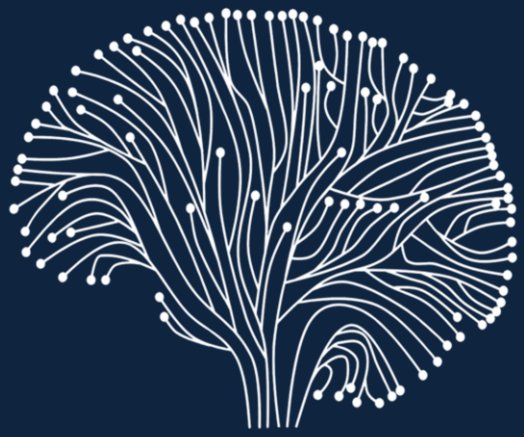


SAN2024

XXXIX Annual Meeting
Ebook

October 25th – 27th IFIBYNE Auditorium

Ciudad Universitaria, Universidad de Buenos Aires

INDEX

ORGANIZING COMMITTEE

Macarena Amigo Duran
IBioBA-MPSP-CONICET

Esteban J. Beckwith
Laboratorio de Cronobiología Instituto de Fisiología, Biología Molecular y Neurociencias (IFIBYNE-UBA-CONICET)

Mariano Belluscio
Laboratorio Bases Neuronales del Comportamiento Grupo Neurociencia de Sistemas, IFIBIO-Houssay Dpto de Fisiología, Facultad de Medicina, Universidad de Buenos Aires

Pilar Canal
Laboratorio de Mecanismos de la Neurosecreción - IFIBYNE (CONICET-UBA)

Ivanna Castro Pascual
Circadian Biology on Aging Unit, TGB, National Institute on Aging, NIH.

Cecilia Conde
Instituto de Investigación Médica Mercedes y Martín Ferreyra - INIMEC-CONICET-UNC

María José De Rosa
Laboratorio de Neurobiología de Invertebrados, Instituto de Investigaciones Bioquímicas de Bahía Blanca (INIBIBB), CCT Bahía Blanca, UNS-CONICET

Nahir Guadalupe Gazal
Instituto de Investigación Médica Mercedes y Martín Ferreyra (INIMEC-CONICET-UNC)

Alejandra Pacchioni
Dpto. de Cs. de los Alimentos y del Medioambiente Facultad de Ciencias Bioquímicas y Farmaceúticas Universidad Nacional de Rosario

Maria Sol Ramos
IBioBA-MPSP-CONICET

Guillermo Federico Spitzmaul
Instituto de Investigaciones Bioquímicas de Bahía Blanca (INIBIBB) - CONICET/Universidad Nacional del Sur (UNS). Departamento de Biología, Bioquímica y Farmacia – UNS

Diego Rayes
Instituto de Investigaciones Bioquímicas de Bahía Blanca (INIBIBB) - CONICET/Universidad Nacional del Sur (UNS). Departamento de Biología, Bioquímica y Farmacia - UNS

Lidia Szczupak
IFIBYNE UBA-CONICET FBMC FCEN-UBA

SPONSORS & VENUE

VENUE

The XXXIX Annual Meeting of the SAN will be held at Aula Magna of Pabellón 1 y 2, Ciudad Universitaria, Universidad de Buenos Aires - UBA and IFIBYNE building.
Av. Costanera Rafael Obligado, Ciudad Universitaria, Universidad de Buenos Aires, from October 25th to 27th, 2024.
The meeting will be held mainly in face-to-face format.

CODE OF CONDUCT

All attendees are required to agree with the following code of conduct. Organizers will enforce this code throughout the event. We expect cooperation from everyone to help ensure a safe environment for everybody.

No unauthorized Recording:
It is not allowed for attendees to record or take photos of scientific material unless explicit prior consent is given by the presenter. This restriction applies to all the scheduled events in the conference. If you become aware of someone making unauthorized recordings, please contact congreso.anual.san@gmail.com immediately. Any person or organization recording without authorization may be subject to legal actions by the affected presenter, the organizations they are affiliated with, or by SAN. SAN adheres to the copyright laws guiding the appropriate sharing of scientific research material, including data.

Conference Best Practices:
All communication must be carried out in a professional and respectful manner. Live sessions will be moderated and disrespectful messages will not be tolerated.
SAN encourages open intellectual discussion in a welcoming and inclusive environment. Inappropriate behavior, harassment or offensive acts towards any member of the community is strictly prohibited and will result in removal from the conference and a report to the host institution of the removed attendee will be issued. Be friendly, welcoming and respectful. When discussing with colleagues, disagreement is an unavoidable occurrence and it is important that all discussions are carried out in good faith and seen as an opportunity to improve others and our own work. Be mindful of the tone and words you choose to communicate with others.

Unacceptable behavior
Harrasment, intimidation or discrimination in any form is not tolerated at the event. This includes any improper and unwelcome verbal or physical behavior that might reasonably be expected to cause offense or humiliation to another person. Inappropriate behavior can be reported to congreso.anual.san@gmail.com the SAN2024 Organizing Committee or SAN Council members. The event organizers reserve the right to take any action to prevent violations of this Code of Conduct.

PROGRAM

WEDNESDAY 23rd

REFERENCES:	CERO + INFINITO	IFIBYNE
09:00 – 09:30	REGISTRATION	REGISTRATION
09:30 – 18:30	PMC-1 Pre-meeting Course (IA)	PMC-2 Pre-meeting Course (Stat)

THURSDAY 24th

REFERENCES:	CERO + INFINITO	IFIBYNE
09:00 –0 9:30	PMC-1 Pre-meeting Course (IA)	PMC-2 Pre-meeting Course (Stat)
09:30 – 10:00		
10:00 – 10:30		
10:30 – 11:00		
11:00 – 11:30		
11:30 – 12:00		
12:00 – 12:30		
12:30 – 13:00		
13:00 – 13:30		
13:30 – 14:00		
14:00 – 14:30		
14:30 – 15:00		
15:00 – 15:30		
15:30 – 16:00		
16:00 – 16:30		
16:30 – 17:00		
17:00 – 17:30		REGISTRATION
17:30 – 18:00		
18:00 – 18:30		

FRIDAY 25th

REFERENCES:	Aula Magna Pabellón 2	Aula Magna Pabellón 1	IFIBYNE

08:30 – 09:00	REGISTRATION (at AM Pab 2)		
09:00 – 09:30	Plenary Lecture 1: Fernanda Ceriani		
09:30 – 10:00			
10:00 – 10:30	BREAK		
10:30 – 11:00	Symposia S1	Symposia S2	
11:00 – 11:30			
11:30 – 12:00			
12:00 – 12:30			
12:30 – 13:00	LUNCH		
13:00 – 13:30			
13:30 – 14:00	Poster Session V		
14:00 – 14:30			
14:30 – 15:00			
15:00 – 15:30			
15:30 – 16:00	Symposia S3	Symposia S4	
16:00 – 16:30			
16:30 – 17:00			
17:00 – 17:30			
17:30 – 18:00	BREAK		
18:00 – 18:30	Plenary Lecture 2: Hermona Soreq		
18:30 – 19:00			
19:00 – 19:30	Round Table (organised by Comisión Política Científica SAN)		
19:30 – 20:00			

PROGRAM SATURDAY 26th

REFERENCES:	Aula Magna Pabellón 2	Aula Magna Pabellón 1	IFIBYNE

9:00 – 9:30	Plenary Lecture 3: Guillermo Cecchi	
9:30 – 10:00		
10:00 – 10:30	BREAK	
10:30 – 11:00	Symposia S5 - IBRO	Symposia S6
11:00 – 11:30		
11:30 – 12:00		
12:00 – 12:30		
12:30 – 13:00	Round Table (organized by Comisión Género y Diversidad SAN)	
13:00 – 13:30		
13:30 – 14:00	Poster Session S	
14:00 – 14:30		
14:30 – 15:00		
15:00 – 15:30		
15:30 – 16:00	BREAK	
16:00 – 16:30	Young Investigator Talks/JR 1	Young Investigator Talks/JR 2
16:30 – 17:00		
17:00 – 17:30		
17:30 – 18:00		
18:00 – 18:30	BREAK	
18:30 – 19:00	ASAMBLEA SAN	
19:00 – 19:30		
19:30 – 20:00		

SUNDAY 27th

REFERENCES:	Aula Magna Pabellón 2	Aula Magna Pabellón 1	IFIBYNE

9:00 – 9:30	Plenary Lecture 4: Agustín Ibañez	
9:30 – 10:00		
10:00 – 10:30	BREAK	
10:30 – 11:00	Symposia S7 ISN	Symposia S8
11:00 – 11:30		
11:30 – 12:00		
12:00 – 12:30		
12:30 – 13:00	Social (organised by Red de estudiantes de Neurociencias)	
13:00 – 13:30		
13:30 – 14:00	Poster Session D	
14:00 – 14:30		
14:30 – 15:00		
15:00 – 15:30		
15:30 – 16:00	BREAK	
16:00 – 16:30	Plenary Lecture 5: Carlos Brody	
16:30 – 17:00		
17:00 – 17:30		
17:30 – 18:00		
18:00 – 18:30		
18:30 – 19:00		

PRE-MEETING COURSES

PMC - 1 | Bruno Bianchi | Utilizando las respuestas de los modelos de la Inteligencia Artificial para estudiar la cognición

In recent years, we have seen how Artificial Intelligence models have increased their capabilities in different domains. This has allowed us to have models that are capable of processing and generating stimuli in a similar way to how humans do. In particular, in the area of Natural Language Processing, state-of-the-art models have a great capacity for these tasks. The most popular example is the chatGPT system (and its evolutions), from the company OpenAI. These advances have not been alien to the Cognitive Neuroscience community, and in particular to Neurolinguistics, which sees in these advanced models a tool that can be very useful to understand the mechanisms that operate in the brain during tasks associated with language.

Although the use of AI models for the study and analysis of experimental data has been common for some time, this course proposes a different approach. In the papers that will be analyzed during the course, we will present techniques in which the responses of the AIs are used to compare them with cognitive responses (neuroimages, behavioral responses, etc.). These approaches are proposed, then, to extract from the AIs the computational mechanisms that could be analogous to the natural ones. This would allow a more detailed study of them, since there is a great flexibility for experimentation, modification, analysis, etc. on these models.

Día 1: Representaciones vectoriales de palabras y cómo usarlas para entender el cerebro

Introducción al Procesamiento del Lenguaje Natural. Representaciones vectoriales estáticas de palabras (embeddings). Técnicas clásicas (ej. LSA). ¿Es posible usar estas representaciones para estudiar el cerebro humano? Introducción a la neuroimagen: M/EEG, fMRI. Estudios fundamentales sobre la alineación de imágenes fMRI con embeddings de palabras [Huth et al., 2012; Huth et al., 2016]. Ventajas y limitaciones de la alineación. Análisis de Similitud Representacional (RSA) [Abnar et al., 2019]. Otras técnicas.

Día 2: RNN y transformers: más allá de los embeddings estáticos

Introducción a la Inteligencia Artificial y el Aprendizaje Automático. ¿Cómo aprenden los modelos a partir de los datos? Introducción al aprendizaje profundo. Redes Neuronales Recurrentes. Recursividad en RNN y el cerebro [Lakretz et al., 2021]. De RNN a transformers. Atención y auto-atención. Embeddings contextualizados (ej. BERT) [Hollenstein et al., 2019]. Modelos de última generación: GPT (OpenAI), Llama (Meta), Gemini (Google). ¿Cómo es posible que estos modelos se comporten casi como humanos? ¿Cómo se codifica la información en ellos? ¿Cómo puede la Neurociencia contribuir a la comunidad de IA? [Abnar et al., 2019] ¿Qué puede aprender la neurociencia de ellos? [Caucheteu., King, 2022; Caucheteux et al., 2023]

Aulas:
Pabellón 0+Infinito, Ciudad Universitaria, UBA
23/10: 9 a 13hs: 1110; 14 a 18hs: 1111
24/10: 9 a 18hs: 1112

Organizador:
Bruno Bianchi
brunobian@gmail.com
Laboratorio de Inteligencia Artificial Aplicada, Departamento de Computación, Facultad de Ciencias Exactas y Naturales, UBA

PMC - 2 | Ignacio Spiousas - Leandro Pablo Casiraghi | Inferencia estadística en las neurociencias experimentales utilizando R

El principal objetivo de este curso es el de acercar a lxs asistentes a las herramientas modernas de modelado e inferencia estadística con especial foco en los tipos de datos que se manejan en el campo de las neurociencias experimentales. Asumiendo de los participantes un mínimo acercamiento previo a la inferencia estadística, tomaremos la primera mitad del curso para reflexionar sobre qué es y qué no es la estadística, estimulando el pensamiento crítico y evitando las “recetas”. El curso propone la incorporación de los modelos lineales como la base del modelado estadístico en el laboratorio, así como sus extensiones como los modelos lineales generalizados y de efectos mixtos. Finalmente, motivaremos a lxs alumnxs a integrar herramientas a su ráctica científica que les permitan compartir sus datos y procesos de análisis de acuerdo a las recomendaciones de la ciencia abierta. El curso estará basado en herramientas del lenguaje de programación R, enfocándose en recursos para el análisis y visualización de datos, modelado estadístico, producción de reportes automáticos, etc.

Requisitos: Poseer conocimientos básicos del lenguaje R y los paquetes del tidyverse. Haber cursado alguna materia de probabilidad o estadística, y estar familiarizado con los conceptos de variable aleatoria, esperanza, varianza, muestreo y estimación. Se hará disponible un sitio web del curso con material audiovisual y escrito al que puedan recurrir estudiantes que no cumplan con alguno de estos requisitos antes del comienzo del curso.

Día 1:
Teoría: Probabilidad y estadística: ¿Dos caras de la misma moneda? Modelos de generación de datos e inferencia estadística. Repaso de inferencia estadística. ¿Qué es un p-valor y cómo interpretarlo correctamente? Tamaño del efecto y potencia estadística. ¿Cómo determinar el tamaño de la muestra a priori? La simulación de datos como herramienta para la determinación del tamaño de muestra. Prerregistro y ciencia abierta.

Práctica y programación: Manipulación y análisis exploratorio de datos con herramientas del tidyverse. Generación de reportes utilizando R-Markdown. Principios de visualización de datos. Cómo hacer énfasis en lo que queremos mostrar. {ggplot2} como herramienta para la visualización de datos.

Día 2:

Teoría: ¿Son todos los tests estadísticos más usados modelos lineales? Cómo modelar nuestros datos experimentales y no morir en el intento. Modelos lineales y modelos lineales generalizados. Efectos fijos y aleatorios. Modelos lineales (y generalizados) de efectos mixtos.

Práctica y programación: Ajuste e interpretación de modelos lineales y modelos lineales generalizados (regresión logística y de Poisson). Presentación de funciones para el reporte de modelos del paquete {modelsummary}. Introducción a los modelos lineales mixtos utilizando {lme4}.

Aula:
Auditorio IFIBYNE, Ciudad Universitaria UBA

Organizadores:
Ignacio Spiousas
ispiousas@udesa.edu.ar
Laboratorio Interdisciplinario del Tiempo y la Experiencia. Universidad de San Andrés. Conicet.

Leandro Pablo Casiraghi
lcasiraghi@udesa.edu.ar
Laboratorio Interdisciplinario del Tiempo y la Experiencia. Universidad de San Andrés. Conicet.

Plenary Lectures

1. The tip of the iceberg: clock neurons and structural remodeling of the postnatal brain

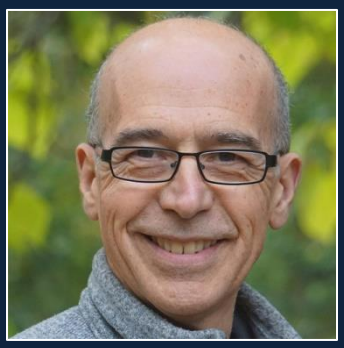
Fernanda Ceriani
Fri 25th – 9:00 AM
Laboratorio de Genética del Comportamiento, Fundación Instituto Leloir, Argentina

Abstract:

Plasticity – the ability to make adaptive changes- is a fascinating property of the nervous system. Plasticity occurs at different timescales and in different structures, ranging from spines and boutons to axonal and dendritic arbors. While experience-dependent synaptic plasticity has been extensively studied, the mechanisms underlying structural plasticity, particularly the large-scale growth and remodeling of axons and dendritic arbors in the postnatal brain, have received less attention. Our laboratory has focused on a group of circadian neurons, the small ventral lateral neurons (s-LNvs), which daily undergo extensive remodeling.

Circadian remodeling correlates with rhythmic changes in synapse number and thus the ability to synapse onto specific targets at specific times across the day. To explore the extent to which dynamic changes in the membrane describe the underlying subcellular organization, we used serial block-face scanning electron microscopy (SBEM). Through volumetric electron micrographs of dorsal termini acquired at times with a distinct degree of complexity our work revealed the basis by which s-LNvs differentially contribute to the circadian network. We also examined some of the cellular mechanisms underlying this unusual form of plasticity, demonstrating that it relies on both activity dependent and independent mechanisms and it is not just limited to a subset of circadian neurons.

2. Molecular mechanisms and roles of neuron-glia interactions and their roles in synapse and myelin development, plasticity, and repair: insights from the inner ear and prefrontal cortex



Gabriel Corfas, Ph.D.
Fri 25th – 17:30 PM
Professor and Associate Chair for Research, Department of Otolaryngology—Head and Neck Surgery
Director, Kresge Hearing Research Institute
The Lynn and Ruth Townsend Professor of Communication Disorders
Michigan Neuroscience Institute Affiliate Faculty
The University of Michigan
http://corfas.lab.medicine.umich.edu/

Abstract:

Since their discovery in the mid-1800s until recently, glia, the non-neuronal cells of the nervous system, were seen as passive nervous system components whose function was to act as connective tissue and provide trophic/metabolic support for neurons. However, studies during the last two decades have shown that glial cells play critical active roles in many aspects of brain development, structure, and function. I will present our findings on key molecular mechanisms by which neurons and glia communicate, and on the roles of neuron-glia interactions in synaptic and myelin development, plasticity, maintenance, and repair. I will also highlight our insights regarding the importance of neuron-glia interactions for mental health and hearing.

3. AI Challenges for Large Longitudinal Clinical Trials in Mental Health

Guillermo Cecchi
Sat 26th – 9:00 AM
Instituto T.J. Watson – IBM Research, EEUU

Abstract:

The recent experience of accelerated vaccine development under the pressure of the covid pandemic, the massive adoption of consumer electronics and the explosion of AI capabilities signal a dramatic shift in the implementation of clinical trials, which have been particularly ineffective and onerous in mental health. We will present results from ongoing and recently completed large longitudinal clinical trials for Amyotrophic Lateral Sclerosis (ALS), Chronic Pain, Prodromal Psychosis and outcomes across all mental health conditions in which massive streams of clinical data are combined with at-home ultra-high frequency digital information including smart phone use, geolocation, and semi-structured and free-form language to provide a holistic and quasi-real time assessment of the participants, and will discuss the analytic and interpretation challenges that emerge in these demanding studies.

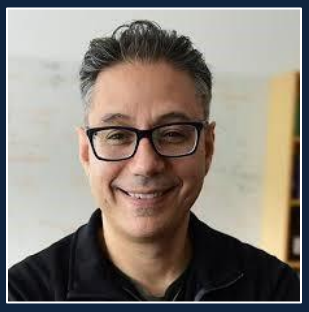
4. A brain made of burning coal: brain health research and multimodal neuroscience

Agustín Ibañez
Sun 27th – 9:00 AM
Global Brain Health Institute, Trinity College Dublin, Ireland, and Latin American Brain Health Institute (BrainLat), Universidad Adolfo Ibanez, Chile.

Abstract:

Current neuroscience and brain health models are predominantly derived from high-income populations, which only partially represent some individuals worldwide. The lack of diversity in data, models, and population representation limits the generalization and effectiveness of brain health research. There is also an unmet need for more complex, multimodal computational frameworks integrating diverse biological, whole-body health, environmental, and social factors to enhance predictive models and personalized interventions. In this presentation, I will introduce different regional initiatives: the Multi-partner Consortium to Expand Dementia Research in Latin America (ReDLat) and the Global Brain Health Institute (GBHI). I will provide examples of multicentric research, emphasizing their potential to diversify brain health science and improve computational personalized medicine models. These include (a) data sharing and multicentric analyses of genetic, epigenetic, social, and economic factors influencing brain health; (b) neurocognitive assessment models for neurodegenerative conditions and healthy aging; (c) development of cost-effective disease markers; (d) computational approaches including brain age (or “brain clocks”) and whole-brain biophysical models; and (e) international collaborations and private sector initiatives promoting brain health, brain capital, and brain health diplomacy. I will summarize opportunities to develop collaboration with ReDLat and GBHI networks, including research applications, fellowships, and multicentric data collection.

5. Large-scale cross-brain recordings during cognition: initial steps towards finding meaning in all that variability in neural activity



Carlos Brody
Sun 27th – 04:00 PM
Laboratory for Quantitative and Computational Systems Neuroscience, Princeton University and Howard Hughes Medical Institute

Abstract:

Neural firing rates are known to be highly variable, responding in different ways to different repeats of identically prepared trials. It has been known for decades that this variability is highly structured across neurons and brain regions, but whether it is meaningful or simply noise has remained unclear. Recent advances in recording technology are now making it possible to record simultaneously from many individual neurons across multiple regions of the brain, opening new opportunities to study coordination of neural activity across brain regions. I will describe recent experiments from my lab in which we are pushing the envelope of such simultaneous electrophysiological recordings, with ~80+ neurons recorded simultaneously from each of more than 30 brain regions (~2,700 simultaneous units). We are carrying out these recordings in rats performing a sensory decision-making task. We found an internal neural signature of commitment to a decision—in other words, a neural signal that indicates when the subject makes up their mind. It is an internal signal in the sense that it occurs and can be detected even if the subject makes no outward motor act to indicate that they have made up their mind. In terms of behavior, the signal indicates when sensory evidence stops affecting the subject's upcoming decision, and in terms of neural activity, the signal indicates major state changes in decision-related spiking across the brain. Seeking to identify further such internal signals, which we hypothesize could explain a substantial fraction of the apparently noisy structured variability in neural firing rates, I will also describe new machine learning-based methods that use simultaneous recordings to identify and succinctly describe structure in joint neural activity.

Symposia

S1 – NeuroTour 2024: A Federal Outlook of Neuroscience in Argentina

Friday 25th 10:00 AM

Chair: Rocío Foltran - rociobfoltran@gmail.com - IFIBYNE (UBA – CONICET), CABA, Argentina
Co-Chair: Clara Chungara - cchungara@immf.uncor.edu - INIMEC-UNC-CONICET, Córdoba, Argentina

Abstract

According to the information surveyed by the SAN in 2021, three districts in Argentina concentrate 90% of researchers in the area of Neuroscience: 61% are based in the city of Buenos Aires and 15% and 14% in the provinces of Córdoba and Buenos Aires, respectively. In this context, and within the framework of the recently created Federalization Commission of the SAN, both during 2022 and 2023 we organized the Federal NeuroTour Symposium at the Annual Meeting. In the first edition we gathered five researchers from outside the main research nodes representing the provinces of Tucumán, Chaco, Santa Fe, Entre Ríos, and Mendoza, and the second one had representations of Santa Fe, San Luis, Rio Negro and Tucumán. Emphasis was made on inviting non-affiliated speakers and the inclusion of young investigators. We believe that fostering a federal community requires continual work over several years and even decades. For this reason we present a third edition of the NeuroTour hoping to make this event a tradition within the SAN annual meeting.

As previously mentioned the main goal of the Federal NeuroTour 2024 is to broaden the neuroscience network along our country. Consequently, the spirit of this symposium was to include several lines of investigation carried out in locations outside the main nodes of SAN. For this reason, in this symposium there is no specific research topic but rather a landscape of neuroscience done out of the most represented areas in SAN. Speakers that will participate in this symposium have their labs in Rio Negro, San Luis, San Juan and Tandil, one small City of Buenos Aires province.

Speaker 1: Lorena Franco
Circadian control of a sex-specific behaviour in Drosophila

An endogenous circadian clock controls many of the behavioral traits of Drosophila melanogaster. This¨clock¨ relies on the activity of interconnected clusters of neurons that harbor the clock machinery. The hierarchy among clusters involved in the control of rest-activity cycles has been extensively studied. Sexually dimorphic behaviors, on the other hand, have received less attention. Even though egg-laying, a female characteristic behavior, has been shown to be rhythmic, it remains largely unexplored possibly due to metholodological constraints. The current study provides the first steps towards determining the neural substrates underlying the circadian control of egg-laying. We show that, whereas the lateral ventral neurons (LNvs) and the dorsal neurons (DNs) are dispensable, the lateral dorsal neurons (LNds) are necessary for rhythmic egg-laying. Systematically probing the Drosophila connectome for contacts between circadian clusters and oviposition-related neurons, we found no evidence of direct connections between

LNvs or DNs and neurons recruited during oviposition. Conversely, we did find bidirectional connections between Cryptochrome (Cry) expressing LNd (Cry+ LNds) and oviposition related neurons. Taken together, these results reveal that cry positive LNd neurons have a leading role in the control of the egg-laying rhythm in Drosophila females.

Lorena Franco - lorefranco@gmail.com
Departamento de Física Médica – Centro Atómico Bariloche, CNEA, San Carlos de Bariloche, Rio Negro, Argentina.
https://www.conicet.gov.ar/new_scp/detalle.phpid=43802&keywords=lorena%2Bfranco&datos_academicos=yes

Speaker 2: Manuel Facundo Latini
Biological rhythms and focal epilepsies

This talk discusses the relationship between epilepsy and biological rhythms, especially the 24-hour daily rhythms. Circadian rhythms are endogenous cycles that occur with a period close to 24 hours and have an impact on metabolic, physiological, and behavioral processes. In addition to circadian rhythms, there are also other biological rhythms with durations shorter than a day (ultradian) and durations longer than a day (infradian). In epilepsy, it has been observed that the circadian rhythm of sleep-wakefulness has an important relationship. In particular, temporal lobe seizures occur more frequently

during the light period, while frontal lobe seizures occur during the dark period. Seizures also characteristically occur at awakening in certain types of epilepsy. This talk addresses various parameters related to daily rhythms in patients with epilepsy, including hormone rhythms, sleep-wakefulness rhythm, temperature rhythm, chronotype, and sleep quality. It also discusses the timing and occurrence of seizures, the use of hypnotics, and the localization and laterality of the epileptogenic zone. The results presented here suggest the need to adapt treatments for epilepsy based on biological rhythms and correct alterations in the sleep-wake cycle.

Manuel Facundo Latini - flatini@uccuyosl.edu.ar
Hospital Central Dr. Ramon Carillo y Universidad Nacional de San Luis, San Luis, Argentina
https://ar.linkedin.com/in/m-facundo-latini-9282a041

Speaker 3: Diana Bruno
Provincial Plan for Prevention, Detection, and Monitoring of Dementias

Within the framework of brain health promotion, cognitive impairment and dementia detection, a provincial plan is being developed to assess individuals over the age of 50. The assessment is carried out through a specifically designed software, which includes clinical data, determinants of brain health, mood scales, cognitive complaints, activities of daily living, and cognitive screening. Following the assessment, an individual report is issued providing specific suggestions. Additionally, those diagnosed with Alzheimer's and Frontotemporal Dementia are invited to participate in another project. This additional initiative, with international scope, involves a deeper exploration including social determinants, neuroimaging studies, genetic analysis, electroencephalography, and comprehensive cognitive evaluation. The integration of both projects allows for a response to societal demands. Concurrently, brain health promotion is pursued through awareness and dissemination activities targeting the community, with initiatives spanning all stages of life.

Diana Bruno - dianabruno2@gmail.com
Instituto de Investigaciones en Psicología Básica y Aplicada (IIPBA), Facultad de Filosofía y Humanidades, Universidad Católica de Cuyo, San Juan, Argentina.
https://ar.linkedin.com/in/diana-bruno-68575b77

Speaker 4: José A. Fernandez-Leon Fellenz
Minute-scale oscillations in a sparse neural network

Medial entorhinal (MEC) grid cell neurons, pivotal in navigation, exhibit sequential firing patterns in mice, repeating approximately every minute. These patterns, however, lack spatial organization and do not seem linked to observable behavior. Minute-scale oscillations in the MEC entraining the entire cell population with periods ranging from 10 to 100 seconds (0.1-0.01Hz), remain shrouded in uncertainty regarding their underlying mechanisms. Through detailed numerical investigations, the talk will propose a plausible mechanism by which ultra-slow sequential firing emerges in spiking neural networks.

José A. Fernandez-Leon Fellenz - jafphd@googlemail.com
CIFICEN-CONICET & Universidad Nacional del Centro de la Provincia de Buenos Aires (UNCPBA), Tandil, Buenos Aires, Argentina.
https://jafphd.intia.exa.unicen.edu.ar/

S2 – The role of epigenetic mechanisms in typical and stressed developmental trajectories

Friday 25th 10AM

Chair: Mariela Chertoff - Laboratorio de Neuroepigenética y Adversidades Tempranas - DQB, FCEyN, UBA – IQUIBICEN, CONICET – Buenos Aires, Argentina
Co-Chair: L Bruno G. Berardino - Laboratorio de Neuroepigenética y Adversidades Tempranas - DQB, FCEyN, UBA – IQUIBICEN, CONICET – Buenos Aires, Argentina

Abstract

The symposium will focus on the intricate ways in which neural development is influenced by various factors, including epigenetic mechanisms related to early life adversities and sex-specific differences. The research presented will highlight the importance of intercellular communication in proper trigeminal ganglion formation, with a particular emphasis on the role of microRNA-203 and neural crest-placode interactions. Additionally, the symposium will delve into how methylation/demethylation machinery associates with sex differences during critical periods of development, which may underlie disparities in neural function. Furthermore, studies on the effects of perinatal protein malnutrition and social and material deprivation on brain development and behavioral outcomes will be discussed. These investigations reveal the significant impact of early life experiences on brain structure, function, and behavior, shedding light on the molecular mechanisms that underlie long-lasting effects on mental health. Overall, these results in the field of neural development and epigenetic regulation provide new insights into the complex interplay between genetics, environment, and behavior.

Speaker 1: Pablo H. Strobl Mazzulla

Unveiling neural crest-placode condensation during Trigeminal Ganglion Formation: The Crucial Role of microRNAs and extracellular vesicles

While interactions between neural crest and placode cells are critical for the proper formation of the trigeminal ganglion, the mechanisms underlying this process remain largely uncharacterized. In our study, we show that the microRNA-(miR)203, whose epigenetic repression is required for neural crest migration, is reactivated in coalescing and condensing trigeminal ganglion cells. Overexpression of miR-203 induces ectopic coalescence of neural crest cells and increases ganglion size. Reciprocally, loss of miR-203 function in placode, but not neural crest, cells perturb trigeminal ganglion

condensation. Demonstrating intercellular communication, overexpression of miR-203 in the neural crest in vitro or in vivo represses a miR-responsive sensor in placode cells. Moreover, neural crest-secreted extracellular vesicles (EVs), visualized using pHluorin-CD63 vector, become incorporated into the cytoplasm of placode cells. Finally, RT-PCR analysis shows that small EVs isolated from condensing trigeminal ganglia are selectively loaded with miR-203. Together, our findings reveal a critical role in vivo for neural crest-placode communication mediated by small EVs and their selective microRNA cargo for proper trigeminal ganglion formation.

Pablo H. Strobl Mazzulla
Laboratory of Developmental Biology
Instituto Tecnológico de Chascomús (INTECH), CONICET – UNSAM. Chascomús, Argentina.
www.intech.conicet.gov.ar

Speaker 2: Carla Cisternas
An emerging role of active DNA demethylation in the sexual differentiation of neurochemical phenotype during brain development

In mammals, neural sex differences have been extensively studied offering insight into the neural underpinnings of sex differences in behavior and vulnerabilities to neuropsychiatric disorders. Differences in stable patterns of gene expression in neurons, which determine the neurochemical cell phenotype could underlie differences in neural function, connectivity and neurotransmitter production in males and females. However, the mechanisms underlying sexual differentiation of cell phenotype remain understudied. Recent evidence points to epigenetic modifications occurring early in life as mediators of the organizational effects of testosterone or estradiol during a perinatal critical period. We have found that expression of the epigenetic factors/enzymes involved in DNA methylation and demethylation is greatest during the first week of life. Sex differences in expression of the epigenetic machinery are brain region-specific and a transient inhibition of DNA methylation or demethylation in neonatal male and female mice abolishes several sex differences in cell phenotype in the mouse hypothalamus suggesting that both DNA methylation and demethylation contribute to the development of neural sex differences. Taken together these findings highlight the role of epigenetics as early programing mechanisms mediating sexual differentiation of the brain.

Carla Cisternas - ccisternas@immf.uncor.edu
Instituto de Investigación Médica M. y M. Ferreyra INIMEC, CONICET – UNC, Facultad de

Ciencias Exactas Físicas y Naturales, Universidad Nacional de Córdoba – Córdoba, Argentina.
http://www.institutoferreyra.org

Speaker 3: Mariela Chertoff

Epigenetic mechanisms are disturbed by perinatal protein malnutrition in a sex- and region-specific manner

Brain development trajectory is altered by early life adversities during critical periods. Mental health is affected in a sex-specific manner, increasing the risk to suffer emotional disorders. We developed a mouse model of perinatal protein malnutrition in which dams were fed with normal (NP) or low (LP) protein diet during gestation and lactation. We observed sex-specific changes associated with memory, social cognition and emotive disorders. Transcriptional deregulation was observed in the immediate early genes and neurotransmission related molecules affecting excitatory/inhibitory balance. In order to understand the mechanisms underlying these changes we evaluate the expression of molecular machinery related with DNA methylation and demethylation, histone acetylation and deacetylation, histones methylation and demethylation and miRNAs. Sex- and region- specific changes on DNA methylation/demethylation machinery, genes encoding enzymes related with H3K27me3 and several miRNAs were found. Our results suggest that epigenetic mechanisms might be involved in the long-lasting effects of perinatal protein malnutrition in mental health.

Mariela Chertoff - marielachertoff@gmail.com
Laboratorio de Neuroepigenética y Adversidades Tempranas – DQB, FCEyN, UBA – IQUIBICEN, CONICET – Buenos Aires, Argentina
www.iquibicen.fcen.uba.ar

Speaker 4: Bruno G. Berardino

A novel multidimensional, perinatal social and material deprivation paradigm induces socio-emotional behavioral changes and alters gene expression of epigenetic machinery in young adult mice

Early-life adversities (ELA), such as child low socioeconomic conditions, affect the structure and function of the brain leading to impaired health and psychological well-being later in life. With the aim of understanding the neurobiological sequelae and mechanisms of risk of ELA, we designed and validated a multifactorial murine model of

social and material deprivation (SMD) produced by a set of adverse environmental factors assumed to be the proximal factors of low socioeconomic status. Dams exposed to SMD displayed depression-like traits and offered less care to their pups than control dams. Regarding offspring, SMD treated mice presented a neurodevelopmental delay, a dominant behavior, and impaired social cognition. Moreover, SMD males showed signs of aggressiveness. The neural correlates of these behaviors are constituted by morphological changes in the medial prefrontal cortex (mPFC), the amygdala and the hippocampus. Thus, we analyzed global gene expression through RNA-seq in the mPFC from SMD and control offspring. We observed that factors of epigenetic machinery, particularly related to histone methylation/demethylation, were dysregulated in SMD mice in a sex-specific manner. Gene expression alterations in the mPFC provide a molecular mechanism for understanding the neurobiology of exposure to early multidimensional adverse conditions.

Bruno G. Berardino - Laboratorio de Neuroepigenética y Adversidades Tempranas – DQB, FCEyN, UBA – IQUIBICEN, CONICET – Buenos Aires, Argentina
www.iquibicen.fcen.uba.ar

S3 – From evolution and development to regeneration of the central nervous system

Friday 25 th 15:30PM

Chair: Gabriel Scicolone - gscicolone@fmed.uba.ar
CONICET – Universidad de Buenos Aires, Instituto de Biología Celular y Neurociencias "Prof. E. De Robertis" (IBCN), Ciudad Autónoma de Buenos Aires, Argentina.
Universidad de Buenos Aires, Facultad de Medicina, Departamento de Biología Celular, Histología, Embriología y Genética, Ciudad Autónoma de Buenos Aires, Argentina.

Co-Chair: José Luis Ferran Bertone - jlferran@um.es - Departamento de Anatomia Humana y Psicobiologia. Universidad de Murcia, España.

Abstract

This session will delve into the cellular and molecular mechanisms that drive the development and regeneration of the central nervous system (CNS), as well as the impact they had during the evolution of homologous regions of the vertebrate CNS. We will discuss the cellular and molecular mechanisms involved in: conservation of homologies or generation of evolutionary novelties in the hypothalamic region of vertebrates using the prosomeric model to understand the CNS regionalization process; the maintaining and losing of neuro-competence and their relationship to neuro-regenerative capabilities; the formation of topographic ordered connections (mapping); the axon regeneration after injury and its possible implications for planning regenerative medical strategies. These themes not only present a high interest in Neurobiology but also important potential applications in Health Care.

Speaker 1: José Luis Ferran Bertone
Homologies and novelties in the hypothalamic region of South American mammals (chiroptera, chaetophractus vellosus and Didelphis albiventris)

The vertebrate central nervous system, which is built following similar rules in all vertebrates, is the result of a main construction plan (bauplan) that was present at the last common ancestor. A shared bauplan determines a similar regionalization process in the hypothalamic region of south American mammals. However, some differences can be expected in terms of sizes of the main nuclei that make up the hypothalamic region. Following the prosomeric model, the aim of our work was to determine the homologue, but also possible novelties, of the nuclei derived from the hypothalamic region by

comparing key mammals from South America. Homologues derivatives are those components that arose from the same part of the bauplan and that may or may be not similar between different species. In that case we analyzed three species with enough evolutive distance to have some potential differences. Adult brains of Didelphis albiventis (Marsupials), Chaetophractus vellosus (Xenarthra) and myotis (microchiropteras) as South American species were selected and compare with mice, rat and gerbil, sectioned and immunohistochemically analyzed with TH (Tyrosine Hydroxylase), PV (Parvalbumin), CR (Calretinin), CB (Calbindin), AVP (Arginine vasopressin), OXT (oxytocin), NF1 (neurophysin 1) and MCH (Melanin concentrating hormone) antibodies. As a result, following the prosomeric model, we compared the topological distribution of some alar and basal plate derivates of the hypothalamic region. We identify homologues components of the paraventricular, supraoptic, arcuate and also for all the specific TH hypothalamic derivatives. Our conclusion was that most of the homologues well know components of the hypothalamic region were present in the species compared. However, there are differences in size and in relation to the radial location of them. Finally, following this analysis some novelties can be proposed. This study could be important for future experimental approaches attempting to understand relevant hypothalamic homeostatic responses in relatively distant South American mammals.

José Luis Ferran Bertone - jlferran@um.es
Departamento de Anatomia Humana y Psicobiologia. Universidad de Murcia, España.
https://portalinvestigacion.um.es/investigadores/333230/detalle

Speaker 2: Katia Del Rio-Tsonis
Breaking the barrier of retinal pigment epithelium neurocompetence

The retinal pigment epithelium (RPE) is a monolayer of cells essential for retina health and physiology. RPE is a plastic tissue that can regenerate neural retina in embryonic amniotes via cell reprogramming. In chicken embryos, RPE reprograms into neural retina after retinectomy and FGF2 stimulation at embryonic day 4 (E4) but not at day 5 (E5), or later. We hypothesized that signaling pathways and intrinsic cell fate control during eye morphogenesis are coupled mechanisms that restrict RPE neurocompetence. To identify transcription factors and signaling pathway candidates for functional perturbation that could promote RPE reprogramming in the late embryonic state, we used single-nucleus multimodal profiling to differentiate chicken RPE from E3-E7. This analysis pointed to 9 up-regulated and 9 down-regulated transcription factor-encoding genes and accompanying changes in motif accessibility that coincided with RPE neurocompetence restriction. Our data suggest that enhanced activity of the Hippo-YAP pathway and

transcription factors such as NFIA and NFIB could restrict RPE neurocompetence. Inhibition of the Hippo-YAP pathway significantly increased cell proliferation in E4 and E5 RPE explants in the absence of FGF2, but did not induce retina formation, although it affected the expression of several genes, including EMT regulators and cell cycle-related genes, while suppressing RPE identity genes. In contrast, inhibition of NFIA increased the size of RPE explants, but only at E4. Altogether, our data suggest that the neurocompetence of embryonic RPE cells is jointly regulated by intrinsic and extrinsic cues, with differing effects on RPE cell behavior. Furthermore, these findings indicate that cell proliferation and gene regulatory networks may be responsible for controlling RPE reprogramming and restricting neurocompetence.

Katia Del Rio-Tsonis - delriok@miamioh.edu
Department of Biology, Miami University. Center for Visual Sciences, Miami University, Oxford, OH, USA.
https://www.eyeregenerationlab.com/

Speaker 3: Gabriel Scicolone
Wiring the central nervous system: from positional values to axon guidance

Investigating the cellular and molecular mechanisms involved in the development of topographically ordered connections (mapping) of the central nervous system (CNS) constitutes an important issue in neurobiology because these connections are the base of the CNS functions. Furthermore, the regeneration of these connections is the final purpose of any regenerative strategy designed to treat traumatic or degenerative pathologies.

The chicken retinotectal system is the main model to investigate the molecular mechanisms of mapping and the formation of these connections depends of two successive events: 1) the specification of topographic identity of neural progenitors cells (NPC) located in the retina and their targets, which establishes 2) the expression pattern of cellular surface molecules that maintain that topographic identity and direct axon guidance during mapping.

The acquisition of the topographic identity of retinal NPCs is not complete described and this knowledge is of main interest to employ NPC as source of retinal ganglion cells (RGC) which could restitute retino-tectal connections after injury. By culturing neurospheres developed from NPCs obtained from different regions of the retina at different stages of development allowed us to show a critical period for determining

topographic identity of NPCs, that FGF2 and insulin are sufficient to obtain RGCs at stages of development when they are not produced and that these RGC are competent to respond to axon guidance cues in a topographic appropriate form. This open the possibility that these RCGs could restitute topographic ordered connections after injury.

On the other hand, the way in which different axon guidance cues may interact and participate in retinotectal mapping is an incompletely understood issue. Thus, we investigated the potential interaction between EphA system and neurotrophins and the intracellular signaling that mediates their effects on axon guidance. We demonstrated that EphA3 and GDNF potentiate nasal RGC axon growth and chemo-attraction by decreasing ephrin-A-mediated EphA4 signaling and increasing FAK. Furthermore, we showed that integrity of lipid rafts is necessary for axon guidance effect mediated by EphA3 and GDNF.

These results highlight about: 1) the combinatorial effects of axon guidance cues during retinotectal mapping; 2) the temporo-spatial pattern and molecular mechanisms of acquisition of topographic identity and cito-differentiation of NPCs to RGCs and; 3) the capabily of RGC to response to axon guidance cues. These data are important in the field of neurobiology and present potential utilities in regenerative medicine.

Gabriel Scicolone - gscicolone@fmed.uba.ar
CONICET – Universidad de Buenos Aires, Instituto de Biología Celular y Neurociencias “Prof. E. De Robertis” (IBCN), Ciudad Autónoma de Buenos Aires, Argentina.
Universidad de Buenos Aires, Facultad de Medicina, Departamento de Biología Celular, Histología, Embriología y Genética, Ciudad Autónoma de Buenos Aires, Argentina.
https://ibcn.fmed.uba.ar/200_grupos-lab-neurobiologia-scicolone.html

Speaker 4: Mariana S Silveira
APou4f2 overexpression in the postnatal retina induces the generation of RGC like cells which efficiently project axons

Retinal ganglion cells (RGCs) are the projection neurons of the retina and the first population to be generated in retinal development. In various retinopathies, such as glaucoma, vision loss is a consequence of the progressive dysfunction and regeneration of RGCs and their axons. Atoh7 is an orchestrator of the RGC developmental program and regulates the expression of critical downstream targets, such as POU4F factors. The importance of POU4F factors for RGC development and survival has been established in several studies which showed that the absence of one or more members of this family

results in RGC death.
We investigated whether Pou4f2 overexpression in late retinal progenitors (late RPCs) could induce the generation of RGCs beyond their developmental window. Using a strong ubiquitous promoter to induce Pou4f2 overexpression in neonates through in vivo electroporation, we detected changes in cell distribution in the retina, with increased numbers of electroporated cells in the inner cell layer, where RGCs normally reside. Moreover, we found a high density of projections toward the optic nerve head. Single cell RNA sequencing (scRNA-seq) analysis showed upregulation of multiple RGC-related genes (such as Rbpms, Gap-43, Hs6st3 and Foxp2) following Pou4f2 overexpression. Comparison with previously published scRNA-seq data from retinal development showed that some cells in the Pou4f2-induced clusters shared similarity with the original RGCs. In addition, gene ontology analysis indicated that axonogenesis and neuronal differentiation were induced after Pou4f2 overexpression. Notably, these RGC-like cells were able to project axons that reached brain targets, such as superior colliculus.
Collectively, these data show that Pou4f2 alone induces a key property of projection neurons that is to project axons up to the brain and endorse its potential as a candidate for reprogramming strategies directed to the generation of new RGCs.

This study was supported by IRRF, CNPq, CAPES and FAPERJ.

Mariana S Silveira - silveira@biof.ufrj.br
Laboratory for Investigation in Neuroregeneration and Development (LINDes), Neurobiology Program, Institute of Biophysics Carlos Chagas Filho, Federal University of Rio de Janeiro, Rio de Janeiro, Brasil.
https://orcid.org/0000-0002-0496-1517

S4 – The Intricate Relationship between Stressful Events and Memory Processes: Exploring Modulatory Complexity

Friday 25 th 15:30PM

Chair: Alejandro Delorenzi
Laboratorio de Neurobiología de la Modulación de la Memoria Neurobiology of Memory Modulation Lab - Instituto de Fisiología, Biología Molecular y Neurociencias (IFIBYNE-UBA-CONICET)
https://ifibyne.fcen.uba.ar/grupo-delorenzi/

Abstract

Numerous studies have indicated that stressful events, emotional arousal, and stress-related hormones can enhance memory consolidation. However, they can also have adverse effects on memory retrieval. Despite abundant empirical evidence identifying a variety of factors modulating different stages of memory, we still face significant challenges in understanding the general rules governing how living organisms manage these modulatory elements. The exploration of how stress and emotional factors influence memory performance presents a challenge due to the inherent complexity of this process. This complexity is reflected in its sensitivity to multiple variables, such as the intensity of the stressor, the memory phase, and the nature of the learned material. Despite the well-established effects of neuromodulators released in response to stress on emotional memory formation, it remains challenging to anticipate whether a specific type of memory will be enhanced, impaired, or prevented following a stressful event. In this symposium, experimental approaches highlighting this complexity will be presented, and some conceptualizations of this issue will be discussed.

Speaker 1: Kenneth D. Lukowiak

Different ecological relevant stressors lead to the same behavioural phenotype but the underlying neural processes are different.

Both a Garcia-effect and a continual learning training procedure lead to a similar behavioural phenotype: a decrease in the positive hedonic value assigned by the organism to a food taste. In both procedures snails (Lymnaea stagnalis) show a significant decrease in their feeding response to the food taste. However, the stressors that cause a Garcia-effect do not cause a Configural Learning effect and the stressors that cause a Configural Learning effect do not cause a Garcia-effect memory. We hypothesize that the configural learning training procedure cause a Landscape of Fear to be established in the brain of the snail whilst the Garcia-effect training procedure causes

a Landscape of sickness to be established in the nervous system of the snail. I will go over the different and similar molecular pathways that the specific stressors elicit in the nervous system. These data show that the snail is more complicated than most of us imagine as it can easily make a cost benefit analysis of how stressors alter its behaviour.

Kenneth D. Lukowiak - lukowiak@ucalgary.ca
University of Calgary: Calgary, AB, CA
https://profiles.ucalgary.ca/kenneth-daniel-lukowiak

Speaker 2: Gastón Calfa
Stress in the dynamism of a fear memory

The importance of a dynamic fear memory is that the organism may have the chance to acquire, store and recall critical information, giving to the mnemonic process, the suitable relevance to cope with a changing environment. Such dynamism of a fear memory, and in particular the destabilization/reconsolidation process, is critically affected due to the internal emotional state resulting from, for example, the exposition to an unescapable stressor. Consequently, it represents a traumatic fear memory, pathognomonic of anxiety disorders. Understanding the neurophysiological changes associated to the dynamism of a fear memory, under particular negative emotional states, is relevant for the comprehension of the underlying mechanisms involved in the occurrence of traumatic and persistent memories, as well as for the rebuilding of potential therapeutics tools that could reestablish the adaptive dynamic of the fear memory trace. Here, we will focus on the relevant outcomes observed in animal models of fear learning and memory and its interaction with stressful experiences, along with the observations performed in humans under the psychiatric disorders previously mentioned.

Gastón Calfa - gaston.calfa@unc.edu.ar
Universidad Nacional de Córdoba: Cordoba, Córdoba, AR. Ins. de Farmacología Experimental
https://ifec.fcq.unc.edu.ar/integrantes_ifec/dr-gaston-calfa/&ved=2ahUKEwiWus3KkM-FAxV3gWEGHeNxBwwQFnoECBUQAQ&usg=AOvVaw0P0KzMXr4dHIYUe5QrPsz9

Speaker 3: Jimmy Stehberg
Role of astroglial gliotransmission in memory, stress responses and depression

Astrocytes regulate glutamatergic synaptic transmission, presynaptic glutamate release and post synaptic NMDAR activity, via the release of gliotransmitters such as glutamate, D-serine and ATP. Here we summarize recent evidence showing that astroglial gliotransmission is critical for short-term fear memory, stress responses and chronic stress-induced depression.

Jimmy Stehberg - jstehberg@unab.cl
Laboratorio de Neurobiología, Centro de Investigaciones Biomédicas, Universidad Andres Bello Santiago, Chile.
https://researchers.unab.cl/es/persons/jimmy-stehberg

Speaker 4: Raquel V. Fornari
Glucocorticoid influences on systems consolidation and contextual memory specificity

Contextual fear memories undergo systems consolidation over time, with memory retrieval becoming more dependent on neocortical regions with loss of contextual details, eliciting fear generalization. Here we will address the influence of different training intensities on systems consolidation and memory specificity over time in rats, showing that a strong contextual fear conditioning protocol promotes time-dependent fear generalization associated with post-training corticosterone levels and increased engagement of Salience Network brain regions. The role of glucocorticoid receptors (GR) in the dorsomedial prefrontal cortex and the dorsal hippocampus in the modulation of contextual fear memory specificity will also be discussed.

Raquel V. Fornari - raquel.fornari@ufabc.edu.br
Centro de Matemática, Computação e Cognição, Universidade Federal do ABC, Brazil
https://www.ufabc.edu.br/ensino/docentes/raquel-vecchio-fornari

S5 – Unleashing the Potential of Human Induced Pluripotent Stem Cells in Neuroscience Research

Saturday 26 th 10:30AM

Chair: Tomás Falzone - tfalzone@fmed.uba.ar
Instituto de Investigación en Biomedicina de Buenos Aires – (IBioBA-CONICET-MPSP)
Instituto de Biología Celular y Neurociencias (IBCN-UBA-CONICET)

Co-Chair: Nicolás Unsain - nunsain@immf.uncor.edu
Instituto de Investigación Médica Mercedes y Martín Ferreyra INIMEC-CONICET-Universidad Nacional de Córdoba.

Abstract

The discovery and application of induced pluripotent stem cells (iPSCs) have revolutionized the field of neuroscience research. iPSCs, derived from adult human cells, possess the remarkable ability to differentiate into various cell types, including neurons. This symposium aims to explore the profound impact of iPSCs in understanding the physiology and pathophysiology of the human brain.

By generating iPSCs from adult human cells (hiPSCs), such as skin or blood cells, researchers can recreate an embryonic-like state and study human brain development and diseases at a cellular level. This approach enables the modeling of a range of neurological disorders, including Parkinson's disease, Alzheimer's disease, and autism. iPSCs derived from patients with these disorders or known mutations offer valuable insights into disease progression and the identification of potential treatments.

An exciting frontier in this field is the creation of brain organoids, or "mini-brains," wherein different cell populations differentiate to mimic the cellular diversity of various brain regions. These three-dimensional structures offer insights into the organizational principles of brain areas, and also to assess neuronal function in a more complex and "realistic" environment.

Both distinguished and mid-career speakers at the symposium will present their latest advances in iPSC research, providing valuable knowledge to colleagues in the region and amplifying its impact. Marilia Zaluar (Universidade Federal do Rio de Janeiro, Brazil) develops human neural models related to opioid tolerance, epilepsy, and viral infections affecting the nervous system. Ana Lis Moyano (CIMETSA, Córdoba, Argentina) will share her findings on how extracellular vesicles shape the development of organoids and disease progression in human-derived neurons from Alzheimer's patients. Maria Ioannou (University of Alberta, Canada) will share her research connecting lipid

alterations in Parkinson's disease to α-synuclein pathology using iPSC-derived dopaminergic neurons of patients with GBA1 and LRRK2 mutations. Lastly, Thomas Durcan (McGill University, Canada) will showcase an open science platform for collaborative efforts in creating a repository of hiPSCs to gain insights into treating a wide range of neurological diseases.

This symposium marks a pivotal moment for human iPSC research in Argentina, with the goal of fostering collaboration and knowledge exchange among researchers in neuroscience. By bringing together diverse perspectives and regions, we aim to create bridges that will positively impact our research community and ultimately advance our understanding of the human brain.

Speaker 1: Marília Zaluar Guimarães
Neural cells derived from Induced Pluripotent Stem cells as models of viral diseases

Studies with human induced-pluripotent stem-cells (hiPSC) and pathogens initially focused on immune cells, since there is a great translational gap between human and murine models regarding inflammation. Fueled by the Zika virus pandemic, these techniques made possible establishing a causal relationship between infection and microcephaly. Moreover, we have looked for an environmental agent to explain why the northeast of Brazil had more microcephaly cases than the rest of the country, and have modeled in vitro what this agent does to neurons. More recently, we used hiPSC-derived cellular and tissular models to investigate SARS-CoV-2 infection in distinct cell types and to search for new treatments to NeuroCOVID. Independent of when the causal agent arose or will arise, modeling infections with human cells will certainly be valuable and complementary to animal models in the comprehension of human and animal infectious diseases, past, present and future.

Marília Zaluar Guimarães - marilia.zaluar@idor.org
Instituto Dor de Pesquisa e Ensino. Rio de Janeiro, Brasil.
https://ppgcm.icb.ufrj.br/marilia-zaluar/

Speaker 2: Ana Lis Moyano
Exploring stem-cell derived extracellular vesicles as regenerative signals and biomarkers in CNS diseases

Extracellular vesicles (EVs) play a fundamental role in intercellular communication between different cell types in the central nervous system (CNS). These small nanoparticles transport diverse molecular cargoes, including proteins, RNAs and lipids, which not only can reflect the condition and identity of their parental cell but also elicit changes in recipient cells. EVs are key mediators of CNS functions, facilitating signaling across the blood-brain barrier and CNS-periphery communication under both healthy and pathological conditions. Therefore, EVs are extensively investigated as biomarkers for CNS diseases and in regenerative medicine as an alternative to cell therapy. Stem-cell EVs exhibit a biological activity comparable to cell-based therapies, have less immunogenicity, are easier to manipulate, and do not form teratomas. Our research suggests that EVs produced by neural stem cells may be responsible for the therapeutic effects in CNS injury. Moreover, stem-cell derived EVs can reflect early hallmarks of CNS diseases.

Ana Lis Moyano - ana.moyano@iucbc.edu.ar
CIMETSA, Córdoba, Argentina
https://www.iucbc.edu.ar/cimetsa/vesiculas-extracelulares-y-enfermedades-desmielinizantes.html

Speaker 3: Maria S. Ioannou
Connecting lipid alterations in Parkinson's disease to α-synuclein pathology

Intercellular transmission of α-synuclein contributes to the pathology of Parkinson's disease. Yet, the mechanisms of α-synuclein spread are not fully understood. Here, we will show how defects in glucosylceramide metabolism induce the shedding of extracellular vesicles loaded with pathogenic α-synuclein fibrils in primary cortical neurons and in iPSC-derived dopaminergic neurons of patients with GBA1 and LRRK2 mutations. These data reveal glucosylceramide as a key player driving α-synuclein transmission in Parkinson's disease.

Maria S. Ioannou - ioannou@ualberta.ca
University of Alberta, Alberta, Canada
https://www.ualberta.ca/cellbiology/people/faculty/maria-ioannou.html

Speaker 4: Thomas Durcan
Advancing our understanding of brain disorders with stem cells

As Associate Professor within the Montreal Neurological Institute (The Neuro) and McGill University and Director of the Neuro's Early Drug Discovery Unit (EDDU), my group is focused on the use of human induced pluripotent stem cells (iPSCs) for fundamental and translational discovery projects through partnerships with academia and industry. Founded a decade ago, the group has established a cohort of 150+ iPSCs that have been advanced into different projects within the group and used to generate a wide range of neuronal and glial subtypes, in addition to more advanced 3D brain organoid models. For the talk, I will focus on a number of case studies from the group, describing how the group develops stem cell models within a dish to model a disease on a dish. Examples will include Parkinson's disease, Leukodystrophies and Fragile X as case studies. This work is funded through research grants from the Michael J Fox Foundation, Brain Canada, CQDM, the Canadian Institute for Health Research, the US Department of Defense (DOD) and the McGill Healthy Brains, Healthy Lives (HBHL) initiative.

Thomas Durcan - thomas.durcan@mcgill.ca
McGill University, Canada
https://www.mcgill.ca/neuro/thomas-durcan-phd

S6 – Neural activity and behavior in vertebrates: the spark that moves us

Saturday 26 th 10:30AM

Chair: Ruben Muzio - rnmuzio@gmail.com
Grupo de Aprendizaje y Cognición Comparada, Lab de Biología del Comportamiento, IBYME-CONICET Instituto de Investigaciones, Facultad de Psicología, UBA

Co-Chair: Maria Florencia Daneri - flordaneri@yahoo.com
Grupo de Aprendizaje y Cognición Comparada, Lab de Biología del Comportamiento, IBYME-CONICET Instituto de Investigaciones, Facultad de Psicología, UBA

Abstract

The study of neural electrical activity is a powerful tool in our attempt to understand the brain circuits involved in a certain behavior. It is within these neural circuits that the essence of behavior is encoded, where thoughts are formed, decisions are made, and actions are executed. By deciphering how neural activity encodes information and the areas involved, we gain unprecedented insight into the evolutionary conserved mechanisms that govern behavior in vertebrates, from the simplest primitive behaviors to the most complex cognitive processes.

The symposium will have four talks addressing different vertebrate models were the electrical neural activity is used to identify the brain areas involved in a selected group highly relevant behaviours: sleep, emotional responses and consciousness.

Speaker 1: Rocío C. Fernández
Role of the medial prefrontal cortex in the frustration response to the devaluation of an appetitive reward

The study of how individuals modify their behavior in response to new reinforcement conditions is crucial for understanding cognitive and emotional processes in adapting to changing environments. The Successive Negative Contrast (CNS) paradigm allows for the investigation of these processes in a laboratory setting by training subjects under high reinforcement conditions that are unexpectedly degraded, leading to behavioral and physiological changes known as “frustration response”. Understanding which brain areas participate in incentive evaluation and negative responses like frustration is fundamental. In this study, two techniques were used to investigate the neural basis of the phenomenon: (i) Electrophysiological recordings in the medial prefrontal cortex during a CNS protocol with rats in head-fixed conditions receiving devaluation of sugary

solutions. An increase in firing rate of pyramidal neurons was observed following devaluation, along with changes in their response pattern. (ii) Immunohistochemistry of c-Fos in the medial prefrontal cortex in subjects receiving devaluation of solid food. An increase in anterior cingulate cortex activity was observed in devalued subjects compared to non-devalued subjects. These findings will contribute to characterizing the circuits involved in frustration response, shedding light on the neurobiological underpinnings of adaptive behavior in response to changing reinforcement contingencies.

Rocío C. Fernández - roccfernandez@gmail.com
Grupo de Aprendizaje y Cognición Comparada y Grupo de Circuitos Neuronales, Cognición y Conducta, Lab de Biología del Comportamiento, IBYME-CONICET Instituto de Investigaciones, Facultad de Psicología, UBA
https://ibyme.org.ar/investigacion/laboratorios/biologia-del-comportamiento/

Speaker 2: Luciana Benedetto
The impact of sleep deprivation in the postpartum rat

In all female mammals studied, the mother will experience sleep disturbances during the postpartum period. However, sleep deprivation (SD) is a common feature in modern society that will worsen maternal sleep. Although it is widely documented that SD in non-lactating animals determines a wide variety of physiological alterations, its effects during the postpartum period it is understudied. Being SD a stressful situation itself, together with the fact that stress in mother can modify milk ejection and composition, and maternal behavior, we wonder if these parameters would be disrupted when mother rats are subjected to an additional sleep restriction to the already existing sleep disturbances. For that purpose, lactating rats were implanted for polysomnographic recordings and for deep brain electrical stimulation for SD procedure. Mother rats were randomly assigned to a control group, chronic SD or acute SD; maternal behavior, milk ejections, and milk macronutrients components were analyzed.

Our results show that the consequences of acute and chronic SD differ, where acute SD mainly affects macronutrient composition and chronic SD alters active maternal behaviors towards the end of the SD period.

Luciana Benedetto - lbenedet@fmed.edu.uy
Unidad Académica de Fisiología, Facultad de Medicina, UdelaR
http://www.labsueno.fmed.edu.uy/material-estudiantes/materiales/l%C3%ADneas-investigaci%C3%B3n

Speaker 3: Maria Ines Sotelo
Preparing to sleep: the importance of the nest, social companionship and the role of emotions

Sleep constitutes a quiescent state that is crucially involved in brain plasticity and vital for health. However, besides our need to sleep, we also need to eat, mate, move or interact with other conspecifics. The coordination of these active behaviors during vigilance is crucial to ensure appropriate time to rest. Animals do not just fall asleep at any time and anywhere: prior to sleep, they find an appropriate site and engage in a stereotypic behavioral routine that may involve preparing a nest or a bed, performing hygiene related activities, sometimes in the companionship of other conspecifics. Recently, in our lab we determined that mice perform a stereotypic routine before sleep that involves self-grooming and nest-building behavior. Moreover, we found that a glutamatergic population of neurons in the lateral hypothalamus is key for the appropriate development of nesting behavior and that this influences the quality of sleep. Notably, we also found that this routine is performed next to other conspecific mice that sleep in the same nest and who later on share synchronized sleep features. Our work opens new avenues to study plasticity in sleep and highlights the importance of the presleep routine in achieving sleep consolidation. Our current work is focusing on how sleep and the sleep preparatory routine may be altered under emotional distress, impeding the normal balance between vigilance and sleep.

Maria Ines Sotelo - minessotelo@gmail.com
Grupo de Aprendizaje y Cognición Comparada, Lab de Biología del Comportamiento, IBYME-CONICET Instituto de Investigaciones, Facultad de Psicología, UBA
https://ibyme.org.ar/investigacion/laboratorios/biologia-del-comportamiento/

Speaker 4: Sergio Lew
Integrated Information: Unveiling Consciousness

Consciousness is one of the most complex aspects of human experience. Studying the mechanisms involved in the transitions among different levels of consciousness remains as one of the greatest challenges in neuroscience. In this study we use a measure of integrated information (ΦAR) to evaluate dynamic changes during consciousness transitions. We applied the measure to intracranial electroencephalography (SEEG) recordings collected from 6 patients that suffer from refractory epilepsy, taking into account inter-ictal, pre-ictal and ictal periods. We analyzed the dynamical evolution of ΦAR in groups of electrode contacts outside the epileptogenic region and compared it

with the Consciousness Seizure Scale (CCS). We show that changes on ΦAR are significantly correlated with changes in the reported states of consciousness.

Sergio Lew - sergiolew@gmail.com
Instituto de Ingeniería Biomédica, Facultad de Ingeniería, UBA
https://www.fi.uba.ar/institucional/institutos-centros-y-escuelas/instituto-de-ingenieria-biomedica

S7 – Neuropeptides: from molecules to behavior

Sunday 27 th 10:30AM

Chair: Andrea Godino - agodino@immf.uncor.edu
Instituto de Investigación Médica Mercedes y Martín Ferreyra, INIMEC-CONICET Universidad Nacional de Córdoba, Friuli 2434, Córdoba 5016, Argentina Facultad de Psicología, Universidad Nacional de Córdoba, Boulevard de la Reforma & Enf. Gordillo Gómez, Córdoba 5000, Argentina

Abstract

This symposium aims to discuss the different neuropeptides system's recent molecular and behavioral regulations. It will explore the peptide's role under several physiological, pathophysiological, and programming conditions and the central and peripheral effects of those neuropeptides, and the sex differences. The speakers will present data acquired using state-of-art techniques, such as electrophysiological and blood pressure recordings, microdialysis, real-time PCR, proteome, single-nucleus RNAseq, and pharmacological approaches. Dr. Sotomayor-Zárate will talk about the role of the glucagon-like peptide-1 system in homeostatic and hedonic control of feeding. Dr. Renard will talk about the role of vasopressin in addictive behaviors and the regulation of the reward system. Dr. Mecawi Will talk about the transcriptional conservation and divergence in oxytocin and vasopressin-producing hypothalamic magnocellular neurons across evolution. Finally, Dr. Godino will talk about the effect of programming vasopressin magnocellular cells on osmoregulatory responses.

Speaker 1: Ramón Sotomayor-Zárate

LATERAL SEPTUM - LATERAL HYPOTHALAMUS CONNECTION IN OBESITY: ROLE OF GLP-1/GLP-1R

Obesity is a global pandemic that generates significant health costs associated with developing chronic diseases such as hypertension, dyslipidemia, and diabetes. A behavioral characteristic in obese patients is hyperphagia, which accounts for dysregulations in the brain circuits that control homeostatic and hedonic food intake. Feeding control is regulated by hypothalamic and extra-hypothalamic areas such as the lateral septum (LS). The Glucagon-like peptide-1 (GLP-1) system has taken great relevance in controlling food intake, and LS expresses the GLP-1 receptor. In addition, LS GABAergic projections regulate the activity of the lateral hypothalamus (LH) and ventral tegmental area (VTA), which are involved in homeostatic and hedonic control of feeding, respectively.

At a neurochemical level, we have shown that the release of GABA in LH mediated by the activation of LS neurons is lower in high-fat diet (HFD) male and female rats than in control rats. We indicate a lower activation of this nucleus in a diet-induced obesity model. Regarding sex differences, we have shown that females expressed higher levels of GLP-1 receptor in the LS than males, and females subjected to an HFD have lower LS GLP-1 receptor levels than control females. Interestingly, treatment with a GLP-1 analog reverted this change. Electrophysiological studies performed on slices in LS and nucleus accumbens (NAcc) showed a reduced probability of glutamate release in LS from males exposed to HFD, accounting for the lower GABA release in LH observed in HFD rats.

In this context, our research demonstrated that this chronic exposure to a high-fat diet decreases the activity of GABAergic neurons in the LS, which results in lower regulatory activity in another brain area known as the hunger center (lateral hypothalamus [LH]). Therefore, the functional and neurochemical deregulation, together with altered gene and protein expression patterns in the LS, accounts for the characteristic hyperphagia of patients with obesity, which could be partly due to this lower activity of the LS on LH. This evidence makes LS an attractive pharmacological target for searching for new treatments to combat this global pandemic.

Ramón Sotomayor-Zárate - ramon.sotomayor@uv.cl
Centro de Neurobiología y Fisiopatología Integrativa (CENFI), Instituto de Fisiología, Facultad de Ciencias, Universidad de Valparaíso, Valparaíso, Chile.
https://www.neurobiologia.cl/investigadores/ramon-sotomayor-z/

Speaker 2: Georgina María Renard
Exploring the role of vasopressin in amphetamine addiction and reward system modulation

Drug addiction is a chronic brain disease characterized by compulsive use of drugs. Amphetamine (AMPH) is a psychoactive substance commonly used as a recreational drug by young people, and there is a lack of effective medications for the treatment of AMPH or other psychostimulant addiction. Recent studies have shown that the vasopressin (AVP) system plays a significant role in drug addiction, making it an interesting therapeutic target. The lateral septum (LS) is a brain structure implicated in addictive behaviors, regulating the activation of dopamine (DA) neurons in the ventral tegmental area (VTA), therefore modulating the reward system. Extended amygdala vasopressin (AVP) projections to LS are sexually dimorphic and could be responsible for the vulnerability to addiction in a sex-dependent manner. Our work aimed to study the effect of LS AVP system modulation on AMPH-induced behavioral and neurochemical

responses in female and male rats. We showed that AVP microinjection in LS reduces the expression of AMPH-induced conditioned place preference (CPP) in male and female rats. However, this behavior is only associated with lower nucleus accumbens (NAc) DA release in male rats. Also, intra-LS AVP administration increases LS GABA release and decreases VTA DA release only in male rats. Interestingly, our data demonstrate that intra-LS AVP reduces AMPH-induced CPP in rats of both sexes; however, at the neurochemical level, we observed sex differences. This research contributes to the knowledge about sex differences in the role of AVP in LS in regulating the reward circuit and addictive-like behaviors.

Georgina María Renard - georgina.renard@usach.cl
Centro de Investigación Biomédica Aplicada (CIBAP), Escuela de Medicina, Facultad de Ciencias Médicas, Universidad de Santiago de Chile, Santiago, Chile
https://cibap.usach.cl/es/georgina-m-renard

Speaker 3: André de Souza Mecawi
Molecular regulation of magnocellular neurons function: insights from single-cell RNA sequencing

The hypothalamic magnocellular neurons (MCNs) in the supraoptic and paraventricular nuclei synthesize and release vasopressin (AVP) and oxytocin (OXT), crucial for regulating renal water reabsorption and female reproductive function. MCNs also influence emotional and cognitive functions via collateral axons. Understanding their molecular regulation and diversity is essential. Recent single-nucleus RNA sequencing in rat supraoptic nucleus identified eight MCN subtypes, including major OXT and AVP-producing clusters with unique transcriptomic signatures. Cell-Chat analysis revealed communication pathways with other neuronal and glial cells, while pseudotrajectory analysis identified genes linked to transcriptional plasticity. NEUROeSTIMator and scVelo identified genes and pathways associated with neuronal activation and AVP RNA processing during water deprivation. Integrating rat data with previous RNA sequencing from other mammals showed transcriptional conservation and divergence in OXT and AVP-producing MCNs across evolution. This collective data provides a comprehensive understanding of MCN diversity, activity-related responses, and evolutionary molecular patterns in mammals.

André de Souza Mecawi - mecawi@unifesp.br
Laboratory of Molecular Neuroendocrinology
Department of Biophysics Paulista School of Medicine – Federal University of São Paulo, Brasil
https://scholar.google.com.br/citations?user=s0Cil-MAAAAJ&hl=pt-BR

Speaker 4: Andrea Godino

Effect of early programming stimuli on vasopressin magnocellular cells and osmoregulatory responses

It has been described that maternal forced high sodium intake during gestation and the perinatal period is capable of modulating both blood pressure and salt intake in the next generation. This early manipulation has anatomical and molecular programming effects at the renal, cerebral, and vascular levels that increase basal and induced blood pressure. In addition, the hypothalamic vasopressinergic system has also been described as a neurobiological substrate vulnerable to the effects of perinatal programming. However, the programming effects of the natriophilia proper of the perinatal period on blood pressure control and the vasopressinergic system have not yet been elucidated. Thus, our work aimed to study the effect of a sodium overload (SO) challenge on blood pressure response and renal and brain gene expression in adult offspring exposed to voluntary hypertonic sodium intake during the perinatal period (PM-NaCl group). We show that male PM-NaCl rats exhibit a more sustained increase in blood pressure after SO than controls (PM-Control). However, female PM-NaCl rats did not show a programmer effect on the blood pressure response. Also, the relative expression of heteronuclear vasopressin (AVP hnRNA) and AVP along the supraoptic nucleus was not changed after SO in PM-NaCl, in contrast to the increase observed in PM-Controls. At renal level, male PM-NaCl rats also showed a reduced number of glomeruli, decreased expression of transient receptor potential vanilloid type 1 (TRPV1), and increased expression of angiotensinergic type 1 receptor (At1a) without changes in vasopressinergic 2 receptor (V2) in the kidney cortex. The data indicate that the availability of a rich source of sodium during the perinatal period induces a long-term effect modifying renal, cardiovascular, and neuroendocrine responses implicated in the control of hydroelectrolyte homeostasis.

Andrea Godino - agodino@immf.uncor.edu
Instituto de Investigación Médica Mercedes y Martín Ferreyra, INIMEC-CONICET-Universidad Nacional de Córdoba, Friuli 2434, Córdoba 5016, Argentina Facultad de Psicología, Universidad Nacional de Córdoba, Boulevard de la Reforma & Enf. Gordillo Gómez, Córdoba 5000, Argentina
https://institutoferreyra.org/andrea-godino/

S8 – Neural Computations in the Brain: Bridging Theory and Experiments

Sunday 27 th 10:30AM

Chair: Rodrigo Echeveste - recheveste@sinc.unl.edu.ar
sinc(i), CONICET-UNL
Chair: Josefina Catoni - jcatoni@sinc.unl.edu.ar
sinc(i), CONICET-UNL

Abstract

Understanding the mechanisms employed by the brain to acquire, process and store information is a complex task which benefits from an interdisciplinary approach, combining empirical knowledge and expertise from the biological sciences with analytic and modeling tools commonly employed in the exact sciences. This includes tools from dynamical systems, signal processing, machine learning, and probabilistic modeling among others. This symposium brings together four scientists who apply a wide range of tools in order to further our understanding of perception, representations, belief formation, and behavioral outputs.

Note: A special emphasis has been put on diversity, not only in terms of gender but also trying to bring together well established scientists with young investigators.

Speaker 1: Ana Amador
Unveiling motor patterns in birdsong with AI

Understanding the cortical representation of vocal communication signals is a major challenge for behavioral neuroscience. In this work, we report evidence of low dimensional neural activity in nucleus HVC (proper name, telencephalic sensorimotor area), during the song production in adult male canaries (Serinus canaria). We recorded multi-unit neural activity in multiple HVC sites and used machine learning techniques to process the data. We unveiled a low dimensional representation of the neural recordings analyzing the modes of the latent space of an auto-encoder. Overall, our results show that the rhythmic features of the vocal behaviors are represented in a telencephalic region of canaries.

Ana Amador - anita@df.uba.ar
Dynamical Systems Lab, DF, FCEN-UBA
https://www.df.uba.ar/es/component/researchers/miembro/68-Ana_Amador

Speaker 2: Josefina Catoni
nmasking visual perception: neural-like representations emerge in artificial neural networks optimized for Bayesian probabilistic inference

The Bayesian theory of visual perception assumes that, given a stimulus, the brain performs probabilistic inference to estimate probabilistic distributions over unobservable variables. This process involves combining sensory information with previous expectations captured by a prior distribution. To understand how this process might occur in the cortex, we train artificial neural networks for a perceptual task: performing Bayesian inference in the context of natural images. In this case, we train Variational Autoencoders, which simultaneously learn a generative model of image patches alongside the corresponding inference model. We show that, under the requirement of optimal inference and using sparse activations, representations similar to those observed in the visual cortex emerge within the network. Notably, when an explicit contrast variable is included in the model, the network is able to not only correctly represent mean estimates about these over unobservable variables but also the level of remaining uncertainty after the observation.

Josefina Catoni - jcatoni@sinc.unl.edu.ar
sinc(i), CONICET-UNL
https://sinc.unl.edu.ar/staff/josefina-catoni/

Speaker 3: Guillermo Solovey
Understanding belief in political statements using a model-driven experimental approach: a registered report

Misinformation harms society by affecting citizens' beliefs and behavior. Recent research has shown that partisanship and cognitive reflection (i.e. engaging in analytical thinking) play key roles in the acceptance of misinformation. However, the relative importance of these factors remains a topic of ongoing debate. In a registered report study, we tested four hypotheses on the relationship between each factor and the belief in statements made by Argentine politicians. Participants (N = 1353) classified fact-checked political statements as true or false, completed a cognitive reflection test, and reported their voting preferences. Using Signal Detection Theory and Bayesian modeling, we found a positive association between political concordance and overall belief, and additionally, that individuals with higher cognitive reflection exhibited greater skepticism, improved truth discernment, but also heightened partisan bias. Our

results highlight the need to further investigate the relationship between cognitive reflection and partisanship in different contexts and formats.

Guillermo Solovey - gsolovey@gmail.com
Instituto de Cálculo, CONICET-UBA
https://www.ic.fcen.uba.ar/institucional/integrantes/solovey

Speaker 4: Mariano Nicolás Díaz Rivera
Mapping meaning: electrophysiological dynamics of domain-specific semantic processing in the human brain

Traditionally, semantic processes have been associated with the activation of multimodal temporal cortices. In recent years, substantial research has expanded this notion by highlighting the significant involvement of modality-specific systems. Yet, what the scope of such embodied phenomena is across conceptual categories remains to be explored. Here, I will introduce a framework combining lesion models with EEG and iEEG to capture key correlates of action, emotional, and negation concepts. Strategically, we focus on persons with movement disorders (Parkinson's disease), socio-behavioral disruptions (behavioral variant frontotemporal dementia), and depth electrodes due to refractory epilepsy. Converging evidence from ERP and oscillatory measures show that these action, emotional, and negation concepts distinctly modulate canonical motor, affective, and inhibitory electrophysiological mechanisms, respectively. Signatures of normal and abnormal processing of these categories span early (< 300 ms) and late (> 300 ms) windows, attesting to the temporal ubiquity of embodied reactivations in the human brain. Altogether, these results illuminate the role of modality specific systems in semantic processing, while pointing to new electrophysiological indexes for disease characterization and monitoring.

Mariano Nicolás Díaz Rivera - mdiazrivera@udesa.edu.ar
CNC-UdeSA
https://udesa.edu.ar/cuerpo-docente/mariano-diaz-rivera

YOUNG INVESTIGATORS TALKS

Young Investigator 1 – Aula Magna Pabellón 1

YI | Joaquin Pardo | Modelling Parkinson's Disease on a single neuron level by transducing rat dopaminergic neurons with barcoded AAVs

Joaquín Pardo[1 2], Martino Avallone[2], Sara Palo[2], Tomas Björklund[2]

[1]Instituto de Investigaciones Bioquímicas de La Plata "Profesor Doctor Rodolfo R. Brenner". Facultad de Ciencias Médicas. Universidad Nacional de La Plata. Buenos Aires, Argentina.
[2]Molecular Neuromodulation, Wallenberg Neuroscience Center, Lund University, Lund, Sweden

Abstract
Parkinson's Disease (PD) is a neurodegenerative condition affecting motor function without a cure. PD is characterized by proteinaceous aggregates in the brain, the Lewy Bodies (LB), mainly composed of alpha-Synuclein protein (aSyn). In PD, LBs primarily affect dopaminergic (DA) neurons of the midbrain substantia nigra (SN), which project to the Striatum. Hence, detecting transcriptomic responses in these neurons at the single cell level according to their aSyn load can provide insights into the disease progression biology.
PD has been modeled in animals by overexpressing aSyn in DA neurons by Adeno-Associated Virus (AAV) nigral injection. However, it was not possible to distinguish aSyn effects from injection damage and cellular response to the AAV transduction or protein overload. To tackle these obstacles, we devised novel AAVs expressing CRE-dependent aSyn or BFP followed by a molecular barcode. Since these AAVs were packaged into the recently developed MNM008 capsid, injection in the TH CRE rats' striatum is followed by retrograde transport to the SN, where single neurons can be sorted by cytometry and sequenced. To enrich for DA cells, we tagged them with an AAV expressing CRE-dependent H2B-GFP.
In summary, viral barcodes provided a marker for viral particle count and a pseudo marker for transgene expression. These unique data provide solid ground for discoveries in PD biology and the development of novel therapies.

YI | Candela Medina | The claustrum's role in learning and memory

Medina C, Ojea Ramos S, Depino AM, Romano AG, Krawzcyk MC and Boccia MM.

The claustrum is a brain structure that remains shrouded in mystery due to the limited understanding of its cellular structure, neural pathways, functionality and physiological aspects. Significant research has unveiled connections spanning from the claustrum to the entire cortex as well as subcortical areas. This widespread connectivity has led to speculations of its role in integrating information from different brain regions, possibly contributing to processes such as attention, consciousness, learning and memory. Our working hypothesis posits that claustrum neural activity contributes to the formation, stabilization and updating of long-term memories in mice. We found evidence in CF-1 mice of a decline in behavioral performance in an inhibitory avoidance task due to intra-claustral administration of 2% lidocaine immediately after a training session or memory recall. Nevertheless, this does not seem to be the case for the acquisition or retrieval of this type of memory, although its neural activity is significantly increased after training, evaluated through c-Fos expression. Moreover, inhibition of the claustrum's synaptic activity appears to impair stabilization but not the acquisition or retrieval of an unconditioned memory formed in a nose-poke habituation task.

YI | Maria Barbara Eizaguirre | Tracking eye movements to detect motor and cognitive decline in Multiple Sclerosis: A Novel Approach

María Bárbara Eizaguirre[1°], Natalia Ciufia[1°], Aldana Marinangeli[1°], Lucia Bacigalupe[1°], Lucia Ibarra[1°], Lucas Lapalma[1°], Matias Shulz[2°], Gerardo Fernandez[2°], Danilo Verge[2°], Ricardo Alonso[1°]

[1°] Multiple Sclerosis University Center (CUEM), Neurology, Ramos Mejia Hospital, Buenos Aires, Argentina
[2°] View Mind Inc, New York, NY, USA.

Background: Previous research has demonstrated that eye movements can reveal brain alterations and provide insights into neurodegeneration and cognitive impairment. Objective: This study aimed to evaluate the relationship between motor and cognitive functions and eye movement parameters during the n-back task (NBKT) in people with multiple sclerosis (pwMS). Methods: A cross-sectional study was conducted involving 71 pwMS. Participants completed the n-back task using a head-mounted display equipped with eye-tracking technology to record eye movements. Motor and cognitive functions were assessed using the Expanded Disability Status Scale (EDSS), Nine Hole Peg Test (NHPT), Timed 25-Foot Walk (T25FW), and Symbol Digit Modalities Test (SDMT). Parametric and non-parametric statistical analyses were performed. Results: Participants had a mean age of 40.2±12.03 years, 13.6±3.7 years of education, and a mean disease duration of 9.7±6.8 years. The median EDSS was 3.0 (IQR 2-4.5). Significant correlations were found between gaze duration, number of fixations, saccade amplitude, and motor and cognitive impairments as measured by EDSS, NHPT, T25FW, and SDMT ($p<0.05$).Conclusion: This study demonstrates significant associations between eye movement patterns and motor and cognitive impairments in pwMS, suggesting that eye movements could serve as a potential biomarker for monitoring MS progression.

YI | Daniela Alejandra Cassano | Role of Agouti-related protein-expressing neurons and growth hormone secretagogue receptor in reward-related behaviors under calorie restriction

Daniela Alejandra Cassano[1°], Franco Barrile[1°],Mirta Reynaldo[1°], Nathalia Ferreira[2°], María Paula Cornejo[1°], Higor Fideles Silva[2°], Rodrigo Rorato[2°], Helgi Schioth[3°], Mario Perelló[1°3°]

[1°] Laboratory of Neurophysiology of the Multidisciplinary Institute of Cell Biology (IMBICE) (CONICET – CICPBA – UNLP). La Plata, Argentina
[2°] Department of Biophysics, Paulista Medical School, Federal University of Sao Paulo. São Paulo, Brasil
[3°] Department of Surgical Sciences, Functional Pharmacology and Neuroscience, University of Uppsala. Uppsala, Sweden

Ghrelin is a stomach-derived hormone that acts via growth hormone secretagogue receptor (GHSR). GHSR has ligand dependent and independent actions and is highly expressed in Agouti-related protein (AgRP) expressing neurons located in the hypothalamic arcuate nucleus (ARH). Ghrelin rises during energy deficit condition, and leads to the activation of AgRP neurons. GHSR signalling and AgRP neurons are known to modulate reward-related behaviors. We studied the role of AgRP neurons and GHSR in the enhancement of reward-related behaviours in calorie-restricted (CR) mice. Male mice were fed with the 40% of their daily food intake for 5 days and daily exposed to a non-caloric sweetener solution, saccharine, for 4 hours before each meal. We characterized the ghrelin-GHSR system and we found that CR wildtype mice showed an increase in GHSR mRNA levels in the ARH, an increase in plasma ghrelin levels and an increase of saccharine intake. Using two transgenic mouse model with lack of GHSR or a reduction of GHSR ligand independent activity we found that GHSR is required for the enhancement of reward-related behavior. Using DREADDs technology we, 1) selectively inhibited AgRP neurons and found a reduction of CR-induced enhancement of saccharine intake, and 2) selectively activated AgRP neurons in ad libitum fed mice and found an increase of saccharin intake. In conclusion, GHSR expression and activation of AgRP neurons are required for the enhanced saccharine intake during CR.

YI | Federico Andrés Gascue | Neuroethological characterization of olfactory sensory adaptation

Federico Gascue[1°2°], Nicolás Pírez[1°2°], Fernando Locatelli[1°2°]

[1°] Instituto de Fisiología, Biología Molecular y Neurociencias; UBA-CONICET
[2°] Departamento de Fisiología, Biología Molecular y Celular, Facultad de Ciencias Exactas y Naturales, UBA.

The olfactory system is continuously exposed to an extraordinary array of chemical stimuli. To keep its sensitivity within a functional and adaptive range, the system must be adjusted based on the animal's experience. One of the main phenomena that contribute to this adjustment is sensory adaptation, which is defined as a decrease in sensitivity or response to a stimulus after a sustained exposure to it. In this work, we investigate the role and mechanisms involved in olfactory sensory adaptation using honey bees. We measured the activity of olfactory receptor neurons (ORNs) by means of electroantennograms and characterized specificity and temporal aspects of this phenomenon. Furthermore, to study the behavioral implications for the animal of the adaptation, we conducted classical conditioning experiments and found that this phenomenon reduces appetitive learning of the adapted stimuli in a mixture, while facilitates learning of the other component in cases where they would normally stay occluded. We also conducted calcium imaging experiments to measure odor-evoked signals in projection neurons (PNs) of the antennal lobe, the first olfactory neuropil in the insect brain. This allowed us to observe how adaptation changes the neural representation of odors. Overall, our results emphasize that sensory adaptation is critical in maintaining the olfactory system unsaturated and ready to detect changes in the olfactory context.

YI | Victoria Rozés-Salvador | A Novel Player in Neuronal Primary Cilia: CREB3L1, The Transcription Factor Associated to The Secretory Pathway

Victoria Rozés-Salvador[1]; Cecilia Alvarez[1]

[1] Facultad de Ciencias Químicas, CIBICI-CONICET-UNC

victoria.rozes@unc.edu.ar

CREB3L1 belongs to the CREB3 family of transcription factors involved in ER and Golgi stress responses as regulators of cellular secretory capacity and cell-specific cargoes. In response to different signals, CREB3 proteins are transported from the ER to the Golgi, where they are cleaved (activated) by S1P and S2P proteases sequentially. Although CREB3 factors have a wide range of biological functions, their role in neuronal development is poorly understood. Our study showed that CREB3L1 localizes to the basal bodies of primary cilia during early neuronal development. Primary cilia are sensory organelles that project from the plasma membrane of many cell types, including neurons. They are essential in intracellular signaling pathways and act as sensory organelles for extracellular and intracellular signals. Our preliminary results show that CREB3L1 colocalizes with γ-tubulin and Inversin (INVS), proteins located in the basal body of primary cilia at early times of culture (3DIV). This basal body localization is lost when CREB3L1 activation by S1P and S2P proteases is inhibited. Furthermore, CREB3L1 knockdown neurons present shorter primary cilium than controls. Our findings suggest that CREB3L1 may have a non-canonical function in primary cilia relevant to neuronal development and function. Additional research could provide new insights into the mechanisms underlying neuronal function.

YI | Raffaella De Pace | BORC complex role in health and disease

Abstract:
BORC is an hetero-octameric complex that couples lysosomes to ARL8 and kinesin-1 and -3 for anterograde transport along microtubules. The ability of lysosomes to move within the cytoplasm is critical for many cellular functions, including maintenance of axonal health. KO of the Borcs5 or Borcs7 in mice causes neonatal lethality, however, the pathological importance of BORC in humans remained unknown. We recently identified biallelic BORCS8 variants in five children from three unrelated families, exhibiting severe intellectual disability, limb spasticity, hypomyelination, and neurodegenerative features. To further analyze the role of BORC in neuron physiology, we examined axonal mRNA transport in BORC-KO human iPSC-derived neurons and found a dramatic depletion of many mitochondrial and ribosomal mRNAs that were common with those involved in pathways of neurodegeneration. We also observed decreased synthesis of mitochondrial and ribosomal proteins in the axon. These affected mitochondria had reduced membrane potential, and were targeted for mitophagy. Finally, we found that BORC-KO axons developed swellings filled with autophagosomes and Tau aggregates, and eventually degenerated. These findings demonstrated a critical role of lysosome-coupled mRNA transport into the axon for the maintenance of mitochondrial homeostasis and could explain the pathogenesis of BORCS8 patients, and, more generally, of neurodegenerative disorders characterized by defective lysosomal transport.

YI | Jessica Lorena Presa | Galectin-1: A potential therapy for restoring microvascular changes in Alzheimer's Disease

Jessica Lorena Presa[1°2°], Carlos Pomilio[1°2°], Ángeles Vinuesa, M. Eugenia Matzkin[1°], Mariano Soiza-Relly[4°], Agustina Alaimo[3°], Soledad Gori[2°], Juan Beauquis[1°2°], Gabriel A. Rabinovich[1°], Flavia E. Saravia[1°2°]

[1°] IBYME-CONICET
[2°] Depto de Química Biológica, FCEN, UBA
[3°] INQUIBICEN, UBA-CONICET
[4°] IFYBINE, UBA-CONICET

Alzheimer's disease (AD) is a major public health challenge, with no cure and increasing prevalence. Vascular changes in AD correlate with disease progression, making them a key target for intervention. Galectins, a family of galactoside-binding proteins, are involved in survival, immune, and vascular pathways. We treated 12 m.o PDAPPJ20 mice, an AD model, with 9 i.p. injections of Gal1 (100 µg/dose) or vehicle. Tg mice showed high vascular amyloid deposits in the hippocampal hilus, a vulnerable region in AD. Gal1 reduced these deposits by 35% ($p<0.05$) without altering vascular density. Astrocyte-endothelial contact, crucial for blood-brain barrier integrity and Aβ clearance, was reduced in Tg mice but restored in Tg-Gal1 mice (lectin staining and GFAP IF). AQP4, an astrocytic endfeet protein necessary for fluid exchange through the BBB, also showed recovery in Tg-Gal1 mice which was diminished in Tg ($p<0.02$) in an array tomography analysis. We also assessed BBB integrity with i.v. Evans blue. Tg-Gal1 mice showed less vascular permeability to the dye than Tg-Veh mice($p<0.05$). In vitro, we used human brain endothelial cells to model the blood-brain barrier. Exposure to 24h of Aβ 1-40 0.1 µM reduced the monolayer's electrical resistance, while Gal1(15 µg/µl) prevented this disruption. Gal1 also mitigated proteostasis alterations in the UPR pathway and proinflammatory activation in endothelial cells caused by Aβ. Our results suggest Gal1 as a potential therapeutic agent for AD.

YI | Jose Dante Daniel Gomez Cuautle | Astrocytes going wild: Understanding the epigenetic roots of epileptogenesis and epilepsy

DANTE DANIEL GOMEZ CUAUTLE1°, ALICIA ROSSI1°, ALEJANDRO VILLAREAL2°, LUCIANA D´ALESSIO3°, ALBERTO JAVIER RAMOS1°

1° LABORATORIO DE NEUROPATOLOGIA MOLECULAR – FACULTAD DE MEDICINA
2° IBCN – FACULTAD DE MEDICINA
3° LABORATORIO DE EPILEPSIA, CONDUCTA Y NEUROPATOLOGIA

Temporal lobe epilepsy (TLE) is the most prevalent epilepsy in humans. Retrospective studies in TLE patients show an initial precipitating event (IPE) in early childhood followed by a silent period, ultimately leading to chronic epilepsy. We hypothesized that epigenetics may be involved in epileptogenesis, particularly affecting astrocytes. To study this, we used the lithium-pilocarpine model of TLE in rats, primary astroglial cultures, and resected samples from TLE patients. We found that astrocytes from TLE patients showed reactive astrogliosis, increased DNA methylation, and downregulation of homeostatic genes Kir4.1, Glutamine Synthetase and AQP4 by immunohistochemistry. In Wistar rats, the IPE induced by lithium-pilocarpine treatment (30 mg/kg IP) caused hypermethylation of astrocytes at 7, 21, and 35 days post-IPE, indicating persistent epigenetic alterations. Additionally, we observed the downregulation of homeostatic astroglial genes AQP4, glutamine synthase (GS), and Kir4.1, along with an increased proinflammatory response (C3, MAFG) and elevated DNMT expression by qPCR. These alterations were mimicked in primary astrocyte cultures exposed to DAMP HMGB1 (500 ng/ml; 18 hours) and PAMP LPS (25 ng/ml; 18 hours) and were reversed by the DNMT inhibitor decitabine (100µM). These findings show that astrocytes are pathologically altered, potentially sustaining the long-term changes underlying epilepsy. Grants PICT 2021-0760/2019-0851; UBACYT, PIP Conicet.

YI | Magdalena Antonino | Aβ induces the enlargement of early and recycling endosomes in human neurons derived from iPSCs trough a Go/Gβγ signaling

Magdalena Antonino[1°], Ángela Debiagge[1°], Romina Almirón[1°], Tiago Miguel Piconêz Pereira[2°], Alfredo Lorenzo[1°], Claudia Guimas Almeida[2°], Anahí Elena Bignante[1°]

[1°] Instituto de Investigación Médica Mercedes y Martín Ferreyra
[2°] iNOVA4Health, Chronic Diseases Research Center (CEDOC), NOVA Medical School (NMS)

Alzheimer's disease (AD) is a neurodegenerative disorder characterized by cerebral amyloid-β (Aβ) deposition. We recently found that Aβ increases APP and BACE1 convergence and interaction in recycling endosomes (RE) of human neurons derived from iPSCs (HN) through Go/Gβγ signaling, leading to enhanced APP processing by BACE1 and intracellular Aβ1-42 accumulation. In this study, we focus on the effects of Aβ on APP trafficking in the endocytic pathway.
N2A cells were transfected with APP or APP-VN/BACE1-VC (BiFC) and intracellular compartment markers, then treated with gallein (GAL), a Gβγ inhibitor, and Aβ. We found that Aβ increased APP levels and its interaction with BACE1 in RE and the Golgi apparatus while decreasing its presence and interaction in lysosomes; both effects were abrogated by GAL. Pulse-chase assays revealed that Aβ enhances APP endocytosis and reduces its recycling via Gβγ-dependent signaling. Further, we found that Aβ induces dramatic enlargement of RE and early endosomes in HN, both effects prevented by GAL. In conclusion, Aβ increases APP endocytosis, reduces recycling, and redirects it to endosomes via Gβγ signaling, avoiding lysosomal degradation. This leads to APP accumulation in endosomes, where it interacts with BACE1, promoting amyloidogenic processing and endosomal enlargement—an early pathological hallmark of AD.

ROUND TABLES

Round Tables will be held in the IFIBYNE Auditorium (Floor 1)

Round Table – Organised by Comisión SAN sobre Política Científica

Friday 25, 18:30 – 19:30.
This activity will be carried out in Spanish.

Round Table – Organised by Comisión SAN sobre Género y Diversidad

Saturday 26, 12:30 to 13:30
This activity will be carried out in Spanish.

Construyendo Puentes: Una Guía para la comunicación Directores-Estudiantes – Organised by Red de Estudiantes de Neurociencias

Sunday 27, 12:30 to 13:30

The activity organized by the Red de Estudiantes de Neurociencias in this SAN 2024 meeting aims to generate a guide to enable and energize conversations between directors and students on relevant topics in their professional relationship. Previously, a survey will be conducted to the community to find the key points to be addressed in the activity. The objective is to obtain a manual of suggestions in order to carry out fruitful conversations that will result in more stable relationships, working on differences in expectations that could harm the relationship and/or the well-being of one or both parties.

This activity will be carried out in Spanish.

POSTER Session V

V-001 | The hypothalamus of Chaetophractus villosus: main landmarks and nuclei.

Cellular and Molecular Neurobiology

Author: Ana Abrego Alvarez | Email: francoluceroarteaga@hotmail.com

Ana Abrego Alvarez1°, Franco Lucero Arteaga1°2°,Ana Inés Portu1°, Mariela Mondino1°, Mónica Alejandra Boeris1°, Valentina Heck1°, Sofía Labegorra1°, Ana Cristina Bratanich3°, Bruno Ribeiro Do Couto4°, José Luis ferrán4°

1° Centro de producción de Animales de Experimentación, Facultad de Ciencias Veterinarias, Universidad Nacional de La Pampa.

2° Consejo Nacional de Investigaciones Científicas y Técnicas (CONICET)

3° National Institute of Animal Production (INPA-CONICET), Faculty of Veterinary Sciences, University of Buenos Aires.

4° Department of Human Anatomy and Psychobiology, School of Medicine, University of Murcia, Murcia, Spain. Institute of Biomedical Research of Murcia –IMIB, Virgen de la Arrixaca University Hospital, Murcia, Spain.

Chaetophractus villosus, commonly known as the big hairy armadillo, is a species of armadillo found primarily in Argentina, Bolivia and Paraguay. This nocturnal and omnivorous armadillo feeds on insects, small vertebrates, corpses and plant material plays an important role in its ecosystem by influencing soil dynamics and contributing to seed dispersal. Our aim was to identify the main hypothalamic neuronal derivatives in the peduncular and terminal regions of the Chaetophractus villosus. The study was performed using immunoreactions with tyrosine hydroxylase (TH), Calbindin (CB), Calretinin (CR) NeuN, Adenosine-vasopressin (AVP), Oxytocin (OXT), Neurophysin I, II (NF1, NF2), and Melanin-concentrating-hormone (MCH). True topological sagittal, transverse and horizontal sections were obtained using a vibrome and sliding microtome. After processing, they were mounted on slides and some of them processed for fluorescent immunoreactions. Using the prosomeric model as a reference for analysis, TH positive alar plate neurons were detected in the terminal and peduncular prosomeres in both species. In addition, AVP and OXT identified both supraoptic (SO)

and paraventricular (PV) nuclei. In the tuberal region (basal plate), TH positive cells were observed periventricularly, in the arquate and A13 nuclei. The Chaetophractus villosus (Xenarthra) is a key model for determining novelties or conserved homologous derivatives characterized in rodents. Grant: Fundación Seneca (21903/PI/22).

V-002 | Ageless Guardians: The Role of Microglia in the Aging Cerebellum

Cellular and Molecular Neurobiology

Author: Martin Avila | Email: mmartinnavila@gmail.com

Martin Avila1°2°, Ana Laura López1°,Leandro Freites1°2°3°, Agata Rita Carpentieri4°, Estela Maris Muñoz1°

1° Laboratorio de Neurobiología Básica y Traslacional, IHEM-UNCuyo-CONICET, Mendoza, Argentina

2° Integrated Neuromics Laboratory, Institute of Neuroimmunology, Slovak Academy of Sciences, Bratislava, Slovakia

3° Institut de Neurociències, Universitat Autònoma de Barcelona, Bellaterra, Barcelona, Spain

4° INICSA-UNC-CONICET; Cátedra B de Química Biológica-Facultad de Odontología-UNC, Córdoba, Argentina

Cerebellar microglia have increased immune surveillance and phagocytic capacity compared with microglial populations from other brain regions maintaining contact, especially with Purkinje neuronal cells during adulthood. As the cerebellum is a region poorly affected during age-related neurodegenerative diseases, we hypothesized that cerebellar microglia execute their functions correctly during aging, avoiding the accumulation of aberrant proteins and the progression of neurodegenerative diseases. To test this we evaluated cell morphology, lysosomal functions, and proinflammatory cytokine levels in aged rat cerebella, and compared them with young specimens. We found that microglia migrated to the Purkinje neuron layer during aging, still contacting them at the soma and dendritic arbor levels. Morphologically, they became more ameboid and reactive, showing increased accumulation of lysosomal markers. Surprisingly, this was not correlated with an increment in proinflammatory cytokine levels. Our analysis underscores the evolving phenotypes of cerebellar microglia with age, characterized by features of reactive microglia but notably lacking an inflammatory profile. All this leads us to think that cerebellar microglia might still be good sentinels, fighting satisfactorily against damage, and preventing or delaying neurodegeneration in the organ.

V-003 | In vitro analysis of cross-talk between angiotensin-II receptors (AT1R and AT2R), neurotrophic factors and pro-inflammatory agents in the context of nerve regeneration.

Cellular and Molecular Neurobiology

Author: Sergio Gonzalo Benitez | Email: sbenitez595@gmail.com

Cristian Acosta1°, Alicia Seltzer1°,Sergio Benitez1°

1° Laboratorio de Estudios Neurobiológicos (LABENE). Instituto de Histología y Embriología de Mendoza (IHEM-CONICET), Universidad Nacional de Cuyo, 5502, Mendoza, Argentina.

There is evidence that the Renin Angiotensin system (RAS) is involved in the process of nerve regeneration. Therefore, understanding the complex interactions between RAS components and the repair and inflammation systems is essential to validate the use of angiotensinergic drugs as an effective therapeutic agent in nerve injuries. Using primary cultures of rat dorsal root ganglion cells, different treatments (inflammatory soup (IS), angiotensin-II, Azilsartan or PD123319) and culture times (2 or 3 days in vitro, DIV), we sought to study the interaction between trophic and inflammatory factors and the variations in the expression of AT1R and AT2R. Cultures were analyzed by qPCR and immunofluorescence (IF). Our results indicate that 2DIV cultures grown in the presence of both GDNF and NGF increased the expression levels of AT1R, whereas AT2R was only upregulated in the presence of IS for one day with NGF. IS alone increased the protein levels of AT1R and AT2R in the population of neurons identified by the expression of b-tubulin III (IF). However, at 3DIV IS alone increased the global expression of both AT1R and AT2R receptors (qPCR). In turn, angiotensin-II at 2DIV through these receptors decreases the expression of pro-inflammatory receptors for Interleukin 6 (IL6) and tumor necrosis factor (TNFa). In conclusion, there is a cross-talk between inflammatory factors and Angiotensin-II receptors that should be taken into account when defining an intervention with these drugs.

V-004 | Identification of proteins that interact with the C-terminal end of Gpm6a through the amino acid residue E258

Cellular and Molecular Neurobiology

Author: Sebasttián Cabré Brosio | Email: scabrebrosio@estudiantes.unsam.edu.ar

Sebastián Cabré Brosio1°, Beata Fuchsova1°

1° Instituto de Investigaciones Biotecnológicas, Escuela de Bio y Nanotecnologías (EByN), Universidad Nacional de San Martín (UNSAM) – Consejo Nacional de Investigaciones Científicas y Técnicas (CONICET), San Martín, Buenos Aires, Argentina

Gpm6a is a neuronal membrane glycoprotein associated with different psychiatric diseases and chronic stress response. It acts in processes of neuroplasticity such as filopodia formation, neurite extension, or synaptogenesis. However, its mechanism of action is not well understood. Gpm6a induces extensive formation of filopodia and the amino acid E258 is necessary for this process. At the same time, its mutation decreases the amount of Gpm6a on the cell surface and increases its accumulation in the intracellular compartments that we identified as Lamp1-positive endosomes, indicating that protein trafficking is affected. Since trafficking of membrane proteins in neurons is related to differentiation, growth, signaling and neuronal plasticity, it is of great relevance to study the role of the residue E258. We hypothesize that E258 plays a crucial role in Gpm6a intracellular trafficking with relevance to neuronal morphogenesis. We assume that by mutating this residue, the interaction of the C-terminal end of Gpm6a with proteins that can mediate its neuroplastic function is lost. Therefore, the objective of the present work is to identify proteins that interact with the C-terminal end of Gpm6a through the amino acid residue E258. Using mass spectrometry, I aim to identify the factors that differentially interact with the wild-type protein and its mutated form E258A employing coimmunoprecipitation assays from lysates of cells that overexpress wild-type Gpm6a and its mutant E258A.

V-005 | Different mutated Transferrins and their effect on the differentiation of the oligodendroglial cell line Oli-neu

Cellular and Molecular Neurobiology

Author: Estefania Chamorro Aguirre | Email: estefachamorro@gmail.com

Estefania Chamorro-Aguirre1°, Martina Garmendia1°,María Julia Pérez1°, Jorge Correale1°2°, Juana María Pasquini1°, Hugo Adamo1°

1° Departamento de Química Biológica e Instituto de Química y Fisicoquímica Biológicas “Dr Alejandro C. Paladini” (IQUIFIB), Facultad de Farmacia y Bioquímica. UBA-CONICET.

2° Departamento de Neurología FLENI.

Since 1994 our laboratory has maintained the hypothesis that apoTransferrin (aTf) is capable of accelerating the maturation of the oligodendroglial cell. The effect was demonstrated “in vivo” first and then “in vitro” and in different experimental models of demyelination and hypomyelination. However, this hypothesis was always questioned given that Tf is an iron transporter, and the question was whether it was an effect of Tf or the iron it transported.

In order to test our hypothesis, we decided to make use of previously described non-glycosylated Tf mutants by Mason et al., 2004. Tf mutant YF (Y95F/Y188F/Y426F/Y517F) is unable to bind iron either in the N-lobe or the C-lobe, while mutant KA (K206E/E534A) is unable to release iron. The oligodendroglial precursor cell line Oli-neu were transfected employed Lipofectamine 2000 either with the Tf wt or mutants. It was evaluated morphological changes using MBP (oligodendrocyte differentiation marker) by immunocytochemistry. The results show that, just as cells transfected with the WT do, the other two Tf mutans were able to produce maturation of the Oli-neu cells, undoubtedly indicating that it is Tf that accelerates their maturation and not iron. Since the morphology of the mature cells was different in the three situations, we investigated the causes of these differences.

V-006 | Behavioral effects of yerba mate on L-DOPA induced dyskinesia in a mouse model of Parkinson's disease

Cellular and Molecular Neurobiology

Author: Andrea Cecilia Cura | Email: cecilia.cura@uner.edu.ar

Andrea Cecilia Cura1°, Liliana Teresita Tribbia1°,Florencia Echeverria1°, Lorena Rela2°3°, Irene Rita Eloísa Taravini1°

1° Laboratorio de Neurobiología Experimental. LNE-ICTAER-UNER-CONICET, Gualeguaychú, Entre Ríos, Argentina.

2° Universidad de Buenos Aires, Facultad de Medicina, Departamento de Ciencias Fisiológicas, Grupo de Neurociencia de Sistemas, Ciudad de Buenos Aires, Argentina.

3° CONICET, Universidad de Buenos Aires, Instituto de Fisiología y Biofísica Bernardo Houssay (IFIBIO Houssay), Buenos Aires, Argentina

Current pharmacological therapy for Parkinson's disease (PD) focuses on the administration of L-DOPA, but after several years it promotes the emergence of L-DOPA-induced dyskinesia (LID). LID is very difficult to reverse, can be more disabling than the underlying disease, and correlates with inflammation and oxidative stress. Yerba mate (YM) consumption is inversely related to PD and has anti-inflammatory and anti-oxidant effects.

Our aim is to investigate whether YM consumption has a preventive effect attenuating LID development in a mouse model of PD. We performed two experiments using mice with severe lesions to the nigrostriatal system by administration of 6-OHDA in the medial forebrain bundle: (1) Chronic YM treatment: mice received an infusion of YM per oral for 2 months, then were lesioned and continued with the treatment along with the administration of L-DOPA, for 15 days; (2) Co-administration of YM with L-DOPA: mice were first lesioned and then received YM via gastric gavage, 1 hour prior to the injection of L-DOPA, for 15 days. In both experiments control groups (sham and water) received vehicle. Our preliminary results suggest that YM administration to severely denervated animals, in both experiments, could reduce the severity of LID compared to control animals. It remains to be evaluated whether this behavioral benefit correlates with a reversal of the maladaptive striatal synaptic plasticity and changes in microglial and astrocytic reactivity observed in LID.

V-007 | Involvement of the p75 neurotrophin receptor (p75NTR) in vulnerability to stress-induced cocaine dependence.

Cellular and Molecular Neurobiology

Author: Tomás Camilo Díaz | Email: tomas.camilo.diaz@mi.unc.edu.ar

Tomás Camilo Díaz1°, María Julieta Boezio1°,Victoria Vaccaro1°, Agustín Anastasia2°, Flavia Bollati1°

1° Instituto de Farmacología Experimental de Córdoba (IFEC-CONICET), Departamento de Farmacología Otto Orsingher, Facultad de Ciencias Químicas, Universidad Nacional de Córdoba, Córdoba, Argentina;

2° Instituto de Investigación Médica Mercedes y Martin Ferreyra, INIMEC-CONICET, Córdoba, Argentina

Our research focuses on the impact of stress on vulnerability to cocaine addiction. Specifically, we propose to investigate the involvement of the p75 neurotrophin receptor (p75NTR) in the expression of stress-induced vulnerability to cocaine, using an animal model that expresses the Val66Met single nucleotide polymorphism (SNP) in the prodomain of the BDNF gene. Recent studies suggest that the Met variant of the prodomain (Met-pBDNF) influences neuronal plasticity and alters stress responses mediated by the p75NTR and SorCS2 receptors. In our study, we will use p75NTR knockout (p75NTR KO) mice, which will be injected intra-accumbens with lentiviral particles expressing the Val66Met prodomain variants, known as Met-pBDNF and Val-pBDNF. Our analysis will focus on behavioral, molecular, and structural changes that occur in the nucleus accumbens (NAc) of stressed mice in response to cocaine. Additionally, we will investigate the signaling pathways involving p75NTR receptors in this model, as the Val66Met polymorphism of the BDNF prodomain interacts differentially with the p75NTR/SorCS2 complex, potentially, leading to alterations in neuronal plasticity.

V-008 | Therapeutic approaches for peripheral nerve regeneration through a hybrid platform combining cell therapy and nanotechnology.

Cellular and Molecular Neurobiology

Author: David Oscar Donalisio | Email: daviddonalisio@gmail.com

David Oscar Donalisio1°2°, Juan Orosco3°,Vanina Usach1°2°, Eliza De Sousa3°, Romina Glisoni4°, Pedro Mendoza Zélis3°, Patricia Setton-Avruj1°2°

1° Universidad de Buenos Aires. Facultad de Farmacia y Bioquímica. Departamento de Química Biológica. Cátedra de Química Biológica Patológica.

2° Instituto de Química y Fisicoquímica Biológicas “Dr Alejandro C. Paladini” (IQUIFIB), UBA-CONICET.

3° Instituto de Física La Plata (IFLP), UNLP-CONICET

4° Instituto NANOBIOTEC UBA-CONICET. Departamento de Tecnología Farmacéutica, Facultad de Farmacia y Bioquímica, Universidad de Buenos Aires, Buenos Aires, Argentina.

Peripheral nerve injuries are frequent afflictions in which full recovery cannot be achieved employing current treatments. Our group focuses on the development of nanotechnological approaches to promote nerve regeneration in a rat model of Wallerian degeneration promoted by sciatic nerve crush. To this end we developed a hybrid platform, consisted of bone marrow mononuclear cells (BMMC) transfected with poly-lactic-co-glycolic acid nanocapsules (PLGA-NC), functionalized with polyethyleneimine (PEI) and loaded with magnetic nanoparticles (MNP), for magnetic targeting of the systemically transplanted platform to the lesion area. Both PLGA-NC and MNP were characterized by thermogravimetry, vibrating-sample magnetometer, transmission electron microscopy and dynamic light scattering. To generate the hybrid platform BMMC are transfected with PLGA-NC:PEI:DNA (mock plasmid) loaded with MNPs and labeled with a fluorochrome. Following rat sciatic nerve crush the platform is systemically transplanted and magnetically targeted to the injured nerve. Seven days post-treatment behavioral tests are performed to assess the effects of the hybrid platform. Our results suggest that the hybrid platform does not hinder the analgesic effects of BMMC, which is optimized by magneto targeting.

Future experiments employing the hybrid platform containing NGF or BDNF mRNA will be performed to evaluate a potential therapeutic approach, and to better understand peripheral nerve regeneration mechanisms.

V-009 | Neonatal overfeeding alters the homeostatic regulation of food intake in response to a cafeteria diet in adulthood.

Cellular and Molecular Neurobiology

Author: Pamela Rocío Fernández | Email: pame.fernandez@live.com

Pamela Fernández1°2°, Rocío Schumacher1°,Luisa Gaydou1°3°, María Florencia Rossetti1°, Ana Paula García1°, Agustina Sabella1°, Jorge Guillermo Ramos1°3°, Cora Stoker1°3°, Guillermina Canesini1°2°

1° 1 Instituto de Salud y Ambiente del Litoral (ISAL), UNL-CONICET, Santa Fe, Argentina.

2° 2 Cátedra de Nutrición en Situaciones Patológicas, FBCB-UNL, Santa Fe, Argentina.

3° 3 Departamento de Bioquímica Clínica y Cuantitativa, FBCB-UNL, Santa Fe, Argentina

In response to the obesity pandemic as a public health issue, a small litter model in rodent and cafeteria diet (CAF) are useful for research. Our aim was to study the effect of neonatal overfeeding (NO) and adult exposure to CAF on the expression of key genes involved in the homeostatic regulation of food intake at brain level. Male Wistar rats were raised in small (4 pups/dam, SL) or normal litters (10 pups/dam, NL). From weaning to postnatal day (PND) 90, they were fed a control diet (CON), then for 11 weeks, animals received CON or CAF (NL-CON, NL-CAF, SL-CON, SL-CAF; 12±2 rats/group). Body weight and food intake were recorded weekly until euthanasia when brains were obtained. Arcuate nucleus (ARC) was isolated by micropunch technique. To analyse the expression of Agouti-related protein (AgRP), Neuropeptide Y (NPY), Cocaine and amphetamine-regulated transcript (CART) and Proopiomelanocortin (POMC), RT-PCR was performed. CAF groups presented increased body weight and food intake ($p<0.05$). SL groups exhibited the lowest levels of POMC ($p=0.02$) and NPY ($p=0.01$). SL-CAF showed significantly lower POMC expression than NL-CAF ($p=0.02$). No differences were observed in CART or AgRP between groups. These results show that neonatal overfeeding causes alterations of the homeostatic system, apparently inhibiting it from responding to new hedonic stimuli, indicating that early life events lead to long-term alterations in response to a Western diet in adulthood.

V-010 | Bisphenol-A Induces Mitochondrial Dysfunction via the Wnt/β-Catenin Pathway: Potential Implications for Alzheimer's Disease

Cellular and Molecular Neurobiology

Author: Micaela Daiana Garcia | Email: mdgarcia@fmed.uba.ar

Micaela Daiana Garcia1°, Belén Favarolo1°,Cayetana Arnaiz2°, Julieta Bianchelli2°, Pedro Miarnau2°, Tomás Falzone1°2°, Mariana Holubiec1°2°

1° Instituto de Biología Celular y Neurociencia, Facultad de Medicina, (IBCN-UBA-CONICET), Argentina.

2° Instituto de Investigación en Biomedicina de Buenos Aires - Instituto Partner de la Sociedad Max Planck (IBioBA-MPSP-CONICET), Argentina.

Many functions have been attributed to the amyloid precursor protein (APP), that through γ and β secretase processing might modulate mitochondrial homeostasis. Increased β amyloid peptides (Aβ) levels,a byproduct of this processing, are considered one of the main hallmarks of Alzheimer's disease (AD). However, it has been shown that redox regulation and mitochondrial homeostasis precede the appearance of Aβ aggregates, indicating the presence of a molecular mechanism that is independent of Aβ. Bisphenol-A (BPA), a compound present in a variety of local consumption elements, has been linked to neurodegeneration and AD. However, BPA is a γ secretase inhibitor, which would decrease Aβ levels. Interestingly, this enzyme is also involved in the Wnt/β-Catenin (Wnt/β-Cat) pathway. Here, we aim to determine if the neurodegenerative action of BPA is linked to mitochondrial redox regulation through the Wnt/β-Cat pathway, mediated by APP. Preliminary results show that BPA treatment decreases nuclear localization of β-Cat in cultured human neurons. Furthermore, BPA increases both mitochondrial length and membrane polarization in the axons of glutamatergic human neurons. These results indicate that BPA might affect the Wnt/β-Cat pathway and mitochondrial homeostasis. Future experiments are aimed to determine if BPA exacerbates metabolic and mitochondrial alterations through the Wnt/β-Cat pathway acting on mitochondrial membrane APP in human models of AD.

V-011 | Impact of the Enriched Environment on the Behavior of Offspring from Mothers Exposed to a Low-Protein Diet

Cellular and Molecular Neurobiology

Author: ERIKA INÉS GEORGIEFF | Email: georgiefferikaines@gmail.com

ERIKA INES GEORGIEFF1°2°, MICAELA SALVOCHEA1°2°,EDUARDO CÁNEPA1°2°, MARIELA CHERTOFF1°2°

1° Laboratorio de Neuroepigenética y Adversidades Tempranas, Departamento de Química Biológica Facultad de Ciencias Exactas y Naturales, Universidad de Buenos Aires. Buenos Aires, Argentina.

2° Instituto de Química Biológica de la Facultad de Ciencias Exactas y Naturales (IQUIBICEN), CONICET- Universidad de Buenos Aires. Buenos Aires, Argentina.

Maternal protein malnutrition has lasting effects that negatively impact brain development and behavior in offspring, increasing the risk of anxiety and depression disorders. This deficient nutritional state alters stress response leading to behavioral alterations. However, it has been shown that an environment enriched with social and sensory stimulation can mitigate the adverse behavioral effects induced by perinatal protein malnutrition. In this study, we investigated plasma corticosterone levels and behavioral modulation in mouse offspring subjected to normal-protein (NP) or low-protein (LP) diets during gestation and lactation. After weaning, offspring from NP and LP groups were assigned to either a standard (EN) or enriched (EE) environment with social and sensory stimuli for five weeks. This allowed us to evaluate the impact of environmental enrichment on reversing behavioral and molecular deficits associated with early protein malnutrition. An increase in plasma corticosterone levels was observed in male and female LP offspring at P21 and only in female offspring to P56 from the LP-EE group compared to the LP-EN group. The results of behavioral Dark-Light Box (DLB) Test and the Dominance Test, revealed significant differences between the groups, in both males and females. These results suggest that the enriched environment influences behavior and the molecular mechanisms affected by protein malnutrition during early development.

V-012 | Aging-induced changes in the expression of the alpha4-containing nicotinic acetylcholine receptor in cortical inhibitory neurons

Cellular and Molecular Neurobiology

Author: Sara Gonzalez | Email: saragonzalez@uca.edu.ar

Sara Gonzalez-Rodulfo1°3°, Ana Uceda2°,Héctor Ramiro Quintá2°3°, Alejandro Omar Sodero1°3°

1° Instituto de Investigaciones Biomédicas (BIOMED), Pontificia Universidad Católica Argentina (UCA), Buenos Aires, Argentina.

2° Laboratorio de Medicina Experimental “Dr. Jorge E. Toblli”, Hospital Alemán, Buenos Aires, Argentina.

3° Consejo Nacional de Investigaciones Científicas y Técnicas (CONICET), Argentina

The decline of cognitive function with aging has been associated to synaptic dysfunction. In addition, alterations in the expression of neurotransmitter receptors have been postulated to significantly contribute to synaptic dysfunction.

We investigated the expression of the alpha4-containing nicotinic acetylcholine receptor (CHRNA4) in cortical inhibitory neurons, in a mouse model of physiological/normative aging, using 3-dimensional imaging of solvent cleared organs (3DISCO). Shortly, the brains of middle-aged and elderly mice were obtained after p-formaldehyde fixation and subjected to double immunofluorescence (IF). Once the IF was completed, the brain tissue was dehydrated with increasing concentrations of tetrahydrofuran and di-chloro-methane. Finally, the tissue was made transparent by immersion and gentle shaking in benzyl alcohol/benzyl benzoate. Using a confocal microscope, we captured 100-150 images in the z-plane to reconstruct the volumes. For the digital processing of volumes, we optimized and filtered the images of the z-stack, designed masks to segment the signals, and performed the quantifications by channel.

We detected a significant decrease in the number of inhibitory neurons (GAD67+) expressing the CHRNA4 in elderly mice, compared to middle-aged mice. This reduction was evident in the prefrontal and occipital cortices. Our results have relevance to understand a reduction in the inhibitory control over the glutamatergic neurons in the context of aging.

V-013 | Effects of poly-glutamine extension in Huntingtin protein on dense-core vesicle distribution and mobility in neurosecretory cells

Cellular and Molecular Neurobiology

Author: María Pilar Canal | Email: pili.canal31@gmail.com

María Pilar Canal1°, Fernando Diego Marengo1°2°,Luciana Inés Gallo1°2°

1° IFIBYNE (CONICET-UBA)

2° FBMC - FCEN - UBA

Huntington's disease (HD) is a hereditary neurodegenerative disorder caused by an expanded poly-glutamine stretch in the Huntingtin protein (Htt). HD animal models show decreased dense-core vesicle (DCV) secretion, and HD patients feature symptoms associated with altered neuropeptide functions. Moreover, Htt regulates Rab11a, a novel protein that we described regulating DCV secretion. However, Htt biological functions and the basic mechanisms by which mutated Htt (mHtt) affects the regulated-secretory pathway, including the possible interactions between mHtt and Rab11a, in neuronal and neuroendocrine cells, remain unclear.

In alignment with emerging evidence suggesting a role of Htt in vesicle trafficking, we analyzed DCV distribution and mobility in chromaffin cells using confocal imaging and bioimage analysis tools. We report that mHtt overexpression decreased DCV presence at the cell periphery and modified DCV transport regimes, showing a predominance of confined motion, with respect to control cells. When both mHtt and Rab11aWT were coexpressed, a partial reversion of these effects was found. In particular, during stimulation we observed a shift towards a higher DCV presence at the cell periphery, and an increased motility of DCV that resembles that of control cells. This data contributes to our understanding of mHtt effects in neurosecretory cells, and by elucidating DCV trafficking regulation, we expect to find potential targets to revert them.

V-014 | The Physiological Relevance of Nedp1: Insights from Different Animal Models

Cellular and Molecular Neurobiology

Author: Ivana Marcela Linenberg | Email: ivanamlinen@gmail.com

Ivana M Linenberg1°, Sebastian A Giusti1°,Mariana Erdocia1°, Luciana F Godoy2°, Diego M Jofré2°, Daniel Hochbaum2°, Damian Refojo1°

1° IBioBA-CONICET-MPSP

2° CEBBAD-UMAI

Nedd8 belongs to the Ubiquitin-like protein family. Like Ubiquitin, Nedd8 covalently binds to its target proteins through a conjugation cascade through specific enzymes, a process called neddylation. Neddylation is reversible and is mediated by two deneddlyases: the signalosome COP9, which deconjugates Nedd8 from Cullins, the most studied neddylation target, and Nedp1, the main protease responsible for removing Nedd8 from all the other proteins. The biological relevance of Nedp1, and non-Cullin neddylation by extension, has been historically questioned.

To address this, we studied the physiological relevance of Nedp1 in various biological models. Using transgenic invertebrate models, we demonstrate that the loss of function of Nedp1 orthologue negatively affects fertility and survival in D. melanogaster and that Nedp1 confers resistance to both D. melanogaster and C. elegans upon stress conditions.

We show for the first time that Nedp1 is essential in a murine model, indicating its biological relevance is greater in mammals. Moreover, Nedp1 deletion in neural tube-derived cells leads to morphological alterations in the mouse brain. These results contribute to understanding the physiological relevance of neddylation in general and of Nedp1, in particular, across diverse contexts and models.

V-015 | Dorsoventral and anteroposterior domains of the hypothalamus of two microchiroptera (Tadarida Brasiliensis and Myotis sp) living in South America.

Cellular and Molecular Neurobiology

Author: Franco Exequiel Lucero Arteaga | Email: francoluceroarteaga@hotmail.com

Franco Lucero Arteaga1°2°, Ana Inés Portu1°,Mariela Mondino1°, Mónica Alejandra Boeris1°, Valentina Heck1°, Sofía Labegorra1°, Ana Abrego Alvarez1°, Ana Cristina Bratanich3°, Bruno Ribeiro Do Couto4°, José Luis Ferrán4°

1° Centro de producción de Animales de Experimentación, Facultad de Ciencias Veterinarias, Universidad Nacional de La Pampa.

2° Consejo Nacional de Investigaciones Científicas y Técnicas (CONICET)

3° National Institute of Animal Production (INPA-CONICET), Faculty of Veterinary Sciences, University of Buenos Aires.

4° Department of Human Anatomy and Psychobiology, School of Medicine, University of Murcia, Murcia, Spain. Institute of Biomedical Research of Murcia –IMIB, Virgen de la Arrixaca University Hospital, Murcia, Spain.

Microchiropteras or microbats are a diverse group of small bats that primarily feed on insects, though some species consume fruit, or blood. Microbats have a wide range of habitats, including forests, caves, and urban areas. They play an essential ecological role by controlling insect populations and pollinating plants. In our study, the insectivorous species Tadarida brasiliensis and Myotis spp. that inhabit in Argentina were selected. Our aim was to determine the hypothalamic neuronal derivatives in the peduncular and terminal regions of both microbats. Using the prosomeric model as a reference, the study was performed by immunoreactions with tyrosine hydroxylase (TH), Calbindin (CB), Calretinin (CR) NeuN, Adenosine-vasopressin (AVP), Oxytocin (OXT), Neurophysin I, II (NF1, NF2), and Melanin-concentrating-hormone (MCH). According to our analysis, alar plate TH positive neurons were detected periventricularly in the terminal and peduncular prosomeres in both species. In addition, AVP allowed to identify supraoptic (SO), suprachiasmatic and paraventricular (PV) nuclei; and OXT was detected in the SO and PV nuclei in both species. In the tuberal region (basal plate) TH positive cells were observed periventricularly. However, differences were observed in the Arquate and A13

nuclei between both species. Further studies will be required to determine possible size/composition differences with rodents. Grant: Fundación Seneca (21903/PI/22).

V-016 | Iron deficiency, through DMT1 (Malvolio) silencing, alters mitochondria dynamics

Cellular and Molecular Neurobiology

Author: Maria Silvina Marcora | Email: silvinamarcora@gmail.com

Maria Silvina Marcora1°, Maximiliano Katz2°,Jorge Correale1°3°, Juana Maria Pasquini1°

1° Departamento de Química Biológica and Instituto de Química y Fisicoquímica Biológica (IQUIFIB)-, Facultad de Farmacia y Bioquímica. UBA- CONICET. Buenos Aires Argentina

2° Instituto de Fisiología y Biofísica Bernardo Houssay, (IFIBIO). Grupo de Neurociencias de Sistemas. Facultad de Medicina. UBA, CONICET. Buenos Aires, Argentina.

3° Instituto de Investigaciones Neurológicas Dr. Raúl Carrea, FLENI. Buenos Aires, Argentina

Iron is essential for several biological processes, including mitochondrial respiration and redox reactions, as it serves as a key cofactor of many catalytic enzymes. The Divalent Metal Transporter 1 (DMT1) participates in iron uptake in the cell.

In a previous work from aur lab, DMT1 was silenced by siRNA in astrocytes, and mitochondrial studies were performed. We found that siDMT1 astrocytes displayed an increased number and reduced size of mitochondria compared to control cells, in correlation with altered expression of fission and fusion genes, indicating disruption in mitochondrial dynamics.

Drosophila melanogaster has several genes related to iron metabolism, including Malvolio, the only ortholog of DMT1. In this study, we employed the fruit fly to evaluate the effect of silencing Malvolio on mitochondrial dynamics.

We found that, like in our previous observation in mammals, Malvolio mutants exhibited altered expression of fission and fusion genes, suggesting mitochondrial dysfunction. To further explore the role of Malvolio in glial cells, gene expression was specifically downregulated in these cells, and mitochondria morphology was assessed.

This in vivo model will complement our previous “in vitro” results and will be of great interest to uncover the effect of iron homeostasis on mitochondrial dynamics of glial cells.

V-017 | ASTROCYTIC RESPONSE IN A CONTEXT OF BRAIN EDEMA: REDUCED HISTONE ACETYLATION AND RESPONSE TO PRO-INFLAMMATORY STIMULUS

Cellular and Molecular Neurobiology

Author: Azul Aymará Millán | Email: azulmillan@hotmail.com

Azul Aymará Millán1°, Matías Monteverde Busso1°,Camila Vidos1°, Alberto Javier Ramos1°, Alejandro Villarreal1°2°

1° Instituto de Biología Celular y Neurociencia "Prof. E. De Robertis" UBA-CONICET, Facultad de Medicina, Universidad de Buenos Aires, Buenos Aires, Argentina.

2° Instituto Tecnológico de Buenos Aires (ITBA).

Astrocytes respond to brain injury through a process of reactive astrogliosis involving transcriptional, phenotypic and functional changes, with an impact on brain injury outcome. We aimed here to address early changes in astrocyte response as a result of hypo-osmolar stress promoted by brain edema. In a model of brain cortical injury adult Wistar rats we observed, using immunofluorescence, a higher proportion of astrocytes with lower levels of H3K9ac at 3.5h when compared to non-injured hemisphere. Also, the injury promoted an increase in GFAP and AQP4 immunoreactivity near the injury core suggesting edema formation. In vitro, exposure of astrocyte primary cultures to hypotonic (20, 30 and 40% osm) stress, significantly decreased the levels of H3K9ac and H3K27ac after 1 and 3h, which were restored to control values 24h after recovery in complete isotonic medium. The decrease in histone acetylation was prevented by histone deacetylase inhibitor Trichostatin-A. Astrocytes exposed to hypo-osmolar stress and bacterial liposaccharide (LPS) showed impaired NFkB (p65 subunit) nuclear translocation but no changes in gene expression. Interestingly, astrocyte number was reduced after hypo-osmolar stress. Our results suggest that astrocytes exposed to edema-like microenvironment show impaired global histone acetylation and response to pro-inflammatory stimulus LPS. These are evidences of mechanisms involved in astrocyte early response to injury which might condition injury progression.

V-018 | Transcriptomic analysis of gene expression following CRISPR knockout of CDK5 in neurons derived from human induced pluripotent stem cells

Cellular and Molecular Neurobiology

Author: Sofia Mucci | Email: sofiamucci27@gmail.com

Sofia Mucci1°, María Soledad Rodríguez Varela2°,Mercedes Vautier4°, Diego García Chialva, Gustavo Emilio Sevlever, María Élida Scassa, Leonardo Romorini

1° INEU (FLENI-CONICET)

Cyclin-dependent kinase 5 (CDK5) plays a vital role in neuronal functions from embryogenesis to postnatal brain modulation. CDK5 is activated through specific binding with the protein P35. In the present study, we generated knockout (KO)-CDK5 human induced pluripotent stem cells (hiPSCs) by CRISPR/Cas9 approach and further differentiated these cells into neurons to evaluate CDK5 relevance in neuronal differentiation and the impact of its absence in the neuronal transcriptome. We differentiated WT and KO-CDK5 FN2.1 hiPSCs into neurons using a defined medium and validated their phenotype through immunostaining with the neuronal markers (TUJ-1, MAP2, MAP5) and then with the glial markers (OLIG2, S100B, GFAP) to confirm the purity of the culture. Then, we performed an RNA-seq analysis (n=3) with RNA isolated from WT and KO-CDK5 hiPSCs-derived neurons. We found 657 differentially expressed genes between WT and KO-CDK5 by using the DESeq2 package in R Studio (alpha=0.01). 4 of these genes (CBLN2, NCAM2, FUT9, NTPX) were validated by RT-qPCR. Interestingly, we observed that several up-regulated genes were synaptic components and regulators of neurite projection and cell adhesion. Remarkably, by Western blot analysis, we found that the lack of CDK5 led to decreased P35 levels and conserved the phosphorylation status of TAU at Thr205. In conclusion, the knockout of CDK5 did not impair hiPSCs neuronal differentiation despite decreasing P35 levels and altering gene expression.

V-019 | DNA damage response players and sleep behavior in Drosophila melanogaster

Cellular and Molecular Neurobiology

Author: Canela Pedreira González | Email: canelaghia@gmail.com

Canela Pedreira-González1°, Emiliano Kalesnik-Vissio1°,Agustina Bruno-Vignolo1°, Ivana Ducrey1°, Florencia Fernandez-Chiappe1°, Pedro Ballestero1°, Marina Propato-Lots1°, Luis de Lecea2°, Nara I. Muraro1°

1° Biomedicine Research Institute of Buenos Aires-CONICET-Partner Institute of the Max Planck Society. Godoy Cruz 2390, C1425FQD, Buenos Aires, Argentina

2° Department of Psychiatry and Behavioral Sciences, Stanford Medicine. 291 Campus Drive, Stanford, CA 94305. United States of America

What are the evolutionary advantages of sleep? It has been established that sleep is a conserved process across all animal species; however, its biological function remains unknown. There are multiple hypotheses regarding the role of sleep in animals. For example, it has been proposed that sleep underlies memory formation, synaptic pruning, and the elimination of toxic metabolites that accumulate extracellularly during wakefulness. Additionally, a new hypothesis has recently been proposed, suggesting that repairing DNA damage accumulated during wakefulness is a fundamental function of sleep in zebrafish. Is this process conserved in other animals? Are DNA repair proteins pivotal sensors for sleep behavior regulation? Our hypothesis is that DNA repair proteins are a molecular component of the sleep homeostat in fruit flies. To test this, we will use canonical methods for inducing DNA damage and further analyze sleep behavior. Additionally, it will be determined whether PARP1, which has been proposed as a key sensor of DNA double-strand breaks for sleep induction in fish, also performs this function in insects. Future studies will determine whether other DNA repair-related proteins such as Rad51, Ku70, and Ku80 are involved in Drosophila sleep behavior.

V-020 | Metallobiology of Parkinson disease: Influence of aS-metal interactions on the equilibrium between cytosolic and membrane-bound states of the protein

Cellular and Molecular Neurobiology

Author: William Queiroz Felippe | Email: william.queiroz@unr.edu.ar

William Queiroz Felippe1°, Phelippe Do Carmo Gonçalves1°,Christian Griesinger2°, Claudio Oscar Fernandez1°

1° Max Planck Laboratory for Structural Biology, Chemistry, and Molecular Biophysics of Rosario (MPLbioR, UNR-MPINAT))

2° Max Planck Institute for Multidisciplinary Sciences, Department of NMR-based Structural Biology, Am Fassberg 11, 37077 Göttingen, Germany

Neurodegeneration in Parkinson´s disease (PD) is characterized by the progressive loss of dopaminergic neurons in the substantia nigra and by the presence of amyloid fibrillar cytoplasmic aggregates, known as Lewy bodies, in multiple brain regions, containing the protein alpha-synuclein (aS). Growing evidence supports a link between brain copper homeostasis, the formation of aS-copper complexes and the development of PD. Protein-metal interactions play an important role in aS aggregation and might represent a link between the pathological processes of protein aggregation, oxidative damage in the brain and neuronal cell loss. Indeed, the role of copper ions in aS amyloid assembly and neurodegeneration became a central question in the pathophysiology of PD. The identity of the Cu(I) binding ligands at Met-X3-Met site of aS and its role into the affinity and structural properties of the interaction were elucidated by our group using NMR spectroscopy. We found that the formation of aS-Cu(I) complex at the N-terminal region stabilizes local conformations with α-helical secondary structure and restricted motility. In this work we have extended our research towards the metallobiology of PD, analysing the impact of aS-Cu(I) complexation and its structural consequences on aS membrane binding and aggregation. Overall, our findings open new avenues of investigations into the metallobiology of PD, reshaping the consideration of copper mediated pathology in vivo.

V-021 | Mothers with a history of childhood abuse and their emotional states during pregnancy: study of genetic and epigenetic components as potential mediators

Cellular and Molecular Neurobiology

Author: Lucila Rios | Email: lulirios09@hotmail.com

Lucila Rios1°, Sergio I. Nemirovsky2°,Eduardo T. Cánepa1°, Bruno G. Berardino1°

1° Laboratorio Epigenética y Adversidades Tempranas, Departamento de Química Biológica, Facultad de Ciencias Exactas y Naturales, Universidad de Buenos Aires - IQUIBICEN, CONICET

2° IQUIBICEN, CONICET

Adverse childhood experiences (ACEs) increase the risk of mental health disorders, such as depression and anxiety, which can affect a child's developmental trajectories. This study examined the role of polymorphisms in serotonin and dopamine pathway genes (SLC6A4, MAOA, DRD4) and their interaction with DNA methylation as potential moderators/mediators of ACEs impact on maternal mental health.

Blood samples from pregnant women were analyzed for genetic variants and DNA methylation to assess their association with maternal depression and anxiety. Through the method CoMeBack, we identified co-methylated regions (CMRs) in our target genes. A linear model revealed a tendency between maternal ACEs and one CMR in the MAOA gene. Investigating further, we found that the genotype load of the MAOA risk allele showed a trending significant moderating effect on this relationship.

A linear model between ACEs and the values obtained for both depression and anxiety as traits show a significant association. Although no significant results were found when considering CMR methylation as a mediator or genotype load as a moderator, a polygenic score showed a tendency in moderating the association between ACEs and depression, but not anxiety. These findings underscore the complex interplay between genetic, epigenetic, and environmental factors, warranting further research into their combined impact on maternal mental health.

V-022 | Characterization of a cholesterol-dependent transcriptional repression mechanism associated with neuronal aging

Cellular and Molecular Neurobiology

Author: Agostina Belén Rojas | Email: agostina.rojas@mi.unc.edu.ar

Agostina B. Rojas1°, Benjamín I. de la Cruz Thea1°,Mauricio G. Martín1°

1° Departamento de Neurobiología Celular y Molecular / Instituto de Investigación Médica Mercedes y Martín Ferreyra (INIMEC-CONICET-UNC) / Universidad Nacional de Córdoba

Aging is associated with a decline in cognitive abilities, including alterations in episodic memory formation. Dysregulation of chromatin structure in response to synaptic activity is a major cause of these alterations.

Previous results from the laboratory have shown that neuronal cholesterol loss associated with aging affects NMDA and AMPA receptor activity and their downstream signalling pathway, altering the epigenetic regulation of genes such as BDNF, which are essential for memory formation.

Specifically, cholesterol loss induces the accumulation of repressor epigenetic marks such as HDAC2 in the BDNF gene, inhibiting its expression. Our data suggest that the transcriptional repression complex REST and the corepressor CDYL play a crucial role in this regulation. Indeed, our results show an accumulation of CDYL in old neurons and a reduced degradation of CDYL in response to a glutamate stimulus.

We propose that aging-associated neuronal cholesterol loss prevents CDYL degradation in aged neurons in vitro, reducing BDNF expression. We use in vitro cholesterol manipulation in hippocampal neurons to assess the relationship between cholesterol loss and CDYL accumulation in this cell type.

V-023 | Neuroprotection of Omega-3 against the deleterious effects induced by ethanol and hypoxia in neonate rats

Cellular and Molecular Neurobiology

Author: Marisol Magali Segovia | Email: marisol.segovia@unc.edu.ar

Marisol Magali Segovia1°2°, Verónica Balaszczuk1°2°,Ana Fabiola Macchione

1° Instituto de Investigaciones Psicológicas IIPsi-CONICET-UNC. Córdoba-Argentina

2° Facultad de Psicología, UNC. Córdoba-Argentina

Early exposure to EtOH (EEE) triggers a spectrum of neurobehavioral dysfunctions, affecting the hypoxic ventilatory response-HVR, reducing Omega-3 (ω3) levels in the CNS, and increasing neuronal degeneration. This study analyzed the effects of EtOH and the protective action of ω3 on the HVR and some nuclei involved in this response. Pups were administered 2.0 or 0.0 g/kg EtOH by i.g on postnatal days-PD 3-5-7-9. On PD 3-5-7, pups received 0.0 or 720 mg/kg of ω3 i.g., 20 min after the EtOH-administration. On PD9, pups were subjected to an intermittent hypoxia event-IHE for 35 min. Brainstem were collected to evaluate the number of dark neurons-DN and caspase-3 (C3) positive neurons. We found that EtOH induced respiratory depressions during the HVR and fewer apneas during recovery normoxia periods than water-treated pups. ω3 did not modify either ventilatory responses. Exposure to IHE significantly increased the number of DN in the raphe magnus and raphe obscurus and had a synergistic effect with EtOH, increasing the number of DN in the NTS. Besides, in the NTS, ω3 showed a protective effect in IHE groups by decreasing the number of DN, corroborated by C3+ labeling. No protective effect of ω3 was observed in EtOH-exposed groups. In sum, EEE negatively affected HVR. At brainstem nuclei analyzed, an increase in the neuronal degeneration was observed as a function of both ethanol EEE and IHE. ω3 provided protection only in the NTS and it reversed IHE-induced neurodegeneration.

V-024 | The role of a brain-enriched circular RNA in the dopaminergic pathway

Cellular and Molecular Neurobiology

Author: Lucía Szychowski | Email: luszychowski@gmail.com

Lucía Szychowski1°, Camila Pannunzio1°,Sebastián Alejandro Giusti1°, Damián Refojo1°

1° Instituto de Biomedicina de Buenos Aires (IBioBA)

Circular RNAs (circRNAs) are single-stranded, covalently-closed non-coding RNAs that contain exonic sequences from protein-coding genes and are formed by backsplicing, a mechanism in which a donor site splices with an upstream acceptor site. Despite thousands of identified circRNAs, their biological roles remain mostly unexplored.

We previously identified many circRNAs with higher expression levels than their linear isoforms in human and mouse central nervous systems. For functional characterization, we focused on circTulp4, derived from the Tulp4 gene, due to its high enrichment in the brain. To study its function, we created a circTulp4-deficient (CD) mouse model where circTulp4 is downregulated without affecting linear RNA or protein levels.

CircTulp4 was found to regulate excitatory neurotransmission in male mice, and its loss led to increased locomotion, stress sensitivity, and altered reward-related behavior, suggesting a dopaminergic pathway alteration. Testing amphetamine-induced locomotion, CD mice showed a heightened response, suggesting circTulp4's role in dopaminergic circuits involved in locomotion. CD females also showed increased shock sensitivity in a passive avoidance test, hinting at potential memory effects. We also used RT-qPCR to assess circTulp4 and dopaminergic component levels in various brain regions.

This study demonstrates circTulp4's significant influence on behavior and neuronal function, focusing on its role in the dopaminergic pathway.

V-025 | Histone modifications as a molecular response underlying the astroglial pro-inflammatory phenotype

Cellular and Molecular Neurobiology

Author: Camila Vidos | Email: cami.vidos@hotmail.com

Camila Vidos1°, Alberto Javier Ramos1°,Alejandro Villarreal1°2°

1° Instituto de Biología Celular y Neurociencia "Prof. E. De Robertis" UBA-CONICET, Facultad de Medicina, Universidad de Buenos Aires, Buenos Aires, Argentina

2° Instituto Tecnológico de Buenos Aires (ITBA).

Under pathological conditions astrocytes become reactive and might acquire a phenotype with a pro-inflammatory gain of function This pathological phenotype is linked to pro-inflammatory NF-kB activation, involving stable morphological and transcriptomic changes. We've demonstrated that pro-inflammatory gain of function in astrocytes correlates with increased histone acetylation and depends on microglial activation.

We hypothesize that NF-kB nuclear translocation in astrocytes recruits chromatin-remodeling enzymes like demethylase KDM6B removing the repressive mark H3K27me3 at pro-inflammatory promoters, after engaging microglial soluble factors. To explore these molecular changes in astrocytes influenced by microglial signals, we developed a two-step protocol. Primary mixed glial cultures were exposed to bacterial lipopolysaccharide (LPS) for 24 hours to generate pro-inflammatory conditioned medium (PCM). Subsequently, microglia-depleted astrocyte cultures were exposed to PCM for 1-6 hours (with 1-hour intervals) to monitor NF-kB activation, and for 24, 48, and 72 hours to assess morphological changes and pro-inflammatory markers. Immunofluorescence revealed a time-dependent increase in NF-kB nuclear translocation and complement 3 protein (C3) immunoreactivity. Quantitative PCR showed increased expression of pro-inflammatory genes like IL6 and CCL2. Further investigation will focus on changes in H3K27me3 enrichment at pro-inflammatory gene promoters using ChIP-qPCR.

V-026 | Studying the resting periods of the crab Neohelice granulata in order to discern sleep behavior.

Chronobiology

Author: Ariana Bertot | Email: arianabertot@gmail.com

Ariana Bertot1°, Esteban Javier Beckwith1°2°,Julieta Sztarker1°2°

1° IFIBYNE (CONICET-UBA)

2° Depto FBMC (FCEN-UBA)

Sleep is present in all animals in which it has been studied suggesting an early evolutionary appearance, and a very positive impact on fitness. Its biological importance is undoubted although the extent of its functions is still unknown. This period of relative disconnection from the external world is considered vitally important for multiple physiological and behavioral processes (such as learning and memory, tissue repair, for example). Different species have diverse sleeping habits, each displaying a specific sleep posture, adapted to its ecological niche and needs. According to the currently accepted model, sleep regulation is guided by two fundamental processes: the homeostatic sleep pressure, which ensures a daily balance of sleep, and the circadian rhythm, which aligns sleep with the day-night cycle. Although sleep has been explored in various animal models, including invertebrates, it has never been studied in intertidal animals. The crab Neohelice granulata is semiterrestrial, meaning that their activity/rest rhythm is guided by a third pressure, the circatidal rhythm, which marks the rise and fall of the tides. In this project we have started filming the crabs during several days to study their activity/rest rhythms and their postures during immobility. We aim to recognize the presence of sleep in crabs by finding specific postural patterns during immobility that coincide with a reduced alertness and which are increased after sleep deprivation or social exposure.

V-027 | Mapping the contribution of sLNv neurons to the circadian network using connectomic and transcriptomic approaches

Chronobiology

Author: Christian Mauricio Carpio Romero | Email: ccarpio@leloir.org.ar

Christian Mauricio Carpio-Romero1°, Francisco J. Tassara1°,Gonzalo Grau2°, Maria Fernanda Ceriani1°

1° Laboratorio de genética del comportamiento - Fundación Instituto Leloir - Instituto de Investigaciones Bioquímicas de Buenos Aires (CONICET)

2° Instituto Tecnológico de Buenos Aires

Living organisms have an internal clock that oscillates with a period of ~24 hours, regulating physiology differentially across the day. In Drosophila, this circadian clock comprises 240 neurons organized in clusters that receive inputs from the environment, process information and organize daily activity patterns. The interaction among these clusters through neuropeptides has extensively been studied; only recently communication through classical neurotransmitters has been uncovered. Two different connectivity databases of the Drosophila brain have just been published. They provide detailed spatial mapping of synaptic inputs and outputs for each neuron, including classification of the clear vesicles based on the loaded neurotransmitter. However, the cost of generating such datasets limits the number of available time-points, constraining the ability to analyse differential connectivity throughout the day. Conversely, single-cell transcriptome analysis of clock neurons contains temporal information on the expression of essential components of the machinery involved in neurotransmission. Taking advantage of the datasets, we mapped interactions within the clock network through the identification of neurotransmitters and receptor subunits that would support communication. This analysis, supported by ours based on a tracing tool that allows identification of postsynaptic partners, contribute to define the landscape of receptors that would mediate communication within the sLNvs.

V-028 | Antibiotic induced dysbiosis of gut microbiota increases motivation and anticipatory activity under a time restricted feeding protocol

Chronobiology

Author: Manuel Crespo | Email: manuel.crespo94@outlook.com

Manuel Crespo1°, Marcos Bilen2°,Alana Del Río2°, Diego Golombek3°, Juan Chiesa1°, Patricia Agostino1°

1° Laboratorio de Cronobiología, Departamento de Ciencia y Tecnología, Universidad Nacional de Quilmes / CONICET

2° 2Laboratorio de Ingeniería Genética, Biología Celular y Molecular, Departamento de Ciencia y Tecnología, Universidad Nacional de Quilmes / CONICET

3° 3Laboratorio Interdisciplinario del Tiempo (LITERA), Universidad de San Andrés / CONICET. Buenos Aires, Argentin

Recent evidence highlights the vital role of gut microbiota in regulating mammalian physiology and behavior, including circadian rhythms. The circadian system regulates several physiological, metabolic, and behavioural rhythms with a period close to 24 h. When food availability is restricted to an interval of the light phase (time restricted feeding, TRF), nocturnal animals adapt to this condition by feeding only during this interval and develop a food anticipatory activity (FAA) driven by a food-entrainable oscillator (FEO). Signals from the gut microbiota influence behaviors related to motivation for food rewards. Therefore, we hypothesized a physiological link between gut microbiota and FEO activity by examining circadian FAA behavior as a motivational outcome. To test this hypothesis, C57BL/6J mice were treated with antibiotics to induce gut microbiota dysbiosis and were subjected to a 3-hour TRF protocol during the day. The antibiotic-treated mice showed increased FAA, shorter time for its consolidation, and higher motivation levels. Furthermore, these mice exhibited elevated levels of tyrosine hydroxylase in the nucleus accumbens and ventral tegmental area. These findings suggest that gut microbiota plays a regulatory role in circadian behavioral rhythms governed by the FEO and in reward-driven motivation. Understanding the role of the circadian system and its potential disruption by gut microbiota is crucial for maintaining health and well-being.

V-029 | Study of the bidirectional regulation between sleep regulation and intestinal physiology

Chronobiology

Author: Luna Ripari | Email: lunaripari@gmail.com

Luna Ripari1°2°, Esteban J. Beckwith1°2°

1° Instituto de Fisiología Biología Molecular y Neurociencias (IFIBYNE) UBA-CONICET

2° Departamento de Fisiología, Biología Molecular y Celular, FCEN, UBA.

Sleep deprivation is a neurobiological topic with growing medical and social concerns. In particular, diseases of the gut and other peripheral organs are often accompanied by behavioural changes, including eating disorders, fatigue, and sleep dysfunction, which can have serious consequences for both body and mind. However, little is known about the mechanisms through which intestinal diseases impact these behaviours.

To study the bidirectional regulation between intestinal physiology and sleep regulation, we decided to establish two models of intestinal tumors in Drosophila melanogaster. This represents an experimental approach that allows the study of the gut and brain within their natural microenvironment as part of a multi-organ system.

While establishing the models in the laboratory, we are conducting a detailed description of the effects these manipulations have on sleep behaviour in both female and male flies. Our initial results show a clear increase in sleep levels in females, while males do not seem to exhibit differential sleep regulation compared to their genetic controls. This increase in sleep correlates with phenomena reported in humans.

Based on these initial observations, we aim to investigate which gut-brain axis communication pathways are responsible for this altered sleep regulation, and to study how sleep deprivation in a chronic deprivation model modulates the progression of the intestinal tumors we model in the laboratory.

V-030 | Gains and losses of pineal non-visual opsins during the evolution of lizards and the tuatara (Lepidosauria)

Chronobiology

Author: Flavio S J de Souza | Email: fsouza.ingebi@gmail.com

Flávio S J de Souza1°2°, Ricardo Romero1°2°

1° Instituto de Fisiología, Biología Molecular y Neurociencias, CONICET

2° Departamento de Fisiología, Biología Molecular y Celular, Facultad de Ciencias Exactas y Naturales, UBA

Non-mammalian vertebrates have a pineal complex with light-sensing capability as well as a neuroendocrine, melatonin-secreting function. Along with the deep pineal gland, many lizards (Squamata), as well as the tuatara (Rhynchocephalia) have a parietal eye, a structure derived from the parapineal containing photoreceptor cells that express an array of non-visual opsins that differ from the visual opsin repertoire of the retina, like pinopsin (opnp), parapinopsin (opnpp) and parietopsin (opnpt). A fourth member of the group, vertebrate-ancient opsin (VA-opsin), is expressed in the brain. Here, we have searched 50 lepidosaurian genomes (tuatara + lizards) for pineal non-visual opsins to check for the gain and loss of these genes during reptile evolution. Remarkably, we have identified a new opsin gene, which we termed “lepidosaur opsin” (lepidopsin) which is phylogenetically close to opnpp and is present in the genome of the tuatara and most lizards. Our survey of pineal non-visual opsins has revealed i) losses of non-visual opsins in specific lizard clades, ii) an apparent correlation between the presence of a parietal eye and diversity of non-visual opsin repertoire and iii) the gain of a new opsin during early lepidosaur evolution. Future studies on the photochemical nature of lepidopsin and the expression patterns of non-visual opsins in the parietal eye and pineal should help illuminate the functions of this class of opsins in reptiles.

V-031 | Long as I can see the light: longitudinal study of sleep timing in Toba/Qom Native Communities in Argentina

Chronobiology

Author: Laura Trebucq | Email: trebucql@udesa.edu.ar

Laura L Trebucq1°, Ignacio Spiousas1°2°,Maria Florencia Coldeira1°2°, Camila R. Godoy Peirone2°, Diego A. Golombek1°2°, Horacio de la Iglesia3°, Leando P. Casiraghi1°2°

1° Laboratorio Interdisciplinario del Tiempo y la Experiencia, Universidad de San Andres, Buenos Aires, Argentina

2° CONICET, Argentina

3° Department of Biology, University of Washington, Seattle, W

In the pre-electricity era, human activities adhered to the safety of daylight, with sleep predominantly confined to the night. The advent of artificial lighting allowed humans to extend wakefulness into the late hours. Our research is focused on isolated Toba/Qom native communities in northern Argentina and helps understanding this complex phenomenon.

Since 2012, our longitudinal wrist-actimetric studies reveal that Toba/Qom individuals in rural areas lacking electricity have earlier sleep onsets and more extended sleep duration compared to their urban counterparts (de la Iglesia et al. 2015). Also, we found a delay in the Dim-Light Melatonin Onset (DLMO) during winter (Casiraghi et al. 2020).

We have monitored these communities as their living conditions improved slowly. Currently, all rural settlements we study have varying degrees of access to electricity and internet, with some residents even owning smartphones. Our recent results show a delay in the average times of sleep in these communities. In addition, thanks to the longitudinal nature of our studies (which adds up to about 10 thousand night of sleep recorded through actigraphy), we are able to monitor changes in the habits of these communities, like detecting and quantifying “social jet-lag”, or studying how ownership of a smartphone affects sleep, while also being able to consider season and gender variables, helping us to describe more profoundly how access to electric light shapes sleep habits in humans.

V-032 | Analysis of genetic and environmental variation on the exploratory activity and context recognition.

Cognition, Behavior, and Memory

Author: Ivan Alvarez | Email: Ivan12alvarez@gmail.com

Ivan Alvarez1°, Agustina Pivato1°,Matias Samper1°, Mario Pagani1°

1° Instituto de Fisiología y Biofísica Bernardo Houssay, UBA-CONICET, Facultad de Medicina

Complex phenotypes including diabetes, cardiovascular disease, psychological disorders or cognitive property are understood as phenotypes with very low heritability and therefore highly susceptible to environmental conditions. In addition, complex phenotypes are understood to be highly sensitive to the genetic background. However, while we were studying habituation memory in exploratory activity and context recognition memory, we found unexpected variability in some situations and unexpected stable performance index in other conditions. Therefore we hypothesized that specific behavioral phenotypes may have specific sensibility to some environmental factors but not to other factors. A similar situation can be found when genetic factors are considered. Thus we examined the effect of temperature, humidity, genetic background (considering the same background from distinct origins and different genetic backgrounds) and also genotypes with distinct levels of cAMP signaling.

These preliminary results indicated that some but not all complex genotypes in our study are susceptible to environmental and genetic variations. In addition, some phenotypes appear to be more sensitive to environmental and genetic variations than others suggesting a much larger number of genes required for such behavioral performance.

V-033 | Competition for Cognitive Resources: Effects of Physical Activity and Novelty on Memory and Creativity in Secondary School Students

Cognition, Behavior, and Memory

Author: Alejo Ramiro Barbuzza | Email: barbuzza.alejo@gmail.com

Alejo Ramiro Barbuzza1°2°, Pedro Benedetti2°,Fabricio Ballarini1°2°

1° Instituto de Biología Celular y Neurociencia “Prof. E. De Robertis” (IBCN), Facultad de Medicina, UBA-CONICET, Ciudad Autónoma de Buenos Aires, Argentina.

2° Instituto Tecnológico de Buenos Aires (ITBA), Ciudad Autónoma de Buenos Aires, Argentina.

Physical activity (PA) provides a range of benefits for physiological and mental health, as well as cognition. However, the amount of research conducted on healthy humans, particularly adolescents, in this area is limited. To address this gap, we aimed to study the role of PA on memory and creativity in secondary school students within natural environments, specifically schools, where there is an intimate relationship between cognition and PA.

Our previous research demonstrated that novelty improved the recall of long-term graphic memory (Rey Complex Figure) and performance in creativity tasks (Alternative Uses Task - AUT) when it was associated with novelty immediately before these tasks. However, this improvement largely depended on the order in which the tasks were presented. The AUT task showed improvement regardless of the order, while the Rey figure only improved when it was recalled first, indicating that the cognitive resources provided by novelty are limited.

The results obtained in PA suggest a similar competition for resources, albeit with a subtle difference. The cognitive resources provided by the physical education class, immediately before these tasks, appear to be more limited than those provided by novelty, as improvements were only observed in the task tested first, regardless of its nature.

V-034 | Egocentric turn as a Navigational Strategy in Amphibians: a Study on its Neural Basis

Cognition, Behavior, and Memory

Author: Sofia Judith Barmak | Email: sofiabarmak@gmail.com

Sofia Judith Barmak1°2°, Rubén Nestor Muzio1°2°,María Florencia Daneri1°2°

1° Grupo de Aprendizaje y Cognición Comparada, Laboratorio de Biología del Comportamiento (IBYME-CONICET)

2° Instituto de Investigaciones, Facultad de Psicología (UBA)

Spatial cognition is a highly relevant skill that involves the ability to orient and navigate in space to obtain the necessary resources for living. This ability is present in multiple zoological species, suggesting it is highly conserved throughout evolution. With the aim of better understanding this behavior, our laboratory uses an amphibian model, which has a brain structure known as the medial pallium, homologous to the mammalian hippocampal formation. The use of amphibians as a model enables us to explore neural control of behavior without strong cortical modulation and to study the evolutionary changes in vertebrate brain structures and functions. In this study, neuronal activation in the primitive hippocampus of the terrestrial toad Rhinella arenarum was measured after learning a spatial task. Subjects were trained in a T-maze where they learned to orient themselves turning towards the location of the reward. Once the learning criterion was achieved the brains were histologically analyzed using the AgNOR technique. Preliminary results revealed that the medial pallium presents an increased activity compared to other brain areas. This suggests that the medial pallium is involved in spatial orientation in amphibians, just like the hippocampus is involved in mammals.

V-035 | The serotonin mediates the locomotor response to high temperatures in Drosophila melanogaster.

Cognition, Behavior, and Memory

Author: Andrea Beltrán Terán | Email: andreabeltran@campus.fmed.uba.ar

Andrea Beltrán Terán1°2°, María Sol Calahorrano1°2°,Andreia Neumann1°2°, Azul Galo2°3°, Maria Victoria Noceti1°2°, Vinicius Bongiovanni1°2°, Pablo Bochicchio3°4°, Diego Hernán Bodin4°, Maximiliano Katz1°2°3°

1° Universidad de Buenos Aires, Facultad de Ciencias Médicas, Departamento de Ciencias Fisiológicas. Buenos Aires, Argentina.

2° CONICET - Universidad de Buenos Aires. Instituto de Fisiología y Biofísica Bernardo Houssay (IFIBIO Houssay). Buenos Aires, Argentina.

3° Consejo Nacional de Investigaciones Científicas y Técnicas (CONICET).

4° Universidad de Buenos Aires (UBA), Facultad de Ciencias Exactas y Naturales, Departamento de Biodiversidad y Biología Experimental, Laboratorio de Neuroetología de Insectos. Buenos Aires, Argentina

In nature, organisms are continually exposed to various stress conditions. High-temperature exposure (HTE) induces physiological and biochemical adjustments that are essential for adaptation to such stressor. Alterations in locomotor activity play a crucial role in this adaptive response across both vertebrates and invertebrates. Serotonin (5HT), a neurotransmitter that regulates multiple aspects of organismal homeostasis, has an unclear role in stress response adaptation. In this study, we used the fruit fly, Drosophila melanogaster, as a model organism to explore the involvement of the serotonergic pathway in the regulation of locomotion under temperature alterations. In Drosophila, HTE leads to a significant increase in locomotor activity. Similarly, gradual temperature increments (GTI) also lead to enhanced locomotion. We exposed control flies and mutants deficient for the enzyme Tryptophan hydroxylase, the serotonin transporter SerT, and the five serotonin receptors described in Drosophila (5HT1A, 5HT1B, 5HT2A, 5HT2B, and 5HT7) to both HTE and GTI protocols, and analyzed their locomotor patterns. Our results indicate that serotonin is essential for a normal locomotor response to high temperature, with the 5HT7 receptor playing a key mediating role in this process.

V-036 | The Cdk5/p35 complex regulates working memory and neuronal activation in a mouse model of Attention Deficit Hyperactivity Disorder

Cognition, Behavior, and Memory

Author: Gimena Berardo | Email: gimenaberardo4@gmail.com

Gimena Berardo1°, Florencia Dadam1°2°,Osvaldo Martín Basmadjian1°, María Gabriela Paglini1°3°

1° Instituto de Investigación Médica Mercedes y Martín Ferreyra, INIMEC-CONICET-UNC

2° Facultad de Psicologia.Universidad Nacional de Córdoba

3° Instituto de Virología “Dr. José María Vanella”, In.Vi.V.-CONICET-UNC

Attention-Deficit/Hyperactivity Disorder (ADHD) is a neurodevelopmental condition characterized by hyperactivity, impulsivity, and memory deficits. One of the crucial symptoms of ADHD is working memory (WM) impairment, a cognitive function essential for temporary storage and manipulation of information during complex tasks such as planning, decision making, and problem solving. WM relies heavily on the prefrontal cortex, which coordinates attention and executive control, as well as the hippocampus, which is involved in the formation of long-term memory.

Using transgenic mice lacking p35 (p35KO), the activating subunit of Cdk5, which models key ADHD features, we studied the role of the complex Cdk5/p35 in WM and neuronal activity in ADHD-relevant brain areas, considering potential sex differences. We used p35KO and wild-type (WT) mice (21-25 days postnatal) to assess WM using the Y-maze task and neuronal activity in relevant brain areas with c-FOS immunostaining

p35KO male mice exhibited altered WM compared to WT. Furthermore, a lower number of c-FOS positive cells were observed in different brain nuclei of both, the prefrontal cortex and the hippocampus, indicating altered neuronal activation in these regions.

In conclusion, our study emphasizes the importance of the Cdk5/p35 complex in WM processes and suggests that dysfunction in these brain areas contributes to WM deficits, which significantly impairs individual's ability to plan and execute complex cognitive tasks.

V-037 | EXECUTIVE FUNCTION TRAINING IN ARGENTINIAN CHILDREN: ANALYSIS OF IMPROVEMENT PROFILES USING CLUSTERING METHODS

Cognition, Behavior, and Memory

Author: Martina Boscolo | Email: martiboscolo@gmail.com

Martina Boscolo1° , Gabriel O. Paz1°, Melina Vladisauskas1°, 2°, 3°, Diego E. Shalom4°, 5°, María Julia Hermida6°, Andrea P. Goldin1°

1° Universidad Torcuato Di Tella. Escuela de Negocios. Centro de Inteligencia Artificial y Neurociencia (CIAN). Laboratorio de Neurociencia. CONICET

2° Cognitive Neuroimaging Unit, CEA, INSERM, Université Paris-Saclay, NeuroSpin Center, 91191 Gif/Yvette, France

3° Collège de France, Université Paris Sciences Lettres (PSL), 11 Place Marcelin Berthelot, 75005 Paris, France

4° Universidad de Buenos Aires, Facultad de Ciencias Exactas y Naturales, Departamento de Física, Buenos Aires 1428, Argentina

5° CONICET—Universidad de Buenos Aires, Instituto de Física Interdisciplinaria y Aplicada (INFINA), Buenos Aires 1428, Argentina

6° Universidad Nacional de Hurlingham - Consejo Nacional de Investigaciones Científicas y Técnicas (UNAHUR-CONICET), Villa Tesei, Provincia de Buenos Aires, Argentina

Executive functions (EF) are cognitive functions that allow us to control actions and thoughts and adapt to changing environments. They are important for educational and life success and can be improved through cognitive training. For more than fifteen years, our team has implemented Mate Marote, a free access gaming software to train and assess EF in 4-to-8 year-olds. Interventions last from 1 to 4 months and take place within schools, with successful results. Current efforts are directly aimed at personalized cognitive training. Here, we present a clustering analysis of an experiment in which 66 6-year-olds' EF were evaluated before and after an intervention of about 27 sessions of 15 minutes each, distributed over 3 months. The aim of this work was to determine how participants are grouped according to their improvement on EF tests after receiving cognitive training. We used k-means method to group data from the experimental

group. In addition, the groups were characterized and compared in terms of sociodemographic and academic variables. We discuss the interpretation of the results in relation to the implications for the analysis of performance profiles in cognitive training, as well as the relevance and advantages of applying clustering methods for data analysis in the field.

V-038 | Online assessment of individual differences on executive function with the cursor trajectories in a Trail-Making Test

Cognition, Behavior, and Memory

Author: Gianluca Capelo | Email: gianluca.capelo@gmail.com

Gianluca Capelo1°2°, Gustavo E Juantorena1°,Agustín Petroni3°, Juan E Kamienkowski1°2°4°

1° Laboratorio de Inteligencia Artificial Aplicada, Instituto de Ciencias de la Computación, Facultad de Ciencias Exactas y Naturales, Universidad de Buenos Aires - CONICET, Argentina

2° Departamento de Computación, Facultad de Ciencias Exactas y Naturales, Universidad de Buenos Aires, Argentina

3° University of Gothenburg, Sweden

4° Maestría de Explotación de Datos y Descubrimiento del Conocimiento, Facultad de Ciencias Exactas y Naturales - Facultad de Ingeniería, Universidad de Buenos Aires, Argentina

The Trail-Making Test (TMT) is a widely used neuropsychological assessment designed to evaluate executive functions, which are critical for complex cognitive processes. Traditionally administered via pencil and paper, the TMT exhibits high sensitivity but low specificity. To cope with this deficit, we have implemented a digital version of the TMT, and validated with other standardized tests to measure different executive functions, such as the Change Detection Task for visual working memory, and Go/No-Go and Stop-Signal Tasks for inhibitory control. Moreover, to make these experiments accessible to different populations, a web platform (https://datapruebas.org/) was developed, where we collected data from over 300 participants performing the four tasks. This data is being analyzed to extract attributes that accurately represent performance on the TMT, based on the trajectory of the cursor. These attributes will be used to predict the executive function capabilities, such as working memory or inhibitory control, measured by the other three tasks.

The aim of this project is to predict, through a comprehensive analysis of a complex task like the TMT, the individual differences in executive functions present in the general

population, with the goal of employing this methodology in the future for the early detection of neurodegenerative diseases associated with executive functions, such as Alzheimer's and other related dementias.

V-039 | Reactivating aversive memories in humans: A EEG study of post-retrieval processes.

Cognition, Behavior, and Memory

Author: luciano cavallino | Email: lcavallino@hotmail.com

Luciano Cavallino1°, Sofia Belforte1°,Luz Bavassi1°, Maria Eugenia Pedreira1°

1° Laboratorio de Neurociencias de la memoria, Instituto de Fisiología, Biología Molecular y Neurociencias (IFIBYNE), CONICET, Facultad de Ciencias Exactas y Naturales, Universidad de Buenos Aires, Buenos Aires, Argentina

Memory consolidation transforms a short-term labile trace into a stable and long-lasting one. Retrieving a consolidated memory can trigger different processes depending on how the cues associated with the original experience (reminders) are presented. Indeed, memories can be reactivated by the cues (reminders) presented during acquisition. We used a threat conditioning protocol, which implied the association between an angry face (conditioned stimulus, CS) and an aversive sound (unconditioned stimulus, US). This study aims to find neural markers of the post-retrieval process triggered by the presentation of the CS 24 hours after acquisition. In this sense, we analyzed the resting state before and after the reminder is presented through electroencephalogram recordings. We compared a group exposed to threat conditioning on the first day (experimental) and a control group that wasn't previously conditioned. We found that the experimental group showed higher alpha activity after the reminder presentation. Previous research demonstrated the importance of alpha oscillations in the encoding and retrieval of episodic memories. In this work, we present evidence as a first step toward describing the neural correlates underlying post-retrieval processes in a threat conditioning protocol.

V-040 | Lateral Entorhinal Cortex as a Bridge Between Amygdala and Hippocampus in the destabilization/reconsolidation of Contextual Fear Memories

Cognition, Behavior, and Memory

Author: Ramiro Gabriel Comas Mutis | Email: ramiro.comas@unc.edu.ar

Ramiro Gabriel Comas Mutis1°2°, Melisa Riva Gargiulo1°2°,Gastón Diego Calfa1°2°

1° IFEC - CONICET.

2° Departamento de Farmacología Otto Orsingher, FCQ, UNC.

The destabilization/reconsolidation of fear memories has been regarded as a potential therapeutic target for the treatment of disorders such as phobias and Post Traumatic Stress Disorder (PTSD). In this sense, it has been shown that the interaction between the basolateral amygdala (BLA) and the Dorsal Hippocampus (DH) is critical for this process to occur, even though there are no direct connections between them. However, acute stress exposure prior to the acquisition generates robust memories resistant to destabilization, from a synaptic standpoint, rendering them impervious to interference. Moreover, stress affects the temporal dynamic of the DH structural plasticity associated with the destabilization/reconsolidation process and the interaction between BLA and DH, generating dichotomic effects in both structures.

We set to investigate how BLA and DH connect during the destabilization/reconsolidation process and how stress affects this circuit. Here we provide evidence that the Lateral Entorhinal Cortex (LEC) works as a functional mediator in the emotional pathway of memories, modulating the influence of BLA on DH. Through electrophysiological recordings in layers V and II of LEC we proved that memory destabilization is accompanied by a decrease in excitatory activity of principal cells that does not occur in stressed animals which, in turn, affects the information that enters DH.

V-041 | Intermittent ethanol consumption and white noise exposure alter hippocampal oxidative state and related behaviors in adolescent male rats

Cognition, Behavior, and Memory

Author: Gonzalo Nahuel Corsi | Email: gonza_corsi@hotmail.com

Gonzalo Nahuel Corsi1°, Lara Candela Araujo Añon1°,Santiago Marcos1°, Luciana D´Alessio2°3°, Laura Ruth Guelman1°2°, Sonia Jazmín Molina1°

1° Universidad de Buenos Aires. Consejo Nacional de Investigaciones Científicas y Técnicas. Centro de Estudios Farmacológicos y Botánicos (CEFyBO, UBA-CONICET). Buenos Aires, Argentina.

2° Universidad de Buenos Aires. Facultad de Medicina. 1ª Cátedra de Farmacología. Buenos Aires, Argentina.

3° Universidad de Buenos Aires. Consejo Nacional de Investigaciones Científicas y Técnicas. Instituto de Biología Celular y Neurociencias (IBCN, UBA-CONICET). Buenos Aires, Argentina

During adolescence, the brain undergoes complex changes and is more vulnerable to environmental agents that can disrupt its development. Ethanol (EtOH) intake combined with loud noise is common among human adolescents and both can individually harm the brain, causing oxidative stress and behavioral changes. Thus, this study investigated the combined effects of EtOH and noise on hippocampus (HC)-related behaviors and oxidative state in adolescent rats.

At postnatal day (PD) 28, male Wistar rats underwent an intermittent two-bottle choice paradigm for voluntary EtOH intake (11 sessions of 6%, 8%, 10% EtOH/1% sucrose). At PD39 and PD46, rats were exposed to noise (95-97 dB, 2h). Finally, at PD52 rats were evaluated on different behavioral tasks and HC was dissected to assess reactive oxygen species (ROS) levels and catalase activity.

Results showed that EtOH intake, noise exposure, and their combination increased exploration compared to controls. Noise alone impaired spatial and long-term habituation memory and reduced risk assessment behaviors. However, the combined

stimuli lowered ROS levels. No significant changes were observed in anxiety-like behavior or catalase activity among groups.

In conclusion, the combination of stimuli caused fewer behavioral changes than noise alone, suggesting that EtOH may help cope with noise stress. Additionally, rats exposed to both stimuli had lower ROS levels, likely due to activated antioxidant defenses that could prevent potential damag

V-042 | Development of an automated video acquisition system for the study of social interactions in rodents

Cognition, Behavior, and Memory

Author: Vicente Dell'Oro Sansoni | Email: vicentedelloro@gmail.com

Vicente Dell'Oro Sansoni1°2°, Catalina Pilotto1°2°,Emilio Kropff1°, María Cecilia Martínez1°

1° Departamento de Física, Facultad de Ciencias Exactas y Naturales, Universidad de Buenos Aires

2° Physiology and Algorithms of the Brain, Fundación Instituto Leloir, IIBBA-CONICET

In the field of neuroscience, studying rodent activity provides insights into behavioral patterns and responses to stimuli. However, little is known about how different stress levels impact on social interaction. In this project, we developed an automated device to record videos of animal groups with varying stress levels to study their behavior.

A versatile recording system was built using a Raspberry Pi 3 Model B and a Raspberry Pi Camera Module 2 NoIR. Both components are low-cost and easily programmable. The camera was configured to film videos at specific times, with recordings accessible remotely.

Since rodents are most active at night, nighttime recordings provide the most valuable data. Given that rats are not sensitive to infrared light, a circuit with infrared LEDs was assembled to record without interfering with the animals' behavior.

Data analysis will be performed using machine learning, allowing efficient and precise study of behavioral patterns. The tool employed will be DeepLabCut in its multi-animal function, trained with videos of the animals in the cage.

This work will provide insights into the behavioral patterns and social interactions of rats, expanding our understanding of how stress influences their social relationships. The results obtained may not only advance knowledge in neuroscience but also have broader implications for studying social behavior in other species.

V-043 | Local experience on the beneficial effects of tunnel handling on mice welfare

Cognition, Behavior, and Memory

Author: Mariana Judith Elías | Email: maruelias23@hotmail.com

Mariana Judith Elías1°, Lucía María Di Guardia Casella1°2°,Claudio Darío Barrios1°2°, Amaicha Mara DePino1°3°

1° Conicet- Universidad de Buenos Aires. Instituto de Fisiología, Biología Molecular y Neurociencias.

2° Universidad de Buenos Aires. Facultad de Ciencias Exactas y Naturales. Departamento de Fisiología, Biología Molecular y Celular

3° Universidad de Buenos Aires. Facultad de Ciencias Exactas y Naturales. Departamento de Biodiversidad y Biología Experimenta

The standard method for handling laboratory mice during routine care and experimental procedures, known as tail handling, involves capturing, lifting, and restraining mice by their tails. Increasing evidence suggests that, compared to non-aversive techniques like tunnel and cup handling, tail handling heightens anxiety-related behaviors and induces anhedonia, thereby negatively impacting mouse welfare.

A year ago, we introduced home cage tunnel enrichment and tunnel handling for the animals housed in the holding areas of behavioral testing at IFIBYNE. We observed increased voluntary interactions with the handler and an apparent reduction in fear and anxiety during routine cage changes. To better quantify the effects of tunnel handling on anxiety-related behaviors, we are assessing animals using the elevated plus maze and open field tests upon arrival at the facility, as well as two and four weeks afterward.

Our findings indicate that the straightforward refinement of substituting tail handling with tunnel handling for routine care and procedures significantly enhances mouse welfare and has the potential to improve scientific outcomes.

V-044 | Automated detection of cognitive symptom severity and mild cognitive impairment in Parkinson's disease

Cognition, Behavior, and Memory

Author: Franco Javier Ferrante | Email: francoferrante95@gmail.com

Franco J. Ferrante1,2,3, Daniel Escobar Grisales4; María Fernanda López5,6; Pamela Lopes da Cunha1,2; Lucas Federico Sterpin1; Jet M.J. Vonk7; Pedro Chana Cuevas8,9; Claudio Estienne10; Eugenia Hesse1,11; Lucía Amoruso1,13,14; Juan Rafael Orozco Arroyave4,12 ; Adolfo M. García1,15,16,*

1 Centro de Neurociencias Cognitivas, Universidad de San Andrés, Vito Dumas 284 (B1644BID), Victoria, Buenos Aires, Argentina.

2 Consejo Nacional de Investigaciones Científicas y Técnicas (CONICET), Godoy Cruz 2290, Piso 9 (C1425FQB), Ciudad Autónoma de Buenos Aires, Argentina.

3 Facultad de Ingeniería, Universidad de Buenos Aires, Colón 850 (C1063), CABA, Argentina.

4 GITA Lab, Faculty of Engineering, University of Antioquia Universidad de Antioquia, Street 67 No. 53 - 108 Of. 18-310, Medellín, 050010, Antioquia, Colombia.

5 Hospital Nacional Posadas, Avenida Presidente Arturo U. Illia s/n y Marconi Morón 386, (B1684) El Palomar, Provincia de Buenos Aires.

6 Universidad de Flores, Av. Rivadavia 5741 (C1406GLA), Caballito, Buenos Aires, Argentina.

7 Memory and Aging Center, Department of Neurology, University of California San Francisco, CA (94158), USA

8 Centro de Trastornos del Movimiento (CETRAM), Av. José Joaquín Prieto 7271 (9120501), Lo Espejo, Región Metropolitana, Chile.

9 Facultad de Ciencias Médicas, Universidad de Santiago de Chile, Avenida Libertador Bernardo O'Higgins n°3363 (9170022), Estación Central, Santiago, Chile

10 Instituto de Ingeniería Biomédica, Universidad de Buenos Aires, Av. Paseo Colón 850, 4to. piso, (C1063ACV), Buenos Aires, Argentina.

11 Departamento de Matemática y Ciencias, Universidad de San Andrés, Vito Dumas 284 (B1644BID), Victoria, Provincia- de Buenos Aires, Argentina.

12 Pattern Recognition Lab, Martensstr. 3, Erlangen, 91058, Germany.

13 Basque Center on Cognition, Brain, and Language (BCBL), San Sebastian, Spain

14 Ikerbasque, Basque Foundation for Science, Bilbao, Spain

15 Global Brain Health Institute, University of California San Francisco, 1651 4th St (94143), San Francisco, CA, USA; and Trinity College Dublin, 42A Pearse St (D02 R123), Dublin, Ireland.

16 Departamento de Lingüística y Literatura, Facultad de Humanidades, Universidad de Santiago de Chile, Av. Bernardo O'Higgins 3363 (9160000), Estación Central, Santiago, Chile.

Establishing cognitive status is vital in Parkinson's disease (PD) assessments, as neuropsychological deficits undermine daily functionality. Here we validate a scalable digital language analysis framework on a well-powered cohort.

384 PD patients completed two semantic and one phonemic fluency tasks. We extracted six variables from each word: semantic variability (SV), granularity, length, frequency, neighborhood and concreteness. In Experiment-1, these variables were used in a random forest regression to predict Mattis dementia rating scale scores as indices of cognitive severity. In Experiment-2 we used these variables to compare [via generalized linear model (GLM)] and classify (via ridge regression) between 49 patients with and 50 patients without mild cognitive impairment (MCI).

In Experiment-1, we found a strong correlation between real and predicted Mattis scores ($R = 0.52$, 95% CI [0.50-0.54], $p < .001$), driven by SV and granularity. In Experiment-2, patients with MCI produced significantly less varied and granular responses than those without MCI. Word properties achieved robust patient classification (mean [95% CI] AUC = 0.84 [0.84-0.85], sensitivity = 0.74 [0.72-0.76], specificity = 0.77 [0.75-0.80]), again led by SV and granularity.

Our results show that digital word property analysis predicts cognitive symptom severity and distinguishes between cognitive phenotypes of PD, enabling scalable neuropsychological screenings.[/vc_column_text][/vc_column][/vc_row]

V-045 | Modulation of iron transporters in glia impact on behavoir.

Cognition, Behavior, and Memory

Author: Azul Denise Galo | Email: azu.galo@gmail.com

Azul Denise Galo1°, Victoria Noceti1°,Vinicius Bongiovanni1°, Pablo Bochicchio2°, Diego Hernán Bodín2°, Jorge Daniel Correale3°, Juana Maria Pasquini4°, Maximiliano Katz1°, Maria Silvina Marcora4°

1° CONICET - Universidad de Buenos Aires. Insti de Fisiología y Biofísica Bernardo Houssay (IFIBIO Houssay). Buenos Aires, Argentina.tuto

2° Universidad de Buenos Aires (UBA), Facultad de Ciencias Exactas y Naturales, Departamento de Biodiversidad y Biología Experimental, Laboratorio de Neuroetología de Insectos. Buenos Aires, Argentina

3° Instituto de Investigaciones Neurológicas Dr. Raúl Carrea, FLENI. Buenos Aires, Argentina.

4° Departamento de Química Biológica and Instituto de Química y Fisicoquímica Biológica (IQUIFIB)-, Facultad de Farmacia y Bioquímica. UBA- CONICET. Buenos Aires Argentina.

Iron is essential for many cellular processes, and maintaining iron homeostasis is fundamental to prevent various health issues. Both iron deficiency and iron overload have been associated with detrimental effects for the cells.

In Drosophila melanogaster several genes are involved iron trafficking. Malvolio, an ortholog of DMT1 in mammals, is involved in iron uptake by the cell. Once inside the cell, iron can reach the endoplasmic reticulum through the ZIP13 transporter, where it is incorporated into ferritin. Ferritin, the primary iron storage complex, is composed of 24 subunits of two ferritin types, Fer1HCH and Fer2LCH. In addition, Mitoferrin (Fer3HCH), located in the inner mitochondrial membrane, facilitates the transport of iron into the mitochondrion.

To investigate the impact of iron metabolism in the Drosophila central nervous system, particularly in glial cells, we conducted an RNA interference (RNAi) screen targeting iron

transport genes. Subsequently, we tracked the flies, and several behavioral parameters were determined. Results on behavioral parameters will be presented.

Our findings underscore the critical role of iron homeostasis in glial cell function and its necessity for normal behavior. Additionally, this screen offers valuable insights into the interactions between iron and various genes and pathways, potentially aiding in the identification of compounds capable of correcting cellular iron imbalances.

V-046 | Exploring the neural correlates of working memory and visual search: MEG and eye-tracking recordings

Cognition, Behavior, and Memory

Author: Joaquin Gonzalez | Email: joaquin.gonzalez6693@gmail.com

Joaquín Ezequiel Gonzalez1°, Damian Care1°,Anthony J. Ries2°, Juan Esteban Kamienkowski1°3°4°, Matias Julián Ison5°

1° Laboratorio de Inteligencia Artificial Aplicada, Instituto de Ciencias de la Computación, Facultad de Ciencias Exactas y Naturales, Universidad de Buenos Aires – CONICET, Buenos Aires, Argentina

2° DEVCOM, ARL, United States

3° Departamento de Computación, Facultad de Ciencias Exactas y Naturales, Universidad de Buenos Aires - CONICET, Buenos Aires, Argentina

4° Maestría de Explotación de Datos y Descubrimiento del Conocimiento, Facultad de Ciencias Exactas y Naturales - Facultad de Ingeniería, Universidad de Buenos Aires, Argentina

5° School of Psychology, University of Nottingham, Nottingham, United Kingdom

Eye movements are essential for most daily tasks, from reading to driving. While a lot is known about eye movement patterns during real-world tasks, the understanding of the underlying neural mechanisms is much more limited. In this project we combine non-invasive MEG brain recordings with eye movement recordings, in a task where participants engage in visual and memory search across different realistic backgrounds. By applying source modeling to saccade and fixation aligned data, we found a strong lambda response localized in the V1, appearing around 100ms after fixation onset, and a robust target-related component consistent with the EEG-related P3, frequently observed in target-detection tasks. A whole-task time-frequency analysis allowed us to study the power changes when memorizing, retaining, and searching for an object. We found a significant occipito-parietal decrease in the Alpha band (8-12 Hz) activity, which was modulated by memory load in memorization and retention, whereas the activity during visual search presented a significant increase in High Gamma band (50-100Hz) originating in the V2 bilateral region. Finally, we found that this power increase was not

originated merely by eye movements suggesting that it is possibly task-related or induced by the visual features from the image. Altogether, this work sheds light on the neural basis and processes involved in working memory and visual search under conditions that are close to real-world situations.

V-047 | SEX-SPECIFIC CONSEQUENCES OF INFANT MALTREATMENT ON BEHAVIORAL AND PHYSIOLOGICAL REACTIVITY TO STRESS IN RATS

Cognition, Behavior, and Memory

Author: Jazmín Grillo Balboa | Email: jazmin.grillo28@gmail.com

Jazmín Grillo Balboa1°, Ailén Alba Colapietro2°,Verónica Cantarelli3°, Marina Ponzio3°, María Eugenia Pallarés2°, Mariela Chertoff1°, Marta Cristina Antonelli2°

1° Laboratorio de Neuroepigenética y Adversidades Tempranas, IQUIBICEN-DQB, Facultad de Ciencias Exactas y Naturales - Universidad de Buenos Aires - CONICET, Argentina.

2° Laboratorio de Programación Perinatal del Neurodesarrollo, IBCN, Facultad de Medicina - Universidad de Buenos Aires, Argentina

3° Instituto de Investigaciones en Ciencias de la Salud, Facultad de Ciencias Médicas - Universidad Nacional de Córdoba, Argentin

Parental care during infancy is crucial for developing cortico-limbic circuits that regulate stress and emotional health. Conversely, infant maltreatment can increase susceptibility to mood disorders and impair stress-coping abilities. Using the "Scarcity-Adversity Model" (SAM) in rats, which limits nesting resources from postnatal days 8 to 12, we studied its effects on maternal care and offspring stress reactivity and behavior. SAM-exposed mothers showed fragmented care and increased violence towards pups. By postpartum day (PPD) 13, maternal fecal corticosterone metabolites (FCM) were elevated, and at weaning (PPD21), SAM dams exhibited heightened anxiety-like behavior in the Elevated Plus Maze (EPM) test, with fewer entries into the open arms. In adulthood, SAM-exposed pups underwent anxiogenic tests. Male rats showed reduced locomotor activity in the Open Field test and increased immobility in the Forced Swim test. Both male and female SAM rats had increased latency to enter open arms and reduced risk-assessment behaviors in the EPM. Additionally, male SAM rats exposed to acute stress had lower FCM levels, matching their passive reactivity in behavioral tests.Our results confirm that SAM induces long-lasting changes in risk-taking behavior, responsiveness to novel stimuli, and stress reactions, especially in males. These findings

highlight the importance of early-life nurturing in promoting well-being and reducing future psychopathological risk.

V-048 | Role of adult hippocampal neurogenesis in object pattern separation in rodents

Cognition, Behavior, and Memory

Author: Karina Hernandez | Email: kmercado@leloir.org.ar

Karina Hernández1°, Lucila Feingold1°,Emilio Kropff1°

1° Physiology and Algorithms of the Brain, Fundación Instituto Leloir, IIBBA-CONICET

The dentate gyrus of the hippocampus is a unique brain region that exhibits new adult born neurons (ABN) in both mice and humans. ABN is thought to be crucial for generating independent representations of similar experiences, through a process called pattern separation. The new ABN undergo various maturation stages, each of which has a distinct impact on the hippocampal circuit. Despite accumulating evidence highlighting the importance of new ABN in pattern separation, the precise role of distinct maturation cohorts remains unclear. In this project, we aim to address two main questions: 1) How do diverse maturation cohorts contribute to the encoding or retrieval of behaviorally similar contextual experiences? 2) What environmental information do they encode, and how do they use it to implement a pattern separation algorithm? To answer the first question, we will employ a chemogenetic strategy to silence new ABN at different maturation stages while they perform a pattern separation task with objects. This approach will help us identify the maturation stages in which new ABN contribute significantly to discriminating between similar memories. To address the second question, we will use calcium imaging to record in vivo the activity of new ABN engaged in the tasks, in particular in relation to where objects are positioned. This methodology will provide insights into the environmental cues encoded by these ABN and their role in cognition.

V-049 | Investigating the Impact of Environmental Enrichment on Memory in Neohelice granulata.

Cognition, Behavior, and Memory

Author: María Luz Iglesias | Email: iglesiasmarialuz@gmail.com

Maria Luz Iglesias1°, Arturo Gabriel Romano1°

1° IFIBYNE, UBA-CONICET

This study explores the effects of environmental enrichment (EE) on short and long-term memory in Neohelice granulata crabs, aiming to understand how EE influence cognitive functions in crustaceans. We assessed memory performance in crabs exposed to both enriched and standard environments and discovered that those in the enriched environment showed marked improvements in long-term memory. Furthermore, according to research in mammals where Brain-Derived Neurotrophic Factor (BDNF) levels increase with EE and correlate with memory enhancement, we performed Western blot analyses using human BDNF antibodies on brain extracts from mice, flies, and crabs. To ensure the accuracy of our results, an adsorption experiment was conducted to assess the specificity of the signals obtained with these antibodies. Additionally, an in silico comparative analysis of neurotrophins from vertebrates, Drosophila melanogaster, and the crab species Eriocheir sinensis was carried out using protein sequence alignment. This comparison revealed significant similarities in neurotrophin profiles across these diverse species, underscoring the evolutionary conservation of neurotrophic factors and their roles in neural processes. Our findings reveal the potential for environmental enrichment to enhance memory in crabs and underscore the utility of comparative neurobiological approaches for uncovering conserved mechanisms across species.

V-050 | Breaking down contextual modulation of word-meaning access

Cognition, Behavior, and Memory

Author: Dulce Constanza Jurado | Email: dulcejurado123@gmail.com

Dulce Jurado1°, Julieta Laurino1°2°,Laura Kaczer1°

1° Departamento de Fisiología, Biología Molecular y Celular, FCEyN, UBA

2° IFIBYNE, UBA, CONICET

Semantic ambiguity, defined as the presence of multiple meanings for a single word, represents a significant challenge in language processing. Previous studies revealed that word-meaning processing is facilitated by a global semantic context that can bias the interpretation of the ambiguous word. This study explores the role of context in the subsequent word-processing. Specifically, the context consisted of a text paired with an image on a certain topic, presented before a target word.

In a first experiment, we investigated whether the facilitation of ambiguous word processing persisted even when the image was removed. We did an online priming task (n=120) where we had three factors to compare: target word type (ambiguous - non ambiguous), context congruence (matched - unmatched) and presence of image (with and without). Our results showed that facilitation, evidenced by shorter response times and higher accuracy levels in the priming task, persisted even when the image was not present in the context.

In a second experiment (n=110), we explored how similar the participants perceived the text to the semantic category of the target word, aiming to determine if a stronger context-to word similarity led to greater facilitation. Semantic similarity was measured using Likert scales, and the data were analyzed using AUC-ROC curves. We found that there was a gradual facilitation in processing, such that higher values of context word similarity lead to greater facilitation.

V-051 | Effect of caffeine on facial recognition memory consolidation: Preliminary results.

Cognition, Behavior, and Memory

Author: Candela Sofía León | Email: cleon@itba.edu.ar

Candela Sofia Leon1°2°, Agustina Lo Celso1°,Luis Brusco3°, Cecilia Forcato1°

1° Laboratorio de Sueño y Memoria, Dpto. de Cs. de la Vida, Instituto Tecnológico de Buenos Aires (ITBA), Buenos Aires, Argentina.

2° Consejo Nacional de Investigaciones Científicas y Tecnológicas (CONICET), Buenos Aires, Argentina.

3° Centro de Neuropsiquiatría y Neurología de la Conducta-CENECON, Facultad de Ciencias Médicas, Universidad de Buenos Aires (UBA)

Numerous studies have observed a facilitating effect of caffeine on cognition, particularly in memory, consumed before learning with immediate testing. However, these studies do not appropriately distinguish whether this enhancing effect acts on encoding or the consolidation of these memories. One study evaluated the caffeine effect on the consolidation of object recognition memory and observed that this substance could improve the discrimination between previously seen and similar objects. In this work, we aim to study the caffeine effect on the consolidation of face recognition memory. To evaluate this, a randomized, double-blind study (N = 49) was conducted where 200 mg of caffeine/placebo was administered after encoding 10 human faces, each face displayed on the screen for 3 seconds and repeated in two trials. The following day, testing was conducted where participants were randomly assigned to either the present condition, where they observed 10 lineups of 6 faces each, one of which was the original, or the absent condition, where they observed 10 lineups of 6 faces each, none of which were the original face. No significant differences have been observed between the groups in any of the conditions. The lack of observed differences in our study may be due to the small sample size or because caffeine does not have an effect on the consolidation of this type of stimuli. However, it is necessary to increase the sample size to draw appropriate conclusions.

V-052 | Role of oxytocinergic neurons in observational fear learning in mice

Cognition, Behavior, and Memory

Author: Emiliano Lower | Email: emilianolower123@gmail.com

Emiliano Lower1°3°, Valery Grinevich Grinevich2°,Verónica de la Fuente1°3°

1° Facultad de Ciencias Exactas y Naturales, Universidad de Buenos Aires, Argentina

2° Department of Neuropeptide Research in Psychiatry, Central Institute of Mental Health, Medical Faculty Mannheim, University of Heidelberg, Mannheim, Germany

3° Instituto de Fisiología, Biología Molecular y Neurociencias (IFIBYNE-UBA-CONICET), Argentina

Oxytocin (OXT) is a neuropeptide involved in a wide range of social behaviors such as comfort, social reward, parental behaviors, among others. OXT is also relevant for the stabilization of information about conspecifics in the brain. For instance, OXT knockout mice exhibit deficits in social recognition memory (SRM), which can be restored by intracerebroventricular injection of OXT. Similarly, intracerebroventricular administration of an OXT receptor antagonist also impairs SRM. Additionally, these memories can be modulated in a more targeted way: negative modulation of oxytocinergic neurons through chemogenetics impairs SRM formation, while positive modulation promotes its persistence. Furthermore, OXT is involved in discriminating the emotional states of conspecifics and enhances observational freezing. Despite advances in SRM research, the role of OXT in encoding and storing information learned through social interactions remains less understood. Here, we used an observational fear learning paradigm to study whether OXT modulates social learning. In this paradigm, mice can vicariously acquire long-lasting fear memories by observing a demonstrator receiving foot shocks. Our preliminary results show that the specific inhibition of oxytocinergic neurons in the paraventricular nucleus of the hypothalamus, a key brain region for OXT synthesis in mammals, impairs long-term observational fear memory, without affecting sociability and social novelty.

V-053 | Oscillatory Dynamics in the BLA-mPFC Circuit: From Fear Persistence to Extinction

Cognition, Behavior, and Memory

Author: Santiago Abel Merlo | Email: santiabelmerlo@gmail.com

Santiago Abel Merlo1°2°3°, Emiliano Merlo4°,María Eugenia Pedreira1°, Mariano Belluscio2°3°

1° Instituto de Fisiología, Biología Molecular y Neurociencias (IFIBYNE-CONICET), Buenos Aires, Argentina

2° Universidad de Buenos Aires, CONICET, Instituto de Fisiología y Biofísica Bernardo Houssay, Grupo de Neurociencia de Sistemas, Laboratorio Bases Neuronales del Comportamiento, Buenos Aires, Argentina

3° Universidad de Buenos Aires, Facultad de Medicina, Departamento de Ciencias Fisiológicas, Buenos Aires, Argentina

4° School of Psychology, University of Sussex, Falmer, United Kingdom

The basolateral nucleus of the amygdala (BLA), along with the prelimbic (PL) and infralimbic (IL) subdivisions of the medial prefrontal cortex (mPFC), have been implicated in the processing of fear-related responses and the encoding of aversive memories. Distinct oscillatory rhythms are known to be selectively modulated during fear memory retrieval and extinction. While the BLA, PL, and IL differentially contribute to various stages of fear memory, much remains unknown about how oscillatory activity in these regions regulate conditioned fear responses, particularly through inter-regional oscillatory interactions. Here, we recorded local field potentials (LFPs) from the BLA, PL, and IL of rats during fear memory retrieval and extinction. We analyzed oscillatory rhythms within the BLA-mPFC network. Our results demonstrate that these regions are involved in encoding negative valence, as indicated by distinct oscillatory activity patterns, synchronization, and inter-regional interactions. Moreover, this encoding was disrupted during the extinction of conditioned fear. These findings contribute to a deeper understanding of the brain's oscillatory mechanisms underlying the expression and inhibition of aversive memories, underscoring the relevance of BLA-mPFC interplay in this process.

V-054 | Impact of psilocybin on gaze behavior in short duration visual stimuli

Cognition, Behavior, and Memory

Author: Stephanie Müller | Email: stephanieamuller@gmail.com

Stephanie Müller1°2°3°, Federico Cavanna1°2°,Laura Alethia de la Fuente1°2°, Nicolás Bruno1°2°, Tomas Ariel D'Amelio1°2°, Carla Pallavicini1°2°3°, Enzo Tagliazucchi1°2°4°

1° Universidad de Buenos Aires, Facultad de Ciencias Exactas y Naturales, Departamento de Física. Buenos Aires, Argentina.

2° CONICET - Universidad de Buenos Aires, Instituto de Física Interdisciplinaria y Aplicada (INFINA). Buenos Aires, Argentina.

3° Fundación para la Lucha contra las Enfermedades Neurológicas de la Infancia (FLENI)

4° Latin American Brain Health Institute (BrainLat), Universidad Adolfo Ibañez, Santiago de Chile, Chile

Classical psychedelics are known to induce profound changes in consciousness and cognition. In particular, studies suggest that psychedelics can alter salience and semantic processing. This double-blind, placebo-controlled study investigated the effects of psilocybin on visual perception in short duration stimuli, focusing particularly on its effect on gaze in relation to areas of varying salience. Experiments were conducted with simple stimuli in a natural environment to promote participant comfort, interest and sustained attention. Using an eye-tracking device, gaze fixations were recorded while pictures were displayed on a screen for a short time, with the aim of exploring differences between conditions. Quantitative saliency maps were obtained for each photo and each fixation was mapped to a fixation value. Saliency values were found to be higher for the dose condition. The entropy of the sequence of fixations in areas of high salience was then studied, revealing higher entropy in the dose condition. These results show that psilocybin results in more elaborate visual paths between regions of high stimulus salience.

V-055 | Role of political ideology in the change of valuation of key semantic contents in complex decision making

Cognition, Behavior, and Memory

Author: Patricio Nogueroles | Email: patricioe.nogueroles@gmail.com

Patricio Nogueroles1°2°, Tomás Alves Salgueiro1°2°,Stefan Efrain Vera3°, Carlos Luddwing Muñoz Valderrama1°3°, Pablo Nicolás Fernández Larrosa1°3°

1° IFIBYNE, UBA-CONICET

2° DFBMC, FCEN-UBA

3° FPSI, UBA

Decision making (DM) refers to the process of selecting an option from a set of alternatives based on its likelihood of leading to the best possible outcome. Many decisions are automatic and require little reflection, while others, such as Complex Decision Making (CDM), require deeper analysis. Political ideology (PI) is a system of representations that acts as a cognitive anchor and a heuristic shortcut for evaluating relevant information in CDT, contributing to making decisions with less cognitive effort. Two online experiments were conducted during the 2023 general (n=2839) and ballotage (n=1294) elections in Argentina, with the aim of evaluating how PI influences the evaluation of semantic content and provokes a change of opinion. Participants evaluated items from a scale of progressivism and conservatism, and then the same items associated with right-wing or left-wing candidates. Two valuation change indices (VCI) were calculated to analyze the effect of PI. The electoral emotional climate was also controlled for using a positivity index. Preliminary results suggest that participants with a more defined political perception showed higher agreement when items matching their PI were associated with a candidate (regardless of PI). These results support the hypothesis that PI serves as a heuristic anchor in DBT.

V-056 | Role of retorsplenial cortex serotonin 2A receptors in recognition memory

Cognition, Behavior, and Memory

Author: Beatriz Agustina Ortega | Email: ortegabeatrizagustina@gmail.com

Beatriz Agustina Ortega1°2°, Noelia V Weisstaub3°,Cynthia Katche1°2°

1° Laboratorio de Memoria, Instituto de Biología Celular y Neurociencia “Prof. E. De Robertis” (IBCN), Facultad de Medicina, CONICET-UBA, Buenos Aires, Argentina.

2° Instituto Tecnológico de Buenos Aires (ITBA), Buenos Aires, Argentina.

3° Instituto de Neurociencia Cognitiva y Traslacional (INCYT). CONICET, Fundación INECO, Universidad Favaloro, Buenos Aires, Argentina

Alzheimer’s disease (AD) is the main cause of dementia and is quickly becoming one of the most expensive, lethal, and burdening diseases of this century. Though very heterogeneous, a main feature of the disease is its memory problems. Also, in many cases, Alzheimrer`s patients present psychosis. Dementia-related psychosis has no selective treatment, but recently the focus has been on serotoninergic drugs and particularly on a selective serotonin (5-HT) 2a inverse agonist, supporting a role for the serotoninergic system in AD treatment. 5-HT2a receptors (5-HT2AR) are profusely expressed in cortical regions and have been associated with the modulation of different cognitive processes. However, its role in memory processes is not completely understood. We have found that mPFC 5-HT2aR are involved in the control of interference during retrieval of episodic like memories. In addition, 5-HT2aR are expressed in the retrosplenial cortex (RSC), a key brain area involved in memory processing which deteriorates in early stages of AD. We have recently shown that RSC is involved in recognition memory. Since 5-HT2aR are expressed in RSC, we decided to investigate the role of 5-HT2aR in RSC in different memory phases. We have found that selective blockade of 5-HT2aR affects the consolidation and retrieval in the object recognition (OR) task. These results suggest that 5-HT2aR in the RSC are required for OR memory processing and may stand out as a target for therapeutic use.

V-057 | Semantic Processing vs. Familiarity Recognition: Reevaluating the N400 and FN400 Components through a Go/No-Go Task.

Cognition, Behavior, and Memory

Author: Victoria Papagna Maldonado | Email: victoria.papagna@usal.edu.ar

Victoria Papagna Maldonado1°, Federico José Sanchez1°,Lorenzo Raggi1°2°, Jorge Mario Andreau1°

1° Neuroscience Laboratory. Psychology and Psychopedagogy Department. Universidad del Salvador, Buenos Aires, Argentina.

2° Psychology Department, Universidad de Buenos Aires, Buenos Aires, Argentina.

The FN400 component has been debated as signaling familiarity or semantic processing. This study aimed to clarify its role by integrating both processes. We recorded electroencephalography (EEG) activity from 35 participants performing a semantic categorization Go/No-Go task using facial expressions (sad and neutral) as stimuli. We then calculated event-related potential (ERP) activity to analyze the FN400 component. Our results showed a negative wave peaking around 350 ms with prominent activity at frontal electrodes (resembling the FN400). Behavioral data indicated that neutral faces were easier to identify than sad faces, signaling the involvement of a semantic process. When comparing ERP activity for early trials (when the stimuli were new) versus late trials (when the stimuli were old), we found that the FN400-like component was not modulated by the old/new effect, supporting the notion that it may reflect semantic categorization rather than familiarity. These findings challenge the view of FN400 as a measure of familiarity and support its role in semantic processing, suggesting that future research should use tasks designed to separate these processes for a more precise understanding of the FN400 component.

V-058 | Evaluation of Different Cognitive Training Strategies for the Development of Executive Functions in Children

Cognition, Behavior, and Memory

Author: Gabriel Osvaldo Paz | Email: pazg@udesa.edu.ar

Gabriel O. Paz1°3°, Melina Vladisauskas4°,Martina Boscolo1°3°, Luis Bustamante2°, Daniela Macario-Cabral1°2°, Diego Slezak2°3°, Andrea P. Goldin1°3°

1° Universidad Torcuato Di Tella. Escuela de Negocios. Centro de Inteligencia Artificial y Neurociencia (CIAN). Laboratorio de Neurociencia. CONICET

2° Universidad de Buenos Aires, Facultad de Ciencias Exactas y Naturales, Departamento de Computación, Laboratorio de Inteligencia Artificial Aplicada (LIAA)

3° Consejo Nacional de Investigaciones Científicas y Técnicas (CONICET), Buenos Aires 1428, Argentina

4° Cognitive Neuroimaging Unit, CEA, INSERM, Université Paris-Saclay, NeuroSpin Center, 91191 Gif/Yvette, France

For the past 15 years, we have been applying the cognitive assessment and training web platform "Mate Marote" with children aged 4 to 8 years. In pilot studies, we observed that children are capable of playing levels that quickly and progressively increase difficulty. Here, we aim to compare two cognitive training models: one with a fixed progression style, similar to what we have used so far, in which the difficulty level increases, or decreases, after three correct, or incorrect, trials, respectively. The other one, with a dynamic progression that quickly adapts to the player's initial skill level and, afterwards, slows its difficulty as each child finds their balance point. Our main hypotheses are that children's executive functions performance: (1) will be higher in the post-test compared to the pre-test, and (2) although that gain may vary for each measured construct, it will be greater for the group with the dynamic adaptive training model. We believe our results will foster motivation along training sessions that dynamically adapt tasks difficulty based on individual cognitive abilities, thus improving results.

V-059 | Speed contribution to the DG neural code of an associative memory

Cognition, Behavior, and Memory

Author: Maria Sol Ramos | Email: m_sol_ramos@hotmail.com

Maria Sol Ramos1°2°, Sebastian Romano1°,Julieta Campi1°, Antonia Marin-Burgin1°, Noel Federman1°

1° IBioBA-MPSP-CONICET

2° FCEN-UBA

The dentate gyrus (DG), a key area in the hippocampus for spatial memory, contains neurons responsive to various factors like position, direction, sensory cues, reward, and speed. While these neurons are often viewed as encoding single variables, their multiplexing ability is becoming increasingly evident in different brain areas, including the DG. However, the hierarchy and learning-dependent changes of this neural code remain less understood. In our study, we trained head-fixed, water-restricted mice in a virtual reality environment to perform a discrimination task based on distinct cues. Using in-vivo electrophysiology, we compared DG responses in first session and expert animals. By applying an adapted Poisson generalized linear model (GLM), we found that neurons exhibit multiplexing responses. Particularly, the percentage of speed cells and the contribution of this variable to neural activity increased with learning. These neurons showed either linear modulation or tuning curve-like responses and could display speed-retrospective or prospective activity. Behaviorally, expert mice adjusted their velocity based on position and sensory stimuli. Moreover, using a virtual corridor moving at a constant velocity, preliminary results indicated that speed cell modulation depends on the animal's movement rather than optic flow. These findings suggest that as mice become experts, DG neurons improve speed encoding, showing dynamic neural adaptation during learning.

V-060 | GABAergic astrocytic uptake: a key modulator of spatial memory dynamics

Cognition, Behavior, and Memory

Author: Juan Gabriel Riboldi | Email: juangriboldi@gmail.com

Juan Gabriel Riboldi1°2°3°, Matías Martín Renfijes1°4°,Josefina Iribarne1°, Haydee Viola1°2°3°

1° CONICET – Universidad de Buenos Aires, Instituto de Biología Celular y Neurociencias “Profesor Eduardo De Robertis” (IBCN), Buenos Aires, Argentina.

2° Departamento de Fisiología, Biología Molecular y Celular “Dr. Héctor Maldonado” (FBMC), Universidad de Buenos Aires (UBA), Facultad de Ciencias Exactas y Naturales, Buenos Aires, Argentina.

3° Instituto Tecnológico de Buenos Aires, Buenos Aires, Argentina.

4° Facultad de Medicina, Universidad de Buenos Aires, Buenos Aires, Argentina.

γ-Aminobutyric acid (GABA) is a major inhibitory neurotransmitter in the Central Nervous System, crucial for regulating neuronal excitability. Astrocytes, integral to synaptic function through the tripartite synapse, primarily express GABA transporter 3 (GAT-3), which helps finalize GABA action at the synapse, maintaining neuronal homeostasis. We studied GAT-3 role in spatial memory consolidation, expression, and reconsolidation. We trained rats in spatial object recognition (SOR) task which induces long-term memory and administered SNAP-5114 (SNAP), a GAT-3 inhibitor, into the dorsal hippocampus around the training session. SNAP treatment impaired memory acquisition/consolidation. This impairment was counteracted by prior exposure to an open field (OF) and this improvement was prevented by emetine administration, suggesting that SNAP's effects on memory consolidation may involve disruptions in protein synthesis. Additionally, Lactacystin, a proteasome inhibitor, mitigated the negative effects of SNAP on memory consolidation when administered before SNAP. Furthermore, SNAP administration before a test session impaired memory expression. However, its infusion before a reactivation session did not impair memory reconsolidation.

These results reveal specific effects of hippocampal GAT-3 blockade on spatial memory, shedding light on GABAergic imbalances from astrocytic dysfunction and their potential role in mental and neurological disorders.

V-061 | Assessment of images-based behavioral parameters in the aversive memory paradigm of Neohelice granulata

Cognition, Behavior, and Memory

Author: Juan Francisco Robuschi | Email: robuschijuan@gmail.com

Juan Francisco Robuschi1°, Francisco Javier Maza2°,Alejandro Delorenzi1°

1° Instituto de Fisiología, Biología Molecular y Neurociencias (IFIBYNE-UBA-CONICET), Ciudad Universitaria, Pabellón IFIBYNE, Argentina; Departamento de Fisiología, Biología Molecular y Celular, Facultad de Ciencias Exactas y Naturales, Universidad de Buenos Aires, Ciudad Universitaria, Argentina.

2° Instituto de Fisiología, Biología Molecular y Neurociencias (IFIBYNE-UBA-CONICET), Ciudad Universitaria, Pabellón IFIBYNE, Argentina.

Predicting whether a particular stressor strengthens or disrupts a specific memory phase is intricate. Unlike theories focused on modulating memory strength, our hypothesis posits that the behavioral expression of reactivated memories is determined, at least in part, by the interplay between reactivated internal states traces (emotions) and mnemonic information when memories are retrieved. There, changes in concurrent internal states form emotional memory traces that will unfold during memory reactivation, modulating expression in evaluation sessions.

In this study, within the aversive memory paradigm of Neohelice, we analyzed behavioral changes during acquisition and retrieval and looked for different internal states' fingerprints via fluoxetine (SSRI) administration.

Different parameters were evaluated: silhouette displacement (ΔS), average distance traveled per pereopod (ADPP), distance traveled by the body center (DBC), area occupied by the experimental subject for at least 7 seconds (A7s) and differential displacement. Results showed that all parameters indicated changes in activity during the training protocol. Trained animals did not move randomly in the arena. The effect of fluoxetine affected both displacement and spatial aspects.

These parameters allow for not only displacement but also spatial distribution information in this aversive memory paradigm of Neohelice

V-062 | Prosocial behaviors on stressed pregnant mice attenuate cognitive and sociability deficits of male and female offspring

Cognition, Behavior, and Memory

Author: Monserrat Rodríguez González | Email: rodriguez.g.monserrat@gmail.com

Monserrat Rodríguez González1°, Paula Thomas1°,Bruno G. Berardino1°, Eduardo T. Cánepa1°

1° Laboratorio de Neuroepigenética y Adversidades Tempranas, Departamento Química Biológica e IQUIBICEN, FCEyN, UBA-CONICET

Prosocial actions on stressed-pregnant women could not only serve the well-being of the mother but also can help to the physical and mental development of the offspring.

To test this hypothesis, pregnant mice between days 2 and 12 of gestation were exposed to an unpredictable series of stressors and then housed (ESA group) or not housed (ES group) with a familial non-pregnant female until the end of pregnancy. A third group similar to the ESA but not exposed to stress (CTA group) was generated.

The offspring's weight as well as the development parameters and neurological reflexes assessed did not show differences between the three groups for either males or females. Six-weeks-old offspring were behaviorally assessed. Recognition memory (NOR test) revealed a significant effect in females ($p=0.0017$) and a trend effect in males ($p=0.0652$) driven by a better performance of CTA and ESA groups compared to the ES group. Next, we analyzed social interaction through the 3-chamber test. ANOVA showed differences between groups in females ($p=0.0543$) and males ($p=0.0208$). Tukey test indicated a recovery of social interaction in ESA vs ES groups in offspring of both sexes. Surprisingly, the ES group exhibited a greater preference for social novelty compared to the ESA group in males ($p=0.0045$), but not in females ($p=0.1105$).

Our findings align with the hypothesis that prenatal support for stressed mothers can reduce stress-related risks and promote healthier developmental in their children.

V-063 | Sleep restriction increments food intake in adult zebrafish.

Cognition, Behavior, and Memory

Author: Agustina Sabella | Email: sabellaagustinaa@gmail.com

Agustina Sabella1°2°, Rocío Schumacher1°,Gaydou Luisa1°3°, Adrian Baños, Cora Stoker1°3°, Guillermina Canesini1°4°, Pamela Fernandez1°4°, Maria Florencia Rossetti1°, Jorge Guillermo Ramos1°3°, Ana Paula García1°

1° Instituto de Salud y Ambiente del Litoral (ISAL), UNL-CONICET, Santa Fe, Argentina.

2° Cátedra de Morfología Normal, FBCB-UNL, Santa Fe, Argentina.

3° Departamento de Bioquímica Clínica y Cuantitativa, FBCB-UNL, Santa Fe, Argentina

4° Cátedra de Nutrición en Situaciones Patológicas, FBCB-UNL, Santa Fe, Argentina.

An increasing number of studies in human and mammal models show that reduced sleep is associated with increased food intake. Zebrafish (Danio rerio) is emerging as a promising model for studying sleep and feeding behavior due to its similarities with mammals. Our goal was to study the effects of sleep restriction on feeding behavior and the expression of key genes involved in the central regulation of food intake. Adult zebrafish (male and female) were exposed to disturbances consisting of vibration periods at nighttime (ND) or daytime (DD) and compared to a control group without vibration (n= 8-12 every group). ND, but not DD, reduced sleep in both sexes (p=0.0141), particularly during active vibration period (21:00-03:00) (p=0.0085). To study the impact on food intake, we measured the daily pellets and milligrams consumed. Males from ND group showed a significant increase of food intake on days with disturbance (D+1, D+2) respect to days without (D-1, D-2). In contrast, females from ND group showed a significant reduction in the time of food intake (p= 0,0195). The expression of neuropeptide Y (NPY), proopiomelanocortin (POMC) and its receptor (MC4R) were analyzed by RT-PCR in the whole brain. No effects were observed in the expression of the evaluated genes in either sex. In conclusion, sleep restriction affected food intake behavior in zebrafish as does in mammals; nevertheless, both sexes were affected differentially. Neural pathways involved need further investigation.

V-064 | Invalidating childhood environments modulation of physiological activation

Cognition, Behavior, and Memory

Author: Federico Jose Sanchez | Email: sanchez.federicojose@usal.edu.ar

Federico Jose Sanchez1°, Jeronimo Rodriguez Cuello3°,Lorenzo Raggi2°, Victoria Papagna Maldonado1°, Marcos Parra1°, Borja Parga2°, Alberto Iorio2°

1° Laboratorio de Neurociencias, Facultad de Psicología y Psicopedagogía (USAL)

2° Facultad de Psicología (UBA)

3° Facultad de Ciencias Humanas y de la Conducta (Universidad de Favaloro)

This project investigates the relationship between mentalization abilities, as measured by the Movie for the Assessment of Social Cognition (MASC), physiological activation (Skin Conductance Level, SCL), and self-reported valence and arousal (measured by the Self-Assessment Manikin, SAM), specially in their relationship with the Invalidating Childhood Environment Scale (ICES). Participants were compelled to complete either the Mannheimer Multikomponent Stress Test (MMST) (n=9) or a simplified version of it that served as a control group (n=11). Our findings indicate that the MMST successfully induced stress as evidenced by self-reports, although this was not reflected in physiological measures. A significant positive correlation was observed between MASC scores and increased SCL activity. Additionally, SAM results showed a decrease in arousal levels at the end of the MMST, with a trend toward lower valence in the control group. Notably, the data revealed that higher levels of emotional neglect were associated with a smaller increase in SCL during the MASC. Furthermore, more invalidating maternal responses were linked to lower SCL activation before the experiment began. Lastly, invalidating responses from both parents were correlated with higher SCL activity during the MMST, indicating that invalidating childhood environments significantly modulate stress-induced physiological responses.

V-065 | Attention to hedonic stimuli in problematic alcohol consumption: a pilot study in a non-clinical population.

Cognition, Behavior, and Memory

Author: Juan Ignacio Segura | Email: jisegura@mail.austral.edu.ar

Ana Paula Colombini1°2°, Thiago Casetta1°3°,Juan Ignacio Segura1°2°, Guillermina Alvarez1°2°, Martina López1°4°, Bautista Elizalde Acevedo1°2°, Lucía Alba-Ferrara1°2°

1° ENyS - Hospital el Cruce - CONICET - UNAJ, Argentina

2° Facultad de Ciencias Biomédicas, Universidad Austral.

3° Facultad de Humanidades, Universidad de Belgrano.

4° Facultad de Psicología, Universidad de Montevideo.

Objective:Identify the neurological basis of inhibitory control in response to hedonic stimuli in problem drinkers, which may act as a mechanism of behavioural change without formal treatment.

Methodology:24 participants underwent an fMRI scan during a dichotic listening task. Two stimuli were presented simultaneously on each ear; one alcohol-related and one unrelated. Participants were asked to focus their attention on one ear and respond whether the sound was alcohol related. We considered two trial types: Bottom-Up (BU) (alcohol-related stimulus in the attended ear) and Top-Down (TD) (alcohol-related stimulus in the ignored ear). We measured alcohol consumption with the AUDIT scale.

Results:BU trials activated the Right Angular Gyrus, Right Precentral Gyrus, Left Middle Frontal Gyrus and Right Superior Parietal Gyrus; while TD trials activated the Left Postcentral Gyrus, Right Parahippocampal Gyrus, Right Cerebellum, Dorsolateral Prefrontal Cortex (DLPFC), Right Superior and Left Inferior Temporal Gyrus, and Right Precentral Gyrus.

Discussion:TD trials possess higher cognitive demand, as they require the subject to ignore the distracting hedonic stimulus. This explains the activation of the DLPFC. The absence of this activation in BU trials suggests a decrease in cognitive demand and control, provoked by the involuntary capture of attention by the hedonic stimulus. The DLPFC may underlie a necessary control mechanism that inhibits behaviour directed to alcohol search.

V-066 | Effects of GluN2A Knockdown on Spatial Memories and Social Behavior

Cognition, Behavior, and Memory

Author: Fernanda Mariana Silva | Email: fernandamariana2305@gmail.com

Fernanda Mariana Silva1°, María Florencia Acutain1°,Luisina Castellari1°, Abril Muñoz1°, Verónica Baez1°2°

1° Instituto de Biología Celular y Neurociencia (IBCN)-CONICET

2° 1UA de HIstología, Embriología, Biología Celular y Genética. Facultad de Medicina - UBA

N-methyl D-Aspartate receptors (NMDAR) are glutamate-gated ion channels that play a role in synaptic plasticity, memory, learning and neurodevelopment. NMDAR are classified into different subtypes according to their subunit composition. One of the most expressed subtypes in the adult brain is GluN2A-NMDAR. The expression of GluN2A subunit is essential for maturation, stabilization and refinement of synaptic connections. In this study, we aimed to evaluate the effects of decreased GluN2A expression in the CA1 region of the dorsal hippocampus of Wistar rats. To this end, male and female young adult Wistar rats were injected with adeno-associated vectors containing a shRNA against GluN2A or a "scramble" sequence (AAV-shsc). After 14 DPI, a series of behavioral tasks were performed to evaluate spatial memories and social behavior. The results showed that animals injected with the AAV-sh2A (GluN2A-KD) exhibited differences in both spatial and social behavior. GluN2A-KD male rats, but not females, exhibited long-term spatial memories only when the tasks involved several days of training. Regarding social behavior, results showed that both male and female GluN2A-KD rats preserved the social interest. However, GluN2A-KD rats recognized a novel same-sex rat only in certain types of tasks. These results suggest that decreased GluN2A expression in the hippocampus of Wistar rats might lead to sex-dependent deficits in spatial memory, as well as an impairment in social recognition.

V-067 | Oral Administration of THC:CBD formulations prevent pain-like behaviors without exacerbating paclitaxel-induced changes in weight, locomotion, and anxiety in a rat model of chemotherapy-induced neuropathy.

Cognition, Behavior, and Memory

Author: Delia Soriano | Email: soriano.del@gmail.com

Delia Soriano1°4°, Milagros Argañarás2°,Pablo Brumovsky3°4°, Marcelo Villar1°4°, Florencia Coronel1°4°

1° Laboratorio de Dolor en Cáncer, Instituto de Investigaciones en Medicina Traslacional CONICET - Universidad Austral, Buenos Aires, Argentina.

2° Laboratorio de Inmuno-Endocrinología, Diabetes y Metabolismo, Instituto de Investigaciones en Medicina Traslacional CONICET - Universidad Austral, Buenos Aires, Argentina.

3° Laboratorio de Mecanismos e Innovación Terapéutica en Dolor, Instituto de Investigaciones en Medicina Traslacional CONICET - Universidad Austral, Buenos Aires, Argentina.

4° Facultad de Ciencias Biomédicas, Universidad Austral, Buenos Aires, Argentina.

Paclitaxel-induced neuropathy stands out as the primary, dose-limiting side effect of this extensively used chemotherapy agent. Effective preventive and therapeutic strategies are currently lacking. Our study aimed to assess the impact of oral administration of pharmaceutical-grade formulations containing the phytocannabinoids THC and CBD in a model of paclitaxel-induced neuropathy. The experimental design involved the co-administration of paclitaxel (PAX) and cannabinoid formulations (THC:CBD 1:1 and 1:20) to adult male rats. Mechanical and thermal sensitivity, locomotor activity, ethologically behaviors, anxiety-related parameters, feeding behaviors, and liver functionality were assessed. Daily administration of THC:CBD 1:1 prevented cold hypersensitivity and improved rearing behaviour, while THC:CBD 1:20 prevented PAX-induced thermal and mechanical allodynia. Cannabinoid formulations were not able to counteract hypo-locomotion, reduced vertical exploratory activity, increased anxious-like behaviors, attenuated weight gain, and decreased food and water intakes. However, the formulations employed did not induce further alterations or toxicity in animals receiving

PAX. Consequently, our results suggest differential effects of two THC:CBD formulations on sensory function and spontaneous activities. Further studies are warranted to explore the mechanisms by which combinations of cannabinoids exert differential therapeutic effects on paclitaxel-induced neuropathy.

V-068 | NLP signatures of episodic memory difficulties in persons with human immunodeficiency virus

Cognition, Behavior, and Memory

Author: Lucas Federico Sterpin | Email: sterpinlucas@gmail.com

Lucas Sterpin1°, Jeremías Inchauspe1°, Camilo Avendaño1°;4°, Gonzalo Pérez1°;2°;5°, Franco Ferrante1°;2°;5°, Lucía Amoruso1°;3°, Lorena Abusamra6°, Bárbara Sampedro7°, Valeria Abusamra8°, Adolfo M. García1°;9°;10°

1° Cognitive Neuroscience Center, Universidad de San Andrés, Argentina

2° National Scientific and Technical Research Council, Argentina

3° Basque Center on Brain, Language and Cognition, Spain

4° Universidad de Santiago de Chile, Chile

5° School of Engineering, Universidad de Buenos Aires, Argentina

6° Hospital Dr. Diego Thompson, Buenos Aires, Argentina

7° School of Linguistics, Universidad de Buenos Aires, Argentina

8° Centro Interdisciplinario de Investigaciones en Psicología Matemática y Experimental "Dr. H. Rimoldi" (CIIPME- CONICET), Buenos Aires, Argentina

9° Global Brain Health Institute, University of California, USA

10° School of Linguistics and Literature, Universidad de Santiago de Chile, Chile

HIV-associated neurocognitive disorders are a rising cause of morbidity in people living with HIV (PLWH). Among other symptoms, PLWH face verbal episodic memory (EM) deficits, even under treatment, affecting quality of life. Retelling tasks are often used to assess EM, but standard measures rely on decontextualized stimuli and manual scoring based on predefined correct responses. Here we introduce an automated, granular, ecologically valid NLP approach for assessing EM in PLWH. We asked 50 PLWH and 42 matched controls to complete a validated retelling task. The original text and each participant's retelling were run through NLP algorithms to extract key features for each content word (CW, namely, nouns, verbs, adjectives, adverbs). These comprised (i) the

ratio of each CW; (ii) the semantic distance for each CW class (cosine similarity between the average embedding of words in each class in the original text and retellings); and (iii) the topological distance for each CW class via differences between the original text and each retelling in relevant speech graph measures tapping on text connectivity, repetitions, and global structural properties. Robust ANOVAs showed that PLWH were characterized by fewer nouns, larger semantic distance across CW classes, and larger topological distances in specific connectivity, repetition, and global structural measures. These results suggest that our NLP approach can reveal fine-grained differences in EM that escape traditional methods.

V-069 | INVOLVEMENT OF CB1 RECEPTORS IN OPIOID ADDICTION: INSIGHTS FROM SEX-BASED DIFFERENCES IN THE EXTINCTION AND RELAPSE OF REWARDING EFFECTS

Cognition, Behavior, and Memory

Author: Jesus Villalobos Vasquez | Email: jvillalobosvasquez1984@gmail.com

Jesus Villalobos Vasquez1°, Virginia Silvana Pérez1°,Graciela Noemí Balerio1°2°

1° Universidad de Buenos Aires, Facultad de Farmacia y Bioquímica, Instituto de Investigaciones Farmacológicas (ININFA-CONINCET))

2° 2Universidad de Buenos Aires, Facultad de Farmacia y Bioquímica, Cátedra de Farmacología

Previous studies revealed sex differences in behavioural, molecular and biochemical responses to morphine (MOR) withdrawal. On the other hand, the stress is one of the factors that induces relapse to drug abuse. This study explored the role of the cannabinoid system in MOR reinforcing effects, extinction, and relapse of these effects in wild-type (WT) and CB1 receptor knockout (KO CB1) of CD1 mice of both sexes. The reinforcing effects of MOR (10 mg/kg, sc) was confirmed by using the conditioned place preference paradigm, followed by an extinction phase with 10 saline sessions (0.10 ml/g, sc) and a stress-tested relapse due to immobilization. Results showed a reinforcing effect of MOR in both sexes of WT and KO CB1 mice ($p<0.05$), being more intense in KO CB1 mice ($p<0.05$). The extinction of reinforcing effects was also observed in both sexes and genotypes, but WT females showed a higher extinction ($p<0.05$) than males, while relapse was only observed in WT females which had extinguished the reinforcing effects ($p<0.05$). Although the reinforcing effects of MOR showed no significant sex differences, it was more intense in KO CB1 mice compared to WT mice. In addition, stress-induced relapse occurred only in WT females, but not in KO CB1 mice. In conclusion, these findings suggest the involvement of the cannabinoid system in the rewarding effects of MOR and its stress-induced relapse, highlighting the CB1 receptor as a potential target for sex-specific opioid addiction therapies.

V-070 | Task Dissociation in PPA Patients with Logopenic and Semantic Variants Using the Mini Linguistic State Examination

Cognition, Behavior, and Memory

Author: Leticia Yanina Vivas | Email: lvivas@mdp.edu.ar

Leticia Yanina Vivas1°, Axel Fernández Zaionz1°

1° IPSIBAT (CONICET/UNMDP)

Primary Progressive Aphasia constitute a group of dementia syndromes characterized by prominent earlier symptoms in language, isolated from other cognitive domains. It can be classified into three variants: logopenic, semantic and non-fluent (Gorno-Tempini et al., 2011). The former has a profile with working memory deficits as a main feature but can also show phonological, syntactic and semantic deficits. The second has mainly semantic deficits but can also show slight syntactic deficits. The last one, shows motor, syntactic and phonological errors, with normal semantic and working memory. In the current work we aimed to compare the linguistic profiles of PPA patients with the semantic and logopenic variants in order to analyze if the results of the Minilinguistic State Examination correspond to the theoretical profile. More precisely, we tried to identify statistically significant dissociations between errors in the different domains of the test. We collected a sample of 4 svPPA and 9 lvPPA. We carried out dissociation analyses according to Crawford et al (2003) proposal comparing the performance of the patients in the different domains. We observed a substantial impairment in working memory for all lvPPA and in semantic memory for svPPA. Additionally we observed impaired performance in other language domains according to the theoretical profile and significantly lower than the main domain (working memory or semantic memory). However, some svPPA patients presented also a substantial deficit in working memory. To conclude, these data suggest that substantial semantic memory impairment is a defining feature of svPPA, but working memory deficits can be observed both in sv and lvPPA.

V-071 | Behavioral and metabolic characterization of a double-burden model of malnutrition

Development

Author: Claudio Dario Barrios | Email: claudiobarr94@gmail.com

Claudio Dario Barrios1°2°, Yael Calles4°,Mariana Elias2°, Evelin Elia2°3°, Amaicha Depino2°3°

1° Universidad de Buenos Aires. Facultad de Ciencias Exactas y Naturales. Departamento de Fisiología, Biología Molecular y Celular

2° CONICET - Universidad de Buenos Aires. Instituto de Fisiología, Biología Molecular y Neurociencias.

3° Universidad de Buenos Aires. Facultad de Ciencias Exactas y Naturales. Departamento de Biodiversidad y Biología Experimental

4° Universidad de Buenos Aires. Facultad de Ciencias Exactas y Naturales.

The double burden of malnutrition (DBM) is an emerging and not fully understood phenomenon that involves the coexistence of undernutrition and obesity/overweight. In this study, we developed a murine model to investigate this imbalance, performing metabolic and behavioral characterizations in adult CF1 mice.

Our lab previously established an undernutrition protocol involving 8 hours of maternal separation daily from postnatal day 5 to 21, which resulted in reduced body weight during the first three weeks of life. Additionally, we set up an obesity model using a cafeteria diet protocol for 14 weeks post-weaning which consisted of delivered junk food daily, which led to significant weight gain.

In this work, we combined these protocols to develop a double-burden model, analyzing behavior and metabolism in adulthood. While we observed no significant differences in glucose, cholesterol, or triglyceride levels, nor in behaviors related to depression, anxiety, memory, or locomotion, there was a notable increase in weight gain among animals on the cafeteria diet, regardless of prior treatment. Interestingly, the greatest weight gain occurred in those previously subjected to the undernutrition protocol followed by the cafeteria diet.

Our results provide a foundation for using this model to explore how other early-adversities, such as maltreatment and stress, may have long-lasting consequences on brain function in individuals experiencing DBM.

V-072 | Alterations in central auditory synapse in mice with modified medial olivocochlear efferent activity.

Development

Author: Daniela Maria Chequer Charan | Email: danichch92@gmail.com

Daniela Maria Chequer Charan1°, Wenqing Huang2°,María Eugenia Gómez-Casati3°, Carolina Wedemeyer1°, Yunfeng Hua2°, Ana Belén Elgoyhen1°, Mariano Nicolas Di Guilmi1°

1° Instituto de Investigaciones en Ingeniería Genética y Biología Molecular “Dr. Héctor N. Torres” (INGEBI), Laboratorio de Fisiología y Genética de la Audición, Buenos Aires, Argentina

2° Shanghai Jiao Tong University School of Medicine, Ninth People’s Hospital, Shanghai Institute of Precision Medicine, Shanghai, China

3° Instituto de Farmacología, Facultad de Medicina. Universidad de Buenos Aires. Argentin

In many mammals, the auditory system is immature at birth but fine-tuned in adults. The activity of medial olivocochlear system (MOC) leads to an accurate development of precise central connectivity by modulating spontaneous activity in the immature inner ear. In mice with enhanced MOC activity (KI), synaptic dysfunction of calyx of Held (CH) in the medial nucleus of the trapezoid body (MNTB) have been observed at different developmental stages (Di Guilmi et al., 2019). In this work, we set out a physiological and structural investigation of the CH-type synapses from electrophysiological recordings at P12-14 and morphological 3D reconstructions at P25 in three mouse models: WT, KI and KO (which lacks MOC activity). The KI displayed lower excitatory postsynaptic current amplitude than WT (WT:4,73±0,37nA, n=21, KI:3,74±0,27nA, n=20, KO:4,18±0,30nA, n=19, ANOVA, p=0.02) and it showed higher short term depression (STD) at low (10Hz) and high (100Hz and 300Hz) frequency stimulus. The 3D-reconstruction of the P25 CH-MNTB from serial-block electron microscopy (SBEM) indicates that a lower proportion of morphologically complex CHs and synaptic pruning are found in the KI model (KI=69% vs. WT=83%). This results in addition with the relation reported by Grande & Wang, 2011 where CH morphology correlates with the STD, allow us to conclude that enhancing the MOC activity triggers deeper developmental changes in comparison with a model without MOC modulation.

V-073 | Prenatal Stress and Externalizing Disorders in Childhood: Risk Factors and Prevention Strategies

Development

Author: Agustina Luciana De Nardo | Email: agustinadnardo@gmail.com

Agustina Luciana De Nardo1°, Quimey Flor Ordiales1°,Jazmin Cevasco2°

1° Universidad Favaloro

2° CONICET-UBA

Previous studies suggest that prenatal stress can have significant consequences on the development of the fetus, and on the appearance of behavioral disorders in early childhood. Research indicates a strong association between prenatal stress and externalizing disorders in children (including symptoms such as aggression, impulsivity, and other disruptive behaviors). However, the studies carried out have not tended to examine the interplay between the role of genetic, environmental and social factors. Considering this gap, the objective of the present review is to survey studies that examine the relationship between prenatal stress and the appearance of externalizing disorders in childhood, considering the interplay between the aforementioned factors. The main risk factors found were exposure to prolonged stress, working conditions, perceived social support and the mother's history of psychiatric disorders, among others. In turn, prevention strategies were presented for parents and those involved in the prenatal stage that are based on psychoeducation, mindfulness exercises, cognitive therapy and dietary and physical exercise habits, which focus on promoting an improvement in the quality of life. of the population in general and mothers in particular.

V-074 | Serotonin reduction synergizes with early life stress to produce adult depressive-like and anxiety phenotypes

Development

Author: Rocío Beatriz Foltran | Email: rociobfoltran@gmail.com

Rocío B Foltran1°, Carla V Argañaraz1°,Mariano Soiza-Reilly1°

1° Instituto de Fisiología, Biología Molecular y Neurociencias (IFIBYNE) UBA-CONICET. Buenos Aires, Argentina

Early-life stress elicits anxiety and depressive-like behaviors both in humans and in rodents. At the same time, low levels of serotonin have been linked to the origin of these mental disorders, and drugs enhancing brain serotonin levels are the first line treatment for these neuropsychiatric conditions. Here we sought to investigate the role of serotonin in a maternal separation model of early-life stress in mice. C57BL/6 pups were subjected to the maternal separation (MS) protocol (3h/day) during a postnatal critical period (P2-P14) while receiving daily injections of the tryptophan hydroxylase inhibitor para-chlorophenylalanine (PCPA, 10mg/kg/day s.c.). Then in adulthood (from P80) we performed the Open Field (OF), Elevated Plus Maze, Sucrose Splash, Novelty Suppressed Feeding (NSF) and Forced Swimming tests to study emotional behavior. PCPA-treated mice had lower weight gain throughout the entire treatment period, which was restored by P25. In the MS model, male mice were more susceptible and showed higher levels of anxiety. PCPA treatment had synergistic effects with MS in females, were stress had milder effects that became apparent only when serotonin was depleted. Our results emphasize the emotional alteration following early life stress and its interaction with the serotonin system, in the search for understanding one of the main risk factors for the development of psychiatric disorders.

V-075 | ROLE OF SPONTANEOUS ELECTRICAL ACTIVITY IN THE DEVELOPMENT AND GROWTH OF CENTRAL AXONAL PROJECTIONS IN ZEBRAFISH LATERAL LINE AFFERENT NEURONS

Development

Author: Matias Rodriguez | Email: matti.rodriguez@hotmail.com

Matias Rodriguez1°, Lucia Salatino1°,Ana Belen Elgoyhen2°, Paola V. Plazas1°

1° Instituto de Farmacología, Facultad de Medicina

2° INGEBI, CONICET

Spontaneous electrical activity (SEA) is required for the proper establishment of sensory systems. We use Zebrafish (Danio rerio) lateral line (LL) to decipher the mechanisms by which SEA affects the assembly of developing sensory circuits. The LL allows fishes and amphibians to detect water motion and pressure changes and consists of clusters of neuromasts, which contains mechanosensory hair cells (HC) innervated by afferent (Aff) and efferent neurons.. We over-expressed hKir2.1 channels to silence SEA in single LL Aff and examined axonal arbor growth in competitive (active neighboring axons) and non-competitive (global suppression of SEA, inactive neighboring axons) environments. Our results indicate that silencing single LL Aff in a competitive environment, reduced innervation area, altered axonal arbor complexity, and increased branch formation, elimination, retraction and elongation rates. In contrast, global suppression of SEA, did not affect innervation area but led to unstable axonal arbors, with increased branch retraction and elongation rates. These results suggest that SEA regulates branch elongation and retraction regardless of activity in neighboring cells, but the ability to arrest branch formation and elimination, and to regulate arbor territory, is an activity-dependent competitive process. Our study provides in vivo evidence that an activity-based competition rule regulates axonal arbor growth and maturation of developing LL Aff.

V-076 | Mapping Astrocyte Diversity in the Developing Spinal Cord

Development

Author: Caterina Laura Sister | Email: cate.sister@gmail.com

Caterina Sister1°, Guillermo Lanuza1°

1° Fundación Instituto Leloir

Astrocytes are involved in the maintenance and regulation of neurological functions and their impairment is related to several pathologies. While neuronal subtype specification is well understood, how development shapes astrocytic diversity remains unclear. Here we show that distinct dorso-ventral progenitor domains of the mouse neural tube (identified by Nkx6.1, Pax3/6/7, Dbx1, Ascl1) produce astrocyte subsets that colonize precise regions of the spinal cord. Each population, despite its origin, exhibits heterogeneity in distribution and morphology comprising gray matter (GM) protoplasmic, white matter (WM) fibrous and subpial astrocytes. We traced individual progenitor cells linage using GlastCreER mice in combination with conditional reporter lines (Tomato or GFP) or the mosaic analysis with double markers clonal system to determine if GM and WM cells share a common ventricular cell origin. Fate mappings at clonal density showed isolated astrocytes, produced by direct differentiation, or pairs of cells with identical subtype identity. Furthermore, experiments indicate that these couples are the result of symmetrical division taking place close to their final settling location after migration. In summary, this study delineates basic principles of astrocyte diversity during development. While dorso-ventral allocation maps depend on progenitor positional identity, GM and WM astrocytes seem to originate from distinct lineages within each embryonic domain.

V-077 | Learning and memory is differentially affected in middle aged wild type and McGill-R-Thy1-APP rats according to sex

Disorders of the Nervous System

Author: Mauro Exequiel Carlos Alfaro | Email: exequielalfaro16@gmail.com

Martin Habif1°, Mauro Exequiel Alfaro1°,Natalia Colettis1°2°, Maria Victoria Oberholzer1°3°, Maria Belén González1°, Diana Jerusalinsky1°

1° Instituto de Biología Celular y Neurociencia (IBCN) "Prof. EDUARDO DE ROBERTIS" Facultad de Medicina - Universidad de Buenos Aires CONICET

2° IQUIFIB - INSTITUTO DE QUIMICA Y FISICOQUIMICA BIOLOGICAS "PROF. ALEJANDRO C. PALADINI"

3° INCYT - INSTITUTO DE NEUROCIENCIA COGNITIVA Y TRASLACIONA

Recent studies highlight sex differences in neuropathology and cognition in Alzheimer's disease (AD) models. We examined the impact of sex on short-term (STM) and long-term memory (LTM) in middle-aged McGill-R-Thy1-APP transgenic (Tg+/-) rats, an AD-like amyloidosis model. Male and female Tg rats, along with wild-type (wt) littermates, were tested in an open field (OF), to assess bidimensional and vertical (rearings) exploration. Traveled distance revealed no significant differences between sexes or genotypes, though males had fewer rearings than females. In a novel object recognition (NOR) task, both wt and Tg rats displayed STM, but Tg rats failed to meet LTM criteria after 24h. In the novel object location (NOL) task, only wt females performed well to discriminate a new location for a familiar object. In inhibitory avoidance (IA), where rats received a mild shock upon entering a dark compartment, wt females showed higher latencies 24h later, indicating better LTM. After 14 days, only wt females maintained this memory performance. Our study found sex-dependent cognitive impairments, with wt males and Tg rats (both sexes) showing deficits in LTM and associative memories, particularly in tasks involving spatial reference and aversive stimuli. These findings suggest that similar sex differences in cognition may occur in preclinical AD, emphasizing the need for improved early detection methods, as these changes may be masked by neuronal and cognitive reserve in humans.

V-078 | Cognitive fatigue in multiple sclerosis: an objective measure

Disorders of the Nervous System

Author: Lucia Bacigalupe | Email: lucia.bacigalupe@hotmail.com

Lucia Bacigalupe1°, Mastroberti Gloria1°,Aldana Marinangeli1°, Natalia Ciufia1°, Mariana Zarza1°, Lucia Ibarra1°, Lucas Lapalma1°, Ricardo Alonso1°, María Bárbara Eizaguirre1°

1° Multiple Sclerosis University Center (CUEM), Neurology, Ramos Mejia Hospital, Buenos Aires, Argentina.

Cognitive fatigability (CF) is considered a way to objectively measure the fatigue symptoms of patients with Multiple Sclerosis (PwMS). Aims: Compare the CF in patients and healthy controls (HC). Analyze the association between CF and clinical, cognitive, and demographical variables. Methods: A cross-sectional study was carried out. Clinical and cognitive variables were evaluated. This study applied the EDSS, the FSS, the BDI-II, and the complete neuropsychological battery from PwMS. CF was obtained from an index calculated by a difference in the first half and the rest of the PASAT and the SDMT. Parametric and non-parametric statistics were used, $p<.05$ was considered significant. Results: 140 PwMS and a group of 50 HC were analyzed. Patients presented a mean age of 36.4±9.0 years and mean education of 13.6±3.60 years. The HC showed a mean age of 33.5 4±10.6 years and a mean education of 14.5±4.48 years. No significant differences were found in age ($p=.064$) and education ($p=.134$). Statistically significative differences were found between groups in the CF measured by SDMT test ($p=.007$), being patients the ones who presented a high index of CF. The lineal regression model showed that gender is a predictor variable of the CF measured by the PASAT ($p=.017$, $\beta=0.206$). No association was found between CF measured by SDMT and clinical, cognitive and demographical variables. Conclusion: PwMS presented a higher CF than the HC and that gender could be associated with fatigability.

V-079 | Cognitive impact and brain structural changes in long COVID patients two years post infection

Disorders of the Nervous System

Author: Martin Belzunce | Email: mbelzunce@unsam.edu.ar

Sol Cataldo1°, Laura Margulis2°,Florencia Sarmiento1°, Melina Cibeyra2°, Milagros Mena3°, Raúl Melano2°, Andrea Micciulli2°, Martin Belzunce1°4°

1° Centro Universitario de Imágenes Médicas (CEUNIM), Escuela de Ciencia y Tecnología, Universidad Nacional de Gral. San Martín

2° Unidad de Neuropsicología, Hospital Interzonal General de Agudos Eva Perón, San Martín, Buenos Aires

3° Escuela de Humanidades, Universidad Nacional de Gral. San Martín

4° CEMSC3, ICIFI CONICET-UNSAM

Long COVID, characterised by persistent symptoms after a SARS-CoV-2 infection, has become a pressing global health problem impacting the daily life of millons people around the globe. Many of these symptoms are neurocognitive, such as brain fog, memory and attention problems, and fatigue. In this cross-sectional study, we explore whether the presence of these self-reported cognitive symptoms correlates with changes in brain morphology and cognitive impairment approximately two years post-infection. The study involved 137 participants, 109 with long COVID symptoms and 28 healthy controls, who underwent a clinical assessment, completed a structured questionnaire and standardized scales of health related quality of life; underwent a cognitive assessment focused on executive functions; and had a brain MRI scan. Structural MRI images were processed using FreeSurfer and FSL to perform a morphometric analysis. Long COVID patients reported a lower self-perception of their health status, especially in terms of mental health, pain and fatigue. Despite their reported cognitive symptoms, cognitive tests did not reveal differences between groups. Brain MRI images showed decreased volumes across different regions (e.g. cerebellum and inferior parietal regions), and reduced cortical thickness in left and right postcentral gyri and precuneus. These results emphasize the need for comprehensive interventions and further longitudinal studies to understand the long-term effects of long COVID.

V-080 | Microglial Depletion Prevents Retinal Ganglion Cell Loss and Visual Deficits in a Model of Early Life Stress

Disorders of the Nervous System

Author: Salvador Calanni | Email: salvadorcalanni@gmail.com

Juan Salvador Calanni1°, Laura Andrea Pasquini2°,Nathaly Bernal Aguirre1°, Damian Dorfman1°, Ruth Estela Rosenstein1°

1° Laboratory of Retinal Neurochemistry and Experimental Ophthalmology, IQUIBICEN, FCEN-UBA, CONICET

2° IQUIFIB, FFyB-UBA, CONICET

Early life stress (ELS) is defined as a period of severe and/or chronic trauma, as well as environmental/social deprivation or neglect in pre/postnatal stage. Presently, the impact of ELS on the visual system in the adult stage is unknown. Using an animal model of maternal separation with early weaning (MSEW), we analyzed the long-term ELS consequences in the visual system.

Mice were separated from the dams for 2 h at postnatal days (PNDs) 4-6, for 3 h at PNDs 7-9, for 4 h at PNDs 10-13, for 6 h at PNDs 14-16, and weaned at PND17. Control pups were left undisturbed from PND0, and weaned at PND21. At PND 60-75, MSEW did not affect the electroretinogram a- and b-wave amplitude, but decreased retinal ganglion cell (RGC) function and number, and increased retinal Iba-1(+) area, and cell soma size, consistently with an increased number of amoeboid microglial cells. At PND45 microgliosis preceded RGC loss, supporting a key role of microglia in visual function alterations induced by ELS. To investigate this hypothesis, microglial depletion was induced by a treatment with Sotuletinib, a Colony Stimulating Factor Receptor inhibitor, orally and daily administered from PND35 to PND60. Sotuletinib alone did not affect the number or function of RGCs, but it significantly mitigated RGC function and number loss in MSEW mice at PND 60.

In summary, our results suggest that microglial cells could play a key role in long term consequences of early life stress on the visual system of mice.

V-081 | Downregulation of the Fyn kinase in an experimental model of tauopathy: functional consequences and therapeutic perspectives

Disorders of the Nervous System

Author: Ramiro Clerici Delville | Email: ramiroclerici@hotmail.com

Ramiro Clerici Delville1°, Javier Andrés Muñiz1°,Carolina Lucía Facal1°, Ezequiel Pereira1°, Melina Bordone2°, Juan Esteban Ferrario2°, María Elena Avale1°

1° Instituto de Investigaciones en Ingeniería Genética y Biología Molecular "Dr. Héctor N. Torres" (INGEBI - CONICET)

2° Instituto de Biociencias, Biotecnología y Biología traslacional (iB3 - FCEN - UBA)

Tauopathies are neurodegenerative diseases, showing accumulation of hyperphosphorylated Tau. Tau is a microtubule-associated protein, predominantly expressed in neurons, involved in many neuronal processes. In many tauopathies, Tau becomes abnormally hyperphosphorylated at specific sites, reducing its affinity for axonal microtubules and promoting its accumulation in the somatodendritic compartment. The src-Fyn kinase has been characterized as a crucial mediator of Tau-dependent neurodegeneration, and it is hypothesized that Tau-Fyn interaction is required for Tau toxicity. This interaction is enhanced in pathologic conditions, favoring the overstimulation of glutamatergic receptors, which generates what is known as “excitotoxicity”. Here we analyzed the interaction between Tau and Fyn, in the development of Tau pathology in the hTau mouse model of tauopathy, which primarily accumulates phospho-Tau in the prefrontal cortex (PFC) and develop cognitive impairments from 6 months-old. We performed specific downregulation of Fyn in the PFC of 3-months-old hTau mice, by stereotaxic injections of lentiviral vectors carrying microRNAs to target Fyn mRNA. Six months after treatment, mice were analyzed using a battery of behavioral tests, in vivo electrophysiological recordings of PFC neurons and molecular-post mortem analyses. We determined whether Fyn downregulation has a beneficial impact on neuronal physiology and phenotypic impairments in aged hTau mice.

V-082 | Impact of ovariectomy at weaning on adult social behavior in mice prenatally exposed to VPA

Disorders of the Nervous System

Author: Lucía María Di Guardia Casella | Email: lmdiguardiacasella@gmail.com

Lucía María Di Guardia Casella1°2°, Mariana Elias 1°,Amaicha M. Depino 1°3

1° Instituto de Fisiología, Biología Molecular y Neurociencias (UBA-CONICET)

2° Departamento de Fisiología, Biología Molecular y Celular (FCEN, UBA)

3° Departamento de Biodiversidad y Biología Experimental (FCEN, UBA)

Autism Spectrum Disorder (ASD) is characterized by reduced sociability and increased repetitive behaviors, with a notable male-to-female incidence ratio of 4:1. Previous experiments from our group demonstrated that male mice exposed to valproic acid (VPA) on gestational day 12.5 exhibit reduced sociability at weaning and in adulthood. Interestingly, females prenatally exposed to VPA show sociability alterations before puberty but not in adulthood, indicating that the VPA mouse model is valuable for studying sex differences in ASD behaviors.

Different mechanisms may underlie this juvenile reversal of prenatal VPA effects on social behavior in females . We hypothesized that gonadal hormones may play a role in the observed resilience of females, as ovaries start producing steroids early in the juvenile phase, while testes remain inactive until adulthood. To explore the impact of ovarian hormones on adult behavior, we performed ovariectomy (OVX) in the ASD mouse model at weaning.

Our results revealed that VPA-OVX females did not exhibit the typical preference for the social chamber during the social interaction test, unlike other groups. We also evaluated social recognition, repetitive behaviors, and anxiety- and depression-related behaviors. These findings suggest that the absence of gonadal hormones since prepuberty, a period sensitive to organizational effects by estradiol, may prevent the resilience of female mice to VPA's impact on sociability later in life.

V-083 | MRI based subtypes of Alzheimer's disease present in a population sample from Argentina

Disorders of the Nervous System

Author: Pilar Freccero | Email: pilarfreccero@gmail.com

Pilar Freccero1°, Mariana Nahir Vallejo Azar1°,Maria Barbara Postillone1°, Julieta Lisso1°, Zulma Sevillano1°, Juan Pablo Princich1°, Patricia Solis1°, María Carolina Dalmasso1°

1° ENyS

Alzheimer's disease (AD) is the leading cause of age-related dementia, influenced by environmental and genetic risk factors. The SuStaIn AI tool has identified three AD subtypes via magnetic resonance imaging (MRI). Subtype 1 (S1) is marked by initial ventricular atrophy progressing to the hippocampus and entorhinal cortex. Subtype 2 (S2) starts with atrophy in the thalamus and pallidum, spreading to the temporal cortex. Subtype 3 (S3) features ventricular atrophy before affecting nearly all other regions. These subtypes may relate to different risk factors. Additionally, brain-age acceleration, computed from MRI scans, is proposed as an early biomarker for cognitive decline, with positive acceleration indicating brains that appear older than their chronological age. Therefore, we aim to study the presence of AD subtypes and validate the brain-age estimation as a biomarker in our population. We analyzed clinical data and 134 MRIs from individuals over 60 at the Memory Clinic at “Asistencia Médica Integral” (AMI-Hospital El Cruce): 63 from cognitively unimpaired (controls), 52 with Mild Cognitive Impaired (MCI) and 19 with AD. Subtypes were identified: 82% as S1, 14% as S2, and only 4 samples as S3. Notably, 23 control MRIs were classified as early stages of S1 (15) and S2 (8). Brain-age acceleration was higher in S1 compared to controls, though no significant differences were found among diagnostic groups. These findings suggest potential for improving AD diagnosis.

V-084 | The presence of adjuvants in the Glyphosate-based herbicides markedly increases developmental neurotoxicity and affects Wnt-non-canonical pathways.

Disorders of the Nervous System

Author: Emiliano Lautaro Gomez Quintero | Email: elgqelgq1114@gmail.com

Emiliano Lautaro Gomez Quintero2°, Maximiliano Gabriel Melano2°,Gonzalo Emiliano Quasollo Infanzon2°, Mariano Bisbal2°, Silvana Beatriz Rosso1°

1° Laboratorio de Toxicología Experimental. FAcultad de Ciencias Bioquímicas y Farmacéuticas. Universidad Nacional de Rosario

2° Laboratorio de Neurobiología Celular y Molecular (IMMF-CONICET-UNC) Córdoba, Argentina.

Glyphosate (Glyph) is the most widely used herbicide worldwide. Several Glyph-based herbicides (GBH) have been developed in different countries to weed control. However, the presence of adjuvants, with surfactant activity, may enhance its potential toxicity. Recently, studies from our group have shown that the exposure to low doses of pure Glyph induces behavioral alterations in developmental rats and signs of neurotoxicity in cell cultures. In the present work, we are showing that rats exposed to Glyphosate formulations (70, 100, and 200 mg/kg/48 h) evidenced motor and cognitive dysfunction compared to controls. Furthermore, we have performed assays in cultured hippocampal neurons exposed to GBH. Images from microscopic analysis showed alterations in the density, morphology, and maturation of dendritic spines in neurons exposed to GBH concentrations around 150 fold below the pure Glyph dose used previously. Taken into account that Wnt pathways play a crucial role for neuronal growth and maturation, we then investigated whether GBH affected Wnt signalling during development. Preliminary results evidenced alterations in the Rac 1 and JNK (PCP pathway) and CaMKII (Ca pathway) mediated non-canonical pathways. Together, these observations suggest greater toxicity of GBH compared to pure Glyph, possibly associated with the presence of adjuvants, as well as a possible correlation between cognitive alterations and changes in the activity of the non-canonical Wnt pathways.

V-085 | TGF-β3 Gene Administration Mitigates Hippocampal Alterations in a Parkinson’s disease Model

Disorders of the Nervous System

Author: Matías Jávega Cometto | Email: matias.javega@unc.edu.ar

Matías Jávega Cometto1°, Leandro Gabriel Champarini1°,Aracely Janneth Naranjo Viteri1°, Rosana Crespo1°, Claudia Beatriz Hereñú1°

1° Instituto de Farmacología Experimental de Córdoba (IFEC-CONICET), Departamento de Farmacología Otto Orsingher, Facultad de Ciencias Químicas, Universidad Nacional de Córdoba, Córdoba, Argentina

Non-motor symptoms in Parkinson's disease (PD), such as anxiety disorders and cognitive impairments, significantly impact patients' quality of life and often appear before motor symptoms. These observations suggest that brain regions involved in cognitive functions, like the hippocampus, are affected along with the classic dopaminergic nigrostriatal pathway. Treatments should therefore target not just neuronal loss but also processes that contribute to damage in these regions like inflammation and oxidative stress. TGF-β3, a member of the TGF-β trophic factor family known for its anti-inflammatory properties and role in dopaminergic neuron differentiation, shows promise as a therapeutic approach. This study assessed the effect of intracisternal administration of the TGF-β3 gene via an adenoviral vector (rAD-TGF-β3) in a Parkinson’s disease rat model induced by 6-hydroxydopamine (6-OHDA). Results demonstrated that 6-OHDA impaired cognitive and anxiety-like behaviors before mild motor disabilities appeared, accompanied by increased inflammation in the hippocampus and reduced dopaminergic markers in the striatum. rAD-TGF-β3 administration mitigated these behavioral alterations, decreased hippocampal inflammation, and eventually restored dopaminergic markers in the striatum at a later time. These results suggest that TGF-β3 gene therapy may be a promising treatment strategy for Parkinson’s disease for both its motor and non-motor symptoms.

V-086 | A C. elegans Model for Studying the Functional Impact of the neurodegeneration-related protein TDP-43

Disorders of the Nervous System

Author: Ailin Lacour | Email: ailin.lacour@gmail.com

Ailin Lacour1°2°, Florencia Vassallu3°4°,Diego Rayes1°2°, Lionel Muller Igaz3°4°

1° Instituto de Investigaciones Bioquímicas de Bahía Blanca (INIBIBB)-CONICET, Bahía Blanca, Argentina

2° Universidad Nacional Del Sur (UNS). Departamento de Biología, Bioquímica y Farmacia, Bahía Blanca, Argentina

3° Universidad de Buenos Aires, Facultad de Ciencias Médicas. Departamento de Ciencias Fisiológicas. Buenos Aires, Argentina

4° CONICET - Universidad de Buenos Aires. Instituto de Fisiología y Biofísica Bernardo Houssay (IFIBIO Houssay). Buenos Aires, Argentina

TDP-43 proteinopathies are characterized by the pathological accumulation of TDP-43 in the cytoplasm, leading to neuronal dysfunction and degeneration. To study the effects of cytoplasmic TDP-43 accumulation, we generated C. elegans models overexpressing either wild-type (WT) human TDP-43 (hTDP-43, nuclear) or a cytoplasmic form with a mutated nuclear localization signal (ΔNLS). Both forms were specifically expressed in serotonergic neurons, which in C. elegans modulate behaviors related to food, such as pharyngeal pumping, egg-laying, and locomotion upon encountering food. Our results show that in young adult animals, both TDP-43 transgenic strains exhibit significant defects in these behaviors compared to WT animals, though less severe than those observed in tph-1 mutants, which cannot synthesize serotonin (tph-1 > ΔNLS > hTDP-43 > WT). Despite these phenotypic defects, fluorescence imaging revealed that the morphology of the serotoninergic neurons was unaffected. Notably, fluoxetine, a serotonin reuptake inhibitor, partially rescued the defects in TDP-43-expressing animals, indicating that serotonin release was not completely disrupted. These findings suggest that TDP-43 mislocalization leads to early functional impairments before morphological changes occur. We have established a C. elegans model to study cytoplasmic TDP-43 aggregation, providing a valuable tool to explore the underlying mechanisms of TDP-43 proteinopathies and to screen potential therapeutic agents.

V-087 | Innovation in biomaterials for peripheral nerves regeneration: a simple deposition method for graphene oxide coating on AZ31 alloy

Disorders of the Nervous System

Author: Luciana Malvestiti | Email: lucianamalvestiti@gmail.com

Luciana Malvestiti1°2°, Florencia Tano de la Hoz1°,Federico Fioravanti3°, Gabriela Lacconi3°, Silvia Ceré1°, Patricia Setton2°, María Rosa Katunar1°, Vanina Usach2°

1° INTEMA UNMDP- CONICET

2° IQUIFIB UBA-CONICET

3° INFIQC UNC-CONICET

Peripheral nerve injuries affect approximately 1.3 million people worldwide. Those with a gap greater than 5 mm are commonly repaired with a nerve guide conduit, where Mg alloys have emerged as key components for these devices. However, Mg alloys' main limitation is the fast degradation in aqueous electrolytes, that can be avoided by the development of coatings that enhance their corrosion resistance. Based on the biomedical application, graphene oxide (GO) is a potential coating due to its biocompatibility, good electrical conductivity and its high surface area, however some disadvantages are variations in shapes, sizes and defects on GO structure which could affect the biocompatibility of the Mg alloy. In the present work, bone marrow mononuclear cells (BMMC) obtained from adult rats were seeded on different polished Mg alloy coated with GO to evaluated Mg alloy topography and cell adhesion and viability; a simple drop-immersion method to deposit GO on AZ31 alloy was used. The material characterization revealed the characteristics GO spectra, followed by an enhances in the corrosion resistance. Also, GO coating improves the interaction between the alloy surface and red blood cells, increased BMMC adhesion and Mg-alloy polished promotes cells alignment on the surface. Taking together, these results demonstrate the possibility of GO coating on Mg.

V-088 | β-amyloid oligomers promote spatio-temporal patterns of activation of Rac1, Cdc42, and RhoA in hippocampal neurons.

Disorders of the Nervous System

Author: Maximiliano Gabriel Melano | Email: mmelano@immf.uncor.edu

Maximiliano Gabriel Melano1°, Lorena Paola Neila1°,Clara Inés Chungara1°, Emiliano Lautaro Gomez Quintero2°, Gonzalo Quassollo1°, Mariano Bisbal1°

1° Laboratorio de Neurobiología Celular y Molecular, Instituto Ferreyra (INIMEC-CONICET-UNC)

2° Laboratorio de Toxicologia Experimental, Facultad de Ciencias Bioquímicas y Farmacéuticas. (UNR-CONICET)

Oligomers of β-amyloid (Aβ) are implicated in dendritic spine and synaptic plasticity alterations associated with Alzheimer's disease (AD), but the molecular mechanisms remain incompletely understood. In this context, Rho GTPases are crucial for actin dynamics and dendritic spine structure. Most studies examining these proteins in AD utilize classical biochemical techniques that do not allow resolving the spatiotemporal activation dynamics. Recently, a large number of FRET sensors have been refined, enabling radiometric measurements with high spatial and temporal precision. Using this tool, we aimed to obtain new and detailed evidence of the activation dynamics of Rho GTPases during early exposure to pathogenic forms of Aβ1-42 in neuronal cultures. We observed that early exposure to Aβ oligomers causes an increase in RhoA activity after 5 minutes, primarily localized in dendritic spines. After 30 minutes of exposure, RhoA activity decreases and Cdc42 activation rises with a slight increase also localized in dendritic spines. This situation reverses for both GTPases after one hour . Regarding Rac1 activity, our results indicate an increase in dendrites shafts after 5 minutes of exposure. This suggests that changes in Rho GTPase activity related to cytotoxic Aβ exposure correspond to complex activation/inactivation patterns, which highlights the need to investigate more precisely these signaling pathways that could explain the onset of dendritic spine loss in this disease.

V-089 | Modelling UBQLN2-linked or related neurodegeneration with patient-derived induced pluripotent stem cells

Disorders of the Nervous System

Author: Micaela Nievas | Email: micnievas@gmail.com

Micaela Nievas1°, Barbara Weil1°,Mercedes Vautier1°, Ana Czerniczyniec1°, Nahuel Magrath-Guimet2°, Ricardo Allegri2°, Tatiana Itzcovich3°, Gustavo Sevlever1°3°, Ezequiel Surace3°, Mariela Marazita1°

1° Laboratorios de Investigación Aplicada en Neurociencias, Instituto de Neurociencias, Fundación para la Lucha contra las Enfermedades Neurológicas de la Infancia (LIAN-INEU-Fleni-CONICET), Escobar, Provincia de Buenos Aires, Argentina.

2° Department of Cognitive Neurology, Neuropsychiatry and Neuropsychology (Fleni), Buenos Aires, Argentina.

3° Laboratory of Neurodegenerative Diseases- Institute of Neurosciences (INEU-Fleni-CONICET), Buenos Aires, Argentin

Ubiquilin-2 (UBQLN2) pathogenic variants are implicated in hereditary Frontotemporal Dementia (FTD) and Amyotrophic Lateral Sclerosis (ALS). However, the molecular mechanisms by which UBQLN2 variants contribute to neurodegeneration remain largely unknown. This study aimed to establish an in vitro model of FTD/ALS by reprogramming patient somatic cells and differentiating them into a neural lineage. Fibroblasts were obtained from a male patient carrying two novel hemizygous UBQLN2 variants. Using the EF1a-hSTEMCCA-loxP lentiviral vector expressing OCT4, SOX2, c-MYC, and KLF4, we reprogrammed the cells in a feeder- and xeno-free protocol. Sequencing confirmed the presence of the variants in the selected iPSC clone (FFDU), which exhibited a normal karyotype (46, XY). Stemness was validated by established protocols. We further differentiated FFDU and iPSCs from a healthy donor into neural stem cells (NSCs). Western blot and IF studies revealed higher UBQLN2 protein levels and cytoplasmic inclusions in FFDU-NSCs, while levels of SOD2, HSP70, and SIRT1—essential proteins involved in oxidative stress management, protein folding, and cellular survival—were lower compared to WT cells. Our data suggest that these novel variants result in UBQLN2 accumulation and disruption in protective mechanisms against cellular stress that may contribute to neurodegeneration. This model is a valuable tool for exploring FTD/ALS pathogenic mechanisms and potential therapeutic approaches.

V-090 | Automated linguistic and acoustic measures of verbal fluency as neurocognitive markers of mild cognitive impairment

Disorders of the Nervous System

Author: Gonzalo Pérez | Email: perez.gonzalo.n@gmail.com

Gonzalo Pérez1°2°3°

1° Cognitive Neuroscience Center, Universidad de San Andrés, Buenos Aires, Argentina

2° National Scientific and Technical Research Council (CONICET), Buenos Aires, Argentina

3° School of Engineering, University of Buenos Aires, Buenos Aires, Argentina

INTRODUCTION: Verbal fluency assessments in mild cognitive impairment (MCI) are traditionally limited to valid response counts. This subjective approach constraints analysis to univariate methods and overlooks which semantic memory dimensions are affected. We tackled these gaps with a novel automated framework. METHODS: We asked 106 participants (52 with MCI, 54 healthy controls) to perform phonemic and semantic fluency tasks alongside standard cognitive tests. Word properties and timing features were automatically extracted and used to (i) discriminate between groups via a generalized linear model (GLM) and machine learning classification, and (ii) predict anatomo-functional brain patterns. RESULTS: GLM revealed significant effects for frequency, granularity, length, and imageability. Classification was maximal (AUC = .80) when combining all automated features, surpassing cognitive measures (AUC = .71). Frequency and granularity correlated with the volume of semantic-related regions commonly atrophied in MCI. DISCUSSION: Automated fluency analyses facilitate MCI detection, capturing fine-grained neurocognitive patterns in the condition.

V-091 | New Perspectives in Cognition in Multiple Sclerosis: Analysis of Cognitive Flexibility and its Relationship with Daily Life Difficulties

Disorders of the Nervous System

Author: Maria Sol Roman | Email: roman.mariasol@gmail.com

María Sol Román1°2°, Lara Bardoneschi1°2°,Juan Manuel Iglesias Passada2°, Florencia Daniele2°, Matías Herrera Fernández2°, María Eugenia Balbuena3°, María Laura Saladino2°, Fernando Cáceres2°, Sandra Vanotti1°2°

1° University of Buenos Aires, Institute for Psychological Research (IIP), Faculty of Psychology.

2° Institute of Restorative Neurosciences (INERE)

3° Demyelinating Diseases Section, Clinical Hospital, Neurology Division

Introduction: Cognitive flexibility deficits may impact daily functioning in People with Multiple Sclerosis (PwMS).

Objective: To determine the percentage of PwMS with cognitive flexibility impairment and study its relationship with demographic, clinical, cognitive variables, and Patient-Reported Outcome Measures (PROMs).

Methods: A cross-sectional study that included 157 PwMS (RRMS=88%, PPMS=6%, SPMS=6%; 76% women; age: 42.31±09.87 years; disease duration:12.65±8.28 years). Measures: the BICAMS battery (CVLT-I, BVMT-R, and SDMT), Paced Auditory Serial Addition Test 3 (PASAT 3), and Brixton test (Cognitive flexibility). PROMs: BDI-II (depression); FSS (fatigue); MusiQol (Quality of Life, QoL); BVMS (employment) and DEX (dysexecutive symptoms). The total number of Brixton test errors was considered.

Results: 22% of the PwMS showed cognitive flexibility deficits. Brixton performance correlated with education($r=-0.20$, $p<0.05$), BICAMS (CVLT-I: $r=-0.32$;$p<0.001$, BVMT-R: $r=-0.42$;$p<0.001$ and SDMT: $r=-0.38$;$p<0.001$), PASAT 3 ($r=-0.43$;$p<0.001$), BDI-II ($r=0.17$;$p<0.05$), ADLs ($r=-0.20$;$p<0.05$), disease symptoms ($r=0.34$;$p<0.01$), sentimental/sexual life ($r=-0.21$;$p<0.05$), QoL index ($r=-0.21$;$p<0.005$) and total DEX ($r=-0.17$;$p<0.005$). Unemployed PwMS made more errors ($p<0.01$). PASAT 3, BVMT-R, and disease symptoms (MusiQol) were significant predictors of cognitive flexibility (R2:.

0.25; p<0.001). Conclusion: Early assessment and rehabilitation are crucial for improving the QoL in PwMS.

V-092 | Structural Connectivity Association with Response to Electroconvulsive Therapy in Major Depression

Disorders of the Nervous System

Author: María Eugenia Samman | Email: mariaeugeniasamman@gmail.com

María Eugenia Samman1°,2°, Leticia Fiorentini1°,4°, María Lucía Fazzito6°, Aki Tsuchiyagaito7°, Elsa Costanzo1°,4°, Joan A. Camprodon8°, Cecilia Forcato2°, Salvador M. Guinjoan1°, Mirta F. Villarreal1°,3°,5°María Eugenia Samman1°2°, Leticia Fiorentini1°4°,María Lucía Fazzito1°, Aki Tsuchiyagaito1°, Elsa Costanzo1°4°, Joan A. Camprodon1°, Cecilia Forcato2°, Salvador M. Guinjoan1°, Mirta F. Villarreal1°3°

1° Grupo de Investigación en Neurociencias Aplicadas a las Alteraciones de la Conducta (Grupo INAAC), Instituto de Neurociencias FLENI-CONICET, Argentina.

2° Laboratorio de Sueño y Memoria, Departamento de Ciencias de la Vida, Instituto Tecnológico de Buenos Aires (ITBA), Buenos Aires, Argentina.

3° Consejo Nacional de Investigaciones Científicas y Técnicas (CONICET), Buenos Aires, Argentina.

4° Servicio de Psiquiatría, Fleni, Argentina.

5° Departamento de Física, Facultad de Ciencias Exactas y Naturales, Universidad de Buenos Aires, Buenos Aires, Argentina.

6° NeuroMood | Psiquiatría intervencionista. Buenos Aires, Argentina.

7° Laureate Institute for Brain Research, Oklahoma, United States of America.

8° Department of Psychiatry, Massachusetts General Hospital, Harvard Medical School, Boston, MA, USA.

Electroconvulsive Therapy (ECT) is the most effective option for treatment-resistant depression (TRD) and certain brain regions are critical nodes in the pathogenesis of this condition. In this study, we investigated whether the structural connectivity between seven bilateral node regions (thalamus- Tha, amygdala- Amy, orbitofrontal cortex- OFC, posterior cingulate cortex- PCC, posterior ventrolateral prefrontal cortex- pvlPFC, anterior insula- aINS, and subcallosal gyrus- SG) is related to depressive symptomatology and clinical response to ECT. Diffusion-weighted magnetic resonance images were

acquired before ECT sessions in 25 TRD patients. The Hamilton Depression Rating Scale was used to assess the severity of depression before and after ECT. Using probabilistic tractography analysis, we explored possible associations between the connectivity of the selected regions and two metrics: the basal symptomatology and the response to treatment. The results indicate that connectivity between the left Tha and right PCC, and between the left PCC and the right Tha was related to initial severity. Furthermore, bilateral Tha connectivity with the left PCC correlated with the level of treatment response. We also found significant associations of OFC, anterior aINS and pvlPFC with the degree of depressive symptomatology and treatment response, although not surviving FDR correction.

V-093 | Behavioral analysis of Freezing of Gait in an experimental model of Parkinson's disease

Disorders of the Nervous System

Author: Angela Isabel Tissone | Email: anyisone@gmail.com

Angela Isabel Tissone1°, Joaquin Alejo Quintana1°2°3°,Florencia Faccioli1°3°, Jose Lobera4°, María Soledad Espósito1°3°

1° Laboratorio de Neurobiología del Movimiento, dpto de Física Médica, Centro Atómico Bariloche

2° Universidad Nacional del Comahue

3° Consejo Nacional de Investigaciones Científicas y Técnicas, CONICET

4° Comisión Nacional de Energía Atómica, Centro Atómico Bariloche

Parkinson's Disease (PD) is a progressive neurodegenerative disorder that affects different populations of neurons. The characteristic symptoms that define the clinical presentation of the disease are threefold: rigidity, bradykinesia, and resting tremor. Additionally, PD patients exhibit various symptoms that often precede the onset of motor symptoms by years and involve neurodegeneration in regions distinct from those causing the motor symptoms. Moreover, PD is characterized by the presence of intracellular protein aggregates known as Lewy bodies, with alpha-synuclein being their primary constituent. In our laboratory, we developed a tool capable of generating animal models of PD through a CRE-dependent virus (pαSyn) that enables the expression of alpha-synuclein. Targeting the pαSyn virus to the Substantia Nigra pars compacta (SNpc) triggered the death of dopaminergic neurons, neurodegeneration in the nigrostriatal pathway, and the presence of Lewy body markers. Additionally, motor deficits were observed in behavioral tests such as the rotarod and open field. To further characterize our model, this study focuses on two key PD symptoms: bradykinesia and difficulty initiating movement. To this end, we used a novel behavioral test that measures the latency in locomotion initiation. By again targeting the pαSyn virus to the SNpc, we will investigate whether our model exhibits a phenotype similar to the freezing of gait characteristic of PD.

V-094 | VTA dopaminergic neuron activity is required for social behaviors relevant to schizophrenia

Disorders of the Nervous System

Author: Juan Martín Uehara | Email: ueharajm@gmail.com

Juan Martín Uehara1°, Analía López Díaz1°,Verónica Risso1°, Juan Emilio Belforte1°, Estefanía Pilar Bello1°

1° Universidad de Buenos Aires - CONICET. Instituto de Fisiología y Biofísica Bernardo Houssay (IFIBIO Houssay), Facultad de Medicina, Departamento de Ciencias Fisiológicas. Grupo de Neurociencia de Sistemas. Buenos Aires, Argentina.

Dopaminergic neurons in the ventral tegmental area (VTA) have previously been implicated in the control of various social behaviors in rodents, such as approaching a novel conspecific or performing an instrumental response to access a social reinforcer. Additionally, dopaminergic imbalances in the midbrain have been proposed as a pathophysiological mechanism underlying psychiatric disorders that feature deficits in social cognition and behavior. The aim of this work was to examine the role of VTA dopaminergic neurons in social behaviors with translational relevance to schizophrenia. To this end, we conducted a region- and neuron-type-specific chemogenetic inhibition while mice performed a battery of paradigms targeting different aspects of social behavior.

V-095 | Bacterial diets are able to modulate life-history treats in C. elegans model of Parkinson disease

Disorders of the Nervous System

Author: Tania Veuthey | Email: tveuthey@uns.edu.ar

Tania Veuithey1°, Andreas Burkovski3°

1° Instituto de Investigaciones Bioquímicas de Bahía Blanca (INIBIBB)-CONICET

2° Department Biologie, Friederich-Alexander-Universität Erlangen-Nürnberg

As life expectancy increase, age-related disorders, such us neurodegenerative diseases (ND), have become more prevalent. Moreover, treatments only attenuate some symptoms. Thus, new challenges emerge in order to understand molecular basis of these disorders. Lately, the gut-brain axis has gain attention and a close relation between gut microorganism and ND has been proposed. We evaluated the relevance of the microbiota assessing the impact of six non-pathogenic bacterial diets on life-history traits in C. elegans models of Parkinson disease (PD). In a first approach, we found 2 bacteria, Escherichia coli K12 and E. coli HB101, able to improve locomotion in liquid media, in in worms at adult day 4, versus E. coli OP50. Moreover, an age-dependent locomotion improvement, between larva-L4 and adult day 4, was observed in liquid media after feeding PD model´s worms with 4 different bacteria versus E. coli OP50. Similar results have been found tracking the movement of worms in solid media. We also observed an increase in the developmental timing of wild-type worms grown in 4 bacteria versus E. coli OP50, but more interesting was the accelerated developmental rate found in worms feed with E. coli BL21 (DE3). We are currently analyzing the changes in the proteoma of worms feed with different diets as well as aggregates numbers. Our results allowed us to identify bacteria with the ability to drive physiological outcomes and improve health status of C. elegans models of ND.

V-096 | Does early social isolation alters habenular coding in larval Zebrafish? Spontaneous and evoked activity habenular responses of larval zebrafish raised in social context

Neural Circuits and Systems Neuroscience

Author: Valentin Agullo | Email: agullovalentin@gmail.com

Valentin Agullo1°2°, Violeta Medan1°2°

1° IFIBYNE-CONICET-UBA

2° Depto. Fisiología y Biología Molecular y Celular, Fac. de Ciencias Exactas y Naturales, Universidad de Buenos Aires

The lateral habenula (LHb) is one of the few brain regions that regulates both the dopaminergic and serotonergic systems, which are fundamental for motivational, motor, and cognitive functions. The LHb plays a crucial role in encoding negative reward. Studies in humans and animal models have linked LHb dysfunction with psychiatric disorders, especially major depression.

During early development, as the nervous system matures and establishes its circuits, it is particularly sensitive to external stimuli; absence of adequate stimulation during this period can result in deficits that persist into adulthood. Specifically, social interaction during early postnatal development plays is central in establishing appropriate behaviors. Adversity during childhood, such as social isolation, represents a risk factor for various disorders, including depression.

We aim to understand the role of the habenula (Hb) in the behavioral changes induced by early social isolation in zebrafish. Here we present preliminary results of spontaneous and stimulus-evoked activity of Hb neurons of larval zebrafish. To perform in vivo calcium imaging we used transgenic zebrafish expressing GCaMP6f panneuronally (Nacre[elavl3:GCaMP6f]). Confocal images were motion-corrected (CaImAn), aligned to a brain atlas (Z-Brain) and segmented (Cellpose) to calculate fluorescence for individual neurons. Results compare spontaneous vs. stimulus evoked activity in animals which developed in a social (control) context.

V-097 | Resting-State Study of Cortical Connectivity Changes in Users of Visual Cortical Prostheses

Neural Circuits and Systems Neuroscience

Author: Leonardo Ariel Cano | Email: lcano@herrera.unt.edu.ar

Fernando Daniel Farfán1°3°, Leonardo Ariel Cano3°,Leili Soo1°2°, Ana Lía Albarracín3°, Eduardo Fernández-Jover1°2°

1° Institute of Bioengineering, Universidad Miguel Hernández of Elche, Spain

2° Research Networking Center in Bioengineering, Biomaterials and Nanomedicine (CIBER-BBN), Madrid, Spain.

3° Neuroscience and Applied Technologies Laboratory (LINTEC), Bioengineering Department, Faculty of Exact Sciences and Technology (FACET), National University of Tucuman, Instituto Superior de Investigaciones Biológicas (INSIBIO), National Scientific and Technical Research Council (CONICET), Av. Independencia 1800, San Miguel de Tucuman 4000, Argentina

Electrophysiological studies have highlighted organizational and functional differences in the cortex of blind versus sighted individuals. This cortical reorganization allows the nervous system to adapt to new sensory modalities used in daily life. Visual cortical prostheses can restore visual sensations via phosphenes, offering blind individuals environmental information. Our study aims to characterize cortical alterations from the use of such neuroprostheses. In this preliminary approach, blind subjects used the prosthesis temporarily (6 months), where microelectrode arrays implanted in the primary visual cortex provided electrical stimulation to evoke phosphenes. Cortical connectivity (spectral coherence, SC) was analyzed during the resting state using EEG to explore the impact of prosthesis use. SC between all EEG channels revealed significant changes in specific frequency bands due to daily prosthesis use, with some bands showing less pronounced alterations. These preliminary results suggest that resting-state cortical connectivity significantly changes with the use of visual cortical prostheses, showing patterns similar to those of sighted individuals in some cases.

V-098 | Characterization of the projection sites for lobula columnar neurons (optic glomeruli) in the crab Neohelice granulata

Neural Circuits and Systems Neuroscience

Author: Ana Paulova Contreras Vera | Email: apavlovac@fbmc.fcen.uba.ar

Ana Contreras1°, Julieta Sztarker1°2°

1° Instituto de Fisiología, BiologíaMolecular y Neurociencias (IFIBYNE), UBA-CONICET, Universidad de Buenos Aires, Facultad de Ciencias Exactas y Naturales.

2° Departamento de Fisiología, Biología Molecular y Celular “Dr HéctorMaldonado”, Facultad de Ciencias Exactas y Naturales, Universidad de Buenos Aires

Semiterrestrial crabs possess a highly developed visual system and display conspicuous visually guided behaviors. The brain structures processing visual information are called optic neuropils. These are highly ordered structures containing thousands of retinotopically-arranged columns performing the parallel processing of visual signals from different points in space. From periphery to center, they are called: lamina, medulla, and lobula complex (composed by the lobula and the lobula plate). These names are shared with insects given the similar organizational principles, cell types, and functional properties. In flies, 22 types of lobula columnar neurons (LC) were described. Each LC is proposed to integrate a different behaviorally relevant visual feature. An anatomical property of LC neurons is the convergence of their axons onto cell-type specific target regions in the lateral protocerebrum called optic glomeruli. Previous work in Neohelice using Golgi impregnation revealed 29 types of LC projecting out of the lobula although their terminals were not described. Since Golgi is a stochastic technique the number of existing elements could be even greater. In this work we aimed to characterize the projection sites of LC in crabs using the massive staining of columnar cells applying dextran-conjugated dyes in the lobula. We also used Golgi impregnations and Bodians stainings to reveal the number, shape and location of optic glomeruli and gain further details about LC terminals.

V-099 | Uncovering the role of striatal cholinergic interneurons in early stages of motor learning on a rotarod task

Neural Circuits and Systems Neuroscience

Author: Martina Gomez Acosta | Email: martinagomezacosta98@gmail.com

Martina Gomez Acosta1°, Andrés P Varani1°,Esteban Valverde1°, Gustavo Almeida Aguiar1°, Carlos A Pretell Annan1°, Juan E Belforte1°

1° Grupo de Neurociencia de Sistemas - Instituto de Fisiología y Biofísica Bernardo Houssay (Universidad de Buenos Aires - Consejo Nacional de Investigaciones Científicas y Técnicas)

Striatal cholinergic interneurons (SCIN) play a relevant role in motor control and decision making, including strategy selection and cognitive flexibility. Previous research showed that ablation of SCIN did not impair motor abilities (such as balance and locomotion), but did alter spatial navigation, hindering the learning process. Yet, it is still unknown how SCIN are involved in the different phases of the learning process. To elucidate this, we microinjected adult heterozygous Chat-Cre mice (males and females) with a viral vector via stereotaxic surgery to express an inhibitory DREADD (hSyn-DIO-hM4D-Gi-mCherry) in the SCIN. Three weeks later, vehicle (control) and CNO treated mice were tested in a accelerating rotarod task (4-40 rpm) during 5 consecutive days (5-7 daily trials). CNO was only injected prior to the first day of the task, while vehicle was injected during the 5 days. CNO mice showed an increased performance compared to control mice along the 7 trials at Day 1 in the rotarod test, suggesting that SCIN inhibition at this stage may be important for correct strategy selection. In addition, a tendency was observed in female CNO treated mice to last longer without falling compared to males. Interestingly, these differences observed in the increased performance in the rotarod could be attributed to sexual dimorphism. In summary, our findings suggest that SCIN would be involved in the acquisition of a motor learning task.

V-100 | Encoding of spatial representations in the piriform cortex: does the olfactory cortex know where I am?

Neural Circuits and Systems Neuroscience

Author: Facundo Montiel | Email: ingfacundomontiel@gmail.com

Facundo Montiel1°, Sol Ramos1°,Noel Federman1°, Antonia Marin Burgin1°, Sebastian Romano1°

1° Biomedicine Research Institute of Buenos Aires - CONICET - Partner Institute of the Max Planck Society

Animals learn to recognize the relationships between sensory and spatial information, in order to adapt their behavior accordingly. For example, rodents learn to associate olfactory and spatial cues to successfully explore the environment. Recently, our lab has shown that when odors acquire behavioral relevance through associative learning between odorants, spatial contexts and rewards, neuronal encoding at the primary piriform olfactory cortex (PCx) of the mouse undergoes dramatic changes. Using a virtual reality setup, we trained mice to recognize specific pairings between odors and virtual environments, and recorded neuronal activity from the PCx. We found that, after successfully learning this task, PCx not only encodes olfactory information, but becomes strongly modulated by the location of the animal in the virtual environment. These results suggest an unexpected role for the PCx in spatial cognition, but the degree of precision to which the PCx can encode spatial locations is still unclear. Here, we present a research project and preliminary results to address this question. We used a diversity of machine learning decoding algorithms to quantify the precision of spatial encoding in the PCx, and compared it to the precision obtained from neuronal recordings in the hippocampus (dentate gyrus and CA3), the brain region canonically involved in spatial cognition. We discuss the obtained results, and the strengths and shortcomings of the different decoding approaches.

V-101 | The role of ventral tegmental area to amygdala circuit in learning and memory

Neural Circuits and Systems Neuroscience

Author: Camila Maria Polotto | Email: camila.polotto@gmail.com

Camila Polotto1°2°, Bárbara Giugovaz Tropper1°2°, Lucía Garbini1°2°, Estefanía Bello1°2°, Mariano Belluscio1°2°

1° Universidad de Buenos Aires, Facultad de Ciencias Médicas, Departamento de Ciencias Fisiológicas. Grupo de Neurociencia de Sistemas. Buenos Aires, Argentina.

2° CONICET - Universidad de Buenos Aires. Instituto de Fisiología y Biofísica Bernardo Houssay (IFIBIO Houssay). Buenos Aires, Argentina.

Memory is a fundamental aspect of our life, allowing us to store information from past experiences. The use of these memories enables animals to obtain the maximum benefit from their actions, whether that be by avoiding danger or exploiting resources. Equally important is the ability to extinguish memories that are no longer useful. It has been extensively demonstrated that the amygdala (AMY), in particular its basolateral portion, has a fundamental role in associative aversive learning, not only at individual neuronal activity but also in coordination with other brain regions including prefrontal cortex and ventral tegmental area neurons. The activity of neurons in the ventral tegmental area (VTA) is known to be related to reward mediated learning and recent studies have also shown they have the ability to respond also to aversive events. However, specific target areas that could be mediating this effect remain poorly understood. In this study, we want to further explore the role of the VTA-AMY in learning and memory. Here, we present different behavioral paradigms that allow us to test the role of the VTA neurons projecting to the Amygdala in both appetitive and aversive learning.

V-102 | Hippocampal neuronal activity during spatial navigation of alternate routes to a unique goal.

Neural Circuits and Systems Neuroscience

Author: Natalia Soldi | Email: natalia.soldi@gmail.com

Natalia Soldi1°, Emilio Kropff2°,Alejandro F. Schinder1°, Verónica C. Piatti1°

1° Laboratorio de Plasticidad Neuronal - Fundación Instituto Leloir - Instituto de Investigaciones Bioquímicas de Buenos Aires (IIBBA)- CONICET

2° Laboratorio de Fisiología y Algoritmos del Cerebro - Fundación Instituto Leloir - Instituto de Investigaciones Bioquímicas de Buenos Aires (IIBBA)- CONICET

Memories are necessary for planning and successful goal accomplishment. The hippocampus is critical for declarative memories, in addition to spatial navigation. In a familiar environment, how animals use their memories to infer new routes to a reward remains unknown. Our work showed that mice could efficiently solve new routes to a known reward position in the crossword maze in only one trial, once the task becomes familiarized. This result indicates that mice are using previously acquired knowledge to predict a detour to the same goal location. It has been shown that hippocampal cells can be reactivated during population emergent phenomena, predicting new trajectories to the goal position. Therefore, we hypothesize that there might be a controlled balance of excitation and inhibition of the hippocampal cells encoding different routes to a unique goal in a daily task. Chronic microdrives were implanted in mice to record hippocampal single units and neuronal population dynamics, to study neuronal activity promoting cognitive flexibility while mice perform this task. These experiments are currently being analyzed. We speculate that neuronal ensembles encoding the first rewarded route might become inhibited to give rise to new activity patterns encoding new detour paths to the goal.

V-103 | Study of the circuits underlying chronic pain and its affective-motivational component

Neural Circuits and Systems Neuroscience

Author: Lesly Spring Valdivia Torres | Email: springvaldivia@gmail.com

SPRING VALDIVIA1°, MARIO PERELLO2°,GUADALUPE GARCIA ROMERO2°, FERNANDO KASANETZ1°

1° IFIBIO -HOUSSAY

2° IMBICE

Chronic pain is one of the most prevalent health issues in modern times. It can often be associated with mood disorders, anxiety, pathological eating patterns, among others, and its symptomatology can even surpass sensory discomfort. Although these comorbidities are clinically well established, the neural mechanisms linking persistent pain with the aforementioned disorders have not been clarified.

The perception of pain results from a combination of multiple complex neural interactions that encode the valence of stimuli (appetitive or aversive). The mesolimbic system, the amygdala, and a novel nociceptive inhibitory efferent pathway from central amygdala (CeA) to the ZI are presented as possible candidates for mediating the emotional disorders evoked by chronic pain.

Our general working hypothesis is that the CeA-ZI circuit could be key, not only for the development and maintenance of chronic pain, but also for the manifestation of anxiety, mood disorders, and associated pathological eating patterns. To this end, we will use a neuropathic pain model in mice induced by partial sciatic nerve axotomy along with behavioral studies, aiming to elucidate the pathophysiological changes that occur during chronic pain and its affective-motivational component.

V-104 | Characterization of HCN Channels in the Somatosensory Thalamus of Female Mice

Neural excitability, synaptic transmission and neuron-glia interactions

Author: María Natalia Gobetto | Email: natygobetto@gmail.com

M. Natalia Gobetto1°, Francisco J. Urbano1°,Paula P. Perissinotti1°

1° IFIBYNE - CONICET- UBA

The Hyperpolarization-activated Cyclic Nucleotide-gated (HCN2/4) channel isoforms are abundantly expressed in the thalamus. The pivotal role of HCN channels arises from their ability to influence membrane properties such as resting membrane potential and input resistance, which are crucial for determining a neuron's role within a circuit. Using the whole-cell patch-clamp technique, we observed a sexual dimorphism in the functional expression of the H current mediated by HCN channels in the somatosensory nucleus (ventrobasal, VB).

In this study, we further characterized the H current at different postnatal stages. We found that H current density increased by 30% in females between 25-30 and 35-60 postnatal days (n = 8, 12), while no changes were observed in males (n = 11, 12). Given that HCN channels are well known targets of various hormones and neuromodulators, this sexual dimorphism suggests a modulation by sex hormones. To investigate this, a group of female mice were ovariectomized at 20-25 days postnatally, and HCN current density was recorded at 50-60 days. No increase in HCN current was observed in ovariectomized compared to sham-operated females (sham: n = 7, ovariectomized: n = 11). We´ve also found that upregulation of H current density in the VB nucleus correlated with increased mechanical sensitivity in the von Frey behavioral test. Consequently, this test started to be performed on female mice at different stages of the estrous cycle, as well as on males.

V-105 | ALTERATIONS IN CHOLESTEROL TRAFFICKING IN REACTIVE ASTROCYTES AS A CAUSE OF NEURONAL DYSFUNCTION IN INFLAMMATION

Neural excitability, synaptic transmission and neuron-glia interactions

Author: Joaquín Ezequiel Martini | Email: joaquin.martini@mi.unc.edu.ar

Joaquín E. Martini1°, Mauricio G. Martin1°

1° Departamento de Neurobiología Celular y Molecular, Instituto Ferreyra, INIMEC-CONICET-UNC, Universidad Nacional de Córdoba, Córdoba, Argentina

Cholesterol is essential for the function of most eukaryotic cells as it determines characteristics such as membrane fluidity and permeability and plays an important role in signaling processes. In particular, cholesterol is a major regulator of neuronal function. Since peripheral cholesterol does not cross the blood-brain barrier, neurons depend mainly on cholesterol synthesized by astrocytes, which is exported in the form of ApoE-cholesterol complexes. In recent work in the lab, we demonstrated that aged astrocytes manifest alterations in cholesterol transport, including lysosomal accumulation of cholesterol and altered cholesterol transport to neurons. Using primary cultures of astrocytes treated with proinflammatory cytokines, we found that reactive astrocytes reproduce the alterations observed in ageing and also accumulate high levels of cholesterol in the lysosomal compartment. Furthermore, we observed that treatment with cannabidiol (CBD) reversed the observed alterations. Given that the reduction of neuronal cholesterol has a direct impact on brain function, this study provides relevant information to understand how inflammatory processes, such as infections or neurodegenerative diseases, affect neuronal function and proposes a possible rescue strategy by CBD administration.

V-106 | Impaired neuron-glia communication

Neural excitability, synaptic transmission and neuron-glia interactions

Author: Giovanna Margarita Velázquez Campos | Email: gvelazquez.010390@gmail.com

Giovanna Margarita Velázquez-Campos1°2°, Magdalena Fernández-Acosta1°,María lucia Mares1°, María Fernanda Ceriani1°

1° Fundación Instituto Leloir IIB-BA/CONICET

2° Biología Molecular y Biotecnología de la Universidad Nacional de General San Martín

The circadian clock plays a crucial role in maintaining lipid homeostasis. However, whether lipid signalling feedbacks to the clock has not been addressed. To explore the impact of lipid metabolism on the molecular clock we investigated the role of Osi, a key regulator of lipid catabolism, in the adult brain. Adult-specific osi knockdown (osiKD) in a subset of pacemaker neurons (LNvs) prolongs the free-running period, which results from an altered pace of the molecular clock. Interestingly, the period phenotype is rescued by expression of ETFRF1, the human ortholog of osi that modulates beta-oxidation. osi mutants have elevated ROS levels; however, neither the antioxidant administration NAC nor SOD2 overexpression were effective in rescuing the phenotypes. We next explored whether abnormal signalling could underlie circadian deficits. Lipase 3 (Lip 3) rescues the phenotypes associated to Osi dysfunction in the fat body. However, Lip3 downregulation in neurons does not alleviate the circadian phenotypes resulting from osiKD. Instead, Lip3 knockdown alone leads to a similar period lengthening, suggesting that both proteins may act on the same pathway; if so, Osi would regulate phosphoinositol levels in the brain. In favor of this possibility, the morphology of the sLNv terminals is affected upon osiKD. These results suggest that Osi plays a fundamental role in LNv physiology and provides an opportunity to analyze the cross-talk between lipid metabolism and the circadian clock.

V-107 | Studies on the mechanisms involved in H2O2 modulation of GABAAα1β2 receptors

Neurochemistry and Neuropharmacology

Author: Andrea Beltrán González | Email: andreabeltrangonzalez@gmail.com

Manuel I López Pazos1°, Victoria Vitali2°,Karina Alleva2°, Mariana del Vas3°, Andrea N Beltrán González1°, Daniel J Calvo1°

1° IFIBYNE-CONICET-UBA

2° IQUIFIB-CONICET-UBA

3° IABIMO-INTA y CONICET

Reactive oxygen species are highly reactive molecules generated during cellular metabolism. We studied the effects of H2O2 on GABAA receptors using heterologous receptor expression in Xenopus laevis oocytes followed by two-electrode voltage clamp recording. Previous results indicated that GABAA receptors with αβ subunits were sensitive to H2O2 while those containing the γ2 subunit were highly resistant.

Now, we aimed to elucidate the mechanism involved in H2O2-induced enhancement of GABAAα1β2 receptor activity. The thiol-modifying agent N-ethylmaleimide (NEM) partially inhibited H2O2 potentiation of GABAAα1β2 responses (%Pot= 76.7 ± 5.3 vs. %PotNEM = 45.9 ± 2.6; n = 6; $P < 0.001$), suggesting participation of one or more cysteine residues. Additionally, we looked whether H2O2 acts via an intracellular mechanism, by developing a co-expression assay that uses aquaporin MtPIP2,2, capable to permeate both water and H2O2, to facilitate the entry of H2O2 into the cell. The presence of MtPIP2,2 did not significantly alter the effect of H2O2 on GABAAα1β2 responses (%Pα1β2 = 40.14 ± 7.4; %Pα1β2+AQP = 33.4 ± 5.2; n = 8; ns). Results suggest that facilitation of H2O2 influx to oocyte cytoplasm does not enhance receptor potentiation. Further experiments will be necessary to address whether the site of action of H2O2 is intracellular.

V-108 | Unraveling the Toxicity of α-Synuclein oligomers: A Novel In Vivo Model

Neurochemistry and Neuropharmacology

Author: Ana Valentina Budeguer Isa | Email: vbudeguer@gmail.com

Valentina Budeguer Isa1°2°, María del Milagro Terán1°2°,Hernán Cruz1°3°, Diego Ploper1°2°, Rosana Chehín1°2°

1° IMMCA (Instituto de Investigación en Medicina Molecular y Celular Aplicada)

2° CONICET

3° UNT

4° SIPROSA

The presynaptic protein α-synuclein (α-Syn) is crucial in Parkinson's disease (PD) and other synucleinopathies, forming β-sheet-rich amyloid fibrils and toxic oligomeric species (α-Synoli). The transient nature of α-Synoli complicates in vivo studies, and while their toxicity is well-documented in biophysical and cellular models, it has not been successfully replicated in living organisms. Recently, dopamine-stabilized α-Syn oligomers (DA-α-Synoli) were characterized through in vitro and ex vivo studies, revealing a critical interaction between dopamine and α-Syn in driving toxicity, underscoring the relevance of oligomers in disease pathology.

Here, we developed a novel in vivo model of oligomer toxicity using the nematode Caenorhabditis elegans. This model employed a transgenic strain of C. elegans that overexpresses human α-Syn in GFP-labeled dopaminergic neurons, where DA-α-Synoli induce neurodegeneration. We challenged the model with oligomers formed in the presence of DAD9, a novel small molecule developed by our group that conjugates dopamine with a non-antibiotic tetracycline (TC). In cell-based assays, DAD9 generates fewer toxic species compared to DA-α-Synoli. Our findings demonstrate that this in vivo model is a valuable tool for investigating the toxicity of various α-Syn species and for assessing small molecules that may disrupt neurodegenerative processes, offering promising therapeutic avenues against synucleinopathies.

V-109 | Brain targeted triamcinolone-loaded nanosystems prevented habituation deficit and motor alterations induced by mild traumatic brain injury in rats

Neurochemistry and Neuropharmacology

Author: Sofía de la Fuente | Email: s.delafuente@unc.edu.ar

Sofía de la Fuente1°, Aida Marcotti1°,Melisa Macizo Fuentes1°, María Lina Formica2°, Santiago D. Palma2°, Mariela F. Pérez1°

1° Departamento de Farmacología Otto Orsingher, IFEC-CONICET, Facultad de Ciencias Químicas, Universidad Nacional de Córdoba, Ciudad Universitaria, Córdoba 5000, Argentina

2° Departamento de Ciencias Farmacéuticas, UNITEFA-CONICET, Facultad de Ciencias Químicas, Universidad Nacional de Córdoba, Ciudad Universitaria, Córdoba 5000, Argentina

Traumatic brain injury (TBI) is the leading cause of long-term physical and cognitive impairment, probably related to early neuroinflammatory processes. Alterations in dopaminergic neurotransmission, mainly in the striatum and limbic system, are involved in the mechanisms underlying sensorimotor deficits induced by TBI. Despite efforts to develop neuroprotective treatments, most preclinical studies show limited efficacy. Previously, we showed that mild TBI (mTBI) induces cognitive deficits that are concomitant with increased oxidative stress biomarkers (OSb), which were attenuated by the administration of triamcinolone-loaded lipidic nanocapsules (NT). Aims: To evaluate mTBI-induced motor alterations as evidenced by amphetamine challenge in adult male Wistar rats, along with OSb and proinflammatory cytokines, and the effects of early NT treatment on these alterations. Results: NT treatment prevented the reduced habituation and locomotor activity in response to amphetamine in mTBI, observed 7 days after mTBI, obtaining responses similar to the SHAM group. We also expect modulation of OSb and proinflammatory cytokine levels in motor-related brain areas by NT treatment. These findings, coupled with previously observed cognitive deficits, suggest a possible hyperdopaminergic state in the mTBI model, likely triggered by early TBI-induced neuroinflammation.

V-110 | Screening of novel chemically modified tetracyclines against Parkinson's Disease.

Neurochemistry and Neuropharmacology

Author: María Laura Guayán | Email: mlauraguayan@gmail.com

María Laura Guayán1°, Rodrigo Tomas-Grau1°,Rita Raisman-Vozari2°, Bruno Figadère3°, Rosana Chehín1°, Diego Ploper1°

1° Instituto de Investigación en Medicina Molecular y Celular Aplicada (IMMCA) (CONICET-UNT-Ministerio de Salud Pública de Tucumán), Pasaje Dorrego 1080, 4000, San Miguel de Tucumán, Argentina

2° Paris Brain Institute-ICM, Inserm, Sorbonne Université, CNRS, Hôpital Pitié Salpêtrière, 75013 Paris, France

3° BioCIS, CNRS, Université Paris Saclay, 92290 Châtenay-Malabry, France

Tetracyclines (TCs) can inhibit protein aggregation, reduce inflammation, and protect dopaminergic neurons, suggesting they might slow or prevent the progression of Parkinson's disease (PD). However, their antibiotic activity limits their repurposing for this condition. Therefore, six novel non-antibiotic TCs were synthesized and screened to identify those with the most promising neuroprotective properties. Initially, their antibiotic activity was assessed. Viability assays were then conducted in SH-SY5Y cells, and their effects on α-synuclein (αS) aggregation, a key mechanism in PD pathogenesis, were studied. The most promising molecules were selected, and αS species formed in the presence of these compounds were characterized using dynamic light scattering and transmission electron microscopy. Additionally, the retention of antioxidant properties of TCs was tested. Finally, using a SH-SY5Y-αS-tRFP transgenic cell line with fluorescently labeled αS preformed fibrils (PFFαS-488), the ability of these compounds to inhibit fibril uptake and subsequent intracellular seeding was evaluated. Results showed that all molecules inhibited αS aggregation, with the aggregated species being morphologically distinct from control fibrils. The most promising compounds showed no toxicity in SH-SY5Y cells, exhibited antioxidant activity, and reduced PFF uptake. These findings identify potential candidates for further investigation in PD, targeting several underlying pathological mechanisms.

V-111 | Sex Differences in Pain Responses in LPS-Induced Acute Inflammatory Pain

Neurochemistry and Neuropharmacology

Author: Mayra Micaela Montes | Email: mayramicaelamontes@gmail.com

Mayra Montes1°, Libia Catalina Salinas Castellanos1°,Georgina Mingolo1°, Mariela Lacave2°, Romina De Lucca2°, Carina Weissmann1°2°

1° Instituto de Fisiología, Biología Molecular y Neurociencias (IFIBYNE)

2° Facultad de odontología (UBA)

Animal models of inflammatory pain often involve the injection of various irritants into tissues to induce acute inflammatory reactions. Lipopolysaccharide (LPS), a well-known activator of inflammation, when administered subcutaneously into the subplantar region of rodent hind paws, elicits an acute localized response characterized by swelling. Similar inflammatory responses have been observed with agents like Carrageenan and Zymosan, which are commonly used in pain research.

In this study, we focused on the LPS-induced acute pain model. The inflammatory process was marked by observable signs such as swelling and neutrophil infiltration. Our results demonstrate significant variations between male and female mice in terms of sensitivity to mechanical stimuli. These changes were associated with elevated levels of Acid Sensing Ion Channel 1 proteins as well as increased phosphorylation of the MAPK ERK, a signaling pathway implicated in pain modulation.

Moreover, our findings align with recent evidence from other acute pain models, showing that sex differences are a consistent feature in the inflammatory pain response. These results underscore the connection between channels and inflammation in various pathological events we are currently studying. This study also highlights the importance of considering sex as a biological variable in pain research and provides insights into the differential mechanisms that may contribute to pain perception.

V-112 | Wnt canonical pathway activity in reward-related brain regions underlying social isolation-induced cocaine sensitization in adolescent rats.

Neurochemistry and Neuropharmacology

Author: Abraham Isaac Ramirez | Email: abrahamrami477@gmail.com

Abraham Ramirez1°2°, Lucia Trossero1°,Cintia Konjuh1°, Alejandra Pacchioni1°2°

1° Laboratorio de Toxicología Experimental, Departamento de Ciencias de los Alimentos y el Medio Ambiente, Facultad de Ciencias Bioquímicas y Farmacéuticas, Universidad Nacional de Rosario,

2° CONICET-CCT Rosario

Cocaine use disorder is a chronic disease where users transition from occasional to compulsive drug use. It has been shown that stress contributes to this progression. The reward brain circuit, which undergoes continued development during adolescence, is affected by stress and drugs. Our team aims to understand the role of stress from adolescent social isolation (SI) on the vulnerability to cocaine in rats. In addition, we study the role of the Wnt canonical pathway by measuring b-catenin levels in the brain´s reward areas. Previously, we demonstrated that changes in the Wnt canonical pathway are associated with both cocaine sensitization and adolescent SI. Our study sought to evaluate if 5 days of SI (PND30-35) would induce cocaine sensitization on PND45 as well as changes in β-catenin levels in the Prefrontal Cortex (PFC) and Nucleus Accumbens (NAcc), in female and male rats. Our results revealed that SI induced cocaine (5mg/kg i.p.) sensitization only in male rats ($p<0,05$). Also, isolated males showed lower exploratory response ($p<0,05$) and higher anxiety levels ($p<0,05$) than control. In contrast, female rats showed similar cocaine responses regardless of previous SI exposure. At the molecular level, Si-induced cocaine sensitization was linked to decreased b-catenin levels in the PFC ($p<0,05$) and increased levels in the NAcc ($p<0,05$). These findings propose the Wnt canonical pathway as a neuroadaptation on the impact of adolescent stress over cocaine effects.

V-113 | Dopaminergic agonist-induced structural remodeling of striatal neurons and its correlation with abnormal involuntary movements in parkinsonian animals

Neurochemistry and Neuropharmacology

Author: Liliana Teresita Tribbia | Email: teresita.tribbia@uner.edu.ar

Liliana T. Tribbia1°, Félix Fares Taie2°3°,Lorena Rela2°3°, Juan E. Belforte2°3°, M. Gustavo Murer2°3°, Oscar S. Gershanik4°, Irene R. E. Taravini1°

1° Laboratorio de Neurobiología Experimental. LNE - ICTAER - UNER - CONICET, Gualeguaychú, Entre Ríos, Argentina.

2° Universidad de Buenos Aires, Facultad de Medicina, Departamento de Ciencias Fisiológicas, Grupo de Neurociencia de Sistemas, Ciudad de Buenos Aires, Argentina.

3° CONICET, Universidad de Buenos Aires, Instituto de Fisiología y Biofísica Bernardo Houssay (IFIBIO Houssay), Buenos Aires, Argentina.

4° Consultor Emérito Laboratorio de Neurobiología Experimental, LNE-ICTAER-UNER-CONICET, Gualeguaychú, Entre Ríos, Argentina.

L-DOPA-induced dyskinesia (LID), is a difficult adverse effect associated with Parkinson's disease treatment, often leading to significant disability. LID is associated with the occurrence of structural plasticity in striatal medium spiny neurons (MSNs) dendritic spines. However, it remains unclear whether the administration of selective D1R or D2R agonists induces similar structural modulation, potentially contributing to abnormal involuntary movement (AIM) development. We propose to determine whether MSNs undergo structural plastic changes after the development of AIM by chronic treatment with selective dopaminergic agonists in animals with severe damage to the nigrostriatal dopaminergic pathway. D1-tomato transgenic mice lesioned with a unilateral injection of 6-OHDA or vehicle (SHAM control group) were treated with SKF-38393 (D1/D5 agonist, 2 mg/kg), QUINPIROLE (D2-type receptor agonist, 0.5 mg/kg) or vehicle for 15 days. Axial, limb and orofacial AIM were scored using a validated rating scale. Lesioned mice treated with both selective dopaminergic agonists developed forelimb, axial and orofacial AIM, which correlated with an increase in the striatal expression of FosB, a synaptic plasticity marker. Control animals did not show AIM, but displayed vacuous chewing movements under the effect of dopaminergic agonists. Studies are in course to

determine whether AIM induced by selective agonists relate to changes in striatal synaptic microarchitecture, as is the case with LID.

V-114 / oral | Role of Agouti-related protein-expressing neurons and growth hormone secretagogue receptor in reward-related behaviors under calorie restriction

Neuroendocrinology and Neuroimmunology

Author: Daniela Alejandra Cassano | Email: danicassano@hotmail.com

Daniela Alejandra Cassano1°, Franco Barrile1°,Mirta Reynaldo1°, Nathalia Ferreira2°, María Paula Cornejo1°, Higor Fideles Silva2°, Rodrigo Rorato2°, Helgi Schioth3°, Mario Perelló1°3°

1° Laboratory of Neurophysiology of the Multidisciplinary Institute of Cell Biology (IMBICE) (CONICET - CICPBA – UNLP). La Plata, Argentina

2° Department of Biophysics, Paulista Medical School, Federal University of Sao Paulo. São Paulo, Brasil

3° Department of Surgical Sciences, Functional Pharmacology and Neuroscience, University of Uppsala. Uppsala, Sweden

Ghrelin is a stomach-derived hormone that acts via growth hormone secretagogue receptor (GHSR). GHSR has ligand dependent and independent actions and is highly expressed in Agouti-related protein (AgRP) expressing neurons located in the hypothalamic arcuate nucleus (ARH). Ghrelin rises during energy deficit condition, and leads to the activation of AgRP neurons. GHSR signalling and AgRP neurons are known to modulate reward-related behaviors. We studied the role of AgRP neurons and GHSR in the enhancement of reward-related behaviours in calorie-restricted (CR) mice. Male mice were fed with the 40% of their daily food intake for 5 days and daily exposed to a non-caloric sweetener solution, saccharine, for 4 hours before each meal. We characterized the ghrelin-GHSR system and we found that CR wildtype mice showed an increase in GHSR mRNA levels in the ARH, an increase in plasma ghrelin levels and an increase of saccharine intake. Using two transgenic mouse model with lack of GHSR or a reduction of GHSR ligand independent activity we found that GHSR is required for the enhancement of reward-related behavior. Using DREADDs technology we, 1) selectively inhibited AgRP neurons and found a reduction of CR-induced enhancement of saccharine intake, and 2) selectively activated AgRP neurons in ad libitum fed mice and found an increase of saccharin intake. In conclusion, GHSR expression and activation of AgRP neurons are required for the enhanced saccharine intake during CR.

V-115 | Study of structural plasticity of hypothalamic tanycytes in response to metabolic- related hormones

Neuroendocrinology and Neuroimmunology

Author: Ivana María Gomez | Email: ivanamariagomez@gmail.com

Ivana María Gomez1°, Daniel Castrogiovanni1°,Mario Perelló1°, Pablo Nicolás De Francesco1°

1° Neurophysiology Laboratory, Instituto Multidisciplinario de Biología Celular (IMBICE)

Hypothalamic tanycytes are polarized ependymoglial cells that line the third ventricle and project through various hypothalamic nuclei and median eminence. They facilitate the bidirectional exchange of metabolic and hormonal cues between blood and the hypothalamus and participate in intercellular communication within hypothalamic circuits that regulate energy homeostasis. In this context, literature suggests that tanycytic morphology may change depending on the energy balance. Here, we investigated the structural plasticity of these cells in response to different hormones related to energy metabolism in primary cultured rat hypothalamic tanycytes. We incubated 7-day cultured tanycytes for 48 h with different concentrations of dexamethasone (DEX), insulin or T4. We then quantified the length of individual cells and the area of their somas and processes. We found that DEX decreased cell length similarly within the tested range, not affecting the area of somas, but decreasing the area of processes. Insulin decreased cell length at low dose and affected both the area of somas and processes, while high levels had no effect on cell morphology. T4 did not significantly affect the morphological parameters studied. This evidence shows that glucocorticoids and insulin modify the morphology of tanycytes in vitro. Next we will study whether these hormonal stimuli affect the morphology of tanycytes and their interaction with vessels or diverse hypothalamic cell types in in vivo conditions

V-116 | Echoes of Stress: An Exploration of Biological, Psychological, and Social Dimensions in a Human Stress Model

Neuroendocrinology and Neuroimmunology

Author: Verónica Zabaletta | Email: vzabaletta@gmail.com

Verónica Zabaletta1°2°, Hernan Lopez-Morales1°2°,Andrea Crupkin3°, Lucas Rodrigo Lombardero3°, Julieta Sosa1°, Gastón Fernando Irtuburu3°, Carla Kurkla4°, Mirta Menonne3°, Marcela Lopez1°

1° Instituto de Psicología Básica Aplicada y Tecnología (CONICET - UNMDP)

2° Facultad de Psicología - Universidad Atlantida Argentina

3° Laboratorio de Ecotoxicología, Instituto de Investigaciones Marinas y Costeras (CONICET - UNMDP)

4° Facultad de Ciencias Exactas y Naturales - UNMDP

Stress is defined as the perceived balance or imbalance between demands and available resources, leading to maladaptive cognitive and behavioral patterns, as well as biological effects on neuroimmunoendocrine, genetic, and epigenetic biomarkers. This study explores the relationships between psychosocial stress indicators, the functionality of the hypothalamic-pituitary-adrenal (HPA) axis, and biomarkers related to stress, oxidative damage, and cellular genotoxicity. The sample included adults experiencing psychosocial stress (n=19) referred by mental health professionals, alongside a reference group (n=19). No significant differences were observed between the groups in the cortisol circadian slope (p=.762). Additionally, the mean values of malondialdehyde and catalase activity—both indicators of stress and oxidative damage—were statistically similar (p=.271; p=.258). Genotoxicity values also showed no significant differences (p=.839). The findings do not support an association between maladaptive cognitive and behavioral patterns and the analyzed biomarkers. These results challenge traditional dichotomous stress models, suggesting a multidimensional approach that includes a continuum of cognitive and behavioral states from well-being to affective disorders, considering implications across various levels of analysis: genetic/epigenetic, psychoneuroendocrine, cognitive, and behavioral.

V-117 | Aversive conditioning and detection of target odors

Sensory and Motor Systems

Author: Lautaro Duarte | Email: duartelautaro5@gmail.com

Lautaro Duarte1°, Martín Klappenbach1°2°,Nicolás Pírez1°2°, Fernando Locatelli1°2°

1° Instituto de Fisiología, Biología Molecular y Neurociencias, CONICET

2° Departamento de Fisiología, Biología Molecular y Celular, Facultad de Ciencias Exactas y Naturales, Universidad de Buenos Aires, Argentina

Odorants are detected by olfactory receptor neurons (ORNs) that project to the antennal lobe (AL), the first olfactory neuropil in the insect brain. In the AL, ORNs make synaptic contacts with: i) projection neurons (PNs), which in turn send olfactory information to other brain areas; and ii) local interneurons (LNs) that form a dense network of lateral inhibitory and excitatory interactions within the AL. Functional and computational studies indicate that this local network transforms sensory information, presumably to enhance perception of meaningful odor. Here, we investigate the role of local GABAergic neurons in both learning-dependent plasticity in the AL and the ability of flies to perceive the presence of learned odors in mixtures. For that aim, we performed aversive olfactory conditioning using a single odorant as the conditioned stimulus. We then tested olfactory avoidance in a T-maze by exposing the flies to the conditioned odor either pure or in different proportions mixed with a novel odor. We determined the threshold proportions that flies need to detect the learned odors immersed in the mixture. These proportions are odor and mixture specific. Next, we are studying whether blocking the activity of the LNs in the AL abolishes the ability of flies to detect learned odors embedded in mixtures.

Finally, we asked whether olfactory aversive conditioning affects the representation of odor mixtures in the antennal lobe. We recorded odor evoked responses of PNs using

V-118 | Intersegmental signals underlying a leech motor behavior

Sensory and Motor Systems

Author: Graciela Ines Kearney | Email: graciela.kearney@gmail.com

Graciela Kearney1°, Lidia Szczupak1°2°

1° Instituto de Fisiología, Biología Molecular y Neurociencias, UBA-CONICET, Argentina

2° Departamento de Fisiología, Biología Molecular y Celular, Facultad de Ciencias Exactas y Naturales, Universidad de Buenos Aires, Argentina

Leeches display a robust motor behavior that allows them to move on solid surfaces through elongation and contraction waves along the longitudinal axis. The neuronal network that controls the crawling behavior can be studied at the level of the isolated nervous system (crawling), where recordings of identified motoneurons show a motor pattern compatible with the behavior. Isolated nerve cords or single ganglia, treated with dopamine (DA), exhibit rhythmic activation of the motoneurons responsible for elongation and contraction with due timing.

To study signal transmission among ganglia we analyzed the motor pattern elicited in three-ganglion chains, isolated from the cord and from the periphery. The three interconnected ganglia show coordinated rhythmic motor activity, indicating that they exchange signals that grant a basic correlated rhythmic activity (Kearney et al, 2022). To further analyze interganglionic signals we used chains of three ganglia that were chemically compartmentalized, where only the anterior ganglion was treated with DA while the rest of the chain was in normal saline. Local application of DA elicited crawling in the treated ganglion and rhythmic activity in untreated ganglia. Activity propagation in contraction and elongation units was distinct, suggesting that the stimulated ganglion sends two parallel intersegmental signals. These signals are not sufficient to generate coordinated crawling in the chain but may contribute to its establishment.

V-119 | Brainstem neural plasticity mechanisms associated to motor learning

Sensory and Motor Systems

Author: Joaquín Alejo Quintana | Email: quintana.joaquin.alejo@gmail.com

Joaquín Alejo Quintana1°, Leonardo Molano Ramírez1°,María Soledad Espósito1°

1° Neurobiology of Movement Laboratory, Medical Physics Department, Atomi Center Bariloche

It is classically believed that learning and memory consolidation occurred exclusively in evolutionarily recent brain regions, such as the cerebral cortex, the hippocampus, amygdala and cerebellum. For motor memories in particular, it is considered that these processes involve the motor cortex, the basal ganglia and the cerebellum, assigning a mere executive role to the brainstem regions. However, our project postulates that the formation of new motor skills requires plastic changes in centers of the brainstem, such as the Mesencephalic Locomotor Region (MLR), in order to adapt the motor command to the new requirements of the environment. Our previous studies suggest a crucial role of the MLR in this process. Nowadays, our work aims to strengthen these findings by investigating the underlying molecular, cellular, and circuit mechanisms of motor memory consolidation in the MLR, through the analysis of the activation of memory-specific signaling pathways, and functional biophysical and synaptic changes

V-120 | Odor Perception Dynamics: Sensory Adaptation and Sequential Integration in Honeybees

Sensory and Motor Systems

Author: Marcos Rafael Sorrentino | Email: marcosrafa.sorrentino@gmail.com

Marcos Rafael Sorrentino1°, Agustín Lara1°2°,Nicolás Pírez1°2°, Fernando Locatelli1°2°

1° Departamento de Fisiología, Biología Molecular y Celular; Facultad de Ciencias Exactas y Naturales; Universidad de Buenos Aires, Argentina.

2° Instituto de Fisiología, Biología Molecular y Neurociencias; UBA-CONICET, Argentina.

We investigate the mechanisms by which the perception of a stimulus is influenced by an immediately preceding stimulus. Specifically, we focus on how exposure to one odor affects the perceptual quality of an odor presented immediately afterward. We propose two hypotheses: 1) Exposure to an odor triggers a sensory adaptation period that affects the perception of a second odor that takes place during this period and 2) Exposure to two consecutive odors is associated by the animal in such a way that the entire sequence of odors is perceived as a single stimulus. We use bees and classical conditioning of the proboscis extension to test these hypotheses. First, we examine learning with a binary odor mixture and the extent to which learning generalizes to the components of the mixture. We observed that if bees are exposed to one of the components of the mixture immediately before the conditioning trial, learning of the exposed component is reduced while learning of the non-exposed component increases. This phenomenon does not occur if the exposure to the component happens after the conditioning trial, indicating a sensory adaptation effect on the perception of the mixture. In the second experiment, we investigate whether bees can discriminate between two inverted sequences of odors where one predicts an appetitive reward and the other an aversive stimulus. The results so far indicate that bees more easily learn the last odor in the sequence that is temporally closer to the reward.

V-121 | Network connectivity and dimensionality in heterogeneous neural networks

Theoretical and Computational Neuroscience

Author: Martina Acevedo | Email: martina.acevedo@ib.edu.ar

Martina Acevedo1°, Soledad Gonzalo Cogno2°,Germán Mato1°3°4°

1° Instituto Balseiro, Universidad Nacional de Cuyo and CNEA, Argentina.

2° Kavli Institute for Systems Neuroscience and Centre for Algorithms in the Cortex, Norwegian University of Science and Technology (NTNU), Trondheim, Norway.

3° Consejo Nacional de Investigaciones Científicas y Técnicas (CONICET), Argentina.

4° Department of Medical Physics, Centro Atómico Bariloche, San Carlos de Bariloche, Argentina.

Brain function emerges from the coordinated activity of interconnected neurons. Neuronal coordination gives rise to patterns of population activity that span different degrees of dimensionality. While neurons exhibit a wide range of intrinsic firing properties, theoretical studies have typically investigated the link between network connectivity and dimensionality using the same single-cell dynamics. Hence, the effect of heterogeneity in single-cell dynamics on this link remains unknown. To address this question, we developed recurrent neural network (RNN) models composed of leaky integrate-and-fire (LIF) neurons, quadratic integrate-and-fire (QIF) neurons, or a mix of both.

We found that when the RNN was in a chaotic state, the dimensionality of the activity depended on the RNN composition and recurrency. As weights increased, the dimensionality always gradually decreased, but with QIF networks keeping a higher dimensionality than LIF ones. We next used FORCE learning to enforce oscillatory activity in the RNN units. After learning, the variability in the weights was smallest in LIF networks, largest in QIF networks, and intermediate in mixed networks. The organization of the weights into connectivity motifs also varied with the network composition, with bidirectional connections being more abundant in networks with more QIF neurons. All in all, our results suggest that the presence of heterogeneous single cell dynamics shapes both neural connectivity and network dynamics.

V-122 | From Dynamics to Behavior: An Excitability Model for Reconstructing Motor Gestures of Birdsong

Theoretical and Computational Neuroscience

Author: Agustin Carpio Andrada | Email: aguscarpio@gmail.com

Agustin Carpio Andrada1°2°, Bernardo Gabriel Mindlin1°2°

1° Universidad de Buenos Aires, Facultad de Ciencias Exactas y Naturales, Departamento de Física, Ciudad Universitaria, 1428 Buenos Aires, Argentina.

2° CONICET - Universidad de Buenos Aires, Instituto de Física Interdisciplinaria y Aplicada (INFINA), Ciudad Universitaria, 1428 Buenos Aires, Argentina.

In this study, we present a dynamical systems approach to modeling physiological gestures. We use as a test bench the generation of a diverse repertoire of respiratory gestures used during birdsong production by canaries and zebra finches. In our approach, the expiratory respiratory gestures used to generate different syllables are built from basic dynamical units (“sub syllabic gestures”), each one being the response of an excitable system to a pulse. The reconstruction process employed a differential evolution algorithm to explore the parameter space, optimizing the alignment between generated gestures and actual motor behaviors. Dimensionality reduction and clustering techniques applied to the model-generated signals revealed that similar birdsong syllables tend to employ coherent sets of subsyllabic gestures across distinct individuals. This finding suggests a structured neural encoding of motor gestures, potentially representing a general principle across species and behaviors. Our results underscore the power of dynamic modeling in unraveling the principles of neural control of complex motor actions, offering insights with implications for neuroscience in general.

V-123 | Perturbation of the dynamic patterns of resting-state brain activity in patients with coma

Theoretical and Computational Neuroscience

Author: Gabriel Della Bella | Email: dellabellagabriel@gmail.com

Gabriel Della Bella1°2°, Benjamine Sarton3°4°,Stein Silva3°4°, Pablo Barttfeld1°

1° Cognitive Science Group. Instituto de Investigaciones Psicológicas (IIPsi,CONICET-UNC)

2° Facultad de Matemática Astronomía y Física (FaMAF) UNC

3° Critical Care Unit. University Teaching Hospital of Purpan, Toulouse, France

4° Toulouse NeuroImaging Center, Toulouse University, INSERM

Coma is the complete loss of arousal due to severe brain injuries, posing significant clinical challenges and offering insights into human consciousness. A key issue in managing coma is the early prediction of neurological outcomes, hampered by a lack of treatment strategies and incomplete understanding of brain networks supporting consciousness. Functional MRI (fMRI) reveals that conscious brain activity is structured into reproducible "brain states," considered signatures of consciousness. While awake individuals display a rich variety of brain states, these diminish under anesthesia and in chronic disorders of consciousness. This study explores how brain injuries in coma patients reorganize brain connectivity, hypothesizing a shift towards less informative brain states, and examines the relationship between these states and neurological outcomes three months post-injury.

V-124 | Minute-scale oscillations in the medial entorhinal cortex overpass dopaminergic-dependent synaptic dynamics

Theoretical and Computational Neuroscience

Author: Jose A. Fernandez-Leon | Email: jafernandez@intia.exa.unicen.edu.ar

Jose A. Fernandez-Leon1°2°3°

1° CIFICEN (CONICET–CICPBA-UNCPBA), CCT-Tandil, Buenos Aires, Argentina

2° Fac. Cs. Exactas-INTIA, Universidad Nacional del Centro de la Provincia de Buenos Aires (UNCPBA), Tandil, Buenos Aires, Argentina

3° Consejo Nacional de Investigaciones Científicas y Técnicas (CONICET)

Neurons in the mouse medial entorhinal cortex (MEC) related to spatial navigation and toroid dynamics exhibit unexpected minute-scale (ultraslow, <0.01 Hz) oscillatory firing patterns without clear behavioral correlates. While the mechanisms underlying slow rhythms remain elusive, their potential link to dopaminergic modulation of spike-timing-dependent plasticity (STDP) has been suggested. It is hypothesized that sparse neural networks (SNN) might sustain minute-scale oscillatory sequences when overpassing such modulation; otherwise, the sequences would be disrupted. A computational model based on Izhikevich's SNN with dopaminergic STDP modulation is used to investigate the conditions supporting ultraslow oscillations. Our results demonstrate that minute-scale sequences emerge in the SNN when a small subset of neurons is sequentially activated along a toroid-like trajectory. Detailed analytical descriptions show that second-scale synaptic resettings are crucial for sustaining these oscillations. Interestingly, the sequential firing patterns induce oscillations that resonate in silent synapses. The balance between long-term synaptic strengthening and wakening during sequential firing explains the relationship between STDP modulation and slow oscillations. This work provides theoretical evidence indicating that minute-scale oscillations can be sustained in a sparse network without imposing severe topological restrictions at the synaptic level.

V-125 | Temporal correspondence of visual processing of rapid stimuli between the human brain and artificial neural network architectures

Theoretical and Computational Neuroscience

Author: Eric Lützow Holm | Email: elholm90@gmail.com

Eric Lützow Holm1°2°, Giovanni Franco Gabriel Marraffini,Enzo Tagliazucchi1°2°3°

1° Consejo Nacional de Investigaciones Científicas y Técnicas (CONICET), Godoy Cruz 2290, CABA 1425, Argentina.

2° Instituto de Física Interdisciplinaria y Aplicada, Departamento de Física, Universidad de Buenos Aires, Pabellón 1, Ciudad Universitaria, CABA 1425, Argentina.

3° Latin American Brain Health (BrainLat), Universidad Adolfo Ibáñez, Av. Diag. Las Torres 2640, Peñalolén 7941169, Santiago Región Metropolitana, Chile

The visual cortex processes information hierarchically, from low-level features to complex patterns that enable object categorization. Similarly, in the most successful artificial models for object recognition, images are processed through multiple layers of artificial neural networks trained to determine the corresponding class. The goal of this work is to compare these models in terms of their temporal correspondence with EEG data recorded during visual perception tasks to determine whether the similarity between both systems depends on generic aspects or if it is influenced by the specific computations of each model. Using public EEG data from tasks involving rapid visual stimuli and the architectures AlexNet, ResNet, MoCo, VGG19, and ViT, we found that the initial layers better correlate with activity evoked in early stages and low-level luminance features, while the later layers correlate better with late components and semantic information. Finally, we verified that it is possible to transition from one representation to another using simple linear transformations. These results suggest a universal parallelism between human processing and that of artificial systems for the recognition of rapid visual stimuli.

V-126 | Unraveling Alzheimer’s Disease: Insights from Neuronal Dynamics

Theoretical and Computational Neuroscience

Author: Federico Miceli | Email: micelifederico08@gmail.com

Federico Miceli1°, Marcelo A. Montemurro2°,Fernando F. Montani1°, Mauro Granado1°

1° Instituto de Fisica de La Plata CONICET

2° School of Mathematics & Statistics, Faculty of Science, Technology, Engineering & Mathematics, The Open University, Walton Hall, Milton Keynes MK7 6AA, United Kingdom.

A neurodegenerative disorder called Alzheimer's disease (AD) causes cognitive performance to gradually deteriorate. Since there is currently no treatment for AD, it is imperative that we use scientific research to deepen our understanding of the disease's mechanisms. Degeneration is frequently observed in several brain regions, including association areas, limbic system regions connected to memory and emotion, and memory itself. Alzheimer's disease (AD) experiences a buildup of the illness's pathology in their central nervous systems. In general, there is a clear pattern to this accumulation in terms of timing and place. Using information theory tools we characterize the evolution of complexity and Shannon entropy for different Alzeheimer's disease states in mice over time and compare them with the dynamics of healthy tissues. Our methodology shows how neuronal dynamics differ in terms of spatial and temporal area as months pass, allowing us to speculate on possible biomarkers of Alzheimer's disease.

V-127 | An Experimental and Simulation Study of Pacemaker Currents in Ventrobasal Thalamic Neurons of Leptin-Deficient ob/ob Mice

Theoretical and Computational Neuroscience

Author: Paula Patricia Perissinotti | Email: peripali@gmail.com

Paula Perissinotti1°2°, Andreas Neef3°

1° Instituto de Fisiologia, Biologia Molecular y Neurociencias (IFIBYNE-CONICET)

2° Departamento de Fisiologia, Biologia Molecular y Celular "Prof. Hector Maldonado". Facultad de Ciencias Exactas y Naturales. Universidad de Buenos Aires. Argentina

3° Institute for Dynamics of Biological Networks of the Georg-August University Göttingen, Germany

Leptin deficiency during the development of thalamocortical system has neurotrophic implications (DOI: 10.1007/s00429-018-1645-x). Electrophysiological recordings from brain slices reveal that leptin absence alters the functional expression of the Hyperpolarization-activated Cyclic Nucleotide-gated (HCN) channel, the T-type calcium channel and the Kv7 (M-type) channel in the ventrobasal (VB) nucleus of the thalamus. VB neurons from ob/ob mice display increased excitability and reduced capacitance compared to WT mice.

We integrated into single theoretical model of the VB neuron all experimentally obtained properties of HCN, T-, and M-type channels, along with changes in capacitance. Simulations were conducted using the NEURON simulation environment and the Python programming language. All simulations were performed at room temperature (24°C). Each compartment was modeled using the conductance-based Hodgkin-Huxley equations. Temperature-dependent ionic mechanisms were integrated into these neuron morphologies, including sodium channels (Nav and Nap), leak channels, potassium channels (Kv1, Kv3, Kv7, BK, Kir, A-type, SK, TREK), calcium channels (high-threshold [HVA], low-threshold [LVA] T-type), HCN channels, and calcium clearance mechanisms.

The development of this in silico model of a single VB neuron allows us to characterize how changes in current density and/or localization (somatic/dendritic) of HCN, T-type, and M channels impact neuronal excitability in mouse models.

V-128 | The role of intrinsic neuronal properties in the synchronization of weakly-coupled neural networks

Theoretical and Computational Neuroscience

Author: Ines Samengo | Email: ines.samengo@gmail.com

Ines Samengo1°2°3°, Bautista Arenaza1°2°3°

1° Department of Medical Physics, Centro Atómico Bariloche

2° Instituto Balseiro, Universidad Nacional de Cuyo

3° Consejo Nacional de Investigaciones Científicas y Técnicas

Weakly coupled neurons may or may not tend to synchronize. The factors determining this tendency include intrinsic neuronal properties and the connectivity pattern of the network. The intrinsic neuronal properties represent a vast set of parameters that govern single-neuron dynamics. Remarkably, in the limit of weak coupling, all these parameters can be encapsulated in the phase-resetting curve, which describes how the timing of the next spike is advanced or delayed based on the timing of a small and brief synaptic input. Depending on whether a neuron integrates its inputs or resonates with a specific input frequency, phase-resetting curves exhibit different functional shapes. Here, we present a theoretical framework that reveals how the shape of phase-resetting curves influences the synchrony of spiking neurons under various connectivity patterns. We demonstrate that the key factors are (a) the sign, (b) the symmetry, and (c) the magnitude of the derivative of the phase-resetting curve.

V-129 | Dopamine Modulation in Leaky Integrate-and-Fire Pattern Generators

Theoretical and Computational Neuroscience

Author: Gabriel Gregorio Torre | Email: gabriel0torre@gmail.com

Gabriel Torre1°2°, Sergio Lew1°3°

1° Universidad de Buenos Aires, Instituto de Ingeniería Biomédica, Buenos Aires, Argentina

2° Universidad de San Andrés, Laboratorio de Inteligencia Artificial y Robótica, Buenos Aires, Argentina

3° Instituto de Biología y Medicina Experimental, CONICET, Buenos Aires, Argentina

In this poster, we investigate an excitatory-inhibitory (E-I) network composed of 1200 leaky integrate-and-fire (LIF) neurons, organized into fully connected clusters: one inhibitory group, multiple selective groups, and one non-selective group. Building on the framework established by Lew and Tseng (2014), we examine how dopamine modulates GABAergic circuits. We explore the monotonic relationship between dopamine levels and oscillation frequency within the network, observing that high dopamine levels disrupt oscillatory patterns, while low levels induce chaotic behavior. We hypothesize that this chaotic activity can be harnessed for state space exploration, facilitating effective sampling in reinforcement learning. This approach, akin to simulated annealing, begins with high randomness and aims to stabilize into desired orbits as reinforcement gradually guides the network. This framework suggests a novel method for leveraging chaotic dynamics in neural circuits to enhance learning and adaptability.

V-130 | Differential Patterns of Functional Connectivity in Temporal Epilepsy with Hippocampal Sclerosis According to Its Laterality

Theoretical and Computational Neuroscience

Author: Manuela Maria Villanueva | Email: manuelamaria.villanueva@gmail.com

Manuela Villanueva1°, Mariana Nahir Vallejo-Azar1°,Paula Natalia Gonzalez1°, Silvia Sara Kochen1°, Juan Pablo Princich1°

1° ENyS

Temporal lobe epilepsy (TLE) associated with Hippocampal Sclerosis (HS) is defined as a TLE-HS syndrome. It serves as a model for studying memory, as deficits are classically reported according to the laterality of hippocampal functional deficit: verbal material in left HS (LHS) and non-verbal material in right HS (RHS). Recognizing the alterations in neural networks involved in each group is key for studying their neurofunctional correlation.

This is a retrospective and analytical study. Sample: 93 individuals, 25 TLE-RHS, 22 TLE-LHS, and 46 healthy controls. Patients with TLE-LHS showed Z-scores below -1.5 in both types of memory, whereas TLE-RHS patients exclusively showed deficits in non-verbal memory. Resting-state fMRI sequences were acquired with a 3T MRI scanner. Preprocessing was performed using DPABI, and Network-Based Statistic (NBS) was used to compare differences in global brain connectivity, including sex, age, and epilepsy duration as covariates of no interest.

Patients with TLE-HS showed a global reduction in connectivity compared to HC ($p<0.01$) in intra-hemispheric and inter-hemispheric regions. TLE-LHS showed a marked reduction in intra-hemispheric temporal, pericentral, and left insular regions ($p<0.02$). TLE-RHS did not show significant differences compared to controls. Additionally, TLE-LHS evidenced reduced intra-hemispheric left temporal connectivity compared to TLE-RHS ($p<0.05$).

V-131 | Conservation of Avian Vocal Heritage through Synthetic Song Reintroduction

Tools Development and Open Source Neuroscience

Author: Roberto Andres Bistel Esquivel | Email: robertobistel@gmail.com

Roberto Andres Bistel Esquivel1°2°, Ana Amador1°2°,Gabriel B. Mindlin1°2°

1° Universidad de Buenos Aires, Facultad de Ciencias Exactas y Naturales, Departamento de Física

2° CONICET - Universidad de Buenos Aires, Instituto de Física Interdisciplinaria y Aplicada (INFINA)

Until the spread of digital recording technology, our knowledge of the history of avian vocal culture was based on onomatopoeic descriptions or notations inspired by musical notation. In the 1960s, hand-drawn annotations of the frequency modulations in the songs of Rufous-collared sparrows (Zonotrichia capensis) were made in a natural reserve in Argentina. Some of these song themes have been preserved to the present day, while others have not appeared in recent recordings. In this work, we used a dynamical system based on an avian vocal production model to generate synthetic songs. We designed a song that matches the description of a currently absent theme and used it as a vocal tutor for wild juveniles. The success of our approach suggests a promising tool for preserving the vocal repertoire of wild birds.

V-132 | STORM - Simple Tracker for Object Recognition Memory: Automated behavioral analysis using neural networks

Tools Development and Open Source Neuroscience

Author: Santiago D'hers | Email: sdhers@fbmc.fcen.uba.ar

Santiago D'hers1°, Mariana Feld1°

1° Instituto de Fisiología, Biología Molecular y Neurociencias (IFIBYNE), UBA-CONICET.

Manual scoring of animal behavior in research, particularly in studies involving object recognition memory, is not only time-consuming but also susceptible to operator bias. To address these challenges, we have developed STORM (Simple Tracker for Object Recognition Memory), a novel automated behavioral analysis method using Python-based neural networks. STORM is designed to learn from the labeling criteria of one or more experimenters, capturing the different aspects of expert opinion and reducing subjective bias in subsequent scoring procedures.

This tool provides a robust methodology for assessing recognition memory in rodents by accurately quantifying exploration times for familiar and novel objects. By optimizing the analysis process, STORM significantly enhances the reliability and efficiency of behavioral research.

Using STORM in a protocol involving two 15' training sessions (45' apart) with different pairs of objects, we were able to describe different exploration dynamics between old and new familiar objects in the presence of a new one. These results challenge the way episodic memory is traditionally studied in mice, revealing a temporal window in which the recall of one object can be affected by the presentation of another.

Furthermore, it should be readily applicable to other experimental designs that rely on quantifying exploration in mice (such as Social Preference and Object Pattern Separation, among others).

V-133 | Improvements for Online Eye-Tracking in Neuroscience Research: Implementing Blink Detection, Head Movement Tracking, and Continuous Distance Estimation

Tools Development and Open Source Neuroscience

Author: Agustin Penas | Email: agustinpenas@gmail.com

Agustin Penas1°2°3°, Gustavo Juantorena1°2°3°,Juan Kamienkowski1°2°3°

1° Instituto de Investigación en Ciencias de la Computación (ICC)

2° FCEyN

3° UBA-CONICET

The use of online eye-tracking tools like WebGazer.js has the potential of revolutionizing data collection in neuroscience by enabling remote experiments. However, the accuracy and versatility of these tools can be limited by factors such as participant head movement and inconsistent distance to the screen. To address these challenges, we have implemented three significant enhancements: blink detection, head movement tracking, and an innovative method for estimating the subject's distance from the screen.

The addition of blink detection improves the precision of eye-tracking data by identifying and filtering out blinks, which can introduce noise both in the calibration/validation phase or in the experiment itself. The head movement tracking is designed to detect significant shifts in the participant's position, identifying instances where calibration may have been compromised. This allows researchers to maintain the integrity of the data by determining when recalibration is necessary. The new distance estimation feature offers a practical alternative to the traditional 'virtual chin rest' method. While not necessarily superior, our approach has the advantage of not demanding interaction from the participant and continuously estimating the distance, rather than performing a single 2 minute measurement. This ensures ongoing accuracy throughout the experiment.

Altogether, this is a step forward into massive eye-movement experiments and remote clinical assessments.

V-134 | Modulation of NMDA Receptor Cellular Signaling to In Vitro Model Cellular Mechanisms Underlying Levodopa-Induced Dyskinesias in Parkinson's Disease

Disorders of the Nervous System

Author: Micaela B. Cuk | Email: micaelacuk@gmail.com

Micaela B. Cuk 1°, Hernán E. Hauché P.1°, Melina Bordone 1°, Juan Ferrario1°

1° Laboratorio de Neurobiología de la Enfermedad de Parkinson (IB3, UBA) Ciudad Autónoma de Buenos Aires, Argentina.

Parkinson's Disease(PD) is the second most prevalent neurodegenerative disease, characterized by the progressive death of dopaminergic neurons, leading to impaired motor control. Levodopa(L-DOPA) is the gold standard treatment for PD, but its long-term use often results in levodopa-induced dyskinesias(LIDs), which represents a therapeutic challenge itself.

Currently, amantadine(AMN), a NMDA receptor antagonist, is the only available option to reduce LIDs, although it has side effects that limit its use. NMDA-R is a key molecular player in LIDs and thus an attractive therapeutic target.

The aim of this project is to develop an in vitro cellular model of LID by reproducing molecular changes that recapitulates those in vivo. So far, we have settled down treatment conditions in vitro to stimulate NMDA- R (with NMDA as the receptor agonist) and determine the phosphorylation of ERK in combination with AMN as an inhibitor, and saracatinib, an inhibitor of the Fyn kinase and a central player in NMDA receptor activation.Our next step is to reproduce these results in the STHdhQ7/Q7 cell line, a mouse striatal neuron cell line that expresses several markers of direct striatonigral pathway such as D1 receptors, NMDA-R, and several signaling elements previously described in vivo for this neuronal type. We expect that this novel in vitro model will be useful to analyze novel targets for LIDs in a faster and cheaper way and reduce the use of experimental animals.

V-135 | Analysis of Semantic Bias in ChatGPT: replacing the BPE tokenizer with a word-level tokenizer in GPT-2

Theoretical and Computational Neuroscience

Author: Gianolini Agustín Andrés | Email:

Gianolini Agustín Andrés 1°, Laurino Julieta 3°, Kaczer Laura 3°, Kamienkowski Juan 1°3°4°, BianchiBruno1°2

1° Universidad de Buenos Aires. Facultad de Ciencias Exactas y Naturales. Departamento de Computación. Buenos Aires, Argentina.

2° CONICET-Universidad de Buenos Aires. Instituto de Ciencias de la Computación (ICC). Buenos Aires, Argentina.

3° Universidad de Buenos Aires. Departamento de Fisiología, Biología Molecular y Celular. Buenos Aires, Argentina

4° Facultad de Ciencias Exactas y Naturales, Maestría en Explotación de Datos y Descubrimiento del Conocimiento, Universidad de Buenos Aires, Buenos Aires, Argentina

The development of the Transformer architecture in 2017 has enabled the creation of Language Models (LMs) capable of interacting fluently with humans. This similarity between humans and LMs prompts the question of whether they process language in a similar manner. One process of interest is the mechanism by which these models assign meaning to words. Given that a large percentage of words in language have more than one meaning (i.e., are polysemous or homonymous), this study aimed to investigate the mechanisms by which LMs disambiguate word meaning. However, current LMs do not process words, but smaller units called tokens. For this, they use a tokenization method called Byte-Pair Encoding (BPE), where each word is generally represented by more than one token. This creates challenges when conducting word-level analysis. In this study, we proposed replacing GPT-2's BPE tokenization with word-level tokenization and analyzing how this change affects the results of behavioral experiments on meaning disambiguation. For this purpose, a pretrained model in Spanish was fine-tuned with a new text corpus. Both models (the original and the fine-tuned) went through analysis showing that the model with word-level tokenization disambiguates meanings more than the model with BPE tokenizer. We conclude that word-level tokenization

significantly impacts the disambiguation of polysemous words, making these models better suited for analyzing such task.

VSD-137 | Corpus Curiosum: tackling today's critical thinking for tomorrow's Neuroscience

Tools Development and Open Source Neuroscience

Author: Mariela Fernanda Trinchero | Email: mftrinchero@gmail.com

Mariela F Trinchero1°, Inés Abalo-Rodríguez2°, Alba Sánchez-Fernández3°, Marta Turégano-López4°

1° Neuronal Plasticity Laboratory, Leloir Institute

2° Department of Experimental Psychology, Complutense University of Madrid, Spain

3° Laboratory for Applied Radiobiology, Department of Radiation Oncology, University Hospital Zurich, University of Zurich, Zurich, Switzerland

4° Universidad Politécnica de Madrid, Laboratorio Cajal de Circuitos Corticales, Centro de Tecnología Biomédica, Pozuelo De Alarcón, Spain

Corpus Curiosum was born in 2020 specifically to stimulate critical thinking in neuroscience and to promote scientific connections for early career reseachers (ECRs). The Corpus Curiosum core is composed of four international neuroscientists at different career stages whose fundamental aims are: to embrace diversity, support ECRs, and be highly accessible to everyone. We have created an online, multidisciplinary agora to hold enriching discussions and openly promote the exchange of opinions from young researchers in the neuroscience field. We address critical topics such as neurosexism, neuroethics, philosophy of neuroscience, credibility in research, etc. The success of the 1st edition convinced us to push this project further. As of today, we have deployed five editions, gathering hundreds of people from 50+ countries worldwide, leveraging our essential pillars. We have now come up with the Curious Minds School, where a selected group of students coming from all over the globe will face and discuss the basis of critical thinking in neuroscience. This course represents a novel asset to broaden the critical minds of our future neuroscientists. In order to support open science, we make all our material free and accessible on our online platforms. Our project has been recognized by IBRO (Diversity Grants 2021 and 2022), FENS, and BNA, who have sponsored our project along the way.

POSTER SESSION S

S-001 | GluN2A-KD induce changes in GluN1 splicing

Cellular and Molecular Neurobiology

Author: Maria Florencia Acutain | Email: facutain@yahoo.com

Maria Florencia Acutain1°, Maria Verónica Baez1°2°

1° Instituto de Biología Celular y Neurociencia (IBCN). CONICET-UBA

2° Facultad de Medicina - UBA

NMDA receptors (NMDARs) are composed of two obligatory GluN1 subunits and two regulatory subunits encoded by grin genes. In the brain, the most commonly expressed regulatory subunits are GluN2A and GluN2B, which are tightly regulated both temporally and spatially. Mutations in the grin2A gene are associated with complex phenotypes, that could include reduced expression of GluN2A. In our last work, we induced a GluN2A knock-down (GluN2A-KD) in mature hippocampal neuronal cultures, which led to a more immature phenotype and a reduced GluN2A/GluN2B ratio compared to control neurons.

In the current study, we further investigated GluN2A-KD by analyzing GluN1 expression and its subcellular localization. We observed that GluN2A-KD led to a decrease in GluN1 protein levels, which was reflected in reduced NMDAR levels at the synaptic sites. However, dendritic GluN1 clusters remained unaffected in GluN2A-KD neurons. Additionally, we noted a shift in GluN1 splicing variants favoring those associated with forward trafficking. These findings suggest that GluN2A down-regulation alters synaptic NMDAR levels by modifying GluN1 expression through changes in splicing variant balance. We hypothesize that this rearrangement contributes to the observed phenotype in the GluN2A-KD cultured neurons. Further experiments are needed to validate this hypothesis.

S-002 | Live cell imaging study of the intracelullar trafficking of Gpm6a and its mutant form E258A

Cellular and Molecular Neurobiology

Author: Candela Belliard | Email: candebelliard@gmail.com

Candela Belliard1°, Nicolás Matías Rosas1°, Beata Fuchsova1°

1° Instituto de Investigaciones Biotecnológicas, Escuela de Bio y Nanotecnologías (EByN), Universidad Nacional de San Martín (UNSAM) – Consejo Nacional de Investigaciones Científicas y Técnicas (CONICET), San Martín, Buenos Aires, Argentina

The neuronal membrane glycoprotein M6a (Gpm6a) belongs to the proteolipid protein gene family and alterations in its expression and sequence are linked to neuropsychiatric disorders in humans. The mechanism of its action is not clearly understood. However, there is evidence for the role in the processes of neuronal differentiation and development such as filopodium formation, neurite extension, and synaptogenesis.

Recently, we have identified E258 as a key functional residue in the process of filopodium formation. Moreover, we have found that its cell surface expression is diminished while it displays increased intracellular accumulation with the preferential localization to Lamp1-positive structures. Different types of membrane outgrowth require polarized membrane transport and the incapacity of E258A to induce filopodium formation could be linked to the disrupted trafficking of mutant Gpm6a to the cell surface. Therefore, in the present study we used confocal microscopy and live cell imaging to analyze Gpm6a wt and E258A intracellular trafficking in neuroblastoma cells line N2a. Using Trackmate plugin of ImageJ, the number of intracellular particles of Gpm6a wt and E258A was determined and their localization, speed, distance traveled and displacement was evaluated. We also analyzed their colocalization with endosomal markers such as Rab5 (early endosomes), Rab7 (late endosomes), Rab11 (recycling endosomes), and the Lamp1-positive late endosomal and/or lysosomal structures.

S-003 | How do Tau mutations alter mitochondrial dynamics and fuel neurodegeneration?

Cellular and Molecular Neurobiology

Author: Julieta Bianchelli | Email: juli.bianchelli@gmail.com

Julieta Bianchelli1°, Mariana Holubiec1°2°, Cayetana Arnaiz1°, Jordi Navarro2°, Tomás Falzone1°2°

1° Instituto de Investigación en Biomedicina de Buenos Aires (IBioBA) - CONICET - Partner Institute of the Max Planck Society

2° Instituto de Biología Celular y Neurociencias (IBCN) "Profesor Eduardo De Robertis" - CONICET - UBA

Tau, a microtubule-associated protein, plays crucial roles in axonal transport. Tau mutations lead to its phosphorylation, disrupting mitochondrial transport and generating oxidative stress in the neurodegeneration process. The V337M tau mutation has been linked to frontotemporal dementia, in which cortical glutamatergic neurons are significantly affected. Therefore, to understand how tau V337M affects mitochondrial homeostasis and dynamics, we stablished a pharmacological differentiation protocol to obtain human glutamatergic neurons from mutant and isogenic hiPSCs. Axonal transport dynamics in vehicle and oxidized conditions, induced by Paraquat (PQ), were studied. PQ reduced axonal mitochondrial density and increased the segmental velocities (SVs) distributions in control neurons. However, we found a decrease in retrograde SVs both in vehicle and PQ treated V337M neurons. Moreover, mitochondria from mutant neurons exhibited reduced lengths than isogenic controls, a difference that increased after PQ treatment. In addition, we generated genetically induced glutamatergic neurons (i3N) to assess their redox state, observing higher mitochondrial depolarization in V337M i3N compared to controls, an effect that was increased after PQ. Immunofluorescent staining in i3N against phospho-tau will uncover differences in its axonal distribution. Moreover, mitochondrial redox state and transport will be evaluated in glutamatergic derived brain organoids from mutant and isogenic hiPSCs.

S-004 | Adult GABAergic neurogenesis in the pallium of zebrafish (Danio rerio)

Cellular and Molecular Neurobiology

Author: Gonzalo Carnevale | Email: gonzacarnevale@gmail.com

Gonzalo Carnevale1°3°, Emilia Delegliese1°2°3°, Luz Mazzaro3°, Nicólas Bellora3°, Lucas Mongiat1°2°

1° Departamento de Física Medica

2° Comisión Nacional de Energía Atómica

3° Universidad Nacional del Comahue

The zebrafish' pallium is involved in learning and memory during emotional and spatial information processing. This structure can be subdivided into several regions, including the dorsomedial (Dm) and dorsolateral (Dl) pallium; where both present a high degree of adult neurogenesis and neuronal plasticity. These regions are mainly conformed by glutamatergic and GABAergic neurons. During embryonic development, the glutamatergic neurons are generated from neural stem cells (NSC) located in the periventricular zone of the pallium and early turn on the expression of neurod1. In contrast, GABAergic neurons are generated in the subpallium from Zash1a+ NSC. Here we wonder if there is GABAergic neurogenesis in the pallium of adult zebrafish. To test this, we used the transgenic adult zebrafish, tg (GAD:GFP). After intra-peritoneal EdU administration, fish were euthanised at 1.5, 3, 8 or 16 days post-injection (dpi) of EdU. Between 3 and 8 dpi, approximately 80% of EdU-positive cells express the glutamatergic marker neurod1, a value that slightly decreases at later times. In contrast, only ~3% of EdU positive cells show GFP label, indicating GABAergic phenotype. The spatiotemporal analysis of adult-born GABAergic pallial neurons support the idea that GABAergic neurons are located closer to the pallial periventricular region than the subpallial neurogenic niches. Our results support a pallial origin of adult-born GABAergic neurons in zebrafish.

S-005 | Neuronal polarity and development: Role of fast cycling Rho GTPase RhoD

Cellular and Molecular Neurobiology

Author: CLARA INÉS CHUNGARA | Email: cchungara@immf.uncor.edu

Clara Ines Chungara1°, Gonzalo Quassollo1°, Josefina Martín1°, Mariano Bisbal1°

1° Institute of Medical Research Mercedes and Martin Ferreyra (CONICET- UNC- IMMF) (5016) Córdoba. Argentina

Neurons are highly polarized cells with long axons and multiple dendrites, essential for processing and transmitting electrical signals. The establishment and maintenance of neuronal polarity involve processes such as actin and microtubule cytoskeleton assembly, membrane protein trafficking, and vesicle transport from the Golgi apparatus (GA). Rho GTPases regulate neuronal cytoskeleton by controlling actin filament dynamics. RhoD, a less characterized member of this family, expressed exclusively in mammals, plays unique roles in cytoskeletal dynamics and organelle function. RhoD exhibits increased intrinsic GDP/GTP exchange activity and is involved in organizing the actin cytoskeleton and maintaining GA homeostasis. Our research suggests that RhoD is crucial for neuronal differentiation, influencing neuritic outgrowth and post-GA membrane protein trafficking. To investigate RhoD's role in neuronal polarity, we developed a FRET-biosensor for spatio-temporal activation studies. Down-regulation of RhoD via shRNAi in cultured hippocampal neurons led to altered neurite outgrowth and reduced neuronal complexity. In addition, expression of a RhoD- negative activity mutant delayed anterograde trafficking of post-GA plasma membrane proteins, underscoring RhoD's importance in cytoskeletal dynamics and neuronal development. These findings highlight RhoD's critical role in maintaining neuronal polarity and suggest broader implications for neuronal architecture.

S-006 | Exploring alpha-synuclein and metabolic regulation by chronic Yerba mate feed in a D. melanogaster model of Parkinson's disease

Cellular and Molecular Neurobiology

Author: Gisela Mariel Decurgez | Email: giseladecurgez@gmail.com

Gisela Mariel Decurgez1°, Lorena Tschopp1°, Pedro Ballestero1°2°, Hernán Hauché1°, Melina Bordone1°, Nara Muraro2°, Juan Ferrario1°

1° Instituto de Biociencias, Biotecnología y Biología traslacional (iB3) - FCEyN –UBA

2° Biomedicine Research Institute of Buenos Aires - CONICET - Partner Institute of the Max Planck Society

Regular intake of yerba mate (YM) is beneficial for Parkinson's disease (PD), including less prevalence to develop the disease in human and a robust neuroprotective effect on dopaminergic neurons in vitro (Bernardi, 2019). Novel results from our lab show that YM activates the AMPK pathway, which is strongly linked with cell homeostasis.

The hallmark of PD is the progressive death of dopaminergic neurons, however, its cause is uncertain. Current evidence stronlgly link accumulation of misfolded alpha-synuclein (aSyn) with the concomitant appearance of cell inclusions while cellular mechanisms that improves cell metabolism and debris clearance reduce signs of degeneration in experimental models and show clinical benefits in patients.

Taking these information together we propose to explore the dynamic of aSyn expression and accumulation in the Drosophila melanogaster aSyn-expressing model of PD chronically feed with YM, which exhibit dopaminergic dysfunction and some benefits upon YM exposure.

We feed flies with YM up to 30 days, evaluated behavioral parameters and processed their heads for western blot and qRT-PCR analysis.

First experiments show a reduction in the amount of aSyn in flies treated with YM. Also, we explored the regulation of aSyn gene expression, AMPK and downstream autophagy markers using qRT-PCR.

In this poster we will present ongoing results and discuss approaches projected to evaluate regulation of autophagy in these animal model of PD.

S-007 | Modulation of early and late steps of αS aggregation and its impact on the morphological structural and toxic properties of amyloid fibrils

Cellular and Molecular Neurobiology

Author: Phelippe do Carmo Goncalves | Email: pgoncalves@cei-mplbior.unr.edu.ar

Phelippe do Carmo Gonçalves1°, Irina Fernández1°, William Queiroz Felippe1°, Juan Ignacio Torres1°, Christian Griesinger2°, Claudio O. Fernandez1°2°

1° Max Planck Laboratory for Structural Biology, Chemistry, and Molecular Biophysics of Rosario (MPLbioR, UNR-MPINAT), Partner Laboratory of the Max Planck Institute for Multidisciplinary Sciences (MPINAT, MPG). Centro de Estudios Interdisciplinarios, Universidad Nacional de Rosario, Rosario, Argentina.

2° Max Planck Institute for Multidisciplinary Sciences, Department of NMR-based Structural Biology, Am Fassberg 11, 37077 Göttingen, Germany.

A plethora of evidences associates structural dysfunction of the protein alpha-synuclein (αS) and self-assembly into fibril species with the neuropathology of Parkinson's disease (PD) and other synucleinopathies. Given the critical role played by αS amyloid assembly in PD, its aggregation pathway represents then an obvious target for therapeutic intervention. In that context, amyloid aggregation of αS was shown to be modulated by specific sequence motifs flanking the NAC region, where the pre-NAC segment 36GVLYVGS42 was shown to play a major role in driving αS aggregation into amyloid structures. Moreover, the sensitivity of the early stages of αS amyloid formation to specific sequences offers opportunities to control amyloid assembly. In this work, we have conducted experiments aimed to obtain high-resolution structural information of αS interactions on different steps of its aggregation landscape. Our strategy allowed us to investigate further how the early and late stages of αS aggregation modulate each other, offering an explanation of how the morphological and structural features of amyloid fibrils can be tuned by the binding of small molecules to specific sequences that modulate fibril formation, thereby rendering the resulting structures less-toxic. Overall, our work demonstrates that sequence-based binding of small molecules to monomeric αS could be executed into the design of therapeutic molecules for the treatment of PD.

S-008 | TDAG51 regulates GDNF-induced survival signaling by inhibiting Ret-mediated AKT activity

Cellular and Molecular Neurobiology

Author: Fernando Federicci | Email: fer.federicci@gmail.com

Fernando Federicci1°2°, Fernanda Ledda2°, Gustavo Paratcha1°

1° Laboratorio de Neurociencia Molecular y Celular- Instituto de Biologia Celular y Neurociencias "Prof E. DeRobertis"- UBA. Buenos Aires, Argentina

2° Fundación Instituto Leloir, Instituto de Investigaciones Bioquímicas de Buenos Aires, Buenos Aires, Argentina.

GDNF is a potent survival factor for different neuronal populations including spinal cord motor neurons. However, while the signaling pathways by which GDNF promotes survival has been relatively well established, the molecular mechanisms that restrict the biological effects of this neurotrophic factor remain unknown. Short-term GDNF stimulation of the motoneuron-derived MN1 cells promotes the localization and recruitment of TDAG51 into detergent-resistant plasma membrane microdomains through a PI3K-dependent mechanism, indicating that TDAG51 could regulate proximal downstream signaling events triggered by GDNF and its receptor Ret. In line with this finding, gain and loss of function assays show that TDAG51 has the ability inhibit PI3K/AKT, but not ERK1/2/MAPK pathway activation in response to GDNF.

Interestingly, our findings also demonstrate that stimulation of MN1 cells with NGF, a treatment that promotes p75NTR-dependent motor neuron apoptosis, induces TDAG51 to suppress GDNF/RET-mediated AKT signaling. Knockdown of Tdag51 restored the ability of GDNF to activate AKT and protect MN1 cells from NGF-induced p75NTR-dependent cell death. Taken together, our results demonstrate that TDAG51 is a key mediator of the balance between NGF-induced p75NTR-promoted apoptotic signaling and GDNF/RET-mediated survival signaling in MN1 neuronal cells.

S-009 | Response of olfactory ensheathing and immune myeloid cells after olfactory nerve damage

Cellular and Molecular Neurobiology

Author: Javier Hernan Fotti | Email: jfotti@fmed.uba.ar

Javier Fotti1°2°, Lucía Garbini1°2°, Juan Belforte1°2°, Lorena Rela1°2°

1° Universidad de Buenos Aires. Facultad de Ciencias Médicas. Departamento de Ciencias Fisiológicas. Buenos Aires, Argentina.

2° CONICET-Universidad de Buenos Aires. Instituto de Fisiología y Biofísica Bernardo Houssay (IFIBIO). Buenos Aires, Argentina.

After damage to sensory neurons in the olfactory nerve (ON), stem cells proliferate in the olfactory epithelium and complete regeneration occurs in ~two months. Immune myeloid cells in the ON react to damage with hypertrophy and proliferation. Olfactory ensheathing cells (OECs), ON glia known for their neurotrophic properties, also react to damage. The relative timing of immune and OEC responses to damage is unknown and is relevant to understand possible interactions between them in the regenerative process. We propose that an early response of immune cells triggers the response of OECs. In this study, we evaluated the morphological changes of immune myeloid cells at early stages after ON damage, following administration of methimazole. Analysis of immunostained tissue sections reveals that methimazole-treated mice exhibit higher density of Iba1+ cells in the nerve layer of the olfactory bulb, when compared to control mice (37.91±11.54 versus 10.13±4.12 cells/mm2; $p<0,0001$, after significant interaction in 2-way ANOVA), as well as reduced cell complexity (6,64±2.96 versus 13,76±6.58 total intersections in sholl analysis; $p<0,001$), as early as day 3 post-injury. A qualitative analysis of the response of OECs in reporter mice (PLP-CreERT-Tomflox) suggests an earlier (2 days post-injury) hypertrophic response of these cells. These preliminary results allow us to consider a more complex scenario in which OECs may recruit immune cells as an early step in the repair process.

S-010 | Tetraspanin 8 as a regulator of hippocampal neuronal morphology and connectivity

Cellular and Molecular Neurobiology

Author: Micaela Daiana Garcia | Email: mdgarcia@fmed.uba.ar

Micaela Daiana Garcia1°2°, Fernanda Ledda2°, Gustavo Paratcha1°

1° Instituto de Biología Celular y Neurociencias (IBCN)-CONICET-UBA, Facultad de Medicina, Universidad de Buenos Aires

2° Instituto de Investigaciones Bioquímicas de Buenos Aires (IIBBA)-CONICET, Fundación Instituto Leloir

The formation of neuronal connectivity requires precise molecular and functional control of different processes such as axonal growth, dendrite complexity and synapse formation. Several reports describe the participation of different Tetraspanin (TSPAN) family members in the development of central and peripheral neurons. However, very little is known about the role of TSPAN8 in hippocampal dendrite development and synaptic connectivity. In this work we describe the expression of TSPAN8 into the rat hippocampus and cortex along the pre and postnatal development. Different approaches showed that TSPAN8 is present in the adult hippocampal CA1-CA3 and dentate gyrus neurons, as well as in somatosensorial and cortical motor neurons. By using subcellular fractionation, we show that TSPAN8 is expressed in rat hippocampal synaptic fraction, suggesting its participation in synapsis. Moreover, we found that a reduction of levels of TSPAN8 results in an increase in dendrite growth, branching and dendritic spine formation. Altogether these results suggest that TSPAN8 regulates the arborization complexity and dendritic spine formation. Additionally, we found a possible participation of TSPAN8 on the development of hippocampal excitatory synaptic contacts.

S-011 ORAL | Astrocytes going wild: Understanding the epigenetic roots of epileptogenesis and epilepsy

Cellular and Molecular Neurobiology

Author: JOSE DANTE DANIEL GOMEZ CUAUTLE | Email: DANTEGCUAUTLE@GMAIL.COM

DANTE DANIEL GOMEZ CUAUTLE1°, ALICIA ROSSI1°, ALEJANDRO VILLAREAL2°, LUCIANA D´ALESSIO3°, ALBERTO JAVIER RAMOS1°

1° LABORATORIO DE NEUROPATOLOGIA MOLECULAR - FACULTAD DE MEDICINA

2° IBCN - FACULTAD DE MEDICINA

3° LABORATORIO DE EPILEPSIA, CONDUCTA Y NEUROPATOLOGIA

Temporal lobe epilepsy (TLE) is the most prevalent epilepsy in humans. Retrospective studies in TLE patients show an initial precipitating event (IPE) in early childhood followed by a silent period, ultimately leading to chronic epilepsy. We hypothesized that epigenetics may be involved in epileptogenesis, particularly affecting astrocytes. To study this, we used the lithium-pilocarpine model of TLE in rats, primary astroglial cultures, and resected samples from TLE patients. We found that astrocytes from TLE patients showed reactive astrogliosis, increased DNA methylation, and downregulation of homeostatic genes Kir4.1, Glutamine Synthetase and AQP4 by immunohistochemistry. In Wistar rats, the IPE induced by lithium-pilocarpine treatment (30 mg/kg IP) caused hypermethylation of astrocytes at 7, 21, and 35 days post-IPE, indicating persistent epigenetic alterations. Additionally, we observed the downregulation of homeostatic astroglial genes AQP4, glutamine synthase (GS), and Kir4.1, along with an increased proinflammatory response (C3, MAFG) and elevated DNMT expression by qPCR. These alterations were mimicked in primary astrocyte cultures exposed to DAMP HMGB1 (500 ng/ml; 18 hours) and PAMP LPS (25 ng/ml; 18 hours) and were reversed by the DNMT inhibitor decitabine (100µM). These findings show that astrocytes are pathologically altered, potentially sustaining the long-term changes underlying epilepsy. Grants PICT 2021-0760/2019-0851; UBACYT, PIP Conicet.

S-012 | Ilex paraguariensis (Yerba mate) and Chlorogenic Acid increase AMPK phosphorylation and promote Autophagy in cell culture.

Cellular and Molecular Neurobiology

Author: Hernán Ezequiel Hauché Pedernera | Email: hernanhauche@gmail.com

Hernán E. Hauché P.1°, Gisela Decurgez1°, Lorena Tschopp1°, Pedro Ballestero1°2°, Melina P. Bordone1°, Juan Ferrario1°

1° Instituto de Biociencias, Biotecnología y Biología traslacional (iB3), Facultad de Ciencias Exactas y Naturales (FCEN UBA), CABA, Argentina.

2° Instituto de Investigación en Biomedicina de Buenos Aires (IBioBA - MSPS), CABA, Argentina.

Neuroprotection is one of the key challenges in neurodegenerative disorders, therefore, understanding their mechanisms may help to develop strategies to delay the process. The identification of neuroprotective compounds enormously helps to reach this goal. Previously we have demonstrated that Yerba Mate (YM) enhances the survival of dopaminergic neurons in primary mesencephalic cultures, similar to green tea and coffee.These beverages have been negatively linked with the development of Parkinson's disease (PD). They share several active compounds, remarkably polyphenols, such as chlorogenic acid (CGA). To investigate whether YM regulates intracellular mechanisms related to the growth and survival of dopaminergic neurons, we focused on AMPK, a key signaling molecule involved in cell metabolism including neuroprotection via stimulation of autophagy. Using the simplified model of the SH-SY5Y cell line, we tested the phosphorylation status of AMPK at different concentrations with an extract of YM and CGA. We have found that YM and CGA regulate AMPK phosphorylation. Additionally, we will share preliminary results regarding the activation of autophagy by YM, analyzed by immunofluorescence and WB against LC3. Further work is still necessary to fulfill our hypothesis, but current results settle down the first steps towards understanding how YM and CGA may modulate neuronal health potentially impacting the progression of neurodegenerative pathologies such as PD.

S-013 | From DNA damage to sleep, exploring novel relationships in Drosophila

Cellular and Molecular Neurobiology

Author: Emiliano Kalesnik Vissio | Email: ekalesnikvissio@ibioba-mpsp-conicet.gov.ar

Emiliano Kalesnik-Vissio1°, Canela Pedreira-González1°, Agustina Bruno-Vignolo1°, Ivana Ducrey1°, Pedro Ballestero1°, Marina Propato-Lots, Luis de Lecea2°, Nara I. Muraro1°

1° Biomedicine Research Institute of Buenos Aires-CONICET-Partner Institute of the Max Planck Society. Godoy Cruz 2390, C1425FQD, Buenos Aires, Argentina

2° Department of Psychiatry and Behavioral Sciences, Stanford Medicine. 291 Campus Drive, Stanford, CA 94305. United States of America.

Why do animals across the animal kingdom sleep? This question is still one of the great mysteries of biology and, although many theories have been proposed, it has not yet been possible to reliably contrast them. Various theories suggest that synaptic homeostasis and the clearance of metabolites and reactive oxygen species are important functions of the rest cycles and drivers of sleep homeostasis. Interestingly, a new significant body of evidence converges on the notion that repairing DNA damage accumulated during wakefulness is a crucial function of sleep. These intriguing findings raise multiple key questions: Is this cellular function evolutionarily conserved from flies to mammals? How DNA repair, a cellular mechanism, translate into an increase in sleep drive? Are canonical arousal/sleep centers involved? Which populations of neurons are responsible for sleep induction by DNA breakage? Are populations more important than others in this regard? Drosophila melanogaster is the perfect model organism to answer these questions and elucidate the evolutionarily conserved cellular substrates and mechanisms that link DNA repair processes to sleep behavior. We will present preliminary results of a thermogenetic screen that will help us answer these important biological questions. To achieve our goals we will utilize different technics, including sleep behavior analysis, western blotting and immunofluorescence, to detect DNA damage in the brains of Drosophila.

S-014 | Characterization of the Pea3 transcription factor, Etv5, in neocortical development.

Cellular and Molecular Neurobiology

Author: Solana Florencia Lopez | Email: slopez@leloir.org.ar

Solana F. López1°, Antonella S. Ríos1°, Gustavo G. Paratcha2°, Fernanda Ledda1°

1° Fundación Instituto Leloir, Instituto de Investigaciones de Buenos Aires (IIBBA)-CONICET

2° Instituto de Biología Celular y Neurociencias (IBCN)-CONICET-UBA

The mammalian cerebral cortex comprises diverse areas involved in the control of elaborated behaviors including complex movement, decision-making, and language. Cortical development follows an organized generation of neurons and glial cells from local neural stem cells (NSCs) which is strictly regulated to ensure proper functionality. Different subtypes of excitatory cortical projection neurons are born in overlapping temporal waves from local NSCs to generate defined cortical layers establishing the six-layered structure of the mature neocortex with layers VI and V generated first, followed by layers IV, III and II, while interneurons generated from NSCs of the ventral telencephalon migrate tangentially to populate the dorsal cortical structure. The precise control of this process is necessary. Alterations in any phase of it may cause nervous system disorders such as cerebral malformations or psychiatric diseases.

In this work, we characterize the expression pattern of the Pea3 transcription factor, Etv5, during the cerebral cortex development. Etv5 is a transcription factor from the ETS superfamily, which has been described to be involved in proliferation and differentiation depending on the cellular context. Here we show that Etv5 is expressed at mid-stages of embryonic glutamatergic neocortical development in proliferating NSCs, neural progenitors as well as in postmitotic neurons. In this study we also analyze the consequences of Etv5 abrogation in cortical development.

S-015 | Pathologically remodeled reactive astrocytes in an Alzheimer's Disease (AD) Model

Cellular and Molecular Neurobiology

Author: Ingrid Eleonora Mailing | Email: mailingingridlabramos@gmail.com

Ingrid Mailing1°4°, Ândria Cunha-Custódio1°, Alicia Rossi1°3°, Dante Gómez Cuautle1°, Sonia Do Carmo2°, Claudio Cuello2°, Diana Jerusalinsky1°, A. Javier Ramos1°

1° IBCN UBA-CONICET, School of Medicine, UBA, Argentina

2° Dept Pharmacology and Therapeutics, McGill University, Montreal, Canada

3° First Academic Unit of Histology, Embryology, Cell Biology and Genetics, School of Medicine, UBA, Argentina

4° Chair of Neurophysiology, School of Psychology, UBA, Argentina

Astroglial alterations have been reported in various neurological disorders, including Alzheimer's disease (AD). Specifically, astroglial atrophy has been observed in aged AD models and human samples. However, the specific timeline of astroglial dysfunction in AD remains incompletely understood. In this study, we used male and female McGill-R-Thy1-APP rats, which express the beta-amyloid precursor protein (AbetaPP) with Swedish and Indiana mutations, to investigate astroglial morphology, expression of homeostatic proteins, and markers of neurotoxic astrocytes at 7, 13, and 20 months of age (mo). Amyloid-beta (Aβ) plaques form very early in homozygous transgenic rats (7mo) and persist in older animals (13 and 20mo). Our results revealed morphological alterations in astrocytes in the proximity to Aβ plaques observed in 13mo male transgenic rats and to a lesser extent in females at 13 and 20mo. Sholl analysis identified three distinct astroglial cell phenotypes. The expression of astroglial homeostatic proteins, such as aquaporin 4 (AQP4) and glutamine synthetase (GS) showed a gradient of reduction towards the plaque. Interestingly, the neurotoxic astrocytic marker MAFG did not exhibit a similar gradient in transgenic rats. These findings provide preliminary evidence of pathological astroglial remodeling occurring in the early stages of Aβ plaque formation, preceding astroglial atrophy. This work was supported by PUE2018, UBACYT, PICT 2019-0851/2021-0760.

S-016 | Astroglial alterations induced by epileptic hyperthermic seizures: Just a heat response or the consequence of seizures?

Cellular and Molecular Neurobiology

Author: Milton Paúl Márquez Cadena | Email: mpaulmarquezcadena@fmed.uba.ar

Milton Paúl Márquez Cadena1°, Dante Gomez Cuautle1°, Alicia Rossi1°, Alberto Javier Ramos1°

1° IBCN UBA-CONICET, Facultad de Medicina, Universidad de Buenos Aires

The hyperthermic seizure model in perinatal rats reflects the natural history of human temporal lobe epilepsy (TLE), showing significant changes in neuronal, glial, and peripheral immune systems and a decreased epilepsy threshold in adulthood. Despite these findings, the cellular astroglial role in the epileptogenesis remains unclear. Here, we analyzed the astroglial response in two paradigms (in vitro and in vivo). Initially, rat pups (10 days old) were exposed to elevated body temperatures (39-42°C) to induce hyperthermic seizures (HS), and brains were collected at 35 days post-HS. In vitro, primary astrocytes were exposed at 40°C for 6 hours to mimic similar heat-exposure conditions and then were studied by immunocytochemistry and qPCR. Our results showed that 35DPHS animals showed reactive gliosis with increased GFAP expression and a reduced epileptic threshold when treated with subconvulsive doses of pilocarpine (10 mg/kg). This contrasts with the absence of reactive gliosis, non-significative changes in proinflammatory cytokines IL1B, IL6, TNFa, and reduced GFAP expression observed in hyperthermia-exposed in vitro cultured astrocytes. We conclude that reactive gliosis and neuroinflammation observed in the rats subjected to hyperthermic seizures occur due to seizures rather than being a consequence of hyperthermia. This suggests that seizures, rather than hyperthermia, may be the initiating factor for epileptogenesis. Grants PICT 2021-0760, PIP CONICET, UBACYT

S-017 | Single-cell analysis shows that expression of cytoplasmic TDP-43 activates the ATF4 Unfolded Protein Response pathway in neuroblastoma N2a cells

Cellular and Molecular Neurobiology

Author: Mauricio Norman Montenegro | Email: mauricio.montenegro909@gmail.com

Mauricio Montenegro1°2°, Calén Sansalone3°, Gabriel Vera Candia1°2°, Matías Blaustein3°, Lionel Muller Igaz1°2°

1° Universidad de Buenos Aires, Facultad de Ciencias Médicas, Departamento de Ciencias Fisiológicas. Grupo de Neurociencia de Sistemas. Buenos Aires, Argentina.

2° CONICET - Universidad de Buenos Aires. Instituto de Fisiología y Biofísica Bernardo Houssay (IFIBIO Houssay). Buenos Aires, Argentina.

3° Instituto de Biociencias, Biotecnología y Biología traslacional (iB3), Departamento de Fisiología y Biología Molecular y Celular, Facultad de Ciencias Exactas y Naturales, Universidad de Buenos Aires

TAR DNA-binding protein 43 (TDP-43) is a key player in neurodegenerative diseases, notably Amyotrophic Lateral Sclerosis (ALS) and Frontotemporal Dementia (FTD). While TDP-43 is primarily known for its function in RNA metabolism, emerging evidence highlights its involvement in the Unfolded Protein Response (UPR), a critical cellular mechanism essential for managing endoplasmic reticulum stress and maintaining proteostasis. This study explores the impact of mislocalized, cytoplasmic TDP-43 on UPR signaling at the single cell level. Immunofluorescence staining combined with high-content image analysis of neuroblastoma N2a cells transfected with mutated, cytoplasmic TDP-43 (TDP-43-ΔNLS) revealed a significant increase in endogenous ATF4 expression, indicating activation of the PERK/ATF4 UPR branch. Moreover, co-treatment with the UPR inductor Tunicamycin further increased ATF4 signal. We also examined cell-to-cell correlations between cytoplasmic TDP-43 intensity and ATF4 expression levels. As a novel tool to investigate activation of the three UPR signaling branches, we developed pathway-specific fluorescent reporters and we confirmed ATF4-Scarlet induction in TDP-43-ΔNLS positive cells compared to non-transfected ones. Lastly, we demonstrate successful expression of additional UPR reporters for the ATF6 and IRE1

branches. Our results on the role of TDP-43 in UPR modulation provide insights into its pathological contributions to protein misfolding diseases such as ALS/FTD.

S-018 | Serotonin regulates gastrointestinal homeostasis in Drosophila melanogaster

Cellular and Molecular Neurobiology

Author: Paulina Orúe | Email: porue@uade.edu.ar

Paulina Orúe1°2°, Azul Galo2°3°, Mauro Marchetto2°, Maximiliano Katz2°3°4°

1° Universidad Argentina de la Empresa. Facultad de Ingeniería

2° CONICET - Universidad de Buenos Aires. Instituto de Fisiología y Biofísica Bernardo Houssay (IFIBIO Houssay). Buenos Aires, Argentina

3° Universidad de Buenos Aires. Facultad de Farmacia y Bioquímica. Buenos Aires, Argentina

4° Consejo Nacional de Investigaciones Científicas y Técnicas (CONICET)

Serotonin (5-HT) is a key neurotransmitter involved in mood regulation, appetite, sleep, among other functions. Although serotonin is synthesized by the central nervous system, the majority is produced in the intestinal epithelium by enterochromaffin cells, suggesting its significant role in gastrointestinal regulation. While imbalances in serotonergic signaling are associated with gastrointestinal disorders such as irritable bowel syndrome and Crohn's disease, the molecular and cellular mechanisms underlying this regulation remain poorly understood. Preliminary data from our group reveal that the Drosophila gut is innervated by serotonergic neurons, and that the absence of 5-HT increases food intake and defecation frequency, suggesting that serotonin plays a crucial role in gut regulation. In this study, we analyzed the feeding behavior, gut motility, and defecation rates of Trh-/- flies (serotonin-deficient), SerT-/- flies (serotonin excess), and flies deficient in each of the five serotonin receptors. While Trh-/- flies displayed increased food intake and defecation frequency, SerT-/- flies show a reduction in these parameters. Similar to Trh-/- flies, 5-HT7r-/- flies exhibited increased food intake and defecation frequency, suggesting that this receptor mediates serotoninergic regulation of gut functions and highlighting the importance of 5-HT in establishing gastrointestinal homeostasis.

S-019 | Modulatory Effects of The Renin-Angiotensin-Aldosterone System on K2P Potassium Channels in DRG Neurons and Their Analgesic Potential in Neuropathic Pain

Cellular and Molecular Neurobiology

Author: Emanuel David Peralta | Email: peralta.emanuel@hotmail.com

Emanuel David Peralta1°2°, Cristian Gabriel Acosta1°2°

1° Instituto dInstituto de Histología y Embriología de Mendoza (IHEM)e

2° CONICET

Chronic pain affects approximately 3% to 17% of the general population, yet current therapeutic approaches remain largely ineffective. The Renin-Angiotensin-Aldosterone System (RAAS) emerges as a promising target for novel treatments. RAAS components are present in Dorsal Root Ganglion (DRG) neurons, and their modulation has shown neuroprotective effects in neuropathic pain conditions. On the other hand, K2P channels determine the resting membrane potential, affecting neuronal excitability and facilitating the firing of action potentials. This study investigates the modulatory effects of Angiotensin-II type 1 and 2 receptors (AT1R and AT2R) on TWIK1, an important K2P potassium channel in DRG neurons, and their analgesic effects in a Wistar rat model of neuropathic pain. We employed immunohistochemistry, qPCR, and in vivo pharmacology, antagonizing AT1R and AT2R with Telmisartan and PD123319, respectively. We assessed their impact on nociceptive responses to mechanical and cold stimuli. Our findings indicate a attenuation of pain with PD123319 administration. Immunohistochemical analysis revealed significant co-expression of TWIK1 with AT1-AT2 in DRG neurons, as well as an increase in TWIK1 expression in neuropathic rats treated with Telmisartan and Telmisartan+PD123319. This was confirmed by qPCR in DRG tissue subjected to the same treatments. Our results suggest that the observed analgesic effect may reflect modulation by the RAAS of K2P channels in nociceptive neurons.

S-020 | LOSS OF INSULIN-LIKE GROWTH FACTOR 1 (IGF1) LEADS TO DEFECTS IN HAIR CELL FUNCTION IN DEVELOPING ZEBRAFISH EMBRYOS

Cellular and Molecular Neurobiology

Author: Macarena Lucia Recalcatti | Email: macarenaluciarecalcatti@gmail.com

Macarena Recalcatti1°, Lucía Salatino2°, María Celia Fernández1°, Ayelén Martin1°, Horacio Domené1°, Patricia Pennisi1°, Paola Plazas2°, Sabina Domené1°

1° Centro de Investigaciones Endocrinológicas “Dr. César Bergadá” (CEDIE), CONICET–FEI–División de Endocrinología, Hospital de Niños Ricardo Gutiérrez, Buenos Aires C1425EFD, Argentina.

2° Instituto de Farmacología, Facultad de Medicina, Universidad de Buenos Aires (UBA), Paraguay 2155, C1121ABG, Buenos Aires, Argentina.

The insulin-like growth factor 1 (IGF1) is highly conserved among vertebrates and plays a central role in pre and postnatal growth. IGF1 deficiency due to homozygous pathogenic variants in the IGF1 human gene leads to intrauterine and postnatal delay of growth sometimes associated with deafness and mental retardation.

To study the role of igf1 in hair cells development we generated a morpholino (MO)-mediated igf1 knockdown phenotype in zebrafish and evaluated the effects on ear and lateral line structure and function. Staining with the fluorophore 4-Di-2-Asp (DIASP) was performed on live MO-injected larvae at 5 days post-fertilization (dpf) to assess hair cells function.

Preliminary results showed that MO-mediated knockdown of igf1 led to a 28% decrease in neuromast fluorescence intensity in morphant embryos compared to MO control ($p= 0.0003$). Moreover, morphant embryos showed a reduction of total otolith area in the otic vesicle compared to MO control embryos (5720.5 versus 7003.9 µm3, $p<0.0001$). Finally, morphant embryos displayed cardiovascular abnormalities including pericardial edema and lower cardiac frequency compared to MO control embryos (120.8 versus 141.1 bpm, $p< 0.0001$). In conclusion, our study showed that igf1 contributes to the correct development of the otoliths and hair cells function in zebrafish embryos. This model will allow to study the underlying role of IGF1 in the development of deafness and mental retardation in human patients with IGF1 deficiency.

S-021 | Characterization of GPM6a and Neuroplastin Interactions in Neuronal Morphogenesis

Cellular and Molecular Neurobiology

Author: Gutierrez Fuster Rocio | Email: rgutierrezfuster@iib.unsam.edu.ar

Rocio Gutierrez Fuster1°2°, Antonella León1°2°, Gabriela Ines Aparicio3°, Facundo Brizuela Sotelo1°2°, Karl Heinz Smalla4°, Camila Scorticati1°2°

1° Instituto de Investigaciones Biotecnológicas, Universidad Nacional de San Martín (UNSAM) – Consejo Nacional de Investigaciones Científicas y Técnicas (CONICET) , San Martín, Buenos Aires, Argentina

2° Escuela de Bio y Nanotecnologías (EByN), Universidad Nacional de San Martín. San Martín, Buenos Aires, Argentina.

3° Department of Neurosurgery, College of Medicine, University of Kentucky, Lexington, USA.

4° Leibniz Institute for Neurobiology, Research Group Neuroplasticity, Magdeburg, Germany

The molecular mechanisms governing neuronal morphogenesis remain incompletely understood. Neuronal membrane glycoprotein GPM6a promotes neuronal differentiation, though the underlying mechanisms remain elusive. The importance of elucidating these mechanisms is underscored by the association of GPM6A gene variants or dysregulated expression levels with neuropsychiatric disorders such as schizophrenia, depression, Alzheimer's disease, and claustrophobia. Given that the extracellular loops (ECs) of GPM6a play a critical role in its function, prior studies from our laboratory revealed that the adhesion molecule neuroplastin (NPTN) co-immunoprecipitates with GPM6a using its ECs as bait. This study aimed to explore the potential functional interaction between GPM6a and NPTN in hippocampal neurons and cell lines. We observed that endogenous NPTN and GPM6a colocalize at the neuronal membrane during different developmental stages. The NPTN ectodomain and GPM6a ECs interact in a trans configuration, inducing cell aggregation in live HEK293 cells. This aggregation was inhibited by the addition of a calcium chelator (EGTA) or neutralizing GPM6a monoclonal antibodies. Notably, an NPTN isoform lacking one of the IgG domains (NPTN55) failed to aggregate with GPM6a, and a GPM6a mutant deficient in

EC2 folding did not aggregate with wild-type NPTN. Collectively, these findings validate the association between GPM6a and NPTN65, likely mediated through their extracellular domains.

S-022 | Altered expression of metabotropic glutamate receptor mGlu3R in brain and CSF from Alzheimer's patients

Cellular and Molecular Neurobiology

Author: Albany Sáez | Email: albanysaez@gmail.com

Albany Sáez1°, Eugenia Olivera1°, Pilar Garaventa1°, Patricio Chrem-Méndez2°, Ricardo Allegri2°, Victoria Massazza3°, María Florencia Alvarez3°, Horacio Martinetto4°, Mercedes Bigi1°, Mercedes Lasaga1°

1° Instituto de Investigaciones Biomédicas (INBIOMED) UBA-CONICET, Facultad de Medicina, Universidad de Buenos Aires

2° Departamento de Neurología Cognitiva, Fleni

3° Laboratorio de enfermedades neurodegenerativas, INEU-Fleni-CONICET

4° Laboratorio de Biología Molecular y Bioinformática, Fleni

AD is the leading cause of dementia worldwide. The current diagnostic method includes testing biomarkers in CSF. Expanding the panel of biomarkers could improve diagnostic accuracy, which is essential for better and earlier intervention.

mGlu3R has neuroprotective and antiamyloidogenic roles. Its levels are decreased in aged PDAPP-J20 mice, which was preceded by accumulation of the isoform mGlu3Δ4. Taking this into account, our aim is to determine the association between AD and mGlu3Δ4/mGlu3R levels in the human brain/CSF.

15 controls and 15 cases were classified according to the A/T/N criteria. Aβ, Tau, mGlu3R, and Δ4 levels were determined in CSF. Neither mGlu3R nor Δ4 showed significant changes in AD patients; however, the mGlu3Δ4/mGlu3R ratio increased by 40% in AD CSF (p=0.06) suggesting a potentially relevant trend. The area under the ROC curve of this ratio was not significant (0.65, p=0.16), although Fisher's exact test yielded an association between Δ4/mGlu3R ratio and AD (p=0.025).

These results were complemented by the analysis of 12 RNASeq databases from AD or control brains. We analyzed expression of mGlu3R and genes related to mGlu3R signaling. A significant decrease in mGlu3R, GLT1, and BDNF was observed in AD; while

SRA was increased. ROC curve analysis yielded significant results for both mGlu3R ($p<0.01$) and the 4-gene panel ($p<0.0001$) as predictors for AD.

In summary, mGlu3R and mGlu3Δ4 levels might be altered in AD patients and are detectable in CSF.

S-023 | Lrig2 as a regulator of hippocampal neuronal development

Cellular and Molecular Neurobiology

Author: IVAN SERVIN BERNAL | Email: ivanserber.ibcn@gmail.com

IVAN SERVIN BERNAL1°, ANA PAULA DE VINCENTI1°, FERNANDA LEDDA2°, GUSTAVO PARATCHA1°

1° Instituto de Biología Celular y Neurociencias (IBCN)-CONICET-UBA, Facultad de Medicina, Universidad de Buenos Aires

2° Instituto de Investigaciones Bioquímicas de Buenos Aires (IIBBA)-CONICET, Fundación Instituto Leloir

Dendrite size and morphology are key determinants of the functional properties of neurons, and brain disorders are due primarily to structural abnormalities of dendrites and their connections. Distinct leucine-rich repeat (LRR) transmembrane proteins are highly expressed in the brain, especially in the hippocampus, where they play a critical role in the organization and function of neural circuits, regulating neurotrophin signaling, coordinating the assembly of pre- and postsynaptic compartments during excitatory and inhibitory synapse formation and regulating synaptic plasticity.

The LRR protein Lrig1 has attracted the spotlight as essential regulator of neurotrophin signaling and dendrite arborization of hippocampal neurons. Despite this evidence, the physiological contribution of Lrig2 family member for neuronal development remains poorly understood. In search for specific LRR proteins involved in neurodevelopmental disorders, and taking advantage of the postnatal expression of Lrig2 by hippocampal developing neurons, we used gain and loss of function assays to examine how altered Lrig2 expression impacts neuronal morphology and synapse formation. Here, we }haracterize the expression and the biological contribution of Lrig2 to the development

of specific neuronal populations of the central nervous system.

S-024 | Regulation of UPRmt-associated proteins mediated by canonical Wnt signaling: A new protective mechanism against AD pathology

Cellular and Molecular Neurobiology

Author: Angie Kim Torres Juacida | Email: aktorres@uc.cl

Angie K. Torres1°2°3°, Rodrigo G. Mira3°, Claudia Jara2°, Alejandra Catenaccio2°, Cheril Tapia-Rojas, Nibaldo C. Inestrosa3°

1° Facultad de Ciencias Biológicas, Pontificia Universidad Católica de Chile, Santiago, Chile

2° Neurobiology of Aging Lab, Centro Ciencia & Vida, Fundación Ciencia &; Vida, Facultad de Medicina y Ciencia, Universidad San Sebastián, Santiago, Chile

3° Centro de Excelencia en Biomedicina de Magallanes (CEBIMA), Escuela de Medicina, Universidad de Magallanes, Punta Arenas, Chile

Canonical Wnt signaling activation induces the transcription of Wnt target genes by nuclear translocation of β-catenin, where it binds to TCF/LEF and CBP/p300. The activation of Wnt signaling reduces AD pathology and improves mitochondrial function by a poorly understood mechanism. In stress conditions, such as AD, the Mitochondrial Unfolded Protein Response (UPRmt) is activated, which induces mitochondrial chaperones and proteases expression. Interestingly, UPRmt activation reduces AD pathology and needs CBP/p300 to induce the expression of its responsive proteins, suggesting that canonical Wnt signaling might regulate UPRmt–associated proteins. By modulating canonical Wnt signaling in vitro, we observed that its activation increases the protein and mRNA levels of UPRmt proteins such as the UPRmt transcription factor ATF5, the mitochondrial chaperone Hsp60, and mitochondrial proteases such as Lonp1. The same regulation was observed in vivo, in mouse models and C. elegans, suggesting the conserved nature of this process. Also, the reduction in UPRmt signaling by the downregulation of ATF5 reduces the ability of Wnt/β-catenin signaling activation to decrease Aβ pathology and phosphorylated tau levels in the hippocampus of the 3xAD mouse model. Thus, our results propose a new mechanism by which canonical Wnt signaling reduces AD pathology, increasing the UPRmt-associated protein expression.

Funding: FONDECYT 1221178 and Ciencia & Vida FB210008 to CTR and IFAN-CORFO P19 of NCI.

S-025 | Ligand-induced trans-synaptic adhesion in neural connectivity

Cellular and Molecular Neurobiology

Author: Julieta Villarosa Outes | Email: jvillarosaoutes@gmail.com

Julieta Villarosa Outes1°, Antonella Soledad Ríos1°, Gustavo Paratcha2°, Fernanda Ledda1°

1° Fundación Instituto Leloir, Instituto de Investigaciones Bioquímicas de Buenos Aires (IIBBA) - CONICET

2° Instituto de Biología Celular y Neurociencias (IBCN) - CONICET

The function of the nervous system critically relies on the establishment of precise synaptic contacts between neurons and specific target cells. Elucidation of the mechanism by which synapses are formed is crucial for understanding the synaptic deficits that underlie cognitive disorders. Many membrane-bound synaptic adhesion molecules (SAMs) have been involved in target recognition and synapse specification by both homophilic or heterophilic trans-synaptic interactions. A third group of trans-synaptic adhesion molecules are ligand-dependent adhesion molecules (LiCAMs) which combines features of both diffusible and membrane bound synaptogenic factors to develop specific neural contacts. One of these ligands is the neurotrophic factor derived from glial cells (GDNF) which binds to the pre and postsynaptic receptor GFRα1. Here we present results related to the analysis of molecular determinants of GFRα molecules underlying the formation of GDNF/GFRa trans-synaptic complexes.

S-026 | Behavioral and physiological role of endogenous Htt in sLNvs of Drosophila melanogaster

Chronobiology

Author: Agustina Bruno-Vignolo | Email: agustinabrunovignolo@gmail.com

Agustina Bruno-Vignolo1°, Lautaro Duarte2°, Ana Ricciuti1°, Ivana Ducrey1°, Florencia Fernández-Chiappe1°, Pedro Ballestero1°, Marina Propato-Lots1°, Cayetana Arnaiz1°, Tomás Falzone1°3°, Esteban Beckwith2°

1° Instituto de Investigación en Biomedicina de Buenos Aires (IBioBA, CONICET – Partner of the Max Planck Society)

2° Departamento de Fisiología, Biología Molecular y Celular, FCEN, UBA; Instituto de Fisiología, Biología Molecular y Neurociencias, UBA-CONICET

3° Instituto de Biología Celular y Neurociencias, Facultad de Medicina, (IBCN-UBA-CONICET)

One of the hallmarks of polyglutamine (polyQ) diseases is the selective vulnerability of different neurons in spite of ubiquitous expression of the pathogenic protein. The reasons behind this specificity underlying neurodegeneration is still an unsolved mystery. In Drosophila melanogaster, it has been shown that the two circadian clusters of lateral ventral neurons (LNvs) exhibit differential responses to the polyQ-expanded huntingtin (Htt) protein. Specifically, while the elongated polyQ tract in Htt selectively impairs the functionality of the small lateral ventral neurons (sLNvs), the large lateral ventral neurons (lLNvs) appear unaffected. However, there is evidence that the disease is not only the result of a gain of function of HttpolyQ, but there is also a concomitant loss of function of wild-type Htt. Htt is ubiquitously expressed in the nervous system and performs various functions, such as serving as a scaffolding protein for molecular motors that mediate the transport of electron-dense vesicles carrying neuromodulators. Drosophila has a homolog of Htt, dHtt, which is conserved in its functional domains but still under-studied. The main objective of this project is to study the function of dHtt in physiology and behavior in order to understand the normal role of this protein. Our data indicate that the downregulation of the fly endogenous huntingtin with dHttRNAi expression in sLNvs impairs circadian rhythmicity and affects sleep behavior.

S-027 | It's Owl Good: Exploring the Impact of Social Environments on Adolescent Sleep in Toba/Qom Communities

Chronobiology

Author: María Coldeira | Email: florcoldeira@gmail.com

María Florencia Coldeira1°2°, Laura Lucía Trebucq1°, Camila Godoy Peirone1°, Ignacio Spiousas1°2°, Diego A. Golombek1°2°, Horacio de la Iglesia3°, Leandro P. Casiraghi1°2°

1° Laboratorio Interdisciplinario del Tiempo (LITERA), Universidad de San Andrés

2° CONICET

3° Department of Biology, University of Washington

Studies report that a large proportion of adolescents experience short sleep duration and significant social jet lag (SJL; the misalignment between their internal circadian rhythms and socially imposed schedules), both which are strongly associated with negative health outcomes. Teenagers often display severely late chronotypes, which are in conflict with early morning obligations like school. It has been observed that adolescents in big cities exhibit high levels of SJL and suffer from chronic sleep deprivation, with less than 10% sleeping the recommended 8h per night on weekdays. Our sleep studies in rural and semi-urban Toba/Qom populations in the north of Argentina allows us to study adolescents free from hyper-industrialized social constraints. From 2016 to the present, we have evaluated sleep through wrist-actimetry, while observing their living conditions gradually change, specifically through the introduction of electric light and, more recently, of internet access. All communities in our study have gradually delayed their sleep times, including those participants in the 15 to 20 y.o. range, who exhibit the latest chronotypes. However, SJL seems hardly detectable in the Toba/Qom, even in teenagers. Our studies reinforce the evidence that socially determined obligations such as early school times and commuting contribute to adolescents' sleep deficiencies.

S-028 | Effect of the interaction between Chronotype and School Start Time on Sleep Duration and School Attendance in Argentine Adolescents

Chronobiology

Author: Florencia Lee | Email: leeflorencia95@gmail.com

Florencia Lee1°2°, Guadalupe Rodríguez Ferrante,3°, Andrea Paula Goldin4°, María Juliana Leone,1°2°

1° Universidad Torcuato Di Tella, Área de Educación, Escuela de Gobierno, CABA, Argentina

2° Universidad Nacional de Quilmes, CONICET, Laboratorio de Cronobiología, Departamento de Ciencia y Tecnología, Bernal, Buenos Aires, Argentina

3° Department of Biology, University of Washington, Seattle, United States

4° Universidad Torcuato Di Tella, CONICET, Laboratorio de Neurociencia, CABA, Argentina

School schedules typically begin very early in the morning, which contrasts sharply with the naturally delayed chronotype of adolescents. Previous evidence shows that this misalignment leads to chronic sleep deprivation, social jetlag, and various negative outcomes, including poorer academic performance. Earlier studies by our group have documented these effects among Argentine students in the 1st and 5th years of secondary school. However, an important but less explored factor is school attendance. The aim of this research is to examine the interaction between chronotype and school shift on sleep patterns and attendance among students in 1st through 5th years, who were randomly assigned to morning, afternoon, or evening shifts at the start of secondary school. Our results indicate that as students progress through secondary school, their chronotype shifts later, while sleep deprivation and absenteeism increase, particularly in the morning shift. These findings highlight the need to consider the interaction between chronotype and school schedule in educational policy design, with the goal of reducing sleep deprivation, improving school attendance, and ultimately enhancing health, well-being, and academic performance during adolescence.

S-029 | Functional role of clock´s dorsal lateral neurons (LNds) in the control of egg-laying in Drosophila melanogaster

Chronobiology

Author: Sabrina Riva | Email: sabririva21@gmail.com

Sabrina Riva1°, Sebatián Risau-Gusman1°, D.Lorena Franco1°

1° Medical Physics Department, Bariloche Atomic Center, Comisión Nacional de Energía Atómica (CNEA) and Consejo Nacional de Investigaciones Científicas y Técnicas (CONICET), San Carlos de Bariloche, Argentina

Most organisms are capable of coordinating their physiology and behavior with the 24 hours of day/night cycling generated by the Earth´s rotation. These biological rhythms are driven by molecular clocks that are conserved across animals. In the Drosophila brain this molecular circadian clock is expressed in ~150 neurons, which are organized in different clusters based in gene expression, anatomy and localization. These clusters are: ventrolateral neurons (LNv; encompassing the small and large LNv groups), dorsolateral neurons (LNd), lateral posterior (LPN), and dorsal neurons [DN; separated in DN1, 2, and 3]. Egg-laying is one of the most important female behaviors since it has a profound impact on the fitness of a species. Egg laying is largely governed by successful mating, but is also influenced by circadian clock. Previous results from our lab have shown that LNds clock/neurons have a leading role in the control of oviposition. To further study the functional role of these neurons in the control of egg-laying rhythm, in this work, we will manipulate their activity in an adult-specific manner and evaluate their involvement in oviposition rhythm.

S-030 | Metabolic Rhythms in Time-Dependent Severity of Septic Mice

Chronobiology

Author: Camila Agustina Senna | Email: camilaagustinasenna@gmail.com

Camila Senna1°, Malena Mul Fedele2°, Ignacio Aiello3°, Guido Hokama1°, Diego Golombek4°, Natalia Paladino1°

1° Laboratorio de Cronobiología, Departamento de Ciencia y Tecnología, Universidad Nacional de Quilmes/CONICET, Buenos Aires, Argentina

2° Laboratorio de Cronofisiología, Instituto de Investigaciones Biomédicas/UCA-CONICET, Buenos Aires, Argentina

3° Integrated Cellular Responses laboratory, Fralin Biomedical Research Institute, Virginia Tech Carilion, Roanoke, USA.

4° Laboratorio Interdisciplinario del Tiempo (LITERA), Universidad de San Andrés, Buenos Aires, Argentina.

Sepsis, a syndrome caused by dysregulated host response to pathogens, is a leading cause of death from infection. Patients with sepsis present early metabolic alterations that disturbs homeostasis and affects glycemic control. In murine models, sepsis mortality is strongly influenced by the circadian system: mice inoculated with high doses of lipopolysaccharide (LPS) at the end of the day exhibit higher mortality rate (~80%) than those inoculated in the middle of the night (~30%). Our previous results revealed that proteins differentially upregulated in serum from mice injected with LPS at ZT19 (ZT0: lights on; ZT12: lights off) are mainly associated with glucose and lipid metabolism.

To further study the differences in metabolism, we evaluated blood glucose levels after stimulus at ZT11 and ZT19. We observed blood glucose levels significantly increased after LPS administration only at ZT11. To study how glycemic response affects sepsis severity, we inhibited the hyperglycemic response by metformin administration before LPS at ZT11, and simulated the hyperglycemic response by exogenous glucose administration after LPS at ZT19. Both manipulation result in decreased severity. These results show time-differences in glucose metabolism in response to LPS, which generates early hyperglycemia associated with higher severity. During the resting phase,

elevated blood glucose contributes to a worse prognosis, while during the active phase, efficient glucose metabolism improves outcom.

S-031 | Social Neuroscience: Assessment of Social Cognition Processes in Individuals with Qualitative Indicators of Executive Dysfunction Syndrome

Cognition, Behavior, and Memory

Author: MARIA JOSE AGUILAR | Email: majoaguilar1@gmail.com

Maria Jose Aguilar1°2°3°, Maria del Pilar Villa1°3°, Paula Lopez1°3°, Maria Lucia Zabala1°3°, Cristian Garcia Bauza2°4°

1° Instituto de psicologia Basica, aplicada y tecnologia IPSIBAT

2° Consejo Nacional de Investigaciones Cientificas y Tecnicas (CONICET)

3° Universidad Nacional de Mar del PLata

4° Universidad del Centro. Laboratorio Media.lab

Introduction: Social neuroscience, as an emerging field, focuses on the neurobiological underpinnings of social cognition processes. These processes refer to the mental operations underlying social interactions, including those involved in perceiving, interpreting, and responding to the intentions, dispositions, and behaviors of others. Objective: To assess social cognition processes in individuals presenting qualitative indicators of executive dysfunction syndrome. Methodology: Non-experimental, cross-sectional group comparison design. The sample consisted of 97 adults divided into two groups. Group 1: Individuals with qualitative indicators of executive dysfunction syndrome (N=37) and Group 2: Individuals without qualitative indicators of executive dysfunction syndrome (N=60). Social cognition tasks (Yoni Task and Interpersonal Reactivity Index) and the DEX executive dysfunction questionnaire were administered. Results: Individuals in Group 1 exhibited higher levels of affective empathy, with significant differences ($p = .008$), particularly in empathic concern ($p = .009$) and personal distress ($p = .031$). No differences were observed in theory of mind processes. Discussion: The results suggest the impact and influence of executive functions located in the prefrontal cortex on social cognition processes, especially in what is known as the empathic brain.

S-032 | Acetylation targets at hippocampal synapses of mice

Cognition, Behavior, and Memory

Author: Melina Sol Alvarez | Email: melinasol.alvarez@gmail.com

Melina Sol Alvarez1°, Sebastián Rivas1°2°, Ramiro Freudenthal1°2°

1° Laboratorio de Plasticidad Sináptica y Memoria, iB3, FCEN UBA

2° CONICET

Memory and learning are fundamental processes that enable animals to adapt to their environments. Memory storage implies a series of molecular processes including intracellular Ca2+ increments, post translational modifications (PTMs) and protein synthesis. A widely accepted consensus indicates that the resulting changes occur at synapses, and affect its efficacy. Previously we showed that during inhibitory avoidance memory consolidation, protein acetylation levels change at the synapse. To identify putative protein targets of acetylation, we isolated the hippocampus of CF1 mice and performed protein extracts enriched on synaptic proteins from this tissue, analyzing the samples through immunoprecipitation with a pan acetyl antibody and protein identification by western blot. Here we report candidate proteins detected in the immunoprecipitation.

S-033 | Coping Strategies in People with Multiple Sclerosis: Impact of Cognitive Impairment

Cognition, Behavior, and Memory

Author: Lara Bardoneschi | Email: larambard@gmail.com

Lara Bardoneschi1°2°, Maria Sol Roman1°2°, Juan Iglesias Passada2°, Florencia Daniele, Matias Herrera Fernandez2°, Marcelo Medina3°, Maria Laura Saladino2°, Fernando Caceres2°, Sandra Vanotti2°

1° INERE. Instituto de Neurociencias Restaurativas, Buenos Aires, Argentina

2° Universidad de Buenos Aires. Facultad de Psicología, Instituto de investigaciones en Psicología, Buenos Aires, Argentina

3° Clínica Delta, Buenos Aires, Argentina

Introduction: Given the impact of a chronic condition that can lead to cognitive impairments, the effectiveness of coping strategies adopted by people with MS (PwMS) can be crucial for their adjustment process. Objective: To explore relationships between coping responses and cognition in PwMS. Method: 80 PwMS (78% women; 86% relapsing-remitting, 16% progressive) were included, mean age: 43.81±9.64, education: 14.73±2.98, and years of disease duration: 11.1±8.46. Cognitive assessment: Processing speed: Symbol Digit Modalities Test (SDMT); Verbal memory: California Verbal Learning Test-I (CVLT-I); Visuospatial memory: Brief Visuospatial Memory Test-Revised (BVMT-R). Coping responses were assessed with Coping Response Inventory-Adult (CRI-A) and categorized as problem-focused or emotion-focused, both cognitive and behavioral. Statistical Analysis: Descriptive analysis and Pearson correlations were conducted. Results: Better verbal memory and processing speed were correlated with problem-focused coping strategies, both cognitive (verbal memory $r=0.499$, $p<0.001$; processing speed $r=0.265$, $p=0.017$) and behavioral (verbal memory $r=0.450$, $p<0.001$; processing speed $r=0.273$, $p=0.014$). Conversely, lower verbal memory is associated with cognitive emotion-focused coping strategies ($r=-0.304$, $p=0.006$). Conclusions: PwMS with better-preserved verbal memory and processing speed tend to adopt cognitive problem-focused coping strategies, indicating a more active approach to challenges.

S-034 | Reducing Collective Error by Promoting Opinion Diversity: The Wisdom of Extremized Crowds

Cognition, Behavior, and Memory

Author: Federico Barrera-Lemarchand | Email: fedex192@gmail.com

Federico Barrera-Lemarchand1°2°3°, Joaquín Navajas1°3°4°

1° Laboratorio de Neurociencia - Escuela de Negocios - Universidad Torcuato Di Tella

2° Departamento de Física - FCEN - Universidad de Buenos Aires

3° Consejo Nacional de Investigaciones Científicas y Técnicas (CONICET)

4° Escuela de Negocios - Universidad Torcuato Di Tella

The aggregation of many lay judgments can lead to surprisingly accurate estimates. This phenomenon, called the “wisdom of crowds,” has been employed successfully in various domains, such as medical decision-making, predicting geo-political events, and financial forecasting. Previous research identified two key factors driving this effect: the accuracy of individual assessments and the diversity of opinions. Most available strategies to enhance the wisdom of crowds have focused on improving individual accuracy while neglecting the potential of increasing opinion diversity. Here, we study a complementary approach to reduce collective error by promoting erroneous divergent opinions. This strategy proposes to anchor half of the crowd to a small value and the other half to a large value before eliciting and averaging all estimates. Consistent with our mathematical modeling, four behavioral experiments (N =1,362) provide converging evidence of the efficacy of the proposed method for both estimation and forecasting tasks. Beyond practical implications, these findings offer new theoretical insights into the epistemic value of collective decision-making.

S-035 | Understanding How Fear Spreads: The Lateral Habenula's Role in Generalizing Aversive Memories

Cognition, Behavior, and Memory

Author: Sol Bencardino | Email: sbencardino@gmail.com

Sol Bencardino1°2°, M. Paula Ospital1°3°, Joaquín Piriz1°

1° Instituto de Fisiología, Biología Molecular y Neurociencias (IFIByNE, UBA-CONICET)

2° Facultad de Ciencias Exactas y Naturales (FCEN-UBA)

Fear, characterized by the perception of risk, serves as an adaptive survival mechanism. However, its dysregulation can lead to anxiety disorders, phobias, and post-traumatic stress disorder. The lateral habenula (LHb) plays a key role in encoding aversive memories. Fear conditioning (FC) is one of the most commonly used protocols to study these types of memories, where a neutral element or conditioned stimulus (CS) is paired with an aversive unconditioned stimulus (US). We developed an FC protocol to investigate fear generalization in mice—defined as the extension of fear from a stimulus associated with an aversive experience to other, similar stimuli. We then used fiber photometry to measure calcium activity in LHb neurons, aiming to understand the role of this structure in the generalization process.

Our results show that the intensity of the aversive stimulus is a critical factor in fear generalization. We successfully established two distinct groups: a "Strong Shock" group, which exhibited fear generalization to both the cue and the context, and a "Weak Shock" group, which showed associative learning without generalization. This distinction is essential for differentiating between generalized and specific fear responses. Moreover, we observed LHb activation in response to the conditioned stimulus, suggesting its role in encoding aversiveness and predicting the CS. These findings offer insights into fear generalization, crucial for developing targeted therapies.

S-036 | Ethanol and memory consolidation: exploring the role of α7 nicotinic acetylcholine receptors.

Cognition, Behavior, and Memory

Author: Marina Fátima Berisso | Email: marinaberisso@campus.fmed.uba.ar

Marina Fátima Berisso1°, Felipe Urrea1°, Jorge Medina1°2°, Verónica Pastor1°

1° Instituto de Biología Celular y Neurociencia “Prof. E. De Robertis” (IBCN, UBA-CONICET)

2° Instituto Tecnológico de Buenos Aires (ITBA); Buenos Aires, Argentina.

Ethanol negatively impacts brain functions, leading to cognitive and behavioral changes. While chronic ethanol's effects on learning and memory are well-studied, its acute impact remains less clear. We used an inhibitory avoidance (IA) task and neuropharmacology in adult rats to explore acute ethanol effects on memory consolidation. Our results indicate that ethanol administration immediately post-training in an IA task dose-dependently interferes with memory consolidation, impairing memory expression 24 or 48h later. Open field tests revealed no anxiety-like behavior or altered locomotion. Given that ethanol might increase alpha 7 nicotinic receptors (α7nAChRs) desensitization, we explored if this mechanism underlies ethanol-induced memory deficits in specific brain areas. In the ventral tegmental area (VTA), α7nAChRs are not involved in memory consolidation per se. However, the infusion of a positive allosteric modulator reversed the amnesic effect of ethanol, suggesting that VTA α7nAChRs are involved in ethanol-induced memory modulation. Our results provide new insights into the neurobiological bases of aversive memory and ethanol-induced memory impairment.

Acknowledgements: ISN (CAEN grant); FONCyT (PICT INVI grant); UBA (UBACyT II grant); CONICET (PIBAA grant)

S-037 | Omega-3 (ω-3) fatty acid effects on anxiety-like behavior and oxidative stress in a binge-like ethanol exposure model in adolescent rats

Cognition, Behavior, and Memory

Author: Valentín Cabrera | Email: valentin.cabrera@unc.edu.ar

Valentín Cabrera1°, Aída Marcotti2°, Ana Fabiola Macchione1°, Paula Abate1°, Mariela Pérez2°, Verónica Balaszczuk1°

1° Laboratorio de Psicología Experimental. Instituto de Investigaciones Psicológicas, IIPsi-UNC-CONICET. Córdoba, Argentina.

2° Departamento de Farmacología Otto Orsingher. Instituto de Farmacología Experimental de Córdoba, IFEC-CONICET, Facultad de Ciencias Químicas, Universidad Nacional de Córdoba

Alcohol consumption is a worldwide concern that causes 5% of the global disease burden being adolescents among the most vulnerable to its negative effects. Previous evidence suggests that alcohol exposure increases anxiety-like behavior (AnxB) and oxidative stress (OS) while ω-3 can revert these effects. Yet, no literature was found about these outcomes in adolescence. The aim of this study was to analyze the long-term effects of binge-like EtOH exposure and DHA treatment on behavior and OS in adolescent Wistar rats. We administered 2 or 0g/kg of EtOH (ig) at postnatal days (PD) 28, 30 and 32. 15 min after, animals received DHA (1 or 0mg/kg, ip). At PD 34 subjects were evaluated in the Light-Dark Box for 5 min to assess AnxB. At PD 35 blood and tissue was collected to measure OS by measuring thiobarbituric acid reactive substances and catalase activity in different brain areas. DHA treated animals spent less time in the dark compartment (p=.043) and had decreased catalase activity in Prefrontal Cortex (PFC) (p=.012). EtOH+DHA animals had lower TBARS levels compared to the Water+DHA group (p=.041). Moreover, AnxB correlated with catalase activity in Motor and PFC (.52 and .37) and TBARS levels in EtOH+Albumin rats (.82). These results suggest that DHA can beneficially decrease AnxB and OS in adolescent rats. We found no significant effect of EtOH exposure. This may be because the evaluations were carried out on sober animals that were exposed to the drug several days before.

S-038 | Language-based Alzheimer's identification: A comparison with neuropsychological and neuroimaging features

Cognition, Behavior, and Memory

Author: Ivan Caro | Email: ivan.caro.strokes@gmail.com

Ivan Caro1°2°, Gonzalo Pérez1°2°, Joaquín Valdés Bize3°, Joaquín Ponferrada1°, Franco Ferrante1°2°, Lara Gauder4°, Luciana Ferrer4°, Agustín Ibañez1°2°, Andrea Slachevsky1°, Adolfo M. García1°

1° Cognitive Neuroscience Center (CNC), Universidad de San Andrés, Buenos Aires, Argentina

2° National Scientific and Technical Research Council (CONICET), Buenos Aires, Argentina

3° Department of Psychiatry, School of Medicine, Pontificia Universidad Católica de Chile, Santiago, Chile

4° Instituto de Investigación en Ciencias de la Computación (ICC), CONICET-UBA, Argentina, Departamento de Computación, Faculty of Exact and Natural Sciences, University of Buenos Aires (UBA), Argentina.

Automated word property (WP) analysis represents a powerful digital innovation to reveal scalable markers of Alzheimer's disease (AD). Quantification of lexical features during oral production proves useful to detect AD cases and to predict cognitive outcomes and anatomical-functional brain patterns. However, no study has compared the discriminatory capacity of WP markers with standard neuropsychological and neuroimaging measures, casting doubts on the actual clinical contributions of the approach. This proof-of-concept study aims to compare the relative robustness of WP markers with features extracted from neuropsychological and brain assessments. We recruited 33 AD patients and 33 healthy controls from a carefully characterized cohort. All participants underwent verbal fluency tests, neuropsychological evaluations (tapping on general cognitive skills, attention, set-shifting, and working memory) and MRI scans. Separate machine learning classifiers were trained with (i) WP features from the fluency tasks, (ii) score from the neuropsychological tests, and (iii) volumetric features from the imaging protocol. Cross-validation results showed that patient identification was similar between WP features (AUC=.828) and both neuropsychological (AUC=.814) and imaging

(AUC=.892) features (p-values>0.05). Overall, WP analyses seem non-inferior to standard diagnostic measures, reinforcing their value as a scalable, low-cost tool for dementia assessments.

S-039 | Role of Impulsivity in the automation of Complex Decision Making (CDT)

Cognition, Behavior, and Memory

Author: Esperanza Emilia Celestino Battagliero | Email: especeles@hotmail.com.ar

Esperanza Emilia Celestino Battagliero1°, Tomas Alves Salgueiro3°, Pablo Nicolas Fernandez Larrosa3°

1° Facultad de Psicología, UBA

2° 2. IFIBYNE, UBA-CONICET

3° 3. Facultad de Ciencias Exactas y Naturales, UBA

Decision making (D) refers to the process of selecting an option from a set of available alternatives. Most decisions are automatic and of low cognitive demand, others such as Complex Decisions (economic, moral or political) require a higher cognitive level and deliberative processes. However, they can be subject to modulations that favor more automatic processes (system 1) or deliberative processes (system 2), according to Dual Process Theories 1. We previously observed that they can be susceptible to different priming but task instruction can discourage their effect 2,3.

The reinforcement sensitivity theory proposes that motivation and emotion are central to personality, mediating the relationships between stimuli and behavioral responses 4. The present work aims to evaluate whether impulsivity can mediate the preference for automatic cognitive processes (system 1), even under conditions that previously favored system 2 processes. To do so, a self-report impulsivity questionnaire (BIS-11) will be used, composed of three dimensions (cognitive, motor, lack of planning). With it, subjects with extreme scores on the impulsivity scale (first and fourth quartile) will be selected, who will carry out the complex decision-making experiment to evaluate priming susceptibility 2

S-040 | Role of ERK/MAPK dimerization in two-trial memory in the crab Neohelice granulata

Cognition, Behavior, and Memory

Author: Carla Daniela Concilio | Email: carladanielac03@gmail.com

Carla Daniela Concilio1°, Santiago Ojea Ramos1°, Santiago D´hers1°, María Verónica Baez2°, Mariana Feld1°

1° Instituto de Fisiología, Biología Molecular y Neurociencias (IFIBYNE), UBA-CONICET

2° Instituto de Biología Celular y Neurociencias Prof. Dr. E. de Robertis (IBCN), CONICET-UBA

The long-term memory (LTM) of the crab Neohelice granulata has been widely studied using behavioral, pharmacological, molecular, and electrophysiological approaches. Recently, a 2-trial LTM (2t-LTM) protocol was developed, revealing an associative, protein synthesis dependent and context-specific memory that is expressed up to 96 hours after training. This memory induces ERK/MAPK phosphorylation in the central brain and is impaired by systemic injection of an ERK/MAPK inhibitor.

While ERK phosphorylation has been extensively studied, little is known about the role of dimerization in memory processes. ERK/MAPK dimerization is hypothesized to regulate both the kinase's targets and its retention in the cytosol. Given the importance of extra-nuclear ERK/MAPK activation in memory processes in both vertebrates and invertebrates, we evaluated the effect of injecting DEL-22379, a specific ERK dimerization inhibitor, in 2-trial long- and short-term memory retention. Additionally, we present preliminary results using native gel electrophoresis to assess ERK/MAPK dimerization levels in the crab's central brain following biochemical stimulation.

Our initial findings suggest a potential role for ERK dimerization in memory formation in Neohelice granulata but further investigation is required to confirm this mechanism's involvement.

S-041 | Exploring rutabaga involvement on time-estimation

Cognition, Behavior, and Memory

Author: Malena Cortasa | Email: malenacortasa@gmail.com

Malena Cortasa1°, Lia Frenkel1°

1° Laboratorio de Neurociencias del Tiempo-Instituto de Biociencias, Biotecnología y Biología traslacional- Facultad de Ciencias Exactas y Naturales- Universidad de Buenos Aires

The neurobiological basis of time estimation has not been clearly established yet. We hypothesize that time estimation could be a type of immediate/short-term memory in which time itself is the stimulus that launches a behavior. We centered our study in rutabaga to find out whether it is engaged in time estimation, as it is a Ca+/calmodulin dependent adenylate cyclase involved in short-term memory.

We developed an automated interval-timing experimental setup for Drosophila melanogaster that delivers sucrose drops at a fixed interval. Each drop is available for 10s and the isolated fly only reaches the drop by executing a Proboscis Extension Response (PER). An overhead camera registers the behavior over time and DeepLabCut is used to analyze it. Previous results showed that 1) training increases the probability of PER, anticipating the occurrence of the drop and 2) that mushroom bodies seem to be involved in these responses.

Our first results showed that rutabaga is necessary for proper eye development since its downregulation in eyeless (OK107) pattern leads to morphologic and functional phenotypes. We adopted an auxin-inducible gene expression system to overcome these unwanted effects. Adult-specific downregulation of rutabaga in the OK107 pattern leads to eyes, phototaxis and startle response that are indistinguishable from control flies. Finally, we are evaluating the necessity and sufficiency of rutabaga in the mushroom bodies for the ability to estimate time.

S-042 | Differences between communal and biparental nesting and its implications on adolescent behavior and ethanol response

Cognition, Behavior, and Memory

Author: Julia Dimundo | Email: Julia.dimundo@mi.unc.edu.ar

Julia Dimundo1°, Lucila Pasquetta1°, Ximena Caeiro1°, Roberto Sebastián Miranda-Morales1°2°

1° Instituto de Investigación Médica Mercedes y Martín Ferreyra (INIMEC-CONICET-Universidad Nacional de Córdoba), Córdoba, 5016, Argentina.

2° Facultad de Psicología, Universidad Nacional de Córdoba, Córdoba, 5000, Argentina.

Social experiences, including parental care and family structure, during early ontogeny affect offspring neurodevelopment, behavior and drug response. Our previous studies on C57 mice found significant differences between single-mother and biparental (BP) rearing. Adolescents reared by single-mothers displayed an anxiety-prone phenotype with higher rates of alcohol consumption. In the present study, traditional BP nesting, was compared with a communal nesting (CN), consisting of a nursing female plus the father and mother. Parental activity during the lactation was analyzed. Also, the behavior of the adolescent offspring, under ethanol effects, was studied using the Light/Dark Test (LDB). Results indicated that the presence of an additional caregiver during birth and lactation increases the frequency of pup-directed behaviors. In the LDB, although a significant effect of the rearing condition could not be determined, differences in the behavioral profiles of males and females and a clear effect of alcohol, were observed. Female mice, spent more time in the light side, traveled longer distances and made more side transitions. The stimulating effect of alcohol was evidenced by a higher speed achieved during the test, greater distance traveled, more transitions, and an increased number of rearing and wall-climbing events. This study showed that long-term differences as a consequence of parenting structure seem to decrease when two or more caregivers are present since birth.

S-043 | Systemic administration of Rac1 inhibitor 1A-116 enhances recognition memory in rats

Cognition, Behavior, and Memory

Author: Gabriel Fernandes Borges | Email: gabriel.borges@edu.isd.org.br

Gabriel Fernandes Borges1°2°, Thays Alves Monteiro1°, Beatriz do Nascimento Pinheiro Moura1°, Andressa Radiske1°, Maria Carolina Gonzalez1°

1° Edmond and Lily Safra International Institute of Neuroscience

2° Federal University of Rio Grande do Norte

Recognition memory allows the identification of previously encountered items or situations as familiar, being essential for declarative memory function. Pharmacological strategies that enhance recognition memory could play a crucial role in the treatment of cognitive disorders. Recent studies showed that Rac1 activity modulates memory formation and decay by regulating spine morphology and synaptic efficacy. In this study, we investigated the effects of systemic administration of the Rac1 inhibitor 1A-116 on object recognition memory retention in Wistar rats using weak and strong training protocols to induce short- and long-lasting memories. We found that 1A-116 (20 mg/kg; i.p.) given immediately after weak training facilitated memory formation and retention in young adult male and female rats, as well as in middle-age subjects. Furthermore, following a strong training protocol, 1A-116 administration promoted memory persistence for at least 28 days. Importantly, 1A-116 treatment did not affect locomotor activity or memory retrieval. Additionally, we observed that 1A-116 increased c-Fos expression and gamma activity in the hippocampus. These results suggest that 1A-116 modulates hippocampal activity and is a promising strategy for treating memory-related disorders.

S-044 | MORA: A Smartphone Application for Learning Math Through Games: Results and Perspectives.

Cognition, Behavior, and Memory

Author: Christopher Gabaldon | Email: c_gabaldon@outlook.com

Christopher Gabaldon1°, Valeria Edelsztein3°, Andrés Rieznik1°

1° Universidad Torcuato Di Tella, Buenos Aires, Argentina

2° Centro de Formación en Investigación en Enseñanza de las Ciencias, UBA, Buenos Aires, Argentina

We analyzed data collected through a mobile application designed for children aged 6 to 12 to learn basic arithmetic while playing on a smartphone. The app, called MORA, features a playful and engaging design. With data from over 3,000 participants, we demonstrate that children are learning : the response times decrease as they progress through the game.

A key focus of our study was on the longitudinal tracking of individual performance, observing how each participant's performance evolved over time and the tasks repetitions. This detailed approach was complemented by population-level analyses and the application of linear mixed-effects models, which allowed us to identify general trends and individual differences in learning. Additionally, we explored population variabilities related to schooling level and student gender. These analyses enhance our understanding of arithmetic learning in digital contexts and provide new insights for future research.

S-045 | Semantic memory navigation in HIV: Conceptual associations and word selection patterns

Cognition, Behavior, and Memory

Author: Carolina Gattei | Email: carogattei@utdt.edu

Carolina Gattei1°2°3°, Franco Ferrante3°4°, Bárbara Sampedro2°, Lucas Sterpin4°, Valeria Abusamra4°, Lorena Abusamra, Paola Lorena Cañataro, Adolfo García4°

1° Escuela de Gobierno, Universidad Torcuato Di Tella

2° Instituto de Lingüística, FFyL, Universidad de Buenos Aires

3° Consejo Nacional de Investigaciones Científicas y Técnicas

4° Centro de Neurociencia Cognitiva, Universidad de San Andrés

Objective: This study aimed to characterize semantic memory in individuals with human immunodeficiency virus (HIV) and mild neurocognitive impairment.

Method: Using a semantic relatedness task, we explored conceptual association and word selection patterns in people living with HIV (PLWH; n = 50) relative to people living without HIV (n = 46). We also studied whether, within the group of PLWH, word selection patterns were associated with measures of working memory capacity, cognitive flexibility, inhibitory control and viral load.

Results: While accuracy did not differ between groups, PLWH produced significantly longer responses than controls (r = .32) , with fewer hypernyms (d = .47), more troponyms (r = .37), and words that were more frequent (r = .39) and had more phonological neighbors (r = .22). None of these patterns correlated with measures of working memory, cognitive flexibility, inhibitory control or viral load (all correlation coefficients < .36) . Together, these results suggest that PLWH might use alternative word finding strategies when involved in tasks that require semantic memory navigation, irrespective of the severity of other cognitive symptoms. Such findings contribute to the characterization of cognitive deficits in HIV and to the search of novel markers of the condition.

S-046 | Dream content and declarative memory processing during sleep

Cognition, Behavior, and Memory

Author: María Laura Gorosito | Email: lauragorosito658@gmail.com

M. Laura Gorosito1°, Matías Pretel1°, Nerea L. Herrero1°, Laura Kaczer2°, Cecilia Forcato1°

1° Laboratorio de Sueño y Memoria, Depto. de Ciencias de la Vida, Instituto Tecnológico de Buenos Aires (ITBA)

2° Laboratorio de Lenguaje y Cognición. Departamento de Fisiología, Biología Molecular y Celular, FCEN, Universidad de Buenos Aires

During Non Rapid Eye Movement (NREM) sleep, spontaneous reactivations occur in the neural circuits involved in encoding information acquired while awake facilitating the transfer and redistribution of information between brain areas, favoring memory consolidation. Reactivations during REM sleep have been linked to the integration of new memories into pre-existing neural networks. From a neuroscience perspective, dreams reflect memory processes. This study aimed to assess whether the learning of new words (word-definition-image) could induce dreams, and to determine if the amount of dream content related to the learned task is associated with the consolidation of this memory. To achieve this, 15 subjects learned a new-word task before sleep (Day 1), followed by a serial awakening protocol. They were tested on Day 2 and had uninterrupted sleep. On Day 3 memory reactivation took place, followed by 4 awakenings. A final testing was conducted on Day 4, with dream reports collected after each awakening.

Results show that 55% of dreams had elements of the learned task, proving that the protocol was effective in inducing task-related dream content. Furthermore, we found a negative correlation between the amount of dream content after reactivation and the number of correctly recalled words and definitions. This result could be explained by the reactivation-induced labilization of that memory trace, which along with awakenings, could be disrupting its restabilization and integration.

S-047 | The influence of the Cdk5/p35 complex on working memory and the effects of acute treatment with methylphenidate and fluoxetine in a mouse model of Attention Deficit Hyperactivity Disorder.

Cognition, Behavior, and Memory

Author: Franco Adrián Haehnel | Email: franco.haehnel@mi.unc.edu.ar

Franco Adrián Haehnel1°, Florencia Dadam1°2°, Osvaldo Martín Basmadjian1°, María Gabriela Paglini1°3°

1° Instituto de Investigación Médica Mercedes y Martín Ferreyra, INIMEC-CONICET-UNC.1 Instituto de Investigación Médica Mercedes y Martín Ferreyra, INIMEC-CONICET-UNC.

2° Facultad de Psicologia, Universidad Nacional de Córdoba

3° Instituto de Virología "Dr. José María Vanella", In.Vi.V.-CONICET-UNC

Attention-Deficit/Hyperactivity Disorder (ADHD) is a neurodevelopmental disorder characterized by hyperactivity, impulsivity, and working memory (WM) deficits, which impair short-term memory used for the planning and execution of cognitive functions. The treatment of ADHD typically involves the use of psychostimulants such as methylphenidate (MTPH), while fluoxetine (FLX) may be incorporated when there is comorbidity with depressive disorders. We previously demonstrated that p35KO mice, which lack the activating subunit of Cdk5, exhibit key features of ADHD animal models.

We aimed to investigate the contribution of the Cdk5/p35 complex to WM and explore the impact of acute MTPH and FLX treatments, taking into account potential sex differences. We used p35KO mice and wild-type (WT) controls. Between postnatal days 21-25, the animals received acute treatment with MTPH, FLX, MTPH+FLX, or saline solution, followed by a Y-maze test to assess WM. Both, male and female p35KO mice exhibited impaired WM compared with WT mice. However, acute treatment with MTPH or FLX reversed the WM deficit only in male mice, these effects were not seen with combined treatment. Additionally, these treatments reduced WM performance in WT female mice.

In conclusion, our study highlights the crucial role of the Cdk5/p35 complex in WM processes. It also demonstrates that acute treatment with MTPH or FLX can restore WM deficits in p35KO-male mice, although these treatments may pose risks for WT animals.

S-048 | Running is not always good for you: effect of voluntary exercise on memory processes in mice

Cognition, Behavior, and Memory

Author: Rocío M. Hernández Clauser | Email: rhclauser@cbc.uba.ar

Rocío M. Hernández Clauser1°, Candela Medina1°2°3°, Mariano M. Boccia1°, María C. Krawczyk1°

1° Laboratorio de Neurofarmacología de Procesos de Memoria, Cátedra de Farmacología, Facultad de Farmacia y Bioquímica – UBA. Buenos Aires, Argentina

2° Universidad de Buenos Aires (UBA), Facultad de Ciencias Exactas y Naturales (FCEyN), Departamento de Fisiologia, Biologia Molecular y Celular (DFBMC), Buenos Aires, Argentina

3° Universidad de Buenos Aires (UBA)-CONICET, Instituto de Fisiología, Biología Molecular y Neurociencias (IFIBYNE), Buenos Aires, Argentina

State-dependent memories are those that are more easily retrieved when a subject is in the same neurohumoral state as when they were formed. This phenomenon suggests that the congruence between the state during encoding and the state during retrieval facilitates memory access. Several studies have suggested that physical exercise induces a physiological state that could modulate memory consolidation and retrieval through the release of endogenous opioids, among others. Endogenous opioids are neuromodulators naturally produced by the body that are involved in pain modulation and reward responses. Previous studies conducted in our laboratory suggest that exposure to moderate/intense exercise immediately after a training session on an aversive task induces an impairment in performance evaluated 48 hours later. We speculate that this impairment could be due to state-dependence induced by exercise. This work aims to elucidate how voluntary exercise is capable of modulating the consolidation and retrieval processes of an aversive memory in CF1 mice, highlighting the role of endogenous opioids and possible state-dependence. These findings may have significant implications for the design of behavioral interventions on pathological memories and will contribute to the understanding of the mechanisms underlying this relationship.

S-049 | Exploring the role of the medial prefrontal cortex in the retrieval of episodic memory

Cognition, Behavior, and Memory

Author: Mariana Imperatori | Email: marianaimperatori3@gmail.com

Mariana Imperatori1°, Pedro Bekinschtein1°, Noelia Weisstaub1°

1° Laboratorio de Memoria y Cognición Molecular, Instituto de Neurociencia Cognitiva y Traslacional (CONICET-Fundación INECO-Universidad Favaloro).

Episodic memory can be defined as the memory for unique events. In most situations, reality is ambiguous, and the cues that trigger retrieval are often associated with more than one particular memory. The medial prefrontal cortex (mPFC) controls the retrieval of memory traces, inhibiting the less relevant one, in situations where the cues presented could trigger the expression of more than one and cause interference. We have identified that the mPFC, the ventral hippocampus (vHPC), the dorsal hippocampus (dHPC), as well as the perirhinal cortex (PRH), are involved in the retrieval of memories that integrate more than one type of information. But it is still not known the type of information they store and the interaction among them. We have previously shown that mPFC 5HT2aR are necessary for the control of interference during a contextual version of the object recognition task. However, if and how 5-HT2aR modulation of mPFC subregions are involved in this process is not clear. Combining behavioral and pharmacological tools we started analyzing the contribution of 5-HT2aR within the different subregions of the mPFC in the control of memory interference Our findings show that infralimbic (IL) and prelimbic (PL) 5-HT2aR are required for the retrieval of an object in context memory. Additionally, we have evidence indicating that 5HT2aR modulation of the IL-HPCv; IL-PRH; PL-HPCd and PL-PRH circuits are required during retrieval of this type of memory.

S-050 | Split olfactory pathways convey appetitive and aversive information

Cognition, Behavior, and Memory

Author: Agustin Eleazar Lara | Email: agustin.e.lara@hotmail.com

Agustin Eleazar Lara1°, Emiliano Marachlian2°, Martin Klappenbach1°, Fernando Locatelli1°

1° Instituto de Fisiología, Biología Molecular y Neurociencias (IFIByNE-UBA-CONICET)

2° Institut de Biologie de l´Ecole Normale Superieure - Paris, France

A feature of several neural circuits in insects and vertebrates is the presence of multiple tracts creating parallel pathways between periphery and higher brain centres. A main interest is whether these tracts convey redundant or distinct information. In our work, we investigated two tracts of the olfactory circuit in Apis mellifera, each connecting different parts of the AL (antennal lobe) to the MB (mushroom bodies). These parts possess distinct processing features, such as the number of local inhibitory interconnections. Therefore, these tracts could carry olfactory information processed differently. In previous research, we measured odor representation in the lateral tract and found that appetitive, but not aversive conditioning, enhances the representation of a conditioned odor. This correlated with behavioral results where an appetitive learned odor blocks learning of a second odor within a mixture. Additionally, we discovered that bees can distinguish appetitive and aversive learned odors presented as a mixture. Thus, we propose that information of different olfactory modalities is segregated in the AL and relayed independently to the MB. To test this, we conducted physiological and behavioral experiments. Our results show that lesions to either the lateral or medial tract impairs retrieval of appetitive or aversive memory, respectively. Currently, our experiments aim to determine if aversive learned odors also block the learning of a second odor within a mixture.

S-051 | Neural circuits underlying social recognition memories in rodents

Cognition, Behavior, and Memory

Author: Luciana Delfina Levinsonas | Email: lucianalevinsonas@gmail.com

Luciana Delfina Levinsonas1°2°, Paula Funaro1°2°, Verónica de la Fuente1°2°

1° Facultad de Ciencias Exactas y Naturales, Universidad de Buenos Aires, Argentina

2° Instituto de Fisiología, Biología Molecular y Neurociencias (IFIBYNE-UBA-CONICET), Argentina

Social recognition memory (SRM) is essential for maintaining the stability of social groups, as it allows individuals to identify and remember conspecifics across time. Despite the importance of SRM, the neural circuits involved remain poorly understood. In rodents, SRM is commonly studied using the social recognition task (SRT), where an experimental subject initially explores an unfamiliar conspecific and is later presented with the familiar individual alongside a novel one. Social novelty preference, the tendency to favor interactions with novel conspecifics, has long been used as a proxy for assessing social memory. In our lab, we recently established the SRT paradigm to begin investigating the neural basis of SRM. Using cFOS immunohistochemistry, we observed an increase in cFOS-positive cells in the dentate gyrus of the dorsal hippocampus, but not in the paraventricular nucleus of the hypothalamus, in mice that underwent the SRT, compared to naive mice or mice that underwent an object recognition task. These findings suggest a potential role for the dorsal hippocampus in SRM. Here, we discuss future experiments aimed at further elucidating the neural circuits involved in SRM. Understanding the neural circuits underlying social recognition is crucial, as disruptions in these processes are linked to various psychiatric, neurodevelopmental, and neurodegenerative disorders.

S-052 | Associations between sourcing and working memory, vocabulary and text comprehension in high school students

Cognition, Behavior, and Memory

Author: Magalí Ayelén Martínez | Email: martinezmagali@psi.uba.ar

Magalí Ayelén Martínez1°2°, Giuliana Fraternale1°, Gaston Saux2°3°, Debora Burin1°2°

1° Instituto de Investigaciones, Facultad de Psicología, Universidad de Buenos Aires

2° CONICET

3° Centro de Investigaciones en Psicología y Psicopedagogía (CIPP), Pontificia Universidad Católica Argentina

Reading literacy on the Internet involves evaluating source trustworthiness. Theoretical models have associated this ability with individual psycholinguistic and executive differences, but empirical evidence is inconsistent. We studied the association between working memory capacity (WM), vocabulary, and text comprehension with performance on a web page evaluation task in high school students. Participants were 76 second- and third-year students (mean age = 14.37 SD = 0.69), who completed the Letter Number Sequencing test (WM), the BAIRES test (Vocabulary), the TLC-II battery Informational Text screening (Text Comprehension), and an online source rating task (i.e., assessing the trustworthiness of short descriptions of links of varying quality). Linear mixed models with WM, Vocabulary, and Text Comprehension as fixed predictors and Participant and Item as random factors, and good and bad quality sources ratings as dependent variables, indicated that these variables did not predict scores assigned to bad quality links, ps > .107. In contrast, Text Comprehension positively predicted scores for good quality links, β = 0.10, CI95% = [0.01, 0.19], p = .029, but the rest of the predictors were not significant, ps > .053. These results suggest a link between comprehending text and evaluating online sources, conditional on the trustworthiness (high or low) assigned to the source.

S-053 | Under predation Drosophila stores an associative long-term memory

Cognition, Behavior, and Memory

Author: Valentino Morazzo Nunzi | Email: valentinovittoriomn@gmail.com

Valentino Morazzo Nunzi1°, Christian Carpio Romero3°, Lia Frenkel3°, Freudenthal Ramiro1°

1° Laboratorio de Plasticidad Sináptica y Memoria, Instituto de Biociencias, Biotecnología y Biología traslacional (IB3), UBA-CONICET, FCEN, UBA, CABA, Argentina.

2° Laboratorio de Genética del Comportamiento, Fundación Instituto Leloir, IIBBA-CONICET, Buenos Aires, Argentina.

3° Laboratorio de neurociencias del tiempo, Instituto de Biociencias, Biotecnología y Biología traslacional (IB3), UBA-CONICET, FCEN, UBA, CABA, Argentina

Evolutionarily, predation has exerted selection pressure on the behaviors of species. Strategies that are effective and confer survival, will persist over time. Predatory risk can affect the behavior and physiology of the prey, and in this way, it has been proposed that natural selection guided the development of different behavioral systems, among them a rapid learning and memory system (Pavlovian conditioning) that allows to identify threats and promote pertinent defensive behaviors.

Drosophila melanogaster under predation express a variety of defensive behaviors therefore predation has been proposed to promote learning; thus, it is valuable to utilize a natural predator as a source of unconditioned stimulus to study behavior responses, in comparison to more reductionistic ones such as electric shocks. Here we study the interaction with the spider Menemerus semilimbatus, a Salticid specialized predator of Diptera. It is of our interest to study long-term memories so we developed a paradigm in which we faced flies with a predator within a specific context during a training session and 24 hours later, during testing we evaluated long-term memory retention, defined as a significantly lower movement in trained than control animals. We found that this memory retention is context-specific which suggests that this type of memory is associative.

This long-term memory model will allow us to study molecular pathways involved in a naturalistic learning and memory model.

S-054 | Investigating Inter-Brain Synchronization in Coordination Tasks

Cognition, Behavior, and Memory

Author: Lautaro Mundel | Email: lautaroezequielmundel@gmail.com

Lautaro Mundel1°2°, Francisco Domato1°2°, Cecilia Martinez2°, Emilio Kropff2°

1° Universidad de Buenos Aires, Facultad de Ciencias Exactas y Naturales

2° Fundación Instituto Leloir

The hippocampus is a brain structure highly conserved throughout the evolution of mammals and has a fundamental role in the formation of memories and spatial orientation. It contains place cells, neurons that associate their activity to a specific position in the environment, allowing the construction of an internal representation of the place being visited. The first studies on place cells were carried out in rodents, although there are similar findings in other mammals and even humans. It has been recently discovered in mice and bats that, in addition to encoding the position of an individual, place cells can encode the position of a conspecific in mimicry tasks.

To strengthen this hypothesis with new evidence, we will study neuronal activity in the CA1 region of the hippocampus of pairs of adult rats while they perform a task that requires them to act coordinately. We will implant tetrode arrays to record local field potential and neuronal activity. In particular, we will analyze whether the oscillations of the local field potential of each individual are associated with the encoding of the position of the other.

S-055 | Role of 5-HT2A Receptor in Memory Interference Control: Combining pharmacology with electrophysilogical recordings in behaving rats

Cognition, Behavior, and Memory

Author: Maria Victoria Oberholzer | Email: vic.ober@gmail.com

Maria Victoria Oberholzer1°, Esteban Valverde2°, Noelia Weisstaub1°, Camila Zold2°

1° Instituto de Neurociencia Cognitiva y Traslacional Fundación Favaloro (INECO-CONICET)

2° INSTITUTO DE FISIOLOGIA Y BIOFISICA BERNARDO HOUSSAY (IFIBIO HOUSSAY)

Effective episodic memory recall requires distinguishing between similar experiences. In rodents, this can be studied using the Object-in-Context (OIC) task, where animals must differenciate between two competing memories by using contextual cues. The medial prefrontal cortex (mPFC) is key in selecting the correct memory, a process influenced by neurotransmitters such as serotonin (5-HT). Blocking 5-HT2A receptors in the mPFC disrupts memory interference control but does not affect attentional processing . The hippocampal (HIP) connection with the mPFC is believed to provide contextual information to the mPFC during recall. Theta oscillations in the HIP, linked to exploratory behavior and memory processes, modulate mPFC activity. Local field potential (LFP) recordings show increased theta power in the ventral HIP and mPFC during object exploration. Coherence between both structures increases particularly when the object is incongruent (IO) and it correlates with animals' performance. To assess how 5-HT2A receptor blockade in the mPFC affects HIP-mPFC synchrony during episodic memory recall, Wistar rats were implanted with tetrodes and cannulas in the mPFC and electrodes in the HIP. Preliminary results show that while vehicle-infused rats perform well on the OIC task , 5-HT2A antagonist infusion impairs performance. Further analysis will explore the impact of blocking 5-HT2AR in the mPFC on theta band coherence and mPFC unit activity during object exploration.

S-056 | Changes in the state of DNA methylation in nicotine-induced place preference in zebrafish brain

Cognition, Behavior, and Memory

Author: Joaquin Ortiz | Email: joaquinortiz22.jo@gmail.com

Joaquin Ortiz1°, Leandro Rocco1°, Paula Faillace1°, Ramón Oscar Bernabeu1°

1° IFIBIO Houssay (UBA-CONICET)

A goal of addiction research is to gain an understanding of the molecular changes that underlie the onset and persistence of addiction-like behaviors. Drugs of abuse regulate behavioral responses in zebrafish, among others, via epigenetic modifications. We have previously shown that DNA methylation (5mC) is involved in the establishment of a nicotine-induced conditioned place preference (CPP) in zebrafish. However, cytosine hidroxymethylation (5hmC), the first step on DNA demethylation, is a long-lasting epigenetic mechanism not explored yet in the nicotine CPP. To assess the influence of 5hmC on nicotine-CPP we evaluated both 5mC and 5hmC, together with the transcriptional expression of key enzymes of the DNA methylation cycle on structures involved in the zebrafish reward-pathway. Different structures in the reward pathway showed different amounts of positive cells of each marker in experimental groups. Furthermore, the DNA methyltransferases were downregulated, while the mRNA level of TET1 (a DNA demethylase) was increased in the nicotine-CPP group. This suggests that nicotine-rewarding behavior is modulated in part by 5mC but also by 5hmC in a structure dependant manner.

The use of nicotine CPP protocol allowed us to demonstrate that transcriptional expression of enzymes controlling DNA methylation and demethylation were widely modified in the brain reward structures of zebrafish. A deeper analysis is necessary to evaluate if this is a common mechanism for drugs of abuse

S-057 | Gene therapy with OSKM genes enhances hippocampal-dependent recognition memory

Cognition, Behavior, and Memory

Author: Diana Camila Pasquini Pasquini | Email: dpasquini@med.unlp.edu.ar

Diana Camila Pasquini Pasquini1°, Magdalena Vicens1°, Manuel Ronco1°

1° NEURODEGENERATIVE DISEASES, INIBIOLP, UNLP

It is well established that aging is associated with a reduction in hippocampal neurogenesis, leading to memory impairment in mammals. To investigate therapies that reactivate neurogenesis, decrease neuroinflammation, and promote senolitic effect we performed an experiment on 66 rats divided into three age groups: young (6 months, n=28), middle-aged (12 months, n=25), and senescent (24 months, n=13).OSKM-treated rats in each age group received stereotaxic bilateral injection of an adenoviral vector harboring Yamanaka genes (OSKM) into the dentate gyrus of the hippocampus. Placebo control rats received an adenoviral vector carrying the GFP reporter protein gene. Intact control rats without intervention. At 40 days of post-treatment, the time require to restore neurogenesis, spontaneous location recognition (SLR) and Barnes maze tests were performed to evaluate the effects of OSKM factors. In the spontaneous location recognition rats tested under two choice conditions: Low and High overlapping condition designed by the new object location. Results showed that control placebo and intact cohorts do not discriminate the novel locations in the two conditions. Interestingly, OSKM-treated rats present a major preference for the novel location in the High condition in all age groups. This suggests that the SLR-behavioural protocol is not adequate for detect age-related cognitive decline. Furthermore, recognition memory in the High overlapping condition was enhanced by OSKM factors.

S-058 | Oral treatment with fatty acids ɯ3 mitigates behavioural and molecular changes in the STZ-icv neurodegeneration model in rats

Cognition, Behavior, and Memory

Author: Facundo Peralta | Email: facundoperalta@med.unlp.edu.ar

Facundo Peralta1°, Ana Abril Vidal Escobedo1°, Juliette López Hanotte1°, Juan Ignacio Posada2°, Dylan Simón Canale1°, Joaquín Pardo1°, Paula Cecilia Reggiani1°2°

1° Instituto de Investigaciones Bioquímicas de La Plata `Prof. Dr. Rodolfo R. Brenner´ (CONICET-UNLP)

2° Cátedra de Citología, Histología y Embriología, Facultad de Ciencias Médicas, UNLP

Neurodegeneration-associated diseases are issues to be addressed for the well-being of future generations. We explore therapies that address this problem by utilizing a rat model induced by a single intracerebroventricular (ICV) injection of streptozotocin (STZ). In this opportunity, we aim to evaluate the effect of oral dietary supplementation with omega-3 (ɯ3) fatty acids, focussing on behavioural performance and molecular changes in the hippocampus (HC), two features particularly affected in our model. On week 0, animals were randomly grouped (n=8/group) into SHAM, STZ, and STZ+ɯ3, and received icv-artificial cerebral spinal fluid (SHAM) or STZ (STZ/STZ+ɯ3) (3mg/kg) bilaterally. Among week 1 and 12, STZ+ɯ3 rats were treated daily with ɯ3 (Regulip1000 150 µl: 44,5 mg ɯ3/rat). Two weeks before euthanizing, behavioural tests were performed. Immature neurons and astrocytes in the HC were examined using immunohistochemical labelling for doublecortin and glial fibrillary acidic protein, respectively. We observed that ɯ3 treatment ameliorates STZ-induced neurodegeneration associated with species-typical behaviour, short-term but not long-term recognition memory, and depressive-like behaviour. At the molecular level, it modulated astrocytes and partially restored the number of immature neurons. We conclude that neurodegenerative features can be mitigated through a minimally invasive therapeutic strategy when using an appropriate therapeutic factor such as ɯ3.

S-059 | Reconsolidation, updating, and organization of memory

Cognition, Behavior, and Memory

Author: Thomas Yamil Reller | Email: treller@itba.edu.ar

Thomas Yamil Reller1°2°, Natalia El Hage Barrita1°2°, Zoe Rapoport2°, Diego Moncada1°2°

1° 1: Instituto Tecnológico de Buenos Aires

2° Laboratorio de Neurofisiología de la Memoria, Instituto de Biologíca Celular y Neurociencias (CONICET-UBA/FMED))

Memory, or the collection of memories of any individual, is shaped over a lifetime in various learning experiences and creative processes that also rely on previously stored information. Yet, the environment's dynamics and shifts in individual circumstances can lead to discrepancies in many factors between the formation of a memory and its later use. Therefore, memory prediction capabilities may turn inaccurate or incomplete, triggering mechanisms to update or refine the trace. This may happen multiple times, particularly for repeatedly accessed memories, suggesting the need for a biological system to organize and integrate these updates. Here we begin to study this possibility.

To do it, we followed an object location memory, in rats, through multiple reconsolidation sessions. To the moment, our results show that each session triggers the long-term storage of information about a novel object's position, in a time-lapse that otherwise would not occur. Impairing a reconsolidation session also impairs the updating of the memory trace. Impairing the first session induces anterograde and retrograde amnesia. Interestingly, impairing reconsolidation in another session also induces amnesia, but it retroacts up to information acquired in a previous reconsolidation session, without affecting the memory formed upon learning.

This first approximation suggests that information added to a trace in successive reconsolidation sessions is stacked in layers with partial memory representations

S-060 | Stress affects the plasticity of synapses during fear memory destabilization/reconsolidation process

Cognition, Behavior, and Memory

Author: Melisa Riva Gargiulo | Email: melisa.gargiulo.080@unc.edu.ar

Melisa Riva Gargiulo1°2°, Ramiro Comas Mutis1°2°, Crhistian Bender1°2°, Lucas Pozzo Miller3°, Gastón Calfa1°2°

1° Instiruto de Faracología Experimental de Córdoba-IFEC

2° Departamento de Farmacología Otto Orsigher, Universidad Nacional de Córdoba

3° Department of Pediatrics & Human Development, Michigan State University

When a reminder is presented, an already consolidated memory can enter a labile state, followed by a new process of stabilization defined as destabilization/reconsolidation. In this sense, LTD could be critical for the weakening of synaptic connections. Previous studies have shown that such process is accompanied by the internalization of the glutamate receptor subunit GluA2 in the dorsal hippocampus (HD). However, it has been observed that emotionally relevant experiences, such as stress, prior to contextual fear conditioning generates resistance to destabilization/reconsolidation, with the consequent loss of the dynamic property of the fear memory. In the present study, we assessed if a stressful event influences the dynamic of LTD and GluA2 expression during destabilization/reconsolidation process in CA1. For this, we use previously stressed and conditioned C57BL/6 mice which were reactivated one day later in the same conditioning context. The animals were sacrificed before or 60 minutes after retrieval, CA1 DH was obtained for WB analysis and electrophysiology recordings. The preliminary findings showed that the stress exposure caused a higher excitatory tone in CA1 and an impediment in the internalization of GluA2 subunit.

S-061 | Persistent changes in histone acetylation play a fundamental role in nicotine relapse.

Cognition, Behavior, and Memory

Author: Leandro Rocco | Email: lrocco@fmed.uba.ar

Leandro Rocco1°, Joaquín Ortiz1°, María Paula Faillace1°, Ramón Oscar Bernabeu1°

1° IFIBIO Houssay. UBA-CONICET

Epigenetic mechanisms have been studied as an essential cog in the development, maintenance and reinstatement of addiction-related behaviours, whereas its involvement regarding relapse to drugs of abuse have not been fully elucidated. Zebrafish constitutes a practical and verified model used in addiction biology through the conditioned place preference (CPP) task.

In the present study we aimed to evaluate nicotine relapse-related responses and assess the levels of epigenetic markers related to drug reward such as histone acetylation in lysine residues 9 and 27 (H3K9Ac and H3K27Ac) which are associated with chromatin relaxation and higher transcriptional activity. Animals tested on a nicotine-CPP task showed higher levels of H3K9Ac and H3K27Ac in all regions that constitute the reward pathway in comparison to saline-treated controls. Interestingly, in fish that were later subjected to an extinction protocol and evaluated for nicotine relapse, these epigenetic markers remained elevated in brain regions principally with a high number of dopaminergic neurons, such as PTN and Vd/Vv.

In addition to this, using RT-qPCR, we evaluated mRNA levels of key enzymes involved in histone acetylation such as HDAC-1, CBP-A and CBP-B.

These findings suggest that histone acetylation plays a fundamental role in maintaining nicotine induced preference and may regulate susceptibility to relapse, offering a potential target in the treatment of nicotine addiction.

S-062 | Gene therapy with OSKM genes improves hippocampus-dependent episodic memory

Cognition, Behavior, and Memory

Author: Manuel Andres Ronco | Email: maroncoescuela@gmail.com

Magdalena Vicens1°, Diana Camila Pasquini1°, Manuel Andres Ronco1°

1° NEURODEGENERATIVE DISEASES, INIBIOLP, UNLP

Changes in the central nervous system (CNS) over time are associated with a progressive deterioration of neurogenesis and synaptic connections, leading to cognitive deficits, specifically loss of spatial memory and loss of recognition memory. objects. These functional alterations correlate with morphological and molecular changes throughout the CNS, mainly in the hippocampus. In this study, we aim to investigate the impact of gene therapy using Yamanaka genes (Oct4, Sox2, Klf4 and c-Myc) on the hippocampus of middle-aged rats. Our hypothesis is that the expression of these genes that encode four transcription factors, when expressed for a short period, allows the maintenance of cellular identity and the simultaneous reversal of age-associated epigenetic marks (Horvat reference), promoting neurogenesis in the hippocampus.

In the treatment, an adenovector carrying OSKM genes was injected bilaterally into the subgranular zone of the dentate gyrus region of the hippocampus in 62 rats aged 6, 12, and 24 months. Four weeks later, the Barnes maze and SLR tests were performed. To determine spatial memory retention in the Barnes maze, we assessed the time animals spent in target sector 3 (GS3) when the escape box was removed.

It will be observed that rats treated with the OSKM genes will demonstrate better learning ability compared to the untreated group (Barnes maze). Regarding object recognition, an improvement will also be observed with bilateral OSKM treatment in the subgranular

S-063 | Serotonin 2A receptor plays a sex and time-specific role in social behavior

Cognition, Behavior, and Memory

Author: Agostina Belén Sacson | Email: agostina.sacson@gmail.com

Agostina Sacson1°, Marcelo Giachero1°, Noelia Weisstaub1°

1° Laboratorio de Memoria y Cognición Molecular, Instituto de Neurociencia Cognitiva y Traslacional (CONICET-Fundación INECO-Universidad Favaloro), CABA, Argentina

Serotonergic signaling has shown to be a key player in the modulation of social behavior. Specifically, serotonin type 2A receptor (5-HT2AR), known to be involved in a variety of behaviors. It has also been linked to social cognition through the pathophysiology of different psychiatric and neurodevelopmental disorders, and its role in the mechanism of action of so-called “prosocial” drugs. Our lab found that 5-HT2AR knockout (htr2a-/-) mice had reduced discrimination indexes in the three-chambers social interaction test (SIT) compared to wild-type (htr2a+/+) mice. By genetically restoring the expression of 5-HT2AR in the forebrain, mice reached discrimination indexes similar to htr2a+/+. Moreover, acute blockade of 5-HT2AR with MDL 11939 in adult htr2a+/+ mice before the SIT caused an increase in discrimination indexes only in female mice suggesting a sex-specific modulation of the 5-HT2AR in this task. Finally, preliminary results of c-fos expression analysis post-SIT showed differential expression between htr2a+/+ and htr2a-/- mice. In conclusion, these findings suggest that 5-HT2AR plays a role in social behavior, with sex-specific modulation, and highlight the distinct roles of this receptor in social cognition under acute versus developmental manipulations.

S-064 | Differential effects of valence in L1-L2 recall and recognition

Cognition, Behavior, and Memory

Author: Leticia Sarli | Email: leti.sarli@gmail.com

Leticia Sarli1°2°3°, Alexis Cadoux4°, Nadia Justel1°2°

1° Laboratorio Interdisciplinario de Neurociencia Cognitiva (LINC), CINN - UP

2° Consejo Nacional de Investigaciones Científicas y Técnicas (CONICET)

3° Universidad Nacional de Córdoba

4° Aix-Marseille Université

Memory, language, and emotions are deeply interconnected. Evidence has shown that emotionality influences memory recall and recognition in monolinguals; for bilinguals, the evidence is mixed. This study aimed to investigate the verbal memory performance of bilinguals who acquired their second language (L2) later in life, across three emotional conditions (positive, negative, and neutral). Thirty-one Spanish French bilinguals performed an encoding-retrieval task over two days, with a seven-day interval. On session one, participants assessed the emotionality of a given word and later performed a surprise recall task. After a 7-day interval, they performed a deferred free recall task and an old/new recognition task. Results showed that immediate recall outperformed deferred recall, favouring L1 positive and L2 neutral words. Participants' decision-making processes were assessed through STD on the old/new recognition task, using bias (C) and sensitivity (d') indexes. For sensitivity, participants had a higher score in their L2, with emotional words showing less bias than neutral. Particularly bias shifted between L1 and L2: L1 exhibited a conservative bias, while L2 showed a liberal bias for negative words. These results highlight significant differences in how emotional and neutral words are processed and remembered in L1 and L2, both in terms of accuracy and the underlying decision-making processes for recall and recognition.

S-065 | Attentional modulation of emotional prosody perception: Insights from a Dichotic listening fMRI paradigm

Cognition, Behavior, and Memory

Author: Juan Ignacio Segura | Email: jisegura@mail.austral.edu.ar

Juan Ignacio Segura1°2°, Guillermina Alvarez1°2°, Thiago Casetta1°4°, Martina López1°3°, Ana Paula Colombini1°, Bautista Elizalde Acevedo1°2°, Lucía Alba-Ferrara1°2°

1° ENyS - Hospital el Cruce - CONICET - UNAJ, Argentina

2° Facultad de Ciencias Biomédicas, Universidad Austral.

3° Facultad de Psicología, Universidad de Montevideo

4° Facultad de Humanidades, Universidad de Belgrano

Emotional prosody encodes vocal affection and has right hemisphere dominance. It remains unclear how attentional processing modulates lateralization. We study the neural correlates of goal-directed attention to prosody perception.

33 controls underwent an fMRI dichotic prosody task, with two stimuli (emotional or neural voices) presented simultaneously (one in each ear). Subjects attended to one ear and ignored the other. Brain activations were calculated for laterality processing (trials attending the right or left ear) and attentional processing, trials with emotion display in the unattended ear (Top-Down) or in the attended ear (bottom-up).

RTs were shorter in "bottom-up" compared to "top-down" trials, reflecting less cognitive demand. "Top-down" trials activated the left temporal (parahippocampal and medial temporal gyri) and frontal lobe (L superior frontal and R paracentral frontal gyri). There were shorter RTs when attending the left ear compared to the right, indicating rightward lateralization. Focussing on the left ear activated the insula, L medial occipital gyrus, cingulate gyrus and R superior frontal gyrus. Attending the right ear activated the L temporal lobe (superior temporal, medial temporal and superior temporal gyri), R precentral and angular gyri, L superior frontal gyrus.

Frontal recruitment reveals greater cognitive demand for top-down and the shorter RT for the left ear indicates rightward lateralization of prosody.

S-066 | The Impact of omega-3 fatty acids (ω-3 FAs) on Glial Cells and Behavior in Aging Rats

Cognition, Behavior, and Memory

Author: María Milagros Sisti | Email: msisti@med.unlp.edu.ar

María Milagros Sisti1°, Cervellini Sofia1°, Echavarría Lila1°, Carreras Tomas Ricardo1°, Peralta Facundo1°, Maté María Sabina1°, Bellini María José1°

1° INIBIOLP-CONICET, Facultad de Medicina, Universidad Nacional de La Plata, La Plata, BA, Argentina

Aging is a biological process that significantly impacts the brain, often leading to neurodegenerative diseases. Chronic inflammation, primarily driven by glial cells like microglia and astroglia, is a hallmark of the aging brain. Understanding the changes within these cell types and their correlation with behavioral alterations is crucial for gaining insights into age-related neurodegeneration.

To investigate these links, we examined behavioral changes (cognition, depression, locomotion) and the characteristics of glial cells in female Sprague Dawley rats at various ages: 6, 12, 18, and 24 months. Additionally, we assessed the effects of omega-3 fatty acid (ω-3 FAs) supplementation, known for its anti-inflammatory, antioxidant, and neuroprotective properties, on aging rats at 18 and 24 months.

Our findings reveal that early signs of depressive-like behavior appear at 12 months. While memory impairments were evident only at 24 months using Barnes Maze (BM) test, ω-3 FAs effectively ameliorated cognitive deficits associated with hippocampal memory. No significant changes were observed in other evaluated tests. Changes in the quantity and phenotype of glial cells were also observed in the different regions evaluated.

These findings suggest that ω-3 FAs supplementation could mitigate the detrimental effects of aging, by acting on glial cells. This promising outcome paves the way for exploring novel therapeutic strategies to address age-related neurodegenerative diseases.

S-067 | Effect of the temporal sequence of stimuli on olfactory associative learning in Apis mellifera.

Cognition, Behavior, and Memory

Author: Marcos Rafael Sorrentino | Email: marcosrafa.sorrentino@gmail.com

Marcos Rafael Sorrentino1°, Nicolás Pírez1°2°, Fernando Locatelli1°2°

1° Departamento de Fisiología, Biología Molecular y Celular; Facultad de Ciencias Exactas y Naturales; Universidad de Buenos Aires, Argentina.

2° Instituto de Fisiología, Biología Molecular y Neurociencias; UBA-CONICET, Argentina.

Here we investigate the contribution of the temporal order of odorants, as well as the role of sensory adaptation in the identification of meaningful olfactory stimuli. Recent experiments from our lab demonstrated that the ability of honeybees to detect target odorants embedded in complex mixtures is improved when bees are exposed to the masking odorants before conditioning with a mixture that contains both odorants. However, it remained unclear whether this capacity was due to the animals being adapted to the masking odor or to the animals learning that the masking odor predicted no reinforcement. To disambiguate it, we performed olfactory conditioning experiments in which unrewarded exposure to the masking odors was made before or after rewarded trials using as conditioned odor a mixture of both odors. We observed that specific learning towards the target odor was improved only when prolonged exposure to the masking odor precedes rewarded trials with the mixture, while it did not when unrewarded exposures were made immediately after the rewarded trial. These observations led to subsequent experiments aiming to demonstrate the animal's ability to distinguish among different temporal orders of the odorants. Two experimental protocols were proposed using quantitative analysis tools to explore this new paradigm. Our results support the idea that olfactory working memory and sensory adaptation serves as fundamental mechanisms to sharpen olfactory discrimination.

S-068 | Social comfort to stressed pregnant mice improves the quality of maternal care

Cognition, Behavior, and Memory

Author: Paula Thomas | Email: paulathomas073@gmail.com

Paula Thomas1°, Monserrat Rodríguez González1°, Bruno G. Berardino1°, Mariela Chertoff1°, Eduardo T. Cánepa1°

1° Laboratorio de Neuroepigenética y Adversidades Tempranas, Departamento Química Biológica e IQUIBICEN, FCEyN, UBA-CONICET

Maternal stress during pregnancy can affect offspring through the quality of care provided postnatally. In this work we evaluated whether comforting actions towards a stressed pregnant mouse improves postnatal care of her offspring.

From GD1 to GD12 pregnant mice were exposed once per day to one of 4 stressors at random. From GD13 until birth, mice were housed with a previously known female called support (ESA group) or unaccompanied (ES group). A third pregnant group was housed under the same conditions but not exposed to stress (CTA group).

Prior to mating no significant differences were observed in a variety of social behaviors between dam and support in ESA and CTA groups. However, during pregnancy, the ESA dyads dispensed a greater amount of allogrooming and sniffing activities than CTA, suggesting prosocial behavior triggered by perceived distress. Nurturing behaviors were evaluated from PD1 to PD6. Our results show that ES dams provided lower quality and quantity of maternal care compared to their counterparts in the ESA and CTA groups. No differences were observed in arched-back nursing and licking/grooming on pups between ESA and CTA dams suggesting that social support improved caregiving behavior towards the offspring. Changes in OxtR expression assessed in PFC and amygdala could underly the prosocial behavior observed.

Thus, social supportive behaviors can mitigate negative effects of stress during pregnancy that can affect healthy development of offspring.

S-069 | Differential Effects of Gestational Environmental Enrichment and Postnatal Stress on Social and Spatial Behavior in Male and Female Adolescent Rats

Cognition, Behavior, and Memory

Author: Agustina Belén Villegas | Email: agustina.villegas@mi.unc.edu.ar

Agustina Belén Villegas1°, Ana Paula Toselli1°, Franco Rafael Mir1°2°4°, María Angélica Rivarola1°3°

1° Cátedra de Fisiología Animal, FCEFyN, Universidad Nacional de Córdoba

2° átedra de Fisiología Animal, DACEFyN, Universidad Nacional de La Rioja

3° Instituto de Investigaciones en Ciencias de la Salud, CONICET, Universidad Nacional de Córdoba

4° Instituto de Investigación Médica Mercedes y Martín Ferreyra (INIMEC-CONICET-UNC)

Social behavior and cognitive abilities can be shaped during perinatal life, a period of high neuronal plasticity. Environmental enrichment (EE) has been observed to provide a wide range of neurochemical and behavioral benefits. However, the impact of gestational EE on programming neurocognitive development in offspring remains underexplored. Additionally, the brain exhibits sexual dimorphism, with different neuroendocrine responses to both EE and stress. This study examines the influence of gestational EE on adolescent rats, focusing on their ability to counteract the adverse effects of postnatal stress and potential sex differences. Wistar rats were exposed to EE or standard environments during gestation. On postnatal days (PND) 1 to 21, pups were subjected to either maternal separation (SM) stress or no stress. Social behavior and spatial memory were assessed in adolescence (PND 45-50) using the three-chamber test and Barnes maze. Results indicate that gestational and postnatal environments independently influence behavior with sexually dimorphic effects in adolescent rats. Social recognition memory showed a positive trend with the gestational EE having a greater impact on males, while SM affected females. For spatial memory, significant effects were only observed in males, with both gestational EE and SM enhancing memory independently, but neutral when combined. Gestational environment and postnatal stress affect adolescents' behavior in a sex-specific way.

S-070 | Quantitative analysis of autobiographical memory: validation of NLP-derived metrics from narrative data

Cognition, Behavior, and Memory

Author: Zoe Werner | Email: zoewerner27@gmail.com

Zoe Werner1°, Corina Revora2°, Luz Bavassi2°3°, Laura Kaczer1°

1° Laboratorio de Lenguaje y Cognición. Departamento de Fisiología, Biología Molecular y Celular, FCEyN, UBA

2° Departamento de Física, FCEyN, UBA

3° IFIBYNE, UBA, CONICET

The quantification of memory processes is an ever-evolving area in neuroscience. Autobiographical memories pose a particular challenge due to the high variability of individual experiences, which complicates systematic and quantitative analysis. These memories consist of an episodic component (related to the spatiotemporal context) and a semantic component (abstract details), both reflected in narratives. The primary objective of this project is to validate automated, NLP-derived measurements against the established gold standard of manual scoring (Levine et al., 2002).

For this, we have collected narratives from 60 participants and transcribed them. The scoring manual was initially adapted to Spanish and we quantified the number of internal and external details present in each narrative. We will then conduct a correlation analysis to compare these metrics with the ones previously obtained from NLP to identify which variable provides the most informative insight regarding the quantification of autobiographical memory. Through this approach, we aim to identify markers of memory plasticity in the structure and content of the narratives.

S-071 | The genetic programs behind the differentiation of CSF-contacting neuron in the spinal cord

Development

Author: Carla Campetella | Email: ccampetella@leloir.org.ar

Carla Campetella1°, Guillermo Lanuza1°

1° Fundación Instituto Leloir

During embryonic development, some spinal cord progenitors are still capable of producing neurons after the neurogenic-to-gliogenic switch. We have previously demonstrated that late neurogenesis exclusively generates Pkd2l1+ CerebroSpinal Fluid-contacting Neurons (CSF-cNs), a discrete sensory neuron type in the ependymal area. Here we show that Pkd2l1+ neurons originate from two Ascl1-expressing progenitor pools (p2/pOL and p3 domains) to produce four distinct subtypes: Lateral, Ventral, Distal-Ventral and Distal-Lateral. Our experiments show that neurons of each cluster have a specific embryonic origin, migration, final settlement and variations of a common developmental program. Using mouse molecular genetics, we found that Pkd2l1+ Lateral, Distal-Ventral and Distal-Lateral derive from p2/pOL cells and require Pax6 for their differentiation. The proneural factor Ascl1 determines CSF-cN production, but surprisingly the delaminating Distal-Ventral cells are still present in Ascl1-KO. Finally, we precisely defined the temporal activation of Gata3/2 transcription factors along postmitotic specialization. To dig deeper into their role in the specification program we generated mice with varying combinations of Gata3/2 conditional or null alleles, and found that each cluster has differing requirements for gene dosage of Gata factors. All in all, we have dissected the role of Ascl1, Pax6 and Gata3/2 throughout the differentiation pathway of late-born spinal Pkd2l1+ neurons.

S-072 | Anatomical Variability of the Accessory Sulci in the Inferior Frontal Gyrus

Development

Author: Julian Leonardo Cicler | Email: juliancicler@icloud.com

Julian Cicler1°, Axel Colombo1°, Daiana Gonzalez1°, Tomas Picone1°, Julieta Valdivia1°, Valentina Duzer Salvador1°, Gonzalo Bonilla1°, Mariana Bendersky2°

1° Laboratorio de Neuroanatomía, III Cátedra de Anatomía, Facultad de medicina, Universidad De Buenos Aires

2° Laboratorio de Anatomía Viviente, III Cátedra de Anatomía, Facultad de medicina, Universidad De Buenos Aires

Introduction:

The inferior frontal gyrus (IFG) is crucial in motor control and language processing. Its anatomy has been widely studied due to the variability in the presence of accessory sulci, such as the diagonal sulcus (DS) and the triangular sulcus (TS). This study aims to analyze the anatomical variability of these sulci, determining their frequency and describing their morphological characteristics to justify their importance in the quantification of gray matter in language areas.

Materials and Methods:

A total of 115 T1-weighted magnetic resonance imaging (MRI) scans of healthy individuals' brains were analyzed. The variables assessed included the presence of DS and TS, the morphology of the DS and its relation to the ascending branch of the lateral sulcus (ABLS), and the termination of the TS.

Results:

The DS was found in 53.05% of the left hemispheres (LH) and in 48.69% of the right hemispheres (RH), while the TS was identified in 70.43% of the LH and in 63.49% of the RH. The DS exhibited notable variability in its pattern, with a tendency to terminate over the ABLS. The TS characterized by its termination in the inferior frontal sulcus and the circular sulcus.

Conclusions:

The prevalence of these sulci in the IFG is significant, with considerable variability in their depth and termination patterns, focusing on the importance of recognizing and understanding these anatomical variations to enhance the precision in studying this region.

S-073 | EFFECTS OF STIMULUS CATEGORIZATION ON SEMANTIC RECONSTRUCTION OF CONTINUOUS LANGUAGES FROM FMRI SIGNALS

Development

Author: Nicolás Agustín Delmagro | Email: agustin.delamgro@gmail.com

Nicolás Agustín Delmagro1°, Bruno Bianchi1°2°, Juan Kamienkowski1°2°3°

1° Universidad de Buenos Aires. Facultad de Ciencias Exactas y Naturales. Departamento de Computación. Buenos Aires, Argentina.

2° CONICET-Universidad de Buenos Aires. Instituto de Ciencias de la Computación (ICC). Buenos Aires, Argentina.

3° Facultad de Ciencias Exactas y Naturales, Maestría en Explotación de Datos y Descubrimiento del Conocimiento, Universidad de Buenos Aires, Buenos Aires, Argentina

In recent years, many studies have emerged in which fMRI signals are analyzed while certain cognitive or emotional tasks are performed. Several works have been based on capturing these brain responses while the study subjects listened to narrative stories, which were used for the semantic mapping of different areas of the brain and even the generation of decoders that are able to semantically reconstruct these stories from brain signals. Following a previous work we will train a decoder that has been developed to rebuild perceived speech from those fMRI signals. Since we consider that those stories with similar themes should have certain similarities in the vocabulary used, we will seek to group these stories automatically by the main theme they talk about. Using these subsets as training, we will analyze the effects they have on the semantic reconstructions generated and on the brain areas activated during the training. We expect getting better scores rebuilding a story that matches the category of the training set. It will also be interesting to examine if the rebuilded stories preserve the category of the original story or if they match the categories used in the training set.

S-074 | Characterization of a model of schizophrenia induced by maternal immune activation: preliminary results

Development

Author: Facundo Mateo Martin | Email: facundo.martin@unc.edu.ar

Facundo Mateo Martin1°2°3°, Estela Maris Muñoz4°, Agata Rita Carpentieri1°3°, Maria Elena Peralta Lopez1°2°

1° Cátedra B de Química Biológica-Facultad de Odontología-UNC, Córdoba, Argentina

2° Cátedra de Bioquímica y Biología Molecular FCM-UNC, Córdoba, Argentina

3° INICSA-UNC-CONICET, Córdoba, Argentina

4° Laboratorio de Neurobiología Básica y Traslacional, IHEM-UNCuyo-CONICET, Mendoza, Argentina.

Schizophrenia, a mental disorder with unclear etiophysiopathology, presents with delirium, hallucinations, social isolation and cognitive alterations. There are various animal models of schizophrenia. The first and most widely studied are based on alterations in different neurotransmission systems. Recently, maternal immune activation (MIA) by infectious conditions during pregnancy has begun to be studied. These insults can trigger persistent neuroinflammation in the offspring, impair neurodevelopment and cause a schizophrenia-like syndrome. In the present work we set out to establish and characterize a model of MIA in Wistar rats induced by poly I:C acid IP on day 12 of gestation. Systemic parameters and acute phase inflammatory reactive parameters were analyzed in blood obtained by cardiac puncture 24 hours after the injection of poly I:C in doses of 5, 10 and 20 mg/kg body weight. No significant differences were detected in blood count, C reative protein (CRP) and ultrasensitive CRP of the rats treated with poly I:C acid and the controls. Body temperature was similar in both groups. The analysis of proinflammatory interleukins would be important to confirm systemic inflammation capable of determining neuroinflammation in the offspring. We are processing other inflammatory and behavioral parameters in the MIA offspring that could confirm this as a model of schizophrenia.

S-075 | GDNF/GFRa1 receptor contribution to circuits associated with neurodevelopmental psychiatric disorders

Development

Author: Delfina Mercedes Romero | Email: delfina.romero@conicet.gov.ar

Delfina Mercedes Romero1°, Maria Muñoz Osorio1°, Ana Paula De Vincenti1°, Juan Emilio Belforte2°, Mariano Soiza Reilly3°, Fernanda Ledda4°, Gustavo Paratcha4°

1° IBCN, Prof. E. De Robertis. Facultad de Cs. Médicas, UBA. Conicet

2° IFIBIO, BERNARDO HOUSSAY. Facultad de Cs. Médicas, UBA. Conicet

3° IFIBYNE. Facultad de Cs. Exactas y Naturales, UBA. Conicet

4° IIBBA. FIL. Conicet

During nervous system development, the formation of synaptic circuits occurs under a precise control of the axon and dendritic growth. Abnormalities in neuronal connectivity could contribute to the aetiology of neurodevelopmental disorders. Studies in humans and animal models indicate that alterations on the excitatory/inhibitory synaptic balance are present in neurodevelopmental psychiatric conditions such as schizophrenia, autism spectrum disorders and Rett syndrome. In addition, alterations in neural morphology and synaptic architecture could contribute to behavioural defects in mouse models associated with such psychiatric conditions. Neurotrophic factors, like the glial cell line-derived neurotrophic factor (GDNF) and its receptor GFRalpha1 (GFRa1) play a critical role in dendritic arborisation and spine maturation in the cerebral cortex and hippocampus. Despite this evidence, the role of GDNF/GFRa1 receptor in the maturation and remodelling of synaptic circuits in different forebrain regions still remains poorly understood. To investigate this, we generated new conditional mutant mice with selective ablation of GFRa1 in different populations of forebrain neurons. These mice lines will allow us to determine the specific involvement of GDNF/GFRa1 in forebrain circuits associated with neurodevelopmental disorders.

S-076 | Role of the Eph-ephrin System and Neurotrophic Factors in Cone Growth Morphology and Axon Guidance Dynamics of Retinal Ganglion Cells

Development

Author: Gonzalo Nicolás Spelzini | Email: gspelzini@fmed.uba.ar

Gonzalo Spelzini1°2°, Mara Medori1°2°, Sofía Martin Mena1°2°, Alejandro Scicolone3°, Viviana Sanchez1°2°, Luciano Fiore1°2°, Gabriel Scicolone1°2°

1° CONICET-Universidad de Buenos Aires, Instituto de Biología Celular y Neurociencias “Prof. E. De Robertis” (IBCN). Ciudad de Buenos Aires, Argentina.

2° Universidad de Buenos Aires, Facultad de Medicina, Departamento de Biología Celular, Histología, Embriología y Genética. Ciudad de Buenos Aires, Argentina.

3° Universidad de Buenos Aires, Facultad de Medicina, Departamento de Medicina interna. Ciudad de Buenos Aires, Argentina

Introduction: Tectal EphA3 stimulates axon growth of nasal retinal ganglion cells (RGCs) towards the caudal tectum, inhibiting branching in the rostral tectum. GDNF and BDNF stimulates RGC axon growth, though its effects on RGC growth cone morphology and guidance are unclear. The combined effects of EphA3 with GDNF or BDNF on RGCs remain unexplored.Objectives: This study examines the individual and combined effects of EphA3, GDNF, and BDNF on RGC growth cone morphology and dynamics.Methods: Dissociated nasal RGCs from chicken embryos were cultured and exposed to EphA3-Fc, GDNF, BDNF, or EphA3-Fc combined with neurotrophic factors. Growth cone velocity and morphology were assessed.
Axonal guidance responses to gradients were tested using a chemotaxis assay with Dunn's chamber.Results: RGC axons showed directed growth towards EphA3, GDNF, and BDNF gradients, with increased axon outgrowth velocities. EphA3-Fc combined with GDNF produced the strongest effects. Growth cones showed consistent velocity variations along their paths, with extended growth phases under combined GDNF and EphA3-Fc gradients, enhancing overall growth cone advancement and reducing collapse. Combined BDNF and EphA3-Fc gradients also increased growth phase velocities.Conclusion: GDNF, BDNF, and EphA3 promote

RGC axon outgrowth velocity and act as chemoattractants, with synergistic effects. These findings highlight the impact of chemotactic cues on growth cone morphology and movement.Support: UBACYT0197BA.

S-077 | Neuroprotective Effects of Gallein-Loaded Human Albumin Nanoparticles on a Human iPSC-Derived Neurons of model of Alzheimer's disease

Disorders of the Nervous System

Author: ROMINA SOLEDAD ALMIRON | Email: ralmiron@immf.uncor.edu

Romina Soledad Almiron1°, Cecilia Tettamanti2°, Sofia Martinez2°, Magdalena Antonino1°, Alfredo Lorenzo1°, Daniel Allemandi2°, Daniela Quinteros2°, Elena Anahi Bignante1°

1° INIMEC-UNC-CONICET

2° UNITEFA-UNC

Previously, our group managed to synthesize human serum albumin (NP) nanoparticles, both pure and loaded with gallein (NP-GAL) through a desolvation and thermal stabilization technique. NPs were evaluated in in vitro models of Alzheimer's disease (AD), using N2a cells and cortical neurons from rat embryos (RCN) treated with beta-amyloid (Aβ). The results validated the NP-GAL preparation method and demonstrated the effectiveness of these NPs in mitigating Aβ-induced toxicity in RCN. To explore the therapeutic potential of NP-GAL in the modulation of the Gβγ signaling pathway, key in the pathogenesis of AD, in a more complex and relevant in vitro model we used human neurons (HN) derived from induced pluripotent stem cells. We validated the model by demonstrating the toxic effect of Aβ on HNs, evidenced by marked neuritic dystrophy and decreased synaptophysin expression. We evaluated the protective effect of NPs and NP-GAL against Aβ-induced toxicity; we observed that NP-GAL significantly attenuated both neuritic dystrophy and synaptophysin loss induced by Aβ. This suggests that NP-GAL could exert a neuroprotective effect through modulation of the Gβγ signaling pathway, which represents a novel and promising mechanism of action for the treatment of AD. We also observed a protective effect of NPs; total on dystrophy and partial on Aβ-induced synaptic dysfunction. Our results support the therapeutic potential of GAL-NPs by modulating the Gβγ signaling pathway and of NPs per se.

S-078 | Neuroprotective effects of Yerba Mate (Ilex paraguariensis) in Parkinson's disease models

Disorders of the Nervous System

Author: Pedro Ballestero | Email: pedroballestero88@gmail.com

Pedro Ballestero1°2°, Hernan Hauche1°, Sebastian Romano2°, Melina Bordone1°, Juan Ferrario1°, Nara Muraro2°

1° Instituto de Biociencias, Biotecnología y Biomedicina - FCEyN –UBA

2° Biomedicine Research Institute of Buenos Aires - CONICET - Partner Institute of the Max Planck Society

Parkinson's disease (PD) is the second most prevalent neurodegenerative disorder and its hallmark is the gradual deterioration of dopamine-releasing neurons in the Substantia nigra. A study conducted in Argentina uncovered a link between the consumption of yerba mate (YM) and a reduced risk of PD development (Gatto, 2015). Our own investigations have revealed that YM extract exhibits a robust ability to safeguard dopaminergic neurons in vitro (Bernardi, 2019). These findings encourage us to explore whether YM extract could also protect neurons from the detrimental consequences associated with the expression of human alpha synuclein (aSyn) in a Drosophila m. model of PD. We settled down the conditions to feed flies with YM and evaluated both behavioral and molecular parameters. Although we have not observed behavioral changes in YM-treated flies, Western blot analysis exhibited a reduction in the levels of aSyn in flies treated with YM. Moreover, employing the GRASP method, we detected an elevated GFP signal—an indicator of synaptic connections—between dopaminergic neurons and both Ventral Lateral neurons and mushroom body neurons in aging flies fed with YM, suggesting a potential preservation of synaptic connectivity.

S-079 | THERAPEUTIC EFFECT OF METFORMIN IN EXPERIMENTAL OPTIC NEURITIS

Disorders of the Nervous System

Author: Nathaly Azucena Bernal Aguirre | Email: nbernal@fmed.uba.ar

Nathaly A. Bernal Aguirre1°, Juan S. Calanni2°, Ruth E. Rosenstein2°, Damian Dorfman1°

1° Laboratory of retinal neurochemistry and experimental ophthalmology, Department of Human Biochemistry, School of medicine/CEFYBO

2° Department of Biological Chemistry, School of Natural and Exact Sciences/IQUIBICEN, UBA/CONICET, Buenos Aires, Argentina

In previous work we have developed an experimental model of primary optic neuritis (NEO) in rats through the microinjection of lipopolysaccharide (LPS) directly into the optic nerve (ON). Metformin has protective effects in several inflammatory diseases of the central nervous system. We studied the effect of metformin on the retinal and ON alterations induced by experimental NEO. Adult male Wistar rats were injected with 1 µl of LPS (4.5 µg/µl) in one NO and vehicle in the contralateral ON. A group of animals was treated with metformin or vehicle at 24 h before and at 2, 4 and 6 days after the injection of LPS (preventive treatment), or at days 4 and 6 post-LPS/vehicle (delayed treatment). LPS induced a significant and persistent decrease in visual evoked potentials (VEPs) amplitude and light pupillary reflex (RPC), an increase in Iba-1 and glial fibrillary acidic protein (GFAP) immunoreactivity, ON demyelination and loss of ON axons and a significant loss of retinal ganglion cell loss. Moreover, LPS induced an early increase in blood-brain barrier permeability, inflammatory and oxidative stress, as well as a decrease in AMP activated kinase (AMPK) activation at the ON. Pre-treatment with metformin significantly prevented all these alterations, and delayed treatment with metformin significantly reversed the decrease in VEPs and RPC amplitudes caused by LPS. These results suggest that metformin could be considered a new (potentially translatable) strategy to treat human NEO.

S-080 | Assessment of differentially expressed miRNAs as potential diagnostic and prognostic biomarkers for evaluating the presence and severity of clinical manifestations in girls with Rett syndrome

Disorders of the Nervous System

Author: María Belén Cardillo | Email: belencardillo@gmail.com

M. Belén Cardillo1°, Patricia A. Paloscia2°, Bruno G. Berardino1°, Eduardo T. Cánepa1°

1° Laboratorio de Neuroepigenética y Adversidades Tempranas – Departamento de Química Biológica – Facultad de Ciencias Exactas y Naturales – Universidad de Buenos Aires / Instituto de Química Biológica de la Facultad de Ciencias Exactas y Naturales (IQUIBICEN) – Consejo Nacional de Investigaciones Científicas y Técnicas (CONICET), Argentina.

2° Departamento de Química Biológica – Facultad de Ciencias Exactas y Naturales – Universidad de Buenos Aires / Instituto de Química Biológica de la Facultad de Ciencias Exactas y Naturales (IQUIBICEN)

Rett syndrome (RTT) is a severe neurological disorder primarily affecting girls, caused by mutations in the MeCP2 gene. The disease is characterized by developmental regression after normal growth, with symptoms such as loss of speech and motor skills, stereotypic hand movements, and seizures. Due to the complexity and cost of clinical and genetic tests, identifying accessible and effective biomarkers for diagnosis is crucial. This study evaluated differentially expressed miRNAs in girls with RTT as potential diagnostic and prognostic biomarkers for the severity of clinical manifestations. Small RNAs were extracted from blood samples of RTT-diagnosed girls and control subjects without neurodevelopmental disorders, and expression of selected miRNAs was measured by RT-qPCR. Additionally, miRNA expression was analyzed across three age groups corresponding to disease progression. No significant differences were observed in miRNA expression between the RTT and control groups, and attempts to correlate miRNA expression with clinical severity yielded no significant results. A ROC curve analysis for miR-22-3p showed an area under the curve (AUC) of 0.65, indicating its predictive capacity, with a cut-off point of 0.8, specificity of 1, and sensitivity of 0.42. These results highlight the need to broaden the miRNAs studied and to increase the

study participants, essential steps for improving it's reliability as biomarkers for RTT diagnosis. Both aspects are currently in progress.

S-081 | Mackenzie’s Nerve Variations

Disorders of the Nervous System

Author: axel omar colombo | Email: axelcolombo59@gmail.com

Aaxel omar colombo1°, Tomas Picone1°, Julieta Rodriguez Valdivia1°, Catalina Dolccimelli1°, Valeria Trofa1°, Julian Cicler1°, Gonzalo Bonilla1°, Facundo Villamil1°2°

1° Neuroanatomy Laboratory, III Department of Anatomy, School of Medicine, University of Buenos Aires, Paraguay 2155, C1121, Buenos Aires, Argentina.

2° Surgical Neuroanatomy Laboratory, Neurosurgery Department, FLENI, Montañeses 2325, C1428 Buenos Aires, Argentina.

Introduction Mackenzie’s Nerve (MN) is a communicating branch from the accessory nerve to the ventral branch of the first spinal nerve, it transports sternocleidomastoid’s motor fibers and this is of major significance in rizhotomy surgeries to treat spasmodic torticollis. It has a vertical variation of greater length and a transverse of shorter. The objective is to describe trough dissections the variations of length and appearance percentage.
Materials and Methods9 heads (18 sides) were used in a 10% formalin solution. The squamous of the temporal bone and the posterior arch of the first two cervical vertebrae were removed using a drill. For the MN dissection were used dissecting forceps, iris scissors, scalpel with 24-blade; and measured with a precision of 0,1mm.

ResultsThe MN on 8 out of 9 heads was going through the first dentate ligament, precisely on 8 sides (44,4%). Out of those, there were 3 on right (16,6%) and 5 on left (27,7%). Also no findings of bilateral MN nor communications. The vertical variation was on 6 sides (33,3%), 2 on right (11,1%) and 4 on left (22,2%), measuring 7mm to 9mm; the transverse was on 2 cadaveric corps (11,1%), 1 on each side measuring 4mm to 6mm.
ConclusionsVariations regarding length and direction of MN were detailed but particularly one, in opposition to the most reported by other authors, was notable because of its side of origin. Considering this may be useful in avoiding undesirable lesions during selective d

S-082 | Doxycycline Partially Recovered Dendritic Spine Density of Medium Spiny Neurons in Parkinsonian Mice

Disorders of the Nervous System

Author: Felix Fares Taie | Email: ffarestaie@fmed.uba.ar

Félix Fares Taie1°2°, Agostina Stahl1°2°, Germán La Iacona1°2°, Irene Taravini3°, Gustavo Murer1°2°, Lorena Rela1°2°

1° Universidad de Buenos Aires, Facultad de Medicina, Departamento de Ciencias Fisiológicas, Buenos Aires, Argentina

2° CONICET, Universidad de Buenos Aires, Instituto de Fisiología y Biofísica Bernardo Houssay (IFIBIO Houssay), Buenos Aires, Argentina

3° Laboratorio de Neurobiología Experimental. LNE-ICTAER-UNER-CONICET, Gualeguaychú, Entre Ríos, Argentina

Dopaminergic denervation of the striatum results in medium spiny neurons (MSN) dendritic spine loss. Microglia—central nervous system's immune myeloid cells—react to inflammation associated with neurodegenerative processes, and potentially enhance their phagocytic activity.

This study aims at examining whether inhibiting microglial reactivity can provide therapeutic benefits and/or prevent the dendritic spine pruning of MSN.

We induced hemi-parkinsonism in D1-Tomato mice by injecting the toxin 6-OHDA into the left medial forebrain bundle. Control mice experienced a sham lesion. After one week to allow for complete denervation in parkinsonian mice, half the animals in each group received doxycycline in the drinking water for five weeks to inhibit microglial reactivity, while the other half drank regular water. Following treatment, tissue underwent immunohistochemical analysis, and we quantified the dendritic spine density of MSN.

Our results replicated the reduction in dendritic spine density in MSN in parkinsonian animals compared to sham-controls. A significant increase in dendritic spine density was observed in MSN of parkinsonian mice following doxycycline treatment, with an increased proportion of spines with immature morphology. We observed no significant improvements in global locomotion.

These results contribute to the hypothesis of microglial involvement in striatal circuit remodeling, in addition to its participation in dopaminergic neuron loss.

S-083 | Alterations in GABAAR α1 and α2 containing PVI synapses onto pyramidal neurons in the mPFC of a mouse model relevant for schizophrenia

Disorders of the Nervous System

Author: Nicolás Marcelo Fulginiti | Email: nicolasmfulginiti@gmail.com

Nicolás Marcelo Fulginiti1°, Fernando Benítez1°, Juan Emilio Belforte1°, Diego Esteban Pafundo1°

1° Laboratorio de Fisiología de Circuitos Neuronales, IFIBIO Houssay, UBA-CONICET, Ciudad de Buenos Aires, Argentina

Schizophrenia (SZ) is a severe neurodevelopmental illness characterized by positive and negative symptoms as well as cognitive impairment, which hinders self-sufficiency more drastically. Thus, understanding cognitive deficits is crucial for treatment. In mice, cognitive processes correlate with synchronous activity in the mPFC, maintained by reciprocal synapses between pyramidal neurons (PNs) and interneurons, particularly parvalbumin interneurons (PVIs). PVI activity seems crucial for such synchronicity and, furthermore, PVI dysfunction has been related to cognitive deficits. We employed a mouse model of PVI dysfunction, in which NMDARs are eliminated in corticolimbic interneurons, predominantly PVIs. Its phenotype displays cognitive deficits and mPFC circuit alterations, comprising excitatory/inhibitory imbalance. During development, GABAARs in PVI synapses onto the soma of PNs show a reduction of α2 and an increase in α1 subunits, which has been related to PVI synaptic maturation and has been found altered in SZ patients. We hypothesized that mPFC circuit alterations in KO mice could be related to a deficit in PVI synaptic maturation, hence we performed an immunohistochemical quantification of PN somatic puncta in the mPFC of control and KO mice, both juvenile and adult. Our preliminary results reveal differences between developmental stages and suggest a disbalanced expression of α1/α2 levels contingent to layer position in adult KO, without changes in PV puncta density.

S-084 | METFORMIN RESTORES COGNITIVE DEFICITS, AMYLOID PATHOLOGY AND MICROGLIAL AUTOPHAGY IN EXPERIMENTAL MODELS OF ALZHEIMER DISEASE

Disorders of the Nervous System

Author: Nicolas Gabriel Gonzalez Perez | Email: nicolasggonzalezperez@gmail.com

Nicolas G Gonzalez Perez1°2°, Luciano Arcucci1°2°, Melina Bellotto1°2°, Melisa Bentivegna1°2°, Jessica Presa1°2°, Juan Beauquis1°2°, Carlos Pomilio1°2°, Flavia Saravia1°2°

1° Instituto de Biología y Medicina Experimental (IByME-CONICET)

2° Departamento de Quimica Biologica (DQB-FCEN-UBA)

The global population is ageing, which is expected to increase the prevalence of age-related pathologies such as Alzheimer's disease (AD) and type 2 diabetes mellitus (T2D). These diseases share an exacerbated neuroinflammatory response coordinated by microglial cells. In this context, some key cellular processes are affected: there is evidence of a dysfunctional autophagic flux. Treatment with metformin (MET) has been associated with attenuated microglial activation and restored autophagic flux in T2D models. Our aim is to evaluate the therapeutic potential of MET in experimental AD using mouse models and in vitro experiments. In 9-month-old male PDAPP-J20 mice carrying AD mutations treated with MET (320 mg/kg i.p. three times a week for three weeks), we found a reduction in anxiety phenotype, improvement in spatial memory (evaluated by Open field test and Barnes maze, respectively) and a decrease in amyloid pathology in the hippocampus compared to vehicle-treated group. AD mice showed decreased levels of the homeostatic microglial marker TMEM119, which was reversed when treated with MET. Furthermore, in microglial BV2 cells exposed to amyloid peptides in vitro (A, 0.05 µM for 24h), a blockade of autophagic flux was observed as measured by the autophagosome marker p62, that was restored by MET (0.2 mM for 1h). These results suggest that metformin may reestablish cognitive performance by promoting microglial proteostasis in experimental models of AD.

S-085 | A New Digital Neuropsychology Approach for Mild Cognitive Impairment: Computerized Trail Making Test with Integrated Hand and Eye Tracking

Disorders of the Nervous System

Author: Gustavo Juantorena | Email: gjuantorena@gmail.com

Gustavo Juantorena1°, Waleska Berrios2°, María Cecilia Fernández2°, Betsabe León2°, Agustín Ibáñez3°4°5°6°, Agustín Petroni7°, Juan E. Kamienkowski1°8°9°

1° Laboratorio de Inteligencia Artificial Aplicada, Instituto de Ciencias de la Computación (FCEyN, UBA - CONICET)

2° Departamento de Neurología Cognitiva, Hospital Italiano de Buenos Aires,

3° Latin American Brain Health Institute (BrainLat), Santiago, Chile.

4° Trinity College Dublin (TCD), Dublin, Ireland

5° Global Brain Health Institute (GBHI)

6° University of California San Francisco (UCSFA)

7° Universidad de Gothenburg, Gothenburg, Suecia

8° Departamento de Computación, Facultad de Ciencias Exactas y Naturales, Universidad de Buenos Aires, Argentina

9° Maestría de Explotación de Datos y Descubrimiento del Conocimiento, Facultad de Ciencias Exactas y Naturales - Facultad de Ingeniería, Universidad de Buenos Aires, Argentina

In this study, we apply a novel computerized version of the Trail Making Test (c-TMT), designed to track hand and eye movements across multiple trials, addressing key limitations of the traditional pen-and-paper version. Our research involved adults diagnosed with mild cognitive impairment (MCI) and a matched healthy control group (HC). Using a standard computer mouse and eye-tracking hardware, we captured detailed task-related features and conducted various analyses to identify digital markers of cognitive function.

Participants also completed a comprehensive neuropsychological battery, including the Paper-and-Pencil TMT, Digit Symbol Test, Forward and Backward Digit Span, and the Clock Drawing Test. We explored the correlations between c-TMT measures and standardized executive function tests to uncover novel markers of executive function.

Our findings revealed statistically significant differences between the MCI and HC groups, not only in traditional behavioral measures (e.g., time to complete trials) but also in eye-movement-specific features such as scanpath length (i.e., number of fixations). Furthermore, we trained several machine learning algorithms on the hand and eye movement data to accurately classify MCI and healthy controls.

We advocate for complementary digital tools in neuropsychology to enhance the precision and effectiveness of cognitive assessments.

S-086 | Mapping social concepts: A psycholinguistic normative database for Spanish words

Disorders of the Nervous System

Author: Pamela Lopes da Cunha | Email: pamelopes@gmail.com

Pamela Lopes da Cunha1°, Agustina Selser1°, Lucia Amoruso1°2°, Adolfo Garcia1°3°4°

1° Centro de Neurociencias Cognitivas, Universidad de San Andres

2° Basque Center on Cognition, Brain and Language.

3° Global Brain Health Institute

4° Depto de Linguistica y Literatura, Facultad de Humanidades, U. de Santiago de Chile

Social concepts, which describe characteristics and circumstances in interpersonal scenarios, are crucial for human communication and relationships. Poor social interaction could even affect mental health. Our team has identified specific linguistic alterations linked to neurodegenerative disorders and aims to study these phenomena in social cognition. Studies on social concepts require systematically validated normative databases; these have been used to research word recognition and prevalence and how socialness, concreteness, or emotional valence relate to word meaning and behaviour. However, no psycholinguistic normative database for social concepts exists in Spanish, precluding theoretical and translational advances in Latin populations. Here, participants will complete an online form, rating Spanish nouns, verbs and adjectives, based on the social relevance of their meaning. A total of 600 words, randomly divided into subsets of 100, will be presented to participants. Then, words with high and low sociality (such as “friendship” and “cooperate” or “button” and “vibrate”, respectively) will be established. Once validated, this database will facilitate using these words and manipulating the “sociality” variable in various linguistic tasks, combined with tools like natural language processing, fMRI, and tDCS, for a comprehensive study of social concepts in Spanish.

S-087 | Depression and anxiety-like behaviors in mice induced by inflammatory chronic pelvic pain: preliminary data

Disorders of the Nervous System

Author: Aída Marcotti | Email: aida.marcotti@unc.edu.ar

Aída Marcotti1°, María Sol Martínez2°, Rubén D. Motrich2°, Mariela F. Pérez1°

1° Departamento de Farmacología Otto Orsingher-Instituto Farmacología Experimental de Córdoba (IFEC)-CONICET, Facultad de Ciencias Químicas, Universidad Nacional de Córdoba

2° Departamento de Bioquímica Clínica-Centro de Investigaciones en Bioquímica Clínica e Inmunología (CIBICI)-CONICET, Facultad de Ciencias Químicas, Universidad Nacional de Córdoba

Chronic pain is a debilitating condition that frequently leads to mood disorders like depression and anxiety. These disorders are refractory to commonly used antidepressants, likely due to neuroinflammatory and oxidative stress processes, with no available pharmacological therapies. This study aims to assess depression and anxiety-related behaviors, and oxidative stress indicators (OSi) and antioxidant enzymes (AOe) activity in brain areas linked to nociceptive and emotional processes, in an animal model of chronic pelvic pain consequence of autoimmune prostatitis induction. Finally, it proposes repositioning triamcinolone, an anti-inflammatory drug, loaded in nanocarriers (NT) to target brain tissue as a potential therapy. Preliminary behavioral data showed that, 35 days post-disease induction, mice subjected to open field test preferred the peripheral area, suggesting an anxious phenotype in contrast to control animals. In sucrose preference test, diseased mice lacked the control group's marked preference, with reduced performance in the suspension tail test suggesting anhedonia and depressive-like behavior. Increased levels of malondialdehyde (an OSi) and catalase activity (an AOe) were detected in brains from diseased mice with respect to controls. These outcomes offer encouraging insights for further characterization of neuroinflammation and related behaviors in our model, and for evaluating the proposed treatment with NT as a potential therapeutic option.

S-088 | Stress-induced vulnerability to cocaine addiction is linked to Nuclear Factor Kappa B (NF-κB) activation in the Nucleus Accumbens Core

Disorders of the Nervous System

Author: Bethania Mongi-Bragato | Email: bethania.mongi@unc.edu.ar

Bethania Mongi- Bragato1°, Marianela Sánchez1°, Boezio Julieta1°, Avalos Maria Paula1°, Bisbal Mariano2°, Eduardo Perassi3°, Flavia Bollati1°, Liliana Cancela1°

1° Instituto de Farmacología Experimental de Córdoba (IFEC-CONICET) - Departamento de Farmacología Otto Orsingher, Facultad de Ciencias Químicas, Universidad Nacional de Córdoba

2° Instituto de Investigación Médica Mercedes y Martin Ferreyra (INIMEC - CONICET)

3° Instituto de Investigaciones en Físico-Química de Córdoba, INFIQC-CONICET, Departamento de Química Teórica y Computacional, Facultad de Ciencias Químicas, Universidad Nacional de Córdoba

Stress-induced cocaine-related behaviors are associated with significant impairment of the glutamate mechanism in the Nucleus Accumbens core (NAcore). The hallmark of impaired glutamate homeostasis following stress is the downregulation of the glutamate transporter (GLT-1). Several evidences have reported a strong link between GLT-1 and the Nuclear factor-kappa B (NF-kB), which controls genes targets for glial glutamate regulation. The present study evaluated the involvement of NF-kB signaling in stress-induced vulnerability to cocaine addiction. We used lentiviral vectors DNIKK which expresses a dominant negative of IKK activity, to knock down transcription factor activity. Pre-stressed animals received DNIKK intra-NAcore one week after the last stress session. On day 21, animals were assigned to immunohistochemical, biochemical, or behavioral studies. Stress induces a marked activation of NF-kB pathway in the NAcore. Consistently, inhibition of NF-kB activation could reverse the facilitatory effect of stress on the acquisition of cocaine self-administration. Furthermore, DNKK administration prevented stress-induced GLT-1 downregulation in the NAcore. Immunofluorescence analysis in pre-stressed animals revealed a strong expression of NF-kB in astrocytes, the cells where 90% of GLT-1 is expressed. These findings reveal a critical role for NF-kB in the neurobiological mechanisms underlying the comorbidity between stress exposure and addictive disorders

S-089 | Remyelination Model Induced by Metformin in CPZ rats and Study of Circulating Plasma EVs

Disorders of the Nervous System

Author: Federico Ezequiel Occhiuzzi | Email: fede.occh@gmail.com

Vanesa Soledad Mattera1°, Federico Ezequiel Occhiuzzi1°, Maria Silvina Marcora1°, Juana Maria Pasquini1°, Jorge Daniel Correale2°, Laura Andrea Pasquini1°

1° IQUIFIB Department of Biological Chemistry - University of Buenos Aires

2° Institute for Neurological Research Dr. Raúl Carrea. FLENI

Multiple Sclerosis (MS) is a chronic demyelinating disease that acts on mature oligodendrocytes (OLm), characterized by reactive gliosis, inflammation and demyelination (Dem). Current therapies are focused on reducing inflammation, but little is known about drugs that stimulate remyelination (Rem). Rem is an example of spontaneous repair in the adult central nervous system, where new myelin sheaths form around demyelinated axons. Recent studies in an animal model of Dem have demonstrated that Metformin (Met) can reverse damage and restore the regenerative capacity of oligodendrocyte precursor cells (OPCs), improving REM. Additionally, Met has an effect on increasing mitochondrial bioenergetics.

Wistar rats were treated with Cuprizone (CPZ) and CPZ plus Met using two routes of administration: oral and intraperitoneal. Data obtained during Rem showed that in both routes, Met significantly reduces astrogliosis and microgliosis in the corpus callosum, along with a higher number of OLm compared to the spontaneous Rem condition without Met. Plasma extracellular vesicles (pEVs) were isolated from control and Dem animals to study their effect on OLs in primary cultures and were characterized by Nano Particle Analysis Tracking (NTA). Preliminary results show that pEVs from animals that received CPZ show a delay in OL maturation, suggesting a role of pEVs in the perpetuation and maturation failure typical of the disease.

S-090 | Evaluation of a mouse model of chronic muscular pain induced by acidic saline injections

Disorders of the Nervous System

Author: Martina Poodts | Email: Mpoodts@mail.austral.edu.ar

Martina Poodts1°, Benjamín Zylberberg2°, Violeta Klimek1°, M. Clara Rodríguez1°, Alejandro Montaner3°, M. Florencia Coronel1°2°, Graciela L. Mazzone1°2°

1° Facultad de Ciencias Biomédicas, Universidad Austral, Av. Pte. Perón 1500, B1629AHJ, Pilar, Buenos Aires, Argentina.

2° Instituto de Investigaciones en Medicina Traslacional (IIMT), CONICET-Universidad Austral, Av. Pte. Perón 1500, B1629AHJ, Pilar, Buenos Aires, Argentina.

3° Instituto de Ciencia y Tecnología "Dr. César Milstein", CONICET, Fundación Pablo Cassará, Pilar, Buenos Aires, Argentina

Fibromyalgia (FM) is a widespread chronic pain condition with unclear etiology and limited therapeutic strategies. In the present study, we aimed to test a model of chronic muscular hyperalgesia that mimics FM-syndrome to investigate underlying mechanisms and develop novel treatments. To induce FM-like syndrome two acidic saline (pH 4.0) injections were administrated four days apart into the left gastrocnemius muscle of male and female Balb/C mice. Based on our findings from the Von Frey and Choi tests, we observed increased sensitivity to both mechanical and thermal stimuli, indicating a decrease in mechanical pain threshold and higher number of cold-induced responses. This hypersensitivity was particularly pronounced bilaterally with a significantly greater impact being observed in females. No differences were observed in the locomotor patterns studied, including distance travelled and immobility time. The expression of GFAP in the spinal cord remained unchanged. However, females showed a significant decrease in the size of the gastrocnemius endplates when analyzing images stained with the postsynaptic marker α-bungarotoxin. According to our data, repeated injections of acid saline into the muscles of rodents seems to be relevant for studying a condition involving widespread, long-lasting pain, such as FM, and could potentially be used to develop new treatment approaches. Supported by Universidad Austral, CONICET and FONCYT.

S-091 | Sex-Specific Astroglial and Immune Alterations Following Febrile Seizures: Implications for Epileptogenesis in Temporal Lobe Epilepsy

Disorders of the Nervous System

Author: Alicia Raquel Rossi | Email: arossi@fmed.uba.ar

Alicia Rossi1°, Dante Gomez Cuautle1°, Andrea Pecile1°, Luca Sapia1°, Alberto Javier Ramos1°

1° IBCN. UBA CONICET/ Facultad de Medicina,UBA

Temporal lobe epilepsy (TLE) is the most common form of epilepsy. Many patients report complex febrile seizures in childhood (initial precipitating event, IPE). During the latency period between IPE and TLE onset, epileptogenesis occurs. We used a rat model of hyperthermic seizures (HS) to investigate sex differences in brain and spleen responses during the LP. Rat pups (10 days old) were exposed to elevated core temperatures (39-42°C) to induce seizures. Brain tissues were collected for qPCR analysis at 15 days post-HS (15DPHS). A separate group was analyzed at 15 and 35DPHS for immunohistochemistry. Spleens were also collected for histological analysis. Both sexes showed moderate reactive gliosis, with males exhibiting an atypical distribution of astroglial cells in the pyriform cortex (PC) at 15DPHS, normalizing by 35DPHS but with persistent reactive gliosis. Increased Iba1+ cells and a proinflammatory phenotype were more pronounced in males. Spleen analysis revealed white pulp disorganization and lymphocyte mobilization in both sexes, increasing CD3/CD4 T-lymphocytes in peripheral blood. Both sexes showed decreased AQP4 and Kir4.1 mRNA expression, with males showing AQP4 redistribution in the PC. Males also had a lower convulsive threshold after pilocarpine exposure at 39DPHS. These findings suggest that HS induces astroglial and immune changes, more evident in males, potentially contributing to epileptogenesis. Grants: PICT 2021-0760; UBACYT, PIP CONICET

S-092 | NEUROPROTECTIVE EFFECT OF POTATO PEEL POLYPHENOLS ON NEURODEGENERATIVE MODELS

Disorders of the Nervous System

Author: María Ximena Silveyra | Email: mxsilveyra@gmail.com

María Ximena Silveyra1°2°, Valentina Filiberti1°2°

1° Instituto de Investigaciones Biológicas (IIB-CONICET-UNMdP)

2° Facultad de Ciencias Exactas y Naturales, Universidad Nacional de Mar del Plata

Oxidative stress is associated with many pathologies, such as neurodegenerative diseases, and polyphenols are antioxidants that could prevent this stress. Potato peel waste (PPW) is an abundant leftover from the potato processing industry. We have previously identified antioxidant polyphenols in PPW ethanolic extracts, such as chlorogenic acid, cafeic acid, and ferulic acid. This study aimed to analyze the neuroprotective effect of PPW on neurodegenerative models and evaluate the mechanisms involved. To test the neuroprotective activity, we assayed subtoxic concentrations of PPW extract in vitro on neuronal HT-22 cells injured by glutamate. First, we demonstrated that pretreatment with these PPW extracts increased cell viability and protected the cells from glutamate-induced apoptosis. Our results showed that PPW polyphenols restored the Δψmit, ROS levels, and lipid peroxidation modified by glutamate in the cellular model. Preliminary, we also demonstrated that the PPW extract pretreatment reduced galactose-induced oxidative stress in an accelerated aging mice model. These findings suggest that PPW extracts have effective neuroprotective properties, demonstrating that they would be a source of neuroprotective compounds to develop a dietary supplement with beneficial effects on human brain health.

S-093 | IMPACT OF ORAL EXPOSURE TO LOW DOSES OF THE HERBICIDE 2,4-DICHLOROPHENOXYACETIC ACID (2,4-D) ON THE MOTOR RESPONSE TO COCAINE IN RATS.

Disorders of the Nervous System

Author: Lucia Trossero | Email: lucia.trossero@hotmail.com

Lucia Trossero1°, Abraham Ramirez3°, Alejandra Ma. Pacchioni3°, Cintia Konjuh4°

1° Laboratorio de Toxicología Experimental, Área Toxicología, Departamento de Ciencias de los Alimentos y el Medioambiente, Facultad de Ciencias Bioquímicas y Farmacéuticas, Universidad Nacional de Rosario

2° Laboratorio de Toxicología Experimental, Área Toxicología, Departamento de Ciencias de los Alimentos y el Medioambiente, Facultad de Ciencias Bioquímicas y Farmacéuticas, Universidad Nacional de Rosario. CONICET-CCT

3° Laboratorio de Toxicología Experimental, Área Toxicología, Departamento de Ciencias de los Alimentos y el Medioambiente, Facultad de Ciencias Bioquímicas y Farmacéuticas, Universidad Nacional de Rosario. CONICET-CCT

4° Laboratorio de Toxicología Experimental, Área Toxicología, Departamento de Ciencias de los Alimentos y el Medioambiente, Facultad de Ciencias Bioquímicas y Farmacéuticas, Universidad Nacional de Rosario

2,4-Dichlorophenoxyacetic acid (2,4-D) is currently the second most used herbicide worldwide. Previous research from our laboratory has indicated that 2,4-D has neurotoxic effects in animal models and may be linked to cognitive and psychiatric disorders associated with disruptions in dopaminergic systems. For instance, the susceptibility to psychoactive substances. Our study aims to investigate whether oral exposure to low doses of 2,4-D during adolescence alters the stimulant effects of cocaine, and whether these changes are modulated by sex. To this end, rats at postnatal day 30 (PND30) of both sexes received a standard diet or one contaminated with 2,4-D (25 mg/kg/day) for 20 days. At PND50, rats were individually placed in activity monitoring chambers. After one-hour of habituation, they received an injection of cocaine (5 mg/kg) or saline, and their motor responses were assessed for 2 hours.

The results indicate that both male and female rats previously exposed to 2,4-D displayed an increased response to cocaine. interestingly, female rats showed higher motor activity after cocaine than their male counterpart suggesting that 2,4-D exposure may heighten cocaine susceptibility in adolescent rats, with a more pronounced effect found in females. Moreover, b-catenin levels in specific brain areas will be analyzed. Our working hypothesis is that 2,4-D increases cocaine vulnerability by changing Wnt pathway activity in specific brain areas in a sex dependent manner.

S-094 | Chronic fluoxetine treatment reverses compulsive and perseverative behaviors induced by striatal cholinergic interneurons Inhibition.

Disorders of the Nervous System

Author: Andrés Pablo Varani | Email: andresvarani@gmail.com

Andrés P Varani1°, Martina Gomez Acosta1°, María C Fagnani1°, Gustavo Almeida Aguiar1°, Cecilia Tubert1°, Carlos A Pretell Annan1°, Juan E Belforte1°

1° Instituto de Fisiología y Biofísica Bernardo Houssay (Instituto Universidad de Buenos Aires - Consejo Nacional de Investigaciones Científicas y Técnicas). Paraguay 2155, 7°piso, (CP: 1121), Ciudad de Buenos Aires, Argentina.

Antidepressant fluoxetine (Flx) is clinically used to treat compulsive/perseverative behaviors in patients with obsessive-compulsive disorder and Tourette syndrome. Unveiling the pathophysiology of these disorders can aid in the rational design of therapeutic interventions. We aimed to study whether chronic Flx treatment reverses the compulsive/perseverative behaviors induced by chemogenetic inhibition of striatal cholinergic interneurons (SCIN). ChatCre heterozygous mice were injected with a viral vector (pAAV-hSyn-DIO-hM4DGi-mCherry) to selectively express inhibitory DREADD in SCIN. Mice were chronically treated with Flx (10 mg/kg, in drinking water) or water during 21 days after viral vector injection. Comprehensive behavioral tests were conducted using CNO or vehicle. The results showed that SCIN inhibition increased the grooming events, head dippings in the hole board test, frayed cotton for nest assembly and more buried marbles in water-treated mice. Long-term Flx treatment reversed the compulsive/perseverative behaviors induced by SCIN Inhibition. The expression and inhibitory effect of DREADDs in SCIN were confirmed through immunofluorescence and ex-vivo electrophysiology recordings. In summary, SCIN inhibition exacerbated ritualistic behaviors, suggesting that SCIN modulates these behaviors. Finally, the reversal caused by Flx validates the use of this drug to treat specific symptoms observed in these psychiatric disorders, lending support to our experimental model.

S-095 | Lesions in the cerebellar vermis modulate impulsive-like behaviors in mice

Disorders of the Nervous System

Author: Zoe Ziperovich | Email: zoe.ziperovich00@gmail.com

Zoe Ziperovich1°, Adrián M Kim1°, Elizabeth Mamani1°, Malco D Rossi2°, Andrés P Varani1°

1° Instituto de Fisiología y Biofísica Bernardo Houssay (Instituto Universidad de Buenos Aires - Consejo Nacional de Investigaciones Científicas y Técnicas). Paraguay 2155, 7°piso, (CP: 1121), Ciudad de Buenos Aires, Argentina.

2° Servicio de Movimientos Anormales, FLENI. Montañeses 2325, (CP: 1428), Buenos Aires, Argentina.

The cerebellum is often described as a motor structure, but in recent years its involvement in sensory behaviors such as emotions, learning, addiction, among others, has been demonstrated. Reciprocal disynaptic connections between the basal ganglia, motor cortex and cerebellum have been proposed, which suggest their contribution to compulsive and impulsive behavior. However, the specific region of the cerebellum that would be responsible for the modulation of these behaviors is unknown. We aimed to analyze whether site-specific alterations in the cerebellar cortex induce impulsive/compulsive behavior in male and female mice. Excitotoxic lesions with kainic acid were performed at different cerebellar vermis levels using stereotaxic surgery. Behavioral tests were performed to evaluate the impact of the lesions on the animal's behavior. Impulsiveness was measured by the plus-maze, cliff, emerge, and y-maze tests; Compulsiveness was assessed with the marble, nesting and hole board tests. Motor function was studied with the grip strength, balance, gait and rotarod tests. The results showed an increase in impulsivity in mice of both sexes in the plus-maze, cliff and emerge tests. However, these lesions did not trigger compulsive behaviors. Regarding motor function, the lesions showed alterations only in balance compared to control animals. In conclusion, these results suggest that the cerebellar vermis could be involved in the modulation of impulsive, but not compulsive behaviors.

S-096 | Cholinergic Modulation of Associative Learning and Memory in the Dentate Gyrus

Neural Circuits and Systems Neuroscience

Author: Macarena Amigo Duran | Email: macky.amigo@gmail.com

Macarena Amigo-Duran1°, Julieta Campi1°, Antonia Marin-Burgin1°

1° IBioBA - MPSP - CONICET

The hippocampus is crucial for learning and memory, with the dentate gyrus (DG) playing a key role in processing incoming information and forming distinct memory representations. Our lab has shown that acetylcholine (ACh) release in the DG reconfigures inhibitory circuits, leading to excitatory neuron disinhibition and enhanced synaptic plasticity. Building on these findings, we hypothesized that ACh release boosts learning and memory. Using a head-fixed virtual reality Go/No-Go task, we assessed contextual discrimination in mice, and employed chemogenetics (Chat-hM3DQ) to increase endogenous ACh release. Our results indicate a trend towards faster task learning in animals with enhanced cholinergic activity compared to controls, and higher memory of the task tested 7 days after. We also explored how ACh modulates synaptic plasticity in the DG by studying spike timing-dependent plasticity and associative long-term potentiation (LTP) in hippocampal slices. As lateral and medial entorhinal cortex inputs are anatomically and functionally distinct, processing content-specific and contextual information, respectively, we examined their convergence in the DG and found that ACh modulates responses from both pathways and gate associative LTP induction by weakening inhibitory inputs. This mechanism could potentially enhance learning, as we observed in vivo. The results contribute to understanding how ACh-mediated neuromodulation supports cognitive flexibility and memory formation.

S-097 | Analysis of Agouti Related Peptide neuronal projections from the Hypothalamic Arcuate Nucleus to their target nuclei in the mouse brain and their response to fasting

Neural Circuits and Systems Neuroscience

Author: Matias Ezequiel Cure | Email: matiascure3@gmail.com

Matias Ezequiel Cure1°, Paula Ravettino1°, Daniela Cassano1°, Ivana María Gomez1°, Mirta Reynaldo1°, María José Tolosa1°, Mario Perello1°, Pablo Nicolás De Francesco1°, Gimena Fernandez1°

1° Laboratorio de Neurofisiología del Instituto Multidisciplinario de Biología Celular (CONICET, UNLP, CIC-PBA), 1900 La Plata, Buenos Aires, Argentina.

Agouti Related Protein-expressing neurons of the Hypothalamic Arcuate Nucleus (ARHAgRP) constitute a key population involved in food intake regulation and energy balance. These neurons drive strong orexigenic responses and are activated under energetic deficit conditions, such as fasting. We hypothesize that an increased activity of ARHAgRP neurons during fasting promotes remodeling of AgRP projections to their target nuclei, which could in turn modulate their efferent response profile. We used a transgenic mouse model expressing tdTomato in AgRP neurons (Agrp-cre×Rosa26-tdTom, named Agrp-Tom) along with immunofluorescence to explore this system. We first validated the model by performing AgRP staining in colchicine-treated Agrp-Tom mice and evaluated both fluorescent signals in ARH neurons, which showed a high degree of colocalization. Then, we studied both signals in the ARH of fasted mice and found an increase in AgRP+ signal without changes in tdTom fluorescence. We also observed the activation of tdTom+ neurons with fasting by c-Fos staining. Finally, we studied the distribution and colocalization of both signals in fibers innervating several intra- and extrahypothalamic target nuclei, and their modulation by fasting. We found evidence of differential modulation of ARHAgRP fiber density with fasting in some, but not all, of the studied nuclei. Overall, our results indicate that fasting modifies the efferent connectivity of ARHAgRP neurons in a target-dependent manner.

S-098 | “Sleeping on it”: Untangling the interaction between sleep and frustration

Neural Circuits and Systems Neuroscience

Author: Martina Holz | Email: tiniholz@gmail.com

Martina Holz1°2°, Nina Possamai2°3°, Ruben N. Muzio2°3°, M. Inés Sotelo2°3°

1° Escuela de Bio y Nanotecnologías (UNSAM)

2° Grupo de Aprendizaje y Cognición Comparada, Laboratorio de Biología del Comportamiento (IBYME-CONICET)

3° Instituto de Investigaciones, Facultad de Psicología (UBA)

Sleep, a universal state observed in every animal, is typically preceded by specific preparatory routines such as finding a sleeping spot, grooming, and nest-building. These behaviors are essential for sleep consolidation, and disruptions in these routines, particularly due to negative emotions, may affect sleep quality. The hypothesis guiding this study is that emotional regulation and sleep are interconnected, sharing common neural circuits. To explore this, we utilized a rodent model of emotional frustration known as consummatory Successive Negative Contrast (cSNC), which achieves frustration/emotional dysregulation induced by the unexpected devaluation of a reward. We combined this protocol with pre- sleep routine analysis via video and wireless EEG/EMG monitoring to track sleep/wake rhythms. Our preliminary results after the cSNC protocol have shown increased locomotor and rearing behavior during sleep preparation in the first two days following reward devaluation. Furthermore, we have found possible sleep/wake fragmentation and increasing time spent awake associated with reward downshift.
We aim to establish an experimental protocol in rodents to model the interaction between emotional states and sleep, focusing on how pre-sleep distress impacts sleep patterns.
Key Words: Frustration and sleep, Emotional dysregulation, Sleep/wake cycle, Pre-sleep, consummatory Successive Negative Contrast

S-099 | The Metabotropic Glutamate Receptor MGL-2 Modulates Satiety and Serotonergic Signaling in C. elegans

Neural Circuits and Systems Neuroscience

Author: Ailin Lacour | Email: ailin.lacour@gmail.com

Ailin Lacour1°2°, María Gabriela Blanco1°2°, María José De Rosa1°2°, Diego Rayes1°2°

1° Instituto de Investigaciones Bioquímicas de Bahía Blanca (UNS-CONICET), Bahía Blanca, Buenos Aires, Argentina.

2° Departamento de Biología Bioquímica y Farmacia, Universidad Nacional del Sur, Bahía Blanca, Buenos Aires, Argentina.

The ability to perceive nutritional status is crucial for modulating animal behavior. In this study, we explore the mechanisms by which C. elegans senses its nutritional state. We discovered that mutants in mgl-2, the C. elegans ortholog of mammalian metabotropic glutamate receptors (mGluRs), exhibit hyperphagia and a pronounced reduction in locomotion when exposed to food. While these behaviors are typical of starved animals, these mutants display them even without prior food deprivation. This hyperphagic behavior leads to increased lipid accumulation, indicating that MGL-2 is essential for the perception of satiety in these animals.

In starved wild-type animals, encountering food triggers an exacerbated release of serotonin, which allows the animal to increase its feeding rate and slow down locomotion to restore its nutritional status. Through genetic experiments and in vivo neuronal activity measurements, we determined that MGL-2-mediated nutritional state perception is necessary to temper serotonergic signaling in fed animals. We are currently working to identify the specific neurons where MGL-2 exerts these effects.

We propose that MGL-2 serves as a key modulator within neural circuits that control appetite and energy homeostasis. Notably, mammalian mGluRs have recently been implicated in hunger and satiety perception. Given the conservation of fundamental processes across the animal kingdom, our study provides potentially universal insights into feeding behaviors.

S-100 | Role of 5-HT7 receptor in early-life stress influence of adult emotional behavior in mice

Neural Circuits and Systems Neuroscience

Author: Melina Maidana | Email: melinamaidana03@gmail.com

Melina Maidana1°2°3°, Grace Wu1°2°3°, Carla Argañaraz1°2°3°, Rocío Foltran1°2°3°, Tamara Adjimann1°2°3°, Mariano Soiza-Reilly

1° Instituto de Fisiología, Biología Molecular y Neurociencias

2° Fac. de Ciencias Exactas y Naturales, Universidad de Buenos Aires

3° CONICET

Early-life stress of repeated maternal separation (MS) during postnatal days 2 to 14 (P2-14) in mice produces anxiety and depressive-like symptoms in adulthood. Emotional alterations are accompanied by hyper-connectivity of the prefrontal cortex (PFC) to dorsal raphe nucleus (DRN) synaptic circuit (PFC-DRN), a cortico-limbic pathway involved in stress responses and mood control. Activation of 5-HT7 receptors has been shown to mediate such alterations on the PFC-DRN synaptic circuit, however the impact of this receptor function on adult emotional responses observed after MS remains unknown. Here we exposed mice to MS during P2-14 while administering a selective 5-HT7 receptor antagonist (SB-269970, s.c. 20mg/kg/day). We tested in adulthood anxiety and depressive-like behaviors in maternally-separated SB-269970-treated mice and saline controls. Our results indicate a crucial role of 5-HT7 receptors in the early stress vulnerability of prefrontal circuits and its adult behavioral consequences.

S-101 | Anatomical Pathways of Language

Neural Circuits and Systems Neuroscience

Author: Pablo Sebastian Paolinelli | Email: pablo.paolinelli@gmail.com

Pablo Sebastian Paolinelli1°, Facundo Villamil1°, Camila Migliardo1°, Valeria Trofa1°, Paloma Suarez1°, Catalina Dolcimelli1°, Gonzalo Bonilla1°

1° Laboratory of Neuroanatomy, third department of Anatomy, School of Medicine, University of Buenos Aires,

Introduction: Language is a complex process, several hypotheses have been proposed regarding the functioning of the speech circuit, with the most well-known being the one described by Pierre Broca and Carl Wernicke, who identified two areas: Broca's area and Wernicke's area, connected by the arcuate fasciculus. Over time, these hypotheses have proven to be overly simplistic given the complexity of the subject. Therefore, several subsequent studies, including neuroimaging techniques, have contributed to this field.

Our objective is to conduct a comprehensive review of the anatomy of language using contemporary theories and establish a correlation between data obtained and findings derived from cadaveric dissections.

Materials and Methods: Five fixed brains were used and dissected according to Klinger’s technique. Wooden spatulas of various diameters were employed for the dissection, starting with larger ones at the surface and smaller ones in deeper regions.

Results: Our exhaustive search revealed new language-related theories, identifying the fasciculi involved in language. These were successfully dissected in cadaveric specimens and include the superior and inferior longitudinal fasciculus, the inferior fronto-occipital fasciculus, the uncinate fasciculus, and the oblique frontal fasciculus.

Conclusion: Our study, through the dissection of cadaveric brains following Klinger’s technique, has contributed to correlating anatomical findings with current theories on language.

S-102 | How well do isolated CPGs reflect whole-animal behavior? Comparing fictive and in vivo motor patterns.

Neural Circuits and Systems Neuroscience

Author: Martina Radice | Email: radicemarti@gmail.com

Martina Radice1°2°, Federico Yulita1°3°, Lidia Szczupak1°2°

1° Instituto de Fisiología, Biología Molecular y Neurociencias, UBA-CONICET, Argentina.

2° Departamento de Fisiología, Biología Molecular y Celular, Facultad de Ciencias Exactas y Naturales, Universidad de Buenos Aires, Argentina.

3° Departamento de Física, Universidad de Buenos Aires, Argentina

Central pattern generators (CPGs) are neuronal networks that produce rhythmic behaviors like locomotion. Ex vivo preparations that retain core functionality and produce fictive patterns resembling those in vivo have been essential for studying CPGs.

Leeches have been used to study motor control due to their robust repertoire of motor behaviors executed by a relatively simple body plan and nervous system. On solid surfaces, leeches exhibit crawling, a robust rhythmic motor pattern resulting from waves of elongation and contraction that propagate along the body segments. Fictive crawling can be monitored in the isolated nervous system.

Extracellular recordings of various nerves during fictive crawling enabled single unit identification. Based on their rhythmic activity, units were classified considering whether they fired during the contraction phase, defined by motoneuron DE-3 activity, or during the elongation phase.

To compare ex vivo and in vivo motor patterns, we conducted kinematic measurements in intact leeches during crawling using DeepLabCut. The contraction and elongation duty cycles of specific body regions closely matched motoneuron activity from isolated ganglia of those sections. However, some motor pattern characteristics are not replicated in isolated ganglia due to intersegmental interactions. Combining physiological studies with mathematical models of coupled CPG chains seems essential to better understand how coordinated behavior emerges from the nerve cord.

S-103 | A dissection through the pathways of BA-25 (Subgenual Cyngulate Gyrus) in deep brain stimulation

Neural Circuits and Systems Neuroscience

Author: Valeria Luciana Trofa Ojeda | Email: val.trofa@gmail.com

Facundo Villamil1°2°, Melanie Catena-Baudo1°, Valeria Trofa1°, Julieta Rodriguez Valdivia1°, Juan Navarro1°, Catalina Dolccimelli1°, Paloma Suárez1°, Micaela Piñero1°, Gonzalo Bonilla1°, Mariana Bendersky3°

1° Neuroanatomy Laboratory, III Department of Anatomy, School of Medicine, University of Buenos Aires, Paraguay 2155, C1121, Buenos Aires, Argentina.

2° Surgical Neuroanatomy Laboratory, Neurosurgery Department, FLENI, Montañeses 2325, C1428 Buenos Aires, Argentina.

3° "Anatomía Viviente" Laboratory, III Department of Anatomy, School of Medicine, University of Buenos Aires, Paraguay 2155, C1121, Buenos Aires, Argentina

Introduction

Deep brain stimulation on the subgenual cingulate gyrus (SCG) is currently an aim for major depressive disorder. The connections between white matter underneath the SCG are still under investigation and we believe that its knowledge may help us became clear about the network that participates on the mechanism of DBS, and improve electrode placement.

Objective

Carrying out a deep investigation around the anatomical connections of the SCG by tractography, and the second and most extended study of cadaveric dissections of this region.

Methods

Tractographies were made using software DSI Studio with a template of 1065 healthy human brains, and a perspective of 1 ROI on the ventromedial frontal cortex. The tracts were observed in a three dimensional plane. Results were compared with cadaveric dissections made in 12 human hemispheres with Klinger Technique.

Result

In this study, seven main connections were found: Cingulum fibers; Fibers from the uncinated fasciculus; Forceps minor; Frontostriatal fibers; Accumbofrontal fasciculus; Fibers communicating both amygdala through forceps minor; Fibers from IFOF's deep portion.

Conclusion

The SCG exhibited a network of white matter connections with the limbic system, prefrontal cortex and mesial-temporal areas. Three bundles of white mater were described that were not considered in previous studies; this may be useful to improve the electrode placement. These findings can help explaining the SCG's part in disorders.

S-104 | EFFECTS OF IBOGAINE ON HIPPOCAMPAL CA1 LONG-TERM PLASTICITY IN MICE LACKING 5HT2A RECEPTORS

Neural excitability, synaptic transmission and neuron-glia interactions

Author: Natasha Maria Brun | Email: natbrun17@gmail.com

Natasha M. Brun1°, Sofía Villalba1°2°, Afsaneh Labbaf1°, Pablo Torterolo3°, Ignacio Carrera4°, Verónica Bisagno2°, Francisco J. Urbano1°

1° IFIBYNE-CONICET, Buenos Aires, Argentina

2° Austral Univ., Derqui, Pilar., Argentina

3° School of Medicine, Univ. de la República, Montevideo, Uruguay

4° School of Chemistry, Univ. de la República, Montevideo, Uruguay

NMDA receptor–dependent long-term potentiation (LTP) in hippocampal CA3-CA1 Schaffer collateral synapses has been extensively studied in vitro. Ibogaine, the main indole alkaloid isolated from the root bark of the African shrub Tabernanthe iboga, is an atypical psychedelic drug capable of inducing oneirogenic effects and vivid memory recall, as well as antiaddictive and antidepressive effects. Ibogaine is known to block open NMDA receptors in a use-and voltage-dependent manner during whole-cell recording in cell cultures. The main objective of this study was to analyze the effect of ibogaine (50 microM) in vitro field potentials recorded at CA1 stratum radiatum (apical dendrites) of hippocampal 300 microM thick coronal slices from 5-HT2A receptor knockout (KO) (5-HT2A -/-) or wild type (WT) male mice. We induced LTP using a strong tetanus (5x 100 ms long 100 Hz trains) of the Schaffer´s collaterals using a bipolar electrode. Tetanic stimulation was applied after 20-30 minute baseline recording in presence of bicuculline (10 microM, GABA-A receptor inhibitor) or bicuculline+ibogaine (50 microM). Results show an enhancement of baseline glutamate release after 20 min ibogaine application in WT slices but not 5-HT2A KO mice (One-way RM ANOVA). A statistically significant postetanic response was observed from both WT and 5-HT2A KO slices (One-way RM ANOVA). Results suggest that in vitro ibogaine hippocampal synaptic effects involve 5-HT2A receptors dependent pathways.

S-105 | Probing AMPA receptors response at ribbon synapses in the mammalian cochlea with glutamate-uncaging

Neural excitability, synaptic transmission and neuron-glia interactions

Author: Walen Leonardo Gribaudo | Email: walen.gribaudo@gmail.com

Walen L. Gribaudo1°, Juan D. Goutman1°

1° Laboratorio de Transmision Sinaptica del Sistema Auditivo (INGEBI-CONICET)

AMPA receptors in the mammalian brain mediate fast neurotransmission and are typically found in the postsynaptic densities (PSDs). Across synapses a great variability of PSDs sizes and number of AMPA receptors has been described . In the mammalian inner ear, glutamatergic synapses are formed between inner hair cells (IHCs) and spiral ganglion neurons (SGNs). All aspects of sound information are encoded and transmitted to the brain through this synapse. A key aspect of the presynapse (IHCs) is the presence of a ‘synaptic body’ or ‘ribbon’ that concentrates large amounts of synaptic vesicles, ensuring high rates of exocytotic events. Postsynaptic terminals of SGNs are characterized by large PSDs, 5 to 10 times bigger than those found in the brain. The role that these large PSDs play in synaptic function is unknown. We speculate that normal neurotransmission activates only a portion of the PSDs area, resulting in non-saturation of the AMPA receptors. To investigate this, we implemented a glutamate photolysis method by which a laser pulse is flashed upon the entire postsynapse, previously bathed with a caged-glutamate compound, producing fast transients in glutamate concentration. Responses to glutamate uncaging were recorded by patch-clamp directly on SGNs terminals. Both the intensity and the duration of laser pulses could be modulated to generate transients of different sizes

S-106 | Resveratrol Prevents Chemotherapy-Induced Neuropathy Without Compromising Antitumor Activity: Insights from an Oxaliplatin-Induced Neuropathy Model

Neural excitability, synaptic transmission and neuron-glia interactions

Author: CONSTANZA MIGUEL | Email: constanzaagata@gmail.com

Constanza Miguel1°, Tobias Giovannetti1°, Mariel Fusco1°, Flavia Piccioni1°, Mariana Malvicini1°, Florencia Coronel1°

1° Instituto de Investigaciones en Medicina Traslacional, CONICET - Universidad Austral

Oxaliplatin (OXA), a first-line chemotherapeutic agent, exerts peripheral neurotoxic damage leading to sensory, motor, and autonomic symptoms. No current strategies effectively prevent or reverse chemotherapy-induced peripheral neuropathy (CIPN). This study aimed to assess sensory and motor impairments, as well as the underlying mechanisms. We also evaluated resveratrol's effectiveness in preventing CIPN. Adult rats received OXA or saline. Resveratrol was administered daily before the chemotherapy regimen (preventive strategy, RESVp). Mechanical and thermal allodynia and locomotor function were assessed. To confirm resveratrol's non-interference with OXA's antitumor effects, adult Balb C mice were injected with CT26 cells and treated with OXA and RESVp. OXA-treated rats developed mechanical and thermal hypersensitivity and allodynia. No impairments in locomotor function were detected. OXA-treated animals showed increased ATF-3, GFAP, IBA-1, NFκB, TNF-α and HMGB1 expression levels in dorsal root ganglia. RESV administration prevented allodynia and did not interfere with OXA's antitumor actions. RESVp increased GSH stores and SIRT-1, NRF-2 and NQO-1 mRNA levels, and decreased TBARS levels and ATF-3, NF-κB and TNF-α expression. Thus, early and sustained RESV administration effectively prevented OXA-induced pain without interfering with its antitumor activity. RESVp increased antioxidant reserves, reduced oxidative damage and mitigated neuroinflammation and neuronal damage.

S-107 | Screening of potential positive allosteric modulators for the α9α10 nicotinic cholinergic receptor

Neurochemistry and Neuropharmacology

Author: Lucia Agüero | Email: lucia@ague.ro

Lucia Agüero1°, Sofía Ludmila Gallino1°, María Eugenia Gomez Casati2°, Paula Inés Buonfiglio1°, Viviana Karina Dalamon1°, Ana Belén Elgoyhen1°2°

1° Instituto de Investigaciones en Ingeniería Genética y Biología Molecular, Dr Héctor N. Torres

2° Instituto de Farmacología, Facultad de Medicina, UBA

Hearing loss affects 360 million people (5% of the world's population and 42% of those over 75). While half of hearing loss has a genetic origin, the other 50% is due to environmental factors, with prolonged exposure to loud noise being the leading cause. One of the main challenges in hearing research is finding a pharmacotherapeutic strategy to prevent damage from noisy environments when they cannot be avoided. Recent studies have identified the α9α10 nicotinic cholinergic receptor in the sensory hair cells of the cochlea as a therapeutic target for developing drugs that enhance the olivocochlear efferent system to prevent acoustic trauma. This work aims to test potential positive allosteric modulators (PAMs) of α9α10 for their ability to prevent hearing loss due to noise exposure. Several candidates, including PAMs and agonists of receptors related to α9α10, such as α7, α4β2, α4β4, and serotonin receptors, were tested on recombinant α9α10 receptors expressed in Xenopus laevis oocytes. So far, chlorophenyl biguanide (a selective serotonin receptor agonist) showed some effect (133.1 ± 11.5% current amplitude normalized to 10 µM control ACh), but the other compounds, including ivermectin, TQS, 4BP-TQS, B-973B, A-867744 (PAMs of α7 nAChRs), NS-9283 (an α4β2 nAChR PAM), and LY-2087101 (a PAM of α7, α4β2, and α4β4 nAChRs), did not behave as PAMs of the α9α10 nAChR, with some even acting as blockers at high concentrations such as TQS, 4BP-TQS and B-973B.

S-108 | The emerging role of BDNF Met prodomain carriers in the comorbidity between stress and cocaine

Neurochemistry and Neuropharmacology

Author: Maria Julieta Boezio | Email: jboezio@unc.edu.ar

M. Julieta Boezio1°, Daiana Rigoni1°, Marianela Sanchez1°, Bethania Mongi-Bragato1°, Victoria Vaccaro, Liliana Cancela1°, Mariano Bisbal2°, Agustin Anastasia2°, Flavia Bollati

1° Instituto de Farmacología Experimental de Córdoba (IFEC-CONICET), Departamento de Farmacología Otto Orsingher, Facultad de Ciencias Químicas, Universidad Nacional de Córdoba

2° Instituto de Investigación Médica Mercedes y Martin Ferreyra (INIMEC-CONICET)

Stress is a significant risk factor in the development of addiction and relapse vulnerability. Research from our lab has shown that stress heightens the psychomotor and stimulant effects of cocaine and facilitates the acquisition of cocaine self-administration behavior. The reasons behind some individuals' greater risk for substance use disorders remain unclear, but these differences might be explained by genetic variants. The Val66Met variant of brain-derived neurotrophic factor (BDNF), which impairs BDNF transport and activity-dependent secretion, has been associated with increased susceptibility to neuropsychiatric and substance use disorders, due to its role in nervous system development and plasticity. In this study, we evaluate the Met prodomain BDNF (Met-pBDNF) in stress-related vulnerability to cocaine addiction. For this purpose, we generated lentiviral (LV) particles carrying Met-pBDNF and Val-pBDNF variants and microinjected them into the nucleus accumbens core (NAc). Our results show increased locomotor activity and facilitated cocaine self-administration in stressed Met-pBDNF rats compared to stressed and non-stressed Val-pBDNF animals. Moreover, we observed increased AMPAR surface expression in stressed Met-pBDNF rats, consistent with our previous findings. These results suggest a novel and crucial role for Met-pBDNF in the neurobiological mechanisms underlying the comorbidity between stress exposure and addiction disorders.

S-109 | SILDENAFIL REDUCES DAT-MEDIATED DOPAMINE REUPTAKE AND GENERATES DUAL MEMORY EFFECTS IN YOUNG RATS IN ACUTE AND CHRONIC TREATMENT

Neurochemistry and Neuropharmacology

Author: Maria Florencia Constantin | Email: mafconstantin@unc.edu.ar

Maria Florencia Constantin1°, Leonardo Bravo2°, Aida Marcotti1°, María Dolores Rubianes2°, Mariela Fernanda Pérez1°

1° Departamento de Farmacología Otto Orsingher, IFEC-CONICET, Facultad de Ciencias Químicas, Universidad Nacional de Córdoba

2° Departamento de Físicoquímica, INFIQC-CONICET, Facultad de Ciencias Químicas, Universidad Nacional de Córdoba

Sildenafil-SILD is used for the treatment of peripheral pathologies and it is also misused. In the CNS, SILD improves synaptic plasticity in hippocampus-HP and dopamine-DA neurotransmission. Increased DA signaling may either interfere with or enhance memory formation. Aims: To evaluate SILD effects in HP-dependent memories; to determine if memory deficits are DA-dependent; and to assess SILD effects on re-uptake kinetics of monoamine transporter DAT in HP and nucleus accumbens-NAc. Methods: male Wistar rats (50 days old) received an acute (P1) or a daily SILD dose for 10 days (P2) starting behavioral tests 2h or 24h after the last dose, respectively. Tests included novel object recognition-NOR and fear conditioning-FC. Another P1 group received FAUC365 (D3 antagonist) 20 min before NOR training. HP and NAc were extracted after P1 to evaluate the DAT function. Results: SILD reduced the discrimination index in NOR, which was prevented by FAUC365 after P1, and increased the freezing % after FC. SILD also reduced DA reuptake after P1 in HP and NAc. Conclusion: SILD differentially affected HP-dependent memory formation, possibly by increasing DA transmission through DAT inhibition. D3 antagonism reversed NOR deficits, suggesting DA overload impaired normal NOR performance. In an aversive environment, DA increments improved memory. This suggests SILD may negatively affect young, healthy subjects, highlighting the importance of considering central effects when using SILD.

S-110 | ¿Can yerba mate modulate oxidative stress levels in an animal model of Parkinson's disease?

Neurochemistry and Neuropharmacology

Author: Florencia Echeverria | Email: florencia.echeverria@uner.edu.ar

Florencia Echeverria1°, Liliana T. Tribbia1°, Andrea C. Cura1°, Roy C. Rivero2°, Irene R. E. Taravini1°

1° Laboratorio de Neurobiología Experimental (LNE)-ICTAER-UNER-CONICET, Gualeguaychú, Entre Ríos, Argentina.

2° Laboratorio de Desarrollo y Mejoramiento de Alimentos de Calidad a partir de Recursos de Entre Ríos (DyMACRER)-ICTAER-UNER-CONICET, Gualeguaychú, Entre Ríos, Argentina.

The precise causes that trigger the dysfunction and death of nigral dopaminergic neurons that lead to the development of Parkinson's disease (PD) have not yet been clarified. However, neuroinflammation and oxidative stress have been postulated as mechanisms involved in neurodegeneration. Yerba mate (YM) consumption provides numerous health benefits, which are strongly related to its marked antioxidant activity. In hemiparkinsonian mice, we have observed that chronic treatment with YM exerts a beneficial neuroprotective effect on dopaminergic neurons. Our objective is to elucidate whether the neuroprotective effect of YM is correlated with an enhancement of enzymatic antioxidant systems and/or a decrease in biomarkers of oxidative damage in the striatum of hemiparkinsonian mice. C57BL6J mice received an infusion of YM or water for 4 months. Then, a moderate lesion was induced by an intrastriatal injection of 6-OHDA and continued with their treatment until sacrifice, 2 or 30 days postlesion. Analyses are being performed on striatum homogenates in order to study the antioxidant capacity of the tissue (ABTS), the levels of oxidative damage (TBARS) and enzymatic antioxidant systems (NOS, GPX, SOD, CAT) by spectrophotometric and immunohistochemical techniques. These analyses will allow us to establish whether the antioxidant capacity of YM contributes to minimizing the neurodegeneration of the nigrostriatal system induced by the action of a pro-oxidant toxin such as 6-OHDA in mice.

S-111 | Perinatal Protein Restriction Facilitates Anxiety- and Anhedonia-like Behaviors in Rats During Cocaine Withdrawal

Neurochemistry and Neuropharmacology

Author: Maria Cecilia Gutierrez | Email: cecilia.gutierrez@unc.edu.ar

Maria Cecilia Gutierrez1°2°, Maria Cecilia Perondi1°, Luis Manzanelli1°, Analia Valdomero1°2°

1° Departamento de Farmacología Otto Orsingher, Facultad de Ciencias Químicas, Universidad Nacional de Córdoba

2° IFEC (CONICET).

Previously, we showed that perinatal protein restriction increases the rewarding effects of cocaine, and facilitates the reinstatement of extinguished conditioned place preference. Relapse into substance use during abstinence is often associated with withdrawal symptoms such as anxiety and depressive-like behavior. This study aimed to investigate whether early malnutrition facilitates these behaviors in cocaine-abstinent adult animals. To achieve this, different groups of male adult rats, subjected to a perinatal protein restriction schedule (PR-rats) and normoprotein diet (NP-rats), received a daily i.p. injection of either saline (1 ml/kg) or cocaine (5 or 10 mg/kg) for 7 days. After 4 and 7 days of withdrawal (WD), we evaluated anxiety and anhedonia-like behavior in the elevated plus maze (EPM) and sucrose preference test (SPT), respectively. The results showed that PR-rats spent less time in the open arms of the EPM on WD 4 and 7 with both doses of cocaine, indicating anxiety-like behavior. This effect was observed in NP-rats only with the higher dose of cocaine on WD7. In the SPT, early malnutrition reduced sucrose preference on both WD 4 and 7, regardless of the treatment. These findings demonstrate that nutritional injury facilitates anxiety-like behavior and induces anhedonia, a depression-related symptom during cocaine abstinence. This suggests that early malnutrition may contribute to relapse into substance use during withdrawal by facilitating these behaviors.

S-112 | Medical cannabis from Entre Rios: effect on involuntary movements induced by antiparkinsonian and antipsychotic drugs

Neurochemistry and Neuropharmacology

Author: Aylén Camila Nelson Mohr | Email: aylen.nelson@uner.edu.ar

Aylén C. Nelson Mohr1°, L. Teresita Tribbia1°, Paula B. González2°, Omar A. Vallejos3°, Natalia Sosa2°, Irene R.E. Taravini1°

1° Laboratorio de Neurobiología Experimental. LNE-ICTAER-UNER-CONICET, Gualeguaychú, Entre Ríos, Argentina

2° Laboratorio de Desarrollo y Mejoramiento de Alimentos de Calidad a partir de Recursos de Entre Ríos. DyMACRER-ICTAER-UNER-CONICET, Gualeguaychú, Entre Ríos, Argentina

3° Área Cromatografía de la Facultad de Bromatología. UNER

The development of abnormal involuntary movements (AIMs) or dyskinesias is a common complication in the pharmacological treatment of neurological and psychiatric disorders associated with abnormal basal ganglia function, such as Parkinson's disease (PD) and schizophrenia (SCZ). Both L-DOPA-induced dyskinesias (LIDs) in PD and tardive dyskinesia (TD) in SCZ are often irreversible and more disabling than the underlying condition itself. Using neuromodulation as an innovative therapeutic approach for AIMs, the endocannabinoid system has emerged as a promising treatment strategy due to its role in the physiological neuromodulation of the basal ganglia in the movement control. Considering the health benefits offered by various bioactive compounds in cannabis, including cannabinoids, we aim to obtain an extract of Cannabis sativa (CS) from the Entre Rios province with a profile of bioactive compounds and properties unique to the cultivation region. We also plan to test its potential therapeutic effect in animal models of AIMs induced by L-DOPA and haloperidol (HAL). The emerging results of this project will aid determined whether treatment with Entre Rios CS extracts has therapeutic potential to prevent or attenuate the severity of LIDs and TD in animal models, and whether this effect is accompanied by modulation of the synaptic microstructure of striatal cells.

S-113 | Overcoming Diagnostic Challenges in Parkinson's Disease: A Tetracycline-Based Approach for Detecting Aggregated α-Synuclein

Neurochemistry and Neuropharmacology

Author: Silvana Estefanía Soliz Santander | Email: tefi.9625@gmail.com

Silvana Estefanía Soliz Santander1°, Ma. Belén Machin1°, Agustín Pernicone3°, Florencia González-Lizarraga1°, Verónica Manzano3°, César Ávila1°, Oscar Varela2°, Rosana Chehín1°, Esteban Vera Pingitore1°

1° IMMCA (CONICET-UNT-SIPROSA). Pje Dorrego 1080. San Miguel de Tucumán. Tucumán

2° CIHIDECAR (CONICET-UBA). Ciudad Universitaria, Pabellón 2. Ciudad Autónoma de Buenos Aires

Detecting amyloid-like α-synuclein (aSyn) aggregated species in biological fluids is crucial for early Parkinson's disease (PD) diagnosis and the effectiveness of therapies. However, current diagnostics face challenges because traditional antibodies struggle to detect the wide variety of toxic aSyn species. Based on our previous research demonstrating that certain tetracycline derivatives selectively bind to aggregated α-Syn but not to its monomeric form, we immobilized a modified tetracycline and tested its ability to distinguish between aggregated and monomeric aSyn species using a novel immunoassay without any antibody as a capture molecule. The analyte (aggregated aSyn) was produced from human recombinant aSyn expressed and purified in our laboratory and then aggregated following standard protocols. Our protocol demonstrated nanomolar affinity for aggregated α-synuclein species, with no cross-reactivity to native α-synuclein, which served as a negative control. We also tested this novel ELISA in real cerebrospinal fluid (CSF) samples to detect possible interferents and design strategies to address these issues. The successful application of this novel tetracycline-based immunoassay in real CSF samples highlights its potential for early and more accurate detection of PD's main biomarker. This advancement not only contributes to more reliable PD diagnostics but also paves the way for further research and development in neurodegenerative disease detection and management.

S-114 | Role of hypothalamic proopiomelanocortin expression in a subpopulation of cholinergic neurons

Neuroendocrinology and Neuroimmunology

Author: ESTEFANIA BELLO | Email: estefania.bello@gmail.com

Bárbara A Giugovaz Tropper1°2°, Verónica Risso1°2°, Analía López Díaz1°2°, Agostina Presta1°2°, Viviana F. Bumaschny1°2°3°, Estefanía P. Bello1°2°3°

1° Universidad de Buenos Aires, Facultad de Ciencias Médicas, Departamento de Ciencias Fisiológicas. Grupo/Laboratorio. Buenos Aires, Argentina.

2° CONICET - Universidad de Buenos Aires. Instituto de Fisiología y Biofísica Bernardo Houssay (IFIBIO Houssay). Buenos Aires, Argentina.)

3° *equal contribution

The hypothalamic arcuate nucleus (Arc) is a key regulator of energy homeostasis composed by different neuronal populations that integrate peripheral and central signals through complex circuits with different functions. In particular, the Arc proopiomelanocortin (POMC) neurons inhibit food intake and promote energy expenditure. This population is heterogeneous, composed of neuronal subpopulations differing not only in their target areas but also in terms of the neurotransmitter and receptor expression. Given that different subpopulations of POMC neurons secrete antagonistic neurotransmitters, such as glutamate and GABA, it has been proposed that they could have different physiological roles and targets. Smoking can decrease food intake, body weight and increase metabolism through nicotine acting on Arc-POMC neurons. Although it is well established that a minor subpopulation of Arc-POMC neurons also express acetylcholine, whether these neurons play a role in regulating feeding behavior is still unknown. In the present study, we aimed to characterize the contribution of Arc-POMC cholinergic neurons in the control of energy balance by expressing Pomc exclusively in this subpopulation. Elucidating the role of POMC expression in cholinergic neurons could contribute to unraveling a new pathway modulating appetite and body weight and lead to the development of novel appetite suppressants.

S-115 | Androgen steroid levels and clinical performance in a murine model suffering Amyotrophic lateral Sclerosis (ALS)

Neuroendocrinology and Neuroimmunology

Author: Ivan Jose Esperante | Email: esperanteibyme@gmail.com

Ivan J. Esperante1°, Maria Meyer1°, Carolina Banzan1°, Philip Liere4°, Analia Lima1°, Paulina Roig1°, Rachida Guennoun4°, Alejandro F De Nicola1°3°, Maria Claudia Gonzalez Deniselle1°2°

1° Instituto de Biología y Medicina Experimental (IBYME-CONICET)

2° Dto de Ciencias Fisiológicas, Facultad de Medicina, UBA

3° Dto de Bioquímica Humana, Facultad de Medicina, UBA

4° U1195 INSERM and University Paris Sud: "Neuroprotective, neuroregenerative and remyelinating small molecules"

The Wobbler mouse (WR), a recognized model of ALS, shows a selective loss of motoneurons associated to astrocytosis and microgliosis in cervical spinal cord (CSC) and brainstem. We have demonstrated neuroprotective effects of testosterone (T) and modulation of neurosteroidogenic enzymes in the WR's CSC. Here, we investigated T and flutamide (F) effects on superoxide dismutase 1 (SOD1), glutathione peroxidase (GPX1) mRNAs and on steroid levels in male WR's CSC. T was implanted in silastic tubes (2 months). F was given in pellets (20mg) starting 1 week before T. Four groups were prepared: a) WR, (b) control+empty silastic tubes, c) WR+T (silastic tubes+T) and d) WR+T+F. T but not T+F increased seminal vesicles and biceps weight ($p<0.05$ vs WR). In WR+T, we showed: 1) high expression of SOD1 ($p<0.05$), GPX1 ($p<0.01$), and SIRT3 mRNAs ($p<0.001$) vs. WRs and WR+T+F; 2) high levels of T, 5α-dihydrotestosterone (5α-DHT), and 3β-androstanediol ($p<0.01$ vs. WR and WR+T+F); 3) high levels of 3a-androstanediol, a GABA A agonist, vs. WRs ($p<0.05$) but not vs. WR+T+F; 4) a positive association between grip strength and T or 3β-androstanediol ($p<0.05$) and 5) a negative association between paw atrophy and 5α-DHT levels ($p<0.01$ vs WR, NS vs WR+T+F). We suggest that the androgen receptor may be involved in T protective mechanisms against motoneuron degeneration and propose considering androgen derivatives as potential prognostic biomarkers for this condition.

S-116 | Impact of precocious puberty on Behavioral Traits Relevant to Psychiatric Conditions

Neuroendocrinology and Neuroimmunology

Author: Juliana Navarro | Email: ju.navarro13@gmail.com

Juliana Navarro1°, Macarena Maldonado1°2°, Araceli Seiffe2°, Amaicha Mara Depino2°3°

1° Facultad de Ciencias Exactas y Naturales (UBA)

2° IFIBYNE (UBA-CONICET)

3° Departamento de Biodiversidad y Biología Experimental (FCEN, UBA)

Precocious puberty can be triggered by the early secretion of gonadotrophins or sex hormones, the latter is known as peripheral precocious puberty and is often idiopathic (90-95% in girls). The onset of puberty marks a critical period for physical growth, endocrine maturation, and brain circuit consolidation. Children with precocious puberty face social and emotional challenges that may impact self-esteem and predispose them to psychiatric conditions. However, the direct impact of early puberty on brain maturation and behavior remains underexplored.

This study presents a model of precocious puberty to evaluate its impact on psychiatric-relevant behaviors. We administered 17β-estradiol (E2) daily from postnatal day 21 (PD21) to PD35 and assessed adult sociability, anxiety-, and depression-related behaviors. Female mice exposed to E2 exhibited earlier vaginal opening, confirming pharmacologically-induced early puberty. In adulthood, no significant differences were observed between groups in anxiety, repetitive behaviors, or sociability tests. However, E2-treated animals showed impaired social recognition, with no deficit in social novelty response, indicating a specific behavioral alteration. Additionally, sex differences were noted in urine marking and forced swim test immobility.

These findings establish a new model of precocious puberty in mice and highlight a specific effect on social recognition that warrants further investigation into the underlying neuronal mechanisms.

S-117 | Effect of early social isolation on risk assessment in zebrafish

Sensory and Motor Systems

Author: Valentin Azar | Email: azarvalentin8@gmail.com

Valentin Azar1°, Valentin Agulló1°, Nicolás Martorell1°, Violeta Medan1°

1° FCEN-UBA / IFIBYNE - CONICET

Early postnatal social interaction is critical for establishing proper behavioral patterns, while social isolation during early development is a risk factor for depression, anxiety and autistic-type disorders. Zebrafish (ZF) are social vertebrates that aggregate in groups both in nature and in the laboratory and are susceptible to social isolation. In this work, we asked whether early social isolation affects risk assessment, multisensory integration of danger stimuli and social preference for other conspecifics. Taking advantage that ZF do not require parental care, we kept ZF in groups of 50 individuals or in individual opaque containers since egg fertilization and tested their behavior 10-30 days post fertilization. We evaluated ZF escape behavior in response to visual, acoustic or multisensory stimuli. Isolated ZF showed lower escape thresholds than control ZF. However, while the combination of an auditory and a visual (multisensory) stimulus increases the probability of escape in control ZF, isolated ZF did not show significant multisensory integration. We analyzed visual preference for conspecifics by offering the focal fish two options: either to look at other fish or to observe an empty chamber. We found that isolated ZF exhibited a lower visual preference index compared to control ZF. Our results suggest that social isolation leads to hyper-reactivity to threatening stimuli and reduces multisensory integration, while abolishing visual preference for conspecifics.

S-118 | How the brain protects the ear: Transcriptomic changes underlying the role of the efferent system during noise-induced trauma.

Sensory and Motor Systems

Author: VALERIA CASTAGNA | Email: valeriacarolinacastagna@gmail.com

Valeria Castagna1°2°, Jimena Perez Lloret3°, Rachel Williams3°, Jimena Ballestero1°, Belén Elgoyhen2°, Maria Eugenia Gomez Casati1°, Marcela Lipovsek3°

1° Instituto de Farmacología, Facultad de Medicina, Universidad de Buenos Aires, 1121 Buenos Aires, Argentina.

2° Instituto de Investigaciones en Ingeniería Genética y Biología Molecular, Dr. Héctor N. Torres, Consejo Nacional de Investigaciones Científicas y Técnicas, 1428 Buenos Aires, Argentina.

3° Ear Institute, UCL, London, UK

Noise-induced hearing loss (NIHL) is becoming a leading type of non-congenital hearing loss, presenting a major societal hazard that begins early in life. Recent studies showed that the medial olivocochlear system (MOC) can mitigate acoustic trauma effects in rodents. We investigated the role of the MOC in NIHL using two mouse models: an α9 nicotinic receptor subunit (nAChR) knock-out (carrying an9 point mutation that leads to enhanced cholinergic activity KO), which lacks cholinergic transmission between MOC neurons and hair cells; and an alpha9 knocking (α9KI) carrying an9 point mutation that leads to enhanced cholinergic activity. Results showed a positive correlation between the degree of hearing loss prevention and the level of cholinergic activity.

This study aimed to analyze transcriptomic changes in specific cell types within the organ of Corti following acoustic trauma, to understand the function of the MOC feedback. WT, α9KI, and α9KO mice at 3 weeks of age were exposed to loud sounds (1-16 kHz, 100 dB SPL, 1hr). One week later, we dissected and flash-froze the organ of Corti. We generated single-nuclei sequencing libraries (Evercode WT, Parse Biosciences) from these tissues. Our initial findings show successful isolation and sequencing of nuclei from inner hair cells (IHCs), outer hair cells (OHCs), supporting cells (SCs), and spiral ganglion neurons (SGNs). Further analyses will clarify the differential responses of each group post-trauma.

S-119 | Song-like activation of syringeal and respiratory muscles during sleep in canaries

Sensory and Motor Systems

Author: Facundo Fainstein | Email: facu.fainstein@gmail.com

Facundo Fainstein1°2°, Franz Goller3°4°, Gabriel B. Mindlin1°2°

1° Universidad de Buenos Aires, Facultad de Ciencias Exactas y Naturales, Departamento de Física, Ciudad Universitaria, 1428 Buenos Aires, Argentina.

2° CONICET - Universidad de Buenos Aires, Instituto de Física Interdisciplinaria y Aplicada (INFINA), Ciudad Universitaria, 1428 Buenos Aires, Argentina.

3° School of Biological Sciences, University of Utah, Salt Lake City, UT 84112, USA

4° Institute for Integrative Cell Biology and Physiology, University of Münster, 48149 Münster, Germany

Sleep replay activity involves the reactivation of brain structures with patterns similar to those observed during waking behavior. In this study, we demonstrate that adult male canaries exhibit spontaneous, song-like peripheral reactivation during night sleep. Our findings include: (1) the presence of activity in respiratory muscles, leading to song-like air sac pressure patterns of low amplitude, (2) the simultaneous occurrence of respiratory replay events and reactivation of syringeal muscles, and (3) the reactivation of syringeal muscles without concurrent respiratory system activity. This song-like reactivation of peripheral motor systems enables the identification of specific motor patterns, with replay events preserving individual morphological and temporal properties. The activation of peripheral motor systems in songbirds and the differences in activation patterns between species give unique insights into the fictive behavioral output of activation of a complex learned motor behavior during sleep, allowing insights into the neural control mechanisms and potential functions.

S-120 | Low dimensional neural dynamics underlying the generation of rhythmic vocal behavior in canaries

Sensory and Motor Systems

Author: Fiamma Liz Leites | Email: fiamma.liz17@gmail.com

Fiamma L. Leites1°2°, Cecilia T. Herbert1°2°, Felipe I. Cignoli1°2°, Gabriel B. Mindlin1°2°, Ana Amador1°2°

1° Departamento de Física, Facultad de Ciencias Exactas y Naturales, Universidad de Buenos Aires, Buenos Aires, Argentina

2° Instituto de Física Interdisciplinaria y Aplicada, INFINA-CONICET, Buenos Aires, Argentina

The dynamical features of neural coding of complex learned vocal behavior remain under active investigation. Here we examined multiunit neural activity in the song system nucleus HVC of singing adult male canaries (Serinus canaria). Canaries have a rich repertoire of syllable types and some flexibility in how these are sequentially deployed during song production. Using machine learning techniques to search for concise underlying structure in the data, we find a low dimensional representation of the neural recordings analyzing the modes of the latent space of an auto-encoder. These modes are closely correlated with characteristics of the associated song, such as the rhythm of singing or the shape of syllables in the sound envelope, including characteristics of the underlying motor gestures, air sac pressure patterns. Several syllable types can be represented by one mode. Our results demonstrate a tight link between peripheral and central dynamical patterns of activity during singing.

S-121 | Characterizing muscular and biomechanical strategies in postural control. An exploratory study

Sensory and Motor Systems

Author: Cecilia E. Saavedra Fresia | Email: csaavedra@herrera.unt.edu.ar

Cecilia E. Saavedra Fresia1°, Leonardo Ariel Cano1°, Celia Tagashira1°, Eduardo Fernandez-Jover2°3°, Fernando Daniel Farfán1°2°, Ana Lía Albarracín1°

1° Neuroscience and Applied Technologies Laboratory (LINTEC), Bioengineering Department, Faculty of Exact Sciences and Technology (FACET), National University of Tucuman, Instituto Superior de Investigaciones Biológicas (INSIBIO), National Scientific and Technical Research Council (CONICET), San Miguel de Tucuman, Argentina.

2° Institute of Bioengineering, Universidad Miguel Hernández of Elche, Spain

3° Research Networking Center in Bioengineering, Biomaterials and Nanomedicine (CIBER-BBN), Madrid, Spain

Introduction: Postural control requires the efficient functioning of sensorimotor mechanisms and the ability to coordinate movement strategies to stabilize the body's center of mass during stability disturbances. However, the effectiveness of the mechanisms controlling these processes can be affected by aging, neuromuscular pathologies and neurodegenerative diseases. In this exploratory study, we investigate the muscle contractile dynamics and biomechanical strategies generated by challenging postures. Methods: Postural control was evaluated by using three items of the Berg Balance scale Scale. It was administrated in increasing difficulty and with both open and close eyes. Electromyographic (EMG) signals were obtained from specific leg and trunk muscles involved in balance control and synchronized with IMU and plantar sensors to extract biomechanical information. Results: This experimental approach allowed to characterize muscle dynamic contraction under different postural conditions with and without visual information. We have found that different strategies and specific modulations were required for controlling balance in high demanding postures. Intermittent muscle activity along the postural tasks was observed specially in the muscles of the dominant leg. Conclusions: In this study we describe characteristic oscillatory modulations and synergistic activations as motor strategies for maintaining the balance after a demanding postural condition.

S-122 | The synaptic complexity of a high-integration lobula neuron in crabs

Sensory and Motor Systems

Author: Julieta Sztarker | Email: sztarker@fbmc.fcen.uba.ar

Julieta Sztarker1°2°, Yair Barnatan1°, Claire Rind3°

1° IFIBYNE (CONICET-UBA)

2° Depto FBMC, FCEN, UBA

3° NUBI, Newcastle University

Arthropods are diverse, abundant, successful animals that exploit all ecological niches. They sense the environment, move, interact with prey/predators/conspecifics, learn, etc. using small brains with 5 orders of magnitude less neurons than mammals. Hence, these microbrains need to be highly efficient in information processing. One distinct aspect is the presence of large, easily identifiable single neurons that act as functional units for information processing integrating a high volume of information to guide behavior. To understand the synaptic organization behind these high integration nodes research on suitable neurons is needed. The lobula giant neurons (LG) found in the third optic neuropil, the lobula, of crabs, respond to moving stimuli, integrate information from both eyes, show short- and long- term plasticity and are thought to be key elements in the visuomotor transformation guiding escape responses to approaching objects. One subgroup, the MLG1 (Monostratified Lobula Giants type 1) possesses wide main branches and a regular arrangement in a layer of the lobula that allows their identification even in unstained preparations. Here, we describe the types and abundance of synaptic contacts involving MLG1 profiles using transmission electron microscopy (TEM). We found an unexpected diversity of synaptic motifs and an apparent compartmentalization of the dendritic arbor in two domains where MLG1s act predominantly as presynaptic or postsynaptic, respectively.

S-123 | Enhancing Alzheimer’s Diagnosis through fMRI Analysis using Variational Autoencoders

Theoretical and Computational Neuroscience

Author: Santiago Valentino Blas Laguzza | Email: santiblaas@gmail.com

Santiago Valentino Blas Laguzza1°, Martin Alberto Belzunce2°, Diego Diego1°

1° Intituto de matematica aplicada del litoral IMAL-CONICET

2° ICIFI UNSAM-CONICET, Escuela de Ciencia y Tecnología, UNSAM

My research focuses on improving the diagnosis of Alzheimer's disease by analyzing fMRI data using Variational Autoencoders (VAEs). This approach leverages the VAEs' ability to capture complex patterns in high-dimensional data by mapping it into a latent space. The latent space representation allows for the differentiation between Alzheimer's patients and healthy individuals. By analyzing the properties of this latent space, we can better understand the underlying neural changes associated with Alzheimer's, which may serve as biomarkers for early detection. Additionally, I explore the use of graph-based methods to interpret these biomarkers more effectively. This combination of advanced machine learning techniques and neuroscience aims to enhance diagnostic accuracy and provide deeper insights into the disease's progression. My work also involves investigating the application of transformers and LSTM networks in processing temporal sequences of clinical data, further pushing the boundaries of computational neuroscience.

S-124 | Study of changes in brain dynamics during sleep cycles in dogs under the effects of Trazodone.

Theoretical and Computational Neuroscience

Author: Magaly Catanzariti | Email: magalybelenc92@gmail.com

Magaly Catanzariti1°2°, Alejandra Mondino3°, Natasha Olby3°, Diego Mateos4°

1° Consejo Nacional de Investigaciones Científicas y Técnicas (CONICET), Argentina.

2° Instituto de Matemática Aplicada del Litoral (IMAL-CONICET-UNL), CCT CONICET, Santa Fe, Argentina.

3° Department of Clinical Sciences - North Carolina State University.

4° Universidad Autonoma de Entre Ríos (Uader), Entre Ríos, Argentina.

Trazodone has been shown to be effective in improving sleep quality in humans. This study aimed to investigate the impact of trazodone on brain dynamics during sleep-wake cycles in healthy dogs, as compared to a control group, using electroencephalographic (EEG) analysis. The signals were stratified into four states: wakefulness, sleepiness, Non-REM, and REM. Power spectral density (PSD) studies were carried out on these signals, as well as non-linear analysis of information and connectivity measures. .

Our findings indicate that 70% of dogs under the influence of trazodone did not enter the Rapid Eye Movement (REM) sleep stage. Additionally, we observed a significant increase in high-frequency brainwave activity during the Non-Rapid Eye Movement (NREM) stage in sedated dogs compared to the control group.

The results provide insights into the effects of trazodone on canine brain activity during sleep, which could have implications for its clinical use as a sleep aid.

S-125 | Achieving Path Integration In Feedforward Models Of Grid Cells

Theoretical and Computational Neuroscience

Author: Facundo Emina | Email: facuemina@gmail.com

Facundo Emina1°2°, Emilio Kropff2°

1° Universidad de Buenos Aires, Facultad de Ciencias Exactas y Naturales, Departamento de Física, Buenos Aires, Argentina

2° Fundación Instituto Leloir — IIBBA/CONICET, Buenos Aires, Argentina

Path integration is the ability that enables mammals to track their trajectory through space and navigate efficiently, even in the absence of external landmarks. In rodents, the entorhinal cortex contains various neurons that respond to navigational variables like angle and velocity, essential for this process. Within the same area, Grid Cells are thought to integrate this information, coherently firing with the animal's position in space, forming a periodic lattice with triangular symmetry. However, the precise mechanisms behind this code remain unclear. Models based on continuous attractor neural networks suggest that grid cells achieve their firing pattern by integrating velocity and head direction signals within a specifically tuned recurrent network. Conversely, feed-forward models explain grid cell formation through self-organizing principles but do not account for path integration.

In this work, we explore how feed-forward models could be adapted to support path integration. Through numerical simulations, we show how adaptive and competitive networks could learn attractors from a tutor using Hebbian plasticity rules. Our goal is to provide a unified perspective on path integration by elucidating how these learned low-dimensional manifolds could facilitate effective spatial navigation.

S-126 | Entropy of the brain as a biomarker for the study of Altered States of Consciousness under the effect of LSD using fMRI

Theoretical and Computational Neuroscience

Author: Dante Sebastian Galvan Rial | Email: sebas.galvan@mi.unc.edu.ar

Dante Sebastián Galván Rial1°4°, Gabriel Della Bella1°2°, Tristan Martin Osan4°, Emmanuel A. Stamatakis3°, Pablo Barttfeld1°

1° Cognitve Science Group, Instituto de Investigaciones Psicologicas, Universidad Nacional de Cordoba

2° Facultad de Matematica, Astronomia y Fisica, Universidad Nacional de Cordoba

3° Cognition and Consciousness Imaging Group, Division of Anaesthesia, University of Cambridge

4° Instituto de Física Dr. Enrique Gaviola, UNC

The revival of scientific interest in psychedelics has prompted research into the neural correlates of their effects. Entropy is a unitless measure often used to quantify the uncertainty of a system's state, but it can also reflect physical properties, where greater entropy indicates greater disorder. This study analyses subjects who consumed LSD vs. a placebo, applying sampling entropy and Graph Theory small-world measures.

Data, obtained and preprocessed by Carhart-Harris (2016), were parsed using 2 anatomical atlases (AAL and AICHA) and a functional atlas (Power300). The time series were windowed to construct thresholded and undirected connectivity matrices. Regions of interest correspond to nodes and Pearson correlations between nodes to weighted edges. In addition, inter- and intra-network connectivity was explored in 13 functional networks.

Linear mixed effects statistics showed that sampling entropy was higher in LSD than in Placebo in AAL ($\beta = 0.071$, $p = 0.002$) and AICHA ($\beta = 0.13$, $p = 0.001$). The Power300 atlas highlighted significance in the Visual, Fronto-Parietal and Dorsal Sensorimotor networks. Inter-network connectivity increased in 7 of 13 networks ($p < 0.05$). These findings suggest that LSD induces significant brain reorganisation, increasing inter-network integration and synchronisation, specially in areas associated with altered

states of consciousness, helping to understand the profound changes in perception and cognition experienced by subjects.

S-127 | Temporal Correspondence Between Human Brain and Vision Transformers in Rapid Stimuli Tasks

Theoretical and Computational Neuroscience

Author: Giovanni Franco Gabriel Marraffini | Email: giovanni.marraffini@gmail.com

Giovanni Franco Gabriel Marraffini, Eric Lützow holm1°2°, Enzo Tagliazucchi1°2°3°

1° Consejo Nacional de Investigaciones Científicas y Técnicas (CONICET), Godoy Cruz 2290, CABA 1425, Argentina.

2° Instituto de Física Interdisciplinaria y Aplicada, Departamento de Física, Universidad de Buenos Aires, Pabellón 1, Ciudad Universitaria, CABA 1425, Argentina.

3° Latin American Brain Health (BrainLat), Universidad Adolfo Ibáñez, Av. Diag. Las Torres 2640, Peñalolén 7941169, Santiago Región Metropolitana, Chile

Visual processing in the human cerebral cortex is hierarchical and highly parallelized. Similarly, in the deep learning architecture known as vision transformers, data is processed iteratively through attention operations, which allow for the parallel evaluation of the importance of certain aspects of the image in the context of the rest of the image. In both the human brain and transformers, the attention mechanism selects parts of the input that are more relevant to the task at hand, enabling the model to prioritize and weigh this information during processing. In this work, we investigate the temporal correspondence between both systems, based on the hypothesis that each successive layer of the transformer will be correlated with temporally ordered components of the EEG response in an object recognition task. First, we analyze the representational similarity between the two systems, then we investigate predicting brain activations based on neural network activations, and finally, we use a state-of-the-art metric to make comparisons between neural network representations. We find that the early layers of the network are mostly aligned with the early stages of electrophysiological signals, while the advanced layers correspond to later stages.

S-128 | Context-based remapping in artificial neural networks shows shared representational features previously found in the rodent hippocampus

Theoretical and Computational Neuroscience

Author: Mauro Navarra | Email: mauro93866@gmail.com

Mauro Navarra1°, Camilo J. Mininni1°

1° Instituto de Biología y Medicina Experimental

Changes in firing patterns of navigational brain regions ('remapping') occur (although not exclusively) after changes in contextual cues. In particular, hippocampal place cells remap by either changing their place field location or place field firing rate. Previous experimental studies in rodents have shown that the maps at the neural activation level that emerge in two distinct contexts are not completely independent, but share a representational geometry even across different individuals. Can this shared representational geometry in the remapping phenomenon be understood as a consequence of the computational problem being solved by the system? To answer this question, we trained recurrent neural network models to solve a spatial navigation task with two contexts that are a geometric transformation from one another (in particular, rotations). Using principal component analysis on neural activations and Procrustes transformations (rotation, translation and scaling) over said components, we observed that the representations in both contexts aligned. This result shows that the experimental observations in previous studies can be replicated in artificial neural networks, suggesting that the mechanism underlying the differences in firing patterns at the neural activation level arises as a solution to the optimization problem of path integration and context discrimination.

S-129 | Are you self-modulating enough? Measuring motor imagery skills in brain-computer interfaces

Theoretical and Computational Neuroscience

Author: Victoria Peterson | Email: vpeterson@santafe-conicet.gov.ar

Victoria Peterson1°, Valeria Spagnolo1°, Catalina M. Galván1°, Nicolás Nieto1°2°, Rubén Spies1°, Diego H. Milone2°

1° Instituto de Matemática Aplicada del Litoral, IMAL, CONICET-UNL

2° Instituto de Investigaciones en Señales, Sistemas e Inteligencia Computacional, sinc(i), FICH-UNL, CONICET

Mastering a brain-computer interface based on motor imagery (MI-BCI) can be a long and frustrating journey for users. While users learn how to self-regulate their brain activity and generate distinguishable electroencephalography (EEG) patterns, the machine learning model that analyzes this brain data must adapt to signal changes that occur over multiple MI-BCI sessions. To address these challenges, we developed BOTDA -a backward formulation of optimal transport for domain adaptation- that adapts data distribution shifts between sessions in real time. In this study, we investigate the relationship between effective adaptation and the user's ability to modulate their brain activity. We show that the effort BOTDA needs to put in performing the adaptation is correlated with the discriminability of EEG patterns, providing insights into the user MI capabilities in real-time. In this way, BOTDA not only facilitates seamless adaptation between sessions but also offers meaningful feedback that can help the user to enhance their MI-BCI control capabilities. By integrating BOTDA into MI-BCI systems, we aim to increase user confidence and engagement, ultimately contributing to improved clinical outcomes in motor rehabilitation.

S-130 | Grid cells as an introspective metric system: the impact of grid cell coordination on goal navigation

Theoretical and Computational Neuroscience

Author: Luca Sarramone | Email: lsarramone@intia.exa.unicen.edu.ar

Luca Sarramone1°2°, Jose A. Fernandez-Leon1°2°3°

1° Exactas-INTIA, Universidad Nacional del Centro de la Provincia de Buenos Aires (UNCPBA), Tandil, Buenos Aires, Argentina

2° Consejo Nacional de Investigaciones Científicas y Técnicas (CONICET), Buenos Aires, Argentina

3° CIFICEN (CONICET–CICPBA-UNCPBA), CCT-Tandil, Buenos Aires, Argentina

Grid cells in the medial entorhinal cortex (MEC) are organized in different modules that sustain the mammal's self-localization system. Recent evidence shows that grid modules remain coordinated during animal foraging. However, the mechanism behind this coordination and its role in spatial navigation are still unclear. We hypothesized that a shared velocity input among all grid modules could explain such coordination. By using a continuous attractor model of grid cells, we tested whether a simulated e-puck robot can self-estimate its position on each time step relative to a starting point when exploring a square arena. Visited places were encoded as place fields and used to reset the current estimated position for error reduction. The impact of grid module coordination on spatial navigation was evaluated by guiding the robot to a goal based solely on the grid modules' activity. When grid cell activity was reset to the absolute coordinates of the place fields, the position prediction error was significantly reduced. Contrarily, when the reset happened relative to the place fields' estimated position, the prediction error significantly increased. Grid modules remained coordinated either when noise was added to the input velocity signal, or the estimated position deviated from the actual one. Together, this work suggests that grid module coordination enables navigation to a goal position even when the estimated position is imprecise.

S-131 | Analysis of Semantic Bias in ChatGPT: Generating Word Definitions by Extension

Theoretical and Computational Neuroscience

Author: Facundo Ariel Totaro | Email: facutotaro@gmail.com

Facundo Ariel Totaro1°, Julieta Laurino3°, Laura Kaczer3°, Juan Kamienkowski1°2°4°, Bruno Bianchi1°2°

1° Universidad de Buenos Aires. Facultad de Ciencias Exactas y Naturales. Departamento de Computación. Buenos Aires, Argentina.

2° CONICET-Universidad de Buenos Aires. Instituto de Ciencias de la Computación (ICC). Buenos Aires, Argentina.

3° .Universidad de Buenos Aires. Departamento de Fisiología, Biología Molecular y Celular. Buenos Aires, Argentina.

4° Facultad de Ciencias Exactas y Naturales, Maestría en Explotación de Datos y Descubrimiento del Conocimiento, Universidad de Buenos Aires, Buenos Aires, Argentina

The encoding of the word meaning in our brain is one of the main unknowns in the study of language as a cognitive ability. In this regard, words with more than one meaning, homonyms and polysemous words (e.g., "banco"), provide us with great possibilities to further the understanding of this issue. Behaviouraly, state-of-the-art Language Models (LM) can disambiguate word meanings similar to the human brain. This similarity between humans and LM prompts the question of whether they process language in a similar manner. Therefore, understanding how these models work can help us better understand the brain. In a preliminary analysis, meaning assignment to ambiguous words in LM was studied neurally, using a corpus of biasing contexts and ambiguous sentences. This corpus consisted of 48 ambiguous words, with at least 2 meanings each. Meanings were defined as a unique word (e.g., for "banco", "ecnonomía" and "mobiliario"). The meaning assignment was determined by comparing the distance between the embeddings (i.e., the vectorized representation of words) of the target-word and its meaning-word. Despite promising results, it was noted that the measurement of word meaning using only one meaning-word is noisy. In the present work, we aimed to define the ambiguous words' meaning as lists of words, and to

validate them through an online experiment. Increasing the precision of how we measure meaning assignment with LMs will help us better understand how the brain performs this task.

S-132 | Exploring Demographic Biases in Deep Learning Models for Motor Imagery BCI

Theoretical and Computational Neuroscience

Author: Bruno Jose Zorzet | Email: bzorzet@sinc.unl.edu.ar

Bruno J. Zorzet1°, Victoria Peterson2°, Diego H. Milone1°, Rodrigo Echeveste1°

1° Research Institute for Signals, Systems and Computational Intelligence, sinc(i), (FICH-UNL / CONICET), Santa Fe, Argentina

2° Institute of Applied Mathematics of the Litoral, IMAL, (FIQ-UNL / CONICET), Santa Fe, Argentina

Brain-computer interfaces (BCI) are systems that allow direct communication between the brain and external devices. Brain activity signals, like electroencephalography, are captured and processed to be converted into controlling commands. Recently, the use of deep learning methods for decoding the mental states has gained attention. Besides accurate decoding performance, it is essential to ensure that the model behaves fairly across different demographic groups in the data. Here, we study whether the performance of models in motor imagery (MI) tasks are influenced by protected attributes of the users. To assess the presence of biases in decoding MI based on biological sex of the participants, we conducted a rigorous analysis of performance of a deep learning model in an across-subject MI-BCI scenario. Our analysis reveals that certain subjects achieve consistently high performance independent of the training sets and initialization of the models. Furthermore, upon comparing metrics between males and females, we observed a tendency where females outperform males, with significant differences in one of the used datasets. This serves as a warning to the community about the potential presence of biases in across-subject MI-BCI.

S-133 | On the application of visibility graphs in the spectral domain for speaker recognition

Tools Development and Open Source Neuroscience

Author: Hernan Bocaccio | Email: hbocaccio@gmail.com

Hernan Bocaccio1°2°, Gabriel Mindlin1°2°

1° Laboratorio de Sistemas Dinámicos, Departamento de Física, FCEN, UBA

2° INFINA, CONICET

In this study, we explore the potential of visibility graphs in the spectral domain for speaker recognition. Adult participants were instructed to record vocalizations of the five Spanish vowels. For each vocalization, we computed the frequency spectrum considering the source-filter model of speech production, where formants are shaped by the vocal tract acting as a passive filter with resonant frequencies. Spectral profiles exhibited consistent intra-speaker characteristics, reflecting individual vocal tract anatomies, while showing variation between speakers. We then constructed visibility graphs from these spectral profiles and extracted various graph-theoretic metrics to capture their topological features. These metrics were assembled into feature vectors representing the five vowels for each speaker. Using an ensemble of decision trees trained on these features, we achieved high accuracy in speaker identification. Our analysis identified key topological features that were critical in distinguishing between speakers. This study demonstrates the effectiveness of visibility graphs for spectral analysis and their potential in speaker recognition. We also discuss the robustness of this approach, offering insights into its applicability for real-world speaker recognition systems. This research contributes to expanding the feature extraction toolbox for speaker recognition by leveraging the topological properties of speech signals in the spectral domain.

S-134 | Analyzing Sleep Dynamics Using Permutation Entropy: A Novel Approach to Hypnogram Visualization

Tools Development and Open Source Neuroscience

Author: Cristina Daiana Duarte | Email: cristinaduarte88@gmail.com

Cristina Daiana Duarte1°, Marianela Pacheco1°2°3°, Alejandro Wainselboim4°, Claudio Augusto Delrieux3°, Gustavo Gasaneo1°

1° Instituto de Física del Sur, Departamento de Física, Universidad Nacional del Sur (UNS) - CONICET, 8000 Bahía Blanca, Argentina.

2° Doctorado en Neurociencias, Universidad Nacional de Córdoba (UNC), Córdoba, Argentina.

3° Instituto de Ciencias e Ingeniería de la Computación (ICIC), Universidad Nacional del Sur - CONICET, Bahía Blanca, Argentina.

4° Lingüística y Neurobiología Experimental del Lenguaje (LyNEL), INCIHUSA-CCT Mendoza

Sleep is a biobehavioral state characterized by changes in the electrical activity of the brain. It has the important adaptive function of contributing to homeostasis in mammals. It is a vital neurological process, necessary for rest and replenishment of the body's energy reserves. Normal human sleep is divided into non-rapid eye movement (NREM) and rapid eye movement (REM) stages, which alternate throughout a night of sleep. NREM sleep is subdivided into stages of different depth. Alterations in the quality, quantity and pattern of sleep can cause sleep disorders, the prevalence of which is worrying and significantly affects the general population.

A hypnogram, a common tool for analyzing sleep macrostructure and diagnosing sleep disorders, graphically represents sleep stages over time. It is usually derived from polysomnography (PSG), a comprehensive sleep study that records various physiological parameters such as brain activity, eye movements, heart rate, and muscle activity.

In this work, we present an innovative method to visualize hypnograms using PSG data.

By calculating Bandt and Pompe permutation entropy from brain electrical signals recorded during the night, we provide new insights into sleep cycles. This approach not

only captures each sleep cycle, but also reveals the decrease in sleep depth as the night progresses. Finally, we applied this method to compare normal sleep patterns with patterns from a sleep disorder registry.

S-135 | Single-Objective Light-Sheet Microscopy for live imaging of neuronal plasticity in Drosophila.

Tools Development and Open Source Neuroscience

Author: Francisco Joaquín Tassara | Email: ftassara@leloir.org.ar

Francisco Tassara1°, Lourdes Simó1°, Mailen Folgueira 1°, Julian Gargiulo2°, María Fernanda Ceriani1°

1° Fundación Instituto Leloir—IIBBA—CONICET

2° Instituto de Nanosistemas, Universidad Nacional de San Martín

In most animals, daily rhythms of activity and rest are regulated by a circadian system. In Drosophila melanogaster, a specific group of neurons known as small ventral lateral neurons play a key role in generating these rhythms. Our research group observed the circadian remodeling of clock neuron terminals, an indication of synaptic plasticity. However, these studies were performed using fluorescence confocal microscopy techniques in fixed brains, which restricts the ability to observe this process dynamically. This poses a challenge in achieving a precise description of the structural changes that occur during the circadian cycle.

In this work we utilize an oblique plane version of light sheet microscopý. This technique utilizes a single objective for both illumination and imaging. The approach has several advantages over confocal microscopy. It minimizes phototoxic damage to the tissue, enabling prolonged time-lapse observations and it allows the use of high numerical aperture objectives, leading to sub-micron spatial resolutions. Here, we demonstrate an upright design of SOLS microscope compatible with imaging a live fly and present the first images of s-LNvs neurons. These advances contribute towards the goal of achieving long-term monitoring of structural remodelling in a single live fly, a key step for the understanding of the biological mechanisms underlying circadian structural plasticity.

VSD-137 | Corpus Curiosum: tackling today's critical thinking for tomorrow's Neuroscience

Tools Development and Open Source Neuroscience

Author: Mariela Fernanda Trinchero | Email: mftrinchero@gmail.com

Mariela F Trinchero1°, Inés Abalo-Rodríguez2°, Alba Sánchez-Fernández3°, Marta Turégano-López4°

1° Neuronal Plasticity Laboratory, Leloir Institute

2° Department of Experimental Psychology, Complutense University of Madrid, Spain

3° Laboratory for Applied Radiobiology, Department of Radiation Oncology, University Hospital Zurich, University of Zurich, Zurich, Switzerland

4° Universidad Politécnica de Madrid, Laboratorio Cajal de Circuitos Corticales, Centro de Tecnología Biomédica, Pozuelo De Alarcón, Spain

Corpus Curiosum was born in 2020 specifically to stimulate critical thinking in neuroscience and to promote scientific connections for early career reseachers (ECRs). The Corpus Curiosum core is composed of four international neuroscientists at different career stages whose fundamental aims are: to embrace diversity, support ECRs, and be highly accessible to everyone. We have created an online, multidisciplinary agora to hold enriching discussions and openly promote the exchange of opinions from young researchers in the neuroscience field. We address critical topics such as neurosexism, neuroethics, philosophy of neuroscience, credibility in research, etc. The success of the 1st edition convinced us to push this project further. As of today, we have deployed five editions, gathering hundreds of people from 50+ countries worldwide, leveraging our essential pillars. We have now come up with the Curious Minds School, where a selected group of students coming from all over the globe will face and discuss the basis of critical thinking in neuroscience. This course represents a novel asset to broaden the critical minds of our future neuroscientists. In order to support open science, we make all our material free and accessible on our online platforms. Our project has been recognized by IBRO (Diversity Grants 2021 and 2022), FENS, and BNA, who have sponsored our project along the way.

POSTER SESSION D

D-001 | Differential Tau expression alters AIS establishment maturation and function in murine and human neurons

Cellular and Molecular Neurobiology

Author: Cayetana Arnaiz | Email: cayetanarnaiz@gmail.com

Cayetana Arnaiz1°, Ricardo Angelini4°, Julieta Bianchelli1°, Mariana Holubiec1°2°, Carolina Facal3°, Indiana Páez3°, Elena Avale3°, Luciana Bruno4°, Tomás Falzone1°2°

1° IBioBA-MPSP-CONICET

2° IBCN-UBA-CONICET

3° INGEBI-CONICET

4° IC-UBA-CONICET

The axon initial segment (AIS) regulates cargo transport and action potential initiation. Tau is developmentally regulated to express isoforms with 3 or 4 microtubules binding domains (3R/4R). Tau mutations and PTMs affect AIS plasticity, however, the molecular mechanism remains unknown. My project focuses on understanding the role of tau on transport and electrochemical activity in the AIS. Immunostainings and confocal microscopy of AnkG in hippocampal neurons from tau mouse models showed a tau-dependent establishment of the AIS. Human neurons differentiated from hiPSCs showed that modulating 3R/4R expression by transplicing is sufficient to regulate AIS presence. In addition, lysosomal transport at the AIS analyzed by live-imaging revealed differential transport dynamics after manipulating 3R/4R ratio. To determine if tau-mediated effects occur locally at the AIS, I used ExM and iPALM superresolution microscopy to study the nanoscopic localization of tau revealing a clustered distribution in axons that is different from dendrites. Chronic depolarization experiments with KCl didn't show changes in AIS features in transgenic mice and human neurons. Spine density analysis and Ca+2 activity by live-imaging was compared in transpliced human neurons with 3R/4R disbalance. These preliminary results indicate that tau ratio alters the establishment and functional responses of the AIS such as transport and electrical activity in developing neurons.

D-002 | Effect of ceramide synthesis pathway inhibition in murine model of Alzheimer's disease.

Cellular and Molecular Neurobiology

Author: Melina Paula Bellotto | Email: melinabellotto@gmail.com

Melina Bellotto1°2°, Melisa Bentivegna1°2°, Nicolás Gonzáles Pérez1°2°, Jessica Presa1°2°, Carlos Pomilio1°2°, Flavia Saravia1°2°, Juan Beauquis1°2°

1° Instituto de Biología y Medicina Experimental (IBYME-CONICET)

2° Departamento de Química Biológica, FCEN, UBA

Alzheimer's disease (AD) is the main cause of dementia. Among the molecular hallmarks are amyloid plaques and Tau neurofibrilary tangles. We hypotesized that ceramides, membrane lipids that mediate inflammation, have a role in the neurodegeneration and glial activation that occur in AD.

The aim of this work was to study the effects of inhibiting ceramide synthesis pathways on the pathology of PDAPPJ20 transgenic mice, model of AD. We treated mice with farmacological inhibitors of 1) the de novo pathway, mediated by serin-palmitoyl transferase (SPT), and 2) the pathway mediated by neutral sphingomyelinase 2 (nSMase2), involved in exosome synthesis.

8-month-old female PDAPPJ20 mice were treated with the inhibitors Myriocin (Myr; inh. SPT; 0,3 mg/Kg; i.p.) or GW4869 (GW; inh. NSMAse2; 1,25 mg/Kg, i.p.). Myr-treated mice exhibited an exacerbated behavioral phenotype in the Open-Field and Barnes Maze tests. We studied amyloid plaque content in brain samples and found that Myr-treated mice showed more plaques in the hilus ($p<0.01$) region and larger plaques in the stratum radiatum ($p<0.01$) compared to vehicle-treated mice. The results of Myr treatment could indicate that the inhibition of SPT mediated ceramide synthesis pathway could accelerate the progression of the disease. Results from the GW treatment and from in vitro experiments will help us understand the relevance of the nSmase2 pathway in AD.

D-003 | In vitro and in vivo effects of the intransasal administration of extracellular vesicles loaded with the neuronal glycoprotein M6a on chronic stress related disorders.

Cellular and Molecular Neurobiology

Author: María Victoria Bühler | Email: mvbuhler@estudiantes.unsam.edu.ar

María Victoria Bühler1°2°3°, Camila Attonaty1°2°3°, Marcela Brocco1°2°3°, Melisa Carolina Monteleone1°2°3°

1° Instituto de Investigaciones Biotecnológicas IIBIO

2° Escuela de Bio y Nanotecnologías EByN

3° Universidad Nacional de General San Martín UNSAM

Chronic stress is involved in the etiology of various pathologies, including depression. Due to the heterogeneity of symptoms, existing treatments present low remission rates and undesirable side effects. Therefore, an alternative strategy is proposed: the administration of extracellular vesicles (EVs) containing therapeutic factors added in vitro. Since M6a is a glycoprotein that contributes to neuronal plasticity and its levels are reduced under stress conditions, we propose using EVs loaded with the M6a plasmid for intranasal administration in mice exposed to chronic restraint stress. This approach will allow us to evaluate whether some of the behavioral and/or molecular phenotypes associated with the pathology are reversed.

First, we standardized the isolation of EVs from the HT22 cell line through ultracentrifugation and characterized them using Western blot, TEM, and NTA. Next, we loaded the EVs and analyzed potential changes in their surface. Finally, we administered the modified EVs to C57 mice subjected to a restraint stress protocol and evaluated their behavior through sucrose preference and forced swim tests, their weight and M6a expression in the hippocampus. Our results indicate that we obtained particle populations of approximately 125 nm in diameter with morphology and sizes compatible with EVs. Animals treated with loaded EVs, unlike those treated with PBS, showed differences in weight, in the forced swim test and in M6a expression.

D-004 | The N-terminal region of Rab3a positively regulates the opening of the early fusion pore of dense core vesicles in chromaffin cells

Cellular and Molecular Neurobiology

Author: Octavio Caspe | Email: octavio.caspe@uns.edu.ar

Octavio Caspe1°, Fernando Diego Marengo1°

1° Instituto de Fisiología, Biología Molecular y Neurociencias (UBA-CONICET). Facultad de Ciencias Exactas y Naturales. Departamento de Fisiología, Biología Molecular y Celular. Universidad de Buenos Aires, Buenos Aires, Argentina

Rab3a is a small GTP binding protein associated with presynaptic and secretory vesicles that is thought to regulate positively their targeting to active zones. However, the results obtained in different cellular models were contradictory, resulting in facilitation or, alternatively, inhibition of exocytosis. To try to overcome this apparent contradiction, it was proposed that while the C-terminal fragment of Rab3a was associated to the classical effect on vesicle targeting, the N-terminal fragment was related with some type of modulation on fusion pore opening (JBC 291: 23101–23111, 2016). To study the effect of Rab3a on fusion pore regulation, we transfected the chimeric Rab3a-22a protein (N-ter-Rab3a1-80-Rab22a64-195-C-ter, J Mol Cell Biol 6(4):286-298, 2014) in primary cultures of murine chromaffin cells. This chimera loses the vesicle recruitment function, but keeps its putative capacity to modulate the fusion pore opening. We performed amperometric recordings to study the exocytosis of dense core vesicles in mouse chromaffin cells expressing the chimera. Our results show an increase in the amplitude (+20%) and a shortening of the duration (-30%) of the pre-spike-foot (PSF) in the cells expressing the chimera vs control cells, with no significant changes in spike parameters. These results suggest that the N-terminal fragment of Rab3a contributes to the opening of the early fusion pore.

D-005 | Investigating the Role of SARA protein in the pathogenesis of Epilepsy

Cellular and Molecular Neurobiology

Author: Estefania Clavenzani | Email: eclavenzani@immf.uncor.edu

E Clavenzani1°, J M Bourbotte, J C Battista, C Conde1°

1° Estefania Clavenzani

Neuroinflammation is an important mechanism of hyperexcitable pathologic brain tissue in pharmaco- resistant epilepsies. The transforming growth factor β (TGF-β) pathway is involved in epileptogenesis and SARA (Smad Anchor for Receptor Activation) is a protein associated to TGF-β. A recent study has reported that the expression of SARA is increased in the hippocampus and temporal cortex of rats induced to status epilepticus (SE) with pilocarpine, and also in patients with temporal lobe epilepsy (TLE). Smurf2 is a ubiquitin ligase contributing to physiological and pathological processes, which has been involved in the degradation of SARA and TGF-β receptors, in HEK293T cells. However, studies don't show a cooperative modulation between SARA and Smurf2 proteins, not even Smurf2 activity in TLE conditions. Then, in this work we focus on the biological role of SARA in TLE and its possible participation in seizures. We induced SE on young rats with pilocarpine, to analyze levels and distribution of SARA and Smurf2 in neurons. Additionally, in the same way, we analyzed the behavior of both proteins in samples from human astrocytes of epileptic versus healthy patients. Our preliminary results show an increased expression of SARA in human astrocytes and animal models with TLE vs control samples. These findings could indicate a deregulation in the complex formed by Smurf2, leading to the SARA and TGF-β receptor accumulation and could be a reason for seizures in patients.

D-006 | Phytocannabinoids increase adult neurogenesis in specific pallial regions of zebrafish.

Cellular and Molecular Neurobiology

Author: Emilia Deleglise | Email: emilydeleglise@gmail.com

Emilia Deleglise1°2°3°4°, Gonzalo Carnevalle1°2°3°, Luz Mazzaro3°, Jose Lobera1°2°, Lucas Mongiat1°2°3°4°

1° Departamento de Física Médica

2° GAANS, CNEA

3° Universidad del Comahue

4° CONICET

In zebrafish, the central nervous system (CNS) exhibits global network remodeling driven by adult neurogenesis. Previous studies show that the zebrafish forebrain expresses high levels of the CB1 receptor across the pallium. Phytocannabinoids, have been shown to influence these cannabinoid receptors, playing a significant role in processes such as synaptic activity, neuronal excitability, and adult neurogene-sis. Here, we aimed to test if phytocannabinoids impinge on pallial adult neurogenesis in zebrafish. We found CB1 receptor expression in specific regions of the zebrafish telencephalon in mature as well as adult-born neurons, but not in neural stem cells (NSC). Phytocanna-binoid treatment (THC 1ug/ml, CBD 1,6ug/ml, for 60min) reduces motor activity. In concordance with the CB1 distribution, the treatment does not affects NSC proliferation. Next, we assessed the phytocannabinoid effects on adult-born neuronal survival by pulse and chase of the thy-midine analogue, EdU. After 12 days of EdU administration fish were subjected to phytocannabinoid treatment for 13 days. We found that treatment increase adult neurogenesis specifically in dorso-anterior and dorso-medial pallial regions. We are currently characterizing the neurophysiological effect of phytocannabinoids on pallial circuit function.

D-007 | STUDY OF THE TRANSCRIPTIONAL REGULATION OF THE FOXP2 GENE IN THE HUMAN LINEAGE FROM AN EVOLUTIONARY APPROACH

Cellular and Molecular Neurobiology

Author: Gonzalo Nicolas Dominguez Paredes | Email: gonzalodp316@gmail.com

Gonzalo Nicolas Dominguez Paredes1°, Leandro Caporale1°, Lucia Florencia Franchini1°

1° Consejo Nacional de Investigaciones Científicas y Técnicas (CONICET)

Our research investigates genetic changes related to the evolution of the human brain. We hypothesize that new expression patterns in brain developmental genes were key to neuroanatomical evolution in humans. We focus on non-coding regions of the genome, particularly Human Accelerated Regions (HARs), which have evolved rapidly compared to other vertebrates. Loci near genes like NPAS3, RBFOX1, and FOXP2 are of interest due to their role in brain development. FOXP2, essential for speech development, has been widely studied in human evolution. We identified two HARs within the FOXP2 locus, HACNS750 and HACNS169, as transcriptional enhancers active during brain development. Reporter assays in zebrafish and mice showed that these HARs exhibit gain of function when comparing human and chimpanzee sequences. We propose that these HARs regulate FOXP2 expression via promoter interactions and that human-specific changes led to new expression patterns in FOXP2-regulated genes, impacting brain development. To explore this further, we are generating CRISPR/Cas9-modified mice. This poster presents our HACNS750 knock-out (KO) mice and our strategy for creating HACNS169KO mice, as well as knock-in (KI) mice where the murine versions of these HARs are replaced with their human orthologs.

D-008 | Targeting the master-controller sequence motifs of α-Synuclein aggregation: Using small molecules as structural probes

Cellular and Molecular Neurobiology

Author: Irina Fernández | Email: ifernandez@cei-mplbior.unr.edu.ar

Irina Fernández1°, Christian Griesinger2°, Claudio O. Fernandez1°2°, Phelippe do Carmo Gonçalves1°

1° Max Planck Laboratory for Structural Biology, Chemistry, and Molecular Biophysics of Rosario (MPLbioR, UNR-MPINAT), Partner Laboratory of the Max Planck Institute for Multidisciplinary Sciences (MPINAT, MPG). Centro de Estudios Interdisciplinarios, Universidad Nacional de Rosario, Rosario, Argentina.

2° Max Planck Institute for Multidisciplinary Sciences, Department of NMR-based Structural Biology, Am Fassberg 11, 37077 Göttingen, Germany.

The aggregation of proteins into toxic conformations plays a critical role in the development of different neurodegenerative diseases such as Alzheimer's disease (AD) and Parkinson's disease (PD). These disorders share a common pathological mechanism that involves the formation of aggregated protein species including toxic oligomers and amyloid fibrils. The aggregation of alpha-synuclein (αS) in PD results in neuronal death and disease onset. Accordingly, the aggregation pathway of this protein represents a useful target for therapeutic intervention. The design of small molecules that efficiently inhibit the aggregation process and/or neutralize its associated toxicity constitutes a promising tool for the development of therapeutic strategies against this disorder. In that direction, the limited number of amyloid inhibitors that have progressed through clinical trials could be explained by three main factors: (i) the complexity of the structural conversions occurring during the amyloid aggregation process, (ii) the absence of high-resolution structural information about the binding modes and nature of the molecular interactions involved in protein-inhibitor complexation, and (iii) the scarcity of research intended to understand the physicochemical requirements of inhibitory molecules determining their anti- amyloid activity. In this work, we explore several of these aspects related to amyloid inhibitors with poliaromatic scaffolds and their potential use as drug candidates in P

D-009 | Role of metabotropic glutamate mGlu3 receptor in glia-mediated synaptic elimination in an Alzheimer's murine model

Cellular and Molecular Neurobiology

Author: Pilar Garaventa | Email: piluxgaraventa@gmail.com

Pilar Garaventa1°, Eugenia Olivera1°, Albany Sáez1°, Ana Clara Romero1°, Juan Beauquis2°3°, Carla Caruso1°, Flavia Saravia2°3°, Mercedes Lasaga1°, Daniela Durand1°

1° Instituto de Investigaciones Biomédicas (INBIOMED) UBA-CONICET, Facultad de Medicina, Universidad de Buenos Aires

2° Departamento de Química Biológica, Facultad de Ciencias Exactas y Naturales, Universidad de Buenos Aires

3° Instituto de Biología y Medicina Experimental, CONICET

mGlu receptors, particularly the mGlu3R subtype, have neuroprotective functions in various pathologies through glia. The splicing variant mGlu3Δ4 could act as a negative modulator of mGlu3R, according to our previous studies.

It has been postulated that synaptic pruning would be reactivated at the onset of AD, leading to synaptic loss. The complement system has been associated with this process, and synapses marked with C1q can be phagocytosed by glia expressing the complement receptor.

The aim of this study is to investigate the role of mGlu3R in glia-mediated synaptic elimination in the murine model PDAPP-J20. To this end, primary glial cultures were prepared and synaptosomes isolated from wild-type (Ntg) and transgenic (Tg) mice.

The Tg cultures showed increased immunofluorescence for C1q ($p<0.05$) and decreased levels of mGlu3R ($p<0.05$), which co-localized in glial membranes. On the other hand, Tg synaptosomes expressed higher levels of mGlu3R, mGlu3Δ4, and C1q ($p<0.05$). Additionally, engulfment assays were performed using glial cultures treated or not with the mGlu3R agonist, LY379268, which were then incubated with Ntg or Tg synaptosomes. We observed that glia preferentially engulfed Tg synaptosomes, whereas the effect of LY was variable. In conclusion, alterations in mGlu3R and mGlu3Δ4 levels were observed in the AD model, both in glial cells and synaptic terminals. A possible relationship between mGlu3R, C1q, and synaptic elimination in AD was also noted.

D-010 | hiPSC-derived motor neuron axons show gaps in the periodical spectrin lattice induced by stress

Cellular and Molecular Neurobiology

Author: Nahir Guadalupe Gazal | Email: nggazal@immf.uncor.edu

Nahir Guadalupe Gazal1°, María Jose Castellanos-Montiel2°, Guillermina Bruno1°, Anna Franco2°, Lale Gursu2°, Ghazal Haghi2°, Gilles Maussion2°, Thomas Durcan2°, Nicolas Unsain1°

1° Instituto Ferreyra (INIMEC-CONICET-Universidad Nacional de Córdoba), Córdoba, Argentina.

2° Early Drug Discovery Unit, Montreal Neurologial Institute-Hospital, Canada

The membrane-associated periodic skeleton (MPS) is a periodic protein structure of actin "rings" transverse to the axon, separated every 190 nm by "spacers" of α/β-spectrin tetramers. In mature neurons, the MPS is organized along almost the entire axonal shaft, which correlates with the rather homogeneous distribution and high levels of βII-spectrin in this region. During the maturation of motor neurons derived from human induced pluripotent stem cells (hiPSCs MNs) in culture, an intriguing disruption of the otherwise uniform distribution of βII-spectrin along axons was observed. The βII-spectrin gaps (βIIs gaps) appear as regions devoid of βII-spectrin. Various analyses were performed to evaluate axonal constriction or loss. Interestingly, our results indicate that βII-spectrin is the only protein lacking in these specific regions. Since hiPSCs MNs cannot remain healthy beyond 4 weeks, we hypothesized that cellular stress triggers the formation of βIIs gaps. Remarkably, we observed a significant increase in the occurrence of axons with βIIs gaps in 2-week-old cultures only under stress induced by staurosporine, an inhibitor of protein kinases. STED microscopy was used to examine whether βIIs gaps represent a local loss of MPS. We found that this phenomenon is not reversible and can be pharmacologically modulated. We believe that the study of βIIs gaps will provide valuable insights into the formation and dynamics of the MPS.

D-011 | miR-191-5p regulates Neuronal Complexity and dendritic spine maturation during Mammalian Brain development

Cellular and Molecular Neurobiology

Author: Paula Macarena Gonzalez | Email: paugonzalez.0991@gmail.com

Paula M. Gonzalez1°2°, Rodolfo Sanchez-Iazurlo1°2°, David Alarcón Pastor1°2°, Paula A. Aguirre1°2°, Sebastian A. Giusti3°4°, Damian Refojo3°4°, Fernando Bustos, Juan Pablo Fededa1°2°

1° Instituto de Investigaciones Biotecnológicas, Universidad Nacional de San Martín (UNSAM) – Consejo Nacional de Investigaciones Científicas y Técnicas (CONICET).

2° Escuela de Bio y Nanotecnologías (EByN), Universidad Nacional de San Martín.

3° Instituto de Investigación en Biomedicina de Buenos Aires (IBioBA)–CONICET–Partner Institute of the Max Planck Society, Buenos Aires, Argentina.

4° Molecular Neurobiology, Max Planck Institute of Psychiatry, Munich, Germany.

microRNA-191 (miR-191-5p), a small regulatory non-coding RNA, has been implicated as a marker of different neurodegenerative diseases, and is one of the major microRNA species expressed in the cerebral cortex from neurogenesis and throughout synaptogenesis.

To investigate the role of miR-191-5p during post-natal cortical development using loss of function experiments, we KO miR-191-5p in newborn mice using an adeno-associated virus (AAV) based CRISPR/Cas9 gene editing strategy to disrupt the structure of miR-191-5p precursor (pri-miR-191-5p) and suppress the generation of the mature microRNA.

Using Golgi-Cox staining combined with confocal microscopy to evaluate the morphology of cortical and hippocampal pyramidal neurons, we observed a reduction in the average length of neuronal processes and the total surface area of the dendritic tree in miR-191-5p KO mice vs. control. Similarly, in vitro miR-191-5p-depleted primary cultured neurons also exhibited shortened neuronal processes compared to control cultures.

We also analyzed the density and type of dendritic spines generated in miR-191-5p KO vs. control cultured neurons in vitro and found that miR-191-5p is necessary for the generation of mature spines.

Altogether, our data shows that miR-191-5p acts as a positive regulator of neuronal branching and connectivity during early post-natal brain development.

D-012 | The forebrain of microchiroptera (Tadarida Brasiliensis and Myotis sp) according to the Prosomeric Model.

Cellular and Molecular Neurobiology

Author: Valentina Heck | Email: francoluceroarteaga@hotmail.com

Valentina Heck1°, Franco Lucero Arteaga1°2°, Ana Inés Portu1°, Mariela Mondino1°, Mónica Alejandra Boeris1°, Ana Abrego Alvarez1°, Sofía Labegorra1°, Bruno Ribeiro Do Couto4°, Miguel Ángel García-Cabezas3°, José Luis Ferrán4°

1° Centro de producción de Animales de Experimentación, Facultad de Ciencias Veterinarias, Universidad Nacional de La Pampa.

2° Consejo Nacional de Investigaciones Científicas y Técnicas (CONICET)

3° Department of Anatomy, Histology and Neuroscience, School of Medicine, Autonomous University of Madrid, Madrid, Spain.

4° Department of Human Anatomy and Psychobiology, School of Medicine, University of Murcia, Murcia, Spain. Institute of Biomedical Research of Murcia –IMIB, Virgen de la Arrixaca University Hospital, Murcia, Spain.

Microchiropteras or microbats belongs to the order of chiroptera that mainly inhabits caves or nests and are well-kwon for using echolocation instead of their visual abilities to catch preys. In our study were selected the insectivorous species Tadarida brasiliensis and Myotis spp. living in Argentina. The prosomeric model proposes that the vertebrate brain is regionalized along its anteroposterior and dorsoventral axis. Each anteroposterior partition constitutes a neuromeric unit that is composed of roof, alar, basal and floor plates. Our aim was to determine the main prosomeric subdivisions of the microbat forebrain and its principal alar and basal plate domains. We therefore performed an analysis of the forebrain regions using immunohistochemical reaction, Nissl staining but also AChe and Gallyas reactions. Tyrosine Hydroxylase (TH), Calbindin (CB), Calretinin (CR) and NeuN immunoreactions allowed us to identify major anatomical landmarks such as the nigrostriatal, fornix, retroflex tracts and posterior commissure but also specific derivatives from the telencephalic, hypothalamic, prethalamic, thalamic, pretectal, and midbrain regions. Nissl staining, AChe and Gallyas reactions complemented the structural analysis. The analysis revealed an expected conserved regionalization, but also helps to clearly define each prosomeric unit, which

will allow to accurately identify the main derivatives of each topological domain. Grant: Fundación Seneca (21903/PI/22).

D-013 | The forebrain of the big hairy armadillo (Chaetophractus villosus) following the Prosomeric rules.

Cellular and Molecular Neurobiology

Author: Sofía Labegorra | Email: francoluceroarteaga@hotmail.com

Sofía Labegorra1°, Franco Lucero Arteaga1°2°, Ana Inés Portu1°, Mariela Mondino1°, Mónica Alejandra Boeris1°, Ana Abrego Alvarez1°, Valentina Heck1°, Bruno Ribeiro Do Couto4°, Miguel Ángel García-Cabezas3°, José Luis Ferrán4°

1° Centro de producción de Animales de Experimentación, Facultad de Ciencias Veterinarias, Universidad Nacional de La Pampa.

2° Consejo Nacional de Investigaciones Científicas y Técnicas (CONICET)

3° Department of Anatomy, Histology and Neuroscience, School of Medicine, Autonomous University of Madrid, Madrid, Spain.

4° Department of Human Anatomy and Psychobiology, School of Medicine, University of Murcia, Murcia, Spain. Institute of Biomedical Research of Murcia –IMIB, Virgen de la Arrixaca University Hospital, Murcia, Spain.

The big hairy armadillo is a species native to South America, characterized by having its body covered in a mixture of tough armor plates and thick fur, which helps protect it from predators and harsh environments. The big hairy armadillo is a nocturnal and omnivorous animal. Prosomeric rules dictate that the neural tube is regionalized along its anteroposterior axis giving rise to neuromeric units. Each neuromeric unit is regionalized along its dorsoventral axis into the roof, alar, basal, and floor plates. Our aim was to define the anteroposterior and dorsoventral subdivisions of the forebrain of the armadillo following prosomeric rules. To this end, the analysis was performed using immunoreactions with Tyrosine Hydroxylase (TH), Calbindin (CB), Calretinin (CR) and NeuN immunoreactions; but also, Nissl staining plus ACHe and Gallyas reactions. The study allowed to identify main prosomeric (p) subdivisions such as secondary prosencephalon (peduncular and terminal prosomeres), prethalamus(p3), thalamus (p2), pretectum (p1) and midbrain; characterizing their main anatomical landmarks such as fornix, and retroflex tract between others. Additionally, the study revealed some specific derivatives that are candidates to be homologous with other vertebrates. The study identified the main conserved forebrain neuromeres, but also opened the

opportunity to begin in-deep studies to characterize the main derivatives of the Xenarthra. Grant: Fundación Seneca (21903/PI/22).

D-014 | Differential dynamics of GABABR in neuronal areas in physiological and neurodegenerative conditions

Cellular and Molecular Neurobiology

Author: Ana Laura López | Email: allopez@mendoza-conicet.gob.ar

Ana Laura López1°, Elena Vásquez1°, Agata Rita Carpentieri2°, Estela Maris Muñoz1°

1° Laboratorio de Neurobiología Básica y Traslacional, IHEM-UNCuyo-CONICET, Mendoza, Argentina.

2° INICSA-UNC-CONICET; Cátedra B de Química Biológica, Facultad de Odontología, UNC, Córdoba, Argentina.

Previous research from our laboratory has shown that the GABABR-mediated connectome is influenced by aging in the rat cerebellum. A decrease in GABAB2 subunit and consequently, in the GABABR-KCC2 interaction, was found. In addition, we showed a novel interaction between the tail of GABAB1 subunit and the transporter, which was affected by variations in membrane lipid composition, such as those observed in aged organs. In this PhD thesis, we hypothesize that GABABRs behave differentially in distinct neuronal areas, which may contribute to their unique cellular and functional identities, and to a particular susceptibility in various pathological contexts. Our main goal is to characterize the dynamics of the GABABR-mediated connectome in cell populations of the neuronal lineage, under physiological and neurodegenerative conditions. For this study, cerebellar and hippocampal specimens will be collected from young and old male Wistar rats. Samples from a D-Galactose-induced aging rat model will also be included. Additionally, transgenic mouse models under neurodegeneration, such as APP/PS1;Cx3CR1-eGFP+/-mice (an Alzheimer's disease model), will be studied. Methodologically, we will apply a multidisciplinary approach, including immunohistochemistry, advanced microscopy techniques, Western blot, mass spectrometry, and molecular dynamics simulations. Preliminary data generated from this study will be presented.

D-015 | Effects of lithium administration in BDNF Val66Met Carriers: implications for neuropsychiatric disorders

Cellular and Molecular Neurobiology

Author: Dalila Noelia Jazmín Mancino | Email: dmancino@immf.uncor.edu

Dalila Noelia Jazmín Mancino1°, Agustín Anastasía1°2°

1° Instituto de Investigación Médica Mercedes y Martín Ferreyra - INIMEC-CONICET-UNC, Córdoba, Argentina

2° Instituto de Ciencias Biomédicas de Córdoba (IUCBC), Córdoba, Argentina

The BDNF (Brain Derived Neurotrophic Factor) Val66Met polymorphism is a common variant associated with neuropsychiatric disorders, where poor fear extinction is a prevalent characteristic. In this variant, a valine is substituted by methionine at position 66 in the BDNF prodomain (pBDNF) sequence. This genetic variant is known to induce morphological changes in neurons and circuitry alterations. However, the cellular and molecular mechanisms by which pBDNF Met affects human behaviour and potential therapeutic interventions remain largely unexplored. Preliminary results from our group suggest that lithium can interact with this protein. Therefore, we propose that lithium may mitigate the structural defects observed in neurons. To test this, we assessed dendritic tree complexity and dendritic spine morphology in rat hippocampal neuron cultures transfected with pBDNF Val or Met, followed by lithium treatment. Additionally, considering that carriers of the Met allele exhibit poorer fear extinction, we analysed the fear response in BDNFVal/Val and BDNFMet/Met knock-in mice during a fear conditioning test after lithium administration. Neuronal cytoarchitecture and brain connectivity are being examined in brain sections from these animals. Our findings provide insights into the mechanisms of action of lithium and contribute to the study of potential treatments for pBDNF Met carriers.

D-016 | Establishing a biobank from patients fibroblasts to characterize tauopathy phenotypes in primary cultures

Cellular and Molecular Neurobiology

Author: Pedro Miarnau Alvarez | Email: pedromiarnau@gmail.com

Pedro Miarnau Alvarez1°, Mariana Holubiec1°2°, Gonzalo Corrado1°2°, Franco Dolcetti1°, Gabriel Mizraji3°, Elena Avale4°, Blas Couto5°, Tomas Falzone1°2°

1° Instituto de Biología Celular y Neurociencia, Facultad de Medicina (IBCN-UBA-CONICET).

2° Instituto de Investigación en Biomedicina de Buenos Aires - Instituto Partner de la Sociedad Max Planck (IBioBA-MPSP-CONICET).

3° Unidad de Movimientos Anormales, Instituto de Neurociencias Fundación Favaloro.

4° Instituto de Genética y Biología Molecular (INGEBI-CONICET)

5° Instituto de Neurociencia Cognitiva y Traslacional (INCyT, INECO-Favaloro-CONICET)

Tauopathies are characterized by the abnormal accumulation and phosphorylation of tau protein in the brain, leading to severe disability and death, with no effective treatments or clear understanding of its underlying molecular mechanisms.

Our objective is the generation of a research ready fibroblast biobank from patients with diagnosis of probable primary tauopathies, to build a valuable resource for research and access to in-vitro patient's models.

Punch biopsies from 20 patients at different stages of tauopathies have been collected after prior signing an informed consent. Fibroblasts appeared within a week after punch dissection and were expanded for approximately 50 days and finally frozen. Fibroblasts identity was confirmed by morphology and vimentin staining. Control and patient's fibroblasts were characterized using phalloidin (actin) and antibodies against tubulin, tau and phosphorylated tau (PHF1). Mitochondrial network complexity was analyzed by live imaging using mitotracker to detect mitochondrial morphology and mobility. Further mitochondrial analysis included their interaction with lysosomes and hydrogen peroxide production.

This biobank will enable the development of specific in-vitro models to study phenotypic changes, establish predictive tools, and explore new therapies. This work will offer new diagnostic approaches and tools to study neurodegenerative diseases as well as a platform for drug treatment.

D-017 | Filopodium outgrowth-defective mutant form of Gpm6a, E258A, affects its endocytic fate

Cellular and Molecular Neurobiology

Author: María Belén Montiel | Email: bmontiel@iib.unsam.edu.ar

María Belén Montiel1°, Beata Fuchsova1°

1° Instituto de Investigaciones Biotecnológicas, EByN, UNSAM-CONICET

Gpm6a is a neuronal membrane glycoprotein with four transmembrane domains and the N- and C-terminal ends facing the cytoplasm. It functions in the processes of neuronal development and its overexpression leads to the extensive formation of filopodia. However, the mechanism of its action is not clearly understood. Previously, we have identified E258 residue within the C-terminus of Gpm6a as a critical for the process of filopodium formation. Moreover, we observed that the incapacity of E258A Gpm6a to form filopodia correlates with its accumulation in the cytoplasm of neuroblastoma N2a cells. Subsequent bioinformatic analysis revealed that E258 is predicted as a part of sorting signal of transmembrane proteins. Since the endocytic sorting and recycling of membrane proteins has been shown to assist plasma membrane remodeling necessary for different types of membrane outgrowth, we asked here whether the endocytic fate of Gpm6a is affected by the mutation that impact filopodium outgrowth. Using confocal microscopy we analyzed the effect of E258A overexpression on endocytic trafficking of Gpm6a in primary hippocampal neurons. We observed that the overexpression of E258A not only leads to the decreased neuronal arborization as assessed by Sholl analysis but also to the differences in the colocalization of Gpm6a with both recycling (Rab 11 positive) and degradative (Lamp1-positive) compartments.

D-018 | Alpha synuclein selectively disrupts intracellular trafficking via actin cytoskeleton remodeling

Cellular and Molecular Neurobiology

Author: Milagros Ovejero | Email: movejero@immf.uncor.edu

Milagros Ovejero1°, Mariano Bisbal1°, Alfredo Cáceres2°, Agustín Anastasía1°2°

1° Instituto Ferreyra (INIMEC-CONICET-UNC)

2° IUCBC (Instituto Universitario de Ciencias Biomedicas de Cordoba)

Alterations in intracellular trafficking have been described as a common feature of several neurodegenerative diseases. In Parkinson’s disease and synucleinopathies, a major pathogenic factor is the accumulation of alpha synuclein (AS). Although the mechanisms by which this protein causes neurodegeneration are not clearly understood, there are several hypotheses that includes that AS may cause defects in intracellular trafficking. In this study, we synchronized the exocytic pathway in mammalian hippocampal neurons to investigate whether AS impacts protein trafficking. Our results clearly demonstrate that AS induces selective trafficking deficits in different proteins; specifically we analyzed p75 neurotrophin receptor (p75NTR) and transferrin receptor (TfR). AS disrupts p75NTR trafficking while TfR remains unaffected. Moreover, AS causes defects in p75NTR vesicle fission leading to a decrease in the size of vesicles transporting this receptor. These experiments were performed using both confocal and STED nanoscopy. The underlying mechanism appears to involve abnormal stabilization of the actin cytoskeleton, which alters Golgi apparatus fission and consequently vesicle structure. Notably, we managed to rescue the observed effects on trafficking and vesicle morphology using an active Cofilin. This research provides new insights into the mechanisms by which AS contributes to neurodegeneration, advancing our understanding of Parkinson's disease and synucleinopathies.

D-019 | Studies on the subcellular Localization of Proteins 4.1N and 4.1B and their Interaction with the Axonal Cytoskeleton

Cellular and Molecular Neurobiology

Author: Josefina Alejandra Pogonza Bandrowsky | Email: josefina.pogonza.bandrowsky@mi.unc.edu.ar

Josefina Alejandra Pogonza Bandrowsky1°, Guillermina Bruno1°, Nahir Guadalupe Gazal1°, Axel Gorostiza2°, Nahuel Zamponi3°, Nicolás Unsain1°

1° Laboratorio de Neurobiología, Instituto de Investigación Médica Mercedes y Martín Ferreyra, INIMEC-Consejo Nacional de Investigaciones Científicas y Técnicas (CONICET), Universidad Nacional de Córdoba (UNC), Córdoba, Argentina

2° Department of Animal Physiology, Institute of Zoology, University of Cologne, 50674 Cologne, Germany

3° Division of Hematology and Oncology, Weill Cornell Medicine, NY, Estados Unidos

Actin and spectrin, along with associated proteins, form a membrane-associated periodic skeleton (MPS) that is ubiquitously present in axons and dendrites of all types of neurons examined so far. The MPS consists of transversal actin "rings" along the neurite and spaced every 190 nm by α/β spectrin tetramers. Studies on erythrocytes suggested that protein 4.1 stabilizes the spectrin-actin interaction and their interaction with the plasma membrane. However, protein 4.1 has not been described as part of the neuronal MPS yet. In mammalian neurons, two versions of protein 4.1 are expressed, 4.1N and 4.1B, and neither of them has been studied in detail in neurons. The main goal of my graduate thesis project is to determine the subcellular distribution of 4.1N and 4.1B and examine if they are part of the MPS. We will first determine the subcellular distribution of proteins 4.1N and 4.1B in cultured mouse hippocampal neurons at various developmental stages using immunocytochemistry and quantitative confocal microscopy. Subsequently, we will use the super-resolution microscopy technique STED, to determine their nanoscale distribution and their possible co-distribution with components of the MPS. We will share the detailed experimental designs, and preliminary results.

D-020 | IMPAIRMENT OF THE MEDIAL OLIVOCOCHLEAR SYSTEM MATURATION DUE TO KCNQ4 DEFICIENCY

Cellular and Molecular Neurobiology

Author: Ezequiel Ignacio Rías | Email: e.rias@hotmail.com

Ezequiel Rías1°2°, Ingrid Ouwerkerk2°, Guillermo Spitzmaul1°2°, Leonardo Dionisio1°2°

1° Instituto de Investigaciones Bioquímicas de Bahía Blanca (INIBIBB), CONICET-UNS

2° Departamento de Biología, Bioquímica y Farmacia (BByF), Universidad Nacional del Sur

The medial olivocochlear (MOC) system regulates outer hair cell (OHC) excitability. In response to sound overstimulation, MOC activates Ca2+ influx through nicotinic acetylcholine receptors, which stimulates BK and SK2 channels, helping KCNQ4 to remove K+ and restoring membrane potential. KCNQ4 absence results in chronic depolarization, OHC damage, and hearing loss. We evaluated how the absence of KCNQ4 affects the organization and function of the MOC system. Confocal imaging was used to analyze MOC terminal locations on OHC in Kcnq4+/+ (WT) and Kcnq4-/- (KO) mice at 2, 3, 4, and 10 postnatal weeks (W). At 2W, both genotypes have 49% of synaptic contacts in the basal domain and 51% in the lateral domain. In mature animals (≥3W), WT show all terminals in the basal domain, whereas KO kept 8.7%, 16.5%, and 2.9% in the lateral domain at 3, 4, and 10W, respectively. KO mice also had fewer and smaller synaptic contacts per OHC at 4 and 10W compared to WT. Similar results were found in inner hair cells. Using qPCR we demonstrated that, KO mice had a 6-fold decrease in α10 subunit mRNA, with α9 unchanged, and a 3-fold decrease in BK and SK2 at 4W. By 10W, all tested genes returned to WT levels. Additionally, BK protein was also mislocalized, and some Ca2+-associated proteins showed altered expression at 4W in KO mice. These findings indicate that chronic depolarization alters MOC system development and efferent components expression, leading to functional impairment and hearing loss.

D-021 | Biochemical Mechanisms involved in the Recruitment of “Repair” Cells for Peripheral Nerve Regeneration: Enhancing Cell Therapy with Nanotechnology

Cellular and Molecular Neurobiology

Author: Daniela Alejandra Rodriguez Carrascal | Email: danielarcarrascal@gmail.com

Daniela Rodriguez-Carrascal1°2°, Vanina Usach1°2°, Patricia Setton-Avruj1°2°

1° Universidad de Buenos Aires. Facultad de Farmacia y Bioquímica. Departamento de Química Biológica. Cátedra de Química Biológica Patológica.

2° Instituto de Química y Fisicoquímica Biológicas “Dr Alejandro C. Paladini” (IQUIFIB), UBA-CONICET.

Peripheral neuropathies are a group of over 100 diseases that cause weakness, pain, and loss of sensory and motor functions, affecting quality of life. Current therapies only manage symptoms and fail to address the underlying pathology, emphasizing the need for new treatments that accelerate recovery before irreversible damage occurs. We have demonstrated that bone marrow-mononuclear cells (BMMC) have great therapeutic potential in nerve regeneration by migrating to the site of damage and reducing neuropathic pain. In this research, we evaluated the role of peroxisome proliferator-activated receptor gamma (PPARγ) in neuroinflammation, regeneration, and its involvement in the recruitment of multipotent cells and macrophages in the context of peripheral nerve injuries. In a rat Wallerian degeneration model promoted by the crush of the sciatic nerve, through epifluorescence and confocal microscopy, we demonstrated that indomethacin, an inhibitor of cyclooxygenase (COX) activity, a rate-limiting enzyme in prostaglandins (PG) biosynthesis, prevented BMMC migration to the injury site, as well as, decreases PGE2 levels and increases PGJ2 levels, a PPARγ endogenous ligand. Additionally, sciatic nerve crush promoted an increase in PPARγ levels that was not modified by a PPARγ agonist treatment. We are evaluating nanoapproaches to enhance the efficacy of cell therapies, exploring the molecular mechanisms associated with the signaling pathways of PPARγ in nerve regeneration.

D-022 | IL-6, Acidic Conditions, and Neuronal Responses

Cellular and Molecular Neurobiology

Author: Libia Catalina Salinas Castellanos | Email: licasaca@gmail.com

Libia Catalina Salinas Castellanos1°, Mayra Montes1°, Georgina Mingolo1°2°, Carina Weissmann1°

1° IFIBYNE-UBA-CONICET, Buenos Aires, Argentina

2° Cátedra de Histología y Embriología, Facultad de Odontología, UBA, Buenos Aires, Argentina

Perturbations in brain pH levels are commonly observed in neurodegenerative disorders and can activate ASICs. Among these, ASIC1a, a pH-sensitive sodium channel, has been implicated in several pathophysiology conditions, characterized by neuroinflammation and elevated levels of interleukin-6 in the central nervous system. We analyzed the interaction between IL-6 and ASIC1a channels. We found that IL-6 promotes the translocation of ASIC1a from cytosolic compartments to the plasma membrane. Once at the membrane, ASIC1a activation initiates critical signaling pathways, including calcium/calmodulin-dependent protein kinase II (CaMKII) and extracellular signal-regulated kinase (ERK).Pre-incubation with IL-6 significantly amplified the phosphorylation of CaMKII and ERK upon ASIC1a activation by MitTx, a specific ASIC1a toxin. IL-6 and MitTx also induced morphological changes in HEK cells, such as membrane blebbing, which were mitigated by ERK inhibition or ASIC1a blockade. Notably, neurons exposed to a pH of 6.5 exhibited morphological alterations after just a few minutes, which could be prevented by the ASIC1a inhibitor Pctx-1.These findings highlight the complex crosstalk between IL-6, pH dysregulation, and ASIC1a channels, offering new insights into the mechanisms underlying neuroinflammation and neurodegeneration. Understanding these interactions could lead to novel therapeutic strategies in neuroinflammatory conditions.

D-023 | UNVEILING THE ROLE OF PIAS4 AS A KEY PLAYER IN TAU PATHOLOGICAL ACCUMULATION

Cellular and Molecular Neurobiology

Author: María Clara Sokn | Email: sokn.maria@maimonides.edu

María Clara Sokn1°4°, Facundo Claverie1°4°, Camila Mimura2°4°, Victoria Ambrosino3°, Angel Ramón Torres Mc Cook1°, Gerson Smith Asti Tello1°, Vanina Giselle Velardo1°, Ana Liberman1°2°

1° Centro de Estudios Biomédicos, Básicos, Aplicados y Desarrollo (CEBBAD), Universidad Maimónides (UMAI), Buenos Aires, Argentina.

2° Departamento de Química Biológica, Facultad de Ciencias Exactas y Naturales (FCEyN), Universidad de Buenos Aires (UBA), Ciudad Universitaria, Buenos Aires, Argentina.

3° Universidad Nacional de Quilmes, Buenos Aires, Argentina.

4° Equally contributed

Tauopathies are neurodegenerative diseases characterized by aberrant tau protein homeostasis. Given the role of PIAS SUMO ligases in the regulation of neurodegeneration-related proteins, this study examined their impact on tau regulation.

A Western Blot screen in HT22 cells overexpressing wild-type (WT) human 2N4R tau (hTau) alongside PIAS family members revealed that PIAS4 overexpression significantly increased total tau levels. In addition, bimolecular fluorescence complementation (BiFC) analysis showed that PIAS4 promotes tau dimerization, a critical step in pathological aggregation.

To corroborate these findings, N2a cells stably expressing endogenous levels of WT or a SUMOylation-deficient tau (hTauK340R) were utilized. PIAS4 enhanced the accumulation of both tau forms, suggesting a tau SUMOylation-independent mechanism of action. Nickel purification assays confirmed the inability of PIAS4 to induce tau SUMO conjugation.

Furthermore, PIAS4 knockdown using two distinct shRNA vectors resulted in a significant reduction of total tau protein levels, implying a role for PIAS4 in regulating tau degradation. To explore the potential involvement of autophagy in this process, the impact of PIAS4 modulation on autophagic flux was examined. Overexpression of PIAS4 inhibited autophagy, while its knockdown enhanced this cellular clearance mechanism.

Collectively, these findings position PIAS4 as a key regulator of tau homeostasis.

D-024 | The Role of Rac1 in Structural Plasticity in the Nucleus Accumbens Core during stress-induced Cocaine Sensitization.

Cellular and Molecular Neurobiology

Author: Victoria Vaccaro | Email: victoria.vaccaro@unc.edu.ar

Victoria Vaccaro1°, Julieta Boezio1°, Daiana Rigoni1°, Liliana Cancela1°, Mariano Bisbal2°, Flavia Bollati1°

1° Instituto de Farmacología Experimental de Córdoba (IFEC-CONICET), Departamento de Farmacología Otto Orsingher, Facultad de Ciencias Químicas, Universidad Nacional de Córdoba, Córdoba, Argentina

2° Instituto de Investigación Médica Mercedes y Martin Ferreyra, INIMEC-CONICET, Córdoba, Argentina

Previous studies from our laboratory demonstrated that chronic stress enhances behavioral sensitization to cocaine and that the Rho GTPase Rac1 in the Nucleus Accumbens core (NAc) plays a crucial role in this phenomenon. Rho GTPases are guanine nucleotide-binding proteins cycling between an active, GTP-bound state and an inactive, GDP-bound state. In its active form, Rac1 activates p21-activated kinase 1 (PAK1), which regulates downstream signaling by phosphorylation. Rac1 controls actin cytoskeleton dynamics, essential for dendritic spine morphogenesis and synaptic plasticity, contributing to the long-lasting effects of drug sensitization.

The aim of this project is to characterize and quantify Rac1 activity in the NAc during stress-induced cocaine sensitization. To achieve this goal, we developed a laboratory kit for a Rac1 activity assay based on the downstream signaling pathway of this protein. The assay uses the p21 Binding Domain, PAK-PBD of the Rac effector protein, that binds specifically to the GTP-bound form of Rac. Our experiments involved the production of the recombinant protein PAK-PBD and its subsequent conjugation with agarose beads to conduct a pulldown assay that exclusively recognizes the active form of Rac1, GTP-bound Rac1. We will also evaluate structural plasticity in the NAc to provide further insight into the molecular mechanisms underlying the structural changes associated with cocaine sensitization induced by chronic stress.

D-025 | Sex-dependent regulation by limonene of non-peptidergic primary sensory neurite outgrowth in a mouse model of post-surgical pain.

Cellular and Molecular Neurobiology

Author: Yanaysis Stable García Yanaysis | Email: ystable1994@gmail.com

Yanaysis Stable García1°, Cristian Acosta1°

1° Instituto de Histología y Embriología de Mendoza. Conicet

Post-surgical pain is a common condition that individuals experience after surgery, accidents, traumas or cosmetic procedures. This pain is associated with deregulation of nociceptor activity and hyperinnervation of the injured regions. Limonene is a monoterpene that could modulate the activity of sensory neurons thus potentially having analgesic properties. We aim to determine the effect of limonene on nociceptive fibers in a rodent post-surgical pain model. Our focus was to evaluate the ability of limonene to affect neuritogenesis in subpopulations of rat dorsal root ganglion (DRG) neurons and its underlying mechanisms of action. Four-month-old C57BL/6 mice of both sexes were treated with a limonene-based cream or placebo after induction of a plantar skin lesion. In vivo, we performed behavioral tests of postsurgical pain for 15 days and quantitative immunohistochemistry. In vitro we treated DRG neurons with limonene, NGF or both and examined the results using Western Blot and immunocytochemistry. Behavioral tests showed that male mice treated with limonene after skin injury experienced a significant recovery of mechanical allodynia compared to the placebo group from day 6 onwards. This effect was not evident in females, where treatment with limonene resulted in significantly greater length of IB4+ sensory fibers compared to the placebo group. Additionally, TrkA expression was modulated in vitro by limonene combined with NGF.

D-026 | The involvement of the chloride channel ClC-a in sensory stimuli detection and sleep regulation

Chronobiology

Author: Agustina Bruno-Vignolo | Email: agustinabrunovignolo@gmail.com

Agustina Bruno-Vignolo1°, Nara I. Muraro1°

1° Instituto de Investigación en Biomedicina de Buenos Aires (IBioBA, CONICET – Partner of the Max Planck Society)

The circadian oscillator of Drosophila consists of approximately 150 clock neurons that express a set of molecular components, known as clock genes, which through negative feedback loops coordinate the oscillation of transcription and translation of specific genes and proteins. A subgroup of these clock neurons, called ventral lateral neurons (LNvs), is characterized by the expression of the neuropeptide Pigment Dispersing Factor (PDF). LNvs play a fundamental role in controlling alertness and are essential for regulating sleep/wake behavior via a neuronal circuit that is not yet fully understood. Previous work from our laboratory has identified ClC-a, a voltage-dependent chloride channel, as a potential key element in LNvs physiology. This channel has not been studied in adult Drosophila neurons before. The main goal of this project is to characterize the role of neuronal ClC-a and its mechanism of action. Our initial findings indicate that downregulation of ClC-a in LNvs increases sleep in both male and female flies and reduces latency to siesta sleep. Additional behavioral analyses suggest that ClC-a may be involved in detecting sensory stimuli such as light and mechanical stimuli. Based on these results, we performed electrophysiological recordings using the whole-cell patch clamp configuration. So far, our promising data indicate that ClC-a indeed affects the physiology of lLNvs, in agreement with our behavioral findings.

D-027 | Entrainment of the molecular clock through social cues

Chronobiology

Author: Chiara Costa | Email: chcostapetrillo@gmail.com

Chiara Costa1°2°, Martina Radice1°2°, Esteban J. Beckwith1°2°, Nicolás Pírez1°2°

1° 1 Instituto de Fisiología, Biología Molecular y Neurociencias; UBA-CONICET, Argentina

2° Departamento de Fisiología, Biología Molecular y Celular; Facultad de Ciencias Exactas y Naturales; Universidad de Buenos Aires, Argentina.

To dissect the impact of social interactions on the circadian organization of locomotor activity of the fly Drosophila melanogaster, we performed experiments using two fly populations entrained to different light schedules, one advanced 6hs from the other. After a week of social interactions in constant darkness in a ratio 70:30, the activity of the flies was individually recorded during 4 days. We observed no differences in the phase of the locomotor activity peak after the interaction, and both groups kept their previous rhythmicity. These results suggest that in our experimental conditions the social context did not affect the circadian rhythm. To characterize the circadian clock of the pacemaker neurons at the molecular level, we analyzed in real time the oscillation of the clock protein TIM. For this purpose, we used genetically modified animals that present an insertion of the fluorescent reporter TOMATO in the clock protein TIM, allowing the analysis of the molecular clock by ex vivo confocal microscopy. We measured timTOMATO for a period of 24hs in the small ventral-lateral neurons (s-LNvs), the main pacemaker neuronal cluster in the fly brain. This experiment allowed us to observe if the phase of locomotor activity of the flies matches with the oscillation of proteins from the molecular clock in the pacemaker neurons.

D-028 | Interaction between dietary restrictions, ageing and the circadian clock

Chronobiology

Author: Briana Liset | Email: alanisliset@gmail.com

Briana Liset1°, M. Fernanda Ceriani2°, Jose M. Duhart1°2°

1° Departamento de Ciencia y Tecnología. Universidad Nacional de Quilmes

2° Fundación Instituto Leloir – Instituto de Investigaciones Bioquímicas de Buenos Aires - CONICET

The circadian clock controls a wide variety of physiological functions which timed daily organization is required for sustaining health. An increasing body of evidence suggests a correlation between alterations in the circadian rhythm and the process of ageing. Dietary restriction widely improves lifespan and healthspan, with recent studies indicating that some of these benefits may be mediated by the circadian system. However, the precise interaction between dietary restriction, ageing and the brain circadian clock is still elusive. We propose Drosophila as a suitable model for studying this interaction, given its short lifespan, the well-characterized components of the circadian network and ample resources for genetic manipulation.

As a first approach, we monitored locomotor activity of individual flies throughout their lifespan, providing access to food with increasing yeast content, the main source of protein in fly laboratory diet. Surprisingly, both high and very low yeast content shortened lifespan, with 2% yeast being the optimal composition in terms of survival. Preliminary analysis indicates that while certain circadian and sleep quality parameters may be associated with longevity, the age-related changes in these behavioural traits appear to be relatively unaffected by dietary patterns. The findings indicate the existence of a complex interplay between lifespan, dietary habits and the behavioural correlates of the circadian clock.

D-029 | Daily changes in vesicle fusion underlies differential release of neuropeptides and neurotransmitters

Chronobiology

Author: Micaela Rodríguez | Email: mmicarodrigueez@gmail.com

Micaela Rodríguez-Caron1°, Juan Ignacio Ispizua1°, Francisco Joaquín Tassara1°, Ivana Leda Bussi1°, María Fernanda Ceriani1°

1° Laboratorio Genética del Comportamiento - Fundación Instituto Leloir - Instituto de Investigaciones Bioquímicas de Buenos Aires

Animal physiology follows daily rhythms that are typically regulated by central pacemakers in the brain, involving a dozen of clock genes. In Drosophila melanogaster, these clock genes are expressed in 240 neurons, which are grouped into functional clusters based on their anatomical location and gene expression profiles. Under constant conditions, the small lateral ventral neurons (sLNvs) play a crucial role in maintaining circadian rhythmicity. We have previously shown that these neurons undergo daily changes in their axonal projections, with more complex branching in the subjective morning and less branching in the early subjective night. Fluorescent reporters have shown that the levels of the synaptic protein BRP and the strength of connectivity between the sLNvs and other clock neurons also change as the structure remodels. However, little is known about the functional correlates of this form of adult plasticity. To explore the circadian regulation of neuropeptide and neurotransmitter release we employed new fluorescent reporters based on GFP reconstitution in the pre-synapse (GRIP). Interestingly, vesicle fusion accompanies other features of structural plasticity, reaching a maximum at the beginning of the day and a minimum in the early night, highlighting another level of clock-mediated regulation of neuronal communication.

D-030 | Innovative approaches to sleep analysis: assessing the impact of ethoscopes in studying DNA damage and sleep behavior in Drosophila melanogaster

Chronobiology

Author: Santiago Joaquin Sidoli Cano | Email: santisidoli@gmail.com

Santiago Sidoli-Cano1°, Carolina Kung1°, Canela Pedreira-González1°, Emiliano Kalesnik-Vissio1°, Agustina Bruno-Vignolo1°, Ivana Ducrey1°, Marina Propato-Lots1°, Nara I. Muraro1°

1° Biomedicine Research Institute of Buenos Aires-CONICET-Partner Institute of the Max Planck Society. Godoy Cruz 2390, C1425FQD, Buenos Aires, Argentina

Sleep is a fundamental biological process that is conserved across species, though its function and underlying mechanisms remain unclear. In Drosophila melanogaster, sleep has primarily been studied using Drosophila Activity Monitors (DAMs), which, despite their usefulness, have limitations in both resolution and real-time monitoring capabilities. Recently, the ethoscope platform (Geissmann et al., 2017) has emerged as an innovative tool for detailed behavioral analysis. The ethoscope devices, equipped with 3D-printed components, Raspberry Pi microcomputers, and cameras, provide a cost-effective, reproducible, and scalable solution for real-time tracking through supervised machine learning. To explore new possibilities in sleep research and overcome the limitations of traditional DAMs, this project employs ethoscopes within a thermogenetic screen. Our goal is to compare the effectiveness of DAMs and ethoscopes in monitoring sleep behavior and to investigate the relationship between DNA damage and sleep. By leveraging the advanced features of ethoscopes, we aim to gain new insights into the molecular and cellular mechanisms that link DNA damage to sleep regulation. Ultimately, this work could contribute to a broader understanding of the evolutionary significance of sleep across species.

D-031 | Odorant exposure during development modulates odor preference in adult Drosophila melanogaster

Cognition, Behavior, and Memory

Author: Matias Aleman | Email: matialeman3@gmail.com

Matías Alemán1°, Lautaro Duarte1°2°, Fernando Locatelli1°2°, Nicolás Pírez1°2°

1° Instituto de Fisiología, Biología Molecular y Neurociencias; UBA-CONICET, Argentina

2° Departamento de Fisiología, Biología Molecular y Celular; Facultad de Ciencias Exactas y Naturales; Universidad de Buenos Aires, Argentina

Insects rely on the olfactory system, among other sensory modalities to find food and mate. The olfactory cues that drive different behaviors are expected to have been determined by evolution and thus their neurobiological mechanisms are assumed to depend on hardwired circuits. However, it is well established that learning and memory have a large impact in tuning olfactory guided behaviors. The fly Drosophila melanogaster is one of the models in which the link between olfactory circuits and behavior is best understood. In order to unveil the neural bases of odor guided behavior, big efforts are made to identify attractive, aversive and neutral odors. The main goal of this project is to unveil the effect that exposure to olfactory stimuli during early stages of development has on the olfactory preference during adulthood. Flies were reared in vials with normal food in the presence of either aversive or appetitive odors. After 5 to 7 days after hatching we evaluated their preference for each odorant by means of a behavioral paradigm that allows us to measure innate and acquired odor attractiveness. Changes in the innate valence of the odors were analyzed by comparing treated flies with the corresponding controls. Our results show that the environment where the animals are reared modulates the behavioral response during adulthood. These results provide a novel paradigm to study olfactory memories that resist metamorphosis.

D-032 | Refractory epilepsy in limbic encephalitis due to anti-GAD, possibly linked to the persistence of high levels of anti-GAD antibodies and neuronal loss in the medial temporal lobe.

Cognition, Behavior, and Memory

Author: María Gabriela Avalos Navas | Email: dramariagabriela@outlook.es

María Gabriela Avalos Navas1°, Carlos Alberto Mangone1°, Marcelo Esteban Katz1°

1° Servicio de Neurología, Hospital D. F. Santojanni, CABA

Limbic encephalitis (LE) is characterized by cognitive symptoms and epilepsy, which are related to medial temporal lobe disfunction. Its etiology has been associated to paraneoplastic syndrome, infections, and autoimmune diseases. Among these, LE related to anti-glutamic acid decarboxylase antibodies (anti-GAD) deserves special attention, as seizures tend to be refractory, with no clear mechanism. Here, we describe the case of a 33-year-old woman with no pathological history, who developed a LE Ssyndrome alongside type I diabetes. Screening for neoplasms, infections, and systemic autoimmune diseases was negative. Blood and cerebrospinal fluid analyses were negative for NMDA, AMPA1/2, CASPR2, LGI1, DPPX, GABAb, and CKVD autoantibodies, but positive for anti-GAD in both fluids. After resolving the acute phase, the patient received chronic immunosuppressive and antiepileptic treatment, but continued to experience daily focal seizures as a sequela. After 8 years, symptoms worsened again (cognitive decline and an increase in the number of seizures per day). Tests showed persistence of high titers of anti-GAD, as well as decreased metabolic activity in the medial temporal lobe. We discuss the clinical case and review the literature on CNS damage mediated by the immune system.

D-033 | The Importance of Autonomy in Multiple Sclerosis: Self-Determination and Its Relationship with Clinical Factors

Cognition, Behavior, and Memory

Author: Lara Bardoneschi | Email: larambard@gmail.com

Lara Bardoneschi1°2°, Maria Sol Roman1°2°, Florencia Daniele2°, Felisa Leguizamon3°, Ignacio Casas Parera4°, Maria Laura Saladino2°, Fernando Caceres2°, Sandra Vanotti2°

1° INERE. Instituto de Neurociencias Restaurativas, Buenos Aires, Argentina

2° Universidad de Buenos Aires. Facultad de Psicología, Instituto de investigaciones en Psicología, Buenos Aires, Argentina

3° Hospital General de Agudos Dr. Teodoro Álvarez, Buenos Aires, Argentina

4° Universidad de Buenos Aires. Facultad de Medicina. Buenos Aires, Argentina

Introduction: In a chronic condition such as multiple sclerosis (MS), it is crucial to identify factors that impact functionality, including self-determination, defined by self-perceived autonomy and personal competence. Objective: To explore the predictors of self-determination in people with multiple sclerosis (PwMS). Method: 80 PwMS were included (84% relapsing-remitting, 14% progressive), Age:43.8±9.6, Education:14.7±2.9, Years of disease duration: 11.1±8.4. Personal Self-Determination Scale, Fatigue Severity Scale (FSS), and Beck Depression Inventory-II (BDI-II) were administered. Cognitive variables were assessed with California Verbal Learning Test-I (CVLT-I), Brief Visuospatial Memory Test-Revised (BVMT-R), Symbol Digit Modalities Test (SDMT). Statistical Analysis: A stepwise linear regression analysis was performed, including fatigue, depression, verbal memory, visual memory, processing speed, and years of disease duration as potential predictors. Results: Fatigue and depression were significant predictors of self-determination ($F=27.12$, $p<0.001$). The final model explained 39.81% of the variability in self-determination (ad $R2=0.39$). Cognitive variables and disease duration were excluded from the final model due to lack of statistical significance. Conclusion: This study highlights that mood and fatigue are significant predictors of self-determination in PwMS. These results underscore the importance of addressing these factors in the comprehensive management of MS.

D-034 | Reactivation of threat conditioning memory: disentangling the effects on emotional memory intensity and cognitive biases

Cognition, Behavior, and Memory

Author: Sofía Oriana Belforte | Email: sofiaorianabelforte@gmail.com

Sofía Oriana Belforte1°, Soledad Picco1°, Paula Hoijer2°, Rodrigo Fernández1°, Eugenia Pedreira1°, Luciano Cavallino1°

1° Laboratorio de Neurociencias de la memoria, Instituto de Fisiología, Biología Molecular y Neurociencias (IFIBYNE), CONICET, Facultad de Ciencias Exactas y Naturales, Universidad de Buenos Aires, Buenos Aires, Argentina.

2° Free University of Amsterdam, Amsterdam, Nederlands.

Retrieving a consolidated memory can trigger different processes, such as memory reactivation by the cues (reminders) presented during acquisition. Threat-conditioning memory plays a central role in anxiety disorders, impacting complex cognitive systems and inducing an overestimation of potential threats. We designed a differential threat-conditioning protocol, the association of an angry face conditioning stimulus (CS+) with an aversive tone unconditioned stimulus (US), combined with declarative tasks to analyze the interplay between implicit memory and cognitive bias. We showed that during the reactivation session, 24 hours after acquisition, CS+ presentation followed by an amnesic treatment weakened memory retention as expressed in skin conductance response (SCR) and the representation of the threat on Day 3, demonstrating a period of memory malleability after reactivation. Only a few reports have shown that memory modification might occur earlier than the declarative changes associated with the aversive stimuli. Therefore, this study aims to determine the effect of repeated reactivations on the threat conditioning memory and the stimuli representation by analyzing different time windows. We performed various experiments with varying numbers of CS+ presentations during the reactivation session, evaluating its effects 24 or 3 weeks after acquisition. The results show a different temporal dynamic between the implicit memory and the changes observed in the cognitive bias.

D-035 | Influence of aircraft-generated sounds on avian respiratory rhythms

Cognition, Behavior, and Memory

Author: Francisco Benegas Aquino | Email: benegasfrancisco99@gmail.com

Francisco Benegas Aquino1°2°, Gabriel Mindlin1°2°, Facundo Fainstein1°2°

1° Universidad de Buenos Aires, Facultad de Ciencias Exactas y Naturales, Departamento de Física, Ciudad Universitaria, 1428 Buenos Aires, Argentina.

2° CONICET - Universidad de Buenos Aires, Instituto de Física Interdisciplinaria y Aplicada (INFINA), Ciudad Universitaria, 1428 Buenos Aires, Argentina

Noise pollution is expanding at an unprecedented rate, impacting reproduction and development across taxa. Recent attention has focused on its effects on avian singing behavior in airport environments, where noise levels are particularly high. However, the physiological impacts of noise pollution and its effects on birds' night sleep remain largely unknown. In this study, we examine how aircraft noise pollution near Jorge Newbery Airport affects the respiratory activity of adult male canaries during both waking behavior and night sleep. Our results show that birds’ breathing rate and air sac pressure amplitude during night sleep are more than three fold increased above normal values, and that it takes several minutes for birds’ to recover their natural sleeping state. These effects are also present, albeit to a lesser extent, during waking behavior. Overall, our findings suggest that human noise pollution is more pervasive and potentially harmful than previously realized.

D-036 | Direct and indirect effects of testing-induced strengthening of an consolidated episodic memory and its neural correlates.

Cognition, Behavior, and Memory

Author: Juan Cruz Beron | Email: juanberon1991@gmail.com

Juan Cruz Beron1°, Carolina Vlatko1°, Maria Eugenia Pedreira1°, Luz Bavassi1°, Rodrigo S. Fernández1°

1° Instituto de Fisiología, Biología Molecular y Neurociencias - UBA - CONICET

The testing effect is characterized by a direct benefit on memory retention of reactivated and practiced items compared to their restudy. A scarcely explored phenomenon in consolidated episodic memory is how the direct retrieval of an item by retrieval practice can indirectly strengthen non-reactivated items associated with their acquisition context.

To study the direct and indirect benefits of retrieval practice we designed a 3-day protocol. On Day 1 subjects learned paired-associates (objects belonging to one of 4 semantic categories) on a specific context (belonging to one of 2 different categories). On Day 2, each pair was either tested or restudied, in the absence of its context image. On Day 3 we tested memory retention of the paired-associates and their context evaluating memory specificity (object level) and gist memory (category level). During the three days of the experiment, we recorded the brain activity with an electroencephalogram (EEG). Through this experimental approach, we will explore the degree of similarity between the EEG patterns on Day 2 and those observed during the visual presentation of the background images.

We found that, compared to restudy, testing directly strengthened the retrieved elements (paired-associates). Notably, we also found an indirect effect as it produced a better recall and recognition of the context background image, in comparison to the restudy trials.

D-037 | Decoding Fear: Measurement of Neural Activity in the terrestrial toad Rhinella arenarum

Cognition, Behavior, and Memory

Author: Nicolas Gustavo Calleja | Email: nicoocalleja97@gmail.com

Nicolas Gustavo Calleja1°2°, Ruben Nestor Muzio1°2°, Maria Florencia Daneri1°2

1° Grupo de Aprendizaje y Cognición Comparada, Laboratorio de Biología del Comportamiento (IBYME-CONICET)

2° Instituto de Investigaciones, Facultad de Psicología (UBA)

Fear and anxiety responses depend on the interaction between phylogenetically ancient

brain structures and more modern ones. The lateral and basal nuclei of the amygdala are believed to be a site of memory storage in fear learning. Studying the responses to aversive stimuli in amphibians is crucial for understanding the function of these ancient structures. In our laboratory, we have developed a series of aversive stimulation procedures in the toad Rhinella arenarum using saline solutions and recording the increase in heart rate. In this study, we successfully recorded cardiovascular conditioning and its subsequent extinction through the implantation of electrodes. The subjects were exposed to a neutral solution followed by an aversive solution, leading to an increase in heart rate (Unconditioned Response). Over the sessions, this increase was observed upon the presentation of the neutral solution (Conditioned Response), indicating anticipatory tachycardia to the aversive event. During extinction, the aversive solution was substituted with a neutral one, leading to the elimination of the Conditioned Response. After verifying the protocol's effectiveness, we decided to measure the neural activity. We used the AgNOR technique to identify which areas of the amphibian brain show activity. Preliminary data suggest increased activation in areas known to be associated with fear, such as the amygdala, revealing similarities with mammals.

D-038 | Brain representation of complex speech attributes during natural dialogue

Cognition, Behavior, and Memory

Author: Juan Octavio Castro | Email: joctavio287@gmail.com

Juan Octavio Castro1°2°, Joaquín E Gonzalez1°, Jazmín Vidal Dominguez1°, Pablo E Riera1°3°, Agustín Gravano4°5°, Juan E Kamienkowski1°3°6°

1° Laboratorio de Inteligencia Artificial Aplicada, Instituto de Ciencias de la Computación, Facultad de Ciencias Exactas y Naturales, Universidad de Buenos Aires - CONICET, Argentina

2° Departamento de Física, Facultad de Ciencias Exactas y Naturales, Universidad de Buenos Aires, Argentina

3° Departamento de Computación, Facultad de Ciencias Exactas y Naturales, Universidad de Buenos Aires, Argentina

4° Laboratorio de Inteligencia Artificial, Universidad Torcuato Di Tella, Argentina; Escuela de Negocios, Universidad Torcuato Di Tella, Argentina

5° CONICET, Argentina

6° Maestría de Explotación de Datos y Descubrimiento del Conocimiento, Facultad de Ciencias Exactas y Naturales - Facultad de Ingeniería, Universidad de Buenos Aires, Argentina

Speech requires integrating phonetic, syntactic, semantic and prosodic information in real time, and its study in natural environments challenges traditional approaches in EEG analysis. In recent years, human neurophysiology studies have turned toward natural dynamic stimuli such as videos or natural speech, mostly driven by advances in signal processing, computational modeling and machine learning. Techniques such as encoding models are key to separating the signal from the artifacts produced by movement, which necessarily arise from interactions with the environment, and also allow analysis of more complex stimuli. In recent work, we have shown that these models perform well even during natural dialogues in predicting EEG signals from low-level attributes, such as envelope or spectrogram. In the present work, we aim to expand the study on low-level features (MFCCs, deltas) and gradually deepen the

analysis into higher-level attributes such as phonemes, phonological features, semantic properties of words, indicators of turn-taking, and leadership. Preliminary results show that including these novel features outperforms previous models. Moreover, we plan to implement complex representations, mainly based on DNNs, such as wav2vec2 or x-vectors, to increase the performance of the model, opening up new possibilities for investigating the interaction between perception and action and increasingly less controlled stimuli.

D-039 | The Quality of the Previous Day's Meal Affects Gustatory Sensitivity and the Formation of Appetitive Memories in Honeybees

Cognition, Behavior, and Memory

Author: Anahí Cintia Charalambous | Email: anahichara4@gmail.com

Anahí Cintia Charalambous1°2°, Milagros Azcueta1°2°, Agustin Lara1°2°, Romina B. Barrozo3°4°, Fernando Locatelli1°2°, Martin Klappenbach1°2°

1° Instituto de Fisiología, Biología Molecular y Neurociencias, CONICET

2° Universidad de Buenos Aires, Argentina, Facultad de Ciencias Exactas y Naturales, Departamento de Fisiología, Biología Molecular y Celular

3° Universidad de Buenos Aires, Facultad de Ciencias Exactas y Naturales, Departamento de Biodiversidad y Biología Experimental, Laboratorio de Neuroetologia de Insectos

4° Instituto de Biodiversidad y Biología Experimental y Aplicada, UBA-CONICET

During foraging and back in the colony, honey bees (Apis mellifera) are capable of assessing quality of different food sources. In our lab, we recently demonstrated that bees stabilize stronger associative memories when the quality of the unconditioned stimulus exceeds previous experiences. Accordingly, honey bees whose reward expectations are frustrated show weaker memory retention, indicating that bees perform a subjective evaluation of the reward based on their most recent consumption. Here, we aim to elucidate whether such plasticity in reward assessment emerges at the level of detection or is it a central cognitive process.

We conducted behavioral experiments on honeybees and electrophysiology experiments on single sensilla of the anetanne, revealing that sugar sensitivity is modified according to previous experience. To address whether this change in sensitivity leads to differences in learning, we trained bees to associate antennal stimulation with sucrose to an odor, without post-ingestive reinforcement, and observed differences depending on the bees' previous experiences. These findings suggest that experience modulates the strength of the reward sensed peripherally, thereby affecting learning and memory.

Furthermore, we demonstrated that the training protocol using antennal contact can generate long-term memory if post-ingestive reinforcement is provided a few hours later. Notably, this effect is also dependent on the bees's prior experience

D-040 | Negative affective state in mice after the interruption of chronic ethanol drinking plus a single intraperitoneal administration.

Cognition, Behavior, and Memory

Author: Leon Condat | Email: leoncondat@unc.edu.ar

Leon Condat1°2°, Gaston Calfa1°2°, Irene Martijena1°2°

1° IFEC-CONICET, Departamento de Farmacología Otto Orsingher

2° Universidad Nacional de Córdoba

Ethanol consumption is capable of inducing neuroinflammatory processes, resulting in limbic structures changes which, in turn, can impact on memory and learning. In this sense, the protocol for ethanol administration used in the present work becomes relevant. It was designed for the study of the above mentioned phenomena but until now, it lacks of studies about its impact on emotional memories potentially associated with neuroinflammatory changes. To do that, adult male C57BL/6N mice were exposed to a chronic consumption of ethanol in a liquid diet (5% v/v) with a final administration of ethanol (3 g/kg, i.p.). One day latter, a group of animals was tested in an Open Field Arena where ethanol consumption history was shown to be correlated with anxiogenic behavior. On day 5 of ethanol withdrawal, animals were trained with mild or high intensity Pavlovian fear conditioning. No significant decay in fear expression was detected in withdrawn animals in memory test up to 15 days after the lower training. In the absence of previous open field exposition, mild conditioned group expressed higher freezing levels than controls in a retention test. This emotional sensitization and its influence in associative learning, anxiety and fear memory persistence could be linked to the aforementioned neurochemical changes and represent the first characterization of the effect of this alcohol consumption protocol in terms of affective state.

D-041 | Exploring the anxiety effects on the Iowa Gambling Task

Cognition, Behavior, and Memory

Author: Sofia Davicino | Email: sofiadavicinoo@gmail.com

Pedro Bianco Milatich1°2°, Sofia Davicino1°2°, Jo Carlos Jimenez Torres3°, Ignacio Ferrelli3°

1° Laboratorio de Ciencias Cognitivas IIpsi (Instituto de Investigaciones Psicológicas)

2° UNC (Universidad Nacional de Córdoba)

3° UBA (Universidad de Buenos Aires)

Emotion plays a critical role in risk-related decision-making (DM) processes. Previous studies suggest that individuals with anxious traits make fewer risky decisions. Social stressors, such as public speaking, modulate DM; research suggests that stress may amplify gender differences in risk-taking, with women being more risk-averse and men more risk-prone, but it is unclear how these variables affect performance. In this study, we will assess the impact of anxiety induced by a social stressor on DM. To do this, we will use the Iowa Gambling Task (IGT), a decision-making task where participants choose between four decks of cards with different monetary losses or gains. The goal of the task is to identify the most advantageous decks. We will include a social stress condition: an experimental group will be instructed to give a public speech after completing the task, and we will include a control group without this instruction. Electroencephalographic (EEG) activity will be recorded, and the event-related potentials known as error-related negativity (ERN) and error-related positivity (ERP) will be analyzed. This will allow us to explore the neural mechanisms underlying error detection and the effect of stress on DM across different genders.

D-042 | From bodily numbness to social connection: unveiling the relationship between depersonalization and social touch

Cognition, Behavior, and Memory

Author: Nadia Alejandra Dowzuk | Email: ndowzuk.nps@gmail.com

Nadia Alejandra Dowzuk1°, Martina Nayla Gallo2°, Paula Celeste Salamone3°, Rebeca Boehme4°

1° Faculty of Psychology, University of Buenos Aires, Buenos Aires, Argentina.

2° Faculty of Psychology, University of Buenos Aires, Buenos Aires, Argentina.

3° Center for Social and Affective Neuroscience, Linköping University, Linköping, Sweden.

4° Center for Social and Affective Neuroscience, Linköping University, Linköping, Sweden.

This study explores the relationship between depersonalisation symptoms, social contact seeking and acceptance, self-concept clarity and psychological factors in a large sample of Argentinean participants (N=273). Through an online study, we assessed participants' acceptance or willingness to receive physical contact from strangers, friends/family and intimate partners. Replicating previous research, we found that people with closer social ties show a higher acceptance of physical contact. Acceptance of contact from intimate partners was related to greater self-concept clarity and lower symptoms of depersonalisation. However, there was no conclusive relationship between depersonalisation symptoms and seeking or accepting social contact. Higher levels of depersonalisation were associated with greater avoidance of social contact and lower self-concept clarity. We conducted a mediation analysis that indicated that social contact avoidance partially mediates the relationship between depersonalisation and self-concept clarity. Furthermore, depersonalisation was associated with higher levels of anxiety, depression and negative affect, as well as lower levels of positive affect and life satisfaction. Our findings underscore the importance of considering physical contact in the development of therapeutic interventions for depersonalisation.

D-043 | Aterations in hedonic impact in a binge eating model induced by prior frustration events

Cognition, Behavior, and Memory

Author: Martín Rubén Fernández | Email: martinferyaru@gmail.com

Martín Rubén Fernández, Lucas Touriño, Matias Serafini, Lucas Cuenya

1° Martin Fernadez

2° Matias Serafini

3° Lucas Cuenya

4° Lucas Touriño

Introduction: Previous data from our lab show that frustration from reward delays increases intake upon re-encounter and heightens motivation for the lost reinforcer. This may be due to changes in the reinforcer's palatability (liking) or the value of reward expectation (wanting). Liking is assessed through the microstructure of consummatory behavior, with longer bursts of licking linked to higher hedonic value. Objective: To evaluate if increased intake from prior frustration alters liking. Method: Adult Sprague-Dawley rats were food-deprived to 83% of their ad libitum weight. Dependent variables included intake in milliliters, goal tracking time (GTT), and burst duration. Three groups were exposed to a 32% sucrose solution for five 5-minute trials. On day six, the No-Delay group had immediate access, while Delay-10 and Delay-2 groups accessed it after 10 or 2 minutes of an empty bottle. On day seven, all had immediate access. This cycle repeated five times. Results: Delay-10 and Delay-2 animals showed greater GTT and intake compared to No-Delay. Re-encounter trials revealed longer burst durations in Delay-10 and Delay-2. Discussion: Increased intake following frustration may enhance the hedonic component of motivation, suggesting increased consumption might be driven by greater liking or hedonic value. Keywords: Intake; Frustration; Liking; Rat.

D-044 | Examining the Squared Tasks of Attention Control in an Online Argentine Sample

Cognition, Behavior, and Memory

Author: Lorenzo Ariel Galán | Email: lorenzogalan43@gmail.com

Federico M. Gonzalez1°2°, Lorenzo A. Galan1°, Debora Burin1°2°

1° Instituto de Investigaciones, Facultad de Psicología, Universidad de Buenos Aires

2° CONICET

Traditional attention control paradigms, while experimentally consistent, often fail to capture individual differences, leading to ongoing debates about the construct. To address this issue, the Engle lab developed the “squared tasks”. Additionally, online research is expanding due to its cost-effectiveness and access to large samples, but it faces different challenges than controlled lab studies. In this study, 237 first-year psychology students completed, remotely and unsupervised, the three tasks. These are three-minute versions of traditional paradigms (Stroop, Flanker, and Simon) that Include incongruences not just at the stimuli level but also in the response options. Twenty-four cases (10%) were excluded due to very low scores (inferred as lack of comprehension/intention). The split-half reliability was .91 for Stroop, .93 for Flanker, and .72 for Simon. Differences in hit rates between congruent and incongruent conditions aligned with expectations for Stroop (OR=10.83, p<.001) and Flanker (OR=3.68, p<.001), but not for Simon (OR=1.24, p= .549), which exhibited a ceiling effect. Additionally, there were positive and significant correlations between the three tasks (Stroop-Flanker: r=.32, p<.001; Flanker-Simon: r=.27, p<.001; Stroop-Simon: r=.27, p<.001). In conclusion, the Squared tasks of attentional control, implemented online with an Argentine sample, demonstrated good psychometric properties and performed as expected, particularly for the Stroop and Flanker tasks.

D-045 | Exploring Self-Regulated Learning: How Do Children Learn Entirely New vs. Partially Known Concepts?

Cognition, Behavior, and Memory

Author: Julieta Goldstein | Email: julieta.goldstein@utdt.edu

Julieta Goldstein1°2°, Carolina Gattei1°2°3°, Cecilia Calero1°2°4°

1° Área de Educación, Escuela de Gobierno, Universidad Torcuato Di Tella, Ciudad Autónoma de Buenos Aires, Argentina.

2° Laboratorio de Neurociencia, Escuela de Negocios, Universidad Torcuato Di Tella, Ciudad Autónoma de Buenos Aires, Argentina.

3° Instituto de Lingüística, Universidad de Buenos Aires, CONICET, Ciudad Autónoma de Buenos Aires, Argentina.

4° Consejo Nacional de Investigaciones Científicas y Técnicas (CONICET), Ciudad Autónoma de Buenos Aires, Argentina.

Self-regulated learning may be crucial for goal setting, progress monitoring, and adaptive problem-solving. The ability to find and recognize relevant and reliable information has become increasingly valuable with advances in technology. Therefore, to understand self-regulated learning processes, we interviewed 136 9-11-year-olds to analyze their information-seeking behaviors when learning either novel or partially known concepts by themselves. Each student was evaluated twice in a randomized order.

Children's responses were categorized into two groups: Human-Sources Learners and Platform Learners. Results revealed an overall preference for platforms (73.23%). Interestingly, when learning novel concepts, the proportion favoring human sources increased significantly (34.56% versus 18.80%).

When stuck during the learning process, 79.93% mentioned changing their strategy. Notably, when comparing the responses based on their initial choice, 89.34% of the platform learners were willing to change strategies, compared to 54.17% of students relying on human sources, suggesting differing plasticity.

These findings deepen our understanding of children's decision-making regarding learning, aiding teachers in guiding their learning processes more efficiently which could prove valuable not only in educational settings, but also in their personal and professional lives.

D-046 | Behavioral Characterization of Paclitaxel-Induced Neurotoxic Effects in Rats: Interference with Spontaneous Activities

Cognition, Behavior, and Memory

Author: Martina Griguelo | Email: martinagriguelo2@gmail.com

Martina Griguelo1°, Delia Soriano1°2°, Florencia Coronel1°2°

1° Laboratorio de Dolor asociado al Cáncer, Instituto de Investigaciones en Medicina Traslacional (IIMT) CONICET – Universidad Austral, Buenos Aires, Argentina.

2° Facultad de Ciencias Biomédicas, Universidad Austral, Buenos Aires, Argentina.

Paclitaxel-induced peripheral neuropathy and associated pain are the major dose limiting side effects of this widely used chemotherapy drug. Central nervous system toxicity can also occur, contributing to the development of anxiety, cognitive dysfunction, and impairment in daily-life activities. This study aims to characterize multiple behavioral changes induced by paclitaxel (PAX) in rats, with a special focus on innate spontaneous activities. Adult male Sprague-Dawley rats receiving either PAX or vehicle were periodically weighed. Simultaneously, food and water intake were assessed. Paw mechanical and cold-induced sensitivities were evaluated using von Frey and Choi tests. Locomotor activity, ethologically relevant parameters, and anxiety-like behaviors were also assessed by using the open field test. Animals receiving PAX exhibited heightened paw sensitivity to both mechanical and cold stimuli. Additionally, they experienced a progressive attenuation in their weight gain that paralleled a reduction in food and water intake. Moreover, PAX-treated animals showed decreased horizontal and vertical exploratory activities, while anxious-like behaviors was observed. This study offers valuable insights into the complex behavioral effects of PAX on rats, particularly in the context of peripheral and central neurotoxicity. This thorough phenotypic characterization of the rodent model will contribute to optimize translational mechanistic and treatment-oriented investigations.

D-047 | Convergence of interoception, emotion, and social cognition in the allostatic interoceptive network across neurodegenerative diseases

Cognition, Behavior, and Memory

Author: Jessica Hazelton | Email: jessica.hazelton@edu.uai.cl

Jessica L. Hazelton1°2°3°, Fábio Carneiro4°, Marcelo Maito1°2°, Fabian Richter, Agustina Legaz1°2°, Florencia Altschuler2°, Leidy Cubillos-Pinilla, Yu Chen, Colin P Doherty, Prof Sandra Baez, Agustín Ibáñez1°2°

1° Latin American Brain Health Institute (BrainLat), Universidad Adolfo Ibáñez, Santiago, Chile

2° Cognitive Neuroscience Center (CNC), Universidad de San Andres, Buenos Aires, Argentina

3° The University of Sydney, Brain and Mind Centre, School of Psychology, Sydney, Australia

4° Laboratory of Neuropsychophysiology, Faculty of Psychology and Education Sciences, University of Porto, Portugal

Deficits in interoception, emotion, and social cognition occur in neurodegeneration. Indirect evidence suggests that allostatic-interoceptive network (AIN) dysfunction underlies these deficits. No study, however, has investigated the convergence of these deficits in neurodegeneration or considered how both structural and functional changes may lead to the cross-domain impairment.

We conducted Activated-Likelihood Estimate (ALE) meta-analyses in studies measuring neural correlates of interoception, emotion, or social cognition (structural: MRI; functional: fMRI and FDG-PET) in neurodegeneration (e.g., behavioral-variant frontotemporal dementia (bvFTD), primary progressive aphasias, Alzheimer's disease, and Parkinson's Disease).

From 20,593 studies, 170 reports met inclusion criteria (58 interoception, 65 emotion, and 47 social cognition) involving 7032 participants (4963 patients and 2069 healthy controls). In all patients combined, conjunction analyses revealed cross-domain

involvement of the insula, amygdala, orbitofrontal cortex, anterior cingulate, striatum, thalamus, and hippocampus. In bvFTD only, we replicated this result.

Neurodegeneration induces dysfunctional AIN across atrophy, connectivity, and metabolism, with particular relevance for bvFTD. Findings bolster the predictive coding theories of large-scale AIN, calling for more synergistic approaches to understanding interoception, emotion, and social cognition impairments in neurodegeneration.

D-048 | Semantic integration of words in Guaraní: An EEG study on the impact of practice in language learning using Duolingo

Cognition, Behavior, and Memory

Author: Ramón Javier Igarreta | Email: igarretaramon@gmail.com

Ramón Javier Igarreta1°, Camila Sobrino2°, Laura Kaczer1°

1° Laboratorio de Lenguaje y Cognición, FCEN-UBA

2° Departamento de Ciencias de la Vida, ITBA

Learning novel words in a new language is a challenging process for our memory systems. The aim of this study is to determine the diagnostic characteristics of the consolidation of new words in a second language in young adults, using an ecological approach. The study was carried out using Guaraní in the Duolingo learning platform. A group of 24 people used the platform for 5 weeks, after which they attended the laboratory to carry out an in-person experiment. We sought to determine the influence of the degree of practice on the integration of new words from a passive reading task coupled to an EEG recording. The results show statistically significant differences in the intensity of the N400 potential between different levels of practice of the new words. This suggests that the most practiced words are more integrated in semantic memory. On the other hand, the power bands of the time-frequency representations show a statistically significant difference in the alpha band (8-12 Hz) in the left lateral region. Additional trends were observed in some regions in the alpha, beta (15-20 Hz) and theta (4-8 Hz) bands: an increase in power in the theta bands and a decrease in power are observed alpha, in new known words. These results validate the analysis of the N400 evoked potential as an electrophysiological marker of the integration of new words into the mental lexicon, for more common and less controlled learning situations.

D-049 | Digital markers of episodic memory impairment in Parkinson's disease: A natural language processing approach

Cognition, Behavior, and Memory

Author: Jeremias Inchauspe | Email: inchauspe.jeremias@gmail.com

Jeremias Inchauspe1°, Camilo Avendaño1°2°, Lucas Sterpin1°, Franco Ferrante1°, Gonzalo Pérez1°, Edinson Muñoz2°, Pedro Chaná-Cuevas2°, Yamile Bocanegra3°, Lucía Amoruso1°, Adolfo García1°2°4°

1° Cognitive Neuroscience Center, Universidad de San Andrés, Buenos Aires, Argentina

2° Universidad de Santiago de Chile, Santiago, Chile

3° Grupo de Neurociencias de Antioquia, Facultad de Medicina, Universidad de Antioquia, Medellín, Colombia; Grupo Neuropsicología y Conducta (GRUNECO), Facultad de Medicina, Universidad de Antioquia, Medellín, Colombia.

4° Global Brain Health Institute, University of California, San Francisco, USA

Frontostriatal atrophy in Parkinson's disease (PD) impairs episodic memory (EM) skills. Though critical to predict further cognitive and functional decline, EM assessments are prone to examiner bias and prioritize retrieval of predefined items rather than graded proximity between stimuli and responses. Here we overcome these limitations through a novel NLP-based approach. Seventy-four participants (34 with PD, 39 healthy controls) retold two texts emphasizing either bodily actions or internal states. We ran the original texts and each participant's retellings through NLP algorithms to calculate (i) the retelling's verbosity (word count); (ii) semantic distance, via the cosine similarity between the text-level embeddings of texts and retellings; and (iii) topological distance, via differences in text-level connectivity, repetitions, and global structural properties captured by speech graphs. Robust ANOVAs showed that patients said fewer words only in the bodily-action text while exhibiting larger semantic distance and topological distance across texts. These findings suggest that NLP metrics of EM can afford useful markers of PD, opening new pathways for clinical assessments.

D-050 | Semantic Context Reduces Cognitive Effort in Bilingual Word Processing: A Pupillometry Study

Cognition, Behavior, and Memory

Author: Julieta Laurino | Email: julilaurino@gmail.com

Julieta Laurino1°2°, Laura Kaczer1°, Clara D. Martin3°4°

1° Departamento de Fisiología, Biología Molecular y Celular. Facultad de Ciencias Exactas y Naturales, Universidad de Buenos Aires, Buenos Aires, Argentina.

2° Instituto de Fisiología, Biología Molecular y Neurociencias. CONICET. Buenos Aires, Argentina.

3° Basque Center on Cognition, Brain and Language (BCBL), Mikeletegi Pasealekua, 69, 20009, Donostia-San Sebastián, Gipuzkoa, Spain.

4° Ikerbasque, Basque Foundation for Science, Bilbao, Spain.

Understanding words appears effortless, yet we often encounter ambiguous input for which context information is crucial for comprehension. Bilinguals face a unique challenge in this regard, as they frequently switch between their languages, and thus need to integrate context across them. However, our understanding of the mechanisms that enable cross-lingual context-to-word interaction remains limited. In our study, we evaluated whether global semantic context in the second language (L2) influences word processing in the first language (L1) and how this effect interacts with semantic ambiguity. We recorded pupil diameter in Spanish-English bilinguals (N = 37) during a semantic relatedness task, where an ambiguous or non-ambiguous target word in Spanish (L1) appeared. The target word was immediately preceded by a short text in English (L2) or Spanish (L1) that was thematically related or unrelated to the target word. Results showed that target words were processed more accurately, faster, and with reduced neurocognitive demands (i.e., smaller pupil dilation) when preceded by a related context, for both L1 and L2 texts. Taken together, these results evidence a cross-lingual effect of global semantic context, which facilitates and reduces neurocognitive demands during word processing. In addition, they extend the literature demonstrating that bilinguals have one integrated lexicon in which lexical access is not language-selective.

D-051 | The Role of Perinatal Stress in Shaping Infant Temperament: Evidence from a Longitudinal Study

Cognition, Behavior, and Memory

Author: Hernán López Morales | Email: hernanlopezmorales@gmail.com

Hernán López-Morales1°2°3°4°, Julieta Sosa1°4°, Verónica Zabaletta1°4°, Eduardo Tomás Cánepa2°4°, Sebastián Urquijo1°2°

1° Instituto de Psicología Básica, Aplicada y Tecnología (CONICET-UNMdP))

2° Consejo Nacional de Investigaciones Cientificas y Técnicas (CONICET)

3° Facultad de Psicología, Universidad Atlántida Argentina

4° Instituto de Química Biológica de la Facultad de Ciencias Exactas y Naturales (CONICET - UBA)

Pregnant women can experience stress levels up to twice as high as non-pregnant women, with rates in middle- and low-income countries potentially three to five times higher. This maternal adversity may negatively impact fetal brain maturation, increasing the risk of future health issues, such as temperamental alterations in offspring. The aim of this study was to identify the effects of maternal perinatal stress on infant temperament at three months postpartum. A longitudinal study was conducted with 198 mother-infant dyads involving full-term, singleton pregnancies. Mothers were assessed during the second and third trimesters of pregnancy and at three months postpartum, while infants were evaluated at three months. Depression (EPDS), anxiety (STAI), perceived stress (PSS-10), and pregnancy-related distress (PDQ) were measured using validated scales. Infant temperament was assessed using the Infant Behavior Questionnaire (IBQ). Principal component analysis generated three composite indices of maternal stress for each study time point. Hierarchical linear regression analyses, adjusted for covariates, revealed that infant extraversion (R^2_{ajust}=.347, $p<.01$), negative affectivity (R^2_{ajust}=.470, $p<.01$), and effortful control (R^2_{ajust}=.364, $p<.01$) were predicted by maternal stress during the second trimester. These findings underscore the importance of managing stress during this critical period to mitigate potential adverse effects on the socio-emotional development of the infant.

D-052 | Exploring Reactivation through World Cup Memories: A Speech Quantitative Analysis

Cognition, Behavior, and Memory

Author: Guillermo Meriño | Email: guillermomerino1997@gmail.com

Guillermo Meriño1°, Corina Révora2°, Laura Kaczer3°, Luz Bavassi2°4°

1° Departamento de Física, FCEIA, UNR

2° Departamento de Física, FCEyN, UBA

3° Laboratorio de Lenguaje y Cognición. Departamento de Fisiología, Biología Molecular y Celular, FCEyN, UBA

4° IFIBYNE, UBA, CONICET

The quantification of memory processes is an ever-evolving area in neuroscience. Memory reactivation is the phenomenon in charge of memory transformation. Autobiographical memories, the ability to recall personal experiences, pose a challenge due to their high variability, complicating systematic and quantitative analysis. This study's primary objective is to determine reactivation's role in the free recall of autobiographical memory, particularly whether reactivation leads to an update in its content and structure. To achieve this goal, we will compare autobiographical memories that have been previously reactivated (6 months before the interview) with those that have not. The corpus of narratives was obtained from autobiographical interviews, where participants were asked to recall the day of the World Cup final and the day of the match against Saudi Arabia. We will analyze the interviews by applying NLP-derived metrics such as the number of unique words, positivity and negativity percentage probability, and first-neighbor coherence. Through this approach, we aim to identify markers of memory plasticity in the structure and content of the narratives.

D-053 | How to classify my rodent? Methodologies for identifying behavioral profiles in animal models of Post-Traumatic Stress Disorder

Cognition, Behavior, and Memory

Author: Francisco Elías Moreno | Email: Francisco.elias.moreno@mi.unc.edu.ar

Francisco Elías Moreno1°2°, Martina Ramires1°2°, Vittorelli Franco Antonio1°2°, Gastón Diego Calfa1°2°, Crhistian Luis Bender

1° Instituto de Farmacología Experimental de Córdoba - CONICET. Facultad de Ciencias Químicas

2° Departamento de Farmacología Otto Orsingher, Universidad Nacional de Córdoba, Argentina

Modeling post-traumatic stress disorder (PTSD) is challenging. Over the past decades, preclinical research in PTSD has increased, but its results have not yielded new and effective therapies. In the quest to improve translational power, refinement of animal models is needed. For this purpose, the classification of stressed animals into behavioral profiles of “vulnerability” and “resilience” has emerged as an important advance, recognizing that stressful experiences are necessary but not sufficient to induce pathological states. Importantly, distinctive neurobiological mechanisms have been associated with these profiles. This perspective, however, presents new theoretical and methodological problems that require better argumentation of the criteria and tests that have been used to identify behavioral profiles.

In order to synthesize the classification variants, their problems, and possible solutions, a systematic and critical review of the methodologies used was performed. The PubMed database was used to identify articles with explicit interest in studying PTSD using rodents and behavioral profiling (128 articles were found that met this criterion). In addition, we employed the single prolonged stress model, a widely used animal model in PTSD research, in order to apply and propose a suitable classification methodology for this paradigm. For behavioral profiling, anxiety tests and contextual fear memory assessments were used in adult male Wistar rats and C57BL/6 mice.

D-054 | Neural and behavioral markers of the retrieval of old and new Autobiographical Memories: an EEG study

Cognition, Behavior, and Memory

Author: María Carla Navas | Email: mcarla.n94@gmail.com

María Carla Navas1°, Ignacio Ferrelli1°, María Eugenia Pedreira1°, Rodrigo Fernandez1°, Luz Bavassi1°2°

1° Laboratorio de Neurociencias de la Memoria, IFIByNE, UBA-CONICET

2° Deparamento de Fìsica, FCEN, UBA

Autobiographical memory (AM) is the ability to recall personal experiences and reflect on them, this plays a crucial role in shaping and maintaining our identity. Naturally, AMs can change through time and it's been proposed that older AMs are recalled with less vivid event-specific details and more general gist-like details than newer events. Although the mechanisms involved in AM storage and retrieval and how these change with time are still a matter of debate, there's evidence that neural oscillatory mechanisms in the range of theta band (4-8 Hz) are involved in the modulation of a brain network supporting the retrieval that includes deeper regions such as the medial temporal lobe and frontal and parietal regions. In this work, we sought to investigate the retrieval dynamics of AMs of different ages in order to provide evidence of distinct neurophysiological signatures involving the role of theta rhythm and its link to behavioral characteristics of the retrieval process. Due to AM nature, it's important to think of testing approaches capable of capturing its intrinsic features in the most naturalistic way possible. Here, we cued people to remember old or new personal events while using EEG recording techniques. We found an increase in theta band power in the frontocentral region for old (>3y) compared to recent <1y) AMs. This result is a first step to dive deeper into characterizing the changes in neural signatures of retrieval as a function of AMs age.

D-055 | ERK regulatory mechanisms in memory and plasticity.

Cognition, Behavior, and Memory

Author: Santiago Ojea Ramos | Email: ojea.santiago@gmail.com

Santiago Ojea Ramos1°, Candela Medina2°, María del Carmen Krawczyk2°, Millán Julieta2°, Acutain María Florencia3°, Báez María Verónica3°, Urbano Suarez Francisco José1°, Romano Arturo Gabriel1°, Boccia Mariano Martin2°, Feld Mariana1°

1° Instituto de Fisiología, Biología Molecular y Neurociencias (IFIBYNE), UBA-CONICET.

2° Laboratorio de Neurofarmacología de Procesos de Memoria, Cátedra de Farmacología, Facultad de Farmacia y Bioquímica – UBA.

3° Instituto de Biología Celular y Neurociencias Prof. Dr. E. de Robertis (IBCN), CONICET-UBA

Extensive research has focused on ERK1/2 phosphorylation in memory and plasticity, while other regulatory mechanisms remain mostly unexplored. Here, we present findings on two less-studied regulatory mechanisms: ERK2 dimerization (a post-translational modification affecting interaction with cytosolic targets), and the role of MAPK phosphatase 3 (MKP-3, also known as DUSP6), a cytosolic negative regulator of the pathway.

We assessed ERK2 dimerization during chemical long-term potentiation (cLTP) in mature rat primary cortical neuronal cultures, as well as in mice hippocampus after inhibitory avoidance (IA) memory reactivation. We also studied the impact of DEL-22379 (DEL), a specific ERK dimerization inhibitor on LTP induced in hippocampal slices (LTP), cLTP and memory reconsolidation.

In parallel, we also determined MKP-3 expression levels and the effect of inhibiting it (with BCI, its specific inhibitor) during IA reconsolidation.

Our results suggest a pivotal role of ERK2 dimerization and MKP-3 in plasticity and IA memory reconsolidation, but deserve further research.

This is the first study to document ERK dimerization in neural tissue and its impact on these processes.

D-056 | Exploring neuronal activity in the Lateral Habenula during aversive learning through Fear Conditioning

Cognition, Behavior, and Memory

Author: Maria Paula Ospital | Email: ospitalpaula@gmail.com

María Paula Ospital1°2°, Joaquín Piriz2°

1° Departamento de Fisiología, Biología Molecular y Celular (DFBMC) - Universidad de Buenos Aires

2° Instituto de Fisiología, Biología Molecular y Neurociencias (IFIBYNE) - UBA-CONICET

Fear is an adaptive defense emotion in response to potential danger, but its exacerbated expression underlies pathological conditions such as phobias, post-traumatic stress or anxiety. Pavlovian fear conditioning (FC) is undoubtedly the most studied paradigm of fear learning in rodents and involves the association of a tone (cue) and an electric shock (US). The Lateral Habenula (LHb) is a small brain nucleus located dorsal to the thalamus and is associated with encoding aversion. Recently, the group has discovered that during learning the LHb would be involved in contextual as well as cue conditioning. However, the mechanisms by which it does so remain unknown. In this study we combined viral vectors injections and neuronal activity recordings through fiber photometry to observe the LHb's response throughout FC protocol.

D-057 | Fear memory acquisition in the retrosplenial cortex: the role of alpha 7 nicotinic acetylcholine receptors

Cognition, Behavior, and Memory

Author: Verónica Pastor | Email: verpastor@fmed.uba.ar

Verónica Pastor1°, Beatriz Agustina Ortega1°2°, Cynthia Katche1°2°

1° Instituto de Biología Celular y Neurociencia “Prof. E. De Robertis” (IBCN; UBA-CONICET); Buenos Aires, Argentina

2° Instituto Tecnológico de Buenos Aires (ITBA); Buenos Aires, Argentina

The retrosplenial cortex (RSC) is a key brain area involved in memory processing which deteriorates in early stages of Alzheimer's disease. Alpha 7 nicotinic acetylcholine receptors (a7nAChRs) are key players in plasticity processes, including those necessary for memory processing. We have previously shown that the antagonism of a7nAChRs with methyllycaconitine (MLA) in the RSC before an inhibitory avoidance (IA) training enhanced memory expression 24h later. Considering that retrosplenial a7nAChRs are mainly expressed in gabaergic neurons, we hypothesized that the infusion of MLA in the RSC could be decreasing gabaergic activity. Thus, we asked if the activation of gabaergic receptors in the presence of MLA could prevent IA memory acquisition enhancement.Our results support this hypothesis, identifying a potential mechanism for a7nAChR modulation of an aversive memory processing in the RSC and highlighting the potential of targeting a7nAChRs for therapeutic strategies aimed at enhancing cognitive function in early Alzheimer's disease.

D-058 | Influence of Immersion Levels on Perceptual Decoupling in Mind-Wandering Episodes

Cognition, Behavior, and Memory

Author: Antonella Pratto | Email: prattoanto@gmail.com

Antonella Pratto1°, Nicolás Bruno1°2°3°, Nicolás Rozenberg1°, Jeremías Inchauspe4°, Tomás D'Amelio1°2°, Juan Ignacio Piccinini1°2°, Federico Cavanna1°2°, Carla Pallavicini1°2°, Jacobo Sitt3°, Enzo Tagliazucchi1°2°4°

1° COCUCO Lab, Instituto de Fisica Interdisciplinaria y Aplicada, Facultad de Ciencias Exactas y Naturales, Universidad de Buenos Aires

2° Consejo Nacional de Investigaciones Científicas y Técnicas (CONICET)

3° Paris Brain Institute - Institut du Cervau (ICM)

4° Centro de Neurociencias Cognitivas, Universidad de San Andrés

Mind-wandering is characterized by the mind's tendency to shift from a primary task to unrelated thoughts, often accompanied by perceptual decoupling, where attention detaches from external stimuli to focus inward. This phenomenon affects cognitive performance, altering reaction times, task accuracy, and event-related potentials (ERP). In contrast, immersion reflects the depth of engagement in a task or thought. It remains unclear whether episodes of mind-wandering with low immersion exhibit similar patterns of perceptual decoupling as those with high immersion. Such insights could clarify whether mind-wandering and task-focused states represent different cognitive states or share a common attentional dimension. This study investigates the impact of mind-wandering and immersion on perceptual decoupling during a sustained attention to response task. Our initial analysis of the reaction time coefficient of variability (RTCV) indicated higher rates for high immersion than for low immersion mind-wandering episodes, supporting the dimensionality theory. However, no significant differences were observed in omission and commission errors across immersion levels. To further test this hypothesis, we propose to explore the influence of immersion on the P1 and P3 ERP components, anticipating reduced ERP amplitude under higher immersion conditions.

D-059 | Astrocitic GLT-1 in Aversive Memories: Differential Effects of its Blockage or Upregulation

Cognition, Behavior, and Memory

Author: Matías Martín Renfijes | Email: matias.mrenfijes5@gmail.com

Matías Martín Renfijes1°2°, Juan Gabriel Riboldi1°2°3°, Josefina Iribarne1°, Haydee Ana María Viola1°2°3°

1° Facultad de Medicina, Instituto de Biología Celular y Neurociencia "Prof. E. De Robertis" (IBCN), UBA-CONICET, Buenos Aires, Argentina,

2° Instituto Tecnológico de Buenos Aires, Buenos Aires, Argentina.

3° Departamento de Fisiología, Facultad de Ciencias Exactas y Naturales, Biología Molecular y Celular "Dr. Héctor Maldonado" (FBMC), University of Buenos Aires (UBA), Buenos Aires, Argentina

The control of glutamate concentration in the synaptic gap is crucial for neuronal communication, preventing excitotoxicity from excessive receptor activation. There are specific transporters in the brain that are responsible for maintaining glutamate homeostasis. GLT-1 transporters are mainly localized in astrocytes and its expression is particularly abundant in the hippocampus. This study explored the role of GLT-1 using contextual fear conditioning (CFC) and inhibitory avoidance (IA) tasks. Dihydrokainic acid (DHK), a selective GLT-1 inhibitor, was injected into the dorsal hippocampus of rats at different time around aversive learning. DHK administration around a weak CFC or IA training sessions promoted long-term memory (LTM) formation. However, DHK administration around strong trainings that induced LTM, did not affect consolidation in either task. Moreover, the application of DHK 15 minutes before test sessions impaired the expression of short-term memory and LTM in both tasks. DHK administered 15 minutes after a reactivation session impaired CFC reconsolidation. In contrast, the antibiotic ceftriaxone (CFT), which increases GLT-1 expression, did not affect the expression of aversive memory. The effects of DHK and CFT on memory were not due to changes in locomotor activity or anxiety-like state of rats. This study highlights the critical role of hippocampal astrocytic glutamate uptake in the formation and persistence of aversive memories.

D-060 | Two critical time-points for memory impairment mediated by NF-kB inhibition with BAY 11-7082

Cognition, Behavior, and Memory

Author: Agustina Denise Robles | Email: agusd.robles@gmail.com

Agustina Robles1°2°, Santiago D'hers1°2°, Arturo Romano1°2°

1° Universidad de Buenos Aires. Facultad de Ciencias Exactas y Naturales. Departamento de Fisiología, Biología Molecular y Celular. Buenos Aires, Argentina.

2° CONICET. Universidad de Buenos Aires. Instituto de Fisiología, Biología Molecular y Neurociencias (IFIBYNE). Buenos Aires, Argentina

NF-κB is a highly conserved transcription factor associated with memory processes in both vertebrates and invertebrates. Previous studies in Neohelice granulata crabs have demonstrated that two waves of NF-κB activity, right after and 6 hours after training, are essential for long-term memory formation. While acute pharmacological inhibition immediately post-training has been shown to impair memory in the inhibitory avoidance task in mice, its effects during the second wave of activity and in the novel object recognition (NOR) task remain unclear. In this study, we investigated the effect of the NF-κB inhibitor BAY 11-7082 on memory consolidation using the NOR task in mice. Acute systemic administration of the drug immediately after training did not affect recognition memory, leading us to test localized injections into the dorsal hippocampus at different intervals post-training. We found that inhibition immediately and 6 hours after training, but not 3 hours after, resulted in memory deficits compared to vehicle-injected controls. These findings support the hypothesis that two critical waves of NF-κB activity are involved in memory consolidation. To confirm that these effects were due to NF-κB inhibition, we are performing immunofluorescence staining on brain tissue sections from the injected subjects and measuring NF-κB presence in the nucleus.

D-061 | Studying factors and mechanisms underlying frustration recovery between Successive Negative Contrast tasks

Cognition, Behavior, and Memory

Author: Mariano Nicolás Rodríguez | Email: rodriguezmariano@hotmail.com.ar

Mariano Rodríguez1°2°, Franco Cardozo Denis1°2°, Martín Puddington1°2°3°, Rubén Muzio1°2°

1° Grupo de Aprendizaje y Cognición Comparada, Laboratorio de Biología del Comportamiento (IBYME-CONICET)

2° Instituto de Investigaciones, Facultad de Psicología (UBA)

3° Universidad de Tres de Febrero (UNTreF)

Successive Negative Contrast (SNC) is a behavioral phenomenon characterized by the disruption of instrumental (running time; iSNC) or consummatory response (sucrose licking; cSNC) following a surprising downshift in expected reward. The aversive emotion resulting from the negative discrepancy between the received and expected reward is known as frustration. This effect is temporary; approach behavior gradually recovers after a few sessions with new incentive conditions. It was proposed that counterconditioning, resulting from pairings between frustration and devalued reward, is involved in the recovery of approach behavior. Thus, recovery from frustration depends on the time of exposure to downshifted reward. This hypothesis was tested in two experiments. In Experiment 1, the number of postshift trials was manipulated in a cSNC task (Phase 1) before switching animals to the iSNC task (Phase 2). In Experiment 2, the duration of postshift trials in the cSNC task (Phase 1) was manipulated. Animals receiving less exposure to downshifted reward in Phase 1 showed a stronger SNC effect in Phase 2 than animals with more exposure. More extensive downshift experience created more opportunities to develop counterconditioning of the disruptive effects of frustration. Based on previous studies, animals that experienced recovery in Phase 1 would show reduced neural activity in some brain regions (e.g., ACC, amygdala) in the second task, corresponding to inhibition of emotional activation.

D-062 | Neonatal treatment with clonazepam disrupts episodic like-memory in young adult male rats

Cognition, Behavior, and Memory

Author: Maria Florencia Rossetti | Email: mfrossetti@fbcb.unl.edu.ar

María Florencia Rossetti1°, Guillermina Canesini1°3°, Pamela Fernández1°3°, Luisa Gaydou1°2°, Agustín García1°, Cora Stoker1°2°, Jorge Guillermo Ramos1°2°

1° Instituto de Salud y Ambiente del Litoral (ISAL), Facultad de Bioquímica y Ciencias Biológicas, Universidad Nacional del Litoral, Santa-CONICET, Santa Fe, Argentina.

2° Departamento de Bioquímica Clínica y Cuantitativa, Facultad de Bioquímica y Ciencias Biológicas, Universidad Nacional del Litoral, Santa Fe, Argentina.

3° Cátedra de Nutrición en Situaciones Patológicas, Facultad de Bioquímica y Ciencias Biológicas, Universidad Nacional del Litoral, Santa Fe, Argentina

Benzodiazepines (BZDs) are central nervous system depressants and GABAA positive allosteric modulators. BZDs are generally prescribed for the treatment of sleep and anxiety disorders, anticonvulsant, and acute responses to trauma. However, concerns have arisen about the effects that early exposure to BZDs may have on brain development, particularly in pediatric patients.

The aims of our work were to explore the effects of neonatal treatment with clonazepam on behavior and to analyze enriched environment as a mitigating factor. Male pups were treated intraperitoneally from postnatal day (PND) 7 to 11 with clonazepam (1 mg/kg/day; CLONA) or saline solution (CON). On PND21, some of the rats were kept in the standard laboratory environment (SE), while others were housed in enriched environments (EE; with objects and toys). At PND75, animals were tested in locomotion activity, episodic like-memory (ELM) and anxiety like-behavior test.

CON animals housed in SE exhibited a good performance in ELM, while CLONA group failed to distinguish between the presented objects, suggesting impairment in this type of memory. No differences were observed in locomotor activity between CON and CLONA groups in SE (distance traveled, time/entries to the periphery and to the center, fecal boli). Results of anxiety like-behavior and those of the animals exposed to EE are currently being analyzed. These first analysis show that neonatal treatment with clonazepam produces long-term behavioral effect.

D-063 | Stress Resilience: Differences in Movement Strategies Between Resilient and Susceptible Mice During the Forced Swimming Test

Cognition, Behavior, and Memory

Author: Micaela Salvochea | Email: micaela.salvochea@gmail.com

Micaela Salvochea1°, Jennifer Miranda1°, Erika Georgieff2°, Mariela Chertoff1°2°

1° Universidad de Buenos Aires. Facultad de Ciencias Exactas y Naturales. Departamento de Química Biológica, Laboratorio de Neuroepigenética y Adversidades Tempranas. Buenos Aires, Argentina.

2° CONICET- Universidad de Buenos Aires. Instituto de Química Biológica de la Facultad de Ciencias Exactas y Naturales. (IQUIBICEN). Buenos Aires, Argentina.

Gestational stress affects the trajectory of brain development, resulting in the modification of cognitive and socioemotional functions. However, not all individuals respond to stress in the same way. In order to analyze the mechanisms of stress resilience, we used a gestational restriction stress model in which pregnant adult CF1 females were subjected to movement restriction (MR) 3 times a day for 45 minutes from GD10 to GD19. Latency to groom in the Splash Test was used to differentiate between resilient and susceptible mice after RM at PD28, in which susceptible animals were separated as those with a mean of latency to groom after RM greater than control group + 1SD. Mice behavior was analyzed in the forced swimming test. Differences in the movement strategies were observed between the groups in the last 4 min of the test, with the susceptible group showing significantly more active swimming and less passive swimming compared to the control group, whereas no significant differences were found between the resilient and control group. RNA was extracted from the prefrontal cortex of all animals to evaluate potential molecular mechanisms of stress adaptation.

D-064 | The impact of impaired sociality upon social contagion and brain transcriptome in zebrafish

Cognition, Behavior, and Memory

Author: Maria Florencia Scaia | Email: mflorenciascaia@gmail.com

Maria Florencia Scaia1°2°, Florian Reichmann3°, Will Norton4°, Matt Parker3°

1° IFIBYNE, CONICET-University of Buenos Aires (Argentina)

2° Department of Clinical and Experimental Medicine, School of Biosciences, University of Surrey (UK)

3° Department of Pharmacology, Medical University of Graz (Austria)

4° Department of Genetics and Genome Biology, University of Leicester (UK)

Emotional social contagion can be described as the ability to match the emotional state of another individual. Recent evidence suggests that certain mechanisms of emotional contagion in mammals, such as the role of oxytocin, are conserved in zebrafish. Research using social fear contagion protocols rules out the hypothesis that social transmission of fear in zebrafish merely relies on motor imitation, but rather on emotion discrimination. While this has been assessed in mutants with impaired oxytocinergic pathway, social fear transmission in other zebrafish strains with altered sociality remains unexplored. To tackle this, we assessed a protocol of social transmission of fear in ednraa-/- mutants, which are more aggressive and less cohesive than wild-types, and lrrtm4 mutants, showing the opposite pattern of behavior ("unfriendly" and "friendly" strains, respectively). To assess how impaired sociality might affect social contagion, we exposed fish from each strain to alarm substances or water influx, and we quantified individual behavior in time series of exposed and observer fish. Moreover, in order to explore how different social phenotypes can be affected by a social challenge, we isolated fish from both strains for 7 days and we compared brain transcriptome by RNAseq in isolated and control ednraa-/, lrrtm4 and AB fish. Our study will help to understand whether different social phenotypes in zebrafish might influence social transmission of fear and brain transcriptome.

D-065 | Opening Pandora's Box of Sensorimotor Synchronization

Cognition, Behavior, and Memory

Author: Ariel Dario Silva | Email: arieldario.silva83@gmail.com

Ariel Silva1°3°, Rodrigo Laje1°2°3°

1° Laboratorio de Dinámica Sensomotora, Departamento de Ciencia y Tecnología, Universidad Nacional de Quilmes

2° Universidad de Buenos Aires

3° CONICET

Sensorimotor synchronization is one of the paradigmatic behaviors in millisecond timing, where both perception and production of temporal patterns are at play. A typical sensorimotor synchronization task is paced finger tapping. The task consists of tapping in synchrony with a periodic external stimulus, as when we follow the beat of music by tapping our foot. The differences between the occurrence time of each response and that of the corresponding stimulus are called asynchronies and constitute the most important observable to describe the synchronization phenomenon. Traditionally, finger tapping tasks include temporal perturbations with the aim of unraveling the underlying error-correction mechanism. These perturbations are made by modifying the external stimuli sequence (e.g. changing its period by a fixed amount), and the observed behavior is a resynchronization to a new baseline. In this work we go beyond the traditional fixed-size perturbations and perform adaptive perturbations where the stimulus period is dynamic and depends linearly on the previous asynchrony value. This manipulation causes the system to show solutions beyond the known and robust resynchronization, among which we can find bistable, unstable, oscillatory, alternating, etc. Preliminary results show that the error-correction mechanism is intrinsically nonlinear. Furthermore, all these results could potentially be explained as different aspects of a single underlying mechanism.

D-066 | Is the dentate gyrus the core of the hippocampal allocentric spatial navigation?

Cognition, Behavior, and Memory

Author: Natalia Soldi | Email: natalia.soldi@gmail.com

Natalia Soldi1°, Joaquín A. Quintana2°, Sabrina Benas3°, Emilio Kropff3°, Alejandro F. Schinder1°, Maria Soledad Esposito2°, Verónica C. Piatti1°

1° Laboratorio de Plasticidad Neuronal - Fundación Instituto Leloir - Instituto de Investigaciones Bioquímicas de Buenos Aires (IIBBA)- CONICET

2° Laboratorio de Neurobiología del Movimiento - Departamento de Física Médica - Centro Atómico Bariloche - Comisión Nacional de Energía Atómica (CNEA) - CONICET

3° Laboratorio de Fisiología y Algoritmos del Cerebro - Fundación Instituto Leloir - Instituto de Investigaciones Bioquímicas de Buenos Aires (IIBBA)- CONICET

In nature, actions such as foraging, feeding and hiding safely are daily requirements for survival. In a changing world, flexible behaviors are necessary to execute fast adaptive responses. Cognitive flexibility is the ability to solve new situations based on knowledge from previous experiences and a good approach to test it in all motile animals is spatial navigation. The animal location in a particular place could be established on the relative metric differences between the environmental sensorial cues (allocentric) or based on to the relative positions of those same cues with itself (egocentric). While the first reference frame is flexible, the second one is inflexible because it requires new learning each time the familiar environment changes. The hippocampal formation has been implicated in the allocentric and also in the egocentric navigation when a sequence of places has to be learnt to arrive to one goal location. However, it is unknown which strategy is the dentate gyrus hippocampal region good for. We found that this region was critical when a goal-guided spatial task required flexibility using a chemogenetic inhibition approach in mice. In addition, dentate gyrus was not necessary for the learning of trajectories to the goal. Bearing this in mind, we are now analyzing the navigation strategies mice with or without dentate gyrus inhibition used to reach their goal. We speculate the dentate gyrus could be a core of the hippocampal system for allocentric navigation.

D-067 | Chronic preadolescent treatment with methylphenidate affects the motor-stimulating effects of ethanol in adulthood in a mouse model of Attention-Deficit/Hyperactivity Disorder

Cognition, Behavior, and Memory

Author: Fabrizio Stanglino | Email: fstanglino@mi.unc.edu.ar

Fabrizio Stanglino1°2°, Roberto Sebastian Miranda Morales1°2°, María Gabriela Paglini1°3°, Florencia Dadam1°2°

1° Instituto de Investigación Médica Mercedes y Martín Ferreyra, INIMEC-CONICET-UNC

2° Facultad de Psicologia, Universidad Nacional de Córdoba

3° Instituto de Virología "Dr. José María Vanella" , In.Vi.V.-CONICET-UNC

Actually, 2 billion people globally consume or abuse alcohol, causing 3.2% of deaths. Attention-Deficit/Hyperactivity Disorder (ADHD), the most common behavioral disorder in childhood, affects around 4% of children and impacts their social and academic functioning. The psychostimulant methylphenidate (MTPH) is the most commonly treatment for ADHD. Given MTPH's amphetamine-like pharmacodynamics and the influence of early substance use on addiction risk, chronic MTPH use during childhood or adolescence may increase the likelihood of substance abuse in adulthood. We studied the effects of chronic MTPH treatment during childhood/adolescence on ethanol motor-stimulating effects in adulthood in an ADHD animal model. We used p35KO transgenic mice and wild-type (WT) controls, both chronically treated with MTPH from postnatal days 21-31 and tested for ethanol-induced stimulation and sensitization in adulthood. We found that p35KO-CON and MTPH treated mice exhibited ethanol-induced stimulation only after 14 days of repeated exposure, without developing sensitization, unlike the WT controls. However, only p35KO-MTPH-treated mice exhibited a sustained stimulant effect.

In conclusion, our study underscores the critical role of the Cdk5/p35 complex in ethanol stimulant response. Also, we demonstrate that chronic psychostimulant treatment during preadolescence leads to a loss of the sensitization phenomenon, suggesting that prolonged MTPH treatment may pose a potential risk of addiction.

D-068 | Gene Therapy with Insulin-like Growth Factor 1 in Hippocampal Astrocytes of Aged Rats

Cognition, Behavior, and Memory

Author: Ana Abril Vidal Escobedo | Email: avidalescobedo@med.unlp.edu.ar

Ana Abril Vidal Escobedo1°, Facundo Peralta1°, Julia Emilia Alejandra Díaz Baliero1°, Candela Mutuberría1°, Joaquín Pardo1°, Paula Cecilia Reggiani1°

1° Instituto de Investigaciones Bioquímicas de La Plata `Prof. Dr. Rodolfo R. Brenner´ (CONICET-UNLP)

Aging is associated with numerous anatomical, physiological and gene expression alterations in the hippocampus, a key structure for memory. In this region, astrocytes are fewer, smaller, and have shorter and sparser branches. We hypothesize that overexpression of Insulin-like Growth Factor 1 (IGF1) in hippocampal astrocytes of aged rats will modulate their trophic functions, leading to positive effects on behavior. Previously, we analyzed astrocyte arborization in 2-month-old male Sprague-Dawley (SD) rats transduced with a bicistronic adeno-associated virus (AAV) overexpressing IGF1 or GFP (a control vector expressing green fluorescent protein), followed by red fluorescent protein tdTomato (a marker gene for visualizing transduced cells) under an astrocyte-specific promoter. Morphometric analysis of astrocytes from AAV-IGF1-injected rats showed significant increases in arborization and extension length compared to controls. With this system, we aim to evaluate if IGF1 overexpression in astrocytes improves behavior in aged rats. Female SD rats aged 20 months were used, divided into Intact and IGF1 groups. Six weeks before sacrifice, behavioral tests to assess species-typical, exploratory, anxiety-like, depressive-like behaviors, and recognition memory were performed. Preliminary results indicated that aged rats treated with AAV-IGF1 improved its behavior and cognitive performance. Thus, IGF1 overexpression in astrocytes improved certain deteriorated behaviors in aged rats.

D-069 | Activity of connexin 43 (Cx43) hemichannels in astroglial cells in an animal model of post-traumatic stress disorder

Cognition, Behavior, and Memory

Author: Franco Antonio Vittorelli | Email: fvittorelli@mi.unc.edu.ar

Franco Antonio Vittorelli1°2°, Melisa Riva Gargiulo1°2°, Martina Ramires1°2°, Francisco Moreno1°2°, Yordan Lemunao-Inostroza3°, Jimmy Stehberg3°, Gastón Diego Calfa1°2°, Crhistian Luis Bender1°2°

1° Instituto de Farmacología Experimental de Córdoba - CONICET. Facultad de Ciencias Químicas

2° Departamento de Farmacología Otto Orsingher, Universidad Nacional de Córdoba, Argentina

3° Laboratorio de Neurobiología, Instituto de Ciencias Biomédicas, Universidad Andrés Bello, Santiago, Chile

Post-traumatic stress disorder (PTSD) is a psychiatric illness that develops after a person is exposed to an extremely stressful event. It can be understood as maladaptive responses due to deregulation of the fear and anxiety brain circuits, in which the amygdala and hippocampus play a fundamental role. Astrocytes are known to have an active role in synaptic function, with the release of gliotransmitters being a critical aspect of the functioning of tripartite synapses. Recent experimental studies demonstrated the role played by astrocytic Cx43 hemichannels in the release of gliotransmitters and their participation in emotional processing. The aim of this research was to evaluate the functionality of astrocytic Cx43 hemichannels in a model of post-traumatic stress, known as single prolonged stress (SPS). This is a multimodal stress protocol that includes a sequential application of three stressors (restraint, forced swimming, and exposure to ether vapors) during a single session. In this work, we applied SPS to adult mice and then measured hemichannel activity through an ethidium bromide uptake assay in ex vivo tissue. For staining validation, we assessed bromide uptake in the presence of a synthetic peptide, which selectively blocks Cx43 hemichannels. GFAP immunohistochemistry was used to identify astroglial cells. Changes in Cx43 hemichannel activity in astrocytes might represent a novel mechanism in PTSD and a new target for pharmacotherapy.

D-070 | Transfer effects of a mindfulness training program on social cognition and executive functioning in preschoolers. Preliminary results

Cognition, Behavior, and Memory

Author: MARÍA LUCÍA ZABALA | Email: lu_zabala@live.com

MARÍA LUCÍA ZABALA1°3°, MARÍA JOSÉ AGUILAR1°2°3°, MARCELA CAROLINA LÓPEZ1°3°, MARÍA MARTA RICHARD´S1°2°3°

1° IPSIBAT (Instituto de Psicología Básica, Aplicada y Tecnología UNMDP-CONICET)

2° CONICET (Consejo Nacional de Investigaciones Científicas y Técnicas)

3° Facultad de Psicología (Universidad Nacional de Mar del Plata)

Mindfulness is the ability to attend to the present moment without judgment, with openness and acceptance towards experience. Mindfulness-based intervention programs are the subject of numerous studies that show strong evidence of their impact on mental health, stress management and depression in clinical populations. Concurrently, another approach examines the effects of mindfulness training programs aimed at children in educational contexts evaluating their impact on academic and socio-emotional performance. This paper presents a study that evaluated the impact of a mindfulness training program and its short- and long-term transfer effects on social cognition and executive functioning in preschoolers. An experimental design with an active control group was implemented in a sample of 90 preschoolers from public and private institutions. Theory of mind, emotional recognition, cognitive flexibility and inhibition were evaluated. Preliminary results for transfer effects on emotion recognition revealed statistical significance in both within and between-subject contrasts ($p=.03$; $p=.05$), indicating that the intervention improved this ability in preschoolers attending private institutions, while no intervention effects were found in public schools. It is hypothesized that the context of program implementation—systematicity, disposition and resources—as well as the socio-educational level of the participants might influence the effectiveness of such programs.

D-071 | Zika virus infection of trophoblast cells hinders their ability to modulate the viability and metabolism of neural progenitor cells

Development

Author: Mathias Chemen | Email: mathias.chemen@yahoo.com.ar

Mathias Chemen1°2°, Soledad Rodriguez-Varela3°, Daiana Rios1°, Valentina Tacchino1°2°, Fatima Merech1°, Vanesa Hauk1°, Claudia Pérez Leirós1°, Leonardo Romorini3°, Cybele García2°, Daiana Vota1°

1° Laboratorio de Inmunofarmacología. Instituto de Química Biológica de la Facultad de Ciencias Exactas y Naturales (IQUIBICEN), CONICET-Universidad de Buenos Aires, Buenos Aires, Argentina

2° Laboratorio de Estrategias Antivirales. Instituto de Química Biológica de la Facultad de Ciencias Exactas y Naturales (IQUIBICEN), CONICET-Universidad de Buenos Aires, Buenos Aires, Argentina

3° LIAN-CONICET, Fundación FLENI

The placenta is an endocrine and metabolic fetal organ that contributes to fetal brain development. Zika virus (ZIKV) infection during early pregnancy is associated to adverse pregnancy outcomes including neurological disorders at or after birth. We aim to investigate the impact of first trimester trophoblast-derived (Tb) cells ZIKV infection on the viability and survival of human neural progenitor cells. First trimester Tb-derived cell line Swan-71 (Tb) was infected or not with a local ZIKV isolate for 8h to obtain Tb-conditioned media (CMTbZ/CMTb). Neural progenitor cells (NPs) derived from human embryonic stem cells were stimulated with CMTb or CMTbZ for 24h and metabolic and viability parameters were analyzed. Apoptosis, ROS production, long chain fatty acid (LCFA) and lipid droplet (LD) accumulation was measured by flow cytometry using a specific fluorescent Annexin V/IP kit or DCFH-DA, BODIPY FL C12 and BODIPY 493/503 fluorescent dyes, respectively. BDNF and CPT1 gene expression were measured by RT-qPCR. CMTb induced an increase in LCFA uptake and the gene expression of CPT1($P<0.05$), the rate-limiting enzyme in the fatty acid β-oxidation. Moreover, CMTb protected NPs from apoptosis and decreased ROS production. Interestingly, this regulatory effect of Tb cells was not observed when NPs were cultured with CMTbZ.

These results suggest that ZIKV infection of first trimester Tb cells hinders their ability to modulate the viability and metabolism of neural progenitor cells.

D-072 | Alterations in adrenal glands, stress response and behavior in juvenile rat offspring exposure to infant maltreatment

Development

Author: Ailen Alba Colapietro | Email: ailencolapietro@gmail.com

Ailen A. Colapietro1°, Jazmín Grillo Balboa1°, Eleonora Regueira2°, Gladys N. Hermida2°, Verónica Cantarelli3°, Marina Ponzio3°, María Eugenia Pallarés1°, Silvina L. Diaz4°, Marta C. Antonelli1°

1° Laboratorio de Programación Perinatal del Neurodesarrollo. Instituto de Biología Celular y Neurociencias "Prof. E. De Robertis". Facultad de Medicina. Universidad de Buenos Aires. Buenos Aires, Argentina.

2° Laboratorio Biología de Anfibios e Histología Animal, Departamento de Biodiversidad y Biología Experimental. Facultad de Ciencias Exactas y Naturales. Universidad de Buenos Aires. Buenos Aires, Argentina.

3° Instituto de Investigaciones en Ciencias de la Salud, Facultad de Ciencias Médicas. Universidad Nacional de Córdoba. Córdoba, Argentina.

4° Laboratorio de Neurogénesis Experimental. Instituto de Biociencias, Biotecnología y Biología Traslacional. Facultad de Ciencias Exactas y Naturales. Universidad de Buenos Aires. Buenos Aires, Argentina.

Chronic stressful conditions such as adverse parental care during early stages of development impact on an individual's health and the way they cope with stressful situations later. Consequently, the alteration of the capacity to cope with subsequent stressors, heightens vulnerability to the development of psychopathologies. In this study, we take advantages of the scarcity-adversity model (SAM) from postnatal days (PND) 8 to 12 in rats to investigate the impact of adverse care conditions on the adrenal glands, stress response and behavior phenotype at juvenile age (PND 21-35). SAM offspring presented histological alterations in the adrenal glands accompanied by greater reactivity to acute stress. At the behavioral level, higher sucrose consumption, more unsupported exploratory behaviors, a passive response in the forced swim and deficient spatial memory were observed in SAM offspring. At the biochemical level, we are analyzing the Brain-derived neurotrophic factor (BDNF) pathway in the hippocampus

of offspring, using the Western blot technique. So far, the results obtained in the ventral region of the hippocampus do not show significant protein variations between the experimental groups; however, we will continue exploring the dorsal region. In conclusion, our findings will contribute to characterize the pre-pubertal period, underscoring the significance of early intervention strategies in mitigating the progression towards psychopathological outcomes in adulthood.

D-073 | Effects of bisphenol A (BPA) during neural development using Xenopus laevis as a model

Development

Author: Maria Belen Favarolo | Email: mfavarolo@fmed.uba.ar

M. Belen Favarolo1°, Micaela Garcia1°, Mariana Holubiec1°, Matias J. Garavaglia2°, Silvia L. Lopez1°

1° Instituto de Biología Celular y Neurociencias “Prof. E. De Robertis” (IBCN). Universidad de Buenos Aires, Facultad de Medicina (UBA-CONICET).

2° Instituto de Biotecnología. Universidad Nacional de Hurlingham.

Neural induction occurs during gastrulation, when germ layers (ectoderm, mesoderm, and endoderm) arise. The neural tube develops from the induced neural ectoderm, where neurogenesis gives rise to neurons in a temporal and spatial orchestrated way. The Notch pathway, highly conserved through the animal kingdom, is a key player during neurogenesis, acting through lateral inhibition to prevent equipotent cells from simultaneously adopting the neuronal fate. Notch is a single-pass membrane receptor that, upon interaction with specific ligands presented by neighboring cells, undergoes sequential cleavages. In the last one, γ-secretase releases the Notch intracellular domain, which translocates to the nucleus, leading to transcriptional activation of target genes. Bisphenol A (BPA) is widely used to produce polycarbonate plastics. It is being recognized as an endocrine disruptor and related to perturbations of embryonic development. It was proposed as a γ-secretase inhibitor causing malformations in Xenopus laevis tadpoles. However, there is no previous work studying BPA exposure during early stages of development including neural induction. Here, we found that early exposure of X. laevis embryos to BPA delays neural plate folding and increases the density of differentiated neurons at neurula stage. Later consequences of early BPA exposure in tadpoles include microcephaly, shorter distance between eyes, misplacement of neural crest derivatives, and a shorter cephalo-caudal axis.

D-074 | Binge-like ethanol intake at adolescence alters sensitivity to the effects of the drug at adulthood

Development

Author: Camila Ravasi | Email: cravasi@mi.unc.edu.ar

Camila Ravasi1°, Pedro Peñalver Abed1°, Leonardo Marengo2°, Agustín Salguero2°, Ricardo Pautassi1°2°

1° Facultad de Psicología, Universidad Nacional de Córdoba, Córdoba, Argentina

2° Instituto de Investigación Médica M. y M. Ferreyra, INIMEC-CONICET-UNC, Córdoba, Argentina.

Binge drinking is associated with a higher risk of developing alcohol use disorders. Studies of our lab reported that binge drinking in adolescent Wistar rats increases alcohol intake in adulthood. This study explored the mechanisms behind this effect. It assessed if adolescent binge drinking influences sensitivity to alcohol-induced intoxication and abstinence in adulthood, and its association with compulsive and anxiety-like behaviors. Wistar rats were exposed (or not) to binge ethanol drinking at postnatal days 25-45 (PDs 25-45; nine 2-hour sessions with access to 8-10% ethanol). In adulthood, they were subjected to alcohol or vehicle administration (PDs 61-65; 3 intragastric doses of 1.5 g/kg per day for 5 days), and signs of alcohol intoxication (PD's 61-65) and withdrawal (PDs 62-71) were assessed. Compulsive and anxiety-like behaviors were evaluated using the Light-Dark Box, Elevated Plus Maze and Marble Burying tests (PDs 66-68). Wistar rats exposed to binge drinking at adolescence exhibited lower levels of alcohol intoxication signs compared to controls ($p=0.01$). Alcohol exposure in adulthood induced withdrawal ($p<0.001$) and alterations in anxiety patterns ($p=0.08$), regardless of adolescent exposure. The results suggest that adolescent binge drinking decreases sensitivity to the behavioral effects of alcohol in adulthood, possibly due to the development of tolerance. This highlights the need to further prevent early alcohol onset and binge drinking at adolescence.

D-075 | Role of Islet transcription factors in the development of the mouse and frog pineal gland

Development

Author: Ricardo Daniel Romero Marin | Email: naft.rromero@gmail.com

Ricardo Daniel Romero Marin1°, Ángeles Amette Estrada1°, M. Cecilia Cirio1°, Flávio S J de Souza1°

1° Instituto de Fisiología, Biología Molecular y Neurociencias, CONICET

The pineal gland, a small cerebral structure responsible for nocturnal melatonin secretion, exhibits remarkable morphological and cellular diversity among different vertebrates. While the pineal is a fairly simple neuroendocrine structure in mammals, in anuran amphibians the pineal complex includes the frontal organ, a structure derived from the pineal primordium that exhibits photoreceptor capabilities. Transcription factors involved in mouse pineal development include Pax6, Otx2, Crx and Lhx9, but the function of the Islet (Isl) transcription factors in the pineal remains unexplored. This family, composed of Isl1 and Isl2, is present in all vertebrates and encodes highly similar LIM-homeodomain proteins. In the present study, we have characterised Islet expression in the pineal of developing mouse embryos and in early and late stage Xenopus laevis larvae by immunofluorescence. We found that Islet is expressed in differentiating pinealocites in both species, where is colocalises with developmental factors like Pax6 as well as markers of melatonin synthesis, like serotonin and tryptophan hydroxylase. Remarkably, Islet is also expressed in the frontal organ of the late frog larva, suggesting that Islet factors might be involved in the development of photoreceptor, as well as neuroendocrine, functions of the vertebrate pineal complex.

D-076 | Exploring the impact of ageing on brain structural connectivity: A graph theory approach on a local population sample

Development

Author: Mariana Nahir Vallejo-Azar | Email: mvallejoazar@unaj.edu.ar

Mariana Nahir Vallejo-Azar1°, Julieta Laura Rodríguez Valdivia3°, Juana Irene Murray3°, Tomás Picone3°, Juan Ignacio Navarro3°, Victoria Sosa Espinosa3°, María Agustina Lago3°, Paula Natalia Gonzalez1°, Mariana Bendersky1°2°

1° Unidad de Estudios en Neurociencias y Sistemas complejos (ENyS, CONICET- UNAJ-Hospital SAMIC El Cruce)

2° Facultad de medicina, UBA

In recent years, studies have explored brain connectivity across different life stages. This study aimed to analyze changes in the global topology of the structural connectivity network with age in a local population. Structural MRI of 150 healthy volunteers (51 males and 99 females, age: 43.87±16.21 years) were acquired in a 3T scanner. Weighted connectivity matrices and topological measures were obtained using fiber number. Biological ages of subjects were assessed. A combined approach using Diffusion Weighted Imaging (DWI) and graph theory was applied. Linear models evaluated the effects of age and sex on the measures. Participants were divided into 10-year age intervals, and a Kruskal-Wallis test investigated differences among these groups. This method identified age intervals where topology is influenced by age. Most topological measures showed a significant decline with advancing age, except for path length, which increased. A notable impact on network topology was observed starting at age 61. The age interval of 71-90 years exhibited characteristics similar to those of the 61-70 years interval. The density of connections remained stable, likely due to high variability within each interval. Additionally, sex did not influence topological measures or ageing. Connectivity weighted by the number of fibers was sensitive to age-related changes, with ageing linked to a network with less efficiency, slower communication, greater vulnerability to injuries, and reduced redundanc

D-077 | Exploring the effect of neurodegeneration and cardiovascular risk factors in white matter hyperintensities burden across dementias

Disorders of the Nervous System

Author: Florencia Altschuler | Email: faltschuler@udesa.edu.ar

Florencia Altschuler1°, Verónica Canziani1°, Agustín Ibañez2°, Vicente Medel1°3°, Cecilia González Campo

1° Cognitive Neuroscience Center (CNC), Universidad de San Andrés, Buenos Aires, Argentina

2° Latin American Brain Health Institute (BrainLat), Universidad Adolfo Ibañez, Santiago, Chile

3° Consejo Nacional de Investigaciones Científicas y Técnicas (CONICET)

White matter hyperintensities (WMH) are usually interpreted as a sign of small vessel disease. However, recent studies suggest that neurodegeneration may also play an important role in its pathophysiology. Our goal is to identify and quantify the portion of WMH attributable to cardiovascular factors or neurodegeneration. For this, we will use a multimodal approach analyzing sociodemographic, neuroimaging, and clinical data from the ReDLat consortium, comprising dementia patients (Alzheimer's disease [AD], frontotemporal dementia [FTD]) and healthy older adults from 10 Latin America. Statistical analyses will include multiple regression models and structural equation modeling, to explore the effects of neurodegeneration and cardiovascular risk factors (such as body mass index, smoking and blood pressure) in white matter hyperintensities burden across dementias and healthy aging.

D-078 | Study of the neural circuits underlying different symptoms of Parkinson's disease in Drosophila melanogaster

Disorders of the Nervous System

Author: Soledad Yamila Barrientos Eduards | Email: barrientoseduards@gmail.com

Soledad Yamila Barrientos Eduards1°, Lucia Roncoroni1°, Gustavo Ezequiel Perez1°, Sebastian Risau Gusman1°, Diana Lorena Franco1°

1° 1- Medical Physics Department, Centro Atómico Bariloche, CNEA-CONICET, Bariloche, Argentina

Parkinson's disease (PD) is the second most common neurodegenerative syndrome affecting millions of people worldwide. It is characterized by motor and non-motor symptoms that affect the quality and life expectancy of patients. In fact, there are non-motor symptoms that develop even before the onset of classic motor problems, such as REM sleep behavior disorder (RBD), characterized by loss of muscle atonia during the REM sleep phase. Notably, 90% of people with RBD eventually develop PD, making RBD an early indicator of PD. The origin of these symptoms is considered to be the neurodegeneration of dopaminergic neurons of the substantia nigra compacta (DA-SNc) and the most frequent treatment is the administration of dopamine derivatives (L-DOPA). This treatment is only able to relieve a limited number of motor symptoms. In this project we postulate that L-DOPA-resistant PD symptoms may originate from neurodegeneration across multiple brain regions and associated circuit dysfunctions. Drosophila melanogaster is a good model to study PD because it can recapitulate key characteristic of the disease. To gain insights of the neuronal circuits that are underlying of locomotor defects and movements disorder during REM sleep we will deregulate genes associated with PD and RBD in sleep circuits and will evaluate defects in locomotor activity, sleep architecture and neurodegeneration in young and adult flies. These experiments aim to give insights into lesser-studied symptoms of PD.

D-079 | Unraveling the glial response after striatal dopaminergic denervation through single nuclei RNA sequencing

Disorders of the Nervous System

Author: Melina Paula Bordone | Email: melina_bordone@yahoo.com

Melina Bordone1°, Claudio Schuster2°, Chang Li3°, Yogita Sharma3°, Jenny Johansson3°, Anna Hammarberg3°, Marcelo Marti2°, Angela Cenci3°, Juan Ferrario

1° Instituto de Biociencias, Biotecnología y Biología Traslacional (iB3), Facultad de Ciencias Exactas y Naturales, Universidad de Buenos Aires, Argentina.

2° IQUIBICEN, Facultad de Ciencias Exactas y Naturales, Universidad de Buenos Aires, Argentina.

3° Department Experimental Medical, Science, Wallenberg Neuroscience Center, Lund University, Sweden

The striatum is a complex brain region essential for motor function that is mainly affected by dopaminergic denervation in Parkinson's disease (PD). The aim was to perform single nuclei RNA sequencing from striata of intact and hemiparkinsonian mice at early and chronic stages of dopaminergic denervation to obtain cell-type specific transcriptional profiles. For this, unilateral 6-OHDA lesions in the mid forebrain bundle were used to model PD. Striata were immediately dissected at 5 or 28 days post lesion (DPL) for nuclei isolation. cDNA libraries were prepared and sequenced from 8500 FACS-sorted nuclei from 4 samples/group using a droplet-based RNA sequencing technology (10X Genomics). Data were first preprocessed to generate high quality expression matrices for each sample, and then integrated into a single one containing 46955 nuclei that were clustered and annotated based on the expression of well-established mRNA markers. Using DESeq2 we perform a pseudobulk analysis to obtain differentially expressed genes for each cluster and treatment comparison. A massive transcriptional response was observed at 5DPL in dSPNs, iSPNs, microglia, astrocytes, OPCs and oligodendrocytes. Notably, while in glial cells it ceased at 28DPL, in neurons it progressed specially in dSPNs. This is the first transcriptomic study at single cell level on the time course of a 6-OHDA lesion addressing the contributions of different striatal cell types, with special focus on glial cells.

D-080 | CYP46 in Brain Inflammation: A Link to Alzheimer's Risk

Disorders of the Nervous System

Author: Gabriel Cataldi | Email: gcataldi@immf.uncor.edu

Gabriel Cataldi1°, Mauricio Martin1°

1° Laboratory of Cellular and Molecular Neurobiology, INIMEC CONICET, Universidad Nacional de Córdoba

Cholesterol 24-hydroxylase (CYP46) catalyzes the hydroxylation of cholesterol to 24(S)-hydroxycholesterol [24(S)HOC], the main mechanism of cholesterol elimination from the brain. While CYP46 is primarily expressed in neurons, its expression increases in astrocytes under pathological conditions like traumatic brain injury or Alzheimer's disease. We found that CYP46 levels are significantly elevated in reactive astrocytes treated with lipopolysaccharide (LPS) or proinflammatory cytokines (IL-6, IL-1β, TNFα). Additionally, CYP46 transcription is induced by H_2O_2, suggesting that reactive oxygen species (ROS) generated by LPS drive CYP46 expression. Supporting this, NAC, a potent antioxidant, prevents LPS-induced CYP46 expression.

Furthermore, IL-6 enhances amyloid precursor protein (APP) synthesis in rat astrocytes, and this effect is CYP46-dependent, as inhibiting CYP46 reduces IL-6-induced APP production. 24(S)HOC-treated astrocytes show increased APP levels, with transcriptional origins. 24(S)HOC also enhances APP processing, leading to APP-CTF fragments, potential precursors of amyloid beta.

Finally, LPS-treated reactive astrocytes accumulate cholesterol, likely increasing 24(S)HOC production. This suggests that under proinflammatory conditions, astrocytes may elevate APP synthesis and processing through a mechanism involving both CYP46 and increased cholesterol metabolism, potentially predisposing to Alzheimer's disease.

D-081 | GERANIOL PROTECTS AGAINST OXIDATIVE STRESS AND PROTEOTOXICITY IN C. ELEGANS PARKINSON'S DISEASE MODELS

Disorders of the Nervous System

Author: MARIA JOSE DE ROSA | Email: mjderosa@criba.edu.ar

Stéfano Romussi1°2°, Natalia Andersen1°2°, Sofía Ibarguren2°, Diego Rayes1°2°, María José De Rosa1°2°

1° Instituto de Investigaciones Bioquímicas de Bahía Blanca (INIBIBB-CCT BAHIA BLANCA UNS-CONICET)

2° Departamento de Biología, Bioquímica y Farmacia (UNS)

The rise in life expectancy has led to an increase in age-related disorders, including neurodegenerative diseases (ND). Oxidative stress (OS) plays a crucial role in the progression of these conditions. For instance, in Parkinson's disease (PD), impaired free radical scavenging results in α-synuclein (α-syn) aggregation and subsequent proteotoxic damage. Geraniol (GER), a plant-derived essential oil, is well-known for its potent antioxidant properties. Given the association between OS and ND, antioxidant compounds are attractive as potential therapeutic agents.

In this study, we investigated the effects of GER in C. elegans models of PD, where α-syn is expressed either in muscle or dopaminergic neurons. Our findings show that GER treatment improves locomotion, reduces α-syn accumulation, and protects dopaminergic neurons from degeneration. Thus, these results demonstrate GER's protective effect against proteotoxicity caused by α-syn aggregation.

Additionally, GER enhances OS resistance in C. elegans. To further explore GER's protective mechanisms, we analyzed null mutants in key OS-related pathways. Our results indicate that the transcription factors SKN1/NRF2 and HSF1 play crucial roles in mediating GER's antioxidant effects. Preliminary data also suggest that GER may modulate autophagy, contributing to its neuroprotective actions.

In conclusion, this work demonstrates the potential anti neurodegenerative effects of GER in vivo, which should be validated in other models.

D-082 | Concomitant Treatment with Microfluidic-Assisted Tadalafil- and Paclitaxel-Loaded Polymeric Micelles Enables Dose Reduction and Enhances Cytotoxicity Against Glioblastoma Multiforme

Disorders of the Nervous System

Author: Luciano Fiore | Email: lfiore@fmed.uba.ar

Luciano Fiore1°2°, Noelia Anahi Soria1°2°, Greta Bolzi1°2°, Julia Gallino1°2°, Irina Muntaabski1°2°, Rodrigo Lloyd1°2°, Paola Rojas3°, Diego Chiappetta4°, Marcela Moretton4°, Patricia Gargallo5°, Biscochea D5°, Guevara M5°, Bastianello M5° and Policastro L1°2°

1° Laboratory of Nanomedicine, Comisión Nacional de Energía atómica (CNEA), Av. General Paz 1499, B1650KNA, San Martín, Buenos Aires, Argentina.

2° Instituto Nanociencias y Nanotecnología, Comisión Nacional de Energía atómica (CNEA), Av. General Paz 1499, B1650KNA, San Martín, Buenos Aires, Argentina

3° Laboratory of Hormonal Carcinogenesis, Instituto de Biología y Medicina Experimental (IBYME CONICET), Buenos Aires, Argentina.

4° Instituto de Tecnología Farmacéutica y Biofarmacia (InTecFyB), Universidad de Buenos Aires, Buenos Aires 1113, Argentina.

5° Centro de Educación Médica e Investigaciones Clínicas “Norberto Quirno” (CEMIC). Argentina.

Polymeric micelles (PMs) are nanosized carriers for delivering hydrophobic drugs, like paclitaxel (PX). Multi-drug combinations have gained traction to enhance PX therapeutic efficacy. Tadalafil (TD), have demonstrated immunomodulatory activity in combination with checkpoint inhibitors. Thus, combining TD with PX may reduce the chemotherapy dose needed to achieve a therapeutic response. This study aimed to evaluate the in vitro performance of PX-loaded and TD-loaded PM based on co-polymer of mPEG-PCL and produced by microfluidic (MF). These PMs were characterized in size, polydispersity index (PDI), stability, drug concentration and release. Furthermore, PMs performed by MF were compared to the commercially available formulation Abraxane®, as well as with PMs prepared using conventional methods (CM). Globally MF PMs exhibited an

average size of 92,855 ± 1,330 and a narrow PDI. In vitro assays revealed that PX-loaded PMs produced by MF exhibited higher antitumor activity compared to PX-loaded PM performed by CM in the glioblastoma multiforme (GM) cell line U251 and a primary culture of GM. Moreover, the concomitant treatment with MF-based PX and TD PMs resulted in a significant increase in cytotoxicity at lower doses for both cell lines. Overall, these findings confirmed that PMs produced through MF exhibit superior performance compared to CM PX-loaded PMs, presenting an attractive alternative for the development of novel nanosized carriers for anticancer therapy.

D-083 | Expression of human TDP-43 leads to behavioral abnormalities and altered neuronal activity in a Drosophila model of ALS/FTD.

Disorders of the Nervous System

Author: Azul Denise Galo | Email: azu.galo@gmail.com

Azul Denise Galo1°2°, Lautaro Duarte3°, Florencia Vassallu1°2°, Vinicius Bongiovanni1°2°, Pablo Bochicchio4°, Diego Hernán Bodin4°, Nicolas Pírez3°, Maximiliano Katz1°2°, Lionel Muller Igaz1°2°

1° Universidad de Buenos Aires, Facultad de Ciencias Médicas, Departamento de Ciencias Fisiológicas. Buenos Aires, Argentina.

2° CONICET - Universidad de Buenos Aires. Instituto de Fisiología y Biofísica Bernardo Houssay (IFIBIO Houssay). Buenos Aires, Argentina.

3° Universidad de Buenos Aires (UBA), Facultad de Ciencias Exactas y Naturales, Departamento de Fisiología, Biología Molecular y Celular and CONICET-UBA, Instituto de Fisiología, Biología Molecular y Neurociencias (IFIBYNE), Buenos Aires, Argentina

4° Universidad de Buenos Aires (UBA), Facultad de Ciencias Exactas y Naturales, Departamento de Biodiversidad y Biología Experimental, Laboratorio de Neuroetología de Insectos. Buenos Aires, Argentina

Alterations of the nuclear protein TDP-43 are hallmark features of the neurodegenerative diseases amyotrophic lateral sclerosis and frontotemporal dementia. TDP-43 is an evolutionary conserved nuclear protein with multiple cellular functions, most notably related to RNA metabolism. However, its role in the regulation of neuronal activity is less studied. We have shown in mice that inducible expression of cytoplasmic human TDP-43 (hTDP-43-ΔNLS) in forebrain neurons recapitulates several features of TDP-43 proteinopathies. In this study, we used *Drosophila* models expressing hTDP-43-ΔNLS to evaluate a) locomotion in flies expressing hTDP-43-ΔNLS in the mushroom bodies (MBs); b) evoked neuronal activity through calcium imaging experiments in the antennal lobe (AL) olfactory receptor neurons (ORNs) and c) accumulated neuronal activity in MBs and ALs using the calcium reporter CalexA. Using a custom-made behavioural tracking software, we assessed locomotor activity in non-transgenic Control or MB-expressing hTDP-43-ΔNLS flies. Both males and females mutant flies showed

altered distance travelled respect to Controls, although with different age-dependent phenotypes. Using the calcium indicator Gcamp6f, we showed that ORN activity from hTDP-43-ΔNLS flies was not altered, while the CalexA experiments revealed reduced activity in both ALs and MBs. Our results underscore the utility of using multiple, phylogenetically distant organisms to model complex human neurological diseases.

D-084 | RNAseq analysis of patient-induced pluripotent stem cells-derived cortical neurons uncovers commonly dysregulated genes in familial Alzheimer's disease.

Disorders of the Nervous System

Author: Luciana Isaja | Email: lucianaisaja@gmail.com

Luciana Isaja1°, Mercedes Vautier1°, Sofía Mucci1°, Soledad Rodríguez Varela1°, Giulia Clas1°, Diego García Chialva1°, María Elida Scassa1°, Gustavo Emilio Sevlever1°, Ezequiel Ignacio Surace1°, Leonardo Romorini1°

1° Instituto de Neurociencias (FLENI-CONICET)

Autosomal dominant Alzheimer's disease (AD) is mainly caused by pathogenic variants in three genes: amyloid precursor protein, presenilin 1 and 2 (PSEN1-2). We previously demonstrated that cortical neurons derived from the human induced pluripotent stem cells (hiPSCs) line FFAD1 carrying the PSEN1 p.T119I variant exhibited AD pathological features (e.g. increased Tau phosphorylation at Thr231) compared to PSEN1 WT hiPSCs (UOW002iA)-derived neurons. Here, we performed an RNA-Seq assay to analyze differences between the transcriptome of cortical neurons derived from both FFAD1 and UOW002iA lines. We identified 85 differentially expressed (DE) genes: 34 downregulated and 51 upregulated. Gene ontology analysis revealed significant enrichment in genes associated with cellular homeostasis, substance transport and iron homeostasis. We validated 13 DE by RT-qPCR, confirming decreased ACP5, ICAM4, NOS3, TUBA4A, TMEM87B, HSPA6 and increased PROKR2, RGDP2, ADAMTS15, THSD1, TRP6, GPD1 and GRIN2A mRNA expression levels in FFAD1-derived neurons. Additionally, by RT-qPCR, we determined that in cortical neurons derived from hiPSCs harboring the PSEN1 p.A246E variant, TUBA4A, NOS3, ACP5, TRPC6, THSD1, GPD1 and PROKR2 mRNA expression levels showed the same expression trends as observed in FFAD1 derived-neurons when compared to PSEN1 WT derived-neurons. These results might provide valuable insights into common pathways driving disease progression in hereditary AD.

D-085 | Neuroprotection through environmental enrichment in severe perinatal asphyxia: Correlation between morphological and behavioral markers in the murine cerebellum

Disorders of the Nervous System

Author: Tamara Kobiec | Email: tamara.kobiec@gmail.com

Tamara Kobiec1°2°, Marcos D'Ambrósio Andrade2°3°, Claudia Mardaraz2°, Sofía Bordet1°2°, Carlos Kusnier2°, María Malena García1°2°, Juan Pablo Luaces2°, Francisco Capani2°

1° Centro de Investigaciones en Psicología y Psicopedagogía (CIPP), Facultad de Psicología y Psicopedagogía, Pontificia Universidad Católica Argentina, Buenos Aires, Argentina.

2° Centro de Altos Estudios en Ciencias Humanas y de la Salud (CAECIHS.CONICET), Universidad Abierta Interamericana (UAI), Consejo Nacional de Investigaciones Científicas y Técnicas (CONICET), Buenos Aires, Argentina.

3° Facultad de Medicina, Fundación H. A. Barceló, Buenos Aires, Argentina

Perinatal asphyxia (PA) is an obstetric complication characterized by an interruption in oxygen supply around the time of birth, which affects the development of the nervous system. Environmental enrichment (EE) is an animal housing paradigm that includes different stimulations, and is presented as a promising strategy in PA.

A severe PA model was conducted with Sprague Dawley rats, following Bjelke et al. (1991). The rats were housed in standard (ST) or enriched environment cages (EE). Control (CTL-ST and CTL-EE) and asphyxiated groups (PA-ST and PA-EE) were established.

GFAP localization was analyzed in coronal sections of the cerebellum using immunohistochemistry. In the molecular layer, a disruption in the pattern of Bergmann glia was observed in the PA, with partial recovery in the EE. In the granular layer, the reactive area was quantified, without significant differences.

Significant differences were found in the righting reflex between PA-ST and CTL-EE, with best performance of CTL. In the walking reflex, significant differences were observed depending on birth status (PA or CTL), with better performance of CTL. In the negative

geotaxis test, significant differences were observed between CTL-EE and PA-ST, with poorer performance of PA. In limb grip strength, significant differences were found between PA-ST and the other groups.

Therefore, the offspring subjected to PA were affected in the development of their nervous system, which could be partially improved by EE

D-086 | Transmission Electron Microscopy analysis of TDP-43-ΔNLS transgenic mice reveal cortical and hippocampal ultrastructural abnormalities

Disorders of the Nervous System

Author: Milagros Lopez | Email: andrmilagroslopez@gmail.com

Milagros Lopez1°2°, Florencia Vassallu1°2°, Laura Caltana3°, Lionel Muller Igaz1°2°

1° Universidad de Buenos Aires, Facultad de Ciencias Médicas, Departamento de Ciencias Fisiológicas. Buenos Aires, Argentina.

2° CONICET - Universidad de Buenos Aires. Instituto de Fisiología y Biofísica Bernardo Houssay (IFIBIO Houssay). Buenos Aires, Argentina.

3° IBCN (CONICET), University of Buenos Aires School of Medicine, Buenos Aires, Argentina

TDP-43 proteinopathy is the primary pathology associated with amyotrophic lateral sclerosis (ALS) and frontotemporal dementia (FTD), indicating that these neurodegenerative diseases may have common underlying mechanisms. We have shown that transgenic (Tg) mice conditionally overexpressing a cytoplasmic form of human TDP-43 protein (TDP-43-ΔNLS) in forebrain neurons replicate key features of FTD/ALS, including altered cognitive, motor and social behaviors. Both changes in plasticity-related gene expression and the behavioral phenotypes can be detected 1 month after Tg induction, before overt neurodegeneration occurs. To assess early ultrastructural features in this model, we performed Transmission Electron Microscopy (TEM) analysis in cortex (Ctx) and hippocampus (Hp) of Tg animals and their non-Tg controls. TEM studies (n=4/genotype) of Ctx and Hp revealed that synaptic density was significantly decreased and synapse length was increased in Tg animals. Synaptic cleft thickness was increased and post-synaptic density thickness was decreased only in the Ctx of Tg mice, revealing differential regional effects in synaptic morphology. Lastly, we analysed mitochondrial density and we found an increase in the Ctx and a decrease in the Hp of Tg animals. These alterations in synaptic density and architecture suggest that TDP-43-ΔNLS mice may exhibit deficits in synaptic transmission and that ultrastructural changes may play a role in the behavioral deficits observed in this model.

D-087 | Cell-type specific transcriptional profiles by snRNAseq in the 6-OHDA mouse model of Parkinson's disease and levodopa induced dyskinesia.

Disorders of the Nervous System

Author: Bárbara Martínez | Email: barbarafmartinezm@gmail.com

Bárbara Martínez1°, Chang Li2°, Yogita Sharma2°, Jenny Johansson2°, Anna Hammarberg2°, Claudio Schuster3°, Marcelo Marti3°, Juan Ferrario1°, Angela Cenci2°, Melina P. Bordone1°

1° Instituto de Biociencias, Biotecnología y Biología Traslacional (iB3), Facultad de Ciencias Exactas y Naturales, Universidad de Buenos Aires, CABA, Argentina.

2° Department Experimental Medical, Science, Wallenberg Neuroscience Center,Lund University, Lund, Sweden

3° IQUIBICEN-FCEN-UBA

The striatum is a complex brain region essential for motor function and the key structure involved in levodopa (L-DOPA)-induced dyskinesia (LID), the main side effect of Parkinson's disease treatment. The aim was to perform a comprehensive transcriptome analysis with cell-type resolution using single nuclei RNA sequencing from striata of intact and hemiparkinsonian mice with or without LID. cDNA libraries from 8500 nuclei/sample were prepared and sequenced using a droplet-based RNA sequencing technology. Data was preprocessed following a standardized pipeline to obtain a single expression matrix for downstream analysis. Good quality nuclei were integrated, clustered and annotated based on well-known genetic markers for striatal cellular types. Using DESeq2 we performed a pseudobulk analysis to obtain differentially expressed genes (DEGs) for each cluster and comparison. DEGs were then used for a gene ontology analysis on biological processes. Notably, in the dyskinetic state the upregulated DEGs in dSPN were associated with lipid metabolism and cytoskeleton reorganization while in iSPN with K+ transport, membrane potential and actin-cytoskeleton organization. Some but minor changes were seen in astrocytes and other cell types that will be discussed in the poster. These results provide new insights into the complex molecular adaptations of the striatal circuitry in LID and allow us to identify cell functions involved in LID which can emerge as possible therapeutic targets.

D-088 | Increased Preictal Activity of Inhibitory Interneurons in Human Temporal Lobe Seizures

Disorders of the Nervous System

Author: Alejandro Nasimbera | Email: alejandro_nasimbera@hotmail.com

Alejandro Nasimbera1°, Santiago Cordisco Gonzalez1°, Demi Brizee2°, Nuria Campora1°, Pablo Seoane1°, Juan Pablo Princich1°, Silvia Jo1°

1° ENYS (CONICET - UNAJ - HOSPITAL EL CRUCE)

2° Oxford University, Oxford, United Kingdom

Epilepsy is characterized by recurring seizures. Surgery can benefit patients with drug-resistant epilepsy if the epileptogenic zone (EZ) is identified. In some cases, invasive studies using intracerebral electrodes are necessary. Our objective was to identify epileptogenic biomarkers in the cortex using single neuron recordings for more precise EZ mapping. Patients who underwent stereo encephalography (SEEG) were included. Electrical activity was recorded with macro-micro intracerebral electrodes in the mesial temporal regions. EZ and propagation areas (PA) were visually identified. Microelectrode signals were filtered between 1-9000 Hz and sampled at 30 kHz. Neuronal spikes were clustered using the Wave_clus algorithm and manually inspected. Units were classified as putative inhibitory or excitatory based on waveform morphology. Firing rates (FR) before and during seizures were computed using LOESS for peak FR estimation, and mixed linear models to analyze changes. We isolated 512 single units from 18 patients in 180 seizures. In the EZ, inhibitory interneurons increased FR 7 seconds before seizure onset ($p<0.01$), while excitatory neurons peaked 4 seconds after onset ($p<0.01$). In PA, both types showed no significant change during onset but peaked 12 seconds after. This suggests inhibitory interneurons' FR increase as a biomarker for EZ localization, improving patient outcomes.

D-089 | Music-based interventions and rhythm processing in a person with traumatic brain injury: single case study.

Disorders of the Nervous System

Author: Marianela Pacheco | Email: marianelapacheco@hotmail.com

Marianela Pacheco1°2°3°4°, Dana Guber4°, Jessica Del Punta4°5°, Gustavo Gasaneo4°6°

1° Universidad Nacional de Córdoba, Córdoba, Argentina

2° Instituto de Ciencias e Ingeniería de la Computación (ICIC), Universidad Nacional del Sur - CONICET, Bahía Blanca, Argentina

3° Universidad Provincial del Sudoeste (UPSO), Bahía Blanca, Argentina.

4° Instituto de Física del Sur, Departamento de Física, Universidad Nacional del Sur, CONICET, 8000 Bahía Blanca, Argentina

5° Departamento de Matemática, Universidad Nacional del Sur, 8000 Bahía Blanca, Argentina

6° Centro Integral de Neurociencias Aplicadas, 8000 Bahía Blanca, Argentina

Traumatic brain injury (TBI) can cause motor, cognitive, sensory and behavioral alterations due to injuries to the central nervous system. Music-based interventions are frequently used in the rehabilitation of people with TBI to improve motor, language, cognitive, affective, and sensory processing functions. This work presents a single case study, focused on describing rhythm processing in a person with severe TBI. An experiment was carried out where the participant had to follow the rhythm of a metronome while percussing with his hand, evaluating his performance at three different moments during the music therapy treatment. Audio analysis was conducted to support clinical assessments. A correlational and longitudinal study was conducted to examine the relationship between the sound generated by the person and the metronome in each instance. The results indicated that music-based interventions favored the acquisition of temporal skills that improved musical performance and rhythm processing.

D-090 ORAL | Galectin-1: A potential therapy for restoring microvascular changes in Alzheimer's Disease

Disorders of the Nervous System

Author: Jessica Lorena Presa | Email: ib.jpresa@gmail.com

Jessica Lorena Presa1°2°, Carlos Pomilio1°2°, Ángeles Vinuesa, M. Eugenia Matzkin1°, Mariano Soiza-Relly4°, Agustina Alaimo3°, Soledad Gori2°, Juan Beauquis1°2°, Gabriel A. Rabinovich1°, Flavia E. Saravia1°2°

1° IBYME-CONICET

2° Depto de Química Biológica, FCEN, UBA

3° INQUIBICEN, UBA-CONICET

4° IFYBINE, UBA-CONICET

Alzheimer's disease (AD) is a major public health challenge, with no cure and increasing prevalence. Vascular changes in AD correlate with disease progression, making them a key target for intervention. Galectins, a family of galactoside-binding proteins, are involved in survival, immune, and vascular pathways. We treated 12 m.o PDAPPJ20 mice, an AD model, with 9 i.p. injections of Gal1 (100 µg/dose) or vehicle. Tg mice showed high vascular amyloid deposits in the hippocampal hilus, a vulnerable region in AD. Gal1 reduced these deposits by 35% ($p<0.05$) without altering vascular density. Astrocyte-endothelial contact, crucial for blood-brain barrier integrity and Aβ clearance, was reduced in Tg mice but restored in Tg-Gal1 mice (lectin staining and GFAP IF). AQP4, an astrocytic endfeet protein necessary for fluid exchange through the BBB, also showed recovery in Tg-Gal1 mice which was diminished in Tg ($p<0.02$) in an array tomography analysis. We also assessed BBB integrity with i.v. Evans blue. Tg-Gal1 mice showed less vascular permeability to the dye than Tg-Veh mice($p<0.05$). In vitro, we used human brain endothelial cells to model the blood-brain barrier. Exposure to 24h of Aβ 1-40 0.1 µM reduced the monolayer's electrical resistance, while Gal1(15 µg/µl) prevented this disruption. Gal1 also mitigated proteostasis alterations in the UPR pathway and proinflammatory activation in endothelial cells caused by Aβ. Our results suggest Gal1 as a potential therapeutic agent for AD.

D-091 | Characterization of Pathologically Remodeled Astrocytes in the Penumbra of Traumatic Brain Injury (TBI)

Disorders of the Nervous System

Author: Sofia Saita | Email: sofiamsaitta@gmail.com

Sofia Saita1°, Milagros Pla1°, Diego Lopez Campos2°, Dante Daniel Gomez Cuautle1°, Maria Belen Cieri1°, Alicia Rossi1°, Alberto Javier Ramos

1° IBCN UBA-CONICET, Facultad de Medicina, Universidad de Buenos Aires

2° Hospital General de Agudos Dr. Cosme Argerich

Astrocytes respond to brain injury through a general process known as reactive astrogliosis. Under circumstances that remain not fully understood, reactive astrocytes can undergo pathological remodeling that contributes to neuronal death. This remodeling involves the downregulation of homeostatic genes and the overexpression of pro-inflammatory mediators. We hypothesized that pathologically remodeled astrocytes are present in the penumbra surrounding the core of traumatic brain injury (TBI), leading to the well-known delayed neuronal death in this region. In this study, we analyzed reactive astrocytes in C57 mice subjected to a stab wound TBI model at 7 days post-lesion (7dpl) to identify phenotypic changes and assess the expression of astroglial proteins essential for homeostatic brain function. Using immunohistochemistry, Nissl staining, Sholl analysis, and image analysis focused on the core/penumbra of TBI, we found that reactive astrocytes in the penumbra, identified by GFAP expression, exhibit distinct morphological changes as shown by Sholl analysis. These altered astroglial morphologies are associated with decreased expression of glutamine synthase (GS) and increased mRNA levels of pro-inflammatory cytokines. Our results indicate that penumbral astrocytes display characteristics of pathologically remodeled cells, suggesting they may serve as potential targets for therapeutic interventions. Grants: PICT 2021-0760/2019-0851; UBACYT; PIP Conicet

D-092 | Role of striatal somatostatinergic interneurons in a model of Parkinson's disease

Disorders of the Nervous System

Author: Agostina Stahl | Email: astahl@fmed.uba.ar

Stahl AM1, Taravini I2 Gomez G3, López Díaz A1, Rela L1, Murer MG1.

1-Instituto de Fisiología y Biofísica Bernardo Houssay (IFIBIO Houssay), UBA-CONICET.

2- Instituto de Ciencia y Tecnología de los Alimentos de Entre Ríos (ICTAER-UNER-CONICET), Universidad Nacional de Entre Ríos, Gualeguaychú, Entre Ríos, Argentina.

3- Department of Psychiatry, University of California, San Diego, La Jolla, CA, United States.

Parkinson's disease (PD) motor symptoms arise after striatal dopaminergic denervation and are linked to an imbalance between direct and indirect striatal projection pathways. These pathways are modulated by various striatal interneurons, including cholinergic interneurons that contribute to PD motor symptoms and dyskinesias induced by L-dopa treatment, the standard therapy. Whether striatal interneurons co-expressing somatostatin, NPY, nitric oxide, and GABA (iSOM) contribute to PD symptoms or L-DOPA-induced dyskinesia (LID) remains unknown. Using ex vivo patch-clamp recordings, we examined iSOM spontaneous activity in control, PD and dyskinetic mice. There was a non-significant trend toward increased firing frequency in PD mice and an excitatory effect of the D1/D5 selective agonist SKF81287 in all experimental groups. We also found an increased expression of the activity marker c-Fos in iSOM of PD mice 1 h after finishing a 14-day dyskinetogenic L-dopa treatment. Therefore, we evaluated whether selective inhibition of iSOM using DREADDs could alleviate motor symptoms of PD and LID. After LID was established with a mild dose of L-dopa (6 mg/kg), iSOM inhibition slightly increased LID expression but did not affect locomotor activity or motor deficits. Moreover, inhibiting iSOM alongside L-dopa treatment did not prevent the onset or severity of LID. Given the diverse neurotransmitters released by iSOM, selective ablation may help clarify their role in PD pathology.

D-093 | Neuroprotective Effects of Palmitoylethanolamide on the Morphology and Viability of a Murine Hippocampal Neuronal Cell Line Subjected to Hypoxia

Disorders of the Nervous System

Author: Lucas Udovin | Email: lucas2304@hotmail.com

LUCAS UDOVIN1°, JUAN PABLO LUACES1°, TAMARA KOBIEC1°3°, SOFIA BORDET1°3°, CLAUDIA MARDARAZ1°, MALENA GARCIA3°, FRANCISCO CAPANI1°2°

1° Centro de Altos Estudios en Ciencias Humanas y de la Salud, Universidad Abierta Interamericana, Consejo Nacional de Investigaciones Científicas y Técnicas, CAECIHS. UAI-CONICET, Buenos Aires, Argentina.

2° Instituto de Ciencias Biomédicas, Facultad de Ciencias de la Salud, Universidad Autónoma de Chile, Santiago, Chile.

3° Centro de Investigaciones en Psicología y Psicopedagogía (CIPP), Facultad de Psicología y Psicopedagogía, Pontificia Universidad Católica Argentina (UCA), Buenos Aires, Argentina

Perinatal asphyxia (PA) is an oxygen deprivation that occurs around birth and disrupts neurodevelopment. Recent evidence from our laboratory revealed that in vivo treatment with Palmitoylethanolamide (PEA) could attenuate early cytoskeletal dysfunction in CA1 hippocampal neurons and its behavioral correlate after PA (Herrera and Udovin et al. 2018, 2020, 2022). To further explore the neuroprotective role of PEA against PA, we studied the in vitro effects of PEA pretreatment in a murine hippocampal cell line HT22 subjected to hypoxia for 72 hours. The cultures were incubated with vehicle (absolute ethanol) or increasing doses of PEA (0.001, 0.1, 1, 10, 20 µM) for 72 hours before hypoxia and during the normoxia period. Cell viability was assessed using the trypan blue method. Our results revealed that PEA pretreatment (5, 10, and 20 µM) significantly attenuated the decrease in cell viability after hypoxia. Additionally, using immunofluorescence, the integrity of the actin cytoskeleton was evaluated using phalloidin toxin and the nuclear marker NeuN for nuclear integrity under the same experimental conditions mentioned above, and it was found that PEA at a single concentration (20 µM) was also able to attenuate the morphological alterations induced during hypoxia. Therefore, PEA appears to be a promising neuroprotective agent that

requires further investigation of its mechanism for the implementation of future therapeutic strategies.

D-094 | Immunohistological assessment of brain regional neurodegeneration in a rodent model of neuropathic pain

Disorders of the Nervous System

Author: Florencia Vassallu | Email: florencia.vassallu@gmail.com

Florencia Vassallu1°2°, Lucas Muzio1°2°, Agustín Chamorro1°2°, Milagros López1°2°, María Jesús Trujillo1°2°, Agostina Presta1°2°, Fernando Kasanetz1°2°, Lionel Muller Igaz1°2°

1° Universidad de Buenos Aires, Facultad de Ciencias Médicas, Departamento de Ciencias Fisiológicas. Buenos Aires, Argentina.

2° CONICET - Universidad de Buenos Aires. Instituto de Fisiología y Biofísica Bernardo Houssay (IFIBIO Houssay). Buenos Aires, Argentina

Chronic neuropathic pain (NP) is a severe neurological condition characterized by nociceptive sensitization and the enduring emergence of cognitive and emotional impairments. The latter, which dramatically affects the quality of life of patients, is believed to arise from structural and functional plasticity of the brain on different spatial scales. While the occurrence of synaptic and dendritic plasticity is well documented, the role of neurodegeneration and related cellular abnormalities in NP's pathophysiology remains unclear. To gain insight into this, we used an established rodent model to investigate neurodegeneration at long-term periods after the induction of NP. Using immunofluorescence against the neuronal marker NeuN, we first analyzed structures at both low and high magnification to assess gross neurodegeneration in target cortical regions. The somatosensory cortex, hippocampal CA1, and dentate gyrus regions showed no significant change in thickness between NP and control mice. To identify subtler changes in neuronal loss, we measured NeuN+ cell density at higher magnification in these same structures, as well as in the anterior insular and prefrontal cortices. The number of neurons in these areas was preserved upon NP. We are currently evaluating neurodegeneration in additional regions and analysing the levels, distribution, and aggregation of TDP-43, a protein that plays a central role in the pathogenic process of multiple neurodegenerative diseases.

D-095 | Kainic acid resulted in altered locomotion, nociception and CREB nuclear translocation after inducing spinal cord damage

Disorders of the Nervous System

Author: Benjamín Zylberberg | Email: BZylberberg-iimt@austral.edu.ar

Benjamín Zylberberg1°, Angela M. Suburo1°2°, M. Florencia Coronel1°2°, Graciela L. Mazzone1°2°

1° Instituto de Investigaciones en Medicina Traslacional (IIMT), CONICET-Universidad Austral, Av. Pte. Perón 1500, B1629AHJ, Pilar, Buenos Aires, Argentina.

2° Facultad de Ciencias Biomédicas, Universidad Austral, Av. Pte. Perón 1500, B1629AHJ, Pilar, Buenos Aires, Argentina.

We have previously demonstrated that excitotoxicity can be triggered by the glutamate analogue kainate (KA), leading to a significant decrease in the number of rat spinal neurons and a higher release of glutamate, ultimately resulting in the blockage of the locomotor network. Our current objective was to assess the role of CREB as a predictive marker of damage following chemically-induced spinal cord injury by using in vivo and in vitro models. Thus, in vivo excitotoxicity in Balb/C adult mice was induced by KA intraspinal injection (1 µL, 5 mM) while spinal cord in vitro excitotoxicity was produced by bath-applied KA (100 µM). Locomotor behaviors were evaluated in an open field by applying the Basso Mouse locomotor scale rating (BMS), the horizontal ladder, and the footprinting analysis. The application of KA induced a significant deterioration in hindlimb motor coordination and balance during locomotion. When performing the Choi test an increased sensitivity to cold stimuli was detected in the ipsilateral hindpaw from 8 to 30 days after injury. Immunohistochemical analysis showed that KA evoked significant neuronal loss and decreased the number of CREB positive nuclei in the ventral horn and dorsal layers III-IV. Thus, our present data suggests that CREB could be used as a novel indicator of spinal tissue damage. Supported by Universidad Austral, CONICET, FONCYT, and IBRO Collaborative Research Grant.

D-096 | Role of Dorsal Raphe glutamatergic neurons in cocaine-seeking behavior

Neural Circuits and Systems Neuroscience

Author: Maria Flavia Barbano | Email: maria.barbano@nih.gov

Flavia Barbano1°, Jia Qi1°, Orlando Espinoza1°, Uzma Mohammad1°, Marcos Candido1°, Marisela Morales1°

1° National Institute on Drug Abuse (NIDA/NIH)

The dorsal raphe nucleus (DR) contains glutamatergic neurons that express the vesicular glutamate transporter type 3 (VGluT3). We have demonstrated that DR-VGluT3 neurons establish synapses with ventral tegmental area (VTA) dopaminergic neurons. Activation of this pathway induces release of dopamine in the nucleus accumbens and is rewarding. Here, we determined whether DR-VGluT3 inputs to the VTA play a role in cocaine seeking behavior, measured by conditioned place preference (CPP) and self-administration (SA). We expressed Channelrhodopsin in DR-VGluT3 neurons in mice and evoked the release of glutamate in the VTA by photostimulation. We tested the behavior of these mice using a CPP procedure, to evaluate the role of VTA glutamate release after extinction of cocaine CPP. VTA photostimulation of DR-VGluT3 inputs induced reinstatement of cocaine CPP but did not induce reinstatement of food-seeking behavior. We next determined whether VTA glutamate release from the DR modifies stress- or priming-induced reinstatement of cocaine CPP or cocaine-seeking. We injected Halorhodopsin (Halo) in DR-VGluT3 neurons and implanted bilateral optic fibers in the VTA. Control mice reinstated cocaine CPP and cocaine-seeking after stress or a cocaine priming injection. In contrast, reinstatement was not observed in Halo mice. From these findings, we concluded that VTA release of glutamate from DR-VGluT3 fibers plays a critical and unexpected role in the reinstatement of cocaine-seeking behavior

D-097 | Anatomy of the corticospinal tract and its importance in resection of pontine cavernomas Surgical

Neural Circuits and Systems Neuroscience

Author: Julian Leonardo Cicler | Email: juliancicler@icloud.com

Julian Cicler1°, Axel Colombo1°, Camila Migliardo1°, Valentina Duzer Salvador1°, Valeria Trofa1°, Juan Navarro1°, Julieta Laura Rodríguez Valdivia1°, Facundo Villamil1°2°, Gonzalo Bonilla1°

1° Laboratorio de Neuroanatomía, III Cátedra de Anatomía, Facultad de medicina, Universidad De Buenos Aires

2° Laboratorio de Neuroanatomía Quirúrgica, Departamento de Neurocirugía, FLENI, Montañeses 2325, CP1428 Buenos Aires. Argentina

Introduction: Surgical resection of pontine cavernomas presents unique challenges due to the variety of critical neural structures in that region, such as the corticospinal tract (CST). Given the important role of the CST in voluntary movements of most of our body, this study focuses on the anatomy and CST relationships at the level of the pons with nearby structures, aiming to reduce tract injuries in different approaches and thereby improve postoperative outcomes.

Materials and Methods: Five brainstems and two hemi-brainstems with cerebellum were dissected using the Kingler technique and fixed with formaldehyde and alcohol. The approach started from the ventral side of the brainstem and was completed on the dorsal one. Wooden spatulas were used, beginning with the larger diameter and then progressing to smaller ones, as well as microdissection tools.

Results: The CST fibers in the pons disperse into small fascicles, circumscribed ventrally and dorsally by the transverse pontine fibers (TPF) and the pontine nuclei. Additionally, their dorsal relationship with the medial lemniscus is remarcable, this last one being separated from the CST by the TPF.

Conclusions: This study highlights the importance of the CST, including its anatomy and immediate relationships, for its preservation during the resection of pontine cavernomas. Its intraoperative location is crucial for preserving its fibers, significantly improving motor outcomes and reducing the risk of neurological deficits

D-098 | Temporal Dynamics of Dopaminergic Neurons During Self-Paced Actions

Neural Circuits and Systems Neuroscience

Author: Marcos Antonio Coletti | Email: coletti.marcos@gmail.com

Marcos Coletti1°2°, Azul Silva1°2°, Gustavo Murer1°3°, Mariano Belluscio1°2°

1° Universidad de Buenos Aires, CONICET, Instituto de Fisiología y Biofísica Bernardo Houssay, Grupo de Neurociencia de Sistemas, Laboratorio Bases Neuronales del Comportamiento, Buenos Aires, Argentina

2° Universidad de Buenos Aires, Facultad de Medicina, Departamento de Ciencias Fisiológicas, Buenos Aires, Argentina

3° Universidad de Buenos Aires, CONICET, Instituto de Fisiología y Biofísica Bernardo Houssay, Grupo de Neurociencia de Sistemas, Laboratorio de Fisiología de Circuitos Neuronales, Buenos Aires, Argentina

Midbrain dopamine neurons (DAn), especially those in the ventral tegmental area (VTA) and substantia nigra pars compacta (SNc), play a crucial role in modulating reward-related behaviors.

While several studies analyze the DAn activity during tasks guided by predictive cues, the dynamics of their activity during self-initiated tasks remain less understood. Addressing this knowledge gap is important since self-initiated actions are a fundamental aspect of adaptive behavior, requiring the integration of internal and external signals to guide decisions without external cues.

In this study we explored DAn activity during a self-paced task where rats autonomously initiated a sequence of actions to obtain a reward. Through in vivo electrophysiological recordings we registered and characterized neuronal activity during different phases of the task, focusing on action initiation, timing, and outcome anticipation.

Preliminary findings suggest that DAn in the VTA encode anticipatory signals linked to task initiation, indicating their critical role in the timing and preparation of self-initiated actions. This activity is modulated by the duration of the waiting period before action initiation and resembles the temporal coding observed in the striatum during similar tasks.

These findings reveal an important role for DAn in integrating temporal information and reward outcomes, providing a deeper understanding of the neural mechanisms underlying decision-making and adaptive behavior.

D-099 | Linking neuronal avalanches with oscillatory and broadband 1/f activities in the resting human brain

Neural Circuits and Systems Neuroscience

Author: Héctor Damián Dellavale Clara | Email: dellavaledamian@gmail.com

Damián Dellavale1°, Emahnuel Troisi Lopez2°, Antonella Romano3°, Giovanni Rabuffo4°, Pierpaolo Sorrentino4°

1° CONICET, Departamento de Física Médica & Instituto de Nanociencia y Nanotecnología, Centro Atómico Bariloche, R8402AGP, San Carlos de Bariloche, Río Negro, Argentina.

2° Institute of Applied Sciences and Intelligent Systems, National Research Council (CNR), 80078, Pozzuoli, Italy.

3° University of Naples Parthenope, Department of Motor Science and Wellness, Naples, Italy.

4° Institut de Neurosciences des Systèmes, Aix-Marseille Universitè, Marseille, France.

Brain oscillations, broadband 1/f activity and neuronal avalanches (NAs) are valuable conceptualizations extensively used to interpret brain data, yet, these perspectives have mainly progressed in parallel with no current consensus on a rationale linking them. This study aims to reconcile these viewpoints.

We analyzed NAs in source-reconstructed MEG data from 47 healthy subjects during eyes-closed resting state. For this, we introduced custom measures and a comprehensive array of features characterizing the statistical, spatiotemporal and spectral properties of NAs.

The observed NAs disclose a significant spectral signature in the alpha band, suggesting that the large-scale spreading of alpha bursts occurs mainly via brain avalanches. Besides, the NAs detected in our MEG dataset can be segregated based on their spectral signature in two main groups having different propagation patterns, where cluster 2 avalanches is mainly related to the spread of narrowband alpha bursts across the brain network, whereas cluster 1 avalanches correspond to more spatially localized fluctuations promoted by the broadband 1/f activity. We also provide an analytical framework, supported by model and experimental evidence, showing that a) spectral

group delay consistency in specific narrow frequency bands, b) transient cross-regional coherent oscillations and c) broadband 1/f activity, are all key ingredients for the emergence of realistic avalanches.

D-100 | Encoding of nocifensive responses by cortico-striatal neurons of the Anterior Cingulate Cortex

Neural Circuits and Systems Neuroscience

Author: Fernando Kasanetz | Email: fkasanetz@fmed.uba.ar

Constanza Ilarraz1°2°, María Jesús Trujillo1°2°, Mario Acuña3°, Thomas Nevian3°, Fernando Kasanetz1°2°

1° Universidad de Buenos Aires, Facultad de Ciencias Médicas, Departamento de Ciencias Fisiológicas, Grupo de Neurociencia de Sistemas, Buenos Aires, Argentina

2° CONICET - Universidad de Buenos Aires, Instituto de Fisiología y Biofísica Bernardo Houssay (IFIBIO Houssay), Buenos Aires, Argentina

3° Department of Physiology, University of Bern, Bern, Switzerland

The perception of pain is a complex experience that arises from distributed brain activity, but how the brain encodes this experience remains unclear. The Anterior Cingulate Cortex (ACC) plays a crucial role in processing the affective dimension of pain. Dense excitatory connections between the ACC and the dorso-medial striatum may serve as a primary pathway for transmitting nociceptive information to the mesolimbic system, which is essential for the motivational modulation of behavior. We hypothesize that the ACC cortico-striatal (ACC-CS) pathway encodes the selection of adaptive strategies to cope with pain.

Previous results from our group showed that chemogenetic inhibition of ACC-CS neurons interfere with the manifestation of pain aversion-related responses in a Conditioned Place Avoidance (CPA) paradigm, but the changes in neuronal activity that allow such behavior remain elusive. To address this issue, we recorded ACC-CS neuronal activity by imaging calcium transient in vivo using implantable miniature microscopes in mice subjected to the CPA test. Preliminary results show differential patterns of neuronal activity upon stimulation onset and the development of avoidance responses.

These findings highlight the critical role of the ACC-CS pathway in modulating pain-related behaviors and suggest potential targets for therapeutic intervention in pain management.

D-101 | Auditory stimuli enhance visual responses in the optic tectum of zebrafish

Neural Circuits and Systems Neuroscience

Author: Nicolas Martorell | Email: martorellnicolas1995@gmail.com

Nicolas Martorell1°2°, Emiliano Marachlian3°, German Sumbre3°, Violeta Medan1°2°

1° IFIBYNE (UBA - CONICET), Buenos Aires, Argentina

2° Departamento de Fisiología, Biología Molecular y Celular (FCEN, UBA)

3° Biologie, École Normale Supérieure, Paris, France

The Optic Tectum (OT) in the zebrafish brain (Danio rerio) is known to be a visual processing hub. Neurons in the Tectal Neuropil (TN) are known for feature-based detection of stimuli, while the Periventricular Layer (PVL) relays this information to other regions, such as decision-making neurons in the Hindbrain. We investigate if the OT responds to auditory stimulation, and whether the response to visual stimulation is enhanced by the addition of an auditory stimulus. 4-7 dpf transgenic zebrafish were embedded in agarose and recorded with a confocal microscope (HuC:GCaMP6f, N=73) or with a Single Plane Illumination Microscope (H2B:GCaMP6f, N=10). Five repetitions of visual looming stimuli and short auditory stimuli were presented either separately or combined, varying the salience of the visual stimulus by changing its contrast. Auditory responses were observed in the OT in 64% of fish and were stronger and more common in the TN than in the PVL. During multisensory trials, both TNs and PVL neurons showed an increased activation probability when compared to visual-only stimulation. This enhancement was stronger for lower salience stimuli and correlated with increased pre-motor and motor activity. This study shows a classically visual brain region responding to a different modality, and highlights the effect of multisensory integration on behavior and decision making.

D-102 | Development of an experimental paradigm in rats for the study of movement coordination between subjects

Neural Circuits and Systems Neuroscience

Author: Mayra Paszkowicz | Email: mayrapaszkowicz@gmail.com

Mayra Paszkowicz1°, Emilio Kropff1°, María Cecilia Martínez1°

1° Physiology and Algorithms of the Brain, Fundación Instituto Leloir, IIBBA-CONICET

There is a growing interest in neuroscience in understanding the neural mechanisms mediating different types of social interactions, both in humans and laboratory animals. The coordination of movements is one of the simplest types of social interaction which allows for everyday tasks such as opening the door for a passerby or performing a move in a team sport. These situations involve the spatio-temporal location of the other, through mechanisms in which the hippocampus plays a fundamental role. However, there are no standardized behavioral paradigms to assess and measure movement coordination in detail. Here we developed two variants of a multi-trial task in which a pair of adult rats must synchronize their movements to obtain a reward. In the task, a visual cue turns on to indicate the beginning of a trial and afterwards subjects must coordinately collect the reward. The first variant has a sudden turn on of the cue whereas in the other, the light is gradually lit. We characterized the learning curves of both variants and adjusted the conditions to increase synchronization through training. Our preliminary results show that the second variant of the task increases significance of the correlation between the movements of the subjects as they walk towards the reward delivery port. This sets ground for future electrophysiology studies aimed to register hippocampal CA1 local field potential.

D-103 | Analyzing how learning shapes contextual information in the piriform cortex

Neural Circuits and Systems Neuroscience

Author: Lucca Salomon | Email: lsalomon@ibioba-mpsp-conicet.gov.ar

Lucca Salomon1°2°, Noel Federman1°, Julieta Campi1°, Sebastián Alejo Romano1°, Antonia Marin-Burgin1°

1° Biomedicine Research Institute of Buenos Aires (IBioBA) - CONICET - Partner Institute of the Max Planck Society.

2° University of Buenos Aires, Faculty of Exact and Natural Sciences, PhD Program, Buenos Aires, Argentina.

Recent discoveries have transformed our understanding of sensory representations in the cerebral cortex, revealing their plasticity and sensitivity to experience. Olfactory processing, in particular, depends on prior experiences, context, and the animal's internal state.

To investigate how sensory learning dynamically changes responses in cortical circuits, we created an olfactory-contextual conditioning paradigm within a virtual reality setting. In this setup, mice are trained to associate a specific odor with a water reward when presented in a particular visual context. We focused on the piriform cortex (PCx), the largest area of the olfactory cortex, and conducted in-vivo electrophysiological recordings while the animals engaged in the task.

We found that several behavioral variables (licking, locomotion, sniffing) modulate the PCx neuronal activity, and by comparing naive, intermediate and expert session animals, we observed that the response to non-olfactory variables, including contextual modulation, were sequentially acquired during learning. In particular, while expert animals encode contextual information in the PCx, those that learn to discriminate odors but not yet contexts (intermediate session) do not. This study highlights the sequential acquisition of contextual encoding in the PCx and provides insights into how sensory learning reshapes cortical representations. Future experiments will focus on the mechanism by which contextual information arises in the PCx.

D-104 | VIP-expressing interneurons mediate D1 Dopamine Receptor Modulation of the Anterior Insular Cortex

Neural Circuits and Systems Neuroscience

Author: María Jesús Trujillo | Email: mtrujillo@fmed.uba.ar

María Jesús Trujillo1°2°, Agostina Presta1°2°, Micaela Buscema1°2°, Fernando Kasanetz1°2°

1° Universidad de Buenos Aires, Facultad de Ciencias Médicas, Departamento de Ciencias Fisiológicas. Laboratorio de Fisiologia del Dolor, Grupo de Neurociencias de Sistemas. Buenos Aires, Argentina.

2° CONICET - Universidad de Buenos Aires. Instituto de Fisiología y Biofísica Bernardo Houssay (IFIBIO Houssay). Buenos Aires, Argentina.)

The Anterior insular cortex (AIC) acts as a central anatomical integration hub for sensory, emotional, motivational, and cognitive functions, including pain perception. The mesolimbic dopaminergic system conveys information about salient motivational events and has been shown to induce pain relief via D1 receptors (D1R) in the AIC. However, the mechanisms by which dopamine regulates AIC microcircuit activity remain unclear.

We have previously shown that D1R-bearing neurons located in the superficial layers of the AIC are primarily inhibitory interneurons, while D1R-positive cells in deeper layers comprise both pyramidal cells and interneurons. Her we used immunofluorescence assays and identified VIP-expressing, but not somatostatin or parvalbumin-expressing, as a major subclass of D1R-bearing interneurons in the AIC. Morphological reconstructions revealed the bipolar and multipolar features of D1R+ interneurons, typical of VIP+ cells. Furthermore, using ex-vivo electrophysiology we found that a D1R agonist increased the excitability of D1R+ cells of the AIC. Given the preferential connectivity of VIP+ interneurons to other interneurons, our results suggest that dopamine in the AIC may act favoring the disinhibition of output cells.

Further experiments will test the impact of dopamine modulation of AIC circuits on pain-related behaviors.

D-105 | Role of the calcium-binding protein Sorcin in the auditory system

Neural excitability, synaptic transmission and neuron-glia interactions

Author: Camila Catalano Di Meo | Email: ccatalano98@gmail.com

Camila Catalano Di Meo1°2°, Valeria Castagna2°, Marcelo Moglie1°, Jimena Ballestero2°, María Eugenia Gomez-Casati2°, Juan Diego Goutman1°

1° Instituto de Ingeniería Genética y Biología Molecular, CONICET

2° Instituto de Farmacología, FMED-UBA

Intracellular Ca2+ compartmentalization is essential for cellular function and the maintenance of independent signaling pathways. Outer hair cells (OHCs) in the cochlea are responsible for the amplification of sound waves within the inner ear, crucial for fine sound detection. An important aspect of these cells is the precise regulation of Ca2+ homeostasis during their normal functioning. Ca2+ is thought to be involved in mechanotransduction -the process by which these cells detect sound signals- and in synaptic communication between OHCs and neurons projecting to and from the inner ear. Common causes of hearing loss are Ca2+ excitotoxicity in OHCs following noise over-exposure. Recent transcriptomic studies have identified two highly expressed genes related to intracellular Ca2+ homeostasis in OHCs: oncomodulin and sorcin. Whereas the former is a well described Ca2+ buffer, no clear role has been established in the cochlea for the latter. Sorcin is crucial in regulating the Ca2+ cycle and the excitation-contraction coupling in cardiac muscle. It has been demonstrated that sorcin can modulate the phenomenon of "Ca2+ induced Ca2+ release" by binding to, and regulating, various essential Ca2+ homeostasis proteins such as ryanodine receptors, L-type Ca2+ channels, and SERCA pumps. This study aims to determine the role of sorcin in the regulation and dynamics of Ca2+ in mouse cochlear OHCs, based on the hypothesis that high sorcin expression in OHCs is crucial for Ca2+ regulation

D-106 | Characterization of cholinergic agonists and HDAC inhibitors effects on neuronal differentiation of murine neuroblastoma N2a cells

Neural excitability, synaptic transmission and neuron-glia interactions

Author: Maximiliano R. Hurtado Paso | Email: maxihurtado777@gmail.com

Maximiliano R. Hurtado Paso1°, Verónica Bisagno2°, Francisco J. Urbano,

1° IFIBYNE-CONICET, University of Buenos Aires, Argentina

2° School of Biomedical Sciences, Austral University, Buenos Aires, Argentina

Our group has previously used N2a mouse neuroblastoma cell line to study voltage-gated channel expression, signaling pathways, neurite growth and histone deacetylases mediated (HDACs) neuronal differentiation. N2a cells are neural precursors that can change their morphology under a low fetal bovine serum cell culture condition; extending their cytoplasm forming neurites in bipolar or multipolar shapes. Understanding the mechanisms underlying N2a cells ability to differentiate into neurons is important to develop treatments to prevent human neuroblastoma spreading. N2a cells were cultured for 4 days in vitro (d.i.v.) in a DMEM-0.5% FBS condition and treated with a cholinergic agonist carbachol (CAR, 50 uM) or dbcAMP (50 uM). Some experiments combined CAR/dbcAMP with a low concentration (50 uM) of MS275/MC1568 class I/IIa HDACs inhibitors respectively, or DMSO. Whole cell patch-clamp recordings and neurite length/type characterization among treatments were performed to study N2a differentiated neuron-like characteristics. Our results showed that N2a cells were able to adopt a neuron-like differentiation phenotype after 4 d.i.v. of DMSO or CAR/dbcAMP. Density of voltage-gated sodium and potassium currents was enhanced after CAR treatment (One way ANOVA). These results suggest that N2a cells can be differentiated in the presence of cholinergic agonists adopting a similar neuron-like morphology previously described for dbcAMP treatments.

D-107 | SYNAPTIC PROPERTIES OF CO-TRANSMITTING SYNAPSES AT THE LATERAL HABENULA

Neural excitability, synaptic transmission and neuron-glia interactions

Author: Claudia Mosquera | Email: ClaudiaMosquera23@uba.ar

Claudia Mosquera1°2°, Joaquín Piriz1°

1° Instituto de Fisiología, Biología Molecular y Neurociencias (IFIBYNE), UBA-CONICET, Buenos Aires, Argentina

2° Departamento de Fisiología, Biología Molecular y Celular, Facultad de Ciencias Exactas y Naturales, UBA

The lateral habenula (LHb) is an epithalamic nucleus involved in mood disorders. The LHb is the only consistently characterized brain structure that is targeted by synapses that co-transmits GABA and glutamate (co-transmitting synapses). These synapses originate in at least two LHb upstream structures. However, recent works suggest many LHb innervating structures generate co-transmitting synapses.

In this work we seek to investigate properties of GABAergic component of co-transmitting synapses and comparing it with GABAergic inputs to the LHb. We performed patch-clamp recordings from the LHb in brain slices. To study the GABAergic component of co-transmission we used a transgenic mice Ai32::Vglut2-ires-cre in which ChR2(H134R) is directed to Vglut2 positive neurons. To study the GABAergic inputs to the LHb we injected Cre in mainly GABAergic structures of transgenic mice with Cre dependent ChR2. In both cases synaptic currents were evoked by light stimulation of axonal terminals at the LHb, and pharmacologically isolated the GABAergic component were adding CNQX and APV to the recording solution.

Consistently with what is reported, we observed GABAergic synaptic currents in Ai32::Vglut2-ires-cre mice. Moreover, GABAergic responses were detected in the majority of LHb recorded neurons supporting the generality of co-transmission.

D-108 | Angiotensin II receptor´s: Neuropathological changes in an animal model of Parkinson`s disease

Neurochemistry and Neuropharmacology

Author: María Elena ARCE | Email: earce.arce7@gmail.com

Maria Elena Arce1°2°, Helga Myrna Blanco1°2°, Maria Belen Torres Basso1°2°, Gladys Maria Ciuffo1°2°

1° Facultad de Quimica, Bioquimica y farmacia . UNIVERSIDAD NACIONAL DE SAN LUIS

2° IMIBIO-SL . CONICET. SAN LUIS

The renin angiotensin system (RAS) is an endocrine system considered relevant in physiologic and pathophysiologic mechanisms, including neurodegenerative diseases. Widespread distribution of angiotensin receptors (Angiotensin type-1 receptor [AT1R] and type-2 [AT2R] has been found in the central nervous system including Substantia nigra (SN). AT1R and AT2R expressions are regulated differently, and regulation is also tissue-specific. Previously, we evaluated the effect of 10-week treatment of Wistar rats with rotenone in an experimental model of Parkinson`s disease. Significant changes were observed on behavioral motor tests after 5 weeks of treatment and altered distribution of angiotensin II receptors were found in SN of treated animals. Taking into account these observations, the aim of this work was to study more accurately the time when these alterations appears in SN and its correlation with the motor impairments in this model. Histological and immunohistochemical analyses were performed in rotenone-treated rats after 3-week, 5-week and 9-week of treatment. The number of tyrosine hydroxylase immunoreactive dopamine neurons decreased in the SN of the 9-week rotenone-treated rats. Indeed, the number of AT1R and AT2R immunopositive cells in SN was lower in the 5 and 9 –week rotenone- treated rats than the 3-week treated animals.

The physiological and pathological roles of RAS require more studies to elucidate their functions.

D-109 | NEUROPROTECTIVE EFFECT OF CB1 RECEPTOR AGONIST (ACEA) IN LIGHT INDUCED RETINAL DEGENERATION

Neurochemistry and Neuropharmacology

Author: Julieta Bressano | Email: Jula.Bresa@outlook.com

Julieta Bressano1°, Manuel Soliño1°, Veronica Zuccarella1°, Juan José López-Costa1°

1° Instituto de Biología Celular y Neurociencia ¨Prof. E. De Robertis¨ (IBCN), Facultad de Medicina, UBA-CONICET

In glaucoma animal models, CB1 receptor agonists have shown a neuroprotective effect. Light-induced retinal degeneration (LIRD) is a model that simulates human retinal degenerative diseases, such as age-related macular degeneration (AMD). The aim of this study was to evaluate the effect of a CB1 receptor agonist (ACEA) on LIRD. Sprague Dawley rats were exposed to continuous illumination (12,000 lux) for 24 hs. Subsequently, ACEA, was injected intravitreally into the right eyes, while the left eyes received vehicle (control). After one week, retinas were dissected out and fixed for immunohistochemistry (IHC), or were frozen for Western Blot (WB) assays. The antibodies for GFAP, active Caspase 3 (aC3), and AKT were used for WB, while only the first two were used for IHC. Immunoreactive areas and optical density (OD) were quantified by image analysis and data were statistically analyzed using Student's t-test at GraphPad software. ACEA treated retinas showed a trend to a lower area and OD of GFAP (p: 0.46 and 0.37, respectively). On the other hand, the aC3 immunostained sections showed a significant decrease in area (p: 0.045) and a non-significant decrease in OD (p: 0.094). WB studies showed non-significant decreases of aC3, GFAP and AKT in ACEA-treated retinas compared to controls (p:0.23, 0.79 and 0.05, respectively). The administration of ACEA following illumination showed some neuroprotective effect although further research is needed in order to confirm its potential use.

D-110 | Paraquat effects on human induced pluripotent stem cells-derived neural stem cells and neurons

Neurochemistry and Neuropharmacology

Author: Analia Czerniczyniec | Email: anaczerni@gmail.com

Analia Czerniczyniec1°, Sofia Mucci1°, Mariela Marazita1°, Gustavo Sevlever1°, María Élida Scassa1°, Leonardo Romorini1°

1° Laboratorio de Investigación Aplicada a Neurociencias, Instituto de Neurociencias, Fundación Para La Lucha Contra Las Enfermedades Neurológicas de La Infancia (LIAN-INEU, Fleni-CONICET), B1625XAF, Belén de Escobar, Provincia de Buenos Aires, Argentina.

Paraquat (PQ) is one of the most widely used herbicides in the world. The mechanisms mediating PQ neurotoxicity involved reactive oxygen species (ROS) production. In this study, we investigated the in vitro effects of PQ on human induced pluripotent stem cells (hiPSCs)-derived neural stem cells (NSCs) and neurons by treating them with PQ 50 µM for 24 h. We observed that PQ treatment significantly reduces cell viability by 54% and 66% ($p<0.001$) in NSCs and neurons, respectively. Meanwhile, PQ treatment significantly decreased the percentage of living cells (31%; $p<0.001$) in neurons. Due to the importance of mitochondrial function in cell viability, we measured different mitochondrial parameters to establish a potential mechanism for different susceptibility. We observed that mitochondrial membrane potential was decreased by 18% ($p<0.05$) and 51% ($p<0.01$) in NSCs and neurons after PQ treatment, respectively. Regarding ROS production, PQ increased superoxide anion levels in NSCs (56%; $p<0.05$) and neurons (79%¸ $p<0.001$). Also, cardiolipin oxidation (84%; $p<0.001$) was present in neurons after PQ exposure. Summing up, PQ effects include changes in mitochondrial function, and NSCs appeared less susceptible than neurons to PQ toxicity. Further studies will be conducted to elucidate if mitochondrial dysfunction presented in hiPSCs-derived neurons induces cell death by activating apoptotic signalling pathways.

D-111 | REGULATION OF GABAA RECEPTOR EXPRESSION INDUCED BY PROLONGED EXPOSURE TO BENZODIAZEPINES

Neurochemistry and Neuropharmacology

Author: Leydi Carolina González Gómez | Email: lcarolina.gonzalez@udea.edu.co

Leydi Carolina González Gómez1°, María Clara Gravielle1°

1° Instituto de Investigaciones Farmacológicas (ININFA), Facultad de Farmacia y Bioquímica, Universidad de Buenos Aires-CONICET

The development of tolerance limits prolonged treatments with benzodiazepines. In previous work, we demonstrated that sustained exposure of rat neocortical neurons to diazepam induces selective transcriptional repression of the GABAA receptor α1 subunit gene by a mechanism that depends on the activation of L-type voltage-gated calcium channels (L-VGCC) and the protein kinase A. The present study aimed to further investigate the signaling pathway activated by continuous exposure to benzodiazepines that leads to regulating GABAA receptors. To this end, we treated rat primary cerebrocortical cultures with diazepam for different periods. Our results showed that diazepam exposure significantly increased intracellular calcium concentration ($P<0.05$, Student`t test). We then demonstrated, using immunocytochemical experiments, that the diazepam-induced reduction in the total levels of the α1 subunit is accompanied by a significant decrease in the surface levels of the subunit which are part of functional receptors ($P<0.05$, one-way ANOVA and Tukey post hoc test). Finally, we observed that prolonged in vivo administration of diazepam (7 days) in rats induced a significant decrease in mRNA and protein levels of α1 in the cerebral cortex ($P<0.05$, Student`t test). Taken together, our results suggest that diazepam-induced regulation of GABAA receptor expression is mediated by the stimulation of calcium influx through L-VGCC. This regulatory process was validated by in vivo experiments.

D-112 | Enduring Effects of Perinatal Protein Restriction on Anhedonia: Evidence from Early-Life and Adulthood Studies in Rats.

Neurochemistry and Neuropharmacology

Author: Maria Cecilia Gutierrez | Email: cecilia.gutierrez@unc.edu.ar

María Cecilia Gutierrez1°2°, Luis Manzanelli1°, María Cecilia Perondi1°, Analia Valdomero1°2°

1° Departamento de Farmacología Otto Orsingher, Facultad de Ciencias Químicas, Universidad Nacional de Córdoba

2° IFEC (CONICET)

Previous findings from our lab demonstrated that perinatal protein restriction facilitates depressive-like behavior later in life and may increase the risk of developing anhedonia by altering BDNF-TrkB signaling in the nucleus accumbens (NAc) shell.

Building on this, the present study aimed to assess whether the alterations observed in adult rats are also evident in 30-days-old offspring, immediately after the period of protein restriction. To this end, male pups subjected to perinatal protein restriction (PR-rats) were submitted to the sucrose preference test (SPT), a paradigm commonly used to evaluate anhedonia, and compared to animals fed a normoprotein diet (NP-rats). After the SPT, rats from both groups were sacrificed for quantification of BDNF levels in the NAc. In line with the results observed in adulthood, we found a lower sucrose preference in the 30-days-old PR-group, which correlated with increased BDNF levels in the NAc. Similar findings were found in adult and 30-days-old PR-female rats.

Altogether, our findings suggest that the behavioral and molecular changes observed in adult rats are due to the persistence of enduring alterations resulting from malnutrition during perinatal development. These alterations impair the brain's ability to respond appropriately to external stimuli, thereby facilitating anhedonic-like behavior in a sex-independent manner.

D-113 | Alcohol consumption during pregnancy alters, in the drinking mother, subsequent alcohol sensitivity

Neurochemistry and Neuropharmacology

Author: Pedro Peñalver Abed | Email: pedro.penalver.abed@mi.unc.edu.ar

Pedro Peñalver Abed1°, Camila Ravasi1°2°, Luana Fornero1°, Aranza Wille-Bille2°, Ricardo Pautassi1°2°

1° Universidad Nacional de Córdoba. Facultad de Psicología. Córdoba, Argentina

2° Instituto de Investigación Médica M. y M. Ferreyra, INIMEC-CONICET-UNC, Córdoba, Argentina.

Alcohol consumption is highly prevalent among pregnant women, which has motivated preclinical studies on the effects of prenatal alcohol exposure. This exposure can trigger neurocognitive alterations in offspring, including changes in alcohol sensitivity that are precursors to alcohol use disorders. However, the effects of alcohol consumption during pregnancy on the pregnant woman herself and her subsequent alcohol intake trajectories have been much less investigated. This experiment assessed, in a preclinical mouse model, the effects of voluntary alcohol consumption (0% -controls- or 10% v/v solution) via a 'drinking in the dark' (DID) protocol (2 hours/day, four times a week, from gestational day 9 to postnatal day 5) on sensitivity to alcohol intoxication. After weaning, the C57BL/6 mothers were exposed to 5.25 g/kg of alcohol (3.0 g/kg and 2.25 g/kg, separated by 90 minutes) daily for five consecutive days. The results indicated greater initial sensitivity to ethanol and greater tolerance development across days ($p<0.05$) in females with a history of alcohol consumption during gestation and parturition. These findings suggest that alcohol consumption during the sensitive periods of gestation and breastfeeding induces changes in alcohol sensitivity in the dam, potentially increasing the risk of alcohol misuse in pregnant women. Keywords: prenatal, alcohol, mice, tolerance, sensitivity.

D-114 | DAD9, a novel dopaminergic agonist with neuroprotective properties, avoids dopamine oxidation and inhibits aggregation of α-Synuclein into toxic species

Neurochemistry and Neuropharmacology

Author: María Terán | Email: maria0191@hotmail.com

María del Milagro Teran1°, Hernán Cruz2°, Valentina Budeguer Isa1°, Diego Ploper1°, Rosana Chehín1°

1° Instituto de Medicina Molecular y Celular Aplicada (IMMCA) (CONICET-UNT-SIPROSA), San Miguel de Tucumán, Argentina

2° Universidad Nacional de Tucumán (UNT), San Miguel de Tucumán, Argentina

The innovative compound DAD9, a chemically modified non-antibiotic tetracycline (TC) conjugated to dopamine (DA), was synthetized to create a dopaminergic agonist with neuroprotective properties for Parkinson's disease (PD). This study aimed to investigate the mechanisms underlying the neuroprotective effects of DAD9 using a model of α-Synuclein (α-Syn) oligomers stabilized with DA. The characterization of α-Syn oligomeric species was performed through ThT fluorescence, SDS-PAGE, dynamic light scattering (DLS), and viability assays in neuronal cell lines.

Our results indicate that the DA moiety in DAD9 was protected from oxidation, effectively preventing the formation of neuromelanin, a toxic and insoluble polymer. Notably, the α-Syn species formed in the presence of DAD9 produced a distinct type of aggregated species, which differed if size, lacked cross-β structure, and exhibited reduced toxicity in vitro.

These findings demonstrate that the DA moiety in DAD9 was incapable of suffering oxidation into toxic species. In addition, DAD9, either though its DA or TC moiety, redirected the formation of α-Syn oligomers towards non-toxic off-pathway species, distinct from those stabilized by DA. In conclusion, this research elucidates a novel mechanism of action for DAD9 as a multitarget neuroprotective dopaminergic agonist, offering promising implications for PD treatments.

D-115 | Sex differences in the expression of oxytocin and the oxytocin receptor in the mouse brain during development

Neuroendocrinology and Neuroimmunology

Author: Rocio del Milagro Bigarani | Email: rbigarani@immf.uncor.edu

Rocio del Milagro Bigarani1°, Maria Julia Cambiasso1°2°, Carla Daniela Cisternas1°3°

1° Instituto de Investigación Médica M y M Ferreyra, INIMEC-CONICET-UNC, Córdoba, Argentina.

2° Cátedra de Biología Celular, Facultad de Odontología, Universidad Nacional de Córdoba, Argentina

3° Cátedra de Fisiología Animal, Facultad de Ciencias Exactas, Físicas y Naturales, Universidad Nacional de Córdoba, Argentina

Sex differences in neurochemical cell phenotype might have broad consequences and underlie differences in neuronal function, morphology, connectivity, and neurotransmitter production in males and females. Many of these sex dimorphisms in the brain are organized during development by gonadal hormones and by a sex-specific genetic and epigenetic pattern. We previously found sex differences in brain expression of enzymes involved in DNA methylation and demethylation that were restricted to the critical period of sexual differentiation. Here, we explored oxytocin (OXT) expression in the preoptic area (POA), the paraventricular (PVN) and supraoptic (SON) nucleus of the hypothalamus by immunohistochemistry at postnatal day (P) 7 and P18 in male and female mice. We found a higher number of OXT+ neurons and covered area by OXT-immunoreactivity ($p<0.05$) in the female POA at P18. We also studied oxytocin receptor (OXTR) expression by qPCR in brain punches of prefrontal cortex (PFC), POA and the PVN at the same postnatal ages. At P7, we found a higher expression of OXTR ($p<0.01$) in the PFC of males compared with females. No sex differences were found in the PVN and SON at P7 or P18. Taken together with our previous results, these sex differences in oxytocinergic regions during development might be mediated by a sex-specific regulation of epigenetic mechanisms during the critical period of sexual differentiation.

D-116 | LEAP2 induces long-term anorexigenic effects in mice

Neuroendocrinology and Neuroimmunology

Author: Lucia Giovanini | Email: luciagiovanini5@gmail.com

Lucia Giovanini1°, Nahuel Wanionok1°, Heredia Florencia1°, Rodriguez Silvia1°, Castrogiovanni Daniel1°, Cornejo Maria Paula1°, Perello Mario1°

1° Laboratory of Neurophysiology of the Multidisciplinary Institute of Cell Biology (IMBICE) (CONICET – CIC-PBA – UNLP)

Liver-expressed antimicrobial peptide 2 (LEAP2) is a newly discovered endogenous ligand of the growth hormone secretagogue receptor (GHSR), a G-protein coupled receptor mainly expressed in the brain that is strongly implicated in the regulation of energy balance. LEAP2 inhibits GHSR activity, including the orexigenic actions of the stomach-derived hormone ghrelin. Here, we used mice to study the kinetics of the inhibitory effect of LEAP2 on ghrelin-induced food intake and the brain nuclei target of this effect. In mice with intracerebroventricular cannulas, we found that centrally-injected LEAP2 blocks the orexigenic effect of ghrelin injected 1-, 3- or 8-h later but does not alter the effect of ghrelin injected 24-h later. We analyzed c-Fos induction in hypothalamic brain nuclei and found that LEAP2 also inhibits ghrelin-induced increase of c-Fos in the arcuate nucleus. We then assessed the ability of a centrally-injected fluorescent variant of LEAP2 (F-LEAP2) to label the brain at different time points. We measured fluorescence intensity of F-LEAP2 labeled neurons, which were mainly localized in the arcuate and ventromedial hypothalamic nuclei. Finally, we performed pulse-chase studies in a HEK 293T cell line that stably expresses GHSR and observed that F-LEAP2 remained bound to GHSR for hours. Altogether, our results suggest that LEAP2 induces a long-term inhibitory effect on the orexigenic effects of ghrelin, presumably because it remains bound to GHSR for several hours.

D-117 | Thyroxine induces Neuro 2A cell differentiation and increases viability

Neuroendocrinology and Neuroimmunology

Author: Mariana Elizabeth Troncoso | Email: troncoso.mariana@gmail.com

Mariana Troncoso1°2°, Flavia Neira1°, María Belén Sánchez1°, María Cecilia Michel1°, Marta Soaje1°3°, Elisa Pietrobon1°3°, Luciana Viruel, Esteban Lozano1°3°, Juan Pablo Mackern-Oberti1°3°, Susana Valdez1°2°

1° Insitituto de Medicina y Biología Experimental de Cuyo (IMBECU), CONICET, CCT - Mendoza.

2° Universidad Nacional de Cuyo, Facultad de Ciencias Exactas y Naturales.

3° Universidad Nacional de Cuyo, Facultad de Ciencias Médicas

Introduction: Neurogenesis, the process of generating new neurons, is crucial in embryonic development as in the adult brain. Thyroid hormones are key modulators of this process. Traditionally, the action of Triiodothyronine (T3) (biologically active hormone) has been studied, being less explored than the action of Thyroxine (T4) (non-genomic pathway). Objectives: to study the effect of T4 on the maturation, differentiation, and viability of the Neuro 2A cell line (Mouse Albino neuroblastoma). Methodology: Neuro 2A cells were cultured in DMEM supplemented with 10% fetal bovine serum (FBS). Treatments were conducted for 48 h with 5, 10, and 20 nM of T4 in DMEM containing 10% or 2% charcoal-stripped FBS (FBS CH). Retinoic acid (10 µM) was a positive control for neuronal differentiation. Results: T4 (5, 10, and 20 nM) in FBS CH 10% significantly ($p < 0.01$) increased neuronal differentiation without affecting viability relative to controls. In FBS CH 2%, T4 increased neuronal differentiation ($p < 0.001$) and viability ($p < 0.001$) relative to controls. In addition, 10 and 20 nM concentrations of T4 significantly ($p < 0.01$) induced the formation of differentiated neurons with complex morphology. Conclusion: T4 promotes neuronal differentiation in Neuro 2A cells and increases cell viability at low FBS concentrations. The relevance of this work lies in the fact that, in certain pathophysiological contexts, T4 activity could compensate or even modulate T3 action.

D-118 | Unraveling central canal neurons connectivity in the mouse hindbrain

Sensory and Motor Systems

Author: Joselina Berti | Email: jberti@leloir.org.ar

Joselina Berti1°, Guillermo Lanuza1°

1° Fundación Instituto Leloir

Cerebrospinal fluid-contacting neurons (CSF-cNs) are a distinct group of neurons within the spinal cord, which stand out due to their strategic location surrounding the central canal. In zebrafish, they detect spinal curvature during swimming and act as chemosensors of CSF composition. However, how they contribute to CNS circuitry in tetrapods remains unclear. In this work, we characterize the CSF-cNs network in the mouse brain by using Pkd2l1Cre mice to selectively mark the CSF-cN cell bodies, axons and synaptic terminals. We confirm they are present in the central canal in the hindbrain, extending up to the beginning of the fourth ventricle. Their axons project across different brainstem areas, including the hypoglossal (nXII) and Roller nucleus. CSF-cN' axons wrap around the nXII in a remarkably precise manner, while also innervate the core of the Roller. XII motoneurons modulate tongue movement and are output of the rhythmic network that control breathing. Opposing, Roller nucleus has been poorly studied. The analysis of genetic Synaptophysin-Tom puncta identified that CSF-cNs form profuse GABAergic synapses on ventral motoneurons of the nXII and Dbx1-derived Roller neurons. We hypothesize that CSF-cNs may regulate respiratory activity though these nuclei, according to CSF homeostasis. Altogether, our results describe a brand-new connectivity map of CSF-cN in the mammalian brainstem, which could bring light to unforeseen circuits and regulation of autonomic functions.

D-119 | Beyond Reaction Time: Studying the Spatiotemporal Dynamics of Motor Planning by analyzing Corticomuscular Coherence during Motor Reaction tasks

Sensory and Motor Systems

Author: Leonardo Ariel Cano | Email: lcano@herrera.unt.edu.ar

Leonardo Ariel Cano1°2°, Gonzalo Daniel Gerez1°2°, María Soledad García1°2°, Ana Lía Albarracín1°, Eduardo Fernández-Jover3°, Fernando Daniel Farfán1°3°

1° Laboratory of Neuroscience and Applied Technologies (LINTEC), Bioengineering Department, Faculty of Exact Sciences and Technology (FACET), National University of Tucuman (UNT), Instituto Superior de Investigaciones Biológicas (INSIBIO), National Scientific and Technical Research Council (CONICET). Av. Independencia 1800, San Miguel de Tucuman 4000, Argentina.

2° Faculty of Physical Education, (FacDEF), National University of Tucuman (UNT). Av. Benjamin Araoz 750, San Miguel de Tucuman 4000, Argentina.

3° Institute of Bioengineering, Universidad Miguel Hernández of Elche. Av de la Universidad S/N, Elche 03202, Spain

The involvement of the cerebral hemispheres in motor planning is a significant research topic in sports science and laterality. In the field of motor control, decision-making (DMK) time has been proposed as a metric of central processing speed, reflecting the time needed to complete processes such as scanning the environment, identifying objects of interest, selecting a response, and initiating the motor program. In this study, twenty-five healthy right-handed volunteers were divided into control (n=16) and athletes (n=9) groups. Participants performed motor reaction tasks based on visual stimuli, while 64-channel EEG, EMG, and motion capture data were collected to assess functional connectivity between the cortex and muscles. The control group exhibited around 20% longer DMK time for right-hand selection compared to the left hand, while the athletes group showed no such disparity. Additionally, controls demonstrated significant right-hemisphere corticomuscular coherence in sensorimotor areas during motor planning for both hands. These findings provide evidence that hemispheric involvement in motor planning is neither symmetrical nor equivalent for both hands in control subjects. In contrast, athletes did not display consistent spatiotemporal

patterns. Future research on athletes will require more precise classification based on the type of sport practiced.

D-120 | Exploring Microstructural Variants Across Different Position-Related Tremors in Parkinson's Disease

Sensory and Motor Systems

Author: Ivonne Cruz | Email: ivonnecruzx@gmail.com

Ivonne Cruz1°, Miguel Wilken1°, Gonzalo Álvarez2°, Mirta Villarreal3°, Marcelo Merello1°3°

1° Servicio de Movimientos Anormales, Departamento de Neurología, FLENI, Buenos Aires, Argentina

2° Centro Atómico Bariloche, CONICET, CNEA, S. C. de Bariloche, Argentina

3° Consejo Nacional de Investigaciones Científicas y Técnicas (CONICET), Argentina

Microstructural differences between tremor phenotypes in Parkinson's Disease (PD) have not been explored. In this study, we aim to identify microstructural differences in the cerebello-thalamo-cortical circuit (CTC) among four groups of PD patients: those with no tremor (N=19 hemispheres), those with isolated rest tremor (RT=14), those with rest tremor that re-emerges after a pause when changing position (RET=12), and those with continuous tremor without pause during position change (CT=16). Diffusion Magnetic Resonance Images were acquired and each brain hemisphere was classified based on contralateral tremor. Voxelwise statistical analysis of diffusion parameters was carried out (p-value≤0.05). CT hemispheres presented increased mean and radial diffusivity (≥20.48%) in the whole CTC, as compared to NT and RT hemispheres; also decreased fractional anisotropy was observed. RET hemispheres present changes (≥39.34%) in the superior corona radiata as compared to NT and RT hemispheres. Our findings indicate that the hemispheres associated with RET and CT exhibit greater demyelination in the hemisphere opposite to the tremorous side of the body compared to RT and NT. Specifically, the hemispheres linked to RET display changes primarily in the thalamo-cortical section of CTC, whereas those associated with CT show alterations throughout the entire CTC. This suggests a potential correlation between the extent of CTC alterations and the degree of tremor attenuation during movement.

D-121 | Visual responses of central neurons that encode stimulus acceleration are modulated by locomotor activity in an arthropod.

Sensory and Motor Systems

Author: Matias Gültig | Email: magultig@gmail.com

Matías Gültig1°2°, Alejandro Cámera1°2°, Damian E. Oliva2°3°, Daniel Tomsic11°2°

1° University of Buenos aires (UBA)

2° Institute of Fisiology, molecular biology and neurocience (IFIBYNE)

3° Qulmes University (UNQUI)

The neural control of behavioral responses to visually detected approaching objects (looming stimuli) is increasingly studied in several animal models. However, in almost all these models the behavior entails a ballistic response, i.e. a response that once released is not further regulated. In contrast, the velocity (and direction) of the escape run of the crab Nehohelice is continually adjusted according to changes in the visual information provided by the stimulus. To further characterize this visuo-motor transformation we recorded the locomotor responses of the animal in a treadmill, simultaneously with the neuronal responses of lobula neurons using multielectrode extracellular recordings. By analyzing the responses to a variety of visual motion stimuli our results clearly reveal a strong locomotor-dependent modulation of the neuronal responses. Furthermore, responses to approaching and receding objects show that lobula neurons may encode stimulus acceleration, a property that to our knowledge has not yet been described in any neuron.

D-122 | Key Role of the Mesencephalic Locomotor Region in the Consolidation of Motor Learning

Sensory and Motor Systems

Author: Leonardo Molano Ramirez | Email: leomol5164@gmail.com

Leonardo Molano Ramirez1°, Joaquin Alejo Quintana1°, Damian Hernandez1°, Maria Soledad Esposito1°

1° Neurobiology of movement/Medical physics department/Centro Atómico Bariloche

The traditional motor learning model emphasizes specific brain structures within the forebrain and cerebellum, positing that they undergo activity-dependent modifications during skill acquisition. In contrast, brainstem motor regions have been traditionally regarded as static, primarily governing stereotyped motor behaviors. However, we challenge this perspective by proposing that the acquisition of new motor skills also involves dynamic changes in brainstem motor centers, with a particular focus on the mesencephalic locomotor region (MLR). In our study, we investigate MLR's role in learning new motor skills, using the accelerating rotarod task and single pellet reaching task with mice as a model. Employing various methods, including drug protein inhibition, specific drug for blocking signaling pathway receptors, synaptic silencing, and unsupervised machine learning, we provide evidence supporting MLR involvement in consolidating new motor skills. To demonstrate the specificity of MLR's role in motor learning, we also utilized paradigms such as contextual fear conditioning and novel object recognition, which showed no significant MLR involvement, further emphasizing its unique contribution to motor skill acquisition.

D-123 | Evaluation of the therapeutic potential of D5 receptors ablation in striatal cholinergic interneurons in a mouse model of Parkinson's disease.

Sensory and Motor Systems

Author: Kianny Miroslava Sanchez Armijos | Email: kianny.sanchez97@gmail.com

Kianny M. Sanchez1°, Agostina M. Stahl1°, Agostina Presta1°, M. Gustavo Murer1°, Cecilia Tubert1°

1° Universidad de Buenos Aires - CONICET. Instituto de Fisiología y Biofísica Bernardo Houssay (IFIBIO Houssay), Facultad de Medicina, Departamento de Ciencias Fisiológicas. Grupo de Neurociencia en Sistemas. Buenos Aires, Argentina.

Striatal cholinergic interneurons (SCIN) are the main source of striatal ACh. In Parkinson´s disease (PD), the degeneration of dopaminergic neurons innervating the striatum leads to increased cholinergic activity, which contributes to PD symptoms. While L-dopa remains the gold standard therapy, prolonged treatment can result in dyskinesia. Although selective modulation of SCIN activity influences dyskinesia, the underlying mechanisms remain uncertain. SCIN become hyperexcitable in parkinsonian dyskinetic mice due to an increased ligand-independent activity of dopamine D5 receptors (D5R). Reducing this activity with D1/D5 inverse agonists restores SCIN's normal physiology. Our study aims to clarify the role of SCIN D5R in L-dopa-induced dyskinesia. We explored the therapeutic potential of reducing D5R expression in SCIN by generating ChAT-Cre+/-;D5R/flox+/+ mice lacking D5R expression in cholinergic neurons. Both ChAT-Cre+/-;D5R/flox+/+ and control D5Rflox+/+ mice were lesioned with 6-OHDA to induce parkinsonism and treated with L-dopa to induce dyskinesia. Preliminary data show a decrease in dyskinesia in D5R ablated mice. We plan to extend this research by selectively eliminating D5R from striatal neurons in adult mice with an AAV vector-approach.

D-124 | Kinematic study of crawling in Hirudo Verbana leeches

Sensory and Motor Systems

Author: Federico Yulita | Email: federico_yulita@hotmail.com

Federico Yulita1°2°, Lidia Szczupak1°3°, Martina Radice1°3°

1° Instituto de Fisiología, Biología Molecular y Neurociencias, UBA-CONICET, Argentina

2° Departamento de Física, UBA-CONICET, Argentina

3° Departamento de Fisiología, Biología Molecular y Neurociencias, Facultad de Ciencias Exactas y Naturales, Universidad de Buenos Aires, Argentina

Leeches crawl on solid surfaces through a succession of extension and contraction body waves moving in an antero-posterior order, anchored on its anterior and posterior suckers. This rhythmic, step-like behavior displaces the animal forward. We aim at characterizing this behavior including the coordination of its body segments to analyze the metachronal nature of this movement, using DeepLabCut.

Each crawling step can be divided into 5 phases: an Initial Rest followed by an Extension of its body up to a Plateau phase where its body length is maintained, and a Contraction phase that ends in a Final Resting phase. The period is a function of the duration of each of these phases, except for the plateau phase. The most predominant phases are the extension and the plateau phases, taking up almost two thirds of the entire step.

Results show that during each step there is a strong correlation in length and speed between adjacent body segments, indicating that crawling results from a wave-like pattern confirming the metachronal nature of the behavior.

D-125 | Exploring Hybrid Search using EEG and Eye Tracking Coregistration and Deconvolution analysis

Theoretical and Computational Neuroscience

Author: Damian Ariel Care | Email: damianos.care@gmail.com

Damian A. Care1°, Joaquin E. Gonzalez1°, Anthony J. Ries3°, Matias J. Ison4°, Juan E. Kamienkowski1°2°

1° Laboratorio de Inteligencia Artificial Aplicada (ICC, CONICET-UBA, Argentina)

2° Departamento de Computación , FCEyN-UBA

3° ARL(United States)

4° Scholl of Psychology (University of Nottingham, UK)

In everyday scenarios, we frequently encounter the task of pinpointing a specific item amid distractions. For instance, imagine navigating a supermarket aisle to find any cereal from a list of preferred options. The demands of this hybrid visual and memory search task, where search is coupled with the simultaneous need to access and recall items from memory, represent significant cognitive challenges. To explore the dynamics underlying hybrid search, we conducted a study using concurrent EEG and eye-tracking measurements, focusing on fixation-related potentials (FRPs). Across two sites, 42 participants were asked to identify any of multiple memorized targets, with varying memory set sizes (MSS). Our analysis investigated how different task components—such as task progression, target presence, and memory load—affect FRPs using linear model-based techniques. This approach effectively managed the temporal overlap inherent in natural viewing responses, allowing for a clearer disentanglement of the effects we sought to study. Additionally, we developed a specialized analysis tool in Python that facilitated exploration of alternative solvers beyond ordinary least squares, improving estimation accuracy and addressing collinearity issues. Ultimately, our findings demonstrate how integrating empirical and analytical approaches enables the differentiation of interacting neural processes while faithfully capturing the intricacies of real-world tasks.

D-126 | Uncertainty in latent representations of variational autoencoders optimized for visual tasks

Theoretical and Computational Neuroscience

Author: Josefina Catoni | Email: jcatoni@sinc.unl.edu.ar

Josefina Catoni1°, Domonkos Martos2°, Enzo Ferrante1°3°, Diego H. Milone1°, Ferenc Csikor2°, Balázs Meszéna2°, Gergő Orbán2°, Rodrigo Echeveste1°

1° Research Institute for Signals, Systems and Computational Intelligence, sinc(i), CONICET-UNL, Santa Fe, Argentina

2° Computational Systems Neuroscience Lab, Department of Computational Sciences, HUN-REN, Wigner Research Centre for Physics, Budapest, Hungary

3° Department of Computer Science, University of Buenos Aires, Buenos Aires, Argentina

Deep learning methods are increasingly becoming instrumental as modeling tools in computational neuroscience, employing optimality principles to build bridges between neural responses and perception or behavior. Developing models that adequately represent uncertainty is however challenging for deep learning methods, which often suffer from calibration problems. This constitutes a difficulty in particular when modeling cortical circuits in terms of Bayesian inference, beyond single point estimates such as the posterior mean or the maximum a posteriori. In this work we systematically studied uncertainty representations in latent representations of variational auto-encoders (VAEs), both in a perceptual task from natural images and in two other canonical tasks of computer vision, finding a poor alignment between uncertainty and informativeness or ambiguities in the images. We next showed how a novel approach which we call explaining-away variational auto-encoders (EA-VAEs), fixes these issues, producing meaningful reports of uncertainty in a variety of scenarios, including interpolation, image corruption, and even out-of-distribution detection. We show EA-VAEs may prove useful both as models of perception in computational neuroscience and as inference tools in computer vision.

D-127 | Memristive Hardware Neural Networks

Theoretical and Computational Neuroscience

Author: Leandro Ezequiel Fernandez | Email: leandrofernandez671@gmail.com

Leandro Ezequiel Fernandez1°2°, Marcelo Rozenberg3°, Gabriel Bernardo Mindlin1°2°

1° Dpto. de Física, Facultad de Ciencias Exactas y Naturales, Universidad de Buenos Aires

2° Instituto de Física Interdiciplinaria y Aplicada, INFINA-CONICET, Buenos Aires, Argentina

3° Université Paris-Saclay, CNRS Laboratoire de Physique des Solides, 91405, Orsay, France

In the last years, many mathematical models have been proposed to emulate the behavior of neurons. Electronic circuits which integrate analogically those equations, or display dynamics qualitatively similar to neurons, are known as electronic neurons. The advantage of performing an analogic integration of the equations, as opposed to integrating them by software running on a computer, emerges if the computation requires or is designed to interact on real time with a living being. In that case, an analog integration avoids any delays caused by an operative system controlling data acquisition cards, or the running of the codes themselves. In this work we built on previous efforts that lead to the construction of an electronic neuron of minimal complexity in its design, and yet was capable of displaying a diversity of excitable dynamics. We now show how to couple the units in a realistic way and build the first elements of a circuit capable of displaying acoustically selective responses.

D-128 | A Multiscale Symbolic Approach to Decoding Delta and Ripple Oscillations Bands as Biomarkers for Epileptiform Discharges

Theoretical and Computational Neuroscience

Author: Mauro Granado | Email: granadomauro@gmail.com

Mauro Granado1°, Federico Miceli1°, Nataniel Martinez2°, Lijandy Jiménez Armas3°, Fernando Montani1°

1° Instituto de Física La Plata - Universidad Nacional de La Plata - CONICET

2° Instituto de Investigaciones Físicas De Mar De Plata - Universidad Nacional de Mar del Plata - CONICET

3° Instituto de Matemática Aplicada del Litoral - Universidad Nacional del Litoral - CONICET

We apply a multiscale symbolic approach to analyze the complex dynamics of temporal lobe refractory epilepsy using high-resolution intracranial EEG (iEEG). Focusing on basal and preictal phases, we examine frequency bands up to 240 Hz, revealing key periodicities and time scales in neural dynamics. By band-pass filtering signals into delta, theta, alpha, beta, gamma, and high-frequency oscillations (HFO), we assess distinct nonlinear dynamics. Our method identifies critical time lag scales (τ) within these bands, crucial for studying refractory epilepsy. Metrics like permutation entropy (H), Fisher information (F), and complexity (C) uncover nonlinear patterns, revealing intrinsic τ that maximize complexity. Comparing basal and preictal signals, we identify significant differences in the delta and 200-220 Hz (HFO 6) bands. These differences in Fisher information before seizures underscore the importance of delta oscillations and HFO waves as potential biomarkers, offering new insights into focal epilepsy dynamics.

D-129 | Scattering Transform to detect Electrographic Seizure Pattern Modulations in patients treated with Responsive Neurostimulation

Theoretical and Computational Neuroscience

Author: Carlos Andrés Mateos | Email: mateos.andres@gmail.com

Carlos Andrés Mateos1°, Juan Manuel Miramont2°, Victoria Peterson1°

1° Instituto de Matemática Aplicada del Litoral (IMAL), CONICET-UNL, Santa Fe

2° Postdoctoral Researcher at Centre de Recherche en Informatique, Signal et Automatique de Lille (CRIStAL), France

Individuals with drug-resistant epilepsy are usually treated with invasive therapies like resective surgery or neurostimulation. Responsive neurostimulation (RNS) is a closed loop interface that monitors the electrical brain activity and applies local electrical current when seizure-like patterns are detected. This treatment is designed to work directly at the seizure foci like a heart defibrillator does in cardiac arrhythmia. However, evidence reveals that this may not be its primary mechanism of action. The slow time course of seizure reduction with RNS therapy provides some evidence for a long-term neuromodulatory effect on brain networks that generate seizures. Only effects at some latency after stimulation, called indirect electrographic seizure pattern modulation (iESPM), were associated with clinical improvements. These iESPMs are characterized by changes at the time-frequency domain and were described by visual inspection of expert epileptologists. Due to the large amount of data and escarse of experts' time, there is a need to develop unsupervised methods to identify iESPM with high precision. Here, we explore Scattering Transform (ST), a tool that constructs invariant, stable, and informative signal representations by cascading wavelet modulus decomposition followed by a low pass filter. One-class support vector machines are then used upon the ST features to build an unsupervised model for estimating changes in seizure patterns along the RNS therapy.

D-130 | Analysis of Semantic Bias in ChatGPT: Analyzing Generated Bias Across the Model's Layers

Theoretical and Computational Neuroscience

Author: María Belén Paez | Email: bpaez2@gmail.com

Maria Belen Paez1°, Facundo Totaro1°, Julieta Laurino3°, Laura Kaczer3°, Juan Kamienkowski1°2°4°, Bruno Bianchi1°2°

1° Universidad de Buenos Aires. Facultad de Ciencias Exactas y Naturales. Departamento de Computación. Buenos Aires, Argentina.

2° CONICET-Universidad de Buenos Aires. Instituto de Ciencias de la Computación (ICC). Buenos Aires, Argentina.

3° Universidad de Buenos Aires. Departamento de Fisiología, Biología Molecular y Celular. Buenos Aires, Argentina.

4° Facultad de Ciencias Exactas y Naturales, Maestría en Explotación de Datos y Descubrimiento del Conocimiento, Universidad de Buenos Aires, Buenos Aires, Argentina

The assignment of meaning to a word is a key process in language comprehension. However, since words can have more than one meaning (i.e., homonym and polysemy), there is additional complexity to consider. Nevertheless, both our brain and state-of-the-art Language Models (LM) can assign meaning to each word when processing it, taking into account the context in which it appears. The aim of the present study is to understand if the mechanisms used by the brain and the LM to solve this task are analogous. Current LM processes text by executing a series of transformations sequentially. For these, words are converted to embeddings (i.e., the vectorized representation) that are modified, introducing information about the surrounding context, as they pass through the layers. Our goal is to compare the human behavior of meaning assignment (measured in an online experiment) with model neural representations across layers, focusing on how embeddings of ambiguous words vary depending on several biasing contexts. We measured the model's bias as the cosine distance between the embedding of the meaning and the contextualized embedding of the ambiguous word in a given layer. Our results show a non-linear progression of the

biasing. This is in line with previous works, and suggests that middle and final layers process different aspects of the input texts.

D-131 | Integrating Ideal Bayesian Searcher and Neural Networks Models for Eye Movement Prediction in a Hybrid Search Task

Theoretical and Computational Neuroscience

Author: Gonzalo Ruarte | Email: gruarte@dc.uba.ar

Gonzalo Ruarte1°2°, Gastón Bujía1°2°, Damián Care1°, Matías Ison3°, Juan Kamienkowski1°2°4°

1° CONICET - Universidad de Buenos Aires. Instituto en Ciencias de la Computación (ICC). Laboratorio de Inteligencia Artificial Aplicada (LIAA). Buenos Aires, Argentina.

2° Universidad de Buenos Aires. Facultad de Ciencias Exactas y Naturales. Departamento de Ciencias de la Computación. Buenos Aires, Argentina.

3° University of Nottingham, Nottingham, United Kingdom

4° Universidad de Buenos Aires. Facultad de Ciencias Exactas y Naturales. Maestría en Explotación de Datos y Descubrimiento del Conocimiento. Buenos Aires, Argentina.

Visual search, where observers search for a specific item, is a crucial aspect of daily human interaction with the visual environment. Hybrid search extends this by requiring observers to search for any item from a memory set. While there are models simulating human eye-movement in visual search tasks within natural scenes, none of them have been extended to memory search tasks. In this work, we present an improved version of the Bayesian Searcher model based on the Entropy Limit Minimization (ELM) model, that not only outperformed previous models in Visual search but it is also capable of performing Hybrid search tasks. Briefly, by adjusting the model's (peripheral) visibility, we made early search stages more efficient and closer to human behavior. Additionally, limiting the model's memory reduced its success in longer searches, mirroring human performance. The key challenge in Hybrid search is that participants might search for different objects at each step. To address this, we developed target selection strategies. We tested this model on the VISIONS benchmark (https://github.com/NeuroLIAA/visions) and against human participants performing a novel Hybrid search task that includes natural scenes backgrounds. Altogether, our improved model not only performs Hybrid search tasks but also shows a behavior closely aligned with human performance across both tasks, advancing our

understanding of the complex processes in visual search while maintaining interpretability.

D-132 | Competition dynamics explains mixed representation of space and time in the hippocampus

Theoretical and Computational Neuroscience

Author: Federico Szmidt | Email: fszmidt@gmail.com

Federico Szmidt1°, Camilo J. Mininni1°

1° Instituto de Biología y Medicina Experimental

The hippocampal formation is crucial for the neural representation of space and time. Particularly in the hippocampus, CA1 and CA3 neurons use sparse coding to represent these variables, with place cells firing in specific spatial regions and time cells firing at specific times within an interval. However, many neurons display a mixed representation, firing in response to both a particular time and place. While several models have been proposed to explain the emergence and mechanisms of place and time cells separately, mixed representation remains unexplained.

In this work, we trained recurrent neural networks with two interconnected modules: one encoding an agent's position by integrating speed from simulated trajectories and visual inputs, and another encoding elapsed time between discrete stimuli. The architecture promotes neural competition dynamics within each module. The trained networks exhibited sparse coding similar to that observed in hippocampal place cells and time cells, with many neurons demonstrating mixed selectivity. The networks also shared other properties with biological systems, such as place field size distributions and the occurrence of Weber’s Law in time cells. Finally, we explored how network connectivity and dynamics give rise to these properties. Our findings suggest that sparse coding and mixed representation for space and time naturally arise from a joint space-time optimization problem involving competition dynamics.

D-133 | PIBE: Progression Invariant Brain Embeddings

Theoretical and Computational Neuroscience

Author: Fermin Travi | Email: fermintravi@gmail.com

Fermin Travi1°2°, Eduardo Castro3°, Hongyang Li3°, Anushree Mehta3°, Jenna Reinen3°, Pablo Meyer Rojas3°, Guillermo A. Cecchi3°, Pablo Polosecki3°

1° Facultad de Ciencias Exactas y Naturales, Departamento de Ciencias de la Computación, Universidad de Buenos Aires, Buenos Aires, Argentina

2° Laboratorio de Inteligencia Artificial Aplicada (LIAA), CONICET - Universidad de Buenos Aires, Instituto en Ciencias de la Computación (ICC), Buenos Aires, Argentina

3° IBM T. J. Watson Research Center, Yorktown Heights, New York, NY, United States

One of the main hypotheses across a variety of disorders, including dementias, bipolar disorder, and schizophrenia, is that their effects produce premature brain aging. Current approaches typically find correlations between features extracted from MRI images and subjects' age, conflating phenotypes with progression. Different disorders are hard to distinguish when the degree of progression of each subject is not considered. Simply finding correlates of aging tends to group subjects by progression.

To tackle this problem, we leveraged invariant deep Generative Artificial Intelligence models with the goal of obtaining brain embeddings (i.e., abstract representations in the form of vectors) capable of capturing the phenotypes that underlie neurodegenerative disorders. By processing 44.178 brain MR images (23.115 females, 21.063 males; mean age 64, std. 7.7) from the UK Biobank dataset, we were able to obtain brain embeddings that contain little to no information about age (0.11 pearson's correlation vs. 0.79 from the non-invariant model), albeit at a cost in sex prediction (down from 95% to 78%) and reconstruction error (up from 0.21 to 0.33). The ensuing evaluation will consist of predicting neurodegenerative disorders —were our hypothesis to be correct, there should not be differences in the performance of the classifier across age windows. This model holds the promise of paving the way for the development of early diagnostic tools.

D-134 | Characterization of the autonomic nervous system through multifractality in human heart rate variability.

Tools Development and Open Source Neuroscience

Author: Manuel Almagro | Email: manualmagro98@gmail.com

Manuel Almagro1°, Agustina Giorgetti1°2°, Shanesia Gasaneo1°2°, Juan Martin Randazzo3°, Gustavo Gasaneo1°2°

1° Instituto de Fisica del Sur (CONICET) - Departamento de Fisica, Universidad Nacional del Sur, Bahia Blanca, 8000, Argentina

2° Centro Integral de Neurociencias Aplicadas, Bahia Blanca, 8000, Argentina

3° Centro Atómico Bariloche (CONICET), 8400, Bariloche, argentina

ALS is a progressive neurodegenerative disease with a prevalence of 5-8 cases per 100,000 inhabitants and an average life expectancy of five years from diagnosis. Currently, diagnosis is often delayed up to two years due to the absence of specific biomarkers. Recent research suggests that it is possible to detect subclinical autonomic dysfunctions in early stages of ALS, which could be key to early diagnosis. Heart rate variability (HRV) has also been shown to be a valuable indicator for monitoring sympathetic and parasympathetic balance, underlining its potential as a diagnostic tool.

The heart rate was modelled taking into account the electrical activity of the heart and the influence of the Autonomic Nervous System, from a system of six coupled differential equations, each pair of them representing the SA node, the AV node and the His-Purkinje complex. Time-dependent perturbations were added to simulate the periods of cardiac activation or relaxation that a person with this pathology can maintain. Finally, the multifractality of the cases with and without perturbations was studied. The analysis shows that it is possible to observe a difference between the values of some multifractality coefficients, in agreement with the initial hypothesis.

D-135 | Development, construction and characterization of electrodes to perform electrocorticography in songbirds during sleep.

Tools Development and Open Source Neuroscience

Author: Nahuel Contureyuzon Colomes | Email: nahuel.colomes@hotmail.com

Nahuel Contureyuzón Colomes1°, Ana Amador1°2°

1° Universidad de Buenos Aires, Facultad de Ciencias Exactas y Naturales, Departamento de Física, Ciudad Universitaria, 1428 Buenos Aires, Argentina.

2° CONICET - Universidad de Buenos Aires, Instituto de Física Interdisciplinaria y Aplicada (INFINA), Ciudad Universitaria, 1428 Buenos Aires, Argentina.

Songbirds share several sleep characteristics with mammals, in particular the set of complex electroencephalogram patterns that occur naturally during sleep. Specifically, in zebra finches (Taeniopygia guttata), slow wave sleep (SWS), rapid eye movement (REM) and an intermediate sleep (IS) stage that commonly occurs at transitions between other stages have been observed during sleep. As a first step in the study of sleep stages in songbirds, we present the process of construction and characterization of electrocorticographic (ECOG) electrodes. The electrodes are characterized according to their shape, contact area and impedance. In this work we show a robust and low-cost construction process that allows to produce ECOG electrodes for recordings in small animals.

D-136 | Sleep stage classification using generalized ordinal patterns

Tools Development and Open Source Neuroscience

Author: Cristina Daiana Duarte | Email: cristinaduarte88@gmail.com

Cristina Daiana Duarte1°, Marianela Pacheco1°2°3°4°, Francisco Ramiro Iaconis1°, Claudio Augusto Delrieux3°, Gustavo Gasaneo1°

1° Instituto de Física del Sur, Departamento de Física, Universidad Nacional del Sur (UNS) - CONICET, 8000 Bahía Blanca, Argentina

2° Doctorado en Neurociencias, Universidad Nacional de Córdoba (UNC), Córdoba, Argentina.

3° Instituto de Ciencias e Ingeniería de la Computación (ICIC), Universidad Nacional del Sur - CONICET, Bahía Blanca, Argentina.

4° Universidad Provincial del Sudoeste (UPSO), Bahía Blanca, Argentina.

Sleep is a natural and reversible state. It is organized into cycles of about 120 minutes, consisting of rapid-eye-movement (REM) and non-REM (NREM) stages. NREM includes N1, N2 and N3 substages, each characterized by different physiological and brain activity patterns. In this context, polysomnography aims to identify these stages through the analysis of EEG signals, which is an essential tool for the diagnosis of sleep disorders. However, identifying and labeling sleep phases is a time-intensive task that requires considerable effort from experts. In this research we propose an unsupervised EEG signal analysis model that facilitates the identification of sleep stages efficiently and accurately.

We evaluate the statistical complexity of the EEG signal across sleep stages using the Generalized Ordinal Patterns (GOP), a generalization of the ordinal patterns of Bandt and Pompe's permutation entropy. We determine the probability of each individual ordinal pattern, weighted by signal variance within the pattern, and raised to an entropic index. In this way, a given signal segment can be characterized by the set of weighted probabilities of each ordinal pattern, under the different entropic indices. A random forest classifier is trained on a labeled polysomnography dataset using these features. After training, the resulting classifier achieves remarkable accuracies, showing

the potential of GOP as signal features for classification or other machine-learning based analysis.

VSD-137 | Corpus Curiosum: tackling today's critical thinking for tomorrow's Neuroscience

Tools Development and Open Source Neuroscience

Author: Mariela Fernanda Trinchero | Email: mftrinchero@gmail.com

Mariela F Trinchero1°, Inés Abalo-Rodríguez2°, Alba Sánchez-Fernández3°, Marta Turégano-López4°

1° Neuronal Plasticity Laboratory, Leloir Institute

2° Department of Experimental Psychology, Complutense University of Madrid, Spain

3° Laboratory for Applied Radiobiology, Department of Radiation Oncology, University Hospital Zurich, University of Zurich, Zurich, Switzerland

4° Universidad Politécnica de Madrid, Laboratorio Cajal de Circuitos Corticales, Centro de Tecnología Biomédica, Pozuelo De Alarcón, Spain

Corpus Curiosum was born in 2020 specifically to stimulate critical thinking in neuroscience and to promote scientific connections for early career reseachers (ECRs). The Corpus Curiosum core is composed of four international neuroscientists at different career stages whose fundamental aims are: to embrace diversity, support ECRs, and be highly accessible to everyone. We have created an online, multidisciplinary agora to hold enriching discussions and openly promote the exchange of opinions from young researchers in the neuroscience field. We address critical topics such as neurosexism, neuroethics, philosophy of neuroscience, credibility in research, etc. The success of the 1st edition convinced us to push this project further. As of today, we have deployed five editions, gathering hundreds of people from 50+ countries worldwide, leveraging our essential pillars. We have now come up with the Curious Minds School, where a selected group of students coming from all over the globe will face and discuss the basis of critical thinking in neuroscience. This course represents a novel asset to broaden the critical minds of our future neuroscientists. In order to support open science, we make all our material free and accessible on our online platforms. Our project has been recognized by IBRO (Diversity Grants 2021 and 2022), FENS, and BNA, who have sponsored our project along the way.