIDADE METABÓLICA CEREBRAL SOB ESTRESSE AGUDO USANDO [14C] -2-DEOXI-GLICOSE: UMA COMPARAÇÃO ENTRE ESTRESSE FÍSICO, PSICOLÓGICO E MISTO

BRAIN MAPPING OF METABOLIC ACTIVITY UNDER ACUTE STRESS USING [14C]-2-DEOXY-GLUCOSE: A COMPARISON BETWEEN PHYSICAL, PSYCHOLOGICAL AND MIXED STRESSES
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Instituição: 1 USP - Universidade de São Paulo (Av. Prof. Mello Moraes 1721, São Paulo, SP, 05508-030), 2 IB - Instituto Butantan (Av. Vital Brasil, 1500 - Butantã, São Paulo - SP, 05503-900)Introdução:
Psychiatric disorders have been related to stress experiences. Stress models have been widely used for the study of psychiatric diseases but they have several limitations. These models must follow criteria of isomorphism, predictive validity and equivalence of the neurobiological bases, which are still poorly understood.
Objetivos:
This work aims to investigate the neural bases involved in different acute stress categories: physical, psychological and mixed.
Métodos:
For this, adult male Wistar rats were permanently implanted with intravenous catheters 7 days before the experimental protocols. Animals were randomly assigned to four groups (4-6 animals per group): control unstressed, forced swimming for 5 minutes, ether vapor inhalation until unconsciousness and restraint for one hour. Immediately prior to stress the animals were intravenously injected with 50 micro-Ci of [14C]-2-DG. One hour after the injection, the animals were decapitated and brains were frozen at -80°C and later sliced at 20 µm in a cryostat. Slices were exposed to autoradiographic films along with calibration standards. Regions of interest were identified based on Watson & Paxinos – 6th Ed. rat brain atlas and measured by optical densitometry using a MCID Core 7 system. Twenty three brain areas were investigated. This protocol was approved by the ethical committee of Butantan Institute (CEUAIB 1175/13).
Resultados e Conclusões:
In the restrain and ether inhalation stress groups, all the analyzed areas showed tendencies to increase the uptake of [14C]-2DG. Restraint produced increases in cortical areas: frontal cortex (FrA) 43%, cingulate cortex (Cg) 40%, prélimbico cortex (PrL) 32%, Inframalimbic cortex (IL) 29% and pyriform cortex (Pir) 39%. In the ether vapor inhalation stres, the pattern of cerebral activation was very similar to restrain group, however, a reduction in [14C]-2DG uptake was seen in frontal areas: FrA -2% and IL -3%. Contrasting to the other two stresses, forced swimming showed statistically significant reductions in [14C]-2DG uptake in almost all areas analyzed. Remarkable reductions were seen especially in the hippocampus regions CA1 -44%, CA2 -40%, CA3 -41%, molecular layer of dentate gyrus (MoDG) -40%; and granular layer of dentate gyrus (GrDG) -38% while stria terminalis menial ventral (STMV) and stria terminalis lateral ventral (STLV) showed the least reductions, -5% and -18%, respectively. These results support previous laboratory results, showing that there are different patterns of brain activation with different types of stress. As new animals are being added to our sample, the present results must be considered preliminary and may change until the end of the protocol.
Palavras-chaves: [14C]-2-Deoxy-Glucose, Animal model, Brain mapping, Stress
Agência Fomento:

18.041 - EFFECT OF FB EXTRACT ON THE BEHAVIORAL AND MEMORY IMPAIRMENTS CAUSED BY ATTENTION DEFICIT HYPERACTIVITY DISORDER IN AN ANIMAL MODEL - SPONTANEOUSLY HYPERTENSIVE RATS (SHR).

EFFECT OF FB EXTRACT ON THE BEHAVIORAL AND MEMORY IMPAIRMENTS CAUSED BY ATTENTION DEFICIT HYPERACTIVITY DISORDER IN AN ANIMAL MODEL - SPONTANEOUSLY HYPERTENSIVE RATS (SHR).
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Agronomia, Porto Alegre/RS - Brasil), 3 UFCSPA - Federal University of Health Sciences of Porto Alegre (Rua Sarmento Leite, 245 - Centro Histórico, Porto Alegre/RS - Brasil)Introdução:
Attention Deficit Hyperactivity Disorder (ADHD) is characterized by three symptoms of hyperactivity, inattention and impulsivity, which cause damage in diagnosed individuals. The conventional treatment is with methylphenidate (MPH), which, however, can cause side effects or not present effects in individuals, which justifies the search for new treatment alternatives.
Objetivos:
Objective: To investigate the potential effects of a treatment with FB extract in an animal model of ADHD (SHR).
Métodos:
Methods: Forty - two male rats, thirty - five SHR rats and seven wistar - kyoto rats were divided into six groups (n: 7), according to the treatment: 1 Kyoto - veh; 2 SHR-veh; 3 SHR MPH; 4 SHR-FB50; 5 SHR-FB100; 6 SHR-FB500. Groups 1 and 2 received saline, 3 Ritalin (2 mg / kg), 4 FB (50 mg / kg), 5 FB (100 mg / kg) and 6 FB (500 mg / kg). The treatment was for 15 days, via gavage twice a day. Subsequently, locomotion, spatial learning and spatial memory were evaluated by the Morris Water Maze (MWM) test in a black circular pool divided into four imaginary quadrants and a fixed platform in one of the quadrants. The training was five days with 8 starts to find an escape platform. On the sixth day, the platform was removed from the pool and the test was performed. In the test, the time in which the animal swam in the platform quadrant, the latency to find the platform site and the number of crossings by the quadrants was analyzed. MWM results were analyzed by one-way ANOVA, followed by Bonferroni's post hoc. Values of $P < 0.05$ were considered significant. This work was approved by the Ethics Committee on the Use of Animals of UFRGS (Nº35747 / 2018).
Resultados e Conclusões:
Results: For crosses between the quadrants in the test, group 2 had an increase in the number of crosses between the quadrants, compared to group 1 (n: 7, F: (5, 36) = 19,67, $P < 0.0001$). The rats of group 3, 5 and 6 presented a decrease in the crossing, in comparison to group 2 (n: 7; F: (5, 36) = 19,67; $P < 0.0001$; $P < 0.0001$; $P < 0, 0001$). The latency to find the platform site was higher in group 2 when compared to group 1 (n: 7, F (5, 36) = 9,245, $P = 0.0006$). The rats of groups 3, 5 and 6 found the site of the fastest platform, in comparison to group 2 (n: 7; F (5, 36) = 9,245; $P < 0.0001$; $P < 0.0001$; $P < 0.0001$). The percentage of time spent in the target quadrant (the quadrant where the platform was during training) in the test was lower in group 2 than in group 1 (n: 7; F (5, 36) = 10,66; P = 0,0002) and the rats in groups 3, 5 and 6 spent more time in the target quadrant than the rats in group 2 (n: 7, F (5, 36) = 10,66, $P < 0,0001$, P = 0,0001, $P < 0,0001$). Conclusion: Treatment with FB extracts, at doses of 100mg / kg and 500mg / kg, was effective in attenuating the memory and learning deficits observed in the animal model of ADHD.
Palavras-chaves: ADHD, natural product, memory and behavior
Agência Fomento:

18.042 - DISTÚRBIOS DE MIELINIZAÇÃO E DE OLIGODENDRÓCITOS NO CORPO CALOSO E ZONA SUBVENTRICULAR CONCOMITANTES COM ATIVAÇÃO MICROGLIAL EM UM MODELO MURINO DE DEPRESSÃO.

MYELINATION AND OLIGODENDROCYTE DISTURBANCES IN THE CORPUS CALLOSUM AND SUBVENTRICULAR ZONE CONCOMITANT WITH MICROGLIAL ACTIVATION IN A MOUSE MODEL OF DEPRESSION.
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Major depression is the most common neuropsychiatric disorder characterized by depressed mood, anhedonia, appetite and sleep disturbances, feelings of low self-esteem, guilt. The etiology of depression is multifactorial, however, unbalance of the HPA axis appears to be an important factor. Previous studies have shown alterations in hippocampal neurogenesis and myelin damage.
Objetivos:
The current study aims to evaluate the oligodendrocyte progenitors and microglia population at the subventricular zone (SVZ) and corpus callosum (cc) and myelin disturbances in a depressive-like model.
Métodos:

The paradigm of depression used in this study mimics chronic stress by administering exogenous corticosterone (0,100 mg/mL) in drinking water paired with chronic social isolation for 28 days. Then, the animals were submitted to behavioral tests for evaluation of depressive-like symptoms and cellular analysis of SVZ and corpus callosum were carried out by immunohistochemistry and electron microscopy.
Resultados e Conclusões:
We hereby demonstrated that CORTICO/ISO group (N=14) exhibited a reduction of body weight and consumption of food and water compared to vehicle (N=11). In behavioral tests, the CORTICO/ISO group showed greater immobility in the forced swim test, tail suspension test, and reduced sucrose preference, which suggests the development of a depressive-like state. In addition, our data revealed an increase in oligodendrocyte lineage cells (Olig2+) in the SVZ concomitant to a reduction of Olig2+ cells in corpus callosum of CORTICO/ISO group. Also, electron microscopy analysis showed both reduced fiber and axon areas in the corpus callosum of CORTICO/ISO group (N=3) compared to control and a tendency of myelin area reduction as well, suggesting that myelination may be compromised in the pathophysiology of major depression. Finally, we showed an increased population of microglia (Iba1+ cells) in the CORTICO/ISO group in SVZ and peri-SVZ when compared with control, which reveals a possible role of microglial cells in the disorder. Hence, we show that this model promotes consistent behavioral depressive-like symptoms. Also, we described for the first time an increase in oligodendrocyte commited cells in SVZ accompanied by a decrease within the corpus callosum with cellular and myelin disturbances. Therefore, our study unveils profound cellular changes in neuronal and nonneuronal populations in a corticosterone induced depression model which are promising therapeutic targets for the disorder.
Palavras-chaves: Corpo caloso, Depressão, Mielinização, Oligodendrócito, ZOna Subventricular
Agência Fomento: FOCEM; PRONEX-FAPERJ; INCT-NIM; CNPq

18.043 - A INDOMETACINA ENVOLVIDA NO COMPORTAMENTO TIPO ANSIEDADE

THE INDOMETHACIN INVOLVED IN THE ANXIETY-LIKE BAHAVIOR

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Instituição: 1 UFPA - Federal University of Pará (Rua Augusto Corrêa, 01), 2 NMT - Tropical Medicine Center (Av. Generalíssimo Deodoro, 92 - Umarizal)Introdução:
Anxiety disorder is characterized as an emotional anticipation in an aversive situation, that difficult to control and exacerbated way. Anti-inflammatory drugs are widely utilized for treatment of several diseases and few studies describe the effect of these drugs on the anxiety behavior. Zebrafish have emerged as a powerful model for studies related with anxiety behavior.
Objetivos:
Thus, the objective of this work is to evaluate the effect of indomethacin, a non steroidal anti-inflammatory compound, on the anxiety-like behavior.
Métodos:
The animals were divided into the following groups: control and indomethacin (2 mg / kg) and later their behavior was evaluated using the novel tank test. The following parameters were analyzed: time at the top of the apparatus, number of crossed quadrants, freezing time and erratic swimming. The test was recorded with a camera and were later analyzed in the X-Plo-Rat software. Behavioral data were analyzed by one-way ANOVA, followed by the Bonferroni test, using the software Bioestat 5.3. All experiments were performed according to ethical guidelines 213-14 CEPAE-UFPA.
Resultados e Conclusões:
The results showed that the indomethacin group promoted an anxiogenic effect in the animals, as an increase in time at the bottom of the apparatus compared to the control group ($p < 0.05$, 112.65 ± 24.871 control vs 30.014 ± 7.61 indomethacin). Regarding the analysis of the other behavioral parameters, no statistical differences were observed. Therefore, according to our data, we conclude that indomethacin enhanced the anxiety-like behavior of animals.
Palavras-chaves: anxiety, indomethacin, anti-inflammatory
Agência Fomento: CNPq

18.044 - ALTERAÇÕES COMPORTAMENTAIS E OXIDATIVAS NO CÉREBRO E INTESTINO DE RATOS SUBMETIDOS A SEPARAÇÃO MATERNA: INFLUÊNCIA DO SEXO

BEHAVIORAL AND OXIDATIVE ALTERATIONS IN THE BRAIN AND GUT OF RATS SUBMITTED TO MATERNAL SEPARATION: INFLUENCE OF SEX

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Instituição: 1 UFC - Universidade Federal do Ceará (Rua Coronel Nunes de Melo, 1000 - Rodolfo Teófilo, Fortaleza - CE, 60430-275), 2 Fiocruz Ceará - Fundação Oswaldo Cruz (R. São José, S/N - Precabura, Eusébio - CE, 61760-000)Introdução:
Early life stressful events can trigger various mental disorders, including depressive disorder. Maternal separation (MS), as one of the early developmental stressors, has been related to depression in adulthood, as well as the cause of inflammatory bowel diseases, also linked to depressive symptoms. Despite advances, the influence of sex on the neurobiology of depression is still poorly understood.
Objetivos:
Here we verified the influence of sex on behavioral and oxidative alterations in the cerebral and intestinal areas of animals exposed to MS.
Métodos:
Wistar Rats of both sexes were submitted to maternal separation or not (control) between postnatal days 1 to 15 (PN1-15). In the PN75, all animals were submitted to open field, Y maze and forced swimming tests. The brain areas pre-frontal cortex (PF), hippocampus (HP) and striatum (ST), as well as segments of the intestine duodenum (DN), jejunum (JJ) and ileum (IL) were collected for determination of GSH levels and myeloperoxidase activity (MPO). The statistical analysis was performed with two-way ANOVA followed by Tukey as post-hoc test and considered significant when $P < 0.005$. This work was approved by the Ethics Committee on Animal use of the Federal University of Ceara with protocol number N ° 84/2017.
Resultados e Conclusões:
Our results evidenced that both male and female MS animals showed increased immobility time in forced swimming test when compared to controls [$F(1, 44) = 11.90$, $P = 0.0013$], a depressive-like behavior. The vertical locomotor activity was increased in females [$F(1, 46) = 7.564$, $P = 0.0085$] and reduced in MS animals [$F(1, 46) = 5.193$, $p = 0.0274$]. We did not observe any changes in other behaviors. In the biochemical parameters we observed that MS reduced the GSH levels in all areas {PF [$F(1, 28) = 39.11$, $p < 0.0001$]; HP [$F(1, 25) = 66.63$, $p < 0.0001$]; ST [$F(1, 28) = 64.28$, $p < 0.0001$], DN [$F(1, 17) = 15.39$, $P = 0.0011$], JJ [$F(1, 19) = 22.07$, $p = 0.0002$], IL [$F(1, 18) = 5.683$, $p = 0.0283$]}, and in the brain areas hippocampus and striatum this reduction is evidenced in males {HP [$F(1, 25) = 10.89$, $P = 0.0029$]; ST [$F(1, 28) = 11.09$, $p = 0.0024$]}. MPO activity was increased in all intestinal areas and in the hippocampus of MS animals {DN [$F(1, 19) = 69.68$, $p < 0.0001$], JJ [$F(1, 19) = 88.78$, $P < 0.0001$], IL [$F(1, 19) = 25.53$, $p < 0.0001$], HP [$F(1, 26) = 9.390$, $p = 0.0050$]}, while in the striatum this increase was evidenced only in MS females [$F(1, 28) = 10.36$, $p = 0.0033$]. In conclusion, maternal separation promotes behavioral and oxidative alterations in the brain and intestine, but sex influence is evidenced only in some brain areas. This may explain the differences in prevalence and response do treatment between men and women, but it is still necessary to investigate more parameters associated with depression.
Palavras-chaves: maternal separation, depression, gender, oxidative stress, gut inflammation
Agência Fomento: CNPq, CAPES, FUNCAP

18.045 - EM UM MODELO PRÉ-CLÍNICO DE TRANSTORNO DE ESTRESSE PÓS-TRAUMÁTICO O ÁCIDO ROSMARÍNICO MELHORA O COMPORTAMENTO DE ANSIEDADE E MOSTRA PROTEÇÃO SOBRE O EIXO HIPOTALÂMICO-PITUITÁRIO-ADRENAL EM CAMUNDONGOS

IN A PRE-CLINICAL MODEL OF POSTTRAUMATIC STRESS DISORDER ROSMARINIC ACID AMELIORATES ANXIETY BEHAVIOR AND SHOWS PROTECTION ON HYPOTHALAMIC-PITUITARY-ADRENAL AXIS IN MICE

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Instituição: 1 UFES - Universidade Federal do Espírito Santo (Av. Maruípe, Vitória - ES)Introdução:
Posttraumatic stress disorder (PTSD) is one of the most prevalent and disabling psychiatric disorders developed by exposure to traumatic events such as wars, accidents, assaults, kidnackers, violations, assaults, abductions, Traffic accidents, fires, wars, sexual and/or physical violence among others.

Although most patients recover from this disorder, through psychotherapy and/or pharmacotherapy, most patients experience relapses, resistance or response refractory to treatment also due to hypothalamic-pituitary-adrenal (HPA) axis malfunction amid other dysfunctions. Among the alternative therapies, the use of medicinal plants or their derivatives had shown to be highly attractive for the treatment of several neuropathologies. On this hand, rosmarinic acid (RA) treatment has previously exhibited antioxidant, neuroprotective, and antidepressant-like effects
Objetivos:
We tested whether RA treatment has a therapeutic potential to alleviate the symptoms and biochemical alterations presented in PTSD model
Métodos:
Male adult Swiss mice (8 weeks), CEUA 18/2017, were divided in 6 groups: control + vehicle (C), PTSD + vehicle (V) and PTSD treated groups in a dose response paradigm of RA in 3 (3), 10 (100), 30 (30) and 100 mg/kg (100). Animals were exposed to an inescapable foot shock strategy in a modified step down apparatus. Behavioral experiments were performed reexposing the animals for 3 minutes to the apparatus 24 hours after the traumatic event to analyze fear and anxiety behavior using an ethogram and then let to explore for 5 minutes the elevated plus maze immediately after the reexposion. Additionally, UV-Vis HPLC analyzed the potential effect of RA in the HPA axis by quantifying corticosterone hormone in the animal´s plasma 24 and 48h after trauma. One/Two-Way ANOVA were used to statistical analyses followed by Bonferroni's post hoc
Resultados e Conclusões:
The analyses of freezing showed a significant decrease in animal´s immobility in the group treated with RA at 30 mg/kg dose [F (5, 78) = 18.36, p < 0.0001]. RA also showed anxiolytic effect in EPM, which open arms entries were reduced in groups (V), (3) and (100) compared to (C) group and group treated with RA 30 mg/kg was statistic significant higher from (V) group [F (5, 76) = 5.064, p = 0.0005], time spent in open arms followed the same profile where (30) group was different from (V) [F (5, 75) = 3.793, p = 0.0041]. The plasma corticosterone amount was significant higher 24h after trauma induction and completed reverted 14 days after trauma induction [F (2, 12) = 5.185, p = 0.0206]. The treatment with RA reduced corticosterone in the animals evaluated 24h after trauma which inhibited almost 35% against 28,78% from sertraline group [F (3, 22) = 5.93, p = 0.0040] and this prevention remained until 48h after PTSD induction, 26,63% against 26,81% from sertraline group [F (3, 24) = 5.235, p = 0.0064]. RA can be a safe alternative to treat PTSD behavioral symptoms like anxiety and corticosterone alterations on HPA axis in the PTSD model
Palavras-chaves: Transtorno de Estresse Pós-Traumático, Ácido Rosmarínico, Ansiedade, Corticosterona
Agência Fomento: CAPES, FAPES, PROAP

18.046 - INFLUÊNCIA DA MICROBIOTA INTESTINAL E DO SISTEMA SEROTONINÉRGICO NO NÚCLEO DORSAL DA RAFE NO COMPORTAMENTO RELACIONADO À ANSIEDADE EM RATOS WISTAR INDUZIDOS À OBESIDADE

INFLUENCE OF THE GUT MICROBIOME AND SEROTONERGIC SYSTEMS WITHIN THE DORSAL RAPHE NUCLEUS ON ANXIETY-LIKE BEHAVIOR OF OBESITY-INDUCED WISTAR RATS

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Overweight and obesity are a worldwide pandemic affecting billions of people. These conditions have been associated with a chronic low-grade inflammatory state that is recognized as a risk factor for a range of somatic diseases as well as neurodevelopmental disorders, anxiety disorders, trauma- and stressor-related disorders, and affective disorders. HFD intake is one of the reasons for changes in the microbiome, and increasing evidence points to appropriate diversity in the gut as essential for normal physiologic functioning of organs and the brain. An altered gut might emerge for a variety of reasons, including diet style. We previously reported that the ingestion of a high-fat diet (HFD; 45% fat kcal/g) for nine weeks was capable of inducing obesity in rats in association with increased reactivity to stress and increased anxiety-related defensive behavior.
Objetivos:

To investigated the impact of a HFD-induced obesity on gut microbial communities, serotonergic systems within the dorsal raphe nucleus and defensive behavior in rats.
Métodos:
In this study, we conducted a nine-week diet protocol to induce obesity in rats (CEUA process #048/2015, protocol #2015/16), followed by investigation of anxiety-related defensive behavioral responses using the elevated Plus-maze (EPM), light-dark chamber (LD) and open-field (OF) tests. Gene expression using in situ hybridization method was done for two genes limiters for the central production (tph2) and transporter (slc6a4) of serotonin in the dorsal raphe nucleus (DR), the median raphe nucleus, pontomesencefalic formation, and B9 serotoninergic cell group. We also characterized the HFD intake over the microbiome community, using alpha and beta diversity metrics, as well as taxonomic relative abundance of microbiome communities.
Resultados e Conclusões:
Here we demonstrated that HFD-induced obesity group showed increased abdominal fat adiposity ($p < 0.0001$) and weight gain ($p=0.0054$). We also found that obese rats showed anxiety-related defensive behavioral responses after tested in the EPM, comparing time spent in open or enclosed arms [$F(1.43) = 132.4$; $p < 0.0001$], but no difference in the LD and OF paradigm. We found that obese rats presented higher mRNA expression of tph2 [$F(1,165.3) = 19.1$; $p < 0.0001$] and slc6a4 [$F(1,157.1) = 26.4$; $p < 0.0001$], in a range of dorsal raphe and median raphe subdivision, pivotal to organize anxiety-related behavioral responses. Microbiome communities were different between CD and HFD groups after nine weeks of diet protocol, with dissimilar beta community (weighted UniFrac; $p < 0.001$), decreased complexity of alpha diversity metrics (Shannon; h-test Kruskal-Wallis; $p=0.0051$) and altered top 10 relative taxonomic abundance. These data are consistent with the hypothesis that HFD induces alteration in the neurotransmitter production in brain nuclei controlling behavioral responses to stressful stimuli and altered the microbiome composition, in part explaining the anxiety-related defensive behavioral responses in obese rats.
Palavras-chaves: Obesity, Microbiota, Anxiety, Serotonin, High-fat diet
Agência Fomento: Capes, Fapemig e CNPq

18.047 - IMPACTO DA OBESIDADE INDUZIDA PELA DIETA HIPERLIPÍDICA SOBRE O CICLO ESTRAL E COMPORTAMENTOS DEFENSIVOS EM RATAS WISTAR

IMPACT OF HIGH-FAT DIET- INDUCED OBESITY ON THE ESTROUS CYCLE AND DEFENSIVE BEHAVIOR IN FEMALE WISTAR RATS
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Instituição: 1 UFOP - Universidade Federal de Minas Gerais (Diogo de Vasconcelos, 122. Pilar - Ouro Preto Minas Gerais)Introdução:
Obesity is caused by the imbalance between the amount of calories ingested and the energetic debt. In females, hormonal cycles impact the progression of obesity. Furthermore, female hormones play an important regulatory role in behavioral responses related to the development of anxiety related behaviors
Objetivos:
To analyze the impact of a high-fat diet (HFD) induced-obesity on the estrous cycle and anxiety-related defensive behavioral responses in female Wistar rats.
Métodos:
Twenty sixt female Wistar rats (Ethical committee approval number: CEUA/UFOP-8744280818) were divided in two experimental groups: control (n= 12;11% fat kcal/g diet) and obese (n= 14;45% fat kcal/g diet). Both groups underwent a 63-day nutritional protocol. After the nutritional protocol period, animals were subjected to the elevated T-maze (ETM), light/dark box (LD) and open field (OF), behavioral tests, as well as the estrous cycle evaluation. After euthanasia, organs, tissues and blood samples were collected for further analysis.
Resultados e Conclusões:
HFD intake was able to induce visceral obesity by increasing the abdominal adipose tissue (retroperitoneal C: 1.4g ± 0.12g vs O: 2.8g ± 0.27g p= 0.0002; parametrial C: 1.7g ± 0.17g vs O: 5.9g ± 1.0g p= 0.0011 and inguinal C: 0.63g ± 0065 vs O: 1.5g ± 0.17g p=0.0002), compared to control diet intake. The ETM data suggests that obesity impaired the avoidance learning process in 3 trial exposures to the enclosed arm, with similar times to leave this arm in each attempt. Conversely, control rats showed increased latency time in avoidance 2 compared to baseline (12s ± 2.65s vs 84s ± 28.08s A p = 0.0002) and avoidance 1

(12s ± 2.65s vs 26s ± 10.85s p= 0.0025). In this sense, we observed that obese rats showed a reduction in avoidance 2 compared to control rats [C: 84s ± 28.08 vs O: 42s ± 16.81s/ F(2.48) = 8,641; p= 0.0006], suggesting an anxiolytic effect of obese animals, which may be covered by the learning impairment in obese female rats. Furthermore, we subdivided the inhibitory avoidance results accordingly to the estrous cycle of the animals, considering a low hormone phase (metestrum and diestrus) and high hormone phase (proestrus and estrus) in the test day. We found that, the impairment on the inhibitory avoidance learning process persisted in obese rats with high hormone on the day of the test, and our results showed an anxiolytic effect on avoidance 2 trial between control and obese high hormone groups (C: 104s ± 66.73s vs O: 10s ± 2.056s p = 0.0410). Regarding the LD test, we found an increase in the time spent on the light part of the chamber by the obese group (C: 106s ± 5.895 vs O: 83s ± 7.830 p = 0.0257), considered to be an anxiogenic response. Conclusion: These results reinforces the hypotheses that HFD-induced obesity, impact the physiological and metabolic parameters and the central action of the sex hormones, leading to altered anxiety-related defensive behavioral responses.
Palavras-chaves: Obesidade, Fêmeas, Comportamento
Agência Fomento: Fapemig, Prop, Ufop, Capes e CNPq

18.048 - ALTERAÇÕES NO METABOLISMO DE UM CARBONO EM OLIGODENDRÓCITOS E POSSÍVEIS IMPLICAÇÕES NA ESQUIZOFRENIA

ONE-CARBON METABOLISM ALTERATIONS ON OLIGODENDROCYTES AND POSSIBLE IMPLICATIONS IN SCHIZOPHRENIA
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Instituição: 1 Unicamp - University of Campinas (Laboratory of Neuroproteomics, Institute of Biology)Introdução:
Schizophrenia is a serious psychiatric disorder involving genetic and environmental factors and affects more than 23 million individuals worldwide. Initials symptoms usually occur in early adulthood and are categorized into positive, negative, and cognitive symptoms. Several explanations for the pathophysiology of schizophrenia have been proposed, such as the dopaminergic and glutamatergic hypotheses as well as the neurodevelopmental hypothesis. There is also evidence that dysfunctions in the white matter, including changes in oligodendrocyte function, may be associated to the development of neurocognitive symptoms. In addition, it is known that patients with schizophrenia often present increased levels of homocysteine and a deficiency of folate and vitamins B6 and B12, as well as reduced levels of glutathione, an important cellular antioxidant. These alterations are associated with the development of an oxidative dysregulation as well as an inflammatory state, which may impair oligodendrocytes functioning.
Objetivos:
In this context, the present study aims to treat a cell lineage of human oligodendrocytes (MO3.13) with compounds related to one-carbon metabolism, including homocysteine, cofactors of the cycle, and N-acetylcysteine, a precursor in glutathione synthesis, to investigate possible related alterations with oligodendrocyte function.
Métodos:
To do so, reactive oxygen species assays will be carried out to evaluate the adverse effects of homocysteine and the potential protective role of cofactors in the oligodendrocytes. Furthermore, proteomic analyses of the cells will be performed after the different treatments by two-dimensional nano-liquid chromatography coupled with ultra-high-resolution mass spectrometry. This will identify changes that may be related to one-carbon metabolism and oxidative processes.
Resultados e Conclusões:
Currently, the dosage of each compound and the duration of treatments are being established by cell viability assays. A proteomic analysis of MO3.3 treated with N-acetylcysteine has already been carried out and identified differentially expressed proteins associated with its antioxidant activity and with one-carbon metabolism, including glutathione-S transferase P. Thus, this work aims to investigate the alterations linked with one-carbon metabolism in oligodendrocytes, investigating possible implications in the context of the pathophysiology of schizophrenia.
Palavras-chaves: myelination, B vitamins, methylation
Agência Fomento: FAPESP processo 2018/25439-9

18.049 - PREDIÇÃO DE SINTOMAS DO TRANSTORNO DE ESTRESSE PÓS-TRAUMÁTICO A PARTIR DE PADRÕES MULTIVARIADOS DE SINAIS FISIOLÓGICOS PARA IMAGENS DE AMEAÇA EM ESTUDANTES: UMA ABORDAGEM DE APRENDIZADO DE MÁQUINA

PREDICTING POSTTRAUMATIC STRESS SYMPTOMS FROM MULTIVARIATE PATTERNS OF PHYSIOLOGICAL SIGNALS TO THREAT PICTURES IN STUDENTS: A MACHINE LEARNING APPROACH

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Instituição: 1 UFF - Universidade Federal Fluminense (Hernani Pires de Melo 101), 2 UFRJ - Universidade Federal do Rio de Janeiro (IBCCF/CCS/BLOCO G/UFRJ ILHA DO FUNDAO), 3 UFF - Universidade Federal Fluminense (Passo da Pátria 156)Introdução:
Identify biomarkers reflecting pathophysiological processes associated with PTSS (posttraumatic stress symptoms) has the potential to provide targets that can guide psychiatry diagnosis, progression and treatment choice. Machine learning, a subfield of artificial intelligence, represents a powerful tool in the search for psychiatric biomarkers and have been increasingly used to identify patterns in neuroimaging data. However, the combination of machine learning approaches and physiological signals to predict psychiatry scores on a given dimension remains unrealized.
Objetivos:
We aimed to use electrocardiographic recordings (ECG) and skin conductance response (SCR) to determine whether physiological signals induced by negative images could accurately predict individual-level PTSS in a sample of healthy students.
Métodos:
A sample of fifty-five students (M= 20.7, s.d.=2.7 years; 18 males) were exposed to a 64 pictures of each category: (1) threat stimuli directed towards the participant; (2) threat stimuli directed away from the participant; (3) neutral stimuli directed towards the participant; and (4) neutral stimuli directed away from the participant. The experimental session consisted of two blocks and each trial began with a fixation cross (6–8 s), which was followed by a picture presented for 6 s. The SCR and ECG were collected during exposure to pictures. For each participant, heart rate changes and skin responses to the four categories defined the spatial patterns used as input to the regression model. Participants filled a psychometric instrument to evaluate the severity of PTSS (Posttraumatic Stress Disorder Checklist, PCL). We trained a machine learning regression model to predict the PTSS score based on psychophysiological signals. Pattern regression analyses consisted of Relevance Vector Regression and five-fold cross-validation strategy implemented in the Pattern Recognition for Neuroimaging toolbox (PRoNTo). Decoded and actual PTSS scores were compared using Pearson's correlation coefficient (r) and normalized mean squared error (MSE) to evaluate the models. Permutation test was applied to estimate significance levels. The study was approved by the Research Ethics Committee of number CAAE 0164025800009.
Resultados e Conclusões:
The machine learning regression model was able to predict PTSS from the multivariate patterns of physiological signals with a significance above chance. The r and the normalized MSE between predicted and actual PCL were 0.30 (p=0.04) and 0.88 (p=0.03), respectively. Heart rate changes that occurred while viewing threat directed toward the participants have the highest contribution to the pattern regression model.These results suggest, for the first time, that the combination of pattern regression models and physiological measures can help to predict the severity of PTSS in students. From a public health perspective, compared to the neuroimaging data, collection of SCR and ECG is cost-effective.
Palavras-chaves: Machine Learning, Physiological Signals , PTSD
Agência Fomento: CAPES, FAPERJ, CNPq

18.050 - PROTEOMIC EFFECT OF CUPRIZONE ON MO3.13 OLIGODENDROCYTES AND POTENTIAL IMPLICATIONS IN SCHIZOPHRENIA

PROTEOMIC EFFECT OF CUPRIZONE ON MO3.13 OLIGODENDROCYTES AND POTENTIAL IMPLICATIONS IN SCHIZOPHRENIA

Autores: Ana Caroline Brambilla Falvella 1, Danielle Gouvêa Junqueira 1, Valéria de Almeida 1, Daniel Martins de Souza 1
Instituição: 1 Unicamp - Universidade Estadual de Campinas (Cidade Universitária Zeferino Vaz - Barão Geraldo, Campinas.)Introdução:
Disturbances in oligodendrocytes and myelin integrity are observed in several mental illnesses, such as schizophrenia. In this context, toxic models of demyelination are used to understand the mechanisms involved in demyelination, remyelination, and alterations in the biochemistry of oligodendrocyte.
Objetivos:

Considering that proteomic approaches are important for the understanding of processes involved in neurological disorders, here we aim to investigate proteins and pathways involved in demyelination, remyelination, and the proliferation of oligodendrocytes in the cuprizone-induced demyelination model in a cell lineage of oligodendrocytes (MO3.13).
Métodos:
Initially, cell viability was evaluated with the MTT and calcein assays, in which oligodendrocytes were treated with increasing concentrations of cuprizone (500µM, 1000µM, 2000µM, or 3000µM) for 18 and 24 hours. Results indicated that only oligodendrocytes administrated with 1000µM, 2000µM or 3000µM of cuprizone in 24 hours were significantly differentiated between the control condition (ANOVA < 0.005). With these results, the oligodendrocytes treated with 1000µM and 3000µM of cuprizone had their proteomic analyzed. Extracted proteins were digested, and peptides were injected in a two-dimensional nano-chromatography system coupled with ultra high resolution mass spectrometry (2DLC-UDMSe).
Resultados e Conclusões:
We identified alterated pathways that could be explained by cuprizone-toxicity, such as the deregulation of NAD+, ATP, and GTP binding. Furthermore, a downregulation was observed in proteins related to amino acid and lipid metabolism, for instance, mitochondrial beta-oxidation, amino-acid biosynthesis, and homocysteine biosynthesis. As mentioned above, these results indicated a perturbation in energy generation in oligodendrocytes that were treated with 1000µM or 3000µM of cuprizone for 24 hours. Our results suggest that the disturbances in mitochondrial function can be correlated with cuprizone-toxicity; and this model can be used to study potential neuroprotective drugs and their implications for understanding the pathophysiology of schizophrenia.
Palavras-chaves: Cuprizone, Oligodendrocytes, Proteomics, Schizophrenia
Agência Fomento: FAPESP

18.051 - MAUS TRATOS NA INFÂNCIA PREDIZEM A GRAVIDADE DOS SINTOMAS DE TRANSTORNO DE ESTRESSE PÓS-TRAUMÁTICO (TEPT): O PAPEL DA REVITIMIZAÇÃO

CHILDHOOD MALTREATMENT PREDICTS THE SEVERITY OF POSTTRAUMATIC STRESS DISORDER (PTSD) SYMPTOMS: THE ROLE OF REVICTIMIZATION
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Instituição: 1 UFF - Universidade Federal Fluminense (Rua Prof. Hernani Pires de Melo, 101, São Domingos, Niterói - RJ)Introdução:
Childhood is a life stage in which an individual can be more vulnerable to stressful experiences. Frequently, children are exposed to different types of abuse (physical, emotional and sexual) and neglect (physical and emotional). Indeed, literature has consistently shown the long-term consequences of childhood maltreatment (CM), as impairing not only physical, but also emotional and psychological health, including important social aftermaths. The Posttraumatic Stress Disorder (PTSD) is one of the most debilitating disorders that can emerge as consequence of such kind of experience.
Objetivos:
The present study aims to investigate the effects of different forms of CM in the prediction of PTSD severity in a revictimized sample of college students.
Métodos:
499 graduate and undergraduate students of the Fluminense Federal University and Federal University of Rio de Janeiro answered a protocol with scales encompassing the investigation of traumatic events in childhood (Childhood Trauma Questionnaire - CTQ), during lifetime (Trauma History Questionnaire - THQ) and PTSD symptoms (Posttraumatic Stress Disorder Checklist 5 – PCL-5). Inclusion criteria was having more than 18 years. Exclusion criteria were applied to participants who did not fully complete questionnaire battery, those who did not presented a subsequent traumatic event in THQ after 12 years-old, and those who did not meet criterion A for PTSD according to Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition - DSM-5 - (the person must be threatened or exposed to death, serious injury, or sexual violence). Final sample comprised 255 participants (82.4% female, mean age = 21.3; Standard Deviation(SD)=2.59). Five individual Negative Binomial Regressions between each CM and PTSD symptoms were performed. A unique regression model was performed to assess the contribution of each of CM subtype in the prediction of PTSD symptoms. All regressions were adjusted for intensity of the worst

traumatic event. This project was approved by Local Ethics Committee number 56431116.5.0000.5263.
Resultados e Conclusões:
When analysed individually, all types of childhood maltreatment were associated with higher PSTD symptoms ($p < 0.01$ for all analysis). However, when a unique model was performed, only emotional ($p < 0.000$; Confidence Interval(CI) [1.41-2.24]) and sexual abuse ($p < 0.00$; CI [1.15-2.12]) showed a significant impact on PTSD symptoms severity scores.Our data suggest that the presence of childhood maltreatment, especially emotional and sexual abuse could represent a vulnerability factor of PTSD symptom severity.
Palavras-chaves: Childhood maltreatment, Revictimization, Posttraumatic stress disorder, Trauma
Agência Fomento: CAPES, CNPq e FAPERJ

18.052 - EFEITOS DE CAFEÍNA E ETANOL SOB O COMPORTAMENTO DE LARVAS DE ZEBRAFISH NO LABIRINTO EM CRUZ COM RAMPA

EFFECTS OF CAFFEINE AND ETHANOL IN THE BEHAVIOR OF ZEBRAFISH LARVAE IN THE PLUS MAZE WITH RAMP
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Instituição: 1 UFMG - Universidade Federal de Minas Gerais (Núcleo de Neurociências, ICB/Campus Pampulha, Belo Horizonte/MG), 2 IFPA - Instituto Federal do Pará (Laboratório de Neuroquímica e Comportamento, IFPA Tucuruí), 3 UFPA - Universidade Federal do Pará (Laboratório de Neurociências e Comportamento, NTPC, UFPA Belém)Introdução:
The plus maze with ramp (PMR) represents na aquatic model for the study of anxiety in fishes, having beenin spired by the elevated plus maze (EPM).In the PMR, the flat arms are equivalent to the closed arms of the EPM, and the with ramp arms (PMR) resemble the open arms of the EPM.For guppies and zebrafish, the anxious response is evident and consistent.However, PMR has so farbeen used only for adult subjects.
Objetivos:
Considering that larvae have the potential to contribute to animal development research in different approaches, the present study aimed to verify the acute effect of drugs on the behavior of zebrafish larvae exposed to PMR.
Métodos:
We used 175 larvae of zebrafish (Daniorerio, n=25), obtained in our biotery, with 14dpf. The animals were exposed to a cute doses of caffeine (100, 500 and 1000 µM) and ethanol (0.5, 1.0 and 2.0%). This doses are effective to adults of zebrafish.The drugs were dissolved in water and the exposure time was 5 minutes.The control group was exposed only to water from the aquariums system. After exposure the animals were tested in the PMR.Previous study in our laboratory determined the sensitivity of zebrafish larvae to PMR in sessions of 5 minutes and 1.2cm water column. The arms for PMR had 1cm of length and 1cm of width. The arms with ramp, opposite each other, had a ramp that rose from the center to the end of the arm, where it reached the height of 1cm. We measured: a) total time in the compartments (center, flat arms and arms with ramp); b) number of entrances (flat arms and arms with ramp). ANOVA (post-test: Tukey) was used and $p \leq 0.05$ was considered.
Resultados e Conclusões:
In animals exposed to caffeine, no statistically significant difference was found between compartment well times.Differences were found only in the numbers of entries in the arms. In the entries in the flat arms, the control group (6.50±4.98) differed from the 1000 µM group (2.58±2.47, p=0.041).For the with ramp arms, the control group (7.67±4.46) differed from the groups 100 µM (4±3.41, p=0.030), 500 µM (3.50±2.43, p=0.011) and 1000 µM (2.17±1.27, p=0.001).For the total entries, the statistical difference was between control (14.17±12.36) and 500 µM (6.42±6.04, p=0.010) and 1000 µM (4.75±4.25, p=0.001).For animals exposed to ethanol, again differences were found only for the number of entries. For the entries in the with ramp arms, the control group differed from that exposed to 2% ethanol (15.08±14.21, p=0.043).For the total entries, the control group also differed from the 2% group (21.33±19.65, p=0.039).The results showed that the larvae of zebrafish exposed to PMR and treated with caffeine show reduced locomotor activity, with possible anxiogenic effect, while those exposed to ethanol show increased locomotor activity, with a potential anxiolytic effect at the dose of 2%.
Palavras-chaves: caffeine, zebrafish, larvae, plus maze with ramp, ethanol
Agência Fomento: CAPES

18.053 - EFEITOS DA CETAMINA E MK-801 SOBRE ALTERAÇÕES SENSORIAIS NA ILUSÃO DE MÜLLER-LYER EM PRIMATAS NÃO HUMANOS: VIAS CEREBRAIS DIFERENTES DE AÇÃO?

EFFECTS OF KETAMINE AND MK-801 ON SENSORY CHANGES IN MÜLLER-LYER ILLUSION IN NONHUMAN PRIMATES: DIFFERENT BRAIN ROUTES OF ACTION?

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Instituição: 1 UnB - University of Brasilia (Campus Darcy Ribeiro, Brasília, DF, Brasil CEP 70904-970)Introdução:

Schizophrenia is a psychopathology that affects 1% of the world population. Its etiology is multifactorial and not yet fully understood. Among the explanatory hypotheses, the glutamatergic hypothesis which consists in a glutamate N-methyl-D-aspartate (NMDA) receptor hypofunction is associated with negative, positive and cognitive symptoms of the disorder.

Objetivos:

The present study evaluated the effects of NMDA receptor antagonism on the Muller-Lyer illusion test in capuchin monkeys (Sapajus spp.)

Métodos:

The study was divided into three phases: 1) training - consisted in gradual difficulty stages, where the animal reacted to touch a single stimulus (straight line) by touching a monitor screen where straight lines were randomly showed on the bottom or top of the screen; 2) PSE determination - identify and touch the smallest stimulus; 3) Test - Finally, phases three and four had convergent and divergent arrows, the third with arrows of the same direction and the fourth with arrows in opposite directions, composed by the illusion pair and the control pair (without illusion). From Step 4 of the training stimuli, the Point of Subjective Equality (PSE) of the illusion for each subject was determined. The PSE is defined as the minimum difference in length of the two lines from which the individual can no longer differentiate the largest and smallest between the lines. Once PSE was determined, the performance of the subjects after ketamine administration (KET; 0.3mg / kg, i.m.) and MK-801 (MK; 5.6 µg / kg, i.m.) was analyzed. Protocol number of the ethics committee for animal use (CEUA-UnB 34/2019).

Resultados e Conclusões:

There was a difference between the PSE of lines without arrows and with arrows ($p = 0.0206$; $t = 3.337$; $df = 5$). Acute administration of MK and KET did not alter performance regardless of the context of arrows ($p = 0.2398$). The present results indicate that it was possible to replicate the illusion effect of non-human primates (Sapajus spp.) And that acute administration of NMDA-type channel blockers does not alter performance in the illusion task.

Palavras-chaves: Schizophrenia, Ketamine, MK-801, NMDA, Müller- Lyer Illusion

Agência Fomento: CNPq

18.054 - EFEITOS DA EXPOSIÇÃO DAS ESPÉCIES ENFERMEIRINHA (Aphyocharax anisitsi) E MATO GROSSO (Hyphessobrycon eques) EM DIFERENTES MODELOS EXPERIMENTAIS DE ANSIEDADE

EXPOSURE EFFECTS OF SPECIES ENFERMEIRINHA (Aphyocharax anisitsi) AND MATO GROSSO (Hyphessobrycon eques) IN DIFFERENT ANXIETY EXPERIMENTAL MODELS

Autores: ANA CLARA ALMEIDA SILVA 1, THIAGO MARQUES DE BRITO 1

Instituição: 1 UFMT - UNIVERSIDADE FEDERAL DE MATO GROSSO (Av. Fernando Corrêa da Costa, 2367 - Boa Esperança, Cuiabá - MT, 78060-900)Introdução:

Anxiety, fear and panic are defensive reactions that activates different neural substrates and symptoms. The study of nonhuman animals behavior helps to understand the pathologies in humans, since experimental models allow to clarify a complex reality in a simpler way (EGAN ET AL., 2009; MAXIMINO ET AL., 2009).

Objetivos:

Behavior evaluation of Enfermeirinha (ENF)-Aphyocharax anisitsi and Mato Grosso (MT)-Hyphessobrycon eques in experimental models of anxiety, identifying ecological and ethological differences that impact in anxiety like behaviors when they are compared with Zebrafish (ZF)-Danio rerio.

Métodos:

Subjects: 40 ZF, 40 ENF and 30 MT, adults, undetermined sex. They were kept in water house system, with controlled lighting (12h/12h), pH between 7 and 8, alkalinity between 50-150mg $CaCO^3$/L, water hardness above 75mg/L, salinity around 0.5-2 g/L, nitrogen compounds levels below 0.02 mg/L and water temperature between 25ºC and 27ºC. They were fed with food for ornamental fish once a day in the morning. Equipments: Light/dark aquarium: The aquarium (10x15x45cm) was divided into equal compartments, half white, half black and one central (5x10x15cm), delimited by two containment doors. Open field: A trapezoidal tank (15.2x27.9x22.5x7.1cm) used in: Novel Tank and Anxiety Evoked by the Substance Alarm (CAS). Procedures: In all tests the

animals were individually placed in the apparatus. Light/Dark Test: 15mi of testing: 5min of habituation and 10min for free exploration. The frequency and total time of crossing, freezing, erratic swimming and tigmotaxis in each compartment were analyzed. New Tank Test: The animals explored the aquarium freely for 6min. CAS test: After injecting 5 mlof distilled water (control group) or 5ml of CAS produced with co-specific animals skin, the animals explored the aquarium freely for 6min. Novel Tank and CAS allowed to measure the frequency and total time of crossings, freezes, erratic swimming at the top and bottom, and geotaxis.
Resultados e Conclusões:
Results: Light/Dark: Mann-Whitney U test indicated that ZF spent more time exploring the dark compartment than the ENF (U[18]=33,000, p=0,212). Wilcoxon signed rank test showed that ENF spent more time exploring the dark side (W[18]=51,000, p=0,006) and Student's T-Test indicated the same results for ZF (t[18]=-4.407 , p=0,002). Novel Tank: MT spent more time exploring the bottom (W[18]=55,000, p=0,002). The same results were found for ZF (t[18]=-62,275, p= < 0,001) and ENF (t[18]=-9.327, p= < 0,001). CAS: There are differences in total time spent at the top and bottom of MT control group (W[18]=55,000, p=0,002) and CAS group (W[18]=55,000, p=0,002). The same results were found for ENF control group (t[18]=-3.496, p=0,007) and CAS group (t[18]=- 3,439, p=0,007). The same results were found for ZF control group (W[18]=55,000, p=0,002) and CAS group (t[18]=-174,316, p= < 0,001). Conclusion: ENF is the species that most resembles the literature ZF and MT is the one that most closely resembles the ZF used.
Palavras-chaves: ANXIETY, EXPERIMENTAL MODELS, PSYCHOPATHOLOGY, ZEBRAFISH
Agência Fomento:

18.055 - AVALIAÇÃO COMPORTAMENTAL DE MULHERES SUBMETIDAS A CIRURGIA BARIÁTRICA

BEHAVIORAL EVALUATION OF WOMEN SUBMITTED TO BARIATRIC SURGERY
Autores: ANDRE LUIZ LACERDA SOUZA 1, GABRIELA GUERRA LEAL DE SOUZA 1
Instituição: 1 UFOP - Universidade Federal de Ouro Preto (Morro do Cruzeiro - Ouro Preto - MG - 35400-000)Introdução:
Overweight and obesity have grown exponentially becoming a public health problem.
Objetivos:
To evaluate the effect of anxiety and depression in fast weight loss in women over 120 days after bariatric surgery. M
Métodos:
Non-probabilistic, intentional sample composed by patients of a clinic in the city of Montes Claros, MG(20 women with a mean age of 35.07 ± 5.62 years). The mean pre-surgery weight was 118.10 ± 12.30 kg and mean body mass index was 45.90 ± 6.19 kg / m². The study was approved by the Ethics Committee of UFOP under the number CAAE: 80680517.9.0000.5150. All volunteers read and signed the Free and Informed Consent Form. The symptoms of depression and anxiety were measured through the Beck Inventory, Depression (BDI) and Anxiety (BAI). Besides that, weight and height were assessed to extracted the body mass index (BMI). All data were collected before the surgery, and 30, 60, 90 and 120 days after the surgery. Data were analyzed using statistical software SPSS version 20 and considered a level of significance of 0.05. For the variables with normal distribution, the ANOVA test of repeated measures was used for statistical treatment, whereas the variable that had the normality hypothesis rejected was used the Friedman test.
Resultados e Conclusões:
Results: There was a reduction in all variables over time during the 120 days after surgery: depression symptoms (Time 0 = 12.55 ± 1.217, 30 days = 8.40 ±, 972, 60 days = 8.55 ± 1.00, 90 days = 6.90 ± 0.814 and 120 days = 6.7 ± 1.20 [F (2.21; 41.94) = 8.762; p < 0.001]), weight (Time 0 = 118.10 ± 12.30, 30 days 106.58 ± 10.85, 60 days = 101.50 ± 10.39, 90 days = 97.84 ± 9.81, 120 days = 93.70 ± 10.03 [F (1.651; 31.364) = 396.99 p < 0.001]), BMI (Time 0 = 45.90 ± 4.41, 30 days 41.21 ± 3.98, 60 days = 39.27 ± 4.02, 90 days = 37.85 ± 3.63, 120 days = 36.32 ± 3.73 [F (1.712; 32.519) = 404.409 p < 0.001]) And anxiety symptoms (Time 0 = 11.30 ± 1.45, 30 days 7.20 ± 1.27, 60 days = 7.05 ± 1.17, 90 days = 5.60 ± 0.96, 120 days = 4.2 ± 0.69, (X^2 (4) = 27.108, p < 0.000)). Conclusion: As expected, women submitted to bariatric surgery showed reduction in weight and BMI over 120 days. More importantly, they presented reduction in anxiety and depression symptoms. Taken together this suggests that bariatric surgery contribute to improve physical and mental health.
Palavras-chaves: Anxiety, Depression, Bariatric Surgery
Agência Fomento:

18.056 - PREJUÍZO DAS FUNÇÕES EXECUTIVAS EM PACIENTES COM TRANSTORNO DE ANSIEDADE GENERALIZADA

IMPAIRMENT OF EXECUTIVE FUNCTIONS IN PATIENTS WITH GENERALIZED ANXIETY DISORDER

Autores: Gabrieli Armagni 1, Maria Beatriz Souza 1, Gabriel Klaus 1, Samuel Augusto Aurelio 1, Felipe Rodrigues 1
Instituição: 1 Unoeste - Universidade do Oeste Paulista (Presidente Prudente-SP)Introdução:
Generalized Anxiety Disorder (GAD) affects individuals of all ages, causing physical and cognitive impairment, thus reducing their quality of life. The evaluation of the cognitive capacity of patients with GAD is an important tool when trying to understand the damages that this disorder brings to the individual.
Objetivos:
The present study aimed to understand if there are losses or alterations in cognitive functions, mainly executive ones of these individuals.
Métodos:
This study was registered and approved by the National Research Ethics Committee under CAAE number 89236818.7.0000.5515. Twenty-one subjects, both men and women patients from ambulatory care at a tertiary hospital in the Western São Paulo, underwent a 2-back test to assess operational memory performance and a Stroop Task to assess inhibitory control, comprising a TAG Group (n = 11) and a Control Group (n = 10). Test protocols were developed on Psychopy software. Analysis of variance for repetitive measures (ANOVA) were used to compare the mean reaction times and the mean percentage of errors in the 2-back test, with Group and Blocks as factors, and, in the Stroop test, Group, Blocks and Condition (Congruent or Incongruent) as factors.
Resultados e Conclusões:
The results showed important differences in the performance of patients with GAD, who exhibited equivalent reaction times (RT) performance in the 2-back test, but with a greater number of errors. The ANOVA for reaction times showed significant difference for Block ($F_{7,133}=3,199$, $p=0.004$), a significant effect for the interaction between Block and Group ($F_{7,133}=2,695$, $p=0,012$) and no significant difference between groups ($F_{1.19}=0.069$, $p=0.795$). The ANOVA for the percentage of errors in the 2-back test showed a significant effect for the Blocks ($F_{7,133}=5.426$ $p < 0.001$) and a close to significant difference between the groups ($F_{1,19}=3.576$, $p=0.074$). At the Stroop task they are consistently slower than the Control Group, for the equivalent number of errors. The ANOVA for reaction times showed a significant effect for Condition ($F_{1,19}=11,754$, $p=0.003$), for Block ($F_{7,133}=7,606$, $p < 0.001$) and between Groups ($F_{1,19}=4,370$, $p=0,050$). The ANOVA for the percentage of errors in the Stroop Test reveals a significant difference only for Block ($F_{7,133}=2,254$, $p=0,034$). Taken together, these data point to significant prejudice of Executive Functions in GAD, even within a limited sample of subjects.
Palavras-chaves: Executive Function, Psychophysics, Stroop test, Anxiety Disorders
Agência Fomento: Unoeste

19. Neurociências Teórica e Computacional

19.001 - MODULAÇÃO DIFERENCIAL DAS OSCILAÇÕES DELTA DE CA1 E DG EM RESPOSTA À ADMINISTRAÇÃO SISTÊMICA DE CETAMINA ANTAGONISTA NMDAR

DIFFERENTIAL MODULATION OF CA1 AND DG DELTA OSCILLATIONS IN RESPONSE TO SYSTEMIC ADMINISTRATION OF NMDAR ANTAGONIST KETAMINE

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Instituição: 1 UFRN - Universidade Federal do Rio Grande do Norte (Av. Sen. Salgado Filho, 3000 - Candelária, Natal - RN, 59064-741), 2 UNB - Universidade de Brasília (Campus Universitário Darcy Ribeiro, Brasília-DF - CEP 70910-900)Introdução:
The investigation of intracerebral oscillatory activity generated by populations of neurons have provided advances in our understanding of brain function in normal and pathological conditions. Recent reports have used systemic administration of the NMDA receptor antagonist ketamine as an animal model to study Schizophrenia. These studies revealed the disturbance of normal oscillatory activity in many brain areas like the thalamus and prefrontal cortex, and also in the hippocampus. For instance, the amplitude of low-frequency oscillations in the delta band (1-4 Hz) increases in the hippocampus. However, it is still unclear whether specific subareas of the hippocampus are equally affected.
Objetivos:
Our aim was to investigate the amplitude modulation of delta oscillation in CA1 and Dentate Gyrus (DG) of the rat hippocampus in response to the systemic

administration of saline and three subanesthetic doses of ketamine (25 mg/kg, 50 mg/kg e 75 mg/kg).
Métodos:
Here we analyzed a dataset previously collected by our group. Four male wistar rats (2-3 months old) were chronically implanted with a bundle of eight electrodes vertically distributed for the recording of the laminar profile of the dorsal left hippocampus. One week after surgery, animals their behavior and local field potentials recorded while explored a rectangular open field where they received on three consecutive days saline, 60 minutes followed by 25, 50 or 75 mg/Kg. We then used MATLAB to perform power spectral density analysis of the local field potentials from CA1 and DG. The power of delta oscillation was measured within ten minutes after saline and ketamine injection only in moments when the animal's locomotion speed was less than 5 cm/s. We firstly compared delta band power between saline and ketamine, and then compared delta band power between CA1 and DG directly. We used Student's T-test to verify statistical differences with $p < 0.05$.
Resultados e Conclusões:
We found no significant differences between saline and ketamine doses of 25 and 50 mg/Kg in both subregions. Under the dose of 75 mg/Kg we found a significant increase in delta power from saline to ketamine moments for subregion CA1 ($p=0.0286$), whereas DG did not present significant differences. Direct comparison of delta power among CA1 and DG electrodes showed no statistical difference. Our results suggest that the CA1 delta oscillations are modulated by NMDAr antagonist ketamine in a dose-dependent manner. In addition, at least under the doses investigated here, ketamine significantly affects delta power in CA1 but leaves the DG unaffected. These findings suggest that differential responses of delta oscillations in hippocampal subregions may underlie an animal model of Schizophrenia.
Palavras-chaves: Hippocampus , Ketamine, Delta oscillations
Agência Fomento: CNPq

19.002 - ANÁLISE COMPORTAMENTAL EM APARATOS DE ÁREA QUADRANGULAR UTILIZANDO TÉCNICAS COMPUTACIONAIS INTELIGENTES.

BEHAVIORAL ANALYSIS IN QUADRANGULAR AREA DEVICES USING INTELLIGENT COMPUTATIONAL TECHNIQUES.

Autores: Paula Santos 1, Rafael Bonuti 1, Irio Musskopf 1, Silvio Morato 1
Instituição: 1 USP - Universidade de São Paulo (Av Bandeirantes, 3900)Introdução:
O comportamento animal é estudado por vários ramos da ciência, principalmente quanto à sociabilidade, emotividade e respostas medicamentosas. No entanto, várias são as formas de observação, e em geral, realizadas pela análise do movimento, emissão de sons entre outros. O registro preciso e a análise do movimento realizado em resposta ao estímulo oferecido torna-se difícil, particularmente se fatores como a luz, que pode dificultar na detecção do animal e mudanças abruptas na forma (levantar e abaixar) que são informações essenciais no registro. Embora, existam alguns softwares que realizam o monitoramento do comportamento animal, entre eles o Ethovision da Noldus (Noldus et al., 2002) e o X-Plot-Rat 2005 (Morato et al, 2006), PluzMZ e o OPenFLD, tais softwares apresentam alto custo, ou quando gratuitos, suas funcionalidades são limitadas e subordinadas a comandos manuais.
Objetivos:
Desenvolvimento de um software (X-PlorAll), para realizar o rastreamento e classificação de comportamento por meio de técnicas inteligentes computacionais em aparatos quadrangulares de animais (ratos, camundongos, cobaias, peixes) para análise comportamental.O estado da arte é implementar e avaliar um novo atributo (Minimum Description Length) dentro da rede neural convolucional (CNN), para auxiliar o problema fundamental e recorrente de detecção de contorno individual , subsequentemente, utilizamos uma Rede Neural para classificação de comportamentos como: auto-limpeza, rastreamento, levantar, abaixar, mergulho e cabeça para fora do aparato.
Métodos:
Foram utilizados 500 vídeos de ratos, 200 vídeos de camundongos e 150 vídeos de peixe (zebrafish), realizados em teste como: claro/escuro, campo aberto, labirinto elevado em cruz , sendo que estes dois últimos testes são realizados em camundongos e ratos. Utilizamos o atributo inicial MDL para melhor representação do objeto no vídeo com o menor número de pontos, associada a uma rede profunda multi-escala que com uma sub-rede bifurcada conectada.
Resultados e Conclusões:
A Rede Neural apresentou uma acurácia de ~ 98%; no entanto, essa precisão é fortemente ponderada pelo

fato de que classificamos " auto-limpeza, mergulho, levantar, abaixar e cabeça para fora" corretamente em 98% do tempo. Para entender o desempenho do nosso modelo em um nível mais profundo, calculamos a sensibilidade e a especificidade. A sensibilidade mede a proporção dos verdadeiros positivos que também foram preditos como positivos (95,03%). Por outro lado, a especificidade mede nossos verdadeiros negativos (84,70%). Ao final desenvolvemos o X-PlorAll , um software para analisar de forma automática a classificação do comportamento animal, tempo de rastreamento em diferentes regiões do aparato e tempo e a latência, na qual cada comportamento foi realizado.

Palavras-chaves: Comportamento animal, Processamento de imagens, Redes Neurais , Software para análise comportamental
Agência Fomento:

19.003 - DISPOSITIVO INTELIGENTE PARA TREINAMENTO MUSCULAR EM INDIVÍDUOS ACOMETIDOS POR NEUROPATIAS

SMART DEVICE FOR MUSCULAR TRAINING IN INDIVIDUALS AFFECTED BY NEUROPATHIES

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Instituição: 1 UFPA - Universidade Federal do Pará (Rua Augusto Corrêa, 1 - Guamá, Belém - PA, CEP: 66075-110)Introdução:
Peripheral neuropathy is a neurological disorder, which may affect one or several peripheral nerves, causing loss of sensation, weakness and muscular atrophy, as well as symptoms like pain, tingling and burning. This project presents a new device for training and strengthening muscles.
Objetivos:
Creation and evaluation test of a device for training and strengthening muscles.
Métodos:
In this first phase of the research, healthy individuals aged 18 to 30 years were divided into two groups. The control group (n=20) using the Digiflex device and the experimental group (n=17) using the smart device composed of hardware and software. Subgroups were divided according to gender and hand. For intragroup analysis, the paired T test and the Wilcoxon test were used; and for unpaired intergroup T test. The results were expressed by arithmetic mean, standard deviation and median, with statistical significance of P ≤0.05. The second phase will be the utilization on people with neuropathies. The project was approved by the Ethics Committee (CAAE: 72677617.8.0000.0017).
Resultados e Conclusões:
The female's control group (n=8) presented a significant result with $p < 0.05$, in both hands. The mean values and standard deviation of the right hand before and after strengthening were 23.69 ± 4.04 and 28.22 ± 3.6; in the left 22.84 ± 3.7 and 25.86 ± 3.35. In the male control (n=12), both hands did not present statistical difference, right hand: 33.7 ± 6.02 and 34.04 ± 4.4; and left hand: 33.05 ± 7.52 and 33.85 ± 6.24. In the female experimental group (n=6), the right hand presented a significant result with $p < 0.01$ and the left hand a significant result with $p < 0.001$. Right hand: 19.27 ± 4.49 and 26.5 ± 2.8; and left hand: 18.61 ± 4.5 and 24.53 ± 5.2. In the experimental male (n=11), both right and left hand presented significant results with $p < 0.001$, right hands: 28.23 ± 6.7 and 36.46 ± 7.8; and left hands: 30.6 ± 8.2 with median of 25.33 and 36.09 ± 6.8 with median of 34.33. In the intergroup analysis, there was no statistical difference. The experimental group presented performance in the groups measured, generating muscle strength gains in both genders and hands, different from the control group, which did not gain in the male group. Although there was no difference in the intergroup analysis, both had a similar performance, confirming the efficiency of the smart device.

Palavras-chaves: Muscle exercise, Neuropathy, Prototyping
Agência Fomento: CAPES

19.004 - THE ROLE OF MEDIAL PREFRONTAL CORTEX IN THE MODULATION OF RAT BEHAVIOR IN THE FORCED SWIMMING TEST: A SYSTEMATIC REVIEW AND META-ANALYSIS

THE ROLE OF MEDIAL PREFRONTAL CORTEX IN THE MODULATION OF RAT BEHAVIOR IN THE FORCED SWIMMING TEST: A SYSTEMATIC REVIEW AND META-ANALYSIS

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Instituição: 1 UFSC - Universidade Federal de Santa Catarina (R. Eng. Agronômico Andrei Cristian Ferreira, s/n - Trindade, Florianópolis - SC,), 2 USP -

Universidade de São Paulo (Av. Prof. Lineu Prestes, 2415 - Butantã, São Paulo - SP, 05508-900)Introdução:
The forced swimming test (FST) is a predictive test for antidepressant action in rodents, therefore, any drug with antidepressant action would be able to reduce immobility time in this test (Detke, M.J. et al, Exp. Clin. Psychopharmacol. 5:107, 1997). Primary studies indicate that the inhibition of the medial prefrontal cortex (mPFC) is an important mechanism mediating the effect of antidepressants on the immobility of rats in the FST (Slattery, D.A., et al. J. Psychopharmacol, 25:1295, 2011).
Objetivos:
Here, we quantified the relationship between activity of the mPFC and immobility of rats in the FST by doing an unbiased summary of the literature.
Métodos:
For this, a systematic review of the literature followed by a meta-analysis was performed (complete protocol in OSF: https://osf.io/t9r2p/). Briefly, key words, bibliographic database, inclusion and exclusion criteria, data to be extracted and analytic decisions were defined beforehand. After retrieval and screening, relevant data was extracted from the selected literature (39 articles) and analyzed using Random effects model. From these articles we extracted data regarding immobility (time or frequency; mean, SD and/or SE) in animals that had manipulation in the mPFC. These data were analyzed using R and the effect size was calculated by Hedge's G.
Resultados e Conclusões:
The summary effect of all studies indicate that compounds injected in the mPFC reduced immobility scores of rats in the FST significantly (Hedges G= -0.7656 $p < 0.0001$).Due to the high heterogeneity of the sample (84.03%), analysis of subgroups were performed across the sub-regions of the PFC (i.e., infralimbic cortex (IL), prelimbic cortex (PL), anterior cingulate cortex (acg), ventromedial prefrontal cortex (vmPFC)) and the type of stimulus in the PFC (inhibition, activation or "unknown"). Analysis of the effect size indicated that inhibiting the IL, the PL or the mPFC of the rats reduced immobility scores in the FST significantly (IL: Hedges G=-2.8942, p=0.004; PL: Hedges G= -1.309; mPFC: Hedges G=-0.9531, p=0.0342). As a general conclusion we state that the inhibition of both IL and PL (both subregions of the mPFC) reduced immobility scores in the FST. The inhibition of the mPFC as a whole, also reduced, although the effect was smaller. These effects are very similar to the one observed after antidepressant treatment. Therefore, it is possible that the anti-immobility effects of different antidepressants in the FST may dependent on the inhibition of different subregions of the mPFC.
Palavras-chaves: Meta-analysis, Systematic review, Prefrontal cortex, forced swimming test
Agência Fomento: CNPq

22. Ética, popularização e impacto social

22.001 - NEUROCAST: O PODCAST DE NEUROCIÊNCIA DA UFABC

NEUROCAST: NEUROSCIENCE'S PODCASTS OF UFABC
Autores: Gloria Santucci 1, Juliana Volpe 1, José Augusto Cipriano Guedes 1, Noemi Mitsunaka 1, Carla Rodriguez 1, Guilherme Brockington 1
Instituição: 1 UFABC - Universidade Federal do ABC (Av. dos Estados, 5001 - Bangú, Santo André-SP)Introdução:
The Neurocast is a podcast production project created in 2016 by undergraduate and graduate students of UFABC, who wanted to discuss current and important issues about Neuroscience and spread this discussion beyond the University, due to the impact of its findings might be relevant to society.
Objetivos:
The objective is to arouse interest of young people, principally high school students from public schools, in science, specifically in neuroscience and its related areas.
Métodos:
As an extension project under development since 2017, Neurocast works on three fronts with different methodologies. The first one is related to production, recording and editing of a podcast episode. The activities include the writing of the episode script and interview with the guests. Currently, 11 episodes are available with diverse themes including memory, bilingualism, attention, drugs, philosophy of mind and neurossexism. The second methodology is aimed at divulgation of the project in social media and presenting it to the school's management, teachers and students. Neurocast Facebook page has more than 1300 followers and the site has 3459 downloads of the episodes altogether. The Google Analytics tool, implemented in August 2018, allowed us to gather relevant data about the audience, such as the number of page visitors (1400). The third methodology seeks to promote actions in the project's partner schools.

Resultados e Conclusões:
In 2017, 34 high school seniors from a public school visited UFABC to learn about the project, the Neuroscience course, and the university campus. In 2018 an intervention was made in a school in ABC region, with 4 weekly one hour meetings, in which subjects such as Memory, Attention, Consciousness and myths related to Neuroscience were discussed. At the end, podcast production issues were discussed with students and teachers, resulting in the recording of an episode with the theme Neuroscience and RPG (Role-Playing Game). As a next step, the project is preparing a plan of action so that future episodes are related to the contents treated in the classroom, thus allowing teachers to use them as a didactic resource. The use of a media that can be reproduced for free via the internet, such as podcasts, enables content to be accessible anywhere through the most varied devices, which can encourage learning and motivate the target audience of the project to become interested in scientific content and attending a university. In this way, by bringing Neurocast into the classroom, the project seeks to reaffirm the interdisciplinary aspect that neuroscience possesses, along with the technology of the podcast tool.
Palavras-chaves: podcast, divulgação científica, midias alternativas , Neurociência , popularização das ciências
Agência Fomento:

22.002 - DISPARIDADE DE GÊNERO NA REUNIÃO ANUAL DE 2018 DA SBNEC

SPEAKERS GENDER DISPARITY IN THE 2018 SBNEC MEETING

Autores: Fátima Erthal 1, Camilla Vaccariello 1, Tatiely Santos 1, Analice Madeira 1, Luísa Lage 1, Bruna Nascimento 1, Maria De Fátima Lopes 3, Letícia Oliveira 2, Mirtes Pereira 2, Karin Calaza 2, Cecília Hedin Pereira 1, Aline Bastos 1, Eliane Volchan 1
Instituição: 1 UFRJ - Universidade Federal Do Rio De Janeiro (Av. Carlos Chagas Filho, 373 - G2-031 - Ilha do Fundão, Rio de Janeiro - RJ, 219), 2 UFF - Universidade Federal Fluminense (R. Prof. Hernani Melo, 101 - São Domingos, Niterói - RJ, 24210-130), 3 CEAC - Colégio Estadual Amaro Cavalcante (Largo do Machado, Nº 20 - Catete, Rio de Janeiro - RJ, 22221-020)Introdução:
The number of invited women speakers at scientific meetings is much smaller than their proportion in a field of research. This means that women have fewer opportunities to present their research, to publish in higher-tie journals and to have their work cited, impacting on chances to receive financial support and to reach leadership positions. The dearth of women speakers also implicitly dampens the aspirations of young female researchers, further contributing to gender inequality in science.
Objetivos:
In 2018, the proportion of women among SBNeC members outnumbered men in all categories - undergraduate, graduate, postdoc, and faculty / researchers. The majority of participants at the 2018 SBNeC meeting were women (62%). Here, we investigated their participation as speakers at this meeting.
Métodos:
The 2018 Scientific Program was analyzed to estimate the proportion of men and women participating as speakers (full conferences, symposia and thematic modules) and first authors of posters. We assessed the gender distribution among SBNeC members to determine the expected gender proportion of presenters (undergraduate and graduate students: 64% women and 36% men; and Faculty researchers and post-docs: 64% women and 36% men). Further, we investigated if the gender of the organizer impacted on the proportion of women participating as speakers. We employed chi square tests; p value < 0.05 were considered statistically significant.
Resultados e Conclusões:
Women were the majority of first authors in poster abstracts (65%). Posters are often presented by undergraduate and graduate students. Indeed this proportion is similar to women membership in those categories (64%). Among speakers, women were underrepresented in full conferences (18%), symposia (42%) and thematic modules (32%). Compared to the expected gender proportion, symposia and thematic modules showed very significant imbalance ($X2 = 9.15$, $p < 0.01$ and $X2 = 9.63$, $p < 0.01$, respectively). Women organized 44% of thematic modules and 33% of symposia. Most strikingly, among thematic modules and symposia, the proportion of female speakers differed dramatically by the gender of the organizer. Male-organized thematic modules had 8% women speakers, while in those organized by women the percentage raised to 66%. Male-organized symposia had 32% women speakers while in women-organized ones 60% were female speakers. Statistically, in comparison to the expected gender proportion, there was no significant gender disparity in women-organized activities while in men-organized ones a

significant gender bias was observed (thematic modules: X2 = 17.76, p < 0.01; symposia: X2 = 12.27, p < 0.01). The present estimates corroborate previous gender disparity studies of other Societies, including those that are female-rich, and urge strategies to be found to create gender-balanced and diverse meetings. Diversity leads not only to fairness but also to higher quality science. A diverse set of individuals develops more creative solutions to solve complex problems, broadens viewpoints and benefit from the intellectual capital of the society.
Palavras-chaves: GENDER BIAS, SPEAKER GENDER, GENDER INEQUALITY
Agência Fomento: CAPES, CNPq, FINEP, FAPERJ

23. Neurobiologia do Estresse

23.009 - PAPEL DO ÓXIDO NÍTRICO NO COMPORTAMENTO TIPO ANSIEDADE INDUZIDO PELO ESTRESSE AGUDO DE CONTENÇÃO EM DANIO RERIO (ZEBRAFISH).

ROLE OF NITRIC OXIDE IN ANXIETY LIKE BEHAVIOR INDUCED BY ACUTE RESTRAINT STRESS IN DANIO RERIO (ZEBRAFISH).
Autores: Nadyme Assad 1, Diego Rodrigues de Paula 1, Adelaide da Conceição Fonseca Passos 2, Suellen Alessandra Soares de Moraes 1, Evander de Jesus Oliveira Batista 3, Karen Renata Herculano Matos Oliveira 1, Anderson Manoel Herculano Oliveira da Silva 1
Instituição: 1 UFPA - Universidade Federal do Pará (Rua Augusto Corrêa, 1.), 2 CESUPA - Centro Universitário do Pará (Avenida Governador José Malcher, 1963.), 3 NMT - Núcleo de Medicina Tropical (Avenida Generalíssimo Deodoro, 92.)Introdução:
Nitric oxide (NO) is a gas that acts as a neuromodulator in CNS and it seems to play in the regulation of neurobehavioral responses to stress. It is well documented that acute restraint stress (ARS) induces anxiogenic effect in animal models. Therefore, we aimed to evaluate if the NO can be acting as a mediator of the behavioral effects induced by ARS.
Objetivos:
Our aim was to evaluate the effect of L-NAME, a blocker of nitric oxide synthesis, in anxiety like behavior induced by ARS.
Métodos:
To do this work, we used 40 zebrafish wild type from both sexes (50:50 ratio) divided into the following groups: control (n=10), L-NAME (n=10), ARS (n=10) and L-NAME+ARS (n=10). Drug administration was made 30 minutes before the stress protocol or behavioral test. The ARS protocol was performed by enclosing each animal in a microtubes for 90 minutes and was followed by the novel tank diving test to evaluate the behavior by the following parameters: time on top, latency to top, freezing, erratic swimming and squares crossed. All experiments were performed in accordance to ethical guidelines for animal testing CEPAE – UFPA: 213-14.
Resultados e Conclusões:
Considering the time on top (TT) and latency to top (LT) parameters, our results demonstrated that ARS evoked an anxiogenic effect (p < 0.01; TT: 225.6±28 control vs. 2.4±1 ARS; LT: 134.3±27 control vs. 458.4±84 ARS). On the other hand, L-NAME treatment prevented the anxiety-like behavior caused by ARS (p < 0.01; TT: 392.6±85 L-NAME+ARS vs. 2.4±1 ARS; LT: 47.7±19 L-NAME+ARS vs. 458.4±84 ARS), showing an anxiolytic effect. L-NAME group did not show statistical difference compared to control. The other parameters did not show any statistical difference between groups. Based on our results, we suggest that NO is participating in the modulation of this behavior pattern.
Palavras-chaves: nitric oxide, acute restraint stress, anxiety, zebrafish, behavior
Agência Fomento: CAPES

23.010 - ENRIQUECIMENTO AMBIENTAL PREVINE O DÉFICIT DE EXTINÇÃO DE MEMÓRIA AVERSIVA DECORRENTE DE ESTRESSE AGUDO DE CONTENÇÃO VIA A FOSFORILAÇÃO DA SUBUNIDADE GLUA1 DE AMPA NO HIPOCAMPO

ENVIRONMENTAL ENRICHMENT PREVENTS ACUTE-RESTRAINT STRESS FEAR EXTINCTION IMPAIRMENT VIA AMPA GLUA1 SUBUNIT PHOSPHORYLATION IN HIPPOCAMPUS
Autores: Leticia Morais Bueno de Camargo 2, Leonardo Santana Novaes 2, Carolina Demarchi Munhoz 2
Instituição: 2 ICB/USP - Instituto de Ciências Biomédicas (USP) (Avenida Professor Lineu Prestes, 1524 - ICB I - São Paulo, SP)Introdução:
The incidence of psychiatric disorders such as anxiety and post-traumatic stress disorder (PTSD) has increased around 15% worldwide, according to the WHO. One typical component of these disorders is the fear extinction impairment in which the inhibitory

neurocircuitry involved in fear suppression is ineffective. Experimentally, fear extinction protocols simulate the neurobiological basis for exposure therapy which is highly used on PTSD patients. Memory extinction requires the contextual information processed in the hippocampus which is mainly related to the glutamatergic ionotropic receptors signaling: AMPA (phosphorylation of the A1 subunit; pGluA1) and NMDA (NR2B and NR2C subunits). Finally, several studies had focused on the predisposing and protective factors related to the response to stressors, and we and other groups had demonstrated that exposure to environmental enrichment (EE) prevented stress-induced anxiety (emerging 10 days post-stress). Nonetheless, the effects of EE on preventing the acute stress-induced late fear extinction impairment is not clear.
Objetivos:
In this study, we sought to verify whether one session of acute restraint stress induced the late fear extinction impairment and the protective role of EE on those effects. Additionally, we analysed the protein expression of AMPA and NMDA subunits in the hippocampus of those animals.
Métodos:
All experimental procedures were approved and performed according to the standards of the CEUA/ICB-USP (nº 85/2016). We used adult male Wistar rats allocated in a standard cage (SC) or EE (pre-exposed to EE during 14 days) and stressed [2h restraint stress session (Str)] or not, resulting in four groups: SC, SC-Str, EE, EE-Str. Ten days after stress, all animals were submitted to the contextual fear conditioning protocol, based on classic Pavlov fear conditioning and their percentage of freezing were quantified. After the 6th extinction session, the hippocampus and BLA were dissected and prepared for Western Blot, which the GluA1, pGluA1, NR2B, and NR2C protein expression were analyzed. Two-Way ANOVA followed by the post-hoc test Tukey was used.
Resultados e Conclusões:
The acute restraint stress 10 days earlier impaired the extinction of contextual fear memory, which was prevented by EE housing (n=8-14/group; $p < 0.05$) without modulating the acquisition of contextual fear conditioning (n=5-8/group). In the hippocampus of stressed animals (SC-Str) that exhibited the impairment on fear extinction, the ratio pGluA1/GluA1 was augmented, which was blunted in EE-Str animals (n=5-6/group; $p < 0.01$). This difference was not observed in the basolateral amygdala complex (BLA). Our results indicate that glutamatergic signaling on the hippocampus, but not on the BLA, could be a potential mechanism whereby EE exerts its protective effects on the stress-induced fear extinction impairment.
Palavras-chaves: environmental enrichment, acute stress, fear extinction, AMPA
Agência Fomento: FAPESP, CAPES, CNPq

23.011 - O BLOQUEIO DOS RECEPTORES MINERALOCORTICÓIDES NO CÓRTEX PRÉ-FRONTAL MEDIAL (CPFM) DURANTE O ESTRESSE EVITA O COMPROMETIMENTO DA EXTINÇÃO DA MEMÓRIA AVERSIVA EM RATOS

THE BLOCKADE OF MINERALOCORTICOID RECEPTORS IN THE MEDIAL PREFRONTAL CORTEX (MPFC) DURING STRESS AVERTS THE AVERSIVE MEMORY EXTINCTION IMPAIRMENT IN RATS

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Instituição: 1 ICB/USP - Instituto de Ciências Biomédicas/Universidade de São Paulo (Av. Prof. Lineu Prestes, 1524 - Butantã, São Paulo-SP)Introdução:
Throughout life, it is inevitable to experience some stress or trauma. In addition to the symptoms of anxiety, the impairment in extinguishing aversive memories is in strict association with the symptoms observed in PTSD patients. Glucocorticoids are crucial mediators of the stress responses and act via the classical mineralocorticoid (MR) and glucocorticoid (GR) receptors. The MRs in the mammalian brain are present in regions that are important for primary actions related to cognition, emotion, and initial processing of stress, such as the medial prefrontal cortex (mPFC), a structure that governs learning and decision making, in addition to having an important role in neuroendocrine adjustment in the stress response. Also, several studies have shown that MRs are associated with the modulation of memories and their extinction, confirming the MR basal activity in regulating attentional and mnemonic processes related to aversive situations, in which its optimal activation can be considered neuroprotective.
Objetivos:
This study aimed to verify whether the aversive memory extinction deficit triggered by previous acute stress was dependent on MR activity.
Métodos:
Male adult Wistar rats (n = 8-11 per group) (protocol number 85/2016 ICB/USP) were bilaterally implanted

with guide-cannula into the mPFC (AP = +3.1; ML = 3.6; DV = -4), and randomly divided into control (nST) and stressed (ST) groups. The subjects of each group received intra-mPFC injection of vehicle (PBS + 2% chloroform) or spironolactone (spiro, 10ng/0.1 µl; MR antagonist) and were exposed to 2h of restraint stress. After 10 days, the animals were submitted to the contextual aversive conditioning (footshock; 1 mA for 1 second) followed by the aversive memory extinction protocol (6 re-exposures in the conditioned environment).
Resultados e Conclusões:
On the 1st day of extinction, all animals showed an increase in freezing time. However, no difference between groups (control x ST) was observed ($F(3, 42) = 0.42$; $p < 0.05$), suggesting that all groups acquired the aversive contextual memory and were able to evoke it in the context re-exposure. On the 6th day of extinction, ST impaired the aversive memory extinction (persistence of freezing, ($F(3, 39) = 6.46$; $p > 0.01$ - one-way ANOVA and $p > 0.001$, Tukey post-hoc test), which was blunted by the injection of spiro in the mPFC ($p < 0.05$). In the control animals, spiro injection did not affect memory extinction. Our results suggest that the MR activity in the mPFC during stress is important for the stress-induced aversive memory extinction impairment.
Palavras-chaves: Stress, Aversive Memory Extinction , Mineralocorticoid Receptors, Medial Prefrontal Cortex
Agência Fomento: CAPES, CNPQ, FAPESP

23.012 - EFEITOS DA SEPARAÇÃO MATERNA NA FASE NEONATAL SOBRE A FRUSTRAÇÃO EM RATOS

EFFECTS OF NEONATAL MATERNAL SEPARATION UNDER FRUSTRATION IN RATS

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Instituição: 1 UFRGS - Universidade Federal do Rio Grande do Sul (Rua Ramiro Barcelos,2600,Porto Alegre,RS)Introdução:
Maternal separation (MS) is a model of early stress that modifies long-term neurobiological parameters leading to significant differences in emotional states; one of them is frustration, a negative emotional state which may be involved with susceptibility to psychiatric disorders.
Objetivos:
Evaluate the effects of neonatal MS and sex on frustration in adult rats.
Métodos:
Male and female Wistar rats (M32;F51) were used in adulthood (postnatal day-PND80), divided into MS (PND1-10,3h per day in incubator at 32C) and non hadeled (NH). Frustration was induced by successive negative contrast task (CNS). The animals were divided into shifted (S,10 sweetened pellets by trial in 10 days of training and 1 pellet in 3 days of unexpected reward reduction) and unshifted (U, always received1 pellet). CNS had 6 trials of 1 min each (30s interval). Frustration was measured through the latency (s) to arrive at the reward. Another group of adult animals (M25;F25) performed the Y maze learning task, where a palatable reward was placed on one of the arms of the apparatus, and the animals had to locate the reward. 1 or 2-way ANOVA of repeated measures were used.CEUA-UFRGS 35364.
Resultados e Conclusões:
As preliminary results in males, a significant effect of the reward group [$F(1.28) = 23.852$, $p < 0.001$] was found on the latency to arrive at the reward, showing that S animals had a higher latency to seek the reward when it was reduced (S: 6.3 ± 0.5; U: 3.4 ± 0.4). When the analysis was done by trial, an interaction between the trial and the reward group [$F(17.476) = 2.931$, $p < 0.001$] was found and a tendency to an interaction between trial and postnatal treatment [$F(17,476) = 1.553$, $p = 0.073$], suggesting a possible difference between NH and MS animals in the frustration response. In females, we also found a change in latency after unexpected reward reduction, as evidenced by the interaction between day and reward group [Day1: S4.8 ± 0.4, U3.7 ± 0.4, Day2: S6.3 ± 0.5 ($P < 0.001$)], and by the interaction between the trial and the reward group [$F(17.799) = 4.054$, $p < 0.001$], although MS does not appear to have influenced the latency to seek reward in females. In Y maze there was no difference between the groups in the number of correct answers (F: NH2.5 ± 0.2, MS1.9 ± 0.2, M: NH1.9 ± 0.2, MS2 ± 0.2, $p > 0.05$) nor in the days required to reach the learning criterion (F: NH8 ± 0.5, MS8.4 ± 0.7, M: NH8.5 ± 0.5, MS8.6 ± 0.6, $p > 0.05$). Male and female rats presented a response compatible with frustration when exposed to CNS. All animals learned to seek the palatable reward in Y maze, showing that the result obtained in the CNS task was not affected by a possible

learning deficit involving palatable reward caused by MS.
Palavras-chaves: frustração, separação materna, ratos, estresse precoce
Agência Fomento: Capes, CNPQ

23.013 - ESTIMULAÇÃO OPTOGENÉTICA DO CÓRTEX PRÉ-FRONTAL INFRALÍMBICO ESQUERDO, MAS NÃO DO DIREITO, FACILITA A EXTINÇÃO DO MEDO APÓS ESTRESSE ÚNICO PROLONGADO EM RATOS

OPTOGENETIC STIMULATION OF THE LEFT (BUT NOT RIGHT) INFRALIMBIC PREFRONTAL CORTEX ENHANCES FEAR EXTINCTION AFTER A SINGLE PROLONGED STRESS IN RATS.
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Rats subjected to the single prolonged stress (SPS) procedure demonstrate impaired fear extinction and increased anxiety, similar to those behavioral and physiological symptoms observed in posttraumatic stress disorder patients. Converging evidence indicates that functional lateralization of the mPFC in the control of emotional states induced by stressful situations. In this sense, we hypothesized that the loss of tonic left mPFC inhibitory control over the right mPFC is related to the loss of resilience, contributing to the development of maladaptive responses, like impaired fear extinction and enhanced anxiety after the SPS.
Objetivos:
To investigate the effects of optogenetic stimulation of the left infralimbic prefrontal cortex (LIL) during incubation period of the SPS on fear extinction and anxiety-like behaviors.
Métodos:
Thirty-nine male Sprague-Dawley rats were subjected to stereotaxic surgery for LIL or RIL injections of the adeno-associated virus (AAV) containing the appropriate opsin gene and for implantation of optical fibers in the brain. The gene constructs for stimulation was CaMKII α-hChR2(E123A)-eYFP (Chr2-eYFP) and its respective control CaMKII α-eYFP (eYFP-control). Four to five weeks after surgery, the rats (LIL: eYFP-control, n=13 and Chr2-eYFP, n=9; RIL: eYFP-control, n=9 and Chr2-eYFP, n=8) were subjected to the SPS and were optogenetic stimulated for 15 minutes/day for 7 consecutive days. In the 8th day, the rats were subjected to the elevated plus maze followed by Auditory Fear Conditioning (AFC) 24 h later. Twenty-four hours later rats were subjected to extinction 1. On day 3 rats underwent a retention session or a second extinction session (extinction 2). Twenty-four hours after extinction 2, rat underwent retention. Extinction and retention trials were administered in the training context without footshock. The freezing response was used as a measure of the conditioned fear response (CFR) and expressed as the percent time spent freezing during the 30 s tone. Freezing was defined as a period of complete immobility, characterized by a lowered head, spread paws, and rapid respiration.
Resultados e Conclusões:
Our data demonstrated that activating LIL (ANOVA Repeated Measures: $F(3,60)=11.94$, $P < 0.001$), but not RIL (ANOVA Repeated Measures: $F(3,45)=0.698$, $P=0.557$), during the incubation period of SPS enhanced extinction of conditioned fear and did not alter open arms exploration in the elevated plus maze. Our results suggest that (i) the left IL glutamatergic system is impaired by the SPS, and (ii) LIL daily stimulation facilitates the AFC extinction in rats exposed to the SPS paradigm (iii) without changing anxiety-like behavior.
Palavras-chaves: Optogenetic stimulation, infralimbic, medial prefrontal cortex, fear extinction, single prolonged stress
Agência Fomento: grant 2018/05808-0, São Paulo Research Foundation (FAPESP), National Institutes of Health (MH104384 to C.K.M)

23.014 - CHRONIC SOCIAL DEFEAT STRESS INDUCES SOCIAL AVOIDANCE: ROLE OF GLUTAMATE NMDA RECEPTOR IN THE LEFT MEDIAL PREFRONTAL CORTEX IN MICE

CHRONIC SOCIAL DEFEAT STRESS INDUCES SOCIAL AVOIDANCE: ROLE OF GLUTAMATE NMDA RECEPTOR IN THE LEFT MEDIAL PREFRONTAL CORTEX IN MICE
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Physiological Sciences (São Carlos/Araraquara), 3 U of T - University of Toronto (Toronto - Canada)Introdução:
Chronic social defeat stress (CSDS) in mice allows the identification of two subgroups of behavioral phenotypes: susceptible [low social interaction (SI) with an aggressive conspecific] and resilient (normal SI). A recent optogenetic study showed that while the activation of the left medial prefrontal cortex (LmPFC) in susceptible mice restores sociability to control levels, its inhibition leads to social avoidance in resilient mice. Thus, the LmPFC seems to regulate social behavior, helping animals to cope with aversive situations. Besides, we have recently shown that NMDA receptor activation of the LmPFC provokes anxiolytic-like effects of mice exposed to the elevated plus maze.
Objetivos:
Here, we investigated whether the social avoidance induced by CSDS is reversed by NMDA activation in the LmPFC of mice exposed to the SI test.
Métodos:
Male Swiss mice were subjected to SDS (n = 10) or to non-aggressive encounters (control; n = 7) for 10 consecutive days. Twenty-four hours later (11th day), they were individually exposed to the SI test to record the social interaction profile. The SI ratio was calculated as follows: time in the interaction zone with the aggressor/time in the interaction zone without the aggressor. Then, mice were classified as susceptible (SI ratio < 1) or resilient (SI ratio ≥ 1). On the 12th day, mice received intra-LmPFC injection of saline or NMDA (0.04 nmol/0.2 µL) and were reexposed to the SI test and the SI ratio was recalculated.
Resultados e Conclusões:
Unstressed subjects presented SI ratio ≥ 1 on 11th and 12th days (1.2 ± 0.3 and 1.4 ± 0.3, respectively). Ninety percent of the defeated mice were classified as susceptible (SI ratio: 0.3 ± 0.09) and, then, were separated to receive intra-LmPFC injection of sal (n=4) or NMDA (n=5) on 12th day. While saline-injected mice did not change their SI ratio (0.3 ± 0.2), NMDA-treated group showed increased SI ratio to 1.8 ± 0.1. These results are suggestive that i) CSDS protocol induces high percentage of mice with a susceptible phenotype and ii) the social avoidance induced by CSDS seems to be reversed by activation of Glutamate NMDA receptors in the LmPFC in mice
Palavras-chaves: Functional Lateralization, Glutamate-NMDA receptor, Medial Prefrontal Cortex (mPFC), resilience, social defeat stress
Agência Fomento: FAPESP 2016/24568-4

23.015 - DIFERENÇAS INTERINDIVIDUAIS NO COMPORTAMENTO EXPLORATÓRIO E SOCIAL DE RATOS SUBMETIDOS A UM PROTOCOLO DE ESTRESSE TRAUMÁTICO

INDIVIDUAL DIFFERENCES IN EXPLORATORY AND SOCIAL BEHAVIORS IN RATS SUBMITTED TO A TRAUMATIC STRESS PROTOCOL.

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Instituição: 1 UNIFESP - Universidade Federal de São Paulo (Rua Napoleão de Barros, 925 - São Paulo - SP)Introdução:
Posttraumatic stress disorder (PTSD) affects around 20-30% of people exposed to traumatic situations. Unpredictable and uncontrollable stress protocols are widely used in pre-clinical PTSD research, as these induce multiple behavioral impairments reminiscing of those seen in PTSD patients.
Objetivos:
The goal of this study (CEUA #8594160318) was to characterize social behavior and neuroendocrine reactivity in subpopulations of adult male Wistar rats submitted to a traumatic stress protocol based on contextual fear conditioning.
Métodos:
Stress-exposed rats (STR, N = 63) freely explored a conditioning chamber for 2 min before receiving a single 2 mA, 1 s footshock. The non-shock group (NS, N = 11) was submitted to the same procedure except for shock delivery. On day 15, rats were re-exposed to the same chamber for 5 min, in the absence of shock, and freezing time was measured as an index of conditioned fear response. On day 22, STR and NS rats, as well as rats who had not been previously manipulated (NM-T, N = 10), were submitted to the social preference test, which consists of a three-compartment apparatus with a wired cage in each lateral compartment, one containing an unfamiliar naïve rat and one containing a novel object. Two days later, animals were submitted to the social interaction test, in which both tested and an unfamiliar naïve rat could explore each other freely. Thirty minutes after the end of the test, animals were decapitated, and trunk blood was collected for plasma corticosterone (CORT) assessment. For this assay, ten additional rats were used as a non-manipulated non-tested (NM-NT) basal group.
Resultados e Conclusões:

Results show that total freezing time during context re-exposure was higher in STR than in NS rats (STR: 183.3 ± 72; NS: 6.6 ± 7, p < 0.01). STR rats were further segregated into three groups, according to their total freezing time during re-exposure: high responder (HR) [equal or above the 75thpercentile], low responder (LR) [equal or under the 25thpercentile], and intermediary (INT) rats. NM-T and NS groups were pooled into a single control (CTL) group when they did not differ from each other. Results from the social preference test show that HR rats had fewer compartment entries compared to CTL (CTL: 14.1 ± 4.6, HR: 8.4 ± 4.8, p = 0.03) and LR (13.2 ± 8, p = 0.04). In the social interaction test, NS rats interacted more with the conspecific compared to all groups (NS: 31.6 ± 11.2, NM-T: 19.8 ± 9.4, LR: 22.5 ± 8.9, INT: 22 ± 8.7, HR: 21.1 ± 8.2). STR rats exhibited higher CORT levels than NM-NT animals (NM-NT: 3 ± 1.8, STR: 8.3 ± 5.3 µg/dl). These data indicate that STR rats exhibit an overall behavioral impairment and augmented neuroendocrine reactivity, with HR rats showing higher exploratory deficits compared to other subgroups. Thus, the exposure to this protocol induces interindividual differences in behavioral responses, which can provide insight into the mechanisms of resiliency and vulnerability.

Palavras-chaves: contextual fear conditioning, social behavior, traumatic stress
Agência Fomento: FAPESP / CNPq / CAPES / AFIP

23.016 - VALIDAÇÃO COMPORTAMENTAL E FARMACOLÓGICA DE CAMUNDONGOS SOCIALMENTE DERROTADOS E EXPOSTOS AO TESTE DE PARTIÇÃO

BEHAVIORAL AND PHARMACOLOGICAL EVALUATION OF SOCIALLY DEFEATED MICE EXPOSED TO THE PARTITION TEST

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Instituição: 1 UNESP - Universidade Estadual Paulista (Rodovia Araraquara-Jaú, km 1 – CP 174 - Machados, SP, 14800-901), 2 UFSCar - Universidade Federal de São Carlos (Rod. Washington Luiz, s/n, São Carlos - SP, 13565-905)Introdução:
Anxiety when disproportional can provoke disorders, which lead to pathological apprehension and conflict in face of daily situations. For instance, social anxiety can be described as a persistent and disproportional fear from social situations.

Objetivos:
Accordingly, this study aimed at evaluating the effects of the benzodiazepine alprazolam (APZ) in the social avoidance behavior displayed by defeated mice exposed to the partition test.

Métodos:
Swiss-Webster mice (6-26/group) were exposed to a rectangular area, divided by a wire mesh into two surfaces (surface A - 13 x 24 x 21 cm; surface B – 23 x 24 x 21 cm). For 4 consecutive days, each mouse was subjected to an aggressive (stressed group) or non-aggressive (control group) encounter with a conspecific into the surface A for 3 minutes, flanked by two 5-min exposure to the surface B, separated by the wire mesh from the conspecific, which remained in the surface A (psychological stress). In the 5th day (partition test), both stressed (Exp.1 undrugged/Exp.2 APZ 0; 0.25, 0.5, or 0.75 mg/kg; i.p.) and control groups were exposed to the surface B separated from an aggressive conspecific (confined in the surface A) and had recorded the spatiotemporal [time (in seconds) in the proximal and distal area related to the surface A] and complementary behavioral measures (time and frequency of rearing, grooming and climbing).

Resultados e Conclusões:
Student t test in Exp.1 showed that the defeated group spent (p < 0.05) less time in the proximal area compared to the control group(Defeated 139 +/- 14 s; Control 229 +/- 6 s), , suggesting social defeat-induced avoidance. One-way ANOVA revealed that alprazolam treatment did not change any behavior (p > 0.05). Nevertheless, different from that observed in Exp. 1, social defeat did not induce avoidance in Exp.2, perhaps due to the small sample size used (n = 6). Thus, next step consists with increasing the sample size, specifically in Exp.2, and widen the range of doses of APZ, e.g. 0.125 mg/kg to avoid locomotor impairment. In addition, it is not ruled out to test serotonergic drugs in an attempt to reverse the social defeat-induced avoidance.

Palavras-chaves: ansiedade, benzodiazepinicos, camundongos , derrota social, teste de partição
Agência Fomento: CNPq; FCF/Ar/UNESP; FAPESP

23.017 - OUABAIN INDUCES EXTINCTION OF CONTEXT FEAR MEMORY IN RATS SUBJECTED TO CHRONIC UNPREDICTABLE STRESS

OUABAIN INDUCES EXTINCTION OF CONTEXT FEAR MEMORY IN RATS SUBJECTED TO CHRONIC UNPREDICTABLE STRESS

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Instituição: 1 ICB-1 - Institute of Biomedical Science (Dept. of Pharmacology - University of São Paulo)Introdução:

Introduction: Ouabain (OUA), a potent inhibitor of the Na+,K+-ATPase, was identified as an endogenous hormone. It has been demonstrated the involvement of the OUA in the acute stress response. Chronic stress is an important aggravating factor of psychiatric illness, including posttraumatic stress disorder (PTSD).

Objetivos:

Aim: The present work aimed to investigate the effect of chronic intermittent treatment with OUA (CIT-OUA) on HPA axis hyperactivity caused by chronic unpredictable stress (CUS) protocol, on gene expression neuropeptide CRF, CRF receptors and extinction of context fear memory.

Métodos:

Methods: Adult male rats were pre-treated intraperitoneally with ouabain (1.8 µg/kg) or PBS followed to CUS protocol for 14 days. Serum corticosterone, ACTH and CRF levels were measured by ELISA and the Crf, Crfr1 and Crfr2 genes expression were assayed by qPCR in the hypothalamus. Moreover, contextual fear memory and its extinction were evaluated. All procedures were approved by CEUA no 52/2014.

Resultados e Conclusões:

Results: Our results showed that CUS + CIT-OUA treatment reduced CUS –induced increase in corticosterone levels (CTR: n=7; mean=5.32; SD=4.55; OUA: n=7; mean=5.88; SD=3.34; CUS: n=7; mean= 17.99; SD=5.77; CUS+OUA: n=7; mean= 8.08; SD= 3.16. CTRxCUS $p < 0.001$; CUSxCUS+OUA $p < 0.001$). However, we did not observe alterations in serum CRF and ACTH levels 24h after the last stressor of the animals submitted to CUS when compared to the control group (CTR). In addition, CIT-OUA presented a negative modulation in Crf gene expression in hypothalamus (CTR:n=6; mean=1.00; SD=0.28; CUS:n=8; mean=1.36; SD=0.33; OUA: n=10; mean=0,86; SD=0.062; OUA+CUS: n=10; mean=0,95; SD=0.14; CTRxCUS $p < 0.05$; CUSxOUA+CUS $p < 0.01$). However, differences in the Crfr1 gene expression in hypothalamus were not observed, but CIT-OUA treatment increased Crfr2 gene expression in hypothalamus of rats submitted to CUS (CTR: n=5; mean=0.76; SD=0.28; CUS:n=10; mean=0.78; SD=0.10; OUA: n=10; mean=0.96; SD=0.63; OUA+CUS: n=10; mean=2,02; SD=1,39; CUSxOUA+CUS $p < 0.01$). Furthermore, our results showed that there was no difference between groups related to fear memory acquisition. Interestingly, in relation to the process of memory extinction, we observed that animals CIT-OUA, as well the animals submitted to CUS that received CIT-OUA and also the ones submitted only to CUS presented reduction of freezing faster than CTR (CTRxOUA, CUS, CUS+OUA $p < 0.01$; n=10; CTR: mean=23.52; SD=22.71; OUA: mean=7.3; SD=8.79; CUS: mean=1.6; SD= 2.7; CUS+OUA: mean=0.7; SD= 1.63) after successive re-exposures to the conditioned arena. Conclusions: These data demonstrate the ability of the OUA to modulate the HPA axis, as well as the extinction of fear memory in rats.

Palavras-chaves: Ouabain, Stress, Fear memory, CRF

Agência Fomento: FAPESP, CNPq

24. Dependência de Drogas

24.007 - EXPOSIÇÃO COMBINADA A NICOTINA DURANTE O INÍCIO DO PERÍODO PÓS-NATAL E NA FASE ADULTA LEVA A SENSIBILIZAÇÃO COMPORTAMENTAL E À EFEITO ANSIOLÍTICO

COMBINED EXPOSURE TO NICOTINE DURING THE EARLY POSTNATAL PERIOD AND ADULT LIFE TRIGGERS TO BEHAVIORAL SENSITIZATION TO NICOTINE AND ANXIOLYTIC-LIKE BEHAVIOR IN ADULT MICE.

Autores: Gabriel Estevam Santos de Amorim 1, Antonio Alves Pereira Júnior 1, Alessandra Oliveira Silva 1, Marina Pugina de Paula 1, Carolina Aparecida de Faria Almeida 1, Jéssyca Milene Ribeiro 1, Marilene Lopes Ângelo 1, Tania Marcourakis 2, Raphael Caio Tamborelli Garcia 3, Carla Speroni Ceron 1, Marcos Vinicios Salles Dias 1, Larissa Helena Torres 1

Instituição: 1 UNIFAL/MG - Federal University of Alfenas (R. Gabriel Monteiro da Silva, 700), 2 USP - University of São Paul (Av. Prof. Lineu Prestes 580), 3 Unifesp - Federal University of São Paulo (Rua São Nicolau, 210)Introdução:

Worldwide, about 25% of pregnant women are active smokers. Harm reduction strategies, such as nicotine replacement therapies, have been used to decrease exposure to tobacco smoke. However, little is known

about the effects of nicotine during a critical period of brain development.
Objetivos:
The aim of this study is to evaluate the effects of exposure to nicotine during the early postnatal period in anxiolytic behaviour during adulthood.
Métodos:
Swiss mice were exposed to nicotine during breastfeeding, by an osmotic mini-pumps implanted in the mothers (8 mg/kg/dia). In adulthood, the mice were treated i.p. with nicotine (1 mg/kg) or saline on every other day for 13 days (D1, D3, D5, D9, D11, D13) and locomotor activity was evaluated. After four days of withdrawal, the mice were challenged with a single dose of saline or nicotine to measure the locomotor activity (groups: SAL-NIC, n=10; NIC-SAL, n=15; NIC-NIC, n=13). An elevated plus maze test (EPM) was performed in the third day of withdrawal.Ethics Com. 54/2018.
Resultados e Conclusões:
In the acquisition phase of sensitization (D1-D13) there was an increase in the locomotor activity in the groups SAL-NIC (8029.9 cm ± 1002 vs 5221.9 cm ± 729.0; $p < 0.0001$), NIC-SAL (7213.5 cm ± 563.3 vs 6789.9 cm ± 288.1; $p < 0.05$) and NIC-NIC (7805.1 cm ± 420.5 vs 4589.1 cm ± 562.5; $p < 0.01$) in D13 compared with D1. The NIC-SAL group showed increased locomotor activity at D1 (7213.5 cm ± 563.3) compared to the NIC-NIC group (4589.1 cm ± 562.4; $p < 0,001$). Comparisons of D13 and challenge day (expression of sensitization) revealed an increase in the locomotor only for the NIC-NIC group (7805.1 cm ± 420.5 vs 6518.6 cm ± 554.3; $p < 0.05$). In addition, mice from the NIC-NIC group (59.06% ± 2.88) showed an increase in time spent in open arms compared to NIC-SAL mice (51.4 ± 2.17; $p < 0,05$). Together, these data suggest that only animals exposed to nicotine during the early postnatal period and during adulthood shown acquisition and expression of behavioural sensitization to nicotine. Moreover, mice exposure to nicotine during the early postnatal period and during adulthood shown anxiolytic-like behaviour.
Palavras-chaves: Brain Behavioral , Sensitization to nicotine, Tobacco smoking
Agência Fomento: CAPES

24.008 - INVESTIGATION OF ISRADIPINE CALCIUM CHANNEL BLOCKER TREATMENT IN AN ANIMAL MODEL OF CHEMICAL DEPENDENCE INDUCED BY COCAINE

INVESTIGATION OF ISRADIPINE CALCIUM CHANNEL BLOCKER TREATMENT IN AN ANIMAL MODEL OF CHEMICAL DEPENDENCE INDUCED BY COCAINE
Autores: Anna Luiza Diniz Lima 1, Fabrício A. Moreira 1, Pablo Leal Cardozo 1, Fabíola M. Ribeiro 1, Luciene Bruno Vieira 1
Instituição: 1 UFMG - Universidade Federal de Minas Gerais (Av. Pres. Antônio Carlos, 6627 - Pampulha, Belo Horizonte - MG)Introdução:
Chemical dependence is a chronic disease characterized by compulsive seeking for drugs, as well as repeated episodes of intoxication and withdrawal. Despite several researches, there are no pharmacological treatments available capable of reducing addiction or preventing relapse. Dopaminergic neurons in the mesolimbic pathway express L type calcium channels (LTCCs), specifically Cav1.2 and Cav1.3 channels. Moreover, these channels seem to regulate the dopaminergic trigger activity, which could in turn, mediate reward behaviors. In addition, LTCCs are known to regulate different forms of synaptic plasticity. Scientific evidence has demonstrated a relationship between increased expression of LTCCs in the ventral tegmental area (VTA) and addition to cocaine.
Objetivos:
To investigate whether treatment with LTCC blocker, isradipine, is able to reduce dependence and seeking for cocaine using an animal model.
Métodos:
Swiss mice were pre-treated (45 minutes before the test for 4 days) with isradipine (0.1, 3 and 5 mg / kg) via intraperitonial (i.p.), and then treated with cocaine (15 mg / kg, i.p, in the last 2 days), in order to induce cocaine sensitization. Open field assay was performed to measure the locomotion of the animals. We also perfomed RT-qPCR to measure the levels of Cacna1c (Cav1.2) and Cacna1d (Cav1.3) mRNA from the reward-related areas (prefrontal cortex, hippocampus and striatum) in cocaine-dependent mice. Animal care was in agreement with the Ethics Committee on Animal Experimentation of the Federal University of Minas Gerais, CEUA (120/2017).
Resultados e Conclusões:
Our preliminary results showed that animals treated with Isradipine show tendency to reduce locomotion as compared to not treated group. RT-qPCR results did not show any significant difference in the levels of Cacna1c (Cav1.2) and Cacna1d (Cav1.3). L-Type Calcium channel blocker therapy may offer a potential treatment to cocaine dependence.However, it is

necessary to perform more experiments in order to have conclusive results.
Palavras-chaves: Adccion, Cocaine, Dependence, Isradipine, Treatment
Agência Fomento: FAPEMIG, CNPq, CAPES

24.009 - INIBIÇÃO DA PROTEÍNA MATRICELULAR HEVIN NO ESTRIADO DORSAL BLOQUEIA A SENSIBILIZAÇÃO LOCOMOTORA INDUZIDA PELO ETANOL

KNOCKDOWN OF NEURONAL MATRICELLULAR PROTEIN HEVIN IN THE DORSAL STRIATUM DECREASE ETHANOL-INDUCED LOCOMOTOR SENSITIZATION IN MICE
Autores: Paula Cristina Bianchi 1, Raphaële Mongredien 3, Cleopatra Silva Planeta 2, Vincent Vialou 3, Fábio Cardoso Cruz 1
Instituição: 1 UNIFESP - Universidade Federal de São Paulo (Rua Botucatu, 862 - Ed. Leal Prado 1. andar São Paulo - CEP: 04023-062), 2 UNESP - Universidade Estadual Paulista (Laboratório Farmacologia, Rodovia Araraquara-Jaú, Km1 CEP: 14801-902), 3 UPMC - Université Pierre et Marie Curie (bâtiment B, étage 4, case courrier 37, 7 quai Saint Bernard, 75 252)Introdução:
Addiction is characterized by long-lasting changes in synaptic plasticity, in the mesolimbic system. In this regard, Hevin, which is a matricellular protein, has been implicated in structural plasticity associated with reward and stress resilience.
Objetivos:
Here, we investigate the role of Hevin in the behavioral sensitization to ethanol.
Métodos:
First, adult males C56BL6/J mice were stereotaxically injected with Hevin siRNA-expressing AAV vectors (AAV2.2-hSyn-miRNA) in the dorsal striatum and the control group was injected with GFP control virus (AAV2.2-hSyn-GFP). One month later, they were sensitized with a daily alcohol injection (1.7 g/kg) for 13 days. Four and five days after the last ethanol injection, animals were challenge with a injection of ethanol (1.7 g/kg, i.p.) and saline (0,9%, i.p.), respectively. The locomotor activity was assessed for 20 minutes, after each challenge injection.
Resultados e Conclusões:
Our data showed that inhibition of Hevin expression, in neurons, did not change the acute stimulatory response of ethanol (locomotion: 98.6±11.5 Sham-Saline, 246.1±59 GFP-Alcohol, 249.0±28.1miRHevin-Alcohol; n=5-9 per group) (saline; alcohol: $F_{1,19} = 6,87$ $p < 0,05$). However, Hevin knockdown in the dorsal striatum, significantly attenuated the behavioral sensitization to ethanol (locomotion: 123.5±28.0 Sham-Saline, 175.0±29.7 Sham-Alcohol, 138.7±15.8 GFP-Saline, 307.3±40.4 GFP-Alcohol, 127.4±15.4 miRHevin-Saline and 200.4±23.4 miRHevin- Alcohol; n=5-9 per group) (challenge; virus: $F_{1,19} = 3,65$; $p < 0,05$) when compared to controls. Thus, our results suggest that Hevin expression in neurons of the dorsal striatum play a causal role in ethanol-induced behavioral sensitization. Ethical committee approval: European Committee Council Directive 2010/63/EU.
Palavras-chaves: synaptic plasticity, hevin, alcohol, matricellular protein
Agência Fomento: CAPES

24.010 - EFEITO DO CONTEXTO PAREADO COM CHOQUE NAS PATAS NA PREFERÊNCIA CONDICIONADA POR LUGAR INDUZIDA POR ANFETAMINA EM CAMUNDONGOS.

EFFECT OF CONTEXT-PAIRED FOOT SHOCK PUNISHMENT ON METHAMPHETAMINE-INDUCED CONDITIONED PLACE PREFERENCE IN MICE.
Autores: Paulo Eduardo Carneiro de Oliveira 1, Isabela Miranda Carmona 1,2, Azair Liane Matos do Canto de Souza 1,2
Instituição: 1 UFSCar - Universidade Federal de São Carlos (Rod. Washington Luís Km 235 - São Carlos/SP CEP 13565-905), 2 Unesp - Universidade Estadual Paulista (Rod. Araraquara Jaú Km 01 - Araraquara/SP CEP 14800-903)Introdução:
Drug addiction is a chronically relapsing disorder characterized by loss of control over drug taking and continued use despite awareness of its adverse consequences.In recent years researchers have tried to emulate these human behaviors using self-administration animal model under taste aversion or footshock punishment.
Objetivos:
For this purpose, we propose an alternative animal model of resistance to punishment using both, conditioned place preference and conditioned place aversion in the same paradigm.
Métodos:
Male swiss mice were paired with negative (footshock) and positive (methamphetamine) stimuli in the same context for 4 days. In the very next day, mice were allowed to explore the apparatus for 15 minutes and

the time spent on the context paired with footshock and methamphetamine was recorded (CEUA: 3963190618).
Resultados e Conclusões:
The two-way ANOVA test revealed that methamphetamine (1mg/Kg), but not saline [$F(2,41)=10.25$; $p < 0.05$], induced place preference in the context associated with 0 or 0.5mA [$F(1,41)=7.16$; $p < 0.05$], but not with 1.0mA [$F(2,41)=0.80$; $p=0.46$] footshock. Our results showed that mice prefer methamphetamine paired context even them has been submitted to mild footshock punishment in this place.
Palavras-chaves: Methamphetamine, Footshock, Conditioned place preference, Mice
Agência Fomento: PNPD/Capes CNPq

24.011 - EFEITO DO EXERCÍCIO FÍSICO LEVE EM ESTEIRA SOBRE O CONSUMO DE ETANOL INTERMITENTE EM RATOS

PREVIOUS EXPOSURE TO LIGHT PHYSICAL EXERCISE ON TREADMILL REDUCES ETHANOL DRINKING IN RATS
Autores: Carlos Roberto Oliveira Junior, Marcelo Marin Oliveira Junior 1,1,1
Instituição: 1 Unesp - Universidade Estadual Paulista (Rodovia Araraquara-Jaú, km 1 – CP 174 - Machados, SP, 14800-901), 2 Unesp - Universidade Estadual Paulista (Rodovia Araraquara-Jaú, km 1 – CP 174 - Machados, SP, 14800-901)Introdução:
Practice of physical exercise has been pointed as beneficial for many cardiovascular, respiratory and mental disorders. Also, some positive effects on addiction related behaviors of psychoactive substances have been evidenced in both humans and animal models. However, there are few data on the effect of light physical exercise on ethanol consumption
Objetivos:
Our aim was to evaluate the effect of previous light and repeated treadmill exercise on ethanol drinking in rats.
Métodos:
For this, adult male Wistar rats underwent four days of daily training on the treadmill with increasing intensity over the days (speed of 4, 6, 8 and 10 m/min during fifteen minutes daily). On the fifth day, the maximum effort test was applied to the animals. After the initial treadmill protocol, the animals were exposed to ethanol solution (10%) by two-bottle choice on alternating days (three days per week) during six weeks. The experimental groups were animals submitted to Physical Exercise and sedentary, with the average of ethanol drinking calculated weekly in gram (g) of ethanol per kg animal body weight. Data were analyzed by repeated ANOVA followed by Newman-Keuls post hoc test ($p < 0.05$, N=11 rats/group). The protocol was approved by local Ethical Committee (CEUA FCFAr 03/2017).
Resultados e Conclusões:
Results showed that ethanol drinking was lower in the animals previously exposed to treadmill exercise when compared to the sedentary ones mainly during the sixty week (Sedentary = 3.74±0.45; Exercise = 1.13±0.24). Therefore, previous exposure to light physical exercise on treadmill appears to protect animals from excessive ethanol drinking.
Palavras-chaves: dependência química, ethanol, exercício físico
Agência Fomento: CNPq

24.012 - ALTERAÇÕES ELETROFISIOLOGICAS CORTICAIS AUDITIVAS INDUZIDAS POR CETAMINA E PELA NOVIDADE

NOVELTY DISRUPTS CORTICAL AUDITORY ELECTROPHYSIOLOGY INDUCED BY SHORT-TERM KETAMINE
Autores: Roberta Monteiro Incrocci 1, Franciely Paliarin 1, Manoel Jorge Nobre do Espírito Santo 1,2
Instituição: 1 FFCLRP-USP - Universidade de São Paulo (Av Bandeirantes, 3900), 2 Uni-FACEF - Centro Universitário Mununicipal de Franca (Av. Dr. Ismael Alonso Y Alonso, 2400)Introdução:
Ketamine is a non-competitive NMDA-glutamate antagonist that shares the ability to modulate GABA and dopamine (DA) neurotransmission, as well. That is the reason for the stimulant, hypnotic and analgesic properties, and for its harmful influence on mental state, as well. These unusual and disturbing effects, that limit the clinical use, poses KET as a recreational drug. Chronic KET administration changes normal encephalic activity and induces psychotic states. KET also changes field evoked-potentials including the auditory ones. The dissociative effects of KET are supposed to be due to the sensory overload consequent from a reduction exerted by the inhibitory top-down control on the mesencephalic bottom-up processes resulting in the induction of psychotic-like symptoms where cognitive impairment, emotional blunting, and auditory hallucinations are the core signs. Auditory hallucination is related to functional and

structural abnormalities in several regions of this system, including the inferior colliculus (IC), thalamus (TL), primary auditory cortex (CA), and the medial prefrontal cortex (CPFm), with a significant contribution of NMDA, GABA, and dopamine receptors. In fact, the effects of KET on the sensory systems are powerful involving changes at the electrophysiological (PEAs) and cognitive domains, as revealed by studies using unconditioned or selective attention. The present study was sought to determine the influence of KET on the processing of auditory stimuli. Changes on this system, greatly contributing to the expression of anomalous behavior and accentuating the impairment of psychic functions. Besides, similarities among species enable to infer data obtained from translational models to the clinical domain.
Objetivos:
Our objective is to investigate the physiological changes induced by KET on the ascending auditory sensory information, and the effects of the pharmacological modulation of GLU on the auditory processing and context-induce conditioned.
Métodos:
For the conditioned tolerance protocol the animals were submitted to a dose of ketamine or placebo (10mg / kg, 1x day) in context A or B (aleatory way) for 4 days and then AEP recordings. Therefore the experimental groups were divided into A x A or A x B. All experiments were conducted with the consent of CEUA (FFCLRPUSP, protocol n°18.5.300.59.0).
Resultados e Conclusões:
Novelty was able to disturb ketamine tolerance as showed by the strong elevation of cortical AEP amplitude following exposure to a drug-naive environment. Ketamine disrupts cortical auditory electrophysiology in a drug-associated manner and this effect may help to explain the neural basis of auditory hallucinations phenomena commonly observed in ketamine users.
Palavras-chaves: Drug Abuse, Electrophysiology, Ketamine, Neuropsypharmacology
Agência Fomento: Capes;CNPQ;Fapesp

24.013 - O PAPEL DO CÓRTEX PRÉ-LÍMBICO NA APRENDIZAGEM ASSOCIATIVA INDUZIDA POR MORFINA: UM ESTUDO ELETROFISIOLÓGICO

THE ROLE OF PRELIMBIC CORTEX ON THE CONTEXTUAL ASSOCIATIVE LEARNING INDUCED BY MORPHINE: AN ELECTROPHYSIOLOGICAL STUDY

Autores: Franciely Paliarin 1, Roberta Monteiro Incrocci 1, Manoel Jorge Nobre do Espírito Santo 1,2
Instituição: 1 FFCLRP-USP - UNIVERSIDADE DE SÃO PAULO (Av Bandeirantes, 3900. Ribierão Preto - SP), 2 Uni-FACEF - Centro Municipal Universitário de Franca (Av. Dr. Ismael Alonso Y Alonso, 2400 - São José, Franca - SP, 14401-426)Introdução:
In an earlier study, an intravenous injection of morphine paired with an auditory conditioned stimulus was able to increase cortical evoked potentials (Exp Neurol. 55:505,1977) showing that morphine can form conditional responses. Drugs like opioids can potently modulate associative processes linked to memory and learning, and greatly strengthen memory associated with the context related to the reinforcing effects of the drug. We know that Auditory-evoked potentials (AEPs) can be modified by associative learning. Morphine treatment is also known to promote a reorganization of the prosencephalic synaptic connections.
Objetivos:
An analysis of the possible electrophysiological changes in the prelimbic cortical area of the medial prefrontal cortex, concomitant to the morphine-paired context association expression.
Métodos:
In this study, we used seventeen male Wistar Hannover rats from the campus of Ribeirão Preto, University of São Paulo. The animals were 7 weeks old, weighing 200 ± 10 g, at the beginning of the experiments. They were provided with food and water ad libitum and maintained in a colony in a temperature-controlled room (24 ± 1o C) under a 12:12h light-dark cycle (lights on at 7 a.m.). AEPs latency and amplitude were recorded in two different contexts inside a Faraday cage system. Treatments were able to easily induce place associated with the drug. Drugs used were the opiate agonist morphine (10mg/kg). Conditioning started 24 hours following the last baseline trial with four independent groups. Two groups, saline and morphine, were conditioned and tested in environment A, two other groups were conditioned in environment A and tested in environment B (novelty context). At baseline, the animals were allocated into the apparatus and registered the PEA in a drug-free state. Each animal underwent one subcutaneous injection of isotonic saline (n=9) or morphine 10 mg/kg (n=8) and the animal was confined was 60 minutes. The test session was performed 24 hours after conditioning in the same way as a baseline and in the absence of drug effects, in

context A or B according to the group to which it was allocated. All experiments were conducted with the consent of CEUA (FFCLRP-USP, protocol n°18.5.245.59.0).

Resultados e Conclusões:

Two-way ANOVA revealed that AEP amplitude not di ffers in baseline (F1,17 = 0,072; P = 0.79), revealed by signi ficant interaction between factors in the test (F1,13 = 4,95; P= 0,04). The T test did not reveal significant difference in the group treated and tested in environment A (t-value = -0.47), but a significant difference between the groups conditioned in environment A and tested in environment B (t-value = 3.63). Overall, data recorded point out that novelty was able to increase AEP amplitude in the prelimbic cortex in both control and experimental groups. This result may indicate that the effects of morphine on contextual learning may develop upstream from cortical regions.

Palavras-chaves: Auditory-evoked potentials, Drug Abuse, Morphine

Agência Fomento: CNPQ, CAPES, FAPESP

Quinta-Feira, 03 de outubro de 2019
16:30 às 18:00 - Sessão de Painéis III

01. Desenvolvimento do Sistema Nervoso & Distúrbios do Desenvolvimento

01.021 - CANDESARTANA COMO UMA POSSÍVEL ESTRATÉGIA PARA PREVENIR COMPORTAMENTOS TIPO-ESQUIZOFRENIA INDUZIDOS POR DESAFIO IMUNE NEONATAL COMBINADO A ESTRESSE NA ADOLESCÊNCIA EM CAMUNDONGOS

CANDESARTAN AS A POSSIBLE STRATEGY TO PREVENT SCHIZOPHRENIA-LIKE BEHAVIORS INDUCED BY NEONATAL IMMUNE CHALLENGE COMBINED WITH PERIPUBERTAL STRESS IN MICE

Autores: Germana Silva Vasconcelos 1, Manuel Alves do Santos Júnior 1, Ingridy da Silva Medeiros 1, Caren Nádia Soares de Sousa 1, Naiara Coelho Ximenes 1, Francisco Eliclécio Rodrigues da Silva 1, Francisco Cid Coelho Pinto 1, Tatiane da Silva Araújo 1, Danielle Macêdo 1, Silvânia Maria Mendes Vasconcelos 1
Instituição: 1 UFC - Universidade Federal do Ceará (Rua Coronel Nunes de Melo 1000)Introdução:
Schizophrenia is a serious and chronic mental disorder that affects more than 21 million people in the world. The main symptoms are positive (hallucinations, delusions and paranoia), negative (social isolation, anhedonia, and alogia) and cognitive (deficits in working memory and attention) (Expert Rev Neurother. 10:1347, 2010). The neurodevelopmental hypothesis that supports the pathophysiology of schizophrenia has been highlighted (Prog. Neurobiol. 90:285, 2010). In this sense, it was developed an animal model of schizophrenia induced by "two-hit". This model comprehended of the first "challenge" as an immune activation in the first postnatal days, and the second as stressful events in the peripuberty of the pups. Candesartan (CAND), an angiotensin II receptor blocker (ARB) with different neuroprotective properties, is considered our target in a preventive perspective of some neuropathological aspects of schizophrenia.
Objetivos:
Thus, our research aimed to evaluate whether the treatment with CAND 0.3 mg/kg v.o. during puberty - postnatal day (PND) 30 to 50 - was able to prevent schizophrenia-like behaviors in male and female mice.
Métodos:
Male and female Swiss mice were submitted to neonatal immune activation (PND 5-7) induced by the poly (I: C) viral particle followed by stressful events during peripuberty (PND 35-43). We performed a behavioral evaluation using the open field (OFT), social interaction (SIT), and Y-maze (YMT) tests. After approval by the Ethics and Animal Research Committee (number 72/15).
Resultados e Conclusões:
Our results of OFT, SIT and YMT showed a significant interaction between two factors: "treatment" and "two-hit", [F (1, 91 = 22.685; P < 0.0001], [F (1, 109) = P < 0.0001] and [F (1, 76 = 45.464, P < 0.0001], respectively) were evaluated by the crossing number, OFT showed that the male and female animals presented an increase in this parameter when exposed (P=0.001, females P < 0.0001) compared to control animals. Exposure to the two-challenge model also reduced IS when compared to animals with no challenge, both males and females and females: P < 0.0001). The two-hit model in relation to working memory, evaluated through YMT, reduced the percentage of correct alternations in both male and female animals when compared to control animals (males and females : P < 0.0001) Treatment with CAND decreased the number of crosses, the deficit in sociability and the working memory deficit when compared to the animals submitted to the untreated model in both sexes (males and females: P < 0.0001). Taken together, our findings suggest an interaction between neonatal immune challenge and peripubertal stress, contributing to the development of schizophrenia-like behavior in adulthood. CAND treatment prevented these behavioral alterations. We suggested that the use of ARB may be an interesting alternative to investigate it in animal models with translational validity in neuroscience.
Palavras-chaves: Candesartan, poly(I:C), Schizophrenia, Two-hit model
Agência Fomento: CNPq

01.022 - IMPLICAÇÕES DO TRATAMENTO COM ÁCIDO FÓLICO NO MODELO DE HIPÓXIA-ISQUEMIA NEONATAL.

IMPLICATIONS FROM FOLIC ACID TREATMENT ON NEONATAL HYPOXIA-ISCHEMIA MODEL

Autores: Jaqueline Vieira Carletti 1, Iohanna Deckmann 1, Bruna Ferrary Deniz 1, Ramiro Diaz 1, Joseane Jimenez Rojas 1, Louisiana Meireles 1, Ionara Siqueira 1, Janaína Kolling 1, Angela Wyse 1, Lenir Orlandi Pereira 1
Instituição: 1 UFRGS - Universidade Federal do Rio Grande do Sul (Rua Sarmento Leite, 500,Campus Centro - CEP 90.046-900 - Porto Alegre, RS)Introdução:

Hypoxia-ischemia (HI) is a major cause of death and chronic disability worldwide (1-6/1000) that occurs in the neonatal period. The brain is the main organ affected by hypoxia and reoxygenation and one of the most susceptible to oxidative stress. Preterm newborns are highly vulnerable due to having the immature antioxidant defence systems, and often exhibit clinical manifestations such as motor and behavioural deficits. Folic acid (FA) is a water-soluble vitamin and essential compound involved in the prevention of neural tube defects and fetal growing. Also, previous studies have suggested that the anti-oxidative activity of FA could have protective effects.
Objetivos:
The aim of this study was to understand whether FA treatment could improve neurological and metabolic complications from neonatal HI.
Métodos:
To do this, Wistar rats were divided into four experimental groups (CT, CT-FA, HI and HI-FA). The HI procedure consists of permanent ligation of artery common carotid on seven-day-old rat pups and the treatment including the administration a daily dose (I.P.) of FA (0.011uM/g body weight) during 14 days after HI procedure. After the treatment, it was performed ox-maze task (n=11-12 per group), oxidative stress parameters (nitrite and sulfhydryl) (n=6-7 per group) and epigenetic marker as histone deacetylase (HDAC) activity (n=4-6 per group) on the hippocampus to examine whether FA has a role in attenuating brain injury after HI. Data were analyzed using Two-way analysis of variance (ANOVA) and Tukey's post-test when indicated. Differences were considered statistically significant if $p \leq 0.05$. All procedures were approved by the Ethical Committee at the UFRGS, Brazil (nº 23564).
Resultados e Conclusões:
Results showed that HI animals untreated had increased latency (HI-S 346,7±48.1); CT-S 209.0±34.1), time to complete the task (HI-S 445,3±44.5; CT-S 325.4±40.0) and number of incorrect nose pokes (HI-S 53.4±2.9; CT-FA 43.9±2.3) when compared to controls on ox-maze task. Also, fewer correct nose pokes it was observed in the HI animals untreated (HI-S 44.0±3.2; CT-FA 56.0±2.3) compared to controls, highlighting that HI caused memory and learning impairments. Furthermore, it was observed that FA animals had alleviated deficits in some parameters as latency and total time in the task compared to untreated animals (HI-S) during testing days. Regarding the effects of FA treatment, on some parameters of oxidative stress, neither nitrite levels nor total sulfhydryl content showed a significant difference between groups. In addition, epigenetic marker, HDAC has not changed its activity between groups. In conclusion, the HI model showed a learning impairment, which was partially reversed by FA. Additionally, neither oxidative stress nor epigenetic marker was affected by HI model or FA treatment. Taken together, the results of this work indicate that other parameters should be evaluated, as well as, other pathways involved in the formation of oxidative stress and neuronal death.
Palavras-chaves: Folic Acid, Neonatal hypoxia-ischemia, Ox-maze task
Agência Fomento: CNPQ

01.023 - MYELINATION AND GLYCOSAMINOGLYCANS ALTERATIONS ARE RELATED TO INCREASED EXCITABILITY AFTER CORTICAL MALFORMATION

MYELINATION AND GLYCOSAMINOGLYCANS ALTERATIONS ARE RELATED TO INCREASED EXCITABILITY AFTER CORTICAL MALFORMATION
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Instituição: 1 UFRJ - Universidade Federal do Rio de Janeiro (Av. Aluizio da Silva Gomes, 50 - Novo Cavaleiro, Macaé - RJ, 27930-560), 2 UFRJ - Universidade Federal do Rio de Janeiro (R. Prof. Rodolpho Paulo Rocco, 255 - Cidade Universitária, Rio de Janeiro - RJ)Introdução:
Cortical malformations during development, as microgyria, induce epileptiform activity, once the excitability is altered in the epileptogenic zone. Seizures arise when there is a change in the mechanisms that balance the excitation and inhibition. Histological features such as myelination and the presence of glycosaminoglycans (GAG's) of the extracellular matrix (ECM) increase excitability, by raising the conduction velocity and synaptic maturation, respectively.
Objetivos:
Therefore, we hypothesized that malformed cortices would be prone to convulsion due to an increase in excitability due to changes in myelination and GAG's in the ECM.
Métodos:
In order to test, we induced microgyria in Swiss mice on the postnatal day (PD) 1. After anesthesia with

ketamine and xylazine, the skull was exposed. A probe at -55 ° C was pressed against the skull in the parieto-occipital region for 5 sec (MG group). In the PD 12, animals submitted or not to the lesion, were exposed to febrile seizure (group MG + FS and group FS, respectively) by exposure to dry air (47-48ºC) until a generalized tonic-clonic convulsion occurred. Animals not submitted to any procedures were considered controls (CT group). In the PD 100, the brains were removed for quantification of GAGs in the parieto-occipital cortex through the measurement of hexuronic acid and histological analysis by immunoperoxidase to verify myelinization (anti-MBP) and number of oligodendrocytes (anti-CC1) in the corpus callosum (CC) and in white (WM) and gray matter (GM) of the cortex. The difference between the groups was tested using the ANOVA one-way test followed by Tuckey's post-hoc test. The experiments were approved in CEUA UFRJ-Macaé under protocol 0040.
Resultados e Conclusões:
Results were considered significant when $p < 0.05$. Our results show that the latency, in seconds, until the MG group presents a crisis is lower than the FS (486.3 ± 18.37 x 463.1 ± 19.87, respectively). The MG and MG + FS groups have increased GAG's in the parieto-occipital cortex compared to the CT group (0.0097 x 0.0102 x 0.0019, respectively). MG and MG + FS (37.27 ± 4.69 x 61.60 ± 5.17, respectively) had increase of CC1 in GM compared to CT group. MG and MG + FS (13.38 ± 4.41 x 20.60 ± 4.53, respectively) had increase of CC1 in WS compared to the CT group. MG (60.17 ± 5.73) had CC1 increase in CC compared to CT group. MG and MG + FS had increase of MBP in GM compared to the CT group (83 ± 6.684 x 87 ± 8.816 x 45.91 ± 3.507, respectively). There was no difference in MBP between groups in WM (105.5 ± 6.486 x 112.4 ± 6.672 x 86.18 ± 4.807). MG and MG + FS had increased MBP in CC compared to CT group (111.8 ± 6.176 x 113 ± 2.881 x 88.25 ± 7.707, respectively). The data suggest that cortical malformation predisposes the brain to convulsive crises, promoting the increase of oligodendrocytes, myelination and GAGs, and may reduce synaptic intervals, leading to cortical hyperexcitability.
Palavras-chaves: CORTICAL MALFORMATION, FEBRILE SEIZURE, MYELINATION
Agência Fomento: FAPERJ

01.024 - ASSOCIATION BETWEEN MALFORMATION IN THE VISUAL CORTEX AND EXCITABILITY IN RODENTS: POSSIBLE CORRELATION WITH NEUROPLASTICITY

ASSOCIATION BETWEEN MALFORMATION IN THE VISUAL CORTEX AND EXCITABILITY IN RODENTS: POSSIBLE CORRELATION WITH NEUROPLASTICITY
Autores: Luiza dos Santos Heringer 1, Julia Rios de Carvalho 1, Domethila Mariano de Souza Aguiar dos Santos 1, Suelen Adriani Marques 1, Ana Maria Blanco Martinez 1, Henrique Rocha Mendonça 1
Instituição: 1 UFRJ - UNIVERSIDADE FEDERAL DO RIO DE JANEIRO (R. Prof. Rodolpho Paulo Rocco, 255 - Ilha do Fundão)Introdução:
Polymicrogyria is the most prevalent malformation of cortical development, being correlated to the development of epilepsy. Normally occurring as a consequence of cytomegalovirus infection or reactivation during the third trimester of gestation, microgyria may be mimicked by transcranial freeze-lesion in neonatal mice. Epileptiform activity in the cortex adjacent to the lesion requires a temporal window to appear, suggesting that neuroplastic changes takes place within this period, leading to excitability.
Objetivos:
Thus, the aim of this study is to evaluate whether microgyria modulates the plasticity of the visual cortex after induction of microgyria.
Métodos:
For this, we induced microgyria through a transcranial freeze-lesion by a copper probe cooled to -55 ° C for 5 seconds in C57bl6 mice anesthetized by hypothermia on postnatal day 0 (PND0). In PND33, the animals were anesthetized with ketamine and xylazine and perfused transcardially with 4% paraformaldehyde. Then, the animals were dissected and submitted to immunohistochemical analysis. Alternatively, in DPN33, the unfixed brains were stained in Golgi-Cox solution, sectioned in a vibratome and mounted on histological slides. The procedures were approved in the animal ethics committee (protocol MAC040). The statistical analysis used was Student's t-test and the results were considered significant when $p < 0.05$.
Resultados e Conclusões:
Our results showed that the immunostaining of the GAP43 protein in the microgyria group showed a significant increase in the density of labeling when compared to the control group (n = 6: 416.8 ± 281; n = 6: 263.7 ± 217.2, respectively; p= 0.04), suggesting an increase in axonal plasticity. Through Sholl analysis of the photomicrographs, it is possible to measure the complexity of the dendritic tree, counting the number of intersections of dendrites with digital circumferences of growing radius centered in the soma

of granular (gr) and pyramidal (py) neurons (present in layers 4 and 5, respectively). Our results showed an increase in dendritic complexity in the group with microgyria (n = 7: gr 520. 4 ± 57.66, py 672.6 ± 50.7 ; p= 0.004) when compared to the control group (n = 5: gr 245.0 ± 33.87, py 421.0 ± 40.20 ; p= 0.004). The analysis of the number of spines in a 30 µm segment of the apical dendrite of pyramidal neurons showed an increase in the microgyria group (n = 7: 30.86 ± 3.86) when compared to the control group (n = 5: 13.2 ± 1.56; p= 0.03). Therefore, our results showed an increase in axonal and dendritic plasticity of both pyramidal and granular neurons, correlated with an increase of excitatory synapses in dendritic spines, thus suggesting an increase in cerebral excitability.
Palavras-chaves: Cortical dysplastic malformation, Microgyria, Neuroplastic
Agência Fomento: CNPq

01.025 - PROJEÇÕES GLUTAMATÉRGICAS DO NÚCLEO MEDIAL DA AMIGDALA EM CAMUNDONGOS

GLUTAMATERGIC PROJECTIONS OF THE MEDIAL NUCLEUS OF THE AMYGDALA IN MICE
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Instituição: 1 ICB-USP - Instituto de Ciências Biomédias da Universidade de São Paulo (Av. Prof. Lineu Prestes, 2415 - Butantã, São Paulo)Introdução:
The medial nucleus of the Amygdala (MEA) is described as gabaergic in rats (Trends in Neuroscience.21(8): 323-331, 1998), and because it receives dense afferents projections from the vomeronasal organ it conveys crucial information for modelling social behaviors (Comp. Neurol.360:213–45, 1995; Nat. Rev. Neurosci.4(7):551-62,2003). There is a lacking body of research reporting MEA projections and its chemical identity in mice, some of those studies suggest that MEA may have other chemical identities than only GABA (Cell Reports.26,1747-1758, 2019).
Objetivos:
The goal of this study is to describe the glutamatergic MEA projections, afferents and efferents, in mice.
Métodos:
Male (n=9) and female (n=6) transgenic mice Vglut2Cre (C57Bl/6 background) received 70nl of the anterograde virus (AAV5-EF1A-DIO-HCHR2(H134R)-EYFP) or retrograde virus (AAV-Retro- Ef1a-DO_DIO-Td Tomato_EGFP-WPRE-Pa) injected into the Medial Nucleus of the Amygdala (MEA). After approximately 21 days, animals were perfused, and the brains were collected and processed. One of the brain slices series was immuno-labelled for Green Fluorescent Protein (GFP). The analysis was conducted by describing qualitatively the projections observed. All the manipulations were approved by the Ethical Committee (CEUA-ICB/USP nº 58/2016).
Resultados e Conclusões:
RESULTS: For the anterograde study, once it was cre-dependent, affecting only glutamatergic MEA efferents expressing EYFP. In the same line, for the retrograde, only glutamatergic afferents expressed EGFP. As efferents, MEA showed projections to the medial pre-optic nucleus (MPN), the Ventromedial Hypothalamus nucleus (VMH), the Premamillary nucleus, Ventral part (PMV) and the Bed nucleus of the Stria Terminalis (BST). The patterns of afferents was observed to have the same connections as the retrograde injections, meaning that MPN, VMH, PMV and BST also projects to MEA. No differences between males and females were observed in terms of projections density or brain sites. CONCLUSION: In our experiments, glutamatergic afferents and efferents of the Medial nucleus of the Amygdala was accessed by the use of a transgenic mouse expressing Cre only on glutamatergic neurons and the injection of cre-dependent viruses. Our data showed that the anterograde MEA tracing match the projections previously described as efferents of the anterior region of the MEA (Comp. Neurol.360:213–45, 1995). We observed in these Vglut2Cre animals, both males and females, bidirectional projections to MPN, VMH, PMV and BST.
Palavras-chaves: Amygdala, glutamate, neuroanatomy, adeno-associated virus
Agência Fomento: Fundação de Amparo a Pesquisa do Estado de São Paulo (FAPESP)

01.026 - EFEITOS DO ETANOL NA NEUROGÊNESE

ACUTE EFFECTS OF ETHANOL ON THE NEUROGENEIS
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Instituição: 1 Unifal - Universidade Federal de Alfenas - MG (aboratory of Biomathematics, Department of Anatomy, Institute of Biomedical Scie)Introdução:
The development of the central nervous system involves a series of programmed cellular and molecular events that could be disorganized by use of some kind of drugs during the pregnancy in humans and animals. Therefore, health care for the mother is essential for the future health of the offspring, mainly for humans.

Objetivos:
The goal this work was to study the alterations in the neocortex layers in rats born from treated females with acute injection of ethanol.
Métodos:
Female Wistar rats (180-230 g) were used. On the 12th day of pregnancy (E12), 12 rats received three intraperitoneal injections of a 20% ethanol solution (3 g of ethanol/kg of body weight), at 8 h intervals and six control pregnant rats received saline injections of 0.9%. All rats received a single intraperitoneal injection of BrdU (5 mg/mL in 0.9% NaCl, containing 70 mM NaOH) at a dose of 60 mg/kg 2 h after the last injection of ethanol or saline solution. On the 8th day of postnatal life (P8), the brains were removed and processed for histological analysis. Data were analyzed statistically using parametric statistic [mean comparison] and Student's t-test, with a value of $p < 0.001$ indicating significance.
Resultados e Conclusões:
Results: In quantitative terms, the number of cells was lesser in rats treated with ethanol than to controls to each lobe and to total count in all lobes (frontal, parietal, temporal and occipital) considering absolute numeric data and after statistical analysis of means comparison with T-test to $p < 0,001$. The main alterations observed in ethanol treated animals were ectopic neurons with pyramidal shape found in layer I (molecular layer) and heterotopic groups into molecular and external granular (layer II) layers. Cell depopulation in deep layers, manly V and VI (pyramidal internal and fusiform layers, respectively) was observed qualitatively and quantitatively. Apoptotic cells characterized by pyknotic nuclei were observed in heterotopic clusters and a putative radial pathway to pia mater was found by observation of a line of nuclei.
Conclusions: In conclusion, the acute effects on the ethanol in the birthday neurons present histological aspects similar to the chronic exposition on the neocortical layers.
Palavras-chaves: Neocortex, Drugs, Neurogenesis
Agência Fomento: Nenhuma

01.027 - MEDIDAS PSICOFÍSICA E ELETROFISIOLÓGICA DE ACUIDADE VISUAL DE CRIANÇAS COM A SÍNDROME CONGÊNITA DO ZIKA VÍRUS

PSYCHOPHYSICAL AND ELECTROPHYSIOLOGICAL MEASURES OF VISUAL ACUITY OF CHILDREN WITH CONGENITAL ZIKA VIRUS SYNDROME

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Instituição: 1 UFPE - Universidade Federal de Pernambuco (Av. Prof. Moraes Rego, 1235 - Cidade Universitária, Recife - PE, 50670-901)Introdução:
Introduction: Congenital Zika Virus Syndrome (CZVS) causes various morphofunctional disorders in the body. The most recurrent dysfunctions are neurological, sensory and articular, including microcephaly, dilated cerebral ventricles, maculopathies, arthrogryposis, among others.
Objetivos:
Objectives: This research has the objective of investigate the visual acuity (VA) and the operation of the visual pathways of infants with CZVS, using the Flash Visual Evoked Potential (FVEP), Pattern-Reversal Visual Evoked Potential (PRVEP), and Teller Acuity Cards (TAC II).
Métodos:
Methods: Were included in the sample 8 children aged between 21 and 24 months, diagnosed with CZVS. For the VEP exam, the EEG actiCHamp 32-channel was used, at a 250Hz sample frequency. With the help of an adjustable headband, four (4) electrodes were positioned on the patient's scalp, according to the 10-20 international system: two (2) active electrodes (O1 and O2), one (1) reference electrode (Fpz), and one (1) grounding electrode (Cz). In subsequent moments they observed two stimuli: (i) photic, (ii) reverse pattern, both with stimulus presentation frequency of 1Hz. For the Teller Acuity Cards (TAC) the cards with the stimuli were presented in a sequential fashion from the progressive spatial frequency.
Resultados e Conclusões:
Outcomes: The differential statistical analysis completed in the comparison between the clinical group and the normative standard showed that there was no significant differences regarding the visual performance: for the stimulus "1.2X1,2" and "2.4X2.4" the Clinical Group had a higher mean position than the Standardized, but not statistically significant ($U = 21$, $p = 0.271$), and ($U = 13$, $p = 0.05$) respectively.*$p < 0,05$. However, the descriptive datas (reduced amplitude values of the P100 wave in more than 50% of the sample) suggest a trend for visual acuity impairment in the clinical group in comparison with the normative performance. The descriptive analysis also demonstrated latency values in accordance to the expected average (between 100 and 130ms), which suggests the preservation of the axonal myelination. Nevertheless, great variations of amplitude on both

waves were observed, which could denote inefficient operation of the patient's visual system – the changes are related to the macular vision, to the visual acuity. For the Teller Acuity Cards (TAC II) the results were inconclusive due to the patient's evasive behavior. Conclusions: Due to sampling error, it was not possible to find statistically significant differences in the visual acuity of the infants with CZVS in comparison with the normative standard, however, the descriptive data shows tendency to visual acuity impairment in this population. Nevertheless, in order to validate this interpretation it is necessary further investigations with expanded sample. Ethics Committee: 2337190
Palavras-chaves: Zika Vírus, Microcephaly, Visual Evoked Potential, Teller Acuity Cards
Agência Fomento: Capes

01.028 - INFLAMAÇÃO SISTÊMICA NEONATAL: AVALIAÇÃO A LONGO PRAZO DA DENSIDADE DE MICRÓGLIA E CÉLULAS DE PURKINJE, EXPRESSÃO DE TNF-α E PRODUÇÃO DE ESTRESSE OXIDATIVO NO CEREBELO DE RATOS.

NEONATAL SYSTEMIC INFLAMMATION: LONG TERM EVALUATION OF MICROGLIA AND PURKINJE CELL DENSITY, EXPRESSION OF TNF-α And Production Of Oxidative Stress In The Rat's Cerebellum.
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Instituição: 1 UNIFESP - Universidade Federal de São Paulo (Rua Pedro de Toledo, n 669, Vila Clementino, São Paulo, Brasil.), 2 IDOR - Instituto Dor de Pesquisa e Educação (Rua Diniz Cordeiro, n 30, Botafogo, Rio de Janeiro, Brasil.)Introdução:
The central nervous system is especially vulnerable in the neonatal period. Injection of lipopolysaccharide (LPS) at different neurodevelopmental stages produces long term consequences in several brain structures, however little is known regarding alterations in the cerebellum.
Objetivos:
To evaluate the long term consequences for the cerebellum of a systemic inflammatory process induced by neonatal LPS injection.
Métodos:
The project was approved by CEUA-UNIFESP (N. 9781020317). Neonatal rats (Wistar, male) were randomly assigned to three different groups: Naive (n=9), Saline (SAL; n=8) and LPS (1mg/Kg; n=11). The solutions were systemically injected (i.p.) on post-natal (PN) days PN1, PN3, PN5 and PN7. At PN89 animals were euthanized and the cerebellum was processed for molecular biology or histological analysis. Fresh tissues were used for assessment of mRNA expression of the pro-inflammatory cytokine tumor necrosis factor alpha (TNF- α) through qPCR. Perfused tissues were used to evaluate the microglia and Purkinje cell density by immunofluorescence and the oxidative stress level was assessed with dihydroetidine (DHE).
Resultados e Conclusões:
Our results showed increased oxidative stress in the cerebellum of LPS rats, as evidenced by higher fluorescence signal of the DHE staining ($F(2, 11) = 22.100$; $p < 0.0002$, Anova). Stereological analyses also indicated increased microglia density in LPS rats ($F(2, 12) = 6.927$; $p < 0.010$, Anova). Nonetheless, these changes were not followed by Purkinje cell loss or alteration in TNF- α expression in adult animals. Interestingly, despite normal neuronal density, we observed Purkinje cells ectopically positioned in the granular and molecular layers in animals of the LPS group. Our data suggest that neonatal LPS exposure causes persistent alterations in the cerebellum, indicating the susceptibility of this region to systemic inflammatory insults early in life. Further investigation of the consequences of these changes and the development of strategies to avoid those should be subject of future studies.
Palavras-chaves: Neonatal, Cerebellum, Purkinje cell, Inflammation, Lipopolysaccharide
Agência Fomento: CAPES; FAPESP.

01.029 - A HIPÓXIA-ISQUEMIA NEONATAL EM RATOS INDUZ DÉFICITS DE APRENDIZADO E MEMÓRIA NÃO REVERTIDOS POR UMA ÚNICA DOSE DE METILFENIDATO

NEONATAL HYPOXIA-ISCHEMIA IN RATS INDUCED LEARNING AND MEMORY DEFICITS A SINGLE-DOSE OF METHYLPHENIDATE DID NOT IMPROVE THESE DEFICITS
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Attention-deficit/hyperactivity disorder (ADHD) is a neurodevelopmental disorder characterized by inattention, hyperactivity and/or impulsivity that often impairs learning and memory. We have shown that neonatal hypoxia-ischemia (HI) induced ADHD-like behaviors in rats, such as impulsivity and attentional inflexibility, and that methylphenidate (MPH) administration - the first-line treatment for ADHD - was able to reverse these deficits.
Objetivos:
In the present study, we aimed to evaluate learning and memory of young HI rats after MPH administration as well as hippocampal BDNF levels.
Métodos:
Male Wistar rats (CEUA: 29750) were divided into 4 groups: control saline (CTS), CTMPH, submitted to HI saline (HIS) and HIMPH. On the 7th postnatal day (PND) the animals were submitted to the Rice-Vanucci HI model and on the 31st PND they received the MPH injection (2.5 mg/kg, intraperitoneally) 30 min prior the Novel Object Recognition Test (NOR) (n=11-13/group). Another group of animals did not perform the task and received daily MPH injections for 15 days for the BDNF (ELISA) assay – hippocampus collected 30 min after the last injection (n=5-7/group). Statistical analysis was performed using two-way ANOVA followed by Tukey's post hoc test and significant results were considered when $p < 0.05$. BDNF levels were expressed as a percentage compared to the CTS group.
Resultados e Conclusões:
The ANOVA indicated lesion ($F(1,45)=11.19$, $p=0.002$) and treatment effects ($F(1,45)=6.99$, $p=0.002$) and a trend towards lesion*treatment interaction effect ($F(1,45=3.6$, $p=0.062$) for the preference index in the NOR test. Tukey test indicated that the CTS group had a higher preference index for the novel object (0.39 ±0.05) when compared to all other groups (CTMPH: 0.13 ±0.05; HIS 0.1 ±0.05; HIMPH 0.05 ±0.05). These results indicate that both the HI procedure and the MPH treatment impaired the animals' ability to discriminate the novel object. In the BDNF levels, expressed as percentage of control, injury ($F(1,23)=7.89$, $p=0.010$) and treatment effects ($F(1,23)=7.59$, $p=0.011$) were observed in the ipsilateral hippocampus. Tukey's test showed that the HIMPH group had an increase in BDNF levels (252.09 ±26.7) compared to all other groups (CTS: 100 ±26.7; CTMPH: 128.46 ±26.7; HIS: 129.93 ±28.9). The neonatal HI model in rats causes learning and memory deficits similar to those observed in individuals with ADHD. A single dose of MPH did not recover this memory deficit in the HI group but impaired the performance in the CT group. MPH treatment (15 days) increased BDNF levels in the hippocampus of HI animals, therefore functional assessments after chronic treatment should be considered to understand whether this increase in BDNF affects cognitive performance.
Palavras-chaves: Attention-deficit/hyperactivity disorder, methylphenidate administration, neonatal hypoxia-ischemia , cognition
Agência Fomento: CNPQ E CAPES

01.030 - EFEITO DA EXPOSIÇÃO AO ETANOL NO TERCEIRO TRIMESTRE EQUIVALENTE COMBINADO COM ESTRESSE POR SEPARAÇÃO MATERNA NA ATIVIDADE LOCOMOTORA E NO COMPORTAMENTO TIPO-ANSIOSO EM RATOS ADOLESCENTES

EFFECT OF THIRD TRIMESTER-EQUIVALENT ETHANOL EXPOSURE COMBINED WITH MATERNAL SEPARATION STRESS ON LOCOMOTOR ACTIVITY AND ANXIETY-LIKE BEHAVIOR IN ADOLESCENT RATS

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Instituição: 1 UFSC - Universidade Federal de Santa Catarina (Campus João David Ferreira Lima, s/n - Trindade, Florianópolis/SC)Introdução:
Prenatal ethanol exposure (PAE) can damage the developing nervous system, producing long-lasting impairments in both brain structure and function. In addition, mothers who drink alcohol may become negligent about maternal care. In an attempt to better represent the etiology of fetal alcohol spectrum disorder (FASD) and the associated psychological deficits, PAE was followed by maternal separation (MS) in a rat model to account for the effects of early-life adversities in addition to PAE.
Objetivos:
To evaluate the effects of PAE, combined with MS, during the brain development period corresponding to the third trimester of human gestation, can affect locomotion and the development of anxiety-like behavior in adolescent rats.
Métodos:

Pregnant Wistar rats (n=8) were provided by the Animal Care Facility of the UFSC. On postnatal day 2 (PND2), the offspring were organized into four groups: Control, Ethanol (EtOH), MS, and EtOH+MS. EtOH was administrated (5g/kg/day, i.p., 25% in saline) on PNDs 4, 6, 8 and 10. MS was performed for 13 days (PND 2-14), during 3h/day. After weaning (PND21), the groups were separated by sex (M and F, n=8). The parameters analyzed were locomotor activity and anxiety-like behavior (PND40), using the open field test (OFT). All animal procedures were approved by the Committee on Ethics of Animal Experimentation of the UFSC (number: 6980201116). All data were analyzed using two-way ANOVA for condition (EtOH or vehicle) and stress (MS or non-MS), followed by the Duncan post hoc test. Results are expressed as mean ± S.E.M. and are considered statistically significant if $p < 0.05$.
Resultados e Conclusões:
In the OFT, the SM group traveled a greater total distance (39.16±1.3) compared with the EtOH (33.94±2.1) and Control (31.82±2.0) groups ($p < 0.05$ and $p < 0.01$), had higher mean velocity (0.1097±0.0035) compared to all other groups, EtOH (0.0947±0.0057; $p < 0.05$), EtOH+MS (0.0944±0.0049; $p < 0.05$) or Control (0.0885±0.0055; $p < 0.01$) and had more mobility time (279.03±5.5) compared to control (264.33±5.0; $p < 0.05$). Also, the SM group spent more time in the central zone (15.42±1.7) compared to the EtOH+SM (10.76±1.5) and EtOH (9.17±1.6) groups ($p < 0.05$ and $p < 0.01$), and spent less time in the corners (154.47±4.6) compared to all the others groups, EtOH+MS (170.66±5.5; $p < 0.05$), EtOH (172.39±5.9; $p < 0.05$) and Control (183.41±4.2; $p < 0.01$). In conclusion, MS per se increased hyperactivity; however, MS animals exposed to EtOH did not differ from control group. In addition, MS per se seems to reduce anxiety-like behavior in adolescent rats, which may be reflected in increased risky behavior. EtOH per se, administered in the third trimester equivalent to human gestation, had no effect on the parameters analyzed in adolescent rats. However, when combined with MS (EtOH+MS), EtOH appears to reduce hyperactivity and increase anxiety-like behavior compared to the MS group.
Palavras-chaves: Adolescence, Anxiety, Locomotion, Maternal separation, Prenatal ethanol exposure
Agência Fomento: Capes

01.031 - COMPARAÇÃO DA MORFOLOGIA NEURONAL DAS ÁREAS CORTICAIS DO TROPIDURUS HISPIDUS (Squamata, Tropiduridae)

COMPARATIVE NEURONAL MORPHOLOGY OF THE CORTICAL AREAS IN TROPIDURUS hispidus (Squamata, Tropiduridae)
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Instituição: 1 UFS - Universidade Federal de Sergipe (Av. Marechal Rondon, s/n - Jardim Rosa Elze, São Cristóvão - SE, 49100-000)Introdução:
Tropical lizard Tropidurus hispidus has been studied because a significant adult neurogenesis (regardless of injury) and there are theories of homologies between reptile cortex and the neocortex of mammals. In this study we analyzed the neuronal soma morphology in the different cortex regions of T. hispidus, differentiating adult neurogenesis from prenatal neurogenesis.
Objetivos:
Description of neuronal soma morphology across different cortical regions in Tropidurus hispidus.
Métodos:
Six lizards were anesthetized with Xylazine and Ketamine and transcardiac perfused with phosphate buffered saline and paraformaldehyde. The slices were stained using Nissl protocol or DCX immunohistochemistry. A Olympus microscope (40X) was used for to images capture and cell count were made in the software Image J and the data found analised with Graphpad Prism.
Resultados e Conclusões:
In the dorsal-medial cortex, in Nissl, the highest value was found in oval sum cells, with averages 141.8 ± 7.920; 309.2 ± 17.07 and 455.8 ± 35.3 (respectively per region) in DCX, the highest value was elongated pyramidal (38.25 ± 6.175, 29.72 ± 2.133 e 24.90 ± 3.350). In the medial cortex, Nissl, pre-commissural, the values found for oval and pyramidal approaches (129,4 ± 3,103 e 119,7 ± 3,904) with P= 0,0534; in the comissural oval were more frequent 121.4 ± 2,899 as well as in the post-commissural 139.5 ± 3.168; in DCX, the values found were higher for pyramidal (14.84 ± 0.9754; 18.64 ± 1.471 and 14.83 ± 0.7598). In the dorsal, pre-commissural cortex, the most found type of neural sum was the oval (122.3 ± 4.027); in the comissural, oval (136.89 ± 2.943) and elongated pyramidal (132.5 ± 2.002) had approximate values with P= 0.218; in the post-commissural the elongated

pyramidal was higher, and in DCX, the most usual was elongated pyramidal with means: 7.35 ± 0.9272, 7.53 ± 0.6595 and 4.79 ± 0.5983 respectively. In the lateral cortex, in Nissl, ovate showed the highest mean (259.7 ± 16.67 and 254.3 ± 6.218), and in DCX, the most frequent somatic type was the elongated pyramidal (39.87 ± 4.153 and 13.5 ± 3.777). Conclusion: We verified that neurons from the embryonic period, stained with Nissl protocol have abundance of neurons with oval and elongated pyramidal soma, while pyramidal soma were significantly less frequent in all studied areas. Similar results were found on postnatal neurons, labeled with DCX, with expected volume significantly lower than those stained with Nissl protocol, however more studies should be done to visualize reptiles and mammals cortical homologies.
Palavras-chaves: Morfologia neuronal, Áreas corticais, Tropidurus hispidus
Agência Fomento: Fapitec/SE

03. Glia

03.007 - GLYPHOSATE-BASED HERBICIDE DECREASES MITOCHONDRIAL CONTENT AND INDUCES AUTOPHAGY IN RAT ASTROGLIOMA CELL LINE

GLYPHOSATE-BASED HERBICIDE DECREASES MITOCHONDRIAL CONTENT AND INDUCES AUTOPHAGY IN RAT ASTROGLIOMA CELL LINE
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Instituição: 1 UFSC - Universidade Federal de Santa Catarina (Rod. Ulysses Gaboardi, Km3. Curitibanos-SC.)Introdução:
Glyphosate [N-(phosphonomethyl) glycine] is an active ingredient of many herbicides. Formulations contain around 36-48% glyphosate and water, salts and adjuvants such as ethoxylated alkylamines and it is known that glyphosate-based herbicides are more toxic than this compound per se. Some studies have demonstrated that glyphosate formulations cause neurotoxicity related with oxidative stress, alterations on glutamatergic system, inhibition of acetilcholinesterase and mitochondrial dysfunction. However, the effect of herbicide exposure in astrocytes are unclear.
Objetivos:
The aim of this study was to analyze the effects of micromolar concentrations (0, 40 or 80 µM) of a glyphosate-based herbicide in mitochondrial mass, nuclear area and autophagy induction in rat astroglioma cell line (C6 cells) after 24 hours exposure.
Métodos:
Cells grown in coverslips were stained with Mitotracker® and DAPI or they were incubated with ATG16L1 or LC3B antibodies to analyze autophagy by immunofluorescence. Samples were observed under a conventional fluorescence microscope and they were analyzed using ImageJ software.
Resultados e Conclusões:
Mitochondrial mass was decreased by glyphosate-based herbicide in rat astroglioma cell line in a concentration-dependent manner [Kruskal-Wallis(2,93) = 14.44, $P < 0.001$; β(linear regression) = -0.04828; $P < 0.01$]. It also might be observed that cells exposed to the herbicide present changes in nuclear morphology: these cells have condensed nucleus with a smaller size than compared to controls and this effect was in a concentration-dependent manner [$F(2,92) = 33.82$, $P < 0.0001$; β(linear regression) = -0.2266; $P < 0.0001$]. Due to the decrease on mitochondrial mass, autophagy induction also was investigated. It was possible to observe that glyphosate-based herbicide increased the number of ATG16L1 and LC3B positive cells in the lowest concentration used (40 µM) [ATG16L1: Kruskal-Wallis(2,95) = 10.64; $P < 0.01$; LC3B: $F(2,90) = 4.776$; $P < 0.05$]. In conclusion, it was observed that the glyphosate-based herbicide decreases mitochondrial mass and provokes changes in nuclear morphology. Furthermore, the herbicide at low concentrations induced autophagy to remove dysfunctional organelles from the cell, which may avoid cell death. However, an excessive autophagy can lead to cell to death; thus, more studies are needed to clarify the role of autophagy in astrocytes exposed to a glyphosate-based herbicide.
Palavras-chaves: Autophagy, Glyphosate, Mitochondria
Agência Fomento: CNPq

03.008 - ESTADO ANTIOXIDANTE DE CÉLULAS DE ASTROGLIOMA DE RATOS EXPOSTAS A NEOPTERINA

ANTIOXIDANT STATUS OF RAT ASTROGLIOMA CELL LINE EXPOSED TO NEOPTERIN
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Instituição: 1 UFSC - Universidade Federal de Santa Catarina (Florianópolis, SC, Brasil), 2 UFSC - Universidade Federal de Santa Catarina (Araranguá, SC, Brasil)Introdução:

Neopterin, a well-established biomarker for immune system activation, is found at increased levels in the cerebrospinal fluid of individuals affected by neurological and neurodegenerative diseases (Journal Psych. Res. 47: 1417, 2013). Recently, our research group has shown that neopterin enhances cognition by anti-inflammatory pathways in mice and inhibits NLRP3 inflammasome activation in human astrocytes (Brain Behav. Immun. 56: 156, 2016; Free Rad. Bio. Med. 115:371, 2018).
Objetivos:
Here, it was investigated neopterin effects on the antioxidant status of rat astrocytes.
Métodos:
The rat astroglioma C6 cell line was obtained from the American Type Culture Collection (Rockville, Maryland, USA). The cells were exposed to neopterin (0-500 nM) for 24 hours and either collect or further exposed to LPS (5 µg/mL) for 24 hours. The antioxidant status was evaluated through the quantification of the mitochondrial complexes I (CI) and IV (CIV) activity and the lactate and hydrogen peroxide (H_2O_2) production by spectrophotometry. In addition, the basal oxygen consumption was measured using the Seahorse oximeter, and the content of the antioxidant enzyme hemeoxygenase-1 (HO-1) and the cytosolic and nuclear fractions of the transcription factor Nrf2 were analyzed by Western blot.
Resultados e Conclusões:
Neopterin (50nM) exposure per se increased the mitochondrial complexes I and IV activity (CI: $[t(4)= 5.45; P < 0.001]$; CIV $[t(4)=4.38; P < 0.001]$) and the basal oxygen consumption $[t(4)=11.02; P < 0.001]$, indicating an increased oxidative metabolism, denoted by increased oxygen consumption and reduced lactate production $[F(3,25)=14.13; P < 0.001]$. Moreover, neopterin antioxidant effect was also investigated in the presence of an inflammatory stimulus. The 24 h exposure to neopterin attenuated LPS-induced H_2O_2 production $[F(1,8)=14.45; P < 0.01]$. In order to elucidate the mechanisms by which neopterin exert its antioxidant effects, it was investigated Nrf2 activation. The exposure of rat astrocytes to neopterin (50 nM; 3 h) significantly increased the content of Nrf2 $[t(3)=5.81; P < 0.01]$, and elicited a significant nuclear translocation of the Nrf2 starting 1 h after the exposure, and remaining activated for at least 4 h $[F(4,10)=18.21; P < 0.001]$. In addition, neopterin (50 nM; 24 h) increased the content of the antioxidant enzyme hemeoxygenase-1 (HO-1) $[t(4)=4.38; P < 0.05]$, which synthesis is triggered by Nrf2. It was observed that neopterin induces the nuclear translocation of the transcription factor Nrf-2, consequently triggering the increased synthesis or activity of its antioxidant targets. Altogether, this strongly suggests that neopterin production in the central nervous system contributes for a balanced antioxidant status, potentially contributing for the pteridine anti-inflammatory effects.
Palavras-chaves: antioxidant status, Neopterin, rat astroglioma
Agência Fomento: CNPq e CAPES

03.009 - EFEITO DO EXERCÍCIO FÍSICO NA GLIA ESTRIATAL EM UM MODELO BILATERAL DA DOENÇA DE PARKINSON

EFFECTS OF PHYSICAL EXERCISE ON THE STRIATAL GLIA IN A BILATERAL MODEL OF PARKINSON'S DISEASE

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Instituição: 1 UFRJ - Universidade Federal do Rio de Janeiro (Av. Carlos Chagas Filho, 373 - CCS)Introdução:
Parkinson's disease (PD) is a neurodegenerative, chronic and idiopathic condition, related to depleted dopamine levels with death of nigrostriatal dopaminergic neurons. Glial cells, such as astrocytes and microglia, are involved and contribute to neuroinflammation, showing an important role in functional recovery/maintenance against such condition. Studies have suggested that physical exercise can contribute to neuroprotection for neurodegenerative diseases; however, the cellular mechanisms involved are not fully understood.
Objetivos:
The aim of this study was to verify the possible effects of physical exercise on the striatal glia and tyrosine hydroxylase (TH) content in a bilateral model of PD induced by 6-hidroxydopamine (6-OHDA).
Métodos:
Male Swiss mice were submitted to bilateral striatum stereotaxic surgery. In control animals (CA), saline was injected, and experimental animals received 6-OHDA. The animals were divided into four groups: sedentary control (SC), trained control (TC); Parkinson sedentary (PS) and Parkinson trained (PT); and animals from TC and PT groups were submitted to treadmill training (CEUA: UFRJ 008/16).
Resultados e Conclusões:

Immunohistochemistry and Western blotting showed that after 6-OHDA injection, loss of axonal branching in striatal dopaminergic neurons occurred, and that after physical exercise, axonal branches were positive for TH. Additionally, a decrease of striatal glial fibrillary acidic protein (GFAP), which labels astrocytes, was seen in PS compared to CA (p < 0, 05; N=5; SC: 144,6+/- 18,5; TC: 180,5+/-22,4; PS: 110,6+/-19,2; PT: 167,3+/-12,9). However, an increase in GFAP labeling in PT compared to PS group was observed (p < 0,05; GFAP/Actin: 1,0+/- 0,1), which implies that physical exercise was able to return GFAP levels to control group conditions. Preliminary results for microglia, labeled with Iba1 antibody, have shown a possible decrease density of PS and PT groups compared to CA in Western blotting. Nevertheless, the density of microglia of PT increased compared to PS in the same method. In immunohistochemistry for Iba1, the CA, apparently, showed more cells with small cell bodies and numerous processes compared with PS and PT. These, showed bigger cell bodies and less processes. These data indicate a possible morphological change associated with microglia activation. Our results suggest that TH and glia, astrocytes and microglia, are positively regulated by physical exercise in Parkinson´s disease.

Palavras-chaves: Glia, Neurodegeneration, 6-Hydroxydopamine, Physical exercise
Agência Fomento: Faperj, Capes e CNPq

03.010 - RESPOSTAS PRÓ-INFLAMATÓRIAS DE ASTRÓCITOS NO ESTRIADO DE CAMUNDONGOS DISCINÉTICOS SÃO INDUZIDAS PELO GLUTAMATO

ASTROCYTE PRO-INFLAMMATORY RESPONSES IN THE STRIATUM OF THE DYSKINETIC MICE ARE ELICITED BY GLUTAMATE.

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Objetivos:
Here, we addressed the hypothesis that L-DOPA-induced dyskinesia (LID) is favored by a glial-dependent pro-inflammatory environment caused by L-DOPA treatment and, consequently, abnormalities in the cortical glutamatergic neurotransmission
Métodos:
To this aim, we used 6-OHDA-lesioned C57BL/6 dyskinetic mice (L-DOPA 25 mg/kg + benserazide 10 mg/kg i.p. for 21 days) to quantify striatal inflammatory markers. Using purified cultures of astrocytes and microglia, we tested the possible role of L-DOPA/Dopamine (DA) and glutamate (GLU) in the induction of neuroinflammatory events in LID.
Resultados e Conclusões:
LID development was accompanied by striatal astrocyte and microglia activation and by an elevation of the cytokines TNF- α, IL-1 β and IL-6 in the denervated dorsal striatum. The anti-dyskinetic treatment with cannabidiol (CBD) and capsazepine (CPZ) (30 mg/kg, 5 mg/kg, i.p.) partially reduced TNF- α production while having no effect on IL-1 β and IL-6 or glial expression. While L-DOPA or DA failed to induce a pro-inflammatory response in both types of glial cells in the in vitro model, GLU increased the expression of the astrocytic marker GFAP and the production of TNF- α by astrocytes. The treatment of CBD and CPZ abolished the increase of GFAP expression and TNF- α production triggered by GLU in astrocytes. By using purified cortical neurons cultures, we also demonstrated that chronic treatment with TNF- α (50 ng/ml) stimulated GLU release, and CBD+CPZ prevented this effect. Overall, we conclude that the TNF- α produced by GLU-activated astrocytes might have a crucial role in promoting LID through local amplification of cortical GLU release in a process resembling a vicious circle.

Palavras-chaves: L-DOPA, microglia, citocinas, neuroinflamação, doença de parkinson
Agência Fomento: FAPESP 2017/14207-7

03.011 - RECEPTOR CANABINOIDE CB1 MODULA OLIGODENDROGÊNESE EM CÉLULAS HIPOCAMPAIS DE RATOS PÓS-NATAIS EM CULTURA ESTIMULADA PELO MEIO CONDICIONADO DA GLIA EMBAINHANTE OLFATÓRIA

CB1 CANNABINOID RECEPTOR MODULATES OLIGODENDROGENESIS IN POSTNATAL RAT HIPPOCAMPAL CELLS IN CULTURE STIMULATED BY OLFACTORY ENSHEATHING GLIA-CONDITIONED MEDIUM

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Instituição: 1 UFRJ - Universidade Federal do Rio de Janeiro (Avenida Carlos Chagas Filho, 373 - Sala C 1-027, Cidade Universitária), 2 ICB - Istituto di Chimica Biomolecolare (Via Campi Flegrei, 34 - 80078 Pozzuoli), 3 HMS - Harvard Medical School (25 Shattuck Street Boston, Massachusetts, 02115), 4 MGH - Massachusetts General Hospital (55 Fruit Street Boston, Massachusetts - 02114)Introdução:
Olfactory ensheathing glia (OEG) are key players in promoting axonal growth and/or myelination. On the other hand, the endocannabinoid system (ECS) is conserved in mammalian and non-mammalian species, formed by selective receptors, endocannabinoids and a group of enzymes. Both olfactory ensheathing glia and endocannabinoid system were shown to promote neurogenesis and oligodendrogenesis in the central nervous system.
Objetivos:
The aim of the study was to investigate whether the ECS is expressed in OEG and if it plays any role in the release of endocannabinoids as trophic support to mediate differentiation of oligodendrocytes in hippocampal cell cultures.
Métodos:
Hippocampal mixed cell cultures were obtained from postnatal Wistar rats and OEG primary cell cultures were obtained from adult Wistar rats, as described in Carvalho et al., 2014. The OEG conditioned medium was collected, filtered, and used in hippocampal cultures, or processed for quantification of endocannabinoids. The cells, either hippocampal or OEG, were processed for Western blotting or immunocytochemistry; the OEG cells were also processed for qRT-PCR.
Resultados e Conclusões:
qRT-PCR data show that OEG express markers of ECS (cannabinoid receptor type 1 (CB1), fatty acid amide hydrolase (FAAH) and monoamine glycerol lipase (MAGL) (n=3). Western blot (n=3) and immunocytochemistry (n=5) confirmed the expression of CB1 and MAGL protein levels. Endocannabinoids anandamide (AEA), 2-arachidonoylglycerol (2-AG), and related molecules palmitoylethanolamide (PEA) and oleoylethanolamine (OEA) levels were found in the olfactory ensheathing glia conditioned medium (OEGCM) (AEA: 0.8571 ± 0.2254, 2-AG: 7.478 ± 3.497, PEA: 33.00 ± 6.910, OEA: 6.793 ± 1.674) (n=10, $p < 0,05$). OEG cell cultures treated with either URB597 (10-9 M), a selective inhibitor of FAAH or with JZL184 (10-9 M), a selective inhibitor of MAGL, increased OEA (control: 6.793 ± 1.674, iFAAH: 11.34 ± 2.882, iMAGL: 9.893 ± 2.522) and 2-AG levels (control: 7.478 ± 3.497, iFAAH: 11.05 ± 4.256, iMAGL: 15.72 ± 5.898) in OEGCM (n=10, $p < 0,05$). Addition of OEGCM increased the number and the degree of complexity of OL arborization revealed through O4 (DMEM/F12 0.6500 ± 0.9147, NB27: 0.8500 ± 0.5000, OEGCM 3.700 ± 0.8406, AM251: 0.9333 ± 0.3055, OEGCM+AM251: 1.767 ± 0.6658) (n=3, $p < 0,05$) or myelin basic protein (MBP) staining (DMEM/F12: 0.1533 ± 0.1501, NB27: 1.033 ± 0.4509, OEGCM: 3.000 ± 1.000, AM251: 1.633 ± 0.3512, OEGCM+AM251: 1.633 ± 0.3512) (n=3, $p < 0,05$), while treatment with AM251 inhibited it. Our data reveal the role of CB1 receptor in the oligodendrogenesis-induced by OEGCM in mixed cell cultures of early postnatal hippocampus.
Palavras-chaves: cannabinoid, oligodendrocyte, olfactory ensheathing glia, Olig-2, anandamida
Agência Fomento: FAPERJ, CNPq, CAPES, INNT-INCT

06. Membranas Excitáveis e Canais Iônicos

06.001 - CONTROLANDO NEURÔNIOS DO CÓRTEX PRÉ-FRONTAL COM OPTOGENÉTICA: DA PADRONIZAÇÃO METODOLÓGICA À VALIDAÇÃO IMUNOISTOQUÍMICA E ELETROFISIOLÓGICA

CONTROLLING PREFRONTAL CORTEX NEURONS WITH OPTOGENETICS: FROM METHODOLOGICAL STANDARDIZATION TO IMMUNOHISTOCHEMICAL AND ELECTROPHYSIOLOGICAL VALIDATION

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Instituição: 1 FMRP/USP - Universidade de São Paulo (Avenida Bandeirantes, 3900. Faculdade de Medicina de Ribeirão Preto.)Introdução:
Optogenetics is a technique that allows accurate space and time manipulation of cellular activity via light pulses. Genes encoding light-responsive proton pumps or ion channels, the opsins, are delivered to the encephalon by viral vectors and expressed in the membrane of neurons. Emerging in the national scenario, this technique has aided the investigation of neural circuits relevant to neuropsychiatric disorders.
Objetivos:

We sought to implement the optogenetic technique in the context of our laboratory validating viral transfection of opsins and selective manipulation of neuronal activity in anesthetized rats. Implementation takes place in four procedural steps: (A) making low-cost optrodes (optical fiber coupled to electrode) for optical stimulation and concomitant electrophysiological recording; (B) immunohistochemistry of opsins expression; (C) C-fos differential expression validation in stimulated region between experimental groups; and (D) electrophysiological recording of neuronal activity triggered by light stimuli.
Métodos:
The protocol was approved by the Ethics Committee of FMRP-USP (case No. 136/2014). Stereotactic surgeries were performed in 11 male Wistar rats for opsin expression in the pre-limbic region of the medial prefrontal cortex (mPFC). We infused a viral construct containing the ChR2 gene (AAV5-hSyn-ChR2(E123A)-EYFP, 0.5 µ µ L) into 5 animals or ArchT (AAV5-hSyn-Arch3.0-EYFP, 0.5 µL) into 2 animals. Sham animals were injected with viral vector without opsin (n = 2; AAV5-hSyn-EYFP) or saline (n = 2; 0.9% NaCl). After 21 days, part of the animals were perfused and their brains were cross-sectioned in the cryostat and submitted to immunohistochemistry to characterize opsins expression. The mPFC neurons were colocalized with eYFP and nuclear DAPI labels. In new stereotactic surgery to record neuronal activity, the rats were anesthetized with urethane (1.5 g/kg, i.p.) and implanted in mPFC with a manufactured optrode. Pulses of blue or green light generated by a LED (465 or 525 nm, respectively, 5 ms duration at 20 Hz, 5 mW) were applied during epochs of 13s: 5s pre-stimulation, 3s of stimulation, and subsequent 5s. Stimulation effect was characterized by comparing the rate of neuronal firing between epochs.
Resultados e Conclusões:
Preliminary results evidence successful viral transfection in most injected rats (63%). Analysis of electrophysiological record indicates neuronal firing rate reduction in periods of ArchT activation (One-way ANOVA, $F(2.89)=6.15$; $p=0.0006$). Analyzes are underway to verify an increase in neuronal activity resulting from Chr2 activation. We will also test hybrid silicon probes for concomitant stimulus to electrophysiological recording. The optogenetic technique is being standardized and validated with low-cost tools, exhibiting potential results in opsins transfection and neural activity manipulation. We believe the technique validation is relevant, given its emergence in the national scenario and potentiality of use.
Palavras-chaves: Optogenetics, Electrophysiology, Prefrontal cortex, Light-gated ion channel
Agência Fomento: FAPESP

08. Plasticidade Neural

08.007 - ZIKA VIRUS NEUROINFECTION IMPAIRS DENTATE-CA3 HIPPOCAMPAL SYNAPTIC PLASTICITY IN ADULT MICE

ZIKA VIRUS NEUROINFECTION IMPAIRS DENTATE-CA3 HIPPOCAMPAL SYNAPTIC PLASTICITY IN ADULT MICE
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Instituição: 1 ICB-UFRJ - Instituto de Ciências Biomédicas - UFRJ (Av. Carlos Chagas Filho 373, sala J1-029, 21941-902 Rio de Janeiro), 2 FF-UFRJ - Faculdade de Farmácia - UFRJ (Av. Carlos Chagas Filho 373, sala Bss-016, 21941-902 Rio de Janeiro), 3 IMPPG-UFRJ - Instituto de Microbiologia Pr Paulo de Góes - UFRJ (Av. Carlos Chagas Filho 373, sala Iss-055, 21941-902 Rio de Janeiro), 4 IBqM-UFRJ - Instituto de Bioquímica Médica - UFRJ (Av. Carlos Chagas Filho 373, sala E1-018, 21941-902 Rio de Janeiro), 5 IBCCF-UFRJ - Instituto de Biofísica Carlos Chagas Filho - UFRJ (Av. Carlos Chagas Filho 373, sala H2-019, 21941-902 Rio de Janeiro)Introdução:
Zika virus (ZIKV) infection during gestation has been recently associated with severe neurodevelopmental abnormalities. Signs of central neurological disease have also been described in infected adults, but the underlying mechanisms are unknown. Here we show that ZIKV affects the adult mouse brain, targeting mature neurons and affecting synaptic function. Our group has found a selective regional pattern of viral replication and neuropathological changes, which, together with impaired performance in memory tasks, implicated the principal cells of the dentate gyrus (DG) and CA3 as relevant targets (data not shown).
Objetivos:
We aimed at investigating whether ZIKV neuroinfection affects plasticity in synapses between DG mossy fibers and CA3 pyramidal neurons, and also whether any such changes are due to neuroinflammation.

Métodos:
Brazilian (Pernambuco strain) ZIKV (or vehicle) were infused i.c.v. in adult Swiss mice and allowed to replicate for 6-10 days before sacrifice (approved animal care protocols #043/2016 and #126/2018, CEUA-CCS-UFRJ). Dorsal hippocampal slices preserving the DG-CA3 pathway were used for field excitatory postsynaptic potential (fEPSP) recordings.
Resultados e Conclusões:
Viral RNA and NS2B protein were found in pyramidal and granule cells layers of infected mice. Control mossy fiber-evoked fEPSPs recorded in CA3b stratum lucidum showed marked paired-pulse facilitation (PPF) at 40 ms intervals (2.4 +/- 0.2x, n = 10), while ZIKV infection reduced PPF (1.7 +/- 0.2x, n = 8, p = 0.04). High-frequency stimulation (HFS) induced robust post-tetanic potentiation (PTP) of the fEPSP to 384 +/- 43% but infection reduced PTP to 201 +/- 22% (p = 0.003). Fourty minutes after HFS, the fEPSP was still 137 +/- 8% of baseline in control slices, showing long-term potentiation (LTP), while infection reduced LTP to 111 +/- 5% (p = 0.015). We next examined the role of microglia-derived TNF-alpha in the ZIKV-induced changes in synaptic plasticity. The microglial inhibitor minocycline HCl (50 mg/kg i.p., 3 doses one week before, 3 doses one week after the virus injection), as well as the TNF-alpha antagonist infliximab (0.2 ug i.c.v., 4 daily doses after ZIKV injection) prevented the infection-induced loss of plasticity. We conclude that ZIKV effectively targets adult mouse CNS neurons and impairs both short-term (PPF and PTP) and long-term plasticity (LTP) of the mossy fiber to CA3 synapse, which might explain the associated cognitive deficits. These changes are dependent on microglial activation and may be prevented by appropriate control of neuroinflammation.
Palavras-chaves: hippocampus, long-term potentiation, Zika virus
Agência Fomento: CNPq, FAPERJ, CAPES, FINEP

08.008 - MORFOLOGIA DO HIPOCAMPO NA PROLE DE RATOS TRATADOS COM ALPRAZOLAM DURANTE A GESTAÇÃO

HIPPOCAMPUS MORPHOLOGY IN THE OFFSPRING OF RATS TREATED WITH ALPRAZOLAM DURING GESTATION

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Instituição: 1 UFU - Universidade Federal de Uberlândia (Av. Amazonas, 1777 - Bloco 2A - Departamento de Anatomia Humana), 2 UFG - Universidade Federal de Goiás (Av. Esperança, s/n - Chácaras de Recreio Samambaia), 3 FAV - Faculdade de Agronomia e Medicina Veterinária. (Campos Universitario Darci Ribeiro ICC – Asa Norte, Brasília - DF)Introdução:
The lack of information on the risk of antidepressant use during the gestational period often leads to the non-recommendation of its use in the pregnant patient. However, the presence of psychiatric disorders is common in women in the reproductive period and their treatment during pregnancy is complex. In Brazil, about 0.6% of pregnant women use benzodiazepines (BZDs), usually Alprazolam. Alprazolam is indicated for the treatment of anxiety disorders and it acts on the nervous system through binding to stereo-specific receptors. Evidences indicate that exposure of fetus to BZDs may be associated with malformations. Additionally, current researches show the relationship between the continued use of BZDs and the increased propensity for the development of Alzheimer's disease (Pharmacotherapy. 38:1010, 2018), characterized by a degenerative process that initially affects the hippocampus with atrophy and cell loss.
Objetivos:
The present study (CEUA protocol 014/17) aimed to study the changes related to the morphology and cell density in the hippocampus of offspring of rats treated with alprazolam throughout the gestational period.
Métodos:
Wistar rats [30 animals (24 females and 6 males) with ~ 200g] were used. The females were divided into three groups (n=8): control (CT, 0mg/animal), treatment 1 (T1, 1,25mg/animal) and treatment 2 (T2, 30mg/animal). The alprazolam was administered orally ten days before intercourse and during the entire gestation. The drug was administered orally once daily. The newborns' brains were extracted and included in paraffin. Brain frontal sections were stained with luxol and cresyl violet. The individual cell area and the amount of cells in the hippocampus were analyzed. In addition, we counted the number of newborn and the number of female and male per mother, and, we measured the body mass of each newborn.
Resultados e Conclusões:
It was observed a decreased in the number of total cell ($p < 0.05$, Bonferroni post test) in the T2 group (76,11±12,56) in comparison to CT (126,70±7,05) and

T1 (124,30±10,22) the area of cell was similar among the groups. The results of the number of total newborns or the number of female and male were similar among the groups ($p > 0.05$, Anova two way and Bonferroni post test). The body weight was significantly higher for newborns in the T1 group (13,19±1,67; $p < 0.05$, Bonferroni post test) in comparison to CT and T2 groups (6,95±1,31 and 6,62±0,82). In conclusion, the treatment with an overdose of alprazolam during gestation affected the number of hippocampal cells and a therapeutic dose influenced the increased of the weight body of the newborns.

Palavras-chaves: Hippocampus, Neuronal Plasticity , Teratogenesis
Agência Fomento: CAPES - Coordenação de Aperfeiçoamento de Pessoal de Nível Superior

08.009 - AVALIAÇÃO DOS EFEITOS DO EXERCÍCIO VOLUNTÁRIO NA COGNIÇÃO DE ANIMAIS COM DELEÇÃO DA PTEN EM NEURÔNIOS

EVALUATION OF VOLUNTARY RUNNING EFFECTS ON COGNITION OF NEURONAL-PTEN DELETED ANIMALS

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Instituição: 1 ICB-USP - Instituto de Ciências Biomédicas - Universidade de São Paulo (Avenida Prof Lineu Prestes, 1524, ICB I sala 338)Introdução:

PTEN (phosphatase and tensin homolog deleted on chromosome 10) is a phosphatase that converts phosphatidylinositol 3,4,5-triphosphate to phosphatidylinositol 4,5-bisphosphate causing inactivation of AKT pathway. In central nervous system (CNS), PTEN is present in almost all cells and its inhibition may lead to changes in neuron morphology and an increase in dendrite branches, leading to a greater number of synapses and aberrant connectivity and excitability. The beneficial effects of physical exercise in the CNS seem to be related to improvement of cognitive functions.

Objetivos:

This study aimed to evaluate the effects of voluntary exercise on signaling pathways associated with learning and memory that can be modulated by neuronal deletion of PTEN in mice.

Métodos:

Sixty days-old female Ptenloxp/+;Nse-Cre+ mice were allocated individually in a cage in the presence or absence of a running-wheel for 10 days. After this period, they were submitted to behavioral tasks followed by euthanasia and hippocampus dissection for biochemical assay.

Resultados e Conclusões:

Comparing heterozygous (HT) and wild-type (WT) mice on the first and last day of the running protocol, these animals run long distances on last day (WT n=11, mean on 1st day: 44.82m X 10th day: 729.89m, SD=245.3, $p < 0.001$; HT n=6 on 1st day: 124.35m X 10th day: 655.89m, SD=178.7, $p < 0.05$). These animals also showed an increase in food consumption during this period (Sedentary WT n=8, mean=43.42g, SD=11.06 X Exercise WT n=7, mean=87.37g, SD=17.09, p=0.0005; Sedentary HT n=7, mean=38.9g, SD=15.25 X Exercise HT n=6, mean=83.28g, SD=27.36, p=0,0009). In the open field test no differences were observed in distance traveled in the apparatus (Sedentary WT n=10, mean=28.08m, SD=11.66; Sedentary HT n=10, mean=35.32m, SD=26.96; Exercise WT, n=9, mean=22.45m, SD=8.42; Exercise HT n=9, mean=25.39m, SD=10.03). In the inhibitory avoidance test, HT animals submitted to voluntary exercise remembered the aversive stimulus (Sedentary WT training n=11, mean=22.22s, SD=11.62 X Sedentary WT probe test n=11, mean=90.56s, SD=85.66, p=0.3583; Sedentary HT training n=10, mean=33.9s, SD=25.75 X Sedentary HT probe test n=10, mean=122.3s, SD=71.59, p=0.0672; Exercise WT training n=9, mean=28.3s, SD=37.89 X Exercise WT probe test n=9, mean=111.4s, SD=98.84, p=0.2034; Exercise HT training n=9, mean=35.22s, SD=27.26 X Exercise HT probe test n=9, mean=153.0s, SD=99.01, p=0.0071). Conclusion: Voluntary physical exercise in HT animals seems to recall memory from aversive stimulus (inhibitory avoidance). CEUA protocol: 44/2017. References: Di Cristofano, A. et al; PTEN is essencial for embryonic development and tumor suppression; Nature Genetics, v.19, p. 348-354, 1998; Kwon, C.H. et al. PTEN regulates neuronal arborization and social interaction in mice; Neuron, v.50, p. 377-388, 2006; van Praag, H. et al. Running increases cell proliferation and neurogenesis in the adult mouse dentate gyrus; Nat Neurosc, v.2, p.266-270, 1999.

Palavras-chaves: Cognition, PTEN, Voluntary Running
Agência Fomento:

08.010 - INFLUÊNCIA DE INTENSIDADE DE EXERCÍCIO EM RECUPERAÇÃO FUNCIONAL E NEUROREGENERAÇÃO APÓS LESÃO DA MEDULA ESPINAL EM CAMUNDONGOS

INFLUENCE OF EXERCISE INTENSITY IN FUNCTIONAL RECOVERY AND NEUROREGENERATION AFTER SPINAL CORD INJURY IN MICE

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Instituição: 1 UFRJ - Universidade Federal do Rio de Janeiro (Rua Prof. Rodolpho Paulo Rocco), 2 UFF - Universidade Federal Fluminense (Alameda Barros Terra, S/N, Nitéroi)Introdução:
Traumatic spinal cord injury (SCI) is a serious clinical disorder that causes significant alterations in sensory and motor functions. Currently,physical rehabilitation is the only reality for injured individuals and aims to minimize secondary complications to injury. A study using physical activity in animal models provides a good opportunity to test new therapeutic strategies in vivo.
Objetivos:
In this work, we intend to analyze the efficacy of different intensity exercise protocols in a model of compressive spinal cord injury.
Métodos:
In this project (CEUA-UFF 591-2014), we used the model of spinal cord compression established by our group, through laminectomy of the T9 vertebra in young female mice (C57/Bl6) and extradural compression of the spinal cord, with a vascular clip (30g, for 10 seconds). We compared two protocols of exercise in this model of SCI and evaluated its effects on locomotor performance and tissue preservation. We studied 4 groups: SHAM (laminectomy only), SCI (injured), TMT1 (injured and treated with treadmill exercise, during 10 minutes) and TMT2 (injured and treated with treadmill exercises, for two 10 minutes cycles with 10 minutes gap time between them). At 7 days after the injury, the training was started (6 to 12 m/min). Sensory (digital analgesimeter) and motor assessment (BMS and LWT) were performed weekly up to 8 weeks, after which the morphological analyzes were performed.
Resultados e Conclusões:
RESULTS: In the BMS scale, 28 days after injury, the animals of the TMT2 (1.475±0.309,p & lt;0.05) had a significantly higher score than the SCI (0,857±0.388) and TMT1 group (0.885±0.228). However, 42 days after the injury, the TMT1 group (2.427±0.1236,p & gt;0.05) presented a statistical difference in relation to the other studied groups (SCI 0.7857±0.2405, TMT2 2.014±0.3595), maintaining this result until the end of the survival. In the other tests, there was no significant difference in relation to the protocols tested in the treated groups. Treated groups also presented better structural preservation on qualitative and quantitative morphological analyzes, showing a greater amount of preserved myelinated nerve fibers (TMT1 1315±123.3, p & lt;0.05, TMT2 1158±1158, p & lt;0.05) when compared to the SCI group (680.7±30.34). The TMT1 group (38.39±0.6752) also had a higher amount of white matter preserved at the epicenter of the lesion compared to the other groups evaluated (TMT2 23.57±4.745 and SCI 25.12±3.63), indicating better tissue preservation.
Palavras-chaves: Spinal , Cord Injury, Mice , Exercise
Agência Fomento: CNPq e Faperj

08.011 - CHANGING THE FOREST BY THE TREE: THE EFFECT OF READING COMPETENCE IN PERCEPTUAL ORGANIZATION STRATEGIES OF THE VISUAL SCENE

CHANGING THE FOREST BY THE TREE: THE EFFECT OF READING COMPETENCE IN PERCEPTUAL ORGANIZATION STRATEGIES OF THE VISUAL SCENE

Autores: Deusa Priscila da Silva Resque 1, Daniel Alves da Cruz Filho 1, Adriany Maria de Moura Lobato 1, Carolina Gomes da Silva 1, Suzana Cescon de Souza 1, Felipe de Oliveira Matos 2, Antonio Pereira Junior 1
Instituição: 1 UFPA - Universidade Federal do Pará (Rua Augusto Corrêa, 01 - Guamá, CEP 66075-110), 2 UEM - Universidade Estadual de Maringá (Av. Colombo, 5790. Central Campus, CEP 87020-900)Introdução:
Reading competence depends on the rearrangement of both visual and language cortical circuits in a process called neuronal recycling. One well-known example is the recycling of a region located on the left occipitotemporal cortex, genetically programmed for the processing of information about faces and other visual objects that depend mostly on holistic perceptual strategies for their recognition. After literacy development, this area (called the visual word form area-VWFA) starts responding to written words.
Objetivos:
Investigate, through behavioral methods, how acquisition of reading competence interferes with the relative use of holistic and analytical patterns of visual perceptual organization.
Métodos:
All procedures were approved by the Ethics Committee of the State University of Maringá (CAAE 92956318.2.0000.0104). The experimental sample of

83 volunteers (age group 6-10 years, age 8.4 ?1.3 years, 41 males; 42 females) was submitted to the Mooney Face Test (24 faces presented in the canonical position and 24 distractors) and to a computerized reading-aloud test (25 words read and 25 repeated). The correlation between the Mooney Faces test scores and the Mooney Faces test was evaluated using the Pearson test and comparison between and among groups with t-test and the ANOVA test. The level of statistical significance was 0.05.
Resultados e Conclusões:
Our results indicate that the performance in the reading test between boys and girls was not significantly different (P > 0.9). However, for the Mooney test, boys had a better performance (P < 0.0136), which is similar to the results obtained in adult individuals, with females having a lower performance which declines with age. We also did not find a correlation between the testes' scores and gender (boys: P > 0.9714, girls: P > 0.6486). Although the relative weight of face recognition and perceptual closure processes in determining Mooney's test scores has not yet been determined, our results indicate that acquisition of reading competence, despite the heavy early dependence on analytical processes, does not compromise visual perceptual organization based on holistic processes.
Palavras-chaves: Reading skills, Facial stimuli, Effect of Global Precedence
Agência Fomento:

08.012 - EVIDÊNCIA DE HIPÓXIA RELACIONADA À GERAÇÃO DE MICROGIRIA APÓS LESÃO FOCAL POR CONGELAMENTO EM CAMUNDONGOS NEONATOS

EVIDENCE OF HYPOXIA RELATED TO THE GENERATION OF MICROGYRIA AFTER FOCAL LESION BY FREEZING IN NEONATAL MICE
Autores: Vanessa Kiill Rios 1, Débora Magalhães Portela 1, Greice Nascimento Pires 1, Henrique Rocha Mendonça 1
Instituição: 1 Ufrj - Universidade federal do Rio de janeiro (Campus UFRJ Macaé -professor Aluízio Teixeira)Introdução:
Microgyria is a malformation that leads to hyperexcitability, epilepsy and developmental delay. Case studies have demonstrated that microgyria may occur due to local perfusion failure, leading to ischemia / hypoxia. However, this hypothesis has never been directly tested. Hypoxia would lead to necrosis of preformed deep cortical layers, with subsequent neuroinflammation. The future migration of neuroblasts would form the superficial layers. Transcranial focal lesion by freezing on the day of birth in mice mimics microgyria, inducing tissue necrosis and death of differentiated neuroblasts in the IV, V and VI neocortical layers. The undifferentiated neuroblasts migrate, but never surpassing the zone of necrosis, which generates a sulcus in the cortical plate.
Objetivos:
To test whether the microgyria model by focal lesion by transcranial freezing produces vascular changes that may lead to hypoxia, and consequent necrosis of the newly formed cortex in neonatal mice.
Métodos:
For this purpose, we performed a focal freezing lesion in Swiss newborn anesthetized mice (n = 16) at 1 day of age (P1). The animals were euthanized 4 hours and 15 days after injury. The contraleteral cortex to the lesion was used as internal control (CTL). The experimental procedures were approved by the CEUA MAC040. To verify haemorrages, we performed histochemistry for peroxidase activity. Neutrophils were identified as cells immunolabelled for LYG-6 and hypoxia was verified by immunohistochemistry against the HIF-1alpha transcription factor. Statistical analysis were performed with paired Student's T-test, with statistical significance when $p < 0.05$.
Resultados e Conclusões:
:On the injured side there was a qualitative increase of extravasation of peroxidase positive cells compared to the contralateral cortex, in addition to significant increases in the number of HIF-1alpha positive cells (Microgiria = 127 +/- 21 and CTL = 0.5 +/- 0.5, with $p < 0.05$) and LYG-6 (Microgiria = 275.7 +/- 11.1 and CTL = 3 +/- 1.52 $p < 0.05$) at 4 hours after to injury (P1). This label is decreased after 15 days but remains somewhat higher on the side of the lesion compared to the control side for both HIF-1 alpha (Microgiria = 38.75 +/- 8.826 and CTL = 2.25 +/- 1,652) and for labeling with LYG-6 (Microgyria = 17.75 +/- 4.58 and CTL = 0.25 +/- 0.25). Conclusion:The results suggest that vascular damage occurs due to the lesion, leading to neocotex haemorrage. This discontinuity of the vessels should promote hypoxia of the region previously vascularized by them, inducing necrosis characteristic of microgyria, with the presence of neutrophil infiltrates.
Palavras-chaves: Microgyria, Hypoxia, Lesion
Agência Fomento:

11. Sistemas Sensoriais

11.007 - ANÁLISE DA DIETA COMO PRESSÃO SELETIVA PARA A VISÃO EM CORES EM PRIMATAS

EVALUATION OF DIET AS SELECTIVE PRESSURE ON COLOR VISION IN PRIMATES

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Instituição: 1 UnB - Universidade de Brasília (Departamento de Ciências Fisiológicas, Instituto de Biologia, UnB), 2 UnB - Universidade de Brasília (Departamento de Zoologia, Instituto de Biologia, UnB)Introdução:
The color vision ability allows to discriminate uniform surfaces with similar brightness, acquiring sensory information from the environment. Among mammals, the trichromatic vision was reported only in some species of primates. All catarrhine genera have trichromatic vision. Among the platyrrhines, however most genera present a polymorphic gene for color vision, resulting in both dichromatic and trichromatic individuals, with two exceptions: the Alouatta (trichromatic) and the Aotus (monochromatic). Some studies suggest that primates' vision and the reflectance spectrum of fruits of tree species dispersed by primates might have coevolved, however a systematic analysis of the patterns of color vision and diet consumption across primates is still lacking.
Objetivos:
Therefore, we investigated the association of diet and color vision in both groups.
Métodos:
A bibliographic review was made concerning diet composition and color vision of platyrrhines and catarrhines species, and the history of both characters was reconstructed in a phylogenetic tree (modified from Perelman et al., 2011).
Resultados e Conclusões:
We gathered diet information for 17 of 21 platyrrhine and 24 of 45 catarrhine genera. Regarding chromatic vision, we obtained data for all the platyrrhine genera analyzed, except for Mico, whereas data was found only for 12 genera of catarrhines. Our survey indicated that high intake of fruits and leaves both platyrrhines (fruits: 57%±24.0; leaves: 2%±18.0) and catarrhines (fruits: 40%±26.0; leaves: 19%±23,0). Regarding color vision, our results those found in the literature, the data found indicate that for platyrrhines a polymorphic pattern was observed, with the exception of the Alouatta and the Aotus, in which invariable trichromacy and monochromacy were observed, specifically. For the catarrhines, the data found indicated a general pattern of trichromatic vision, even in the case of genera where data could not be found.Based on these results, dietary components were mapped onto phylogenetic trees of both groups and compared to the respective history of vision diversification.The general pattern of color vision in both catarrhines and platyrrhines were not clearly associated with either fruits or leaves in their respective diets. In conclusion, the hypothesis of trichromatic vision as an adaptation for frugivory is not supported by the present results. Furthermore, our review has revealed significant gaps in the scientific literature regarding primate vision and diet. Despite that, our analyses suggest that other selective pressures may have driven the development of trichromatic vision in primates.
Palavras-chaves: Color vision, Diet, Primates
Agência Fomento:

11.008 - EVIDÊNCIA ELETROFISIOLÓGICA DE UM MECANISMO INDEPENDENTE DE FASE EM INTERAÇÕES LATERAIS MODULANDO PERCEPÇÃO VISUAL DE SINAIS TEMPORAIS

ELECTROPHYSIOLOGICAL EVIDENCE OF A PHASE-INDEPENDENT MECHANISM IN LATERAL INTERACTIONS MODULATING VISUAL PERCEPTION OF TEMPORAL SIGNALS

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Visual perception of a stimulus can be altered by its surround, although the basis of neural interactions involved in this perceptual effect are unknown. Based on psychophysical data, we recently proposed that lateral interactions have a phase-dependent and a phase-independent mechanisms, the latter similar to contrast adaptation. Both mechanisms were influenced by surround stimulus size and have cortical and

subcortical components, and the phase-independent "lateral contrast adaptation" constraint the phase-dependent mechanism (J Vis. 14:10,2014).
Objetivos:
The aim of this work was to further investigate the above mentioned mechanisms of lateral interactions through visual-evoked potentials (VEP) measurements.
Métodos:
VEP were measured in 6 healthy individuals. Test and matching stimuli were generated from a VISAGE system (Cambridge Research System) coupled to a 21-inch Mitsubishi Diamond Pro 2070SB monitor using the MATLAB® program. The test stimuli were composed of a central circular and a peripheral annular stimuli, with a diameter of 3 and 5 cm2, respectively, both with spatial frequency of 0 cycles/degree and average luminance of 50 cd/m2, modulated by sine functions (Michelson contrast at 10%, 50% and 90%) at 5 surround frequencies (3, 6, 12 and 25 Hz) and 3 center frequencies (3, 6 and 12 Hz). The stimuli were observed under monoptic condition. VEP data analysis was performed using MATLAB's Signal Analysis toolbox and differences (± 95% confidence interval) between phase responses for different stimuli were analyzed using GraphPad Prism 8 and Sidak's multiple comparison test after two-way ANOVA. This work was approved by the Ethics Committee of the Universidade da Amazonia (Record: 177.503, CAAE: 10717212.6.0000.5173).
Resultados e Conclusões:
In all tests conditions above mentioned, our results show that the neurological phase response to visual stimuli was largely delayed when the peripheral stimulus was modulated at 25Hz, e.g. when surround stimulus was modulated phase-independently from center stimulus. In other words, the neural lateral interactions involved in psychophysical response to spatiotemporal visual stimuli are influenced more by the stimuli frequency component than by the stimuli phase and space components ($p < 0.05$). Our results support previous evidences that both phase-dependent and -independent mechanisms have a cortical component, and that phase-independent mechanism is related to contrast adaptation owing to the presence of surround modulation.
Palavras-chaves: Cortical interactions, Lateral interactions , Phase-independent mechanisms
Agência Fomento:

11.009 - QUANTIFICAÇÃO ELETROFISIOLÓGICA DE COMPONENTES CORTICAIS IPSI E CONTRALATERAIS DE INTERAÇÕES LATERAIS MODULANDO PERCEPÇÃO VISUAL DE SINAIS TEMPORAIS

ELECTROPHYSIOLOGICAL QUANTIFICATION OF CORTICAL IPSI- AND CONTRALATERAL COMPONENTS OF LATERAL INTERACTIONS MODULATING VISUAL PERCEPTION OF TEMPORAL SIGNALS
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Visual perception of a stimulus can be altered by its surround, although the basis of neural interactions involved in this perceptual effect are unknown. Based on psychophysical data, we recently showed that lateral interactions have cortical and subcortical components, which in turn have phase-dependent and a phase-independent mechanisms, the latter similar to contrast adaptation. Both mechanisms were influenced by surround stimulus size (J Vis. 14:10,2014).
Objetivos:
The aim of this work was to further investigate the above mentioned mechanisms of lateral interactions involved in flicker perception through visual-evoked potentials (VEP) measurements.
Métodos:
VEP were measured in 6 healthy individuals. Test and matching stimuli were generated from a VISAGE system (Cambridge Research System) coupled to a 21-inch Mitsubishi Diamond Pro 2070SB monitor using the MATLAB® program. The test stimuli were composed of a central circular and a peripheral annular stimuli, with a diameter of 3 and 5 cm2, respectively, both with spatial frequency of 0 cycles/degree and average luminance of 50 cd/m2, modulated by sine functions (Michelson contrast at 10%, 50% and 90%) at 5 surround frequencies (3, 6, 12 and 25 Hz) and 3 center frequencies (3, 6 and 12 Hz). The stimuli were observed under monoptic condition, oriented to fall within ipsi- or contralateral visual field while subjects fixed on a small dot at central monitor screen. VEP data analysis was performed using MATLAB's Signal Analysis toolbox

and differences (± 95% confidence interval) between phase responses for different stimuli were analyzed using GraphPad Prism 8 and Sidak's multiple comparison test after two-way ANOVA. This work was approved by the Ethics Committee of the Universidade da Amazonia (Record: 177.503, CAAE: 10717212.6.0000.5173).
Resultados e Conclusões:
In all tests conditions above mentioned, our results show that the neurological phase response to visual stimuli was largely delayed by phase-dependent mechanism when stimuli were oriented to contralateral visual fields than to ipsilateral. On the other hand, neurological phase response to visual stimuli was largely delayed by phase-independent mechanism only when stimuli were oriented to ipsilateral visual fields ($p < 0.05$). None differences between responses magnitude of ipsi- and contralateral mechanisms were found. Our results support that the phase-dependent mechanism works in both ipsi- and contralateral visual pathways. Interestingly, the contrast-dependent mechanism was found only in the ipsilateral pathway
Palavras-chaves: Cortical Interactions, Receptive field, Electroencephalogram
Agência Fomento:

11.010 - ATIVIDADE SENSORIOMOTORA PROVOCADA PELA APLICAÇÃO DE RADIAÇÃO INFRAVERMELHA NA REGIÃO DO NERVO RADIAL: INVESTIGAÇÃO DOS EFEITOS DA TEMPERATURA SOBRE A FASE DE RESPOSTA CORTICAL

SENSORIMOTOR ACTIVITY ELICITED BY APPLICATION OF INFRARED RADIATION ON RADIAL NERVE REGION: INVESTIGATION OF TEMPERATURE EFFECTS ON CORTICAL PHASE-RESPONSE
Autores: Wellington Oliveira 1,2, Noemy Silva 1,2, Rita Almeida 1,2, Jose Fiel 1, Pedro Almeida 1,2, Cláudio Teixeira 1,2, Anderson Rodrigues 1
Instituição: 1 UFPA - Universidade Federal do Pará (Av. Generalíssimo Deodoro, 92 - Umarizal, Belém - PA, 66055-240), 2 CESUPA - Centro Universitário do Estado do Pará (Av. Gov. José Malcher n.1963 CEP: 66060-232)Introdução:
Infrared (IR) radiation is electromagnetic radiation with wavelengths between 760 nm and 100,000 nm. Many factors influence the therapeutic effects of IR, including fluence, irradiance, treatment timing and repetition, pulsing, and wavelength. Increasing evidence suggests that IR can carry out photostimulation and photobiomodulation effects particularly benefiting neural stimulation. However, little is known about how IR therapeutic effects are produced.
Objetivos:
The aim of this work was to further investigate IR effects on sensorimotor cortex activity through event-related potentials (ERP) measurements.
Métodos:
In this pilot study, Eleven healthy individuals were exposed to infrared radiation in the radial nerve region, borderline temperature of 40ºC and lamp distance of 50-70 cm. The acquisition and amplification of electrophysiological signals were performed in the primary sensory and motor areas, C3 and C4 according to the international 10/20 system, for 3min before and during 15min of exposure to infrared radiation. The neuronal potentials were amplified 100,000×, filtered by a differential amplifier (CED1902; Cambridge Electronic Design), digitized by a data acquisition system (Micro 1401-3) and controlled by software (Signal 5.0; Cambridge Research Systems). ERP data analysis was performed using MATLAB's Signal Analysis toolbox and differences (± 95% confidence interval) between phase responses for different stimuli were analyzed using GraphPad Prism 8 and Sidak's multiple comparison test after two-way ANOVA. This pilot work was submitted to the Ethics Committee of the Universidade Federal do Pará.
Resultados e Conclusões:
Results: In all experimental conditions above mentioned, our results show that the neurological phase response to IR stimulation underwent a statistically relevant delay in comparison to neurological phase response in non-stimulated condition, independent of the IR temperature range ($p < 0.05$). Conclusion: Our results show that neurological phase response delay occurs independent of IR temperature range of stimulation. As neural phase response curves can inform about the degree of neuronal synchrony in a given cortical region, and neuronal synchrony is associated with many high level processes, our results allow hypothesizes that IR therapeutic effects might be related to changes in neuronal synchrony.
Palavras-chaves: Radiação infravermelha, Eletroencefalografia, resposta eletrofisiológica
Agência Fomento:

11.011 - ACHADOS ELETROFISIOLÓGICOS EM INDIVÍDUOS SUBMETIDOS À EXPOSIÇÃO CONTROLADA DE ELETROACUPUNTURA

SENSORIMOTOR ACTIVITY ELICITED BY ELECTROACUNPUCTURE ON RADIAL NERVE: A PILOT INVESTIGATION OF SIGNAL FREQUENCY EFFECTS ON CORTICAL PHASE-RESPONSE

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Instituição: 1 cesupa - Centro Universitário do Estado do Pará (Av. Generalíssimo Deodoro,92-Umarizal, Belém-PA,66055-240), 2 ufpa - Universidade Federal do Pará (Av, Gov. José Malcher n.1963, CEP 66060232)Introdução:

Electroacupuncture (EA) is another kind of acupuncture derived from the integration of traditional acupuncture and modern electrical stimulation. EA has become widely used in clinical practice because of its repeatability and standardisation of frequency, intensity and duration. However, little is known about how EA therapeutic effects are produced.

Objetivos:

The aim of this work was to further investigate EA effects on sensorimotor cortex activity through event-related potentials (ERP) measurements.

Métodos:

In this pilot study, 9 healthy individuals were exposed to EA technique, with needles inserted in the radial nerve region, in the acupoints IG4 and IG5, which were randomly stimulated with the following frequencies: 2, 10, 20, 30, 40, 50, 60, 70, 80, 90 and 100Hz. Each EA frequency was applied for 3 min. The acquisition of cortical ERP was performed in the primary sensory and motor areas, C3 and C4 according to the international 10/20 system. ERPs were amplified 100,000×, filtered by a differential amplifier (CED1902; Cambridge Electronic Design), digitized by a data acquisition system (Micro 1401-3) and controlled by software (Signal 5.0; Cambridge Research Systems). ERP data analysis was performed using MATLAB's Signal Analysis toolbox and differences (± 95% confidence interval) between phase responses for different stimuli were analyzed using GraphPad Prism 8 and Sidak's multiple comparison test after two-way ANOVA. This pilot work was submitted to the Ethics Committee of the Universidade Federal do Pará (Record: 177.503, CAAE: 10717212.6.0000.5173).

Resultados e Conclusões:

Results: In all experimental conditions above mentioned, our results show that the neurological phase response to EA frequency stimulation underwent a statistically relevant delay in comparison to neurological phase response in non-stimulated condition, independent of the EA stimulus frequency ($p < 0.05$). Conclusion: Our results show that neurological phase response delay occurs independent of EA frequency stimuli. As neural phase response curves can inform about the degree of neuronal synchrony in a given cortical region, and neuronal synchrony is associated with many high level processes, our results allow hypothesizes that EA therapeutic effects might be related to changes in neuronal synchrony.

Palavras-chaves: Acupuntura, Eletroacupuntura, Eletroencefalografia, Resposta fisiológica

Agência Fomento:

12.017 - DIFERENÇAS NOS COMPONENTES DO POTENCIAL RELACIONADO AO EVENTO (ERP) NA PREPARAÇÃO E EXECUÇÃO DO MOVIMENTO REAL E DA IMAGINAÇÃO DO MOVIMENTO

EVENT-RELATED POTENTIAL (ERP) COMPONENT DIFFERENCES IN PREPARATION AND EXECUTION OF REAL AND IMAGINARY MOVEMENTS

Autores: André da Silva Pereira 1, Daniel Cordeiro Marques 1, Mario Fiorani Jr 1, Elkin Yesid Veslin Díaz 2, Luciano Santos Constatin Raptopoulos 2, Max Suell Dutra 2, Luiz Bevilacqua 2, Juliana Guimarães Martins Soares 1

Instituição: 1 UFRJ - Universidade Federal do Rio de Janeiro (Laboratory of Cognitive Physiology, Institute of Biophysics Carlos Chagas Filho), 2 UFRJ - Universidade Federal do Rio de Janeiro (Department of Engineering, COPPE)Introdução:

Electroencephalographic activity (EEG) has been used in a series of brain-computer interface (BCI) research programs to provide a communication channel for individuals suffering from incapacitating diseases. These EEG signals include slow cortical potentials, P300 and N400, and alpha, beta or gamma rhythms recorded from the scalp. In order to improve control of BCI devices, it is essential to differentiate EEG neural signals that represent general attention from that of motor execution processes. Stimulus-guided movement involves a sequence of neuronal events that include identification of stimulus, motor planning, and the execution of the planned movement.

Objetivos:

In this study, we investigated how this sequence of events is implemented in the distributed networks of cortical cell populations using a paradigm that segregate the preparation activation from the movement activation.
Métodos:
This study was conducted by the protocol approved by the Ethics Committee of Universidade Federal do Rio de Janeiro (Protocol number: 851.521). Twenty two healthy right-handed volunteers were studied after giving their informed consent. During the test, the volunteer is seated on a chair in front of a screen used to present the cue for the elbow movement. The volunteers were divided in two groups. The test group (n=11) performed left or right elbow flexion or -imagination, while the control group performed left or right elbow flexion or no movement. Each condition consisted of 60 trials of 10 seconds of duration. The EEG was recorded continuously using 32 electrodes distributed around the scalp according to a 10-10 modified system. The signals were amplified, digitalized with a sampling rate of 1000 Hz and band-pass filtered in the 0.5-100 Hz frequency band. EEG data were processed using EEGLAB Matlab toolbox.Event-related potential (ERP) activity in real and imagined movement and control trials in the preparation and execution intervals were compared.
Resultados e Conclusões:
Both P300 and N400 presented a significant (Fieldtrip statistics, $p < 0.05$) higher amplitude in the preparation than in the movement interval for all conditions. While the ERP behavior seems similar for real and imagined movement in the preparation time, in the movement execution interval, N400 presented higher amplitude for real than imagined movement. Both real and imagined movement presented higher N400 than control conditions (Fieldtrip statistics, $p < 0.05$), especially in Cz, C1, and C2 channels, where was observed higher alpha desynchronization. These findings show that imagined movement elicits neuronal events similar to real movements, and that the sequence of neuronal events in the preparation time, including response selection and specification of response parameters, presented higher ERP components. However, the significant difference between movement and control conditions was observed in the amplitude of the N400 component in the execution time.
Palavras-chaves: EEG, ERP, BCI, Motor system
Agência Fomento: FINEP, FAPERJ

12. Sistemas Motores

12.018 - VELOCIDADE DE CORRIDA E FADIGA MODULAM AS OSCILAÇÕES DELTA E THETA NO HIPOCAMPO DO RATO

RUNNING SPEED AND FATIGUE MODULATE DELTA AND THETA OSCILLATIONS IN THE RAT HIPPOCAMPUS
Autores: Alan Michel Bezerra Furtunato 1, Adriano Bretanha Lopes Tort 1, Hindiael Aeraf Belchior 1,2
Instituição: 1 UFRN - Universidade Federal do Rio Grande do Norte (Campus Universitário Lagoa Nova), 2 BU - Boston University (610 Commonwealth Ave)Introdução:
Neuronal networks in the rodent hippocampus oscillate in many different and sometimes coexisting frequency rhythms according to behavioral states. While theta (5-10 Hz) oscillations are prevalent during active behaviors and also during REM sleep, hippocampal delta (1-4 Hz) oscillations occur mostly in quiet behaviors and non-REM sleep. These two rhythms are traditionally viewed as mutually exclusive, and often used to characterize respectively "online" and "offline" states of the hippocampus.
Objetivos:
To investigate the modulatory effect of running speed on hippocampal delta and theta oscillatory responses, we recorded local field potentials (LFP) from hippocampal CA1 area of rats executing successive bouts of running in a computer-controlled treadmill under crescent or constant speeds (permit number 061.069/2017).
Métodos:
Animals were trained to perform 48 bouts of running on the treadmill (20 seconds) under a consecutive protocol of crescent (1, 1.5, and 2 cm/s^2) and constant speeds (20, 30 and 40 cm/s) in one day session. We also investigate full sessions were animals executed at least 35 bouts of running on the treadmill (15 seconds) under constant speed (30 cm/s).
Resultados e Conclusões:
We observed the emergence of strong delta oscillations while the rats executed treadmill runs under crescent speeds, which become remarkably periodic above speeds of 30 cm/s. The amplitude and frequency of delta oscillations increased significantly across constant speed protocols of 20, 30 and 40 cm/s. In contrast, theta oscillations were prominent throughout all protocols of constant running speeds, but the power of theta band were not significantly

different. In addition, while we observed a significant increase in the power of delta band along successive bouts of running under constant speed (30 cm/s), we also observed that the power of theta band significantly decreased along the bouts of running. In summary, our results show that running speed strongly modulates delta oscillations in the rat hippocampus, and that successive bouts of running inversely affect delta and theta oscillations. We suggest that delta and theta rhythms coexist in the rat hippocampus, and that their differential modulation may be important for signaling the development of fatigue along running exercise.
Palavras-chaves: Hippocampal oscillations, Running exercise, Fatigue
Agência Fomento: CAPES, CNPq.

12.019 - A FACILITAÇÃO DA FORÇA DE PREENSÃO PALMAR EM MULHERES É DIMENSIONADA DE ACORDO COM A GERAÇÃO DE FORÇA NA MÃO OPOSTA

INTERLIMB FACILITATION OF WOMEN GRIP STRENGTH IS SCALED TO OPPOSITE ARM FORCE GENERATION
Autores: Giovanna Cristina Toffano 1, Tamyris Padovani dos Santos 1, Robert L. Sainburg 2, João Eduardo De Araujo 1
Instituição: 1 FMRP-USP - Faculdade de Medicina de Ribeirão Preto- USP (Av. Bandeirantes, 3900, Monte Alegre CEP: 14049-900 - Ribeirão Preto-SP), 2 Penn State - Pennsylvania State University (University Park, State College, PA 16801, EUA.)Introdução:
There has been general agreement that during unilateral voluntary contractions, unintended muscle activity can be observed in the contralateral homologous muscle (Shinohara et al. 2003, for review). This phenomenon is named motor overflow, that is the natural tendency for a resting limb to move during movement of the opposite limb and is thought to be influenced by inter-hemispheric interactions and intracortical networks within the 'resting' hemisphere (Perez and Cohen 2008). Perez and co-workers (Long J. et al., 2016) had shown that when healthy young participants performed an isometric contraction at greater than or equal to 70% of maximum voluntary isometric contraction (MVIC) of a homologous muscle, there is an interhemispheric facilitation (IHF) showed through TMS.
Objetivos:
We now hypothesize that such interhemispheric facilitation might occur not only in homologous muscle and in more general patterns of tasks. We predicted that isometric resistance to finger flexion in one hand should facilitate (increase) the grip strength at the other hand performs after repetitive handgrip tasks in a dynamometer.
Métodos:
To test this prediction, women performed four hand grip muscle contractions, each one sustained by five seconds with five seconds to rest, in a hand-held dynamometer. Before the fourth contraction, the participants produced an isometric force with the opposite hand index finger (percentage of MVIC determinate by the grip strength obtained in the first contraction). Twenty-eight right-handed women were divided into three groups (age 17-22, mean 20.35± 1.73 SE). Two resistance groups performed the grip strength task with the right hand (isometric finger flexion at the left) or vice versa. One control group did the same, but with no isometric finger flexion in the opposite limb. In the three groups, the grip strength decreases in the second and third trial, but in the resistance group, after the participates did the finger flexion at 70% or higher of MVIC, the grip strength increases in the fourth contraction.
Resultados e Conclusões:
The grip strength increase is scaled with opposite hand isometric force, and we do not see the increase when the force is less than 70% of MVIC or in the control group ($F=3.72$; $P < 0.05$). In our participants, the effect is not different when we analyzed the right-hand grip strength and the left-hand grip strength ($F=0.11$; $P=0.92$). These results might be explained by IHF, and as we do not use only homologous muscles, we suggest that this might result from a dopamine-mediated increase in strength "vigor" (Panigrahi B et al., 2015).
Palavras-chaves: motor overflow, controle motor, Facilitação Neuromuscular Proprioceptiva
Agência Fomento: Fundação de Amparo à Pesquisa do Estado de São Paulo

12.020 - AVALIAÇÃO DA LATERALIDADE DO CONTROLE MOTOR DE MEMBROS SUPERIORES COM ANÁLISE DE SINERGIA MUSCULAR COM ELETROMIOGRAFIA.

EVALUATION OF THE LATERALITY OF MOTOR CONTROL OF UPPER MEMBERS WITH ANALYSIS OF MUSCULAR SYNERGY WITH ELECTROMOGRAFIA
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Filho 1, Adriany Maria de Moura Lobato 1, Antonio Pereira Junior 1
Instituição: 1 UFPA - Universidade Federal do Pará (Rua Augusto Correa 1 - Campus Universitário Guamá 66075-110 BELEM - PA)Introdução:
The Central Nervous System (CNS) acts in the command of muscles to perform movements with dexterity of the upper limbs. These movements depend on the joint activation of muscle groups, with individual contribution differentiated from the involved muscles. Through the analysis of muscular synergies it is possible to identify the precise arrangement of activation of muscle groups triggered by the descending motor commands of the brain.
Objetivos:
To compare, through the analysis of electromyographic signals (EMG), the differences of synergy using a motor paradigm of pointing by hand for movements against and in favor of gravity in the right and left arms.
Métodos:
The procedures were approved by the Human Research Ethics Committee of the Health Sciences Institute of the Federal University of Pará (CAAE: 82131517.1.0000.0018). The research was performed with five right-handed volunteers (age range 20-40 years, mean age 24.4±4.6) who performed multiple-range movement with target redundancy (Berret et al., 2011) with the right and left arms. The EMG signal was acquired with a three-channel MSV3 system, with electrodes arranged in the triceps, brachial, biceps brachii and deltoid muscles. The extraction of the muscular synergies was done according to Ebied and collaborators (2018) with the Non-Negative Matrix Factorization method.
Resultados e Conclusões:
The electromyographic signals of all the subjects presented less noise and more uniformity in the movement in favor of the gravity than against the gravity, indicating more precision in the motor control in the second movement. The mean of the synergies for the first movement did not present difference for both arms when comparing the biceps (0.8626±0.13), triceps (0.9283±0.10) and deltoid (0, 7866±0.24), whereas for the second movement the biceps muscle weight (0.92396±0.07) was significantly higher than the triceps (0.6179±0.40) and deltoid (0.67178±0.35) on the right and left arms. These results indicate that the motor control for movement counts and in favor of gravity is differentiated in descending signals coming from neural groups in the central nervous system.

Palavras-chaves: Electromyography, Muscle Synergies, Motor Control
Agência Fomento:

12.021 - A CAFEÍNA REDUZ A FADIGA LOMBAR ELETROMIOGRÁFICA

CAFFEINE REDUCES ELECTROMYOGRAPHIC LUMBAR FATIGUE

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Instituição: 1 UFSC - UNIVERSIDADE FEDERAL DE SANTA CATARINA (Unidade Mato Alto - Pós-Graduação. Rua Pedro João Pereira, nº 150. Mato Alto – A)Introdução:
Caffeine is an ergogenic aid which increases fatigue tolerance. We evaluated the role of caffeine in muscle stress in the lumbar extensor muscles.
Objetivos:
The purpose of this study was to determine whether caffeine is ergogenic for the lumbar and transverse/abdominal multifidus muscles by analyzing isometric resistance and electromyography (EMG) in the Sorensen test. The Sorensen test is a timed measure used to assess the endurance of the trunk extensor muscle.
Métodos:
This study was approved by the Human Ethics Committee (protocol 86400418.0.0000.0121). Twenty-six male subjects (20.2±1.9 years old, BMI 21.4±2.2 kg/m2) performed the Sorensen test 60 minutes after treatment of caffeine (6 mg/kg, V.O.) or vehicle (placebo, 0.3% saline solution) in a cross-sectional double-blind study. The muscle fatigue was evaluated by surface EMG (decreased neural firing rate) and Borg rated perceived exertion scale. Heart rate, blood pressure and blood lactate were also evaluated.
Resultados e Conclusões:
Caffeine improved 10.6±6.6% time in the Sorensen test ($d=0.34$, $p < 0.05$), increased muscle recruitment for multifidus ($p < 0.05$) and transverse/abdominal ($p < 0.05$), and rose median frequency of transverse/oblique abdominal muscles ($p < 0.05$). Blood lactate values were also higher for caffeine ($d=0.5$, $p < 0.05$), probably due to longer exercise time and recruitment of fast motor units, with greater efficiency for anaerobic metabolism. Even so, caffeine decreased rated perceived exertion ($d=0.4$, $p < 0.05$).

Caffeine was ergogenic for postural muscles of healthy subjects during a lumbar muscle stress test.
Palavras-chaves: caffeine, electromyography, isometric contraction, muscle fatigue
Agência Fomento: CAPES; CNPq; FAPESC

12.022 - ANÁLISE DA ATIVIDADE ESPONTÂNEA DOS NEURÔNIOS ESPINHOSOS MÉDIOS ESTRIATAIS DURANTE A OCORRÊNCIA DAS DISCINESIAS INDUZIDAS PELA L-DOPA.

ANALYSIS OF SPONTANEOUS ACTIVITY OF STRIATAL MEDIUM SPINY NEURONS DURING THE OCCURRENCE OF L-DOPA-INDUCED DYSKINESIAS.
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Instituição: 1 FFCLRP- USP - Faculdade de Filosofia, Ciências e Letras de Ribeirão Preto (Av. Bandeirantes, 3900 - Vila Monte Alegre, Ribeirão Preto - SP)Introdução:
Parkinson's disease (PD) is a neurodegenerative disorder that occurs as a consequence of decreased striatal dopamine due to the gradual loss of dopaminergic neurons in the substantia nigra compacta (SNc). L-DOPA is used to treat motor symptoms of PD by increasing dopamine availability in the striatum. However, chronic L-DOPA administration often results in the emergence side effects known as L-DOPA-induced dyskinesias (LIDs). The striatum has cells called medium spiny neurons (MSNs) that are divided according to their projection targets forming the direct pathway (dMSNs) and the indirect pathway (iMSNs), being responsible for facilitating and inhibiting respectively the motor response. It is suggested that LIDs occur as a result of imbalances between these striatal projections pathways.
Objetivos:
: This study aimed to characterize the spontaneous activity of MSNs during the occurrence of the LIDs.
Métodos:
All experimental procedures are in accordance with the FFCLRP Ethics Committee approval (case N°. 18.5.35.59.5). PD was experimentally induced in rats by injecting 6-hydroxydopamine (6-OHDA) in the medial forebrain bundle (MFB). Control animals (sham-operated) were submitted to the same procedures and received vehicle microinjection in the MFB. Sham-operated and 6-OHDA-lesioned rats were chronically treated with either vehicle (0.9% saline solution; n=4 shams and n=3 6-OHDA) or L-DOPA (5 mg/kg L-DOPA combined with 12.5 mg/kg benserazide; n=6) for 3 weeks. Animals were recorded for 3 hours after administration of vehicle or L-DOPA, three days a week during the chronic treatment for behavioral analysis of axial, limb and orofacial dyskinesias. The stepping test was performed once a week, 1 hour after administration of vehicle or L-DOPA to monitor akinesia. Finally, extracellular electrophysiological recordings were performed in vivo to analyze the spontaneous activity of MSNs during the effect of L-DOPA. Animals were then perfused transcardially for immunohistochemistry.
Resultados e Conclusões:
Results: The stepping test demonstrated that 6-OHDA induced a marked reduction in the number of adjusting steps performed with the anterior contralateral paw ($P < 0.05$ vs. Sham-operated, t test). Chronic administration of L-DOPA to 6-OHDA-lesioned rats induced a significant increase over time on axial limb and orofacial LIDs. Electrophysiological recording analysis revealed increased firing rates in MSNs recorded in the striatum of dyskinetic animals ($P < 0.05$ vs. Sham-operated and 6-OHDA-lesioned groups; one-way ANOVA after and Bonferroni post-hoc test). Conclusions: Abnormal firing rates patterns of MSNs within the striatum might contribute the occurrence of LIDs.
Palavras-chaves: Atividade espontânea, Discinesias, L-DOPA
Agência Fomento: Fundação de Amparo à Pesquisa do Estado de São Paulo - FAPESP

12.023 - REGISTRO DA ATIVIDADE UNITÁRIA DE NEURÔNIOS DO NÚCLEO ACCUMBENS DE RATOS DURANTE O COMPORTAMENTO DE APROXIMAÇÃO APETITIVA

SINGLE UNIT ACTIVITY OF RATS NUCLEUS ACCUMBENS NEURONS DURING APPETITIVE APPROACH BEHAVIOR
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Instituição: 1 UFPR - Universidade Federal do Paraná (Av. Cel. Francisco H. dos Santos, 100 - Jardim das Américas, Curitiba), 2 CAS - Czech Academy of Sciences (142 20, Vídeňská 1083, 142 00 Praha 4, Tchéquia), 3 UCSD - University of California, San Diego (9500 Gilman Dr, La Jolla, CA 92093, EUA), 4 UC - Universidad de Chile (Avenida Independencia 1027, Independencia), 5

AECM - Albert Einstein College of Medicine (1300 Morris Park Ave, The Bronx, NY 10461, EUA)Introdução:
The accumbens nucleus (NAc) receives projections from the limbic system and has indirect projections to motor centers. This suggests that NAc is an interface between motivation and action.
Objetivos:
However, there is little direct evidence showing a causal relationship between the activity of NAc neurons and the choice of "where to go" and the motor control of locomotion towards the chosen target.In search for this evidence, we recorded the activity of 66 NAc neurons from 5 male Wistar rats during appetitive approach behavior.
Métodos:
The animals were trained to find chocolate milk rewards in the same 3 arms of an 8-arm radial maze in two different conditions: 4 drops in each of the 3 reinforced arms 100% of the times (2 rats); or 4 drops 100% of the times in one arm, 4 drops 66% of the time in the second arm, and 1 drop 100% in the third arm (3 rats). An array of electrodes mounted in a microdrive directed towards the shell of the NAc. Rats performed the task while electrophysiological recordings and concomitant digital video tracking of the animal's location within the maze were conducted. The experiments were approved by the UFPR Animal Ethics Committee (protocol 932).
Resultados e Conclusões:
The spike time stamps of single units were aligned to the following events: locomotion onset, speed peak and arrival into the reward area. General linear model (GLM) analysis showed that the main predictors of firing rate changes were the instantaneous speed and reward distance. The variance in firing rate was considered significantly explained by the GLM if the explained variance exceeded that of 95% of 100 models run using shuffled spike data. 63% of recorded neurons met this criterion. Visual inspection of the spike rasters suggested the following 4 activation patterns: neurons with an activation peak near locomotion onset and an inhibition peak after the animal reaches the maximum speed; neurons with the opposite pattern; neurons with firing rates that varied concomitantly with speed; neurons inhibited during locomotion and activated after locomotion end. The exact time of the activation/inhibition peaks of each neuron was homogeneously distributed between the fractions of distance between start location and the reward location. We did not find robust evidence of correlation between neuronal activity and the choice of a specific arm, regardless of the arm location, magnitude of reward and reward probability. These results are consistent with the hypothesis that during the appetitive approach the NAc adjusts the speed of locomotion according to reward distance.
Palavras-chaves: accumbens nucleus , electrophysiology, speed, appetitive approach
Agência Fomento:

12.024 - RESISTED LADDER CLIMBING IMPROVES THE ANXIOUS AND DEPRESSIVE BEHAVIOR OF MICE - A PILOT STUDy

RESISTED LADDER CLIMBING IMPROVES THE ANXIOUS AND DEPRESSIVE BEHAVIOR OF MICE - A PILOT STUDY
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Instituição: 1 UFSC - Universidade Federal de Santa Catarina (R. Eng. Agronômico Andrei Cristian Ferreira, s/n - Trindade, Florianópolis)Introdução:
In addition to aerobic exercises, resistance exercise is indicated for general health maintenance, prevention and treatment of chronic non-transmissible diseases. Different animal models were developed in rats. However, little is known about the resisted ladder climbing model in mice.
Objetivos:
To analyze the effect of five weeks of resistance training (ladder) on the anxious and depressive behavior of mice.
Métodos:
The study was approved by the ethics committee (protocol 1958010616). Sixteen male mice (Swiss, 8 weeks, 44.5±1.5 g) were randomized into two groups: sedentary control (n = 8) and ladder exercise (n = 8). Exercise consisted of climbing a ladder (1.1 m; 0.18 m; 1.4 cm grid, 80° inclination) resisted by a fixed overload on the mouse-tail. After familiarization (3 days), exercised animals performed the initial assessment of muscle strength through the maximum voluntary carrying capacity (MVCC) for exercise prescription. Mice climbed the ladder for 5 weeks, 3 times/week, totaling 15 sessions. Animals started with MVCC 50% (10-15 repetitions/day, 35 sec rest). In the second and third week the load was MVCC 60% (8-12 repetitions /

day, 45 sec rest). At the fourth and fifth weeks the load was MVCC 70% (5-8 repetitions / day, 55 sec rest). MVCC was revalidated every 2 weeks. Control animals were handled without any exercise application. We assessed anxious behavior of mice through the open field and elevated plus maze, 24 hours after the last exercise session. The depressive behavior of mice was assessed through the splah test, 48 hours after the last exercise session. Values were expressed as mean ± standard error of the mean (SEM). Results were compared using unpaired t-test and ANOVA for repeated measurements with Bonferroni post-hoc test when necessary. The differences were considered significant for P ≤0.05 Results: Strengthening increased body mass (before 44.4±0.8 g after 52.1±0.9 g; F2,38=72; P < 0.05) and MVCC (before 55.4±2.1 g after 80.5±1.9 g; F1,16=26; P < 0.05). Exercise also reduced anxious-type behavior through open field (longer time in the center, control 41.5±7.1 s exercise 63.6±6.2 s, P=0,03) and elevated plus maze (higher risk assessment number, control 4.1±0.4 exercise 5.5±1.0, P=0,00). In addition, training reduced anedonia demonstrating its effect on depressive-type behavior (longer self-cleaning time in the splash test, control 59.4±5.4 s exercise 127.4±6.1 s, P=0,00).
Resultados e Conclusões:
Strengthening exercises improved anxious and depressive behavior of mice.
Palavras-chaves: anxiety, exercise, resistance training
Agência Fomento:

13. Memória & Aprendizado

13.039 - RELAÇÃO ENTRE O USO DE METILFENIDATO E A ESCOLARIDADE DE CRIANÇAS DE 0 A 10 ANOS EM UMA CIDADE NO SUL DO BRASIL

THE RELATION BETWEEN THE USE OF METHYLPHENIDATE AND THE SCHOOLING OF CHILDREN FROM 0 TO 10 YEARS OLD IN A CITY SOUTHERN BRAZIL

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Instituição: 1 UEM - Universidade Estadual de Maringá (Avenida Colombo, 5790, Maringá - PR), 2 IAP - Instituto Adventista Paranaense (Gleba Paiçandu, 80, Ivatuba - PR), 3 UENP - Universidade Estadual do Norte do Paraná (Rodovia BR-369, Km 54, Bandeirantes - PR)Introdução:
The worldwide consumption of methylphenidate (MPD) increased approximately 400% between 2000 and 2012. It has occurred mainly in the United States, Canada, Germany, Spain, Switzerland, Netherlands and Brazil, reaching a 71.8 tons worldwide consumption record in 2013.
Objetivos:
To verify if there is a relation between the use of Methylphenidate and the shift of study and schooling years.
Métodos:
The proposal presented in this summary is part of a broad study entitled "A Picture of the Medicalization in Paraná", registered in the SGP/UEM, in progress since 2012, and approved by the Ethics Committee (COPEP), report 862.751. The data were collected through a questionnaire filled out by people responsible for medicalization of children from 0 to 10 years old at the enrollment of these students in 2013 in municipal schools of Maringá, State of Paraná, Brazil. A total of 18,207 valid questionnaires were collected from 26,205 enrolled children that year. With respect to valid questionnaires, 5,890 questionnaires were from Preschool students, 11,773 questionnaires were from Elementary School students, and 544 students did not fill out this blank. The data were entered in the Microsoft Excel spreadsheet and then exported to the Statistical Package for Social Science (SPSS) version 20.0, where statistical analyzes were performed.
Resultados e Conclusões:
In this study, 3.7% of the children in the Municipal Educational Network of Maringá have used MPD in 2013, representing 5.6% of those enrolled in Elementary School, and being mostly male children. Table 1 presents the general data of children using methylphenidate in the city of Maringá. It can be observed that there is a greater risk for male children from Elementary School, to use Methylphenidate, presenting the afternoon shift as a protector from MPD usage. Table 2 shows the relation between the use of methylphenidate and the children's schooling years, and it can be observed that the risk of methylphenidate use increases as the Elementary School years go on. Conclusion We can observe the afternoon shift is a protector from MPD usage. Thus, we believe that the accentuated risk in these periods can be explained by sleep disorders such as quality deprivation and/or adequate amount, leading to daytime sleepiness. We can find that there is a strong

relation between children´s schooling years and the use of MPD, because the risk of using MPD was also related to the raise of educational level, as school requirements increase and probably child's difficulty in accompanying teaching as well. Thereby, children who present academic difficulties and hyperactivity must be carefully analyzed by a multidisciplinary team.
Palavras-chaves: Methylphenidate, students, ADHD
Agência Fomento:

13.040 - RECUPERAÇÃO DE FONTE SOB PISTAS PROBABILÍSTICA: EFEITOS DISSOCIADOS ENTRE ACURÁCIA VERSUS CONFIANÇA.

SOURCE RETRIEVAL UNDER PROBABILISTIC CUEING: DISSOCIATED EFFECTS OF ACCURACY VERSUS CONFIDENCE.
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Instituição: 1 UFMG - Universidade Federal de Minas Gerais (Avenida Antonio Carlos, 6627, Belo Horizonte, MG, 31270-901, Brazil.)Introdução:
Our ability to remember events (episodes) depends on two critical components, information about the item and information about the context (source). In source monitoring tasks, the individual is asked to retrieval the context in which the stimulus was encoded. However, there aren't studies investigating how external cues influence the responses, neither the relationship between accuracy and confidence in this task. Accuracy during memory recognition declines when probes are preceded by misleading information about their study status (i.e., invalid cueing). Invalid cueing also decreases confidence, but only for correct rejections, not hits.
Objetivos:
We hypothesized that the preserved confidence of hits (and not correct rejections) in the face of invalid memory cueing stems from recollection.
Métodos:
To test this, we conducted two source-memory experiments manipulating encoding location (left or right side) or list (first or second). At test, the studied objects were preceded by predictive arrow cues (75% valid and 25% invalid) indicating the prior location or list in which each object had been studied. The participants' task was to remember the location or the list in which each object was studied, as well as to rate their confidence on each of their responses. The research was appreciated by the ethics committee in research with human beings of the Federal University of Minas Gerais, with approval number 27468014.8.0000.5149.
Resultados e Conclusões:
Cue validity prominently affected accuracy (valid > invalid), and confidence was markedly higher for correct versus incorrect source judgments. Nonetheless, as with hits during recognition, confidence for correct source judgments was unaffected by cue validity. Since source memory is heavily based on recollection, we interpret this accuracy vs. confidence dissociation in light of dual process models of recognition.
Palavras-chaves: confidence, cueing, dual-process model. , source memory
Agência Fomento:

13.041 - IMPLICIT LEARNING OF PROBABILISTIC SEQUENCES IN PARKINSON'S DISEASE

IMPLICIT LEARNING OF PROBABILISTIC SEQUENCES IN PARKINSON'S DISEASE
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Parkinson's disease (PD) is not known as a motor impairment only, it also involves a specific injury of the substantia nigra resulting in a reduction of the dopamine levels. Studies indicated that striatum is an essential brain area for motor circuits. Moreover, the role of learning and executing implicit programs has also been studied. Recent studies showed correlation between motor performance and implicit learning (IL) using an analogous protocol. In addition, some studies demonstrated difficulties in the IL acquisition in PD. The Goalkeeper Game (GG) is a computer game being developed by the CEPID NeuroMat to identify IL and explicit learning (EL) in PD. In this game, brain signatures are evaluated through the performance of the participant in guessing the next direction chosen by the penalty-taker. The game phases are divided into

three stages where the goal is to tackle as many kicks as possible in short periods. The system records the sequence of guesses of the player, who must identify the context tree model used by a virtual penalty-taker. We compared the learning capacity of the sequences in individuals with PD and healthy (control group) to correlate the loss cognitive skills in the different stages of PD.
Objetivos:
The aim of the study was to evaluate the loss of cognitive skills in the process of learning probabilistic sequences using the GG in individuals with PD.
Métodos:
This game was adopted for data collection of 65 participants (32 male and 33 female), (mean age = 65.59 ± 10.57) , (years of formal education=13.34 ± 5.50). The study was inserted in a protocol in progress and approved by the research ethics committee (CAAE 67388816.2.0000.0065). The volunteers were divided into two groups: PD group with 41 individuals (according to the stages of PD was subdivided in - HY1 = 3, HY2 = 18, HY3 = 20) diagnosed with PD (7.35 ± 5.69 years before testing) and control group with 23 participants. The GG is based on stochastic processes driven by the context tree model using structured sequences random stimuli in the game. The context tree models generating random sequences of high probability and weak probability. We use the symbols 0, 1, and 2 to represent the direction right, left, or middle, respectively A = {0, 1, 2}.
Resultados e Conclusões:
To verify the performance between the groups, we used a hypothesis test considering the following: - h0: The control group has more or equal errors than PD group. - h1: The control group has fewer errors than PD group. We considered the control and PD groups are independent and we used the t-test to infer the population. As a result, the p-value was 0.0351. Control group had higher performance than PD group in the final stage of the GG. PD group presented a median higher than control group, also, the extreme values and the first quartile was higher in PD group. Conclusions These results demonstrated that different performances between PD and control groups might be explained by cognitive impairments in PD.
Palavras-chaves: Implicit learning , Parkinson's disease, probabilistic sequences
Agência Fomento:

13.042 - MODERNOS MÉTODOS DE ENSINO NO BRASIL: UMA ANÁLISE NEUROPSICOLÓGICA

MODERN TEACHING METHODS IN BRAZIL: A NEUROPSYCHOLOGICAL ANALYSIS
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Instituição: 1 UNIFAL - UNIVERSIDADE FEDERAL DE ALFENAS (R. Gabriel Monteiro da Silva, 700 - Centro, Alfenas - MG, 37130-000)Introdução:
The new teaching methodologies have among their proposals the so-called active methodologies that allow students to be authors of their own knowledge, weaving through experiences the search for knowledge, promoting autonomy in learning that helps in the development of creativity, critical awareness in cognitive and psychosocial aspects; collaborating in the resolution of problems, in the modeling of teaching materials and consultations to platforms that add positively in this construction of knowledge. The theories for modern teaching take into consideration some basic authors, philosophers and psychologists. Of these we consider, for reasons of relationship with neural structures and objective analysis, authors with more biological emphasis such as Luria and Vygotsky.
Objetivos:
This study aimed to understand the relationship between the methodologies used in teaching and the effectiveness of learning, in addition to studying, applying and assessing active learning as a method of teaching renewal in the light of Luria and Vygotsky's neuropsychology.
Métodos:
A bibliographic review of the main concepts of Luria and Vygotsky was carried out in order to help in the understanding of how active methodologies are effective in the learning of students at all levels of teaching.
Resultados e Conclusões:
Most of the literature found refers to basic and secondary education. Despite the use of didactic systems to use modern neuropsychology as one of the bases, it was observed that the interpretation seems confusing in some cases, such as in constructivism and the use of active methodologies, in accordance with the socio-cultural psychology preached by Luria and Vygotsky, mainly. The socio-cultural psychology suggested by Vygotsky and colleagues, with Luria as the main follower and continuator, underlies the justification of part of modern didactics in Brazil; however, Luria's subsequent studies, especially in

relation to research on brain injuries as a basis for cortical functions and mind studies, show a more objective analysis and justifies the processes of memory, learning with social and cultural bases, however, without disregarding the biological factors involved. In this perspective, the qualities of the individual are important for the learning process, and these qualities can hardly be considered as a collective factor only. This can be observed in the book "The Construction of the Mind", in which socio-cultural psychology is emphasized, but the cerebral aspects, especially of the tertiary cortical areas, are evidenced as the basis of the functioning system of the cerebral processes. In conclusion, the data obtained by reading Luria's studies, need to be analyzed with more care in the teaching proposals, and consider the cortical functions.

Palavras-chaves: neuropsychology, teaching, learning
Agência Fomento:

13.043 - DIFERENÇAS EM TAREFAS DE LEITURA USANDO FMRI

DIFFERENCES IN READING TASKS USING FMRI

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Reading can be facilitated in words with high orthographic neighborhood density (ND) which is the number of new real words that can be made by one letter substitution (e.g. word fear to dear/near/feat, ND=3). High ND words are recognized faster than low ND words and this effect is believed to be due to parallel activation.

Objetivos:

The aim of this study is to verify differences in brain activation during reading words and pseudowords with high and low ND.

Métodos:

thirty-seven university students volunteers (mean age= 25.37±5.61, 16 women) participated in the study, all signed the informed consent term (Ethics Committee Approval FMUSP 089/11). The participants were screened for reading and cognitive functions using a series of neuropsychological tests. Silent reading was assessed by block design paradigm composed of 100 words and 100 pseudowords, in two level of orthographic ND (50% high and 50% low), each word was shown in 1 second, totalizing 8,40 minutes of experiment. The pseudowords were created by one letter substitution. In each group there were 50 stimuli with low orthographic neighborhood density (N0) and 50 with high density (N3+). The compliance with the task was verified by integrated eye tracking. Images were acquired in a 3T MRI scanner (Philips Achieva). GRE-EPI SENSE was used to acquire BOLD sensitive images with the following parameters: TR=2000ms, TE=30ms, FA=90°, 3.0mm isotropic voxels, whole brain coverage and 260 volumes. ANOVA repeated measures (2x2) was performed on two factors: lexicality (words x pseudowords), density (High ND x Low ND) and interaction of both.

Resultados e Conclusões:

BOLD effect/response was detected in brain regions related to lexicality factor was detected in the left hemisphere in inferior frontal gyrus, intraparietal sulcus extending into inferior parietal cortex and the fusiform gyrus (the visual word form area - VWFA). Additional activation was found in the right inferior frontal gyrus, ventromedial prefrontal cortex, paracingulate cortex and right cerebellum. We observed brain response in areas previously related to reading words, such as: Broca, Wernicke and VWFA, in words versus pseudowords comparison. It is possible that prefrontal areas may be related to the process of discriminating words from pseudowords, and the right cerebellum to the automatization of eye movements in reading.

Palavras-chaves: functional magnetic resonance imaging, pseudowords, reading, words
Agência Fomento: CAPES - Coordenação de Aperfeiçoamento de Pessoal de Nível Superior

13.044 - EFEITOS DA MULTITAREFA E MÍDIA NA RECORDAÇÃO

MEDIA MULTITASKING EFFECTS ON REMEMBERING

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Federal de São Paulo. R. Napoleão de Barros, 925 Vila Clementino 0)Introdução:
Media multitasking (MM), i.e. the use of media while performing another tasks, has increased because of the widespread use of smartphone. MM is detrimental because it can impair cognitive and academic performance. Some may believe this may be compensated for by using adequate study techniques such as retrieval practice (RP). RP consists of trying to remember learned information after it was presented by answering tests, quizzes, etc
Objetivos:
To investigate whether receiving and reading messages on a mobile phone while reading short texts impairs recall of the information later, on same-day. We also investigated whether RP of information in the texts can minimize this effect.
Métodos:
This study (ethical approval: # 2.697.276) involved 60 college students (27 men; 21.15±2.50 years - mean±SD). Each participant read three consecutive texts on PsychoPy v.2.1 Software (within-participants), each of which under two manipulations in random order: 1) read only, without multitask (RO; control condition); 2) read two texts while receiving messages (on their personal smartphone) that also had to be read (MM conditions). Next participants were submitted to 3 other immediate manipulations, one for each text (first recall test): 1) answering 7 short answer questions about the RO text [RO followed by RP (RO → RP); 2) 7 RP tests of information in one of the MM texts (MM → RP)], with feedback of the correct answer; 3) rereading (RR) 7 passages about the other MM text that included the same information as in the RP condition [MM → RR)]. Five minutes later, participants were asked to answer all 21 questions about the 3 texts (second recall test).
Resultados e Conclusões:
It took participants longer [$F(1,110) = 91.51$; $p < 0.0001$; $\eta 2 = 0.62$] to read the texts in the MM conditions than in the RO conditions (p values < 0.03). Recall in the first test [$F(1.55) = 11.7$; $p < 0.001$; $\eta 2 = 0.18$] was impaired after MM by about 15% in comparison to the RO condition ($p < 0.001$). Recall in the second test (with the 21 questions about all 3 texts) [$F(1,110) = 4.05$; $p < 0.05$; $\eta 2 = 0.07$] was better in the MM →RR than in the other conditions ($p < 0.05$). This indicates that the initial harm of performing MM while reading the text is not minimized by RP. Reading a text while receiving messages on Smartphone took 10% longer and decreased immediate recall by 15%, showing interference in learning. Practicing retrieval immediately after this did not compensate for this decrease in learning, while rereading parts of the text with full attention and no MM led to better subsequent recall. Hence, MM must be avoided in academic settings.
Palavras-chaves: Learning, Memory, Media Multitasking, Retrieval Practice
Agência Fomento: Fundação Araucária - Apoio ao Desenvolvimento Científico e Tecnológico do Paraná

13.045 - ATENUAÇÃO DE MEMÓRIAS AVERSIVAS ATRAVÉS DO MECANISMO DE DESCONDICIONAMENTO: UMA NOVA ABORDAGEM PARA ELIMINAR MEMÓRIAS TRAUMÁTICAS

SHIFTING FROM FEAR TO SAFETY THROUGH DECONDITIONING-UPDATE: A NOVEL APPROACH TO ATTENUATE FEAR MEMORIES
Autores: Bruno Popik 1, Henrique Schaan Fernandes 1, Kétlyn Talise Knak Guerra 1, Lucas de Oliveira Alvares 1
Instituição: 1 UFRGS - Universidade Federal do Rio Grande do Sul (Av. Bento Gonçalves, 9500 - Porto Alegre, RS)Introdução:
The capacity of updating our memories in response to new experiences is a crucial phenomenon to our survival. It needs a flexible mnemonic system, and that is made possible by memory reconsolidation.
Objetivos:
Therefore, our goal is to investigate the neuronal mechanisms that underlie fear memory attenuation through the deconditioning-update protocol.
Métodos:
This protocol consists in training (0.5mA) the animals and then exposing them to four reactivation sessions, through which weak shocks (0.1mA) are administered (in the shock group only). We used nimodipine to block L-type voltage gated calcium channels. The behavioural tasks used were the following: contextual fear conditioning (CFC), auditory fear conditioning (AFC) and passive avoidance.
Resultados e Conclusões:
We trained the animais in the AFC and, on the test session, 48h later, observed severe reduction in freezing in the shock group in comparison to the no-shock and control groups ($F3,29 = 10.87$; $p < 0.0001$). That difference was mantained on the renewal ($F2,17 = 33.41$; $p < 0.0001$) and spontaneous recovery ($F2,17 = 17.38$; $p < 0.0001$) sessions. Next, we showed that our protocol is effective in different types of fear memory

by conducting experiments with CFC and passive avoidance. After that, we investigated the boundary conditions of reconsolidation (memory strength and age). To address memory strength, we used strong training (1mA). To address memory age we started the reactivation sessions 40 days after moderate training (0.5mA). Fear memory was disrupted in both cases, showing our protocol works past reconsolidation boundary conditions. To further investigate if we were in fact modulating memory reconsolidation, we conducted the protocol while blocking L-type voltage gated calcium channels. Nimodipine blocked fear memory attenuation through deconditioning-update. This novel and promising approach was capable of updating the original memory trace in a robust and permanent manner, making it markedly less aversive and without the need of pharmacological agents.
Palavras-chaves: Memory, Reconsolidation, Extinction
Agência Fomento:

13.046 - HIPPOCAMPAL-PREFRONTAL INTERACTIONS DURING DECISION MAKING

HIPPOCAMPAL-PREFRONTAL INTERACTIONS DURING DECISION MAKING
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Instituição: 1 ICe - Instituto do Cérebro (Av Nascimento de Castro, 2155, Natal, RN)Introdução:
The hippocampus has been linked to memory encoding and spatial navigation, while the prefrontal cortex has been associated with cognitive functions such as decision making. These two areas are hypothesized to communicate in tasks that demand both spatial navigation and decision-making processes. However, the electrophysiological signatures associated with this interplay remain to be elucidated.
Objetivos:
To investigate the dynamics of the hippocampal-prefrontal interactions in rats during decision making.
Métodos:
We have analyzed local field potentials (LFPs) previously recorded from rats performing a spatial alternation task in an 8-shaped maze (Fujisawa et al., 2008). In this task, odor cues indicated the rewarded arm during inter-trial delays. We analyzed 13 sessions among 3 Long Evans rats (average trials per session: 39±9). We computed intra-regional spectral power decompositions, inter-regional phase coherence, intra- and inter-regional cross-frequency coupling, and inter-regional Granger causality. The analysis framework was generally divided into two approaches. In the "temporal" approach, we concatenated LFPs within time windows centered at the timestamps of four task events: trial start, choice point, turn and trial end. In the "spatial" approach, we divided the locomotion trajectory and associated LFPs into spatial bins.
Resultados e Conclusões:
Hippocampal spectral power exhibited prominent theta-frequency peaks (6-10 Hz) at specific maze locations. However, such spatial selectivity could be accounted for by differences in locomotion speed across the maze. Interestingly, in both analytical approaches, we found an increase in theta coherence between the hippocampus and prefrontal cortex near the choice point ($p = 0.01$), which could not be explained by changes in theta power. In addition, we observed an increase in inter-regional beta band coherence during maze runs ($p < 0.01$), although to a smaller degree and slightly longer duration. We also found spatially dynamic changes in cross-frequency coupling patterns between and within the two regions. Finally, Granger causality showed directional flow from the hippocampus to the prefrontal cortex at theta frequency (and at the opposite direction at delta frequency), whose magnitude peaked at the choice point ($p < 0.01$). In all, by using different connectivity measures, our results reveal maximum electrophysiological interactions between the hippocampus and the prefrontal cortex near the decision-making period of the spatial alternation task. These results corroborate the hypothesis that the dynamic interplay between these two regions is important for cognitive processes.
Palavras-chaves: Decision Making, Hippocampus, Prefrontal Cortex, Computational Analyses, Cross-Frequency Coupling
Agência Fomento: CAPES

13.047 - EFEITOS DAS INFUSÕES DE MUSCIMOL E AP5 NO SUBÍCULO DORSAL SOBRE A AQUISIÇÃO E A CONSOLIDAÇÃO DO CONDICIONAMENTO DE MEDO AO CONTEXTO EM RATOS

EFFECTS OF MUSCIMOL AND AP5 INFUSIONS INTO THE DORSAL SUBICULUM ON CONTEXTUAL FEAR CONDITIONING ACQUISITION AND CONSOLIDATION IN RATS
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Instituição: 1 UNIFESP - Universidade Federal de São Paulo (Departamento de Psicobiologia, Rua Botucatu 862, 04023062, São Paulo-SP, Brasil.)Introdução:
The hippocampal formation has a well-known role in contextual fear conditioning (CFC). Involvement of the dorsal hippocampus (DH) in CFC has been established by showing that its muscimol-induced temporary inactivation impairs CFC consolidation while acquisition is hindered by blocking DH glutamatergic NMDA receptors with AP5. The dorsal subiculum (DSub) connects the hippocampus to the entorhinal cortex through pathways that seemingly relies on NMDA-dependent synaptic plasticity. Although contribution of the DSub in CFC retrieval has been previously reported, its putative role in acquisition and consolidation remains unexplored.
Objetivos:
Our aim was to assess the effects of intra-DSub muscimol or AP5 infusion on CFC acquisition and consolidation.
Métodos:
The DSub of 3-to-4-month-old male Wistar rats were bilaterally cannulated (AP=-6.4 mm, ML=±3.8 mm, DV=- 3.4 mm). CFC training consisted of applying a footshock (1s/0.8mA – after a 120s delay) as the unconditioned stimulus. A 5-min test was done 48h later, and freezing was assessed as the behavioral conditioned response. All groups received 0.2ul/hemisphere infusions 5min before (saline n=6; AP5 n=9; muscimol n=8) or immediately after the training. (n=7 for all groups). Data from animals with incorrect cannula implantation were excluded. To control for bias such as shock sensitivity and emotional reaction, we employed a hippocampal-independent procedure: step-through inhibitory avoidance (ST-IA). Freezing was analyzed by the generalized estimating equations (GEE) method, with group and time-bin (minute-by-minute) as independent factors. IA-ST latency was analyzed by generalized linear model (GlzM), with group as the only independent factor. LSD posthoc test was applied when appropriate.
Resultados e Conclusões:
Pre-training infusion of muscimol into DSub diminished freezing [Wald (8, 80)= 16,67; p=0,03] at min3 (M=8,42±SE=4,43 x M=27,33±SE=6,11) and min4 (M=7,63±SE=3,75 x M=26±SE=7,79), while post-training muscimol decreased freezing [Wald (8, 72)= 24,88; p= 0,002] at min3 (M=22,43±SE=4,21 x M=38,71±SE=6,98) and min5 (M=14,14±SE=3,02 x M=34,86±SE=7,55). Regarding AP5, pre-training infusion did not affect freezing response, while post-training infusion reduced [Wald (8, 72)= 24,88; p= 0,002] freezing at min1 (M=10,71±SE=3,53 x M=32,57±SE=5,55), min2 (M=18,14±SE=4,47 x M=38,86±SE=5,11) and min3 (M=18,98±SE=5,82 x M=38,71±SE=6,98). Our data suggest that only CFC consolidation seems to depend on the DSub, unlike the DH, which is involved in both CFC acquisition and consolidation. The lack of drug effect on ST-IA latency indicates that shock sensitivity and emotional reaction did not account for the observed group differences. (CEUA nº 5032300517).
Palavras-chaves: Contextual fear conditioning, Muscimol, NMDA, Step-through inhibitory avoidance , Subiculum
Agência Fomento: FAPESP (processo n° 2017/09837-1)

13.048 - INFLUÊNCIA DO NÍVEL SOCIOECONÔMICO NO DESEMPENHO DA MEMÓRIA OPERACIONAL

SOCIOECONOMIC STATUS INFLUENCE ON WORKING MEMORY PERFORMANCE
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Instituição: 1 FAMEPP-Unoeste - Curso de Medicina - Universidade do Oeste Paulista (Campus 1, Presidente Prudente-SP), 2 Biomed-Unoeste - Curso de Biomedicina - Universidade do Oeste Paulista (Campus 1, Presidente Prudente-SP), 3 Psico-Unoeste - Curso de Psicologia - Universidade do Oeste Paulista (Campus 2 - Presidente Prudente-SP)Introdução:
Socioeconomic status (SES) is measured by the aggregation of information on education, occupation, and wealth or income of individuals and is associated with cognitive ability (Farah, 2018). This is expected, as education has direct implications to cognition, and simple measurements of components of Executive Functions (EF) could be a good measure of the prejudice of low education (and SES) on cognition.
Objetivos:
The objective of the present study was to measure working memory performance, using a 2-back test, on two different SES populations.
Métodos:
Data presented on this work was taken from studies registered and approved by the National Research Ethics Committee under CAAE numbers 89236818.7.0000.5515 and 03150918.2.0000.5515. Twenty two subjects, both men and women patients from ambulatory care and resident or internship

doctors at a tertiary hospital in the Western São Paulo, underwent a 2-back test to assess working memory performance, comprising respectively a Low SES Group (n = 10) and a High SES Group (n = 12). Test protocols were developed on Psychopy software. Analysis of variance for repetitive measures (ANOVA) were used to compare the mean reaction times and the mean percentage of errors in the 2-back test, with Group and Blocks as factors.
Resultados e Conclusões:
The results for reaction times (RT) showed important differences between the groups ($F_{1,20}=10.720$, $p=0.004$), with High SES Group exhibiting lower RT. Learning between groups were similar: interaction between Block and Group non-significant ($F_{7,140}=1.751$, $p=0.102$). The ANOVA also showed significant difference for Block ($F_{7,140}=6.041$, $p < 0.001$). The ANOVA for the percentage of errors also showed difference between the groups ($F_{1,20}=5.594$, $p=0.028$) and a significant effect for Block ($F_{7,140}=6.605$, $p < 0.001$) and absence of significant difference for the interaction Block and Group ($F_{7,140}=0.395$, $p=0.904$). Taken together, these data points to important influences of SES on working memory performance and, possibly, to EF capacity.
Palavras-chaves: working memory, socioeconomic status, executive functions
Agência Fomento: Unoeste

13.049 - O PAPEL DO HIPOCAMPO DORSAL NA MODULAÇÃO DA MEMÓRIA ESPACIAL DE RATOS WISTAR.

THE ROLE OF THE DORSAL HIPPOCAMPUS IN SPATIAL MEMORY MODULATION OF WISTAR RATS
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Instituição: 1 UNESP - Universidade estadual paulista (São José do Rio Preto, São Paulo, Brasil), 2 UFSCar - Universidade federal de São Carlos (São Carlos, São Paulo, Brasil)Introdução:
The hippocampus (HPC) has a well-established role in memory processing. Studies show that the left and right hemispheres of mammals have anatomical and functional differences, including structures such as the HPC. Thus, there are controversies about the functions of the sub-regions of HPC itself (Cornu ammonis; CA), its dorsal and ventral region and between right and left HPC.
Objetivos:
To evaluate the function and possible lateralization of the CA3 region of dorsal hippocampus (HPCd) in spatial memory processing (recently and remotely acquired).
Métodos:
Forty Wistar rats (Rattus novergicus) were used and the experimental apparatus used was the Morris water maze (MWM). The procedures were approved by CEUA (protocol no. 184/2018). First, the animals underwent a stereotatic surgery and were divided in four experimental groups (n=10 each group): VG, with animals that received bilateral infusion of PBS (vehicle) in CA3 of both HPCd; LG, with animals that received infusion of a neuronal lesioner, the ibotenic acid (IBO), in CA3 of left HPCd; RG, with animals that received IBO in CA3 of right HPCd, and BiG, with animals that received IBO in CA3 of both HPCd. After 14 days of surgical recovery, for learn to locate an invisible submerged platform in MWM, subjects underwent 5 training/day for 7 days. On the 8th day, the submerged platform was removed, the recent spatial memory test was performed and 30 days later, the remote memory test. The data were submitted by Shapiro-Wilk's normality test and, later, one-way ANOVA with post hoc Fisher. For the learning curve, two-way ANOVA with Fisher post hoc.
Resultados e Conclusões:
The learning curve, derived from the 7 days of training, demonstrate that the animals of the all groups learned the task of finding the submerged platform, once the latency over the days decreased, with significant difference between the first and last day for each group ($P < 0.05$ - D1: VG = 36±3s; RG = 34±3s; LG = 41±2s; BiG = 32±3s. D7: VG = 4.8±1s; RG = 4.2±0,5s; LG = 5.7±1s; BiG = 6.2±1s). In the recent memory test the LG animals spent less time swimming in the quadrant where the platform had previously been in relation to VG ($P = 0.02$) and RG ($P = 0.04$). There were no significant differences between the other groups ($F(3,36)=2.3$; $P > 0.05$ - VG = 26±1s; RG = 26±1s; LG = 22±1s; BiG = 25±1s). In the remote memory test there were no significant differences between groups (VG = 15±1s; RG = 15±0,6s; LG = 13±1s; BiG = 15±0.7s; $F(3.36)=0,8$; $P > 0.05$). The data demonstrate that there is lateralization in the modulation of recent spatial memory, evidencing that the CA3 of the left HPCd is more related to this function, once the injury of that region caused the animals to remember less where previously contained the platform relative to the VG and DG. However, this region showed no relation to remote spatial memory modulation, since the retention time in the quadrant where the platform was

before was similar for the animals of the 4 groups during the test.
Palavras-chaves: function, lateralization, recent memory, remote memory
Agência Fomento: CNPq e FAPESP

13.050 - AVALIAÇÃO DA VARIABILIDADE DO TRAÇO DE ANSIEDADE EM CAMUNDONGOS SOBRE A AQUISIÇÃO, EXTINÇÃO E REINSTALAÇÃO DE MEMÓRIAS AVERSIVAS

EVALUATION OF VARIABILITY OF ANXIETY TRAIT IN MICE ON THE ACQUISITION, EXTINCTION AND REINSTALLATION OF AVERSIVE MEMORIES
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Instituição: 2 UFPR - Universidade Federal do Paraná (Av. Cel. Francisco H. dos Santos, 100 - Curitiba PR, 81530-000)Introdução:
Post-traumatic stress disorder (PTSD) is a psychiatric disorder that develops after exposure to a traumatic event. When in comorbidity with anxiety, its treatment is only effective in 40% of the patients. An important issue for the treatment of PTSD is to identify factors that interfere in the development of this disorder, such as the anxiety trait.
Objetivos:
In this sense, the main objective of the study is to evaluate the effects of anxiety trait variability on the acquisition, extinction and reinstallation of aversive memories in the context conditioning model in Swiss mice (CEUA n ˚1224).
Métodos:
The free-exploratory paradigm (FEP) (10 min) was classified according to its anxiety-trait levels: high (n = 8), medium (n = 13) and low (n = 8), (29, 67 ± 0.02, 57.98 ± 0.05 and 81.16 ± 0.02, mean ± SEM) according to % TNA (percentage of time spent in the new ambient, being submitted in sequence to the Elevated plus maze (EPM) and Open Field Test (OPF), 5 min each test. Two weeks later, the animals passed a second test section (FEP2, EPM2 and OPF2). Context conditioning (3 foot shocks of 0.8mA, with 2s and 60s interval) followed by Extinction (30 min without foot shock) and reinstallation (3 min, 1 foot shock of 0.1mA, for 2s) was performed. After this protocol, the animals were submitted to a third section of tests (FEP3, EPM3 and OPF3).
Resultados e Conclusões:
High, medium and low anxiety-trait groups showed differences between groups for the % TNA parameter evaluated in both FEP1 (29.67 ± 0.02, 57.98 ± 0.05, 81.16 ± 0.02, mean ± SEM) and in FEP2 (29.39 ± 0.01, 60.17 ± 0.03, 83.82 ± 0.02, mean ± SEM) and FEP3 (29.24 ± 0.03, 57.22 ± 0.03, 80.78, ± 0.01, mean ± SEM) ($F(2.78) = 176.4$, $p < 0.0001$) but with no significant difference between sections of the test. In EPM1 the low anxiety-trait group presented increase in the % Entries in open arms (41.61 ± 0.02, mean ± SEM) and % Time in open arms (59.76 ± 0.02, mean ± SEM) which increased in EPM2 (57.83 ± 0.04, 66.57 ± 0.02, mean ± SEM), but in EPM3, the same parameters decreased (21.24 ± 1.81, 17.73 ± 3.66, mean and SEM) ($F(2.78) = 39.26$, $p < 0.0001$; $F(2.78) = 50.71$, $p < 0.0001$). There were no significant differences between the groups and nor between the sections in OPF1, OPF2 and OPF3. In the context conditioning, high anxiety-trait animals exhibited higher levels of freezing during extinction (65.05 ± 0.06, mean and SEM) ($F(2, 130) = 265$, $p < 0.0001$) as well as during reinstallation (82.26 ± 0.01, mean and SEM) ($F(2, 26) = 39.03$, $p < 0.0001$). Conclusion: In the FEP, % TNA was stable between the sections, unlike the data obtained in EPM and the animals with high anxiety-trait presented alterations in the phases of extinction and reinstallation of the aversive memory.
Palavras-chaves: Memória aversiva, Ansiedade-traço, TEPT, Extinção, Reinstalação
Agência Fomento:

13.051 - EFEITOS DO ISOLAMENTO SOCIAL CRÔNICO SOBRE PARÂMETROS COMPORTAMENTAIS E METABÓLICOS DE CAMUNDONGOS DE MEIA-IDADE

EFFECTS OF CHRONIC SOCIAL ISOLATION ON BEHAVIORAL AND METABOLIC PARAMETERS OF MIDDLE-AGE MICE
Autores: Robson Luiz Oliveira Santos 1, Ana Carolina Silvares Quintanilha 1, José Ivo Araújo Beserra Filho 1, Alessandra Mussi Ribeiro 1, Izabelle Dias Benfato 1, Camila Aparecida Machado De Oliveira 1
Instituição: 1 UNIFESP - Universidade Federal De São Paulo (Rua Silva Jardim, Nº 136, SALA 325 - Vila Mathias, Santos - SP)Introdução:
Social isolation is associated with reduced quality of life and increased mortality, becoming more common with advancing age. Unfortunately, our population presents this type of isolation precociously.
Objetivos:
For these reasons, our aim was to evaluate the effects of chronic social isolation from early adulthood (4 months-old) to middle age (10 months-old) on

metabolism, locomotion, anxiety and memory in mice kept in different types of housing.
Métodos:
Twenty c57bl/6 male mice (10/group – Animal Ethics Committee nº 5541040218) were randomly divided at 4 months of age and kept in individual (Isolated Group (IG)) or collective (Social Group (SG)) housing until 10 months. Metabolic (fast blood glucose, insulin sensitivity, food intake and weight gain), locomotor (spontaneous physical activity (SPA), distance traveled (DS), average speed (AS) in a 24h cycle) and behavior (memory and anxiety) parameters were evaluated at the end experimental period. For the statistical analysis, t-student and two-way ANOVA tests were performed. Values were expressed as mean ± 95% confidence interval. The significance level was 95%.
Resultados e Conclusões:
Regarding the metabolic parameters, we didn't observe a significant difference between SG and IG at the end of the 10-month period (Food intake: SG = 0,08 ± [0,08 - 0,087]; IG = 0,09 ± [0,08 - 0,09] g food/g body weight); Fast blood glucose(SG = 182,5 ± [161,2 - 203,8]; IG = 169,5 ± [146,9 -192,1] mg/dL) and Area under the curve during intraperitoneal insulin tolerance test (SG = 627,8 ± [523,9 - 731,6]; IG = 662,2 ± [573,0 - 751,3] count), just a trend in weight gain in IG (SG = 3,03 ± [1,39 – 4,66]; IG = 4,98 ± [3,58 – 6,37] g, p =0,055). In locomotion parameters, we didn't find difference in SPA between groups (SG = 75580 ± [66840 - 84320]; IG = 85930 ± [71580 – 100300] count). However, AS (SG = 0,47 ± [0,41 - 0,52]; IG= 0,59 ± [0,47 - 0,71] cm/s ; p=0,04) and DS (SG = 40550 ± [35720 - 45380]; IG = 51450 ± [41110 - 61800] cm; p = 0,04)), increased in IG. The anxiety, evaluated by the elevated plus-maze, didn't present differences between groups (Time in closed arm: SG = 69,68 ± [61,83 - 77,53]; IG = 69,27 ± [62,73 -75,82] %)/ open arm: SG = 14,75± [8,42 -21,07]; IG = 13,29 ± [7,19 - 19,38]%). However, in memory, evaluated by the object recognition test, we observed that the SG spent a greater percentage of time exploring the new object than the familiar object, while the IG explored the two objects for a similar time, indicating memory impairment (New object: SG = 60,05 ± [50,09 - 70,01] %; IG: 50,38 ± [41,12 - 59,65]%/ Familiar object: SG = 39,95 ± [29,99 - 49,91] %; IG= 49,62 ± [40,35 - 58,88] %, p = 0,02). In conclusion, the type of accommodation didn't alter the metabolic parameters evaluated. However, chronic social isolation resulted in an alteration in some parameters of activity and memory impairment, without affecting the level of anxiety in mice.

Palavras-chaves: ANSIEDADE, ENVELHECIMENTO, ISOLAMENTO SOCIAL, MEMÓRIA
Agência Fomento: CNPQ e FAPESP

13.052 - GUANOSINA PREVINE COMPORTAMENTO TIPO-ANEDÔNICO E DEBILITAÇÃO NO TRANSPORTE DE GLUTAMATO HIPOCAMPAL APÓS ADMINISTRAÇÃO DE AMILOIDE-β1–40 EM CAMUNDONGOS

GUANOSINE PREVENTS ANHEDONIC-LIKE BEHAVIOR AND IMPAIRMENT IN HIPPOCAMPAL GLUTAMATE TRANSPORT FOLLOWING AMYLOID-β1–40 ADMINISTRATION IN MICE

Autores: Débora Lanznaster 1, Josiel Mack 1, Victor Coelho 1, Marcelo Ganzella 1, Roberto Almeida 2, Tharine Dal-CIm 1, Gisele Hansel 1, Eduardo Zimmer 2,3, Diogo Souza 2, Rui Prediger 1, Carla Tasca 1
Instituição: 1 UFSC - Universidade Federal de Santa Catarina (R. Eng. Agronômico Andrei Cristian Ferreira, s/n - Trindade, Florianópolis), 2 UFRGS - Universidade Federal do Rio Grande do Sul (Av. Paulo Gama, 110 - Farroupilha, Porto Alegre - RS, 90040-060), 3 PUCRS - universidade pontifícia do rio grande do sul (Porto Alegre, Rio Grande do Sul)Introdução:
Alzheimer's disease (AD) is an age-related progressive neurodegenerative disorder that is the main cause of dementia worldwide. Its neuropathological hallmark is the deposition of amyloid-beta (A β) peptides. A β accumulation in the synapses causes neuroinflammation and glutamatergic neurotransmission impairment, thus interfering in processes in the brain such as memory and learning, and eventually leading to neuronal loss and cognitive impairment. Guanosine is an endogenous guanine-derived nucleoside physiologically released by glial cells. Guanosine induces neuroprotective effects, by the modulation of the glutamatergic system and the cellular redox status.
Objetivos:
This study focused on the putative neuroprotective effect of guanosine in an AD-like mouse model
Métodos:
Adult mice received a single intracerebroventricular injection of A β1–40 (400 pmol/site) or vehicle followed by an immediately and 3h later treatment with guanosine (8 mg/kg, intraperitoneal). Guanosine treatment continued once a day for 14 consecutive days
Resultados e Conclusões:

Locomotor activity and anxiety-related behavior were not altered by A β1–40 and guanosine. A β1–40-treated mice showed a short-term memory deficit in the object location task ($F(1,29)$ 4.9329, $P < 0.05$) and an increased latency to grooming in the sucrose splash test ($F(1,30) = 7.3079$, $P < 0.05$), and both were prevented by guanosine treatment. Guanosine also prevented the increase in Na+-independent glutamate uptake induced by A β1–40 ($F(1,42) = 0.6692$, $P < 0.05$; $F(1,42) = 4.10$, $P < 0.05$). GFAP expression in the hippocampal CA1 region was decreased by A β1–40 and was not altered by guanosine ($F(1,7) = 22.715$, $P < 0.05$). Guanosine administration also increased hippocampal GDP levels, which was not observed in the A β1-40/guanosine-treated group ($F(1,17)$ 11.06, $P < 0.05$). Therefore, we showed that guanosine prevents memory deficit and anhedonic-like behavior induced by A β1–40 that seems to be linked to an unbalance in glutamate transport and purinergic metabolites levels in mice hippocampus.
Palavras-chaves: Doença de Alzheimer, Guanosina, Neurotoxicidade Glutamatérgica
Agência Fomento:

13.053 - ENVIRONMENTAL ENRICHMENT REVERSES THE EFFECT OF STRESS IN THE NEONATAL PERIOD AND ADOLESCENCE ON EMOTIONAL AND MEMORY PROCESSES IN RAT

ENVIRONMENTAL ENRICHMENT REVERSES THE EFFECT OF STRESS IN THE NEONATAL PERIOD AND ADOLESCENCE ON EMOTIONAL AND MEMORY PROCESSES IN RAT
Autores: Vanessa Athaide Garcia 1, Daniella Agrati 1, Natalia Uriarte 1, Annabel Ferreira 1
Instituição: 1 UDELAR - Universidade de la Republica (Iguá 4225, 11400 Montevideo)Introdução:
Introduction: Adverse situations in early periods of life induce persistent alterations in the development of the nervous system. Previously, we determined that exposure to an intruder into the mother's box during the first days of life, affects the declarative memory and anxiety of these infant rats when they become adults.
Objetivos:
Objectives: Based on these evidences, our objective was to evaluate if the deleterious effects of exposure to stressors in the neonatal stage can be potentiated by stressful events during adolescence and reversed by environmental enrichment.
Métodos:
Methods: To prove it, mothers with their pups were exposed 8 hs / day from day 1-4 postpartum to an empty box (control group, n = 8) or to an unknown male in a cage (male group, n = 8). At weaning (D21) the male infant rats of both groups were exposed to social isolation or control condition, and in mid-adolescence (D35) they were exposed to environmental enrichment or control condition. In adulthood (D60) memory tests of recognition of a new object, and open field experimental anxiety were performed (Ethical Protocol approved: ID 900).
Resultados e Conclusões:
Results and Conclusions: Animals exposed to early stress, male group, showed deficits in long-term memory retention (memory index: $U(7,6)= 0,0$, $p=0,001$, Mann Whitney U test) and exhibited greater experimental anxiety in the open field (time in central area: $U(7,6)= 7,5$, $p=0,05$) when compared to control individuals. Moreover, control animals exposed to social isolation showed deficits in both, memory and anxiety, indexes ($T(7)=0,0$, $p=0.02$ and $T(7)=1,5$, $p=0,03$, respectively, Wilcoxon matched paired test). In addition, environmental enrichment reversed memory deficits and the anxiogenic effect of exposure to both stressors (within control group: isolation vs enrichment+isolation $T(7)=0$, $p=0,02$ for both indexes, and whitin male group: enrichment vs non-enrichment $T(7)=1,0$, $p=0,03$ and $T(6)=0$ $p=0,03$, and enrichment+isolation vs isolation $T(6)=0$, $p=0,03$ and $T(6)=0$ $p=0,03$, respectively, also improving the memory retention of control animals ($T(7)=0$, $p=0,02$). These results show that positive experiences during adolescence, such as environmental enrichment, can reverse the deleterious effects of adverse experiences, positioning this period as a window of opportunity for the reversal of the long-term effects of stress.
Palavras-chaves: Memory, adverse early experiences, adolescent neonatal period, environmental enrichment.
Agência Fomento: Comisión académica de posgrado - Cap

13.054 - PRE-RETRIEVAL STRESS ALTERS NOVELTY PREFERENCE OF MARMOSET MONKEYS (CALLITHRIX PENICILLATA) IN A SPONTANEOUS OBJECT RECOGNITION TASK.

PRE-RETRIEVAL STRESS ALTERS NOVELTY PREFERENCE OF MARMOSET MONKEYS (CALLITHRIX PENICILLATA) IN A SPONTANEOUS OBJECT RECOGNITION TASK.

Autores: Clara de Sena Costa 1, André Wagner Carvalho de Oliveira 1, Fernando Magela de Jesus 1, Jéssica do Vale Nobre Pacheco 1, Jéssica Lohana Aquino Cunha 1, Marilia Barros 1

Instituição: 1 UnB - Universidade de Brasília (UnB - Brasília, DF, 70910-900)Introdução:

Stress may disrupt or sometimes enhance neural processes required for different types of memory, such as recognition memory. The latter is the ability to recognize whether stimuli have been previously encountered. In rodents, this type of memory is frequently assessed via the Spontaneous Object Recognition (SOR) task, which relies on the animals' natural tendency to explore novelty. Although this task has been recently transposed to primates, the effect of a stress event on performance has yet to be investigated.

Objetivos:

Therefore, we assessed whether an acute 15 min restraint stress, held immediately prior to retrieval, alters the performance of adult marmoset monkeys (Callithrix penicillata) in the SOR task. This study was approved by the Animal Ethics Committee of the University of Brasilia (no. 114/2017).

Métodos:

Marmosets were randomly assigned to an experimental group (n=6/group) – stress or no-stress control – and submitted to a single 10 min habituation trial in an open field arena. After a 24 h interval, each subject was tested in the SOR task. For this two-trial procedure, each marmoset was first submitted to a 10 min sample trial in the open field. Then, after a 6 h retential interval, a 10 min test trial was held. On the sample trial two identical objects were placed in the apparatus, while on the test trial one object was replaced with a new item. Also, immediately before the test trial, the stress group was placed in a small aluminum box for 15 min, having no visual contact with other animals.

Resultados e Conclusões:

On the test trial, the no-stress controls explored the new object significantly longer than the familiar item, whereas the stressed marmosets preferentially explored the familiar item rather than the novel object. However, the latency to start exploring on the test trial did not differ between the objects or groups. Total exploration and locomotion were also similar over trials, and memory indicators in the SOR task were not correlated with total object exploration on the sample trial. Therefore, when stressed right before retrieval, the typical novelty preference in the SOR task was replaced by a familiarity preference, as reported in the rodents. Familiarity preference due to pre-retrieval stress is possibly an adaptive behavior during such conditions rather than a memory deficit.

Palavras-chaves: monkey, marmoset, stress, recognition memory, retrieval

Agência Fomento: CAPES

13.055 - ESTRESSE PRECOCE E MEMÓRIAS TRAUMÁTICAS: OSCILAÇÕES CEREBRAIS NO CIRCUITO HIPOCAMPO-AMÍGDALA DURANTE A RECONSOLIDAÇÃO DE MEMÓRIA AVERSIVA

EARLY LIFE STRESS AND TRAUMATIC MEMORIES: BRAIN OSCILLATIONS IN THE HIPPOCAMPUS-AMYGDALA CIRCUIT DURING AVERSIVE MEMORY RECONSOLIDATION

Autores: Natividade de Sá Couto Pereira 1, Marcelo Pastore Bernardi 1, Joelma Alves 1, Carla Dalmaz 1, Maria Elisa Calcagnotto 1

Instituição: 1 UFRGS - Universidade Federal do Rio Grande do Sul (Rua Ramiro Barcelos, 2600, Porto Alegre/RS, Brazil)Introdução:

Early life stress has long-lasting effects on brain maturation, often leading to vulnerability to psychiatric disorders in adulthood. Maternal separation in rodents (MS) is a widely used animal model of early stress, which results in resistance to aversive memory reconsolidation. Changes in the magnitude and coherence of brain oscillations in the hippocampus and amygdala have been reported during aversive memory retrieval and reconsolidation, and they appear to mediate mnemonic processes.

Objetivos:

Our aim was to study the effect of MS on the hippocampal and amygdala oscillations during aversive memory reactivation/reconsolidation in adult rats.

Métodos:

Twelve Wistar male rats, either non-handled (NH, n=6) or submitted to MS (n=6) during the neonatal period (3-hour separation from dam, from P1-10), underwent to stereotaxic surgery at P60 for intracerebral electrodes implantation. Local field potential (LFP) recording electrodes were implanted in the dorsal hippocampus DHc (-3,0AP;±2,0ML;-3,0DV) and basolateral amygdala BLA (-2,0AP;±5,0ML;-8,0DV). Seven days later, electrodes were connected to a signal

acquisition system coupled to video-EEG recording (MAP32, Plexon), 10-3s-1 sample rate and 0,3-1kHz filter, to record LFP while animals were exploring a clean cage for 15 min (Basal 1). The following day, a training session of contextual fear conditioning (CFC) was performed: animals were placed in the apparatus and 3 electric footshocks 0,4 mA, 30s interval were applied. 24 hours after, a second recording session was performed (Basal 2), followed by a 5-min retrieval session in the CFC apparatus (Reactivation). LFP signals were decomposed in frequency ranges (delta: 1-4 Hz; theta: 4-12 Hz; slow gamma: 30-50 Hz) and power spectrum analysis were performed for each oscillation using the pwelch function (Matlab v.R2018a). We analyzed three 30s-periods of exploration behavior in the Basal 2 and Reactivation sessions and 1 period of freezing behavior during Reactivation. Data were normalized by same length periods from the Basal 1 session. Results were analyzed by repeated measures ANOVA (SPSS v.16.0), accepting $p < 0.05$, and are presented as mean±SD. Institutional Ethics Committee approval: CEUA-UFRGS #33317.

Resultados e Conclusões:

No significant differences were found in freezing duration between NH and MS rats. In the DHc, our preliminary results point to a significant increase in delta power (2,48±1.61 vs. 1.05±0.55; $F(2,20)=4.815$, $p=0.020$) and a decrease in slow gamma power (0.86±0.28 vs. 1.00±0.31; $F(2,20)=6.679$, $p=0.006$) oscillations during freezing in both groups. In the BLA, only the power of delta oscillations was increased (2.09±0.91 vs. 1.08±0.30; $F(2,20)=13.582$, $p < 0.001$). Our results suggest that both delta and slow gamma oscillations in the DHc and BLA were altered during the freezing and may play relevant role in aversive memory retrieval; more data needs to be collected to identity possible differences induced by MS.

Palavras-chaves: memory reconsolidation, early stress, brain oscillations, dorsal hippocampus, basolateral amygdala

Agência Fomento: CAPES

13.056 - IMMEDIATE MEMORY ASSOCIATION WITH TOBACCO USE, NR3C1 DNA METHYLATION, FNIS AND RURAL RESIDENCE

IMMEDIATE MEMORY ASSOCIATION WITH TOBACCO USE, NR3C1 DNA METHYLATION, FNIS AND RURAL RESIDENCE

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Instituição: 1 UFES - Universidade Federal do Espírito Santo (Rua Felício Alcuri, S/N Bairro: Alto Universitário - Alegre, ES - 29500-000), 6 UNIFESP - Universidade Federal de São Paulo (São Paulo, SP)Introdução:

Evidences suggests that epigenetic modification of the glucocorticoid receptor gene (NR3C1) and the social stress may affect memory processes. However, the underlying mechanisms, however, remain unknown.

Objetivos:

The aim of this study was to examine the possible association between Immediate Memory from RAVLT, NR3C1 DNA methylation, lifestyle and sociodemographic status.

Métodos:

This is a cross-sectional study in adults (n = 70; 20-59 years) attended by public health. Sociodemographic and lifestyle status were investigated using IBGE-based questionnaire and Brazilian Food Insecurity Scale (EBIA) was applied to assess the condition of food and nutritional insecurity (FNiS). Rey's Verbal Auditory Learning Test (RAVLT) was used for immediate memory assessment and 1F region on NR3C1 gene (CpG 40-47) was analyzed by bisulfite pyrosequencing using periferical blood-derived DNA. Statistical analysis was performed using Poisson regression models with robust variance, with RAVLT Immediate Memory z-score as dependent variable. For all analyzes, the significance value of 5% was adopted. The project is approved by the Ethics Committee on Research with Human Beings, Health Sciences Center, Federal University of Espírito Santo (CEP / CCS / UFES # 1.574.160/2016) and all Survey participants signed an Informed Consent Form.

Resultados e Conclusões:

The Poisson Multivariate model results showed that Immediate Memory z-score is associated with residence (IRR = 0.38, p=0.050), FNiS (IRR= 1.81, p=0.039), current smoking (IRR= 1.78-7, p= < 0.000) and CpG44 (IRR= 0.79, p=0.004) and CpG45 (IRR= 1.27, p=0.001) DNA methylation. This data suggests that immediate memory is associated with tobacco use, NR3C1 DNA methylation, rural area and food insecurity. Tobacco use and CpG44 NR3C1 DNA methylation is a protective factor of immediate memory and rural location, FNiS and CpG45 NR3C1

DNA methylation is associated with an increase in immediate memory deficit.
Palavras-chaves: epigenetics, glucocorticoid receptor, immediate memory, social environment
Agência Fomento: FAPES e CAPES

14. Cognição & Emoção

14.042 - EFEITO DO TEMPO E DA DENSIDADE DE ALOJAMENTO SOBRE O COMPORTAMENTO NO LABIRINTO EM CRUZ COM RAMPA EM ZEBRAFISH (DANIO RERIO)

EFFECT OF TIME AND STOCKING DENSITY ON THE BEHAVIOR WITH PLUS MAZE WITH RAMP ON ZEBRAFISH (DANIO RERIO)
Autores: Rodrigo dos Santos Pessoa 1, Amauri Gouveia Jr. 1
Instituição: 1 UFPA - Universidade Federal do Pará (Av. Perimetral, 2-224 - Guamá, Belém - PA, 66075-110)Introdução:
A new model proposal for the study of anxiety is the Plus Maze with Ramp (PMR) inspired by the Elevated Plus Maze for rodents and the novel tank test for fish. The test consists of a cross-shaped aquarium with two flat arms and two arms with ramps, where the fish when exploring the apparatus tends to prefer the flatter and deeper arms and avoid the less deeper arms.
Objetivos:
To evaluate the effect of exposure time to different stocking densities on anxiety type behavior in Plus Maze with Ramp on Zebrafish (Danio rerio).
Métodos:
Fish from the Danio rerio (216) species, experimentally naive, were divided into three large groups according to the dwell time (1, 7 and 30 days) and each of these groups was divided into six subgroups with varied stocking Density (D) (1, 2, 4, 8, 16 and 24 per aquarium). For the test a cross-shaped aquarium was used measuring 45cm of total length by 10cm of width in each arm and 15cm of height. Each of the four arms is 17.5cm long, so that there is a central intersection between the arms measuring 10x10cm. The apparatus has two flat arms and two arms with ramps. The water column will be maintained at 10 cm throughout the test. The dwell time and the number of crossings in the Flat, Ramp and Center compartments were measured.
Resultados e Conclusões:
We found changes in the time spent in the Ramp for the Time parameter [F (2, 124) = 4.537, p = 0.010] where the groups stocked for 1 day explored more than the groups of 7 days and 30 days. The treatment also altered the time in compartments between Densities, with differences in time spent in the Ramp [F (5, 124) = 3,649, p = 0.004] between the D-1 and D-24, D-1 and D-8 groups with the higher density groups spending less time exploring the Ramp arms and in a complementary way, the highest density group, spending more time in the Flat arms [F (5,124) = 2,916, p = 0,010] with statistical differences between the groups D-1 and D-24, D-2 and D-24. For the locomotive activity, differences were found between groups stocked at different Times in the number of entries in the Center ([F (2, 124) = 5.763, p = 0.004]), with 1 day groups crossing more times than 7 days groups. In the Flat compartment, a greater number of entries from the 1 day and 30 days groups were observed when compared to the 7 days group ([F (2,124) = 4.534, p = 0.010]). Statistical differences were also found for motor activity between Densities at Ramp entries, ([F (5, 124) = 2,649, p = 0.02]) for the 7-day group in which the D-1 group entered more times on this compartment than groups D-8 and D-24. The treatment altered the anxiety-type behavior revealing that the increase in the dwelling time reduces the exploration in the arms with Ramp and that the increase of the density intensifies the preference for the Flat arms.
Palavras-chaves: Animal Model, Anxiety, Behavior, Elevated Plus Maze , Zebrafish
Agência Fomento: pq/CNPQ - Capes

14.043 - INFLUÊNCIA DE ESTÍMULOS VISUAIS EMOCIONAIS SOBRE O CONTROLE POSTURAL

INFLUENCE OF EMOTIONAL VISUAL STIMULI ON POSTURAL CONTROL
Autores: Caroline de Souza Marinho 1, Adriana Ribeiro de Macedo 2, Luis Aureliano Imbiriba Silva 1
Instituição: 1 UFRJ - Universidade Federal do Rio de Janeiro (Av. Carlos Chagas Filho, 540 - Cidade Universitária da UFRJ), 2 IFRJ - Instituto Federal de Educação, Ciência e Tecnologia do Rio d (Rua Professor Carlos Wenceslau, 343 - Realengo, Rio de Janeiro)Introdução:
Postural balance is a complex motor skill based on multiple sensorimotor processes. Biomechanical aspects underlying postural control have been studied

extensively, but the effect of emotion, induced by different body images, on postural control seems to be an emerging topic.
Objetivos:
The purpose of this study was to investigate the postural balance during the observation of emotional stimuli involving different categories of body pictures.
Métodos:
The research was approved by the Research Ethics Committee of the Federal Institute of Education, Science and Technology of Rio de Janeiro, CAAE 47151315.1.0000.5268. Seventeen healthy young volunteers (12 males, 22.1 ± 3.45 of age) were instructed to remain standing on a force platform, with arms along their sides and feet together, while body images were projected on a screen positioned 1.50 m ahead. For the stabilometric record in the upright posture, an AccuSway Plus force platform (AMTI, USA) was used. The visual emotional stimuli were organized in three categories with 20 pictures each: (1) neutral pictures (people standing upright), (2) images suggesting trunk movements (from Photograph Series of Daily Activities database -PHODA) and (3) negative emotional pictures of mutilation (from the International Affective Picture System - IAPS). Each image was presented for 3 s in a blocked-protocol by each emotional category. A gray screen was displayed for 20 seconds before each block and the session on the force platform lasted uninterruptedly for 260 seconds. In the psychometric report, participants evaluated each picture used through Self Assessment Manikin (SAM) in the valence and arousal scales . The following stabilometric parameters were evaluated: sway area, standard deviation, mean frequency and mean velocity in the anterior-posterior (AP) and medial-lateral (ML) directions . ANOVA for repeated measurements and the Newman–Keuls post test were used to compare the emotional blocks in relation to stabilometric parameters and emotional aspects, considering a significance level of 0.05.
Resultados e Conclusões:
A significant difference was observed for valence (p = 0.01) and arousal (p = 0.01) in the negative block in relation to PHODA block and the neutral one, but not between the neutral and the PHODA blocks. The negative block obtained a lower mean (2.1 ± 1.16) on the valence scale, followed by the neutral one (5.4 ± 0.92) and finally, the PHODA block (5.5 ± 0.85). On the arousal scale, the negative block obtained higher averages (6.2 ± 2.60), followed by the PHODA (2.3 ± 1.09) and finally, the neutral block (1.7 ± 0.99)There were not significant differences for the stabilometric parameters. Therefore, despite the differences in the subjective emotional responses to pictures based on human body, the postural control did not differ among the emotional blocks, contrary to expectations, indicating the possible need for a larger sample size.
Palavras-chaves: Emoção, Equilíbrio postural, Avaliação psicométrica
Agência Fomento:

14.044 - ENVIRONMENTAL ENRICHMENT REVERSES ANXIOGENIC-LIKE BEHAVIOR IN LOW- AND HIGH-EXPLORER MICE SUBMITTED TO COHABITING WITH A CONSPECIFIC IN CHRONIC NEUROPATHIC PAIN

ENVIRONMENTAL ENRICHMENT REVERSES ANXIOGENIC-LIKE BEHAVIOR IN LOW- AND HIGH-EXPLORER MICE SUBMITTED TO COHABITING WITH A CONSPECIFIC IN CHRONIC NEUROPATHIC PAIN
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Emotional reactivity have been used as an important tool in the study of anxiety. Our group recently demonstrated that cohabiting with a conspecific submitted to chronic pain produces enhancement anxiety-like behaviors in observer mouse. Although identical strain, sex and housing conditions, we observe individual differences related to behavioral and physiological responses in laboratory animals exposed to elevated plus maze (EPM) test. For this, we propose separated mice according to their propensity to display high (HE) or low (LE) exploration in the EPM. The animals were sorted by their total entries in the any arms of the maze and split at the median into high and low explorers. Furthermore, it has also been shown that mice may differ also when submitted to environmental enrichment.
Objetivos:
The present study aimed to evaluate the effects of environmental enrichment in anxiety-like behavior

tested on the elevated plus-maze (EPM) in mice that cohabiting with a cagemate in neuropathic pain considering individual differences.
Métodos:
For this, Male Swiss mice (n=8-10/group) were submitted to 28 days protocol. On the 21st after birth (weaning) mice were housed in pairs for 14 days to familiarity establishment. On the 14th day, the animals were divided into four groups: cagemate nerve constriction exposed to standard environmental (CNC+SE), in which one animal from each pair was subjected to sciatic nerve constriction and cagemate nerve constriction exposed to EE (CNC+EE); cagemate sham exposed to standard environmental (CS+SE), one animal from each pair was subjected to the same surgery but without constriction and cagemate sham exposed to EE (CS+EE). On the 28th day all groups were exposed to EPM. After exposure to the EPM, the animals were allocated to one of the two groups (HE or LE) and maintained in this condition throughout the analyses.
Resultados e Conclusões:
According to our previous results two-way ANOVA followed by post-hoc Duncan test revealed that cohabitation with mice in sciatic nerve constriction condition induces anxiogenic-like behavior in observer mouse both HE and LE in percentage of open arm entries (HE: $F_{1,24} = 2.92$; $P=0.05$; LE: $F_{1,24} = 0.01$; $P=0.03$) and percentage of open arm time (HE: $F_{1,25} = 5.95$; $P=0.02$; LE: $F_{1,24} = 0.04$; $P=0.01$). Statistical analysis also demonstrated that enriched environment reverted this effect in percentage of open arms entries (HE: $F_{1,25} = 1.77$; $P=0.07$; LE: $F_{1,24} = 11.45$; $P=0.03$) and percentage of open arm time ($F_{1,25} = 5.95$; $P=0.07$; $F_{1,24} = 12.31$; $P=0.01$) versus respective CNC/SE group. However, EE decreased open arms exploration in LE/CS animals observed in percentage of open arms entries ($F_{1,24} = 0.001$; $P=0.03$) and percentage of open arm time ($F_{1,24} = 0.14$; $P=0.01$) versus respective CS/SE group. Significant differences were not observed in HE/CS animals. These findings suggest that EE increase open arms exploration only in mice that cohabitated with a conspecific submitted to chronic pain.
Palavras-chaves: Environmental enrichment, Anxiety, Empathy, Mice
Agência Fomento: UFSCar, CAPES, CNPQ (309201/2015-2)

14.045 - EFEITOS DA AYAHUASCA EM BAIXA DOSE NA CONECTIVIDADE CEREBRAL DE USUÁRIOS EXPERIENTES

BRAIN FUNCTIONAL CONNECTIVITY CHANGES AFTER A LOW DOSE OF AYAHUASCA INTAKE IN EXPERT USERS
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Instituição: 1 UFRJ - Universidade Federal do Rio de Janeiro (HUCFF - Rua Rodolpho Paulo Roco, 255 Cidade Universitaria- Rio de Janeiro-RJ)Introdução:
Ayahuasca is an indigenous sacramental brew from the Amazon region that has a sinergetic serotonergic action. Ayahuasca is chemically composed of: N,N-dimethyltryptamine (DMT), which is an agonist to 5HT2A receptors; harmine and harmaline, inhibitors of monoamine-oxidase-A (iMAO-A); and tetrahydroharmine (THH), weak serotonin reuptake inhibitor. It promotes increases in brain activity at frontal and subcortical brain regions including visual perception, emotions and cognition, while reducing activity of the default mode network (DMN). Recently, evidences support its therapeutic potential in cases of refractory depression, however the understanding of the mechanisms involved in this process is still unknown.
Objetivos:
The goal of this study is to evaluate the acute effects of a low dose of Ayahuasca at the main brain functional networks in expert users.
Métodos:
Nineteen (19) expert volunteers underwent two neuroimaging examinations using functional MRI (fMRI), before and after Ayahuasca intake. They were all instructed to maintain their eyes closed, to stay relaxed and not to keep a specific thought. FSL software was used to preprocess all images and also to perform an Independent Component Analysis (ICA). Results were expressed in p value corrected for family-wise error (FWE). For the psychometric scales, a t test was performed for each category of the scale, using Prisma software, version 6. The procedures and experimental design of this study were approved by the research ethics committee of the Hospital Universitario Clementino Fraga Filho of the Universidade Federal do Rio de Janeiro (UFRJ) - CAAE: 34772414.9.0000.5257.
Resultados e Conclusões:
On the ICA, only two networks increased their activity: the salience network (p-FWE = 0.05) and the executive control network (p-FWE = 0.03). Both visual and

sensorimotor networks had no increase or decrease in activity. No other networks were identified in this analysis including DMN. In psychometric scales analysis, decreases in anxiety and mental sedation ($p < 0.01$) were observed after Ayahuasca intake. As self reported by most subjects, ICA results also suggest that they didn't experienced visual psychedelic effects with a lack of perceptual changes on both visual and sensorimotor networks. On the other hand, the increase in activity of the salience and executive control networks corroborate findings in the literature that show Ayahuasca effects on cognitive and emotional processes. These are further reinforced by the psychometric reporting reduction in anxiety and mental sedation. Besides, promoting stronger salience network connectivity among its parts including anterior cingulate cortex, amygdala and insula may represent improvements in brain fuctions responsible for many complex functions related to sensory, emotional and cognitive processing. These findings contribute to a better understanding of the Ayahuasca effects on the human brain as well as to show a cognitive-emotional regulation, that may have therapeutic use in future research.
Palavras-chaves: Ayahuasca, neuroimaging (fMRI), conectividade funcional, emotion, cognition
Agência Fomento: FAPERJ

14.046 - SEXUAL BEHAVIOR THROUGHOUT ADOLESCENCE IN THE FEMALE RAT

SEXUAL BEHAVIOR THROUGHOUT ADOLESCENCE IN THE FEMALE RAT
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Instituição: 1 UdelaR - Facultad de Ciencias, Universidad de la Republica (Igua 4225)Introdução:
During adolescence, individuals exhibit a unique behavioral profile associated with the state of maturation of various neural systems that includes high expression of playing behavior and exploration. Female rats begin to express sexual behavior during this period, although the circuits involved in its control are still developing. We recently observed that the expression of sexual motivation in specific models (50 kHz USV emitted in response to a male and sexual preference test) increases from middle to late adolescence in female rats. Based on these evidences, we hypothesize that females in middle adolescence exhibit more playing behavior and less sexual proceptive responses than females in late adolescence and adulthood when sexually interacting with a male. To test this hypothesis, we compared sexual and social behaviors of late-proestrous rats in middle adolescence (days 39-43, n=12), late adolescence (days 49-53, n=9) and adulthood (days 90-110, n=8) during a 15 min interaction with a sexually active male in a 90 cm sexual arena (Ethical Protocol approved: No. 240011-000941-17). Results showed no differences in the expression of proceptive behavior, hops and darts ($H=0.64$, $p=0.72$, Kruskal-Wallis test), or in females' receptivity assessed by the lordosis quotient ($H = 1.47$, $p = 0.47$), according to the age of the individuals. Likewise, sexual behavior of the males reflected in the number of mounts ($H=0.98$, $p=0.61$) and ejaculations ($H=0.65$, $p=0.72$) did not differ between age groups. However, middle adolescent rats showed more olfactory exploration of the male ($U(11,8) =19.5$, $p=0.03$, Mann-Whitney U test), as well as playing behavior ($U(11,8)= 8.0$, $p=0.001$) with respect to adult females. These results demonstrate that middle adolescent females are capable of displaying full sexual behavior repertoire when interacting with a male, while co-expressing other behavioral components typical of this development period. Nevertheless, the differences previously found, in the expression of sexual motivation during adolescence advocate for a deeper analysis of this social behavior during this life period.
Objetivos:
Métodos:
Resultados e Conclusões:
Palavras-chaves: sexual , adolescent, motivation
Agência Fomento:

14.047 - COMPARAÇÃO DE ELEMENTOS DA IMAGEM CORPORAL FEMININA ENTRE MODELOS DE PASSARELA E PÚBLICO CONTROLE

COMPARISON OF FEMALE BODY IMAGE ELEMENTS BETWEEN FASHION MODELS AND PUBLIC CONTROL
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Working as a fashion model demands several requirements such as specific body measurements. The ideal body imposed on this category and accepted among the majority of the female society is the thin body. However, the desired proportions is a risk to physical and psychosocial health. Currently, women feels more dissatisfied with their own body image. The concept of body image is multifaceted and it has been important to understand the way we relate and perceive the body itself as well as how this affects our daily behavior.
Objetivos:
The main goal of this work is to evaluate and compare the satisfaction, healthy and dysfunctional investment of their own appearance of women who act as fashion models and the ones who do not.
Métodos:
The research was executed through Google Forms with the following instruments: Sample Characterization Questionnaire, Weight and Height Report (BMI), Multidimensional Body-Self Relations Questionnaire – Appearance Scales and Appearance Schemes Inventory-Revised. The instruments are divided into subscales with responses options presented in a 5 points Likert type scale ranging from “Strongly disagree” (1 point) to “Strongly Agree” (5 points). The participants were divided into two groups, brazilian fashion models (Experimental Group/EG) and brazilian non-models (Comparison Group/CG). For both groups the age range was from 18 to 28. In the case of EG was required that they have already been linked to a modeling agency. The final N was 102 for EG and 250 for CG. The EG presented an average age of 22 years (SD = 2.6), most of Southeast region of Brazil (36%), caucasians (65%), heterosexuals (84%), singles (95%), with high school education complete (42%), low weight nutritional status (65%) linked to a modeling agency during the survey period (87%) and with more than three years of experience in the field (38%). The CG showed an average age of 23 years (SD = 2.5), mostly Southeast (50%), caucasians (66%), heterosexuals (80%), singles (93%), undergraduates (50%) and adequate nutritional status (57%).
Resultados e Conclusões:
The Mann-Whitney test was used to evaluate significant differences (p value < 0,005) between the subscale averages of the groups. Significant differences were shown in the attractiveness (EG: 3.7; CG: 3.0), body satisfaction (EG: 3.6; CG: 3.2) and self-rated weight (EG: 2.5; CG: 3.33). There were no differences in overweight worry (EG: 3.0; CG: 2.8), healthy investment (EG: 3.9; CG: 3.7) and dysfunctional thoughts (EG: 3.3; CG: 3.4) about appearance. The modeling profession is commonly highlighted among society and it is often perceived as overwhelming for the health of models. Our results indicate, actually, that fashion models have a better accuracy of body awareness, higher self-esteem suggesting a more positive body image. Non-model women have more body dissatisfaction because they are under social pressure to seek “ideal thinness” although there exists a movement towards greater body acceptance and positivity.
Palavras-chaves: Aparência, Imagem corporal, Modelos de passarela, Mulheres
Agência Fomento: CAPES/PROEX

14.048 - DIFERENÇAS NOS NÍVEIS DE OXIHEMOGLOBINA CORTICAL REFLETE ESTADOS ATENCIONAIS EM TAREFA DE VIGILÂNCIA

DIFFERENCES IN CORTICAL OXYHEMOGLOBIN LEVELS REFLECTS ATTENTIONAL STATES IN A VIGILANCE TASK
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Instituição: 1 UFABC - Universidade Federal do ABC (Alameda da universidade, s/n. São Bernardo do Campo)Introdução:
Our attention fluctuates over time. Understanding the mechanism behind these fluctuations and how to better detect attention changes might be important to improve performance and prevent accidents. It has been demonstrated that the variation of oxyhemoglobin levels evoked by a stimulus in an attention task positive correlates with engagement level measured by reaction times.
Objetivos:
The goal of the present work was to assess if oxyhemoglobin variation levels before stimulus presentation are related to attention fluctuations.
Métodos:
Twenty-four participants took part in the study. Experimental session consisted of a 15 minutes psychomotor vigilance task concomitant with fNIRS scanning over the right hemisphere. The research was approved by the UFABC ethical committee (n. 2.754.496). Data were preprocessed on Homer2 using a band-pass filter between 0.01 and 0.08 Hz and principal component analysis was used to remove possible systemic physiological artifacts. Attentive and non-attentive states were defined for each participant

in relation to their higher and lowest reaction times (top and bottom deciles). Means of oxyhemoglobin variation levels from a window of 3s before stimulus presentation were calculated for each of the seven regions (involving frontal and parietal associative areas, motor, pre motor, somatosensory and visual areas) during attentive and non-attentive states. Paired t-tests were conducted to assess differences between states on activity of each region. Bonferroni correction for multiple testing were conducted.
Resultados e Conclusões:
Higher oxyhemoglobin levels were found in the attentive condition compared with the inattentive condition in frontopolar cortex (Ma= 1,93x10-8, SDa 1,66 x10-7 , Mi= -1,38x10-8, SDi=1,4 x10-7 , t=2,96, p < 0.05), supplementary motor area (Ma= 7,56x10-9, SDa= 9,31x10-8 , Mi= 1,22x10-9, SDi=1,78 x10-7 , t=2,76, p < 0.05) and inferior parietal cortex (Ma= 4,13x10-9, SDa=7,79 x10-8 , Mi= -9,34x10-9, SDi=7,31 x10-8 , t= 3,79, p < 0.05). Dorsolateral prefrontal, primary motor, sensory and occipital cortices did not show statistically significant differences between conditions. These data suggest that higher oxyhemoglobin levels on frontopolar cortex, SMA and parietal cortex are related to better attention levels. It agrees with previous data showing the possibility to track attention fluctuations and point to the importance of frontal and parietal areas on this phenomenon. One main contribution of these study is to provide an alternative and simple way to asses hemodynamic activity associated with task engagement and attentiveness.
Palavras-chaves: sustained attention, fNIRS, reaction time, frontoparietal network
Agência Fomento: CAPES

14.049 - CRENÇAS, ATITUDES E PRÁTICAS PARENTAIS EM RELAÇÃO A ALIMENTAÇÃO DAS CRIANÇAS COMO PREDITORES DO IMC

PARENTAL BELIEFS, ATTITUDES, AND PRACTICES REGARDING CHILD FEEDING AS PREDICTORS OF CHILDREN'S BODY MASS INDEX

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Instituição: 1 USP - Universidade de São Paulo (Avenida Bandeirantes, 3900, Monte Alegre), 2 Unaerp - Universidade de Ribeirão Preto (Av. Costábile Romano, 2201, Ribeirânia)Introdução:
Considering the growing epidemic of childhood obesity in Brazil and worldwide, investigating the parental influence on children's feeding as a predictor of child's Body Mass Index (BMI) becomes an alternative to understand and, in the future, to control this unbridled growth.
Objetivos:
To understand if parental beliefs, attitudes, and practices regarding child feeding emerge as predictors of children's BMI.
Métodos:
Participated of the study 168 individuals, 84 parents and their respective children aged between 5 to 7 years old, regularly enrolled in two private schools at the city of Bauru (SP). Parental participation consisted of completing the Child Feeding Questionnaire (CFQ), whereas children had their weight and height measured by a trained researcher. BMI was calculated by dividing the weight by the squared height. The CFQ is a self-report measure that assess parental beliefs, attitudes, and practices regarding child feeding, with a focus on obesity proneness in children. The CFQ comprises 31 items, loading on seven factors. For this research, 5 factors and item 7 of the factor "Perception of parental weight" were used: (1) Perceived responsibility, assessing parents' perceptions of their responsibility about child feeding; (2) Parents' concerns about child weight, assessing parents' concerns about the child's risk of being overweight; (3) Monitoring, assessing the extent to which parents oversee their child's eating; (4) Restriction, assessing the extent to which parents restrict their child's access to foods; and (5) Pressure to eat, assessing parents' tendency to force their children to eat more food, typically at mealtimes. Item 7 of the instrument evaluates the perceived parent weight at the moment. All items are measured using a 5-point Likert-type scale, and results are computed as mean (Standard Deviation) of each factor. The study was approved by the local Institutional Review Board (Protocol n. 02317818.0.0000.5407).
Resultados e Conclusões:
The mean (SD) for children's BMI was 16.82 kg/m² (SD 2.76). The mean (SD) score of the 5 factors and question 7 were as follow: 4.37 (SD 0.69) for Factor 1; 3.42 (SD 0.73) for Factor 2; 2.68 (SD 1.37) for factor 3; 4.20 (SD 1.12) for factor 4; 3.14 (SD 1.10) for factor 5; and 3.64 (SD 1.17) for item 7. In the stepwise multiple regression model, QAC factors were included as independent variables and children's BMI as the dependent variable. The model was statistically

significant [(F (2.83) = 32.2, p < 0.001] and the Child Weight Concern factor (β = 0.520, t = 6.264, p < .001) and the Pressure to Eat factor (β = -0.435, t = -5.244, p < .001) emerged as predictors, explaining 43% of the variance of children's BMI. Conclusion: BMI tends to be higher the greater is the concern of parents with their children's feeding. On the other hand, the child BMI tends to be lower the higher is the pressure exerted by parents on children feeding. Financial support: CAPES/PROEX.

Palavras-chaves: Comportamento alimentar, Criança , IMC, Pais
Agência Fomento: Capes/PROEX

14.050 - INFLUENCE OF DIFFERENT PERIODS OF CHRONIC RESTRAINT STRESS IN MICE SUBMITTED TO EMOTIONAL CONTAGION

INFLUENCE OF DIFFERENT PERIODS OF CHRONIC RESTRAINT STRESS IN MICE SUBMITTED TO EMOTIONAL CONTAGION

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The capacity to perceive emotions in each other allows predicting and understanding their feelings, actions and motivations, this aspect is a relevant factor for social interaction. Have been demonstrated that rodents also have the ability to be empathic. Previous findings by our research group demonstrated that living together with a cagemate 14 days before and 14 days after chronic restraint stress induced hypernociception in observer mice.
Objetivos:
Here we evaluate whether different periods of living with a conspecific under chronic restraint stress would be able to produce familiarity and empathy responses to nociception in male mice
Métodos:
Male Swiss mice (n=148), CEUA: 9483240918, were housed in pairs lived together for different periods and then separated into stress cagemate group (SCG), one animal of each pair cohabitation the animal subjected to chronic restraint stress; and control cagemate group (CCG), one animal of each pair cohabitation the animal without submission to stress session. The chronic restraint stress was performed using a PVC pipe [14 cm(length) × 3 cm (diameter)]. The animals of the chronic restraint stress were placed inside the pipe once a day for 1 h/day in the presence of their cagemates, SCG or CCG. In experiment 1 (Exp.1), mice living together for 7 days followed by cohabitation with CRS or WSS for 7 days. On 15th day, the cagemates, SCG and CCG were subjected to the writhing test, induced by intraperitoneal (i.p.) injection of 0.6% acetic acid (0.1 mL/10g). In experiment 2 (Exp.2), mice living together for 7 days followed by cohabitation with chronic restraint stress or without submission to stress session for 14 days. On 22th day, the cagemates, SCG and CCG were subjected to the writhing test. In experiment 3 (Exp.3), mice living together for 14 days followed by cohabitation with chronic restraint stress or without submission to stress session for 7 days. On 22th day, the cagemates, SCG and CCG were subjected to the writhing test.
Resultados e Conclusões:
Student's t test revealed that the number of writhes was significantly higher in SCG compared to animals in the CCG (Exp.1: t20= -6.23, p < 0.05; Exp. 2: t9= -6.25, p < 0.05; Exp. 3: t15= -2.15, p < 0.05). Present study show that living with a conspecific under chronic restraint stress condition for seven or fourteen days produce familiarity and hypernociception in observer cagemate.

Palavras-chaves: chronic restraint stress, hypernociception, mice, empaty
Agência Fomento: UFSCar, CAPES, CNPQ (156300/2018-4)

14.051 - VIESES IMPLÍCITOS EM RELAÇÃO A ÍCONES DE APLICATIVOS ESTÃO ASSOCIADOS A UMA FORTE FUNÇÃO DE ORIENTAÇÃO EM UMA TAREFA DE BUSCA VISUAL

IMPLICIT BIASES TOWARDS APPLICATION ICONS ARE ASSOCIATED WITH STRONG ORIENTING FUNCTION IN A VISUAL SEARCH TASK

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Research on consumer experience applies implicit measures to estimate the influence of brands on consumers' attitudes, judgments and preferences. However, how are the psychological processes subjacent to these attitudes explained, and how are they related to strong orienting function towards attitudinally related stimuli? The Implicit Relational Assessment Procedure (IRAP) was developed as an attempt to capture dimensions and levels of arbitrarily applicable relational responses "in flight", yielding a behavioral explanation for implicit attitudes, among other cognitive processes. Recent research suggests that the affective value associated with visual stimuli can guide users' attention to emotionally relevant information by increasing engagement and frequency of applications (apps) usage. The current study evaluated the relationship between eye movements as orienting responses and IRAP performance as a measure of behavioral biases that can reveal implicit attitudes.
Objetivos:
Investigate whether implicit attitudes can predict people's behavior toward a preferred app and how that preference influences the performance of a visual search in locating an icon on smartphone interface display.
Métodos:
To assess preference attitudes towards apps, the present study performed an IRAP task to measure relational coherence in responding to four relations between two apps icons and two facial expressions, namely WhatsApp-Happy, WhatsApp-Angry, Messenger-Happy, and Messenger-Angry, alongside explicit measures, namely Likert, preference ranking, and Self-Assessment Manikin (SAM) valence and arousal scales. To answer the question of whether preferences are associated with target localization performance, latency time to find the two apps' icons in a smartphone screen comprised of a 6 × 4 icons matrix was measured by eye tracking. The research was appreciated by the ethics committee in research with human beings of the Federal University of Minas Gerais, with approval number 79213917.6.0000.5149.
Resultados e Conclusões:
For all the implicit (IRAP) and explicit measures, WhatsApp and Messenger means showed significant differences, proving a pro-WhatsApp preference. The overall mean time to find the WhatsApp icon in the screen matrices was significantly smaller than to find the Messenger icon. This suggests an association between WhatsApp icon localization quickness and the WhatsApp-Happy relation's high relational coherence, leading to hypotheses of general associations between behavioral bias and target localization.
Palavras-chaves: brands preferences, eye tracking, IRAP, orienting function, visual search task
Agência Fomento: Coordenação de Aperfeiçoamento de Pessoal de Nível Superior (CAPES) e Instituto Nacional de Ciência e Tecnologia sobre Comportamento, Cognição e Ensino (INCT-ECCE)

14.052 - RESPOSTAS COMPORTAMENTAIS E EXPRESSÃO DE C-FOS EM RATOS EXPOSTOS À COBRA (BOA CONSTRICTOR)

BEHAVIORAL RESPONSES AND C-FOS EXPRESSION OF RATS EXPOSED TO A LIVE SNAKE (BOA CONSTRICTOR)
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When confronted with a live cat, laboratory rats will exhibit strong defensive responses (i.e. flight and freezing). This ecologically-relevant paradigm allowed for the characterization of strong fear responses and of its underlying neural circuitry. Notably, in situations where the threat levels are low or ambiguous, rats will express risk assessment (RA) in detriment of flight of freezing. However, little is known about the pathways involved in the control of RA.
Objetivos:
In this study, we hypothesized that the exposure of rats to a live snake (Boa constrictor), a species that did not co-evolved with the experimental subjects, will constitute an ambiguous threat, thus promoting increased levels of RA. Moreover, we aim to characterize part of the neural circuitry involved in the control of RA by evaluating c-Fos expression (a proxy for brain activity) in selected encephalic regions.
Métodos:
12 male Long-Evans rats (60 days old) were maintained under controlled temperature (23±2 °C), illumination (12 h cycle) and with food and water ad libitum. Animals from snake group (n=6) were individually introduced to an arena containing a live B. constrictor separated from the rats by wire mesh. Similarly, animals from control group (n=6) were introduced to the experimental apparatus containing a rubber snake. The test session was recorded for 10 min. for posterior

behavioral analysis. 90 min. after the test session, animals were anesthetized and transcardially perfused with saline, followed by 4%. PFA. Brains were removed, cut at 40um and processed by free-floating immunohistochemistry for c-Fos detection. Sections were mounted on slides and analyzed under microscope for c-Fos+ cells quantification. All experimental procedures were approved by the Institute's Ethics committee (CEUA/ICB/USP, Protocol Nº 2945290119). Differences between groups were tested using Student's t-test.
Resultados e Conclusões:
Statistical analysis (t=3.0, p=0.012) revealed that snake exposure significantly decreased average locomotor speed (40.7±3.7mm/s) when compared to controls (62.4±6.0 mm/s). Snake exposure caused a mild, yet statistically significant (t=2.30, p=0.0037) increase in freezing (27.4±11.7 s) when compared to controls (0.50±0.2.2s). Duration of RA was significantly greater (t= 4.01, p=0.0039) in the snake group (225.8±35.8s) than in control group (76.8±9.3). Snake exposure prompted statistically significant increases in c-Fos cells/mm² in the lateral periaqueductal gray (Snake: 126.3±23.1; Control: 43.1±19.3; t=2.75, p=0.03), Edinger-Westphal nucleus (Snake: 234.9±22.7; Control: 53.6±16; t=6.49, p=0.006), supraoculomotor area (Snake: 171.5±40.6; Control: 64.2±8.1; t=2.58, p=0.04) and lateral hypothalamus (Snake: 202.1±31.6; Control: 73.1±10.7; t=3.86, p=0.008). In conclusion, exposure to live snake provoked a marked increase in RA in rats. Animals exposed to the snake showed a strong increase of c-Fos expression in several subcortical brain areas that may be involved in a neural pathway organizing RA.
Palavras-chaves: c-Fos, Periaqueductal gray, Risk Assessment
Agência Fomento: Fapesp

14.053 - EFEITO DA ADMINISTRAÇÃO DE PROBIÓTICOS EM RATAS PRENHAS NO COMPORTAMENTO DAS PROLES EM UM MODELO DE ADOÇÃO CRUZADA.

EFFECTS OF PROBIOTIC ADMINISTRATION TO PREGNANT RATS ON THE OFFSPRING BEHAVIOR IN A CROSS-FOSTERING MODEL
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Instituição: 1 UFRGS - Universidade Federal do Rio Grande do Sul. (Sarmento Leite, nº 500. Centro Histórico, Porto Alegre. RS.)Introdução:
Probiotics are living microorganisms that when consumed in adequate quantities are able to modulate the composition of the intestinal microbiota, which is connected to the brain via several bi-directional pathways, such as through the immune and neuroendocrine system. Moreover, intestinal bacteria participate in the formation of body odors, including feces, that allow members of the same species to recognize others as belonging to the same group or not, including mothers and offspring.
Objetivos:
Present study investigated the alteration of the microbiota of pregnant rats by probiotic treatment on the olfactory preference of offspring for the mother's odor in a cross-fostering model. We aimed to test whether pups would show affiliative behaviours towards adopted lactating females with different microbiota. We also analysed behaviours of those offspring in the juvenile phase.
Métodos:
Female rats received probiotic bacteria Lactobacillus rhamnosus, at a concentration of 5x108 CFU/mL through gavage, or deionized water as a vehicle from gestational day (GD) one to the day of weaning, postnatal day (PND) 21. On PND 1, pups were cross-fostered in order to control for pre and post-natal effects, and thus 6 groups were studied (probiotic treatment vs cross-fostering). On PND 7, pups were tested for olfactory preference in a Y-maze, being exposed to olfactory stimuli from feces of lactating vehicle rats or feces of lactating rats treated with probiotics, and clean sawdust as a neutral stimulus. On PND 45, animals were tested for anxiety in the open field and plus maze tests.
Resultados e Conclusões:
Results showed that the dams treated with probiotics had greater weight gain during pregnancy compared to vehicle rats ($t=2.870$; $p < 0.01$), however, no change in the offspring weight was detected (t=0.6459). In females pups, cross fostering induced a tendency to increase preference for the odor of lactating rats treated with vehicle compared to non-adoption groups. In males, adoption induced no significant change on the odor preference. Male and female pups tend to prefer the odor of lactating females, regardless of the probiotic treatment. In juvenile females, neonatal cross fostering led to a higher anxiety-like behavior in open field ($F(5,54)=7.558$; $p < 0.01$) and in plus maze tests these rats tended to spend less time in open arms. Males showed no significant change in anxiety-like behaviors in both tests. Preliminary data

indicate that both probiotic treatment and adoption may affect male and female pups differently. In juvenile period, cross-fostered female pups born and raised by mothers treated with vehicle showed greater anxiety-like behaviours than non-adopted ones, while females raised by Lactobacillus mothers showed no change in those behaviors. CEUA UFRGS é 33278.
Palavras-chaves: affiliative behaviors, microbiota, olfactory preference
Agência Fomento: Capes

14.054 - COMPARAÇÃO ENTRE OS EFEITOS DE DIFERENTES MODALIDADES DE EXERCÍCIO FÍSICO SOBRE O COMPORTAMENTO DO TIPO ANSIOSO E A FLEXIBILIDADE COGNITIVA DE RATOS WISTAR MACHOS

COMPARISON AMONG THE EFFECTS OF DIFFERENT PHYSICAL EXERCISE MODALITIES ON ANXIETY-LIKE BEHAVIOR AND COGNITIVE FLEXIBILITY OF MALE WISTAR RATS

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Instituição: 1 DCM UFRGS - Departamento de Ciências Morfológicas, ICBS,UFRGS, RS (Sarmento Leite, 500, POA-RS), 2 PPG NEURO UFRGS - Programa de Pós-Graduação em Neurociências, ICBS,UFRGS,RS (Sarmento Leite, 500, POA-RS)Introdução:
Clinical studies show that physical exercise has anxiolytic and pro-cognitive properties for both healthy individuals and those with psychiatric disorders. Most of these data refers to the effects of aerobic exercise. However, other modalities, as resistance exercise, deserve more attention, once they may modulate anxiety and cognition into different magnitudes and mechanisms.
Objetivos:
The aim of this study was to compare the effects of chronic aerobic and resistance exercise protocols on anxiety-like behavior and cognition in healthy rats.
Métodos:
This study was approved by the Ethics Committee of Universidade Federal do Rio Grande do Sul (nº 32461). Thirty-five male Wistar rats (90 days old) were divided into three groups: sedentary (SED), submitted to aerobic treadmill training (AER) and submitted to resistance training (RES). The AER and RES groups were trained for six weeks, five times/week. The treadmill training consisted of running sessions (20 min/day) at an intensity of 60% of its maximum oxygen consumption (VO2 max). In resistance training sessions, each rat climbed a vertical ladder eight times/day carrying a tail-attached weight of 60% of its maximal carrying capacity (MCC). The VO2 max and MCC of the respective groups were re-evaluated weekly. After the last exercise session, the anxiety-like behavior of the animals was evaluated by the Elevated plus maze (EPM) and Light-dark (LD) tests. The percentage of time spent and of the number of open arms entries, number of closed arms entries, number of risk assessment (EPM) and time spent on the light compartment (LD) were analyzed, n = 11-13/group. Subsequently, the rats' cognition were analyzed by the Modified hole board test, where the latency to find three rewards hidden in small pots was counted (n = 8-12/group). Data were expressed as mean ± standard error and differences were considered significant when $p < 0.05$.
Resultados e Conclusões:
According to one-way ANOVA and Tukey's post hoc tests, the AER group presented a higher percentage of time spent in seconds (SED: 15.3 ± 2.8; AER: 32 ± 3.5; RES: 23. 7 ± 3.5, p = 0.004) and number of open arms entries (SED: 23.6 ± 2.6; AER: 36.4 ± 3.3; RES: 32.1 ± 3.4, p = 0.022) compared to SED. Furthermore, the number of entries in the closed arms by the AER group was lower compared to the RES (7 ± 0.6; AER: 5.7 ± 0.3; RES: 8.2 ± 0.5, p = 0.001). No significant differences were detected among the groups in the other tests. The data suggest that treadmill aerobic exercise had an anxiolytic effect in healthy animals, confirming the clinical findings. However, the resistance exercise model used in our study did not reproduce the anxiolytic effects observed in humans, suggesting that other protocols of this modality should be used to investigate the mechanisms by which this type of exercise modulates anxiety. Although we have not observed effects of exercise on cognitive flexibility, this data is preliminary and the sample will be enlarged to give greater credibility to the assessment.
Palavras-chaves: treadmill running, vertical ladder climbing, aerobic exercise, anaerobic exercise, emotion
Agência Fomento: CNPq

14.055 - CHEMICAL INACTIVATION OF THE INSULA PRODUCES ANXIOLYTIC-LIKE EFFECT IN MICE EXPOSED TO THE MODEL OF EMPATHY FOR PAIN

CHEMICAL INACTIVATION OF THE INSULA PRODUCES ANXIOLYTIC-LIKE EFFECT IN MICE EXPOSED TO THE MODEL OF EMPATHY FOR PAIN

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Instituição: 1 UFSCar - Dept Psychology-Psychobiology group/UFSCar/SP (Rod. Washington Luiz, s/n, São Carlos - SP, 13565-905), 2 UFSCar - Graduate Program in Psychology/UFSCar/São Carlos/SP (Rod. Washington Luiz, s/n, São Carlos - SP, 13565-905), 3 UFSCar/UNESP - 3Joint Graduate Program in Physiological Sciences (Rod. Washington Luiz, s/n, São Carlos - SP, 13565-905)Introdução:
Empathy is expressed by the capacity to recognize and respond to the emotional signals of others. Recently, our group have demonstrated that mice cohabiting with a conspecific submitted to chronic neuropathic pain show anxiogenic-like behaviors in the elevated plus-maze (EPM). Evidence has emphasized the role of insula in modulation of anxiety, pain and emotional contagion.
Objetivos:
The aim of this research is investigated the effects intra-insula injection of cobalt chloride (CoCl2, a reversibly non-selective synaptic blocker), on the modulation of anxiety induced by cohabiting with a cagemate in neuropathic pain in mice exposed to the EPM.
Métodos:
Male Swiss mice (n=05-09/group), CEUA: Nº3400210118, were submitted to a 28 days protocol. On the 21st after birth (weaning) mice were housed in pairs for 14 days to establish familiarity. On the 14th day, the animals were divided into two groups: cagemate sciatic nerve constriction (CNC), in which one animal of each pair was subjected to sciatic nerve constriction and cagemate sham (CS), in which one animal from each pair was subjected to the same surgery without nerve constriction. After surgery, the mice returned to the box with their respective conspecific (cagemate). On the 23rd day, cagemates were submitted to stereotactic surgery for implantation of guide cannulas directed to the insula. On the 28th day, the CNC and CS groups received bilateral injections of saline or CoCl2 intra-insula, and the cagemates were submitted to EPM for five minutes.
Resultados e Conclusões:
Two-way ANOVA followed by post-hoc Duncan test revealed that cohabitation with mice CNC induces anxiogenic-like behavior and demonstrated that temporary chemical inactivation of the insula increased percentage of open arm entries ($F_{1,22}= 8.39$; $p < 0.05$) and percentage of open arm time ($F_{1,22}= 7.69$; $p < 0.05$), without altering closed arm entries ($F_{1,22}= 2.31$; $p > 0.05$) of the EPM. These findings suggest that inactivation of the insula produce anxiolytic-like effect in the EPM in mice. Furthermore, it is suggesting that insula is fundamental for exhibition of anxiety-like behaviors induced by emotional contagion, evaluated through cohabitation with conspecific submitted to chronic neuropathic pain.
Palavras-chaves: Model of empathy for pain, insula, cobalt chloride (CoCl2), mice
Agência Fomento: UFSCar, CAPES (88887187389/2018-00), CNPQ (309201/2015-2)

14.056 - ROLE OF BENZODIAZEPINE-GABAA RECEPTORS IN THE MODULATION OF ANXIETY AND AVERSIVE MEMORY IN MICE EXPOSED TO A MODEL OF POSTTRAUMATIC STRESS DISORDER.

ROLE OF BENZODIAZEPINE-GABAA RECEPTORS IN THE MODULATION OF ANXIETY AND AVERSIVE MEMORY IN MICE EXPOSED TO A MODEL OF POSTTRAUMATIC STRESS DISORDER.

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Two of the most important aspects of the posttraumatic stress disorder (PTSD) are the stability of a traumatic (aversive) long-term memory, and hypervigilance, which may be associated with higher levels of anxiety. One of the cerebral structures that has been associated with these processes related to PTSD is the dorsal anterior cingulate cortex (ACC) due to its role in aversive encoding and anticipation.
Objetivos:
Therefore, we carried out a study to evaluate the effects of injections of midazolam (MDZ; a benzodiazepine-GABAA receptor agonist) intra-anterior cingulate cortex (ACC/Cg2) of mice on anxiety-like behavior and memory by using an animal model of

PTSD that employed reexposures to situational reminders (SR).
Métodos:
The experimental setup consisted of exposing male Swiss mice (n= 10/group), CEUA: 3047280318, to an inescapable footshock (0.5 mA/10 s) into the dark side of a light-dark box (LDB), followed by once a week for three weeks reexposures to the light side of the box for 2 minutes (SR), without contact to the shock compartment. Forty-eight hours after the last SR, all animals were stereotaxically implanted with guide cannulas bilaterally aimed to the ACC/Cg2. On the twenty-eighth day, mice received injections intra-ACC/Cg2 of saline or midazolam (3.0 and 30.0 nmol/0.1 µl) and 5 minutes after were exposed to elevated plus-maze. On the thirty-fourth day, following the same injection procedure, the same mice were submitted to explore both sides of the LDB for 5 minutes.
Resultados e Conclusões:
For EPM, one-way ANOVA followed by post-hoc Duncan test revealed that intra-ACC/Cg2 injection of midazolam (both doses) did not change percentage of open arms entries ($F_{2,27} = 1.48$, $p > 0.05$), percentage of open arms time ($F_{2,27} = 1.31$, $p < 0.05$) and closed arms entries ($F_{2,27} = 0.28$, $p > 0.05$). In relation to LDB, one-way ANOVA followed by post-hoc Duncan test revealed that only intra-ACC/Cg2 injection of midazolam (30 nmol) decreased latency to enter into the dark side of the box ($F_{2,27} = 8.11$, $p < 0.05$) and increased the time spent in the dark side ($F_{2,27} = 9.53$, $p < 0.05$), but no significant different was observed between groups in relation to the entries in the dark side of the LDB ($F_{2,27} = 2.68$, $p > 0.05$) when compared to saline. These results suggest no effects for the treatment of midazolam intra-ACC/Cg2 of mice on anxiety-like behavior in the EPM. Otherwise, these data suggest that higher dose injection of midazolam intra-ACC/Cg2 provokes an anxiolytic-like and/or aversive mnemonic modulation only in the LDB, due to possible impairment in the evocation of the aversive memory in mice.
Palavras-chaves: Anxiety, Memory, PTSD
Agência Fomento: FAPESP

14.057 - COMPREENSÃO DE VERBOS PSICOLÓGICOS POR CRIANÇAS EM PROCESSO DE AQUISIÇÃO DA LINGUAGEM

PSYCOLOGICAL VERBS COMPREHENSION BY CHILDREN IN THE LANGUAGE ACQUISITION PROCESS

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Instituição: 1 UFRA - Universidade Federal Rural Da Amazônia (Av. Perimentral)Introdução:
This research investigated how children, at different stages of language acquisition, evidence the understanding of psychological verbs through the Visual World Paradigm. We assume that, among a set of lexical items available for acquisition, psychological verbs are complex to language acquisition, given their inherent characteristics, such as designating a state, condition, or situation.
Objetivos:
The experimental task aimed to examine the comprehension of the psychological verbs FEAR, FRIGHTEN, CALM and ANIMATE, according to the Cançado's proposal (1995).
Métodos:
Therefore, we developed an experimental study using the eye tracking technique - Tobii T120, with a temporal resolution of 8 milliseconds - and we counted on the participation of 72 children, aged between 3 and 8 years old, divided into three age groups. Participants performed a listening comprehension task of 16 experimental sentences (eg, the cat fears the dog's bark.). Then the children were asked to choose the image that corresponded to the sentence heard. During the task, participants' eye movements were recorded. This research was authorized by the Research Ethics Committee of the Federal University of Ceará with a favorable opinion under number 1.482.664.
Resultados e Conclusões:
Statistical tests revealed that there is a significant main effect for the factors of the variable age group ($F_{[2,1124]} = 10{,}35$, $p = 3{,}486e\text{-}05$), as well as for the factors of the psychological verb variable ($F_{[3,1124]} = 26.02$, $p = 2.817e\text{-}16$). However, ANOVA had no major effect for the group and psychological verb variables ($F_{[6,1124]} = 0.69$, $p = 0.65$). The results suggest that the Fear and Frighten verbs are verbs that demand high processing costs for the children participating in our investigation. However, among the two psychological verbs mentioned above, we understand the verb Fear as the most difficult for the comprehension of children from 3 to 8 years old, since, besides being the verb with the highest error rate in the correspondence auditory stimulus and visual stimulus, this required an average total fixation time of 4.76s, with average fixations of 0.395s and an average number of 12.45 fixations per stimulus.

Palavras-chaves: psychological verbs, language acquisition, eye movement
Agência Fomento:

14.058 - DIFERENÇAS EVOLUTIVAS E COGNITIVAS EM CIRCUITOS NEURAIS ENVOLVIDOS NA EMPATIA

EVOLUTIONARY AND COGNITIVE DIFFERENCES IN NEURAL CIRCUITS INVOLVED IN EMPATHY

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Instituição: 1 UFSC - Universidade Federal de Santa Catarina (Departamento de Ciências Fisiológicas, Campus Trindade, Florianópolis/SC)Introdução:
The empathy is a cognitive ability essential to execute an adequate coespecific social interaction present among the mammals and much of the neurobiological features underlying empathy are still unknown.
Objetivos:
Our goal is to understand the role of certain limbic and cortical circuits involved in empathetic behavior on different species.
Métodos:
We've reviewed the literature found in repositories and articles database.
Resultados e Conclusões:
If we adopt the multi-level conceptualization of empathy proposed by de Waal is truly that not all the levels are present in all mammals, being notable an increased in complexity of empathy on certain taxa (e.g. only apes and humans are likely to express the third level empathetic perspective taking). The differences exist also in the neural substrate of this cognitive ability in humans, we see an increased activation first of the Anterior Insula (AI) and then the Anterior Cingulate Cortex (ACC) during empathy (MEYZA et al., 2017). The AI cortex serves as the input region of the system, which translates sensations into subjective feelings and awareness, whereas the ACC functions as the output region that exerts volitional control and is related to cognitive processing load but not the property of the input itself (GU et al., 2013). Moreover, the predominant role of AI involves understanding others' feeling and bodily states rather than their action intentions or abstract beliefs (LAMM; SINGER, 2010). However, in rodents, which, except for prairie voles, seem to rely less on insular and anterior cingulate circuitry and more on the amygdalo-prefrontal pathway in transmitting information about the emotional state of their conspecifics. Therefore, rodents present a more direct pathway of processing the value of others feelings, simulate then, concern and take the decision about, maybe representing a quickly response which is consistent with the physiology, position in food chain and brain evolution of the group, requiring no need for the more complex cognitive level of empathy, which is, in essence, the theory of mind. GU, Xiaosi et al. Anterior insular cortex is necessary for empathetic pain perception. Brain. 135:2726, 2012. LAMM, Claus; SINGER, Tania. The role of anterior insular cortex in social emotions. Brain Struct Funct. 214:579, 2010. MEYZA, Ksenia et al. The roots of empathy: Through the lens of rodent models. Neurosci Biobehav Rev. 76:216, 2017.
Palavras-chaves: Anterior Insula, Empathetic behavior, Multi-level conceptualization of empathy, Rodents
Agência Fomento:

14.059 - EMPATHIC RESPONSES TO MOTHER'S DISTRESS IN ONE-YEAR-OLD CHILDREN

EMPATHIC RESPONSES TO MOTHER'S DISTRESS IN ONE-YEAR-OLD CHILDREN

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Instituição: 1 UdelaR - Universidad de la República (Laboratorio de Neurociencias), 2 UdelaR - Universidad de la República (Sección Fisiología y Nutrición, Facultad de Ciencias)Introdução:
The development of empathic responses in infants may depend on the establishment of a close affective bond between mother and child, which allows the coordination of physiological and emotional processes between them. Although there is evidence showing that 18-month-old children exhibit empathic responses to the mother and others' distress, it has not been studied yet whether these responses develop earlier in life.
Objetivos:
We aimed to assess if 11 to 15 month-old children exhibit empathic responses to the simulated distress of the mother and if they were associated with the synchronic mother-infant behavior.
Métodos:
The infants were divided into two groups: a: 11 to 12 months (n=12) and b: 13 to 15 months (n=9). The free play interaction between mother and child was assessed during a 3-min session. After this interaction, mother and infant play with a spinning top (30 sec, basal phase), then the mother is pricked with the top

and pretends feeling pain (30 sec, pain phase), and finally she recovers from pain (30 sec, recovering phase) according to Zahn-Waxler and Robinson (Dev. Psych. 28:1038, 1992). The entire sequence was filmed for posterior analysis.
Resultados e Conclusões:
Both groups showed more affective concern (Group a: basal: 2.5 (0.9), pain: 1.0 (0.0), W= 2.8, p=0.005; Group b: basal: 1.0 (0.0), pain: 3.0 (1.2), W=2.2, p=0.026; Wilcoxon test) and inquisitiveness (Group a: basal: 1.0 (0.5), pain: 4.0 (0.9), W=2.7, p=0.007; Group b: basal: 2.0 (0.5), pain: 4.0 (0.2), W=2.6, p=0.008) during pain than during the basal phase, yet no differences were found between groups (p=ns). Only the older infant group showed a higher prosocial behavior during the recovering than during the basal phase (basal: 1.0 (0.7), recovering: 3.0 (1.0), W=2.4, p= 0.016). Interestingly, synchronic gaze time between mother and child during the free play interaction was positively associated with the affective concern (n=13, r=0.655, p=0.015, Spearman correlation) and inquisitiveness (r=0.568, p=0.04) of the infant during the pain phase. These results suggest that around the year of life, children can already express affective concern and inquisitive behaviors to the suffering of others, specifically to their mother, although prosocial and comfort behaviors are expressed later, probably because they require higher cognitive abilities. Results also underscore the importance of synchronic behavior between mother and child in the development of empathic behaviors early in life. The protocol went through the evaluation process without suggestions or corrections (Nº 191175-000728-18), although the resolution has not been officially emitted yet.
Palavras-chaves: Empathy, Children, Synchrony
Agência Fomento:

14.060 - AVALIAÇÃO DO USO DE FLORAIS DE BACH NO COMPORTAMENTO SEMELHANTE À ANSIEDADE AVALIADO NO LABORATORIO EM CRUZ ELEVADO EM RATOS.

EVALUATION OF THE USE OF BACH FLOWER IN THE ANXIETY-LIKE BEHAVIOR EVALUATED IN THE ELEVATED PLUS MAZE IN RATS.
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Instituição: 4 FORP e FFCLRP - USP - Universidade de São Paulo (Rua Monte Alegre, Av. Bandeirantes, 3900 - Ribeirão Preto, 14040-900)Introdução:
Fear is characterized as a barrier in the dentist-patient relationship, resulting in episodes of crying and screaming during pediatric dental care. The sedation by drugs used for behavioral control is associated with health risks to the child. The Integrative and Complementary Practices in Health present themselves as an alternative for the dentist. In this context, the Bach Flower act on human emotions and do not present side effects and adverse effects.
Objetivos:
: This study aimed to evaluate the effects of the use of Bach flower in the emotional behavior in Wistar Hannover rats submitted to the elevated plus maze test (EPM) from the administration of five flower essences: Rock Rose, Mimulus, Cherry Plum, Aspen, and Red Chestnut.
Métodos:
Adult male Wistar Hannover rats (n = 10/group) were assigned into two experimental groups: control and Bach Flower. The oral treatment with Bach Flower was performed by ten consecutive days). At day 11th the EPM test was performed for 5 minutes. The t-Student test was used for statistical analyses. Procedures were approved by CEUA-FORP, USP-Brazil (Number: 2018.1.611.58.0).
Resultados e Conclusões:
Results are shown as means ± standard errors means (SEM). The results showed that the diary administration of the Bach flowers did not alter the outcome measures evaluated in the EPM test. In this way, the percentage of time in the open arms (F 4,4 = 6.305, 4, 4 p = 0.1022), the number of open arms entries (F 7,7 = 2.098 p 0.3494) and the number of closed arms entries (F 7,7 = 1.126 p = 0.8799) did not differ when compared the Control group with Bach Flower group (P > 0.05, t-Student test). Although some evidence has shown that the use of Bach Flower in humans can promote changes in emotional behavior, in the EPM, no modifications were observed in the parameters evaluated. However, it is possible that in other models, different results may be found.
Palavras-chaves: Florais de Bach, Ansiedade, Medo, Comportamento Emocional.
Agência Fomento: FAPESP, CAPES-PROEX, CNPq

14.061 - IMPULSIVITY AND STRESS PERCEPTION IN UNDERGRADUATE STUDENTS

IMPULSIVITY AND STRESS PERCEPTION IN UNDERGRADUATE STUDENTS

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Instituição: 1 UFRGS - Universidade Federal do Rio Grande do Sul (Laboratório de Psicologia Experimental)Introdução:
The Balloon Analogue Risk Task (BART) is a behavioural task, which assess risk taking. The Barratt Impulsiveness Scale (BIS) on the other hand measures attentional and motor impulsivity, and lack of planning. The Daily Stress Inventory (DSI) is used to measure perception of daily stressing events and their impacts in the respondent's perception.
Objetivos:
Approved by the Committee of Ethics (CEP/UFRGS: CAAE numbers 77251517.1.0000.5334 and 88488518.5.0000.5334), this study aimed to perform an analysis between impulsivity and stress perception in undergraduate students.
Métodos:
The sample consisted of 28 men (mean age: 21, 21 years old) and 43 women (mean age: 20, 60) who filled in the DSI online and booked a session to complete the experiment in person (filling in BIS and doing BART). The sessions took place between 2pm and 6pm on working days, in a room in the Universidade Federal do Rio Grande do Sul. We used Shapiro-Wilk to verify normality of the data. We used Pearson's correlation test to verify any correlations. We adopted 95% as threshold for significance and we used SPSS version 21 to analyse our data. Currently, this study is still in progress.
Resultados e Conclusões:
There was no correlation between variables in men. Women presented significant correlation between Average Impact Rating of DSI and Attentional Impulsivity subscale of BIS (r=0.397; n=41; p=0.0010). Results indicate that chronic stress might be related to impulsivity. As there was much fewer men than women, that might have cause their lack of results.
Palavras-chaves: Impulsivity, Stress, Students
Agência Fomento:

15. Dor

15.013 - EFICÁCIA DA ESTIMULAÇÃO TRANSCRANIANA POR CORRENTE CONTÍNUA DE ALTA DEFINIÇÃO (HD-TDCS) NO TRATAMENTO DA DOR CRÔNICA NA FIBROMIALGIA

EFFICACY OF HIGH-DEFINITION TRANSCRANIAL DIRECT CURRENT STIMULATION (HD-TDCS) IN THE TREATMENT OF CHRONIC PAIN IN FIBROMYALGIA
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Instituição: 1 UERJ - Universidade do Estado do Rio de Janeiro (Rio de Janeiro, RJ, Brasil), 2 Soterix - Soterix Medical Inc. (New York, NY, USA), 3 CUNY - City College of the City University of New York (New York, NY, USA)Introdução:
Fibromyalgia (FM) is a multisymptomatic chronic diffuse musculoskeletal pain syndrome with evidence of central nervous system dysfunction. Accordingly, non-invasive brain stimulation techniques such as high-definition transcranial direct current stimulation (HD-tDCS) may be a complementary therapeutic resource to reduce pain perception.
Objetivos:
This research aimed to test the efficacy of HD-tDCS in the treatment of chronic pain in patients with FM.
Métodos:
Nineteen patients from both the Pain Clinic at the University Hospital Pedro Ernesto of the Rio de Janeiro State University (Brazil) as well as from the general public, diagnosed with FM (American College of Rheumatology – 1990 and 2010 criteria) were enrolled in this triple-blind randomized controlled trial (CAAE: 34183714.9.0000.5259). Pain (Visual Analogue Scale, VAS), psychological aspects (Hamilton Anxiety (HAM-A) and Depression (HAM-D) Scales), and quality of life specific for FM (Fibromyalgia Impact Questionnaire - FIQ) were evaluated at the beginning of the treatment (baseline, BL), immediately after the treatment (W0), two (W2) and eight weeks (W8) after the end of the intervention. Subjects were randomly distributed into ACTIVE HD-tDCS (4x1-ring montage, anodic stimulation, central anode over the left primary motor cortex (M1), C3, 2mA/20 min) (n=9) or SHAM (n=10) groups (1 session/working dayx5 weeks=25 sessions). All data are normalized for BL (raw score/BL) and presented as mean (percentage of the baseline values) ± standard deviation.
Resultados e Conclusões:
HD-tDCS led to a reduction of VAS values relative to the baseline by the end of treatment for both ACTIVE (W0=0.55±0.36) and SHAM groups (W0=0.58±0.59). For ACTIVE, we observed that the effect of the treatment decreased over time (W2=0.43±0.32) and returned to the baseline at the last follow-up visit

(W8=0.95±0.52), whereas a persistent reduction of VAS was presented for SHAM (W2=0.42±0.40; W8=0.64±0.53). We also observed an effect for FIQ immediately after treatment both for ACTIVE (W0=0.69±0.25) and SHAM (W0=0.86±0.37), which lasted for the subsequent visits (ACTIVE: W2=0.67±0.34; W8=0.75±0.13; SHAM: W2=0.72±0.38; W8=0.69±0.38). The outcomes of humor displayed a progressively increasing difference in HAM-D relative to baseline scores for both ACTIVE (W0=0.92±0.31; W2=0.77±0.38; W8=0.77±0.29) and SHAM (W0=0.96±0.20; W2=0.84±0.17; W8=0.88±0.26), although more accentuated for ACTIVE. Similar results were found for anxiety SHAM (W0=0.76±0.23; W2=0.64±0.23; W8=0.65±0.28), whereas the immediate HD-tDCS effects for ACTIVE (W0=0.62±0.31) lasted until the last follow-up assessment (W2=0.64±0.31; W8=0.63±0.28). These results suggest that HD-tDCS may represent an option for the treatment of chronic pain in fibromyalgia.

Palavras-chaves: fibromyalgia, chronic pain, neuromodulation, HD-tDCS
Agência Fomento: CAPES, Soterix Medical Inc.

15.014 - DESENVOLVIMENTO E VALIDADE CONTEÚDO: ESCALA FOTOGRÁFICAS RELACIONADA AO MODELO MEDO E EVITAÇÃO PARA ATIVIDADES DO OMBRO

DEVELOPMENT AND VALIDITY CONTENT: PHOTOGRAPHIC SCALE RELATED TO FEAR AVOIDENCE MODEL FOR SHOULDER ACTIVITIES (SHOULDER-FAM)

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The fear-avoidance model is considered an explanatory model for the course of persistent musculoskeletal pain. Shoulder pain is among the three most prevalent musculoskeletal pain disorders. The Tampa Scale of Kinesiophobia was designed for fear-avoidance assessment and is validated for different populations in developed countries. However, some patients could experience challenges to answer the Tampa scale (Qual Quant. 43:773, 2009), especially those with low sociocultural level.

Objetivos:
The objective of the present study was to present the development and validity content of a photographic scale developed to assess the fear-avoidance behaviour in several shoulder activities (Shoulder-FAM).

Métodos:
The development followed the recommendations of the practical guideline (de Vet. et al. Measurement in medicine. A practical guide. 2011). An expert sample with different academic backgrounds selected photos representing daily activities that involve shoulder movements. Photos were chosen following the Activities and Participation domain of the International Classification of Functioning, Disability, and Health (ICF) published by the WHO. Subsequently, fifteen experienced clinicians and thirty patients with persistent shoulder pain were asked to judge the degree of importance of the photos for this construct. The patient sample was composed of 16 men and 14 women with a mean age 51.8 years old (SD=19.9); mean height of 167cm (SD=8.9); mean weight 75.7Kg (SD=13.9). The mean level of disability due to shoulder pain was 53.5 (SD=17.5) in a scale ranging from 0 to 100 by SPADI. All participants signed Consent Form approved by the Research Ethics Committee (CAAE) 79517717.0.0000.5414.

Resultados e Conclusões:
Three experts agreed on the activities with a Kappa value greater than 0.8. Regarding the choice of clinicians and patients, a content validity index (CVI) of 80% was considered. The expert sample consisted of physicians, physiotherapists, and occupational therapists. Three activities related to sports, remunerative, and non-remunerative work were discarded. The final version of Shoulder-FAM has 19 photos representing activities that involve shoulder movements/position. The CVI of each ICF item were: d4300 (93,3); d4301 (86,7); d4302 (86,7); d4303 (86,7); d4451 (80,0); d4452 (86,7); d4454 (86,7); d4750 (93,3); d5100 (93,3); d5101 (93,3); d5102 (93,3); d5201 (93,3); CIF: d5202 (93,3); d5400 (86,7); d5401 (93,3); d550 (93,3); d560 (93,3); d6400 (86,7); d6402 (93,3). The development process of the Shoulder-FAM can provide a new tool for the assessment of the fear and avoidance behavior in shoulder pain conditions. This resource can be useful, especially for patients with a low level of education. Future works involve the analysis of measurement property.

Palavras-chaves: medo, emoções, reprodutibilidade dos resultados, estudos de validação, dor musculoesquelética
Agência Fomento:

15.015 - AVALIAÇÃO DA ATIVIDADE ANTINOCICEPTIVA DO 3,5,4-TRIMETÓXI- CINAMATO DE METILA EM MODELOS ANIMAIS UTILIZANDO ROEDORES

EVALUATION OF ANTINOCICEPTIVE ACTIVITY OF METHYL-3,5,4-TRIMETHOXI-CINAMATE IN ANIMAL MODELS USING RODENTS

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Instituição: 1 UFPB - Universidade Federal da Paraíba (Campus I - Lot. Cidade Universitaria, PB, 58059-900)Introdução:
In modern days, the majority of options for pharmacological treatments for pain is accompanied of multiple collateral and toxic effects for the patient who needs this type of intervention and the search for substances capable of minimization of those effects and of increase in the efficacy of the treatment has been progressively frequent. Anterior researches shows that methoxicinamic acid presents pharmacological action on the Central Nervous System[1]. Methyl-3,5,4-trimethoxi-cinamate (M-TMC) can be synthesized from 3,4,5-trimethoxicinamic acid through the Fischer reaction, although too little is known about the therapeutic potential of this molecule.
Objetivos:
To evaluate the antinociceptive activity of M-TMC employing acetic acid induced writhing test and formalin test.
Métodos:
Male, 25g-35g, 3 months old Swiss mices (Mus musculus) were utilized. Groups (n=6) were treated with vehicle, M-TMC (50mg/kg, 75mg/kg, 100mg/kg, i.p.) or morphine (10mg/kg, i.p.). In the acetic acid test, 30 minutes afterwards substances administration, the rodents received acetic acid 1% i.p. (10µL/g of weight), with the abdominal constriction been accounted for 20 minutes. In the formalin test, 30 minutes afterwards respective treatments, the formalin was injected in the posterior paw, been recorded paw licking time in both standard phases of the test. The Ethic Comission on the Use of Animals approved all experimental protocols (Certificate N º. 5203080318). The results are expressed as average ± e.p.m. For the statistical analysis the method utilized was of Analysis of Variance (ANOVA) "one way", followed by the Dunnett test for comparison between the averages through the program GraphPad Prism, 7.0 version for Windows. The values were considered significant when $p < 0,05$.
Resultados e Conclusões:
RESULTS: In the acetic acid test, there was observed a significative reduction on the number of abdominal constriction in groups with doses of 50mg/kg (11,4±4,1), 75mg/kg (14,7±4,1), 100mg/kg (12,2±4,0), and morphine (1,0±0,5), when compared with control group (46,7±4,5). In the neurogenic phase of the formalin test, the groups treated with doses of 50mg/kg (54,9±4,8s), 75mg/kg (58,2±4,3s) and morphine (30,9±4,1s) revealed significant statistical difference in comparison with the control group (87,5±15,6s); in the inflammatory phase, the groups treated with doses of 50mg/kg (94,0±9,0s), 75mg/kg (95,4±13,2s), 100mg/kg (81,0±9,9s) and morphine (23,4±3,6s) presented a significative reduction of the paw licking time, in comparison with the control group (132,0±10,8s). CONCLUSION: From the data obtained in the present study, it is possible to conclude that the substance M-TMC presents important antinociceptive effects whose mechanisms of action needs to be better investigated. REFERENCES: [1] Tamiz et al., 1999; Kawashima et al., 2003; Kawashima et al., 2004.
Palavras-chaves: Methyl-3,5,4-trimethoxi-cinamate, Antinociception, Psychopharmacology
Agência Fomento: Capes

15.016 - ATIVIDADE ANTINOCICEPTIVA E ANTI-INFLAMATÓRIA DA ACUPUNTURA E LASER ACUPUNTURA NOS ACUPONTOS IG11, E36, VB34 E B60 EM PATA DE CAMUNDONGOS

ANTINOCICEPTIVE AND ANTI-INFLAMMATORY ACITIVTY OF ACUPUNCTURE AND LASER ACUPUNCTURE ON MICE PAW LI11, ST36, GB34 AND BL60 ACUPOINTS

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Pain is the most suffering inducing symptom observed in patients with different pathologic conditions. As a result, various therapeutic approaches are used to diminish its negative effects. Although advances in pharmacological therapy have been done, the side effects of chronic use of AINEs and corticoids stimulate the search for complementary therapeutic methods, such as acupuncture and laser acupuncture. Acupuncture is a form of treatment in which needles are inserted in specific points of the body, while laser acupuncture utilizes low intensity laser to stimulate the same acupoints.The acupoints were chosen from the effects observed in humans that are analgesic, anti-inflammatory and myorelaxant.
Objetivos:
Thus, this work aimed to evaluate the effects of mice LI11, ST36, GB34 and BL60 acupuncture and laser acupuncture treatments over carrageenan induced paw edema, thermal hyperalgesia, formalin induced nociception and skin temperature.
Métodos:
168 male Swiss mice, were submitted to this experiment, according to CEUA/FURB protocol 016/2017. The animals remained the needles inserted for 10 minutes, measuring the needles, 0.18 x 8.0 mm. The laser was low intensity with the wavelength of 808 nm and the energy of 25 J/cm2, 100 mW for 10 seconds. Morphine (1 mg/kg) and dexamethasone (0.5 mg/kg) were applied 30 minutes before the experiments. The results were analyzed in the program Graph Pad Prism. Results were expressed as the standard mean of the mean and were evaluated by one-way and two-way ANOVA.
Resultados e Conclusões:
Firstly, hyperalgesia was evaluated through the hot plate test. It was observed that the acupuncture and laser acupuncture groups had a 57% ($p < 0,05$) increase paw withdraw latency when compared to the control group, with similar results observed on the morphine group. Therefore, it is suggested that the increased nociceptive threshold produced by alternative techniques observed on this research might occur analogously to the diffuse noxious inhibitory control mediated by A- δ and C fibers. Moreover, it was observed that comparing to the control group laser acupuncture promoted a 14% ($p < 0,001$) decrease on paw edema size after 0,5 and 1 hour, while after 4 hours a 24% ($p < 0,01$) decrease was detected. Acupuncuture also effectively reduced edema when compared do the control group, as observed in different points in time (12% ($p < 0,001$) after 0,5, 1 and 2 hours, 27% ($p < 0,01$) after 4 hours). This effects were similar to the ones observed on the dexamethasone group. Furthermore, acupuncure reduced neurogenic phase (35%, $P < 0,05$) and imflammation phase (40%, $p < 0,01$), as well as termography calculated paw temperature (26ºC, in comparison to 30ºC observed on the control group). Thus, this work shows that complementary therapies can too be beneficial and attenuate inflammatory and pain processes, avoiding side effects standardly prescribed pain-relieving drugs.
Palavras-chaves: acupuncture, laser acupuncture, pain, inflammation, thermography
Agência Fomento: PIBIC-FURB

15.017 - EFEITO DO TRATAMENTO COM DIACEREÍNA NO MODELO DE ESMAGAMENTO DO NERVO ISQUIÁTICO EM CAMUNDONGOS

EFFECT OF TREATMENT WITH DIACEREIN ON SCIATIC NERVE CRUSH MODEL IN MICE

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Instituição: 1 UFSC - Universidade Federal de Santa Catarina (R. Eng. Agronômico Andrei Cristian Ferreira, s/n - Trindade, Florianópolis - SC,)Introdução:
Peripheral nerve damage can result from both non-traumatic (diabetic neuropathy) and traumatic injuries (motor vehicle accidents), which can cause compression, crush or transection of nervous tissue resulting in neuropathic pain and sensory-motor impairment, negatively impacting the quality of life of people with this type of injury. The treatment can be carried out through surgical interventions, physiotherapy, as well as pharmacological therapies, aimed at sensory-motor recovery and pain relief. Diacerein, derived from an anthraquinone found in plants of the genus Cassia, has a moderate analgesic and anti-inflammatory activity and it is used clinically in cases of osteoarthritis.
Objetivos:
The purpose of this study was to analyze the effect of diacerein treatment in an experimental model of sciatic nerve crush in mice.
Métodos:
The experimental protocol was approved by Ethics Committee on Animal Use of Federal University of Santa Catarina (CEUA/UFSC) under protocol no. 3042250219. Forty-eight male Swiss mice (8-12 weeks

age, 25-45g) were randomly assigned to 6 groups: sham-operated + vehicle; sham-operated + diacerein 30 mg/kg; injury + vehicle; injury + diacerein 3 mg/kg, 10 mg/kg and 30 mg/kg. Hemostatic forceps was used to compress right sciatic nerve for 30 seconds. Twenty-four hours after surgery the mice were treated with diacerein (3-30 mg/kg) or vehicle (saline with 6% Tween 80), administered orally (gavage) twice a day for 21 days. Were assessed: mechanical hyperalgesia and allodynia (Von Frey of frequency and up down, respectively), quantification of spontaneous pain-related behaviors (score 0 to 5), cold hypersensitivity (acetone test) and motor function by the sciatic functional index (SFI) (static and dynamic analysis). All evaluations were carried out before and after the surgical procedure (28 days). Data analysis was performed by two-way ANOVA repeated measures followed by Bonferroni post-test and non-parametric Kruskal-Wallis test, with significance level being accepted for $\alpha = 0.05$.
Resultados e Conclusões:
Animals submitted to sciatic nerve crush showed hyperalgesia and allodynia, and diacerein promoted decrease in the response frequency [$F (25, 175) = 2.169$; $p = 0.0020$] and increase in nociceptive threshold [$F (25, 175) = 2.112$; $p = 0.0028$]. Regarding the spontaneous pain-related behavior ($p > 0.06$) and the cold hypersensitivity ($p > 0.05$), there was no significant difference between groups. In addition, mice exhibited functional deficit after injury, and diacerein treatment improved motor function, as evaluated by dynamic SFI [$F (25, 175) = 9.132$; $P < 0.0001$]. Our findings revealed that diacerein minimizes hyperalgesia and mechanical allodynia of animals submitted to sciatic nerve crush, as well supports their motor recovery.
Palavras-chaves: Diacerein , Mice, Motor function, Nociception, Peripheral nerve injury
Agência Fomento: CAPES

15.018 - GALATO DE ETILA COMO UMA NOVA FERRAMENTA TERAPÊUTICA PARA O TRATAMENTO DE FIBROMIALGIA: EVIDÊNCIAS PRÉ-CLÍNICAS.

ETHYL GALLATE AS NEW THERAPEUTIC TOOL FOR THE TREATMENT OF FIBROMYALGIA: PRECLINICAL EVIDENCES.
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Instituição: 1 LAIF - Laboratório de Autoimunidade e Imunofarmacologia (UFSC) (Centro de Ciências, tecnologias e saúde, Universidade Federal de Santa Catarina), 2 PPG Neuro - Programa de Pós-graduação em Neurociências (Centro de Ciências Biológicas, Universidade Federal de Santa Catarina.), 3 LANDI - Laboratório de Neurobiologia da Dor e Inflamação (LANDI) (Centro de Ciências Biológicas, Universidade Federal de Santa Catarina.)Introdução:
Fibromyalgia is a chronic musculoskeletal syndrome characterized by chronic widespread pain, tenderness, fatigue and markedly impairs the quality of life of patients, which additionally show somatic symptoms, sleep disorder, and cognitive deficits. Some treatments are available for managing of fibromyalgia, however with limited success.
Objetivos:
Herein, the present study investigated the antinociceptive effect of ethyl gallate (EG), a phenolic compound, in the animal model of fibromyalgia-induced by reserpine.
Métodos:
The study was approved by the Animal Ethics Committee of Universidade Federal de Santa Catarina (CEUA-UFSC, protocol number 2572210218). Swiss mice were administered with reserpine (0.25 mg/kg, subcutaneous route, and treated with ethyl gallate (100 mg/kg, oral route) between the days 0-15 or 4-15 post-induction. All data were expressed as mean ± SEM of 4–6 animals/group and are representative of two independent experiments. A statistical comparison of the data was performed by two-way ANOVA followed by Bonferroni's post hoc test. P-values less than 0.05 ($P < 0.05$ or less) were considered significant. Statistical analyses were performed using GraphPad Prism 6 software (GraphPad Software Inc., San Diego, CA, United States).
Resultados e Conclusões:
Results: In the 4th day post-induction, mechanical hyperalgesia has been accomplished by von Frey filament (0.4 g) and the frequency of withdrawal method. In this context, the treatment with EG from day 0 to 15 significantly inhibited mechanical hyperalgesia induced by reserpine ($p < 0.01$). Moreover, EG also reduced nociceptive behaviour when administered between the days 4 and 15 ($p < 0.01$). From 8th day post-induction both treatments prevented mechanical hyperalgesia induced by reserpine. In the 15th day post-induction, when cold

allodynia was evaluated by acetone method test, the treatment from day 0 reduced nociceptive behaviour especially two hours after EG administration ($p < 0.01$). Additionally, significant increases in mouse grimace scale score were found in the animals treated only with reserpine, while animals treated with EG showed significantly reduction in pain score, mainly four and seven days post-induction. Moreover, EG also supressed anhedonic behaviour during splash test. Conclusion: Altogether, EG demonstrated potential analgesic activity and provide the novel insight into its usefulness as a therapeutic tool for the treatment of fibromyalgia

Palavras-chaves: Chronic pain, Fibromyalgia, Reserpine, Swiss mice
Agência Fomento: FAPESC.

15.019 - O EFEITO DO CANABIDIOL NO TRATAMENTO DA DOR NEONATAL EM RATOS ADULTOS SOBRE O COMPORTAMENTO DE ANSIEDADE É DOSE DEPENDENTE

THE EFFECT OF CANNABIDIOL IN THE TREATMENT OF NEONATAL PAIN IN RATS ON ANXIETY IN ADULTHOOD IS DOSE-DEPENDENT

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Instituição: 1 UNIFESP - Universidade Federal de São Paulo (Rua Pedro de Toledo, 669 Vila Clementino - São Paulo), 2 CEBRID - Centro Brasileiro de Informações sobre Drogas Psicotrópicas (Rua Marselhesa, 557 Vila Clementino - São Paulo), 3 IDOR - Instituto D'Or (Rua Diniz Cordeiro, 30 Botafogo - RJ), 4 SM - Sidra Medicine (Al Gharrafa Street, Ar-Rayyan, Doha, Qatar)Introdução:
The neonatal period is critical to the brain development. Stressful experiences caused by nociceptive stimuli during the first week of life may be associated to an increased vulnerability to psychopathological phenotypes, such as anxiety in the adulthood
Objetivos:
Here, we investigated the cannabidiol (CBD) combined or not to fentanyl in the treatment of the neonatal inflammatory pain induced by Freund's Complete Adjuvant (CFA) during the first week of life, on the weight gain and anxious behavior response in both sexes in the adulthood
Métodos:
After approval by the Research Ethics Committee at Universidade Federal de Sao Paulo (UNIFESP/HSP - 4332300516), Wistar rats (Rattus norvegicus) of both sexes were allocated to seven groups on the first day postnatal day (PN1): VEHICLE; CFA; CFA+F; CFA+CBD (5 and 20mg/Kg); CFA+F+CBD (5 and 20mg/Kg). VEHICLE: received the same volume of solutions used to dissolve the drugs in the treatment groups - subcutaneous (sc.), intraperitoneal (ip.) and hind paw from PN1 to PN7. CFA: inflammatory stimuli caused by the injection of Freund's Complete Adjuvant (CFA) in the left (PN1) and right paw (PN3) after 30 minutes of fentanyl and CBD administration; F: fentanyl (100ug/Kg, sc.) from PN1 to PN7, daily injection on the back and CBD: cannabidiol 5 or 20 mg/Kg (ip.) from PN1 to PN7, daily injections. On PN60 the animals were evaluated on the elevated plus maze and the body mass was assessed daily from PN1 to PN7; on PN21, PN46 and PN63
Resultados e Conclusões:
The repeated measures ANOVA for the variable 'weight gain' showed a significant difference for the group during the first week of life among males [$F(6, 86) = 3,052$; $p > 0.01$] and females [$F(6 , 86) = 4.357$; $p > 0.01$]. The animals that received 5mg/Kg CBD had a greater weight gain when compared to the animals that received 20mg/Kg. This difference extends to PN21 [$F(6, 86) = 2.099$; $p > 0.05$] in females. ANOVA revealed on the elevated plus maze that the VEHICLE group did not present an anxious behavior, as the animals spent longer in the open arms [$F(6, 168) = 3.297$; $p > 0.01$] compared to the groups: CFA, CFA + CBD (5mg/Kg) and CFA + F + CBD (5mg/Kg). Females showed higher ambulation [$F(1,168) = 54,565$; $p > 0,001$] and frequency in the central zone [$F(1,168) = 48,894$; $p > 0,001$]. Males presented more grooming [$F(1,168) = 10,601$; $p > 0,01$] and longer period in this behavior [$F(1,168) = 27,584$; $p > 0,001$]. Animals that received lower doses of CBD exhibited more head dipping compared to the other groups [$F(6, 168) = 4,941$; $p > 0.001$]. Females receiving 5mg/Kg CBD showed more climbing than females that received 20mg/Kg [$F(6,168) = 3,045$; $p > 0.01$]; while the males showed less climbing than females [$F(1,168) = 10,750$; $p > 0.01$]. The CFA + 5mg/Kg CBD group presented more stretched-attend postures than the ACF and ACF + F groups [$F(6, 168) = 3.261$; $p > 0.01$]. The effects of the cannabidiol in the treatment of the neonatal pain on the weight gain during the first week of life and in anxiety in adulthood is dose-dependent.

Palavras-chaves: Cannabidiol, Opioid, Neonatal pain, weight gain, elevated plus maze
Agência Fomento: CNPq

16. Neurodegeneração e Envelhecimento

16.046 - O TRATAMENTO COM EXTRATO AQUOSO DA TRADESCANTIA SPATHACEA DIMINUI A PERDA NEURONAL APÓS LESÃO MEDULAR EM RATOS

THE AQUEOUS EXTRACT OF TRADESCANTIA SPATHACEA IS PROTECTIVE AGAINST THE NEURONAL CELL LOSS AFTER SPINAL CORD INJURY IN RATS

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Polar extracts of the herbaceous Tradescantia spathacea present remarkable antioxidant activity. It could be useful, therefore, to counteract oxidative stress and inflammatory-related secondary damage after spinal cord injury (SCI), that promote loss of motoneurons.
Objetivos:
To evaluate the neuroprotective effect of the aqueous extract of Tradescantia spathacea (AETS) after spinal cord hemisection injury in rats.
Métodos:
The procedures were approved by the Ethical Committee on Animal Use of Tiradentes University (protocol n. 020116). Female Wistar rats (150-200g) were submitted to laminectomy and/or hemisection procedures at the thoracic-level (T10) of the right side of spinal cord, under anesthesia. They were distributed into 4 groups (n=7): CTL (laminectomy/vehicle treated – distillated water), LES (hemisection/vehicle), AETS 10 (hemisection/AETS 10 mg/kg) and AETS 100 (hemisection/AETS 100 mg/kg), treated for 7 days (0.5 mL, p.o., daily). The sensorimotor evaluation was performed using the Basso, Beattie and Bresnahan (BBB) scale at days -1; 1; 3 and 7 from surgeries. After euthanasia (7º day), sections of spinal cord were stained with hematoxylin-eosin for histological analysis (tissue morphology) by optical microscopy. The mean number of neurons was counted in both ventral horns of spinal cord as a whole and also at the right ventral horn (ipsilateral side in relation to hemisection). Data were analyzed by Kruskal-Wallis test followed by Dunn's ($p < 0.05$).
Resultados e Conclusões:
All injured groups presented decreased functional performance compared to LAM group from 1 to 3 days after SCI ($p < 0.05$). At the day 7, the groups treated with the AETS reached values statistically similar CTL ($p > 0.05$). The LES group presented the lower mean number of neurons in the right ventral horn ($p = 0.0001$; CTL = 23.05±7.76; LES = 6.38±4.38; AETS 10 = 15.48±6.56; AETS 100 = 10.04±3.24) and also in the total counts (sum of the two sides, $p = 0.0001$; CTL = 22.89±7.88; LES = 6.93±4.84; EATS 10 = 16.3±6.57; EATS 100 = 10.72±3.73). The pre -treatment with AETS at 10 and 100 mg/kg attenuates the neuronal loss, but this effect (neuroprotective) was significantly increased for AETS 10. On histological evaluation, the structural integrity of spinal cord tissue was observed only in groups CTL, AETS 10 and 100 mg/kg. These results showed that the AETS presented neuroprotective effect after the SCI in a rodent model.
Palavras-chaves: Commelinaceae, Hemisection , Neuroprotect
Agência Fomento: Fundação de Apoio à Pesquisa e à Inovação Tecnológica do Estado de Sergipe (FAPITEC) and Coordenação de Aperfeiçoamento de Pessoal de Nível Superior - Brasil (CAPES) – Financial Code 001

16.047 - DERMATAN SULFATE PROTECTS NEURO-2A CELLS FROM OXIDATIVE STRESS BY ROTENONE-INDUCED

DERMATAN SULFATE PROTECTS NEURO-2A CELLS FROM OXIDATIVE STRESS BY ROTENONE-INDUCED

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Parkinson's disease (PD) is characterized by progressive and selective loss of dopaminergic neurons in the nigrostriatal pathway. Although of unknown etiology,

PD may be the result of interactions of genetic and environmental factors, including herbicides, such as rotenone. Several molecules have a role in the regeneration of the central nervous system (CNS) of mammals, and among them are complex carbohydrates such as glycosaminoglycans (GAGs) present in abundance in ascidians, animals belonging to the Chordata phylum, to which the subphylum of Vertebrata, being that, unlike vertebrates, they present high CNS regenerative capacity in adults. There are several types of GAGs and some of them, such as dermatan sulfate (DS), are found in the perineuronal CNS network, stimulating or inhibiting neurite outgrowth, depending on the individual structural characteristics of each molecule. In vitro and in vivo studies have shown that exposure to rotenone reproduces the neurochemistry and neuropathology of the disease, mimicking the pathology findings in humans.
Objetivos:
Used the NEURO-2a cell line, which is a recognized in vitro model for neuronal studies, and investigated the possible protective effect of DS on the astringent P. nigra species in these cells after exposure to rotenone.
Métodos:
The method used to evaluate the cytotoxic lesion and possible neurorregenerative effect of DS was the cell viability assay (MTT).
Resultados e Conclusões:
The results obtained in the evaluation of rotenone cytotoxicity (0.12-4 µg/mL) showed IC50 values (1 µg/mL) in Neuro-2a cells (1 x 10 5 cells/well) after 48 hours of treatment and did not show cytotoxicity in low concentrations. The protective effect of DS present in the viscera of P. nigra (20-375 ng/mL) was characterized by a decrease in the cytotoxicity of rotenone (1 µg/mL) at the concentration of 45ng/mL DS of dose-dependent form. For analysis of the obtained data were used the analysis of variance (ANOVA) and later the Tukey multiple comparison test with significance of $p < 0.05$. The program used to perform the analysis was the GraphPad-Prism 7 software. Finally, the construction of graphs was performed using the average of three independent experiments. In conclusion, this research may have access to a preclinical area of neurodegenerative diseases, allowing a greater understanding between an association of degenerative responses with the treatment networks involved in the neuroprotective process in PD.

Palavras-chaves: Glycosaminoglycans, Rotenone, NEURO-2a
Agência Fomento: CAPES, FAPERJ, UENF, NUPEM-UFRJ

16.048 - P2Y1 ANTAGONIST, MRS2500, PROTECTS HEMIPARKINSONIAN RATS FROM L-DOPA-INDUCED DYSKINESIA

P2Y1 ANTAGONIST, MRS2500, PROTECTS HEMIPARKINSONIAN RATS FROM L-DOPA-INDUCED DYSKINESIA

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Instituição: 1 UFC - aDepartment of Physiology and Pharmacology (Rua Coronel Nunes de Melo, n.1000), 2 DMC - bDepartment of Clinical Medicine (Rua Prof. Costa Mendes), 3 NPDM - cDrug Research and Development Center (Rua Coronel Nunes de Melo, n.1000)Introdução:
Parkinson's disease (PD) is a neurodegenerative movement disorder that affects about 1% of the population aged 65 and it is clinically characterized by resting tremor, akinesia, rigidity, and postural problems. The current treatment for PD consists primarily of dopamine replacement. Chronic administration of levodopa in PD leads to debilitating involuntary movements, termed L-DOPA-induced dyskinesia (LID), which has a negative impact on quality of life of patients, and sometimes more prejudicial than PD itself. The pathogenesis of LID is poorly understood. The participation of purinergic receptors is still unclear, despite evidence suggesting their involvement in the fluctuation of dopamine release in the basal ganglia.
Objetivos:
The aim of this study was to investigate the role of P2Y1 receptors in L-DOPA-induced dyskinesia.
Métodos:
Adult male Wistar rats received unilateral microinjection of ascorbic acid (sham) or 6-hydroxydopamine (6-OHDA) into the right striatum. Past two weeks, rats were treated during 21 days with L-DOPA/benserazide (30mg/kg and 7.5 mg/kg, respectively, v.o.) combined with P2Y1 antagonist,MRS2500 (2 nmol/µl i.c.v.) or saline. Abnormal involuntary movements (AIM's) were assessed on 7th, 14th and 21th days after L-DOPA

treatment. This study was approved by Ethics committee on Animal. Experimentation of the Federal University of Ceará (CEUA/UFC nº90/2016).
Resultados e Conclusões:
L-DOPA treatment induced dyskinesia in 6-OHDA rats and P2Y1 inhibition prevented significantly LID scores (7th: 6-OHDA: 4.4±0.2, L-DOPA: 10.9±1.6, L-DOPA + MRS 2500 9.2±2.1; 14th: 6-OHDA: 5.1±0.6, L-DOPA: 8.7±1.6, L-DOPA + MRS2500: 7.9±1.4; 21th: 6-OHDA: 4.7±0.6, L-DOPA: 14.2±2.4, L-DOPA + MRS 2500: 4.9±1.1). These results suggest that P2Y1 receptors play an important role in L-DOPA induced dyskinesia.
Palavras-chaves: Parkinson, Discinesia, MRS2500
Agência Fomento:

16.049 - SOURCE RETRIEVAL IN ALZHEIMER'S DISEASE

SOURCE RETRIEVAL IN ALZHEIMER'S DISEASE
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Instituição: 1 UFMG - Universidade Federal de Minas Gerais (Av. Pres. Antônio Carlos, 6627 - Pampulha, Belo Horizonte)Introdução:
Alzheimer's Disease (AD) is a neurodegenerative disease clinically characterized by episodic memory impairments. It is unknown, however, whether external cues can increase the retrieval of episodic memories of this population.
Objetivos:
Investigate whether AD patients are benefited by probabilistic cues during episodic memory retrieval in a source retrieval task
Métodos:
Participants: Fourteen individuals with AD (mean age = 71.5, SD = 9.5) and 14 healthy controls (mean age = 65.6, SD = 13.3) participated voluntarily in the research. All participants signed an informed consent, which was approved by the Institutional Review Board of Federal University of Minas Gerais. (CAAE 17850513.2.0000.5149) Materials: 56 photos of objects were used as stimuli. The presentation of stimuli and response recordings were conducted using psychophysics toolbox on MATLAB. Procedures: Episodic memory was tested in a source memory task, which comprised a study and a test phase. At study, half of the 56 objects were presented on the left, and half on the right side of the computer screen, in a random order. The participants were asked to judge each object as pleasant or unpleasant. At test, all the 56 studied objects were presented again, although this time they were presented in the center of the computer screen. Participants were asked to report verbally to the experimenter the side wherein each object was previously seen ("left" or "right"). In 75% of the test trials, objects were preceded by cues that probabilistically forecasted the correct responses. In 66.7 % of the cued trials, the cues indicated accurately where the objects were seen at study whereas in 33.3 % of the cued trials the cues indicated the incorrect side. The number of objects studied in the left and right side of the screen was identical for valid, invalid, and uncued trials. Participants were correctly informed about the overall frequency of each cue type, and were told they were free to use them whenever they think it could improve their performance.
Resultados e Conclusões:
Overall memory performance was greater for controls than for AD patients (p=0.003). Importantly, while valid cues increased and invalid cues decreased performance relative to baseline for controls ($p < 0.05$), such pattern was not significant for AD patients. As expected, AD patients exhibited an overall significantly lower performance relative to controls. Such impairment, however, did not result in greater reliance on the external cues available at retrieval. This suggest that these patients were not able to make a strategic use of information available at the time of retrieval in order to overcome their memory limitations.
Palavras-chaves: Alzheimer's disease, Episodic memory, Source retrieval
Agência Fomento: CAPES

16.050 - O ENVOLVIMENTO DOS GLICOSAMINOGLICANOS NA NEURORREGENERAÇÃO DA ASCÍDIA STYELA PLICATA

THE INVOLVEMENT OF GLYCOSAMINOGLYCANS IN THE NEURORREGENERATION OF THE ASCIDIAN STYELA PLICATA
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Instituição: 1 NUPEM/UFRJ - UFRJ - Campus Macaé/NUPEM (Av São José do Barreto, s/n, Barreto, Macaé-RJ, CEP 27910-970)Introdução:
Many neurodegenerative diseases have been characterized, however, they still have no cure, such as Alzheimer's disease (AD), which involves neuronal death and synaptic loss. In this context, ascidians,

chordate marine invertebrates, present high neuroregenerative capacity in adults, unlike vertebrates, becoming excellent models for comparative studies of neurorregeneration (PloS one, 4:e4458, 2009). Several molecules have a role in this process and recent studies indicate that glycosaminoglycans (GAGs) can modulate neuritogenesis and synaptogenesis according to their sulfation pattern (positive modulation for 6 sulfated (6S) and negative for 4 sulfated (4S) GAGs) (Science, 332:484, 2011; J Cell Sci, 121:3083, 2008).. These include: Dermatan 6-O-sulfate (DS-6S), Heparan 6-O-sulfate (HS-6S), Chondroitin 4-O-sulfate (CS-4S) and Heparin (HEP).
Objetivos:
Thus, it is aimed to analyze the profile of GAGs in neurorregeneration using a chemical injury model that mimics some pathophysiological conditions of neurodegenerative diseases, such as AD, in Styela plicata ascidian.
Métodos:
In the present study, the CNS degeneration of the animal was induced through the systemic injection of 65 mg/kg of 3-acetylpyridine (3-AP), a neurotoxin that promotes chemical injury in neurons with high metabolic activity (Develop neurobio, 75:877, 2015). To do this, after 1 day and 10 days, the CNS was dissected and processed for light microscopy, using staining with Hematoxylin and Eosin, for quantification of total GAGs or PCR. For the analysis of neurorregeneration, we used immunofluorescence assays with anti- β-III-tubulin (TUJ - identification of neurons), anti-synaptophysin (synaptic tree identification), anti-CS-4S, HS-6S, DS-6S and HEP (evaluation of GAG involvement) antibodies.
Resultados e Conclusões:
1 day after application of the neurotoxin, neuronal disorder and the presence of vacuolations in the cortex were observed, in addition to reduction of the markings for TUJ and synaptophysin in relation to the control, and in 10 days, these parameters resembled the control. In the quantification of GAGs, there was an increase in total GAGs in the ganglion 10 days in relation to the ganglion 1 day. In the immunofluorescences, apparently, more intense CS-4S, HS-6S and DS-6S markings were found in the cortex of the control animals, and there was an apparent increase in that area in the ganglion 1 day, whereas for HEP there was a decrease in the marking compared to the control. Within 10 days, all parameters resembled the control marking. In the PCR, increased expression of enzymes that sulfate GAGs at carbon 6 (positive modulation of synapses and neurite), during the process of neurorregeneration, was observed.Therefore, we observed a correlation of the studied molecules with the neurorregeneration process in Styela plicata, in which the DS-6S, HS-6S and HEP GAGs contribute to synaptogenesis and neuritogenesis, counterbalancing the inhibitory effect of CS-4S.
Palavras-chaves: Glycosaminoglycans, Neurorregeneration, Ascidian
Agência Fomento:

16.051 - O PAPEL DA CAFEÍNA NO SISTEMA ANTIOXIDANTE EM MODELO DE PARKINSON (SH-SY5Y) APÓS INJÚRIA PELO PARAQUAT

THE ROLE OF CAFFEINE IN THE ANTIOXIDANT SYSTEM IN PARKINSON'S DISEASE MODEL (SHSY5Y) AFTER INJURY BY PARAQUAT
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Paraquat is an herbicide marketed widely in agriculture and in various products worldwide. It acts promoting the formation of reactive oxygen species (ROS) and nitrogen, causing mitochondrial complex I inhibition, resulting in cell death. Previous studies have reported, according to the characteristics cited, a correlation to the pesticide Paraquat exposure with Parkinson 's disease. Various models are described in the literature for the induction of PD both in-vivo as in-vitro. The PD is caused by the degeneration in the dopaminergic neurons in the substantia nigra with various clinical symptoms. Due to the lack of effective treatments that reduce the progression of PD, the search for new drugs is necessary and research about neuroprotective molecules is of paramount importance. Various substances with possible neuroprotective role are being studied. One of them is the caffeine and its metabolites. Caffeine, present in various products, is the subject of studies for having preventive potential antioxidant effects on PD using meta- analysis research. Works in literature have been showing dubious actions of caffeine in relation to their beneficial effects. One of the negative effects of change was the alteration of brain development in

mouses at embryonic period. Probably its antioxidant effect contributes to the reduction of free radicals present in the degeneration of dopaminergic neurons and neuroinflammation, patho-physiological characteristics of PD.
Objetivos:
In this way, we analyze the antioxidant role of caffeine in human neuroblastoma lineage (SHSY5Y) after damage induced by Paraquat
Métodos:
Methods For this, we incubated the cells with different concentrations of caffeine (6 µM, 12 µM, 25 µM, 50 µM and 100 µM µ) and different concentrations of Paraquat (0,3 mM,0,12 mM, 0,25mM and 0,50mM), after the determination of IC 50 for cell viability tests (MTT). Incubation with caffeine showed increased cell viability at a concentration of 6 µM, and the IC 50 of the cells exposed to paraquat was 3 mM. Incubation in conjunction of Paraquat (3 mM) and caffeine (6 µM) showed its possible neuroprotective role in the cell lineage used.
Resultados e Conclusões:
The tests of activities of antioxidant enzymes have shown an increase of SOD (superoxide dismutase) and Catalase comparing the treated cells only with Paraquat. It has been found also in contract analysis of phase increased formation of cellular extensions. The present study intends to perform other tests and related methodologies for understanding the effectiveness of caffeine molecule in neurodegeneratives and inflammatory processes.
Palavras-chaves: SH-SY5Y, Cafeína, Parkinson, Antioxidante, Paraquat
Agência Fomento: CNPq

16.052 - CONTRIBUIÇÃO DA ENZIMA GSK-3β EM MODELOS DE 6-OHDA NA DOENÇA DE PARKINSON

CONTRIBUTION OF GSK-3β ENZYM IN 6-OHDA MODELS IN PARKINSON'S DISEASE
Autores: Ana Flavia Tostes da Silva 1, Luiz Roberto Giorgetti de Britto 1,1
Instituição: 1 USP - Universidade de São Paulo (Lineu Prestes, 1524)Introdução:
A doença de Parkinson (DP) é uma afecção neurodegenerativa crônica e progressiva. O principal achado desse distúrbio é a morte dos neurônios dopaminérgicos na substância negra e no estriado, ocasionando os sintomas característicos da doença como; bradicinesia, rigidez, tremor de descanso e instabilidade postural. Dados na literatura mencionam que durante apoptose de neurônios dopaminérgicos, há uma correlação com a expressão da GSK3 β, uma enzima envolvida em inúmeras vias de sinalização celular.
Objetivos:
Apontar o aumento da expressão proteica da GSK-3 βem sua forma ativa no modelo de DP induzido por 6-OHDA, investigando os mecanismos de sobrevivência e morte neuronal; Avaliar o potencial do lítio como inibidor da enzima GSK-3 β nos mecanismos envolvidos na proteção dos neurônios dopaminérgicos das regiões estriatais e da substância negra.
Métodos:
Para indução do modelo de DP,foi administração 6-OHDA intracerebral na concentração de 2 µg/µl, dissolvida em solução NaCl 0,9%, contendo ácido ascórbico 0,2%. A injeção da droga intraestriatal foi em dois pontos distintos nas seguintes coordenadas: Ponto 1: A (anterior): +1.0 mm; ML (médio-lateral): 2,0 mm em relação ao bregma e DV (dorso-ventral): 2,9 mm em relação a dura-máter. Ponto 2: P (posterior): - 0,3 mm; ML: 2,3 mm em relação ao bregma e DV: 2,9 mm em relação a dura-máter. O volume total injetado da droga foi de 2 µl.Para o tratamento, os animais foram tratados com cloreto de lítio 0,12% (concentração capaz de inibir a enzima GSK β em modelos de camundongos) veiculados na água de beber por 7 dias.
Resultados e Conclusões:
O uso de um inibidor da GSK3 β como o lítio, relatou a existência de uma contribuição da enzima GSK3 β no aumento da neuroproteção, na região da substância negra em modelos de 6-OHDA em camundongos, sendo uma possível explicação da ação neuroprotetora do lítio e futuramente podendo ser visto como uma terapia direcionada para DP.
Palavras-chaves: Doença de Parkinson, GSK-3β, lítio
Agência Fomento: FAPESP

16.053 - TEORIAS DE ENVELHECIMENTO E A PREVALÊNCIA DA DOENÇA DE ALZHEIMER

THEORIES OF AGING AND THE PREVALENCE OF THE ALZHEIMER'S DISEASE
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Alfenas (Rua Gabriel Monteiro da Silva, 700 - Centro - Alfenas/MG), 3 UNIFAL/MG - Universidade Federal de Alfenas (Rua Gabriel Monteiro da Silva, 700 - Centro - Alfenas/MG), 4 UNIFAL/MG - Universidade Federal de Alfenas (Rua Gabriel Monteiro da Silva, 700 - Centro - Alfenas/MG)Introdução:
The association of AD with aging seems to indicate that the majority of elderly people are subject to a high probability of having it and, considering the prevalence of other dementia, almost all elderly people have the potential to present some type of dementia during the third age based on the reasoning of the theories of aging. With the increasing average life of the population, dementia in general and, particularly, Alzheimer's will be a public health issue or, at least, a social concern.
Objetivos:
The goal of this review is to verify, in light of some aging theories, the prevalence of AD.
Métodos:
For the purpose of this manuscript, were considered the keywords Alzheimer, aging, theories of aging isolate and associate for search the papers for this work. Were chosen the more recent papers and the classic ones, plus some important books for the theme. The research was conducted using PubMed, Medline, Scopus, Elsevier, and Google Scholar.
Resultados e Conclusões:
In view of the analyzed articles, the association between Alzheimer and theories of aging seem inconclusive. According to the general idea, AD is associated with aging in such a way that almost all people will present this disease. It is plausible to consider that the increase in life expectancy will generate a high prevalence of AD. It seems that aging theories explain the origin of AD under superlative and catastrophic considerations and use more biomolecular data than social or behavioral data as the basis of analysis, which may be a problem. References: The Lancet. 344: 769, 1994. Nat Neurosci, 18: 794, 2015.
Palavras-chaves: Aging, Alzheimer' Disease , Theories of Aging
Agência Fomento:

16.055 - PAPEL DO SISTEMA RENINA-ANGIOTENSINA CEREBRAL NA FISIOPATOLOGIA DA DOENÇA DE HUNTINGTON

ROLE OF THE BRAIN RENIN-ANGIOTENSIN SYSTEM IN THE PATHOPHYSIOLOGY OF HUNTINGTON'S DISEASE

Autores: Kivia Santos 1, Thatiane Machado 1, Priscila Valadão 1, Matheus Magalhães-Gomes 1, Julliane Joviano-Santos 1, Ana Cristina Simões e Silva 1, Aline Miranda 1, Lucas Kangussu 1, Cristina Guatimosim 1
Instituição: 1 UFMG - Universidade Federal de Minas Gerais (Av. Pres. Antônio Carlos, 6627 - Pampulha, Belo Horizonte - MG, 31270-901)Introdução:
The renin-angiotensin system (RAS) is known for its regulation of blood pressure and hydroelectrolyte balance. It is formed by peptides, enzymes and receptors and it has influence on physiological and pathophysiological aspects. The RAS is composed of two main axes. The first includes the angiotensin-converting enzyme (ACE), Angiotensin II (Ang II) and Angiotensin II type I receptor (AT1) and it has been associated with neurodegeneration. The counter-regulatory axis is formed by ACE2, Angiotensin-(1-7) [Ang-(1-7)] and Mas receptor and induces neuroprotective effects. Through the last years, it has been described that RAS has actions that goes beyond cardiovascular and renal system and it is involved in neurodegenerative disorders like Huntington's Disease (HD). The HD is a neurodegenerative, autosomal dominant disorder characterized by cognitive, motor and psychiatric symptoms. Although it has already been demonstrated, there is still much to discover about the role of the brain components of the RAS in HD.
Objetivos:
Thus, the aim of this study was to evaluate the role of brain RAS in transgenic BACHD mouse model for HD at age of 24 months. Experiments were approved by the Ethics Committee on Animal Experiments (CEUA/UFMG; protocol #076/2015).
Métodos:
Initially, we assessed the gene expression of angiotensinergic receptors (AT1 and Mas) in striatum, hippocampus and frontal cortex using the technique of RT-PCR. The levels of enzymes and peptides were also analysed through immunoenzymatic assay (ELISA).
Resultados e Conclusões:
The BACHD animals exhibited an increased expression of AT1 receptor in the three brain regions (Striatum: 4,66±0,61 a.u.; Hippocampus: 3,32±0,39 a.u.; Cortex: 4,42±0,46 a.u.; n=6) when compared to wild type (WT) mice (Striatum: 1,47±0,18 a.u.; Hippocampus: 1,58±0,26 a.u.; Cortex: 1,23±0,07 a.u.; n=5). A lower expression of Mas receptor was observed in the striatum of BACHD mice (0,63±0,08 a.u.; n=6) when compared to WT (1,52±0,09 a.u.; n=5). There was no difference on Mas receptor expression on the

hippocampus and cortex. The levels of ACE2 were decreased in the cortex of BACHD mice (5,53±0,64 pg/mg vs 8,08±1,84 pg/mg; n=5). There was no difference in ACE2 the striatum and hippocampus, as well as in the levels of ACE in all the brain regions. Accordingly, it was observed a reduction of Ang-(1-7) in the striatum and hippocampus on the brain of the BACHD group (Striatum: 289,41±14,22 pg/mg; Hippocampus: 224,59±6,55 pg/mg; n=5) when compared to the WT (Striatum: 325,02±9,64 pg/mg; Hippocampus: 279,14±16,74 pg/mg; n=5). There was no difference on the Ang II levels in the three brain regions. These results suggest an imbalance of the RAS components on the brain of BACHD mice. The mechanisms involved in degeneration in HD are complex and not yet fully understood. Therefore, the characterization of the RAS components could help to understand better the disease and, consequently, contribute to the development of new drugs that aim to enlarge pharmaceutical strategies.

Palavras-chaves: Huntington's Disease, BACHD, Renin-angiotensin system, Angiotensinergic receptors
Agência Fomento:

16.056 - INIBIÇÃO DA ECA ATENUA ALTERAÇÕES COMPORTAMENTAIS E MOTORAS NO MODELO DE CAMUNDONGO BACHD PARA A DOENÇA DE HUNTINGTON

ACE INHIBITION ATTENUATES BEHAVIORAL AND MOTOR ALTERATIONS IN BACHD MOUSE MODEL FOR HUNTINGTON'S DISEASE

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Instituição: 1 UFMG - Universidade Federal de Minas Gerais (Av. Pres. Antônio Carlos, 6627 - Pampulha, Belo Horizonte)Introdução:
Huntington’s disease (HD) is an autosomal dominant, progressive neurodegenerative disorder. Its main symptoms are motor impairments, such as chorea. Alterations in the renin-angiotensin system (RAS) have been associated with the pathophysiology of neurodegenerative disorders, including HD. Also, it has been demonstrated that RAS modulation with ACE inhibitors leads to neuroprotection.
Objetivos:
Thus, the aim of this study was to assess the effects of ACE inhibition on the morphofunctional alterations of the BACHD mice model for HD
Métodos:
BACHD and wild type (WT) mice at 6 months-old were used. All experiments were approved by the Ethics Committee on Animal Experiments (CEUA/UFMG; protocol #076/2015). RT-PCR was used to assess the mRNA level of RAS receptors in the main brain areas affected in HD (WT: n=5, BACHD: n=5). Then, animals were treated with an ACE inhibitor [Lisinopril (Lis)] for 28 days. An osmotic pump with Lis at a concentration of 5 mg/Kg/day was implanted subcutaneously in mice of treated groups (WT: n=5, WT Lis: n=5, BACHD: n=3, BACHD Lis: n=3). Behavioral tests were made to assess motor function.
Resultados e Conclusões:
There was an increase in AT1 mRNA level in the striatum (WT: 1.09±0.07, BACHD: 6.39±0.56) and cortex (WT: 1.11±0.13, BACHD: 6±0.28) of BACHD mice. AT2 mRNA levels were increased in the striatum (WT: 1.03±0.09, BACHD: 3.2±0.32), but not in the cortex (WT: 1.27±0.1, BACHD: 1.16±0.05) of BACHD mice. Mas receptor mRNA level was increased in the striatum (WT: 1.35±0.05, BACHD: 3.37±0.32) and cortex (WT: 1.3±0.09, BACHD: 2.11±0.06) of transgenic mice. On the wire hang and rotarod tests, BACHD mice presented decreased latency to fall time. BACHD mice treated with Lis presented an improvement on both tests (Wire rang – WT: 113.6±3.89, WT Lis: 117.4±1.48, BACHD: 34.37±3.57, BACHD Lis: 89±3.74; Rotarod – WT: 25.25±2.03, WT Lis: 47.6±3.32, BACHD: 4.33±0.72, BACHD Lis: 42±7.48). On the open field test, BACHD mice traveled shorter total distance (WT: 20.87±1.41, WT Lis: 20.13±0.56, BACHD: 11.23±0.69, BACHD Lis: 17.34±0.7) and shorter distance in the periphery (WT: 16.37±0.92, WT Lis: 16.74±0.57, BACHD: 8.8±0.67, BACHD Lis: 13.1±0.56) than control animals, although time percentage spent on the periphery was not different (WT: 85.26±1.64, WT Lis: 81.56±1.72, BACHD: 92.15±0.99, BACHD Lis: 89.55±0.73). BACHD mice also travelled shorter distances in the center (WT: 4.5±0.63, WT Lis: 3.36±0.36, BACHD: 2.43±0.21, BACHD Lis: 4.24±0.17), and spent less percentage of time on this region of the box (WT: 14.74±1.64, WT Lis: 18.44±1.72, BACHD: 7.85±0.99, BACHD Lis: 10.45±0.73). Treatment with Lis increased total distance travelled and distance travelled in the periphery and in the center of BACHD mice. However, it did not alter the time percentage spent in the center. In conclusion, 6 month-old BACHD animals presented alterations in the brain RAS and

treatment with Lisinopril, an ACE inhibitor, improved their motor function.
Palavras-chaves: BACHD, Doença de Huntington, Inibidor da ECA, Sistema Renina Angiotena
Agência Fomento: FAPEMIG, CNPq, CAPES

16.057 - A PALMATINA DIMINUI A NEUROINFLAMAÇÃO EM CAMUNDONGOS SUBMETIDOS À ISQUEMIA CEREBRAL FOCAL PERMANENTE.

PALMATINE DECREASES NEUROINFLAMATION IN MICE SUBMITTED TO PERMANENT FOCAL CEREBRAL ISCHEMIA
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Instituição: 1 UFC - Universidade Federal do Ceará (Rua Coronel Nunes de Melo, 1000 - Rodolfo Teófilo, Fortaleza - CE, 60430-275)Introdução:
Stroke is the second cause of death and the first cause of disability worldwide. Oxidative stress and inflammation play an important role in physiopathology of brain ischemia. Palmatine is a natural isoquinoline alkaloid and has been widely used in pharmaceutical field, with known antioxidant and anti-inflammatory activity.
Objetivos:
The aim of this study was to evaluate the palmatine effect against neuronal death and inflammatory response in mice subjected to focal cerebral ischemia induced by permanent middle cerebral artery occlusion (pMCAO).
Métodos:
Male Swiss mice, weighting 30-35g, were submitted to pMCAO and treated with palmatine (2mg/kg, p.o.). Palmatine treatment was initiated 2 h after pMCAO induction and daily over a period of 4 days depending of the experimental design. The study was approved by the ethics committee on animal experimentation of the Federal University of Ceará (protocol number 109/2015).
Resultados e Conclusões:
Palmatine diminished significantly ischemic area (pMCAO: 11,86 ± 1,455%; pMCAO+PAL 2: 4,429± 0,5714%, $p < 0.05$); and enhanced neurological performance in mice (scores - SO: 18 (17-18); pMCAO: 13 (8-15); pMCAO+PAL2: 17 (15-18);) $p < 0.05$. Neuroinflammation was assessed through the measurement of the immunohistochemistry for Iba-1, GFAP, iNOS, and COX-2. Palmatine decreased the immunoreactivity of all these markers in the cortex (Iba-1 (fluorescence intensity) - SO: 9.98±1.69; pMCAO: 21.57±2.81; pMCAO+PAL2: 13.57±0.58); GFAP (fluorescence intensity)- (SO: 4.48±0.69; pMCAO: 29.72±5.74; pMCAO+PAL2: 13.18±1.98); - iNOS (positive cell) - SO: 1.00±0.40; pMCAO: 62±11.31; pMCAO+PAL2: 27±8.91); COX-2 (positive cells)- SO: 16.25±2.32; pMCAO: 50±5.55; pMCAO+PAL2: 38.25±2.59) $p < 0.05$). Our results suggest that palmatine has a remarkable neuroprotective effect probably by its neuroinflammatory activity, providing experimental evidence regarding the possible palmatine use as an adjuvant treatment to stroke.
Palavras-chaves: Cerebral ischemia, palmatine, neuroinflamation, neuroprotection
Agência Fomento: CNPq, CAPES, FUNCAP

16.058 - BLOCKING IGF-1 RECEPTORS IN THE OLFACTORY BULB MAY IMPROVE PARKINSON'S DISEASE OLFACTORY IMPAIRMENT.

BLOCKING IGF-1 RECEPTORS IN THE OLFACTORY BULB MAY IMPROVE PARKINSON'S DISEASE OLFACTORY IMPAIRMENT.
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Instituição: 1 UFPR - Universidade Federal do Paraná (Centro Politécnico, Jardim das Americas, Curitiba, Paraná,)Introdução:
Parkinson's disease (PD) motor disturbances reflect a massive degeneration of substantia nigra pars compacta (SNpc) dopaminergic neurons and nigrostriatal dopamine depletion. However, decades earlier, 90% of patients have olfactory disorders, among other non-motor disorders. In a PD situation, an increased dopamine release by the olfactory bulb (OB) interneurons as a response to the loss of dopaminergic neurons in SNpc could lead to a deficit in odor discrimination, reported by patients. However, adult cell proliferation in the subventricular zone (ZSV), which gives rise to dopaminergic interneurons in the OB, is regulated by several factors that may also modulate olfactory function. Among these factors, IGF-1 receptors, which modulate IGF-1 signaling, could be involved in olfaction control, supported by a study that performed the knocking down of IGF-1 receptors in

ZSV, and had observed an olfactory improvement related to advanced age, capable of decreasing olfactory acuity by itself. Analysis of these receptors blockage in a PD animal model associated with olfactory impairment becomes important to evaluate possible mechanisms involved in olfactory regulation.
Objetivos:
This study aimed to investigate the role of IGF-1 receptors in the rotenone PD animal model with olfactory disturbance.
Métodos:
The experiments were conducted in accordance with the guide-lines of Brazilian Guide for Care and Use of Laboratory Animals (COBEA) and approved by the Institutional Ethics Committee (approval ID #1232). Male Wistar rats (N = 8-10 / group) underwent stereotactic surgery for rotenone intranigral injury and cannula implantation in the OBs. Seven days after surgery, the animals received 1 µl bilateral micro-infusions of IGF-1 receptor antagonist (BMS-754807) in OBs (2nM, 20nM or 300nM / µl) or dimethylsulfoxide vehicle (DMSO), and 1 hour later the olfactory discrimination task (ODT) was performed.
Resultados e Conclusões:
The rotenone lesion group with DMSO microinfusion in the OB showed impairment in ODT compared to the sham DMSO group. Regarding the groups that had intranigral lesion and received BMS-758407 OB microinfusion at the three different doses, only the 20nM dose group was able to discriminate between the familiar and non-familiar odor compartments (***p ≤0.001) at the ODT, without olfactory disturbance characteristic of the PD animal model used. Thus, it can be concluded that IGF-1 receptor blockade may be related to olfactory disorder improvement in the PD animal model. Future studies are needed to investigate the mechanisms underlying the behavioral change observed.
Palavras-chaves: IGF-1 receptors, olfactory bulb, olfactory disturbance, Parkinson's disease, rotenone
Agência Fomento: CAPES; CNPq.

16.059 - EXTRAVASAMENTO DE AZUL DE EVANS COMO UM INDICADOR DE AUMENTO DA PERMEABILIDADE DA BARREIRA HEMATOENCEFÁLICA EM UM MODELO DE CAMUNDONGO ADULTO DE DOENÇA DE PARKINSON

EVANS BLUE LEAKAGE AS AN INDICATOR OF INCREASED BLOOD–BRAIN BARRIER PERMEABILITY IN AN ADULT MOUSE MODEL OF PARKINSON'S DISEASE
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Instituição: 1 FORP-USP - Dentistry School, University of São Paulo (Av do Café S/N, Campus da USP, Ribeirão Preto-SP, CEP 14040-904)Introdução:
Parkinson's disease (PD) is an age-related neurodegenerative disease which is accompanied by the death of dopaminergic neurons and neuroinflammation, whose cause not yet been elucidated. In this context, a BBB dysfunction could be contributing to the onset or even amplifying the ongoing disease. Evans blue (EB) dye, an inert tracer, is the most commonly used tracer to evaluate the BBB integrity in several diseases, which its leakage from cerebral vessels to the brain parenchyma is indicative of vascular leakage and BBB dysfunction. EB dye binds to plasma albumin. Therefore, its extravasation is an evidence of increased BBB permeability to large molecules, such as proteins.
Objetivos:
This study aims to evaluate the integrity of the blood-brain barrier (BBB) in parkinsonism.
Métodos:
The amounts of accumulated stain in brains following injection in the jugular vein of a 2.5% solution of EB (4ml/kg of body weight) at 45 min of circulation time were evaluated in parkinsonism (unilaterally 6-OHDA-lesioned mice) and levodopa-induced dyskinesia (LID) (L-DOPA, 25mg/kg i.p.; benserazide hydrazide hydrochloride, 10 mg/kg i.p.) in C57/BL6 adult mice (6 months of age; n= eight animals per group). Intravenous injection of EB in sham-operated and in saline-treated mice was also done. Afterwards, mice were killed and the brain was removed. Right and left striatum were put in formamide during 48h for dye extraction at room temperature. EB stain was measured by spectrophotometer and quantified according to a standard curve. All values obtained were corrected by background subtraction of naïve mice. This study was approved by the institutional Ethics and Animal Welfare Committee (CEEA - Comissão de Ética e Experimentação Animal, FORP-USP, process 2018.1.27.58.7.
Resultados e Conclusões:
EB dye concentration has been detected in the lesioned striatum from all animals, except in sham or saline-treated animals. There was no statistical difference in parkinsonian animals (13.86 ± 8.67 ng EB / mg of tissue) and mice with LID (9.88 ± 2.98 ng EB / mg

of tissue). These results show that BBB dysfunction occurs independently of L-DOPA treatment in parkinsonian mice. Collectively, these data provide strong evidence of BBB breakdown in PD, which would enable the entrance of large molecules within the brain, exacerbating neuroinflammation.
Palavras-chaves: capillary permeability, central nervous system, Parkinsonian disorders
Agência Fomento: FAPESP 2018/00461-1

16.060 - EFEITOS DA CALCINEURINA EM MODELOS DE EXCITOTOXICIDADE INDUZIDO POR MICROINJEÇÕES INTRA-HIPOCAMPAL DE NMDA.

EFFECTS OF CALCINEURIN INHIBITION IN AN EXCITOTOXICITY MODEL INDUCED BY NMDA INTRAHIPPOCAMPAL MICROINJECTIONS.
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Instituição: 1 UFMG - Universidade Federal de Minas Gerais (Av. Pres. Antônio Carlos, 6627 - Pampulha, Belo Horizonte - MG, 31270-901)Introdução:
Neurodegenerative (ND) disorders represent an important public health issue around the world. One component of the ND diseases is the excitotoxicity, a pathological condition in which there is neuron damage, primarily induced by the entry of high levels of calcium ions into cell, caused by the overactivation of receptors for the excitatory neurotransmitter glutamate, such as the NMDA receptor. In the context of calcium modulation, calcineurin (CN) - a Ca2 +/calmodulin-dependent serine/threonine phosphatase protein that is expressed in almost all cell types, including brain tissue -, can be an important target to better understand process involved in excitotoxicity. When CN is activated, this dephosphorylates the nuclear factor of activated T cells (NFAT), leading to its translocation to the nucleus. NFAT acts in cooperative with other factors and is involved in the transcription of several genes and cytokines.
Objetivos:
The aim of the present study was to evaluate the effect of CN inhibition on NMDA-induced excitotoxicity on the hippocampus and its impact on memory impairment induced by NMDA toxicity.
Métodos:
We used C57Bl/6 and NFAT -/- animals, the NMDA-induced excitotoxicity model by injecting 40 pmol of NMDA (in 500 µL of volume) in the hippocampus by the insertion of a guide cannula on the following coordinates: AP: -1.9; ML: -1.5; and DV: +1.8. Eighty minutes before NMDA injection, we administrated 2.5, 5 or 10 mg/kg of FK506 (tacrolimus) or vehicle by the intraperitoneal route. To evaluate the impact of FK506 pretreatment on NMDA-induced memory impairment, the object recognition task (OR) was applied 24h after NMDA injection. In addition, we evaluated the number and presence of seizures, as well as the mortality. Finally, we investigated the neurodegeneration by FluoroJade C staining (FJC).
Resultados e Conclusões:
Our results showed that NMDA (40 pmol) injection (NMDA+vehicle group) induced deficit in the OR, seizures in 30% of animals and 30% of death, in addition to the neurodegeneration evidenced by FJC. Pretreatment with 5 mg/kg of FK506 (NMDA+5mg/kg group) retrieved memory impairment in the OR and abolished the number of deaths, despite the maintenance of 30% of seizure and neurodegeneration intensity, as compared to NMDA+vehicle group. On the other direction, 2.5 and 10 mg/kg FK506 pretreatment increased the number of seizures and deaths induced by NMDA injection. Pretreatment with 10 mg/kg of FK506 also increased the neurodegeneration as compared to NMDA+vehicle and NMDA+5mg/kg groups. Conclusion: The results demonstrate the important role of CN in neurotoxic processes observed in ND diseases. We have demonstrated that CN inhibitors are able to prevent cognitive impairment induced by excitotoxic damage, although further clarification about their cellular and molecular bases is still necessary. Thus, this molecule is evidenced as a potential target for a better understanding of such processes, such that involved in Alzheimer's disease.
Palavras-chaves: Calcineurina, Alzheimer, Excitotoxicidade, NMDA
Agência Fomento: CAPES

16.061 - PAPEL DA KLOTHO NA RECAPTAÇÃO DE GLUTAMATO EM CULTURA PRIMÁRIA DE ASTRÓCITOS

THE ROLE OF KLOTHO IN THE UPTAKE OF GLUTAMATE IN ASTROCYTIC PRIMARY CULTURE
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Instituição: 1 ICB/USP - Institute of Biomedical Sciences -University of Sao Paulo (Av. Prof. Lineu Prestes , nº 1524 – Butantã – São Paulo/SP – CEP 05508-000), 2 NIH - National Institutes of Health (9000 Rockville Pike Bethesda, Maryland 20892), 3 Rutgers - The State University of New Jersey-Rutgers (57 US Highway 1 New Brunswick, NJ 08901-8554)Introdução:
Aging is a complex and multifactorial process, associated with molecular, cellular and behavioral alterations. Oxidative stress, neuroinflammation and excitotoxicity are characteristics common to various neuropathological processes of aging as in Parkinson's disease, amyotrophic lateral sclerosis, multiple sclerosis and Alzheimer's disease. The neuronal damage by excitotoxicity occurs, mainly, at the expense of astrocytic deficiencies in glutamate uptake of extracellular excitatory neurotransmitter important for several actions in the Central Nervous System (CNS). The α-Klotho protein is correlated to an increase in life expectancy for its differents physiological actions and your decreased along the aging is increasingly related to such neurodegeneratives processes. Evidence shows that the Klotho protein are able to modulate the Na+/K+ATPase on the cell surface, important for maintaining the electrochemical gradient necessary for the operation of receptors of glutamate (EAATs), in cell types such as astrocytes and neurons. In addition, the Klotho is possibly able to modulate the inwardly-rectifying potassium channels in astrocytes required for neuronal repolarization, facilitating the excitatory neurotransmitter reuptake and able to control lactate production by astrocytes, essential nutrient to neurons.
Objetivos:
Considering the various possibilities of operation of Klotho in neurons and astrocytes and the importance of glutamate uptake to prevent excitotoxicity and the consequent death of neurons, the central objective of this study is to verify the effect of that protein in the process of glutamate uptake in primary culture of astrocytes.
Métodos:
To evaluate a possible modulation of activity of EAATs in astrocytes , cultured astrocytes cells were used with neonatal rats cortex. The functional evaluation of the uptake of glutamate was made by radioactive method using [3 H]- L-glutamate, in order to define the full profile and the ideal uptake (10, 15, 30, 45 and 60 minutes). Primary culture of astrocytes were treated for 24h with recombinant protein Klotho (R & D Systems) to a final concentration of 1 nM, according to preliminary data from the lab, and Western Blot was performed to evaluate the EAAT1 and EAAT2 of astrocytes.
Resultados e Conclusões:
Concerning the standardization of glutamate uptake, it was possible to observe the largest incorporation of glutamate marked over time, and a possible plateau between 45 and 60 minutes of uptake(F=19.2, DFn=5 ,DFd=10, P value < 0,0001, n = 2). For the next tests, temporal points on the curve will be added to plot the full profile of the glutamate uptake until saturation points and the treatment reach at the ideal time of glutamate uptake.
Palavras-chaves: Klotho, Astrocytic, Glutamate, uptake, primary culture
Agência Fomento: FAPESP, CNPq

16.062 - MODELO ANIMAL DA DOENÇA DE PARKINSON E DISTÚRBIO OCULOMOTOR

ANIMAL MODEL OF PARKINSON'S DISEASE AND OCULOMOTOR DISORDER

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Instituição: 1 UFPR - Universidade Federal Do Paraná (Av. Cel. Francisco H. dos Santos, 100 - Jardim das Américas, Curitiba - PR, 8153)Introdução:
Several brain nuclei are related to Parkinson's disease (PD), causing the classically known symptoms, such as tremor at rest, gait changes, memory impairment and sleep-related disorders. One of the nuclei recently related to PD is the oculomotor nucleus (CMO), responsible for saccadic eye movements, a characteristic associated with REM sleep. It has recently been shown that REM sleep deprivation (REMSD) promotes an exacerbated activation of the CMO cholinergic neurons.
Objetivos:
Considering the above and the role of sleep in memory consolidation, the aim of this study was to investigate the possible relationship between CMO and SNpc (Substance negra pars compacta) on cognition in an animal model of PD.
Métodos:
The animals (male Wistar 290 - 330g rats) had free food and water under the condition of (22 ± 2ºC), approved by the UFPR CEP / SD under No. 999. The animals underwent stereotactic surgery and received bilateral infusion into SNpc [rotenone (12 µg / µl) or

DMSO (vehicle)] and / or OCM [NMDA (17.6 µg / µl) or saline (vehicle)]. After six days, the animals underwent the object recognition test.
Resultados e Conclusões:
Memory impairment was observed in animals treated with rotenone. However, the NMDA-treated group showed no memory impairment (P ≤0.058), demonstrating that the memory impairment observed in the NMDA + Rotenone group was due to treatment with rotenone neurotoxin. These preliminary results indicate that neurodegeneration in SNpc affects the declarative memory of animals and that CMO apparently is not involved in memory consolidation circuitry in animals. But other methodologies are aimed at corroborating this hypothesis.
Palavras-chaves: parkinson , neurodegeneração, oculomotor
Agência Fomento: Esse trabalho tem o apoio financeiro da Capes e do CNPq.

16.063 - EFEITOS DOS GLICOCORTICOIDES NA ATIVAÇÃO GLIAL INDUZIDA POR CITOCINAS PRÓ-INFLAMATÓRIAS EM CÉLULAS PRIMÁRIAS HIPOCAMPAIS DE CAMUNDONGOS

GLUCORTICOID EFFECTS ON GLIA ACTIVATION INDUCED BY PRO-INFLAMMATORY CYTOKINES IN MICE HIPPOCAMPAL PRIMARY CELLS
Autores: Regiane Carvalho Paes 1, Nilton Barreto dos Santos 1,1, Carolina Demarchi Munhoz 1,1,1
Instituição: 1 USP - Universidade de São Paulo (Avenida Professor Lineu Prestes, 1524)Introdução:
Central nervous system (CNS) inflammation is related to the development of neurological and demyelinating diseases and pro- and anti-inflammatory mechanisms may induce the immune response in this system. The glial release of crucial cytokines, such as IFN- γ and TNF- α, also produced by activated Th1 and Th17 lymphocytes, in addition to the activation of the NLRP3 inflammasome, may contribute to the progress of neurodegenerative diseases.,. The inflammasome complex is responsible for regulating caspase-1 activation, with consequent cleavage and release of pro-inflammatory cytokines IL-1 β and IL-18. Glucocorticoids (GCs), the anti-inflammatory drug used in clinical practice worldwide, are effective in modulating inflammation in inflammatory and autoimmune diseases. However, some evidence shows that these hormones also increase the production of proinflammatory mediators, especially in regions of the CNS, such as the frontal cortex and the hippocampus.
Objetivos:
This study aims to evaluate the effects of GCs on glial cell activation induced by proinflammatory cytokines, as well as to verify the intracellular signaling pathways involved in their harmful effects on neuronal cells.
Métodos:
We used primary hippocampal cell culture of C57BL / 6 neonatal mice (protocol number 003/2013 ICB/USP) stimulated with IL-17 and IFN- γ cytokines and simultaneously treated with dexamethasone, a synthetic glucocorticoid.
Resultados e Conclusões:
We observed that IL-17 or DEX treatment decreased the viability of hippocampal cells in culture($F(5,18) = 5498$; $p < 0.01$; , $F(5,11) = 4,230$; $p < 0.05$, respectively - one-way ANOVA, Dunnet post-hoc test) but had no effects in primary cortical cells. Our initial results suggest that hippocampal cells are more susceptible to the endangering effects of dexamethasone when compared to the frontal cortex cells. These data, added to the current literature, allow us to predict that increased release of pro-inflammatory factors may be related to the use of high-dose dexamethasone in the treatment of some CNS diseases.
Palavras-chaves: Neuroinflammation, Neurodegeneration, Dexamethasone, Microglia, Interleukin-17
Agência Fomento: CAPES

16.064 - AVALIAÇÃO DO POTENCIAL NEUROPROTETOR DE EXTRATO AQUOSO DE Swietenia macroplhylla (MOGNO) EM MODELO MURINO DA DOENÇA DE PARKINSON

EVALUATION OF NEUROPROTECTIVE POTENTIAL OF Swietenia macrophylla (MAHOGANY) AQUEOUS EXTRACT IN MURINE MODEL OF PARKINSON'S DISEASE
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Instituição: 1 UFPA/HUJBB/LANEX - Universidade Federal do Pará - HUJBB - LANEX (Rua dos Mundurucus, Nº 4487, Bairro: Guamá. CEP: 66073-000), 2 UFPA/LABCROL - Universidade Federal do Pará - LABCROL (Rua Augusto Correa, Nº 01, Bairro: Guamá. CEP:66075-110)Introdução:

Parkinson's disease (PD) affects 2% of the population with 65 years of age. The hallmarks of the disease is the motor symptoms: resting tremor, muscular rigidity, bradykinesia and postural instability. These motor complications are associated to the substantia nigra pars compacta (SNpc) neurodegeneration. The etiology remains unknown, but oxidative stress and neuroinflammation are mechanisms involved in the neuronal death. Animal models of PD are used to investigate new neuroprotective strategies and the search for new drugs that can be used in the treatment of PD has attempted to interest for products with anti-inflammatory and antioxidant properties from the Amazon biome.
Objetivos:
In this work, we evaluated whether Swietenia macrophylla (Mahogany) aqueous extract has neuroprotective effects under behavior and nigrostriatal pathway neurodegeneration in a murine model of PD.
Métodos:
Forty adult male Swiss mice were used and randomly divided into 4 groups: Vehicle/Vehicle (N = 8), Vehicle/Mahogany (N = 8), 6-OHDA/Vehicle (N = 12) and 6-OHDA/Mahogany (N = 12). All procedures were approved by the Institutional Ethics Committee (CEUA/UFPA 3576180418). Oral mahogany treatment (50 mg/kg/day) was performed for 14 days and survival was 28 days. Open field (OF) test and apomorphine-induced rotation were performed; TH+ neurons were immunostained with tyrosine hydroxylase antibody and were quantified using stereological estimations; the optical density (OD) of TH+ fibers in the striatum was measured. One-Way and Two-Way analysis of variance (ANOVA), followed by appropriate post-hoc were used, values were expressed as mean ± S.E.M. and significance was established when $p < 0.05$.
Resultados e Conclusões:
The 6-OHDA/Mahogany group showed an improvement in motor performance in the OF test (118± 6.12 on 14th day; 120 ± 4.71 on 28th day; $p < 0.05$), the distance travelled was increased compared to the 6-OHDA/Vehicle group (71.5 ± 10.2%, day 14; and 66.38 ± 10.2%, day 28, ANOVA Two Way; $p < 0.05$). The mean contralateral rotations in the apomorphine-induced test to the 6-OHDA/ Mahogany were 66 ± 5.18 (14th day) and 92 ± 6.83 (28th day) being lower than the mean of the 6-OHDA/Vehicle group, 123 ± 2.65 (14th day); and 156±4.42 (28th day). Stereological estimations of TH+ neurons in the SNpc relative to the contralateral intact side were: Vehicle/Vehicle = 92.87%±4.9; Vehicle/Mahogany = 96.94%±4.6; 6-OHDA/Vehicle = 50.8%±4.8; 6-OHDA/Mahogany = 53.7%±5.0. The OD of TH+ fibers in the striatum relative to the contralateral side was: Vehicle/Vehicle = 102.7 1.6; Vehicle/Mahogany = 103.4%±1.5; 6-OHDA/Vehicle = 33.5%± 6.6; 6-OHDA/Mahogany = 28.8% ± 8.1. Although the literature shows neuroprotective effects conferred to mahogany extract in in vitro models, our results show that despite the improvement in motor performance in OF and the reduction of rotations in the apomorphine test in the 6-OHDA / Mahogany group, it was not possible to register phenomena related to neuroprotection in the in vivo model of PD.
Palavras-chaves: Neuroprotection, Parkinson's disease, Swietenia macrophylla
Agência Fomento: CAPES

16.065 - EARLY AND LATE BEHAVIORAL EFFECTS OF SUBACUTE MANGANESE INTOXICATION IN ADULT WISTAR RATS

EARLY AND LATE BEHAVIORAL EFFECTS OF SUBACUTE MANGANESE INTOXICATION IN ADULT WISTAR RATS
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Instituição: 1 UNOESC - Universidade do Oeste de Santa Catarina (Programa de Pós-Graduação em Biociências e Saúde), 2 UNOESC - Universidade do Oeste de Santa Catarina (Graduada em Ciências Biológicas)Introdução:
Manganese (Mn) is an essential element required for several biological systems, however, in excess, it could be neurotoxic leading to a neurochemical change resulting in a parkinsonian-like syndrome, known as Manganism. Symptoms include irritability, aggressiveness and hallucinations, and subsequently, concentration, memory and motor changes.
Objetivos:
This study aimed to investigate the early motor activity and anxiety level in male and female adult Wistar rats exposed to a subacute Mn intoxication model and the late effects, after 45 days of the intoxication model.
Métodos:
For this purpose, male and female rats received 15 mg/kg of Mn, intraperitoneally, 5 days a week, for 4 weeks in order to mimic the subacute intoxication (n=10 for all groups). The control group received sterile saline 0,9% i.p. for the same time. In parallel, an independent male and female group that were

exposed to the subacute intoxication protocol remained 45 days without intoxication (n=7 for each sex group and n=10 to control groups) to test the potential later behavioral effects. The behavioral tests included rotarod for locomotor activity and elevated plus-maze (EPM) for anxiety evaluation. Was performed a GLM for each set of experiments including group and sexes as variables.
Resultados e Conclusões:
In rotarod, the group that were evaluated immediately after subacute intoxication did not shown difference between intoxicated Mn group and control group [F(3,30)=1.4; p=0.2589]. On the other hand, the rats that were exposed to subacute Mn intoxication and remained additional 45 days without these insult, displayed poor performances than control group [F(3,19)=13.41; p < 0.0001] and this result was mainly observed in male rats [p < 0.0001 – group*sex interaction]. Related to EPM, male intoxicated rats decreased their permanence into the open arms [F(3,56)=8,745; p=0,0006] and female intoxicated rats enhance their permanence into open arms [F(3,56)=12,57; p < 0,0001]. However, in the group that were exposed to subacute Mn intoxication and remained additional 45 days without Mn exposition, both sexes remained longer time into the open arms than control group [F(3,56)=3,7; p=0,0125 – male; F(3,56)=1,99; p=0,0413 – female]. These data demonstrate that this model of intoxication causes motor alteration in male after 45 days intoxication ceased, suggesting late injury. The anxiety effects were different between sexes. Male rats presented early anxiogenic effect and late anxiolytic effect. Instead, female presented early and late anxiolytic effect. These differences would be partially explained due to hormonal differences between sexes. Protocolo aprovado pelo CEUA sob o nº 45/2016.
Palavras-chaves: Manganese intoxication, Neurotoxicity, Behavioral effect
Agência Fomento: Unoesc, Capes Edital Nº 11/2014 Pró-Equipamentos.

16.066 - EFEITOS DO ENRIQUECIMENTO AMBIENTAL NA HABILIDADE MOTORA E NO COMPORTAMENTO ANEDÔNICO DO CAMUNDONGO YAC128, MODELO DA DOENÇA DE HUNTINGTON

EFFECTS OF ENVIRONMENTAL ENRICHMENT ON MOTOR ABILITY AND ANHEDONIC BEHAVIOR IN THE YAC128 MOUSE MODEL OF HUNTINGTON'S DISEASE

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Instituição: 1 UFSC - Universidade Federal de Santa Catarina (Campus João David Ferreira Lima, s/n - Trindade, Florianópolis/SC)Introdução:
Huntington's disease (HD) is a genetic neurodegenerative disorder characterized by motor, neuropsychiatric, and cognitive deficits. The striatal neurons are the most-affected neuronal population in HD. However, other brain regions are also affected and are related to non-motor symptoms of HD. The YAC128 transgenic mouse is a good model of HD to search for strategies that modify the disease progress because these mice exhibit neuropathological and behavioral phenotypes that mimic human HD symptoms. Environmental enrichment (EE) is a condition where the animals are exposed to high stimulation compared to standard housing conditions (control environment, CE) and can promote neuroplasticity in various brain regions.
Objetivos:
To evaluate the effects of EE exposition for 39 days (from postnatal day 21 to postnatal day 60) on motor deficits and depressive-like behavior in the YAC128 mice.
Métodos:
Male and female wild-type (WT) and YAC128 mice (n=10-14) were exposed to CE or EE for 39 days. EE was composed by cardboard rolls, twine, wire, tunnels, house, hammocks made from surgical face masks, cotton for nesting and lego pieces. The objects were changed twice weekly. At the end of this period, the motor function was assessed by the rotarod test. The latency to the first fall and the number of falls during each 5min session were recorded. Anhedonic behavior was evaluated by the splash test, which consists of squirting a sucrose solution (10%) on the dorsal coat of a mouse. The time spent grooming was recorded for 5 minutes. All animal procedures were approved by the Committee on Ethics of Animal Experimentation of the Federal University of Santa Catarina (Florianópolis, Brazil; protocol number: 4502210318). All data were analyzed using two-way ANOVA for genotype and environment, followed by the Duncan post hoc test. Results were expressed as mean ±standard error of the mean (SEM). A p value of ≤0.05 was considered to be statistically significant.
Resultados e Conclusões:
We observed a significant main effect of genotype in the rotarod test. Two-month-old YAC128 mice housed in the CE presented a significant decrease (p < 0.05) in

the latency to fall (2.33±0.27) as compared with WT mice (3.30±0.27) and an increase ($p < 0.05$) in the number of falls (6.33±1.16) as compared with WT mice (3.73±0.92). The EE was able to increase the latency for the first fall ($p < 0.001$) and decrease the number of falls ($p < 0.01$) in YAC128 mice. In the splash test no genotype differences were observed in the time spent grooming. However, a significant main effect of environment was observed, the EE was able to increase the time spent grooming in the YAC128 mice (37.12±9.47) as compared with YAC128 mice in CE (6.48±2.45) ($p < 0.01$). Our results confirmed the motor deficits in YAC128 mice and indicated that exposure to an EE could reverse these motor deficits. Furthermore, EE was able to increase the time spent grooming in the splash test, showing an increase of motivational behavior.

Palavras-chaves: Environmental enrichment, Huntington's disease, YAC128 mouse
Agência Fomento: CAPES

16.067 - EFEITOS DA 6-HIDROXIDOPAMINA EM CÉLULAS NEURAIS DO CARANGUEJO UCIDES CORDATUS

EFFECTS OF 6-HIDROXIDOPAMINE ON NEURAL CELLS IN THE CRAB UCIDES CORDATUS

Autores: Carlos Augusto Borges de Andrade Gomes 1, Inês Júlia Ribas Wajsenzon 1, Rafaela Rocha dos Santos 2, Wagner Antônio Barbosa da Silva 1, Louise Caroline Vitorino 1, Clynton Lourenço Corrêa 1, Silvana Allodi 1
Instituição: 2 PUC - Pontifícia Universidade Católica (Rua Marquês de São Vicente, 225), 3 UFRJ - Universidade Federal do Rio de Janeiro (Avenida Carlos Chagas Filho, 373)Introdução:

Invertebrates have been used to study neurodegeneration due to easy manipulation and maintenance, low cost, short life cycle and well described central nervous systems (CNS). Specifically, crustaceans have low rate mutations, and because crabs dwell in mangroves with high concentration of metals, neuronal degeneration deserves study in this animal model.

Objetivos:

To evaluate the effects of the neurotoxin 6-hydroxydopamine (6-OHDA) on cell cultures of neurons and glial cells from cerebral ganglia in the crab Ucides cordatus.

Métodos:

This work was approved by IBAMA, (#14689-1/IBAMA/2008, Allowed use of animal #2440408). We conducted immunohistochemistry (4 crabs) and Western blotting (60 crabs) to verify the content and localization of tyrosine hydroxylase (TH) and alpha-synuclein in the CNS. Next, we analyzed in cell cultures (180 crabs) neuron (NeuN) and glial (GFAP, CNPase and IB4) markers, in addition to TH and alpha-synuclein in control and experimental groups (1, 3 or 5 days of exposure to 6-OHDA), with immunocitochemistry. The in vitro experiments were analyzed by Student's T Test to compare experimental conditions with time-matched control groups, and One Way Anova, to analyze between experimental conditions.

Resultados e Conclusões:

Ex vivo results showed TH- and alpha-synuclein-positive cells in CNS regions associated with sensorial processing, motor control, memory and neurogenesis. The in vitro study showed, in all experimental conditions, that there were less TH-positive ($p < 0,001$ and $p < 0,05$), oligodendrocytes-like cells ($p < 0,001$ and $p < 0,001$) , and mature neurons ($p < 0,001$ and $p < 0,001$) than the time-matched control groups. We also observed more astrocyte-like ($p < 0,001$ and $p < 0,001$), microglial-like ($p < 0,001$ and $p < 0,001$) and alpha-synuclein-positive cells ($p < 0,001$ and $p < 0,05$) than the time-matched control groups. These results showed TH and alpha-synuclein in the crustacean CNS, and that 6-OHDA affects cells similarly to vertebrates. Therefore, Ucides cordatus is appropriate to study neurodegeneration, focusing on cellular physiology and evolution.

Palavras-chaves: cerebral ganglia, culture cell, crustacean, neurodegeneration, 6-hidroxydopamine
Agência Fomento: Conselho Nacional de Desenvolvimento Científico e Tecnológico (CNPQ)

16.068 - EXERCÍCIO FÍSICO EM MODELO ANIMAL DA DOENÇA DE PARKINSON BILATERAL: ANÁLISE DE DESFECHOS MOTORES

PHYSICAL EXERCISE IN AN ANIMAL MODEL OF BILATERAL PARKINSON'S DISEASE: MOTOR OUTCOME ANALYSIS

Autores: Lucas do Amaral Martins 2, Karla Ferreira Oliveira 2, Louise Caroline Vitorino 2, Wagner Antonio Barbosa da Silva 2, Luciana Ferreira Romão 2, Silvana Allodi 2, Clynton Lourenço Corrêa 2

Instituição: 2 UFRJ - Universidade Federal Do Rio de Janeiro (Av. Carlos Chagas Filho, 373, Rio de Janeiro)Introdução:
The physical exercise has long been studied in animal model of Parkinson's disease (PD). As important as the neurobiological outcomes, it is also necessary to study the motor behavior in animal model of PD.
Objetivos:
To evaluate the influence of a physical exercise protocol on motor behavior in an animal model of PD.
Métodos:
24 Swiss mice were used, and they were divided into 4 groups, with 8 animals per group: Sedentary Control (SEDCONT), Exercise Control (EXERCONT), Sedentary Parkinson's disease (SEDPD) and Exercise Parkinson's disease (EXERPD). The animals from the EXERCONT and EXERPD groups were submitted to 4 weeks of training in a treadmill, 2x/week, 9m/min, 50min/day, without electrical stimulus. The tests to evaluate motor outcomes were the open field test, pole test and footprint in pre-training (EV1) and post-training (EV2). 30 days after surgery, all the animals were submitted to the motor outcome analysis, and the animals from the EXERCONT and EXERPD groups were submitted to the exercise protocol. The animals were induced to Parkinsonism by bilateral injection of 5 µg of 6OHDA in 2 µL of saline solution 0.9% into the striatum, in each hemisphere, and the control groups were injected with saline solution 0.9%. This study has been approved by CEUA under registration 008/2016. Statistical analyses were performed using two-way ANOVA and Bonferroni post-hoc test.
Resultados e Conclusões:
After physical training there was a significant improvement in the open field test (EXERCONT EV1 vs EV2 $p < 0.05$ and EXERPD EV1 vs EV2 $p < 0.05$) and the width of the stride of forepaws of the foot print test (EXERCONT EV1 vs EV2 $p < 0.05$). In addition, there was worsening in the animals of the SEDPD group in the front paws (EV1 vs EV2 $p < 0.05$) and hind paws (EV1 vs EV2 $p < 0.05$), which was minimized by exercise in the EXERPD group in the front paws (EV1 vs EV2 $p < 0.05$) and hind paws (EV1 vs EV2 $p < 0.05$). The turn time analysis of the pole test showed a significant difference ($p < 0.001$) between the Control groups and the PD groups, in which the PD groups needed more time to get off the pole than the Control groups. Our results showed that the physical exercise was able to reduce the motor impairments of animals induced to Parkinsonism.

Palavras-chaves: Animal Model, Physical Exercise, Parkinson's Disease
Agência Fomento:

17. Distúrbios Neurológicos

17.032 - EFEITO DAS REDES EXTRACELULARES DE NEUTRÓFILOS (NET) NO SISTEMA NERVOSO PERIFÉRICO: IMPORTÂNCIA PARA O SÍNDROME DE GUILLAIN-BARRÉ

EFFECT OF NEUTROPHIL EXTRACELLULAR TRAPS (NETS) ON THE PERIPHERAL NERVOUS SYSTEM: IMPORTANCE FOR GUILLAIN-BARRÉ SYDROME

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Instituição: 1 IBqM-UFRJ - Instituto de Bioquímica Médica Leopoldo de Meis (Avenida Carlos Chagas Filho, 373-, Ilha do Fundão-Rio de Janeiro-RJ), 2 IMPG-UFRJ - Instituto de Microbiologia Paulo de Góes (Avenida Carlos Chagas Filho, 373-, Ilha do Fundão-Rio de Janeiro-RJ), 3 Fiocruz - Fundação Oswaldo Cruz (Avenida Brasil, 4365 Rio de Janeiro-RJ)Introdução:
Peripheral nervous system (PNS) is succeptible to infectious agents that can provoke demyelination (Rambukkana et al., 2004). Zika virus (ZIKV) is an arbovirus belonging to the genus Flavivirus. ZIKV causes damage to the central nervous system such as microcephaly. To the SNP may cause an autoimmune disease, Guilain-Barré syndrome (GBS), characterized by autoantibodies production that attack myelin sheath proteins inducing demyelination and, consequently, motor and sensory déficits. Neutrophils (NOs) are the first defense cells recruited to sites of infection. A novel NOs mechanism response to pathogens consists in releasing into the extracellular medium a histone-associated DNA-forming fibers network containing antimicrobial and antiviral proteins, called Neutrophil Extracellular Trap (NET). This structure can trap and destroy pathogens, however, exacerbated production of NET can trigger autoimmune diseases (Lee et al., 2017). In addition, studies have shown that, due to their proteases, histones and enzymes, They may cause tissue injury (Kopytek et al., 2019, Liu et al., 2018). Our hypothesis is: NOs recruited by ZIKV infection secrete NET generating tissue damage, as a novel pathogenesis mechanism in GBS.
Objetivos:

To analyze deleterious effect on Dorsal root ganglia (DRG) explants caused by NET induced by phorbol 12-myristate 13-acetate (PMA) and components involved. To verify if ZIKV infection is able to recruit NO and local NET production.
Métodos:
NET is obtained by PMA stimulation (phorbol myristate acetate) for 3 hours in human NOs culture isolated from peripheral blood. P0 mice (DRG) explants are plated on glass coverslips in Dmem/F-12 medium with 20ng/ml NGF, or NET only, NET plus DNAse, or NET plus specific inhibitors compounds (Elastase and Myeloperoxidase-MPO). After 3 days, medium is collected for LDH dosing to assess toxicity and culture is fixed with 4% paraformaldehyde (PFA) and immunolabelled with anti-TuJ-1 or Sox-10 and Krox-20. Then, images are acquired to measure neuritogenic parameters. Adult C57/BL6 mice underwent zikv injection into the sciatic nerve. Then, animals are perfused with 4% PFA and nerves are dissected. Tissue slices are immunolabelled to asses NO recruitment, NET production e damage.
Resultados e Conclusões:
NET prevent neurite growth, arborization and collateral sprouts in DRG being toxic to the cells too. Data also indicate that MPO component plays a key role in the harmful effects caused by NET. We also show that NET decrease total number of glial cells in culture and it impairs maturation for myelinating SC, also affected by MPO. Sciatic nerve ZIKV We can postulate that one of the pathological processes induced by ZIKV in patients with GBS is NET production by infiltrated NO and subsequent axonal damage caused by these NET. These results reinforce the idea of the important role of NETs in the pathogenesis of GBS. Ceua=IBCCF#158
Palavras-chaves: Cytotoxicity, Guillain-Barré Sydrome, Neutrophil Extracellular Traps, Peripheral Nervous System, Zika virus
Agência Fomento: CNPq

17.033 - TETRAHIDROLINALOL INIBE AS CONVULSÕES INDUZIDAS POR PENTILENTETRAZOL EM CAMUNDONGOS

TETRAHYDROLINALOL INHIBITS PENTYLENETETRAZOL-INDUCED CONVULSION IN MICE

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Instituição: 1 UFPB - Universidade Federal da Paraíba (Campus I - Lot. Cidade Universitaria, PB, 58051-900), 2 UNIVASF - Universidade Federal do Vale do São Francisco (Rua da Alvorada, SN - Gen. Dutra, Paulo Afonso - BA, 48607-190)Introdução:
Epilepsy is a common neurological condition, usually with several recurrent clinical manifestations resulting from abnormal electrical activity in the brain. Patients with epilepsy are treated with antiepileptic drugs (AEDs), however the currently available treatment have unpleasant side effects, long-term toxicity and drug interactions. tetrahydrolinalol (THL) is a monoterpene acyclic alcohol, produced from the metabolism of linalool, a constituent of the essential oils. However, unlike its precursor, THL has no reports of its pharmacological activity.
Objetivos:
Therefore, the present study evaluated the anticonvulsive activity of tetrahydrolinalol in mice.
Métodos:
The anticonvulsant activity of tetrahydrolinalol (125 or 150 mg/kg), i.p.) was evaluated in the pentylenetetrazol-Induced convulsion test. All experimental procedures were previously been approved by CEUA – the Ethics Committee on Animal Use, UFPB, under certificate No. 082/2017. During the test, the changes in the electroencephalogram (EEG) was recorded. EEG amplitude was analyzed every 20 seconds by two-way analysis of variance (ANOVA) followed by Fisher's least significant difference (LSD) post hoc test; or was analyzed in the total period of 180 seconds by one-way ANOVA followed by Tukey's multiple comparisons test. Latency for myoclonic seizures, latency for tonic-clonic seizures, duration of tonic-clonic seizures, and latency for death in the EEG experiments were analyzed by Kruskal-Wallis test followed by Dunn's multiple comparisons test. Values of F and H were considered significant and presented only when $P < 0.05$.
Resultados e Conclusões:
Over the first 3 minutes after PTZ administration, THL (125 and 150 mg / kg) increased in the amplitude of the electroencephalographic record when compared to the control groups ($P = 0.0052$). When the mean of this 3-minute period was taken, it was found that the THL 150 mg / kg group had a significantly lower amplitude than the control group, as did the DZP-treated group ($P = 0.0041$). THL 150 mg / kg increased latency for

generalized tonic-clonic seizures (P < 0.001). Finally, it was observed that the animals in the control group showed a high mortality after the initial 3 minutes, whereas the treatment with DZP or the two doses of THL prevented the mortality after administration of PTZ (P < 0.001). The present data suggest that tetrahydrolinalol displays anticonvulsant activity against seizures induced by PTZ in mice.

Palavras-chaves: Tetrahydrolinalol , convulsion , epilepsy

Agência Fomento:

17.034 - DINÂMICA LIPÍDICA CEREBRAL NO MODELO DE HIPOPERFUSÃO CEREBRAL CRÔNICA POR DESI-IMS

CEREBRAL LIPID DYNAMICS IN CHRONIC CEREBRAL HYPOPERFUSION MODEL BY DESI-MS IMAGING

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Instituição: 1 UFG - Universidade Federal de Goiás (Av. Esperança, S/N, Campus Samambaia. UFG. ICB II. Sala 114), 2 UFMG - Universidade Federal de Minas Gerais (Belo Horizonte, Minas Gerais.), 3 IEP-SC BH - Instituto de Ensino e Pesquisa da Santa Casa (Belo Horizonte, Minas Gerais.)Introdução:

Vascular dementia is a major cognitive disorder originated by a blood flow disruption in the brain. This process leads to chronic cerebral ischemia that deeply affects neuronal tissues and lipid homeostasis. The understanding of cerebral lipid dynamics during chronic ischemia can reveal biomarkers and novel pharmacological targets for the treatment of vascular dementia.

Objetivos:

To evaluate the lipid dynamics in the rat model of chronic cerebral hypoperfusion and seek potential biomarkers and new therapeutic targets for vascular dementia.

Métodos:

In this study, it was used 10 Wistar rats, male with 12 to 16-week-old (CEUA/UFG N.º 096/16). The animals were submitted to sham surgery or a bilateral common carotid artery occlusion (BCAO) to induce the rat model of chronic cerebral hypoperfusion. Each group of animals had 05 animals and the biochemical analysis were performed 30 days after BCAO. To map lipids in the rat brain tissues after BCAO, we have used the Desorption Electrospray Ionization - imaging mass spectrometry (DESI-IMS) technique. To analyze metabolomics datasets, we have used the partial least squares-discriminant analysis (PLS-DA). To analyze the difference between sham animals and BCAO animals we have used the Student's t-test.

Resultados e Conclusões:

Decanoic acid (11,62 ± 3,74) was increased in hippocampus after 30 days of BCAO model when compared to sham animals (5,89 ± 3,36),(*p < 0.05, Student's t-test). The analysis demonstrated that arachidonic acid (199.98 ± 37.99), docosahexaenoic acid (31.88 ± 8.13), and dihomo- γ-linolenic acid (7.16 ± 1.80) were significantly reduced in the hippocampus of animals submitted to BCAO model when compared to sham animals (284.93 ± 52.69; 46.62 ± 9.19; and 10.84 ± 2.54, respectively), (*p < 0.05, Student's t-test). PLS-DA was capable to discriminate between BCAO animals and sham animals, being γ-linolenic acid (m/z 277) ion and stearic acid (m/z 283) had the highest discrimination potential (R2= 0.682; Q2= 0.108, the accuracy of 0.7). Taken together, these findings indicate that lipid dynamics are altered in BCAO-induced chronic ischemia in rats and indicate potential biomarkers and pharmacological targets for vascular dementia.

Palavras-chaves: Vascular dementia, BCAO model, Biomarkers, Lipids, DESI-MS

Agência Fomento: CNPq, CAPES, FAPEG

17.035 - MELATONINA MELHORA DANO PROTEICO E LIPÍDICO EM ANIMAIS SUBMETIDOS A UM MODELO ANIMAL DA DOENÇA DA URINA DO XAROPE DO BORDO

MELATONIN IMPROVES PROTEIN AND LIPID OXIDATIVE DAMAGE IN ANIMALS SUBMITTED TO AN ANIMAL MODEL OF MAPLE SYRUP URINE DISEASE

Autores: Anna Julia dos Santos Sabino 1, Paulo César Luiz dos Santos 1, Julia Elena Fontana Ronsani 1, Letícia Burato Wessler 1, Hemelin Resende Farias 1, Mariane Bernardo Duarte 1, Victoria Linden de Rezende 1, Isabela da Silva Lemos 1, Maria Júlia Mastella 1, Gabriela Candiotto 1, Emílio Luiz Streck 1

Instituição: 1 UNESC - Universidade do Extremo Sul Catarinense (Av. Universitária, 1105 - Bairro Universitário CEP: 88806-000 - Criciúma-SC)Introdução:

Maple syrup urine disease (MSUD) occurs due to the accumulation of branched chain amino acids (BCAA); oxidative stress is implicated in the pathophysiology of this disease.
Objetivos:
Considering that melatonin has been shown to have a neuroprotective effect, the aim of this study was to evaluate thiobarbituric acid reactive substances (TBARS) and sulfhydryl content in young Wistar rats submitted to BCAA administration and treated with melatonin, in order to verify oxidative damage to lipids and proteins, respectively.
Métodos:
The experimental procedure was approved by ethics committee of UNESC (protocol number 017/2017-2). For this study 7-days-old male Wistar rats were divided (n=5): Control, Melatonin 10 mg/kg, BCAA, BCAA + Melatonin, for 21 days. For animals receiving BCAA, was administred 15,8ul/g (leucine 190 mmol/L, isoleucine 59 mmol/L and valine 69 mmol/L) and for animals receiving melatonin, was administred 10mg/kg. In the 28th day of life the animals were submitted to euthanasia and hippocampus, striatum and cerebral cortex were separated. Data are presented as means ± standard deviation, and were analyzed by ANOVA of two-way followed by Ducan post hoc.
Resultados e Conclusões:
We observed a significant increase in TBARS levels in hippocampus (0,5154±0,1089) striatum (0,4778±0,03334) and cerebral cortex (0,6954±0,05901)in BCAA group; melatonin administration reversed that alteration in the striatum (0,1541±0,03390). Moreover, we demonstrated that the melatonin group presented a decrease in TBARS in hippocampus when compared to the control group (0,1980±0,05622). BCAA also decreased sulfhydryl content in cerebral córtex(14766±4125) and hippocampus (11778±6823); melatonin administration increased sulfhydryl content in hippocampus (38182±9652), striatum (34185±4101) and cerebral córtex(46426±8920). Melatonin also reversed the effect of BCAA on this parameter in the cerebral córtex (36764±10736) and hippocampus (23319±4175). It is suggested that the pool of BCAA may induce causing protein and lipid oxidative damage, and that melatonin may be useful in the treatment of MSUD patients.
Palavras-chaves: Maple syrup urine disease, oxidative stress, melatonin
Agência Fomento: UNESC, CNPq, CAPES

17.036 - TIANEPTINA PREVINE ALTERAÇÕES COMPORTAMENTAIS EM UM MODELO ANIMAL DA DOENÇA DA URINA DO XAROPE DO BORDO

TIANEPTINE PREVENTS BEHAVIORAL CHANGES IN AN ANIMAL MODEL OF MAPLE SYRUP URINE DISEASE
Autores: Hémelin Resende Farias 1, Mariane Bernardo Duarte 1, Letícia Burato Wessler 1, Victoria Linden de Rezende 1, Anna Julia dos Santos Sabino 1, Isabela da Silva Lemos 1, Maria Júlia Mastella 1, Gabriela Candiotto 1, Jade de Oliveira 2, Emílio Luiz Streck 1
Instituição: 1 UNESC - Universidade do Extremo Sul Catarinense (Av. Universitária, 1105 - Bairro Universitário CEP: 88806-000 - Criciúma-SC), 2 UFRGS - Universidade Federal do Rio Grande do Sul (Av. Paulo Gama, 110 - Bairro Farroupilha - Porto Alegre - Rio Grande do Sul)Introdução:
Maple syrup urine disease (MSUD) is an inborn error of metabolism caused by decreased activity of branched-chain α-ketoacid dehydrogenase complex leading to accumulation in branched chain amino acids (BCAA). MSUD is characterized by neurological and developmental delay, and encephalopathy. With treatment, there is an increase in life expectancy of these patients, and reports suggest that this may increase the risk to development neuropsychiatry disorders, such as depression and anxiety.
Objetivos:
The objective of this study is to evaluate the effects of tianeptine, an atypical antidepressant in behavioral changes in an animal model of Maple Syrup Urine Disease.
Métodos:
The experimental procedure was approved by the ethics committee of UNESC (protocol number 068/20132). Seven-days-old Wistar rats were divided in four groups: control (saline)(n=15); tianeptine(n=15); BCAA(n=15); BCAA + Tianeptine(n=15), and treated for 21 days. For BCAA and BCAA+Tianeptine group, was administered 15,8ul/g (leucine 190 mmol/L, isoleucine 59 mmol/L and valine 69 mmol/L) and for tianeptine 15mg/Kg. To evaluate the depressive-like symptoms, we performed sucrose intake, forced swimming test and body and adrenal gland weight. Results are presented as mean ± standard deviation. Data was analyzed using one-way ANOVA followed by the post-hoc Tuckey. Differences between groups were rated significant at $p < 0.05$.
Resultados e Conclusões:

Our results demonstrated that animals submitted to chronic administration of BCAA showed a decrease in sucrose intake (mean = 1.8; SD: 0.2) compared to the control group (average = 2.5; SD = 0.2), and administration of tianeptine prevented this (mean = 2.5; SD = 0.3). We also observed an increase in adrenal gland weight and immobility time during the forced swim test. The BCAA group (mean = 75, SD = 25) remained longer time immobile compared to the control group (mean = 25; SD = 3.5) which was prevented with tianeptine administration (mean=27; SD = 4). For the adrenal gland weight, the BCAA group had significantly higher weight (mean = 0.19; SD = 0.1) compared to the control group (mean = 0.14; SD = 0.05) which was also prevented by the administration of tianeptine(mean = 0.135; SD = 0.05). Moreover, the tianeptine group did not differ compared to the control group. In conclusion, this study demonstrates a relationship between BCAA increase and depression in rats; We speculate that tianeptine may be a possible adjuvant treatment for patients with DXB.

Palavras-chaves: Maple Syrup Urine Disease, Tianeptine, Behavioral Changes

Agência Fomento: Fapesc, Capes, UNESC e CNPq

17.037 - ADMINISTRAÇÃO INTRACEREBROVENTRICULAR DE ÁCIDO A-CETOISOCAPRÓICO ALTERA PARÂMETROS MITOCONDRIAIS EM RATOS JOVENS

INTRACEREBROVENTRICULAR ADMINISTRATION OF A-KETOISOCAPROIC ACID ALTERS MITOCHONDRIAL PARAMETER IN YOUNG RATS

Autores: Victoria Linden de Rezende 1, Hemelin Resende Farias 1, Joice Regina Gabriel 1, Maria Laura Cecconi dos Santos 1, Isabela da Silva Lemos 1, Letícia Burato Wessler 1, Mariane Bernardo Duarte 1, Maria Júlia Mastella 1, Anna Julia dos Santos Sabino 1, Matheus Scarpatto Rodrigues 1, Gabriela Candiotto 1, Jade de Oliveira 2, Emílio Luiz Streck 1

Instituição: 1 UNESC - Universidade do Extremo Sul Catarinense (Av. Universitária, 1105 - Bairro Universitário CEP: 88806-000 - Criciúma-SC), 2 UFRGS - Universidade Federal do Rio Grande do Sul (Av. Paulo Gama, 110 - Bairro Farroupilha - Porto Alegre - Rio Grande do Sul CEP)Introdução:

Maple syrup urine disease (MSUD) is an inborn error generated by the deficiency in activity of the mammalian mitochondrial branched-chain α-keto acid dehydrogenase complex (BCKAD). This deficit in the complex enzymatic activity leads to an accumulation of the branched-chain α-amino acids (BCAAs) and their respective branched-chain α-keto acids (BCKA), such as α-ketoisocaproic acid (KIC) in tissue and biological fluids. The clinical symptoms frequently presented by MSUD patients include neurological alterations, e.g. hypomyelination/demyelination, psychomotor delay and mental retardation. KIC and Leucine are considered the main neurotoxic metabolites since increased plasma concentrations of these substances are associated with the appearance of neurological symptoms.

Objetivos:

We aimed at evaluating the acute effect of KIC intracerebroventricular (ICV) injection on brain mitochondrial function in young rats.

Métodos:

The present study was approved by ethics committee of the UNESC (protocol number 050/2018-1). For this propose, thirty-days-old male Wistar rats were bilaterally ICV injected with KIC or artificial cerebrospinal fluid (aCSF). In the sequence, we measured the activities of mitochondrial respiratory chain enzymes in hippocampus, striatum and cerebral cortex of these infant rats.One hour after the administration, the animals were killed by decapitation and the brain structures, cerebral cortex, hippocampus and striatum, were dissected. Tissues were stored at -80ºC and biochemical analyzes were performed 24 hours later.Data are displayed as mean ± standard deviation. The groups were compared by Student's t tests non-parametric. All analyses were carried in GraphPad Prism 5.0 (GraphPad Software, Inc., La Jolla, California, EUA).

Resultados e Conclusões:

The significance level was set to $p < 0.05$ in analyses. Acute administration of KIC, a neurotoxic metabolites of MSUD caused a marked reduction in the complex I activity in the cerebral cortex (t= 3.898, p= 0.030), striatum (t=5.577, p=0.0002) and hippocampus (t= 3.005, p=0.0132) of infant rats. The exposition to KIC also resulted in a decrease in the complex II activity in cerebral cortex (t= 4.031, p= 0.0017) and striatum (t=2.505, p=0.0252). With respect to complex II – III presented lower activity in striatum (t=4.309, p=0.0015) and hippocampus (t=5.533, p=0.0003), when compared to control rats. Finally, the KIC injection led to a depletion in the function of complex IV in cerebral cortex (t=2.618, p=0.0307) and striatum (t=4.376, p=0.0024) of rats. The high levels of KIC lead to a mitochondrial dysfunction in the rat brain. Therefore,

impairment in cerebral mitochondrial function seems to be involved in the neurotoxicity induced by KIC
Palavras-chaves: Maple Syrup Urine Disease, Neurotoxic metabolites, α-ketoisocaproic acid, mitochondrial function
Agência Fomento: UNESC, CNPq, CAPES

17.038 - SOCIAL INTERACTION EVALUATION IN ZEBRAFISH EXPOSED TO HIGH CONCENTRATIONS OF LEUCINE

SOCIAL INTERACTION EVALUATION IN ZEBRAFISH EXPOSED TO HIGH CONCENTRATIONS OF LEUCINE
Autores: Gabriela Candiotto 1, Leticia Burato Wessler 1, Isabela da Silva Lemos 1, Paulo Cesar Luiz dos Santos 1, Hemelin Resende Farias 1, Mariane Bernardo Duarte Matias 1, Anna Julia dos Santos Sabino 1, Eduardo Pacheco Rico 1, Emilio Luiz Streck 1
Instituição: 1 UNESC - Universidade do Extremo Sul Catarinense (Av. Universitária, 1105 - Bairro Universitário CEP: 88806-000 - Criciúma-SC)Introdução:
The Maple Syrup Urine Disease (MSUD) results in a branched-chain amino acid (BCAA) leucine, isoleucine and valine accumulation. Studies shows that this accumulation is capable to lead to behavioral alterations, due to BCAA toxicity in brain. Thus, it was evaluated the exposure to leucine effects on behavioral parameters.
Objetivos:
The objective of this project was to evaluate the high doses of leucine on behavioral parameters of social interaction.
Métodos:
Zebrafish (Danio rerio) were used in this study, divided into control group (n=12), exposed animals to a concentration of 2mM or 5mM leucine, for a 24 hour-period. After this, social interaction of each animal was analyzed, for 6 minutes, by Any-Maze. Data were expressed as means ± standard deviation, analyzed by one-way ANOVA followed by post hoc of Tukey. This project was approved by Committee of Etic for Use of Animal under protocol 061/2018-1.
Resultados e Conclusões:
Animals exposed to concentrations of 2mM and 5mM leucine showed a decrease in entering in conspecific, central and empty areas. Regarding the distance, animals from group 2mM and 5mM traveled a shorter distance and when analyzed the distance per area, the animals from group 2mM and 5mM traveled a shorter distance in the conspecific area. The time spent per area were shorter in the conspecific area by 2mM and 5mM groups and in an empty area, group 2mM spent a long time in the bottom. Regarding the speed time, animals of group 2mM and 5mM had a significative decrease in central areas, also had a decrease in the speed time of group 2mM in an empty area. Considering these results, we are able to conclude that high concentrations of leucine are capable to modify social behavior in animals, therefore helping to better clarify behavioral dysfunctions.
Palavras-chaves: Maple Syrup Urine Disease, Zebrafish, Branched-Chain Amino Acid, Social Behavior
Agência Fomento: FAPESC, UNESC, CNPq

17.039 - ÁCIDO ROSMARÍNICO MELHORA PARÂMETROS DE ESTRESSE OXIDATIVO CAUSADOS POR CRISES EPILÉPTICAS INDUZIDAS POR 4-AMINOPIRIDINA E PICROTOXINA

Rosmarinic acid improves oxidative stress parameters caused by 4-aminopyridine and picrotoxin-induced seizure in mice
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Studies have indicated that epilepsy, an important neurological disease, can generate oxidative stress and mitochondrial dysfunction, among other damages to the brain. In this context, the use of antioxidant compounds could provide neuroprotection and help to reduce the damage caused by epileptic seizures. Rosmarinic acid (RA) is a phenolic compound that prevents cell damage caused by free radicals, acting as an antioxidant. It also presents anti-inflammatory, antimutagenic, and antiapoptotic properties.
Objetivos:
The aim of this work was to evaluate the effects of this phenolic compound in 4-aminopyridine (4-AP) and picrotoxin (PTX)-induced seizures in mice. Parameters of oxidative stress, mitochondrial bioenergetics, and DNA damage were also evaluated in hippocampal samples.

Métodos:
Animals were divided into eight groups that received two administrations, one from the treatment or a control drug and, thirty minutes after the treatment, the animals received the seizure inductors 4-AP (13 mg/kg) or PTX (5 mg/kg). The animals were behaviorally evaluated and the seizures were rated using a modified Racine scale. After the behavioral analysis, the animals were killed and their hippocampus was collected for the biochemical assays and the evaluation of mitochondrial complexes activity. The experimental procedures were carried out following the Guidelines of Brazilian Council of Animal Experimentation (CONCEA) and EU Directive 2010/63/EU for animal experiments, with the approval of the Committee on the Ethical Use of Animals of Federal University of Rio Grande do Sul (authorization number 31722).
Resultados e Conclusões:
Although RA could not prevent seizures in the models used in this study, neither enhance the latency time to first seizure at the tested doses, it exhibited an antioxidant and neuroprotective effect. When compared with the group who received Saline in the treatment, RA (8 and 16 mg/kg) decreased reactive oxygen species production (RA16/4-AP $p = 0.0002$; RA16/PTX $p = 0.0120$) induced by 4-AP and PTX administration. RA treatment was also able to reduce superoxide dismutase activity (RA16/4-AP $p = 0.0222$; RA16/PTX $p = 0.0140$) and DNA damage (RA8/4-AP $p = 0.0168$, RA16/4-AP $p = 0.0062$; RA8/PTX $p = 0.0364$, RA16/PTX $p = 0.0136$) who are increased in hippocampus tissue after the seizures. The activity of the mitochondrial complex II was decreased by the administration of 4-AP, but RA was able to restore the levels of this activity in hippocampus samples (RA8/4-AP $p < 0.05$, RA16/4-AP $p < 0.05$) and enhance it in the PTX models (RA8/PTX $p < 0.05$). The results obtained in this study suggest that RA can reduce cell damage generated by the 4-AP and PTX seizures and therefore could represent a potential candidate in reducing pathophysiological processes involved in epilepsy.
Palavras-chaves: Oxidative stress, Rosmarinic acid, Seizure
Agência Fomento: CAPES

17.040 - EFFECTS OF ISOLATED FRACTIONS FROM ANT DINOPONERA QUADRICEPS (KEMPF) VENOM IN MODEL OF CONVULSIVE CRISES INDUCED BY BICUCULIN IN MICE.

EFFECTS OF ISOLATED FRACTIONS FROM ANT DINOPONERA QUADRICEPS (KEMPF) VENOM IN MODEL OF CONVULSIVE CRISES INDUCED BY BICUCULIN IN MICE.
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Instituição: 1 UNIFESP - Universidade Federal de São Paulo (Rua Silva Jardim 136 - Vila Mathias - Santos/SP - CEP 11020-015)Introdução:
Natural products are recognized as therapeutic tools for treatment of diseases since ancient civilizations. In this context, animal venoms and their isolated components have shown great biotechnological potential, because these substances can be neuroactive with high affinity and specificity by nervous tissue. Thus, venoms can be used as instruments that help in the understanding of neuropathological alterations that occur in the human's brain, such as epilepsy. Epilepsy is a neurological disorder that affects millions of individuals worldwide, and despite of the therapeutic advances many patients develop pharmacoresistance. It is unequivocal the need for the development of new substances that can be used as drug-model for new antiepileptic drugs. Previous studies have shown anti- and convulsant effects of the venom of the ant Dinoponera quadriceps.
Objetivos:
The aim of this study was to isolate the fractions of the D. quadriceps venom and to evaluate the neuroprotective potential on seizures induced by bicuculine (BIC) in mice.
Métodos:
Crude venom was fractionated by high performance liquid chromatography (HPLC) resulting in 68 fractions (referred to as DqtxII-1 to 68). Male Swiss mice (3 months) were implanted with a cannula in the lateral ventricle (CEUA 1327091116). After the recovery period, animals were previously microinjected with saline solution (saline, n = 11) or fraction (n = 114), afterwards each animal was observed in an open field (20 min). For the evaluation of the neuroprotective activity, after 30 min the animals of the BIC group (saline x BIC, n = 9) and fractions (Dqtxs x BIC, n = 111) were microinjected with bicuculline (10 mg/mL) and observed in CA (20 min). All procedures were approved by the Ethics Committee (CEUA 1327091116).

Resultados e Conclusões:
Our main results showed that no significant difference in the exploratory, grooming and immobility behaviors was observed in DqTxs-treated mice. In addition, DqtxII-7-treated animals showed high latency to appear of the seizures (971 ± 164 s) when compared with BIC-treated mice (252 ± 91 s, p = 0,007). Furthermore, this fraction protected 71% and 86% of animals against seizures and death, respectively (Fisher's exact test, $p < 0.05$). The results show that the DqTx-7 fraction has anticonvulsive effect. Further, new studies of purification of the anticonvulsant fraction are need to determine the its structure and mechanism of action.
Palavras-chaves: Natural products, ant venom, neurotoxins, neuroprotection, epilepsy
Agência Fomento: FAPESP (#2015/20785-8 and #2018/26609-5); CNPq (#425694/2016-0); CAPES (Finance Code 001, SILVA SP; BESERRA-FILHO JI).

17.041 - TDAH E EDUCAÇÃO NO BRASIL

ADHD AND EDUCATION IN BRAZIL
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Instituição: 1 UNIFAL-MG - Universidade Federal de Alfenas (Rua Gabriel Monteiro da Silva, 700 - centro - Alfenas/MG)Introdução:
The Attention Deficit Hyperactivity Disorder (ADHD) is a neurological condition linked to abnormal level of attention, hyperactive behavior and high impulsivity. Students suffering from ADHD are frequent subjects of bullying by colleagues and teachers, who could consider them lazy and inattentive. In this case the students may lose the motivation, making the learning process more difficult. In this sense, the inappetence of educators is a big, and maybe the bigger, problem that the people suffering with ADHD face.
Objetivos:
In this revision the educational and social parameters involving students suffering from ADHD symptoms were considered mainly to verify the support that people presenting these features have receipt from educational institutions.
Métodos:
For purpose of this manuscript, articles with indexers like “ADHD, depression, education, ADHD and education” were used for the objective this research. The research was done in the PubMed, Medline, Elsevier, Scopus, Scielo, Academic Google focusing mainly on the problems that people presenting ADHD characteristics have suffered in educational institutions.
Resultados e Conclusões:
A few articles in Brazil were found about ADHD and education, and its relationship with learning. Most of them take into consideration the aspects of psychiatry and psychology, but the education aspects are not cited. In Brazil, the main concern in regards to ADHD is children's education. Therefore, adolescents and adults studying in colleges aren't considered important when facing difficulties in learning. Important cases were cited in many courses, for instance in Medicine, where the attention is directed to the source of learning a lot more than to the relation of direct contact with patients. As cited before, these students are poorly assisted by the teachers, complicating further education goals.
Palavras-chaves: ADHD, Depression, Education, ADHD and education, ADHD and adults
Agência Fomento:

17.042 - INCREASED GLUCOSE AVAILABILITY PLAYS NEUROPROTECTION IN CORTICAL REGIONS AFTER PILOCARPINE-INDUCED STATUS EPILEPTICUS

INCREASED GLUCOSE AVAILABILITY PLAYS NEUROPROTECTION IN CORTICAL REGIONS AFTER PILOCARPINE-INDUCED STATUS EPILEPTICUS
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Instituição: 1 UFAL - Federal University of Alagoas (Maceió/AL), 2 UFU - Federal University of Uberlandia (Uberlândia/MG)Introdução:
Glucose is the main source of energy for the brain and its lack can cause neuronal dysfunction. During status epilepticus (SE), the neurons become overexcited, increasing energy consumption. In addition, a supply of glucose can prevent neuronal damage caused by SE.
Objetivos:
We evaluated the effect of increased glucose availability in behavior of limbic seizures and neurodegeneration process of cortical areas after pilocarpine-induced SE
Métodos:

Experimental procedures were approved by the Ethical Committee for Animal Research of UFAL (04/2016). Male Wistar rats (n=12 [240-340g]) were submitted to stereotaxic surgery for cannula implantation in the hilus of dentate gyrus of hippocampus. Animals PILO+VEH (P+V) and PILO+GLU (P+G) received microinjections of pilocarpine (PILO) (1.2mg/ µL) in hippocampus to induce SE, followed 5 minutes later by vehicle (VEH, saline 0.9%, 1 µL) or glucose (GLU, 3mM [diluted in saline]). Behavioral analysis of seizures was performed for 90 minutes during of SE, according to Racine scale (1972). Animals were perfused after 24 hours of SE and neurodegeneration was evaluated by histochemistry of Fluoro-Jade (FJ). FJ positive neurons (FJ+) were counted (ImageJ–NIH) in hippocampus and cortical areas. Results were expressed as mean±SEM, compared by unpaired t test.
Resultados e Conclusões:
The administration of glucose (3 mM) after PILO reduced the severity of seizures (P+V, 0.69±0.02; P+G, 0.57±0.03), as well as the number of limbic seizures classes 3 (P+V, 1.1±0.1; P+G, 0.5±0.2), 4 (P+V, 1.2±0.08; P+G, 0.6±0.1), and 5 (P+V, 1.5±0.2; P+G, 0.6±0.2). Similarly, glucose after SE attenuated the number of FJ+ neurons in hippocampus [CA1 (P+V, 335.7±36.9; P+G, 51.7±25.2), CA3 (P+V, 300.9±39.4; P+G, 82.2±49.0) and hilus (P+V, 161.3±31.9; P+G, 25.0±9.4)]. Furthermore, hippocampal glucose infusion decreased the total number of FJ+ neurons in motor (P+V, 1.7±0.2; P+G, 0.8±0.2), somatosensory (P+V, 1.3±0.3; P+G, 0.2±0.1), visual (P+V, 1.3±0.2; P+G, 0.5±0.2), retrosplenial (P+V, 0.6±0.07; P+G, 0.2±0.1), perirhinal (P+V, 1.9±0.2; P+G, 0.7±0.3), ectorhinal (P+V, 0.9±0.1; P+G, 0.5±0.1), insular (P+V, 1.7±0.2; P+G, 0.4±0.2), and piriform (P+V, 1.9±0.2; P+G, 0.5±0.1) cortices compared to control. These preliminary data suggest that possibly the administration of intrahippocampal glucose protects brain in the earlier stage of epileptogenic processes.
Palavras-chaves: Epileptogenic, Glucose, Hippocampus, Na+/glucose cotransporter
Agência Fomento: FAPEAL, CNPQ, CAPES

17.043 - HIPPOCAMPAL GLYCEMIC CONTROL DECREASES NEURONAL ACTIVITY IN CORTICAL AREAS AFTER PILOCARPINE-INDUCED STATUS EPILEPTICUS

HIPPOCAMPAL GLYCEMIC CONTROL DECREASES NEURONAL ACTIVITY IN CORTICAL AREAS AFTER PILOCARPINE-INDUCED STATUS EPILEPTICUS

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Instituição: 1 UFAL - Federal University of Alagoas (Maceió/AL), 2 UFU - Federal University of Uberlandia (Uberlândia/MG)Introdução:
Status Epilepticus (SE) is defined as continuous and self-sustaining seizures, which trigger hippocampal neurodegeneration, inflammation and gliosis. SE is typically characterized by neuronal hyperexcitability and promotes a sharp increase of regional cerebral blood flow and oxygen consumption correlated with enhancement in glucose utilization. Control of glucose availability can protect neurons from hyperexcitability.
Objetivos:
In this study, we evaluated the influence increased glucose availability in neuronal activity after SE.
Métodos:
Experimental procedures were approved by the Ethical Committee for Animal Research of UFAL (04/2016). Male Wistar rats (n=12 [240-340g]) were submitted to stereotaxic surgery for cannula implantation in the hilus of dentate gyrus (DG) of left hippocampus. Animals received unilateral microinjections of pilocarpine (PILO) in hippocampus (H-PILO, 1.2mg/ µL, 1 µL). After 5 minutes of H-PILO, PILO+VEH (P+V) and PILO+GLU (P+G) received microinjections of vehicle (VEH, saline 0.9%, 1 µL) or glucose (3mM [diluted in saline]), respectively, in the same site of PILO. Animals were perfused after 24 hours of SE and the neuronal activity was evaluated by cFos immunofluorescence. cFos positive neurons (cFos+) were counted (ImageJ–NIH) in hippocampus and cortical areas. Results were expressed as mean±SEM, compared by unpaired t test.
Resultados e Conclusões:
The increase in glucose availability (3mM) after PILO resulted the same effect on neuronal activity in both hippocampi and cortical regions. Increased glucose reduced the total number of cFos+ neurons in the DG hilus (PV, 0.92±0.16; PG, 0.39±0.13) and CA1 (PV, 0.83±0.21; PG, 0.2±0.09) subfield of hippocampus compared to control. Similarly, intrahippocampal infusion of glucose was able to decrease neuronal activity in cortical areas [retrosplenial (PV, 0.7±0.08; PG, 0.3±0.2), perirhinal (PV, 0.9±0.09; PG, 0.4±0.1) and piriform (PV, 0.9±0.1; PG, 0.3±0.05)]. Our preliminary findings suggest that controlling glucose availability

protects the brain from the characteristic hyperexcitability of earlier stage of epileptogenic processes.
Palavras-chaves: Epileptogenic, Glucose, Hippocampus, Na+/glucose cotransporter
Agência Fomento: FAPEAL, CNPQ, CAPES

17.044 - AVALIAÇÃO DO EFEITO ANTI-INFLAMATÓRIO DO EXTRATO HIDROALCOÓLICO DE POLYGALA PANICULATA EM MODELO ANIMAL DE ISQUEMIA CEREBRAL

EVALUATION OF ANTI-INFLAMMATORY EFFECT OF POLYGALA PANICULATA HYDROALCOHOLIC EXTRACT IN AN ANIMAL STROKE MODEL
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Stroke is one of the leading causes of death and disabilities worldwide. The risk of having a stroke increases with ageing but it can occur in individuals of any age, affecting their productive life. The approved treatment is an anti-thrombolytic drug (Alteplase®), which unfortunately have a narrow therapeutic window with multiple side effects, and a free radical scavenger (Radicut®). The inflammatory response following stroke can modulate the size of the ischemic damage. Tumor necrosis factor (TNF α), interleukin (IL)-1 β, and IL-6 are important inflammatory cytokines, and an increase in these molecules modulates neuronal apoptosis within the infarcted tissue, so affecting cytokine response might interfere with tissue recovery. Medicinal plants are considered a source of compounds with biological activity. Polygala paniculata has been shown to be antinociceptive, anti-inflammatory and neuroprotective in many diseases.
Objetivos:
Evaluate the anti-inflammatory effect of Polygala paniculata hydroalcoholic extract in animal stroke model.
Métodos:
Experiments were conducted with male C57bl/6 mice (8-12 weeks age, 20–30 g) after protocol approval by CEUA/UFSC (number 8977231216). Global ischemia was induced in mice by bilateral common carotid artery occlusion (BCCAo). Mice were separate into four independent groups. Groups sham+PpHE and BCCAo+PpHE received Polygala paniculata hidroalcoholic extract (1 mg/kg) diluted in vehicle (saline with 3% Tween 20), by oral gavage, twice a day, starting 3h after BCCAo or sham surgery, for 2 days. Groups sham+vehicle and BCCAo+vehicle received saline with 3% Tween 20. Maximal grip strength was assessed to have a baseline before mice submission to BCCAo and 48h after surgical procedures. Mice were euthanized, hippocampus were dissected for IBA1, GFAP, TNF α, IL-1 β and IL-6 gene expression analysis by qPCR.
Resultados e Conclusões:
Mice had a 35.1±3.2% decreases in maximal grip strength after BCCAo compared to baseline assessment [$F(1,13)=102.2$; $p < 0.0001$]. In animals treated with PpHE, this deficit was attenuated to 9.8%±3.1% (significantly lower [$F(1,13)=31.02$; $p < 0.0001$) as compared to control group). The increase in IBA1 [$F(3,12)=3,299$; $p < 0,0001$] and GFAP gene expression [$F(3,14)=0,8329$; $p < 0,0001$] indicates that BCCAo activated glial cells. PpHE treatment was not able to decrease astrocyte activation ($p=0,3914$), but it was able to reduce microglial activation ($p=0,0463$). Also, there was a reduction in proinflammatory cytokines TNF α [$F(3,11)=1,736$; $p < 0,0002$] and IL-1 β [$F(3,11)=1,073$; $p=0,0691$] gene expression in animals treated with PpHE after BCCAo, while IL-6 was increased in this group [$F(3,12)=6,733$; $p=0,0189$]. PpHE treatment can prevent decreasing of grip force in mice after BCCAo. Also, PpHE treatment was able to reduce microglial activation and proinflammatory cytokines TNF α and IL-1 β gene expression. The increase in IL-6 gene expression can modulated infarct evolution at stroke onset.
Palavras-chaves: Inflammation, Medicinal plants, Stroke
Agência Fomento: CAPES

17.045 - O CONFRONTO ENTRE ETNOFARMACOLOGIA E TESTES FARMACOLÓGICOS DE PLANTAS MEDICINAIS ASSOCIADAS A TRANSTORNOS MENTAIS E NEUROLÓGICOS

The Confrontation between Ethnopharmacology and Pharmacological Tests of Medicinal Plants Associated with Mental and Neurological Disorders

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For neurological disorders, pharmacological tests have shown promising results in the reduction of side effects when using plants with known therapeutic effects in the treatment of some types of dementia.
Objetivos:
Therefore, the goals of this study are to gather data about the major medicinal plants used in the nervous system as described in ethnopharmacological surveys from South America and Brazil and to compare this data with the results from pharmacological tests on the active principles of those same plants found in the scientific literature.
Métodos:
This study was done through literature review of ethnopharmacological surveys on the medicinal plants used by groups in South America (with emphasis on Brazil) found in academic databases (MEDLINE, LILACS, Scopus, SciELO, Google Academic, and Elsevier). The terms searched were ethnobotanical studies, medicinal plants, ethnopharmacology, neural system, South America, and Brazil. The search was restricted to the most recent and classical articles/books written in Portuguese, English, or Spanish. After collecting the data about each plant, their respective popular indication was compared with the results found through pharmacological tests.
Resultados e Conclusões:
The discrepancy rate between the effects observed by ethnopharmacological and pharmacological methods in this study is greater than 50%. In conclusion, despite the importance of ethnopharmacological data, it is important to make comparisons with pharmacological tests for the same plants, since the pharmacological studies, although few, have shown a high rate of discrepancy in the results.
Palavras-chaves: Alternative medicine, Ethnopharmacology, Neurological Disorders
Agência Fomento:

17.046 - SILDENAFIL ALTERA A EXPRESSÃO HIPOCAMPAL DE INOS E NNOS NO MODELO DE CONVULSÃO INDUZIDA PELA PILOCARPINA

SILDENAFIL ALTERS HIPOCCAMPAL INOS AND NNOS EXPRESSION IN PILOCARPINE SEIZURE MODEL

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Instituição: 1 UFC - Universidade Federal do Ceará (Rua Coronel Nunes de Melo, 1000 - Rodolfo Teófilo, Fortaleza - CE, 60430-275)Introdução:
Sildenafil is a phosphodiesterase 5 inhibitor used for the treatment of erectile dysfunction and pulmonary hypertension. The nitric oxide (NO) is involved in the mechanism of action of sildenafil. The effects of sildenafil in seizure threshold may be similar to NO donors.
Objetivos:
To analyze, by the western blotting technique, the expression of iNOS and nNOS in hippocampus of male swiss mice pretreated with sildenafil and submitted to a model of seizure induced by pilocarpine (PILO)
Métodos:
Male mice were submitted to single or repeated (7 days) sildenafil administration (2.5, 5, 10 and 20 mg / kg). Thirty minutes later, PILO 400 mg/kg was injected and mice were further evaluated for 1 h for seizure activity. Afterwards, the animals were sacrificed by decapitation, and the hippocampus (HP) dissected and immediately stored in -80 ° C. Based on the relevance of the hippocampus, as the epileptic focus of pilocarpine-induced seizures, this area of the brain was used for the evaluation of iNOS and nNOS expression. For the analysis of the expression of the two isoformes the western blotting technique was used. Results were expressed as mean ± SEM and were compared by analysis of variance (one-way ANOVA), followed by Tukey's test for multiple comparisons. The project was approved by the Animal Use Ethics Committee (CEUA) of the Federal University of Ceará under number 66/2014.
Resultados e Conclusões:

Regarding iNOS expression, ANOVA revealed a significant effect of each factor singly ("treatment",[F (3, 21) = 12.31; P < 0.0001]; "time", [F(1, 21) = 13.04, P = 0.0016] and a significant interaction between factors [F (3, 21) = 4.634, P = 0.0122]. Multiple comparison test demonstrated a significant increase in the iNOS relative protein expression in the SIL20 + PILO400 group compared to SALINE + SAlINE (P < 0.01) and SALINE + PILO400 (P < 0.01) groups. Regarding nNOS expression, ANOVA analysis showed a significant main effect of "time" [F (1, 22) = 36.78, P < 0.0001] and "treatment" [F (3, 22) = 5.007, P = 0.0085] and a significant interaction between factors [F (3, 22) = 3.913, P = 0.0222]. In the post hoc analysis of data from repeated-doses protocol, we noted a significant increase in nNOS relative protein expression in the group SIL20 + PILO400 compared to SALINE + SAlINE (P < 0.01) and SALINE + PILO400 (P < 0.05). A marked increase in nNOS expression was noted in SIL20 + SAlINE group compared to SALINE + SALINE, despite not achieving statistical significance. Also, there was a significant increase in nNOS expression. in the SIL20 + SAlINE group in the repeated protocol when compared to the respective group in the acute one (P < 0.001). Increased expression of iNOS and nNOS isoforms may be related to increased cholinergic-nitrergic tone and pro-oxidative brain changes and consequently to a proconvulsive action of sildenafil. Also, our findings cautioned against using sildenafil for patients suffering from neurological conditions that reduces seizure threshold, such as epilepsy.

Palavras-chaves: Sildenafil, Convulsão, Pilocarpina, iNOS, nNOS
Agência Fomento:

18. Transtornos Psiquiátricos e Comportamentais

18.057 - EFEITOS DO TIPO ANTIDEPRESSIVO DO CARVACROL EM MODELOS PREDITIVOS DE DEPRESSÃO EM CAMUNDONGOS

ANTIDEPRESSANT-LIKE EFFECTS OF CARVACROL IN PREDICTIVE DEPRESSION MODELS IN MICE

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Instituição: 1 UFC - Laboratório de Neurociências - Universidade Federal do Ceará (Avenida Comandante Maurocelio, 100, Derby, Sobral - Ceará)Introdução:
Depression is a leading cause of disability worldwide and is associated with profound economic costs. Depression is usually treated with antidepressant medications and psychological therapy or combination of both. However, there are several limitations associated with these therapies. Due to these limitations, there is a crescent interest in new treatment options, among them, natural products are good alternatives.
Objetivos:
The current study aimed to investigate the activity of carvacrol in predictive models of depression.
Métodos:
Male Swiss mice (20-25g) were used, under protocol n. 08/17, approved by CEUA - Sobral. Animals were divided into 4 groups and received carvacrol 6.25 or 12.5 mg/kg, fluvoxamine 50 mg/kg or vehicle, during 8 days by gavage prior the tests. Behavioral alterations were assessed by the forced swimming test (FST), tail suspension test (TST) and open field test (OFT).
Resultados e Conclusões:
Carvacrol at both doses 6.25 mg/kg (86.62 ± 11.32, p < 0.01) and 12.5 mg/kg (92.20 ± 8.09, p < 0.01) reduced the immobility time in FST when compared to controls (138.40 ± 6.06); in TST was also able to reduce immobility time (CVC-6.25: 58.67 ± 8.79, p < 0.01; CVC-12.5: 69.43 ± 8.26, p < 0.05; control: 101.0 ± 12.43), suggesting antidepressant-like effect. Corroborating with these findings, no changes were observed in the parameters analyzed in the OFT (crossing, rearing and grooming), so there was no change in the locomotor activity, demonstrating that the effect observed in FST and TST was not related to a psychostimulant action. In conclusion, carvacrol when administered repeatedly in mice showed antidepressant-like effects, being a potential molecule for use in mood disorders.

Palavras-chaves: Carvacrol, Depression, Lippia sidoides, Antidepressants
Agência Fomento: Coordenação de Aperfeiçoamento de Pessoal de Nível Superior

18.058 - AVALIAÇÃO DA AÇÃO ANTIOXIDANTE CEREBRAL DO CARVACROL EM CAMUNDONGOS

EVALUATION OF ANTIOXIDANT BRAIN ACTION OF CARVACROL IN MICE

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Depression is one of the most common and prominent mental disorders worldwide Many studies support a crucial role for oxidative and nitrosative stress in the pathophysiology of unipolar and bipolar depression. Different therapeutic approaches are being adopted for the effective management of depression; however, most of them are riddled with side effects. Therefore, the search for new compounds with antidepressant properties with less potential to produce adverse effects continues and medicinal plants appear as promising option. In this regard, carvacrol is a monoterpene, thymol isomer, which composes essential oils of certain aromatic plants such as oregano, which has antioxidant activity in various experimental models.
Objetivos:
The present study aimed to investigate the antioxidant effect of carvacrol (CVC) in the brain areas after repeated administration in mice.
Métodos:
Male Swiss mice (20-25g) were used, under protocol n° 08/17 CEUA UFC-Sobral. The animals were randomly divided into four groups and received for 8 days carvacrol 6,25 or 12,5 mg/kg, fluvoxamine 50 mg/kg or vehicle, via gavage. After treatment, hippocampus, prefrontal cortex and striatum were removed for neurochemical analysis (TBARS, nitrite/nitrate and reduced glutathione).
Resultados e Conclusões:
Results showed that although CVC at both doses did not altered TBARS or nitrite levels when compared to control group, the reduced glutathione levels were significantly increased. Only CVC at the dose of 12,5 mg/kg increased levels of reduced glutathione in the prefrontal cortex (CVC 12.5: 194.5 ± 30.49; Control:102.0 ± 6.50, $p < 0,05$) and striatum (CVC 12.5: 223.3 ± 29.48; Control:101.8 ± 6.33, $p < 0,01$). In conclusion, carvacrol is a promising molecule since it was able to enhance antioxidant defense in brain areas, demonstrating that it exerts important modulation of neurochemical parameters involved in depression.
Palavras-chaves: Carvacrol, Depression, Lippia sidoides, Antioxidant
Agência Fomento: FUNCAP

18.059 - PARÂMETROS RELACIONADOS À DEPRESSÃO EM CAMUNDONGOS ADULTOS SUBMETIDOS À MALÁRIA CEREBRAL NO PERÍODO INFANTIL.

PARAMETERS RELATED TO DEPRESSION IN ADULT MICE SUBMITTED TO CEREBRAL MALARIA IN THE INFANTIL PERIOD.

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Instituição: 1 UNISUL - Universidade do Sul de Santa Catarina (Av. Pedra Branca, 25 - Pedra Branca, Palhoça - SC, 88137-270)Introdução:
Cerebral malaria (CM) is among the main causes of mortality associated with malaria. There are reports that MC survivors may develop long-term neurocognitive deficits. Studies have shown the role of neuroinflammation in the development of depression. Neuroinflammation can significantly modulate encephalic development, immune and endocrine regulation, as well as neural circuits, resulting in physiological and behavioral changes.
Objetivos:
To evaluate parameters related to depression in adult mice submitted to cerebral malaria in the infantile period.
Métodos:
In this study C57BL / 6 animals were used, divided into four experimental groups: RBC + PBS and RBC + IMIP for animals with uninfected red blood cells; and PbA + PBS and PbA + IMIP for animals with infected red blood cells. At 21 days of age the animals were infected with Plasmodium berghei ANKA, after six days of infection, these animals were treated with chloroquine for seven days. At 46 days of age, both groups received PBS or Imipramine for 14 days. At 60 days of age, sucrose consumption, immobility time, body weight, adrenal gland volume and hippocampus, plasma corticosterone levels, and hippocampal BDNF and IL-1 β levels were evaluated. This project was submitted to the UNISUL Experimental Committee on Animal Use (CEUA),

according to registration 18.001.4.01.IV and was only executed after its approval.
Resultados e Conclusões:
It can be observed that the animals exposed to CM in the infantile period and evaluated in the adult life showed an increase of the immobility time ($F(3,63)=36.98$; $p < 0,0001$); an increase in adrenal gland volume ($F(3,61)=12.27$; $p < 0,0001$); an increase in plasma corticosteroid levels ($F(3,24)=109.0$; $p < 0,0001$); a reduction in hippocampal volume ($F(3,47)=5.862$; $p=0,0017$); a decrease in BDNF levels in the hippocampus ($F(3,32)=6.503$; $p=0,0015$) and an increase in levels of IL-1 in the hippocampus ($F(3,16)=14.69$; $p < 0,0001$). Among the parameters evaluated, only IL-1 β levels were not reversed with antidepressant use. The weight of the animals and the sucrose preference test were also evaluated, however, they did not present a significant difference between the groups. These results suggest that immune activation in the infantile period may be associated with parameters related to depression in adult life.
Palavras-chaves: Depressão, Malária Cerebral, Neurodesenvolvimento
Agência Fomento:

18.060 - ENVOLVIMENTO DO INFLAMASSOMA NLRP3 NO COMPORTAMENTO RELACIONADO Á ESQUIZOFRENIA EM ANIMAIS JOVENS EXPOSTOS A ATIVAÇÃO IMUNE MATERNA

INVOLVEMENT OF NLRP3 INFLAMASSOMES IN SCHIZOPHRENIC LIKE BEHAVIOR IN YOUNG ANIMALS AFTER MATERNAL IMUNE ACTIVATION
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Instituição: 1 UNISUL - Universidade do Sul de Santa Catarina (Av. Pedra Branca, 25 - Pedra Branca, Palhoça - SC, 88137-270)Introdução:
In the course of brain development, all changes, such as maternal, insecticidal or inflammatory exposure, may compromise the development of fetal brain function. Maternal immune activation (AIM) may be a shared path, representing a risk for the development of psychiatric disorders such as schizophrenia. Diseases involving the central nervous system (CNS) present a neuroinflammatory condition, with the involvement of proinflammatory cytokines such as interleukin 1 β (IL-1 β). Cytokines mature by activation of lipopolysaccharide-activated (LPS) inflammasome NLRP3.
Objetivos:
To evaluate the involvement of NLRP3 inflammasome in schizophrenia-related behavior in young animals exposed to maternal immune activation.
Métodos:
The animals were mated for 24 hours and subsequently, the presence or absence of vaginal plug was verified. On the 15th gestational day, the animals received an injection of LPS for the experimental group and PBS for the control for induction of the AIM model.The day of birth of the animals was set to P0. 7 and 14 days old animals were submitted to assisted painless death (MIA) and brain dissection for biochemical analysis of NLRP3 expression and IL-1 β levels. Animals of 45 days performed the behavioral tests of locomotion, social interaction and stereotyped analysis and subsequent biochemical analysis of the same parameters, using Western Blot and ELISA, respectively. Approved by the local ethics committee (Protocol Number 18.002.4.01.IV).
Resultados e Conclusões:
The animals showed schizophrenic-like behavior at 45 days of age in the variables of locomotor activity, social interaction and increased number of stereotyped movements.Number of crosses ($t=3,431$; $df=14$; $p=0,0041$), social interaction through the increase in latency ($t=2,005$ $df=6$; $p= 0,0918$) number ($t=9,674$ $df=10$; $p= < 0,0001$) and the total contact time ($t=5,292$ $df=10$; $p= 0,0004$), Sniffing ($t=9,223$ $df=14$; $p= < 0,0001$), grooming ($t=2,903$ $df=14$; $p=0.0116$) and amount of nail bites ($t=4,417$ $df=14$; $p=0.0006$). In the biochemical analysis, the results show increased expression of inflammasome complex activation on days 7($t=3,824$ $df=6$, $p= 0,0087$), 14 ($t=4,705$ $df=4$, $p= 0,0093$) and 45 ($t=4,364$ $df=4$, $p= 0,0120$) of life and levels of IL-1 β on 7 14 ($t=4,026$ $df=8$, $p= 0,0038$) and 45 ($t=3,804$ $df=8$, $p= 0,0052$) days of age. Conclusion: The data observed in this study show that maternal immune activation may be associated with schizophrenic-like behavior with altered inflammatory and locomotor parameters.
Palavras-chaves: Maternal Immune Activation, Inflamasome NLRP3, Schizophrenia
Agência Fomento:

18.061 - EFEITOS DE DIFERENTES CONFIGURAÇÕES SOBRE O COMPORTAMENTO DE LARVAS DE GUPPY NO LABIRINTO EM CRUZ COM RAMPA

EFFECTS OF DIFFERENT CONFIGURATIONS ON THE BEHAVIOR OF GUPPY LARVAE IN THE PLUS MAZE WITH RAMPS

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Instituição: 1 IFPA - Instituto Federal do Pará (Laboratório de Neuroquímica e Comportamento, IFPA Tucuruí), 2 UFPA - Universidade Federal do Pará (Laboratório de Neurociências e Comportamento, NTPC, UFPA Belém)Introdução:
The Plus Maze with Ramps (PMR) is a device adapted from the Elevated Plus Maze for rodents and the Novel Tank for fish, that aims to study anxiety-like behavior in fish. Its protocol has been validated for adults of guppy and zebrafish. Considering the possibility in the use of larvae of these species, mainly for the possibility of exploring the study of the development in behavior, we adapted the PMR for larvae and manipulated the configurations of the apparatus.
Objetivos:
To verify the anxiety-like behavior of guppies larvae in different versions of PMR.
Métodos:
We used 48 guppy larvae (Poecilia reticulata, n = 12) with 30 days of life, divided in groups according to the configuration of the apparatus: control (2 opposing ramps), asymmetrical (2 non-opposing ramps), without ramps (flat) and four ramps (4 ramps). In flat aquariums or with 4 ramps, the opposite arms were designated for the analysis as axis X and axis Y. In the PMR, each arm had 1cm of length and 1cm of width. The arms with ramp had a ramp that rose from the center to the end of the arm, where it reached a height of 1cm. It was measured: a) total time in the compartments (flat arms, with ramp and center); b) number of entrances (flat and with ramp arms). ANOVA (post-test: Tukey) and Student's t test were used. It was considered $p \leq 0.05$.
Resultados e Conclusões:
The permanence time in the flat arms showed differences between control group (368.08 ± 49.3) and, flat group (233.83 ± 42.51, $p < 0.001$), 4 ramps (279.42 ± 45.55, $p < 0.001$) and asymmetrical (307.83 ± 50.92 $p = 0.016$). Differences were also found between the flat and asymmetrical groups ($p = 0.002$). In the central area of the aquarium differences were found between the control group and the other groups, always with $p < 0.05$. The same statistical profile of permanence time in the central area was observed in the number of entries in the flat arms, with ramp and total entrances. Again, always with $p < 0.05$. No differences were found between the groups other than the control group. According to Student's t-test, the control group had time differences (< 0.001) and entrances (< 0.001) between the flat and with ramp arms. Equivalent results were found for the animals tested in the asymmetric labyrinth (time: $p < 0.001$ and entries: $p = 0.0029$). Such differences were not found in the animals tested in the flat aquarium. For those tested in aquarium with 4 ramps only differences in the time spent between the arms were found ($p = 0.003$). The results indicate that, like adults, guppy larvae have an aversion to the ramp environment and their configuration is not relevant to their avoidance. In addition, the preference for the flat environment does not indicate a lateral preference relationship.
Palavras-chaves: anxiety, plus maze with ramps, guppy, larvae, parametric study
Agência Fomento: IFPA Campus Tucuruí

18.062 - ALTERAÇÕES COMPORTAMENTAIS INDUZIDAS POR ESTRESSES AMBIENTAIS INDIVIDUAIS E COMBINADOS EM RATOS

BEHAVIORAL ALTERATIONS INDUCED BY INDIVIDUAL AND COMBINED ENVIRONMENTAL STRESSORS IN RATS

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Instituição: 1 UFC - Universidade Federal do Ceará (Rua Coronel Nunes Melo, 1000, Rodolfo Teófilo, Fortaleza-CE)Introdução:
Stress can induce a wide range of alterations in an organism, depending on frequency, magnitude, duration, type, context, neurodevelopmental stage, sex, and genetic predisposition. Animal models are important tools for investigating the effects of stress, such as stress-induced epigenetic alterations. Based on the fragility of the available animal models for studying mood disorders, we decided to study the interactions between spontaneous/innate and operant/learned behaviors triggered by repeated exposure to either sleep deprivation, inescapable stressful stimuli or a combination of the two. To do this, we used two animal models: paradoxical sleep deprivation (PSD) using the modified multiple platform method and inescapable exposure to hot air blast (HAB). We

hypothesized that exposure to individual or combined environmental stressors may trigger endophenotypes related to mood and anxiety disorders, depending on the innate or learned nature of the behavior.
Objetivos:
To evaluate whether exposing rats to individual or combined environmental stressors triggers endophenotypes related to mood and anxiety disorders, and whether this effect depends on the nature of the behavior (i.e., innate or learned).
Métodos:
We conducted a three-phase experimental protocol. In phase I (baseline), animals subjected to mixed schedule of reinforcement were trained to press a lever with a fixed interval of 1 minute and a limited hold of 3 seconds. On the last day of phase I, an open-field test was performed and the animals were divided into four experimental groups (n=8/group). In phase II (repeated stress), each group was exposed to either hot air blast (HAB), paradoxical sleep deprivation (PSD) or both (HAB+PSD group) on alternate days over a 10-day period. Control group animals were not exposed to stressors. In phase III (post-stress evaluation), behavior was analyzed on the first (short-term effects), third (mid-term effects), and fifth (long-term effects) days after repeated stress.The experimental procedures were in accordance with Brazilian legislation on the care and maintenance of experimental animals. The study was approved by the local ethics committee for animal experimentation (CEUA protocol 96/13).
Resultados e Conclusões:
The PSD group presented operant hyperactivity ($p < 0,0001$), the HAB group presented spontaneous hypoactivity ($F[1,84] = 6.647$, $p = 0.012$) and anxiety ($p=0,044$) and the HAB+PSD group presented spontaneous hyperactivity ($p < 0,0001$), operant hypoactivity (short-term: $p = 0.06$; mid-term: $p = 0.02$; long-term $p = 0.03$ vs. baseline), impulsivity (long- vs. short-term, $p = 0.013$), evidence of loss of interest, and cognitive impairment. A combination of environmental stressors (HAB and PSD) may induce endophenotypes related to bipolar disorder.
Palavras-chaves: Animal model, Combined stressors, Paradoxical sleep deprivation, Hot air blast, Bipolar disorder
Agência Fomento: Coordenação de Aperfeiçoamento de Pessoal de Nível Superior (CAPES)

18.063 - PAPEL DA VIA MONOAMINÉRGICA E FATOR NEUROTRÓFICO DERIVADO DO CÉREBRO NO EFEITO-TIPO ANTIDEPRESSIVO DO DERIVADO PIPERAZÍNICO, LQFM212

ROLE OF THE MONOAMINERGIC PATHWAY AND BRAIN-DERIVED NEUROTROPHIC FACTOR IN THE ANTIDEPRESSANT-LIKE EFFECT OF THE PIPERAZINE DERIVATIVE, LQFM212
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Depression has a complex neurobiology that involves alterations in neural networks, e.g. hypofunction of monoaminergic neurotransmission and neurotrophic factors. In the investigation of psychoactive drug candidates, piperazine derivatives constitute an attractive class of chemical compounds with ability to cross the blood-brain barrier and act on the central nervous system. In this regard, the 2,6-di-tert-butyl-4-((4-(2hydroxyethyl)piperazin-1-yl)methyl)phenol compound (LQFM212) is a piperazine derivative which has already demonstrated antidepressant-like effect in the forced swimming test (FST) with involvement of serotonergic pathway.
Objetivos:
To investigate the role of noradrenaline, dopamine and brain-derived neurotrophic factor (BDNF) in the antidepressant-like effect of LQFM212.
Métodos:
Experiments were conducted using adult male Swiss mice (n=8), according to Ethical Principles in Animal Research and approved by Ethics Committee on the Use of Animals (CEUA/UFG no. 021/13). To investigate the involvement of the catecholaminergic system, animals were pretreated (i.p.) with 0.9% saline (10 mL/kg) or α-methyl-p-tyrosine (AMPT, 512 µmol/kg), enzyme tyrosine hydroxylase inhibitor, and treated (p.o.) 4 hours later with vehicle (2% Tween 80, 10 mL/kg) or LQFM212 (54 µmol/kg). In addition, participation of noradrenergic receptors was evaluated by pretreatment (i.p.) with prazosin (2.6 µmol/kg), α1-adrenergic antagonist, or propranolol (7.8 µmol/kg), β-adrenergic antagonist, and treated (p.o.) 15 minutes

later with vehicle or LQFM212 (54 µmol/kg). Also was evaluated the participation of dopaminergic receptors by pretreatment (i.p.) with SCH-23390 (15 µg/kg), D1 antagonist, or sulpiride (146 µmol/kg), D2 antagonist, and treated (p.o.) 30 minutes later with vehicle or LQFM212 (54 µmol/kg). One hour later of all treatments the mice were submitted to FST. For quantification of BDNF levels, animals received repeated treatment once a day with vehicle or LQFM212 (54 µmol/kg) for 15 days. After that, the animals were euthanized and hippocampus collected for the determination of BDNF by Kit Elisa. The results were expressed as mean ± standard error of the mean (SEM). Statistical analyses were performed using Student's Test-t.

Resultados e Conclusões:

In FST, treatment with LQFM212 (217.9 ± 10.2 s), when compared with vehicle (265.4 ± 7.5 s), decreased the time of immobility by 18% (p=0.001). The antidepressant-like effect of LQFM212 was reverted by pretreatment with AMPT, prazosin, SCH-23390 and sulpiride, in 53% (p=0.0001), 25% (p=0.0047), 26% (p=0.0025) and 17% (p=0.0001), respectively. The repeated treatment with LQFM212 increased BDNF hippocampal levels from 221.7 ± 33.2 to 303.1 ± 17.3, when compared to the vehicle, resulting in an increase by 37% (p=0.0353). Together, the results demonstrate that the monoaminergic pathway and the BDNF levels are important for the antidepressant-like effect observed with LQFM212.

Palavras-chaves: BDNF, dopamine, noradrenaline
Agência Fomento: Capes e CNPq

18.064 - MECANISMOS ENVOLVIDOS NA ATIVIDADE TIPO ANSIOLÍTICA DO DERIVADO PIPERAZÍNICO LQFM-213

MECHANISMS INVOLVED IN THE ANXIOLYTIC-LIKE ACTIVITY OF PIPERAZINE DERIVATIVE LQFM-213

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Instituição: 1 UFG - Universidade Federal de Goiás (Campus Samambaia, 74001-970, Goiânia, GO, Brazil), 2 UFG FF - Universidade Federal de Goiás (Faculdade de Farmácia Goiânia-GO)Introdução:

Anxiety is a mental disorder that affects a large part of the world population, and it can cause damages in the quality of life of the individuals affected by such pathology. In this sense, in several cases the pharmacological treatment of anxiety is necessary, through the use of anxiolytics and antidepressants, which may have adverse effects, so it is necessary to search for new prototypes for drugs that are more effective and with less undesirable effects. Treatment of the animals with the piperazine derivative LQFM213 showed dose-dependent behavioral changes indicative of anxiolytic activity in elevated plus maze test (EPM).

Objetivos:

To investigate the mechanism of action involved in the anxiolytic-like activity of piperazine derivative LQFM-213.

Métodos:

Adults male Swiss mice (n=7), weighing approximately 30-35 g, were kept under controlled temperature conditions with water and feed ad libitum. The experiments were conducted according to the Ethical Principles in Animal Research and approved by the Ethics Committee on the Use of Animals (CEUA/UFG no. 021/13). It was evaluated action mechanism of LQFM-213 in the EPM using pharmacological antagonists of GABAA receptor/benzodiazepine site (flumazenil) and antagonist of 5-HT1A receptor (WAY-100635). The animals were pretreated (i.p.) with 0.9% saline (10 mL/kg), flumazenil (6.6 µmol/kg) or WAY-100635 (0.7 µmol/kg). After 30 minutes the animals were treated (p.o.) with vehicle (2% Tween 80, 10 mL/kg) or LQFM-213 (50 µmol/kg). One hour later mice were submitted to EPM. The results were expressed as mean ± standard error of the mean (SEM). Statistical analyses were performed using Student's Test-t. Statistical difference was considerate when $p \leq 0.05$.

Resultados e Conclusões:

In EPM, treatment with saline/LQFM-213, when compared with saline/vehicle group, increased the percentage of entries in the open arms from 49.7 ± 1.3% to 58.3 ± 2.5% (p=0.0164) and the time spent in the open arms from 36.9 ± 3.5% to 53.2 ± 2.5%(p=0.0031) and reduced the time spent in the central platform from 27.2 ± 0.7% to 22.2 ± 1.8% (p=0.0133). On the other hand, when compared with the flumazenil/LQFM-213 group, there was no statistical difference. However, treatment with WAY-100635/LQFM-213, when compared with saline/LQFM-213 group, reduced the percentage of entries in the open arms from 51.3 ± 1.9% to 45.6 ± 1.5% (p=0.0466) and time spent in the open arms from 53.9 ± 2.5% to 40.8 ± 3.6% (p=0.0163), and increased the time spent in the central platform from 19.8 ± 1.4% to 28.8 ± 2.5% (p=0.0119). The results obtained show that the

anxiolytic-like activity of compound LQFM-213 was not altered by pretreatment with flumazenil, suggesting that the benzodiazepine site of the GABAA receptor may not contribute for this activity. The pretreatment with WAY-100635 reduced the anxiolytic-like activity of LQFM-213, suggesting the participation of 5-HT1A receptor in the activity observed in EPM.
Palavras-chaves: Anxiety, Behavioral pharmacology, Serotonin
Agência Fomento: Capes e CNPq

18.065 - EFEITO ANTIDEPRESSIVO E ANTIOXIDANTE DO (-)-α-BISABOLOL EM CAMUNDONGOS C57BL/6 SUBMETIDOS AO ESTRESSE CRÔNICO IMPREVISÍVEL

ANTIDEPRESSANT AND ANTIOXIDANT-LIKE EFFECTS OF (-)-α-BISABOLOL IN C57BL/6 MICE SUBMITTED TO AN CHRONIC UNPREDICTABLE STRESS MODEL (CUS)
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Depression is characterized by symptoms of depressed mood, isolation and guilt, and can lead the individual to suicide. There have been some hypotheses that justify its symptoms, however it's cause isn't completely elucidated. The principal treatment used for depression consists of pharmacotherapy with antidepressants, however, they present many adverse effects, as well a long latency period for the therapeutic effect. Likewise, it is interesting to investigate new compounds with antidepressant potential, such as (-)- α-bisabolol (BIS).
Objetivos:
The aim of the study was to evaluate the antidepressant effect of (-)- α-bisabolol, on C57BL/6 mice submitted to an Chronic Unpredictable Stress model (CUS).
Métodos:
: The animal were divided in four groups: vehicle (saline + 3% Tween 80, p.o), (-)- α-bisabolol at doses of 25 or 50 mg/kg, p.o, or Fluoxetine 10 mg/kg, p.o as a drug of reference. At the end of the treatment protocol, the mice were submited to behavioral tests: open field test (OFT), forced swim test (FST) and tail suspension test (TST). This work was approved by the Animal Use Ethics Committee (CEUA) of the Federal University of Ceará (Protocol Number: 9361/15022018). After 60 minutes of behavioral tests, the animals were euthanized by decapitation, and brain areas (hippocampus-HC and prefrontal córtex-PFC) were dissected and investigated the action of BIS on oxidative stress, and on the inflammatory cytokines levels.
Resultados e Conclusões:
RESULTS: The results showed that BIS 25mg/kg and 50mg/kg presented an antidepressant-like effect in the FST (CONTROL: 48.88 ± 12.15; CUS: 130.4 ± 12.06; CUS + BIS25: 43.25 ± 5.119; CUS + BIS50: 19.88 ± 6.501, $P < 0,05$) and the TST (CONTROL: 131.8 ± 5.369; CUS: 175.0 ± 7.416; CUS + BIS25: 115.4 ± 10,53; CUS+BIS50: 103.5 ± 7.028, $P < 0,05$). They presented no effect on crossing numer in the OFT (CONTROL: 52.63 ± 6.279; CUS: 59.00 ± 7.119; CUS + BIS25: 60.50 ± 6.092; CUS + BIS50: 67.75 ± 5.845), discarding relaxant or psychostimulant effects in these doses. In relation oxidative stress, BIS 50mg/kg, reduced levels of malondialdehyde in the HC (CUS: 259.5 ± 20.01; CUS + BIS50: 19.05 ± 4.117), and nitrite/nitrate in the PFC (CUS: 26.11 ± 4.06; CUS + BIS50: 5.65 ± 3.57, $P < 0,05$). The animals submited to CUS model increased the levels of cytokines in the HC (IL-1 β: CONTROL: 2047 ± 177.2; CUS: 8381 ± 717.4) and the PFC (IL-1 β: CONTROL: 2966 ± 455.1; CUS: 7383 ± 1388/ TNF- α: CONTROL: 1087 ± 220.6; CUS: 3743 ± 738.5), however, (-)- α-bisabolol didn't alter these levels. CONCLUSIONS: The present results suggests an antidepressant and antioxidante-like effects of (-)- α-bisabolol.
Palavras-chaves: (-)-α-bisabolol, antidepressant effect, unpredictable chronic stress model
Agência Fomento: CNPq (Process number 12/2017, 306746/2013-1, 446120/2014-6 and 407567/2013-5), FUNCAP and Capes (Finance Code: 001)

18.066 - EFEITO ANTIDEPRESSIVO DA RIPARINA IV EM CAMUNDONGOS: ENVOLVIMENTO DO SISTEMA MONOAMINÉRGICO

ANTIDEPRESSANT-LIKE EFFECT OF RIPARIN IV IN MICE: INVOLVEMENT OF THE MONOAMINERGIC SYSTEM
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Depression is a public health concern, resulting in negative effects on society and public systems. Theories on pathophysiology of depression are based on studies investigating psychosocial stress and related hormones, neurotransmitters, neurocircuits, neurotrophic factors, circadian rhythms, and the immune system.
Objetivos:
The aim of this study was to investigate the antidepressant-like effect of riparin IV, a synthetic alkamide analogue to Aniba riparia's natural compounds.
Métodos:
Male Swiss adult mice (20 g and 30 g) were divided in groups and treated p.o. with vehicle, riparin IV (50 or 100 mg/kg), fluoxetine, bupropion, or imipramine and used in the behavioral tests, such as forced swimming test (FST) and tail suspension test (TST). The open field test OFT was used to evaluate spontaneous locomotor activity. To evaluate the involvement of monoaminergic system mice were pre-treated with specific receptor antagonists (prazosin 62.5 mg/kg, yohimbine 1 mg/kg, SCH23390 15 µg/kg, sulpiride 50 mg/kg, ritanserin 4 mg/kg or ondansetron 0,1 mg/kg) and after were subjected to the FST. Experimental protocols were approved by the Animal Research Ethics Committee of the UFC (68/2014 and 72/2017).
Resultados e Conclusões:
RESULTS: Our results demonstrated that RipIV-50 treatment resulted in shorter immobility time when compared to that of the vehicle group. This effect was not observed in the yohimbine (YOH) + RipIV-50 group. We also observed a significant difference between the RipIV-50 versus the YOH + RipIV-50 groups (vehicle: 198.4 ±7.919; RipIV-50: 130.0±4.563; YOH + RipIV-50: 211.1 ±8.574). In addition, there was no significant difference between the RipIV-50 and prazosin (PRA) + RipIV-50 groups (vehicle: 198.4 ±7.919; RipIV-50: 126.0 ±5.322; PRA + RipIV-50: 169.9 ±11.7). In general, immobility time in the riparin IV group were lower than that in the vehicle group and that in the antagonist groups: SCH23390 (vehicle: 198.4 ±7.919; RipIV-50: 96.75 ±11.31; SCH23390 + RipIV-50: 212.8 ±16.77), sulpiride (vehicle: 198.4 ±7.919; RipIV-50: 81.38±16.61; sulpiride + RipIV-50: 189.3 ±11.96), ritanserin (vehicle: 198.4 ±7.919; RipIV-50: 88.38 ±12.21; ritanserin + RipIV-50: 201.4 ±8.422), and ondansetron (vehicle: 198.4 ±7.919; RipIV-50: 103.0 ±15.31; ondansetron + RipIV-50: 198.0 ±9.813). CONCLUSIONS: The present study explored for the first time, acutely, the antidepressant-like activities of riparin IV that seems to be related to the monoaminergic system. These results suggest it is a promising substance for the treatment of depression in the future.
Palavras-chaves: riparin, depression, monoaminergic system
Agência Fomento: CNPq (Process number 12/2017, 306746/2013-1, 446120/2014-6 and 407567/2013-5), FUNCAP and Capes (Finance Code: 001)

18.067 - BLOQUEIO DO RECEPTOR CB2 REVERTE DÉFICIT NA MEMÓRIA RELACIONADO A ESQUIZOFRENIA

CB2 RECEPTOR BLOCKADE REVERSES A SCHIZOPHRENIA-RELATED MEMORY DEFICIT

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Instituição: 1 UFRJ - Universidade Federal do Rio de Janeiro (Ilha do Fundão, Rio de Janeiro)Introdução:
Cognitive deficits play a central role in schizophrenia. Among those deficits, working memory is one of the most commonly affected domains. Current pharmacotherapy has no impact on such impairments highlighting the need of novel therapeutic targets. Several studies showed that endocannabinoid system is altered in the brain of schizophrenic patients. Also, genetic variations related to the functioning of the gene that encodes the CB2 receptor (CB2R) were associated with schizophrenia and CB2R knockout lead to impairments in short- and long-term fear memory, but improvement in working memory. Despite the evidences pointing to CB2 receptor alterations, results seem to differ according to the evaluated behavior showing the need for further studies. On this way, previous data of our group showed that the CB2R antagonist AM630 improved the performance of mice in the spontaneous alternation task. Moreover, it inhibited the impairment induced by the NMDA antagonist MK-801.
Objetivos:
Thereby, the aim of this study is further characterize the effect of CB2R blockade in a working memory impairment related to schizophrenia.

Métodos:
Male adult Swiss mice working and reference memory was assessed using an 8-arm radial maze (n = 12-15, CEUA CCS-UFRJ 131/16). Animals were trained to search for a reward in the end of seven maze arms. The unbaited arm was used to evaluate the reference memory. Each entry in the unbaited arm represents a reference memory error (RME). Each entry in a previously visited arm represents a working memory error (WME). The number of entrances until the first WME represents working memory capacity (WMC). Deficits in mice memory were induced by MK-801 (0.15 mg/kg i.p.). Blockade of CB2R was achieved by pretreatment with the antagonist AM630 (0.3 or 1.0 mg/kg i.p.). Data were analyzed by two-away ANOVA and Bonferroni post-test.
Resultados e Conclusões:
MK-801 reduced WMC from 4.6 ± 0.3 arms (control group) to 3.8 ± 0.2 arms ($p = 0,04$). It also increased the number of WME from 4.6 ± 0.6 to 10.5 ± 1.2 ($p < 0,01$). Control group presented 1.1 ± 0.2 RME while animals treated with MK-801 showed a worst performance (2.7 ± 0.7 RME, $p = 0,07$). The CB2R antagonist did not change mice performance in the radial maze per se ($p > 0.05$). However, pretreatment with AM630 0.3 mg/kg successfully reduced the number RME in mice exposed to MK-801 (1.2 ± 0.3, $p = 0,02$) without altering WMC or WME ($p > 0.05$). Finally, MK-801 increased the total number of arm entrances (21.7 ± 1.1 vs. 52.8 ± 2.1 in the control group, $p < 0,01$) while AM630 did not change mice locomotion ($p = 0,61$). In summary, our results show that the NMDA antagonist MK-801 is able to induce schizophrenia-related working and reference memory impairments in mice. CB2R antagonist AM630 inhibited the MK-801-induced deficit in reference memory but not in working memory. Further experiments to confirm these observations as well as to understand the mechanisms involved in this modulation are underway.
Palavras-chaves: Working Memory, Schizophrenia, AM630, MK-801
Agência Fomento: Faperj

18.068 - CHIA (Salvia hispanica L.) TREATMENT MODULATE 5-HT1A RECEPTOR AND CREB-1 INTO THE CIRCUITRY OF THE DORSAL AND VENTRAL HIPPOCAMPAL FORMATION

CHIA (Salvia hispanica L.) TREATMENT MODULATE 5-HT1A RECEPTOR AND CREB-1 INTO THE CIRCUITRY OF THE DORSAL AND VENTRAL HIPPOCAMPAL FORMATION

Autores: Milena Ferreira Silva 1, Camila de Carvalho Mariano 1, Cinthia Romeika de Oliveira 1, Vera Lucia Flor Silveira 1, Suzete Maria Cerutti 1, Luciana Chagas Caperuto 1
Instituição: 1 UNIFESP - Universidade Federal de São Paulo (Diadema - São Paulo, Brasil)Introdução:
Depression is the most prevalent mental disorder in population, representing a major global problem. The current medications for the treatment of this disease are not completely effective and have side effects that may aggravate this disorder. In the last decades, the monoaminergic hypothesis has been emphasizing the understanding of the pathophysiology of depression and the action of pharmacological treatments for this disease, making it essential to evaluate the level of 5-HT type 1A receptor (5-HTR1AR) expression. In addition, the hypothesis of neurotrophins has also been used to understand the disease, which shows deficiency in CAMP responsive element binding protein 1 (CREB-1) expression in patients suffering from this disorder. The increased demand for new therapies with greater efficacy and fewer side effects and the use of natural substances for the treatment of depression motivated this study. The essential fatty acids, especially the polyunsaturated fatty acids omega 3 (PUFA ω-3), have been considered of high therapeutic value, because they are able to act positively on nervous tissue. Salvia hispanica L., popularly known as chia, has high concentrations of PUFA ω-3.
Objetivos:
This study aimed to evaluate the effect of chia oil in the differential expression of the 5-HTR1AR and CREB-1 in the dorsal and ventral hipocampal formation (dHF and vHF) of adult male mice (C57BL/6) with depression induced by social isolation (Ethics Committee UNIFESP - 6423200315).
Métodos:
Mice were randomized in groups non-isolated (NI) or isolated (IS). The IS animals were subjected to social isolation (14 days) before the beginning of the treatment. After this period, the groups NI and IS were separated in five subgroups: non-isolated+saline (NI+S), non-isolated+chia (NI+C), isolated+saline (IS+S), isolated+fluoxetine (IS+F) and isolated+chia (IS+C). The animals were subjected to sucrose preference, forced swim and plus-maze discriminative avoidance tasks, before and after the treatment, which lasted for 42 days.
Resultados e Conclusões:

Comparisons between groups of the number of immunopositive cells in the CA1, CA3 and dentate gyrus (DG) revealed no significant differences in the number of cells that were immunoreactive to 5-HT1AR ($P > 0.05$) and CREB-1 ($P > 0.05$) in the isolated mice groups (IS+S; IS+C; IS+F). Further, our data show for the first time that chia treatment not only upregulated the expression of 5-HT1AR in the DG (NI+C: 1.43±0.01, n=3) in the dHF compared with NI+S (1.20±0.02, n=3) but also the expression of 5-HT1AR and CREB-1 in the both DG (NI+C: 96.30±1.15, n=3) and CA3 (NI+C: 98.82±0.61, n=3) of vHF compared with NI+S (DG: 72.26±2.80, n=3; CA3: 82.80±0.80, n=3). Our data add to the current knowledge of the role chia in modulation of proteins correlated with memory in the HF.
Palavras-chaves: depression, social isolation, omega 3
Agência Fomento:

18.069 - EMPATIA EM CAMUNDONGOS: AVALIAÇÃO DO PAPEL DA AMÍGDALA NA MODULAÇÃO DA ANSIEDADE INDUZIDA PELO CONVÍVIO COM PARCEIRO SUBMETIDO A UM MODELO DE ESTRESSE CRÔNICO

EMPATHY IN MICE: THE ROLE OF AMYGDALOID COMPLEX ON MODULATION OF ANXIETY INDUCED BY COHABITATION WITH CAGEMATE SUBJECTED TO CHRONIC STRESS MODEL

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Instituição: 1 UFSCar - Dept Psychology-Psychobiology group/UFSCar (Rodovia Washington Luís km 235), 2 UFSCar/UNESP - Joint Graduate Program in Physiological Sciences UFSCar/UNE (Rodovia Washington Luís km 235), 3 UFSCar - Graduate Program in Psychology/UFSCar (Rodovia Washington Luís km 235)Introdução:
Empathy is the ability to recognize the emotional state in your pairs, being fundamental for social interaction and advantage the species survival. Empathic behaviors can be observed in animal models, as well as increase anxiety resulting from cohabitation with a cagemate undergoing to chronic stress. Neural basis of anxiety and the sharing of emotions point to the amygdala as area involved in processing and generating emotions.
Objetivos:
In this sense, the present work investigated, through the protocol of empathy in mice, the role of amygdaloid complex on modulation of anxiety induced by living with cagemate submitted to chronic restraint stress.
Métodos:
For this purpose, male swiss mice (n=4-8/group, CEUA 7821030418), were housed in pairs for a period of 28 days. On the 14th day, they were divided into two groups: stress (S) and non-stress (NS). The stress group consisted of two subjects; stress and observer (housed in the same housing), one of them underwent stress sessions (retention tube) for 14 days (15º - 28º day) for 1 hour, in the presence of their cagemate. The non-stress group was composed of a pair wherein none of the subjects underwent stress. On day 24th the cagemate of stressed mouse and control observer went through stereotactic surgery for implantation of guide cannulas in the amygdala. On day 29th, these animals received bilateral intra-amygdala injection of saline (0.1 µl) or cobalt chloride (CoCL2) (1mM, non-selective synaptic inhibitor). After 10 minutes, were evaluated in the elevated plus maze (EPM).
Resultados e Conclusões:
Two-way ANOVA [Factor 1: condition (stressed or non-stressed), Factor 2: intra-amygdala treatment (saline or CoCL2)] revealed a significant difference for the condition factor to % open arm entries [%OA: ($F_{1,20}$= 9.40, $P < 0.01$)] and % open arm time [%OAT: ($F_{1,20}$= 9.44, $P < 0.01$)] without change the locomotor activity, closed arms entries [CAE: ($F_{1,20}$= 0.02, $P > 0.05$)]. The Duncan test revealed that living with cagemate submitted to chronic restraint stress decreased %OA (no stressed: 46.2±4.9; stressed: 13.4±5.4); %OAT (no stressed: 41.4±6.5; stressed: 6.7±2.5) in stressed compared to no stressed group. Conclusion: Our results suggest that living with cagemate submitted to chronic restraint stress increase anxiety-like responses in mice. However, intra-amygdala inactivation with cobalt chloride did not alter this anxiety indices.
Palavras-chaves: empathy, stress, anxiety
Agência Fomento: -

18.070 - AVALIAÇÃO COMPORTAMENTAL DA COMBINAÇÃO DE MIRTAZAPINA E ÁCIDO A-LIPÓICO EM MODELO DE DEPRESSÃO INDUZIDO POR CORTICOSTERONA EM CAMUNDONGOS

BEHAVIORAL EFFECTS OF MIRTAZAPINE AND A-LIPOIC ACID ON AN ANIMAL MODEL OF DEPRESSION INDUCED BY CORTICOSTERONE

Autores: Naiara Coelho Ximenes 1, Tatiana de Queiroz Oliveira 1, Adriano José Maria Chaves Filho 1, Paloma

Marinho Jucá 1, Michelle Verde Ramos Soares 1, Charliene Freire Xavier Vieira 1, Natássia Lopes Cunha 1, Germana Silva Vasconcelos 1, Manuel Alves dos Santos Junior 1, Silvania Maria Mendes Vasconcelos 1
Instituição: 1 UFC - Universidade Federal do Ceará (Rua Coronel Nunes de Melo, 1000)Introdução:
Depression is a serious disorder characterized by depressed mood, cognitive impairments, sleep and appetite alterations that affects around 320 million people worldwide (APA, 2014; OTTE el at., 2016; OMS, 2018). The animal model of depression induced by chronic administration of corticosterone (CORT) leads to a hypothalamic-pituitary-adrenal axis disruption causing depressive-like behaviours (CHOPRA; KUMAR; KUHAD, 2011). Mirtazapine (MIRT) is an antidepressant used in the treatment of resistant depression, but with important side effects such as sedation and weight gain. The α-lipoic acid (ALA) is an endogenous compound with inflammatory and antioxidant properties. We raised a hypothesis that its combination with MIRT could ameliorate the MIRT effects.
Objetivos:
We aimed to evaluate the antidepressant effects of the combination of MIRT and ALA on mice submitted to an animal model of depression induced by CORT.
Métodos:
Adult male mice received 0.3% Tween 80, corticosterone (CORT 20 mg / kg), MIRT (3 mg / kg), ALA (100 or 200 mg / kg), alone or associated for 21 days. The animals were submitted to the sucrose (SPT) and forced swimming (FST) tests on the last day of treatment.
Resultados e Conclusões:
Chronic administration of CORT significantly reduced the sucrose preference of animals when compared to vehicle [F (6,38) = 5,107; P = 0.0006], demonstrating an anhedonia-like behaviour. Animals treated with ALA alone (100 or 200) did not show significant difference when compared to the CORT group. However, the MIRT treated group showed an increase in sucrose consumption when compared to the CORT group (P = 0.0132), demonstrating a reversal of anhedonia-like behaviour. Likewise, animals treated with the combination (ALA 100 + M or ALA 200 + M) showed an increase in sucrose consumption when compared to the CORT group (P = 0.0338; P = 0.0103, respectively). Chronic administration of CORT significantly increased the immobility time when compared with the vehicle group [F (6.45) = 3.997; P = 0.0027] in the FST. This effect was reversed when the animals were treated with MIRT (P = 0.0081) and with the association of ALA 200 + M (P = 0.0178) compared to the CORT group. Taken together, our results suggested that the administration of ALA 200 associated with MIRT ameliorate depressive-like behaviours induced by chronic administration of CORT. This provides evidence that the combination of ALA + MIRT may be a perspective of treating depression. However, further research may be conducted for this purpose.
Palavras-chaves: ácido lipóico, depressão, mirtazapina
Agência Fomento: FUNCAP

18.071 - INFLUÊNCIA DO SEXO E IDADE NAS ALTERAÇÕES COMPORTAMENTAIS E HIPOCAMPAIS DE INTERLEUCINA-6 NO MODELO ANIMAL DE DOIS ESTÍMULOS DA ESQUIZOFRENIA INDUZIDA POR ATIVAÇÃO IMUNE NEONATAL COMBINADA COM O ESTRESSE PERIPUBÉRTEO.

SEX AND AGE INFLUENCE IN BEHAVIORAL AND HIPPOCAMPAL INTERLEUKIN-6 CHANGES IN THE TWO-HITS ANIMAL MODEL OF SCHIZOPHRENIA INDUCED BY NEONATAL IMMUNE ACTIVATION COMBINED WITH PERIPUBERTAL STRESS

Autores: Tatiane Da Silva Araujo 1, Eliclecio Rodrigues Da Silva 1, Germana Silva Vasconcelos 1, Caren Nádia Soares De Sousa 1, Manuel Alves Dos Santos Júnior 1, Ingridy Da Silva Medeiros 1, Maria Gabrielle Oliveira E Silva Linhares 1, Cid Coelho Pinto 1, Silvania Maria Mendes Vasconcelos 1, Danielle Macedo 1
Instituição: 1 UFC - Universidade Federal Do Ceara (Rua Coronel Nunes de Melo, 1000 - Rodolfo Teófilo, Fortaleza - CE)Introdução:
Schizophrenia (SCZ) is a severe mental illness characterized by positive (PS) as delusions and hallucinations, negative (NS) as social withdrawal and cognitive symptoms (CS). SCZ presents sex influences in its onset and symptoms severity with men presenting earlier onset of symptoms. Perinatal immune challenge combined with pubertal stress are important risk factors for SCZ, being called the two-hit model.
Objetivos:
Ourfirst aim was to determine behavioral alterations related to SCZ symptoms, in both sexes mice exposed to neonatal immune challenge with poly I:C (PIC) with peripubertal unpredictable stress (PUS) in ages related to human late adolescence (postnatal day – (PN) 50) and adulthood (PN70). Next, we evaluated changes in hippocampal IL-6.
Métodos:

Male and female Swiss mice on PN5-7 received PIC (1 mg/kg, IP). This period corresponds to human last trimester of gestation. On PNs 35-43 mice were exposed to PUS. Behavioral determinations included pre-pulse inhibition (PPI) for PS, social interaction for NS and Y maze for CS, performed on PNs 50 and 70. Statistical analyses were done by two-way ANOVA followed by Tukey's test, $P < 0.05$.Controls received sterile saline during neonatal age being maintained undisturbed in adolescence. The study was approved by the local ethics committee.
Resultados e Conclusões:
Two-hit male mice presented 17% PPI deficit on PN50 and 29% on PN70. In two-hits females this reduction was only on PN70 (30.4 %). Memory deficits and social isolation were observed in both sexes and ages. IL-6 was increased in males on PN50 and 70 and in females on PN70. Thus, in early ages male and female mice present distinct symptoms of SCZ with male animals presenting all symptoms while females only with negative- and cognitive-like ones. These results are of great importance since SCZ is diagnosed based on positive symptoms. Possibly the disorder is underdiagnosed in adolescent females due to sex differences in the symptoms and not on age onset. Hippocampal IL-6 was related to PPI deficits.
Palavras-chaves: Esquizofrenia, ativação imune, two-hits
Agência Fomento:

18.072 - TRATAMENTO PREVENTIVO DE COM NITROPRUSSIATO DE SÓDIO DIMINUI MOTIVAÇÃO ELEVADA PARA O CONSUMO DE SACARINA PRESENTE EM UM MODELO ANIMAL DE ESQUIZOFRENIA: A LINHAGEM SHR

PREVENTIVE TREATMENT WITH SODIUM NITROPRUSSIDE DECREASES HIGH MOTIVATION FOR THE CONSUMPTION OF SACCHARINE PRESENT IN AN ANIMAL MODEL OF SCHIZOPHRENIA: THE SHR STRAIN
Autores: Bianca Aparecida Muniz Pereira 1, Fábio Cardoso Cruz 1, Vanessa Costhek Abílio 1
Instituição: 1 Unifesp - Universidade Federal de São Paulo (R. Botucatu, 862 - Vila Clementino, São Paulo - SP, 04023-062)Introdução:
Schizophrenia is a psychiatric disorder that affects about 1% of the world's population and is associated with neurochemical and behavioral changes. Its involves positive, negative symptoms and cognitive deficits. Current treatments of schizophrenia are poorly effective against negative symptoms, including anhedonia and impairment in social performance. Some studies indicate that these two symptoms may be related, manifesting as a social anhedonia. Despite anhedonia, schizophrenia has a high comorbidity with drug abuse, a behavior considered highly pleasurable. Decrease in social performance and high consumption behaviors are observed in the SHR (Spontaneously Hypertensive Rat) strain, an animal model suggested by our laboratory for the study of schizophrenia. For treatment, clinical and preclinical studies suggest that sodium nitroprusside (SNP) as a therapeutic strategy for the symptoms of schizophrenia.
Objetivos:
We aimed to evaluate SNP in preventing the high consumption behaviors presented by the spontaneously hypertensive rats (SHR) strain.
Métodos:
40 Wistar rats and SHR (20/strain) were divided into 4 groups and treated with vehicle (SAL) or sodium nitroprusside (SNP) at the dose 2.5 mg/kg from 30 to 60 days postnatal. These groups are: Wistar-SAL, Wistar-SNP, SHR-SAL, SHR-SNP, 30 days after the end of treatment, the animals were submitted to behavioral tests, such as the saccharine operative self-administration test
Resultados e Conclusões:
There was an increase in consumption behaviors in the SHR strain,in comparison to Wistar rats receiving vehicle [$F(3,23) = 13{,}690$; $p < 0.05$]. There was an decrease in pressures on the active lever in SHR treated with SNP in comparison to SHR receiving vehicle [$F(3,23) = 4{,}054$; $p < 0.05$].These results points to SNP as a preventive strategy to decrease consumption behaviors in the SHR strain, indicating its beneficial effect in preventing high consummatory behaviors in comorbidity with schizophrenia.
Palavras-chaves: esquizofrenia, modelos animais, nitroprussiato de sódio, SHR
Agência Fomento: Coordenação de Aperfeiçoamento de Pessoal de Nível Superior

18.073 - AVALIAÇÃO DOS EFEITOS AGUDOS DO CHÁ DA AYAHUASCA OU CETAMINA EM CAMUNDONGOS EXPOSTOS A ESTRESSE CRÔNICO LEVE IMPREVISÍVEL

EVALUATION OF ACUTE EFFECTS OF AYAHUASCA TEA OR KETAMINE ON MICE EXPOSED TO UNPREDICTABLE CHRONIC MILD STRESS

Autores: Francisco Cid Coelho Pinto 1, Ingridy Silva Medeiros 1, Manuel Alves dos Santos Júnior 1, Germana Silva Vasconcelos 1, Naiara Coelho Ximenes 1, Caren Nádia Soares de Sousa 1, Francisco Eliclécio Rodrigues da Silva 1, Tatiane da Silva Araújo 1, Gabrielle Oliveira e Silva Linhares 1, Michelle Verde Ramo Soares 1, Iásly Costa Lima 2, Adriano Jóse Maia Chaves 1, Paloma Marinho Jucá 1, João Victor Souza Oliveira 1, Danielle Macedo Gaspar 1, David Freitas de Lucena 1
Instituição: 1 UFC - Universidade Federal Do Ceará (Rua Coronel Gomes de Melo 1000), 2 UECE - Universidade Estadual do Ceará (Avenida Doutor Silas Munguba 1700)Introdução:
Currently, almost 50% of patients with major depression do not show significant improvement in the first 8-12 weeks. Only 20 to 35% will present complete remission, being difficult to manage treatment-resistant depressed patients. Several studies discussed the potential of Ayahuasca tea as a new perspective to treat resistant depression and major depression in a single dose. A clinical study showed therapeutical effects of Ayahuasca tea on treatment-resistant depressed patients. These effects sustained up to 14 days.
Objetivos:
We aimed to evaluate the antidepressant-like effect of Ayahuasca tea in mice exposed to chronic unpredictable stress (CUS).
Métodos:
Male mice were treated with a single injection of Ayahuasca tea (AT) (20 ml/kg, o.p.), ketamine (Ket) (10 mg/kg, i.p.) or vehicle (Veh) (water or saline, o.p or i.p.; respectively) at the 29th day of the CUS protocol. We separated the mice into six groups: Veh-CUS (n= 10), Veh+CUS (n= 10), Ket-CUS (n= 10), Ket+CUS (n= 10), AT-CUS (n= 10), and AT+CUS (n= 10). All experimental and control groups were submitted to oral administration 30 minutes prior to intraperitoneal injection. We performed the open field (OFT) and forced swimming test (FWT) two hours after the last injection. After approval of the Animal Ethics Committee, the study was registered under the protocol number 3065091118.
Resultados e Conclusões:
Our results demonstrated that AT treatment in the animals exposed to CUS decreased the immobility time compared to Veh+CUS group [F (1, 45) =3,759] with P=0.0322. Considering the OFT, the statistical analysis of crossing number showed an interaction between the “treatment” and “chronic stress” factors [F (2, 50) = 3.595; P=0.0348]. Posthoc tests showed that AT-CUS group presented less crossing number compared to Veh-CUS (P < 0.0001). In addition, AT-CUS group decreased the crossing number when compared to Ket-CUS (P < 0.0001). On the other hand, the treatment with AT in mice exposed to CUS decreased the number of rearing compared to Veh+CUS [F (2, 47) = 18.81; P < 0.0001] and compared to Ket+CUS (P=0.0003). When the number of entries in the center parameter was analyzed there was a significant interaction between the factors [F (2, 53) = 6.088; P=0.0042]. AT+CUS treated group decreased the number of entries in the center square compared to the Veh+CUS group (P=0.0482), and compared to Ket+CUS group (P=0.0003). Taken together, our results demonstrated that Ayahuasca tea treatment in animals submitted to chronic unpredictable stress affected the despair behavior, locomotor activity and anxiety-like behavior. It is necessary to evaluate the Ayahuasca tea effects in other depressive-like, and anxiety-like behaviors related to animal models of depression. Furthermore, we need to investigate deeply the mechanisms and effects of Ayahuasca tea and ketamine as rapid antidepressants.
Palavras-chaves: depression, ayahuasca, ketamine
Agência Fomento: CAPES

18.074 - ESTUDO DA MICROBIOTA INTESTINAL DE CAMUNDONGOS INDUZIDOS A DEPRESSÃO POR ESTRESSE IMPREVISÍVEL

STUDY OF THE INTESTINAL MICROBIOTE OF MICE INDUCED TO DEPRESSION BY UNPREDICTABLE STRESS.

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Instituição: 1 UNICHRISTUS - Christus University Center (St. João Adolfo Gurgel, 133 - Cocó, Fortaleza - CE, 60190-060), 2 UECE - Vettings Laboratory, State University of Ceará (Doctor Silas Munguba Avenue, 1700 Campus do - Itaperi, Fortaleza - CE, 60741-000)Introdução:
The intestinal microbial community has been identified as essential for several physiological functions of the human organism, and its high comorbidity among psychiatric symptoms related to stress, such as

depression and anxiety. Characterizing the microbial community of the intestinal system in patients with psychiatric disorders is an important step in predicting disease states and in developing new therapies.
Objetivos:
To analyze the intestinal microbiota profile of mice induced to depression by unpredictable chronic stress.
Métodos:
Method: Swiss mice were divided into 3 groups: Group 1 - Control, without stress induction, Group 2 - Induced with unpredictable chronic stress anxiety and Group 3 - Fluoxetine treated depression. The animals after stress induction in stress (8 days a day, 8 days, 8 days a week, 8 hours a day, 8 days a week, 8 days a week, 8 days a week) 8h) were evaluated by forced swim test. Before the behavioral test was collected and evaluated as the gram-positive and gram-negative variables. Exam results with $p < 0.05$ will be displayed in GraphPrisma 8.0 and presented as mean ± error (number of animals).
Resultados e Conclusões:
Results: In the forced swim test performed with groups of animals, regarding the depression-induced group [86.1 ± 9.5 (14)] 8.2 (7)] and that the depression + fluoxetine group [26, 5 ± 3.7 (7)] had recovery after treatment. Stool analysis was performed using the dataset from a series of gram-positive and negative, containing a larger number of bacterial samples, with a larger amount of data such as cocci shapes and the predominance of gram-negative bacteria. The depression + fluoxetine group showed a reduction in the number of discs, mainly in the form of bacilli and gram-negative discs. Conclusion: The model of inducing unexpected stress-induced depression, besides leading the animals to construct behavioral behaviors of depression, has its intestinal microbiota altered, being reversed after antidepressant treatment.
Palavras-chaves: INTESTINAL MICROBIOTA, DEPRESSION, ANIMAL MODEL
Agência Fomento:

18.075 - “EFEITOS DA IMUNOATIVAÇÃO MATERNAL COM ANTÍGENOS DE TOXOPLASMA GONDII (STAG) E VACINA A (H1N1) E UM PROVÁVEL EFEITO PROTETOR DO RESVERATROL (3,5,4´-TRIHYDROXYSTILBENE) SOBRE OS PREJUÍZOS COMPORTAMENTAIS EM MODELO ANIMAL”

"EFFECTS OF MATERNAL IMMUNITY WITH TOXOPLASMA GONDII ANTIGENS (STAG) AND VACCINE A (H1N1) AND A PROTECTIVE AGENT OF RESVERATROL (3,5,4'-TRIHYDROXYSTILBENE) ON BEHAVIORAL IMPAIRMENTS IN ANIMAL MODELS"
Autores: Amanda Soares Lima 1, Rener Mateus Francisco Duarte 1,1, Erika Renata Barbosa Neiro 1,1, Frederico Rogerio ferreira 2, Angelica Oliveita Gomes 3,5, Elias José Oliveira 3, Vanessa Beatriz Monteiro Galassi Spini 3,3
Instituição: 3 UFU - Universidade federal de Uberlândia (Av. Pará, 1720 – Uberlândia- MG), 4 FIOCRUZ - Fundação Osvaldo Cruz (Av. Brasil, 4365 - Manguinhos, Rio de Janeiro - RJ, 21040-900), 5 UFTM - Universidade Federal do Triângulo Mineiro (R. Frei Paulino, 30 - Nossa Sra. da Abadia, Uberaba - MG, 38025-180)Introdução:
Maternal immune activation has shown to contribute to the development of psychiatric disorders in adult offspring. The resveratrol, due to its antioxidant properties, would be able to reverse such damage, protecting and thus preventing the emergence of these disturbances .
Objetivos:
This study aimed to investigate the effects of immunologic stress caused by Toxoplasma gondii antigen (STAg) and influenza A (H1N1) vaccine during pregnancy on behavioral alterations related to adult offspring anxiety and a Possible neuroprotective effect of resveratrol on behavioral impairments.
Métodos:
The pregnant females were divided into 7 experimental groups (n = 6) and submitted to the respective treatments. Gestational age was obtained from the visualization of the vaginal plugs. (E0): G1-5% tween, 1 dose per day (sc) of the E14 the E19 + 1 PBS (ip) injection in E16; G2-5% tween (sc) E14 the E19 + STAg (ip) in E16; G3-resveratrol (sc) E14 the E19, + PBS (ip) in E16; G4-resveratrol (sc), E16 the E19 + STAg (ip) in E16; G5-5% tween (sc) E14 the E19 + a(H1N1) vaccine in E16; G6-resveratrol of E14 the E19, + PBS in E16; G7-resveratrol (sc) of the E19 E16 + a(H1N1) vaccine in E16. Adult male pups from treated mothers had valued behaviors in the elevated plus maze (EPM). Statistical analysis was done using two way ANOVA.
Resultados e Conclusões:
The results were expressed as the average + EPM, p 0.05 considered significant being < . Protocol/CEUA UFU 048/16. On the ICE the groups G1, G3, G4, G6 and G7 remained significantly more time in open arms (98.34 97.45 +11.78 +16.15; +12.24; 94.09 131.11 ± 10.61; 179.75 ± 6.93; 170.7 ± 8.46, respectively) when compared with the G2 (64.81 ± 15.69) and G5 (107.02

± 12.27) whose mothers received the immunogenic insult. The results show that the RSV used in dosing of 40 mg/kg animal was not able to reverse the damage caused by behavioral STAg, but was able to revert when the insult was caused by vaccine.
Palavras-chaves: IMUNOATIVAÇÃO , ANSIEDADE, LABIRINTO EM CRUZ
Agência Fomento: CNPq e PROPP UFU

18.076 - EFEITOS DO ARIPIPRAZOL SOBRE ALTERAÇÕES COMPORTAMENTAIS E NEUROTRÓFICA INDUZIDAS POR MODELO DE DEPRESSÃO INDUZIDA POR CORTICOSTERONA

ARIPIPRAZOLE EFFECTS ON BEHAVIORAL AND NEUROTROPHIC CHANGES IN A MICE MODEL OF DEPRESSION INDUCED BY CORTICOSTERONE
Autores: Ingridy da Silva Medeiros 1, Caren Nádia Soares de Sousa 1, Raimunda das Candeias 1, Germana Silva Vasconcelos 1, Manuel Alves dos Santos Júnior 1, Francisco Cid Coelho Pinto 1, Francisco Eliclecio Rodrigues da Silva 1, Naiara Coelho Ximenes 1, Tatiane da Silva Araujo 1, Silvânia Maria Mendes Vasconcelos 1
Instituição: 1 UFC - Universidade Federal do Ceará (Rua Coronel Nunes de Melo, 1000 - Rodolfo Teófilo, Fortaleza)Introdução:
Depression is a disorder that triggers sadness and/or anhedonia and cognitive impairment. Moreover, cognitive dysfunction affects negatively the psychosocial functioning, and it has hindered therapeutic response. Therefore, it is important to investigate the pharmacological agents that improve or reverse these deficits.
Objetivos:
We aimed to study the aripiprazole effects on behavioral and neurotrophic alterations in a mice model of depression induced by corticosterone.
Métodos:
Subcutaneous vehicle (tween 0.03%) or corticosterone (CORT - 20mg/kg) were injected in Female Swiss mice (2 to 3 months old) for 21 days. The experimental groups were designed as follows: administration of vehicle (water, o.p.), desvenlafaxine (20 mg/kg, o.p.) or aripiprazole (0.5 and 1 mg/kg, o.p.) from the 15th to the 21st day. On the 21st day, one hour after the last administration, we performed the open field (OFT), tail suspension (TST) and Y-maze (YMT) tests. After euthanasia, we dissected the hippocampus to determinate Brain Derived Neurotrophic Factor (BDNF) levels. This study was approved by the Ethics Committee on Animal Use of the Federal University of Ceará under CEUA No. 7022230418. Afterward, ANOVA two-way analyses followed by the Tukey test (post hoc test) for multiple comparisons were performed on database. The significance level was 5% (P-value < 0.05).
Resultados e Conclusões:
In the OFT, ARI 1 treatment in the healthy group decreased the number of crossing when compared to the vehicle group ($P < 0.05$). In addition, administration of ARI at both doses did not reverse the increase on immobility time in the TST [$F (3.65) = 3.946$; $P = 0.0120$]. ARI 1 did not affect the work memory impairment [$F (3, 70) = 5.038$; $P = 0.0032$]. On the other hand, administration of ARI 1 increased BDNF levels in the hippocampus ($P < 0.01$) [$F (3, 65) = 11.89$; $P < 0.0001$]. Our findings suggest the neurotrophic effects of ARI 1 need more investigation in future research about the pathophysiology of depression.
Palavras-chaves: Aripiprazole, Corticosterone, Depression
Agência Fomento: CAPES

18.077 - EFFECT OF FB EXTRACT ON THE BEHAVIORAL DAMAGE CAUSED BY ATTENTION DEFICIT HYPERACTIVITY DISORDER IN AN ANIMAL MODEL SPONTANEOUSLY HYPERTENSIVE RATS (SHR)

EFFECT OF FB EXTRACT ON THE BEHAVIORAL DAMAGE CAUSED BY ATTENTION DEFICIT HYPERACTIVITY DISORDER IN AN ANIMAL MODEL SPONTANEOUSLY HYPERTENSIVE RATS (SHR)
Autores: Magali Conte 1, Alexandre dos Santos Martins 1, Paula Lunardi 2, Júlia Pasqualini Genro 3, Lucas de Oliveira Alvares 2, Verônica Contini 1
Instituição: 1 UNIVATES - University of Vale do Taquari (Avelino Tallini Street, 171, Lajeado/RS), 2 UFRGS - Federal University of Rio Grande do Sul (Bento Gonçalves Avenue, 9500, Porto Alegre/RS), 3 UFCSPA - Federal University of Health Sciences of Porto Alegre (Sarmento Leite Street, 245, Porto Alegre/RS)Introdução:
Attention-deficit/hyperactivity disorder (ADHD) is a neurodevelopmental disorder characterized by impairing levels of hyperactivity, impulsivity, and inattention. Stimulant medications, such as methylphenidate, are recommended as pharmacological therapy. Although effective, long-term pharmacological therapy may cause side effects and thus, being able to cause a discontinuation of

treatment among patients, therefore supporting a continuous search for non-pharmacological or alternative interventions.
Objetivos:
To investigate the effects of a FB extract treatment on locomotion of the ADHD animal model (SHR).
Métodos:
Forty - two male rats, thirty - five SHR rats and seven wistar - kyoto rats were divided into six groups (n: 7), according to the treatment: 1 Kyoto - veh; 2 SHR-veh; 3 SHR MPH; 4 SHR-FB50; 5 SHR- FB100; 6 SHR-FB500. Groups 1 and 2 received saline, 3 Ritalin (2 mg / kg), 4 FB (50 mg / kg), 5 FB (100 mg / kg) and 6 FB (500 mg / kg). The treatment was conducted for 15 days, via gavage twice a day. Subsequently, locomotor activity and exploratory behavior were evaluated by the Open-Field Test (OF), where the animals were exposed to the open field for two consecutive days, on the 16th day. On the first day (training) the animal remained for 15 minutes and on the second day (test) for 5 minutes. Each mouse was placed on the periphery of the open field and the total distance traveled (periphery and center) was recorded for 5 minutes. Locomotor activity was evaluated by analyzing the number of crosses for the first 5 minutes. Open-Field Test results were analyzed by one-way ANOVA, followed by Bonferroni's post hoc. Values of $P < 0.05$ were considered significant. This work was approved by the Ethics Committee on the Use of Animals of UFRGS (Nº35747 / 2018).
Resultados e Conclusões:
The locomotor activity was different between groups in the number of crossings ($F (5, 36) = 8.47$, $P < 0.0001$, n= 7). The crossing number was higher in the SHR veh group compared to the kyoto veh group ($P = 0.0027$, n=7). When comparing the SHR veh groups with the SHR treated, we observed a decrease in the number of crosses only in the group treated with MPH or with SHR FB (at the dose of 100mg / kg) ($P = 0.0077$ and $P = 0.0012$, respectively, n=7), showing a reduction in the hyperactivity of the animal. In conclusion the treatment with FB extracts, at dose of 100mg/kg, was effective in reducing the hyperactivity in the animal model of ADHD.
Palavras-chaves: ADHD, Natural products, Open-Field Test
Agência Fomento:

18.078 - EFEITOS DO EXERCÍCIO RESISTIDO DURANTE A GESTAÇÃO NO COMPORTAMENTO DA PROLE SUBMETIDA A SEPARAÇÃO MATERNA

EFFECTS OF RESISTANCE EXERCISE DURING PREGNANCY ON BEHAVIOUR OF THE OFFSPRING SUBMITTED TO MATERNAL SEPARATION
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Instituição: 1 UFRGS - Universidade Federal do Rio Grande do Sul (Rua Sarmento Leite 500)Introdução:
Studies have shown that exercise is safe during pregnancy and offers benefits for both mother and child and that physical activity promotes anxiolytic and antidepressant effects and may attenuate the symptoms of Attention Deficit Hyperactivity Disorder (ADHD). However, the effects of resistance exercise during pregnancy on these parameters are still poorly studied. In contrast, clinical studies show that mother-child separation in the early postnatal period results in several harms to offspring, providing an increased risk of neurodevelopmental disorders such as depression, anxiety and ADHD. Therefore, strategies that can prevent these deficits are of fundamental importance.
Objetivos:
The aim of this study was to evaluate the effects of resistance exercise during pregnancy on puppies submitted to a maternal separation model.
Métodos:
This study was approved by the Ethics Committee of the Universidade Federal do Rio Grande do Sul, Brazil (nº36186). Initially, pregnant Wistar rats were divided into four groups: 1) Sedentary (S); 2) Exercise (EXE); 3) Maternal Separation (MS) and 4) Exercise and Maternal Separation (EXE + MS) (N=15-18/group). The resistance exercise protocol was performed on a sloping ladder throughout pregnancy on a 3-weekly basis, with a weight fixed on the tail of the animal with progressive load increase (35%, 45%, 55% and 75% by weight) according to its capacity. Male and female pups were used in this study (N=10-12/group) and on the day of birth (P0), they were allocated in the same experimental groups as their mothers. The maternal separation protocol was performed from P1 to P10 and consisted of removing the puppies from the housing box for 180 minutes per day, with controlled temperature at 37 ° C. At P30, evaluations of anxiety, exploratory and depressive behaviour were performed by the following tests: Elevated Plus Maze (EPM), Open

Field (OF) and Sucrose Preference (SP). The two-way ANOVA test was used followed by Tukey post-hoc test, with $p < 0.05$ as significant.
Resultados e Conclusões:
In the EPM, a separation effect was observed, indicating that the male puppies from MS group (11.33±2.35, p=0.014) were different when compared to the S group (2.30±2.10), remaining longer in the open arms, demonstrating an impulsive behaviour similar to ADHD. In addition, the EXE+SM group was similar to the S group (7.62±2.35, p=0.247), indicating that gestational exercise prevented the possible deleterious effects of the maternal separation. No differences were found in the females in the EPM test. No additional differences were observed in the other tests neither in male nor in female rats. Our preliminary results may indicate that maternal separation causes impulsive / hyperactive behaviour only in male pups and that resistance exercise during pregnancy has a potential preventive effect on these animals.
Palavras-chaves: Early-life Stress, Attention Deficit Hyperactivity Disorder, Physical exercise
Agência Fomento: Conselho Nacional de Desenvolvimento Científico e Tecnológico

18.079 - ASPECTOS ALIMENTARES E NUTRICIONAIS DE CRIANÇAS E ADOLESCENTES COM TRANSTORNO DO ESPECTRO AUTISTA

FOOD AND NUTRITIONAL ASPECTS OF CHILDREN AND ADOLESCENTS WITH AUTISTA SPECTRUM DISORDER
Autores: Tayná Magagnin 1, Marco Antônio da Silva 1, Fabiane Ferraz 1, Jacks Soratto 1
Instituição: 1 UNESC - Universidade do Extremo Sul Catarinense (Av. Universitária, 1105 - Universitário, Criciúma - SC, 88806-000)Introdução:
Autistic Spectrum Disorder (ASD) is a neurodevelopmental disorder influenced by multiple factors and may extend to eating habits.
Objetivos:
Due to the characteristics of the type of study, two objectives were defined: knowledge: To understand the eating habits, difficulties and eating strategies of children and adolescents with ASD; and practical objective: to build a food and nutrition manual for parents of children and adolescents with ASD.
Métodos:
This is a qualitative approach research of the action research type. The study was conducted at the Autistic Parents and Friends Association. Twenty-one members of the association and 14 parents of children and adolescents with ASD participated in the study, totaling 35 participants. To answer the knowledge objective, a semi-structured interview was adopted as a data collection instrument. Data were analyzed using content analysis technique with assistance of Atlas.ti software. In turn, to address the practical objective, workshops were held to construct a nutritional guidance manual. The study was conducted after approval by Opinion Number 3.084.488.
Resultados e Conclusões:
The results of the study indicated the existence of 260 citations, linked to 50 codes, which were inserted into 9 subcategories, grouped into 3 categories, eating habits of children and adolescents with ASD, eating difficulties of children and adolescents with ASD and dietary strategies for eating. children and adolescents with ASD. The study found that children and adolescents with ASD had a diversified diet, but with high consumption of processed and ultra-processed foods, eating difficulties such as refusal to eat, dysphagia, low acceptance of solid foods, binge eating and gastrointestinal symptoms. Sensory activities showed good results in the food acceptance of new foods. However, most parents are unaware of this practice and do not encourage healthy eating. We conclude that these individuals need a multiprofessional team for qualified attention in food and nutritional treatment. Similarly, the family plays a fundamental role in the process of food and nutrition education, as the environmental factors in this study have been shown to affect the diet of these children and adolescents. Thus, the nutritional guidance manual was developed especially for parents of children and adolescents with ASD so that they can answer their questions and encourage their children to have good eating habits.
Palavras-chaves: Autism Spectrum Disorder, Feeding and Eating Disorders, Food Consumption, Healthy Diet
Agência Fomento:

18.080 - IMPORTÂNCIA DA PROTEÍNA C-FOS E DAS ESPÉCIES REATIVAS DE OXIGÊNIO (ROS) NO COMPORTAMENTO ALTAMENTE AGRESSIVO DE CAMUNDONGOS SWISS WEBSTER DO MODELO ESPONTÂNEO DE AGRESSIVIDADE (MEA).

IMPORTANCE OF C-FOS PROTEIN AND REACTIVE OXYGEN SPECIES (ROS) IN HIGHLY AGGRESSIVE SWISS

WEBSTER MICE IN THE MODEL OF SPONTANEOUS AGGRESSION (MSA).

Autores: Rafaela Santos 1, Renata Machado 1, Samuel Iwao 1, Cleiton Felizardo 1, Tânia Cremonini Cremonini 1, Gabriel Melo 1, Viviane Muniz 1

Instituição: 1 IOC- FIOCRUZ - Instituto Oswaldo Cruz - Fundação Oswaldo Cruz (Avenida Brasil, número 4365, pavilhão Cardoso Fontes. Rio de Janeiro- RJ)Introdução:

The MSA uses regrouping as a stress factor, in which some adult male individuals of the Swiss Webster lineage exhibit highly aggressive behavior (Beh Brain Res. 301: 110, 2016). The association of stress with aggressive behavior would be able to cause an increase in c-Fos protein production (Phys. and Beh. 88: 173, 2006), an increase in dopamine levels (Rev. Soc. Bras. Ciên. Anim. Lab. 2: 322, 2014), mitochondrial dysfunction (Proc. Nat. Acad. Sci. 112: 6614, 2015) and an increase in ROS production (Chem. - Biol. Int. 281:121, 2018) in the prefrontal cortex of mice.

Objetivos:

Analyze the expression of c-Fos protein and the ROS production in the prefrontal cortex of MSA mice.

Métodos:

The methodology (MSA) applied was developed by our team (Beh. Brain Res. 301: 110, 2016; Neuroch. Int. 126: 210, 2019), in which the animals were grouped in the 3rd week of life, at the 10th week the animals were regrpuped and categorized into: highly aggressive (Agg), beaten (AgD), harmonics (Har), a part of animals was not regrouped (NR). c-Fos protein quantification, and ROS production analysis in the cerebral córtex by immunohistochemistry and DHE assay, respectively.

Resultados e Conclusões:

Only AgR mice presented a significantly higher number of attacks of 9.9±6.9 number of attacks/30 min ($p \leq 0.05$) than the other categories, and only the AgD mice presented accentuated lesions of 3.0±0.9 cm^2 ($p \leq 0.05$). AgR animals showed a significant percentage increase of c-Fos positive cells of 98.6±0.7% ($p < 0.01$), compared to the other categories (NR:80.3±5.8; Har:87.9±2.5; Sub:87.7±8), NR animals showed significant increase of c-Fos negative cells of 19.7±5.8% ($p < 0.0001$) compared to the other categories (Har:12.1±2.5; Sub:12.3±8.9; AgR:1.4±0.7%). AgR animals showed a significant increase in ROS production of 42.1±4.8 MFI ($p < 0.05$), comparing with the other categories (Har:32.9±4.1; Sub:29.2±16.9; NR:32.1±6.1 MFI). In this study, in the group under regrouping stress, only the aggressive animals presented. Conclusion: an increase in c-Fos expression and ROS production, suggesting that the overexpression of c-Fos would be a cellular attempt to stimulate the production of antioxidant agents to reduce ROS concentration.

Palavras-chaves: aggressividade, c-Fos, cortéx pré-frontal, modelo espontâneo de agressividade (MEA), Espécies Reativas de Oxigênio

Agência Fomento: CNPq

18.081 - SEPSE INDUZIDA POR PNEUMONIA CAUSA NEUROINFLAMAÇÃO, COMPORTAMENTO TIPO ANSIOSO E DEPRESSIVO EM CAMUNDONGOS

PNEUMONIA-INDUCED SEPSIS IN MICE CAUSE NEUROINFLAMMATION, ANXIETY AND DEPRESSIVE-LIKE BEHAVIOR

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Instituição: 1 UFSC - Universidade Federal de Santa Catarina (R. Eng. Agronômico Andrei Cristian Ferreira, s/n - Trindade, Florianópolis - SC.), 2 UDESC - Universidade do Estado de Santa Catarina (R. Pascoal Simone, 358 - Coqueiros, Florianópolis - SC, 88080-350)Introdução:

Clinical studies have showed that sepsis survivors presented increased neuropsychiatric problems compared to before sepsis. Sepsis leaves the survivors with an aftermath of neuropsychiatric and functional impairment. However, the causal role in these short and long term dysfunctions remains unclear.

Objetivos:

To evaluate the neuroinflammatory and temporal behavioral profile in an experimental model of pneumosepsis induced by intratracheal instillation of Klebsiella pneumoniae (K.p).

Métodos:

Forty male Swiss mice were divided into control group and pulmonary sepsis group. The bacteria used in the experimental was Klebsiella pneumoniae (K.p) (ATCC 700603 - American Type Culture Collection, Rockville, MD). A 5 mm incision in the skin of the animal's ventral neck was made, and the musculature gently removed with the identification of the 0.05 mL trachea for injection of the bacterial suspension or PBS. The mice were evaluated (24h, 48-72h, 7 days). Locomotor activity and exploratory behavior (open field test), depressive-like behavior (tail suspension test), anxiety-like behavior (elevated plus maze), and memory (object recognition) were analyzed. The animals were

euthanized for lung, hippocampus and prefrontal cortex removal for analysis of inflammatory profile (TNF- α, IL-1 β, IL-6), organic damage and CFU (colony forming units). Data were analyzed using Sigma Stat software (California, USA, 2005). Data normality was analyzed by the Shapiro Wilk test, followed by Two-way ANOVA, and Holm-Sidak post hoc for multiple comparisons. Significance levels were adjusted to 5% ($p < 0.05$) and values were expressed as mean ± standard deviation.
Resultados e Conclusões:
K.p-induced pulmonary sepsis led to organic (renal) injury with increased creatinine and urea ($p > 0.001$), as well as increased plasma and brain CFU ($p > 0.001$) within 24h. As well, it resulted in increased levels of proinflammatory cytokines in the lung (TNF- α, $p > 0.001$; IL-1 β, $p > 0.0001$) in the hippocampus (TNF- α, $p > 0.05$; IL-1 β , $p > 0.05$) and in the prefrontal cortex (TNF- α, $p > 0.001$; IL-1 β, $p > 0.01$) at 24h. The experimental model of pulmonary sepsis also triggered depressive-like behavior and anxiety-like behavior in animals at 48-72h and 7 days, but showed no short-term memory impairment. Klebisiella Pneumoniae-induced pulmonary sepsis in mice has been shown to trigger an increase in proinflammatory cytokines in the lung, hippocampus, and prefrontal cortex, as well as anxiety and depressive - like behavior in the acute stage.
Palavras-chaves: Sepsis, Inflammation, Behavior
Agência Fomento:

18.082 - META-ANALYSIS OF SENSORIMOTOR GATING DEFICITS IN PATIENTS WITH SCHIZOPHRENIA EVALUATED BY PREPULSE INHIBITION TEST

META-ANALYSIS OF SENSORIMOTOR GATING DEFICITS IN PATIENTS WITH SCHIZOPHRENIA EVALUATED BY PREPULSE INHIBITION TEST
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Instituição: 1 UFABC - Universidade Federal do ABC (Alamenda da Universidade s/n, Sao Bernardo do Campo), 2 SES - Secretaria da Saúde (São Paulo - Estado). (Av. Dr. Enéas de Carvalho de Aguiar, 188)Introdução:
Prepulse Inhibition (PPI) of startle is an operational measure of sensorimotor gating that is often impaired in patients with schizophrenia. Despite the large number of studies, there is considerable variation in PPI outcomes reported. We conducted a systematic review and meta-analysis investigating PPI impairment in patients with schizophrenia compared to healthy control subjects, and examined possible explanations for the variation in results between studies.
Objetivos:
Conduct the first meta-analysis and systematic review prepulse inhibition impairment (PPI) in schizophrenia pacients
Métodos:
Major databases were screened for observational studies comparing healthy subjects and patients with schizophrenia for the prepulse and pulse intervals of 60 and 120 ms as primary outcomes, i.e. PPI60 and PPI120. Standard Mean Deviation (SMD) and 95% confidence intervals (CI) were extracted and pooled using random effects models. We then estimated the mean effect size of these measures with random effects meta-analyses and evaluated potential heterogeneity moderators, using sensitivity analysis and meta-regressions.
Resultados e Conclusões:
Sixty-six primary studies were identified, with 3685 healthy and 4290 patients with schizophrenia. The latter group showed reduction in sensorimotor gating for both PPI60 (SMD = -0.50; 95% CI [-0.61, -0.39]) and PPI120 (SMD = -0.44; 95% CI [-0.54, - 0.33]). Our findings sugest that sample size, gender proportion, imbalance for gender, source of control group, and study continent were sources of heterogeneity ($p < 0.05$) for both PPI60 and PPI120 outcomes.
Palavras-chaves: Meta-regression, PPI test, Sensorimotor gating
Agência Fomento: CAPES

18.083 - NEUROBIOLOGIA DO COMPORTAMENTO AGRESSIVO INDUZIDO PELO ESTRESSE SOCIAL NO MODELO DE AGRESSÃO ESPONTÂNEA (MSA) DE CAMUNDONGOS SWISS WEBSTER.

NEUROBIOLOGY OF AGGRESSIVE BEHAVIOR INDUCED BY SOCIAL STRESS IN MODEL OF SPONTANEOUS AGGRESSION (MSA) OF SWISS WEBSTER MICE.
Autores: Rafaela Santos Barbosa 2, Renata Machado Felippe 2, Luanda Yanaan Hoppe 2, Ana Paula Miranda Mendonça 3, Cleiton Felizardo Brito 2, Célia Martins Cortez 4, Marcus F. Oliveira 3, Tânia Cremonini de Araújo-Jorge 2, Gabriel Melo de Oliveira 2, Viviane Muniz da Silva Fragoso 2

Instituição: 2 IOC/FIOCRUZ - Instituto Oswado Cruz, Fiocruz (Avenida Brasil, 4365, Rio de Janeiro-RJ), 3 UFRJ - Universidade Federal do Rio de Janeiro (Ilha do Fundão Avenida Carlos Chagas Filho. 373. Cidade Universitária da UFRJ), 4 UERJ - Universidade do Estado do Rio de Janeiro (R. São Francisco Xavier, 524 - Maracanã, Rio de Janeiro - RJ, 20550-)Introdução:
Aggression is defined as the act(s) in which an individual intentionally injures or harms others of their own species (Nat. Rev. Neurosci.7: 536, 2007). Death resulted from violence accounts for approximately 1.6 million cases/year (Psychoph. 163: 434, 2002).
Objetivos:
The aim of this study was to investigate the possible mechanism involved in the neurobiology of the aggressive profile of a model of spontaneous aggression (MSA) of adult male Swiss Webster mice.
Métodos:
The Spontaneous Model of Aggression (SMA) developed by our team is based on the behavioral characteristics exhibited by each individual since weaning, at the grouping of animals during childhood, and at their reunification in adulthood, evaluating the emergence of aggression in groups of male mice of the Swiss Webster. At 16 wko, aggressive ethogram analysis was performed, and each individual was classified as harmonic (Har), subordinate (Sub) and aggressive (Agg) (Beh. Brain Res. 301: 110, 2016; Neuroch. Int. 126: 210, 2019). Plasma corticosterone levels were assayed with a double-antibody radioimmunoassay method specific using a commercial kit (MP Biomedicals, USA). We performed the concentration of neurotransmitters in brain regions for HPLC in different categories and investigate whether the use of haloperidol reduces the aggressive profile of MSA. We conducted a functional assessment of mitochondria in brain frontal córtex by respirometry analysis.The experimental protocol was approved by the Ethics Commission on Animal Use of the Oswaldo Cruz Institute, under license number (011/2014 e 031/2017).
Resultados e Conclusões:
We observed a significant increase in the number of attacks/30 min in Agg (22.0 ± 1.9) compared to all other groups (NR: 1.5 ± 1.0, Har: 2.0 ± 1.0 and Sub: 0.8 ± 0.3) ($p \leq 0,05$). Lesion extension revealed that only subordinate mice (Sub) presented extensive lesions (3.0 ± 0.3 cm^2) relative to other groups ($p \leq 0,05$). Before regrouping, the average value in the plasma levels of corticosterone was 43.5±17.5 ng/mL. After regrouping, the Har group increased to 177.0±40.4 ng/mL, the Sb group to 136.4±51.2 ng/mL. However, Agg individuals did not show a proportional increase 72.8±23.8 ng/m, with significant difference compared to Har ($p \leq 0.001$). Aggressive animals also displayed a significant increase in dopamine production, 85% higher than to other groups. Animals that were treated with haloperidol (Agg) presented only 6 attacks, whereas NR categories made 17 and Har made 14 (No. of attacks/30 min). COX activity assessed by an independent method, confirmed the significant reduction in enzyme activity (~70% reduction) in aggressive animals relative to NR group (Agg = 46,5 ± 9,8 vs. NR = 157,6 ± 41,1 nmol/min/mg). Our results showed that the AgR did not adequately adapt to the stress situation promoted by regrouping, we assume it is due to low corticosterone levels.The results described here indicate that social stress promoted by re-grouping strongly and selectively reduced COX activity in brain cortex in highly aggressive mice.
Palavras-chaves: Behavior, aggressive, mice, costicosterone, dopamine
Agência Fomento: CNPQ e CAPES

18.084 - PAPEL DA OLIGOPEPTIDASE THOP1 (EC 3.4.24.15) NA APRESENTAÇÃO ANTIGÊNICA E NO COMPORTAMENTO DEPRESSIVO NA ENCEFALOMIELITE AUTOIMUNE EXPERIMENTAL

ROLE OF THE THIMET OLIGOPEPTIDASE THOP1 (EC 3.4.24.15) IN THE ANTIGENIC PRESENTATION AND DEPRESSIVE LIKE-BEHAVIOR IN EXPERIMENTAL AUTOIMMUNE ENCEPHALOMYELITIS

Autores: Nilton Dos Santos 1, Guilherme Dragunas 1, Rosangela Eichler 1, Roseane Franco 1, Luciana Leite 2, Wesley Brandão 1, Jean Peron 1, Emer Ferro 1, Carolina Munhoz 1
Instituição: 1 USP - Universidade de São Paulo (Av. Professor Lineu Prestes 1524), 2 IB - Instituto Butantan (Av. Vital Brasil 1500, Butantã)Introdução:
Thimet oligopeptidase (THOP1) initially identified as a neuropeptide-inactivating enzyme, processes extra and intracellular peptides optimally in the size of 9-12 amino acids. Ubiquitously distributed in mammalian tissues, THOP1 was largely found in the brain, gastrointestinal tract and rat testis. THOP1 was intimately involved in the metabolism and processing of neuropeptides and major histocompatibility complex (MHC) I antigens. Several reports suggested the role of antigen presentation in the cognitive

impairment and depressive behavior in experimental animals and patients with multiple sclerosis.
Objetivos:
To characterize the pathophysiological profile of THOP1 (THOP1-/-) knockout C57BL/6 female mice brain after experimental autoimmune encephalomyelitis (EAE) induction, a model of multiple sclerosis. Antigenic presentation and mood symptoms that occur in this disease were evaluated.
Métodos:
C57BL/6 (WT; WT/EAE) and THOP1-/-; THOP1-/-/EAE female mice were immunized with MOG35-55 diluted in complete Freund adjuvant and Bordetella Pertussis toxin. The daily clinical scores were analyzed until recovery (at day 26th after immunization). Depressive like-behavior was evaluated using tail suspension test at the day 7th post-immunization. At recovery (day 26th post-immunization), animals were either perfused with paraformaldehyde 4% solution or deep anesthetized, decapitated, and dorsal hippocampus and spinal cord prepared for Western blot, immunohistochemistry and ELISA analysis. This protocol has been approved by the animal ethics committee of the University of Sao Paulo, CEUA nº 003/2013
Resultados e Conclusões:
Both THOP1-/- and WT animals shown no differences in cortisol concentrations 24h before immunization. Behavior clinical scores of WT/EAE (37.33 + 2.231) were better than THOP1-/-/EAE (23.94 + 2.48; p=0.0004, n = 15). THOP1-/- presented increased TNF-α concentrations in dorsal hippocampus ($p = 0.0411$, $n = 6$) and in spinal cord ($p < 0.005$, $n = 6$). THOP1-/-/EAE animals showed increase in MHC-I antigen presentation, in addition to decrease in mobile time during tail suspension test compared to WT/EAE group ($p = 0.0302$; $n = 4$-5). Moreover, THOP1-/-/EAE animals showed smaller dimensions of corpus callosum. In conclusion, these data corroborate previous suggestions that THOP1 plays crucial biological functions in the healthy brain, which could be used as a target for developing new therapeutic strategies for neurodegenerative and psychiatric disorders.
Palavras-chaves: Oligopeptidase , EAE, Depressão, MHCI
Agência Fomento: Fapesp

19. Neurociências Teórica e Computacional

19.005 - ÍNDICE DE ENCEFALIZAÇÃO E MEDIDAS DO CÉREBRO DE SAPAJUS

ENCEPHALIZATION INDEX AND BRAIN MEASURES FOR SAPAJUS
Autores: Emmanuel Freitas Ferreira 1, Tales Alexande Aversi Ferreira 1
Instituição: 1 Unifal - Universidade Federal de Alfenas (R. Gabriel Monteiro da Silva, 700 - Centro, Alfenas - MG, 37130-000)Introdução:
The Sapajus genus is considered a very intelligent and skills primates that is an unexpected case for a New Word primate. Is a fact the high cognition of Sapajus, however, an explanation to justify these abilities in terms of anatomy and structures of the brain are scarce in literature.
Objetivos:
The purpose of this work was to study the brain of the Sapajus genus in quantitative terms measuring the main gyri and sulci, the gyrenchepaly degree, the encephalization index and to compare the results with literature data other primates.
Métodos:
No one animal was dead for purpose this work. Four specimens of adult Sapajus were used andmconserved on formaldehyde. The brains were removed, weighed and measured with a caliper and inextensible lines. The measure of the major gyrus in straight line and with sinuosity was performed to verify the curvature degree. The encephalization index [K] was measured by the following relation: [body weight / brain weight] x100. Statistical analysis of central tendency measures (mean and standard deviation) for measurements of the brain were carried out. Institutional Ethical Committee CoEP-UFG 81/2008, and authorization from the IBAMA No. 15275.
Resultados e Conclusões:
Results: The measurements of the lobes were taken in absolute and relative terms so that the comparison between Sapajus and man could be performed in terms of size and tilt of the main sulci. The vertical tilt of central sulcus was - 0,10, once it was done by the difference between the average distances between the upper extremity of the central sulcus in relation to the anterior and posterior extremities of the brain, to the average of the inferior extremity of the central sulcus in relation to the extremities of the brain. The absolute measurements of these values were divided by the length of the brain in order to determine the relative size of the distances compared to men. The average of the relative's measures for superior and inferior edge

of the central sulcus were, respectively, 0,52 and 0,50. The sinuosity degree was obtained by the ratio between the average of the measures on the vertical axis of the sulcus with the average of the sinuous measures, and for Sapajus, this value was 0,97 indicating a slightly sinuous sulcus. Indeed, the Standard Deviation for the straight shown variations from 0,2 to 0,4; and for sinuous measures, were from 0,2 to 0,6. The calculation of the encephalization index indicated the value of 2.12 ± 0.31 for Sapajus. Conclusions: using the values as reference, is possible to observe that the Sapajus' brain is smoothly than modern human brain, i.e., less gyrenchephalic. The measures were used in confrontation with humans' ones because this kind of data were no founded for other no human primates. The K indicate that Sapajus is placed between humans and chimpanzees.
Palavras-chaves: Sapajus, Encéfalo, Medidas
Agência Fomento:

19.007 - ANÁLISE DE FLUTUAÇÃO DESTENDENCIADA (DFA) DE UM MODELO DE NEURÔNIOS INTEGRA-DISPARA ESTOCÁSTICO

DETRENDED FLUCTUATION ANALYSIS OF A INTEGRATE-AND-FIRE STOCHASTIC NEURON MODEL.
Autores: Bruno Freitas Lima 1, Mary Jean Amon 2, Olaf Sporns 3, Luis Favela 4, Ariadne de Andrade Costa 1
Instituição: 1 UFG - Universidade Federal de Goiás - Regional Jataí (Rua Riachuelo n° 1530 - Setor - Samuel Grahan, Jataí - GO, 75804-020), 2 UC - University of Colorado- Boulder (Boulder, Colorado, USA), 3 IU - Indiana University (Bloomington, Indiana, USA), 4 UCF - University of Central Florida (Orlando, Florida, USA)Introdução:
Várias formas de atividade coletiva vêm sendo identicadas em tecidos neuronais, incluindo: oscilações, caos e avalanches neuronais, que são reações em cadeia de disparos de potenciais de ação separadas por intervalos inativos. Tem-se medido o número de neurônios envolvidos e a duração de avalanches neuronais, os quais seguem distribuições na forma de leis de potência. Esses são alguns dos possíveis indicativos de criticalidade auto-organizada na rede.
Objetivos:
Nosso objetivo foi calcular os expoentes de Hurst obtidos por DFA para diferentes séries temporais obtidas por simulações computacionais e verificar se são bons indicadores de criticalidade no sistema.
Métodos:
A partir de resultados de simulações computacionais de neurônios integra-dispara estocásticos com plasticidade no ganho neuronal, analisamos séries temporais de ganhos neuronais e densidades de neurônios ativos.
Resultados e Conclusões:
Observamos que o método é eficiente para identificação de criticalidade e que a série temporal de ganhos neuronais parece ser um bom parâmetro para essa análise, diferentemente da densidade de neurônios ativos.
Palavras-chaves: flutuação, destendenciada, neurônios, integra-dispara, estocástico
Agência Fomento:

21. História, Educação e Arte

21.004 - OLIMPÍADA BRASILEIRA DE NEUROCIÊNCIAS COMO FERRAMENTA PARA DIVULGAÇÃO E POPULARIZAÇÃO DAS NEUROCIÊNCIAS

BRAZILIAN BRAIN BEE AS A TOOL FOR DISSEMINATION AND POPULARIZATION OF NEUROSCIENCES
Autores: Judy Chun 1, Alfred Sholl-Franco 1, Aliny Carvalho 1, João Vítor Galo Esteves 1, Ingrid Moura de Oliveira 1, Larissa Eletherio Miranda 1
Instituição: 1 UFRJ - Universidade Federal do Rio de Janeiro (Avenida Carlos Chagas Filho, 373 - Cidade Universitária, Rio de Janeiro)Introdução:
The Brain Bee are competitions for high school students that have taken place internationally since 1998 and in Brazil since 2013.
Objetivos:
The objectives of the Brazilian Brain Bee are: (1) to raise the interest of students for scientific knowledge related to neurosciences, (2) to guide the existing local committees and expand the national coverage of the Brazilian Brain Bee and (3) to carry out the national competition.
Métodos:
To organize the selection of the regional champions, virtual meetings are held together with the local committees, in order to support and homogenize their

processes. The national committee also provides an online selection for candidates residing in regions without a committee. After the selection of regional champions, the preparation and execution of the national stage takes place, which consists of four tests held in two days, interspersed with cultural activities. Once selected the national champion, this candidate is trained for the International Brain Bee, through face-to-face or virtual meetings. Throughout the year, dissemination actions are carried out to expand the local committees, with instructions and support on website.
Resultados e Conclusões:
In 2018, in the VI Brazilian Brain Bee (BBB), 22 candidates were selected by local committees from 8 locations (Grande Rio-RJ, São Fidélis-RJ, São Paulo-SP, Ribeirão Preto-SP, Belém-PA, Brasília-DF, Grande Dourados-MS and Porto Alegre-RS). The online test selected 2 candidates from Pernambuco. The national champion of 2018 was the representative of the Committee of Rio de Janeiro, who was trained with theoretical and practical content in English and competed in the international stage held in Berlin, reaching 13th place overall. In addition, over the last year, two neuroscience vacations courses were held in Rio de Janeiro and six other courses in Brazil, carried out by local committees, which reached more than 400 primary school students. Furthermore, 10 videos and 22 articles were produced and disseminated in the social networks and sites of the project. The VII BBB will be held on July 17, 18 and 19, in Rio de Janeiro, and will be attended by 12 committees. A total of 39 candidates from different regions of the country are expected. The steady increase in the number of participating committees and candidates denotes that the project is growing. Further the selection of the national champion, BBB consolidates itself as an inducer of the dissemination of neurosciences, fostering actions such as summer courses, student training, university-school interface, elaboration of videocasts, blogs etc. In this way, the project can be considered as a tool for dissemination and popularization of neurosciences, bringing teachers and students closer to the academic environment.
Palavras-chaves: neurociências, olimpíada de conhecimento, divulgação científica
Agência Fomento:

21.005 - II OLIMPÍADA PARAENSE DE NEUROCIÊNCIAS: UMA NOVA FERRAMENTA DE DIVULGAÇÃO CIENTÍFICA NA AMAZÔNIA

II PARAENSE NEUROSCIENCE OLYMPIAD: A NEW TOOL OF SCIENTIFIC DISSEMINATION IN THE AMAZON.
Autores: Brenda Maria Silva Lacerda 8, Luana Carvalho Martins 8, Sávio Lima Bastos 8, Mateus Santos Silva 8, Renato Mateus Santos de Lima 8, Caroline Araújo Costa Lima 8, Laís Resque Russo Pedrosa 8, Lucival Seabra Furtado Júnior 8, Mayara Nerina Fortes Arthur 8, Patrick Bruno Cardoso Costa 8, Yuri Richard Silva da Conceição 8, Victor Gabriel Bastos Chaves 8, Luis Carlos Pereira Monteiro 8, Nadyme Assad Holanda da Silva 8, Analú Alves Maciel 8, Anderson Manoel Herculano Oliveira da Silva 8
Instituição: 8 UFPa - Universidade Federal do Pará (Rua Augusto Corrêa, Nº 1 - CEP: 66075-110)Introdução:
The Brain Bee takes place annually in several countries, including Brazil, where the competition has been held for 6 years. Despite the existence of a committee to organize the Brazilian Neuroscience Olympiad, few states participate in this initiative, and the participation of the states of the South and Southeast regions is prevalent.
Objetivos:
Thus, in order to promote scientific dissemination in the Amazon region, more specifically in the state of Pará, which is lacking in scientific educational programs, the Paraense Neuroscience Olympiad (OPNeuro) was founded by a student committee of the Federal University of Pará (UFPa).
Métodos:
The first edition of OPNeuro was in 2018, and in the following year, the second edition was organized by the Academic League of Neurosciences and Behavior (LANeC) and took place at the Biological Sciences Institute of UFPA. The objective of the Olympiad was to provide basic training in neurosciences for students between the ages of 14 and 19, mostly in high school, in order to contribute to the dissemination of the knowledge produced at the University and to foster scientific research as a possible career for the participants. A course was held for a period of 2 weeks and included lectures theoretical and practical on classes in cell biology, neurochemistry, neurohistology, neurophysiology, and clinical neuroscience, as well as visits to the area's laboratories, which are in contact with UFPa researchers. This contact with the university environment at this crucial moment in the formation of the student can stimulate his interest in the studies

also awaken aptitudes in the area of the neurosciences, and in addition, activities like these help in the cognitive development of the participants, generating learning and improvement of the mental functions, essential to any formal education process.
Resultados e Conclusões:
At the end of these two weeks, theoretical and practical evaluations were carried out on the content taught. The results of this edition of the Olympics were undoubtedly better when compared with the last edition. The overall student average this year was 7.5 and last year was 5.5, a growth of 36.4%; the discipline of neurochemistry obtained the best performance and the one of neurohistology the worse. Taking into consideration the students' lack of previous instruction in histology and physiology, the practical exercises and complementary activities performed were fundamental for the improvement of grades. Therefore, the theoretical-practical course developed prior to the Second Olympiad of Neuroscience was fundamental for the best performance of the students, in this event. It is important to emphasize that in the high school period there is no specific content related to the themes associated with neurosciences, which highlights the importance of performing these activities, both to perform well in the Olympics and to encourage primary school students to seek the academic field, especially courses focused on Neurosciences.
Palavras-chaves: EDUCAÇÃO, EXTENSÃO, BRAIN BEE
Agência Fomento:

21.006 - LIGA ACADÊMICA DE NEUROCIÊNCIAS E COMPORTAMENTO: CONTRIBUIÇÕES E DESAFIOS NO PROCESSO DE DIVULGAÇÃO CIENTÍFICA NA AMAZÔNIA.

ACADEMIC LEAGUE OF NEUROSCIENCES AND BEHAVIOUR: IMPROVEMENT AND CHALLENGES IN THE PROCESS OF SCIENTIFIC DISSEMINATION IN AMAZON.
Autores: Luana Carvalho Martins 1, Analú Alves Maciel 1, Patrick Bruno Costa Cardoso 1, Mayara Nerina Fortes Arthur 1, Nadyme Assad Holanda da Silva 1, Caroline Araújo Costa de Lima 1, Emerson Feio Pinheiro 1, Renato Mateus dos Santos de Lima 1, Victor Gabriel Chaves Bastos 1, Yuri Richard Silva da Conceição 1, Waldo Lucas Luz da Silva 1, Ana Carolinne Lopes Ascenção 1, Anderson Manoel Herculano Oliveira da Silva 1
Instituição: 1 UFPa - Universidade Federal do Pará (Rua Augusto Corrêa, 1, Guamá, Belém/PA.)Introdução:
Science popularization is, currently, an urgent form of social inclusion, due its impact on health, political and environmental issues. However, this type of popularization is much lower than the expected, specially in Amazon region because public and private educational systems rarely stimulates basic scientific discussions and critical reasoning.
Objetivos:
This study aimed to raise the debate about the importance of academic leagues as tools of scientific dissemination through the experience report of an academic league founded in the Amazon.
Métodos:
There by, the academic League of Neuroscience and Behavior (LANeC) was founded in 2017 by students from the Federal University of Pará (UFPa) intenting to disseminate neurosciences inside and outside the university, using unconventional tools in order to overcome sociocultural and economical barriers.
Resultados e Conclusões:
Since its inception, a number of events have been promoted in an attempt to achieve this goal, including the organization of discussions inside the university to debate neuroscience topics, such as neuropsychological aspects of depression, neuroesthetics and nutritional neuroscience. In addition, in order to disseminate neuroscience outside the academy, the League founded in 2018 the first North and Northeast committee to organize the Olympics of Neuroscience at Pará State, which is in its second edition and is the first of the three phases (local, national and international) which students must pass to reach the Brain Bee World Championship conducted every year by the International Brain Bee, which main goal is to motivate students who have not entered superior education to learn about the brain and inspire them to pursue careers in neuroscience. Besides, LANeC is also part of the Brain Awareness Week, a global neuroscience outreach initiative promoted by the Dana Alliance for Brain Initiatives and, nationally, by the Brazilian Society of Neuroscience and Behavior. In 2018, “The education transforms” was the theme that guided the brain week in Brazil, in which lectures, interactive movie sessions and playful games were organized at UFPa and at a public square, purposely in the center of Belém, in order to elucidate how the neuroscience presents itself in the daily lives of the population. This year, the theme chosen was “Artificial Intelligence” and the league accomplished

lectures on fundamentals of artificial intelligence applied to neurosciences, as well as a tour for students from Dr. Agostinho Monteiro State Elementary and Secondary School to laboratories of Anatomy, Experimental Neuropharmacology, Neuroregeneration and Cytogenetics. Thus, we observed that all of these unconventional educational actions, such as open discussions, playful games and the olympics organized by the League gradually achieved a bigger, diversified and participative public, which demonstrates the great contribution of LANeC in the process of scientific dissemination in Amazon.
Palavras-chaves: Alternativas de ensino, Aprendizado, Universidade Aberta
Agência Fomento:

23. Neurobiologia do Estresse

23.018 - MANIPULAÇÕES NEONATAIS AFETAM O COMPORTAMENTO EMOCIONAL DE FORMA SEXO-DEPENDENTE

NEONATAL MANIPULATIONS AFFECT EMOTIONAL BEHAVIOUR IN A SEX-DEPENDENT MANNER
Autores: Natália Cristina Zanta 1, Carlos Eduardo Girardi 1, Deborah Suchecki 1
Instituição: 1 UNIFESP - Universidade Federal de São Paulo (Rua Botucatu, 862)Introdução:
Neonatal adversities can have an important impact on neurodevelopment, such as alterations in emotionality. Maternal deprivation (MD) is an animal model widely used to study the effects of early life adversity throughout life, such increase in fear response, induction of anxiety-like behavior and impairment in social behaviour.
Objetivos:
To assess whether MD, associated or not, to a stress challenge (saline injection) could change the response of the adolescent offspring in behavioural tests.
Métodos:
The litters of Wistar rats were culled to 4 males and 4 females on postnatal day 1 (PND 1). On PND 9, half of the total number of litters were maternally-deprived for 24 h (DEP9) while the other half was left undisturbed (CTL). On PND 10, 22 h after the onset of MD, half of each group received an i.p. 0.9% saline injection (SAL) and two hours later, DEP9 litters were reunited with their mothers and left undisturbed until weaning. Between PDN 45 and 55, all rats were submitted to fear conditioning (FC): training consisted of 5 paired tone-footshock (0.6 mA) presentations and tests were performed 24 h (contextual fear assessment) and 48 h later (tone fear assessment). From PDN 90 to 95, context fear conditioning was once again evaluated, and anxiety-like behaviour was assessed on the elevated plus maze (EPM) (approval protocol CEUA/UNIFESP: 0366/12).
Resultados e Conclusões:
Neither MD nor SAL affected contextual fear conditioning in males, while DEP9-SAL females spent less time in freezing behavior than CTL-SAL (61.7 ± 41.1 s and 157.8 ± 60.8 s, respectively), and CTL-SAL spent more time in freezing behavior than CTL-NSAL (157.8 ± 60.8 s and 95.7 ± 76.3 s; respectively). Additionally, females expressed lower freezing time in adulthood compared to juvenility (85.4 ± 53.1 s and 109.8 ± 64.0 s; respectively). For tone fear conditioning, DEP9 males froze more than CTL males (162.1 ± 44.8 s and 126.9 ± 42.4 s; respectively), whereas SAL females froze less than NSAL ones (94.1 ± 23.9 s and 111.9 ± 23.7 s; respectively). In the EPM, DEP9 males enter less (8.1 ± 2.7 and 6.2 ± 1.9; respectively) and visited less the extremity of the open arms than CTL animals (6.8 ± 2.9 and 4.7 ± 1.6; respectively). In females, there was no effect on the EPM. Neonatal manipulations had sexually dimorphic effects on fear conditioning. In females, contextual fear response decreased with re-exposure, which is expected for this type of response, while in males, the conditioned fear response was maintained. Additionally, MD seemed to enhance anxiety-like behavior only in males.
Palavras-chaves: early life stress, animal behaviours , emotionality
Agência Fomento: Fapesp , AFIP

23.019 - INVESTIGAÇÃO DOS EFEITOS DO ANTAGONISMO CB2 NO MODELO ANIMAL DE DEPRESSÃO DE EXPOSIÇÃO AO ESTRESSE CRÔNICO MODERADO IMPREVISÍVEL

INVESTIGATION OF THE EFFECTS OF CB2 ANTAGONIST IN THE UNPREDICTABLE CHRONIC MILD STRESS MODEL OF DEPRESSION
Autores: Aline Rodrigues Cardoso 1, Isabelle de Medeiros Braga 1, Gilda A. Neves 1

Instituição: 1 UFRJ - Universidade Federal do Rio de Janeiro (Cidade Universitária - Rio de Janeiro, RJ)Introdução:
Depression is an emotional disorder characterized by anhedonia, persistent sadness, social isolation, low energy, suicidal thoughts, among other factors that affect individual's physical and social well-being. Many patients do not present favorable outcomes with currently used drugs, highlighting the need for new drug targets. Studies show a role for the endocannabinoid system in the regulation of emotions in which CB2 receptors (CB2R) seem to be involved.
Objetivos:
The aim of this study was to investigate the effects of a CB2R antagonist on the unpredictable chronic mild stress (UCMS) model of depression.
Métodos:
Adult male Swiss mice were exposed to UMCS (CEUA/ UFRJ no. 131/16). The experiments were divided into two stages: 1) standardization of the UCMS protocol; 2) pilot experiment treating mice with the CB2R antagonist AM630. In stage 1, animals were separated into control and UCMS groups (n=8-9). In stage 2, animals were divided into control, stress-resilient and stress-sensitive (n=6-21) and subdivided into vehicle and CB2R antagonist treated mice (AM630 1 mg/kg/day i.p. for 12 days). The depressive-like phenotype of the animals was evaluated using the sucrose preference (SP), spontaneous alternations in the Y maze, social approach and forced swimming (FST) tests. Data were analyzed by Student's t test or two-way ANOVA.
Resultados e Conclusões:
Ten weeks of UCMS were necessary to induce a slightly reduction in SP (control: 88.0 ± 4.8% vs. UCMS: 69.3 ± 11.6%, p = 0.141). These animals also showed a non-significant increase in the latency to immobility (control: 43.6 ± 8.5 s vs. UCMS: 54.3 ± 16.2 s, p = 0.555) and a mild increase in the immobility time (control: 112.4 ± 18.2 s vs. UCMS: 151.7 ± 40.2, p = 0.369) in the FST. No changes in animals' behavior were detected in the spontaneous alternation (p = 0.814) nor in the social approach test (p = 0.728). Our data presented a big variability indicating important individual differences in mice response to stress. Thus, we adopted the strategy of classifying animals submitted to UCMS as stress-sensitive (SP ≤ 65%) or stress resilient (SP > 65%). In this situation, we demonstrated that repeated treatment with AM630 did not alter the behavior of both control (SP saline: 70.4 ± 8.0%, AM630: 92.6 ± 8.3%, p = 0.094; FST latency saline: 80.7 ± 9.1s, AM630: 88.6 ± 9.6s, p = 0.661; FST immobility saline: 63.0 ± 14.0s, AM630: 58.0 ± 16.4s, p = 0.748) and stress-resilient animals (SP saline: 83.9 ± 10.0%, AM630: 79.0 ± 10.0%, p = 0.094; FST latency saline: 68.5 ± 11.7s, AM630: 84.2 ± 11.7s, p = 0.661; FST immobility saline: 76.7 ± 19.0s, AM630: 65.8 ± 19.0s, p = 0.748). Data of the animals classified as stress-sensitive are still inconclusive. The UCMS model used induced only mild behavioral changes in male Swiss mice. Further experiments are underway to better investigate the effects of CB2R blockade on stress-sensitive animals.
Palavras-chaves: AM-630, depressão, estresse, anedonia, endocanabinoide
Agência Fomento: CNPQ

23.020 - ADMINISTRAÇÃO DO EXTRATO DO CAROÇO DO AÇAÍ (EUTERPE OLERACEA) PREVINE ASTROGLIOSE HIPOCAMPAL DE RATOS SUBMETIDOS A UM MODELO DE HIPÓXIA-ISQUEMIA

ADMINISTRATION OF EUTERPE OLERACEA MART (AÇAÍ) SEED EXTRACT PREVENTS HIPPOCAMPUS ASTROGLIOSIS IN A PRENATAL HYPOXIA-ISCHEMIA MODEL

Autores: EVERTON LUIS NUNES COSTA 3, LYNIKER SALLES 3, CRISTIANE AGUIAR 3, ÂNGELA RESENDE 3, PENHA BARRADAS 3
Instituição: 3 UERJ - UNIVERSIDADE DO ESTADO DO RIO DE JANEIRO (AV. 28 DE SETEMBRO, 87. 5º ANDAR, SALA 12. VILA ISABEL, RIO DE JANEIRO. RJ)Introdução:
Perinatal hypoxia-ischemia (HI) causes damage to the central nervous system (CNS). HI promotes nerve tissue damage, with neuronal death and increased production of glial fibrilar acidic protein (GFAP). The brain development is more susceptible to HI, since, among other characteristics, its antioxidant system is unable to fight elevated quantities of reactive species. Polyphenols from the seed extract of Euterpe oleracea Mart. – açaí - (ASE) have significant antioxidant properties and we have previously showed that ASE administration prevents oxidative stress in a model of pre-natal HI.
Objetivos:
Therefore, it is interesting to evaluate the effects of ASE administration in the astroglial reactivity as also neuronal survival in the hippocampus of rats submitted to this model of prenatal HI.
Métodos:
All experimental procedures were approved by the institution's Ethics Committee, protocol number: UERJ

/ CEA / 006/2016. Pregnant rats at the 18th gestational day (E18) underwent HI (HI group) through transient (45 minutes) obstruction of uterine and ovarian blood flow. In the surgical control group (SHAM), uteri were exposed, but artery obstruction was not performed. After the surgery the gestation proceeds and the pups are born with no intervention.The groups treated with ASE (HI + ASE and SHAM + ASE) received the dose of 200 mg/Kg body mass in the pregnant dams drinking water from E17 to the fourth day of postnatal life (P4).
Resultados e Conclusões:
The evaluation of glial reactivity (immunohistochemistry with anti-GFAP) at P7 evidenced damages in the HI group, which were not present in the ASE-treated group (Astrocyte reactivity – pixels density of GFAP+ cells: P < 0,05; SH group: n=8, MD=1600 pixels/optical density DP=200 pixels/optical density; SH+ASEgroup: n=8, MD=1400 pixels/optical density, DP=170 pixels/optical density; HI group: n=8, MD=11000 pixels/optical density, DP=2000 pixels/optical density; HI+ASE group: n=8, MD=1300 pixels/optical density, DP=150 pixels/optical density). However, the reduction in the number of neurons that is observed in this model was not avoided by the administration of ASE (Neuronal density – counting cells Neurotracer blue+: P < 0,05; SH group: n=8, MD=500, DP=100; SH+ASEgroup: n=8, MD=490, DP=80; HI group: n=8, MD=290, DP=50; HI+ASE group: n=8, MD=290, DP=30). In conclusion, ASE administered to the dam is able to decrease the astrogliosis observed in the hippocampus of HI offspring, however with no effect on neuronal loss at P7. Our results suggest that ASE may be a therapeutic approach for the oxidative damages that occur in perinatal hypoxia-ischemia.
Palavras-chaves: Terapias fitoterápicas, Astrogliose, Euterpe oleracea, Hipocampo, Hipóxia-isquemia
Agência Fomento: CNPq; CAPES; PIBIC-UERJ; FAPERJ.

23.021 - AVALIAÇÃO DO POSSÍVEL PAPEL PROFILÁTICO DA CETAMINA NA ANSIEDADE INDUZIDA PELA DERROTA SOCIAL EM CAMUNDONGOS.

EVALUATION OF THE POSSIBLE PROPHYLACTIC ROLE OF KETAMINE IN ANXIETY INDUCED BY SOCIAL DEFEAT IN MICE.
Autores: Natália Urel Carneiro 1, Lucas Canto de Souza 1,1, Cleopatra da Silva Planeta 1,1,1
Instituição: 1 Unesp - Universidade estadual paulista (Rodovia Araraquara Jaú, Km 01 - s/n - Campos Ville - Araraquara/SP)Introdução:
Ketamine, an N-methyl-d-aspartate (NMDA) receptor antagonist, has been investigated as an alternative treatment to major depressive disorder (MDD) and to anxiety disorders. Evidence suggests that a single dose of Ketamine has a prophylactic effect in clinical trials, and animal models of depression induced by social defeat (SD). However, its preventive role in animal models of anxiety induced by SD stress needs to be elucidated. Thus, the hypothesis of this work is that a single dose of ketamine has a prophylactic effect on the alteration of anxiety-like behaviors in socially defeated mice.
Objetivos:
Investigate if a single dose of ketamine (i.p.) (1,10 or 100 mg/Kg) prevents the effects of five social defeats in mice submitted to the elevated plus maze (EPM).
Métodos:
Forty-three mice were previously treated with saline (0.9%) or ketamine (1, 10 or 100 mg/Kg) and assigned in 5 groups (control; 0, 1, 10 or 100 mg/Kg, n=6-12). After 24 hours, animals were exposed to five alternating days of SD (except control group) and tested in the EPM 5 minutes after the last session of SD.
Resultados e Conclusões:
One way ANOVA demonstrated a decrease of the percentage of open arm entries (%OAE) ($F(1,22)=5.015$, $p < 0.05$) of the stressed mice (0 mg/Kg) against control mice (mean±SEM: 28.45±5.61 vs 14.23±2.99) and a decreasing trend ($F(1,22) = 3.82$, $p = 0.063$) of the percentage of open arm time (%OAT) (mean±SEM:20.09±6.83 vs 6.39±1.58) followed by no alteration on enclosed arm entries (EAE) ($F(1,22) = 0.459$, $p=0.504$). Further, one way ANOVA followed by Duncan test also revealed an increase of the open arm activity at dose of 10 mg/Kg (%OAE: $F(3,27)=6.79$, $p < 0.05$; %OAT: ($F(3,27)= 6.24$, $p < 0.05$) compared to 0 mg/Kg (mean±SEM: %OAE 46.36±6.87 vs 14.23±2.99; %OAT 26.32±5.44 vs 6.39±1.58) followed by no alteration on enclosed arm entries (EAE) ($F(3,27) = 1.096$, $p=0.367$). Conclusion: Our data demonstrated that five alternating days of SD produces an anxiogenic effect on mice submitted to EPM which is prevented by a single prophylactic dose of Ketamine (10 mg/Kg).
Palavras-chaves: Ketamine, anxiety, elevated plus maze, mice, social defeat
Agência Fomento: Fapesp

23.022 - EFEITOS DA DERROTA SOCIAL CRÔNICA SOBRE COMPORTAMENTOS DO TIPO DEPRESSIVO E MODULAÇÃO DA ATIVIDADE DO EIXO HPA

EFFECTS OF CHRONIC SOCIAL DEFEAT STRESS ON DEPRESSIVE-LIKE BEHAVIORS AND MODULATION OF HPA AXIS ACTIVITY

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Instituição: 1 UNIFESP - Universidade Federal de São Paulo (Vila Clementino, São Paulo - SP), 2 USP - Universidade de São Paulo (Butantã, São Paulo - SP)Introdução:

Chronic exposure to stress and HPA-axis dysregulation are factors associated with development of depressive disorder.

Objetivos:

In this study, we evaluated the effects of chronic social defeat stress on depressive like-behaviors, HPA-axis activity and glucocorticoids receptors (GR) levels and translocation in brain areas involved with HPA-axis and motivation control.

Métodos:

Male Swiss mice (aged 10 weeks) were exposed to social defeat stress during 10 days (stress n=20; control n=20). Social defeat consists in a daily 5-min confrontation between an intruder and an aggressive resident. After each confrontation, the intruder cohabited with the resident for 24h, separated by a perforated acrylic partition until the next confrontation episode, when the intruder was defeated by a new resident. Control and defeated animals were submitted to sucrose splash test and social investigation test 24h after the end of social defeat protocol. Another cohort of control and defeated animals had blood samples collected from the submandibular region 7 days before the onset of social defeat protocol (basal) and during the cohabitation phase (specifically 22h after the confrontation) on days 2, 6 and 11 of the stress protocol for determination of corticosterone levels. 24h after the end of social defeat protocol, mice were euthanized and their brains were collected for determination of GR levels and translocation in the hypothalamus, prefrontal cortex, striatum and ventral hippocampus. Data were analyzed with one-way ANOVA, two-way ANOVA with repeated measures and Mann-whitney nonparametric test. The statistical significance level was set as $p < 0,05$. (CEUA #4869290517)

Resultados e Conclusões:

Defeated mice presented decreased time spent in the social zone during the social investigation test ($F (1, 16) = 9,249$, $p < 0,05$). No group differences were observed in distance travelled during the test. In the sucrose splash test, no differences were detected for latency to initiate grooming ($F (1, 17) = 0,230$; $p=0,637$) and total grooming time ($F (1, 17) = 1,672$; $p=0,213$). There was no stress effect on corticosterone levels during the cohabitation phase on days 2, 6 and 11 of the stress protocol ($F (1, 9) = 0,704$; $p=0,423$). Mann-Whitney nonparametric test did not show effect of exposure to social defeat on GR levels and translocation in the hypothalamus (levels $p=0,690$; translocation $p=0,841$), prefrontal cortex (levels $p=0,286$; translocation $p=1,000$), striatum (levels $p=0,931$; translocation $p=0,730$) and ventral hippocampus (levels $p=0,730$; translocation $p=0,857$). This study showed that chronic social defeat stress particularly induced deficits in social interest, an important aspect present in depressive disorder, but did not influence the other parameters evaluated.

Palavras-chaves: Corticosterone, Depression, Glucocorticoid Receptor, Social Avoidance, Social Stress

Agência Fomento: CNPq

23.023 - EFEITO DO ESTRESSE SUBCRÔNICO NO PESO E NO CICLO ESTRAL DE CAMUNDONGOS (MUS MUSCULUS) FÊMEAS SWISS.

EFFECT OF SUBCHRONIC STRESS ON WEIGHT AND ESTROUS CYCLE OF FEMALE SWISS MOUSE (MUS MUSCULUS).

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Instituição: 1 UFPB - Universidade Federal da Paraíba (Campus I - Cidade Universitaria, PB, 58051-900), 2 Psifarm - Laboratório de Psicofarmacologia (Campus I - Cidade Universitaria, PB, 58051-900)Introdução:

Stress is a physiological response to danger, leaving the individual on alert to react effectively to the stressor. However when stress is prolonged or intense it becomes toxic to the organism, causing hormonal dysregulation, weight variations and neurological changes. Reduced levels of synaptic integrity markers (SYN, PSD-95) have already been found in animals that have been subjected to stress protocols. Changes in these markers are also found in patients with Major Depressive Disorder who are more prevalent in women, because of differences in behavioral and neurobiological responses to stress. Estrogen is one of

the responsible for this response, promoting neuronal protection at high levels and reducing this effect when in low concentration.
Objetivos:
Thus, the objective of the present study was to evaluate whether subchronic stress could cause changes in the weight and estrous cycle of female Swiss mice (Mus musculus).
Métodos:
The animals were divided into two groups, the control and stress submitted to the unpredictable subchronic stress protocol, which consists of the application of stressors for 14 days. All groups were adapted to the laboratory environment (5 days) prior to initiation of the protocol. The weight of the animals and the determination of the phase of the estrous cycle in which the animals were found was made in three moments (days 0, 7 and 14). Swiss females (Mus musculus) mice were used. The experiment was approved by the CEUA / UFPB - protocol 6900191118.
Resultados e Conclusões:
The percentage variation of the weight of the animals was observed from day 0. It was found that the stress group (n: 7) had weight loss throughout the protocol in relation to the control (n: 7), where on the 14th day ($p < 0.001$) between control (10,4 ± 2,0) and stress (-4,7 ± 3,5) [$F (1, 12) = 13,68$, $p = 0,003$]. In the cycle the fertile (proestrus), infertile (estrus, diestrus) and transition (metaestrus) phases were recorded. The control (n: 9) had significantly ($p < 0.01$) more infertile females (5.3 ± 0.3) compared to fertile (1.3 ± 0.3) throughout the protocol [$t(0,01;2)= 8,485$]. The stress group (n: 9) in the infertile (5.6 ± 0.3) and fertile (0.6 ± 0.3) group also had a difference ($p < 0.001$) during stress [$t(0,001;2)=10,61$]. In both groups, a higher prevalence was observed between the infertile phase and the fertile phase, although in the stress group this difference was more significant. This could indicate that stress reduced estrogen levels (estrus, diestrus) leaving animals more susceptible to behavioral and physiological changes such as weight loss that was also observed.
Palavras-chaves: Subchronic Stress, Mouse, Estral Cycle, Weight
Agência Fomento: Capes

23.024 - REDIRECIONAMENTO DO USO DO CARVEDILOL: ESTUDO COMPORTAMENTAL E NEUROQUÍMICO EM UM MODELO ANIMAL DE DEPRESSÃO INDUZIDO POR ESTRESSE CRÔNICO IMPREVISÍVEL

REDIRECTIONING THE CARVEDILOL USE: BEHAVIORAL AND NEUROCHEMICAL STUDY IN ANIMAL MODEL OF DEPRESSION INDUCED BY CHRONIC UNPREDICTABLE STRESS
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Instituição: 1 UFC - Universidade Federal do Ceará (Rua Coronel Nunes de Melo, 1000, Rodolfo Teófilo)Introdução:
Depression is an incapacitating disorder characterized by mood swings and decreased motivation and anhedonia for at least 2 weeks. It is also associated with high rates of suicide and increased risk for comorbidities. Studies have shown that chronic stress exposure has an intimate relationship with the pathogenesis of depression. Thus, it is important to search for agents with neuroprotective action, such as Carvedilol (CARV).
Objetivos:
We aimed to evaluate the effects of CARV on behavioral and neurochemical alterations in mice submitted to the model of depression induced by chronic unpredictable stress (CUS).
Métodos:
Female Swiss mice (30-32 g) were submitted to different stressors for 21 days. Between days 15 and 21 the animals received CARV (10mg / kg) or Desvenlafaxine (DVS, 10mg/kg), both by oral pathway. We performed the open field (OFT), tail suspension (TST) and Y-maze alternations (YMT) tests one hour after the last administration. Afterwards, we measured the brain-derived neurotrophic factor (BDNF) levels in the prefrontal cortex and hippocampus. Statistical analysis of the data was performed using the GraphPad Prism 8 software. For comparison of the data a one-way ANOVA followed by Turkey was used. The differences were considered statistically significant at $p \leq 0.05$. The research approved by the Committee of Ethics and Animal Research (CEPA) of the UFC under protocol no. 26/2017.
Resultados e Conclusões:
In the open field test, CUS caused a decrease in the number of crossings [$F (3, 22) = 11.54$; $P < 0.0001$] when compared to the control, showing impairment of

locomotor activity. DVS and CARV were able to reverse this effect. In addition, in this same test, CUS caused an increase in the number of rearing [F (3, 22) = 10.65; P = 0.0002] and grooming [F (3, 22) = 77.81; P < 0.0001] when compared to the control group, showing a behavior possibly associated with anxiety. All treatments were able to reverse this effect. In the Tail Suspension test, there was an increase in immobility time in CUS group when compared to the control, while DVS and CARV reversed this effect [F (3, 29) = 48.29; P < 0.0001]. In addition, CUS also caused cognitive deficit showing by a reduction in the number of spontaneous alternations when compared to the control in the Y-maze test [F (3, 27) = 8.503; P = 0.0004] and in the same way the treatments with CARV10 and DVS reversed this effect. Associated with the behavioral alterations CUS also caused a reduction of BDNF concentrations in both brain areas studied (CPF: [F (3, 18) = 13.96; P < 0.0001] and HC: [F (3,18) = 25.40; P < 0.0001] and only the treatment with CARV10 reversed this alteration. Taken together, our results demonstrate the antidepressant effect of CARV in an animal model of depression providing subsidies for possible use in patients with associated hypertension and depression.

Palavras-chaves: Depression, Chronic unpredictable stress, Carvedilol, Behavior, BDNF
Agência Fomento: National Council for Scientific and Technological Development (CNPq)

23.025 - ESTRESSE E DIETA RICA EM GORDURA DURANTE O DESENVOLVIMENTO: DIFERENTES EFEITOS NA MEMÓRIA, NEUROGÊNESE E FUNCIONALIDADE MITOCONDRIAL

STRESS AND HIGH FAT DIET DURING DEVELOPMENT: DIFFERENT EFFECTS ON MEMORY, NEUROGENESIS AND MITOCHONDRIAL FUNCTIONALITY

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Instituição: 1 UFRGS - Universidade Federal do Rio Grande do Sul (Rua Ramiro Barcelos, 2600-Prédio Anexo - Floresta, Porto Alegre - RS, 90035-003)Introdução:
Recent studies have observed that both social isolation stress during early (pre-puberty) periods and access to high-fat diets (HFD) induce changes in hippocampal plasticity in rats. These modifications may be directly involved with changes in memory consolidation and / or recall.
Objetivos:
To investigate the effects of early exposure to social isolation and chronic consumption of HFD on memory, neurogenesis and mitochondrial functionality in the dorsal hippocampus of adult male rats.
Métodos:
After approval by the Animal Ethics Committee (35334), 88 male Wistar rats were used. At postnatal day (PND) 21, half of the animals were housed in groups of four per cage, and the other half were subjected to stress by social isolation. Each group (control or stressed) was subdivided into two other groups, according to their diet: (1) receiving standard lab chow or (2) receiving both standard chow plus HFD ad libitum. Isolation stress was applied during 1 week, between PNDs 21 and 28. On PND 28, isolated animals were returned to regular home cages, in groups of four. From 60 days of age, the animals underwent behavioral evaluations, such as the context-conditioned fear task and object location task. After the end of the behavioral measurements, mitochondrial functionality was analyzed by flow cytometry, and neurogenesis was also evaluated using immunohistochemistry, both in the dorsal hippocampus. Two-way ANOVA tests were used, and $p < 0.05$ was considered significant.
Resultados e Conclusões:
In the task of conditioned fear, the stress group showed a reduction in freezing time [F: (1,49) = 4,824, p = 0,033; means (S.E.M.) (in s): control: 71.42 ± 8.83; control + HFD: 66.13 ± 16.25; stress: 61.58 ± 12.15; stress + HFD: 61.46 ± 10.20]. In the task of object location, groups that consumed HFD showed decreased percentage of exploration of the relocated object [F: (1,37) = 3,979, p < 0.05; control: 59.00 ± 12.27; control + ¸HFD: 53.39 ± 7.49; stress: 60.75 ± 4.54; stress + HFD: 54.88 ± 11.00]. Immunohistochemical results showed a decrease in doublecortin immunoreactivity [F (1,16) = 13.361; p < 0.01] and decreased NeuN immunoreactivity [F: (1,16) = 6.927; p < 0.02) in HFD-treated male rats compared

to the control group. An interaction was observed between stress and diet, reducing mitochondrial functionality [F: (1,17) = 8.694; p < 0.01)]. Conclusion: These results showed that HFD and stress by social isolation differently impair memory. Also, both environmental factors impaired mitochondrial functionality in dorsal hippocampus. However, only consumption of HFD was able to decrease neurogenesis. These changes observed in the dorsal hippocampus suggest altered plasticity and functionality, and may be directly associated with memory impairments in these animals.

Palavras-chaves: High-fat diet, Memory, Mitochondria, Stress

Agência Fomento: CNPq

23.026 - A PERSISTÊNCIA DO COMPORTAMENTO DO TIPO ANSIOSO EM RATOS SUBMETIDOS AO ESTRESSE AGUDO: OS GLICOCORTICÓIDES COMO MODULADORES DA PLASTICIDADE DENDRÍTICA NO COMPLEXO BASOLATERAL DA AMÍGDALA

THE PERSISTENCE OF ACUTE RESTRAINT STRESS-INDUCED ANXIETY-LIKE BEHAVIOR IN RATS: THE GLUCOCORTICOIDS AS MODULATORS OF THE DENDRITIC PLASTICITY IN THE BASOLATERAL AMYGDALA COMPLEX

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Instituição: 1 ICB/USP - Instituto de Ciências Biomédicas - Universidade de São Paulo (Av. Prof. Lineu Prestes, 1524 - Butantã, São Paulo - SP, 05508-000)Introdução:

Anxiety disorders are constituted by a range of behavioral responses to danger triggered by innocuous and unpredictable stimuli. Both acute stress and elevated concentrations of glucocorticoid hormones (GCs) promote persistent anxiety-like behavior as well as increased density of dendritic spines in the basolateral amygdala complex (BLA) in rats. BLA is a key brain structure related to fear and anxiety behaviors. In fact, a recent work from our group has shown a crucial role of the glucocorticoid receptor (GR) signaling in BLA for anxiety-like behavior expressed both immediately and late after acute restraint stress. However, it is unclear whether the stress-induced morphological changes in the dendritic arborization are events that depend directly on the genomic signaling of GC in this encephalic structure, as well as whether these biological changes are a sine qua non condition for the persistence of anxiety-like behavior.

Objetivos:

This study aims to investigate whether there is an interdependence between increased corticosterone signaling (CORT, main murine GC), via GR, and the remodeling of dendritic spines and whether those events are necessary for the manifestation of the acute stress-induced late anxiety-like behavior.

Métodos:

Thirty-six, 60-day-old, male Wistar rats (protocol number 85/2016 – CEUA ICB/USP) were randomly divided in two groups: injected (i.p) with either saline (0.9%) or metyrapone (GC synthesis inhibitor; 150 mg/kg) solutions. Out of the total, twenty rats were exposed to acute stress (restraint, 2h) thirty minutes after the injections, resulting in four groups: saline/non-stressed (n=9); metyrapone/non-stressed (n=7); saline/stressed (n=10); and metyrapone/stressed (n=10). After 10 days, we tested the animals in the elevated plus maze to evaluate the anxiety-like behavior. The alteration in dendritic spines density in BLA of these animals was measured after Golgi staining.

Resultados e Conclusões:

Two-way ANOVA showed that acute restraint stress reduced, 10 days later, the percentage of entries [F(1, 31) = 6.481, p = 0.0161] and time spent [F(1, 31) = 7.206, p = 0.0117] in open arms in saline-treated but not metyrapone-treated animals [Tukey´s post hoc test, p < 0.05]. Yet, acute restraint stress increased, 10 days later, the spine density in all dendritic segments of both saline-treated and metyrapone-treated animals compared to unstressed ones [F(2, 3) = 3.542, p = 0.3245 for primary segments; F(2, 3) = 2.653, p = 0.4342 for secondary segments; F(2, 3) = 2.253, p = 0.6442 for tertiary segments]. CONCLUSIONS: The results obtained so far indicate that the persistence of anxiety-like behavior induced by acute stress is dependent of GC signaling, however there is no evidence of the GC effect over the stress-induced dendritic arborization in the BLA.

Palavras-chaves: stress, anxiety, dendritic plasticity, amygdala, glucocorticoid

Agência Fomento: FAPESP, USP, CAPES, CNPQ

24. Dependência de Drogas

24.014 - CONSUMO DE BEBIDAS ALCOÓLICAS POR UNIVERSITÁRIOS: EFEITOS NO COMPORTAMENTO ALIMENTAR

CONSUMPTION OF ALCOHOLIC DRINKS BY UNIVERSITY STUDENTS: EFFECTS ON FOOD BEHAVIOR

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Instituição: 1 UESB - Universidade Estadual do Sudoeste da Bahia (Estrada do Bem Querer, km 4, Caixa Postal 95. Vitória da Conquista - BA CEP: 450)Introdução:
Alcohol (ethanol) is one of the most widely used and accepted psychoactive substances. However, this habit can trigger socioeconomic and biological disorders. Eating behavior is one of the biological aspects that are affected by alcohol consumption. It is known that encephalic areas related to food intake and energy expenditure can be affected by this drug and this may compromise eating behavior. In fact, ethanol affects the hypothalamus, the most important area of the CNS related to the control of food intake, energy expenditure and food preference. Hypothalamic nucleus are sexually and functionally dimorphic and the alterations are more intensive in female with chronic exposure to ethanol.
Objetivos:
To study the relationship between alcohol consumption and the eating behavior of undergraduate students; to analyze possible effects on their body weight and to evaluate if the studied aspects differ between the sexes.
Métodos:
Data collection was done using questionnaires applied to 205 students in their last years (from the third year of studies) of the undergraduate courses at the State University of the Southwest of Bahia-UESB. The study was approved by the UESB Ethics Committee, number 1,875,430.
Resultados e Conclusões:
The results showed that 74% of the students were between 19 and 24 years old. It was verified that 76% of the participants consume alcoholic drinks regularly. Among those we observe that 54% usually drink with an empty stomach. Among the others, who reported eating food while consuming alcohol, 75% prefer eating just snacks. It was verified that among all students, who consumed this drug, 19% had body weight gain. The results showed no differences between the sexes in any of the studied aspects. There is a high consumption of alcohol among students and this affects food behavior and body weight because alcohol is a substance with a high caloric value, though empty, that offers a great energy source, replacing the calories obtained from the solid food. This happens probably because alcohol affects the hypothalamic nucleus leading the individual to prefer foods high in fat and sodium levels and with lower nutritional quality, which can be responsible for weight gain observed in our study. This behavior can leads to cardiovascular, obesity and drug addiction that are the major diseases of XX and XXI centuries. In addition, the fact that men and women have the same alcohol consumption is worrying because women are more vulnerable to the effects of this drug. In this way, is necessary educative measures and sensitization by the public organs and the universities with the purpose of reducing the consumption of ethanol by young people and preventing the damages caused by this practice.
Palavras-chaves: Alcohol consumption, University students, Food behavior, Hypothalamus, Body weight
Agência Fomento:

24.015 - O EXTRATO PADRONIZADO DE PASSIFLORA INCARNATA L REDUZ OS SINTOMAS DA SÍNDROME DE ABSTINÊNCIA A MORFINA INDUZIDA POR NALOXONA EM CAMUNDONGOS.

STANDARDIZED PASSIFLORA INCARNATA L. EXTRACT DECREASES NALOXONE-INDUCED MORPHINE WITHDRAWAL SYMPTOMS IN MICE.

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Instituição: 1 UFRGS - Universidade Federal do Rio Grande do Sul (Rua Sarmento Leite, 500/305, 90050-170, Porto Alegre, Rio Grande do Sul,Brazil.)Introdução:
The chronic use of opioids induces changes in brain chemistry, especially in areas related to reward processing, memory, decision making and habit formation, it may result in consequent tolerance and dependence. Also, the withdrawal syndrome is the main responsible for the relapse of the opioid addicts on detoxification process. The search for new therapeutic approaches is emerging, since there are no totally satisfactory pharmacological strategies for the treatment of opioid withdrawal. In this sense natural products are important source of substances with potential therapeutic applicability. Based on an extensive bibliographical review and previous work of the research group, the standardized extract of Passifora incarnata L. (Sintocalmy® Aché) was selected for evaluation, a phytotherapeutic drug indicated for anxiety, tension and sleep disorders.

Objetivos:
To evaluate the effect of a standardized extract of P. incarnata on the naloxone-induced jumping model in morphine-dependent mice.
Métodos:
(Approved by CEUA/UFRGS 30520). Male CF1 mice (N=8-10/group) were treated intraperitoneally (i.p.) with a methanolic extract from standard Passiflora incarnata L. tablets and diluted in 10% DMSO (PI 50, PI 100, PI 200 mg/kg), saline and 10% DMSO (extract control). Sixty minutes later, they were placed in automatized activity boxes (Insight Equipamentos Ltda.) to evaluate locomotor activity by the distance traveled, the initial 5 minutes were considered exploratory activity and the final 10 minutes the locomotor activity. To the evaluation of naloxone-precipitated jumping behavior on morphine-dependent mice, the animals were divided into groups (N=8-10/group) and treated with increasing doses of morphine sulfate (ip) 3 times a day (9:30 a.m., 1:30 and 5:30 p.m.) for 3 days. Each day the dose had an increase of 25 mg/kg. On day 4 morphine 50 mg/kg (ip) was administered and 2 hours after: saline, 10% DMSO or PI (50, 100 and 200 mg/kg, i.p.). Forty-five minutes later, the withdrawal syndrome was precipitated with naloxone (5 mg/kg, i.p.), immediately the animals were placed individually in acrylic cylinders (45 cm high x 15 cm in diameter) for observation. The number of jumps was recorded for 15 minutes. Data were analyzed by ANOVA/Tukey.
Resultados e Conclusões:
The PI 50 (4,4+2,1) and PI 100 mg/kg (7,84+2,7) treated groups significantly decreased the naloxone-induced jumping behavior in morphine-dependent mice ($F(4,50)=6,144$; $p < 0.05$) without reducing locomotor activity. The PI 200 mg/kg (12,10+1,9) treated group significantly reduced locomotor activity ($F(4,44)=4,796$; $p < 0.05$), however, with no effect on naloxone-induced jumping behavior. Conclusion: The results suggest that the extract of P. incarnata presents therapeutic potential and could be an adjuvant in the treatment of opioid dependence and withdrawal syndrome.
Support: CAPES / CNPq / UFRGS.
Palavras-chaves: Morphine withdrawal, Botanical extract, Passiflora incarnata
Agência Fomento: CAPES, CNPq, UFRGS

24.016 - TRATAMENTO REPETIDO COM ETANOL E AVALIAÇÃO DO EFEITO ESTIMULANTE: ENVOLVIMENTO DO SISTEMA CRF ENCEFÁLICO

REPEATED TREATMENT WITH ETHANOL AND EVALUATION OF THE STIMULANT EFFECT: INVOLVEMENT OF THE ENCEPHALIC CRF SYSTEM
Autores: Letícia Pichinin de Souza 1, Giovana Camilo Macedo 1,3, Flávia Zacoteguy Boos 1, Marília Brinati Malta 2, Isabel Marian Hartmann de Quadros 1
Instituição: 1 UNIFESP - Universidade Federal de São Paulo (São Paulo - SP, Brasil), 2 USP - Universidade de São Paulo (São Paulo - SP, Brasil), 3 Scripps Research - The Scripps Research Institute (La Jolla - CA, USA)Introdução:
Ethanol is the most used drug worldwide, yet neurobiological mechanisms underlying ethanol addiction are not fully understood. Repeated exposure to ethanol promotes neuroadaptations, mainly on mesocorticolimbic system, which can become hyper responsive or sensitized to ethanol. In mice, repeated ethanol treatment may also promote sensitized locomotor stimulation to the drug. Sensitization is an important marker of neuroadaptive effects of alcohol on behavior and brain. Several studies suggest the involvement of brain CRF (corticotropin releasing factor) system on ethanol sensitization.
Objetivos:
The present study aimed to evaluate whether ethanol sensitization would alter gene expression of CRF and its receptors in different brain regions in mice.
Métodos:
Swiss male mice (n=48) were submitted to a 10-day daily treatment with i.p. administration of 2.2 g/kg ethanol (“E”; 15% w/v) or saline 0,9% (“S”), and their locomotor activity was measured in automated activity cages. Locomotor tests were carried out prior to the treatment (novelty test), and during 30 min after treatment on days 1, 5 and 10 (n=24 mice/group). After 8 days with no manipulation, mice were submitted to saline (day 18) and ethanol (day 20) challenges and had their locomotor activity recorded for 30min. For the ethanol challenge, groups were subdivided according to the previous 10-day treatment, and the challenge treatment on this test: Ethanol-Ethanol, Ethanol-Saline, Saline-Saline and Saline-Ethanol (EE, ES, SS, SE; n=12 per group). An hour after test animals were euthanized and brains collected. Brains were sliced at cryostat, and interest regions (prefrontal cortex, lateral septum, nucleus accumbens, hypothalamus, raphe and ventral tegmental area) dissected by punch. Samples were submitted to qRT-PCR for CRF, CRF-1 and CRF-2 receptors. Behavioral data were analyzed with two-

way ANOVA, followed by Newman-Keuls for post-hoc analysis if differences ($p < 0.05$) were detected.
Resultados e Conclusões:
Results are reported as means and standard errors. No group differences ($p > 0.05$) were detected on the novelty test (prior to drug treatment). Ethanol-treated mice (E) showed significant higher locomotor activity on day 10 (E=3041[738.2], $p < 0.05$) compared to day 1 (E=1841[335.8], $p < 0.05$) indicating sensitization. No group differences were found during the saline challenge (S=1171[236.7]; E=1242[236.9] $p > 0.05$). On ethanol challenge, the group EE showed higher locomotor activity (EE=2747.7[648]) than all other groups (SS=1021[221.7]; SE=1763[444.6]; ES=1131[262.2]; $p < 0.05$), indicating a sensitivity to stimulant effect of ethanol on locomotor activity. The results indicate that mice treated with ethanol for 10 days developed behavioral sensitization, confirmed with the sensitized locomotor response after ethanol challenge (experimental group EE). Molecular PCR analysis are currently ongoing. Approved by: CEUA/UNIFESP:5627060618.
Palavras-chaves: ethanol, CRF, sensitization, corticosterone releasing factor, alcohol
Agência Fomento: CNPq nº428815/2016-2, AFIP, CAPES

24.017 - GESTATIONAL EFFECTS OF CRACK COCAINE USE: BEHAVIORAL ALTERATION IN OFFSPRING

GESTATIONAL EFFECTS OF CRACK COCAINE USE: BEHAVIORAL ALTERATION IN OFFSPRING
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Instituição: 1 ICBS - Institute of Biological Sciences and Health (Federal University of Alagoas (UFAL), Maceió / AL)Introdução:
Crack cocaine is a product of cocaine base paste. Crack cocaine is consumed by the pulmonary pathway, producing rapid absorption, more intense and dependent effects when compared to other cocaine pathways. In addition, the use of crack is associated with an increased risk of infectious diseases. Crack cocaine consumption during pregnancy is associated with an increased risk of miscarriage, fetal death, intrauterine growth retardation, neurological abnormalities and significant behavioral changes in the fetus.
Objetivos:
We evaluated neurobehavioral responses and different gender changes in comorbidities such as anxiety- and depression-like, as well as long-term memory consolidation after prenatal crack cocaine administration.
Métodos:
Experimental procedures were approved by the Ethical Committee for Animal Research of the Federal University of Alagoas (UFAL) (protocol # 54/2017). Pregnant Wistar rats from the 5th to the 21st gestational day were exposed to the products of crack-cocaine pyrolysis. Pups were kept with their mothers until the 21st day of postnatal life. After 30 days, animals were submitted to the following behavioral tests: anxiety [elevated plus maze (EPM)]; locomotor activity [open field test (OFT)]; depression [forced swimming test (FST)]; and memory [step down (SD)]. Results were expressed as mean ± SEM with the unpaired t-test.
Resultados e Conclusões:
Exposure to crack cocaine during the embryonic stage developed anxiogenic-like behaviors (males and females); reduced the time spent [%OAT (females, t26=2,807, p=0.0093; and males, t30=3,025, p=0.0051)], entries into the open arms [%OAE (females, t26=2,625, p=0.0146; and males, t30=2,758, p = 0.0098)], and a lower frequency of risk assessment measured by head-dipping (t18=2,644; p=0.0165) in only young male rats. There was no damage in spontaneous locomotor activity (females; t13=0,2148, p=0.8333 and males; t13=1,331, p=0.1877). In FST, female exposed group had an increase in the immobility time in the last 4 minutes (females, t14=5,929, p= < 0,0001) compared to control group, indicating a depressive-like behavior. This behavioral pattern was not observed in males (males, t14=1,842, p=0,0868). Long-term memory impairment of young rats (F1) was observed only when adults (females, t12=3,114, p=0.0089; and males, t10=1,170, p= 0.2691).These data suggest that exposure to crack cocaine pyrolysis products during the gestational period compromises offspring with the presence of comorbidities such as increased propensity to anxiety, depression and long-term memory deficit, which may predispose crack cocaine babies to develop severe clinical outcomes.
Palavras-chaves: Anxiety, Crack Cocaine, Depression, Gestational
Agência Fomento: FAPEAL, CAPES, CNPq

24.018 - CANNABIDIOL DECREASES ETHANOL SEEKING AND CONSUMPTION

CANNABIDIOL DECREASES ETHANOL SEEKING AND CONSUMPTION

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Drug abuse reached considerable proportions in the last years. Studies have shown that cannabidiol (CBD) has anxiolytic, anti-psychotic, antidepressant and neuroprotective properties. There is also evidence that CBD can reduce drug-seeking behavior. Despite of the relevance, little is known about the effects of CBD treatment on ethanol (EtoH) addiction.
Objetivos:
This study aimed to investigate the effects of CBD treatment upon EtoH consumption in mice and rats using different animal models.
Métodos:
Experiment 1: we used male C57BL/6 mice grouped in 4 groups: a) vehicle; b) CBD 1mg/Kg; c) CBD 5mg/Kg and; d) CBD 10 mg/Kg. Animals underwent 8 weeks of intermittent access to water and ethanol 20% (IA2BC). At the end of IA2BC protocol animals had no more access to ethanol bottle and received CBD during 10 consecutive days. In the last day (30 minutes after CBD treatment), animals had access to ethanol 20% and water bottles during 24 hours. Ethanol and water consumption were measured by bottle weight and corrected by each animal´s weight. Experiment 2: we used male Wistar rats that were grouped in 4 groups: a) air + vehicle; b) air + CBD 10mg/Kg; c) ethanol vapor + vehicle and, d) vapor + CBD 10mg/Kg. Animals underwent vapor chambers and received CBD 10 mg/Kg 30 minutes before operant self-administration sessions.
Resultados e Conclusões:
Experiment 1: Our results demonstrated that animals that received CBD (10 mg/Kg, i.p) during 10 days showed decreased EtoH consumption when compared to their consumption before CBD treatment ($F(1,25)=13.26$, $p=0.0007$). Experiment 2: Our results demonstrated that CBD treatment did not decrease the number of lever presser ($F(3,30)=0.96$, $p > 0.05$), reinforcements ($F(3,30)=0.58$, $p > 0.05$) and ethanol consumption ($F(3,30)=1.20$, $p > 0.05$). However, our results demonstrated that CBD treatment reduced ethanol seeking ($F(1,41)=21.40$, $p < 0.001$). This study demonstrated that CBD at the dose of 10 mg/Kg caused decreased EtoH seeking and consumption.
Palavras-chaves: Cannabidiol, Ethanol Disorders, Addiction
Agência Fomento: FAPESP

24.019 - TOBACCO USE IS ASSOCIATED WITH DEPRESSION INCREASE AND LOWER LEVELS ON NR3C1 DNA METHYLATION

TOBACCO USE IS ASSOCIATED WITH DEPRESSION INCREASE AND LOWER LEVELS ON NR3C1 DNA METHYLATION

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Instituição: 1 UFES - UNIVERSIDADE FEDERAL DO ESPÍRITO SANTO (Alto universitário, S/N, Guararema, Alegre-ES)Introdução:
DNA methylation status of glucocorticoid receptor gene (NR3C1) has been associated with traumatic experiences in early life, suicide and prolonged stress. However, few studies have examined NR3C1 methylation in relation to tobacco use and depression.
Objetivos:
The aim of this study was to examine the possible association between tobacco use, NR3C1 methylation status and depression.
Métodos:
Cross-sectional study in adults (n = 270; 20-59 years) attended by public health was performed according to ethical principles established by Research Ethics Committee-UFES, #1.634.021. Depression were investigated using the Beck Depression Inventory (BDI-II) and tobacco use investigation was perfomed according to IBGE-based questionnaire. The 1F region on NR3C1 promoter and exon gene (CpG 39-47) was analyzed via bisulfite pyrosequencing using periferical blood-derived DNA. Mann-Whitney test and Poisson regression model were used to investigated the relationship among NR3C1 DNA methylation levels, tobacco use and depression. Two-Way ANOVA was

used to investigated interaction between depression and tobacco use on NR3C1 DNA methylation. A probability of $p < 0.05$ was considered statistically significant.

Resultados e Conclusões:

Tobacco use is associated with an increased in depression prevalence by 482% (IRR [95% CI] = 4,82 [2,77-8,40], $p < 0,000$). In addition, tobacco use is associated with lower levels of NR3C1 DNA methylation (Mann Whitney test, p=0,028). Two Way ANOVA analysis shows that there is interaction between tobacco use and depression on NR3C1 DNA methylation ($F [1, 281] = 4,058$; p=0,044). This data suggest that tobacco use are associated with lower levels of NR3C1 DNA methylation and an increase in depression prevalence. Moreover, there are an interaction effect between depression and tobacco use on NR3C1 DNA methylation.

Palavras-chaves: Tobacco , DNA Methylation, Depression, NR3C1

Agência Fomento: FAPES