III INTERNATIONAL CONGRESS OF PSYCHOBIOLOGY

Granada, May 29th- 31st, 2019

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Programme at a glance

WEDNESDAY 29th MORNING	WEDNESDAY 29th AFTERNOON
- 9:30-10:30: **Opening ceremony.** -10:00-11:15: **Opening Plenary Lecture.** *"Neural bases of emotion, memory and depression"* Edmund E. Rolls. - 11:15-11:45: **Coffee break** -11:45-13:15: **Symposia** Symposium 1: *Neuropsychology.* Chair: Mª Victoria Perea Symposium 2: *Stress, memory and hypothalamic-pituitary-adrenal axis.* Chair: Esperanza González Symposium 3: *From negative emotion to compulsión. How do we get there?* Chair: Margarita Moreno -13:15-13:45: **Networks in Psychobiology.** -13:45: **Welcome Reception.**	- 16:00-17:30: **Symposia** Symposium 4: *Etology and comparative psychology.* Chair: Fernando Colmenares Symposium 5: *Psychobiology of learning and memory.* Chair: Fernando Rodríguez Symposium 6: *Some examples of how clinical psychiatric observation may inspire psychobiology.* Chair: Manuel Gurpegui -17:30-18:00: **Coffee break.** -18:00-19:15. **Oral communications.** -19:15-19:35: **Phostumous Tribute to Professor D. Amadeo Puerto Salgado (1944-2018).** -19:50-21:00: **Granada Tour "History of the University of Granada through its buildings"** -22:00-23:30: **Night Visit to the Albaicín.**

THURSDAY 30th MORNING	THURSDAY 30th AFTERNOON
- 09:00-10:15: Plenary Lecture: *"Getting our Brain around Addiction: the example of Cannabis and Nicotine"* Stella Vlachou. **- 10:15-11:45: Symposia** Symposium 7: *Developmental Psychobiology.* Chair: Gabriela Chotro. Symposium 8: *Neuromodulation.* Chair: Fernando Sánchez-Santed. Oral communication. **- 11:45-12:45: Coffee break/ Poster session 1.** **- 12:45-14:00: Short oral comunications.** **- 14:00-16:00: Lunch.**	**- 16:00-17:15: Plenary Lecture:** *"Epigenetics of Brain Aging and Cognitive Decline"* Thomas Foster **- 17:15-17:45: Coffee break/ Poster session 2.** **- 17:45-19:15: Panel Discussion I.** *"Psychobiology in university curricula and its profesional future."* Chair: David García Burgos **- 19:15-20:30: Assembly of the Spanish Society of Psychobiology.** **- 22:00: Gala dinner.**

FRIDAY 31th MORNING

- 09:00-10:30:

Symposium 9:

Psychobiological research in affective processes in human and animal models.
Chair: Fernando Barbosa

Symposium 10:

Psychopharmacology.
Chair: Emilio Ambrosio

Oral communication.

- 10:30-11:00: **Coffe break.**

- 11:00-12:30: **Panel Discussion II.**

Psychology and Neuroscience: the role of Psychobiology.
Chair: Milagros Gallo

- 12:30-13:45: **Closing Plenary Lecture.**

"The role of dopaminergic activity on recognition memory: implications for Alzheimer's disease".
Federico Bermúdez Rattoni.

- 13:45-14:15: **Awards and closing ceremony.**

ABSTRACTS

PLENARY LECTURES, SYMPOSIA, ORAL COMMUNICATIONS, SHORT COMMUNICATIONS AND POSTER SESSIONS.

PLENARY LECTURES

PLENARY LECTURE

THE NEURAL BASES OF EMOTION, MEMORY, AND DEPRESSION

Edmund T. Rolls[1,2]

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The orbitofrontal cortex is the key brain region in emotion and reward value-based decision-making in primates including humans (Rolls, 2019). Evidence for this, including its connectivity, neurophysiology, and functional neuroimaging will be described. The medial orbitofrontal cortex represents many rewards, and the lateral orbitofrontal cortex non-reward (not receiving an expected reward) and punishers. In a new theory of depression, it is proposed that cortical attractor networks in the lateral orbitofrontal cortex, where not receiving expected rewards is represented, are over-responsive or over-connected (Rolls 2016, 2017, 2018). Supporting evidence based on functional connectivity in more than 600 participants with depression and controls is described. Functional connectivity (measured by correlations with resting-state fMRI) of the lateral orbitofrontal cortex (OFC) was increased in depression with the temporal lobe cortex (which provides inputs to the OFC); the angular gyrus (involved in language and providing a long loop for rumination); and the precuneus and posterior cingulate cortex (involved in the sense of self and low self-esteem in depression). The lateral OFC non-reward system has increased functional connectivity with the parahippocampal gyrus and medial temporal lobe memory system, which is believed to increase sad memories in depression. The medial OFC has reduced functional connectivity with the medial temporal lobe memory system in depression, contributing it is believed to fewer happy memories in depression. In an activation study with 1140 participants, it was found that those at high risk of depression have greater activation in the lateral OFC to not winning in the monetary incentive delay task, and that the medial orbitofrontal cortex is relatively insensitive to differences in reward value. This evidence that the non-reward lateral OFC is over-connected and over-responsive to non-reward in depression, and the medial OFC is under-connected and under-sensitive to reward in depression, is leading to new treatments for depression.

Rolls,E.T. (2016) A non-reward attractor theory of depression. Neuroscience and Biobehavioral Reviews 68: 47-58.

Cheng,W., Rolls,E.T., et al. (2016) Medial reward and lateral non-reward orbitofrontal cortex circuits change in opposite directions in depression. Brain 139: 3296-3309.

Rolls, E. T. (2017) The orbitofrontal cortex and emotion in health and disease, including depression. Neuropsychologia doi: 10.1016/j.neuropsychologia.2017.09.021.

Rolls,E.T. (2018) The Brain, Emotion, and Depression. Oxford University Press.

Rolls,E.T. (2019, June) The Orbitofrontal Cortex. Oxford University Press

PLENARY LECTURE

THE ROLE OF DOPAMINERGIC ACTIVITY ON RECOGNITION MEMORY: IMPLICATIONS FOR ALZHEIMER´S DISEASE.

Federico Bermúdez-Rattoni[(1)]

[(1)] Departamento de Neurociencia Cognitiva Instituto de Fisiología Celular, Ciudad de México, México.

Recently, it has been shown that the deregulation of dopamine could be involved in Alzheimer's disease (AD) both in humans and in transgenic mice models. For some time, we have investigated the role of dopaminergic activity on recognition memory consolidation. Therefore, we have studied the relationship between dopamine activity and cognitive dysfunction in a model of transgenic mouse of AD, as well as by exogenous administration of β amyloid oligomers in wild-type mice. We found that the accumulation of beta-amyloid decreased dopamine levels and converted in vivo long-term potentiation (LTP) into long-term depression (LTD) after high-frequency stimulation, which led to a deterioration of recognition memory. Surprisingly, increases in cortical dopamine levels rescued LTP and recognition memory. Our results suggest that Aβ-induced dopamine depletion is a central mechanism underlying early synaptopathy and the recognition memory alterations observed in AD.

Selected publications:

Moreno-Castilla P, Rodriguez-Duran LF, Guzman-Ramos K, Barcenas-Femat A, Escobar ML, Bermudez-Rattoni F. Dopaminergic neurotransmission dysfunction induced by amyloid-β transforms cortical long-term potentiation into long-term depression and produces memory impairment. Neurobiol of Aging, 41:187-99, 2016.

Moreno-Castilla Perla, Pérez-Ortega Rodrigo, Violante-Soria Valeria, Balderas Israela Bermúdez-Rattoni Federico. Hippocampal release of dopamine and norepinephrine encodes novel contextual information. Hippocampus. 27: 547-557, 2017.

Guzmán-Ramos K, Moreno-Castilla P, Castro-Cruz M, McGaugh JL, Martínez-Coria H, LaFerla FM, Bermúdez-Rattoni F.Restoration of dopamine release deficits during object recognition memory acquisition attenuates cognitive impairment in a triple transgenic mice model of Alzheimer's disease. Learning & Memory, 19(10): 453-60, 2012.

Morin JP, Cerón-Solano G, Velázquez-Campos G, Pacheco-López G, Bermúdez-Rattoni F, Díaz-Cintra S. Spatial memory impairment is associated with intraneural amyloid-β immunoreactivity and dysfunctional arc expression in the hippocampal-ca3 region of a transgenic mouse model of Alzheimer's disease.Journal of Alzheimer´s Disease. 51: 69-79, 2016.

Cadena-del-CastilloC., Valdes-QuezadaC. Carmona-Aldana A., Arias C., Bermúdez-Rattoni F., and Recillas-Targa F. Age dependent increment of hydroxymethylation in the brain cortex in the triple-transgenic mouse model of Alzheimer's disease. Journal of Alzheimer´s Disease. 41: 1-9; 2014.

PLENARY LECTURE

EPIGENETICS OF BRAIN AGING AND COGNITIVE DECLINE

Thomas C. Foster[1]

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Gene expression in the aging brain depends on transcription signals generated by senescent physiology, interactingwith genetic and epigenetic programs. In turn, environmental factors influence epigenetic mechanisms, such that anepigenetic–environmental link may contribute to the accumulation of cellular damage, susceptibility or resilience tostressors, and variability in the trajectory of age-related cognitive decline. I will highlight DNA methylation as anepigenetic mechanism for gene regulation, distinguishing methylation sites (CpG, non-CpG, promoters and gene bodies). Examples will illustrate how DNA methylation can maintain neuronal integrity across the lifespan and stabilize gene expression associated with the maintenance of memory. However, with advancing age, this same process may interact with senescent physiology to limit plasticity, contributing to a loss in resiliency and cognitive decline.

Supported by NIH R01AG037984, R37AG036800, R01AG052258, R01AG049711 and the McKnight Brain Research Foundation.

Keywords: Epigenetics, DNA methylation, memory, aging

PLENARY LECTURE

GETTING OUR BRAIN AROUND ADDICTION: THE EXAMPLE OF CANNABIS AND NICOTINE

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There appears to be an enormous impact of drug addiction on humanity. Addiction is a compulsive interplay between drugs, cues and habits; distinct behavioural traits, such as impulsivity, and psychological processes seem to influence the pathway to addiction in different ways through the corticostriatal circuitry including the brain reward system. Two drugs of abuse have received a lot of attention over the past few years, cannabis with its medicinal properties and its psychoactive ingredients, and nicotine with the use of the electronic cigarettes. The endocannabinoid system is thought to modulate the motivational processes and reward-seeking behaviours associated with the (ab)use of cannabis. On the other hand, tobacco smoking, mainly attributed to the addictive properties of nicotine, constitutes a worldwide drug abuse problem with devastating health consequences.

This plenary talk will present a summary of findings from studies on cannabinoid compounds and nicotine, many of which using behavioural paradigms/animal models of drug addiction (i.e., the intracranial self-stimulation (ICSS), the conditioned place preference (CPP), the intravenous self-administration (IVSA) and the reinstatement of drug seeking procedures) and coming from early work by Vlachou and colleagues. Current progress, challenges and future directions on cannabinoid and nicotine research will also be discussed.

Keywords: Behaviour, Addiction, Reward, Cannabis, Nicotine

SYMPOSIA

SYMPOSIUM 1

NEUROPSYCHOLOGY AND DEMENTIA

Wednesday, May 29th, 2019

Chair: María Victoria Perea, University of Salamanca, Spain.

SYMPOSIUM 1

EXECUTIVE FUNCTIONING AND QUALITY OF LIFE IN ALZHEIMER´ S TYPE DEMENTIA

Valentina Ladera[(1)].

[(1)] Departamento de Psicología Básica, Psicobiología y Metodología de las Ciencias del Comportamiento, Universidad de Salamanca, Salamanca, España.

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The aim is to present the results of a study that analyses the relationship between executive functioning performance and self-perceived quality of life in patients with different severity degrees (mild, moderate and moderately severe) of Alzheimer´s type Dementia (ATD). Fifty subjects with ATD (mild=17, moderate=17 and moderately severe=16) and 60 subjects without cognitive impairment (comparison group) participated in the study. To assess executive functioning Frontal Assessment Battery, Trail-Making Test, Similarities subtest, Action Fluency Test, Stroop, and Wisconsin test, and to asses quality of life QOL-AD test were administered. Results show statistically significant differences between ATD subjects (mild, moderate and moderately severe) and subjects without cognitive impairment performance in QOL-AD scores ($p<0.05$). Correlation coefficients between executive functioning performance and scores in QOL-AD are not statistically significant ($p>0.05$) in any ATD group. Conclusion: There is no relationship between executive functioning performance and self-perceived quality of life assessed by QOL-AD in patiens with different severity degree of ATD.

Keywords: Executive Functions, Dementia, Quality of Life, Neuropsychology

SYMPOSIUM 1

VISUOCONSTRUCTION IN EARLY DETECTION OF COGNITIVE IMPAIRMENT

Ricardo García[(1)]

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Different visuoconstructive tasks don´t seem to present equal abilities in early detection of cognitive impairment (CI). The aim of this study is to analyse the progression of visuoconstructive impairment associated to CI using a drawing copy task with different degrees of complexity and comparing the results with a classic visuoconstructive task. Sample is formed by 51 subjects without CI (mean age=68.02±8.87), 18 patients with mild CI (MCI) (mean age=66.06± 12.04) and 29 patients with mild dementia (MD) (mean age=70.90± 10.65). Visuoconstructive skills have been assessed with a Progressive Figure Drawing test and the copy of Rey-Osterrieth Complex Figure (ROCP-c). Analyses of the results show that increasing complexity of sequential geometrical figures differenciates levels of CI from an emerging stage ($p<0.001$). However, performance in ROCP-c doesn´t distinguish between MCI and MD ($p>0.05$). Conclusions: assessment of visuoconstruction can be useful in detecting CI in an emerging stage if the degree of complexity in figure drawing is controlled. Analyses of impaired visuoconstructive components could help in detecting different levels of CI.

Keywords: Cognitive Impairment, Drawing Copy Tasks, Increasing Complexity Drawings, Visuoconstruction, Visuoconstructive Impairment

SYMPOSIUM 1

COGNITIVE STIMULATION THERAPY AND SENSORY STIMULATION. NEUROPSYCHOLOGICAL INTERVENTION IN A DEMENTIA SPECIALIZED CENTER

Jaime Unzueta Arce[(1)]

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Cognitive Stimulation Therapy (CST), referred as a brief psychological treatment to stimulate cognitive functions of people with mild and moderate dementia, and Sensory Stimulation (SS), referred as a group of different techniques used to stimulate the senses to increase alertness and reduce agitation, have been proved to be two types of neuropsychological non-pharmacological intervention useful to slow down the development of cognitive impairment (CI) associated to dementia and improve quality of life. The aim of this conference is to show the administration and benefit of CST and SS in 134 users of the Alzheimer´s Disease Association of Salamanca with different GDS stages in a two years follow-up. To show progression of cognitive performance, MEC, Camcog-TR, Clock drawing test (order and copy), and S-MMSE for users with severe CI were used. Results show that administration of CST in early stages seems to have beneficial cognitive effects. Inpatients with moderate and severe CI, SS is used to encourage spontaneous language evocation and preserve the patient's connection with the environment throughout the senses. As a conclusion, progressive use of CST and SS inpatients with different degrees of CI associated to dementia may have a positive cognitive effect slowing down CI and, in some cases, preserving cognitive functions, leading to an improvement in quality of life.

Keywords: Dementia, Neuropsychology, Cognitive stimulation, Sensory Stimulation

SYMPOSIUM 1

DETECTION AND DEVELOPMENT OF COGNITIVE IMPAIRMENT IN A COMMUNITY-DWEELING SAMPLE OF PEOPLE OLDER THAN 65 YEARS OLD. THE DERIVA STUDY

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The aim of this conference is to show the prevalence and development of cognitive impairment (CI) in a community-dweeling sample of people older than 65 years from the DERIVA study. Basal 19ssessment of this prospective, descriptive and observational study is formed by 327 participants older than 65 years old living in the city of Salamanca. After a 4 years follow-up, a total of 127 participants continued in the study. To assess cognitive performance, MMSE and 7 Minute Screen were administered; to assess activities of daily living, Barthel, and Lawton and Brody Indices; and comorbidity and data from medical history were collected. Results from basal assessment show that a 19% of the participants present CI: 15% out of them, approximately, showed mild cognitive impairment (MCI) and 4.3% dementia. After the follow-up, 86% of the participants didn´t show CI, 10.2% MCI and 3.2% dementia. Only a 4.7% of cognitively healthy participants developed MCI and a 3.2% of MCI participants developed dementia. After performing this study, we can conclude that rates of prevalence of CI in people older than 65 years old from the city of Salamanca are located in the lowest rank compared to other Spanish studies with similar methodological characteristics. Development of CI seems to be slow, in most of the cases, but stable.

Keywords: Mild Cognitive Impairment; Dementia; Detection; Development; Neuropsychology

SYMPOSIUM 2

STRESS, MEMORY AND HYPOTHALAMIC-PITUITARY-ADRENAL AXIS

Wednesday, May 29th, 2019

Chair: Esperanza Gonzalez, University of Valencia, Spain.

SYMPOSIUM 2

ASSOCIATION OF LONELINESS WITH COGNITIVE FUNTION AND DIURNAL CORTISOL VARIATIONS IN OLDER ADULTS

César Venero[(1)], Sara García[(1)], Shishir Baliyan[(1)], Lucía Utrera[(1)], Patricia Sampedro[(2)], Rocío Velasco[(1)], Melina Georgiadis[(1)], Azucena Valencia[(1)], Herminia Peraita[(1)], Raquel Rodríguez[(1)], Carmen Díaz-Mardomingo[(1)].

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Cognitive skills often decrease with age, but the rate of decline varies greatly among individuals. Therefore, it is important to detect modifiable risk factors that can impact cognitive function and elucidate its mechanism of action. As human beings, we live in complex social networks that, since childhood, exert an important impact on health and well-being. Therefore, an active lifestyle, participating in social activities, is related to better physical health and mental well-being. In contrast, loneliness, an affective state that reflects the subjective experience of feeling alone, even when one is accompanied by others, is related to cognitive decline and the onset of dementia. It is important to emphasize that the alteration in the circadian rhythm of the hypothalamic-pituitary-adrenal axis (HPA) has been proposed as a way in which loneliness influences health. The aim of the present study was to investigate the relationship between cognitive function, loneliness and the diurnal rhythm of salivary cortisol in older adults without depression. The neuropsychological evaluation involved the application of an extensive battery of neuropsychological tests that evaluated attention, language, executive function and memory. Solitude was measured using the Spanish version of SELSA-S (Scale of social and emotional loneliness for adults). Participants were administered the Geriatric Depression Scale to identify depression. Five samples of diurnal cortisol (upon awakening, 30 minutes after waking up, 45 minutes after waking up, 2 hours after lunch and before bedtime) were taken from 114 elderly subjects. We observed that social loneliness was inversely related to short and long-term memory, while romantic and family loneliness was negatively associated with attention and executive function. In addition, the magnitude of the wake response of cortisol was positively associated with executive function. Interestingly, we found positive associations between loneliness and total cortisol production throughout the day in men, but not in women. Our results suggest that, in older adults, the impact of loneliness on cognitive function may be mediated, in part, through the modulation of HPA axis activity.

Supported byAGL2014-56464-C3-2-R; PSI2018-094627-R (MINECO, España); Premio UNED-Banco Santander-Investigación.

SYMPOSIUM 2

PSYCHOSOCIAL STRESS EFFECTS ON MEMORY CONSOLIDATION

Vanesa Hidalgo[1,2], Matias M. Pulopulos[3], Sara Puig-Perez[4], Isabel Crespo[2], Mariola Zapater[2], Alicia Salvador[2],

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Despite the large body of research focusing on acute stress effects on memory process, the role of age in the acute stress on memory consolidation is understudied. The aim of the current study was to investigate whether the impact of acute psychosocial stress on memory consolidation is different between older and young people of both sexes. For this purpose, one hundred and twenty-five participants (65 older and 60 young) saw 20 negative, 20 positive and 20 neutral pictures, and immediately after, they were exposed to the Trier Social Stress Test (TSST) or a non-stressful task. One the next day, the free recall of the pictures previously learned was assessed. Results showed no differences in memory consolidation between stress and control conditions for negative, positive and neutral pictures. In addition, stress-induced cortisol response was not related to memory consolidation. No age and sex differences were found. This lack of effects supports the idea of an inverted-U relationship between cortisol levels and memory consolidation in young people and an age-related dysregulation of HPA-axis activity and functional changes in the amygdala and hippocampus in older people.

Supported by Ministerio de Educiación y Ciencia (PSI2013/46889 and PSI2016-78763-P) and Generalitat Valenciana (PROMETEOII2015/20)

Keywords: Stress, Cortisol, Memory, Older people

SYMPOSIUM 2

INFLUENCE OF PSYCHOSOCIAL STRESS ON DECLARATIVE MEMORY IN YOUNG UNIVERSITY STUDENTS

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[2]*Instituto Murciano de Investigación Biosanitaria IMIB, Murcia, España.*

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Previous evidence indicates that the stress responsemodulates declarative memory.The present study explored this relationship in healthy young adults depending on sex hormones. The sample was composed of 76 students (25 men and 51 women) from 18 to 25 years of age. The women were tested in different hormonal stages (25 in follicular phase, and 26 in luteal phase). The participants were exposed to the Trier Social Stress Test (TSST, stress condition), or its control condition. Afterwards, their memory performance was evaluated using a standardized memory test. Results showed significant effects of the psychosocial stress on cortisol and alpha amylase response, with higher levels in the TSST than in the control condition. Moreover, women in luteal phase and men reported significant differences between both conditions in alpha amylase response,whereas such differences did not appear in the follicular women group. Importantly, all groupsrecalled more words in the TSST conditionin comparison to the control condition.Finally, only in the luteal women group exposed to TSST our results indicated a negative relationship between the memory performance and the maximum peak of cortisol.

Supported by the Spanish Education and Science Ministry with grants no. PSI2013-46889, PROMETEOII/2015/020

Keywords: Cortisol, alpha amylase, psychosocial stress, sex hormones and declarative memory

SYMPOSIUM 2

PAST LIFE MEMORY, PERSONALITY AND HYPOTHALAMIC–PITUITARY–ADRENAL (HPA) AXIS FUNCTIONING

Teresa Montoliu[(1)], Vanesa Hidalgo[(1,2)], Corina Santamaría[(1)], Eva Babic[(1)], Alicia Salvador[(1)]

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Some findings suggest that personality traits may have an influence on the HPA-axis functioning. In addition, it has been suggested that focusing on positive aspects of the past is related to a healthier HPA-axis profile. Thus, our aim was to analyze the relationship between personality traits, past life memory, and the HPA-axis functioning in older people. To do so, 87 older people (49.4% female) from 59 to 81 years of age completed the NEO-FFI to measure neuroticism, extraversion, openness, agreeableness, and conscientiousness. In addition, participants were instructed to write a summary of their life, and two indexes were analyzed: positive/negative events, and positive/negative cognitions-emotions. Saliva samples were provided on three consecutive days to obtain awakening and bedtime cortisol levels, the cortisol awakening response, and the diurnal cortisol slope. Our results showed that lower neuroticism and higher conscientiousness scores, together with more positive/less negative events, were related to a healthier HPA-axis profile. In conclusion, our results suggest that personality traits and a positive/negative bias in life story review may be related to the HPA-axis functioning in older adults..

Supported by the Spanish Education and Science Ministry with grant no., PSI2016-78763-P and the Generalitat Valenciana no. PROMETEOII2015/20.

Keywords: Neuroticism, Conscientiousness, Past life memory,HPA-axis, Older people

SYMPOSIUM 3

FROM NEGATIVE EMOTION TO COMPULSION: HOW DO WE GET HERE? A POSSIBLE ANSWER THROUGH A TRANSLATIONAL VIEW ON THE BEHAVIORAL AND NEUROBIOLOGICAL MECHANISMS.

Wednesday, May 29th, 2019

Chair: Margarita Moreno, University of Almeria, Spain

SYMPOSIUM 3

NEUROBIOLOGICAL AND BEHAVIOURAL BIOMARKERS IN AN ANIMAL MODEL OF COMPULSIVE BEHAVIOUR

Margarita Moreno[(1)], Santiago Mora-Parada[(1)], Ana Merchán[(1)], Elena Martín-González [(1)], Ángeles Prados-Pardo[(1)], Pilar Flores[(1)]

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Compulsivity is one of the core symptoms in obsessive-compulsive disorder (OCD), that affects 2-3% of the population, and is ranked within the ten leading neuropsychiatric causes of disability (WHO, 2008).In our laboratory, we investigated the individual vulnerability to compulsion in rats by the Schedule-Induced Polydipsia (SIP) procedure, characterized by excessive drinking under intermittent food reinforcement schedules. Rats that were selected for low (LD) versus high compulsive drinking (HD) behaviour following schedule-induced polydipsia (SIP). We have found other behavioural markers of compulsion in the HD rats such as: lack of inhibitory control on the 5-CSRT task, behavioural inflexibility by perseveration during a reversal task, latent inhibition deficit and an increased fear memory in a fear conditioning test. Moreover, through neuropharmacological and neurochemical studies, we have also revealed a relevant role of the serotonin 5-HT2A receptor and glutamate activity in the compulsive phenotype in rats. These findings could contribute to the elucidation of the mechanisms underlying the compulsive phenotype of HD rats and its relation to vulnerability to neuropsychiatric disorders and possible new neuropharmacological treatments.

Supported by Ministerio de Economía y Competitividad Spanish Government MINECO-FEDER funds (Grants number: PSI2015-70037-R)

Keywords: Compulsivity, Schedule-induced polydipsia, Serotonin, Glutamate, 5-HT2A receptor; Prefrontal cortex.

SYMPOSIUM 3

OF CARROTS AND STICKS: MECHANISMS OF INFLEXIBLE BEHAVIOUR IN REVERSAL LEARNING IN THE RAT

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Cognitive inflexibility is observed across a spectrum of psychiatric and neurological disorders including schizophrenia, drug addiction, Parkinson's disease and obsessive-compulsive disorder, but has only recently become a focus area for drug development. Across species, a frequently used task to measure behavioural flexibility is reversal learning, which requires subjects to update responding to maximise reward when the rules change over time. The neural circuitry underlying this particular cognitive function is remarkably well conserved across species and information gained from rodent experiments could therefore increase our understanding about human disorders characterised by such cognitive impairment. We use touchscreen methodology for rats, which enables the measurement of reversal learning is tests near-identical to human neuropsychological test batteries, e.g. CANTAB. This has allowed us to further explore the psychological and neuropharmacological mechanisms of reversal learning, with a particular focus on the serotonin system and dopamine signalling at the D2 receptor. We have for instance found strong behavioural and computational evidence for a selective blockade of negative feedback in reversal learning after D2-receptor stimulation.

This research was funded by a Wellcome Trust Senior Investigator award to T.W.R. (104631/Z/14/Z). J.A. was supported by the Swedish Research Council (350-2012-230).

Keywords: Dopamine, serotonin, cognitive flexibility, reinforcement learning, computational modeling.

SYMPOSIUM 3

NOVEL PRIMATE MODEL TO STUDY THE NEUROBIOLOGICAL MECHANISMS UNDERLYING GENETIC VARIATION ASSOCIATED WITH AFFECTIVE BEHAVIOUR

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Genetic variation in the repeat region of the serotonin transporter gene (*SLC6A4*) is associated with vulnerability to affective disorders and reduced response to antidepressants. However, the neurobiological mechanisms underlying the link between *SLC6A4* polymorphisms and the emotionally vulnerable phenotype are not fully understood. Using the marmoset monkey, we identified sequence polymorphisms within the *SLC6A4* repeat region (AC/C/G and CT/T/C) associated with individual differences in trait anxiety, gene expression and response to antidepressants. The low-expressing haplotype AC/C/G was linked with high anxiety and an anxiogenic response to threat after an acute dose of citalopram, a selective serotonin reuptake inhibitor. In addition, imaging studies revealed structural and neurochemical brain changes associated with the *SLC6A4* genotype, with AC/C/G homozygous presenting reduced grey matter volume in the anterior hippocampus and subtemporal sulcus and reduced serotonin 2A receptor in the right posterior insula. These findings provide a novel genetic and behavioural primate model to study the molecular, neurodevelopmental, and psychopharmacological mechanisms that underlie genetic variation-associated complex behaviours, with specific implications for the development of personalized pharmacological treatments for psychiatric disorders.

Keywords: serotonin transporter, anxiety, antidepressants, serotonin 2A receptor, insula.

SYMPOSIUM 3

BAD GOALS OR BAD HABITS: UNTANGLING THE ROLE OF HABITS IN OCD USING A NOVEL MOBILE 'APP' METHODOLOGY

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Habits are a powerful route to efficiency; the ability to constantly shift between goal-directed and habitual strategies, as well as integrate them into behavioural output, is key to optimal performance. When such ability is impaired, it may lead to loss of control and compulsive behaviour, as observed in Obsessive-Compulsive Disorder (OCD). Compulsions have been hypothesised to result from the aberrant formation of, and control over, habits. Habits have successfully been induced and investigated in rats using methods such as overtraining stimulus–response associations and outcome devaluation, respectively. However, such methods have ineffectively measured habits in humans because 1) human habits usually involve more complex sequences of actions than in rats; 2) of pragmatic impediments posed by the extensive time (weeks, or even months), it may take for routine habits to develop. I will present preliminary data from a novel behavioural paradigm - a mobile-phone app methodology - for inducing and measuring habits in humansduring their everyday schedule and environment. I will report how healthy volunteers andOCD patients learn and integrate the task into their daily routine,how different reward schedules and reward devaluation influence habit development and how patients arbitrate between intentional actions and habits, once these are established.

Supported by the Wellcome Trust (Sir Henry Wellcome Trust Postdoctoral Research Fellowship: RG86232)

Keywords: habit, skill, automaticity, motor sequence learning, devaluation.

SYMPOSIUM 4

ETHOLOGY AND COMPARATIVE PSYCHOLOGY

Wednesday, May 29th, 2019

Chair: Fernando Colmenares Gil, University Complutense of Madrid, Spain

SYMPOSIUM 4

HUMAN COOPERATION AND PUNISHMENT IN EVOLUTIONARY CONTEXT: GENDER, PERSONALITY, REPUTATION, BONDEDNESS, AND DECISION TIME

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Human cooperation is known to be uniquely normative and moralistic, reputation-based, highly parochial, and enforced through reward and punishment. However, the relation between the various forms of cooperation and the factors that predict and moderate its expression remains to be more fully chartered. It has been argued that women are more empathic and prosocial than men are, that (individual) personality and (social) reputation influence the probability of acting cooperatively, that prosocial behaviour is preferentially directed at closely-bonded partners, and that decisions to behave prosocially rather than selfishly are typically more intuitive and faster to make. It is also unclear what the relation is between collaboration, altruism, prosocial punishment and vengeful punishment, and why punishment is sometimes antisocial, i.e., directed against cooperators (rather than, or in addition to, free-riders). Here we use data recorded in a self-administered survey questionnaire with 711 participants (M_{age} = 21 years; 80% women) to explore some of the prevalent hypotheses put forward to account for the empirical results described above. Our findings lend support to some of the hypotheses tested; however, they also highlight the need to come up with a more nuanced and integrated view of the multiple factors that shape human cooperation and its psychological scaffolding in an evolutionary context.

Supported by MINECO project grants PSI2014-51890-C2-1-P and PR75/18-21494 (UCM and Banco de Santander) to FC.

Key words: Cooperation, punishment, evolutionary perspective, humans

SYMPOSIUM 4

ECONOMIC APPROACH TO THE COMPARATIVE STUDY OF SOCIAL-DECISION MAKING

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Many scholars now agree that uniquely human forms of cooperation first evolved within a social niche where the incentive to defect was weak, and individuals could better benefit from their joint collaborative efforts. Only later, driven by socio-ecological changes, social interactions turned into more stringent and riskier social problems, and humans managed to maintain cooperation. However, recent work on economic games show that chimpanzees and other primate species can reach similar levels of cooperation as humans, provided that the incentive to defect is low. Here we compare humans' and chimpanzees' social decision-making in two contexts that varied according to the risk associated to cooperating: Prisoner Dilemma (PD, high-risk context) and Chicken Game (CG, low-risk context). Results show that both humans and chimpanzees can stabilize cooperation in a risky social-decision situation (PD), but that the way they achieve it might differ in significant ways. Human success was undoubtedly based on our unique capability and motivation to share and coordinate with others, yet chimpanzees could be nearly as efficient cooperators as humans by means of a simpler mechanism: prior experience in a context with low risk of being exploited and where individuals can do better by cooperating (CG) allow them to keep cooperating even when the incentive to defect was increased (PD).

Partly supported by a studentship (AP2009-00159) to CSE from MICINN and project grants ((UCM-BSCH GR35/10-A-940813, and PSI2011-29016-C02-01) to FC.

Keywords: Economic games, Comparative approach, Cooperation, Evolution

SYMPOSIUM 4

TESTOSTERONE AND CORTISOL MODULATE THE EFFECTS OF EMPATHY ON AGGRESSION IN CHILDREN

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This study aimed to analyze the potential moderating role of circulating testosterone, cortisol and estradiol levels on the attenuating effect of empathy on aggression in children. Participants were 139 children (age 8). Their aggressive behavior was measured by the DIAS, empathy was measured using the E-Q-Child Version and hormone levels were analyzed using an ELISA technique in saliva samples. A regression analysis revealed an interaction effect of empathy x testosterone in girls, with higher levels of empathy corresponding to lower levels of aggression at both moderate and low testosterone levels. In boys, an interaction effect of empathy x cortisol was observed, with lower levels of empathy corresponding to higher aggression levels at moderate and high cortisol levels, and higher levels of empathy corresponding to lower aggression levels again at moderate and high cortisol levels. Our results indicate the importance of taking the interaction of psychological and biological factors into account in order to gain greater insight into the complex mechanisms underlying aggressive behavior.

Key words: Testosterone, cortisol, aggression, empathy, children, sex differences.

SYMPOSIUM 4

THE USE OF THEORY OF MIND IN DIFFERENT SOCIO-ECOLOGICAL CONTEXTS: ONTOGENETIC AND PHYLOGENETIC CONSIDERATIONS

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Something that gives us great advantage when managing our social interactions is our capacity to represent others' mental states, like what they perceive, know and believe (i.e., Theory of mind, ToM). Understanding the ontogeny and phylogeny of ToM requires the comparison between subjects of different ages and species. Exploring the conditions of ToM's present use can also shed light on the potential selective pressures that shaped this cognitive capacity in the past. Few studies have compared the use of ToM in cooperation and competition contexts within different types of social relations. Here I present a study done with adult women and 6-year-old children. Subjects participated in pairs, taking turns to choose containers, and could maximize their rewards by taking into account their partner's ToM. Children only solved the visual perspective task and performed better when they competed, whereas adults also solved the knowledge and false belief tasks and performed better when they cooperated. I discuss these findings in the light of previous studies with chimpanzees and the preliminary results of a study carried out with wild Japanese macaques (*Macaca fuscata*) in Koshima island.

Supported by the Universidad Cardenal Herrera-CEU, CEU Universities and the Generalitat Valenciana, ACIF/2014/281.

Keywords: Theory of Mind, Socio-Ecological Context, Ontogeny, Phylogeny.

SYMPOSIUM 5

PSYCHOBIOLOGY OF LEARNING AND MEMORY.

Wednesday, May 29th, 2019

Chair: Fernando Rodríguez, University of Seville,Spain.

SYMPOSIUM 5

BENEFITS OF PHYSICAL EXERCISE ON MEMORY DEFICIT AFTER TRAUMATIC BRAIN INJURY

Laura Amorós-Aguilar[(1)], Isabel Portell-Cortés[(1)], David Costa-Miserachs[(1)], Meritxell Torras-Garcia[(1)], Èlia Riubugent[(1)], Beatriz Almoda[(2)], Margalida Coll-Andreu[(1)].

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The effects of different temporal schedules of voluntary wheel running on object recognition memory deficits were assessed 7 weeks after traumatic brain injury (TBI). TBI rats included a sedentary group, and three exercise groups: early discontinued (3 weeks of exercise initiated 4 days after injury, followed by 4 weeks of sedentary condition); delayed exercise (3 weeks of exercise initiated 4 weeks post-injury), and early continuous (7 weeks of exercise starting 4 days post-injury). Memory deficits induced by TBI on 24-h retention were reversed in early discontinued and delayed exercising groups, and reduced in the early continuous group. Early discontinued exercise reduced the loss of neurons (NeuN+ cells staining) in the hippocampal hilus. Early discontinued and early continuous exercise conditions reduced microglial reactivity (iba1+ cell staining) in the dorsal hippocampus. Exercise during the last 3 weeks of the experiment (early continuous and delayed groups) enhanced neurogenesis (DCX+ cells) in the dentate gyrus of hippocampus. An analysis of exercising animals according to daily exercise time showed a higher reduction of memory deficits in medium than in high runners. We conclude that all the temporal schedules studied are able to reduce memory deficits, and that this effect is better achieve with moderate than with high amounts of daily exercise.

Supported by Ministerio de Ciencia e Innovación (PSI2009-08034) and by Ministerio de Economía y competitividad (PSI2014-55087-R).

Keywords: Traumatic brain injury; Physical exercise; Object recognition memory; Neuroprotection; Neurorepair.

SYMPOSIUM 5

NEUROINFLAMMATION AS LINK BETWEEN CHRONIC SOCIAL STRESS AND DEPRESSION

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Clinical and preclinical findings suggest a role for the immune system in the development of stress-related affective-disorders, through various mechanisms that affect brain activity. Thus, our previous works showed that depressive-like behavior induced by social defeat in male mice were associated with high levels of peripheral proinflammatory cytokines and central expression of cytokines that were associated with the strategy used to cope with stress. Given the evidence of a higher prevalence of depression in women, most recently we have used chronic social instability stress for females. We observed that the depressive-like behavior manifested by females was not associated with an increase in inflammatory cytokines, but a decrease in the expression of hippocampal IL-10, an anti-inflammatory cytokine. It is possible that CSIS make females more susceptible to a posterior stress. Thus, preliminary data en our laboratory indicate that the re-exposure to a stressful experience produces a sensitization in females along with memory impairment. Finally, inflammation could explain the high incidence, as well as the sexual differences in depression observed in other diseases, such as cancer, and whose research is also the subject of our studies.

Supported by Ministerio de Educación y Ciencia, PSI2015-63658-R

SYMPOSIUM 5

MEMORY AND PHYSICAL ACTIVITY

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Aerobic exercise is associated with changes in brain morphology and improvement of cognitive functions. This is especially noticeable in spatial memory, a cognitive ability that depends on the integrity of the medial temporal lobe, one of the brain regions more affected by age-related changes. Thus, it was described that the hippocampus reduces its volume as we age.

Furthermore, our research group developed different neuropsychological tasks for assessing spatial memory in humans. These tests have demonstrated to be sensitive to subtle functional changes and were applied to address the effect of aging on this mnesic function. In this seminar, the effect of practicing sports on spatial memory will be discussed. We will paying attention to variables like the age of the participants as well as the practice of other activities like dancing, which integrates physical activity and movement coordination.

Keywords: Hippocampus, aging, spatial memory, sport.

SYMPOSIUM 5

ACCELERATED FORGETTING IN TEMPORAL LOBE EPILEPSY: WHEN DOES IT OCCUR?

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It has been repeatedly found that Temporal Lobe Epilepsy (TLE) patients retain information at shorter intervals normally (30 minutes), but then they lose it after longer periods of time (days or weeks). This common pattern has been called Accelerated Long-Term Forgetting (ALF)**.** However, these findings are controversial, and some studies have failed to find this forgetting pattern. The main goal of the study was to analyse differences and similarities in forgetting rates of TLE patients compared to those of healthy controls, in order to find out whether ALF is in fact a common feature in this syndrome. A secondary aim of this research was to assess the relationship between clinical epilepsy-related variables and forgetting rates in TLE patients. The sample of the study was composed of 14 TLE patients and 14 healthy matched controls. All of them were volunteers in the study and signed a written informed consent. All participants underwent a full standardised neuropsychological assessment including general intelligence, executive functioning, memory, language and other variables, such as depression, anxiety or everyday memory failures. A specific memory task, consisting of cued recall of 4 short stories and 4 routes was carried out. Both stories and routes were assessed at 4 different intervals (30 seconds, 10 minutes, 1 day and 1 week).Groups were matched in demographic and cognitive variables, despite a slight tendency of differences in visual immediate reproduction (WMS-III Designs). There was a significant difference between groups in 10 min interval in stories task, with TLE group displaying a greater forgetting than healthy controls. None of the other intervals in both tasks showed significant differences between groups.No differences were found when controlled for clinical epilepsy-related variables, with only a tendency to significance when controlled for presence of Medial Temporal Sclerosis (MTS). Forgetting of verbal information at short term (10 minutes) was higher in patients with TLE compared with controls, but ALF pattern was not shown. Evidence found in this study suggests that long-term consolidation process is not necessarily impaired in TLE patients.

This study was supported by Ministerio de Educación (JC2011-0012).

Keywords: Long-Term Forgetting; Epilepsy; Temporal Lobe; Memory consolidation.

SYMPOSIUM 6

SOME EXAMPLES OF HOW CLINICAL PSYCHIATRIC OBSERVATION MAY INSPIRE PSYCHOBIOLOGY.

Wednesday, May 29th, 2019

Chair: Manuel Gurpegui, University of Granada Spain.

SYMPOSIUM 6

TOBACCO USE AND PSYCHIATRIC DISORDERS

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The phenomenon of smoking tobacco appears with particular intensity among psychiatric patients, from the observation of higher rates of smoking initiation and lower smoking cessation rates, with explanations ranging from greater vulnerability for this addiction to an unconscious process of self-medication attempt. Prevalence and associated factors illustrate this naturalistic experiment. There is an association of affective, anxiety and psychotic disorders, as well as suicide attempt, with both smoking and nicotine dependence in the general population. Limbic and fronto-cortical levels of serotonin are reduced after chronic administration of nicotine, which also produces sensitization to nicotine-induced dopamine release at the frontal cortex. The subsequent imbalance between serotonin and dopamine may lead to enhance the consumption of nicotine and others drugs and to reduce the inhibitory control systems of the brain.

SYMPOSIUM 6

CANNABIS MAY PLAY A CATALYTIC ROLE IN PSYCHOSIS

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There are dose-response effects of cannabis use on dimensions of psychosis and on the prevalence of psychotic disorder. The earlier the heavy use of cannabis the earlier is the onset of psychosis. The association of cannabis use with an earlier psychosis onset is independent of the effect of (male) sex; and the onset of psychotic symptoms is posterior to the onset of cannabis use. Cannabis use appears to increase the risk of developing psychosis independently of neuroticism and childhood trauma. According to neuroimaging studies, adolescents who had used cannabis daily for at least one year in comparison with age-matched non-users, and subjects who started cannabis use prior to age 17 in comparison with subjects who started at age 17 or older, show brain-structure abnormalities.

Keywords: Adolescents; cannabis; first episode; psychosis

SYMPOSIUM 6

PHYSICAL EXERCISE IS ASSOCIATED WITH BETTER COGNITIVE PERFORMANCE IN A LARGE ANDALUSIAN COMMUNITY SAMPLE

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A growing body of literature suggests that exercise has profound benefits for brain function, although little evidence comes from epidemiological community-based large samples. The aim of this study was to explore the association between physical exercise and cognitive performance in a sample representative of the general adult population of Andalusia (South Spain). The sample consisted of 4507 adults participating in the PISMA-ep study, the first mental health epidemiological study developed in Andalusia, the largest Spanish autonomous community representing almost a fifth of the Spanish population. Measures include cognitive function assessments, using the SCIP (Screen for Cognitive Impairment in Psychiatry), and independent variables such as self-reported physical activity levels and sociodemographic data. Our results revealed that immediate verbal learning (VL-I), delayed verbal learning (VL-D), working memory (WM), verbal fluency (VF), processing speed (PS) and overall cognitive function were significant and positively associated to physical exercise ($p<0.000$ in all cases). Effect size increased with intensity of the activity performed. Associations remained significant after adjusting for age, sex and participant´s IQ. In our sample, physical exercise was associated to better cognitive performance on different domains, including memory, attention, and executive function. Higher intensity of exercise strengthened this association supporting a dose-dependent neuroprotective relationship between physical activity and cognition in adult population.

Supported by Junta de Andalucía (10-CTS-6682) and Marie Curie Research Grants Scheme (FP7 626235)

SYMPOSIUM 6

OXIDATIVE STRESS IN DEPRESSION, BIPOLAR DISORDER AND PSYCHOSIS

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Meta-analytic studies show that, compared to healthy control subjects, patients with depression have a dysbalance between significantly elevated oxidative stress markers and lower levels of antioxidants. This includes significantly elevated levels of the oxidative stress indicator malonyldialdehyde (MDA), the final product of lipid degradation, lower levels of the antioxidants zinc and uric acid, and upregulated levels of the free radicals eliminating the enzyme superoxide dismutase (SOD). Moreover, effective antidepressant treatment can reduce oxidative stress and increase non-enzymatic antioxidants, some of which seem to normalize to the levels of healthy controls. In addition to potential disease-specific alterations, non-specific oxidative stress abnormalities may cut across different severe psychiatric disorders, as has been observed for increased markers of inflammation. In bipolar disorder, there is an increase of the oxidative stress parameters MDA and thiobarbituric acid reactive substances (TBARS). After restricting the analyses to different phases of this affective illness, both parameters also appear increased in both mania and bipolar depression, but not in bipolar euthymia. Regarding the non-enzymatic antioxidants, glutathione shows a significant decrease and uric acid a significant increase in patients with bipolar disorder in comparison to healthy controls; this increase in the uric acid concentration is higher in patients with mania than in patients with bipolar depression and euthymia.

SYMPOSIUM 7

DEVELOPMENTAL PSYCHOBIOLOGY

Thursday, May 30th, 2019

Chair: M. Gabriela Chotro, University of the Basque Country, Spain.

SYMPOSIUM 7

WORKING MEMORY DEVELOPMENT FROM CHILDHOOD TO YOUNG ADULTHOOD. AN ERPS APPROACH.

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Working memory (WM) is an important cognitive function that is necessary to perform our dailyactivities. In this seminar I would focus on the neurophysiology of WMduring development, from childhood to adulthood (from6 to 24–25 years old, approximately). The results of a neuropsychological test for assessing the Baddeley and Hitch model of WM and the neurophysiology associated to the Delayed-Match-to-Sample Tests will be presented. How the neurophysiological mechanisms related to WM develops with age in these age periods would be discussed, of particular relevance are the maturation of the slow negativity related to the retention period, that clearly suggest an inmaturity of frontal cortex for supporting WM operations during early childhood, and a posterior negativity during the matching period related to the process of selecting the stimulus to be matched. How the neurophysiological signal related to maintaining visual items in WM is impaired in Attention Deficit Disorder would be presented. The results suggest a progressive maturation of anterior sites that would be related to the increased performance of WM with age and with impaired WM performance in ADD.

Supported by Ministerio d eEconomía y Competitividad (PSI2016-80059-R)

Keywords: worrking memory, development, Event Pelated Potentials

SYMPOSIUM 7

DRINKING DURING PREGNANCY: WHAT THE FETUS MAY LEARN

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When the pregnant female ingests alcohol, it reaches the fetus and produces a series of physiological and behavioral effects on the developing organism. Within the behavioral effects, we have shown that prenatal exposure to low and moderate doses increases alcohol liking in infant rats. This enhanced alcohol acceptance results from the fetal association of alcohol's flavor and its pharmacological reinforcing effects. The appetitive effects of this prenatal experience have been proposed to be mediated by the opioid system, and the main responsible for its activation seems to be acetaldehyde, alcohol's first metabolite. However, the sequence of events occurring between acetaldehyde production and the opioid activation is still under research. The knowledge about every link of the neurochemical chain underlying this prenatal appetitive learning may allow us to intervene and prevent the physiological and behavioral effects of fetal alcohol exposure.

Keywords: Prenatal alcohol exposure, appetitive learning, acetaldehyde, opioid system

SYMPOSIUM 7

WELCOME TO YOUR GUT BRAINS: MICROBIAL ECOSYSTEM INFLUENCES YOUR MIND

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The fields of microbiology and neuroscience in modern medicine have largely developed in distinct trajectories despite pioneering work in the nineteenth century showed the co-morbidity of psychiatric and neurological illnesses with gastrointestinal pathology. It has recently become evident that the gut microbiota, the trillions of commensal microbes that inhabit our gastrointestinal tract (GI), can greatly influence brain development and host behaviour, creating the emerging concept of microbiota-gut-brain axis (MGBX). The MGBX occurs through various bidirectional homeostatic routes including the vagus nerve, the immune system, neuroendocrine pathways and bacteria metabolic by-productswith neurological impact. Because early life is a critical period for the colonisation of the GI by bacteria paralleled by the simultaneous dynamic phase of cell differentiation, axon myelination and synaptogenesis, and the rapid emergence of infant cognitive functions, microbiota disruption during this window could lead to alterations in brain development and function with lasting consequences. We will review the burgeoning data on the contribution of the gut microbiota to brain development, central nervous function function and neurological disorders.

SYMPOSIUM 7

EFFECTS OF EARLY STRESS IN THE CEREBELLUM

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Early life stress is a risk factor for the development of certain abnormalities in brain structure and function and it is associated with psychological disorders. Maternal separation is an animal model of early stress that produces changes Central Nervous System development. We aim to assess in a rat model of maternal separation the effects in the cerebellum, structure involved, not only in motor, but in superior cognitive and emotional functions. One group (n=15) were subjected to maternal separation for 21 days and the rest was taken as a control (n=20). Results showed that both groups perform successfully the reference memory task. Although there were not behavioral differences in the Morris Water Maze, the experimental group showed lower metabolic activity in the medial nucleus of the cerebellum, as well as lower number of c-Fos positive cells in the three deep nucleus of the cerebellum. These results highlight the need to increase the study on the effects of early life stress in the cerebellum, an essential but yet unfortunately unknown structure.

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Keywords: cerebellum, c-Fos, cytochrome c-oxidase, early life stress, maternal separation.

SYMPOSIUM 8

NEUROSTIMULATION

Thursday, May 30th, 2019

Chair: Luis Fernando Sánchez Santed, University of Almeria, Spain

SYMPOSIUM 8

CHANGES IN BRAIN PROCESSING OF TOUCH STIMULI INDUCED BY TDCS/TACS IN CHRONIC PAIN PATIENTS

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Previous research has repeatedly observed that chronic pain patients display significant functional (and structural) brain changes of the so-called pain matrix (primary and secondary somatosensory, insular, anterior cingulate, and prefrontal cortices) at rest and during processing of painful and non-painful stimuli. EEG studies have further revealed significant abnormalities in the early and later components of the evoked potentials elicited by somatosensory and affective stimuli (P50, N150, P260 y P450), as well as changes in brain oscillations and enhanced complexity. From the previous findings that point to a hyperexcitability of the central nervous system in patients with chronic pain, it is also possible to consider whether the electrical brain stimulation can lead to revert these plastic changes and, consequently, alleviate the pain of these patients. The modulation of brain activity by transcranial electrical stimulation (tDCS and tACS) electrical brain stimulation can generate specific behavioral changes that can alter the perception of the body. It is likely that such changes can affect the perception of pain and, therefore, represent an open window to treat the relief of symptoms of patients with chronic pain. The present work will present preliminary findings about the effects of tACS and tDCS on habituation mechanisms elicited by the repetitive presentation of tactile stimuli in healthy controls and patients with chronic pain.

Funding: This work was supported by the Spanish Ministry of Economy and Competitiveness and European Regional Development Funds (ERDF) (PSI2017-88388-C4-1-R)

SYMPOSIUM 8

LIGHT ENERGY APPLICATION IN PSYCHOBIOLOGY

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Low-level light therapy (LLLT) represents a new therapeutical technology which has been applied successfully in different fields from elder subjects cognitive impairments, sleep deprivation negative outcomes or depression due to inflammation. This infrared light interacts with COx inside the mitochondria improving the energy metabolism within it. We aim to understand how LLLT affects brain metabolism and how photobiomodulation represents a promising tool in the treatment of stress-related consequences and experimental models of hepatic encephalopathy. For this purpose, we treat experimental models of portal hypertension, cholestasis, and maternal separation with LLLT and we studied brain activity and behavioral outcomes. We provide preliminary insights into the validity of LLLT as a possible intervention to improve behavioural and brain alterations in pathological conditions.

Suported by Gobierno de España PSI2017-83893-R, MINECO PSI2015-73111-EXP and PSI2017-90806-REDT. Acknowledgements: AINDACE Foundation (Ayuda a la Investigación del Daño y Enfermedades Cerebrales).

Keywords: Low-light-level therapy, hepatic encephalopathy, maternal separation, Rat, cytochrome c oxidase.

SYMPOSIUM 8

TRANSCRANIAL DIRECT CURRENT STIMULATION: ANIMAL STUDIES

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Transcranial direct current stimulation (tDCS) is a relatively novel technique for brain activity modulation. Different clinical and experimental studies with human subjects are showing the high potential of tDCS for enhance performance (e.g. cognition), enhance recovery after brain damage and even for treatment of some psychopathological conditions. Animal models are essential in research because can seed light in applications, parametric values for such applications and mechanisms involved. In this sense active research is showing via animal models that tDCS is able to modulate neuropathic pain. Recovery after stroke is also a very important field for tDCS application, and animal models helps to confirm the high potential of the technique for neurorehabilitation. Emotional and cognitive processing can also be modulated by electrical stimulation. Due to the important potential and applicability of the technique, information about mechanisms is basic for future developments. Actual information from animal models show active regulation of LTP and LTD phenomena, hippocampal BDNF release regulation, and then probably plasticity, and even direct regulation of some neurotransmission systems as glutamate and GABA.

Supported by PSI2017-86847-C2-1-R and EU FEDER funds.

Keywords: Animal models, tDCS, Neurostimulation, Cognition, Neurorehabilitation.

SYMPOSIUM 8

TRANSCRANIAL DIRECT CURRENT STIMULATION OVER INHIBITORY CONTROL IN HUMANS

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Transcranial direct current stimulation (tDCS) is a non-invasive and safe neuromodulation technique that changes cortical excitability inducing diverse behavioral and microstructural changes as well as clinical enhancements in a variety of psychopathologies. Within the last years, the inhibitory control field has attracted great interest from tDCS. So far, tDCS has been serving for reporting the distinct functional roles of cortical regions within the subcategories of inhibitory control. In this sense, the present work shows different functions of the orbitofrontal cortex (OFC) over risky decision-making, action restrain and action cancellation. Also, tDCS has been emerging as a neurorehabilitation tool used in the clinical practice within the treatment of pathologies associated to inhibitory control, such as addiction, OCD, schizophrenia or eating disorders. This work reviews some of the most relevant results within the clinical application, encompassing the current limitations and proposing future guidelines.

Supported by MINECO-FEDER: PSI2014-55785-C2-1-R and PSI2017-86847-C2-1-R and UAL Transfiere: TRFE-SI-2018/003

Keywords: Neuromodulation, Transcranial direct current stimulation, Inhibitory control.

SYMPOSIUM 9

PSYCHOPHYSIOLOGICAL RESEARCH OF AFFECTIVE PROCESSES IN HUMAN AND ANIMAL MODELS.

Friday, May 31st, 2019

Chair: Fernando Barbosa, University of Porto, Portugal.

SYMPOSIUM 9

THE EEG AT REST: PATTERNS OF FUNCTIONAL CONNECTIVITY AND ITS ASSOCIATION WITH PERSONALITY TRAITS

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The so-called resting state activity reflects spontaneous brain activity not related with a specific motor task nor sensory input and supports the idea that the human brain is intrinsically organized into large-scale functional networks (Resting State Networks – RSNs; Karahanoğlu and De Ville, 2015). The understanding of the neuronal dynamics underlying the intrinsic activity of these large-scale networks represents a critical step in the study of the resting brain. At the scalp level, distinct patterns of EEG rhythms, which are commonly modulated during active behavioural tasks, have been associated with distinct RSNs that overlap with sensory–motor, visual, auditory, attention, language, and default networks (Mantini et al., 2007). This explores the challenges and applicability of RSNs identification using EEG activity at rest. As an example, it is explored the association of these RSNs with psychopathic personality traits defined by the Triarchic Model of Psychopathy (Patrick, Fowles and Krueger, 2009), with special focus on the salience and central executive networks of the human brain.

Keywords: Resting State, Functional Conectivity, EEG, Psychopathy.

SYMPOSIUM 9

DECISION MAKING IN AN UNLIMITED-TIME VERSION OF THE IGT USING GAMBLING INDEX AND A COMPUTATIONAL MODEL

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From the somatic marker hypothesis (Damasio, 1994), many studies have examined whether or not physiological responses are "somatic markers" that implicitly guide decision-making processes. The Iowa Gambling Task (IGT) has been the most widely used tool in this research. The common IGT protocol for psychophysiological studies comprises time-limited inter-trial intervals, and do not distinguish participants based on relevant physiological traits, such as the anticipatory skin conductance response (aSCR). The objectives of this work were to determine whether "somatic marks" guide the decision-making process without time restrictions and examine the effects of opposite aSCR profiles on such process. Participants were 29healthy subjects, divided into two groups according to positive (+) and negative (-)aSCR. Two different strategies for data analysis were applied: firstly, gambling indices were computed; secondly, we examined the parameters of the probabilistic Prospect Valence Learning (PVL) model. The results show a group effect in gambling indices, with the aSCR+ group presenting lower risk in the decision-making than the aSCR- group. Significant differences were also observed in the Utility and Consistency parameters of PVL, with the aSCR- group selecting cardsless consistently with expectations and granting similar importance to the frequency and magnitude of gains/losses in their decisions.

Keywords: Decision making, skin conductance response, Iowa gambling task, prospect-valence learning.

SYMPOSIUM 9

MATERNAL SEPARATION IN TWO PERIODS OF EARLY DEVELOPMENT: EFFECT ON ADOLESCENT RATS REWARD

Marlene Nogueira*[(1)], Renata Alves*[(2,3)], Joana Bravo[(3)], Cecília Juliana Alves[(3)], Ana Raquel Pereira[(4)], Liliana de Sousa[(5)], Alberto Marcos[(5)], Teresa Summavielle[(3)], Ana Mesquita[(1)], Emilio Ambrosio[(5)], Ana Magalhães[(3,6)].

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Social environment is critical for the development of drug-related problems, with social features playing a highly relevant role. As early mother–infant attachment seems to establish the basic parameters for later social interactions, we tested 2 different periods of maternal separation (MS) in Wistar rats, which correspond roughly to 5 month or 3 years of age in humans, to mimic the periods where most children initiate their stay at a nursery. We aimed at investigating if short periods of early MS could disrupt adolescent interaction with peers and increase their susceptibility to drug abuse. MS was imposed for 2 hours/daily from postnatal day (PND)2-6 or PND10-14. Social behavior evaluations were conducted in the adolescent rat. Data were correlated with the expression of the oxytocin receptor (OXTR) gene. The conditioned reward effect of cocaine was also evaluated. MS from PND2-6 reduced social motivation and social novelty preference, as well as the reward value in the Conditioned Place Preference, highlighting that MS may induce anhedonia. In PND10-14 MS dams and their offspring increased affiliative behaviors. In these adolescents OXTR expression was higher in the prefrontal cortex. This reveals that nonnegligent maternal separation is able to shape the adolescent rat social behavior and affect the reward circuit, increasing the vulnerability to affective disorders.

Supported by Orçamento do Estado, FEDER founds through Programa Operacional Factores de Competitividade – COMPETE and Fundação para a Ciência e a Tecnologia, in the framework of the project, EXPL-AMAGALHÃES-IF/00753/2014/CP1241/CT0005. PTDC/SAU-TOX/32231/2017. Renata Alves was support by PD/BD/114266/2016.

Keywords: Maternal Separation, Drug Abuse, Social Behavior, Reward

SYMPOSIUM 9

MODIFICATIONS OF ELECTRICAL ACTIVITY IN THE AMYGDALA AFTER A VISUAL AVERSIVE CONDITIONING IN THE ANESTHETIZED RAT

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The superior colliculus is involved in visual perception of contrast and movement. These two visual features are crucial for starting rapid motor responses to changing environment and can start emotional behavior. It has been reported the existence of collicular efferences to the basolateral amygdala (Linke et al., 1999) a structure clearly related to emotional behavior. It is possible that those superior colliculus-amygdala projections are crucial to the emotional reaction to visual stimuli. However, the precise role for these system in emotion has not yet been studied. Here we report data on the electrophysiological characterization of this superior collicular-amygdala projection system in anesthetized (urethane 25%) Wistar rats (380 gm). Electrophysiological bilateral activity in both superior colliculus (AP=2.7; ML±1.5; DV=33.2) and basolateral amygdala (AP=5.2; ML±5.4; DV=7.0) was evoked by a white light flash (*conditioned stimulus*; duration=20ms) and recorded before and after its association (100 events) to an aversive stimulus (*unconditioned stimulus*; 0.7mA; one second shock on the whiskers pad). After conditioning, a visual evoked potential was found in the basolateral amygdala in the absence of the unconditioned stimulus. This post conditioning amygdaline electrical activity is compatible with the acquisition of a fear conditioned response. After 600 presentations of the conditioned stimulus alone this evoked potential was still present, suggesting an incomplete extinction. From these data we conclude that this anesthetized rat model is suitable for the study of the contributions of various structures on aversive conditioning acquisition.

SYMPOSIUM 10

PSYCHOPHARMACOLOGY

Friday, May 31st, 2019

Chair: Emilio Ambrosio, Spanish National Distance Education University, Spain.

SYMPOSIUM 10

EFFECTS OF CANNABIDIOL ON COCAINE INTAKE AND ITS MODULATORY EFFECTS ON NEURAL PROLIFERATION IN THE MOUSE HIPPOCAMPUS.

Olga Valverde[(1)].

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Repeated cocaine promotes neural plasticity that cause aberrant motivation toward the drug and related stimuli, which can lead to drug addiction. Cannabidiol (CBD) is the most abundant non-psychotropic compound in the cannabis sativa plant. CBD has a multi-target pharmacological profile acting as modulator of different targets including endocannabinoid system. There is scarce information about the mechanism by which CBD reduces drug use and compulsive seeking. In the present study, we have investigated whether CBD can attenuate cocaine reinforcement, and the role of CBD on adult hippocampal neurogenesis regarding the effects observed in cocaine intake. We show that repeated CBD reduced cocaine voluntary consumption in the self-administration paradigm, but not drug-induced reinstatement. CBD also increased neural cell proliferation in the mouse hippocampus and BDNF expression. Moreover, the blockade of hippocampal neurogenesis after temozolomide treatment prevented CBD-induced enhancement of neuronal maturation and differentiation, and the reduction of cocaine intake in the self-administration. The present study show that CBD has a pro-neurogenic effect in cocaine consuming mice, and this seems to be one of the mechanisms by which CBD attenuates cocaine reinforcement.

SYMPOSIUM 10

EFFECT OF PALATABLE DIET ON THE VULNERABILITY TO ADDICTION

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Currently, there is an increasingly prevalent fast-food culture with rising rates of obesity in developed countries, particularly among the young population. Feeding behavior is regulated by the homeostatic and hedonic systems and malfunctions in either of these systems can lead to overeating and obesity. The reward circuit constituted by the mesocorticolimbic dopaminergic pathway regulates the motivation to seek or consume rewarding stimuli such as drugs or palatable foods. Preclinical studies have provided robust evidence to confirm that a free access to palatable diets has considerable effects on the brain reward system, producing changes in the dopaminergic system. The rise in obesity rates worldwide has encouraged extensive research to improve understanding of this problem, in which the excessive intake of food, especially sugar-rich and high-fat food has become a serious problem for society. Nutritional status is an important factor in the development of addiction, since several studies indicate psychological and biological similarities between fast food intake and addiction to drugs, which share common reward mechanisms. For example, both drug addiction and obesity can be defined as disorders in which the value of the type of reinforcement (drug or food, respectively) is abnormally increased in relationship to other reinforcements. Drug use during adolescence often predicts an increased likelihood of a continued use of drugs into adulthood. Based on these relationships, a Theory of Gateway has been proposed for eating disorders and substance abuse, in which it is postulated that eating disorders, such as binge eating, can lead to the development of another desadaptive behavior, such as drug abuse. At the moment, preclinical studies indicate that the intake of certain types of sugar leads to a sensitization to psychostimulants and to an increase in alcohol self-administration. Our laboratory has demonstrated over the past years that binge-eating on fat increases the vulnerability to cocaine, and alcohol self-administration and conditioned place preference, even when the access to fat is interrupted. On the other hand, we are currently studying the role of other types of diets as protector factors, or punctual accesses to palatable foods as alternative reinforcers to drugs, in order to relieve craving symptoms and prevent relapses into drug-seeking, which is already described by clinicians but not scientifically reported. Our work shows that the nutritional habits not only produce metabolic alterations in our organism or modify our body weight, but they also modify our CNS and change the way in which we respond to drug abuse.

SYMPOSIUM 10

ROLE OF OEA IN ALCOHOL BINGE DRINKING-INDUCED MICROBIOME-GUT-BRAIN AXIS DYSREGULATION

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Alcohol binge drinking induces peripheral inflammation, neuroinflammation and cognitive decline. Pretreatment with oleoylethanolamide (OEA) reduces alcohol-induced innate immune response and inflammation, with consequences in motivational behaviors such as anhedonia, anxiety or depressive-like state. Here, we investigated whether the antiinflammatory and neuroprotective actions of OEA are related to an action in the gut-brain axis communication, bacterial translocation or blood-brain barrier (BBB) dysfunction induced by alcohol. Ethanol binges induced intestinal inflammation, innate (TLR4) and adaptive (IgA) immune systems activation, and a decrease in colonic tight junction (TJ) proteins (occludin and claudin-3), allowing bacterial translocation to mesenteric lymph nodes (MLN) and plasmatic endotoxin elevations. Intraperitoneal OEA pretreatment reduced intestinal inflammation/immune activation and partially preserved the colonic TJ structure and blood endotoxin elevations altered by alcohol binges, with no significant effect on bacterial translocation. Intragastric OEA reduced drastically plasma endotoxin levels and prevented bacterial translocation. Alcohol binge damaged theBBB by decreasing laminin, occludin and ZO-1 expression in frontal cortex,with no protective effect of OEA in this case. Conclusion: the anti-inflammatory and neuroprotective actions of OEA may be due partially to a local action in the intestine but not in the BBB. Results highlight a role of OEA modulating alcohol-induced microbiome-gut-brain axis dysregulation.

Supported by Ministerio de Sanidad, Política Social e Igualdad, Plan Nacional sobre drogas (2015/005)

Keywords: alcohol, binge drinking, microbiome, oleoylethanolamide, neuroinflammation.

SYMPOSIUM 10

PERCEIVED EFFECT OF PSYCHOACTIVE MEDICATION: A CO-TWIN STUDY

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Psychoactive medication use presents variation regarding its therapeutic effect and impact on related variables, such as health perception or quality of life. Both genetic and environmental factors are thought to be in the origin of that variability, which has important consequences for psychological well-being and the use of the health system. Our objective is to explore the relationship between use of psychoactive medication and both, health status and health perception, taking into account the possible effects of shared genetic and environmental factors.A co-twin case-control design is applied in a sample of 2151 individual twins from the Murcia Twin Registry. Use of antidepressants and tranquilizers as well as perceived efficacy was assesed by self-report. Health status and health perception was ascertained through the EQ-5D questionnaire. Logistic regression models are applied in two consecutive phases: whole sample and pairs discordant for medication use.Both, health status and health perception present significant associations with use of psychoactive medication. In discordant pairs significance is maintained but only for health perception and not for health status.Health status and health perception do not related in the same way to psychoactive medication use. The relationship is more direct and suggestive of causality in the case of subjective perception, while the relationship with health status would be indirect and affected by genetic factors that act as a confounding variable.

Supported by Ministerio de Economía y Competitividad (PSI2014-56680-R) and Fundación Séneca, Agencia Regional de Ciencia y Tecnología (19479-PI-14).

Keywords: Psychoactive medication, co-twin design, health status, health perception

ORAL COMMUNICATIONS

ORAL COMMUNICATIONS

SESSION 1

Wednesday, May 29th, 2019

Chair: Carmen Pedraza Benítez, University of Málaga, Spain.

ORAL COMMUNICATIONS 1

NEUROBEHAVIOURAL ASSESSMENT OF NON-ALCOHOLIC FATTY LIVER DISEASE

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Non-alcoholic fatty liver disease (NAFLD) is one of the most prevalent diseases worldwide, and it has been suggested to cause an impact on the nervous system, although its neurophysiological bases are unknown. Therefore, the aim of this study is to characterise a rodent model of NAFLD in order to unravel its consequences on the brain and behaviour and the relationship between hepatic and nervous system damage. To this end, 30 Sprague-Dawley rats were divided into two groups: the control group, which received normal chow, and the NAFLD group, which received a high-fat, high-cholesterol diet, both studied at 14 weeks of administration. Histological and biochemical analyses confirmed the development of NAFLD and detected hyperammonemia. In addition, the experimental group showed gut microbiota dysbiosis and microbial metabolite alterations, implying a dysregulation of the gut-liver-brain axis. Brain tissue showed lower levels of metabolic brain activity and dopamine levels in the prefrontal cortex in the NAFLD group, which also displayed emotional deficits, observed through depressive-like behaviour, and cognitive impairment, specifically short-term memory, including social recognition and prefrontal-dependent working memory. These data propose that NAFLD leads to a disruption in the gut-liver-brain axis that impacts brain metabolism and neurotransmission, resulting in neuropsychological dysfunction.

Supported by Ministerio de Ciencia, Educación y Universidades (PSI2017-83893-R) and Ministerio de Economía y Empresa (PSI2015-63658-R, PSI2015-73111-EXP, PSI2017-90806-REDT)the technical and human support provided by SGIker of UPV/EHU and the Alzheimer's Research UK King's College London Network Centre.

Keywords: non-alcoholic fatty liver disease, gut-brain axis, emotion, cognition

ORAL COMMUNICATIONS 1

THE EFFECT OF EXPERTISE ON AFFECTIVE AND SENSORY BEER EVALUATION: ASSESSING DIFFERENCES IN BRAIN ACTIVITY

Irene Hinojosa-Aguayo[(1)], David García-Burgos[(2)], Andrés Catena[(1)], Felisa González[(1)]

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Four different beers were provided to non-trained consumers, general food and beverage tasters, and beer-tasting experts who evaluated sensory and hedonic beer attributes (behavioural taste test) while brain activity was measured using 64-channel electroencephalographic (EEG) recording. Between-group differences (consumers vs beer-experts) were found in sensory analysis judgments as well as in EEG recording (visual processing, object recognition, executive control, semantic memory, and hedonic processing) for the gustative attribute Touch. For affective evaluation, groups only differed in brain activity. Differential activation (beer-experts and general tasters vs consumers) correlating with differential groups' scores in explicit hedonic and general quality evaluation of beers was found in brain areas related to working memory, object recognition and hedonic processing. Therefore, experts and consumers may differ in access to expert knowledge and decision-making processes involved in sensory analysis, both at behavioural and brain activity levels, but also in the subjective or hedonic processing of the beers, at least using implicit measures as those provided by EEG recording.

Supported by PSI2015-64345-R (MINECO-FEDER); MAHOU-UGR OTRI CONTRACT #3839

Keywords: EEG, expertise, sensory analysis, hedonic evaluation, brain areas

ORAL COMMUNICATIONS 1

SOCIAL SUPPORT, CORTISOL AND TNF-□ AS PREDICTORS OF PSYCHOLOGICAL DISTRESS IN BREAST CANCER SURVIVORS

Ainitze Labaca[(1)], Amaia Arregi[(1)], Oscar Vegas[(1)], Olatz Goñi-Balentziaga[(1)], Andrea Lebeña[(1)], Joana Pérez-Tejada[(2)].

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Breast cancer survivors can suffer anxiety and depression long after the treatment has ended, being social support an important factor in the development of such symptomatology. Evidence suggests that changes in immune system and HPA axis may play a modulatory role in this relation. The objective of this study is determinate if perceived social support, cortisol-awaking response (CAR) and tumor necrosis factor alpha (TNF-α) interact to statistically predict psychological distress in 80 female breast cancer survivors recruited between 2016-2017. The results show that TNF-α moderate the relation between social support and psychological distress, with both high and moderate levels being significant. A negative association between social support and psychological distress was found only in younger and middle women, whilst in older breast cancer survivors lower levels of CAR were associated with psychological distress.This study provides a biopsychosocial approach about the predictors of psychological distress among breast cancer survivors.

Supported by Basque Government IT757-13 Project**.**

Keywords: breast cancer, social support, psychological distress, cortisol, TNF-α

ORAL COMMUNICATIONS 1

IS THERE LIGHT AT THE END OF THE TUNNEL? PHOTOBIOMODULATION AS TREATMENT FOR EARLY STRESS

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Early life stress leads to short and long-term impairments over behavioral, emotional and cognitive domains, due to its power to alter neurodevelopment in the most critical stages. Animal models have been developed in order to study and try to prevent this unwanted outcomes. One of the most used is maternal separation (MS). We carried out MS (10 days, 4h per day), and in the adulthood we tested spatial navigation and cognitive flexibility in both male and females, founding an impairment (with spatial memory preserved). Over the brain we tested energy oxidative metabolism using cytochrome c oxidase (COx) histochemistry and we found an increased COx in almost all areas measured. To try to balance this COx level, we delivered photobiomodulation treatment (Low level light therapy; LLLT) which is known for its action over COx and lastly to its use for treat cognitive impairments. LLLT rescued MS subjects' cognitive flexibility and normalized COx in key brain areas. Opening the possibility for a treatment which address long-term effects of early life stress.

Supported by Projects Grants of the MINECO (Ministerio de Economía y competitividad del Gobierno de España) PSI2017-90806-REDT. PSI2017-83893-R. PSI 2015-73111-EXP. BES-2014- 070562 to M.B.

Keywords: Photobiomodulation, near infrared light treatment, Cytochrome C oxidase, maternal separation, early life stress

ORAL COMMUNICATIONS 1

RISK AND PROTECTIVE FACTORS OF BURDEN IN INFORMAL CAREGIVERS OF PERSONS WITH DEMENTIA

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Background: Although a number of risk factors have been associated with burden in caregivers of people with dementia (PWD), protective variables against burden remain under research. Objective. This study examines the importance of patient- and caregiver-related factors in caregiver's burden, mainly caregivers' resilience and social support. Methods: A total of 283 family caregivers were evaluated using a standardized protocol to assess sociodemographic characteristics, clinical state of patients and specific variables of caregiving. Burden, resilience and social support were measured using standardized self-report scales such Caregiver Burden Interview, Connor-Davidson Scale, and the Duke- Unc Social Support Questionnaire, respectively. Hierarchical multiple regressions were conducted to examine the effect of resilience and social support on burden with caregivers´ sex, previous relationships, PWD cognitive decline and functional activity as covariates. Results: Caregivers were mainly daughters and wives of PWD and reported higher burden than men. Higher resilience and social support, older caregiver's age and lack of PWD psychological and behavioral symptoms predicted lower burden. Conclusions: Resilience and social support showed a protective effect for burden in family caregivers of PWD, even after controlling for different covariates.

Funding: Supported by Ministerio de Educación y Ciencia, PSI2016-700071-B

Keywords: Burden, Family Caregivers, Persons with Dementia, Resilience, Social Support

ORAL COMMUNICATIONS

SESSION 2

Wednesday, May 29th, 2019

Chair: Jose Manuel Cimadevilla Redondo, University of Almeria (Spain).

ORAL COMMUNICATIONS 2

SPECTRAL POWER AND MATURATIONAL FREQUENCY-COUPLING DIFFERENCES BETWEEN ATTENTION DEFICIT AND CONTROL CHILDREN AND ADOLESCENTS

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This report explores possible differences in absolute Power Spectral Density (PSD), the topography of brain rhythms, and slow frequency (Delta and Theta) vs Beta PSD correlation when attention deficit children (ADD) and controls are compared. Open and closed eyes resting state EEG were recorded in a sample of controls and ADD subjects (6-17 years). The PSD from 0-46 Hz was computed. ANOVAs were conducted to compare spectral power in both groups in both conditions. PSD correlations between the whole ranges of frequencies were calculated. An increase in delta power in ADD subjects was obtained. Topographies of the different brain rhythms were similar in both groups. ADD subjects presented lower maturational power-to-power frequency-coupling between slow frequencies and the beta rhythm.The results obtained showing an increased delta PSD in ADD and similar brain rhythm topographies in both groups support the developmental lag model, whereas the decreased co-maturation of slow frequencies vs. beta PSD in ADD subjects suggests a differential maturation rate for slow and beta frequencies. These results would potentially be useful to test the validity of developmental models for ADD.

Supported by Ministerio de Economía y Competitividad, PSI2016-80059-R

Keywords: Attention deficit, EEG resting state, spectral power, delta rhythm, power-to-power frequency-coupling.

ORAL COMMUNICATIONS 2

IMPAIRED P1 HABITUATION AND MISMATCH NEGATIVITY IN AUTISTIC CHILDREN

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Children with autism spectrum disorder (ASD) have difficulties with language and social communication, and it has been hypothesized that auditory perception differences may contribute to these impairments. Passive testing of auditory function is an important objective in individuals with ASD due to known difficulties in understanding and/or following task instructions. In the present study the habituation to standard tones following deviants was examined in two conditions: electronic sinusoidal sounds, and complex sounds with human features, in a sample of 16 children with ASD and 15 control subjects. In the control group the amplitude of the P1 component, induced by human and electronic sounds was higher in the first standard following the deviant than the second standard following deviant, indicating habituation. Children with ASD did not show this pattern, indicating atypical habituation to sounds. Also, mismatch negativity (MMN) – indicating change detection – was lower in children with ASD when compared to control children. The MMN amplitude was correlated with scores on an auditory sensory sensitivity questionnaire. The results suggest that impaired neural processing of auditory information occurs in ASD children is related to unusual sensory experiences in these children, with potential knock-on effects for speech and language development.

Funding: This work has been possible thanks to grants from the Ministry of Science (PSI2016-80059-R; FEDER funds).

Keywords: Autism, auditory P1, Mismatch Negativity, habituation, language development, sensory perception.

ORAL COMMUNICATIONS 2

VISUOSPATIAL MEMORY DEVELOPMENT AT EARLY AGES: DIFFERENCES BETWEEN TERM-BORN AND PRETERM CHILDREN

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Short-term and working visuospatial memory is the ability to buffer, retrieve and manipulate visual and spatial information. This function has not been studied in depth in children at early ages neither in some populations that may suffer memory problems, such as prematurity. We aimed to analyze cognitive development and, specifically, visuospatial memory in term-born children under 2 years and to compare their performance with preterm children. We recruited term-born and premature children at 12, 15, 18 and 22 month-old. We used the Merrill-Palmer R Scale for developmental assessment and an experimental task to obtain scores of spatial location memory, spatial memory delay and the flexible use of spatial memory. Term-born children significantly improve their memory and developmental scores at 22 months, compared to previous ages. In premature, this progress only appeared in developmental outcomes but not in spatial memory. Comparing premature and term-born groups in memory task, we did not find differences. Term-born and preterm children show different developmental paths in their visuospatial memory functions.

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Keywords: visuospatial memory, preterm, cognitive development

ORAL COMMUNICATIONS 2

EMOTIONAL FACIAL INTERACTION OF CHILDREN WITH PRIMARY AND SECONDARY AUTISM WITH THEIR EDUCATORS AT SCHOOL

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Autism comprises a spectrum of neurodevelopmental disorders, being the possible differences in socioemotional behavior exhibited by children with an autism of different etiology supposedly due to distinctive neurological mechanisms. To characterize the early socioemotional symptomatology of Autistic Spectrum Disorders (ASD), in this study we analyzed the emotional interactions of 15 children with primary and secondary autism (average chronological age 7 years, 4 months) and their educators in 6 school settings, including their facial expressions using the Affex and FACS techniques. Results showed that although all children expressed basic emotions, children with primary autism, unlike those with secondary autism, took less initiative to interact and showed less emotions while interacting, but exhibited more facial expressions of anger accompanied by vocalizations.Educators seemed not to perceive the potential communicative value of these emotion expressions, considered them disruptive behaviors and responded to them differently depending on the type of autism each child showed and the context in which they manifested them. We stress the importance of the functional value of these ignored emotional expressions accounting that contexts could have a disparate impact on the social brain development of children with a different ASD.

This work has been funded by the *Ministerio de Economía y Competitividad de España* (PSI2013-46007-P) and *Proyectos de Cooperación Interuniversitaria UAM-Santander* (CEAL-AL/2017-16).

Keywords**:** Autism, emotional facial expression, FACS technique, neurodevelopmental disorders, nonverbal communication.

ORAL COMMUNICATIONS 2

GROUP A STREPTOCOCCUS EXPOSURE AND INHIBITORY CONTROL DEFICIT: PRECLINICAL STUDIES

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Immune activation during early developmental stages has been proposed to have a contributing role in the pathogenesis of neuropsychiatric disorders like obsessive-compulsive disorder (OCD), Tourette's and ADHD. However, the relationship between this factor and the vulnerability to inhibitory control deficit, which is found across these neuropsychiatric conditions, has not been explored. This work studied the effect of streptococcal infection on later impulsive and/or compulsive behavior. Forty-eight male Wistar rats were exposed to Group A streptococcus (GAS) antigen at PND35, with two boosts two and four weeks later, or vehicle; moreover, half of the animals were treated with broad-spectrum antibiotic Ampicillin. In the adult period (>PND90), inhibitory control was assessed by the 5-choice serial reaction time task (5-CSRT task), Schedule-induced polydipsia (SIP) and Delay-discounting task (DDT). Last, brain cytokine levels were measured. Both GAS and antibiotic led rats to a more impulsive behavior on 5-CSRT task and altered cytokine levels, while Ampicillin prevented impulsivity created by GAS exposure on DDT. This novel evidence shows a possible link between immune activation and inhibitory control deficit, as well as an intriguing role of antibiotic treatment.

This work was supported by a grant from the Ministerio de Economía y Competitividad (Spanish Government) and Fondo Europeo de Desarrollo Regional (Grant number MINECO-FEDER PSI2015-70037- R).

Keywords: Inhibitory control, Immune activation, Antibiotic treatment

ORAL COMMUNICATIONS

SESSION 3

Wednesday, May 29th, 2019

Chair: Jaime Iglesias Dorado, Autonomous University of Madrid, Spain

LATERAL HABENULA LESIONS IMPAIR APPETITIVE EXTINCTION, BUT SPARE CONSUMMATORY SUCCESSIVE NEGATIVE CONTRAST

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Recent studies have highlighted the lateral habenula (LHb) as a key brain area for the processing of aversive events. The aim of these studies was to assess the effects of LHb lesions on three behavioral paradigms involving reward downshifts: instrumental extinction, consummatory extinction, and consummatory successive negative contrast (cSNC). Male Wistar rats received bilateral infusions of quinolinic acid (0.175 µl of 0.12 M at a rate of 0.1 µL/min) or sham lesions (PBS infusions). In Exp 1, 18 LHb and 12 Sham rats received 10 acquisition sessions (6 trials/session, 12 pellets/trial) followed by 5 extinction sessions in a runway (Task 1) and 10 acquisition sessions (32% sucrose for 5 min) followed by 5 extinction sessions (water) in consummatory boxes (Task 2). In Exp 2 (cSNC), 13 LHb and 21 Sham/Intact controls received 10 preshift sessions (32% or 4% sucrose for 5 min) followed by 4 postshift sessions (4% sucrose for all animals; Task 3). LHb lesions impaired extinction in both instrumental and consummatory tasks. However, no effects of LHb lesions on the cSNC task were detected. The status of the LHb in the brain circuitry underlying reward relativity will be discussed.

Supported by Ministerio de Economía y Competitividad Grants PSI-2013-44945-P and PSI-2017- 87340-P to CT, and by a Fulbright US Scholar Award and a TCU/RCAF Grant 33502 to MRP.

Keywords: Lateral Habenula, Reward Loss, Appetitive Extinction, Consummatory Successive Negative Contrast.

ORAL COMMUNICATIONS 3

SYSTEMIC PSYCHOPHYSIOLOGICAL RESPONSE TO AUDITORY STIMULI. THE ROLE OF ACTIVATION AND HABITUATION

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The two most basic functions of nervous system correspond to activation and habituation to stimuli. In the present report we try to study the dependence of these basic functions using a systemic integrated approach, by measuring central nervous activity by means of auditory Event Related Potentials (ERPs), heart rate, finger and cephalic peripheral blood flow, and electrodermal responses. Stimuli were presented in blocks of 8 auditory stimuli of the same intensity, each block separated by 14 ± 2 sec. Each block was repeated 20 times. Auditory intensity ranged from 70.9 to 94.5 dBs between blocks.

The auditory components N1 and P2 increased their amplitude as a function of the stimulus intensity. But this relationship was only present for the first stimuli of the block. The other seven stimuli of the stimuli did not show any change due to the intensity of the stimulation. A coefficient of habituation showed a dependence with the intensity of the stimulation. The heart rate, the finger and head blood flow showed a decrease with the stimulus intensity, while the electrodermal response showed an increase with the intensity of the stimulation.

The results suggest a graduated systemic response to the increase of auditory intensity stimulation and a regulation to a fixed level of neural activation during the habituation process, independent of the intensity of stimulation.

Supported by Ministerio de Economía y Competitividad, PSI2016-80059-R

Keywords: Activation, Habituation, Intensity Stimulation, Systemic Respons

ORAL COMMUNICATIONS 3

SEARCHING FOR THE BRAIN SIGNATURE OF PAIN PERCEPTION IN TELEOST FISH

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Pain perception is thought to be the result of the activation of a cortical circuit, the pain neuromatrix, which includes areas involved in sensory aspects of the nociceptive event and regions related with affective, cognitive, and evaluative processing. Regarding teleost fish, little is known about the role of the pallium in nociceptive processing which has led some authors to consider that fish cannot experience pain. We showed by means of in vivo voltage-sensitive dye imaging that noxious stimulation evoked a complex activity pattern in the goldfish pallium, which included the activation of Dm4 and Dm2, a previously defined recipient zone of somatosensory inputs that contains a somatotopic map and a pallial zone involved in emotional processing, respectively. Tract-tracing experiments revealed that Dm4 and Dm2 receive a notable input from the PGlr-d, the diencephalic somatosensory nuclei in teleosts. In addition, Dm2 projects massively to the periventricular hypothalamic region, which in turn projects to different brain stem nuclei, including the periaqueductal gray substance. In summary, our results suggest the existence of a complex pallial network, functionally similar to the pain neuromatrix described in land vertebrates, that could be part of the neural signature of pain in fish, disclosing the likelihood that fish could be able to subjectively experience pain.

Supported by Ministerio de Economía, Industria y Competitividad, PSI2017-84970-P

Keywords: Pain, Telost Fish, Telencephalic Pallium

ORAL COMMUNICATIONS 3

INDIVIDUAL DIFFERENCES IN SELECTION OF HIGH-EFFORT AND VIGOROUS BEHAVIORS IN RODENTS: RELATED BEHAVIORAL CORRELATES AND DOPAMINE MARKERS

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Nucleus Accumbens (NAcb) dopamine (DA), plays an important role in effort-related processes and behavioral activation. Individual differences in selection of high effort activities for food are related to DA activity markers in NAcb. In the present studies, individual differences in effort-based decision-making are studied in non-deprived rats working for sucrose. Sprague Dawley adult male rats were assessed using a progressive ratio task(PROG) in which animals can either lever press on a PROG schedule for a preferred high-sucrose concentrated (5%) solution, or approach and consume a less-preferred (0.3%) solution which is freely available. Previously, animals were tested for anxiety in the Dark and Light box, novelty exploration in the Open Field, voluntary locomotion in running wheel (RW) and free sucrose preference (0.3% vs 5%). Using the two extreme terciles in PROG performance, animals were divided into high-responders (HR), and low-responders (LR). HR rats had higher voluntary RW locomotion measured before the operant training started, but were not different in sucrose preference, anxiety or locomotion compared to LR. DARPP-32 was also different between groups. Identifying behavioral and neural correlates of individual differences in effort-based decision making could promote an understanding of the factors underlying vulnerability to symptoms such as anergia and fatigue.

Supported by Ministerio de Educación y Ciencia, PSI2015-68497-R

Keywords: Dopamine, Accumbens, Exercise

ORAL COMMUNICATIONS 3

FACIAL AND VERBAL MISMATCH NEGATIVITY IN PROSOPAGNOSIA: N400 AS AN INDEX OF FACE IMAGERY

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The aim of this event-related potentials experiment was to study brain activity during face structural and verbal/semantic processing, both involved in the recognition of person identity. Nineteen healthy controls and two prosopagnosic patients participated: an adult female with mixed (apperceptive and associative) prosopagnosia due to acquired brain damage encompassing right visual associative cortex, and an adult male with associative prosopagnosia since childhood but with no neurological history. Two types of stimuli were used: faces and names. They corresponded to identities of familiar people, including 12 personal acquaintances and 10 celebrities. EEG was recorded during a match/mismatch decision task, where a face was presented followed by a matching or mismatching name, and another one in reverse order, where the name was the prime stimulus and the target was the face. Healthy controls showed, in both tasks, a clear mismatch negativity in the form of a prototypical N400 ERP component with a centro-parietal distribution and a right-hemisphere predominance. Our prosopagnosic patients showed a clear N400-like component (albeit slightly frontalised and altered in terms of time course or amplitude) in the face-name task, but only a tendency in the name-face one. This was interpreted as a psychophysiological correlate of absence of face imagery.

Supported by *Ministerio de Economía y Competitividad de España* (PSI2013-46007-P) and *Proyectos de Cooperación InteruniversitariaUAM-Santander* (CEAL-AL/2017-16).

Keywords: apperceptive prosopagnosia, associative prosopagnosia, event-related potentials, N400, mismatch negativity.

ORAL COMMUNICATIONS

SESSION 4

Thursday, May 30th, 2019

Chair: Rosa Redolat Iborra, University of Valencia, Spain

ORAL COMMUNICATIONS 4

ASSESSMENT OF AUTISTIC-LIKE BEHAVIORS IN JUVENILE HUMANIZED APOE TRANSGENIC MICE

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Autism spectrum disorder (ASD) encompasses several neurodevelopmental conditions characterized by abnormal communication, impairment in social interactions and repetitive patterns of behavior. Prenatal exposure to valproic acid (VPA) resulted in a high prevalence of the disorder. Furthermore, deficiencies on reelin signaling which is involved in cell migration, are associated with an increased risk of autism. Moreover, reelin protein competes with the apolipoprotein E (*APOE*) receptors in an isoform dependent manner. The aim of the present study is to assess autistic-like behavior differences between apoE genotypes. Wild (C57BL/6) and the humanized apoE3 and apoE4 homozygous mice were used. A positive control receiving a subcutaneous injection of 300 mg/kg/day on gestational days 12 and 13 was included. Physical development as well as deficits in ultrasonic vocalizations (USVs) in lactating mice and social behavior in adolescent mice were studied. Our results showed delays in physical maturation and a diminution in the number of USVs in VPA-treated mice which is more persistent over time in VPA and apoE3 females. An altered social behavior in males prenatally exposed to VPA was also observed. Our findings suggested that females were more affected by the treatment than males in parameters such as vocalizations while males are more affected in social behavior.

This research was supported by Ministry of the Economy and Competitiveness (MINECO, Spain), PSI2017-86847-C2-2-R.

Keywords: autism spectrum disorder, ultrasonic vocalizations, valproic acid

ORAL COMMUNICATIONS 4

POSTNATAL CHLORPYRIFOS, SEX AND APOE MODULATE SOCIAL BEHAVIOR AND EPIGENETICS IN TRANSGENIC MICE

Laia Guardia-Escote[1,2], Pia Basaure[1,3], Judit Biosca-Brull[1,3], Rikst Nynke Verkaik-Schakel[4], Maria Cabré[1,2], Torsten Plösch[4], Maria Teresa Colomina[1,3]

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Chlorpyrifos (CPF) is a widely used organophosphate pesticide. Exposure to CPF has been related with behavioral and metabolic impairments in a sex- and genotype-dependent manner. The different isoforms of apolipoprotein E (apoE) have been described to influence the response to CPF exposure. In this study, we aimed to assess the effects of an early exposure to CPF as well as the implication of sex and *APOE* genotype on social behavior and body weight regulation. For this reason, we used both male and female apoE3 and apoE4 targeted replacement mice postnatally exposed to either 0 or 1mg/kg/day of CPF. Social behavior was assessed by means of a three-chamber task. Methylation analysis was performed in 45-day-old mice hypothalamus samples, targeting genes implicated on the energetic homeostasis as leptin receptor, proopiomelanocortin, neuropeptide Y and insulin-like growth factor 2. Results revealed that CPF impaired social behavior in apoE3 females while it increased sociability in apoE4 males. Methylation analysis showed the epigenetic contribution underlying metabolic differences within the distinct groups, being already evident from early ages. Overall, these results provide new insight on the pesticide effects over social behavior and reveal CPF as a potential epigenetic modulator and sex and genotype as essential factors in the regulation of feeding control.

This research was supported by PSI2014-55785-C2-R and PSI2017-86847-C2-2-R, Ministry of the Economy and Competitiveness (MINECO, Spain)

Keywords: Chlorpyrifos, APOE, Epigenetics, Social Behavior, Feeding control.

ORAL COMMUNICATIONS 4

CHRONOBIOLOGY AND MENTAL HEALTH: THE GENETIC CONTRIBUTION TO THE RELATIONSHIP BETWEEN SLEEP QUALITY AND PSYCHOLOGICAL DISTRESS

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Sleep quality and psychological distress are strongly related. A high prevalence of poor sleep quality has been reported in subjects suffering from depression or anxiety. However, the nature of this relationship is not well understood. Our objective is to analyze the genetic and environmental structure of this variables and their relationship in a twin sample of middle-aged adults. A total of 2137 twins (M_{Age} = 53.7, SD= 7.3) from the Murcia Twin Registry (MTR) were assessed with the PSQI index, and the "Depression and Anxiety" domain of the EQ5D questionnaire. Additionally a subsample (N=100) provided activity, peripheral temperature and body position measures by means of actigraphy recordings for a week. A joint ordinal-continuous bivariate Cholesky genetic analysis was performed to fit the data. Results were transformed into a correlated factor solution. A model including additive genetic and unique environmental factors was fitted, since shared environment could be dropped for both phenotypes without a significant worsening of the model fit. Heritability of the PSQI and the EQ5D domain was estimated at 34% and 45%, respectively. A considerable proportion (39%) of the phenotypic correlation (rph = 0.41) between PSQI and psychological distress was accounted for by shared genetic influences.A substantial shared genetic influence between sleep quality and anxiety/depression was found in this sample of middle-aged twins.

Supported by Ministerio de Economía y Competitividad (PSI2014-56680-R) and Fundación Séneca, Agencia Regional de Ciencia y Tecnología (19479-PI-14).

Keywords: Sleep quality, actigraphy, twin models

ORAL COMMUNICATIONS 4

IMPULSIVITY, DISCOUNTING RATE, AND SENSITIVITY TO IMMEDIACY IN RODENT MODELS OF ATTENTION DEFICIT/HYPERACTIVITY DISORDER

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This talk will present recent finding from studies analyzing impulsive choice and behaviors characterizing attention deficit/hyperactivity disorder (ADHD) inSpontaneously Hypertensive (SHR), Wistar Kyoto (WKY), and Lewis (LEW) rats. The goal is to demonstrate that nonhuman animals learn to choose impulsively, regardless of their neuro-physiological conditions; and the aim is to provide evidence showing that all prevalent models of intertemporal choice and the Generalized Matching Law, fit delay discounting data from nonhuman animals well.To accomplish these goals, we will present data showing that: (1) delay discounting and timing are interrelated; (2) polydipsia is not a predictor of cognitive impulsivity, but it is linked to motor impulsivity;(3) estimates of discounting rate and sensitivity to immediacy of reinforcement are positively correlated; (4) the SHR rat chooses more impulsively than the LEW rat; and (5) Akaike's index shows that the hyperbolic-decay model is the most appropriate model of intertemporal choice fitting delay discounting data from nonhuman animals.

Key words: Impulsivity, ADHD, SHR, WKY, LEW.

ORAL COMMUNICATIONS 4

STACTIC AND DYNAMIC EMOTIONAL FACIAL EXPRESSION RECOGNITION IN PARKINSON'S DISEASE

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Parkinson´s disease (PD) has been associated with emotional facial expression (EFE) recognition difficulties, although the extent and nature of this deficit is still unclear. To date, much of the research on this field has focused on the ability to recognize static facial expression shown by means of photographs. However, it has been observed that the attribution of an emotional meaning to static faces is more difficult that to facial movements involved in natural EFE. The aim of this study was to compare recognition ability to static faces (photographs), dynamic faces (video recordings) and dynamic whole body expressions in 30 PD patients and 30 controls. Patients recognized worse than controls the three stimuli. However, despite the fact that all participants recognized better dynamic than static stimuli, this improvement was significantly greater in PD patients respect to controls. In sum, EFE recognition deficit in PD has probably been overestimated by the use of static faces expression instead of more natural emotional expressions. Also, these results points to differentiated mechanisms for the recognition of static and dynamic EFE, which could be not equally damaged in PD.

Keywords: Emotional expression; Facial expression recognition; Parkinson's disease

ORAL COMMUNICATIONS

SESSION 5

Friday, May 31st, 2019

Chair: Alejandro Higueras Mata, Spanish National Distance Education University, Spain.

ORAL COMMUNICATIONS 5

BEHAVIOURAL, TRANSCRIPTOMIC AND STRUCTURAL CHANGES IN ADULT RATS AFTER AN ADOLESCENT CHRONIC TREATMENT WITH DELTA-9-TETRAHYDROCANNABINOL

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Cannabis has been shown to interfere with adolescent development favoring the onset of psychopathology in the long-term. Our goal was to understand the behavioural and brain mechanisms of such effect taking advantage of the information provided by massive sequencing and imaging studies.

Male and female Wistar rats received 3mg/Kg i.p. of THC (or vehicle) every other day from P28 to P44. Rats were left undisturbed until adulthood (P90) when we examined: 1) Addiction-related traits; 2) Cocaine self-administration; 3) NAc Shell transcriptome (RNA-seq); 4) Brain morphology/metabolism (MRI).

1) THC males showed an increase in pavlovian to instrumental transfer and reduced motor impulsivity. THC treated animals were more goal-directed. 2) THC females had a higher intake during escalation phase but lower cue-induced seeking of cocaine. 3) RNAseq revealed a dramatic interaction between sex and THC in subsets of genes related to glutamatergic synapses, ion binding and axonal growth. 4) MRI showed an increased volume and mean diffusivity but reduced fractional anisotropy (FA) in the striatum of THC males, while THC females showed the opposite pattern. DTI white matter tractography showed a reduction in FA due to THC mainly in the rostral sections. Ventricular volume was decreased in THC treated rats. In addition, we found a reduction of cortical choline compounds in the cortex of THC treated animals.

ACKNOWLEDGMENTS: This work has been financed with funds provided by the Spanish Ministry of Economy and Competitiveness (Project nº: PSI2016-80541-P); Spanish Ministry of Health, Social Services and Equality (Network of Addictive Disorders - Project nº: RTA-RD16 / 0020/0022 of the Institute of Health Carlos III and Plan Nacional Sobre Drogas, Projects nº: 2016I073 and 2017I042); BBVA (Becas Leonardo; and the UNED (Plan for the Promotion of Research); And We also thank Rosa Ferrado, Luis Carrillo, Gonzalo Moreno and Alberto Marcos for their excellent technical assistance.

Key Words: delta-9-tetrahydrocannabiol, adolescence, addiction, MRI, RNAseq

ORAL COMMUNICATIONS 5

TIME COURSE OF THE INHIBITORY TAGGING EFFECT IN ONGOING EMOTIONAL PROCESSING. A TDCS STUDY.

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Two forms of attentional inhibition, inhibition of return (IOR) and inhibitory tagging (IT) have been widely studied in the task-cueing paradigm. At the cortical level IOR involves the dorsal frontoparietal network, whereas IT involves the executive prefrontal cortex, mainly the DLPFC in cognitive conflict tasks. Moreover, whereas IOR is observed with rather long cue-target intervals in discriminative tasks, IT has been observed just when the prime-target interval is just 250 ms. This pattern of results suggests the existence of two dissociable mechanisms. In this study we asked whether IT is also applied to ongoing emotional processing, and whether the left DLPFC plays a causal role in IT using transcranial direct current stimulation (tDCS). We observed reduced conflict effect, the signature of IT, when the prime word was presented at the cued location, and the interval between the prime and the target was just 250 ms, neither earlier nor later. In a second experiment, the IT effect was eliminated when cathodal stimulation was applied to the left DLPFC.

Keywords: Inhibition of Return, Inhibitory Tagging, tDCS

ORAL COMMUNICATIONS 5

BLOCKING ESTRADIOL RECEPTORS IN DIFFERENT POSTNATAL PERIODS ALTERS POMC EXPRESSION IN MALE AND FEMALE RATS

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It is well known that the hypothalamic circuits that regulate food intake are programmed during the early stages of development mainly by leptin, but estradiol plays a role in the regulation of metabolism at least in adult (Bouret et al, 2004, Asarian and Geary, 2013; Lopez and Tena, 2015; Mauvais-Jarvis et al., 2013). Our previous reports show a modulatory effect of estradiol on alterations induced by malnutrition, when it is administered during the second week of life, from postnatal day (P) 6 to P13 (Carrillo et al., 2016; 2017; Pinos et al, 2018). Moreover, this modulation has differential effects in males and in females in the case of overnutrition. Males seem to alter physiological parameters and females show an alteration in the anorexigenic peptide proopiomelanocortin (POMC). The objective of the present study was to determine if estradiol is involved in the normal programming of energy metabolism in rats and in which period would exert this modulatory role. To address this question, estrogen receptors (ER) α, ERβ and GPER were blocked by their specific antagonists MPP, PHTPP and G15, respectively, in two early postnatal periods: from P1 to P5 or from P6 to P13. Hypothalamic POMC mRNA levels at P90 were studied. We found that blocking ER receptors from P1 to P5 did not have any effect neither in males or females but blocking ER from P6 to P13 significantly decreased hypothalamic POMC mRNA levels in females. Data suggest that estradiol could differentially participate in the programming of the expression of POMC in females and emphasize that it is essential to include both males and females in metabolic studies.

Work supported by Grant: PSI2014-57362-P and PSI2017-86396-P (PC and HP); BFU2014-51836-C2-2; CIBEROBN (JAC).

Keywords: Estradiol, Estradiol receptors, energy metabolism programming, POMC, sex differences.

ORAL COMMUNICATIONS 5

BRAIN STIMULATION MITIGATES THE VIGILANCE DECREMENT: A TDCS AND EEG STUDY

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We used a recently developed task, which simultaneously measures executive (detection of infrequent but critical events) and arousal vigilance (sustenance of a tonic arousal level) to investigate its modulation by brain electrical stimulation. Using a High-Definition Transcranial direct current stimulation (tDCS) procedure, we stimulated different brain regions over the right fronto-parietal attentional network. Participants (n= 90) were randomly assigned to one of three groups (frontal stimulation, parietal stimulation, and sham condition). All of them performed – in combination with the tDCS protocol – an attentional networks task (ANTI-Vea) suitable to measure both vigilance's components together with three typical attentional functions: phasic alertness, orienting, and executive control. EEG was also measured during the first and the last block of trials. A Vigilance decrement was observed across time on task in the control (sham) group, for both arousal (increase in mean RT and variability) and executive vigilance (decrease in accuracy). Furthermore, an increase in alpha power was also observed in occipital electrodes in the last block of trials. Both the executive vigilance decrement and the increase in alpha power were nevertheless mitigated in the electrical stimulations groups. Possible implications of the observed results will be discussed.

Supported by the Spanish Ministry of Economy, Industry and Competitiveness (IJCI-2015-23204) and by the Spanish Ministry of Economy and Competitiveness (PSI2017-84926-P)

Keywords: Attention, Executive Vigilance, Arousal Vigilance, tDCS, EEG.

ORAL COMMUNICATIONS 5

PHASE AND NONPHASE ALPHA EEG IS RELATED TO COGNITIVE IMPAIRMENT IN MULTIPLE SCLEROSIS PATIENTS.

Manuel Vázquez-Marrufo[(1)], Esteban Sarrias-Arrabal[(1)], Alejandro Galvao-Carmona[(2)], Mónica Borges[(3)], Juan Luis Ruíz-Peña[(3)], Guillermo Izquierdo Ayuso[(4)]

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Cognitive impairment and its functional neuroanatomical basis is still a debate in the multiple sclerosis. One of the main goals nowadays is to find physiological correlates of cognitive impairment that allows a rapid detection and could allow intervening as soon as possible in this population. Human electroencephalography, with an excellent temporal resolution, has shown diverse modulations related to cognitive deficits exhibited by multiple sclerosis patients. The main aim of the present study was to analyze possible modulations in the alpha band related to cognitive impairment. A 64-channel EEG was used to record brain activity in two groups of participants (healthy controls and multiple sclerosis patients) and later a time-frequency analysis was applied for alpha modulations (phase and nonphase) in diverse time intervals for the Attention Network Test (ANT). Results evidenced that several differences were found in alpha band between experimental groups and related to cognitive impairment assessed by neuropsychological and behavioral measures.

Supported by Ministerio de Educación y Ciencia, PSI2016-78133-P.

Keywords: Alpha, Cognition, Electroencephalography, Multiple Sclerosis

SHORT COMMUNICATIONS

SHORT COMMUNICATIONS

SESSION 1

Thursday, May 30th, 2019

Chair: Magdalena Méndez López, University of Zaragoza, Spain

SHORT COMMUNICATIONS 1

EFFECT OF A SPATIAL MEMORY TRAINING ON THE PERSISTENCE OF COCAINE-CONTEXTUAL MEMORY

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Modulation of hippocampal memories related with cocaine addiction such as cocaine-context associations could have important clinical implications. It has been shown that learning-related experiences are potent modulators of hippocampal plasticity enhancing neurogenesis. We aimed to evaluate whether a spatial learning task dependent on the hippocampus could reduce the long-term maintenance and reinstatement of these memories. Twenty male C57BL/6J mice were first trained in a cocaine induced conditioned place preference paradigm (CPP). Then, half of them (n=10) were trained in a spatial learning task using the Morris water maze, while the other half stayed in their home-cages. Twenty seven days after conditioning, mice were tested for CPP retention and extinction. Finally, a cocaine priming-induced reinstatement of drug seeking was performed. The results showed that animals trained in the spatial task exhibited a lower long-term CPP retention memory. In addition, it was observed an attenuation of cocaine-induced reinstatement of CPP by spatial training. Further studies could elucidate the biological mechanisms underlying these effects.

Supported by PSI2017-82604; PSI2015-73156-JIN.

Keywords: cocaine; addiction; conditioned place preference; extinction; mice

SHORT COMMUNICATIONS 1

INCREASED FEAR MEMORY ANDGLUTAMATERGIC MODULATION IN COMPULSIVEDRINKER RATS SELECTED BY SCHEDULE-INDUCED POLYDIPSIA

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Compulsivity is a transdiagnostic symptom observed in several neuropsychiatricdisorders. Recent evidence shows that glutamate modulators may be of benefit inimpaired inhibitory control. Our purpose was: first, to test the comorbidity betweencompulsivity and other neuropsychiatric symptoms on different preclinical behavioralmodels; second, to assess the therapeutic potential of different glutamate modulatorsin a preclinical model of compulsivity. Rats were selected as either high (HD) or low(LD) drinkers in schedule-induced polydipsia (SIP). We assessed compulsivity in LDand HD rats by marble burying test, depression by forced swimming test, anxiety byelevated plus maze and phobic behavior by fear conditioning test. In a secondexperiment, we measured the effects of acute administration (i.p.) of N-Acetylcysteine(25, 50, 100 and 200 mg/kg), memantine (3.1 and 6.2 mg/kg) and lamotrigine (15 and30 mg/kg mg/kg) on compulsive drinking on SIP. The results showed arelation between compulsive drinking on SIP, compulsive marble burying anda higher percentage of freezing in the fear conditioning test. Thepsychopharmacological study revealed that memantine and lamotrigine, at all dosestested, decreased compulsive water intake in HD rats compared LD rats on SIP. Theseresults suggest that the symptom clusters of different forms of compulsivity andphobia might be found in the compulsive phenotype of HD rats selected by SIP. Theeffects of memantine and lamotrigine in HD rats point towards a dysregulation in theglutamatergic signaling as a possible underlying mechanism in the vulnerability tocompulsivity on SIP.

Supported by Ministerio de de Economía y Competitividad (Spanish Government) and Fondo Europeo de Desarrollo Regional (Grant number MINECO-FEDER PSI2015-70037- R).

Keywords: Compulsivity, schedule-induced polydipsia, marble burying test, fear conditioning and glutamatergic modulators

SHORT COMMUNICATIONS 1

RELATIONSHIP BETWEEN PHYSICAL AND PSYCHOLOGICAL PAIN IN HUMANS

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Frustration (psychological pain) is a negative emotion induced by unexpected reward loss that shares commonalities with physical pain. Animal research shows that frustration reduces sensitivity to pain (hypoalgesia). In the present study we explored the impact of frustration on physical pain in human participants. Sixty students performed the Raven's Progressive Matrices test and received positive (correct) or negative (incorrect) feedback after each trial. The task involved two phases (preshift, postshift) administered to three groups. The negative contrast group received 10 positive feedback trials in preshift and 3 in postshift phase (high-to-low reward). The positive contrast group received 3 positive feedback trials in preshift and 10 in postshift (low-to-high reward). The control group was exposed to 13 positive trials randomly presented throughout the session (unshifted). Physical pain thresholds were estimated with an algometer before and after the task. Unlike the positive contrast and the control groups, the negative contrast group exhibited higher post-task pain thresholds in comparison to pre-task, thus suggesting that frustration induced hypoalgesia.

Keywords: negative contrast, physical pain, psychological pain, frustration, humans

SHORT COMMUNICATIONS 1

THE SWIMMING CONTROL GROUP IN THE MORRIS WATER MAZE: ANALYSIS OF ITS MOTOR CORTEX ACTIVITY

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Spatial memory in rodents is commonly assessed in the Morris water Maze. The use of control groups on this task is essential in order to subtract brain activity not related to learning. The cytochrome c oxidase histochemistry is used to measure the oxidative metabolism responsible for ATP production in the brain regions involved in learning. Our objective is to analyse the behaviour in the Morris water maze and the brain metabolic activity of the motor cortex in controls that swim in the maze without reinforcement, compared to the other groups. For this purpose, 3 groups of Wistar rats were used: experimental group, swimming control, and cage control. The Morris water maze's behavioural results show significant differences between the experimental group and the swimming control group in time spent in the quadrants and swimming speed. However, there are no differences in the motor cortex metabolic activity of the groups. Therefore, the swimming control can be considered a good control to isolate the motor effects of the task on the cerebral activity.

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Keywords: Morris water maze, rat, swimming control, motor cortex, cytochrome c oxidase.

SHORT COMMUNICATIONS 1

IS REPETITIVE TRANSCRANIAL MAGNETIC STIMULATION A SAFETY NEUROMODULATION THERAPY? A NEURONAL ACTIVITY AND GLIAL DENSITY STUDY.

Candela Zorzo [1,2], Sara G. Higarza [1,2], Marta Méndez [1,2], Juan A. Martínez [2,3], Alberto M. Pernía [2,3], Jorge L. Arias [1,2].

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Repetitive transcranial magnetic stimulation (rTMS) is a noninvasive neuromodulation technique. Despite Rtms is widely use in clinical practice, the exact cellular mechanisms are not completely elucidated. In addition, Rtms effects on glial cells have been less studied. Our aim was to investigate the impact of three days high-frequency Rtms on neuronal activity and its effect on astrocyte and microglial cells. We performed the histochemistry of cytochrome oxidase (Cox) to assess neuronal metabolic activity and immunocytochemistry to stain c-Fos (marker of immediate early gene expression), GFAP (cytoskeletal protein of astrocytes) and Iba1 (expressed in reactive microglia). Our results showed an enhancement of Cox after Rtms in retrosplenial, parietal cortex and hippocampus. Also, higher c-Fos activity was found in agranular retrosplenial cortex. Finally, we did not find changes in astrocytic and microglial density. In conclusion, we can assume that three days of high-frequency Rtms does not involve astroglia reactivity or inflammatory responses, such as microglia proliferation. We have shown an upregulation of neuronal metabolic activity in many limbic structures in addition to higher c-Fos levels in the nearest cortical area proximal to the Rtms. Our work provides a novel insight into the effectiveness and safety of Rtms as a brain modulation therapy.

This work was supported by Gobierno de España PSI2017-83893-R, MINECO PSI2015-73111-EXP and PSI2017-90806-REDT, Programa “Severo Ochoa” de Ayudas Predoctorales de la Consejería de Cultura y Deporte del Principado de Asturias PA-18-PF-BP17-011 to C.Z. We want to acknowledge the technical support of Vicente García Menéndez and AINDACE (Ayuda a la Investigación del Daño y Enfermedades Cerebrales) Foundation.

Keywords**:** repetitive transcranial magnetic stimulation, cytochrome c oxidase, c-Fos, astrocytes, microglia.

SHORT COMMUNICATIONS 1

FUNCTIONAL CONNECTIVITY AS OUTCOME MEASURE OF COGNITIVE REHABILITATION

Andreia Geraldo[1,2], Artemisa Rocha Dores[1,2], Alexandre Castro-Caldas[3], Fernando Barbosa[1]

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Objectives: This study examines the contributes of functional connectivity (FC) in the assessment of the efficacy of cognitive rehabilitation programs (CRP).

Methods: We conducted a systematic search on EBSCO, WoS and Pubmed, further complemented with hand search. Thirty-two studies analyzing the efficacy of CRP and having FC as outcome were included in this review.

Results: The fMRI is the most frequent technique used to assess FC, with resting-state (RS) acquisition protocols. Despite that, 7 fMRI studies used task-engaged (TE) protocols, and 4 used both RS and TE. Two studies used MEG and 1 used EEG, all with RS protocols. Significant changes in FC after CRP were reported in all studies, both compared to baseline and control groups. Additionally, significant positive improvements in neuropsychological outcomes were reported in 28 studies. Correlations between neuropsychological and FC outcomes were found in 19 studies, and FC was significantly correlated with measures of depression and quality of life in 2 studies.

Conclusion: The relationship between FC and behavioral outcomes suggests that FC can provide important measures when assessing the efficacy of CRP.

Supported by Fundação para a Ciência e a Tecnologia, grant reference SFRH/BD/138723/2018.

Keywords: Functional Connectivity; Cognitive Rehabilitation; Neuropsychological Assessment; efficacy

SHORT COMMUNICATIONS 1

TUMOR DEVELOPMENT IN ACUTE VS CHRONIC STRESS AND ITS IMPACT ON CORTICOSTERONE LEVELS AND BEHAVIOR.

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Several studies show the implication of stress and cancer in the onset of depression. This study analyzes the effects of acute vs chronic social stress and different coping strategies employed in response to them on tumor development, HPA axis activation and depressive-like behavior. To this end, male mice inoculated with B16F10 melanoma tumor cells were subjected to social stress for 24h or 18 days, using the sensory contact model. The direct interactions were recorded in order to establish their coping strategy. Corticosterone levels were determined both, prior to, and during the experiment, and the tumor metastasis were analyzed 21 days after the inoculation.

Both stress procedures reduced body weight and increased corticosterone levels immediately after the stress exposure, but chronically stressed mice gained less body weight and showed higher corticosterone levels even 3 days after the end of the stressor. They also had higher tumor development than acutely stressed, being mice with passive strategies those who had higher tumor development. Furthermore, chronic stress produced a decrease in sucrose consumption and an increase in time spent in the periphery in the open field.

Supported by Basque Government pre-doctoral grant (PRE_2018_2_0169) and Spanish Ministry of Economy and Competitiveness project grant (PSI2015-63658-R, MINECO/FEDER, UE). The authors thank for technical and human support provided by SGIker of UPV/EHU.

Keywords: Acute vs chronic social stress, depressive-like behavior, tumor, corticosterone.

SHORT COMMUNICATIONS 1

ANATOMICAL AND FUNCTIONAL ORGANIZATION OF THE VISUAL PATHWAYS IN GOLDFISH

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The presence of geniculate and extrageniculate visual pathways to the telencephalic pallium or cerebral cortex seems to be an ancient vertebrate trait as it has been described in cartilaginous fish, amphibians, reptiles, birds, and mammals. However, the identification of these two pathways in teleost fish is unclear because of the dearth of systematic anatomical and functional studies and the controversy provoked by their results. In the present study, we used both tract-tracing and in vivo voltage-sensitive dye imaging (VSD) in goldfish (*Carassius auratus*) to describe the retino-pallial visual pathways and to analyze the functional properties of the pallial visual area, respectively. Our preliminary results reveal that only a few number of terminals can be observed in the visual diencephalic nuclei after massive tracer injections into the optic nerve, which suggest that the geniculate pathway might not to be present in goldfish or is merely residual and therefore that, the most, if not all, visual information reaches the visual pallium via the extrageniculate pathway, which, interestingly, is highly developed in goldfish. This hodological results together with the functional data obtained by VSD imaging would lead to a better understanding of the evolution of visual pathways not only in the actinopterygian but also in the entire vertebrate lineage.

Supported by Ministerio de Economía, Industria y Competitividad, PSI2017-84970-P

Keywords: Visual Pathways, Telost Fish, Telencephalic Pallium

SHORT COMMUNICATIONS 1

EFFECTS OF WORKING MEMORY TRAINING ON DEPRESSIVE SYMPTOMS AND FRONTAL ALPHA ASYMMETRY: A PILOT STUDY

Carlos Campos[1,2,3], Tiago Paiva[1,3], Luís Ribeiro[2], Sofia Tripologos[2], Fernando Barbosa[1], Diana Tavares [2], Nuno Rocha[2].

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Goal: To assess the effects of working memory training (WMT) on depressive symptoms and frontal alpha asymmetry of young adults with moderate-severe depression.

Methods**:** 30 participants were randomly allocated to the WMT or control groups. Two subjects dropped out and one participant was excluded from EEG analysis.The WMT group completed 5 sessions of automatically adjusted n-back training (starting from 2-back) and the control group only performed 1-back trials. Main outcome measures were self-reported depressive symptoms and frontal alpha asymmetry (pre- and post-training).

Results: There was a significant time*group interaction for self-reported depression (p = .047, η_p^2 = .144) and F4-F3 alpha asymmetry (p = .043, η_p^2 = .153). *Post-hoc* analysis revealed significant improvements in depression on the WMT group (p < .001) and non-significant findings regarding F4-F3 alpha asymmetry. There was no significant interaction for F8-F7 alpha asymmetry (p = .115, η_p^2 = .096).

Conclusion: WMT may be an effective tool to reduce depressive symptoms. Frontal alpha asymmetry should be explored as a neurophysiological outcome measure of cognitive training efficacy.

Supported by Fundação para a Ciência e a Tecnologia, SFRH/BD/136296/2018

Keywords**:** cognitive training; working memory; depression; EEG; frontal alpha asymmetry

SHORT COMMUNICATIONS

SESSION 2

Thursday, May 30th, 2019

Chair: José María Martínez Selva, University of Murcia, Spain

SHORT COMMUNICATIONS 2

COMPENSATORY VISUAL BRAIN MECHANISMS IN AGING

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We have studied the effects of normal aging on visual perception with and without attention to stimuli. Response time to the presentation of stimuli, (0.5º in diameter grey circles or squares) sequentially in 24 positions of the visual field, distributed in 8 polar coordinates and 3 eccentricities (2.15, 3.83 and 5.53 degrees of visual field), were measured in three groups of people with normal vision and average age of 20, 43 and 66 years. The stimulus was presented for 100 milliseconds, with contrast of 6%, 16% and 78%. Experiments were designed to simply detect the stimulus or to discriminate its form. In both cases, experiments were conducted with and without covert attention to stimuli. The results show first that aging induced a progressive increase in the response times with a selective and progressive deterioration in the perception of low contrast and most eccentric stimuli. Secondly, covert attention to stimuli significantly reduced response times in the three groups of age. However, compared to young subjects, the older group achieved better results in the attention tests to stimuli of lower contrast and greater eccentricity. Thus, response times to these stimuli were reduced by attention more than in younger. This suggests that there is a mechanism of adaptation in aging, in which visual attention compensating mechanisms favor the perception of those stimuli more difficult to detect.

Keywords: Aging, Compensatory brain mechanisms,Visual attention

SHORT COMMUNICATIONS 2

BENEFICIAL EFFECTS OF BRAIN PHOTOBIOMODULATION AFTER EXPOSURE TO EARLY LIFE STRESS

Isabel López-Taboada[(1)], Héctor González-Pardo[(1)], Jorge L. Arias[(1)], Nélida M. Conejo[(1)].

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Exposure to prolonged stressful events during early life is associated with increased risk to develop several mental disorders and cognitive impairment in adulthood.

Repeated maternal separation (MS) during lactation period was used as an experimental model of early life stress in Wistar rats. Spatial learning in Morris water maze, anxiety-like behaviour in elevated zero-maze, and depression-like behaviour in forced swim test (FST) were evaluated in 90-day-old male rats. Cortical transcranial low-level laser therapy (LLLT) was applied from PND 75-80 as a non-invasive method aiming to counteract the possible adverse effects of ELS on neurodevelopment and behaviour.

Near-infrared LLLT specifically increases cytochrome c oxidase (CCO) activity, a key enzyme responsible for brain energy metabolism. Results show that MS decreased only mobility in the FST as compared to a control group. LLLT normalized mobility in MS rats and changed CCO activity in particular brain regions. These results partially support the beneficial effects of LLLT to counteract the long-term effects of exposure to early life stress.

Supported by grants PSI 2015–73111-EXP and PSI 2017–83038-P (MINECO, Spain)

Keywords: photobiomodulation, maternal separation, cytochrome oxidase, stress, rat

SHORT COMMUNICATIONS 2

GUSTATORY AND TASTE AVERSION LEARNING AREAS IN THE DORSOMEDIAL PALLIUM OF GOLDFISH

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The dorsomedial pallium (Dm) of teleost fishes plays an important role in behaviors that involve significant emotional component, as does the amygdala in mammals. However, recent studies indicate that the dorsomedial region of the teleost telencephalic pallium could be a heterogeneous division comprising not only an area homologue to the mammalian amygdale involved in emotional processing, but also discrete sensory areas, including a gustatory primary area, gustotopically organized comparable to those present in the mammalian neocortex. In the present study we examined the effects of selective lesions of four different subregions of goldfish Dm (Dm1, Dm2, Dm3 and Dm4) delimited on basis of cytoarchitectonic, topological and functional criteria on the acquisition of taste aversion learning (TAL). We used a TAL delayed procedure, which consists of the presentation of two flavors on different days, one followed by the injection of lithium chloride and the other by saline, both after a 10-min delay. The results showed that Dm2 and Dm3 lesions impaired the acquisition of taste aversion learning in goldfish, whereas damage to Dm1 and Dm4 animals did not produce significant changes in this learning. These data show that Dm2 and Dm3 are essential components of a telencephalon-dependent taste aversion memory system in teleost fish and functional support to the hypotheses that consider Dm as a heterogeneous pallial region that may include areas that are comparable not only to the pallial amygdala, but also with the mammalian neocortex and insula.

Supported by Ministerio de Economía, Industria y Competitividad, PSI2017-84970-P

Keywords: taste aversion learning, dorsomedial pallium, teleost fish, vertebrate brain evolution.

SHORT COMMUNICATIONS 2

NEUROBIOLOGY OF ADDICTIONS AND THEIR INCLUSION IN THE SUBJECT OF PSYCHOPHYSIOLOGY

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The consumption of psychoactive substances (PAS) in children and adolescents involves alterations in the brain development of the consumer, which can be reflected at a structural, neurochemical and cognitive level. These alterations lead, in different degrees, to situations that may affect the individual's life, including decision-making and memory, key aspects for the future. Despite this, several studies show that low risk perception of PAS consumption is common in adolescent populations, which is an aspect that is directly related to the beginning and continuation of consumption. For this reason, from the subject Psychophysiology, has sought ways to address this aspect through the Informational Campaign on Psychoactive Substances, as an academic strategy of the Psychology Program of the Faculty of Health Sciences, Universidad del Magdalena, since 2015-I, with the main objective of providing theoretical tools for making the right decisions for life. This is a strategy to provide information about the effects of PAS, from the neurobiological and psychological point of view. The campaign also includes behavioral addictions, such as addiction to the internet, cell phones, social networks, etc., about which there are still many doubts.

Keywords: Psychoactive substances, Addictions, Psychophysiology, Education, Prevention.

SHORT COMMUNICATIONS 2

DANCING AS A MODULATOR FOR SPATIAL MEMORY AND EXECUTIVE FUNCTIONS

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Aging is generally considered to be related to physical and cognitive decline. This is especially prominent in the temporal and frontal lobe-dependent functions, like spatial memory and executive functions, respectively. Recent research proved that normal aging-related decline could be successfully mitigated with the practice of aerobic sports. Regarding this, dancing integrates physical exercise, movement coordination with music and retrieval of choreographies, making it one of the most suitableways to prevent cognitive decline. In this study, 26 non-professional dancers (mean age 55.3 years) and 20 non-dancers (mean age 57.6 years) were compared. Their spatial memory performance and executive functions were assessed, using modern virtual reality tasks. Results proved that dancers scored better that non-dancers in spatial memory, with less errors and shorter latencies.In addition, they outperformed non-dancers in some of the tests for executive functions assessment. This shows that dancing can be a valid way of slowing down the natural age-related cognitive decline.

Keywords: Physical Activity; Virtual Reality; Aging; Hippocampus; Neuropsychology.

SHORT COMMUNICATIONS 2

DIFFERENTIAL RESPONSE IN ASTROCYTE AND MICROGLIAL POPULATIONS DUE TO PHOTOBIOMODULATION

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Photobiomodulation is considered as one of the most promising techniques to treat, in a non-invasive way, different types of brain damage, as well as a wide range of dysfunctions and damages related to different brain areas; having been carried out, to date, numerous tests with laboratory animals. To apply this therapy to human beings, it is essential to know what kind of side effects can occur in a brain without previous damage. In this sense, the objective of the present work is the study of cellular changes in cerebral areas (hipocampal formation and motor cortex on the CA1 area, striatum and prefrontal cortex) which do not present any injury or previous pathology. For this, we have worked with two groups of subjects, without any cognitive alteration, one of which has received laser light sessions (1064 nm, 30 Hz and 1 hour of exposition) for 5 days, proceeding to quantify populations of astrocytes (GFAP) and reactive microglia (Iba-1), two types of glial cells related to inflammatory processes. The results obtained show statistically significant differences, betweenthe control group and that which received the laser light; in CA1, for the microglial cells, and in the motor cortex for both types of cells. The results may be related to the frequency variations associated with the penetration of laser light in the brain.

Projects: MINECO PSI 2015-73111-XP. PSI 2017-90806-REDT. PSI 2017-83893-R. AINDACE Foundation.

Key words: Photobiomodulation, laser, microglía, astrocytes, light parameters.

SHORT COMMUNICATIONS 2

THE BASIC PSYCHONEUROPHYSIOLOGICAL PROFILE OF FIBROMYALGIA PATIENT

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Fibromyalgia (FM) is a chronic pain syndrome without an objective biomarker for its diagnosis. Scientific research over the last years concludes that FM is characterized by central sensitization (CS). Notwithstanding, no specific measure of CS seems to be used for FM diagnosis. Our aim was obtaining a psychoneurophysiological profile that helps to detect FM patients through a simple evaluation. First, a resting baseline of heart rate (HR) and blood pressure (BP) was taken in FM and healthy control subjects (10 min). After, pain sensitivity and CS were quantified through threshold, tolerance and Slowly Repeated Evoked Pain (De la Coba et al., 2017) measures (15-20 min). FM patients showed significantly higher levels of HR, lower BP and pain thresholds, and presence of CS in comparison to healthy controls. Whereas pain threshold and tolerance were inversely associated to BP in healthy individuals, FM patients showed BP-related modulation only for SREP sensitization, but not for threshold or tolerance. In this way, seems feasible obtaining a psychoneurophysiological profile specific to FM through a short and affordable evaluation of hardly 30 min that could be useful to improve its diagnosis.

Supported by Ministerio de Economía y Competitividad (Spain) and co-financed by FEDER funds (European Union) [Project PSI2015-69235-P].

Keywords: Fibromyalgia, central sensitization, evoked pain measures, blood pressure, clinical symptoms.

SHORT COMMUNICATIONS 2

TRANSCRANIAL DIRECT CURRENT STIMULATION OVER THE PRIMARY MOTOR CORTEX ADMINISTERED AFTER THE TRAINING TASK SHOWS GREATER EFFECTS.

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Transcranial direct current stimulation (tDCS) is a non-invasive and pain-free technique, which provides a constant electrical current to the cerebral cortex that can enhance the motor performance when the stimulation has been applied before, during and after the task.

The main objective of the study was to find the most effective moment to stimulate the primary motor cortex to improve the performance in an implicit motor sequential learning task: the Sequential Finger Tapping task.

We administered two sessions of anodal tDCS at 2mA over 86 healthy right-handed participants, using four different stimulation protocols: before, during, after the task, or sham. The variable measured was the Skill Index (SI). Results showed the highest SI in the second session and 8 days after the stimulation by means of the stimulation administered after the task. Hence, this tDCS stimulation protocol should be considered in future studies.

Supported by MINECO-FEDER grants: PSI2014-55785-C2-1-R and PSI2017-86847-C2-1-R) and UAL Transfiere grant: TRFE-BT-2018/003.

Keywords: primary motor cortex, tDCS, implicit learning.

SHORT COMMUNICATIONS 2

SHORT-TERM SELECTION FOR HIGH AND LOW ETHANOL INTAKE DURING ADOLESCENCE YIELDS DIFFERENTIAL LEVELS OF ALCOHOL INTAKE AND ALTERED ANXIETY RESPONSES IN A CONCENTRIC SQUARE FIELD TEST

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Introduction: Most of the studies on genetic underpinnings of alcohol-related problems have focused in adult organisms, despite alcohol initiation mainly taking place at adolescence. Objectives: Determine alcohol consumption levels, before and after stress exposure, and anxiety responses in two lines of rats, derived from progenitors selected for drinking high or low ethanol as adolescents. Methods: 15 male Wistar rats (7 - high drinking line, 8 - low dinking line) were tested for ethanol intake and preference at adulthood, for 4 weeks. Each animal had access to ad-libitum food and two bottles (water and ethanol). During week 3, the animals were exposed to 120 minutes of daily restraint stress, and ethanol intake testing resumed at week 4. Exploratory and risk-taking behaviors were analyzed, 72 hours after the last ethanol intake test,via the Multivariate concentric square field, before and after an intraperitoneal alcohol administration. Results: The rats derived from the high alcohol drinking line exhibited greater ethanol drinking than peers derived from the low drinking line on weeks 1 and 2, but not in week 4. High drinker ratsexhibit significantly greater risk-taking and lower shelter-seeking behaviorsthan the low drinkers, after receiving the ethanol administration. Discussion: Selection for high- or low alcohol drinking at adolescence induces phenotypes with divergent ethanol intake, which persist until adulthood and are associated with alterations in risk taking and anxiety responses.

Keywords: rats, ethanol, multivariate concentric square field, anxiety.

SHORT COMMUNICATIONS

SESSION 3

Thursday, May 30th, 2019

Chair: Margarita Martí Nicolovius, Autonomous University of Barcelona, Spain

SHORT COMMUNICATIONS 3

TRAINING IN A PLACE TASK PRODUCES SELECTIVE MORPHOLOGICALCHANGES IN THE MEDIAL CORTEX OF *IGUANA IGUANA*

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Multiple evidences reveal structural synaptic plasticity in the hippocampus of birds and mammals following spatial learning. One remarkable example is that training in spatial tasks induces mossy fiber expansion in the hippocampus of mammals as revealed by the Timm-staining technique. This work analyzed possible spatial learning dependent plasticity changes in different telencephalic areas in lizard (*Iguana iguana*) trained to locate a hidden platform in a hippocampus-dependent (place) or a hippocampus-independent (cue) spatial task. Both tasks were identical except that the distal cues were irrelevant in the cue task but provided essential information to solve the place task. Crucial probe tests revealed that the animals trained in the place task employed an allocentric strategy whereas the cue animals relayed exclusively on a guidance strategy. Following training we employed planimetry to compare the relative size of Timm-positive areas in the medial and dorsal cortex of the trained animals as well as in an untrained control group. This analysis revealed a significant increase in the size of the deep layer of the medial cortex of the place trained animals relative to the animals trained in the cue task and in the untrained group, contrasting with a significant decrease in the size of the Timm-positive area in the medial and caudal parts of the dorsal cortex in the place animals relative to the other two groups. These results are discussed in the context of comparative data and in the light of current hypothesis concerning the evolution of the hippocampal pallium in vertebrates.

Supported by Ministerio de Economía, Industria y Competitividad, PSI2017-84970-P

Keywords: spatial learning, medial cortex, Timm-staining technique, vertebrate brain evolution.

SHORT COMMUNICATIONS 3

AUDITORY CONTEXT-MODULATION OF TASTE RECOGNITION MEMORY: EFFECT OF HIPPOCAMPAL NMDA AND 6-OHDA LESIONS.

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Rodents exhibit neophobia to novel tastes which attenuates across days if consumption is not followed by visceral negative consequences, thus indicating safe taste recognition memory. The attenuation of taste neophobia (AN) is context-dependent. A dopaminergic circuit originated at the dorsal hippocampus (HC) has proven to be involved in this effect when using spatial contexts. Whether non-spatial auditory contexts might also modulate AN and the potential hippocampal role has been largely unexplored. We confirmed that a change of the auditory context disrupted AN in adult male mice. This effect was lost following NMDA excitotoxic lesions of the dorsal CA1 hippocampal region. A similar disruption was induced by 6-OHDA dopaminergic depletion aimed at the CA1 region. Moreover, systemic administration of the D1 dopamine receptors (D1DR) antagonist SCH-23390 resulted in a delayed AN when the auditory context was kept constant. We conclude that the auditory context-dependency of taste recognition memory requires the activity of a hippocampal dopaminergic circuit in which D1DR might play a relevant role.

Supported by PSI2014-57643-P and PSI2017-86381-P (MINECO. Spain and FPU14/01531 (MECD, Spain).

Key words: Dopamine, Attenuation of Neophobia, Hippocampus, NMDA, 6-OHDA, Context.

SHORT COMMUNICATIONS 3

SPATIAL MEMORY PERFORMANCE IN A VIRTUAL REALITY-BASED TASK IS MODULATED BY WORKING MEMORY CAPACITY

Juan José Ortells-Pareja[(1)], Joaquín Castillo Escamilla[(1)], José Javier Fernández Castro[(1)], Juan José Ortells Rodríguez[(1)], Laura Tascón Mille[(1)], José Manuel Cimadevilla Redondo[(1)].

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Spatial memory ability allows an accurate orientation through space, reaching targets effectively. This is a complex function involving many different brain regions. In the last years the interaction between frontal and temporal lobes has attracted scientists' attention to decipher the mechanisms underlying memory performance. In this work, the working memory capacity was related to the performance in a spatial memory task. The change location task was used to assess working memory capacity, whereas the Boxes Room task assessed spatial memory performance. The Boxes Room task is a virtual reality-based task that enables the assessment of spatial memory. Thus participants have to find one or more rewards in sixteen plausible positions during ten trials. Forty-eight female undergraduate students (age range from 18-40 years, X = 22.6, SD = 4.8) were recruited to participate in the study. Twelve participants ended in the first quartile and twelve from the fourth quartile were compared. A repeated measures ANOVA (Group x Block of Trials) applied to the number of errors in the Boxes Room Task disclosed a statistical main effect of Group and Block. Hence, participants with better working memory capacity outperformed those with lower working memory skills, and this effect was evident in all the blocks of trials. Accordingly, working memory modulated performance in this spatial memory task.

Keywords: Virtual Reality; Spatial Orientation; Working Memory; Medial Temporal Lobe

SHORT COMMUNICATIONS 3

THE ROLE OF SCHIZOTYPAL TRAITS AND THE SOMATIC MARKER IN DECISION-MAKING

Antonio González-Rodríguez[(1)], José Juan León[(1)], Fernando Sánchez-Santed[(1)], Pilar Flores[(1)], Ángeles F. Estévez[(1,2)], Pablo Sayans-Jiménez[(1)], Fernando Cañadas[(1,2)]

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Defective decision-making is a symptom of impaired cognitive function observed in several neurobehavioral disorders, such as schizophrenia. Impairments in tasks that require flexibility of executive resources, such as the reversal of contingencies, have also been related with this disorder. In order to clarify the cause of these deficiencies, in the present study we explored the effect that schizotypal personality traits may imply on both processes, since these traits are suggested as an endophenotypic marker of genetic risk for schizophrenia. Undergraduate students were assessed using the Schizotypal Personality Questionnaire and performed a modified version of the Iowa Gambling Task, with 60 additional trials that presented a modification of the contingencies. During the task, we also registered their skin conductance, since this has been proposed as a main indicator of emotion-based learning. Performance of the participants was compared as a function of schizotypy. Our results led us to question the somatic marker hypothesis.

Keywords: IGT, schizotypy, decision-making, somatic marker hypothesis

SHORT COMMUNICATIONS 3

MAY THE LATENCY AND AMPLITUDE OF THE N170 COMPONENT VARY DEPENDING ON THE SEX AND MEMORY COMPLAINTS?

Perez, V[(1)]., Garrido-Chaves, R[(1)]., Pérez-Alarcon, M.[(1)], Hidalgo, V[(1,2)]. y Salvador, A[(1)].

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The correct discrimination of emotions expressed at the facial level is important for the empathy and social interactions. The present study used event-related potentials (ERPs) with a set of 32 electrodes to investigate the cortical processing of positive, negative and neutral emotions in a group of people with (N=42) and without(N=38) subjective memory complaints. We hypothesized that the type of facial expression could influence the amplitude and latency of N170 in people with memory complaints though the tendency is not clear. N170 is primarily distributed in the occipito-temporal region of the brain and usually shows a larger response in the right hemisphere. N170 is a face-specific ERP component, and its peak shows face selectivity. Differences in latency were found in women with memory complaints for images of faces with neutral expression while in women without complaints, greater latency was observed for faces with negative expression. In addition, greater amplitude was reported in the right than in the left hemisphere. These results support the statement that the N170 component can be modulated by the emotional valence expressed through the face. They also confirm more activity in the cortical network of the right hemisphere, which is characteristic of the emotional processing.

Funding source: PSI2016-78763 and PROMETEOII2015-020

Key word: Memory complaints, sex, N170 component

SHORT COMMUNICATIONS 3

BRAIN METABOLIC PROFILING IN A TWO-HIT MODEL OF NEURODEVELOPMENTAL DISORDER: EFFECTS OF PRENATAL IMMUNE ACTIVATION

Mario Moreno-Fernández[(1)], Roberto Capellán[(1)], Javier Orihuel[(1)], Marcos Ucha[(1)], David Roura-Martínez[(1)], Emilio Ambrosio[(1)], Alejandro Higuera-Matas[(1)].

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Human neurodevelopment is heavily influenced by environmental factors that may increase the risk of developing certain psychopathologies. In the present study, we analysed brain metabolic disturbances in a two-hit model of neurodevelopment disorders in male rats. Lipopolysaccharide (LPS, 100 µg / kg) or saline was intraperitoneally injected to pregnant rats on gestational days 15 and 16. Then, the male offspring was exposed to five episodes of stress (agitation, immobilization, water deprivation, forced swimming, home cage changes) or standard handling during postnatal days (PND) 28 to 38, on alternate days. Prepulse inhibition (PPI) was evaluated at PND70. After sacrifice at PND90, the cortex and striatum were analysed with magnetic resonance spectroscopy. While we did not detect alterations in PPI, we found neurochemical disturbances that were mainly induced by LPS. We found that LPS decreased glucose levels in the cortex and striatum and modified glutamine and glutamate levels. This results are in accordance with previous studies that show alterations in corticostriatal circuits in neurodevelopmental disorders.

Acknowledgments: This work has been financed with funds provided by the Spanish Ministry of Economy and Competitiveness (Project nº: PSI2016-80541-P); Spanish Ministry of Health, Social Services and Equality (Network of Addictive Disorders - Project nº: RTA-RD16 / 0020/0022 of the Institute of Health Carlos III and Plan Nacional Sobre Drogas, Projects nº: 2016I073 and 2017I042); BBVA (Becas Leonardo; and the UNED (Plan for the Promotion of Research); And We also thank Rosa Ferrado, Luis Carrillo, Gonzalo Moreno and Alberto Marcos for their excellent technical assistance.

Keywords: Neurodevelopment, stress, glutamate, maternal immune activation (MIA), glutamine

SHORT COMMUNICATIONS 3

MAY THE LATENCY AND AMPLITUDE OF THE N170 COMPONENT VARY DEPENDING ON THE SEX AND MEMORY COMPLAINTS?

Perez, V[(1)], Garrido-Chaves, R[(1)]., Pérez-Alarcon, M.[(1)], Hidalgo, V[(1,2)], Salvador, A[(1)].

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The correct discrimination of emotions expressed at the facial level is important for the empathy and social interactions. The present study used event-related potentials (ERPs) with a set of 32 electrodes to investigate the cortical processing of positive, negative and neutral emotions in a group of people with (N=42) and without(N=38) subjective memory complaints. We hypothesized that the type of facial expression could influence the amplitude and latency of N170 in people with memory complaints though the tendency is not clear. N170 is primarily distributed in the occipito-temporal region of the brain and usually shows a larger response in the right hemisphere. N170 is a face-specific ERP component, and its peak shows face selectivity. Differences in latency were found in women with memory complaints for images of faces with neutral expression while in women without complaints, greater latency was observed for faces with negative expression. In addition, greater amplitude was reported in the right than in the left hemisphere. These results support the statement that the N170 component can be modulated by the emotional valence expressed through the face. They also confirm more activity in the cortical network of the right hemisphere, which is characteristic of the emotional processing.

Funding source: PSI2016-78763 and PROMETEOII2015-020

Key word: Memory complaints, sex, N170 component

SHORT COMMUNICATIONS 3

EXPOSURE TO TRAUMATIC EVENTS AND THE ELECTROENCEPHALOGRAPHIC RESPONSE TO AVERSIVE CONDITIONING PARADIGMS

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Exposure to traumatic experiences can lead to significant behavioral and emotional changes, namely to Post-Traumatic Stress Disorder. The Late Positive Potential (LPP) is the event-related potential most consensually referred as a neural correlate of this phenomena. Despite that, a lack of scientific evidence is still noticeable regarding the contribution of the Contingent Negative Variation (CNV) to its comprehension. We intended to explore the relation between the occurrence of traumatic events and the amplitude of the CNV and the LPP event-related potentials. Thirty-four university students participated in the study. All participants completed the Life Experience Survey (LES) and participated in an experiment with EEG recording. In this experiment, the participants were exposed to two aversive conditioning protocols: one with auditory stimuli and the other with facial expressions of anger, both as aversive stimuli. Significant results were found for the conditioning effect of the aversive conditioning protocol with the auditory stimuli, and also to its extinction. The results show a greater sensitivity of the LPP when compared to the CNV for the discrimination between conditioned and unconditioned stimuli. This highlights a stronger association of the LPP with aversive anticipation, which can influence the methodological design of future studies.

Keywords: Late Positive Potential (LPP), Contingent Negative Variation (CNV), event-related potential (ERP), Port-Traumatic Stress Disorder

SHORT COMMUNICATIONS 3

THE FIBROMYALGIA´ AMERICAN COLLEAGUE OF RHEUMATOLOGY (ACR 2010) DIAGNOSTIC CRITERIA: ASSOCIATIONS WITH CENTRAL SENSITIZATION TO PAIN, CLINICAL PAIN AND PSYCHOSOCIAL VARIABLES.

Carmen M. Galvez-Sánchez[(1)], Pablo De la Coba[(1)], Gustavo A. Reyes del Paso[(1)]

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Fibromyalgia syndrome (FMS) is a chronic condition characterized by widespread pain accompanied by different emotional and clinical symptoms. The American College of Rheumatology (ACR) proposed in 2010 new diagnostic criteria for FMS based in two self-reported scales: Widespread Pain Index –WPI- and Severity Score -SS-. This study evaluated the relation between scores in these scales and (1) central sensitization to pain, (2) clinical pain, (4), affectivity, (5) fatigue, and (4) insomnia. 64 women with FMS were assessed with the WPI, SS, State-Trait Anxiety Inventory, Beck Depression Inventory, McGill Pain Questionnaire, Fatigue Severity Scale, Oviedo Sleep Questionnaire and the Short-From Health Survey (SF-36) to evaluate Health Related Quality of Life (HRQoL). Pain threshold, tolerance and central sensitization (slowly repeated evoked pain, SREP) were measured by pressure algometry in 30 of these women. Associations were analysed by Pearson correlations and multiple linear regressions. Results showed thatState Anxiety was positively correlated with Severity Score waking unrefreshed; while Total pain, Intensity pain, Emotional pain, Sensorial pain, Trait anxiety and Depression were positively associated with all dimensions of WPI and SS; except for Severity Score cognitive symptoms. In addition, indicators of central sensitization to pain were found. Nevertheless, no associations were obtained between SS and WPI with central sensitization measured by the SREP procedure. It is an aspect that needs to be considered, taking the relevance of the central sensitization to pain hypothesis into account. The results of regression analysis showed Total Pain as the main predictor of WPI and SS, followed by Intensity pain and Fatigue. We conclude that the ACR (2010) FMS Criteria are associated with several symptoms domains of FMS, especially with clinical pain. However, they do not index the suggested underlying pathophysiology of FMS (central sensitization processes).

Supported by a grant from the Spanish Ministry of Science and Innovation co-financed by FEDER funds (Project PSI2015-69235P) and a FPU pre-doctoral contract (ref: FPU2014-02808) from a grant of the Spanish Ministry of Education, Culture and Sport.

Keywords: Fibromyalgia, diagnostic criteria, pain, affectivity, clinical symptoms, quality of life, central sensitization.

SHORT COMMUNICATIONS 3

INVOLVEMENT OF LC-NORADRENERGIC TRANSMISSION IN NOCICEPTIVE AND DEPRESSIVE-LIKE BEHAVIOR IN A NEUROPATHIC PAIN MODEL.

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Chronic pain is a risk factor for suffering depression. Animal models of chronic pain have reported alterations of the locus coeruleus (LC) coincident with the onset of depression-like symptoms. This noradrenergic nucleus sends descending (spinal cord) and ascending (cingulate cortex) projections regulating different aspects of pain. Here, we evaluated the time-dependent influences of LC on nociceptive and depressive-like behavior in a neuropathic pain model (chronic constriction injury, CCI). Behavioral, pharmacological and chemogenetic techniques were used for testing nociceptive and depressive-like behaviors in Sprague-Dawley and Long Evans-TH:Cre male rats (2, 7 and 30 days after surgery). Ipsilateral LC blockade facilitated hypersensitivity in CCI2d while contralateral LC blockade decreased hypersensitivity of CCI7d and CCI30d. In addition, ipsilateral and contralateral LC blockade reversed depressive-like behavior in CCI30d. Interestingly, bilateral inhibition of LC-rostral anterior cingulate cortex (rACC) reversed depressive-like behavior without changes in sensorial hypersensitivity in CCI30d. These results suggest that neuropathic pain induces time-dependent changes in the LC which impacts on nociceptive and depressive-like behaviors. Also, the LC-rACC overactivation would be related to the development of depressive-like behavior in chronic pain.

Supported by grants cofinanced by "Fondo Europeo de Desarrollo Regional" (FEDER)-UE "A way to build Europe" from the "Ministerio de Economía y Competitividad" (MINECO) (SAF2015-68647-R) and "Ministerio de Salud-Instituto de Salud Carlos III (PI18/01691); the "Consejería de Salud de la Junta de Andalucía" (PI-0134-2018); the "Programa Operativo de Andalucía FEDER, Iniciativa Territorial Integrada ITI 2014-2020 Consejería Salud, Junta de Andalucía" (PI-0080-2017); the "Consejería de Economía, Innovación, Ciencia y Empleo de la Junta de Andalucía" (CTS-510); the "Centro de Investigación Biomédica en Red de Salud Mental-CIBERSAM" (CB/07/09/0033); a Young Investigator Grant from the Brain Behavior Research Foundation (NARSAD23982).

Keywords: Neuropathic Pain, Depression, LC, rACC, Noradrenaline.

POSTER SESSIONS

POSTER SESSION 1

Thursday, 30th May, 2019

(11:45 – 12:45h)

POSTER SESSION 1, No.1

ENVIRONMENTAL ENRICHMENT RESULTS IN BOTH BRAIN CONNECTIVITY EFFICIENCY AND SELECTIVE IMPROVEMENT IN DIFFERENT BEHAVIORAL TASKS

Patricia Sampedro-Piquero[(1)], Paloma Álvarez-Suárez [(2)], Román D. Moreno-Fernández [(1)], Gonzalo García-Castro [(3)], Marcelino Cuesta [(3)], Azucena Begega [(4)]

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Exposure to environmental enrichment (EE) has been a useful model for studying the effects of experience on brain plasticity, but to date, few is known about the impact of this condition on the brain functional networks that probably underlies the multiple behavioral improvements. Hence, we assessed the effect of an EEprotocol in adult Wistar rats on the performance in several behavioral tasks testing different domains (Open field(OP): locomotor activity; Elevated-zero maze (EZM): anxiety-related behaviors; 5-choice serial reaction time task(5-CSRTT): attentional processes; 4-arm radial water maze (4-RAWM): spatial memory) in order to check its effectiveness in a wide range of functions. After this, we analyzed the functional brain connectivity underlying each experimental condition through cytochrome C oxidase (COx) histochemistry. Our EE protocol reduced both locomotor activity in the OP and anxiety-related behaviors in the EZM. On the other hand, enriched rats showed more accuracy in the 4-RAWM, whereas 5-CSRTT performance was not significantly ameliorated by EE condition. In relation to COx functional connectivity, we found that EE reduced the number of strong positive correlations both in basal and training conditions, suggesting a modulating effect on specific brain connections. Our results suggest that EE seems to have a selective effect on specific brain regions, such as prefrontal cortex and hippocampus, leading to a more efficient brain connectivity.

Supported by grant PSI 2013-42704P (Spanish Ministry of Economy and Competivity) and FC15-GRUPIN14-088 (Principality of Asturias). Author P.S.P. holds a 'Juan dela Cierva-formación grant from the Spanish Ministry of Economy, Industry and Competitiveness (code: FJCI-2015-23925).

Keywords: Environmental enrichment, Open Field, Elevated-zero maze, 4-RAWM, 5-choice serial reaction time task, functional connectivity.

POSTER SESSION 1, No. 2

A CASE REPORT OF A PATIENT WITH STUTTERING WHO IMPROVED AFTER OPEN LABEL TMS

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The etiology of and mechanisms underlying stuttering are largely unexplained, and limited effective treatments are available for those affected. Transcranial direct current stimulation has shown a favorable effect on fluency in adults who stutter. To date, however, no studies have investigated the effects of repetitive transcranial magnetic stimulation (rTMS) in patients with developmental stuttering. We assessed the effect of rTMS at the supplementary motor area (SMA) and in Broca's Area in a 30-year-old, right-handed man with developmental stuttering, as stuttering severity is related to increased structural connectivity of the motor response-inhibition network (composed of the supramarginal gyrus, preSMA, subthalamic nucleus, and putamen). Stimulating over SMA produce a significant decrease in %DS and SSI-4 score after 5 rTMS sessions; the fluency improvement was maintained during the subsequent 10 sessions. Unexpectedly no improvement was found when stimulation was over Broca's area. This case illustrated that rTMS over the SMA should be further researched in more subjects, along with sham stimulation, both as therapy and to explore pathophysiological principals of stuttering.

Keywords: stuttering; TMS; SMA

POSTER SESSION 1, No. 3

INDUCED ELECTRIC FIELD IN TMS: A PROPOSAL FOR ITS PARAMETRICAL CHARACTERIZATION

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Transcraneal magnetic stimulation (TMS) is a noninvasive and painless technique for stimulation or inhibition of certain brain regions. Its neuromodulation effects rely on the induced electric field in the brain. However, induced electric fields in volume conductors are not as easily computed. They depend on the coil position, size of any particular current loop and the presence of barriers to current flow. In this work we define five global parameters that characterize the region on the human head where the induced electric field created by TMS is mainly concentrated. Then, an example of a small current loop on a spherically symmetric head model with isotropic conductivity, along with a realistic coil and head model simulation are shown.The defined overall parameters would be useful to clinicians, as a guide for therapy, to better visualize which brain regions are likely to be excited by neurostimulation.

Keywords: TMS; induced electric field; parameters

POSTER SESSION 1, No. 4

BISPHENOL A AND COGNITIVE FUNCTION IN SCHOOL-AGE BOYS: IS BPA PREDOMINANTLY RELATED TO BEHAVIOR?

Andrea Rodríguez-Carrillo[(1,2)], Vicente Mustieles[(1,2,3)*], Rocío Pérez-Lobato[(1)], José M. Molina-Molina[(1,2,3)], Iris Reina-Pérez[(1,2)], Fernando Vela-Soria[(1,2)], Soledad Rubio[(4)], Nicolás Olea[(1,2,3)], Mariana F. Fernández[(1,2,3)*].

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Background: Bisphenol A (BPA) has been associated with impairments in children's behavior, but few studies have investigated its relationship with cognitive function. Objective: To investigate the association of urinary BPA concentrations with cognitive domains and intelligence quotient (IQ) in Spanish boys. Methods: BPA levels were quantified by liquid chromatography-tandem mass spectrometry (LC-MS-MS) in one spot urine sample from 269 boys of the INMA-Granada cohort, in their follow-up at 9-11years of age. Cognitive function was evaluated by a trained psychologist using a comprehensive neuropsychological test battery. Cross-sectional associations between BPA levels and neuropsychological standardized scores were analyzed by adjusted linear and logistic regression models. Results: Boys in the third and fourth quartile of volume-based BPA concentrations showed better processing speed scores than boys in the first quartile [β(SE)= 5.47(2.02), p<0.05, and β(SE)=3.57(2.01), p< 0.1, respectively]; and boys in the third quartile showed better inhibitory control [β(SE)= 1.56(0.94), p< 0.1] and impulsivity [β(SE)=-4.19(2.29), p< 0.1]. In contrast, boys in the fourth quartile showed poorer working memory scores than those in the first quartile [β(SE)= -1.09(0.50), p< 0.05]. All these associations were attenuated when creatinine (Cr)-standardized BPA concentrations were considered. BPA concentrations were also associated with a higher risk of being below the 20th percentile of working memory scores [ORa=1.51; 95% CI: 1.01; 2.25, p<0.05]. Conclusions: These findings do not support an association between urinary BPA concentrations and cognitive function or IQ among boys, except for working memory. BPA was previously found to be associated with behavior problems in the same study population, suggesting that BPA may predominantly affect the behavior of children rather than their cognitive function. Further research is warranted on the impact of BPA exposure on cognition in children.

Key Words: Bisphenol A; BPA; cognitive function; IQ; behavior; endocrine disrupting chemicals; EDCs

POSTER SESSION 1, No. 5

EFFECT OF STRESS ON ETHANOL-INDUCED FLAVOUR AVERSION LEARNING

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Numerous animal models have been used to study the interactions between stress and alcohol use (see See and Waters, 2011). For example, it has been shown that alcohol is able to eliminate sound-induced reactions, normalize behavior in conflict situations, reverse the neurochemical effects of stress, and restore normal locomotor activity after stress (reviewed in Hegarty and Vogel, 1993). Likewise, it has been shown that stress increases the voluntary intake of ethanol (Shina, 2005), facilitates the place preference conditioning (Sperling et al., 2010) and minimizes the conditioned place aversion induced by 1.0 g / Kg of ethanol (Funk, Vohra and Le, 2004). However, results are not always comparable between the different laboratories (Noori et al., 2014). In this work, we analyze the effect of stress (pharmacological induced by Yohimbine, 4 mg/kg) on the acquisition of a flavor aversion learning (FAL; three consecutive trials and a two-bottle choice test) induced by 1,5 g/kg of ethanol in male Wistar rats (n=20; 10, injected with Yohimbine and 10 injected with saline). The obtained results confirm the finding of Funk and colleagues (2004), given that the Yohimbine-injected animals showed a weaker ethanol-induced FAL than the animals injected with saline. It has been suggested that a lower sensitivity to the aversive effects of ethanol may be related to higher levels of voluntary intake of this substance. This question will be studied in our laboratory in future experiments.

Supported by Universidad de Jaén, Research Support Plan 2018-2019

Keywords: ethanol, flavor aversion learning, yohimbine, stress

POSTER SESSION 1, No. 6

HANDEDNESS, SPATIAL ORIENTATION AND EMOTION: A CORRELATIONAL STUDY

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We assessed spatial and emotional factors of 18 left-handers (4 men) and 18 age-matched right-handers (7 men) (mean age: 31 years).

The spatial and emotional variables considered were: left-right confusion, preference for the use of three types of spatial strategies for indoor wayfinding (orientation-based, route-based and building configuration-based), anxiety about wayfinding, trait anxiety and self perceived satisfaction with wayfinding skills. These variables were studied through a battery of questionnaires.

There were no differences between left-handers and right-handers in the variables considered (all $p< 0.05$). Pearson correlations among variables showed that the anxiety about wayfinding is positively related with the left-right confusion (r =0.413, p =0.012). Participants that used an orientation-based strategy are more likely to be satisfied with their wayfinding skills (r =0.625, p<0.001) and are less anxious about wayfinding (r =-0.405, p =0.014).

Funding: Supported by Gobierno de Aragón (for the Group S31_17D) and cofinanced by FEDER 2014-2020 "Construyendo Europa desde Aragón", Fundación Universitaria “Antonio Gargallo” through the project 2018/B007 and Fundación Ibercaja and Universidad de Zaragoza.

Keywords: Handedness; left-right confusion; spatial strategies; wayfinding anxiety

POSTER SESSION 1, No. 7

EFFECT OF THE CATECHOLAMINERGIC STIMULATION IN MODELS OF ALZHEIMER'S DISEASE.

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Introduction: Alzheimer's disease (AD) is a neurodegenerative condition manifested by synaptic dysfunction and memory loss. Recently, it has been shown that repeated exposure to enriched environment has a protective effect against the neurotoxicity of Aβ (Li et al., 2012; Lima et al., 2018). Therefore, in this work, we analyze whether repeated exposure to novel objects or the social interaction of enriched environments has protective effects against the accumulation of Aβ in two different mice models: 3xTg-AD model for Alzheimer's or acute administration of Aβ1-42 fibrils into the hippocampus. The presentation of a novel stimulus increases the release of catecholamines, consequently we evaluate the role of this neurotransmission system during the AD.

Methods: four-month-old wild mice groups were exposed for 4 weeks to a social housing (SH), a novelty environment (Nov, repeated presentations of new objects), and a control group (CG); half of each group received an intrahippocampal administration of βA 1-42 (SH-BA, Nov-BA and CG-BA). In addition, these groups were measured the release of catecholamines by in vivo microdialysis. Also, four-month-old wild mice 3xTg-AD was exposed to novelty environment (3xTg-AD –Nov) and a cage group (3xTg-AD-CG). All groups were evaluated in the spatial memory task and evaluated the length of hippocampal terminal fibers of tyrosine hydroxylase (TH+) by stereology.

Results: the novelty protocol increases the release of dopamine. A novel environment has a protective effect, both in the injection of beta-amyloid fibrils and 3xTg-AD animals. These groups have a clear improvement in spatial memory performance and have an almost normal length of catecholaminergic fibers.

Conclusion: the stimulation of the catecholaminergic system through repeated presentations of novel objects has a protective effect on the accumulation of βA in TH+ positive fibers and improves cognition in two animal models for Alzheimer disease.

Keywords: Alzheimer’s disease, enrichment environment, catecholamines

POSTER SESSION 1, No. 8

INTRAHIPPOCAMPAL ADMINISTRATION OF AMYLOID BETA 42 DIMINISHES CATECHOLAMINERGIC AXONS AND DISRUPTS SPATIAL CONTEXTUAL MEMORY

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Alzheimer's disease (AD) is the most prevalent type of dementia in the elderly. Its major characteristics are amyloid-beta (Aβ) aggregates, neurofibrillary tangles of hyperphosphorylated tau, synaptic failure and neuritic dystrophy that lead to cognitive impairment and memory loss.

It has been reported that increased Aβ deposition or its exogenous administration reduces catecholaminergic neurotransmission, impairs recognition memory and converts long-term potentiation in long- term depression in the cerebral cortex and dorsal hippocampus. Recent evidence from our laboratory has shown that Aβ pathologic alterations, in a transgenic mouse model for AD, coincide with catecholaminergic neurotransmission disruption and recognition memory impairment. Moreover, recently we have shown data that links catecholaminergic input into the hippocampus with the encoding of novel contextual information. In this paper, we aim to evaluate the effects of exogenous Aβ administration on long-term spatial and contextual memory evocation and the induced changes in the catecholaminergic system

We found that the intrahipocampal administration of Aβ after memory acquisition and before evocation impairs spatial memory, codification of novel contextual information and decreases TH + axons after 24 h, but not after eigthdays. While no differences were found when analyzing the MAP2 + axons.

Catecholaminergic neurotransmission spatial and contextual memory evocation are disrupted by intrahippocampal Aβ administration. These findings suggest the importance of the catecholaminergic system in AD that is relevant for the development of new therapeutic targets.

Supported by Consejo Nacional de Ciencia y tecnología (CONACyT) CB 250870 y por el Programa de Apoyos a Proyectos de Investigación e Innovación tecnológica (PAPIIT-UNAM) IN208616

Keywords: Amyloid-beta, Alzheimer´s Disease, spatial memory, contextual memory, catecholamines.

POSTER SESSION 1, No. 9

FOREST BEFORE TREES? GLOBAL VERSUS LOCAL PRECEDENCE IN HEALTHY AGING AND IN NEURODEGENERATIVE DISORDERS

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The aim of this study is to investigate if the global precedence in object-visual processing, originally described in young people by Navon, changes to some extent in healthy elderly people and differentially in age-related pathologies. Previous studies suggest a certain decrease for the global advantage in people with neurodegenerative disorders. To advance on this subject, we administered to elderly people a Navon's classic paradigm, involving the presentation of compound stimuli with large letters composed of smaller letters. Forty healthy elderly adults (83,6 years; MMSE: 28,1), 11 with Mild Cognitive Impairment (MCI) (85years; MMSE: 20,8), 12 with Alzheimer Disease (AD) (83,9 years; MMSE: 20) and 10 with Parkinson Disease (PD) (78,4 years; MMSE: 24,9) took part in this experiment. Also, we administered the same task to 264 young people (19,4years). Response times and error data indicate that healthy elderly people, similar to young people, show a global precedence. In turn, people with AD show both local advantage and local interference, whereas MCI and PD show no global/local advantage but a global interference. Thus, differences in performance allow the identification of early markers of these syndromes and, consequently, to design the most appropriate neurocognitive intervention as early as possible.

Supported by *Ministerio de Economía y Competitividad de España* (PSI2013-46007-P) and *Proyectos de Cooperación Interuniversitaria UAM-Santander* (CEAL-AL/2017-16)

Keywords: Global/Local Processing, Aging, Mild Cognitive Impairment, Alzheimer Disease,Parkinson Disease

POSTER SESSION 1, No. 10

CONTRIBUTION OF THE VENTRAL HIPPOCAMPUS TO ALLOCENTRIC MEMORY: EFFECTS OF EXCITOTOXIC LESIONS IN THE RAT

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Traditionally it has been considered that only the dorsal hippocampus of the rat was significantly involved in allocentric learning and memory with a tiny contribution of the ventral region. Recently, however, a large number of studies based in electrophysiological and lesions data mainly, conducted in the water maze, have challenged this view. Here we investigated for the first time, the effects of excitotoxic lesions of the ventral hippocampus on a variety of spatial tasks in the radial maze. In the first experiment a four-arm plus-shaped maze and a spatial reference memory paradigm were used. In this and in the following experiments, three groups of rats were employed (ventral, dorsal and control). Rats were lesioned or sham-operated 10 days before the handling period and 17 days before the start of the training sessions proper. Results indicated that ventral lesioned rats learned a place response as well as the control subjects, however, dorsal lesioned showed a significant deficit in acquisition, suggesting that the task is dorsal hippocampus dependent. In the second experiment, neurologically intact rats learned a spatial reference memory task similar to the one used in experiment 1 and dorsal or ventral hippocampus was lesioned 1-2 days after acquisition. Results showed a profound retrograde amnesia in both, ventral and dorsal lesioned groups. In the third experiment the goal was to clarify whether the retrograde deficit observed in experiment 2 was specific to allocentric information or to any type of spatial information. With this objective, intact rats learned a spatial task in the plus-shaped maze based exclusively on a "guidance strategy" and ventral or dorsal hippocampal lesions were made 1-2 days after learning. Results showed perfect memory in lesioned groups relative to controls. Thus, although the absence of anterograde amnesia in ventral hippocampus lesioned rats suggests that structures other that the ventral region can take charge of the acquisition, the presence of retrograde amnesia indicated the critical role of the normal ventral hippocampus in the long-term formation of allocentric memory.

Supported by MINECO (Spain) and the European Regional Development Fund (Grant number PSI2013-41098-P).

Keywords: Learning, Memory, Hippocampus, Spatial Memory, Radial Maze.

POSTER SESSION 1, No. 11

ELECTROPHYSIOLOGICAL CHARACTERIZATION IN THE DEVELOPMENT OF ALZHEIMER´ S DISEASE: PROPOSAL OF QUANTITATIVE ELECTROENCEPHALOGRAM MEASURES TO DISENTANGLE THE COGNITIVE IMPAIRMENT IN AGING.

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Early characterization of Alzheimer's Disease (AD) with low-cost and high viability in clinical settings through quantitative electroencephalographic (qEEG) markers is of interest for individual neuropsychological rehabilitation and to understand those neurocognitive processes underlying the continuum of neurodegeneration. In this study we propose to investigate the pattern of brain oscillations in cognitive impairment with measurements of its relative power in a sample of elderly people at rest with closed eyes. The study is also aimed to analyze alpha reactivity and inhibitory control abilities in patients with a high risk of developing AD, classified differentially considering the heterogeneity of clinic conditions diagnosed as Mild Cognitive Impairment (MCI). As a conclusion, early detection of individuals with probable AD based on alfa3/alfa2 relative power ratio might be an effective way to find cognitive and neurophysiological patterns specifically related to a hyperactive state that might be crucial in the neurodegeneration process.

Supported by *Ministerio de Economía y Competitividad de España* (PSI2013-46007-P) and *Proyectos de Cooperación Interuniversitaria UAM-Santander* (CEAL-AL/2017-16)

Keywords: relative power, alpha reactivity, alpha3/alpha2 frequency power ratio, Mild Cognitive Impairment, quantitative electroencephalography.

POSTER SESSION 1, No. 12

ESTROGEN RECEPTOR ALPHA GENE (ESR1) PROMOTER REGION ANALYSIS IN A POPULATION WITH GENDER DYSPHORIA

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Aim: To investigate the implication of the estrogen receptor α gene promoter region in the etiology of Gender Dysphoria (GD).

Methods: Four polymorphisms (rs3138774, rs9478245, rs2234693 & rs9340799) in the ESR1 promoter were studied from 398 female to males (FtMs), 505 male to females (MtFs), and 1184 controls. They were diagnosed with GD (DSM-5) by the Gender Identity Units of Cataluña and Andalucía. The controls were diagnosed as not having GD and matched for chromosomal sex, ethnicity and geographical origin.

Molecular Analysis: Polymorphisms were amplified by PCR. The rs3138774 was performed by automated capillary electrophoresis. In the case of the other polymorphisms, genotyping was performed by the overnight digestion with the corresponding digestion enzyme (BsrDI, PuvII or XbaI).

Statistical methods: The analyses were performed using SNPStats considering $p \leq .05$ as significant.

Results: The allele and genotype frequencies for the rs9340799 polymorphism were significantly different between FtMs vs female controls (p=.03 and p=.04) but not between MtFs vs male controls. The A/G genotype showed a protective effect against cerebral masculinization (p=.017) while the A/A genotype is a risk factor (p=.011). No significant differences were found for the other polymorphisms.

Conclusion: The ERα rs9340799 polymorphism is implicated in the etiology of GD.

Supported by grants from the Spanish Ministry ofScience and Innovation [PSI2014 - 58004-P (AG)] and the Xunta deGalicia [grant number ED431B 2016/013 (EP)]. J. Cortés-Cortés wassupported by a doctoral fellowship FPU 15/02558.

Keywords: Estrogen receptor alpha, Gender dysphoria, transsexualism.

POSTER SESSION 1, No. 13

SPATIAL COGNITION IN CHILDHOOD: TERM-BORN AND PRETERM DEVELOPMENTAL DIFFERENCES

Tania Llana-Fernández[(1)], Cristina Fernández-Baizán[(1,2)], Andrea Pérez-García[(1)], África Cabo-Gómez[(1)], Marta Méndez[(1,2)]

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Spatial cognition allow us to move and to locate ourselves in places. This function has not been studied in depth in preterm (<37 weeks of gestation). Our aim was to compare spatial orientation, visuospatial abilities and intelligence quotient (IQ) in premature and term-born infants, and to assess their neuropsychological outcomes. Eighty-nine premature and 30 term-born children (5-7 years old) performed an egocentric and allocentric memory task, Geometric puzzles (GP) and Route finding (RF) from NEPSY-II and RIST. Significant differences were found between 5, 6 and 7 years old preterm infants in GP , RF, and egocentric task, whereas control group showed age differences in GP. Comparing groups, we found significant differences in RIST, GP, egocentric and allocentric tasks at youngest age, RIST, GP and allocentric task at 6 year-old, and RIST at 7 year-old. Differences in orientation strategies, visuospatial abilities and IQ between premature and term-born are more pronounced at youngest ages.

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Keywords: childhood, spatial cognition, development, premature

POSTER SESSION 1, No. 14

HAIR CORTISOL LEVELS, PSYCHOLOGICAL STRESS AND PSYCHOPATHOLOGICAL SYMPTOMS IN HIGH-RISK PREGANCY: A COMPARISON WITH HEALTHY PREGNANCIES

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Background: Pregnancy has associated higher stress levels, more anxiety and depression symptoms and higher hair cortisol concentrations. Besides, high-risk pregnancies (HRP) due to several medical conditions have an important repercussion in psychological status and obstetrics outcomes. In this sense, the aim of this study was to compare hair cortisol levels, psychological status and obstetrics information in women who had an HRP vs. a healthy pregnancy (HP).

Method: A total of 84 pregnant women were recruited in the third trimester of pregnancy and followed-up until childbirth. Perceived stress, anxiety and depression symptoms, pregnancy specific stress and hair cortisol levels were assessed in mothers who had an HRP (n =36) and a HP (n=48). After delivery, gestational week, birthweight and length of their newborn were asked.

Results: Pregnant women with an HRP had more perceived stress levels, pregnancy-specific stress and anxiety symptoms than those who had a HP.

Conclusions: Women who have an HRP experience a worst psychological status, more precisely perceived stress, pregnancy-specific stress and anxiety. It is necessary to put special attention to this fact, as more stress levels could have an impact on children neurodevelopment. For that reason, it is important to assess psychological status in pregnant women, especially with an HRP.

Keywords**:** Cortisol, high-risk pregnancy, prenatal stress

POSTER SESSION 1, No. 15

SEX HORMONES AND TAXON STRATEGIES FOR SPATIAL NAVIGATION

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Navigation is the ability that permits people and animals to orient themselves in physical space and find a target location. The taxon system for spatial navigation comprises egocentric strategy (by using distances and personal directions, as left/right) and landmark strategy (by using landmarks in the environment as directional cues). This study examines sex differences, the influence of the menstrual cycle, and hormonal contraceptives in an egocentric and landmark 2-D Matrix Navigation Task composed by nameable symbols. During egocentric navigation, men (with high salivary testosterone) outperformed women with a natural menstrual cycle. These differences were observed during the early follicular (low estradiol and progesterone) and mid-luteal phase (high estradiol and progesterone) but not the ovulatory phase or in comparison with women using hormonal contraceptives (high estradiol and low progesterone). No differences were observed among groups during landmark navigation. These results seem compatible with the increased secretion of dopamine in the striatum induced by testosterone and estradiol. In addition, progesterone seems to counteract the effect of estradiol.

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Keywords: sex hormones, egocentric and landmark, navigation.

POSTER SESSION 1, No. 16

THE 2D:4D INDEX AND CIRCULATING TESTOSTERONE JOINTLY MODERATE THE EFFECT OF TEMPERAMENT ON AGGRESSION

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The aim of the investigation was to explore if both prenatal and circulating testosterone jointly moderate the effect of temperament on aggressive behavior. To this end, the sample group comprised 279 eight-years-old-children (154 boys and 125 girls) from Guipuzkoa and Cádiz. Aggressive behavior and temperament were assessed using the mini-DIA (mini-Direct and Indirect Aggression) and the TMCQ (Temperament in Middle Childhood Questionnaire). From the TMCQ we obtained three temperamental scales; effortful control, surgency and negative emotionality. Prenatal testosterone was indirectly measured using the 2D:4D index. Therefore, the length of the index and ring fingers were measured using digital Vernier calipers. Finally, circulating testosterone levels were measured through saliva samples collected in the classrooms (09.00h) and analyzed using ELISA (enzyme-linked immunosorbent assay). The results revealed that children with high negative emotionality were more physically aggressive if their prenatal testosterone levels were high and their circulating testosterone levels were low. The result demonstrate the importance of studying aggressive behavior from a biopsychological perspective.

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Keywords: Aggressive behavior, Temperament, Testosterone, 2D:4D index, Children

POSTER SESSION 1, No. 17

MEMORY IMPAIRMENT BY CHRONIC-INTERMITTENT ALCOHOL IN MICE IS MEDIATED BY NEURO-INFLAMMATORY PROCESSES

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Considering the connection between alcohol and inflammation processes, we evaluated the effects of sub-chronic (Experiment 1) and chronic-intermittent administration (Experiment 2) of alcohol (ethanol) and the anti-inflammatory indomethacin on emotional memory in male and female CD1 mice. Subjects were randomly divided into four groups in each sex: SS (saline+saline), SA (saline+alcohol), SI (saline+indomethacin) and AI (alcohol+indomethacin). Animals were injected (i.p.) with saline, ethanol (3 g/kg) and indomethacin (10 mg/kg) in sub-chronic (3 consecutive days) or chronic-intermittent (the first three days of each week, throughout three weeks) administration. All subjects (n = 8-12 per group) were evaluated in an inhibitory avoidance task 96 h after the pharmacological treatment. In Experiment 1,all groups showed similar inhibitory avoidance learning, i.e. sub-chronic alcohol did not significantly impair memory. In Experiment 2, memory impairment was observed in the SA groups, with even a lack of learning in males;while the AI groups had similar latencies to the SS groups. No significant differences between groups were observed either in locomotor activity or analgesia. In conclusion, the emotional memory impairment produced by chronic-intermittent alcohol (binge drinking model) seems to be mediated by neuro-inflammatory processes.

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Key words: alcohol, binge drinking,emotional memory, neuro-inflammation, mice

POSTER SESSION 1, No. 18

CHANGES IN HEART RATE AND BLOOD PRESSURE IN YOUNG BINGE DRINKERS: A 4-YEAR STUDY

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Binge drinking (BD) alcohol consumption pattern is prevalent among adolescents and young adults, being a serious public health problem. Changes in physiological stress levels (heart rate and blood pressure) in young binge drinkers have been reported in literature. In this study, the effects of acute alcohol consumption (risk consumption: blood alcohol concentration mean = 0.39 g/L) on heart rate (HR) and -systolic and diastolic- blood pressure (BP) were evaluated in healthy young non-drinkers (n = 23) and drinkers with a BD history (n =17). The effects were registered in two moments: a first record at the age of 18 and a second record at the age of 22. Drinkers with a BD history showed higher HR than non-drinkers in the first record, but not in the second one. Intragroup comparisons revealed that these subjects normalized their HR after maintaining a BD pattern for 4 years. No changes in BP were observed between the different groups, neither in the first nor in the second record. Intragroup comparisons showed a decrease in systolic and diastolic BP of some groups in the second record versus the first one. In conclusion, our findings suggest changes in heart rate and blood pressure due to alcohol. In binge drinkers, HR values tend to normalize (habituation) after maintaining this BD pattern for 4 years.

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Key words: alcohol, binge drinking, heart rate, blood pressure, humans.

POSTER SESSION 1, No. 19

CHANGES IN ANXIETY BY ALCOHOL IN YOUNG NON-DRINKERS AND DRINKERS: A 4-YEAR STUDY

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Binge drinking (BD) alcohol consumption pattern is prevalent among adolescents and young adults, being a serious public health problem. Changes in anxiety and perceived stress (PS) have been reported in literature in young binge drinkers. In this context, we evaluated the effects of acute alcohol consumption (risk consumption: blood alcohol concentration mean = 0.39 g/L) on state anxiety (SA), trait anxiety (TA) and PS in young non-drinkers (n = 23) and drinkers with a BD history (n =17). The effects were registered in two moments: a first record at the age of 18 and a second record at the age of 22. The acute alcohol consumption increased the SA in the first record, but not in the second one. Likewise, drinkers with a BD history showed higher SA than non-drinkers in the first record (but not in the second one). No differences in PS or TA were observed between groups, neither in the first record nor in the second one. Intragroup comparisons, with a 4-year interval, also showed no differences in SA, PS or TA in any group. In conclusion, our findings suggest that acute alcohol consumption or having a BD history increases anxiety, but not perceived stress, at an early stage; and this increase in anxiety tend to normalize (habituation) after maintaining this BD pattern for 4 years.

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Key words: alcohol, binge drinking,anxiety, perceived stress, humans

POSTER SESSION 1, No. 20

CHANGES IN PERINEURONAL NETS EXPRESSION DURING WITHDRAWAL AND THE EFFECT OF THEIR DEGRADATION IN INCUBATION OF CRAVING.

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Previous studies have shown that drug addiction is due to the capacity of addictive drugs to produce neuroplastic changes that make the brain inflexible to drugs and drug-related stimuli. We have proposed that the cerebellum can play a crucial role in these processes. Perineuronal nets (PNNs) are cartilage-like structures of extracellular matrix molecules that enwrap in a net-like manner the cell-body and proximal dendrites of special subsets of neurons in order to stabilize their incoming connections and restrict plasticity. Therefore, PNNs might contribute to the maintenance of drug-induced conditioned memories after prolonged drug abuse. In previous studies, we have found an increase in PNN expression around Golgi inhibitory interneurons in the cerebellum after repeated cocaine administration. The aim of the present study was to investigate PNN's role in a model of escalating cocaine use. PNN expression and the effects of PNN degradation (ChABC) were evaluated after different withdrawal times. The results showed an increase in the intensity of PNNs in the escalating group as compared to other groups that was independent of withdrawal times. PNN degradation did not seem to influence the craving incubation process.

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Keywords: Addiction, Cocaine, Perineuronal net, Cerebellum, Chondroitinase ABC

POSTER SESSION 1, No. 21

UNRAVELLING THE ROLE OF THE CEREBELLUM IN DRUG ADDICTION. CEREBELLUM-PREFRONTAL NETWORKS IN DRUG-INDUCED PREFERENCE MEMORY

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Previous investigations from our laboratory have shown that cocaine-induced conditioned preference increase neural activity and PNN expression in the posterior cerebellum. In the present research, we investigated the role of the cerebellum in cocaine-related memory and its functional and anatomical relationships with the medial prefrontal cortex (mPFC). The results showed that deactivations of specific regions in the mPFC and cerebellum facilitated the acquisition of cocaine-induced preference conditioning. Moreover, cerebellar activity and perineuronal net expression increased after IL deactivation. After the cerebellar lesion, we observed increased cFos activity and PNNs expression in the mPFC. To propose a neuroanatomical model for our findings, we addressed a tracing study with retrograde and anterograde tracers. Tracers were infused into the dorsal region of lobule VIII in the vermis, mPFC and ventral tegmental area (VTA) in order to map the interconnections between these regions. We demonstrated direct glutamatergic projections from the lateral nucleus to VTA that hinted at an inhibitory control of the posterior vermis over the mPFC through the VTA. These findings point to an important role of the cerebellum in controlling the activity of the addiction circuit with important behavioural effects on drug seeking.

Keywords: Cerebellum, cocaine, prefrontal cortex, place preference.

POSTER SESSION 1, No. 22

EFFECTS OF CHRONIC SOCIAL INSTABILITY STRESS ON MEMORY, SOCIAL BEHAVIOR AND VULNERABILITY TO SUBSEQUENT STRESS

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Prolonged exposure to a social stress increases vulnerability to the development of affective disorders. Also, recent studies indicate that repeated exposure to stress can lead to sensitization particularly in women, but few preclinical studies have been conducted on female animals using a specific social stress model for this sex. This study analyzed the effects of chronic social instability stress on memory, social behavior and whether produces a sensitization to a subsequent stress. Thus, female mice were subjected to 4 weeks of social instability stress. One week later all mice were submitted to restraint stress. At the end of social stress, novel object recognition and social interaction test were conducted. Corticosterone levels were measuredthe first and last day of stress, and after restraint stress. The results revealed that after social stress corticosterone levels were higher in stressed mice, and only these subjects have increased levels after restraint. In addition, stressed mice showed a minor preference for novel object. No differences were observed in social interaction test. In sum, social stress produce a memory impairment and a vulnerability to subsequent stress.

Keywords: Social stress; Female mice; Vulnerability; Memory; Social interaction.

POSTER SESSION 1, No. 23

RODENT MODELS OF ANERGIA IN MOTIVATION: INVOLVEMENT OF DOPAMINE AND SEROTONIN IN FEMALE AND MALE MICE.

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Mesolimbic dopamine (DA) has been implicated in effort-based decision making and in behavioral activation. Impairments in behavioral activation such as anergia are often seen in people with depression, and are highly resistant to treatment. We compare the impact of DA and serotonin (5HT) manipulations in female and male CD1 mice in measures of behavioral activation assessed in the forced swim test (FST) after DA depletion. We also studied changes in sucrose preference and Social Interaction (SI) patterns, as well as anxiety in the Dark and Light (DL) box. Our results indicate that DA depletion reduces active behaviors in the FST such as climbing, and increases passive behaviors, such as immobility, both in female and male mice. The DA uptake blocker bupropion, reversed these effects in both sexes. However, the 5HT uptake blocker fluoxetine, worsen them in malesbut not in females. There were very moderate changes in SI in both sexes after these pharmacological manipulations. DA and 5HT manipulations did not produce any significant effect on anxiety and preference for sucrose in male and female mice. These results indicate that DA is involved in behavioral activation, and thus, pro-dopaminergic drugs may be able to improve depressive symptoms related to increased fatigue.

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Keywords: Accumbens, Effort, Depression

POSTER SESSION 1, No. 24

INVOLVEMENT OF THE EXTERNAL LATERAL PARABRACHIAL SUBNUCLEUS IN THE ANOREXIC ACTION OF NALOXONE.

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Various studies have reported that both the opiate system and the external lateral parabrachial subnucleus (LPbNe) appear to be involved in the short-term regulation of food intake. Given that this pontine subnucleus receives information from the gastrointestinal system and also expresses a high density of opioid receptors, the objective of the present study was to examine the role of LPbNe in the action of endogenous opioids on food intake. To this end, we studied the effect induced by the subcutaneous administration of an opiate antagonist (naloxone; 4mg/ml/kg) on carbohydrate (10% sucrose) intake in Wistar rats subjected to lesions of this subnucleus. Results show that significantly larger amounts of sucrose were consumed by the LPbNe-lesioned rats than by the controls. After the administration of naloxone, both groups evidenced the anorexic effect of this substance, but this effect was lesser in the LPbNe-lesioned group. In fact, the sucrose intake of naloxone-treated LPbNe-lesioned rats was comparable to that of vehicle-treated controls. These data are discussed in terms of the potential importance of the LPbNe for the action of endogenous opioids in the processing of nutritional information from the upper gastrointestinal tract.

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Keywords: Food Intake,Opioid, Naloxone, External Lateral Parabrachial Subnucleus.

POSTER SESSION 1, No. 25

MATERNAL SEPARATION HAS AN IMPACT ON THE ACTIVITY OF AREAS THAT COMPRISE THE SOCIAL BRAIN

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Maternally-separated adult rats exhibit learning deficits, a hyperactivation of the HPA, are prone to present anxiety-like behaviors and depression, and increased drug use. The aim of this study was to evaluate c-Fos-ir neurons after social novelty exposure in PFC, NAc and LHA. 12 male Wistar rats were used and maternal separation was conducted for 4h daily from postnatal day 1 to 21. On PN 21 rats were weaned and housed in individual cages with food and water *ad libitum* for 32 days. On PN 53 rats were exposed to a social novelty test for 5min. Brains were fixed and coronal sections were obtained for c-Fos immunohistochemistry. Different patterns of c-Fos-ir neurons in the analyzed areas was found in maternally-separated rats compared to non-separated rats. These findings suggest that maternal separation can affect the activity of brain areas involved in the regulation of social behaviors in adulthood.

Supported by UAEM-CA-264

Keywords: maternal separation, social novelty, dopaminergic system, social brain.

POSTER SESSION 1, No. 26

MATERNAL SEPARATION REDUCES SOCIAL INTERACTION IN THE ADULT RAT

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Maternal separation is known to alter the adequate development of neuronal and hormonal systems in charge of the regulation of the stress response. The aim of this study was to evaluate the behaviour of maternally-separated adult rats during social novelty. 12 male Wistar rats were used and maternal separation was conducted for 4h daily from postnatal (PN) day 1 to 21. On PN 21 rats were weaned and housed in individual cages with food and water *adlibitum* for 32 days. On PN 53 rats were exposed to a social novelty test for 5min. Maternally-separated rats displayed reduced interest in social novelty investigation and reduced self-grooming during the social novelty exposure compared to non-separated rats, suggesting they were more anxious. These findings support that maternal care separation has a negative impact in social behaviour, accentuating anxiety-like behaviours during social novelty.

Supported by PRODEP UAEM-CA-264

Key words: maternal separation, social behavior, social brain.

POSTER SESSION 1, No. 27

PSYCHOLOGICAL AND PHYSIOLOGICAL STRESS LEVELS IN FIRST YEAR UNIVERSITY STUDENTS: A COMPARISON BETWEEN VETERINARY AND PSYCHOLOGY STUDENTS

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It has been reported that undergraduate students in health sciences, and especially veterinary students, suffer from higher stress levels than students in other science fields. However, there are no studies that explore the stress level in veterinary students with other university students. We compared the stress level in first-year veterinary (N = 41) and psychology students (N = 92) during their first weeks in the campus. We collected data on state and trait anxiety, perceived stress, depression, and level of academic engagement by employing the STAI, Perceived Stress Scale, BDI and UWES questionnaires; saliva samples taken 30 min after awakening were obtained in two consecutive days to assess levels of salivary alpha-amylase (sAA), salivary flow rate and salivary cortisol. Results showed differences between both groups in academic engagement and depression (higher levels in veterinary students). Psychology students presented higher values of sAA (IU/L), sAA (IU/min) activity, and salivary flow rate. Finally, separate correlation analyses between psychological and biological parameters indicated a positive correlation between salivary flow rate and the level of depression in veterinary students. We discovered differences in the stress levels during the first weeks of university between veterinary and psychology students, both in biological and psychological variables.

Keywords: academic stress; personality; saliva; stress biomarkers.

POSTER SESSION 1, No. 28

THE ROLE OF DECISION-MAKING STYLES IN PREDICTING RESTING HEART RATE VARIABILITY

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Decision-making styles are general tendencies of behavior that influence daily life. Rational and intuitive styles had been related to better mental health, and, by contra, dependent, avoidant and spontaneous styles have been related to worse mental health. Heart rate variability (HRV) is used as a marker of executive and emotional control and health, and resting HRV in influenced by habits and lifestyle, as smoking or sedentarism, but there are not studies with decision-making styles. In consequence, this study aims to test if decision making styles predict resting HRV. A sample of 199 (119) participants fulfilled the GDMS in a laboratory and a questionnaire for controlling variables for the HRV. ECG was measured in resting conditions in order to extract frequency domain HRV variables. Results showed that intuitive style predicts High frequency HRV, while avoidant style predicts less Low frequency HRV. These results provide evidence that intuitive style is related to healthier resting cardiovascular levels. In contrast, avoidant styles are associated with worse resting cardiovascular levels. Results are discussed arguing why intuitive and avoidant styles are related to HRV but no rational, spontaneous and dependent styles.

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Keywords: Decision making style, Heart Rate Variability, Health, Intuitive, Avoidant

POSTER SESSION 1, No. 29

BRAIN ANTIOXIDANT DEFENSE IN IRON DEFICIENCY EVOLUTION DURING GROWTH STAGE

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Iron (Fe) is present in the brain from very early in life, participates in the neural myelination processes, it is required for proper myelination of the neurons used in sensory systems (visual, auditory) and learning and interacting behaviours. In addition, Fe is necessary by enzymes involved in the synthesis of the neurotransmitters serotonin (tryptophan hydroxylase) and dopamine (tyrosine hydroxylase). The objective of present study was to investigate influence of iron deficiency (ID) evolution over antioxidant defense in brain in growing rats.

Fe deposit in brain of ID rats is almost four times lower ($P<0.001$) at day 20 of ID. This lower Fe deposit was kept at day 30 ($P<0.001$), but there was a slight recovery of the Fe content in brain at day 40 ($P<0.05$) with regard to the previous periods. The ID can reduce the activity of Fe dependent enzymes, however, under our experimental conditions, the CAT and GPx activities among ID and control rats brain cytosolic fraction, did not differ. The brain therefore is a tissue that does not seem to depend on the iron levels for the maintenance of the mechanisms of antioxidant defense in the course of evolution of the ID during the first years of life.

Keywords: Iron deficiency evolution, Antioxidant defense, Brain

POSTER SESSION 1, No. 30

TRANSCRANIAL DIRECT CURRENT STIMULATION AS CHRONIC NEUROPATHIC PAIN TREATMENT: A PILOT STUDY N=1

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Neuropathic pain (NP) is a high disruptive pathology that is initiated by a primary lesion in the nervous system. Transcranial direct current stimulation (tDCS) is a non-invasive neuromodulation technique that has shown to reduce pain. This study counted with a resistant to treatment patient that manifested severe NP in the lower extremities and related sleep issues, moderate-high levels of anxiety and mild depression. The treatment was tDCS over the right primary motor cortex (C4) by means of 23 sessions of 20 min of anodal tDCS at 2mA intensity. As control, we included a sham simulation period of 2 weeks. The variables measured were pain levels and psychological state. The results showed a decrease of the pain levels when comparing before and after each session that were maintained until the end of the stimulation. The depression scores decreased and correlated with pain levels. Hence, this stimulation protocol seems to be a suitable treatment for neuropathic pain.

Supported by MINECO-FEDER grants: PSI2014-55785-C2-1-R and PSI2017-86847-C2-1-R) and UAL Transfiere grant: TRFE-BT-2018/003

Keywords: Neurophatic Pain, neuromodulation, tDCS

POSTER SESSION 1, No. 31

BORDERLINE PROCESSING SPEED AND BEHAVIORAL ALTERATIONS IN CHILDREN UNDER 6 YEARS EXPOSEDTO GENERAL ANESTHESIA

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General anesthesia is necessary for the application of surgical procedures, however, in children under six whose brain development is still in process, it could cause neurotoxic effects because some anesthetics alter the function of GABA and NMDA receptors crucial for synapse and other processes linked to brain development. IQ and behavior patterns from childhood are vital for the further development. The aim of this research was to evaluate the IQ and identify behavioral changes in children under six years exposed to general anesthesia. We used the Weschler abbreviated preschool intelligence scale (WPPSI III) and the Child Behavior Checklist (CBCL). We found that children exposed to general anesthetics obtained a meanprocessing speedof 76 and exhibited behavioralcharacteristics of hyperactivity, low tolerance to frustration, failures in followingorders and irritability. According to the parents, those behaviors were not presentat all or were present slightly before their children underwent the surgicalprocedures. We concluded that the application of general anesthetics to childrenunder six years of age may negatively influence IQ and behavioral traits, processesthat are necessary for long-term academic, social and emotional development.

Keywords**:** processing speed, CBCL, WPPSI, neurotoxicity linked to generalanesthetics.

POSTER SESSION 1, No. 32

STRESS, DEPRESSION AND THE HIPPOCAMPUS: MODULATORY EFFECTS OF CONTINUOUS LPA TREATMENT

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The LPA_1, one of the six characterized G protein-coupled receptors ($LPA_{1–6}$)through which lysophosphatidic acid acts may be involved in promoting normal emotional behaviors. Evidence also imply a role for the LPA_1 receptor in mediating the consequences of stress on the hippocampus. However, to date, there is not available information regarding the mechanisms whereby the LPA_1 receptor mediates this adaptation. Changes in glutamate/GABA cycling could be one possible mechanism. To gain further insight into how LPA-LPA_1may prevent the negative consequences of chronic stress, we assessed the effects of chronic ICV administration of LPAon depressive-like behaviours induced by a chronic restraint stress protocol. Then, gene expression for molecular markers for excitatory and inhibitory neurotransmission was determined. In addition, the hippocampal expression of mineralocorticoid receptor and glucocorticoid receptor genes and proteins were determined, as well as plasma corticosterone levels. Contrary to expectations, the continuous delivery of LPA in chronically stressed animals instead of inhibiting, potentiated some, though not all, negative effects of stress. Furthermore, this treatment induced as well altered the excitatory/inhibitory balance in the ventral hippocampus. In conclusion, the results of this study reinforce the assumption that LPA, mainly through the LPA_1 receptor, regulates hippocampal-dependent behaviour and functions.

Funding: This study was supported by Consejería de Economía, Innovación, Ciencia y Empleo, Junta de Andalucía (SEJ1863 to C.P.; CTS-643 to G.E.-T), Ministerio de Economía y Competitividad and the European Regional Development Fund (PSI2017-83408-P to C.P.), Consejería de Salud de la Junta de Andalucía (NICOLÁS MONARDE Program to G.E:T) Ministerio de Educación, Cultura y Deporte (FPU14/01610 to R.D.M.-F.; FPDI2010 to C.R-V. (Junta de Andalucía) and intramural funding from the EPFL to C.S.

Key words: lysophosphatidic acid, LPA, chronic stress, animal models of depression, hippocampus

POSTER SESSION 1, No. 33

ERP response to cued threat in blood-injection-injury (BII) phobia and snake phobia

Juan Pedro Sánchez-Navarro[1,2], José María Martínez-Selva[1,2], Vladimir Kosonogov[3], Ginesa Torrente[1,2], Eduvigis Carrillo-Verdejo[1,2], Sara Pineda[4]

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Phobia-related pictures signalled by a preceding cue provoke an increase in short and long latency ERPs in animal phobia. However, it is unknown whether this effect appears also in BII phobics, since previous research has reported a lack of attentional bias when they are exposed to mutilation pictures. For this purpose, we selected 13 BII phobics, 12 snake phobics and 14 non-phobic participants. The experimental task consisted in an S1-S2 paradigm: S1 was a word signalling the content of the upcoming picture appearing 3s later (S2: mutilations, snakes or household objects). We recorded the EEG activity from 28 locations. The signal was filtered out, epoched, baseline corrected, and artefacts exceeding 100 μV were rejected. Our results showed that BII phobia participants did not show differences in P2 depending on the picture content, whereas in the other groups, mutilations and snake pictures provoked larger peak amplitudes than neutral ones. These data reveal that the anticipation of the phobic object leads to an automatic withdrawal of attention in BII phobics, which may be related to a failure in the mechanisms of emotion regulation in the form of an automatic overregulation.

Supported by Ministerio de Economía y Competitividad, PSI2012-34441 and PSI2015-66769-P

Keywords: Blood-injection-injury phobia, Animal phobia, Threat cue, ERPs

POSTER SESSION 1, No. 34

PERCEIVED HEALTH, WALKING SPEED AND COGNITIVE DECLINE IN OLDER PEOPLE

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The Short-Form-36 (SF-36) Health Survey has been widely used to measure perceived health status in different pathologies. In addition, walking speed is an indicator of health status, and is related to cognitive function. Our aim was to analyze the relationship between perceived health, walking speed, and cognitive decline in older people. To do so, at baseline and at 4 years follow-up, 87 older people (49.4% female) from 59 to 81 years of age completed the SF-36 to measure eight dimensions of perceived health status: physical functioning (PF), social functioning (SF), physical role (PR), emotional role (ER), vitality (V), pain (P), mental health (MH), and general health (GH). In addition, we measured walking speed, and performance on different cognitive domains (global cognition, verbal and working memory, attention, and executive function). Our results showed that a worse perceived health on PF, SF, PR, ER, P, and GH, was related to executive functioning decline. Likewise, a worse perceived health on PF, SF, FR, MH, and GH, was related to verbal memory decline. Also, slower walking speed was related to a worse perceived health on PF and MH. No association was observed between walking speed and cognitive functioning. In conclusion, our results suggest that a worse perceived health status is related to executive functioning and verbal memory decline, and to slower walking speed in older adults.

Supported by the Spanish Education and Science Ministry with grant no., PSI2016-78763-P and the Generalitat Valenciana no. PROMETEOII2015/20.

Keywords: Perceived health, Walking speed, Cognitive decline, Older people

POSTER SESSION 1, No. 35

MODULATION OF HEDONIC (AND POSSIBLY MOTIVATIONAL) COMPONENTS OF REWARD BY ELECTRICAL STIMULATION OF THE NPBLE AND INTAKE OF NATURAL APPETIZING PRODUCTS

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Various authors have demonstrated that opiate substances not only carry a potential risk of dependency and tolerance but can also give rise to appetite and/or body weight control disorders, establishing a parallelism between these behavioral syndromes, which both involve a loss of control and compulsive seeking (craving). Thus, the activation of mu and kappa opiate receptors of the NPBle by electrical stimulation may have a modulatory effect on mechanisms related to taste, to the generation of satiety signals in relation to food intake, and to the generation of general affective states.

This study analyzes the effects of activating a system in which external signals (produced by the intake of appetitive products) may converge with internal signals (experimenter-administered intracerebral stimulation) to modulate incentive motivation and generate appropriate consummatory responses. Involvement of this system was studied by subjecting animals to a place task that allowed their classification into three groups (positive, negative, and neutral) following previously published behavioral criteria. In a second phase, the effect of electrical stimulation on the intake of sucrose and another appetitive product (biscuits) was examined. Results obtained are discussed in relation to the role of hedonic and/or motivational mechanisms related to the intake.

Supported by: Ministry of Education and Science (National R + D Plan BSO2003-06627, PSI2010-17400)

Keywords: Reward, opioids, Electrical Stimulation, External Lateral Parabrachial Nucleus (LPBe), intake.

POSTER SESSION 1, No. 36

PSYCHOPHYSICAL ESTIMATION OF CHEMICAL SENSES IN UNIVERSITY STUDENTS: COGNITIVE IMPLICATIONS ON SENSORY PERCEPTION

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Taste identification is influenced by experience and cognitive processes. The aim of this study is to explore the influence of the knowledge of the word “astringency” in flavor identification. 165 students were exposed to chemical substances representing the 4 basic flavors and of astringent substance. Knowledge vs. unknowledge of astringency, and restriction vs. satiety state were the two experimental conditions of this treatment design. As compared with subjects in which the word astringency was unknown, the identification of astringency was higher in subjects knowing the name of this sensation (77.8% vs. 20.8%, $p < .01$). Astringent substance was identified as bitter taste, or the identification was confused, in those participants without knowledge of this word (79.2%). These results were independent of the satiety or hunger state of the participants ($p = .104$). We conclude that theoretical concepts related to flavors can influence the process of taste perception. This should be considered in psychophysical studies on chemical senses perception to reduce false negatives (incorrect detection), particularly when flavors are erroneously named but physiologically correctly processed.

Keywords: Psychophysical measures, Taste perception, Astringency, Sensation and Cognition, University tasters

POSTER SESSION 1, No. 37

LONELINESS MEDIATES THE RELATIONSHIP BETWEEN SUBJECTIVE MEMORY COMPLAINTS AND COGNITIVE FUNCTION IN YOUNG PEOPLE.

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The subjective memory complaints are usually interpreted as indicators of cognitive decline or age-related cognitive disorders (Alzheimer's disease and other forms of dementia) in elderly people. On the other hand, the loneliness is negatively related to cognitive function, specifically to the immediate and long-term memory in elderly people. Despite this evidence among elderly people, little is known about the effects of subjective memory complaints and perception of loneliness on specific cognitive functions in young adults. The objectives of this study were: (i) to investigate the relationship between loneliness and cognitive function (attention and memory) in young people and (ii) to explore the mediated role of loneliness in the relationship between subjective memory complaints and attention and immediate and long-term memory. Participants were 82 volunteers (42 men and 40 women) aged 18-34 years (mean= 22.24 ± 3.74). Results showed that lonelinesswas negatively correlated withattention and long-term memory. In addition, loneliness mediated the association between subjective memory complaints and cognitive function, specifically attention and long-term memory but not immediate memory. This study shed light on the relevance of the loneliness in the relationship between subjective memory complaints and cognitive function in young adults.

Founding source: PSI2016-78763

Keywords: loneliness, subjective memory complaints, attention, memory, old people

POSTER SESSION 1, No. 38

RELATIONSHIP BETWEEN RESILIENCE AND THE PSYCHOBIOLOGICAL RESPONSE TO STRESS: THE MEDIATING ROLE OF COPING STRATEGIES

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Resilience or the ability to overcome adversity, to face stressful demands and experiences has been strongly associated with successful aging, health and the development of coping adaptive behaviours. However, more research is needed to advance in the knowledge of strategies employed in coping social stress. Thus, we aimed to investigate whether resilient people use more active than passive coping strategies to deal with a stressful situation. For this, 66 older people (31 men and 35 women) from 56 to 75 years old were exposed to TSST or a control situation. Their stress response was analyzed at endocrine (cortisol) and psychological (anxiety) levels. In addition, we measured resilience, coping strategies and perceived stress of the participants. For the stress condition, moderated mediation analysis showed a conditional indirect effect of resilience on cortisol reactivity through active coping. However, passive coping strategies did not mediate the relationship between resilience and cortisol reactivity. Neither active nor passive coping mediated the relationship between resilience and anxiety response. These results show that resilience is associated with active coping strategies which in turn could explain, at least in part, interindividual differences in the cortisol response caused by a psychosocial laboratory stressor.

Founding source: PSI2016-78763

Keywords: resilience, coping strategies, TSST, cortisol, anxiety

POSTER SESSION 1, No. 39

HIPPOCAMPAL DEPENDENT MEMORY IS RESCUED BY GIRK ACTIVATION IN A MOUSE MODEL OF AMYLOIDOPHATY

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Neuronal hyperexcitability occurs early in the pathogenesis of Alzheimer's disease (AD) induced by amyloid-β (Aβ) peptides. One important mechanism for neural excitability control relies on G-protein-gated inwardly rectifying potassium (GirK) channels, which hyperpolarize neurons in response to many G-protein-coupled receptors activation. In a model of acute amyloidosis generated by $A\beta_{1-42}$, we studied in vitro, by electrophysiological recordings and molecular biology techniques, and in vivo, by behavioral testing combining with electrophysiology, the role of GirK channels on hippocampal long-term synaptic potentiation (LTP), the cellular correlate for memory formation. Our results suggest that GirK channels constitute a useful tool able to assure LTP induction in the hippocampus and subsequent memory formation in an amyloidopathy.

Supported by Ministerio de Ciencia, Innovación y Universidades (BFU2014-56164-P and BFU2017-82494-P to JDNL and LJD) and Fundación Tatiana Pérez de Guzmán el Bueno (LJD).I.S.R. held a fellowship from Plan Propio de Investigación of the UCLM.

Keywords: LTP, hippocampus, amyloid-β_{1-42} peptide, GirK, in vivo, in vitro

POSTER SESSION 1, No. 40

ATTENTIONAL CAPTURE IN BLOOD-INJECTION-INJURY (BII) PHOBIA AND SPIDER PHOBIA

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We studied the attentional capture provoked by the phobic object and other non-feared contents in 15 BII phobics, 14 spider phobics, and 16 non-phobia participants. The task consisted in a digit categorization task during the presentation in the background of mutilation, human attack, spider and neutral pictures. We used 30 pictures per category and constructed 240 trials (60 per picture category). Each trial lasted for 350 ms, with an intertrial interval of 3000 ms. During the task we recorded the EEG activity from 64 locations. ERPs were obtained as the local peak amplitude for P2 (150-260 ms), P3 (300-450 ms) and LPP (500-650 ms). Our results revealed larger P2 amplitudes for mutilations and neutral trials, followed by human attack and spider trials, but no significant differences between groups were found. Mutilation pictures provoked larger LPP amplitudes than spider and human attack pictures in BII phobics and control participants. These results revealed that the phobic object did not capture attention in a greater extent than other affective contents, as shown by P2, while mutilation trials provoked an overregulation in BII phobics, as reflected by LPP amplitudes.

Supported by Ministerio de Economía y Competitividad, PSI2012-34441 and PSI2015-66769-P

Keywords: Blood-injection-injury phobia, Attentional capture, ERPs

POSTER SESSION 1, No. 41

HYPOTHALAMIC AND THALAMIC AREAS C-FOS EXPRESSION RELATED AND TASTE FAMILIARITY PROCESSING IN RATS

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The behavioral protocol used to assess taste recognition memory in rats involves repeated presentation of a novel tasting solution so that drinking behavior increases as the taste becomes familiar. The thalamic parvocellular ventral posteriormedial nucleus (VPMpc) and paraventricular nucleus (PVT) have been related with taste processing and drug-reward/food intake, respectively. Likewise, the lateral hypothalamus (LHA) is well known to be a regulatory center for motivated intake behavior in rats. In the present exploratory experiment we use c-Fos immunohistochemistry to assess the activity of VPMpc, PVT and the perifornical region of HLA (PeFLH) as a function of taste familiarity. Three groups of naïve adult male Wistar rats (n=35) were exposed to a saccharin solution (0,5%) and assigned to the group Novel (one exposure), Familiar I (two exposures) or Familiar II (six exposures). A control group drank water. After being euthanized 90 minutes post-trial, c-Fos inmunohistochemistry was performed. The number of Fos positive cells tended to be selectively higher in VPMpc during drinking the novel taste, PVT exhibited the highest drinking-related activity with no effect of taste or familiarity and no differences was found in PeFLH. Further research in other hypothalamic nuclei is needed.

Grants PSI2014-57643-P and PSI2017-86381-P (MINECO, Spain) and FPU16/06017 (MECD, Spain).

Keywords: thalamus, hypothalamus, c-Fos, neophobia, taste memory.

POSTER SESSION 1, No. 42

BLOCKING ESTRADIOL RECEPTORS IN DIFFERENT POSTNATAL PERIODS ALTERS POMC EXPRESSION IN MALE AND FEMALE RATS

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It is well known that the hypothalamic circuits that regulate food intake are programmed during the early stages of development mainly by leptin, but estradiol plays a role in the regulation of metabolism at least in adult (Bouret et al, 2004, Asarian and Geary, 2013; Lopez and Tena, 2015; Mauvais-Jarvis et al., 2013). Our previous reports show a modulatory effect of estradiol on alterations induced by malnutrition, when it is administered during the second week of life, from postnatal day (P) 6 to P13 (Carrillo et al., 2016; 2017; Pinos et al, 2018). Moreover, this modulation has differential effects in males and in females in the case of overnutrition. Males seem to alter physiological parameters and females show an alteration in the anorexigenic peptide proopiomelanocortin (POMC). The objective of the present study was to determine if estradiol is involved in the normal programming of energy metabolism in rats and in which period would exert this modulatory role. To address this question, estrogen receptors (ER) α, ERβ and GPER were blocked by their specific antagonists MPP, PHTPP and G15, respectively, in two early postnatal periods: from P1 to P5 or from P6 to P13. Hypothalamic POMC mRNA levels at P90 were studied. We found that blocking ER receptors from P1 to P5 did not have any effect neither in males or females but blocking ER from P6 to P13 significantly decreased hypothalamic POMC mRNA levels in females. Data suggest that estradiol could differentially participate in the programming of the expression of POMC in females and emphasize that it is essential to include both males and females in metabolic studies.

Work supported by Grant: PSI2014-57362-P and PSI2017-86396-P (PC and HP); BFU2014-51836-C2-2; CIBEROBN (JAC).

Keywords: Estradiol, Estradiol receptors, energy metabolism programming, POMC, sex differences.

POSTER SESSION 1, No. 43

CALORIC RESTRICTION CHANGES MONOAMINERGIC NEUROTRANSMISSION AND METABOLIC HORMONES IN AGED RATS

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Monoaminergic neurotransmission and hormone levels, such as insulin and leptin, decline with age. It has been demonstrated that caloric restriction (CR) may improve general health and one of the proposed underlying mechanismsis attenuationof age-dependent metabolic hormonal dysfunctions, which, in turn, may rescue brain monoamine decline. The present study analyzed in 4-month adult rats and 24-month old male Wistar rats that were fed either ad libitum (AL) or maintained on a 30%CR diet from four months of age, the changes in brain monoamine levels and metabolic parameters. Noradrenaline (NA), dopamine (DA), serotonin (5-HT) and its metabolite levels were determined using high-performance liquid chromatography with electrochemical detection (HPLC-ED) in nine brain regions (cerebellum, pons, midbrain, hypothalamus, thalamus, hippocampus, striatum, frontal cortex and occipital cortex). In addition, blood plasma levels of hormones such as corticosterone, insulin, leptin, insulin-like growth factor 1 and basal metabolic parameters (Cholesterol, Glucose, Triglycerides, Albumin, Low-density lipoprotein, Calcium, and High-density lipoprotein (HDL-c)were analyzed by enzyme-linked immunosorbent assay (ELISA). The results showed that CR rescued DA levels altered by aging in the striatum and changed 5-HT levels in the striatum, hypothalamus, pons and hippocampus and restored the blood levels of insulin, leptin, calcium and HDL-c. Such results suggest that a dietary intervention as CR may exert some beneficial effects, at least in part, on health and cognition byrecovering metabolic parameters and brain monoamine concentrations.

Supported by Ministerio de Economía y Competitividad (PSI2017-84290-R)

Keywords: dietary intervention, HPLC-ED, monoamines, ELISA.

POSTER SESSION 1, No. 44

THE HIPPOCAMPUS: SPATIAL REPRESENTATIONS IN PRIMATES, AND THEIR UTILITY FOR THE STORAGE AND RECALL OF MEMORY

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The spatial representations provided by single neurons in the primate hippocampus will be described. Spatial view cells in macaques respond to locations being viewed "out there", and convey little information about the place where the animal is located, or about head direction, or about eye position. Some spatial view cells combine information about the location being viewed with information about the objects or rewards at each location, and provide a basis for understanding episodic memory in primates, including humans. Video animations of these neurons will be shown.

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POSTER SESSION 2

Thursday, 30th May, 2019

(17:15 – 17:45h)

POSTER SESSION 2, No. 45

INDIVIDUAL DIFFERENCES IN ENDURANCE IN THE RUNNING WHEEL ARE RELATED TO PREFERENCE FOR ACTIVE REINFORCERS: INVOLVEMENT OF DOPAMINE ACTIVITY

Andrea Martínez-Verdú[(1)], Régulo Olivares-García[(1)], Carla Carratalá-Ros[(1)], Paula Matas-Navarro[(1)], Jose Hidalgo-Cortés[(1)], Simona Porru[(2)], John D. Salamone[(3)] and Mercè Correa[(1,3)].

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Motivated behavior is characterized by high levels of behavioral activation, vigor, and persistence. Nucleus Accumbens (Nacb) dopamine (DA) regulates behavioral activation and effort-related decisión-making. It has been shown in rats that selection of effortful operant options correlate with DA activity in Nacb. In the present group of studies, we evaluate the relationship between individual differences in endurance in voluntary wheel running, Nacb DA related markers, and selection of reinforcers with different behavioral activation and effort requirements. CD1 male mice were allowed to run for two hours during 4 weeks. High and low running groups were determined using the two extrem quartiles. After training, animals were assessed in a T-maze where they freely interacted with 3 reinforcers during 15 minutes: a RW, sweet pellets, or a floral odor. High runners spent significantly more time in the RW, and less time in contact with the sedentary reinforcers (food and odor) compared to low runners. Phosphorilation of DARPP-32 at Thr34 was lower among high runners pointing to a reduction of DA activity in D_2 containing neurons. These results suggest that differences in basal levels of voluntary exercise are related to preferences for reinforcers that require high levels of activation and effort.

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Keywords: Dopamine, Accumbens, Effort

POSTER SESSION 2, No. 46

SOMATOSENSORY GATING IS MODULATED BY TRANSCRANIAL DIRECT CURRENT STIMULATION

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Transcranial direct current stimulation (tDCS) is a non-invasive technique known to modulate brain excitability. Although, its effects on behavioral and cognitive performance have been extensively examined, little is known about the effects of this neuromodulatory technique on brain activity. In addition, it is not clear if electrical stimulation of other brain regions different to the motor and prefrontal cortex would also modulate its excitability. The major goal of this study was to examine the influence of tDCS on sensory gating (capacity to suppress irrelevant incoming inputs) by using somatosensory event-related potentials (ERPs) elicited by repetitive non-painful tactile stimulation (paired-pulsed task). Forty healthy youths aged between 18 and 26 participated in the study, and were randomly assigned to two different groups: tDCS or SHAM (non-electrical stimulation). Somatosensory ERPs were recorded while the participants received a train of two identical pneumatic stimuli (100ms duration, separated by an inter-stimulus interval of 550 ± 50ms) on both forefingers. Somatosensory ERPs were twice recorded: before and after brain stimulation. The difference between the somatosensory ERPs amplitude elicited by S1 and S2 was computed as a sensory gating measure. Amplitudes of P50 and N100 components and late positive complex (LPC) were determined and statistically compared by using the *brain stimulation groups* as between subject and the *recording time* (pre vs. post) and *brain localization* (frontal, central and parietal) as within-subject factors. Greater attenuation of LPC amplitude from S1 to S2 (sensory gating) were observed in the tDCS group compared to the SHAM group at frontal and central electrode localizations. These findings suggested that tDCS might modulate the excitability of the somatosensory cortex by improving the inhibitory mechanisms elicited in response to repetitive somatosensory stimuli during late stages of information processing, specifically modulating the activity of frontal and central brain areas.

This work was supported by a grant (#PSI2017-88388-C4-1-R) from Spanish Minister of Science and European Regional Development Funds (ERDF).

Keywords: Transcranial direct currentstimulation, somatosensory cortex, sensory gating, information processing, inhibitory mechanisms.

POSTER SESSION 2, No. 47

COMBINED COCAINE AND ALCOHOL INTRAVENOUS SELF-ADMINISTRATION IN YOUNG ADULT RATS: A METABOLOMICS APPROACH

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Simultaneous consumption of cocaine and alcohol is a widespread pattern, especially among adolescents. When both drugs are consumed together a main metabolite that appears is cocaethylene, but there are studies in humans and animal models that has focused on discovering other possible metabolites pointing toward the involvement of amino acids as possible addiction and toxicity biomarkers. In this work we assessed combined cocaine (1mg/kg injection) and alcohol (133mg/kg injection) intravenous self-administration behavior (21 daily sessions, FR1, 120 min) and analyzed its possible relation with the profile of fourteen blood plasma amino acids. Sixty male and female young-adult Wistar rats were assigned to three treatment groups: cocaine-alcohol, cocaine and saline. Plasma samples were analyzed by capillary electrophoresis with laser-induced fluorescence (CE-LIF). The results showed an effect ofself-administration Day, Treatment and their interaction in response rate. Sex dimorphism was also found in acquisition of self-administration behavior and someconcentrations and ratios of amino acids.

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Keywords: Cocaine-alcohol, self-administration, rats, metabolomics, amino acids.

POSTER SESSION 2, No. 48

PREMATURE AND TERM-BORN CHILDREN: ANALYSIS OF VISUOSPATIAL MEMORY AND GENERAL DEVELOPMENT

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Preterm children (< 37 weeks of gestation) have more risk of suffering neuropsychological alterations. However, visuospatial memory has not been studied as much as other functions in this population. We aim to analyze short-term and working visuospatial memory, as well as general developmental stage, in term-born and premature children at 12 month-old and to analyze if there is a relationship between visuospatial memory and cognitive, fine motor skills, eye-hand coordination and general developmental stage. 10 term-born and 18 premature children were recruited (12 month-old). We used an experimental task to assess spatial memory for single location, spatial memory delay, and flexible spatial memory. The Merrill-Palmer R Scale were employed to evaluate development. We have found significant differences between premature and term-born children in cognitive and general development stage, but not in memory scores. We found significant correlations between developmental index and spatial memory in both preterm and term-born babies. Preterm babies show similar performance in spatial memory, but delays in cognitive and developmental measures, compared to those born at term.

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Keywords: premature children, term-born children, visuospatial memory, general developmental stage.

POSTER SESSION 2, No. 49

BRAIN EXCITABILITY DURING AFFECTIVE PROCESSING IN CHILDREN WITH CEREBRAL PALSY

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Cerebral palsy (CP) is a chronic motor disorder beginning at early childhood and caused by injury in the baby's brain during the pregnancy, the birth giving or even the early months of life. Although CP is predominantly a motor disorder, it is also characterized by sensory and cognitive deficits. Previous literature has reported lower emotional competence in children with CP. Nonetheless, little research has examined brain correlates of emotional/affective processing in children with CP.This study examines if brain processing of affective information is altered in children with CP in comparison with typically developing peers (TDP). Evoked-related potentials were recorded in 16 children with PC and 14 TDP (age range=6-12 years) when viewing pleasant (e.g., happy faces, sports, family, wildlife scenes), unpleasant (e.g., sad and angry faces, scenes with people crying) and neutral (e.g., domestic objects)pictures selected from theInternational Affective Picture System (IAPS). In addition, participants were asked to rate valence and arousal of each picture. Children with CP showed significant amplitude reductions of early components of the evoked potentials (P100 and N200) over occipital electrode locations in response to affective stimuli. Children with CP rated pictures with affective content (pleasant and unpleasant) as less arousing, and neutral pictures as more pleasant, than their TDP. The pictures with emotional content produced less activationin children with CP, both at the behavioral and brain levels.These differences were found in early latencies of brain processing which could be related to alterations in the detection of emotionally relevant stimuli.

Keywords: Cerebral Palsy, affective pictures, evoked potentials, emotions

POSTER SESSION 2, No. 50

CLINICAL UTILITY OF TWO AND THREE DIMENSIONAL VISUO-CONSTRUCTIONAL TASKS IN MILD COGNITIVE IMPAIRMENT AND EARLY ALZHEIMER'S DISEASE

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Background: Three dimensional visuo-constructional abilities have received scarce attention in early detection of dementia, and their diagnostic capacity is barely known in people with mild cognitive impairment (MCI). Objectives: The aim of this study was to compare the utility of two- and three-dimensional constructional tasks for early detection of MCI and early Alzheimer's disease (AD). In this study, we selected twenty patients with MCI and 14 who met AD diagnosis based on standard criteria. All patients were recruited from Lauro Wanderley University Hospital and the Aging Neuropsychology Service of Federal University of Paraiba (João Pessoa, Brazil). The neuropsychological performance of MCI and AD groups were compared with a group of 11 cognitively healthy subjects (HCs) using a standard neuropsychological battery and different two and three dimensional visuoconstructive tasks: Block Design (BD), Visual Puzzles (VP) and Tridimensional Block Construction (TDC). Results: The results indicated that MCI and AD groups scored significantly lower that HCs in all visuoconstructive tasks. However, no significant differences were found between the HC vs. MCI groups on these tasks. The Receiver Operating Characteristic (ROC) analysis showed that all visuoconstructive tasks achieved a good accuracy to discriminate between AD and HCs: BD [sensitivity (se) = .85, specificity (sp)= .90; Area under curve (AUC) =0.86], VP (se =.78 and sp =.72; AUC = 0.81) and TBC (se=. 71, sp = 100; AUC = 0.80). Moreover, BD (se =. 85, sp = .70; AUC = 0.764) and TBC (sensitivity .71, specificity = .80; AUC = 0.70) tasks showed a fair accuracy to differentiate between MCI and AD groups. Conclusion: These findings indicated that visuo-constructional abilities (two and three dimensional) are already impaired at the early stages of AD, but remain preserved in MCI individuals in comparison with healthy controls.

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Keywords: Constructional abilities, Visuospatial cognition, Three-Dimensional Block Construction, Mild cognitive impairment, Alzheimer's disease

POSTER SESSION 2, No. 51

ULTRASONIC CALLS OF RAT PUPS PRENATALLY EXPOSED TO ACID VALPROIC AND CHLORPYRIFOS

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Autism Spectrum Disorders (ASD) are characterized by deficits in social interaction and communication as well as repetitive behaviors or stereotypy. The etiological heterogeneity could be responsible for the symptomatology heterogeneity within the ASD spectrum. Among the environmental factors that increase the risk of developing ASD, prenatal exposure to contaminants has been documented. Organophosphorus pesticides in general, and chlorpyrifos (CPF) in particular, have been strongly related to the development of autism, or at least to the deregulation of social behavior. In order to analyze this behavior in pups prenatally exposed to CPF, the data will be compared with a control group and an animal model ASD (valproic acid) (VPA). For this, 25 females were exposed during 12.5GD, and their offspring passed the isolated from dam protocol on PND7 day. When analyzing the results, a treatment effect was found for the CPF and VPA groups, which allows us to provide evidence of a reduction of ultrasonic vocalizations (USV) characteristic of ASD. All experimental groups emit USV, so the reduction is not due to the phonetic device, it can be mediated by motivational causes.

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Keywords: Ultrasonic calls, Chlorpyrifos, Valproic acid, Prenatal, Autism

POSTER SESSION 2, No. 52

OPPOSITE EFFECTS OF TRANSCRANIAL DIRECT CURRENT STIMULATION (TDCS) ON SUSTAINED ATTENTION IN INDIVIDUALS WITH A HIGH AND LOW LEVEL OF DISPOSITIONAL MINDFULNESS

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Some studies suggest a link between mindfulness and attentional functioning. We tested the hypothesis that mindfulness might improve vigilance through enhanced prefrontal functioning. We compared the performance of 10 individuals with low and 10 individuals with high dispositional mindfulness (LDM vs HDM) under anodal direct-current stimulation of the right prefrontal region and in a sham condition. The stimulation improved vigilance performance in the LDMgroup and reduced it in the HDMgroup. No difference was found between the groups in the sham condition. The results fit with the view that lower mindfulness is associated with lower attentional functioning, such that individuals with low mindfulness benefit from the anodal stimulation of the right prefrontal region in a vigilance task. We hypothesize that individuals with high dispositional mindfulness might have directed more attention to the physical discomfort produced by the stimulation (e.g., itching), thereby reducing the attention directed to the task (and, consequently, performance in this task). In sum, our results suggest a positive link between dispositional mindfulness, prefrontal functioning and vigilance performance.

Funded by the BIAL Foundation (grant 178/14). Applicants: Fabrice Parmentier, Pilar Andrés, Mauro García-Toro, Javier Garcia-Campayo, Margalida Gili.

Keywords: Mindfulness, vigilance, tDCS

POSTER SESSION 2, No. 53

EFFECT OF EXECUTIVE PROBLEMS ON THE DIFFERENT TYPES OF SUBJECTIVE MEMORY COMPLAINTS

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Subjective memory complaints (SMC) can be defined as the self-assessment of forgetfulness or confusions related to information of daily life. Among all the cognitive functions, the executive functions(FFEE) seem to have a more relevant role to explain the SMC. However, there is evidence that the QSM are not homogeneous and that under this concept different types of memory problems are grouped. A total of 1120 participants were recruited (22.24 years, D.T. = 3.65), 49% men. The "Memory Failure of Everyday Questionnaire", composed of three factors: Recognition, Activities recall and communication monitoring, was administered. In addition, the “Prefrontal Symptom Inventory” was administered. The results showed that the variable that presented a higher proportion of variance explained by the executive problems was Activities recall (44%) followed by Communication monitoring (34%) and Recognition (27%). In this way, in the case of people with SMC related to activities recall, the improvement of cognitive functions should be considered as a measure to reduce their memory problems.

Keywords: Subjective, Memory complaints, Executive problems

POSTER SESSION 2, No. 54

IMPULSIVITY AND EXPERIENCE IN SPONTANEOUSLY HYPERTENSIVE (SHR) AND LEWIS (LEW) RATS

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Research shows that prolonged training in the impulsive task determines impulsive choice in nonhuman animals. This paper will extend the generality of this finding to the impulsive choices of Spontaneously Hypertensive (SHR)and Lewis (LEW) rats responding to a novel concurrent-chains procedure. Choice was measured on two levers concurrently available in the initial link, where two non-independent random interval schedules arranged entries to two terminal links. One terminal link delayed the delivery of the LL food (4-pellets) six times, with delays presented in random order within each session.The other terminal link delivered the SS food (1-pellet) immediately. The corresponding discounting functions were analyzed, looking for systematic changes in discounting rate and sensitivity to immediacy of reinforcement. Five models of intertemporal choice and the generalized matching law fitted the data from the SHRs and LEWs well. Discounting rate (k) and sensitivity to immediacy of reinforcement (*s)* increased as a function of prolonged training; estimates of *k* were positively correlated with estimates of *s*, suggesting compatibilities between models of choice. It is proposed that the behavior pattern labeled impulsivity changes with experience in the choice situation.

Key words: Delay discounting, impulsivity, experience, SHR.

POSTER SESSION 2, No. 55

THE MATCHING LAW FITTING DISCOUNTING DATA FROM THE SPONTANEOUSLY HYPERTENSIVE (SHR) AND WISTAR KYOTO (WKY) RAT

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Impulsive behavior characterizes attention deficit hyperactivity disorder (ADHD). The spontaneously hypertensive rat (SHR) shows impulsive behavior like that observed in humans with ADHD. The Wistar Kyoto (WKY) rat is the normotensive control of the SHR. We analyzed the impulsive choices of SHRs and WKYs responding to concurrent-chains schedules requiring locomotion, to identify behavioral determinants of impulsivity linked to ADHD. Choice was measured in two levers concurrently available in the initial link. One terminal link provided 1-food pellet without delay (SSF) and the other terminal link 4-food pellets (LLF) delivered after 0.1, 5, 10, 20, 40 or 80 s. These delays to LLF were presented in random order within each session. Entries to the terminal-link were arranged dependently, controllingfor a possible confound between frequency and delay to food delivery. The hyperbolic-decay model and the general form of the matching law described well delay discounting. Discounting rate and sensitivity to immediacy of reinforcement increased with increasing number of sessions. For the SHRs, estimates of *k* and *s* were higher than those corresponding to the WKYs. It is concluded that SHRs choose more impulsively that WKYs.

Key words: ADHD, SHR, WKY, impulsivity, choice.

POSTER SESSION 2, No. 56

INFLUENCE OF AN INGUINAL HERNIOPLASTY ON THE PHYSICAL AND MENTAL COMPONENTS OF HEALTH-RELATED QUALITY OF LIFE.

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BACKGROUND: Both, physical and mental components of health-related quality of life (HRQoL) are believed to be impaired in patients awaiting a surgery. However, the knowledge about the acute influence of such surgery on the physical and mental spheres of the patient's HRQoL is still scarce.

AIMS: i) To describe physical and mental components of HRQoL in patients awaiting an inguinal hernioplasty; ii) To explore the influence of such surgery on these components.

METHODS: Sixty-six patients (mean age: 55.2±12.1 years old, body mass index: 27.1±4.2 Kg/m^2, 11.2% female) were included in the present analyses. The physical and mental components of HRQoL were assessed by means of the 12-Item Short Form Survey (SF-12). The SF-12 ranges from 0 to 100, where higher scores indicate better quality of life.

RESULTS: The mean score in the SF-12 mental component was 41.3±6.1, and the mean score in theSF-12 physical component was 37.7±4.9. The inguinal hernioplasty promoted evidence of significant association on decreasing the SF-12 mental component by 2.05 points (SF-12 mental component in the post-test = 39.2±5.8 points, p=0.086). Contrary, the surgery promoted evidence of significant association on increasing the SF-12 physical component by 1.72 points (SF-12 physical component in the post-test = 39.4±4.8. points, p=0.076).

CONCLUSION: Both, physical and mental components of HRQoL were clearly impaired in these patients when compared to the reference values for the general population with the same age range and sociodemographic characteristics. The surgery seems to slightly improve the physical component of HRQoL, and to slightly decrease the mental component of HRQoL.

Key words: health-related quality of life; surgery; 12-Item Short Form Survey; postoperative;

POSTER SESSION 2, No. 57

EFFECTS OF CAFFEINE ON THE EXPRESSION OF ETHANOL-ELICITED CONDITIONED PLACE PREFERENCE AND CONDITIONED PLACE AVERSION

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Ethanol and caffeine are the most widely used psychoactive substances in the world. Although there are various epidemiological studies focusing on the association between caffeine and alcoholic beverages in order to reduce the intoxication state induced by high levels of ethanol, currently the effects of the combination of these two drugs on the establishment of motivational processes in animal models of drug addiction are still poorly investigated.

Thus, the aim of our research was to characterize the ability of caffeine to affect the motivational properties of ethanol in a behavioral paradigm of place conditioning. Specifically, this study investigated whether caffeine (3 and 15 mg/kg) may affect both ethanol (2 g/kg)-elicited conditioned place preference (CPP) and place-aversion (CPA) in male CD-1 mice. Following appropriate schedules of ethanol administration to distinct cohorts, mice developed significant CPP and CPA, respectively. Interestingly, whereas only the high dose of caffeine (15 mg/kg) prevents ethanol-elicited CPP, both doses (3 and 15 mg/kg) significantly impair the expression of ethanol-elicited CPA.

These data suggest that the previous administration of caffeine could be able to interfere with both positive and negative motivational properties of ethanol in a paradigm of associative learning.

Keywords: ethanol, caffeine, place conditioning, mice, drug addiction

POSTER SESSION 2, No. 58

AUTOANTIBODIES INVOLVEMENT IN THE NEURODEVELOPMENT OF ASD CHILDREN: PILOT BEHAVIORAL STUDY IN RATS

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Autism spectrum disorders (ASD) comprise a complex variety of neurodevelopmental disorders, characterized by: difficulties in communication, alteration in social interactions and restrictive, repetitive and stereotyped behavioral patterns. Previous studies have found IgG autoantibodies in the central nervous system of subjects with ASD and their mothers. We analyzed and isolated serum IgG fractions of thirty five children with ASD belonging to the Chilean Association of Parents of Autistic Children (ASPAUT). These autoantibodies IgG, both found in mothers and children with ASD, were injected intraperitoneally to pregnant Sprague-Dawley rats. The offspring were evaluated in spatial learning, direct and inverse, locomotor exploration and social preference. The results obtained showed that the offspring injected with mothers IgG had a slower spatial learning and a worse memory. In the open field task the mothers and ASD children groups showed greater motor activity and greater number of entries in the internal quadrants. No differences were found in social approximation task.

These preliminary results point to a possible negative effect of the IgG autoantibodies found in the serum of mothers of ASD children on cognitive development during pregnancy and provide new data that support the theories that suggest that ASD may be caused by an autoimmune disorder during neurodevelopment.

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Keywords: Autism, Antibodies, Immune system, Learning and Memory

POSTER SESSION 2, No. 59

CONCURRENT FLAVOR PREFERENCES INDUCED BY INTRAGASTRIC ADMINISTRATION OF PREDIGESTED DEXTRIN

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According to previous studies, animals appear to have the capacity to rapidly detect and recognize the presence of rewarding complex foods in the upper gastrointestinal tract. Thus, when animals undergo a concurrent flavor learning task, they manifest a clear preference for the nutrient-associated flavor after a few learning tasks. The objective of the present study was to determine whether this preference behavior is maintained when simpler foods (carbohydrates) are intragastrically administered. To this end, male Sprague-Dawley rats were subjected to a concurrent flavor preference task in which the intragastrically-administered nutritional stimulus was pre-digested dextrin. Results showed a significantly higher intake of the flavored stimulus paired with this carbohydrate than of the flavored stimulus paired with physiological saline. Unlike studies using complex foods, which require several learning tasks, significant differences were observed after one task alone. It therefore appears that when the food present in upper gastrointestinal tract is simpler, its identification is easier and quicker.

Keywords: rewarding foods, carbohydrates, upper gastrointestinal tract, rapid detection

POSTER SESSION 2, No. 60

ATTENUATION OF FLAVOR NEOPHOBIA DURING RAT LIFESPAN: EARLY AND ADULT STAGES

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Adolescence is a period of brain reorganization associated with unique behavioural features including search for novelty and high-risk behaviors together with increased vulnerability to stress. Taste neophobia and its attenuation (AN) in rats is used as a privileged model for studying novelty and stress responses. Preadolescent (N = 29), adolescent (N = 29) and adult (N = 22) male and female Wistar rats were exposed to a novel vinegar (3%) solution in 15 minutes daily sessions along 6 consecutive days. The results indicated that adolescent but not preadolescent rats exhibited taste neophobia while AN was slower in adolescent than in adult rats, as it requires two exposures instead of one.The reluctance to attenuate the neophobic response during adolescence might be caused either by an increased reactivity to the novel taste or by a reduced sensitivity to the safe consequences of taste exposure. Both explanations are consistent with increased amygdala reactivity to potentially aversive stimuli and reduced accumbens nucleus sensitivity to positive reinforcing evens. Further research is needed to understand the brain developmental changes involved.

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Keywords: Attenuation of Neophobia, Adolescence, Flavor, Taste, Rat.

POSTER SESSION 2, No. 61

ANTINOCICEPTIVE NEURAL MECHANISMS IN TELEOST FISH

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Mammals present refined neural mechanisms to perceive painful stimuli of the environment (nociception) and to modulate their effects (antinociception). Teleost fish also present nociceptive mechanisms, but the presence of the modulatory onesis not clear. In this work we tried to test whether fish present antinociceptive descendending mechanisms and if so, to identify their neural substrate. With this aim, we submitted goldfish *(Carassius auratus)* to formalin-induced nociceptive and to stress-induced analgesia procedures, and combined them with pharmacological and lesion techniques. Our results revealed that subcutaneous injection of formalin induced nociceptive responses, and that they were attenuated by immobilization-induced stress or by intracranial injections of morphine affecting the telencephalic area. However, lesions of the most rostral part of the dorsomedial telencephalic pallium (Dmr) produced an attenuation of the stress-induced antinociceptive effect. These results suggest that, as mammals, teleost fish may present a modulatory neural system mediated at least by endogenous opiates, in which Dmr might be involved, and that this system could have been appeared long time ago in the course of evolution.

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Keywords: antinociceptive mechanisms, fish, telencephalon, cerebral cortex evolution

POSTER SESSION 2, No. 62

PHYSIOLOGICAL RESPONSES TO MUSICAL DISSONANCE AND CHANGES IN TIMBRE.

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It is well known that the auditory system is more sensitive to tonal sounds, such as speech or animal vocalizations than noise. A recent study of tonal violations and changes in timbre showed that a musical dissonance cause a greater skin conductance response than a change in timbre. Nevertheless, it was unknown whether participants were actually conscious of dissonance due to their lack of musical experience or they generated unconscious physiological responses. The purpose of this research is to replicate this experiment adding a new experimental condition (a dissonance with change in timbre) and more physiological parameters such as frequency of Skin Conductance Response(SCR), cardiac (Heart Rate) and respiratory measures, as well as detecting the percentage of conscious/unconscious responses. Our results showed that *Timbre* (Mean=3,041, SD=1,334)had a higher frequency SCR than *Dissonance (*Mean=2,2917,SD=1,334) (*p*=0,026) and *Timbre_Dissonance* (Mean=0,147, SD=0,756)had a Heart Rate higher than *Dissonance*(Mean= -0,256, SD=0,436).No results were found with respiratory measures. In addition, participants only detected the 59,*3%* of dissonances. The nature of physiological responses to musical dissonance and changes in timbre are discussed.

Keywords: auditory changes, dissonance, timbre, Skin Conductance Response (SCR), Heart Rate (HR)

POSTER SESSION 2, No. 63

PERCEIVED STRESS IN CAREGIVERS OF CANCER PATIENTS ATTENDING AN INTERVENTION SUPPORT GROUP: RELATIONSHIP WITH CORTISOL LEVELS

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The role of informal caregivers induces chronic stress with harmful effects on physical and mental health. Our aim was to evaluate the effectiveness of exposure to cognitive-behavioral therapy in caregivers of cancer patients. The present study was carried out with 13 informal caregivers that received group therapy based in psychoeducation. Perceived Stress Scale (PSS), Zarit Burden Interview (ZBI), Memory Failures of Everyday Questionnaire (MFE-30) and cortisol levels were measured PRE- and POST-intervention.Scores obtained on ZBI, MFE-30 and PSS were higher PRE than POST-intervention although differences were non-significant.No differences in cortisol measures PRE and POST were observed. A positive correlation was obtained between PSS PRE- and ZBI score PRE and POST ($p<0.05$). In POST-intervention, a trend towards negative relationship between ZBI and cortisol ($p=0.08$) were observed. These results suggest that burden, perceived stress, and hormonal biomarkers could be applied in order to select subjects in which support groups interventions could be more effective.

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Keywords: Caregiver; cognition; stress; cancer; cortisol

POSTER SESSION 2, No. 64

COMPARISON BETWEEN PERCEIVED STRESS AND BURDEN ON CAREGIVERS OF CANCER PATIENTS AND ALZHEIMER'S DISEASE PATIENTS

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Caring for a chronic patient induces high levels of stress and burden. Our aim was to compare the consequences of caregiving in different samples of caregivers and its influence in other psychosocial variables. Sample includes caregivers of cancer patients (CC) (n=34) and caregivers of Alzheimer's Disease patients (CA) (n=36). All subjects completed the following tests: Zarit Burden Interview; Perceived Stress Scale; Rosenberg self-esteem Scale and Memory Failures of Everyday Questionnaire. Levels of burden and self-esteem were higher in CC than in CA group (p=0.005). CC displayed higher scores in perceived stress than CA although the difference did not reach statistical significance. No significant differences were obtained in subjective memory complaints between CC and CA groups. These results support previous studies indicating that the emotional impact of the caregiving task is higher in cancer caregivers than in dementia ones, but higher scores in self-esteem were also observed in this group. Future studies should explore other psychosocial differences and include biomarkers of stress in order to achieve more efficient therapeutic strategies.

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Keywords: Cancer caregiver, Stress, Burden, Alzheimer's disease

POSTER SESSION 2, No. 65

SELECTIVE ROLE OF THE INSULAR GRANULAR AND DISGRANULAR CORTEX IN AN EXPERIMENTAL DRINKING PROTOCOL

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Despite the large number of studies on it, the role of the insular cortex in the processing of interoceptive stimuli is not yet clear. Several studies have demonstrated the role of the insular disgranular gustatory cortex in the processing of a novel taste. However, there is little information that relates the insular granular visceral cortex with such processing.

The present study aims to explore the role of the insular granular and disgranular cortex in relation to the processing of taste neophobia. As an index of neural activation, the number of active c-Fos cells in adult Wistar rats was counted during the first presentation of a saccharin solution (Novel), the second exposure (Family 2) and the exposure on the sixth day (Family 6).

The results show an activation of the insular granular cortex during the presentation of water in the baseline compared to the control area. In addition, this activation was maintained with the passage of the presentations. The insular disgranular cortex showed a greater activation than the control area on the novel day, which goes along with previous investigations. The results obtained in the insular granular cortex could point to a relationship between this structure and the hydromineral processing.

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Key Words: Neophobia, c-fos, taste learning, insular cortex, rats.

POSTER SESSION 2, No. 66

EVALUATION OF THE POSSIBLE INVOLVEMENT OF THE PRIMARY SOMATOSENSORY TELENCEPHALIC PALLIAL AREA OF GOLDFISH IN MOTOR CONTROL.

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Recent neurobiological evidence shows that notwithstanding salient cytoarchitectonic differences a structure homologue to the cerebral cortex of mammals is also present in the telencephalon of teleost fishes. One of the most distinctive characteristics of the cerebral cortex is its organization in discrete primary unimodal sensory areas and in separate motor areas. However, the evolutionary origin of the cortical mechanisms for motor control is actually a matter of controversy. In the present experiment we evaluated if the area Dm4 of goldfish, which has been previously described as containing the primary somatosensory area (S1) of the pallium, is involved also in motor control. Goldfish were trained to acquire a complex sequence of goal directed movements, achievement that require variable postural adjustments and fine maneuvers of the fins as well as continuous coordination of axial musculature, fins and mouth. The results showed that the lesion of the somatosensory area of Dm4 does not produce any observable impairment in the execution of this learned complex goal-directed motor sequence. The implications of these results for the question of the evolution of the descendant pallial mechanisms of motor control in vertebrates will be discussed.

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Keywords: motor control, teleost telencephalic pallium, brain evolution.

POSTER SESSION 2, No. 67

EPISODIC-LIKE MEMORY IN TELEOST FISH: PAIRED-ASSOCIATES AND TRANSITIVE INFERENCE TESTS.

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Considerable agreement exists on the homology of the teleost fish lateral region of the telencephalic pallium (Dl) and the hippocampus of land vertebrates. Like in mammals, the teleost fish hippocampal homologue is involved in relational spatial memory, for example, it is essential to perform shortcuts and other spatial inferences. However, few data is available if the teleost fish hippocampus, like the mammalian hippocampus is involved in relational or "episodic-like" memories beyond the spatial domain. In the present experiment we trained goldfish on a set of four overlapping two-item sensory discrimination problems (premises paired associates: A>B, B>C, C>D, D>E) that could be encoded either separately or, because of the presence of a shared element, as a single representation of orderly relations among these discrete stimuli (A>B>C>D>E). The results showed that goldfish readily learned the premise pair discriminations and showed logical transitive inference capabilities when confronted with never experienced pairs of nonadjacent elements (A vs E or B vs D) during the probe tests. The involvement of the goldfish hippocampal pallium in this non-spatial relational memory capability and the implications of these results for the hypothesis of the evolution of episodic memory in vertebrates will be discussed.

Supported by Spanish MINECO and F.E.D.E.R grant PSI2017-84970-P.

Keywords: hippocampal pallium, episodic memory, hippocampus, brain evolution.

POSTER SESSION 2, No. 68

VOLTAGE-SENSITIVE DYE IMAGING OF GOLDFISH TELENCEPHALIC PALLIUM ACTIVITY PATTERNS DURING DELAY AND TRACE EMOTIONAL CONDITIONING.

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Recent evidences suggest that the telencephalic pallium (cortex) of teleost fishes includes both segregated sensory areas with functional properties that resemble those of the tetrapod isocortex and multimodal areas involved in the processing of fearful or unpleasant attributes of the stimulus as occurs to the amygdala and limbic structures of the mammalian brain. In mammals, different cortical regions, including sensory areas and limbic regions such as cingulate cortex, prefrontal cortex and amygdala show plastic changes and neural reorganization during emotional classical conditioning. In the present experiment we used voltage-sensitive dye imaging to analyze the spatiotemporal dynamics of goldfish telencephalic pallium activity during the acquisition and extinction of delay and trace heart-rate classical conditioning. The main finding of the present experiment is that the acquisition of a conditioned bradycardia response induces learning-dependent plastic changes in a wide neural network including several multimodal and unimodal pallial regions that are respectively comparable to the limbic and sensory cortex of mammals. The similarities and differences in the dynamic pattern of the goldfish pallial neural networks involved in delay and trace conditioning will be discussed.

Supported by Spanish MINECO and F.E.D.E.R grant PSI2017-84970-P.

Keywords: VSD imaging, teleost telencephalic pallium, classical conditioning, brain evolution.

POSTER SESSION 2, No. 69

PROCESSING OF NOCICEPTION IN THE TELEOST TELENCEPHALIC PALLIUM: FURTHER EVIDENCE ON THE IMPLICATION OF DIFFERENTIATED AREAS

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Increasing evidence shows that teleost fish possess a nociceptive system similar to those found in mammals, comprising shared molecular mechanisms and nociceptive pathways at spinal and supraspinal levels. But little attention has been paid to the possibility of a complex processing of nociception in the fish brain, leading to the widespread idea that fish responses to nociceptive stimuli are mediated by simple reflexive circuits at spinal level. However, recent evidence from our laboratory suggests that segregate regions of the goldfish telencephalic pallium process the emotional and discriminative aspects of these inputs. The aim of the present work is to further analyze the function of the Dm2, Dm3 and Dm4 areas. Lesions and inactivations of Dm2 but not Dm4 area interfered with the acquisition of an emotional response in a classical conditioning paradigm. Accordingly, the activation of Dm2 but not Dm4 area by means of electrical microstimulation as unconditional stimulus was sufficient to induce the acquisition of a conditioned response when paired with an auditory stimulus. Dm4 has been previously related to discriminative aspects of somatosensory stimulus, including nociception. Thus, the present work supports the role of Dm2 but not of Dm4 in the distinct processing of nociception, being Dm2 mainly involved with the emotional aspects. The implications of these results for the questions of the functional organization of the teleost telencephalic pallium and the evolution of nociception mechanisms will be discussed.

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Keywords: fish; nociception; evolution.

POSTER SESSION 2, No. 70

APP-THERAPY FOR DISABILITY

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The aim of this study was to analyze the effectiveness of app-therapy, help to restructure goals, find purposes, reduce depression, manage anxiety and improve satisfaction and psychological well-being with disability adults. This study was composed of 34 participants, 18 men and 24 women with a mean age of 33 years who were recruited in the Federation of People with Physical and Organic Disability of Granada (FEGRADI). The participants were randomly assigned to one of two groups (experimental or waiting list control). Sociodemographic and Disability Interview and Mini Mental State Exam (Lobo, Saz & Marcos, 2002) were used to determine the inclusion criteria. For data collection, the following instruments were used before and after the app-therapy: Beck Depression Inventory (Beck, Steer & Brown, 1996), State-Trait Anxiety Questionnaire(Spielberger, Gorsuch & Lushene, 2008), Psychological Well-Being Scale (Sánchez-Cánovas, 2013)and Vital Satisfaction Scale (Atienza, Balaguer & García-Merita, 2003). The experimental group included an 8-week mobile phone consists of a mobile phone application. App-therapy participants(experimental group) made daily report about program activities related to their goals. We found that app-therapy with disabilities has been useful because it reduces levels of anxiety and depression and improves satisfaction and psychological well-being.

Key words: app-therapy, disability, satisfaction, well-being

POSTER SESSION 2, No. 71

THE ROLE OF THE DIFFERENTIAL OUTCOMES-BASED FEEDBACK ON PROCEDURAL MEMORY

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Different studies on memoryhave demonstrated that the differential outcomes procedure (DOP) is a tool that improves performance in memory and learning tasks since it booststhe speed of acquisition and generate an improvement in the final execution of the task. Studies with humans to date have focused mainly on declarative memory system or working memory. Here we gather the results of the first study that measures the effects of DOP on procedural memory. An information-integration category-learning task was designed, where the subjects had to learn in a procedural way if a stimulus called Gabor belonged to categories A or B. Participants were randomly assigned to two groups: one group received the reinforcers for correct categorizations differentially, one for each category (the differential outcomes procedure, DOP), and the other group received thereinforcers randomly (the non-differential outcomes procedure, NOP).The participants of the differential group showed a better procedural learning in the categorization task, compared to no differential group. Moreover, those participants of the DOP group developed more optimal strategies, compared to the NOP group.These results extend the benefits of the differential outcomes-based feedback to non-declarative memory tasks.

Keywords: category learning, procedural memory, differential outcomes procedure, information-integration task

POSTER SESSION 2, No. 72

COMPARISON PROCESS DECREASES THE EFFECTIVE SALIENCE OF UNIQUE ELEMENTS IN RATS PERCEPTUAL LEARNING

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Findings from perceptual learning studies using a short interval between presentations of two similar stimuli have shown the Intermixed/Blockedeffect and suggest that stimulus comparison is critical for explaining this phenomenon in human and non-human subjects. Comparison in humans has been explained in terms of better processing of the unique elements. This processing bias would allow the formation of associations between the units activated by the unique elements facilitating the formation of a better memory representation of the stimulus. It is expected that a better represented stimulus would not only become more discriminable but will also suffer a loss of effective salience. In order to test this last prediction we ran an experiment with rats as subjects with a taste aversion paradigm, using a short interval between exposures to the stimuli. The results showed that there was a reduction in effective salience of the unique elements after intermixed preexposure in comparison with blocked preexposure. This is at odds with what is usually found in animals when using the standard procedure involving a long interval between exposures to the stimuli.The results are discussed in terms of the different mechanisms underlying perceptual learning, which seem to depend on the details of the task.

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Keywords: Perceptual Learning, Intermixed/Blocked Effect, Effective Salience, Unitization, Overshadowing Effect.

POSTER SESSION 2, No. 73

INDIVIDUAL CHRONOTYPES MODULATE THE IMPACT OF ALERTNESS ON COGNITIVE CONTROL

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A puzzling interaction between alert network and the cognitive control network has generated an interesting field of research for cognitive psychologists of attention in recent years. The pattern of this interaction consists of faster performance but greater distractor influence on alert than on no-alert trials, what has been interpreted as impairment of the executive network as a consequence of alertness. Although different explanatory models have been proposed, these results are still poorly understood. From the field of behavioral chronobiology it has been studied how healthy adults show different levels of alertness along the day that vary depending on their chronotype. This study aims to ascertain if the individual chronotype, that is, the individual differences in the time of day preferences, could modulate this pattern of results. This approach could help understand the nature of this counterintuitive interactionby dissociating the phasic alert (given by the tone) and the tonic alert (controlled by the time of day).

Keywords: Cognitive control, Alertness, Chronobiology

POSTER SESSION 2, No. 74

CASE SERIES OF BENZODIAZEPINE USERS IN PORTUGAL: ASSESSMENT OF GENERAL COGNITIVE ABILITIES AND SEX-RELATED EFFECTS

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Benzodiazepineslong-term use has been linked to deficits in cognitive domains with sex-related differences. In Portugal, these effects have not been assessed.We aimed to examine the general cognitive functioning in long-term users of benzodiazepines and explore potential sex-related differences.

A neurocognitive protocol (comprising the MoCA, IFS, Corsi Blocks-Tapping Task, TMT, and semantic and phonemic fluency tests), was administered to examine the cognitive abilities of subjects who had a minimum period of benzodiazepine use of 1 year. Due to a small sample size (n_{women} = 8, n_{men} = 2), we used a case-series approach.

The neuropsychological test performance was as follows: four participants (3 women, 1 man) had *MoCA* scores at least one standard deviation (*SD*) below the normative mean; three (2 women, 1 man) had *semantic fluency* scores at least one *SD* below the normative meanand one woman scored one *SD* below the mean on*phonemic fluency*. Performance in the remaining scores was not affected.

Benzodiazepine long-term use seems to negatively affect mainly the language domain, particularly in women. The results suggest the importance of conducting further research, comprising a larger and a non-users samples.

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Keywords: Benzodiazepines, Cognitive functioning, Neuropsychology, Sex differences

POSTER SESSION 2, No. 75

ELECTROPHYSIOLOGICAL CORRELATES OF THE DIFFERENTIAL OUTCOMES EFFECT UNDER CONDITIONS OF NON-CONSCIOUS PROCESSING

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The Differential Outcomes Procedure (DOP) facilitates the learning and retention of conditional symbolic relationships (for a review, see Mok, Estévez, & Overmier, 2010). This procedure entails reinforcing each correct choice response to a particular stimulus-stimulus association with a unique and specific outcome. In the present study, we examined modulations of the event-related brain potentials (ERPs) under two experimental conditions, differential vs. non-differential outcomes, in a group of university students performing a delayed visual recognition memory task. We conducted two experiments in which both the sample stimuli (Experiment 1) and the outcomes (Experiment 2) were presented under non-conscious conditions. Results from both experiments revealed improved perfomance under the DOP conditions. In addition, we found significant differences between both experimental conditions (DOP vs. NOP) while recording ERP waves in parietal and central cortex regions, in both experiments. The implications of these finding for the theoretical accounts of the mechanisms involved in the DOP are discussed.

Keywords: ERP; implicit processes; differential outcomes procedure

POSTER SESSION 2, No. 76

PLACE PREFERENCE INDUCED BY ELECTRICAL STIMULATION OF PARABRACHIAL COMPLEX: BEHAVIOURAL EFFECTS OF NALOXONE.

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Previous studies have shown that electrical stimulation of the external lateral parabrachial nucleus (PBle) has rewarding effects in different learning tasks, and that they can be blocked by the administration of naloxone. However, for the correct execution of these tasks, animals should manifest intact motor skills. In this experiment, place preferences were induced by intracranial electrical stimulation of the PBle in a rectangular maze with three compartments. Subsequently, after the administration of 4 mg/kg of naloxone, a similar procedure was carried out in a new maze in which horizontal crossings and vertical rearings of the animals were recorded. Results have shown that the administration of naloxone only blocked the acquisition of preferences in a new maze. In addition, analysis of the animal behaviour revealed that this inhibitory effect of the opiate antagonist cannot be interpreted in terms of motor deficits, since statistically significant differences in horizontal or vertical activity of the rodents were not found after the administration of naloxone. These results are discussed in terms of a possible involvement of the external lateral parabrachial nucleus in different brain rewarding systems.

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Keywords: Place preference, naloxone, parabrachial, crossings, rearings

POSTER SESSION 2, No. 77

EXPLORING HORSE (*EQUUS CABALLUS*) SPONTANEOUS GAZE AND EAR POSITION IN RELATION TO HUMAN ATTENTIONAL STATE

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Studies have shown that horses are sensitive to humans' attentional state. Also, it has been suggested that they might use their gaze and ears position as communicative behaviors in this context. The aim of the present study was to evaluate this. Eighteen horses were presented with 4 conditions where an unknown experimenter stood in an attentive position with food (A) and without food (B), and in a non-attentive position with food (C), and without food (D). We measured both gaze duration and whether the subject looked at the stimulus directly or had a right (RB) or a left (LB) gaze bias. We also measured the duration of ears' position (asymmetric, both ears forward and both ears back). Subjects looked longer in those conditions where the experimenter was attentive (A,B) compared to when she was not (C,D). Moreover, when the experimenter was attentive, horses looked longer in A than in B condition. Furthermore horses looked for a longer time directly than with a RB in all conditions. We also observed longer duration of ears back in B than in A and C conditions, as well as longer duration of asymmetric ears in C than in the other conditions.These results provide further evidence that horses are able to discriminate humans' attentional state and suggest that they might use their gaze as a communicative behavior, whereas gaze direction and ears position could be indicators of animal's emotional state in this context.

Keywords: Horse, Attentional state, Gaze, Ears position

POSTER SESSION 2, No. 78

ELECTRICAL NEUROIMAGING REVEALS DIFFERENTIAL EFFECTS OF INHIBITORY TRAINING ON RESPONSES TO APPETITIVE VERSUS AVERSIVE FOOD CUES

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Current research suggests that inhibitory control training can improve the regulation of health behaviour, including food intake. Such intervention typically involves regular practice of inhibition tasks such as the Go/NoGo or the stop-signal tasks. However, how inhibitory training interacts with the evaluative-affective properties of food cues and the underlying spatio-temporal brain mechanisms remain unclear. We addressed this question by analysing event-related potentials with electrical neuroimaging during the practice of a Go/NoGo task including two types of food pictures: rewarding (e.g., pleasant chocolate) versus aversive items (e.g., unpleasant vegetables). Forty participants were instructed to press as fast as possible on a button in response to Go stimuli and to withhold their response to NoGo stimuli. The Go stimuli were all pictures depicting non-food items and the NoGo stimuli were all pictures depicting food items. The results showed effects of practice on the event-related potentials to the rewarding versus aversive NoGo stimuli at 200ms post-stimulus onset, when the conflict between response tendency and task demands for response inhibition are processed. Electrical source analyses localized this effect in the right orbitocingular and temporoparietal areas to the rewarding stimuli and the opposite pattern to the aversive stimuli. The underlying neurophysiological processes are discussed.

Keywords: Event-related potentials, Food cues, Inhibitory training, Plasticity

POSTER SESSION 2, No. 79

BRAIN FUNCTIONAL CONNECTIVITY DYNAMICS IN THE EMOTIONAL MODULATION OF PAIN

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Pain is defined as an unpleasant sensory and emotional experience associated with physical damage. Recent evidences reveal that brain variability plays a key role in effective functioning of somatosensory and emotional systems. This is the first study that examine the influence of emotional processing on pain in the variability of electroencephalographic functional connectivity (EEG-FC variability). A sample of 40 university students viewed 6 blocks of negative, neutral and positive pictures. In half of the blocks a warm-pain stimulation was delivered during 1 minute and 48 seconds. Skin conductance and EEG activity was recorded for all task. Pain unpleasantness and emotional dimension ratings were evaluated as control measures. The results showed that affective pictures (positive or negative) increased skin conductance and decreased EEG-FC variability during nonpainful stimuli. Pain increased skin conductance and decreased EEG-FC variability only during neutral pictures viewing. In other words, skin conductance and EEG-FC variability during pain stimulation were modulated by emotional arousal. In conclusion, EEG-FC variability might play a relevant role in the relationship between somatosensory and emotional systems.

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Keywords: EEG-FC variability, skin conductance, pain, somatosensory, emotional

POSTER SESSION 2, No. 80

GENDER DIFFERENCES IN RISKY DECISION MAKING THROUGH IOWA GAMBLING TASK.

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Decision-making processes are essential for daily life activities. One of the neuropsychological tasks most widely used to assess these processes is the Iowa Gambling Task (IGT). In this task, participants have to learn to differentiate long-term advantageous choices from long-term disadvantageous choices. Impairments in IGT performance have been related with several neuropsychological disorders such as pathological gambling, obsessive-compulsive and schizophrenia spectrum disorders. Besides, in healthy populations, sex differences in the performance of the IGT have been broadly reported. Following the somatic marker hypothesis, decision-making is strongly influenced by bioregulatory proccesess and emotion. In order to explore these differences, 114 undergraduate students performed the IGT, followed by three reversal learning phases. Their skin conductance was registered during the whole process. Results showed sex related differences in the IGT performance, specially in the last stages of the task, as well as in reversal learning trials. These differences are not explained by the somatic marker hypothesis.

This work was supported by the Ministerio de Economía y Competitividad, Spanish Government, (grants number PSI2015-70037-R and PSI2017-86847-C2-1-R).

Keywords: Decision-making, Iowa Gambling Task, Somatic Marker Hypothesis.

POSTER SESSION 2, No. 81

EFFECTS OF A MEDITATION PROGRAM BASED ON MINDFULNESS ON COGNITIVE VARIABLES IN PARKINSON'S PATIENTS

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Parkinson's disease is the second most prevalent neurodegenerative pathology in the world and may present with alteration in cognitive variables. Recently, the positive effects that mindfulness can have on different neurodegenerative pathologies have begun to be studied. The objetive of this research consists in the evaluation of the effects of a meditation program based on mindfulness in people with Parkinson's disease on different cognitive variables. The sample includes 17 participants. The main variables evaluated were general cognitive state, executive functions, attention and categorical evocation. For this, the instruments used were Montreal cognitive assessment , "A" test, verbal fluency test, Frontal lobe evaluation battery and Trail Making Test. The Wilcoxon signed rank test, the Mann-Whitney U test and Chi-square test were used to carry out the statistical analyzes. Significant changes were observed in the general cognitive state and categorial evocation. In addition, the descriptive statistics showed an improvement trend in a large part of the variables.

In conclusion, it should be noted that the results obtained support some of the hypotheses and improvements have been made in several of the cognitive variables, which gives hopeful results to continue investigating the beneficial effects of the practice of mindfulness on the variables studied.

Keywords: Parkinson's disease, Meditation program, Mindfulness, Cognitive Variables.

POSTER SESSION 2 No. 82

CARDIAC DEFENSE RESPONSE AND HEART RATE VARIABILITY IN WOMEN WITH HIGH AND LOW RESILIENCE

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Resilience is defined as a dynamic process reflecting positive adaptation despite experiences of significant adversity or trauma and bounce back from stress. The autonomic nervous system plays an important role in the adaptive response of the organism and, in particular, in the resilience to recover from the aversive situations.The aim of the present study was to examine the pattern of the Cardiac Defense Response (CDR) and the Heart Rate Variability (HRV) in women with high and low resilience. The sample was composed of 40 female psychology students from the University of Granada, aged from 18 to 28 years (Mean = 19.50; Standard deviation: 2.48), selected from an initial sample of 290 students based on their scores on two resilience questionnaires: The CD-RISC 25 Resilience Scale and the Resilience Scale. The final sample was composed of 21 women with the highest scores on resilience and 19 women with lower scores in both questionnaires. The results showed (a) a higher CDR in the low resilience group than in the high resilience group, (b) positive correlations between indices of resilience and indices of HRV in the high frequency band in the low resilience group. Our results suggest a greater defensive autonomic reactivity in people with low resilience than in the high resilience group, a finding needed of further explanatory investigation.

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Keywords: Resilience, Cardiac Defense Response, Heart Rate Variability, vagal control

POSTER SESSION 2, No. 83

HABITUATION AS AN UNDERLYING MECHANISM FOR SENSORY SPECIFIC SATIETY

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Sensory specific satiety (SSS) refers to the decline in sensory pleasantness of a particular food as it is eaten. It is characterized by its specificity, so that after having eaten a certain food, other food choices remain appetizing. This change is transient and spontaneous recovery of the initial hedonic value is observed after a relatively short time. These characteristics suggest habituation as a possible underlying mechanism of SSS. Previous studies conducted with a human model which tested this hypothesis have shown inconsistent results. In the present study, we tested this model by studying habituation´s features on SSS expression by using an animal model. Implications of this model for eating behaviour are discussed.

Keywords: Sensory Specific Satiety; Eating behaviour; Habituation

POSTER SESSION 2, No. 84

COGNITIVE DEVELOPMENT IN DEAF CHILDREN AND HEARING PEERS, AGED 3 TO 12 YEARS OLD: A COMPARATIVE STUDY.

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Neurodevelopment is the acquisition and maturation process of cognitive abilities that involve the environment and the intrinsic capabilities of the person, and it is affected by hearing loss. The deprivation of this process can lead to a difference in the performance of cognitive tasks. Bibliographic research shows that performance of deaf children on neuropsychological evaluation is significant lower. We evaluated 148 Mexican children, aged 3 to 12 years. The cases were 75 children diagnosed with profound sensorineural bilateral pre-lingual hearing loss, matched by gender and aged. The AWARD Neuropsychological test for deaf children (Daza et al. 2011) was used to evaluate visuospatial abilities, visual and working memory and abstract reasoning, previously adapted to Mexican population. The majority of the evaluated children were females (64%). The average aged was 7.49 years old for the deaf children and 7.45 years old for their hearing peers. For the cases 84% cochlear implant and 14.7% auditory aid.Lastly hearing children had a better cognitive performance on visual memory $t(146) = -2,13$, $p=.034$ visual working memory $t(146) = -2,71$, $p=.007$ and spatial memory $t(146)=-3,61$, $p<.01$ tasks. Moreover deaf children who had a communication method; sign language, oral language or bilingual, had a better cognitive performance on visual memory $t(73) = 3.69$, $p<.01$, visual working memory $t(73) = 2,37$, $p=.02$ and spatial memory $t(73)=3,33$, $p<.01$. The findings from this study support those previously found by other studies where it has been observed that deaf children had a performance improvement by learning a communication method and with the use of cochlear implant but without reaching the performance of their hearing peers.

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Keywords: Cognitive, development, deaf, Award Neuropsychological Test

POSTER SESSION 2, No. 85

ANALYSIS OF THETA BANDS IN CHILDREN WITH DIABETES MELLITUS TYPE 1

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Diabetes mellitus Type 1 (DM-1) is a chronic degenerative disease characterized by the destruction of pancreatic β cells, which are responsible of insulin production, due to genetic, environmental and immune factors that cause various alterations in different organs and systems where the brain is not the exception. Since it is a disease that begins in childhood the constant glycemic variations may affect the cerebral metabolic supply, and alter different cognitive structures and processes that are still in develop, in particular, executive functions. Inhibitory control is part of these high order skills and an alteration in the maturation of this process would generate commitment in different skills, such as: social behavior, acquisition of learning or impulse control. The aim of these investigation was to analyze the performance of the executive functioning and its neurophysiological correlates by the analysis of Alfa and Theta bands while in subjects (DM-1 or Control group) execute a Go-No Go task paradigm. The sample consisted of a total of n = 28 subjects between 8 and 15 years old, n = 14 (DM-1) and n = 14 (Controls) paired by age, sex and scholarship an normal IQ. During the electrophysiological analysis, we observed greater activation within the alpha band in the occipital areas and in the Theta band in the central-posterior and fronto-central parietal areas, concluding that subjects with DM-1 need to use a greater amount of brain resources as areas to exercise the inhibition of interference and resolution of the activity with the same effectiveness as control subjects, therefore, we can infer the existence of differences between the processing of information and the possible use of different strategies to perform it with major effectiveness despite insulin deficiency.

Keywords: Diabetes type 1, chronic disease, executive functions, chilhood

POSTER SESSION 2, No. 86

MEMORY FUNCTION AFFECTED BY ANXIETY IN SYSTEMIC LUPUS ERYTHEMATOSUS

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Systemic lupus erythematosus (SLE) is a multisystem autoimmune disorder characterized by the production of autoantibodies. Neuropsychiatric involvement is frequent, which includes cognitive impairment and mood disorders. Objective: Our aim was to assess the possible relationship of anxiety or depression to cognitive impairment in these patients. Methods: Disease features, age, education, Beck Anxiety Inventory (BAI) and Beck Depression Inventory (BDI) were evaluated in 13 patients with SLE and 10 healthy controls, all Mexican women; IQ, attention, verbal and visual memory, verbal fluency and executive function was assessed. Mann–Whitney U test was used to compared age, education, anxiety, depression and cognitive scores between groups. Pearson's r was used to measures the association between anxiety and depression scores, and cognitive variables in SLE patients. Results: Compared with control, SLE patients showed higher anxiety (M=22) and depression (M=13) scores (p.05) and lower (M=13), verbal (M=12) and visual (M=21) memory scores (p<.05). Pearson's r showed a negative correlation between higher anxiety scores and lower verbal and visual memory scores (r=-.508, p<.022; r=-.531, p<.016); no relations with depression scores were found. Conclusion: The presence of anxious but not depressive symptoms may interact with memory process in SLE patients, so that it is necessary to take into account this variable when evaluating this population due to comorbid existence.

Instituto de Reumatología, Universidad de Guadalajara, México. Grant Programa Nacional de Posgrado de Excelencia, CONACyT.

Keywords: Systemic lupus erythematosus, autoinmmune disorder, cognitive impairment

POSTER SESSION 2, No. 87

EXECUTIVE FUNCTIONING IN PATIENTS WITH NEWLY DIAGNOSED PARKINSON'S DISEASE

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Parkinson's disease produces cognitive non-motor symptoms that affects mainly attention and executive function, these deficits have been reported in the first stages of the disease and are probably related to dysfunction in dopamine regulation of fronto-striatal circuits. Objective: The aim of this study is to evaluate executive functioning in patients with newly diagnosed Parkinson's disease that have not taken any antiparkinsonian medication using neuropsychological tests to assess executive function.

Methodology: It was a transversal, observational and prospective study in 21 patients with newly diagnosed Parkinson's disease. Instruments: Mental planning was assessed using Tower of London Drexel University (total movements), mental flexibility and set shifting was evaluated using Wisconsin Card Sorting Test (number of perseverative responses) and executive attention was assessed using Stroop color-word test (interference index).

Results: The sample consisted on 21 subjects; 14 men and 7 women were assessed, they had a median age of 67 years old and a median of education of 6 years. In mental planning task, the median percentile was 22 (Below average; min 1, max 85) 10% of subjects showed a borderline performance and 20% showed deficient scores. In mental flexibility task the median percentile score was 18 (Below average; min 1, max 90), where 14.3% and 4.8% of subjects showed borderline and deficient scores, respectively. Finally, in executive attention task, the median percentile was 45 (Average; min 1, max 87), 5.6% displayed borderline scores and 5.6% showed deficient performance.

Discussion: Our study demonstrated cognitive deficits that affects mainly two modalities of executive function (mental planning and mental flexibility/set shifting) in subjects with newly diagnosed Parkinson's disease, both functions are closely related to frontal dorsolateral structures, while executive attention assessed with Stroop color-word test depends mainly on medial frontal structures (anterior cingulate cortex). This profile of neuropsychological performance may characterize the presentation of first stages of evolution in cognitive decline associated to Parkinson's disease since early stages.

Keywords: Parkinson's Disease, executive functions, cognitive non-motor symptoms

POSTER SESSION 2, No. 88

VOLUNTARY ETHANOL CONSUMPTION PARADIGM ASSOCIATED WITH REINFORCING TASK IN RATS.

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Alcohol abuse and alcoholism has turned into a major public health problem. Thus, it is particularly interesting the use of animal models as a mean to target factors involved in the inicial stages of alcohol abuse. It is widely accepted that human alcohol consumption can be triggered throught a motivational-associated positive context; nevertheless, a volunteering model linking rewarding experiences to alcohol consumption has not been yet established.

In this study, we present a novel paradigm that induces voluntary ethanol consumption as a consequence of exposuring rats to a reinforcing task.

To this aim, we exposed the animals to a high (72 dustless sucrose pellets) or a low (6 dustless sucrose pellets) reinforcer during 11 consecutive sessions. After every reinforcer exposure, animals were provided with both etanol solution and water for 90 minutes. Consumption was then measured by weighing both drinking bottles. In this study we conclude that daily reinforcement sessions promotes voluntary ethanol consumption in highly-reinforced rats as compared to the low-reinforced rat showing a significant difference from day 5.

To evaluate drunkenness, speed, acceleration and total distance traveled was measured in an open field arena by using a tracking software (ToxTrack). Positive correlation between all three variable measured and total amount of ethanol consumed was found. These results sustain our model. Further analysis need to be done to completely characterize the paradigm.

This research was supported by CTS-109 group and Esteve Laboratories.

Key Words: Paradigm, voluntary ethanol consumption, rat.

POSTER SESSION 2, No. 89

POST-STIMULATION TIME INTERVAL-DEPENDENT EFFECTS OF MOTOR CORTEX ANODAL TDCS ON REACTION TIME TASK PERFORMANCE

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Anodal transcranial direct current stimulation (tDCS) induces long term potentiation-like plasticity, which is associated with long-lasting effects on different cognitive, emotional and motor performances. Specifically, tDCS applied over the motor cortex is considered to improve reaction time in simple and complex tasks. The timing of tDCS relative to task performance could determinate the efficacy of tDCS to modulate performance. The aim of this study was to compare the effects of a single session of anodal tDCS (1.5 mA, for 15 min) applied over the left primary motor cortex (M1) vs. sham stimulation on performance of a go/no-go simple reaction time task carried out at three different time points after tDCS, namely 0, 30 or 60 min after stimulation. Performance 0 min after anodal tDCS was improved during the whole course of the task. Performance 30 min after anodal tDCS was improved only in the last block of the reaction time task. Performance 60 min after anodal tDCS was not significantly different throughout the entire task. These findings suggest that the motor cortex excitability changes induced by tDCS can improve motor responses, and these effects critically depend on the time interval between stimulation and task performance.

Keywords: anodal direct current; primary motor cortex; reaction time; transcranial direct current stimulation.

POSTER SESSION 2, No. 90

tDCS EFFECTS ON PAIN AND SPASTICITY IN STROKE PATIENTS

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Post-stroke patients have limbs chronic pain that is difficult to treat. Chronic pain of these patients is evaluated using different scales, such as EVA, Fugl-Meyer, among others Intensity Scale. Transcranial direct current stimulation (tDCS) is a safe and non-invasive brain stimulation technique, which alters cortical excitability and might have effects on pain in these patients.

We conducted a study with three patients with chronic post-stroke pain. We applied anodal tDCS over primary motor cortex (M1) for five sessions. The results showed a significant effect of tDCS in the perception of pain through different scales when compared to sham stimulation. These findings suggest that multiple sessions of anodal tDCS over M1 are able to improve chronic pain in limbs of post-stroke patients.

Keywords: TDSC; chronic pain; post-stroke; motor cortex (M1); anodal stimulation

AUTHOR INDEX

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