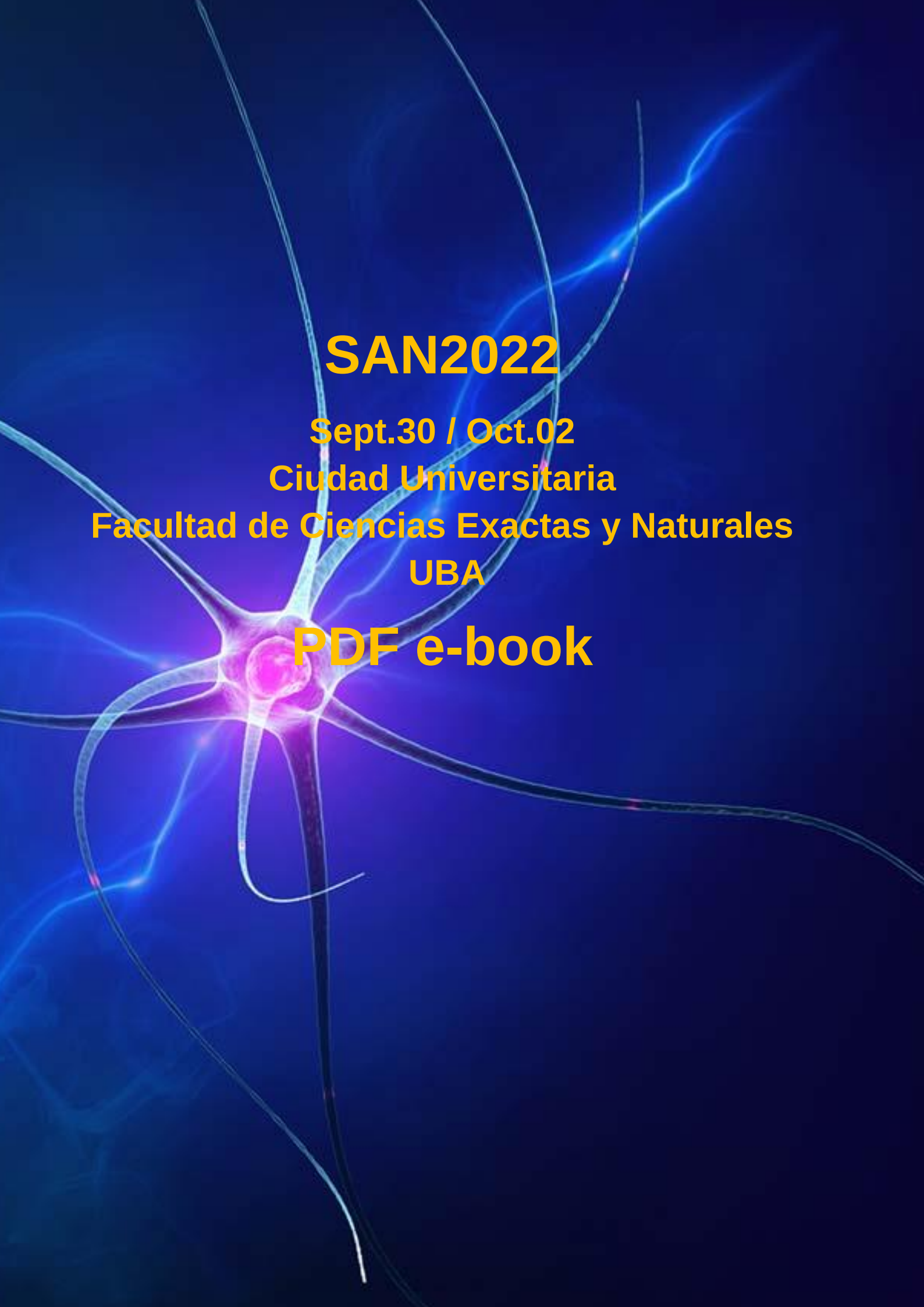

SAN2022

Sept.30 / Oct.02

Ciudad Universitaria

Facultad de Ciencias Exactas y Naturales

UBA

PDF e-book

INDEX

Organizing Committee 3

Sponsors 3

Code of Conduct 4

Program 6

Plenary Lectures 9

Symposia 11

Young Investigator Talks 27

Oral Communications 34

Poster Session 1

- Cellular and Molecular Neurobiology 41
- Chronobiology 66
- Cognition, Behavior, and Memory 72
- Development 111
- Disorders of the Nervous System 116
- Neural Circuits and Systems Neuroscienc 128
- Neural excitability, synaptic transmission and neuron-glia interactions 141
- Neurochemistry and Neuropharmacology 144
- Neuroendocrinology and Neuroimmunology 150
- Sensory and Motor Systems 153
- Theoretical and Computational Neuroscience 160
- Tools Development and Open Source Neuroscience 166

Poster Session 2

- Cellular and Molecular Neurobiology 167
- Chronobiology 192
- Cognition, Behavior, and Memory 197
- Development 236
- Disorders of the Nervous System 241
- Neural Circuits and Systems Neuroscience 253
- Neural excitability, synaptic transmission and neuron-glia interactions 265
- Neurochemistry and Neuropharmacology 268
- Neuroendocrinology and Neuroimmunology 275
- Sensory and Motor Systems 279
- Theoretical and Computational Neuroscience 285
- Tools Development and Open Source Neuroscience 291

ORGANIZING COMMITTEE

Marta Antonelli
Instituto de Biología Celular y Neurociencia "Prof Dr. Eduardo De Robertis", Fmed-UBA

Ivanna Castro Pascual
IMIBIO-CONICET, San Luis

Macarena Fernandez
Instituto de Investigaciones en Psicologia-IIPsi-CONICET-UNC Posdoc

Mauricio Galiano
Dpto. Química Biológica Ranwel Caputto, UNC

Ana Fabiola Macchione
Instituto de Investigaciones Psicológicas IIPsi-CONICET, UNC

Verónica Ramírez
Unidad de Neurobiología Aplicada (UNA, CEMIC-CONICET)

Diego Rayes
Instituto de Investigaciones Bioquímicas de Bahía Blanca

Victoria Rozes
Departamento Bioquímica Clínica, CIBICI-CONICET

SPONSORS

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 SAN2022 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

	September, Friday 30th	October, Saturday 1st	October, Sunday 2nd
09:00 - 09:30		Symposium 2 "Auditory deficits: from bench to bedside" Chairs: B. Elgoyhen & J. Goutman Aula Magna - Pabellón 1	Symposium 4 - "Perspectives of overfeeding research associated to food intake control, brain functions and related behaviors" - Chair: G. Canesini - Aula Magna - Pabellón 1
09:30 - 10:00			
10:00 - 10:30	Registration and Welcome Brunch (IFIBYINE)		
10:30 - 11:00			
11:00 - 11:30		Coffee Break	Coffee Break
11:30 - 12:00	Opening Plenary Lecture ARNE SCHOUSBOE Aula Magna - Pabellón I	Young Investigator Talks Belén Pardi , Natalia Andersen, Nicolás Martinez , Mariela Trinchero, Leonardo Versaci - Aula Magna - Pabellón I	Symposium 5 - "Music and Neurosciences" - Chairs: N. Justel - Aula Magna - Pabellón 1
12:00 - 12:30			
12:30 - 13:00	Young Investigator Talks -Andres P Varani , Antonella Soledad Rios - Aula Magna - Pabellón I		
13:00 - 13:30			
13:30 - 14:00	Lunch	Lunch	Lunch
14:00 - 14:30			
14:30 - 15:00	Symposium 1 - ISN Symposium: "One	Poster Session 1 Odd Numbers IFIBYNE HALLS	Poster Session 2 Even Numbers IFIBYNE HALL

15:00 - 15:30	mechanism to rule them all?: Signaling and endosomal pathways involved in the health and disease of the nervous system" - Chairs: V. Rozes Salvador & C. Conde - Aula Magna - Pabellón 1		
15:30 - 16:00			
16:00 - 16:30			
16:30 - 17:00	Coffee Break	Symposium 3 - "NeuroTour: Un Recorrido Federal de la Neurociencia en Argentina" - Chairs: R. Echeveste & F. Rossetti - Aula Magna - Pabellón 1	Oral Communications Session Aula Magna - Pabellón I
17:00 - 17:30	Round Table on Gender Policies (organized by Comisión de Género y Diversidades) Aula 1306, Pabellón Cero + Infinito		
17:30 - 18:00			Closing Plenary Lecture - "Zinc in the developing central nervous system" - PATRICIA OTEIZA , University of California, Davis, Department of Nutrition - Chair: ANA ADAMO, Departamento de Química Biológica, Facultad de Farmacia y Bioquímica. IQUIFIB-UBA-CONICET Aula Magna - Pabellón I
18:00 - 18:30			
18:30 - 19:00	Mesa redonda de discusión con Fernando Peirano, Presidente de la Agencia Nacional de Promoción de la Investigación, el	Asamblea General SAN Aula Magna - Pabellón I	Farewell Cocktail IFIBYNE Hall
19:00 - 19:30			
19:30 -			

20:00	Desarrollo Tecnológico y la Innovación “Financiamiento del sistema científico argentino, necesidades y realidades” Aula Magna - Pabellón I		
20:00 - 20:30	Wine Tasting Bodega Tapiz IFIBYNE		

PLENARY LECTURES

Opening - Arne Schousboe
Abstract Argentinian Neuroscience Meeting

Forty Years with Glutamate a Metabolite, Neurotransmitter and Excitotoxin with particular focus on the role of astrocytes.

Arne Schousboe, Department of Drug Design and Pharmacology, Faculty of Health and Medical Sciences, University of Copenhagen, DK-2100 Copenhagen, Denmark.

In the mid-seventies I started investigating the role of astrocytes in glutamate homeostasis and it became clear that these cells had a higher capacity for glutamate uptake than neurons, a notion confirmed by others particularly as a result of cloning studies and production of antibodies selectively identifying astrocytic glutamate carriers. It turned out that astrocytes not only expressed highly efficient glutamate transporters but also expressed all key enzymes involved in glutamate metabolism. During several years it was debated whether glutamate taken up into astrocytes was primarily metabolized to glutamine by glutamine synthetase (GS) or additionally to α-ketoglutate either via aspartate aminotransferase or glutamate dehydrogenase (GDH). It was established that GDH played an important role allowing glutamate to function as an energy substrate to secure TCA cycle function. This led to the notion that the glutamine-glutamate cycle did not function in strictly stoichiometric manner. This requires that there is an efficient mechanism allowing a net synthesis of α-ketoglutarate from glucose. This is brought about by the action of pyruvate carboxylase which we showed to be exclusively expressed in astrocytes. Another important observation during the late eighties was the demonstration that the malate-aspartate shuttle plays an important role for synthesis of neurotransmitter glutamate.

It is clear that the homeostatic mechanisms securing a balanced release of neurotransmitter glutamate and its clearance from the extracellular space is energy dependent. Hence, energy failure in the brain will lead to a significant overflow of glutamate from neurons to the extracellular space and it was shown using the newly established microdialysis technology that a brief period of ischemia led to a significant overflow of glutamate to the extracellular space. This turned out to be an important discovery for the development of the notion that glutamate could act as a potent excitotoxin. Since this involves glutamate receptors controlling e.g. calcium homeostasis, an enormous emphasis was in subsequent years devoted to the development of huge numbers of glutamate receptor subtype antagonists.

Unfortunately only a limited number of these were subsequently developed into clinically useful drugs to ameliorate neurotoxic damage.

The lecture will provide examples from the large number of publications in which results from these studies are described in detail.

Closing - Farewell Plenary Lecture: Patricia Oteiza

SYMPOSIA

01 | One mechanism to rule them all?: Signaling and endosomal pathways involved in the health and disease of the nervous system

Chairs:

Cecilia Conde, Inst. Ferreyra (INIMEC-CONICET-UNC)

Victoria Rozés Salvador, Dep. Bioquímica Clínica, CIBICI-CONICET

Several of the cellular processes that allow nerve cells to go through the stages of development, maturation, and aging are governed by endosomal and signaling mechanisms. The endosomal pathway regulates many cells signaling events by controlling the number, functionality, and receptors access as well as molecules available on the cell surface. This pathway, by providing a set of dynamic and biochemically specialized endomembrane structures that communicate with the plasma membrane, is increasingly viewed as a highly flexible scaffold to mediate the precise spatiotemporal control and trafficking of various biological signals. The specific principles of endosome-based signaling in the nervous system as well as the molecules that compose them are a constant subject of study due to their physiological relevance in both nervous system health and disease. Thus, the focus of this symposium is to highlight several well-defined mechanisms and molecules involved that contribute to relevant aspects of neuronal survival and degeneration.

Speakers:

Ching-Hwa Sung. NIH Institute, USA
“Multitasking roles by endosome in retinal homeostasis and disease”.

Christian Gonzalez Billault. Universidad de Chile, Chile

“Coordinated functions of small GTPases from the Rho, Arf, and Rab families define neuronal morphology”.

Neuronal functions are heavily dependent on their morpho-structural features. During development, precursors at the proliferation niches differentiate into neurons that contain two domains that differ in their molecular composition, structure, and functions, the axon and the somatodendritic compartment. Properly comprehending the mechanism controlling the acquisition of these conspicuous morphological and functional features is essential to define therapeutic strategies to overcome brain dysfunction linked to neurodegenerative diseases. Axon determination and elongation is an initial event in the polarization of neurons.

Several cellular and molecular mechanisms control it, including membrane and cytoskeleton dynamics. We recently showed that Rab8 is a critical determinant of axon specification that is functionally coupled to the activity of Cdc42, one of the master regulators for actin dynamics. In addition, Rab35 contributes to defining axonal elongation in a mechanism involving the microtubule-associated protein 1B and the atypical protein kinase PRPK.

Interestingly, the functions associated with Rab35 are tightly controlled by Arf6, a Golgi-associated protein. It has been previously suggested that Arf6 can influence Rac1, another small GTPase that controls actin dynamics. Therefore, a hierarchical organization of small GTPases provides a molecular platform that defines which neurite will become the axon and its extension by coordinating cytoskeleton and membrane-dependent elements.

Anahí Bignante. Inst. Ferreyra, Argentina

“Role of the Go/betagama signaling pathway in amyloidogenesis”.

Alzheimer´s disease (AD) is characterized by deposition of aggregated species of amyloid beta (Aβ) in the brain, which leads to progressive cognitive deficits and dementia. Aβ is generated by the successive cleavage of the amyloid precursor protein (APP), first by β-site APP cleaving enzyme 1 (BACE1) and subsequently by the γ-secretase complex. Conditions that enhance Aβ generation or reduce its clearance predispose to Aβ aggregation and the development of AD. In vitro studies have demonstrated that Aβ assemblies spark a feedforward loop heightening Aβ production. However, the underlying mechanism remains unknown. Here, we show that oligomers and fibrils of Aβ enhance colocalization and physical interaction of APP and BACE1 in recycling endosomes of human neurons derived from induced pluripotent stem cells and other cell types, which leads to exacerbated amyloidogenic processing of APP and intracellular accumulation of Aβ42. In cells overexpressing mutant forms of APP that are unable to bind Aβ or to activate Go protein, we have found that treatment with aggregated Aβ fail to increase colocalization of APP with BACE1 indicating that Aβ-APP/Go signaling is involved in this process. Moreover, inhibition of Gβγ subunit signaling with βARKct or gallein, prevent Aβ-dependent interaction of APP and BACE1 in endosomes, β-processing of APP and intracellular accumulation of Aβ42. Collectively, our findings uncover a signaling mechanism leading to a feedforward loop of amyloidogenesis that might contribute to Aβ pathology in early stages of AD and suggest that gallein could have therapeutic potential.

Natalí Chanaday. Vanderbilt Brain Institute, USA

“Synaptic vesicles and the secretory pathway: overlap and differences”.

The vast majority of neuron studies have a synapse-centered vision. However, there is accumulating evidence that organelles as the endoplasmic reticulum, endosomes, lysosomes and secreted extracellular vesicles can modulate the synaptic vesicle cycle and thus, neurotransmission. My work aims to understand how neuronal organelles interact and influence neuron properties. Specifically, we have recently found that extracellular vesicles can increase neurotransmitter release via the exchange of the SNARE protein synaptobrevin-2. The presentation will cover some of the novel findings we made related to synaptic vesicle fusion and endocytosis, and the overlap of the synaptic vesicle molecular machinery with other organelles in the secretory pathway.

02 | Auditory deficits: from bench to bedside

Chairs:

A. Belén Elgoyhen, INGEBI

Juan D. Goutman, INGEBI, goutman@dna.uba.ar

Congenital hearing loss is one of the most prevalent sensory disabilities, affecting approximately 1 to 2 in 1,000 newborns. In more than 50% of the cases there is a genetic cause, with 70-80% being non-syndromic. More than 100 genes that can produce genetic deafness have been identified so far, implying a very diverse and heterogeneous problems. Some forms of hearing loss appear in newborns, while others develop even after several decades of life, implying that a complex interaction between genes and environment can occur. In recent years, important advances have been made in gene therapy models that aim to supplement the expression of mutant genes using viral vectors with transient expression (Holt). This system has already generated interesting results reversing profound deafness in animal models carrying mutations in genes of the mechanotransduction complex in cochlear cells. On the other hand, non-genetic causes of hearing loss produce major problems in older adults as a result of the interaction of factors such as longevity and daily exposure to very noisy environments that produce “hidden deafness” (Gómez-Casati). The identification of genes products that could prevent/delay the detrimental effects of noise and aging on hearing capacities is a fundamental step towards finding a therapy for these conditions. Synaptic nicotinic receptors mediating efferent cholinergic inputs to cochlear hair cells have been proven as candidates for relieving hair cell damage (Fuchs). In summary, this symposium will provide a unique opportunity to discuss the diverse and complex causes of hearing loss, as well as its potential treatment pathways.

Speakers:

Jeffrey Holt Department of Otolaryngology Boston Children’s, Harvard Medical School, USA

"Putting the pieces together: the hair cell transduction complex"

Our research is focused on sensory transduction or the conversion of stimulus information into electrical information, the language of the brain. Sensory organs are at the interface between the world around us and the internal workings of the brain. To understand how the brain processes information we first need to understand how it collects and encodes information. As a model for sensory transduction our lab studies the inner ear. We aim to

understand how the sensory cells and neurons in the normal inner ear function. In this talk I will discuss the identification of the molecular components required for sensory function

Paul Fuchs Johns Hopkins School of Medicine, Baltimore, USA

—

M. Eugenia Gómez-Casati, Instituto de Farmacología, F. Medicina, UBA, Argentina

The main goal of our laboratory is to increase the knowledge on the consequences of different forms of hearing loss on the normal function of hair cells in the mammalian organ of Corti and to study the role of the medial olivocochlear system (MOC). Noise and aging are the two most common causative factors among the defined etiologies of hearing loss. The clinical significance presented by noise-induced (NIHL) and age-related hearing loss (ARHL) has driven efforts to understand the underlying molecular, physiological and biochemical mechanisms of the cochlear damage. Knowing how the physical structures are affected by noise and/or age is crucial in search for therapeutic agents that act as otoprotectants against hearing loss. In the last 5 years, my lab has been trying to understand the role of the MOC system in protecting the inner ear from damage produced by overly loud sounds and this will be the focus of my talk. We have shown an inverse correlation between the activity of the alpha9alpha10 nAChR and noise-induced cochlear synaptopathy. Moreover, we have shown that the MOC system mediates resistance to ARHL – presbycusis, and that this occurs via the alpha9alpha10 nAChR complexes on OHCs. These results suggest that potentiation of the MOC feedback can trigger cellular and molecular mechanisms to protect and/or repair the inner ear sensory epithelium. These findings are beginning to bridge the gap from bench to clinics as they provide the first proof-of-principle supporting the enhancement of the MOC system as a viable approach for prevention or treatment of NIHL and/or ARHL.

03 | NeuroTour: Un Recorrido Federal de la Neurociencia en Argentina

Chairs:

Maria Florencia Rossetti, Instituto de Salud y Ambiente del Litoral (ISAL), CONICET-UNL, Santa Fe.

Rodrigo Echeveste, Instituto de Señales, Sistemas e Inteligencia Artificial, sinc(i), CONICET-UNL, Santa Fe.

According to the information compiled by the Sociedad Argentina de Investigación en Neurociencias (SAN) in 2021, most of the researchers surveyed in the area of Neuroscience are concentrated in CABA (61%), Buenos Aires (14%), and Cordoba (15%). The remaining 11% is distributed among the provinces of Santa Fe, Entre Ríos, Rio Negro, Mendoza, Tucumán and San Luis. In this context and within the framework of the recent formation of the Federalization Commission of the SAN, this symposium aims to make visible and publicize the research work in Neuroscience in Argentina outside the usual nodes.

Speakers:

Rosana Chehín: Instituto de Medicina Molecular y Celular Aplicada-IMMCA (CONICET-UNT-Siprosa) de San Miguel de Tucumán (Tucumán)

La enfermedad de Parkinson (EP) es un trastorno neurodegenerativo crónico, progresivo y complejo, caracterizado por la pérdida selectiva de neuronas dopaminérgicas en el mesencéfalo generando alteraciones motoras, sensoriales y en estados avanzados, cognitivas. Es actualmente el segundo trastorno neurodegenerativo de mayor incidencia poblacional y al ser el envejecimiento el principal factor de riesgo, el incremento de la expectativa de vida amenaza con duplicar estas cifras en la próxima década. A pesar que la EP fue descrita hace más de 200 años, a la fecha, los únicos tratamientos disponibles son paliativos y no existe fármaco capaz de detener o al menos enlentecer el proceso de muerte neuronal.

Desde el punto de vista biofísico, la agregación amiloide de la proteína presinática α-sinucleína (aSyn) es considerada el evento central en la iniciación y la propagación de la patología. Numerosas moléculas demostraron ser eficientes inhibidores de la agregación de esta proteína in vitro, pero no han logrado proporcionar una neuroprotección efectiva in vivo. Las altas tasas de fracasos en el pasaje de los modelos in vitro a in vivo han sido asociadas a la toxicidad o incapacidad de las mismas para atravesar la barrera hematoencefálica.

Las tetraciclinas constituyen una gran familia de compuestos con diferentes actividades biológicas, además de su conocida actividad antibiótica. Son moléculas muy utilizadas en la clínica médica por su baja toxicidad y buena biodisponibilidad. Nuestro grupo de trabajo logró demostrar en modelos biofísicos y celulares, que ciertas tetraciclinas son capaces de interferir la agregación patológica de aSyn, así como los procesos neuroinflamatorios y el estrés oxidativo característico de los procesos neurodegenerativos. Mediante modelos biocomputacionales, pudimos además proponer las interacciones específicas entre los grupos funcionales de una tetraciclina no antibiótica y los agregados amiloides de sSyn. Esto permitió sentar las bases de la modificación racional de estos compuestos obteniendo moléculas de alta actividad neuroprotectora y baja actividad antibiótica para ser administradas en tratamientos a largo plazo. Estos hallazgos posicionan a las tetraciclinas como moléculas de interés para completar los estudios preclínicos y avanzar a los ensayos clínicos.

Álvaro F. Muchiut, Instituto Superior de Neuropsicología, Departamento de investigación de Resistencia (Chaco)

La utilización de pruebas psicológicas y neuropsicológicas validadas y de confiabilidad comprobadas, aportan evidencias valiosas al profesional en una multiplicidad de actividades, que comprenden desde el diagnóstico, el plan y el seguimiento de tratamiento hasta la selección laboral, la orientación vocacional, las pericias judiciales

e investigación; sin embargo, no siempre se disponen de instrumentos locales/regionales o de baremos adaptados a la población a la que se pretende aplicar y, en ocasiones, siquiera corresponden a datos normativos del país.

Por ellos desde el equipo de investigación nos hemos propuesto crear instrumentos de valoración neuropsicológica (escalas) con el fin de evaluar a niños y adolescentes de nuestra zona con las particularidades propias de la población de esta región. En este sentido comenzamos con la Escala comportamental para nivel escolar inicial (Muchiut, Vaccaro, Zapata & Pietto, 2019) donde el docente valora el comportamiento del niño entre 4 y 6 años. Luego para adolescentes la Escala de funciones ejecutivas para padres de adolescentes (Muchiut, Dri, Vaccaro & Pietto, 2020) donde los padres valoran el funcionamiento de sus hijos entre 12 y 17 años; y actualmente se encuentra en etapa de publicación la Escala de Autorreporte de Funcionamiento Ejecutivo (AFE) para adolescentes (Muchiut, Pietto & Vaccaro, 2022) en la que el propio adolescente reporta su funcionamiento ejecutivo.

Además, como equipo realizamos los baremos del WISC-IV para la ciudad de Resistencia (Muchiut, Vaccaro, Pietto & Dri, 2021), una prueba muy utilizada en nuestra región, donde se evidenciaron diferencias significativas según el baremo sea de Buenos Aires o de Resistencia y actualmente nos encontramos en proceso de Baremación del Cuestionario de Madurez Neuropsicológica Infantil – CUMANIN, prueba muy utilizada en la población infantil de 3 a 6 años.

En este sentido, pareciera conveniente pensar en la necesidad de la regionalización de baremos, entendiendo este término como "la acción y el efecto de regionalizar", involucrando "organizar con criterios descentralizadores un territorio, una actividad, una entidad, etc." (Real Academia Española, s.f.). Con base en ello, se propone "descentralizar" una prueba mediante su estandarización (adaptación y tipificación) en una región diferente en la que fue normativizada originalmente, con el objetivo principal de establecer baremos locales que contemplen las características socioculturales específicas de una zona geográfica determinada.

Si bien regionalizar un instrumento sería lo ideal, coexiste con una realidad en la que no siempre se pueden emprender los procesos de adaptación debido al gran esfuerzo que conlleva, así como los recursos tanto humanos como materiales que requiere.

Entonces, ante los impedimentos que se puedan presentar para la regionalización de una prueba, es de especial importancia que el profesional o investigador sea cauteloso en la interpretación de los resultados si ha decidido aplicar una prueba con baremos no regionalizados.

Victoria Peterson, Instituto de Matemática Aplicada del Litoral de Santa Fe (Santa Fe)

Las vibraciones inducidas por señales acústicas pueden colarse en el sistema de adquisición de señales de electroencefalografía intracraneales (iEEG), apareciendo como un artefacto de vibración. En experimentos de habla pronunciada, este artefacto de vibración rastrea la frecuencia fundamental (F0) de la voz del participante, abarcando la banda de alta frecuencia gamma; banda que es bien conocida por estar involucrada en la producción y percepción del habla. Por lo tanto, para el desarrollo de modelos confiables de (de)codificación de voz, es necesario contar con señales de iEEG libres de cualquier ruido inducido por las señales acústicas de interés. En este trabajo, presentamos un método de eliminación de ruido para artefactos de vibraciones acústicas. El método se basa en enfoques de filtrado espacial que buscan encontrar aquellos componentes estadísticos

altamente acoplados en fase con el audio producido. Mostramos cómo los métodos tradicionales pueden poner en peligro la calidad de la señal y que nuestro método es capaz de limpiar los datos preservando las oscilaciones neuronales subyacentes.

Alejandro Wainselboim, Instituto De Ciencias Humanas, Sociales y Ambientales de Mendoza (Mendoza)

Desde la segmentación de palabras en el flujo del habla hasta la adquisición de las reglas combinatorias que rigen el orden de las mismas en unidades oracionales cargadas de contenido semántico, el cerebro humano adquiere las regularidades relevantes de su entorno que permiten al individuo comprender y producir el lenguaje natural. Nuestro propósito es el de aportar un mayor entendimiento en cuanto a los mecanismos neurocomputacionales de los cuales, junto a los datos recibidos por los mismos, emerge el lenguaje humano. En el presente trabajo nos proponemos por tanto construir un modelo cuyas hipótesis neurocomputacionales se inspiren en rasgos específicos hallados en la corteza cerebral de los mamíferos. Desarrollamos el proyecto atendiendo a distintos niveles del procesamiento del lenguaje, desde la fonética hasta la gramática emergente por la propia dinámica cortical.

Nuestro modelo muestra resultados preliminares que aportarían un mayor entendimiento de la mecánica que subyace al lenguaje y permitirían impulsar nuevos desarrollos para el aprendizaje de máquinas con mayor inspiración en la arquitectura de la corteza de los mamíferos para la resolución de problemas relacionados al procesamiento del lenguaje natural. Consideramos este nuevo enfoque como relevante a la hora de fomentar futuras líneas de investigación con una mayor atención a la biología del cerebro humano.

Irene Taravini, Instituto de Ciencia y Tecnología de los Alimentos de Entre Ríos (ICTAER-UNER-CONICET)

La enfermedad de Parkinson (EP) es la segunda enfermedad neurodegenerativa más prevalente a nivel mundial, afectando al 1-2 % de la población mayor de 60 años. Su incidencia es cada vez mayor debido al aumento de la expectativa de vida y, al ser crónica y progresiva, representa un costo muy alto para el sistema de salud y las familias de quienes la padecen. Los signos clínicos son consecuencia de la degeneración de las neuronas dopaminérgicas de la substantia nigra. Dado que las causas precisas que desencadenan esta muerte neuronal no se han esclarecido surge el desafío de hallar agentes con acción protectora con el fin último de reducir los síntomas, retrasar o incluso prevenir la expresión

de esta enfermedad. Hace varios años se encontró una asociación inversa entre la ingesta de café o el consumo de tabaco y la aparición de la EP. De manera similar, estudios epidemiológicos recientes, realizados en Argentina, Uruguay y Brasil, revelaron que el consumo de yerba mate (YM) presenta también una asociación inversa con el riesgo de desarrollar la EP. El consumo de mate proporciona numerosos beneficios para la salud, los que se relacionan fuertemente con la gran variedad de fitoquímicos bioactivos que componen la YM y con su capacidad antioxidante y antinflamatoria. Recientemente, en experimentos in vitro se demostró que la YM protege a las neuronas dopaminérgicas de la muerte espontánea y progresiva. En nuestro laboratorio hemos observado que la administración a largo plazo de YM en ratones hemiparkinsonianos tiene un efecto neuroprotector de las neuronas dopaminérgicas. A partir de esta evidencia poblacional y de los resultados obtenidos a partir de la experimentación in vitro e in vivo, nos hemos planteado profundizar en el análisis e identificación de modificaciones bioquímico-moleculares relacionadas al efecto neuroprotector de la yerba mate sobre las neuronas dopaminérgicas en un modelo en ratón de la EP. Los estudios actuales de nuestro grupo permitirán elucidar si las propiedades antioxidantes y antiinflamatorias que posee la YM se relacionan con su efecto neuroprotector. Dada la importancia del consumo de YM en nuestra población, esperamos que los resultados de este trabajo contribuyan a reforzar la visión emergente de la YM como un alimento funcional, permitan revalorizar su consumo y redefinir su utilización resaltando sus propiedades benéficas para la salud, utilizándose para prevenir o retrasar la expresión de la EP o tal vez como una aproximación alternativa para el tratamiento de la misma en asociación con los fármacos antiparkinsonianos frecuentemente utilizados y tener así un impacto directo en la calidad de vida de los enfermos.

04 | Perspectives in research of behaviors associated to food intake, memory impairment and sleep restriction

Chair:

Guillermina Canesini, Instituto de Salud y Ambiente del Litoral (ISAL) CONICET-UNL. Departamento de Bioquímica Clínica y Cuantitativa, Facultad de Bioquímica y Ciencias Biológicas, Universidad Nacional del Litoral. Santa Fe, Argentina.

The alarming increase of overfeeding and the associated metabolic and immunological disorders, make the etiology and the consequences of obesity a widely studied topic today and receives increased attention from the scientific community. It is known that, if there is an inadequate nutritional experience during the first stages of life, metabolic missprogramming of vital regulatory pathways can occur permanently affecting appetite, growth dynamics, and cognitive functions. But not only alterations during the neonatal period determine conditions in adulthood. Moreover, the overfeeding associated to the exposure to a high-fat diet can produce an altered inflammatory response, triggering changes in memory functions. On the other hand, overfeeding can be the consequence of other brain functions, as those related to sleep disorders.

The goal of the symposium is to engage the audience in an active discussion about recently published and unpublished findings on behavioral research associated with food intake, memory impairment and sleep restriction in rodent and zebrafish models. In this context, we will explore morphological, genomic and behavioral alterations to elucidate possible new mechanisms involved on these functions and to identify potential therapeutic targets for neurodevelopmental disorders.

Speakers

María Florencia Rossetti, Instituto de Salud y Ambiente del Litoral, CONICET-UNL. Departamento de Bioquímica Clínica y Cuantitativa, Facultad de Bioquímica y Ciencias Biológicas, Universidad Nacional del Litoral. Santa Fe, Argentina

“Neonatal overfeeding: Implications for hippocampal dysfunction and environmental intervention as a mitigating factor”

The objective was to explore the long-term effects of neonatal overfeeding on cognition and neurosteroidogenesis and to analyze enriched environmental as a mitigating factor. Male rats were raised in small litters (4 pups/mother; SL), in which pups ingest larger amounts of milk and gain more body weight than rats raised in normal litters (10 pups/mother; NL). On post-natal day (PND) 21, half of the male rats were sacrificed and the rest of males were

maintained under standard condition (4 rats/cage) or environmental enrichment (EE; 8 rats/cage). For EE, cages were provided with daily changed objects and toys. At PND75, animals were tested in locomotion activity and episodic like-memory (ELM) test. At PND90, animals were sacrificed and brains were microdissected. Using micropunch techniques, dentate girus (DG), CA1 and CA3 regions were isolated for mRNA quantification and methylation studies (results under analysis). At PND21, SL animals had higher body and fat patches weights and greater levels of cholesterol, glucose and triglycerides, than NL rats. At PND90, these metabolic differences were not observed. However, SL rats reported an increased in anxiety like-behavior and a poor performance in ELM test compared to NL. In addition, mRNA expression of aromatase (estradiol synthesis) and 5α-reductase 1 decreased in DG of SL compared to NL rats. EE was enough to attenuate anxiety like-behavior and rescue spatial memory deficit in SL animals. In addition, EE reversed aromatase and 5α reductase 1 expression decline associated to litter reduction. These results showed that neonatal obesity negatively impacts on cognitive functions and neurosteroidogenic pathways in adulthood, suggesting a long-lasting effect of nutritional experience during critical periods of early postnatal development. Importantly, environmental intervention could mitigate these effects and restore brain and behavior functions.

Gisela Paola Lazzarino, Center for Social and Affective Neuroscience (CSAN), Department of Biomedical and Clinical Sciences (BKV), Linköping University, Linköping, Sweden

" The effect of high-fat diet on microglia activation and cognitive function"

High-fat diet (HFD) consumption is linked to metabolic disorders, including obesity, diabetes, and cardiovascular disease. Additionally, it is a risk factor for the development of memory impairment and cognitive decline, as it has a direct impact on brain function. Microglia has an essential role in neuronal remodeling. The ingestion of HFD leads to a systemic inflammatory response, resulting in increased stimulation of pro-inflammatory microglia which can lead to neuronal damage. Therefore, we hypothesized that microglia could play a fundamental role in HFD-induced cognitive decline. Thus, we aimed to investigate the role of microglia in triggering the hippocampal dysfunction related to HFD intake in mice. For this, C57BL/6J mice were fed HFD (45 kcal% fat) or standard chow (10 kcal% fat) for 3, or 10 days. In addition, transgenic mice expressing an inhibitory designer receptor exclusively activated by designer drugs (DREADD) on microglia (Cx3cr1creERT2-hM4Di) were fed for 7 days with HFD or standard chow. In all animals, cognitive tests such as novel object recognition and object relocation test were performed. Hippocampal microglia morphology was assessed using immunohistochemistry. After 10 days of HFD, there was a significant reduction in the time that the animals explored the novel and the

relocated object, suggesting impaired memory. Besides, these animals showed a lower number of endpoints and shorter branch length of their hippocampal microglia, indicative of a more reactive phenotype. DREADD+ HFD-fed animals performed better in the cognitive tests than WT HFD-fed mice. Preliminary data obtained indicate that WT mice fed HFD presented higher microglial cell density than WT standard chow-fed mice, while HFD DREADD+ animals showed a tendency to have lower microglial cell density than WT HFD-fed animals. These results indicate that a short-term intake of HFD affects cognitive functioning and microglia morphology, suggesting that microglia are involved in HFD-induced cognitive impairment. In order to draw firm conclusions about the ability of microglia inhibition to rescue HFD-induced cognitive dysfunction, further research is required.

Ana Paula García, Instituto de Salud y Ambiente del Litoral, CONICET-UNL. Departamento de Bioquímica Clínica y Cuantitativa, Facultad de Bioquímica y Ciencias Biológicas, Universidad Nacional del Litoral. Santa Fe, Argentina:

"Stablishing zebrafish (Danio rerio) as a model to study the effects of sleep deprivation on food intake behavior."

Sleep deprivation has shown to affect the lives of millions of people every day and has a profound impact on the biology of the brain. Notably, it has been reported that in mammals, poor or short sleep produce overfeeding, promotes higher calorie intake from fat and carbohydrate sources, which increases the risk to overweight and obesity development. However, the effects of sleep disturbances in the brain centers that control the food intake behavior are largely unexplored. Zebrafish has been shown to be a suitable model for sleep and food intake research as the brain regulation of these behaviors are highly conserved in vertebrates. According to these, our aim is to stablish the zebrafish as a model to study the effects of sleep deprivation on food intake behavior and in the neural circuits involved in both behaviors, sleep and food intake. In order to reduce the time of sleep, adult zebrafish were submitted to repeated vibrations during the night. The levels of activity of the individuals were monitored during 24 hours in order to evidence the reduction of sleep duration. We observed that the male individuals exposed to the vibrations increased food intake as it was evidenced that the number of pellets ingested per day was significantly increased. The effects on the expression levels of neurotransmitters/ neuropeptides participating in control of food intake behavior and/or sleep will be analyzed, as well as the neural activation of its producing neurons.

05 | Music and Neurosciences

Chair:

Nadia Justel, Lab. Interdisciplinario de Neurociencia Cognitiva (LINC), Centro de Investigación en Neurociencias y Neuropsicología (CINN), Universidad de Palermo, CONICET

Music generates unique demands on our nervous system; therefore, the neural mechanisms involved in musical activities, such as perception, production, and creation, generate a great amount of research questions for cognitive neuroscience. For the last years, music and each of its components have been used as a tool in the research of human cognition and its underlying brain mechanisms since music has great cortical and subcortical involvement. In this symposium 5 talks will be given that show how music is able to modulate our behavior, cognition, physiology, how music modifies our brain, appreciating the close relationship between music and neuroscience.\

Speakers:

Robert J Zatorre, Montreal Neurological Institute, McGill University

“From Perception to Pleasure: The Neuroscience of Music and why we Love it”

Music has existed in human societies since prehistory, perhaps in part because it allows expression and regulation of emotion, and evokes pleasure. In this lecture I will present findings from cognitive neuroscience that bear on the question of how we get from perception of sound patterns to pleasurable responses. I will first discuss evidence that corticocortical loops from and to the auditory cortex are responsible not only for perceptual processes but also for working memory, sensory-motor, and predictive functions that are essential to produce and perceive music. Then, I will discuss neuroimaging and brain modulation studies from our lab focusing on the dopaminergic reward system, its involvement in musical pleasure, and what happens when that system is disrupted. I propose that pleasure in music arises from interactions between cortical loops that enable expectancies to emerge from perceived sound patterns, and subcortical systems responsible for reward and valuation. This model integrates knowledge derived from basic neuroscience of reward mechanisms with independently derived concepts, such as tension and anticipation, from music theory. It may also serve as a way of thinking more broadly about aesthetic rewards.

Ernest Mas Herrero, Institute of Neuroscience of the University of Barcelona:

“Now you like it, now you don’t: exploring the brain generators of music-induced pleasure”

The ability to experience pleasure with music is one of the most impressive skills we possess as humans. Prior neuroimaging studies have shown that, despite its abstractness, music may mimic innate biologically rewarding stimuli (e.g., food) in its ability to engage the brain’s reward circuitry. However, neuroimaging methods are correlational and thus, do not distinguish between brain regions directly involved in generating the hedonic experience from those that are only modulated by that experience. To establish such a causal relationship, it is crucial to actively manipulate brain function. Starting with a review of neuroimaging studies investigating music induced pleasure and ending with a set of studies using non-invasive brain stimulation techniques and pharmacological interventions, in this talk, I will dig into the role of dopaminergic and opioidergic circuits in music reward.

Verónika Diaz Abrahan, Laboratorio Interdisciplinario de Neurociencia Cognitiva (LINC) CEMSC3 ECyT ICIFI UNSAM-CONICET

“Music-based interventions. Experimental studies about memory modulation”

Music is a complex activity with great cognitive potential. However, its cognitive impact depends on whether people are playing or creating music, regardless of their musical training. A specific type of research involves implementing music-based interventions on a single session (before, during, or after a task) to improve cognitive performance. For the past ten years, in LINC lab we have employed music perception (listening to musical pieces) or production (music improvisation and rhythmic reproduction) as interventions to explore their effects as memory modulators. The aim of this presentation is to show the results of several studies that examined the effect of music-based interventions on memory consolidation for preschool children, young adults, old adults without cognitive impairment and adults with Alzheimer’s disease. In general, after the acquisition of verbal or visual emotional information, the different groups were exposed to music improvisation (experimental condition), music imitation (active control intervention) or silence (passive control condition) for 3 min. We then evaluated memory through two tasks (free recall and recognition), by means of immediate and deferred measures (after a week). Across these studies, we found the following pattern of results: participants involved in music interventions showed a significant improvement in memory. They remembered more verbal and visual information than the control-condition groups, especially in the deferred measures. The emotional induction generated by the musical activities is the strongest idea that supports the results. Our findings suggest that a focal musical activity can be a useful intervention in different populations to promote memory enhancement.

María Angélica Benítez, Universidad Favaloro

"Cognitive benefits of music training"

The issue of how music experiences affect development is a matter of interest that has increased over the last two decades, motivated by the idea that music training is a useful framework for the investigation of plasticity in the human brain. Several studies have shown that musicians differ from non-musicians in certain aspects of brain structures and functions. However, recent researchers in this field have reached inconsistent conclusions. The goal of this talk is to present two recent studies about the relationship between music training and different cognitive functions in Argentinian children (study 1), and adolescents (study 2). We compared the scores of memory, language, and visuospatial ability evaluated through neuropsychological tests in children and adolescents with and without music training. To evaluate their memory, we developed a task with the International Affective Picture System. To evaluate language and visuospatial ability, we used the Child Neuropsychological Assessment. The musicians received almost two years of previous music training from conservatories of music in Argentina. The main results show that musicians obtained higher scores in tests for memory and language than subjects with no music training. There were no other significant results. These studies are an important step forward in music neuroscience in Argentina. We believe that new music training research in this country that controls and manipulates imaging techniques, genetic predispositions, and levels of engagement in training could provide new information about the relationship between music and cognition in Latin America. This research is important not only because of its contribution to the area of brain plasticity as a product of musical stimulation, but also because of its relevance in the clinical area, for the rehabilitation of motor functions and the music therapy field.

YOUNG INVESTIGATORS TALKS

01 | Protective roles of imidazolium salts in C. elegans models of oxidative stress and neurodegeneration.

Natalia Andersen1°,3°, Tania Veuthey1°,3°, Gabriela Blanco1°,3°, Gustavo Silbestri2°,4°, Diego Rayes1°,3° and María José De Rosa1°,3°

1 INIBIBB. CCT-CONICET.
2 INQUISUR. CCT-CONICET.
3 Departamento de Biología, Bioquímica y Farmacia, UNS.
4Departamento de Química, UNS

By using C. elegans, our work aimed to explore novel biological roles for imidazole-containing compounds. To this end, we have tested the in vivo anti-proteotoxic effects of imidazolium salts. Since neurodegenerative diseases have been largely linked to impaired antioxidant defense mechanisms, we focused on 1-Mesityl-3-(3-sulfonatopropyl) imidazolium (MSI), one of the imidazolium salts that we identified as capable of improving iron-induced oxidative stress resistance in wild-type animals. By combining mutant and gene expression analysis we have determined that this protective effect depends on the activation of the Heat Shock Transcription Factor (HSF-1), whereas it is independent of other canonical cytoprotective molecules such as abnormal Dauer Formation-16 (DAF-16/FOXO) and Skinhead-1 (SKN-1/Nrf2). To delve deeper into the biological roles of MSI, we analyzed the impact of this compound on previously established C. elegans models of protein aggregation. We found that MSI ameliorates β-amyloid-induced paralysis in worms expressing the pathological protein involved in Alzheimer's Disease. Moreover, this compound also delays age-related locomotion decline in other proteotoxic C. elegans models, suggesting a broad protective effect.

Taken together, our results point to MSI as a promising anti-proteotoxic compound and provide proof of concept of the potential of imidazole derivatives in the development of novel therapies to retard age-related proteotoxic diseases.

02 | Synaptic PKR and eIF2α activation are involved in Amiloyd-beta induced synapse degeneration.

N. W. Martínez1,2,3,4, F.E. Gómez1, S. Matus1,2,3,4 and I. Alfaro1, 5.

1 Fundación Ciencia & Vida, Santiago, Chile.
2 Facultad de Medicina y Ciencia, Universidad San Sebastián.
3 Biomedical Neuroscience Institute, University of Chile.
4 Center for Geroscience, Brain Health and Metabolism.
5 Institute of Sciences and Innovation in Medicine, Faculty of Medicine, Clínica Alemana Universidad del Desarrollo (UDD).

Introduction: Cognitive dysfunction during Alzheimer´s disease (AD) is correlated with synaptic loss. Interestingly, local amyloid-beta (Aβ) peptide accumulation is related to nearby spine density reduction. This antecedent suggests that Aβ local response mediates synapse degeneration, but the molecular mechanism remains unknown. Recently, the stress sensor/kinase PKR has been involved in the Aβ induced LTP and memory impairment.

However, PKR location and its role in Aβ synaptic changes remains unexplored. PKR operates through the eukaryotic translation initiation factor 2 alpha subunit (eIF2α) phosphorylation and regulates homeostasis. Here we studied PKR and eIF2α localization and explored PKR potential as a regulator of Aβ induced synaptotoxicity.

Methods: The localization and activation (phosphorylation) of PKR and eIF2α in response to Aβ at synapses was studied on hippocampal neurons by immunofluorescence (IF). Using genetic and pharmacological targeting tools, we tested the effect of PKR inhibition in preventing Aβ synaptotoxicity. Using western blot assays we analyzed eIF2α and PKR on synaptic fractions obtained from an AD mouse model (5xFAD).

Results: eIF2α and PKR were found partially colocalizing with synaptic markers. Moreover, Aβ oligomers induced eIF2α and PKR activation at synaptic compartments and decreased synapse density. Synaptotoxicity in response to Aβ was inhibited under PKR loss of function conditions. Finally, PKR was enriched and activated on 5xFAD synaptic fractions.

Discussion: Here, we show eIF2α and PKR at synapses. Our results place PKR as a novel mediator of Aβ induced synaptic stress and degeneration.Acknowledgements: AFB-170004 (to FCV), FONDAP 15150012, P09-015-F, ANID .
Postdoctoral 3200932 (NM).

03 | Thalamic top-down control of sensory neocortex for associative memory.

M. Belén Pardi1, 2, Johanna Vogenstahl2, Tamas Dalmay2, Teresa Spanò2, De-Lin Pu1, 2, Laura B. Naumann3, 4, Friedrich Kretschmer2, Henning Sprekeler3, 4 , Johannes J. Letzkus1, 2.

1Institute for Physiology, Faculty of Medicine, University of Freiburg, 79108 Freiburg, Germany.
2Max Planck Institute for Brain Research, 60438 Frankfurt, Germany.
3Bernstein Center for Computational Neuroscience Berlin, 10115 Berlin, Germany.
4Technische Universität Berlin, 10587 Berlin, Germany.

The sensory neocortex is a critical substrate for memory that strongly interconnects with the thalamus. However, the role of direct thalamocortical communication in memory remains elusive. In this talk, I will show you that the higher-order sensory thalamus is a highly plastic source of cortical top-down information. To find this, we performed chronic in vivo two-photon calcium imaging of thalamic synapses in mouse auditory cortex layer 1, a major locus of cortical associations. Combined with optogenetics, viral tracing, whole-cell recording, and computational modeling, we found that the higher- order thalamus is required for associative learning and transmits memory-related information that closely correlates with acquired behavioral relevance. In turn, these signals are tightly and dynamically controlled by local presynaptic inhibition. Our results thus reveal a level of computational flexibility in layer 1 that goes far beyond hard-wired connectivity.

04 | Etv4 regulates nociception by controlling peptidergic sensory neuron development and peripheral tissue innervation.

Antonella Soledad Rios1, Ana Paula De Vincenti2, Pablo Brumovsky3, Jorge Aquino3, Gustavo Paratcha2, Fernanda Ledda1.

1 Fundación Instituto Leloir, Instituto de Investigaciones Bioquímicas de Buenos Aires, CONICET, Buenos Aires, Argentina.
2 División de Neurociencia Molecular y Celular, Instituto de Biología Celular y Neurociencias, Universidad de Buenos Aires, CONICET, Buenos Aires, Argentina.,
3 Developmental Biology & Regenerative Medicine Laboratory, Instituto de Investigaciones en Medicina Traslacional (IIMT), CONICET-Universidad Austral, Derqui-Pilar, Buenos Aires, Argentina

The perception of noxious environmental stimuli by nociceptive sensory neurons is an essential mechanism for the prevention of tissue damage **(1,2)**. Etv4 is a transcriptional factor expressed in most nociceptors in dorsal root ganglia (DRG) during the embryonic development **(3)**. However, its physiological role remains unclear. Here, we show that Etv4 ablation results in

defects in the development of the peripheral peptidergic projections in vivo and deficits in axonal elongation and growth cone morphology in cultured sensory neurons in response to NGF. From a mechanistic point of view, our findings reveal that NGF regulates Etv4-dependent gene expression of molecules involved in extracellular matrix (ECM) remodeling. Etv4-null mice were less sensitive to noxious heat stimuli and chemical pain and this behavioral phenotype correlates with a significant reduction in the expression of the pain-transducing ion channel TRPV1 in mutant mice. Together, our data demonstrate that Etv4 is required for the correct innervation and function of peptidergic sensory neurons, regulating a transcriptional program that involves molecules associated to axonal growth and pain transduction.

(1) Einarsdottir, E. et al (2004).. Hum Mol Genet 13, 799-805.
(2) Indo, Y. (2010). Expert Rev Neurother 10, 1707-1724.
(3) Fontanet, P. et al (2013). J Neurosci 33, 15940-15951.

05 | Activity-dependent plasticity of neurons born in the aging hippocampus.

Mariela F. Trinchero

Laboratorio de Plasticidad Neuronal, Fundación Instituto Leloir – Buenos Aires – (CONICET)

Aging induces changes that result in a decrease in circuit plasticity and ultimately impaired cognitive capacity. Adult hippocampal neurogenesis is also affected with age. Neurons born in 8-month-old (8M) mice are scarce and exhibit slow development. However, when animals are exposed to a running wheel or enriched environment, neuronal development and integration

are largely accelerated. These results indicate that stimuli which enhance hippocampal activity trigger high levels of plasticity in the aging hippocampus. Sensory stimulation at gamma frequency has recently been shown to activate the hippocampus, reduce levels of amyloid beta peptide and improve memory performance in aging animals and mouse models of Alzheimer's disease. We studied the impact of audiovisual stimulation (sound and light flickering) at 40 Hz on the development of neurons born in the dentate gyrus of 8M mice. Gamma flickering boosted circuit remodeling by adult neurogenesis, as shown by a significant increase in the dendritic tree length and complexity of newly generated neurons. These results reveal that audiovisual stimuli awaken mechanisms that promote neuronal plasticity not only under pathological conditions, but also in the healthy aging brain.

06 | Dual contributions of cerebellar-thalamic networks to learning and offline consolidation of a complex motor task.

Andres P Varani1, Romain W Sala1 , Caroline Mailhes-Hamon1 , Jimena L Frontera1 , Daniela Popa1 , Clément Léna1

(1) Institut de biologie de l'Ecole normale supérieure (IBENS), Ecole normale supérieure, CNRS, INSERM, PSL Research University, 75005 Paris, France.

The contribution of the cerebellum to motor learning is often considered to be limited to adaptation, a short-timescale tuning of reflexes and learned skills. Yet, the cerebellum is reciprocally connected to two main players of motor learning, the motor cortex and the basal ganglia, via the ventral and midline thalamus respectively. Here, we evaluated the contribution of cerebellar neurons projecting to these thalamic nuclei in a skilled locomotion task in mice. In the cerebellar nuclei, we found task- specific neuronal activities during the task, and lasting changes following execution suggesting an offline processing of task-related information. Using pathway-specific inhibition, we found that

Dentate Nucleus neurons projecting to the midline thalamus contribute to learning and retrieval, while Interposed Nucleus neurons projecting to the ventral thalamus contribute to the offline consolidation of savings. Our results thus show that two parallel cerebello-thalamic pathways support distinct computations operating on different timescales in motor learning.

07 | Temporal cognition: time-oriented attention improves sensorimotor synchronization performance.

Leonardo Versaci

Universidad Nacional de Quilmes

Temporal cognition is involved in the representation of the temporal structure of events in our environment (ordering events in time, perceiving durations, producing rhythms, thinking about the past or the future, etc). In the hundred millisecond range, temporal cognition is linked to motor control, speech and music performance. A paradigmatic phenomenon in this timing range is sensorimotor synchronization, that is the synchronization of movements with an external periodic stimulus as in paced finger tapping. The effect of

attention when oriented to temporal aspects of a task is well established for reaction time tasks, yet it is reasonable to hypothesize that time-oriented attention could also have an influence on sensorimotor synchronization. In this work we show that attention can be oriented to the purely temporal aspects of a paced finger-tapping task and that it affects performance. Specifically, time-oriented attention improves the accuracy in paced finger tapping and it also increases the resynchronization efficiency after a period perturbation. We use two markers of the attention level: auditory ERPs and subjective report of the mental workload. In addition, we propose a novel algorithm to separate the auditory, stimulus-related components from the somatosensory, response-related ones, which are naturally overlapped in the recorded EEG.

ORAL COMMUNICATIONS

01 | Role of neuroligin-2 in the establishment of perisomatic inhibition in adult-born neurons.

Andrea Aguilar-Arredondo, **Damiana Giacomini**, **Alejandro Schinder**
Leloir Institute Foundation, Neural plasticity lab

Presenting Author: Aguilar Arredondo, Andrea, laaguilar310780@gmail.com

GABAergic signaling is crucial for the development and function of adult-born granule cells (aGCs). Parvalbumin interneurons (PV-INs) exert perisomatic inhibition onto aGCs that becomes functionally mature at 6 weeks of neuronal age. The molecular mechanisms orchestrating the establishment of this synapse are unknown. We investigated whether neuroligin-2 (NL2), a postsynaptic adhesion molecule involved in the development of inhibitory contacts, plays a role in perisomatic GABAergic synaptogenesis in aGCs. Using confocal microscopy, we first characterized the development of synapses formed by PV-INs expressing tdTomato onto aGCs expressing GFP, by measuring the size of perisomatic appositions at different time points. We observed a substantial increase in synaptic size from 2 to 4 weeks, with no further changes at later times. We next delivered a retrovirus expressing a shRNA against NL2 and monitored the effect of NL2 knockdown on the PV-IN to GC synapse. We found smaller synaptic contacts accompanied by an important reduction of perisomatic appositions of the vesicular GABA transporter VGAT, suggesting impaired synaptic function. Moreover, we analyzed the expression of the presynaptic active zone protein bassoon, which showed a reduction in the number of puncta within terminals of PV-INs contacting aGCs in shNL2 expressing cells. Our results reveal NL2 as a critical player in the delayed functional maturation of perisomatic inhibition in aGCs of the adult brain.

02 | Cholesterol loss in old hippocampus triggers HDAC2 mediated repression of BDNF Role

Benjamín I. de la Cruz-Thea, María F. Harman, Mauricio G. Martín
Instituto de Investigaciones Médicas Mercedes y Martín Ferreyra (INIMEC-CONICET-UNC), Universidad Nacional de Córdoba, Córdoba, Argentina.

Presenting Author: de la Cruz-Thea, Benjamín Isaías, lbdlcruzthea@immf.uncor.edu

Aging is associated to epigenetic alterations which lead to diminished expression of memory-related genes. One of the most important changes is the decrease in histone acetylation produced by the Histone Deacetylase 2 (HDAC2) activity. This process has been described as determinant for memory loss during aging. In this work we demonstrate that aging triggers the accumulation of HDAC2 in regulatory regions of the BDNF gene, a key transcription factor for synaptic plasticity. We found that the transcriptional co-repressor Chromodomain Y like protein (CDYL), which interacts with HDAC2 in hippocampal extracts, is accumulated in the nucleus of old neurons. The co-accumulation of CDYL and HDAC2 was also observed in slices of old transgenic Thy-1(GFP) mice brain. Considering that CDYL degradation is triggered by synaptic activity, our data suggest that CDYL accumulation can be due to impaired NMDA receptor activity as a consequence of cholesterol depletion in old neurons. Moreover, we found that CDYL silencing in primary culture of cortical neurons induces a decrease in the levels of HDAC2 when compared to controls, highlighting the fact that CDYL accumulation could both recruit HDAC2 to BDNF promoter and regulate HDAC2 expression or stability through a still undescribed mechanism. The findings herein contribute to the understanding of the epigenetic processes underlying synaptic impairment during aging.

03 | Differential impact of COP9 signalosome loss-of-function during brain developmentCholesterol loss in old hippocampus triggers HDAC2 mediated repression of BDNF Role

Natalia G. Armando 1°, Simon P. Heister 2°, Sebastián Giusti 1°, Damián Refojo 1°

1.IBioBA – Max Planck Partner Institute, Buenos Aires, Argentina
2.Max Planck Institute of Psychiatry, Munich, Germany

Presenting Author: Armando, Natalia Giannina, lng.armando14@gmail.com

The COP9 signalosome (CSN) is a protein complex that regulates protein degradation by removing the ubiquitin-like modifier Nedd8 from cullin-based E3 ubiquitin ligases. The ubiquitin-proteasome system was found to be critically involved in many neuronal processes, but the role of CSN in neurons is still unclear. We aimed to characterize the impact of CSN loss-of-function in several stages of neuronal development using the Cre-loxP system to knock out (KO) the catalytic subunit 5 of the CSN (CSN5). We observed that the constitutive KO of CSN5 in proliferating neuroblasts leads to mid-term embryonic lethality. The KO in early postmitotic neurons proved lethal at postnatal day 1. However, neuron viability was not affected in KO CSN5 neurons from the developing cortex generated by in utero electroporation technique. Moreover, the loss of CSN5 in mature principal neurons of the forebrain did not affect mice viability or relevant behavioral alterations. We analyzed morphological changes of mature neurons in vivo, using a genetically-labelled sparse subset of neurons. Here, we report a reduction in total dendritic length and arborization complexity compared to control littermates, whereas spine density on apical dendrites remains unaffected. Our findings suggest that CSN-reliant regulatory mechanisms exhibit developmental stage-dependent activity patterns in the brain and are indispensable in early developmental stages.

04 | Detection of Prodromal Early Phenotypes and potential therapeutic window in a model of tauopathy

Javier Andrés Muñiz 1°, Carolina Lucia Facal 1°, Ezequiel Pereyra 1°, German Falasco 3°, Indiana Páez Paz 1°, Juan Ferrario 2°, Ana Damianich 1°, M. Elena Avale 1°

1.Laboratorio de Terapéutica Experimental en Procesos Neurodegenerativos – INGEBI
2.Neurobiología de la enfermedad de Parkinson – Instituto de Biociencias, Biotecnologia y Biologia Translacional
3.Laboratorio de Imagen Preclínica, Centro de Imagen Molecular – FLENI

Presenting Author: Muñiz, Javier Andrés Muñiz, ljavier.muniz88@gmail.com

Tau is a microtubule-associated protein predominantly expressed in neurons, which participates in microtubule polymerization and axonal transport. The alternative splicing of exon 10 (E10) in the Tau transcript produces protein isoforms with three (3R) or four (4R) microtubule binding repeats, which are expressed in equal amounts in the normal adult human brain. Here aimed to characterize early phenotypes of htau mice, at 3, 6 and 12 months old, to establish the time course of the progression state of tau pathology and identify the brain nuclei involved in these phenotypes. We performed behavioral tests to identify cognitive deficits, anxiety phenotypes, motor impulsivity and loss of behavioral inhibition. In addition, we assessed electrophysiological neuronal activity during the time course of pathological phenotypes, as well as molecular and histological markers. Finally, using an RNA trans-splicing strategy to modulate E10 inclusion (Sonia/ani) we demonstrate that local shifting of 3R to 4R tau into the striatum of htau mice improved some of the htau phenotypes. Together, our results suggest that tau isoforms imbalance could develop early phenotypes that can be identified to generate elaborate strategies to restore the isoform balance.

05 | Lrig protein controls neural stem cell homeostasis in the developing neocortex

Ana Paula De Vincenti 1°, Antonela Bonafina 1°, Fernanda Ledda 2°, Gustavo Paratcha 1°

1.Laboratorio de neurociencia molecular y celular, Instituto de biología celular y neurociencias “Prof. E De Robertis” (IBCN), Universidad de Buenos Aires-CONICET
2.Fundación Instituto Leloir, Instituto de investigaciones bioquímicas de Buenos Aires, CONICET

Presenting Author: De Vincenti, Ana Paula, lanadevin8@gmail.com

The mammalian cerebral cortex is a highly organized structure responsible for cognitive, sensory and motor functions. It’s development requires coordination of crucial processes such as cell proliferation, migration, differentiation and acquisition of layer specific identities. Many extracellular cues and intrinsic factors have been identified as regulators of this process. However, further investigation is needed to understand how this complex architecture is achieved. In this work, we show that Leucine-rich repeats and immunoglobulin-like domains proteins (Lrig) are expressed in the embryonic neocortex during the period of neurogenesis. We identified a member of Lrig family as a regulator of cortical cell proliferation and self-renewal, disrupting mitogenic activity of trophic factors. We show that genetic ablation of Lrig modifies the population of proliferating cortical precursors in vivo, which in turn gives rise to an abnormal number of excitatory neurons in mice postnatal cortex. These results indicate that Lrig plays a key physiological role functioning as a homeostatic regulator of glutamatergic cortical neurogenesis.

06 | Sleep within the consolidation window improves motor memory retention and promotes the spindle-SO coupling over the contralateral motor network

Agustín Solano 1°, Gonzalo Lerner 1°, Pedro Caffaro 1°, Luis Alberto Riquelme 1°, Daniel Perez-Chada 2°, Valeria Della-Maggiore 1°

1.CONICET-Universidad de Buenos Aires, IFIBIO Houssay, Buenos Aires, Argentina
2.Internal Medicine, Pulmonary and Sleep Service, Austral Univ. Hosp., Pilar, Argentina

Presenting Author: Solano, Agustín, lasolano@bioingenieria.edu.ar

Strong evidence suggests that sleep benefits declarative memories (DM). However, its contribution to motor learning is controversial. Recently, we showed that learning a motor adaptation (MA) task shortly before sleep enhances the delta power and the coupling between spindles and slow oscillations (SO), similarly to what is observed in DM. Here, we tested the hypothesis that the beneficial effect of sleep in MA depends on its overlap with the consolidation window. First, we tracked MA memory retention through a 24h window. We found that it decayed initially and stabilized at 6h post training, and remained constant overnight ($p<0.001$), suggesting that sleep does not benefit MA if the time proximity between learning and sleep is not controlled. To control the interval between learning and sleep we then tracked the time course of MA memory consolidation using an anterograde interference protocol. We found that release from interference started about 6h post learning ($p<0.001$), implying that MA consolidates within such a time window. Finally, we trained two groups of subjects so that sleep occurred outside (~14h; group T-14h) or inside (~10min; group T-10min) the consolidation window, and recorded EEG overnight. We found that T-10min retained 30% more than T-14h ($p<0.05$). This sleep benefit was accompanied by an increment in the spindle-SO coupling and delta band power over the brain hemisphere contralateral to the trained hand ($p<0.05$), supporting our hypothesis.

07 | Spread of rhythmic activity among couple oscillators

Graciela Ines Kearney 1°, Lidia Szczupak 1°

1.Instituto de Fisiología, Biología Molecular y Neurociencias (UBA-CONICET)

Presenting Author: Kearney, Graciela Ines, lgraciela.kearney@gmail.com

In animal motor behaviors, the segments along the antero-posterior axis perform movements in a coordinated manner. Leeches are an outstanding model to analyze the underlying neuronal network controlling this function because the 21 segments that compose the body are virtually identical, simplifying the question on intersegmental coordination to that on interactions among iterated units. Leeches crawl over solid surfaces through successive elongation and contraction body waves. Each segment bears all the neurons required to produce this rhythmic motor pattern and dopamine evokes fictive crawling in isolated midbody ganglia. Coordinated rhythmic motor pattern can be also elicited in chains of 3 ganglia. The pattern of activity in both experimental conditions is highly similar, and fits behavioral parameters. Within the chain, the intersegmental interactions give rise to a global network, turning each segmental circuit refractory to local perturbations. To analyze the nature of these intersegmental signals, we used a chamber that allows chemical compartmentalization of the chain. Application of dopamine in a single ganglion elicited crawling in anterior and/or posterior ganglia. These results show that local crawling oscillators provide excitatory drive bidirectionally, which operates tonically upon neighboring circuits spreading the rhythmic activity.

POSTER SESSION 1

001 | Distribution and localization of neuronal sets that co-express growth hormone secretagogue receptor and Glucagon-like Peptide-1 Receptor in the Mouse Brain

Cellular and Molecular Neurobiology

Author: Julieta Aguggia | email: juliaguggia@gmail.com

Julieta Aguggia [1°], Gimena Fernandez [1°], Daniela Cassano [1°], Paula Cornejo [1°], Franco Barrile [1°], Camila Saenz [1°], Abdella Habib [2°], Mario Perelló [1°]

1° Grupo de Neurofisiología, Instituto Multidisciplinario de Biología Celular (IMBICE). Universidad Nacional La Plata (UNLP), Consejo Nacional de Investigaciones Científicas y Técnicas (CONICET) y Comisión de Investigaciones Científicas de la Provincia de Buenos Aires (CIC-PBA). La Plata, Argentina.
2° College of Medicine, QU Health, Qatar University, Doha, Qatar.

Ghrelin is a stomach-derived orexigenic hormone that acts via the growth hormone secretagogue receptor (GHSR), highly expressed in the brain that increases food intake and glycemia. The Glucagon-like peptide-1 (GLP-1) is a hormone released by the gastrointestinal tract in response to meal intake that acts via the GLP-1 receptor (GLP-1R) and reduces food intake and glycemia. Interestingly, GHSR and GLP-1R expression have been observed within many of the same nuclei of the brain, suggesting may act on common neuronal sets to mediate its neurobiological effects. Here, we explored the extent of this putative direct GHSR and GLP-1R interaction in the brain. We mapped the distribution of the GHSR in the mouse brain and examined the localization of this receptor using two complementary approaches: binding with fluorescent-labeled ghrelin (Fr-ghrelin) in wild type mice or visualizing the endogenous fluorescence of GHSR-eGFP mice in which eGFP is under the control of the GHSR promoter. In both cases, the presence of GLP-1R was visualized by immunohistochemistry using a validated anti-GLP1R antibody. We found that cells containing both GHSR and GLP-1R are mainly located in the hippocampus dentate gyrus. In contrast, simultaneous presence of GHSR and GLP-1R was much less extensive elsewhere in the brain.Thus, we conclude that GHSR and GLP-1R signaling may directly crosstalk in the hippocampus whereas they act largely on distinct neuronal populations in other parts of the mouse brain.

003 | Role of Rab11a in the regulated secretory pathway in chromaffin cells

Cellular and Molecular Neurobiology

Author: Samuel Alberto Alfonso Bueno | email: alfonsosamuel25@gmail.com

Samuel A. Alfonso-Bueno [1°], Fernando D. Marengo [1°], Luciana I. Gallo [1°]

1° Instituto de Fisiología, Biología Molecular y Neurociencias (UBA-CONICET). Facultad de Ciencias Exactas y Naturales. Universidad de Buenos Aires

The small GTPase Rab11a is a well-known coordinator of constitutive recycling pathways. Little is known about its role in secretory pathways. To fill this gap, we studied the Rab11a's role in the regulated neurosecretion in murine chromaffin cells. We transfected fluorescently-tagged Rab11a wild-type (WT), constitutively active Rab11aQ70L mutant (Q70L) or dominant negative Rab11aS25N mutant (S25N). Regulated exocytosis was registered as real-time capacitance changes with the patch-clamp technique in whole-cell configuration. Upon individual or short train depolarization stimuli, all Rab11a variants reduced the exocytosis respect to control, but no differences were obtained between mutants and WT. To study the effect of both mutants on massive exocytosis, we evaluated capacitance changes after dialyzing cells with 1.5 µM free calcium. In these conditions, maximum velocity (fF/s) of exocytosis was reduced for S25N (19±2) and Q70L (19±2) when compared with WT (32±4) or control cells (43±2). To evaluate changes on the number of secretory vesicles, we cotransfected either Rab11a variant (WT, S25N and Q70L) with fluorescently-tagged neuropeptide Y (NPY), as a marker for regulated secretory vesicles. By confocal microscopy, we observed a significant reduction in the amount of peripheral NPY in cells expressing S25N, an effect that was stronger after high K+ stimulation. We conclude that Rab11a regulates secretory exocytosis by modulating the availability of secretory vesicles.

005 | Chronic stress exposure alters signaling pathway that facilitates Gpm6a neuroplastic function

Cellular and Molecular Neurobiology

Author: Sofia Elisa Alzuri | email: sofia.alzuri@gmail.com

Sofia Elisa Alzuri [1°2°], Natasa Hlavacova [3°], Daniela Jezova [3°], Beata Fuchsova [1°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° Laboratory of Pharmacological Neuroendocrinology, Institute of Experimental Endocrinology, Biomedical Research Center, Slovak Academy of Sciences, Bratislava, Slovakia.

Gpm6a is a neuronal membrane glycoprotein that functions in different processes of neuronal plasticity and the mechanism of its action involves the actin regulator Coronin-1a (Coro1a) via a signaling pathway that includes the small GTPase Rac1 and its downstream effector the p21-activated kinase 1 (Pak1). Disruptions of neuroplasticity mechanisms in the hippocampus play a significant role in chronic stress response but the intracellular mechanisms underlying these alterations are poorly understood. It has been shown that chronic stress modifies hippocampal expression of Gpm6a in a variety of animal models so we asked whether the signaling pathway that facilitates Gpm6a neuroplastic function is also affected by chronic stress exposure. Here we show that, apart from Gpm6a mRNA level, also Coro1a mRNA level is decreased in the hippocampus of chronically stressed rats. Furthermore, we show that mRNA level of two members of group I Paks predominantly expressed in neurons, Pak1and Pak3, are significantly diminished. No differences were observed for the ubiquitously expressed Pak2. The small Rho GTPases Rac1 and Cdc42 are known to play a central role in the activation of Pak1 and Pak3. Here we observed a significant increase in Rac1 expression while no differences were observed for Cdc42. We suppose that the alterations in the expression of these genes could be directly related to the morphological alterations found in the hippocampus of chronically stressed animals.

007 | The role of tau in the structure and function of the axon initial segment

Cellular and Molecular Neurobiology

Author: Cayetana Arnaiz | email: cayetanarnaiz@gmail.com

Cayetana Arnaiz [1°], Carolina Facal [2°], Mariana Holubiec [3°], Julieta Bianchelli [1°], Melina González-Prinz [1°], Elena Avale [2°], Tomás Falzone [3°]

1° IBioBA-MPSP-CONICET
2° INGEBI
3° IBioBA-MPSP-CONICET, IBCN

The AIS regulates action potential and acts as a selective barrier for axonal cargo. It presents specific structural features: MT fascicles, Ankyrin-G linkers, and enrichment of ion channels. Tau, a MT-associated protein highly expressed in neurons, acts as an axonal transport regulator. Changes in tau have been associated with AIS defects. However, the molecular mechanisms by which tau modulates the AIS remain unknown. My work focuses on elucidating how tau regulates the AIS. Using hippocampal neurons from hTau mice, and hiPSC-derived neurons, we performed tau conditional KD and regulated tau isoform production. We show that tau isoform production can affect AIS maturation, positioning, and AnkG enrichment in murine neurons. We characterized the maturation and positioning of the AIS in hiPSC neurons, and showed that the proportion of neurons with AIS increases over time, and the intensity of AnkG staining. We confirmed that hiPSC neurons produce 4R-tau after 37 days in vitro. Increasing the early endogenous production of 4R-tau leads to a significant increase in the percentage of neurons with AIS. Finally, the effect of tau KD on the transport of APP within the AIS was evaluated by live-imaging. We found that decreasing tau expression selectively affects the anterograde transport of cargo within the AIS. This work will provide knowledge on how tau modulates the AIS, which is essential for understanding potential pathological mechanisms associated with tauopathies.

009 | The active role of Met prodomain in cocaine sensitization induced by chronic stress

Cellular and Molecular Neurobiology

Author: María Julieta Boezio | email: jboezio@unc.edu.ar

M. Julieta Boezio [1°], Daiana Rigoni [1°], Milena Jandar Paz [2°], Mariano Bisbal [2°], Liliana Cancela [1°], Agustín Anastasía [2°], Flavia Bollati [1°]

1° Instituto de Farmacología Experimental de Córdoba (IFEC-CONICET), Departamento de Farmacología Otto Orsingher, FCQ-UNC-Córdoba, Argentina
2° Instituto de Investigación Médica Mercedes y Martin Ferreyra, INIMEC-CONICET, Córdoba, Argentina

Brain-derived neurotrophic factor (BDNF) is a neurotrophin widely expressed in the brain that plays a major role in the development, differentiation, maturation and plasticity of the nervous system. BDNF has a fundamental role in neuronal plasticity leading to drug abuse. In the last decades, a single nucleotide polymorphism in the BDNF gene, resulting in the substitution of the amino acid Valine for Methionine in codon 66 (Val66Met) in the BDNF prodomain region, has been widely associated with stress disorders and drug abuse. The aim of this study is evaluate the involvement of Met-prodomain of BDNF (Met-pBDNF) in the impact of stress-induced vulnerability to cocaine addiction. For this purpose, we generated lentiviral (LV) particles expressing the prodomain, pBDNF Met and pBDNF Val. Male rats were randomly assigned to the NS (not stress) and S (stress) groups and underwent stereotaxic surgery to bilaterally microinject LV particls of pBDNF variants in the nucleus accumbens core (NAc). After a cocaine challenge, we observed an increase in locomotor activity in stressed Met-pBDNF animals. In correlation with these changes, we also observed a lasting decrease in GLT-1 levels in NAc. This result is relevant since it is considered one of the mechanisms underlying the vulnerability to develop addictive behaviors induced by stress. Our results suggest that Met-pBDNF is involved in stress-induced vulnerability to cocaine addiction, acquiring additional value as an active ligand.

011 | Epigenetic marks dynamics during neuronal differentiation from human induced pluripotent stem cells

Cellular and Molecular Neurobiology

Author: Andres Mauricio Cardozo Gizzi | email: andres.cardozo@iucbc.edu.ar

Andrés Cardozo Gizzi [1°], Monica Remedi [1°], Laura Gastaldi [1°], Alfredo Cáceres [1°]

1° Centro de Investigación en Medicina Traslacional "Severo Amuchástegui" (CIMETSA) – Instituto Universitario Ciencias Biomédicas Córdoba (IUCBC)

During neuronal differentiation, neural progenitor cells must switch their gene expression programs to allow for the generation of neurons and glial cells. This shift is produced by external cues together with epigenetic mechanisms, such as histone post-translational modifications. Chemical modifications in chromatin correlate with its 3D architecture in the cell nucleus, and this organization is integral in the control of gene expression. In this work, we used a human model of neural development derived from induced pluripotent stem cells to study how chromatin post-translational modifications change during the course of differentiation. We measured the dynamics of H3K4me3, H3K27me3 and H3K9me3, epigenetic marks of euchromatin, facultative heterochromatin and constitutive heterochromatin, respectively. Based on confocal imaging data, we used Uniform Manifold Approximation and Projection (UMAP) to separate cell-type populations and characterize them during the time in culture. We found that epigenetic marks intensity and spatial pattern are highly dependent on cell type. This initial characterization of the human model lays the ground to study how chromatin spatial organization is required as an additional layer of gene expression regulation. We propose a novel approach to discern new mechanisms of transcriptional regulation in the context of human neuronal differentiation.

013 | Volume electron microscopy reveals age-related circuit remodeling in the auditory brainstem

Cellular and Molecular Neurobiology

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

Daniela Chequer Charan [1°], Kevin M. Boergens [2°], Wenqing Huang [3°], Maria Eugenia Gomez-Casati [4°], Ana Belen Elgoyhen [1°], Yunfeng Hua [3°], Mariano N. Di Guilmi [1°]

1° Instituto de Investigaciones en Ingeniería Genética y Biología Molecular, Dr. Héctor N. Torres, INGEBI-CONICET, Buenos Aires, Argentina (C1428ADN)
2° Department of Physics, The University of Illinois at Chicago, USA
3° Department of Otolaryngology-Head and Neck Surgery, Shanghai Ninth People's Hospital, Shanghai, China
4° Instituto de Farmacología, Facultad de Medicina. Universidad de Buenos Aires. Argentina

Medial nucleus of the trapezoid body (MNTB) neurons are an integral component of the auditory brainstem circuitry involved in sound localization. In order to study how neural connectivity is refined post-hearing onset in this nucleus, we used serial block-face electron microscopy (SBEM) in mice at different ages (3 weeks, 6 and 18 months). We acquired circuitry-level data volumes of the MNTB neurons which allows a comprehensive neuro-morphological investigation of age-related changes. We found that the total number of MNTB cells is reduced with age. Moreover, the accumulation of age pigment on MNTB cells increased with age. The morphology of the presynaptic terminal, the calyx of Held, was heterogeneous independently of age but degenerated terminals were strongly evident in older animals along the tonotopic axes. Interestingly, poly-innervated MNTB cells were present not only in young but also in older animals being more frequent in the low frequency region. This last observation demonstrates that the multiple innervations of the MNTB is not only restricted to the developmental critical period, but that it is also present throughout life. As a conclusion, our data supports the notion that age-related hearing impairments can be in part a direct consequence of several morphological alterations at the brainstem level.

015 | Yerba mate as a potential functional food attenuating L-DOPA-induced dyskinesia in a murine model of Parkinson's disease: preliminary results

Cellular and Molecular Neurobiology

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

Andrea Cecilia Cura [1°], Liliana Teresita Tribbia [1°], Florencia Echeverria [1°], Lorena Rela [2°], Irene Rita Eloisa Taravini [1°]

1° Laboratorio de Neurobiología Experimental. LNE-ICTAER-UNER-CONICET, Gualeguaychú, Entre Ríos, Argentina
2° Grupo de Neurociencia de Sistemas. GNS-IFIBIO-UBA-CONICET, Buenos Aires, Argentina

L-DOPA is the most effective drug for the treatment of Parkinson's disease (PD); however, long-term administration develops L-DOPA induced dyskinesia (LID). LID is associated with the remodeling of dendritic spines of striatal neurons and with intermittent fluctuations in brain dopamine levels, promoting neurodegeneration or contributing to the establishment of pathological mechanisms mediated by glia. Various approaches have been considered to slow the progression of PD and nutraceuticals have received attention. An inverse association between yerba mate (YM) consumption and the risk to develop PD was found. Besides, it was tested that YM favors survival and growth of dopaminergic neurons in culture. To assess whether YM has the potential to reduce LID, we conducted a pilot study in an animal model of PD. C57BL/6 mice received YM for 2 months and then were unilaterally lesioned with 6-hydroxydopamine in the medial forebrain bundle. After one month, they received L-DOPA in dyskinetogenic doses for 14 days and the severity of the dyskinesias was recorded. Our preliminary results show that YM treatment exhibits a discernible trend to reduce LID in comparison to the control. Upcoming experiments will clarify whether long-term YM administration decreases the severity of LID, and whether its therapeutic effect could correlate with the degree of microglial and astrocytic reactivity, and plastic changes in the synaptic microarchitecture of striatal neurons.

017 | Cholesterol loss in old hippocampus triggers HDAC2 mediated repression of BDNF

Cellular and Molecular Neurobiology

Author: Benjamín Isaías de la Cruz-Thea | email: bdlcruzthea@immf.uncor.edu

Benjamín I. de la Cruz-Thea [1°], María F. Harman [1°], Mauricio G. Martín [1°]

1° Instituto de Investigaciones Médicas Mercedes y Martín Ferreyra (INIMEC-CONICET-UNC), Universidad Nacional de Córdoba, Córdoba, Argentina.

Aging is associated to epigenetic alterations which lead to diminished expression of memory-related genes. One of the most important changes is the decrease in histone acetylation produced by the Histone Deacetylase 2 (HDAC2) activity. This process has been described as determinant for memory loss during aging. In this work we demonstrate that aging triggers the accumulation of HDAC2 in regulatory regions of the BDNF gene, a key transcription factor for synaptic plasticity. We found that the transcriptional co-repressor Chromodomain Y like protein (CDYL), which interacts with HDAC2 in hippocampal extracts, is accumulated in the nucleus of old neurons. The co-accumulation of CDYL and HDAC2 was also observed in slices of old transgenic Thy-1(GFP) mice brain. Considering that CDYL degradation is triggered by synaptic activity, our data suggest that CDYL accumulation can be due to impaired NMDA receptor activity as a consequence of cholesterol depletion in old neurons. Moreover, we found that CDYL silencing in primary culture of cortical neurons induces a decrease in the levels of HDAC2 when compared to controls, highlighting the fact that CDYL accumulation could both recruit HDAC2 to BDNF promoter and regulate HDAC2 expression or stability through a still undescribed mechanism. The findings herein contribute to the understanding of the epigenetic processes underlying synaptic impairment during aging.

019 | Fine tuning the therapeutic strategy in the use of RNAi: development of a neuro-specific tool to silence a target molecule

Cellular and Molecular Neurobiology

Author: Tomás Eidelman | email: tomas.eidelman@gmail.com

Tomás Eidelman [1°], Hernán Ezequiel Hauché Pedernera [1°], Oscar Samuel Gershanik [3°], Maria Elena Avale [2°], Melina Paula Bordone [1°], Juan Esteban Ferrario [1°]

1° Laboratorio de Neurobiología de la Enfermedad de Parkinson, IB3, UBA-CONICET Ciudad Autónoma de Buenos Aires, Argentina
2° Laboratorio de Terapéutica Experimental en Procesos Neurodegenerativos ,INGEBI-CONICET Ciudad Autónoma de Buenos Aires, Argentina.
3° Universidad Favaloro, Ciudad Autónoma de Buenos Aires, Argentina.

Regulation of gene expression using the RNA interference (RNAi) technology is a promising therapeutical approach with real perspective for clinical translation.Several clinical trials are already in progress but none of them was proved to tackle brain diseases yet. In our laboratory, we have developed an RNAi against the mRNA of the tyrosine kinase fyn aimed to reduce the levodopa induced dyskinesia in Parkinson's disease (PD). Combined with lentiviral delivered into the striatum, we have reduced dyskinesia in a pre-clinical model of PD mice (Bordone et al 2021). Although viral transduction was restricted only to the infected areas, fyn expression is ubiquitous throughout the brain and then we envisage to develop further precision of silencing among neuronal subtypes. We designed a molecular scalpel to provide a fine therapeutic option that shall reduce side effects. To reach this goal we have designed a strategy using a modified Cre-LoxP system to restrict expression of RNA molecules into dopamine D1R-expressing neurons. We have cloned the synapsin promoter inverted between lox71/lox66 sequences upstream a EGFP reporter, that should only express in the presence of the recombinase Cre. The next step is to go forward with the already validated miRNA against Fyn. In this poster we will discuss our strategy, show the first trials in vitro and in vivo to evaluate the correct functioning of the system, and the following steps towards testing its efficacy in a mouse model of LID.

021 | DOES CHILDHOOD NUTRITION DEFINE THE ADULT FEEDING BEHAVIOUR? EFFECTS OF NEONATAL OVERFEEDING ON MALE RATS´ INTAKE EXPOSED TO A CAFETERIA DIET IN ADULTHOOD

Cellular and Molecular Neurobiology

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

Pamela Rocío Fernández [1°], Guillermina Canesini [1°], Rocío Schumacher [1°], Luisa Gaydou [1°], María Florencia Rossetti [1°], Ana Paula García [1°], Jorge Guillermo Ramos [1°], Cora Stoker [1°]

1° Instituto de Salud y Ambiente del Litoral (ISAL), UNL-CONICET, Santa Fe, Argentina.
2° Cátedra de Nutrición en Situaciones Patológicas, FBCB-UNL, Santa Fe, Argentina.
3° Departamento de Bioquímica Clínica y Cuantitativa, FBCB-UNL, Santa Fe, Argentina.

Our objective was to study the impact of neonatal overfeeding on the orexigenic response to a cafeteria diet (CAF) in adulthood. Male Wistar rats were raised in small litters (4 pups/dam, SL) or normal litters (10 pups/dam, NL). From weaning they were fed with standard chow until postnatal day 90 (PND90). From PND90 and for 11 weeks animals received standard chow (CON) or cafeteria diet (CAF), (NL-CON, NL-CAF, SL-CON, SL-CAF; 14 rats/group). Body weight and food intake were recorded weekly. Specific sensory satiety test (SSS) was performed 4 weeks before sacrifice at PND167, when blood and fat pads were obtained. CAF consumption significantly increased body weight ($p<0,0001$), energy intake ($p<0,001$) and adiposity ($p<0,0001$) in both NL and SL. SL-CAF presented a significant decrease in food consumption (grams) ($p<0.05$). No differences in energy nor grams of food intake were observed between NL-CON and SL-CON. Blood glucose levels were similar in all groups. Feeding behaviour evaluated through the SSS test was altered by neonatal overfeeding and by exposure to CAF diet, both individually and in synergy ($p<0,05$). We previously demonstrated that overweight produced by neonatal overfeeding (PND21) is reversed by control diet (PND90). However, marks in the brain remain in adult life. This work provides the first evidence that neonatal overfeeding alters the expected orexigenic feeding behaviour in adult life. Future studies will focus on the molecular neurocircuitry involved.

023 | Rapid learning-induced morphological plasticity of hippocampal astrocytes

Cellular and Molecular Neurobiology

Author: Javier Hernán Fotti | email: jfotti@fmed.uba.ar

Javier Hernán Fotti [1°], Paola Mattei [1°], Ana Paula Sieben Samek [1°], Agostina Stahl [1°], Juan Emilio Belforte [1°], Germán La Iacona [1°], Valeria Della Maggiore [1°], Lorena Rela [1°]

1° Instituto de Fisiología y Biofísica Bernardo Houssay (IFIBIO Houssay), Universidad de Buenos Aires y CONICET

Experience-dependent plasticity of neural circuits involves remodeling of glial cells in addition to neuronal structures. Astrocytes become hypertrophic and more closely associated with synapses after exposing animals to stimuli that promote synaptic plasticity. Most behavioral paradigms assessing experience-dependent astrocytic structural plasticity involve several days. Here we aimed at investigating whether astrocytic structural plasticity occurs after a short-lasting learning paradigm. For this, we trained two groups of mice in an accelerated or constant speed rotarod task (learning group and active control, respectively) and sacrificed them 24 hs post-training. Then, we immunostained brain sections for GFAP and S100B to assess morphological changes in astrocytes of different brain regions. Our results show an increased GFAP staining intensity in the hippocampus of the learning group when compared to the active control group (28±3 versus 20±3 AU, t-test, p=0.0492), as well as a tendency to a greater complexity, evaluated by sholl analysis (17% increase in median critical value, Mann-Whitney, p=0.0666). Furthermore, a significant astrocytic soma volume reduction was observed in the learning group, when compared to the active control group (46% reduction, Mann-Whitney, p=0.0208). These data indicate that astrocytic structural plasticity can be observed shortly after learning and support the hypothesis that astrocytes contribute to learning-induced synaptic plasticity.

025 | Study of the allosteric potentiation mechanism of the α9α10 cholinergic nicotinic receptor by extracellular calcium

Cellular and Molecular Neurobiology

Author: Sofia Ludmila Gallino | email: sofi.gallino@gmail.com

Sofia Gallino [1°], Patricio Craig [2°], Juan Boffi [1°], Paola Plazas [3°], Ana Belén Elgoyhen [1°]

1° INGEBI-CONICET, Argentina
2° Instituto de Química Biológica, Facultad de Ciencias Exactas y Naturales (IQUIBICEN, UBA/CONICET), Universidad de Buenos Aires, Argentina
3° Instituto de Farmacología, Facultad de Medicina, Universidad de Buenos Aires, Argentina

The α9α10 nicotinic cholinergic receptor (nAChR) is an ion channel that is composed of α9 and α10 subunits. Each nAChR subunit comprises a large extracellular amino-terminal domain, four transmembrane domains (TM1-TM4), a long cytoplasmic loop between TM3 and TM4 and a C-terminal domain. One of the functional differences between α9 andα9α10 nAChRs is the modulation of their ACh-evoked responses by extracellular Ca2+. While α9 nAChRs responses are blocked by Ca2+, ACh-evoked currents through α9α10 nAChRs are potentiated by Ca2+ in the micromolar range and blocked at millimolar concentrations. In order to identify the structural determinants responsible for these differences, we generated chimeric and mutant α10 subunits, expressed them in Xenopus oocytes and performed electrophysiological recordings under two electrode voltage clamp. Our results suggest that the TM2-TM3 loop of the α10 subunit contains key structural determinants for the potentiation of the α9α10 nAChR by Ca2+.Moreover, to elucidate the mechanism of this potentiation by extracellular Ca2+ we performed molecular dynamics simulations of the interaction of Ca2+ with different nAChRs models. The result shows that both heteromeric α9α10 and homomeric α9 nAChRs exhibit similar Ca2+ binding in the environment of their TM2-TM3 loops. Therefore, our hypothesis is that the TM2-TM3 loop of the α10 subunit contributes with structural determinants that are key for the gating of the α9α10 nAChR in the presence of Ca2+.

027 | Human cerebroids derived from induced pluripotent stem cells in neuronal toxicity studies of glyphosate

Cellular and Molecular Neurobiology

Author: Gonzalo Germán Guendulain | email: gonzaloguendulain@mi.unc.edu.ar

Gonzalo Germán Guendulain [1°], Florencia Linares [1°], Monica Remedi [1°], Laura Gastaldi [1°], Alfredo Cáceres [1°], Ana Lis Moyano [1°], Andrés Cardozo Gizzi [1°]

1° Centro de Investigación en Medicina Traslacional "Severo Amuchástegui" (CIMETSA) – Instituto Universitario Ciencias Biomédicas Córdoba (IUCBC)

The use of stem cells in translational medicine is nowadays one of the great promises of biomedical sciences. One of its short-term possible applications is the development of organoids, three-dimensional tissues capable of reproducing the cellular architecture and some organ-specific functions. Due to this, these models promise to increase the number of toxicity assays performed, and therefore to provide useful toxicological information to improve existing consumption regulations. In this project, we used a human induced pluripotent stem cell (hiPSCs) line to generate brain organoids. We implemented novel cell culture techniques that included a 3D-printed mini-bioreactor to culture the organoids. By immunostaining and confocal microscopy we confirmed the presence of radially arranged cell structures in them. These consist of concentric layers of neural progenitors towards the lumen and neurons towards the periphery, similar to those observed during the in vivo development of embryonic brain tissues. To evaluate their use as a biological platform for toxicity assays, we exposed them to Glyphosate, the most used herbicide in Argentina. We were able to observe both morphological changes and a diminished peripheral neuronal layer in the structures. Thus, our results constitute one of the first records of glyphosate evaluation in a human model and suggest that the herbicide is potentially neurotoxic to our species.

029 | Exploring the AMPK signalling as a potential intermediate in yerba mate-induced neuroprotection

Cellular and Molecular Neurobiology

Author: Hernán Ezequiel Hauché Pedernera | email: hernanhauche@gmail.com

Hernán Ezequiel Hauché Pedernera [1°], Pedro Ballestero [1°], Tomas Eidelman [1°], Melina Bordone [1°], Alejandra Bernardi [2°], Juan Ferrario [1°]

1° Laboratorio de Neurobiología de la Enfermedad de Parkinson, IB3, UBA-CONICET Ciudad Autónoma de Buenos Aires, Argentina
2° Instituto de Investigaciones Farmacológicas: Buenos Aires, AR

Neuroprotection is one of the key challenges in neurodegenerative disorders, therefore, understanding their mechanisms may help in the development of strategies to delay the process. Already identified neuroprotective compounds strongly help to reach such goal. We have demonstrated that Yerba mate (YM) enhances survival of dopaminergic neurons in primary mesencephalic cultures, similarly to green tea and coffee. These beverages have been negatively linked with development of Parkinson's disease. They share several active compounds, remarkably polyphenols, such as chlorogenic acid (CGA). To investigate whether YM regulates intracellular mechanisms related with growth and survival of dopaminergic neurons, we focused on AMPK, a key signaling molecule involved in cell metabolism, strongly linked with neuroprotection and potentially activated by CGA. As a first step to test this hypothesis, we use the simplified model of SHSY5Y neuroblastoma cell line. We have tested the phosphorylation status of AMPK at different concentrations and exposure times with an extract of YM and CGA. We have found that YM regulates AMPK which is relevant because of its role in paradigms of neuroprotection. Moreover, we will discuss additional preliminary results including treatment with CGA, as well the exploration of other regulatory molecules. Further work is still needed but we have already settled down the bases of a new experimental line with a clear projection in the short term.

031 | nsSNPs within the extracellular loops of M6a impair its neuroplastic function

Cellular and Molecular Neurobiology

Author: Antonella León León | email: aleon@iib.unsam.edu.ar

Antonella León [1°], Rocío Gutiérrez Fuster [1°], Ignacio Sallaberry [2°], Gabriela Aparicio [1°], Laura Estrada [2°], Camila Scorticati [1°]

1° Instituto de Investigaciones Biotecnológicas (IIBio-UNSAM-CONICET))
2° Departamento de Física, Instituto de Física de Buenos Aires (IFIBA), Facultad de Ciencias Exactas y Naturales, Universidad de Buenos Aires

Neuronal glycoprotein M6a expression levels or polymorphisms within the GPM6A gene are associated with neuropsychiatric disorders like schizophrenia, depression and claustrophobia. M6a promotes neurite outgrowth, filopodia formation and dendritic spine and synapse maintenance in vitro. Although strong evidence suggests that the extracellular loops of M6a (ECs) are responsible for its function, the molecular mechanisms linking M6a to the onset of such diseases remain unknown. To gain knowledge on these mechanisms, we aim to characterize new non-synonymous polymorphisms (nsSNPs) within the ECs of GPM6A. We identified six nsSNPs (T71P, T76I, M154V, F156Y, R163Q and T210N) that impair M6a-induced plasticity in neuronal cultures; even though M6a´s expression, subcellular localization and folding are not affected by these nsSNPs. Previous reports showed that M6a dimerization is necessary to induce filopodia and synapse formation. M6a´s ECs are involved in homo- and heterotypic protein-protein interactions and might lead to the formation of M6a oligomers at the plasma membrane. Thus, we are currently evaluating whether the nsSNPs might disturb M6a´s oligomerization state. Our preliminary results suggest that the damaging effect of these nsSNPs could be related to a decrease in protein oligomerization. These results highlight the importance of reverse genetics approaches to gain knowledge on M6a´s mechanisms of action and genetic susceptibility of certain GPM6A variants.

033 | Müller glial cells´ photosensitivity effects over glutamate-glutamine cycle components

Cellular and Molecular Neurobiology

Author: NATALIA ANDREA MARCHESE | email: natalia.marchese@unc.edu.ar

Natalia A. Marchese [1°], Paula Mónaco [1°], Maximiliano N. Rios [1°], Mario E. Guido [1°]

1° CIQUIBIC-CONICET. Departamento de Química Biológica “Ranwel Caputto”, Facultad de Ciencias Químicas, Universidad Nacional de Córdoba

Müller cells (MC), the main glial cell type in the retina, are novel photic elements given the expression of blue- and UV-light sensitive opsins (Opn3, RGR and Opn5) and their intrinsic calcium responses elicited by blue light (BL). Each MC constitutes the core of retinal functional units, where its anatomical location allows the interaction with all of its cell types and accounts for their multiple functions, including glutamate recycling. Within the glutamate-glutamine cycle, MC are responsible for the reuptake of glutamate, through membrane transporters (GLAST), and its conversion to glutamine by glutamine synthase (GS) activity, to be transported back to neurons. We explored BL-induced modifications in glutamate metabolism by evaluating its main components in basal conditions and in neuron-conditioned medium. BL stimulation (1h) to primary cultures of avian MC does not modify GS nor GLAST levels. However, immunocytochemichal analysis of GLAST expression in MC reveals a light-evoked effect over cellular vesicles containing GLAST which marked increase in area and intensity after BL, which are restored upon returned to dark. Notably, the light-evoked cellular re-arrangement is blunted when neuronal-conditioned media is added. More experiments could untangle the physiological implication of photic induced changes in MC over glutamate metabolism.

035 | Use of cellular models to investigate the role of the unfolded protein response in TDP-43 associated neurodegenerative diseases

Cellular and Molecular Neurobiology

Author: Mauricio Norman Montenegro | email: mauricio.montenegro909@gmail.com

Mauricio Montenegro [1°], Gonzalo Sánchez [2°], Juan Rodríguez Elgassi [2°], Santiago Charif [2°], María Cotarelo [2°], Matías Blaustein [2°], Lionel Muller Igaz [1°]

1° IFIBIO Houssay, Grupo de Neurociencia de Sistemas, Facultad de Medicina, Universidad de Buenos Aires – CONICET, Buenos Aires, Argentina.
2° 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.

TDP-43 is a ubiquitously expressed, predominantly nuclear protein with multiple roles in RNA processing. In neurodegenerative diseases, such as amyotrophic lateral sclerosis (ALS) and frontotemporal lobar degeneration (FTLD), a key finding is that pathological TDP-43 accumulates in the cytoplasm, forming aggregates. Activation of the Unfolded Protein Response (UPR) in patients suffering from these diseases has been proposed to be linked to TDP-43 toxicity. The UPR is a cellular stress signaling cascade essentially triggered by the accumulation of misfolded proteins in the Endoplasmic Reticulum (ER). Upon detection of ER stress, the ER launches three mechanistically distinct pathways (IRE1, PERK and ATF6) guiding proadaptive and/or proapoptotic cell fate decisions. To study the role of the UPR in TDP-43-mediated pathogenesis we use cellular models overexpressing wild-type, nuclear TDP-43 (TDP-43 WT) or a cytoplasmic form of TDP-43 (TDP-43-ΔNLS) which recapitulate ALS/FTD features. Hela cells transfected with a set of fluorescent reporters will allow us to monitor the activation of the three UPR branches in single cells and in real time. Cells will be co-transfected with either TDP-43 WT, TDP-43-ΔNLS or a TDP-43 shRNA and treated with UPR inducers or vehicle. Biochemical analysis of endogenous UPR components will also be performed to study the effects of TDP-43 dysregulation on UPR activity. These experiments will shed light on the role of the UPR in TDP-43 proteinopathies.

037 | Effect of OPN3 and MC4R on Kir7.1 mediated currents

Cellular and Molecular Neurobiology

Author: victoria pinto | email: vicpinto98@gmail.com

Victoria Pinto [1°], Andrea Portales [2°], Hala Haddad [3°], Elena Oancea [3°], Jesica Raingo [2°]

1° AGENCIA NACIONAL DE PROMOCIÓN DE LA INVESTIGACIÓN, EL DESARROLLO TECNOLÓGICO Y LA INNOVACIÓN
2° CONICET
3° Brown University

OPN3 is part of the opsin family of light-sensitive G-protein coupled receptors. OPN3 was discovered in deep brain regions, specifically the arcuate nucleus and the paraventricular nucleus of the hypothalamus. Oancea lab has discovered that OPN3 functions in a light independent manner and signals through Gai to negatively regulate the melanogenic Gs-coupled MC1R in human epidermal melanocytes. Neuronal melanocortin receptors (MC3R and MC4R) are found in the arcuate nucleus and paraventricular nucleus of the hypothalamus and play non-redundant roles in mediating energy balance. Both MC3R and MC4R share similar structural identities to MC1R and have been found to couple to Gs. Additionally, Cone and his colleagues found that MC4R couples to Kir7.1 in hypothalamic neurons independent of G-protein activity. Previous data in our lab has revealed that OPN3 colocalizes and forms a physical complex with MC4R. The goal of this study is to test the hypothesis that OPN3 functions to negatively modulate MC4R-mediated signaling. More specifically, we overexpress OPN3 and MC4R in HEK293 cells together with Kir7.1 and measured the potassium current at diferent potentials. We only observed a significant amount of current in cells coexpressing OPN3 and this effect seems to be occluded by MC4R addition. More experiments are required to fully understand the signaling cascade involved and what is the effect of MC4R agonists.

039 | Etv4 regulates nociception by controlling peptidergic sensory neuron development and peripheral tissue innervation

Cellular and Molecular Neurobiology

Author: Antonella Soledad Rios | email: arios@leloir.org.ar

Antonella Soledad Rios [1°], Ana Paula De Vincenti [2°], Pablo Brumovsky [3°], Jorge Aquino [3°], Gustavo Paratcha [2°], Fernanda Ledda [1°]

1° Fundación Instituto Leloir, Instituto de Investigaciones Bioquímicas de Buenos Aires, CONICET, Buenos Aires, Argentina.
2° División de Neurociencia Molecular y Celular, Instituto de Biología Celular y Neurociencias, Universidad de Buenos Aires, CONICET, Buenos Aires, Argentina.
3° Developmental Biology & Regenerative Medicine Laboratory, Instituto de Investigaciones en Medicina Traslacional (IIMT), CONICET-Universidad Austral, Derqui-Pilar, Buenos Aires, Argentina.

The perception of noxious environmental stimuli by nociceptive sensory neurons is an essential mechanism for the prevention of tissue damage. Etv4 is a transcriptional factor expressed in most nociceptors in dorsal root ganglia (DRG) during the embryonic development. However, its physiological role remains unclear. Here, we show that Etv4 ablation results in defects in the development of the peripheral peptidergic projections in vivo and deficits in axonal elongation and growth cone morphology in cultured sensory neurons in response to NGF. From a mechanistic point of view, our findings reveal that NGF regulates Etv4-dependent gene expression of molecules involved in extracellular matrix (ECM) remodeling. Etv4-null mice were less sensitive to noxious heat stimuli and chemical pain and this behavioral phenotype correlates with a significant reduction in the expression of the pain-transducing ion channel TRPV1 in mutant mice. Together, our data demonstrate that Etv4 is required for the correct innervation and function of peptidergic sensory neurons, regulating a transcriptional program that involves molecules associated to axonal growth and pain transduction.

041 | CHARACTERIZATION OF SPONTANEOUS ELECTRICAL ACTIVITY IN DEVELOPING ZEBRAFISH LATERAL LINE HAIR CELLS

Cellular and Molecular Neurobiology

Author: Lucia Salatino | email: lu.salatin@gmail.com

Lucia Salatino [1°], Ana Belen Elgoyhen [2°], Juan D. Goutman [2°], Paola V. Plazas [1°]

1° Instituto de Farmacología, Facultad de Medicina, UBA
2° INGEBI, CONICET

Spontaneous electrical activity (SEA) transmitted among developing neurons shapes the connectivity patterns of emerging circuits. In the mammalian inner ear, SEA is originated in the cochlea by the release of glutamate from sensory hair cells (HC). In order to study SEA in developing HC, we used the Zebrafish (Danio rerio) lateral line system (zLL). The zLL allows fishes and amphibians to detect water motion and pressure changes and consists of clusters of mechanosensitive HC. LL HC are innervated by afferent and efferent neurons, and share structural, molecular and functional properties with those of the cochlea. zLL forms at 2-3 days post-fertilization (dpf) and the system is completely mature at 5 dpf. Previous work has shown that zLL HC exhibits SEA at 3 and 6 dpf. In this work, we have taken advantage of the optical transparency and rapid development of zebrafish to study the patterns of SEA in developing LL HC. We performed in vivo calcium imaging in transgenic larvae expressing GCaMP7 in zLL HC and found that HC display two types of spontaneous calcium transients, waves and spikes, from 3 to 7 dpf. The magnitude of SEA changes over this temporal window. Moreover, specific patterns of calcium activity are present at different developmental stages, suggesting its relation to the establishment of zLL microcircuit.

043 | Biochemical analysis of ASIC1a channel distribution within HEK293 cells

Cellular and Molecular Neurobiology

Author: LIBIA CATALINA SALINAS CASTELLANOS | email: libia_catalina53@hotmail.com

Libia Catalina Salinas Castellanos [1°], Osvaldo Daniel Uchitel [1°], Carina Weissmann [1°]

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

Acid-sensing ion channels (ASICs) regulate synaptic activities and play important roles in neurodegenerative diseases as well as pain conditions. Classically, ASICs are described as transiently activated by a reduced pH, followed by desensitization; the activation allows sodium influx, and in the case of ASIC1a-composed channels, also calcium to some degree. The function of ASICs depends on the number of channels on the cell surface. Thus, the dynamic control of surface ASICs under normal and pathological conditions is highly relevant. In this work we present a simple and quick fractionation method we established that involves the use of HEK293 cell lines exogenously expressing the protein of interest, a tabletop centrifuge and different detergents. In hours, different cell fractions enriched in cytosolic (Cyt), plasma membrane (PM), membranous organelle (MO), and nuclear (Nu) proteins are obtained allowing for the identification of proteins in each by western blot. Using specific stimuli as a trigger, and fractionation, we describe and quantify the shuttling of ASIC1a channels, as well as the shuttling of a kinase, between cell compartments. This work shows ASIC1a channels (and other proteins) altered distribution in different conditions that in turn can lead to changes in currents that might be relevant in tissue acidosis as present in ischemic stroke, epileptic seizures, chronic pain, and neurodegenerative diseases.

045 | SERT and Tph2 gene expression in mice that were transiently depleted of 5-HT during embryogenesis

Cellular and Molecular Neurobiology

Author: Ivan Julio Cesar Servin Bernal | email: iservin@immf.uncor.edu

Ivan SERVIN BERNAL [1°], Bianca LOCASCIO [1°], Maria Carolina FABIO [1°]

1° Instituto de Investigaciones Médicas Mercedes y Martín Ferreyra (INIMEC-CONICET-UNC)
2° Facultad de Psicología UNC

Serotonin (5-HT) is a monoamine neuromodulator that plays a key role in the organization of the central nervous system. 5-HT alterations may be associated to the emergence of social deficits and psychiatric disorders, including anxiety anddepression. In previous studies we found that prenatal 5-HT disruption alters compulsive behavior and social vocalizations at weaning. Moreover, 5-HT depletion during gestation altered Tph2 and SERT expression in mPFC. In the present study we aimed to analyze the effects of transient 5-HT depletion at gestation on 5-HT central synthesis and reuptake at weaning in the hippocampus area. A 3 [treatment prenatal (PCPA, vehicle, untreated)] x 2 [sex (male, female)] factorial design was conducted. C57/BL6 male and female mice, born from dams treated with a 5-HT synthesis inhibitor (PCPA; 4-Chloro-DL-phenylalanine methyl ester hydrochloride) at gestational days (G)12-14 At postnatal day (P) 64 all animals hippocampus were dissected and mRNA expression of SERT and Tph2 was analyzed using RT-PCR to. Changes in SERT and Tph2 expression in hippocampus will be discussed in terms their implications in a wide range of functions from basic physiological mechanisms to complex behaviors. These results are relevant because increasing evidence links 5-HT signaling alterations during development to emotional dysregulation and psychopathology.

047 | Tau homeostasis is influenced by PIAS4

Cellular and Molecular Neurobiology

Author: María Clara Sokn | email: csokn@ibioba-mpsp-conicet.gov.ar

María Clara Sokn [1°], Vanina Giselle Velardo [1°], Romina Gobbini [1°], Alejandra Attorresi [1°], Sergio Senin [1°], Eduardo Arzt [1°], Ana Clara Liberman [1°]

1° Biomedicine Research Institute of Buenos Aires – CONICET –Max Planck Partner Institute (IBioBA-CONICET-MPSP)

Tauopathies are neurodegenerative diseases characterized by the de-regulation of tau homeostasis. Accumulating evidence points to an important role of the PIAS family SUMO ligases as regulators of several key proteins involved in neurodegeneration. This work aimed to determine the role of PIAS family in the regulation of tau protein homeostasis. By means of a western blot (WB)-based screening in HT22 cells overexpressing human 2N4R WT tau (hTau) together with the PIAS family members, we observed a robust increase in total tau levels triggered only by PIAS4. Importantly, the catalytically inactive (CA) ligase PIAS4CA was incapable of modulating tau, suggesting that PIAS4 mediated SUMOylation is involved in tau deregulation. Besides, Tau-BifC assay showed that PIAS4 enhances tau dimerization, a process that has been linked to tau pathological deregulation. PIAS4 effect on tau was corroborated in N2a cells stably expressing similar to endogenous levels of WT hTau or the SUMOylation mutant tau (hTauK340R). On one hand, PIAS4 promoted not only WT htau but also hTauK340R accumulation, suggesting that the enzyme activity on tau does not involve direct tau SUMOylation. On the other hand, PIAS4 silencing markedly decreased total tau protein levels. Finally, our autophagic flux assays revealed that PIAS4 overexpression inhibits autophagic activity whereas PIAS4 silencing promotes it. We propose that PIAS4 is an autophagy modulator that regulates tau clearance.

049 | Maternal alcoholism affects cell lineage in adult hippocampal neurogenesis

Cellular and Molecular Neurobiology

Author: Nerina Mariel Villalba | email: nvillalba@fmed.uba.ar

Nerina Villalba [1°], Catalina Madarnas [1°], Viviana Sanchez [2°], Alicia Brusco [2°]

1° Universidad de Buenos Aires, CONICET, Instituto de Biología Celular y Neurociencia Prof. E. De Robertis (IBCN), Buenos Aires, Argentina.
2° Universidad de Buenos Aires, Facultad de Medicina, 1° Unidad Académica del Departamento de Histologia, Biología Celular, Embriologia y Genética, Buenos Aires, Argentina.

Perinatal ethanol exposure (PEE) impacts the developing fetus and the central nervous system being particularly affected. These alterations can have clinical implications encompassed in Fetal Alcohol Spectrum Disorders (FASD). The hippocampus is implicated in cognitive functions which are altered in adults with FASD. The dentate gyrus (DG) of the hippocampus conserves the capacity to produce new neurons in adulthood. In this context, our study aimed to describe the effect of PEE on adult hippocampal neurogenesis using a murine model. Female CD1 mice were exposed to ethanol 6% v/v along pregnancy and lactation. After weaning, pups had no further contact with ethanol. Characteristic cell types of the adult male DG were studied by immunofluorescence. A lower percentage of type 1 and 4 cells and a higher percentage of type 2 cells were observed in PEE animals. This decrease in type 1 cells suggests that PEE reduces the population of remnant progenitors of the DG present in adulthood. The increase in type 2 cells and decrease in type 4 cells may indicate that the presence of ethanol during neurodevelopment alters the capacity of neuroblasts to become neurons in the adult neurogenic niche. These results suggest that pathways implicated in cell determination were affected by PEE and remained affected in adulthood. Since neurogenesis is associated with cognitive processes altered in FASD, these results may contribute to explain one of the mechanisms involved in alcohol teratogenesis.

051 | Role of the ClC-a channel in Drosophila neuronal circuits that regulate sleep/wake behavior

Chronobiology

Author: Agustina Bruno Vignolo | email: agustinabrunovignolo@gmail.com

Agustina Bruno Vignolo [1°], Nara Inés Muraro [1°]

1° IBioBA-CONICET-MPSP

The circadian oscillator of Drosophila is composed of approximately 150 clock neurons that express a set of molecular components, called clock genes, which through negative feedback loops coordinate the oscillation of gene expression and physiological parameters with a period close to 24 hours. A subgroup of clock neurons, called ventral lateral neurons (LNvs) is characterized by the expression of the neuropeptide Pigment Dispersing Factor (PDF) and play a fundamental role in the control of alertness and are essential for the regulation of sleep/wake behavior via a yet not fully understood neuronal circuit. Previous work from our laboratory has identified ClC-a, a voltage-dependent chloride channel, as a potential key element in the physiology of the LNvs. This channel has not been explored in Drosophila adult neurons before. Therefore, the main objective of this project is to characterize the role of neuronal ClC-a and its mechanism of action. As an initial approach we have started to explore the ClC-a in determining behavioral outputs. Our findings indicate that downregulation of ClC-a in LNvs increases sleep, both in females and males. Surprisingly, downregulation of ClC-a in glial cells reduces sleep in males, but does not affect sleep in females. Consistently, downregulation of ClC-a in all cell types reduces latency to siesta sleep. Future work will explore how ClC-a affects LNvs physiology using patch-clamp electrophysiological approaches.

053 | Looking for the lunar input pathway into the timing of sleep episodes

Chronobiology

Author: Leandro Pablo Casiraghi Casiraghi | email: lcasiraghi@udesa.edu.ar

Leandro Casiraghi [1°], Diego Golombek [1°], Horacio de la Iglesia [2°], Ignacio Spiousas [1°]

1° Laboratorio Interdisciplinario del Tiempo y la Experiencia (LITERA), Escuela de Educación, Universidad de San Andrés
2° Department of Biology, University of Washington

The timing of sleep in humans is shaped by many different factors, the most important being the homeostatic drive for sleep (i.e. the more we stay awake, the more we feel we need to sleep; process S) and the circadian drive (the time our body clock says it's best to sleep; process C). These are the elements of the so-called "two-process model of sleep regulation", which has proven useful for studying sleep dynamics. According to it, the combination of the S and C signals determine the times of the start and end of sleep periods, and one can manipulate each process' features (e.g. relative weight, amplitude, etc.) to predict sleep times under different physiological and environmental conditions. Recently, we reported the occurrence of a modulation of sleep times in real-life settings that follows the lunar cycle. The mechanism(s) through which such changes in sleep are mediated are still unknown, and the prevalence of this effect in hyper-industrialized populations suggests that it may not be simply mediated by moonlight. Here we add an input with a lunar period to features within the S and C processes in the model and use it to predict sleep times. We compare these results to field recorded data to test candidate pathways of how a lunar-like signal could be affecting sleep. We also propose specific experiments to test these predictions, and describe the currently planned field and sleep lab studies in the project.

055 | Social interactions synchronize the phase of circadian locomotor activity of the fruit fly Drosophila melanogaster

Chronobiology

Author: Chiara Costa | email: chcostapetrillo@gmail.com

Chiara Costa [1°], Marcos Sorrentino [1°], Esteban J. Beckwith [2°], Nicolás Pírez [1°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

The interactions that individuals undergo with conspecifics are critical for their wellbeing. In Drosophila melanogaster, the social context, defined as the size, sex and genotype composition of the group affects aggression, sleep, feeding, alcohol consumption and the daily pattern of locomotor activity. Specifically, the olfactory system plays a crucial role in the capacity of social cues to synchronize the internal circadian clock. Therefore, the goal of this project is to dissect the mechanisms that underlie locomotor activity entrainment by social interactions. As a first step, we replicated behavioral experiments and evaluated if social interactions were sufficient to entrain flies that were originally in different activity phases. We performed experiments using the wild-type strains Canton-S and w1118, which have different eye colors, entrained in light schedules 6 h apart. We individually recorded the activity of male and females flies for six days after a week of social interactions in groups of different compositions, always in free-running conditions. Preliminary results show that Canton-S flies that were 6 hours delayed were able to re synchronize the w1118 population. Future experiments will include different light schedules and compositions of the interacting populations. We will employ genetic tools to discover the nature of the signal and its receptors in the olfactory system, and map the components of the olfactory system that contact the circadian pacemaker.

057 | The impact of glial signals on neuronal structural plasticity

Chronobiology

Author: Juan Ignacio Ispizua | email: ispizua.juan@gmail.com

Juan Ignacio Ispizua [1°], Magdalena Fernandez-Acosta [1°], Maria Fernanda Ceriani [1°]

1° Laboratorio de Genética del Comportamiento. Fundación Instituto Leloir – IIBBA – CONICET, Buenos Aires, C1405BWE, Argentina

Recently, we described that a functional glial clock is necessary for circadian plasticity in the small lateral ventral neurons (sLNvs), a group of key pacemaker neurons of D. melanogaster. Circadian structural plasticity involves rhythmic changes in the arborization pattern and degree of fasciculation of their dorsal termini. sLNvs expresses PDF, a neuropeptide relevant in clock network synchrony that oscillates in phase with this remodelling process. Circadian plasticity modifies the way the pacemaker circuitry is wired regularly, but its impact on behaviour and the molecular basis that control this process are yet to be defined. Building upon those results, we started to look in depth this neuronal-glial relationship. Using GFP reconstitution analysis, we found that these termini contact directly two different glial subtypes (astrocyte-like and ensheathing glia) and that these contacts are time-of-the-day dependent. Interestingly, using thermosensitive shibire (shiTS) to induce adult glio-transmission blockage has different effects on PDF levels and plasticity depending on the type of glia affected and the length of the treatment (12 or 24 hours). Digging into possible glio-transmitters responsible for that phenotype, we found that silencing Maverick, a BMP pathway ligand, mimics the effects of shiTS treatment. Taken together, our results suggest a complex glial implication in the modulation of adult structural plasticity with distinct roles for different glial subtypes.

059 | Exploring the regulation of PDF, a key neuropeptide for the circadian network

Chronobiology

Author: Micaela Rodríguez Caron | email: mmicarodrigueez@gmail.com

Micaela Rodríguez Caron [1°], María Fernanda Ceriani [1°]

1° Laboratorio Genética del Comportamiento – Fundación Instituto Leloir – Instituto de Investigaciones Bioquímicas de Buenos Aires (CONICET)

Daily rhythms in animal physiology are typically coordinated by a central pacemaker located within the brain, which operates on the basis of transcriptional/translational feedback loops as well as posttranslational control mechanisms involving a dozen of so-called clock genes. In Drosophila melanogaster, clock genes are expressed in 150 neurons that are organized in 7 functional groups. Under constant conditions, circadian activity depends strongly on the small lateral ventral neurons (sLNvs). Along with the large lateral ventral neurons (lLNvs), sLNvs express the PDF neuropeptide, which is essential for synchronizing the circadian network. Despite PDF immunoreactivity cycles along the day, pdf expression does not appear to be circadianly regulated. Moreover, the understanding of the mechanisms that regulate its transport, processing, accumulation or release is limited. We are exploring different strategies to dissect the nature of those cyclical changes in PDF abundance at the dorsal protocerebrum. As PDF is synthesized as part of a larger precursor, which upon cleavage releases the mature form, one of our strategies is to identify the protease/s involved in propeptide processing. For this purpose, we are screening for relevant proteases through interference RNA expression to assess their impact on the daily activity patterns and peptide availability.

061 | Exploring the role of orsai clock neurons and glia

Chronobiology

Author: Giovanna Margarita Velázquez Campos | email: gvelazquez.010390@gmail.com

Giovanna Margarita Velázquez Campos [1°2°], Maria Fernanda Ceriani [1°]

1° Fundación Instituto Leloir
2° Instituto de Investigaciones Biotecnológicas, UNSAM

The circadian network relies on 150 clock neurons that establish contacts with different types of glia, whose coordinated function is evidenced in the temporal organization of locomotor activity patterns. Within the circadian network, the ventral lateral neurons (LNv) coordinate network activity under light-dark cycles and free-running conditions. Further, data generated in our laboratory suggests that ensheathing glia and astrocytes differentially contact the sLNvs neurons throughout the day. A number of years ago, through a missexpression screen targeting genes involved in neuronal homeostasis, we identified a gene relevant in lipid catabolism, that we named orsai (osi). To begin to understand osi role in the adult brain, we downregulated osi levels exclusively in the adult, and evaluate the impact of Osi knock down on two glia subtypes or the LNvs on several circadian outputs. Surprisingly, deregulating osi levels in ensheathing glia or astrocytes does not affect the period or the temporal organization of the activity rhythms in young flies, although it appears to reduce lifespan later on. However, deregulation of osi in the LNv lenthens the period and in time reduces the consolidation of locomotor activity. Interestingly, the period phenotype observed in young flies is rescued by either the expression of its human ortholog ETFRF1, or the downregulation of the phospholipase Lip3. Together these results suggest that osi could play different roles in adult glia and neurons.

063 | Remote olfactory memories in Drosophila

Cognition, Behavior, and Memory

Author: Matias Aleman | email: matialeman@hotmail.com

Matias Aleman [1°], Fernando Locatelli [2°], Nicolás Pírez [2°]

1° Facultad de Ciencias Exactas y Naturales; Universidad de Buenos Aires, Argentina
2° Instituto de Fisiología, Biología Molecular y Neurociencias; UBA-CONICET, Argentina

Insects rely on olfaction 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 main goal of this project is to unveil the effect that exposure to olfactory stimuli during the larval development has on the olfactory preference in adulthood. We used a method that allows us to measure innate and acquired odor attractiveness. Sixty flies are placed in a chamber, which contains two vials with different odorant solutions. The attractiveness is determined based on the ratio between the numbers of flies trapped in each vial. We used two lines of Drosophila melanogaster, Berlin and Canton S, and tested odorants of different innate valence. Flies were reared in either aversive or appetitive odors and 5 to 7 days after hatching we evaluated their preference for each odorant. 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. Future experiments will address the acquisition of valence when rearing in neutral odors. These results provide a novel paradigm to study olfactory memories that resist metamorphosis.

065 | Human memory updating: A behavioral task using engaging audiovisual stimuli

Cognition, Behavior, and Memory

Author: Leila Soledad Ameneiro | email: leilaameneiro1991@yahoo.com.ar

Leila Ameneiro [1°], Arturo Romano [1°], M. Eugenia Pedreira [1°]

1° Laboratorio de Neurobiología de la Memoria, IFIByNE, UBA-CONICET

Memory reconsolidation theory posits that consolidated memories can undergo destabilization following reactivation, allowing changes in its content and/or strength. Prediction error (PE) is considered to be the driving force for learning in both consolidation and reconsolidation. Vast evidence supports both these accounts. In our day-to-day life, we learn from complex situations and stimuli which do not follow explicit rules and cannot be sufficiently described by simple associations. We designed a behavioral task to study memory updating using complex audiovisual stimuli in an online modality. The selected videos are plot- and character-driven to engage participants´ curiosity. We aim to evidence memory updating of richly detailed episodic memories following reactivation under two distinct conditions: one that generates a PE through sudden interruption of some videos and one that does not. On testing day, participants are asked to recall general information and specific details about target videos, allowing for detection of intrusions from interference videos watched following reactivation.

067 | Neurophysiological markers of attention deficits in early use of smoked cocaine

Cognition, Behavior, and Memory

Author: Agustina Aragón-Daud Aragón-Daud | email: agus.aragondaud@gmail.com

Agustina Aragón-Daud [1°], Sofia Oberti De Luca [1°], Claudia Pascovich [2°], Teresa Torralva [1°], Laura de la Fuente [1°]

1° nstituto de Neurociencia Cognitiva y Traslacional (Consejo Nacional de Investigaciones Científicas y Técnicas – Fundación INECO – Universidad Favaloro)
2° Neurobiology of Sleep Laboratory, Universidad de la República

Early cocaine consumption has been associated with attention and executive functions impairment. The severity of these deficits depends upon the route of administration with faster routes, such as smoking, showing stronger impairments than slower routes such as snorting. Structural data from MRI supports these findings, as cocaine users present reduced grey matter in key areas for these cognitive functions, such as the bilateral caudate, compared to control group. Our study aims to assess these findings at a neurophysiological level. We registered EEG data from 72 participants: smoked-cocaine group (n = 25), snorted-cocaine group (n = 22) and healthy control group (n = 25). We administered a passive auditory oddball paradigm that evaluates brain response to violations of temporal regularities that are either local in time or global across several seconds. Given that global violations elicit a P300 response, we aim to evaluate differences between the three groups. The results of this study will have strong implications on the robustness of preview findings, as it tests neurophysiological data, a level of evidence not explored before.

069 | Screen time and its relationship with anxiety, depression and sleep quality in high school students: Possible implications on cognition and school performance?

Cognition, Behavior, and Memory

Author: Alejo Barbuzza | email: barbuzza.alejo@gmail.com

Alejo Barbuzza [1°2°], Maria Susana Barros [3°], Pedro van Gelderen [3°], Luis Combal [3°], Susana Giambruni [3°], Dario Alvarez Klar [3°], Fabricio Ballarini [1°]

1° Instituto Tecnológico de Buenos Aires, Av. Madero 399, Ciudad Autónoma de Buenos Aires, Argentina.
2° Instituto de Biología Celular y Neurociencia “Prof. E. De Robertis” (IBCN), Facultad de Medicina, UBA-CONICET, Ciudad Autónoma de Buenos Aires, Argentina.
3° Red educativa iTINERE, Buenos Aires, Argentina.

Screen time has been closely related to mental health according to different investigations. In particular, the results observed in adolescents show that there is a positive connection between screen time and psychological distress. Our objective as an interdisciplinary laboratory-educational network team is to elucidate the effects of screen time on mental health, find the protective variables and those that threaten it to make decisions that generate a positive impact on the mental health of students. To do this, we conducted a survey of students in the last section of secondary school of the iTINERE educational network that included validated questionnaires on generalized anxiety, depression and sleep quality. We observed that those students who had more than five hours of screen time per day had worse rates of anxiety, depression and quality of sleep than those between three and five hours, and these at their worst rates than those of less than three hours per day. In addition, it was found that depending on the gender and the amount of weekly exercise, these indices can improve or worsen. These partial results are part of an investigation not yet completed where it is expected to carry out explosions within the school to lower these rates, and to observe if said impact generates changes in creativity as a cognitive process and in grades as a measure of school performance.

071 | PLASTICITY OF PRAGMATIC LANGUAGE NETWORKS IN PATIENTS WITH TEMPORAL LOBE EPILEPSY

Cognition, Behavior, and Memory

Author: MARIANA BENDERSKY BENDERSKY | email: mbendersky@fmed.uba.ar

Mariana Bendersky [1°], Bautista Elizalde Acevedo [3°], Carolina Lomlodjian [2°], Silvia Kochen [2°], Lucia Alba-Ferrara [2°]

1° Living Anatomy Laboratory, III Normal Anatomy Dept, University of Buenos Aires
2° ENyS, CONICET
3° Universidad Austral, IIMT (Instituto de Investigaciones en Medicina Traslacional)

Idiomatic expressions (IE) are a kind of pragmatic language whose meaning is different from the sum of the meaning of their words. TLE, the most frequent of the focal epilepsies, can be associated with several cognitive symptoms, including pragmatic language impairment. But many patients manage to maintain these language skills. This compensation may depend on greater recruitment of accessory areas and creation of new connections. This network reorganization for this specific type of language in patients with TLE has not yet been studied. This fMRI study will investigate neural networks activated in patients with chronic mesial TLE, compared to normal subjects, for IE understanding. Methods: 20 controls, 18 patients with right TLE (RTLE) and 15 patients with left TLE (LTLE) were asked to select one of 4 possible meanings for IE or literal sentences. fMRI scans were performed in a 3.0T scanner and processed by SPM 12 comparing IE vs. literal sentences. Results: All participants performed the task above chance level. IE activated a bilateral, slightly right-sided fronto-temporal network. When comparing LTLE vs. controls or RTLE vs. controls we found activation in additional frontal, temporal and insular areas of both hemispheres. Discussion: Both RTLE and LTLE patients showed reorganization of the networks for pragmatic language. Since some of these patients are candidates for epilepsy surgery, it is important to know these compensatory networks recruited so as not to harm them.

073 | Evaluating The Hemispheric Asymmetry Model Of Encoding And Retrieval Through Music

Cognition, Behavior, and Memory

Author: Juan ignacio Bertoli | email: juanibertoli@gmail.com

Juan ignacio Bertoli [1°], Jessica Sanchez Beisel [1°], Matias Serafini [1°], Maria del Rosario Quian [2°], Ignacio Ferrelli [2°], Sabrina Monsalvo [2°], JorgeMario Andreau [1°]

1° Instituto de investigación de la Facultad de Psicología y Psicopedagogía de la Universidad del Salvador.
2° Facultad de Psicología de la Universidad de Buenos Aires

The hemispheric asymmetry model for encoding/retrieval (HERA), (Cabeza et al., 2003; Habib et al., 2003; Nyberg et al., 1996; Tulving et al., 1994) proposes a lateralization during memory process. With a preferential activity of the prefrontal cortex (PFC) in the left hemisphere during encoding and preferential activity of the PFC in the right hemisphere during retrieval. It has been shown that listening to music generates a greater activation of the right hemisphere (Alluri et al., 2013; Bever & Chiarello, 2009; Ono et al., 2011; Santosa et al., 2014). Therefore, an indirect method to evaluate lateralization consists of generating a competition for the resources on the hemisphere involved in the memory process (Friedman & Polson, 1981; Funahashi, 2017). The aim of this study is to validate a new procedure to indirectly study hemispheric activation. We hypothesize that: Listening to music during retrieval of verbal stimuli would lead to a decrease in performance compared to listening to music only at encoding, since in the first case the right hemisphere would be engaged in both tasks.

075 | Behavioral and oxidative state alterations observed in adolescent rats of both sexes subjected to voluntary ethanol intake and noise exposure can be partially restored by housing animals in an enriched environment

Cognition, Behavior, and Memory

Author: Gustavo Ezequiel Buján | email: gbujan@hotmail.es

Gustavo Ezequiel Buján [1°], Luciana D´Alessio [1°3°], Héctor Alejandro Serra [1°], Sonia Jazmín Molina [2°], Laura Ruth Guelman [1°2°]

1° Universidad de Buenos Aires. Facultad de Medicina. 1ª Cátedra de Farmacología. Buenos Aires, Argentina.
2° Universidad de Buenos Aires. Consejo Nacional de Investigaciones Científicas y Técnicas. Centro de Estudios Farmacológicos y Botánicos (CEFyBO, UBA-CONICET). Buenos Aires, Argentina.
3° Universidad de Buenos Aires. Consejo Nacional de Investigaciones Científicas y Técnicas. Instituto de Biología Celular y Neurociencias (IBCN, UBA-CONICET). Facultad de Medicina, Buenos Aires, Argentina.

We have previously shown that noise exposure can induce hippocampal-related behavioral and oxidative alterations in adolescent rats. However, no data about the hippocampal (HC) oxidative state have been obtained in animals subjected to voluntary ethanol yet. Even more, a non-pharmacological neuroprotective strategy, the enriched environment (EE), has not been explored in this model. In consequence, the aim of the present work was to test whether these agents, present individually or sequentially, can affect behavior, ROS levels and catalase activity in the HC. In addition, the effectiveness of housing in an EE was also assessed. 28-days-old male and female Wistar rats were housed in standard or EE cages and subjected to voluntary ethanol two-bottle choice paradigm for 1 week. After that, animals were exposed to noise and different behavioral and biochemical parameters were evaluated. Results showed that, after housing in an EE, several behavioral alterations, as well as biochemical parameters, were partially restored and differed among sexes. These findings suggest that rats exposed to physical and chemical agents during adolescence could induce sex-specific, HC-related behavioral and biochemical alterations, demonstrating a high vulnerability of the developing brain. As these changes can be partially restored by the housing in an EE, it could be hypothesized that only one week of housing in an EE could be an effective neuroprotective tool in this model.

077 | Social and material deprivation during early development impairs social recognition altering morphological and molecular features of the prefrontal cortex in a murine model

Cognition, Behavior, and Memory

Author: María Belén Cardillo | email: belencardillo@gmail.com

María Belén Cardillo [1°], Rocío Priegue [1°], Hugo Perez [1°], Lucila Ríos [1°], Eduardo Tomás Cánepa [1°], Bruno Gabriel Berardino [1°]

1° Laboratorio de Neuroepigenética y Adversidades Tempranas, FCEyN, UBA

Early-life adversities, such as child low socioeconomic conditions, affect the structure and function of the brain leading to impaired mental health later in life. Using a validated multifactorial murine model of social and material deprivation (SMD) we aimed to evaluate the effects of perinatal adversity on social cognition and its related molecular mechanisms. We studied social cognition using the habituation/dishabituation test and found that it is affected by perinatal SMD in male and female mice. Specifically, SMD mice showed a celling level of social investigation throughout trials indicating intact social motivation and decreased social recognition. Ample evidence demonstrated that social cognition is subserved by the PFC, acting in conjunction with other cortical and subcortical areas. We used Nissl staining to determine morphological changes derived from SMD in specific brain regions. Consistent with a decreased brain weight we observed a decrease in total dorsal-ventral axis length and a reduction in the ventral hippocampus. Notably, infralimbic PFC from SMD mice showed a higher size than control mice. We further found that expression of genes involved in the E/I balance were altered in the PFC of SMD mice. These results suggest that SMD affect brain morphology, and this might be driven by gene expression alterations in the PFC providing a molecular mechanism for understanding the neurobiology of social cognition and its dysregulation by perinatal deprivation.

079 | Effect of MK-801 on individual recognition and remembrance of a previous fight in Zebrafish males

Cognition, Behavior, and Memory

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

Luciano Cavallino [1°], Maria Florencia Scaia [1°], Andrea Pozzi [1°], Maria Eugenia Pedreira [2°]

1° Laboratorio de Neuroendocrinología y comportamiento en peces y anfibios, DBBE, IBBEA-CONICET, Facultad de Ciencias Exactas y Naturales, Universidad de Buenos Aires, CABA, Argentina
2° Laboratorio de Neurobiología de la Memoria, FBMC, IFIBYNE-CONICET, Facultad de Ciencias Exactas y Naturales, Universidad de Buenos Aires, CABA, Argentina.

Aggressive encounters can cause injuries and require a significant energy investment. Recognizing and remembering a previous opponent can be beneficial since it can facilitate changes in fighting strategies. We demonstrate that, zebrafish males resolve a second encounter against the same opponent with lower levels of aggression, implying a recognition encounter memory. To analyze the memory consolidation, pairs of adult zebrafish males were allowed to participate in an agonistic encounter. After 30 minutes, individuals were separated and immediately exposed to 15 or 60 minutes of water or MK-801 (antagonist of NMDA receptor, 20 M). Same pairs were isolated again for 24 or 48 hours and exposed to a second fight against the same opponent. Total time of aggression and number of bites were compared between day 1 and 2. Results suggest that individuals exposed to water and to 15 min MK-801resolve the second encounter with significantly lower levels of aggression. Nevertheless, after 60 minute exposure to MK-801, no differences were found in aggression between day 1 and 2, regardless of the interval between fights (24 or 48 hours). These results suggest that individuals resolve subsequent encounters against the same opponent with lower aggression, but 60 minutes of drug treatment after the first encounter restores, at the second encounter, the levels of aggression of the first day. The results suggest that blocking NMDA receptors impairs the encounter-memory consolidation.

081 | Infant maltreatment induces abnormal behavioral phenotypes in juvenile rats

Cognition, Behavior, and Memory

Author: Ailen Alba Colapietro | email: ailencolapietro@gmail.com

Ailen Alba Colapietro [1°], Jazmín Grillo Balboa [1°], Verónica Cantarelli [2°], Marina Ponzio [2°], Marta Cristina Antonelli [1°], María Eugenia Pallarés [1°]

1° Instituto de Biología Celular y Neurociencias "Prof. E. De Robertis", Facultad de Medicina, Universidad de Buenos Aires
2° Instituto de Investigaciones en Ciencias de la Salud, Facultad de Ciencias Médicas, Universidad Nacional de Córdoba

Infant maltreatment is a public health problem with long-term health consequences. It generates a dysregulation of the stress system response, which predisposes individuals to develop emotional disorders later in life. To date, few studies have examined the effects of infant maltreatment in younger individuals, as well as its relevance for the early onset of stress-related disorders. In this study, we used the scarcity-adversity model (SAM) during postpartum days 8-12 to induce maltreatment, and assessed offspring behavioral phenotype at juvenile age. As expected, dams exposed to SAM had enhanced fragmented and violent behavior towards their offspring. At postnatal day 13, SAM treatment increased corticosterone levels in exposed pups compared to control ones. At juvenile age, SAM offspring of both sexes spent more time in unsupported rearing in the Open field test, spent less time swimming and climbing and more time immobile in the Forced swimming test, and consumed more sucrose compared to controls in the Sucrose Preference test. No differences were found between groups in the Light/dark box and in the Elevated plus maze tests. Our results show that exposure to maltreatment during infancy has consequences on depressive-like behavior and exploratory activity at juvenile age. These data about emerging behaviors may be useful for the development of anticipated interventions that prevent the establishment of psychopathologies later in life.

083 | Cdk5 activity regulates working memory and anxiety-like behaviors: sex-dependent differences

Cognition, Behavior, and Memory

Author: Florencia Dadam | email: fdadam@unc.edu.ar

Florencia Dadam [2°], Osvaldo Martin Basmadjian [1°], Daiana Solorzano [1°], Eugenia Sosa [1°], Sebastian Leonangeli [1°], Anahi Rodriguez [1°], Gabriela Paglini [1°]

1° Instituto de Investigación Médica Mercedes y Martín Ferreyra, INIMEC-CONICET-UNC.
2° Instituto de Investigación Psicológicas, IIPsi-CONICET-UNC

Short-term memory (STM) is the ability to store a small amount of information for a brief period of time. Working memory (WM) is a STM used for the planning and execution of cognitive functions. Cdk5 is a serine/threonine kinase activated by p35 or p39 subunits. It regulates neuronal survival, dopaminergic neurotransmission and synaptic plasticity among others. Cdk5 involvement was also observed in fear memory procecces in a sex-dependent manner. We aimed to evaluate the participation of Cdk5/p35 in STM, WM, and anxiety-like behavior accounting sex differences. We used Transgenic mice deficient in the activator of Cdk5, p35 (p35KO) and wild type (WT) control of 21-25 postnatal days . Elevated Y-maze, novel object recognition and elevated plus-maze were used to evaluate WM, STM and anxiety-like behavior, respectively. Data was analyzed using t-test analysis. Male p35KO mice exhibited impaired WM relative to WT male mice, whereas female p35KO mice did not show impaired WM. On the other hand, no differences in STM were observed between p35KO mice and their control strain in both males and females. Finally, p35KO male mice exhibited greater impulsivity compared to WT males, this difference was not observed in females. The deficit in the activation of Cdk5 due to the lack of its activator, p35, induces alterations in WM in male mice than in females, however it does not affect STM. Also, this condition exhibits a more impulsivity in males which is not observed in females mice.

085 | Flexibility as a key feature of the object recognition memory system: a compensation phenomenon in absence of the retrosplenial cortex activity

Cognition, Behavior, and Memory

Author: Ana Belén de Landeta | email: anabdelandeta@gmail.com

Ana Belén de Landeta [1°], Anja Oelschlegel [2°], Sol Cataldo [1°], Jorge H. Medina [1°3°], Jürgen Goldschmidt [2°], Cynthia Katche [1°3°]

1° Instituto de Biología Celular y Neurociencia “Prof. E. De Robertis” (IBCN), Facultad de Medicina, CONICET-UBA, Buenos Aires, Argentina
2° Leibniz-Institute for Neurobiology (LIN). Magdeburg, Germany
3° Instituto Tecnológico de Buenos Aires (ITBA). Buenos Aires, Argentina

Although object recognition (OR) is a world-wide used behavioral task, little is known about the OR memory (ORM) system composition and its dynamics. We showed that the retrosplenial cortex (RSC) is required for ORM consolidation and retrieval, yet only when the RSC is active during ORM acquisition. In this regard, we found that when the RSC is inactive during ORM acquisition a RSC-independent memory is formed, showing a compensation of the ORM system. Furthermore, we observed that brain activity differs during retrieval in animals that had the RSC active or not during OR training session (TR). Particularly, RSC activity increase during ORM retrieval in animals that had the RSC inactive during TR respect to control group. In this context, we analyzed if this increase of RSC activity could be related to a change in the ORM system. We observed that RSC inactivation before re-test produced amnesia in animals that had the RSC inactivated during TR but active during test. Therefore, we suggest that the RSC takes part of the main ORM circuit. When the RSC is inactive during acquisition there is an alternative memory circuit that forms the ORM. However, as the RSC is active during retrieval, this structure incorporates to ORM processing. This way, ORM system turns to the main and preferred RSC-dependent circuit. We propose that the ORM system is dynamic, flexible and modifies itself according to the physiological environment from the brain structures that conform its main circuit.

087 | Neural markers in autobiographical memory retrieval

Cognition, Behavior, and Memory

Author: Constanza Mariana Ferrer | email: fm.constanza314@gmail.com

Constanza Ferrer [1°], Rodrigo S. Fernandez [2°], Luz Bavassi [2°]

1° Universidad de Buenos aires, Facultad de Ciencias exactas y Naturales, Departamento de Física. Buenos Aires, Argentina
2° Laboratorio de Neurociencias de la memoria, IFIByNE, UBA-Conicet

Autobiographical memories (AMs) represent a set of personal experiences and unique, recurrents, extense events that are integrated into a coherent story. Memories be defined as internal representation encoded in brain circuits drawn from experience. AMs contain information at different specification levels that results in very complex representations. In this project, we study the autobiographical memory retrieval process, analyzing the responses of different participants connected to a 30-channel electroencephalograph, facing questions that evoke personal neutral (remote and recent) episodes. To characterize memories we consider a set of variables of interest: age of memory (recent or remote), time to access memory retrieval, level of detail, level of importance and level of emotionality of the memory. Although we did not notice a time distinction between recent and remote memories, we found through clustering techniques that memories can be grouped in two clusters based on emotionality and detail level. In addition a strong correlation was observed between importance level and emotionality level with Spearman's correlation coefficients of remotes S_R= 0.74 for remotes memories, and S_r= 0.84 for recent memories.

089 | Structural differences between non-lucid, lucid dreams and out-of-body experience reports assessed by graph analysis allow for categorization of dream experiences

Cognition, Behavior, and Memory

Author: Francisco T Gallo | email: frgallo@itba.edu.ar

Francisco T Gallo [1°6°], Ignacio Spiousas [2°], Antonela Tommasel [3°], Nerea L Herrero [1°6°], Luis I Brusco [4°], Daniela Godoy [3°], Cecilia Forcato [1°6°], Pablo M Gleiser [5°6°]

1° Laboratorio de Sueño y Memoria, Departamento de Ciencias de la vida, Instituto Tecnológico de Buenos Aires (ITBA).
2° Departamento de Ciencia y Tecnología, Universidad Nacional de Quilmes.
3° ISISTAN – Instituto Superior de Ingeniería de Software Tandil (CONICET/UNCPBA), Tandil.
4° Centro de Neuropsiquiatría y Neurología de la Conducta- CENECON, Facultad de Ciencias Médicas, Universidad de Buenos Aires.
5° Laboratorio de Neurociencia de Sistemas Complejos, Instituto Tecnológico de Buenos Aires (ITBA). 6° Consejo Nacional de Investigaciones Científicas y Tecnológicas (CONICET)

Recently, it was discovered using graph theory that measurements of network structure can predict ratings of dream complexity, with more connectedness and less randomness being seen as dream report complexity increases. This approach proved to be useful to differentiate dream reports in the pathological population as well as NREM and REM dream reports, but it has not yet been used to study different oneiric experiences. During lucid dreaming (LD), subjects know they are dreaming and can control the dream content. Another type of aware dream experience is the out-of-body experience (OBE) initiated from sleep paralysis. Although the differences between non-LD, LD and OBEs are evident, some authors claim OBEs are a kind of LDs. In this work, we analyze dream reports that include non-lucid, lucid dreams and out-of-body experiences initiated from sleep paralysis. We collected a set of 1014 dream reports (824 non-LDs, 122 LDs and 68 OBEs) obtained from 60 participants that kept a dream journal for two months. The collected reports were transformed into directed graphs, where each different word plays the role of a node, and consecutive words are connected by a directed, unweighted edge. We analyze different network measures to compare the graphs. Overall, we found that lematized OBE reports are significantly different from lucid and non-lucid dream reports on indirect measures of connectivity and recursion, allowing for a categorization of different dream experiences.

091 | The expression of generalized fear response allows the modulation of a contextual aversive memory: influence of propranolol treatment

Cognition, Behavior, and Memory

Author: Marcelo Giachero | email: mpgiachero@gmail.com

Marcelo Giachero [1°], Belén Vitullo [1°], Noelia Weisstaub [1°], Pedro Bekinschtein [1°]

1° Laboratorio de Memoria y Cognición Molecular, Instituto de Neurociencia Cognitiva y Traslacional, CONICET-Fundación INECO-Universidad Favaloro

Reconsolidation (RE) can be triggered by memory recall, allowing established memories to be modified. However, very aversive memories are often resistant to this process. Here, after the induction of a resistant fear memory in mice, we examine whether it is possible to render it susceptible to pharmacological disruption according to the degree of generalized fear (GF). For this, based on the perceptual similarity between the associated context (CA) and non-associated contexts (CB, CC, and CD) to the aversive event, we established an ordered gradient of GF. In non-stressed mice, we observed that as the exposure context became less similar to CA, the conditioned response run lower. In stressed mice, the formation of a more robust memory using acute stress prior to conditioning brought about a distortion of the generalization gradient, suggesting an alteration of the adaptive value of this phenomenon. Then, in conditioned mice, we injected propranolol (PROP), a known RE interferent, after exposure to the different contexts. In unstressed mice, PROP treatment resulted in a decreased fear response after exposure to CA, CB, or CC, but not to CD compared to the control group. In contrast, in stressed mice, decreased fear response by PROP was observed after exposure to CC or CD, but not to CA or CB compared to controls. These results indicate the possibility of indirect capture and manipulation of a robust contextual fear memory by controlling the level of GF during recall.

093 | The impact of the successive outbreaks of COVID-19 on mental health in Argentine population

Cognition, Behavior, and Memory - Author: Celina Goyeneche | email: goyeneche.celina@gmail.com

Celina Goyeneche [1°2°], Alejo Barbuzza [1°2°], Victoria Reppucci [1°], Franco Moscato [1°], Jorge H. Medina [1°2°], Cynthia Katche [1°2°], Fabricio Ballarini [1°2°], Diego Moncada [3°4°], Haydeé Viola [1°2°5°]

1° Instituto Tecnológico de Buenos Aires, Ciudad Autónoma de Buenos Aires, Argentina.
2° Instituto de Biología Celular y Neurociencia "Prof. E. De Robertis" (IBCN), Facultad de Medicina, UBA-CONICET, Ciudad Autónoma de Buenos Aires, Argentina.
3° Centro Integrativo de Biología y Química Aplicada, Universidad Bernardo O'Higgins, Santiago, Chile.
4° Departamento de Fisiología, Biología Molecular y Celular "Dr. Héctor Maldonado" (FBMC), Facultad de Ciencias Exactas y Naturales, UBA, Ciudad Autónoma de Buenos Aires, Argentina
5° Departamento de Fisiología, Biología Molecular y Celular "Dr. Héctor Maldonado" (FBMC), Facultad de Ciencias Exactas y Naturales, UBA, Ciudad Autónoma de Buenos Aires, Argentina.

The effect of the COVID-19 pandemic has been devastating. From its start in March 2020 to June 2022, the coronavirus infected 530 million people worldwide, and 6.3 of them died of derived pulmonary and cardiorespiratory diseases. In addition, diverse neurological symptoms such as high prevalence of insomnia, and several psychological distresses also occurred in global population. Recently, a controversy emerged regarding the duration of generalized anxiety disorders (GAD) and depressive symptoms observed during the COVID-19 pandemic. Two opposing postulates have been raised: one says that these symptoms last a short time; others, on the contrary, reported that the symptoms lasted at least a year. The main goal of our present work was to study the dynamics of psychosocial impact along the three outbreaks of COVID-19 on adult Argentine population throughout 19 months of the COVID-19 pandemic. We carried out a repeated cross sectional study to determine the time course of the GAD and depression records. We observed that a high increase in GAD and depression symptoms accompanied the second wave of contagions and that a sharp decline in these levels was parallel to the third wave. The women young adult group was the most vulnerable. The increment in the vaccine doses inoculated between the last two waves of contagion was associated with a decrease of score for GAD and depressive symptoms, suggesting that the vaccines also plays a protective role on mental health.

095 | EEG analysis of False Awakenings and Lucid Dreaming marked by eye signaling in a lab setting: preliminary results

Cognition, Behavior, and Memory

Author: Nerea Herrero | email: neherrero@itba.edu.ar

Nerea L. Herrero [1°2°], Aylin Ágatha Vazquez Chenlo[1°2°], Matias Pretel [1°], Luis I. Brusco [3°], Pablo Gleiser [2°4°], Cecilia Forcato [1°2°]

1° Laboratorio de Sueño y Memoria, Departamento de Ciencias de la Vida, Instituto Tecnológico de Buenos Aires (ITBA), Iguazú 341, (1437) Capital Federal, Buenos Aires, Argentina.
2° Consejo Nacional de Investigaciones Científicas y Tecnológicas (CONICET), Godoy Cruz 2290, (1425) Capital Federal, Buenos Aires, Argentina.
3° Centro de Neuropsiquiatría y Neurología de la Conducta- CENECON, Facultad de Ciencias Médicas, Universidad de Buenos Aires.
4° Laboratorio de Neurociencia de Sistemas Complejos, Departamento de Ciencias de la Vida, Instituto Tecnológico de Buenos Aires (ITBA), Iguazú 341, (1437) Capital Federal, Buenos Aires, Argentina.

Lucid dreams (LD) refers to a dream in which the dreamers are aware of the dream condition. When they occur, subjects have access to their memories, are able to act voluntarily in the dream, and in some cases they are capable of modifying the oneiric environment. Furthermore, a dreamer can voluntarily indicate the beginning of their LD, by using specific prearranged eye movements leaving a mark in the polysomnography recording. False awakenings (FAs) are dreams in which the subjects have an erroneous belief that they are waking up in a familiar place, starting a daytime routine to later find that they are still dreaming. Little is known about FAs, and there is only a single report study which provides EEG data about it. In the Sleep and Memory Lab, we train dreamers on leaving the eye mark under different states of consciousness such as LD and FA to further register their brain activity in the Lab. Here we will discuss preliminary EEG data from periods of LDs and FAs, compared to sleep periods without consciousness.

097 | Exploring the role of dCA1 during retrieval practice in retrieval-induced forgetting

Cognition, Behavior, and Memory

Author: Mariana Imperatori | email: marianaimperatori3@gmail.com

Mariana Imperatori [1°], María Belén Zanoni [1°], Pedro Bekinschtein [1°], Noelia Weisstaub [1°]

1° Laboratorio de Memoria y Cognición Molecular, Instituto de Neurociencia Cognitiva y Traslacional, CONICET-Fundación INECO-Universidad Favaloro

Forgetting is a ubiquitous phenomenon that is actively promoted in many species. The very act of remembering some experiences can cause forgetting of others, in both humans and rats. In rats, the retrieval of a particular memory produces the forgetting of other memories encoded in the same environment. However, the circuit and mechanisms involved are not well understood. This retrieval-induced forgetting (RIF) process is thought to be driven by inhibitory control signals from the medial prefrontal cortex (mPFC) that target areas where the memories are stored. In humans, intentionally suppressing memory retrieval (retrieval stopping) reduces hippocampal activity via control mechanisms mediated by the lateral prefrontal cortex. We speculate that retrieval engages mPFC to induce episodic forgetting of competing memories via fronto-hippocampal inhibitory control, with the mPFC exerting executive control over hippocampal retrieval processes. This work aims to explore the role of dCA1 during retrieval practice in RIF. Precisely, we are using an agonist of the GABAA receptor for the dCA1 to achieve a general inhibition of the structure, specifically during the phase when memories compete (retrieval practice). In summary, we will be studying how exploratory behavior in a rodent object recognition task that typically causes RIF is affected by inhibition of the dCA1.

099 | Segregation of appetitive and aversive information in two tracts of the olfactory system in honey bees

Cognition, Behavior, and Memory

Author: Agustin Eleazar Lara | email: agustin.e.lara@hotmail.com

Agustin Eleazar Lara [1°], Emiliano Marachlian [2°], Martin Klappenbach [1°], Fernando Locatelli [1°]

1° Instituto de fisiología, biología molecular y neurociencias IFIByNE-CONICET
2° Institut de Biologie de l'Ecole Normale Supérieure IBENS

A salient feature of insect´s and vertebrate´s olfactory circuits is the existence of multiple neural tracts that form parallel pathways between periphery and higher brain centers. This aspect has sparked the interest of functional and computational approaches that ask whether and how the parallel tracts convey differential information. We investigate the role of two parallel olfactory tracts described in the honey bee brain. In previous studies we measured odor representation in one of these tracts and found that appetitive but not aversive learning increases the representation of the learned odor. In a recent study we found that bees can recognize appetitive and aversive learned odors when both are presented as a mixture, which suggests that appetitive and aversive odors are processed without getting mixed. These results lead as to postulate that information about aversive and appetitive odors might be split in the antennal lobe and segregated through the parallel olfactory tracts. To address this hypothesis we are performing experiments based on appetitive and aversive learning and evaluating the effect of lesioning one of both tracts. The tracts are stained after behavioural experiments to validate the specificity of the lesion. Preliminary results obtained until now show that lesion of the medial tract does not impair behaviour elicited by appetitive learned odors while lesion of the lateral tract does. Next experiments are focused on aversive olfactory learning.

101 | Guided visualization in people with aphantasia and hiperphantasia

Cognition, Behavior, and Memory

Author: Guido Sebastián Lax | email: laxguido@gmail.com

Guido S. Lax [1°], Alejandro Vische [1°], Pablo M. Gleiser [2°3°], Cecilia Forcato [1°3°], Francisco T. Gallo [1°3°]

1° Laboratorio de Sueño y Memoria, Departamento de Ciencias de la vida, Instituto Tecnológico de Buenos Aires (ITBA)
2° Laboratorio de Neurociencia de Sistemas Complejos, Instituto Tecnológico de Buenos Aires (ITBA).
3° Consejo Nacional de Investigaciones Científicas y Tecnológicas (CONICET), Buenos Aires, Argentina

Visual imagery is a form of sensory imagination similar to perception, except it occurs in the absence of a corresponding external stimulus. Recent studies have shown that some people lack the ability to produce mental images voluntarily, a condition known as “aphantasia”. The opposite case, vivid photo-like mental images, is known as “hyperphantasia”. The study of mental imagery is hampered by its private and subjective nature; the most commonly used questionnaire is the Vividness of Visual Imagery Questionnaire (VVIQ), which allows us to estimate the vividness of mental images based on a self-report. The aim of our research is to develop a novel method to investigate visual imagery through a guided visualization exercise. Aphantasics and hyperphantasics completed a guided auditory visualization task and afterwards answered several questionnaires to evaluate their performance, the quality of the experience and their episodic memory of the exercise. Here we present the preliminary results of the study.

103 | Grounding social concepts in the cerebellum: A multimodal text-level study on cerebellar ataxia

Cognition, Behavior, and Memory - Author: Pamela Lopes da Cunha | email: pamelopes@gmail.com

Pamela Lopes da Cunha [1°2°], Sol Fittipaldi [1°3°], Cecillia Campo [1°3°], Marcelo Kauffman [4°5°], Sergio Rodriguez [4°], Darío Andres Yacovino [6°7°], Agustin Ibañez [1°3°8°9°], Agustina Birba [1°3°9°], Adolfo Martin Garcia [1°3°8°10°]

1° Cognitive Neuroscience Center, University of San Andrés. Bs As, Argentina
2° National Agency for Scientific Promotion and Technology (ANPCyT). Bs As, Argentina
3° National Scientific and Technical Research Council (CONICET). Bs AS, Argentina
4° Neurogenetics Unit Hospital JM Ramos Mejía. Bs As, Argentina
5° School of Medicine, UBA, CONICET. Bs As, Argentina
6° Department of Neurology, Dr. Cesar Milstein Hospital. Bs As, Argentina
7° Memory and Balance Clinic. Bs As, Argentina,
8° Global Brain Health Institute, University of California San Francisco, US and Trinity College. Dublin, Ireland,
9° Latin American Brain Health Institute (BrainLat), Adolfo Ibáñez University. Santiago, Chile
10° Linguistics and Literature Department, School of Humanities, University of Santiago de Chile. Santiago, Chile

When we interact with people, watch a love movie, or read about others´ confrontations, our brain recruits specific mechanisms for processing social concepts (abstract units evoking interpersonal traits or circumstances). This skill has been related to the functions of fronto-temporo-limbic regions subserving broad sociocognitive abilities. Here, we examined whether social concepts also hinge on the cerebellum, a structure increasingly implicated in social cognition. We recruited 15 cerebellar ataxia (CA) patients (with focal cerebellar atrophy) and 29 healthy controls. Participants listened to a social text (rich in interpersonal events) as well as a non-social text (focused on a single person´s actions), answered comprehension questionnaires, and completed a resting-state functional neuroimaging protocol. CA patients were selectively impaired is social text comprehension, even upon accounting for working memory skills. Also, social text outcomes in controls selectively correlated with connectivity between the cerebellum and cortical regions underpinning multimodal semantics and social cognition. Conversely, no such correlation was observed in the patients. Thus, cerebellar structures and connections seem to play a distinct role in social concept processing. Such findings refine current neurocognitive models of social semantics while revealing potential markers of cerebellar dysfunction.

105 | Impulsive behavior in adolescent and adults rats of both sexes in a self-paced rewarded task

Cognition, Behavior, and Memory

Author: Micaela Betsabe Marini | email: micaelamarini@gmail.com

Micaela Betsabe Marini [1°], Maria Cecilia Martínez [1°]

1° Laboratorio de Fisiología de Circuitos Neuronales, Grupo Neurociencia de Sistemas, IFIBIO-Houssay, Facultad de Medicina, Universidad de Buenos Aires-CONICET

Mammals undergo multiple physiological and behavioral changes associated with the transition between youth and adulthood which help them acquire the skills necessary for their independence. In general, adolescents exhibit characteristic behaviors, such as increases in social interactions, a preference for novelty, and risk-taking activities. In previous work from our lab, we found age-related differences in the performance of male Long Evans rats in a self-paced rewarded task. Since developmental divergences between sexes might affect learning, here we studied the performance of both male and female adolescents and adults. In this task, after a minimum waiting interval of 2.5 s, the animals must enter a nose poke and emit an eight-lick sequence onto a sip tube to obtain a reward. Consistently with our former electrophysiology results, we found a higher prevalence of impulsive trial-starting in adolescents. Regarding this, we also analyzed other behavioral markers that could account for the premature response in adolescents such as locomotor activity, memory formation, or, decision-making in the spontaneous exploration of a multiple-regions arena. Our results show suggest that adolescent rats display more premature responses in the rewarded task. Still, this impulsivity is not related to increases in their locomotor activity or deficits in memory formation. Besides, females exhibited slight variations in the learning strategies in some of the tasks.

107 | Effect of Escitalopram on fear memory reconsolidation in mice: preliminary results

Cognition, Behavior, and Memory

Author: Carlos Andrés Mateos | email: mateos.andres@gmail.com

Carlos Andrés Mateos [1°], Marcelo Giachero [1°], Gaston Diego Calfa [2°], Noelia Victoria Weisstaub [1°], Pedro Alejandro Bekinschtein [1°]

1° Instituto de Neurociencia Cognitiva y Traslacional (INCyT), CONICET – Universidad Favaloro – INECO
2° Instituto de Farmacología Experimental de Córdoba (IFEC), CONICET – Universidad Nacional de Cordoba

The retrieval of a stored fear memory can make it transiently vulnerable to interference by pharmacological agents. Previous experiments demonstrated that a single fluoxetine (FLX) 10 mg/kg dose can disrupt contextual fear memory reconsolidation in mice. Here we evaluated the effect of another antidepressant approved for human use, escitalopram (eCIT), on contextual fear memory reconsolidation in male mice. After 5 minute exposure to the training context, eCIT (1, 5 or 10 mg/kg) or vehicle (VEH) (n=3-7 mice per group) were I.P. administrated. Two days later, freezing response was scored when mice were re-exposed to the training environment (Test). A two-way repeated measures ANOVA analysis revealed that there was a non-significant interaction between groups. However, an apparent trend to lower freezing values was observed at Test for the 5mg/kg treated mice compared to the rest of the experimental groups. Thus, these preliminary findings indicate that eCIT 1 or 10 mg/kg did not disrupt the reconsolidation of a contextual fear memory, eCIT 5 mg/dl showed a promising tendency that could become statistically significant if we address statistical power in groups.

109 | Emotions and modulation of the expression of an aversive memory in the crab Neohelice granulata

Cognition, Behavior, and Memory

Author: Francisco Javier Maza | email: fjmaza@fbmc.fcen.uba.ar

Francisco Javier Maza [1°], Francisco José Urbano [1°2°], Alejandro Delorenzi [1°2°]

1° IFIBYNE, UBA-CONICET, Facultad de Ciencias Exactas y Naturales, Universidad de Buenos Aires, Buenos Aires, Argentina
2° Departamento de Fisiología, Biología Molecular y Celular, Facultad de Ciencias Exactas y Naturales, Universidad de Buenos Aires

Emotional (internal) states can modulate memory retrieval, or the expression of reactivated memories. Although the subjective evaluation of emotions is not possible in non-human animals, cognitive, behavioral, and physiological studies suggest they display emotion-compatible states. According to the Affective Extension of Sometimes Opponent Processes (AESOP) model, emotive components triggered by unconditioned stimuli are critical modulators of the behavioral responses elicited by the reactivation of the sensory component of memory traces. In N. granulata, a visual danger stimulus (VDS) passing over their horizon induces an escape response. With the repeated presentations of VDS, animals change their behavior in the short and long term from an escape to an immobilizing response. Here, in a first step to evaluate the role of emotional states in memory expression in this paradigm, we evaluate crabs' anxiety-like behavior in a light/dark maze after a strong VDS training (15 trials). We found that, immediately after training, crabs spent more time in the dark zones than both untrained and naïve crabs. This result suggests that strong training induces a change in the emotional state. We propose that, according to the AESOP model, this internal state links with the memory trace, and that the unfolding of this internal state modulates the memory behavioral expression.

111 | Set up of an mouse model to analysis of resilience and vulnerability to stress: Gestational restraint.

Cognition, Behavior, and Memory

Author: Jennifer Luciana Miranda | email: jenniferlucianamiranda@gmail.com

Jennifer Miranda [1°], Erika Georgieff [2°], Ariel Martínez Dorr [1°], Eduardo Cánepa [2°], Mariela Chertoff [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° Universidad de Buenos Aires. Facultad de Ciencias Exactas y Naturales. Departamento de Química Biológica, Laboratorio de Neuroepigenética y adversidades tempranas. Buenos Aires, Argentina. CONICET- Universidad de Buenos Aires. Instituto de Química Biológica de la Facultad de Ciencias Exactas y Naturales. (IQUIBICEN). Buenos Aires, Argentina.

Several studies have shown that maternal stress alters the brain maturation of the embryo, resulting in the modification of cognitive and socio-emotional functions. However, not all individuals deal on the same way to stress. In order to analyze the mechanisms of resilience to stress, we are seting up a mice model of gestational restraint in which, pregnant CF1 adult females were subjected to movement restriction for 45 min, three times per day, from GD10 to GD19. GD0 was set on the day of vaginal plug observed. Weight of dams and pups were controlled. As maternal behavior might varied by stress, it was evaluated each 3 minutes from PD1 to PD5 at 9 am for 1 hour. After weaning, anhedonia and motivation in the dams were evaluated with the splash test. In addition, in order to separate between resilient and susceptible mice, all males and females pups were subjected to Splash test at 5 weeks of age. In both cases, the evaluation consisted on one first splash followed by 45 min of restraint and then other 5 min splash test. Grooming time was evaluated in each test. We proposed that resilient mice behaved as control mice in the splash test and susceptible mice performed less grooming behavior as consequence of less motivation. Other behaviors related with anxiety and depression were analyzed in the three different groups: control and resilient and vulnerable mice (last two born from restricted dams).

113 | A primary neural cell culture model to study the effect of hyperglycemia in the development of cognitive impairment

Cognition, Behavior, and Memory

Author: Karen Agustina Nini | email: agustinanini@hotmail.com

Karen Agustina Nini [1°], Verónica Baez [1°], María Pilar Canal [1°], Mariana Munner [2°], Ornela Caruso [2°]

1° Instituto de Biología Celular y Neurociencias “Prof. E. De Robertis” (IBCN, CONICET-UBA), Buenos Aires, Argentina
2° Hospital General de Agudos José María Penna, Buenos Aires, Argentina

Impaired Fasting Glucose (IFG) is the first step in DBT2 development, with fasting glucose levels between normal and DBT levels. However, it is not well understood if IFG per se, or the progression to DBT2, would cause cognitive decline. Several authors described that the increase in blood glucose levels would lead to central nervous system damage, mediated by stress signaling or the increase in pro-inflammatory cytokines. Since there are few in vitro models of IFG, we modeled a hyperglycemic condition in vitro, in primary mixed cultures and compared glucose, AGEs-RAGE and proinflammatory cytokines levels after 7 days. Our preliminary findings show lower levels of the proinflammatory cytokines TNF-α, IL-1β and RAGE in the mixed cultures that were subject to hyperglycemic conditions, in comparison to the control cultures. Further investigation is needed to establish the link between these conditions and cognitive impairments.

115 | Spatial attention shifts during mental arithmetic.

Cognition, Behavior, and Memory

Author: Sofía Ortiz | email: sofiaortiz628@gmail.com

Sofía Ortiz [1°], Florencia Prendivoj [1°], Facundo Burgos [1°], Sofía Donner [1°], Sebastian Gandelman [1°], Guido Caruso [1°], Jesica Formoso [1°2°]

1° Instituto de Investigaciones, Facultad de Psicología, Universidad de Buenos Aires
2° Consejo Nacional de Investigaciones Científicas y Técnicas (CONICET)

It has been proposed that mental arithmetic induces attentional shifts towards the right (addition) or left (subtraction) visual fields. However, the findings are contradictory. The aim of this work is to assess this attentional bias using the dual-task paradigm. 32 participants performed a verification task of arithmetic operations presented sequentially on a screen. Between the second operand and the result, the participant had to detect a stimulus presented on the left or right side of the screen. For each trial, we registered response time (RT) and accuracy for the detection task and whether the operation was solved correctly. We fitted a mixed model with TR as the dependent variable, operation, stimulus location, and stimulus onset time (SOA) as independent variables. Results show that RTs were higher when the participant was performing a subtraction instead of an addition ($p < .01$). Additionally, lower SOA was associated with higher RTs ($p < .01$). The stimuli location and the interaction between this and the operation type showed no significant effect on RTs. Although the results suggest an interference effect of the operation on the detection of the stimulus, the evidence obtained does not support the hypothesis of attentional shifts induced by mental arithmetic.

117 | Cognitive forces shape the dynamics of word usage across multiple languages

Cognition, Behavior, and Memory

Author: Alejandro Pardo Pintos | email: alejandropardopintos@gmail.com

Alejandro Pardo Pintos [1°], Marcos Trevisan [1°], Diego E. Shalom [1°], Gabriel Mindlin [1°], Enzo Tagliazucchi [1°]

1° Universidad de Buenos Aires, Facultad de Ciencias Exactas y Naturales, Departamento de Física. Buenos Aires, Argentina. CONICET – Universidad de Buenos Aires, Instituto de Física de Buenos Aires (IFIBA). Buenos Aires, Argentina

The analysis of thousands of time series in different languages reveals that word usage presents oscillations with a prevalence of 16-year cycles, mounted on slowly varying trends. These components carry different information: while similar oscillatory patterns gather semantically related words, similar trends group together keywords representative of cultural and historical periods. We interpreted the regular oscillations as cycles of interest and saturation, whose behavior could be captured using a simple mathematical model. Driving the model with the empirical trends, we were able to explain word frequency traces across multiple languages throughout the last three centuries. Our results suggest that word frequency usage is poised at dynamical criticality, close to a Hopf bifurcation which signals the emergence of oscillatory dynamics. Crucially, our model explains the oscillatory synchronization observed within groups of words and provides an interpretation of this phenomenon in terms of the cultural context driving collective cognition. These findings contribute to unravel how our use of language is shaped by the interplay between human cognition and sociocultural forces.

119 | Following the fate of memory. Disentangling the prediction error in memory reconsolidation in humans using an online protocol.

Cognition, Behavior, and Memory

Author: Soledad Picco | email: solepicco@gmail.com

Soledad Picco [1°], Rodrigo S. Fernandez [1°], M. Eugenia Pedreira [1°]

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

Through the process of reconsolidation, consolidated memories can be reactivated and temporarily labialized, allowing them to be updated in strength and content. In the framework of reconsolidation, a prediction error (PE) is proposed as the key mechanism that triggers the process. Generally speaking, a PE is a mismatch between expected (based on prior experience) and current events. Previous associative memory reconsolidation studies show that incomplete reminders (IR) are a subtype of prediction error that strengthen memory trace. These reminders consist in an incomplete trial that ends abruptly before participants can report the learned association. They are previously instructed to perform the same task they had been trained. Here we design an online protocol targeting memory reactivation by IR and the following re-stabilization stage to assess and characterise the underlying dynamics of the process of episodic performed a 3-day online experiment. On Day 1, subjects learned 32 face-name pairs, 24hs later, on Day 2 different groups were compared, modifying the structure of the incomplete reminder, considering the information available and the possibility to complete or not the given task. On Day 3, memory retention and item recognition was assessed. We found that IR strengthens memory retention despite the type of instruction. These results may support the idea that PE is governed by the contrast between previous and actual experiences.

121 | Study of dentate gyrus engram cells supporting different associative memories

Cognition, Behavior, and Memory

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

María Sol Ramos [1°], Antonia Marin-Burgin [1°], Noel Federman [1°]

1° Instituto de Investigación en Biomedicina de Buenos Aires (IBioBA) – CONICET – Partner Institute of the Max Planck Society

The ability to store new information through a process of learning and retrieve it over time is an essential property of the brain. This information is thought to be encoded by sparse but defined populations of neurons that are synchronously activated during learning, so-called engram cells. The dentate gyrus (DG) of the hippocampus plays a key role in memory formation and generates new adult-born granule cells (abGCs) throughout life. We are conducting experiments training mice to perform a GO/NO GO discrimination task in distinct virtual reality environments. In head-fixed conditions, water restricted mice learn to drink water or not depending on distinct cues presented in a virtual corridor. Animals are trained only with contextual cues or are trained to learn an odor-context association as a prediction of the reward. We show that animals reached to criterion within around 6 sessions showing changes in distinct behavioral variables. In order to study engram cells, we used cfos-tTA mice injected with AAV9-TRE-GFP in the DG to label activated neurons. We characterized memory engrams using confocal imaging and ex-vivo electrophysiological recordings. We recorded miniature postsynaptic currents on activated and non-activated cells of expert animals. Furthermore, we evaluated the contribution of abGCs to the engram by analyzing their activation using confocal microscopy. In addition, we reversibly inactivate abGCs of expert animals using a chemogenetic DREADDs approach.

123 | HDAC3 as a negative memory regulator. Effect on memory of a specific inhibitor

Cognition, Behavior, and Memory

Author: Agustina Denise Robles | email: agusd.robles@gmail.com

Agustina Robles [1°], Arturo Romano [1°]

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

HDAC3 has been associated with memory formation processes, acting as a negative modulator that represses memory related gene expression. It was also observed that transcription during memory consolidation occurs within a definite time window and in waves. In this study, we aimed to determine the effect of HDAC3 inhibition at different time points after a weak learning session on long-term memory consolidation using the Novel Object Recognition (NOR) and Fear Conditioning (FC) tasks in mice. HDAC3 inhibitor RGFP966 has a facilitating effect producing a memory that lasts up to 7 days in the NOR task only when administered immediately or 6 hours after training. In contrast, administration at 3 or 9 hours after training had no effect compared to vehicle injected controls. However, this facilitating effect was not observed in the FC task. These two points of sensitivity found in the NOR task match with two waves of transcriptional activity described in rats and with two waves of NF-kB activation reported in crabs, the latter being partly regulated by HDAC3 which inactivates it by p65 deacetilation. Ongoing experiments are being conducted to elucidate the link between NF-kB and HDAC3. We hypothesize that mice also have two waves of NF-kB activation and transcriptional activity during memory consolidation, but under weak training conditions HDAC3 would be blocking long-term memory formation by repressing gene expression through histone deacetilation and NF-kB inactivation.

125 | Evaluation of drug seeking behavior on nicotine conditioned place preference in zebrafish

Cognition, Behavior, and Memory

Author: Leandro Rocco | email: lrocco@fmed.uba.ar

Leandro Rocco [1°], Antonella Pisera-Fuster [1°], María Paula Faillace [1°], Ramón Oscar Bernabeu [1°]

1° Department of Physiology and Institute of Physiology and Biophysics (IFIBIO-Houssay, UBA-CONICET), School of Medicine, University of Buenos Aires, Buenos Aires, Argentina

Cognitive strategies involved in drug seeking, which is examined in a specific environment, are mostly unknown. To assess the strength of environmental cues that can be associated with nicotine in the zebrafish brain reward circuitry, we have designed a modified conditioned place preference (CPP) paradigm. This task identifies visual cues relevant for nicotine seeking induction. During testing, background colors of the CPP tank chambers were shifted and color preference associated to nicotine was assessed. Our findings indicated that zebrafish seeking behavior was strongly dependent on compartment color. Combination of red and yellow environments, preferred and avoided compartments respectively, was the most effective design presenting the highest CPP-score. Animals that stayed for longer periods in the environment conditioned to nicotine during a first testing interval were also able to follow the background color conditioned to nicotine across compartments immediately after background colors were relocated. During a second testing period, zebrafish stayed for longer periods in the colored compartment paired to nicotine during conditioning. Our findings suggest that under salient environmental conditions, zebrafish follow a shifting visual cue previously associated with nicotine delivery. This indicates that zebrafish exhibit spatial associative learning and memory, generating a repertoire of conspicuous locomotor behaviors induced by nicotine preference in the CPP task.

127 | Social behavior deficits in mice with a constitutive deletion of the 5-HT2A receptor

Cognition, Behavior, and Memory

Author: Aldana Charo Sánchez Sanda | email: alducharo@gmail.com

Aldana Sanchez Sanda [1°], Agostina Sacson [1°], Pedro Bekinschtein [1°], Noelia Weisstaub [1°]

1° Laboratorio de Memoria y Cognición Molecular, Instituto de Neurociencia Cognitiva y Traslacional, Consejo Nacional de Investigaciones Científicas y Técnicas(CONICET)-Fundación INECO-Universidad Favaloro

Serotonergic signaling appears to play a key role in the generation and modulation of a broad array of behaviors, including addiction, aggression and affect. Serotonin type 2A receptors (5-HT2AR) are involved in a wide variety of cognitive and emotional functions. Moreover, these receptors has been linked with the social deficits presented in some psychiatric disorders like Autism spectrum disorders and schizophrenia. Also, it was found that 5-HT2AR is involved in the prosocial effects of some drugs, such as LSD. In recent studies in our lab, knockout mice lacking the 5-HT2AR (htr2a-/-) show decreased discrimination indexes in the three-chambers social interaction test (SI) compared with wild types (htr2a+/+) controls. But it's unknown if the deficit in this test is due to a motivational issue or if a more ecological task can show specific patterns of behavior in htr2a-/- mice. For this purpose, we used htr2a-/- and htr2a+/+ mice, and performed a free social interaction test (Free SI) and a conditioned place preference (CPP) test to measure social interactions in a direct way and to test social motivation respectively. In the CPP test, we didn't find significant differences between genotypes which indicates that the deficit seen in htr2a-/- mice might not be due to a lack of social motivation. Preliminary analysis on the Free SI suggested a similar difference to the one observed in the three-chambers SI task.

129 | Fighting zebrafish: how the brain Social Decision-Making Network parallels sex differences in aggression

Cognition, Behavior, and Memory

Author: Maria Florencia Scaia | email: mflorenciascaia@gmail.com

Maria Florencia Scaia [1°], Luciano Cavallino [1°], Ibukun Akinrinade [3°], Giovanni Petri [4°], Rui Oliveira [2°]

1° Facultad de Ciencias Exactas y Naturales, Universidad de Buenos Aires, Argentina
2° Instituto Gulbenkian de Ciencia, Oeiras, Portugal
3° Hotchkiss Brain Institute and the Department of Physiology and Pharmacology, Cumming School of Medicine, University of Calgary, Calgary, AB, Canada
4° ISI Foundation and ISI Global Science Foundation, Torino, Italy

The neural mechanisms involved in fighting behaviors are usually studied in males but not in females, despite the fact that both sexes show aggressive behavior in different species. The aim of this work is to assess sex differences in intra-sexual aggression and to characterize the patterns of neuronal activation of the social-decision making network (SDMN) related to this behavior in zebrafish. Adult fish were exposed to social interaction with a same-sex opponent, and aggressive behavior and temporal dynamics were assessed. Both sexes show similar motivation for aggression, but female encounters show shorter conflict resolution. Sex differences on functional connectivity throughout the SDMN were assessed by immunofluorescence of the neuronal activation marker pS6. Results suggest that agonistic interactions increased neuronal activity in most brain areas of the SDMN in both sexes. Functional connectivity was assessed using bootstrapped adjacency matrices that capture the co-activation of the SDMN nodes. Each sex showed a distinct neural activation pattern associated with fight outcome, suggesting a sex-specific differential activation of the social brain as a consequence of social experience. We are also studying how female aggression can be modulated by the reproductive stage and the presence of an alarm substance. Overall, our study adds insights into sex differences in agonistic behavior and on the neuronal architecture of intra-sexual aggression in zebrafish.

131 | “Bad News Argentina”: Cultural adaptation of a gamified tool against fake news through psychological inoculation

Cognition, Behavior, and Memory

Author: Sebastián Mesch Henriques | email: manuelserodio.arg@gmail.com

Manuel Serodio [1°], Sebastián Mesch Henriques [1°], Martina Boscolo [2°], Pedro Bekinschtein [1°]

1° Laboratorio de Memoria y Cognición Molecular, Instituto de Neurociencia Cognitiva y Traslacional, CONICET-Fundación INECO-Universidad Favaloro.
2° Laboratorio de Neurociencia, Universidad Torcuato Di Tella

Fake news and misinformation have been recognized as strategic political communication tools that may pose a threat to many democracies. Bad News is a game designed as a playful media literacy tool meant to teach players to detect online misinformation by practicing six common fake news techniques. This idea of developing cognitive and behavioral immunity through exposure to weakened examples of misleading information to then challenge the person is known as psychological inoculation. Various studies point at this strategy as an efficient and effective way to protect people against fake news. In order to test the cross-cultural validity of this intervention, we developed a Spanish translation of the Bad News game (specifically into the ‘Rio de la Plata’ vernacular) with a cultural adaptation and enrichment of the stimuli to have better ecological validity. Then, we tested and selected said stimuli according to the qualification of a group of professional fact-checkers as expert judges. Lastly, we present some preliminary results of our first intervention using a 2 (treatment vs. control) × 2 (pre vs. post) mixed design (N = 67), with future plans of enlarging sample size to increase the statistical power.

133 | The role of executive functions in the comprehension of expository and narrative texts by high school students

Cognition, Behavior, and Memory

Author: Angel Javier Tabullo | email: angeljtabullo@gmail.com

Ángel Javier Tabullo [1°], Juan Manuel Benegas [1°], Santiago Vernucci [1°]

1° INCIHUSA, CCT-MENDOZA, CONICET
2° FACULTAD DE HUMANIDADES Y CIENCIAS ECONÓMICAS, UNIVERSIDAD CATÓLICA ARGENTINA (SEDE MENDOZA)
3° INSTITUTO DE PSICOLOGIA BASICA, APLICADA Y TECNOLOGIA – [CCT MAR DEL PLATA] CENTRO CIENTIFICO TECNOLOGICO CONICET – MAR DEL PLATA -, CONICET

Reading comprehension is the result of the orchestration of linguistic, cognitive and metacognitive processes. Reading can be described as the interplay between word decoding and language comprehension processes. In addition, it has been shown that executive processes, such as working memory, cognitive flexibility and inhibitory control, contribute to text comprehension. This study aimed to examine the role of executive functions in the comprehension of expository and narrative texts among Argentinean high school students. A sample of 121 adolescents (13.87 ± 0.91 years old, 75.2% female,) completed standard tests of reading comprehension, fluency and vocabulary, and a computerized battery of executive function tasks. A linear regression model indicated that, after controlling for sex, school year, vocabulary and reading fluency; working memory and cognitive flexibility were significant predictors of expository text comprehension. On the other hand, only reading fluency contributed to narrative text comprehension. These findings indicate a specific role of executive processes in the comprehension of expository texts, probably reflecting the cognitive load of: 1) building online representations of the text and 2) shifting between sources of information, inferential processes and reading strategies. In addition, third year students exhibited lower comprehension scores than first years, probably due to the COVID-19 pandemic effects on their educational trajectories.

135 | Behavioral paradigms for studying affective state discrimination in mice

Cognition, Behavior, and Memory

Author: Juan Martín Uehara Uehara | email: ueharajm@gmail.com

Juan Martín Uehara [1°], Juan Emilio Belforte [1°], Estefanía Pilar Bello [1°]

1° Grupo de Neurociencia de Sistemas (GNS), Instituto de Fisiología y Biofísica Bernardo Houssay (IFIBIO), UBA-CONICET

The ability to detect and respond to emotional signals during social interactions is crucial to building empathy-based relationships and guiding future behavior in a given environment, thus avoiding imminent threats and finding possible sources of reinforcement. Previous research has shown that this ability is evolutionarily conserved in rodents, which supports the use of murine models of neuropsychiatric disorders associated with alterations in social behavior and emotional processing, such as schizophrenia and autism. The aim of this work is to validate different behavioral assays that allow discriminating between affective states in mice. All these paradigms are based on the interaction of an observer animal with demonstrators subjected to experimental manipulations that alter their emotional state. However, they may differ in the familiarity of the demonstrators presented (cage mate or novel conspecific), the number of animals used (dyads or triads), the type of interaction between them (unidirectional or reciprocal), and the control of other parameters such as dominance or social hierarchy. Validating these paradigms is an important step towards characterizing the social phenotype of a murine model of schizophrenia currently studied in our lab, in which the NMDA receptor is postnatally ablated in GABAergic interneurons of the cortex and hippocampus.

137 | A SHORT NAP IMPROVES MEMORY ENCODING OF A BIOLOGY LECTURE IN A SCHOOL SETTING

Cognition, Behavior, and Memory

Author: Vanessa Vidal | email: vvidal@itba.edu.ar

Vanessa Vidal [1°2°], Matías Pretel [1°], Lucila Capurro [1°], Leonela Tassone [1°2°], Malen Daiana Moyano [1°2°], Romina Malacari [3°], Ignacio Brusco [2°4°], Fabricio Ballarini [5°6°], Cecilia Forcato [1°2°]

1° Laboratorio de Sueño y Memoria, Departamento de Ciencias de la vida, Instituto Tecnológico de Buenos Aires (ITBA).
2° Consejo Nacional de Investigaciones Científicas y Tecnológicas (CONICET), Buenos Aires, Argentina.
3° Quilmes High School, Buenos Aires, Argentina.
4° Centro de Neuropsiquiatría y Neurología de la Conducta – CENECON, Facultad de Ciencias Médicas, Universidad de Buenos Aires.
5° Instituto de Biología Celular y Neurociencias "Prof. E. De Robertis" (IBCN), Facultad de Medicina, Universidad de Buenos Aires (UBA)-Consejo Nacional de Investigaciones Científicas y Técnicas (CONICET), Capital Federal, Buenos Aires, Argentina.
6° Departamento de Ciencias de la Vida, Instituto Tecnológico de Buenos Aires (ITBA), Capital Federal, Buenos Aires, Argentina.

During wakefulness the constant encoding of new information leads to an increase in the net synaptic strength in the brain that saturates learning. During sleep synaptic downscaling takes place allowing new encoding after waking up. This constant saturation of learning could also be observed in students, especially high school students who usually have an important sleep debt. In this study our goal was to apply naps at school to diminish the detrimental effect of the lack of sleep on memory acquisition. We conducted a one-day experiment in the classroom. First, we divided each course in two, half the students took a nap in the school library while a polysomnography took place (3 EEG wireless system), and the other half remained in the classroom performing quiet activities. Then, they all had a Biology lecture with their own teacher and took a multiple choice test. We found that students who had slept a nap showed a significantly better performance in the test than students who remained awake. These results bring new evidence for the implementation of short naps in real-life settings.

139 | Role of the amygdala in modulating the stress response strategies in adult rats exposed to postnatal stress

Cognition, Behavior, and Memory

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

Jazmín Grillo Balboa [1°], Ailén Alba Colapietro [1°], Verónica Cantarelli [2°], Marina Ponzio [2°], Marta Cristina Antonelli [1°], María Eugenia Pallarés [1°]

1° Instituto de Biología Celular y Neurociencias "Prof. E. De Robertis", Facultad de Medicina, Universidad de Buenos Aires
2° Instituto de Investigaciones en Ciencias de la Salud, Facultad de Ciencias Médicas, Universidad Nacional de Córdoba

Early-life stress is a well-established risk factor for the development of affective disorders later in life. Although the mechanisms underlying this vulnerability are not fully elucidated, they have been linked to dysregulations in the Stress System and the cortico-limbic structures that modulate its activity. Among them, the amygdala (Amy) plays a critical role in the emotional processing of threat. During early life the Amy is extremely plastic, rendering it vulnerable to environmental factors that could lead to atypical shaping of behavior in the long term. Among the models that induce infant maltreatment in rats, the "Scarcity-adversity model" (SAM) -by which the nesting resources provided to a lactating dam are limited is particularly interesting, as it is the mother who induces stress in her pups. The SAM is applied from postnatal day 8 to 12, a critical moment in the maturation of the Amy. We hypothesize that SAM will stress the dams, modifying their behavior towards pups. This will, in turn, modify the structure and functioning of the Amy in their pups, leading to variations in the way the offspring responds to threat, and enhancing their vulnerability to develop behavioral alterations. Our preliminary data shows that SAM dams display greater anxiety-like traits than control mothers, evidenced by a lower frequency of entry to the open arms of the Elevated Plus Maze. This result shed some light on the maternal mechanisms underlying infant maltreatment induced by SAM.

141 | SARA modulates TGF signalling during sensory neuron development and regrowth

Development

Author: Juan Manuel Bourbotte Asensio | email: jbourbotte@immf.uncor.edu

Juan Manuel Bourbotte Asensio [1°], Victoria Rozés-Salvador [2°], Cecilia Conde [1°]

1° INIMEC-UNC-CONICET
2° CIBICI-CONICET

SSARA (Smad Anchor for Receptor Activation) is a scaffold protein that recruits Smads 2/3 to the TGFβ-activated receptor I (Transforming Growth Factor Beta-TβRI). Previously, we have demonstrated that SARA localizes at early endosomes (EEs), modulates the proper delivery to somatodendritic and axonal proteins, and participates in neuronal migration during neocortical development. Recently, we have identified to SARA as a negative regulator of the TGFβ pathway. In this work, we focus on the biological role of SARA and its potential association with the TGFβ pathway, during the development of sensory neurons (peripheral nervous system). In embryonic dorsal root ganglion (DRG) neurons, TβRI and SARA are endogenously expressed at the early stages of development and interact in the EEs. The addition of TGFβ enhances this interaction. SARA suppression or exogenous stimulation of the TGFβ pathway promotes axonal growth in embryonic DRGs. Moreover, in postnatal DRGs, TGFβ treatment induces both neuritic elongation and branching and a reduction in the size of growth cones, during axonal regrowth. In addition, TGFβ treatment increases SARA expression together with the number and distribution of SARA endosomes both at the soma and axon level. In summary, our results provide evidence on the involvement of SARA in the TGFβ signalling in axonal growth and regrowth of sensory neurons, highlighting mechanisms and molecules that regulate key physiological processes of neurodevelopment.

143 | Transplantation of early human neural fate organoids to the chick embryo chorioallantoic membrane

Development

Author: Luciano Fiore | email: lfiore@fmed.uba.ar

Luciano Fiore [1°], Mariana Holubiec [2°], Julieta Bianchelli [2°], Alan Hallberg [1°], Gonzalo Spelzini [1°], Gabriel Scicolone [1°], Tomas Falzone [2°]

1° 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.
2° Instituto de Investigación en Biomedicina (IBioBA) – CONICET – Instituto Partner de la Sociedad Max Planck, 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

Human brain organoids allows us to recapitulate in vitro the early development of the brain. Nevertheless, one of the big limitations of this model is the lack of vascularization. In addition to the delivery of oxygen, accumulating evidence suggests that the vascular system of the brain regulates neural differentiation and circuit formation. Our aim is to develop vascularized organoids using extraembryonic chicken cells in order to obtain a faster, better and more representative model of the human brain development. The chick embryo chorioallantoic membrane (CAM) is a rich vascularized extraembryonic-membrane. Since the CAM is naturally immunodeficient, we transplanted early human neural fate organoids (neuroepithelium stage) into chicken embryos of 7 days of development (E7) WT CAM. After 5 days of incubation (E12 embryo) we opened the eggs, fixed the CAM and analyzed the engraftment organoids by immunohistochemistry and hematoxylin-eosin staining. We found that organoids got vascularized and proliferated next to the CAM vessels. We also observed cells expressing the neural marker Pax6, integrated and surrounded by allantoid derived cells that expressed TBX5. These preliminary results allow us to conclude that CAM is a suitable environment to host human brain organoids and that CAM would support the engraftment of more developed brain organoids and their growth therein could faithfully recapitulate most of the characteristics of the brain development process.

145 | Ketogenic modulation of GABAergic neurodevelopment in C. elegans

Development

Author: Sebastián Giunti Giunti | email: sebagiunti@gmail.com

Sebastián Giunti [1°2°], María José De Rosa [1°2°], Diego Rayes [1°2°]

1° INIBIBB Bahía Blanca
2° Departamento de Biología, Bioquímica y Farmacia – UNS

PTEN is a negative regulator of the conserved PI3K pathway. Mutations in this gene are strongly associated with neurodevelopmental disorders, epilepsy, and schizophrenia. Several reports suggest that an increase in the excitation/inhibition ratio in the brain is a hallmark of these disorders. However, it is not known whether PTEN activity can lead to this E/I imbalance. The C. elegans NM system, where both excitatory (ACh) and inhibitory (GABA) motor neurons regulate muscle activity, provides a suitable model for studying E/I balance. We found that daf-18 (C. elegans ortholog of PTEN) mutants phenotypes are typical of worms with GABAergic signaling deficits. We also found that daf-18 mutants exhibit a significantly high frequency of process defects, abnormal branching, and incomplete commissures in GABAergic neurons. These defects are observed in the earliest larval stage (L1), suggesting a neurodevelopment failure. In contrast, we did not find significant differences in the morphology of cholinergic neurons. Our genetic experiments demonstrated that the GABAergic deficit in daf-18 mutants is entirely dependent on the inactivation of the transcription factor DAF-16/FOXO3A. Interestingly, we found that all these defects are ameliorated when daf-18 mutants are exposed to the ketone body hydroxybutyrate, a FOXO3A inductor. These results may contribute to understanding PTEN-associated disorders and the mechanisms linking ketogenic diets with an improvement in these pathologies.

147 | The effect of prenatal social interactions on pre and postnatal neurodevelopment

Development

Author: Monserrat Rodriguez Gonzalez | email: rodriguez.g.monserrat@gmail.com

Monserrat Rodriguez Gonzalez [1°], Jorge Arenas Valerioti [1°], Araceli Castro [2°], Daniel Pirola [3°], Zulma Canet [4°], Vladimir Flores [1°*], Melina Rapacioli [1°*]

1° Grupo Interdisciplinario de Biología Teórica. INCyT (CONICET-Universidad Favaloro-INECO). CABA, Argentina.
2° IMETTyB (CONICET-Universidad Favaloro). CABA, Argentina.
3° Laboratorio de Análisis Clínicos. Hospital Universitario Fundación Favaloro. CABA, Argentina.
4° Estación Experimental de INTA Pergamino

Chick embryo development can be accelerated by means of sounds (clicks), produced by more advanced embryos, transmitted by eggshell contact. We analyzed whether click-mediated actions affect cell proliferation, hormonal profile, and postnatal behavior. Cell proliferation was evaluated on day 1 after hatching in the ventricular and subventricular areas of the pallium cephalic region on (1) accelerated group, (2) incubated in isolation, and (3) incubated in contact. Globally considered, no differences were found between groups in the ventricular area, but higher mitotic densities were observed in the nidopallium of the group 2 and in the medial striatum of the group 1. A higher global mitotic density was found in the subventricular area in group 1, explained exclusively by differences found in the medial striatum. Hormones were assayed at hatching and 33 days after hatching. At hatching, the group 1 displayed values of T3 and TSH higher than controls. The differences disappear 33 days after hatching. Postnatal behavior was evaluated on groups 1 and 3. No differences were found in the performance shown in the “T-maze” test. In the “order of passage through the door” dominance-test, however, in both groups, males passed before than females. Besides, males of group 1 display lower average order than those of group 3. These results will help to better understand the effects of prenatal interactions on neural development.

*corresponding authors

149 | Role of GDNF/GFRa1 receptor in circuits associated with neurodevelopmental disorders

Development

Author: DELFINA MERCEDES ROMERO | email: delfina.romero@conicet.gov.ar

Delfina Mercedes Romero [1°], Maria Mercedes Olivera [1°], Juan Emilio Belforte [2°], Mariano Soiza Reilly [3°], Fernanda Ledda [4°], Gustavo Paratcha [1°]

1° Laboratorio de Neurociencia Molecular y Celular, Instituto de Biología Celular y Neurociencias (IBCN)-CONICET-UBA, Facultad de Medicina, Universidad de Buenos Aires (UBA), Buenos Aires, CP1121, Argentina.
2° Grupo de Neurociencia de Sistemas, Instituto de Fisiología y Biofísica “Bernardo Houssay” (IFIBIO-Houssay), Universidad de Buenos Aires y Consejo Nacional de Investigaciones Científicas y Técnicas (CONICET), Ciudad de Buenos Aires, Argentina.
3° Instituto de Fisiología, Biología Molecular y Neurociencias (IFIBYNE), Consejo Nacional de Investigaciones Científicas y Técnicas (CONICET), Facultad de Ciencias Exactas y Naturales, Universidad de Buenos Aires, Buenos Aires, Argentina.
4° Fundación Instituto Leloir, Instituto de Investigaciones Bioquímicas de Buenos Aires, Buenos Aires, C1405, Argentina.

During nervous system development, the formation of synaptic circuits occurs under a precise control of the axon and dendritic growth. Neuronal abnormal 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. 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.

151 | How white matter hyperintensities impacts Alzheimers disease and frontotemporal dementia across underrepresented Latin American samples

Disorders of the Nervous System

Author: Florencia Altschuler Altschuler | email: florenciaaltschuler@gmail.com

Florencia Altschuler [1°], Matias Fraile-Vazquez [1°], Agustín Ibañez [2°], Cecilia Gonzalez-Campo [1°]

1° Cognitive Neuroscience Center (CNC), Universidad de San Andres
2° Latin American Brain Health Institute (BrainLat), Universidad Adolfo Ibañez, Santiago, Chile

White matter hyperintensities (WMH) are frequently observed in MRI scans of old people. Usually interpreted as a sign of cerebrovascular disease (CVD), they are also associated with increased risk of cognitive impairment and dementia. While WMH and CVD are highly prevalent in Alzheimer´s disease (AD), this has been less studied in frontotemporal dementia (FTD). Thus, we investigated WMH in AD and FTD patients in Latin America (Argentina, Brazil, Chile, Colombia, Peru and Mexico), a region with high prevalence of CVD. We extracted WMH total lesion volumes and their spatial distributions and its associations with cognitive impairment (ACE, MMSE, IFS, MoCA) and sociodemographic variables (age, years of education, gender). A total of 608 participants (146 FTD, 256 AD, and 206 healthy controls (HC)) from the Multi-Partner Consortium to Expand Dementia Research in Latin America (ReDLat) underwent high-resolution brain MRI and neuropsychological examination. WMH were extracted from T2-FLAIR images using automated segmentation algorithms to extract total lesion volumes and their spatial distributions. Group differences in total and regional WMH lesion volumes and associations with different cognitive, clinical and sociodemographic domains were analyzed. Both neurodegenerative groups showed higher total and regional WMH lesion volumes compared to HC. The total WMH load also correlated positively with age and negatively with general cognition scores.

153 | Yerba mate (Ilex paraguariensis) as a neuroprotective agent in Parkinson's disease models

Disorders of the Nervous System

Author: Pedro Lorenzo Ballestero | email: pedroballestero88@gmail.com

Pedro Ballestero [1°], Hernan Hauche [1°], Sebastian Romano [2°], Roy Rivero [3°], Irene Taravini [3°], Oscar Gershanik [1°], Melina Bordone [1°], Nara Muraro [2°], Juan Ferrario [1°]

1° Instituto de Biociencias, Biotecnología y Biomedicina – FCEyN -UBA
2° Biomedicine Research Institute of Buenos Aires – CONICET – Partner Institute of the Max Planck Society
3° Facultad de Bromatología – UNER

Parkinson's disease (PD) is the second neurodegenerative disorder in prevalence. Its origin is unknown, but its pathophysiological characteristic is the progressive degeneration of dopamine-releasing neurons of the Substantia nigra. A clinical study conducted in Argentina revealed that the consumption of yerba mate (YM) has an inverse association with the risk of developing PD (Gatto, 2015), and we found that YM extract induces a strong neuroprotective effect on dopaminergic neurons in vitro (Bernardi, 2019). Given these results, we hypothesized that the YM extract would also protect neurons from the deleterious effects caused by the expression of human alpha synuclein (aSyn) in a widely used Drosophila melanogaster model of PD. To reach this goal, we have set up the administration of YM to these flies and assessed behavioral and molecular parameters. We could observe a decrease in the levels of alpha aSyn measured by the Western blot technique in flies treated with YM. Our experiments using GRASP (GFP Reconstitution Across Synaptic Partners), showed an increased GFP signal (a reporter of synaptic connections) between circadian and dopaminergic neurons in aged flies treated with YM, suggesting more connectivity. To sum up, our experiments show that the administration of YM can decrease the levels of alpha aSyn in this PD fly model and could also maintain synaptic connections; perhaps an indication of healthier neuronal circuits?

155 | Changes in NMDAR subunits levels in the cerebral cortex of zQ175 mice

Disorders of the Nervous System

Author: Luisina Castellari | email: luisinacastellari@hotmail.com

Luisina Castellari [1°], Julieta Saba [2°], Federico López Couselo [2°], Maria Veronica Baez [1°], Carla Mariana Caruso [2°]

1° Instituto de Biología Celular y Neurociencias “Prof. E. De Robertis” (IBCN, CONICET-UBA), Buenos Aires, Argentina.
2° Instituto de Investigaciones Biomédicas (INBIOMED), UBA-CONICET, Paraguay 2155, Facultad de Medicina, Universidad de Buenos Aires, Buenos Aires, Argentina

Huntington’s disease (HD) is a predominantly heritable neurodegenerative disorder caused by a mutation in the huntingtin gene, which leads to expansion of the CAG repeat within exon 1 of the protein. Synaptic signaling alterations underlie the behavioral and neuropathological changes observed during HD. In particular, there is increased cortical excitability in presymptomatic patients. Dysregulation of glutamatergic signaling is known to play an important role in this disease and may contribute to early synaptic dysfunction observed in HD. In this work, using a zQ175 knock-in mouse model, we characterized NMDA receptor levels in the cortex and striatum of Huntington (zQ175) and wild-type (WT) mice at 4 and 8 months of age. Preliminary results suggest that GluN1 levels are increased in the cerebral cortex of both females and males zQ175 animals at 4 months. GluN1 levels at 8 months were similar in the two groups of animals and also between both sexes. Synaptophysin is a presynaptic protein involved in vesicle exocytosis. Surprisingly, we did not observe any difference in synaptophysin levels either at 4 months or at 8 months. These results would suggest that there are some early synaptic cortical changes in zQ175 HD mice that may affect corticostriatal pathway function.

157 | Ferroptosis in midbrain triggers motor impairment associated with lipid dyshomeostasis

Disorders of the Nervous System

Author: Melisa Conde | email: mconde@inibibb-conicet.gob.ar

Melisa Conde [2°*], Athina Maniscalchi [1°*], Oriana Benzi Juncos [2°], Eugenia Fermento [2°], Alejandro Curino [2°], María Marta Fachinetti [2°], Melania Funk [2°], Natalia Alza [3°], Gabriela Salvador [2°]

1° Instituto de Investigaciones Bioquímicas de Bahía Blanca, Universidad Nacional del Sur (UNS), Consejo Nacional de Investigaciones Científicas y Técnicas.
2° Instituto de Investigaciones Bioquímicas de Bahía Blanca, Universidad Nacional del Sur (UNS), Consejo Nacional de Investigaciones Científicas y Técnicas, Departamento de Biología, Bioquímica y Farmacia, UNS.
3° Instituto de Investigaciones Bioquímicas de Bahía Blanca, Universidad Nacional del Sur (UNS), Consejo Nacional de Investigaciones Científicas y Técnicas, Departamento de Química, UNS

Ferroptosis is a form of cell death driven by iron-dependent phospholipid peroxidation by means of antioxidant defense failure related with glutathione depletion. It has major implications in many neurodegenerative diseases. Previously, our laboratory demonstrated that iron overload triggers neurodegeneration and exacerbated lipolysis in whole brain. The goal of this work was to characterize the effect of ferroptosis as a consequence of iron overload in mice midbrain. C57BL/6 mice were intraperitoneally injected with iron saccharate (200 or 333 mg/kg weight) to generate an iron overload model. We found that iron was accumulated in midbrain of treated mice through Perls' staining. This was correlated with higher levels of oxidative stress markers, lipid peroxidation and glutathione depletion, with no changes in caspase activity. Remarkably, tyrosine hydroxylase loss and increased gliosis were detected in midbrain slices of iron-treated animals. Lipid metabolism alterations were also investigated. While fatty acid levels were diminished, cholesterol content was increased by iron overload. Iron-treated animals displayed reduced falling latency and total distance travelled in the rotarod and open field tests, respectively. Our findings indicate that our model represent a scenario of ferroptosis in midbrain with cholesterol accumulation that affects motor skills.

*Equal contribution

159 | Effect of prenatal exposure to VPA on juvenile play in male mice: Identification of key neuronal groups

Disorders of the Nervous System

Author: Lucía María Di Guardia Casella | email: lmdiguardiacasella@gmail.com

Lucía María Di Guardia Casella [1°], Araceli Seiffe [1°], Mauro Federico Ramirez [1°], Amaicha Mara Depino [3°]

1° Instituto de Fisiología, Biología Molecular y Neurociencias, UBA – CONICET
2° Departamento de Fisiología, Biología Molecular y Celular, Facultad de Ciencias Exactas y Naturales, Universidad de Buenos Aires
3° Departamento de Biodiversidad y Biología Experimental, Facultad de Ciencias Exactas y Naturales, Universidad de Buenos Aires

Autism spectrum disorder is a neurodevelopmental disorder characterized by social and communication deficits and repetitive patterns of behavior. We have previously found that male mice prenatally exposed to 600 mg/kg valproic acid (VPA) show reduced play solicitation at postnatal day 21. We hypothesized that these differences in behavior are correlated with alterations in the activity and function of specific neuronal networks. To identify this, we sacrificed VPA and control animals 2h or 24h after a 30-min session of play with a same-treatment, unknown mouse. We analyzed the expression of the early gene cFos, as a marker of neuronal activation, in the prefrontal cortex and striatum, as both regions are reported to be involved in juvenile social play. Moreover, we studied cFos expression in the piriform cortex, as we previously reported hyperactivation of this region in VPA adult male mice. The behavioral analysis showed that mice prenatally exposed to VPA tend to perform fewer play solicitation, particularly because they approach their playmates less often. VPA animals show hyperactivity of the piriform cortex and prefrontal cortex, both 2 and 24h after juvenile social play, indicating that prenatal treatment alters neuronal activity in these regions but suggesting that they would not be involved in social play. In the striatum, we have not found cFos-positive neurons in any of the animals, indicating that this region is not involved in this behavior or affected by VPA

161 | Multivariate psycholinguistic analysis of verbal fluency in Alzheimer's disease

Disorders of the Nervous System

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

Franco J. Ferrante[1*2*3], Joaquín A. Migeot[4*5*], Agustina Birba[1*2*], Gonzalo Pérez[1*2*], Eugenia Hesse[6*], Enzo Tagliazucchi[4*7*], Claudio Estienne[8*], Cecilia Serrano[9*], Andrea Slachevsky[10*11*12*13*], Diana Matallana[14*15*], Pablo Reyes[16*17*], Agustín Ibañez[1*2*4*18*], Sol Fittipaldi[1*2*], Cecilia Gonzalez Campo[1*2*], Adolfo M. García[1*2*18*20*]

1° Centro de Neurociencias Cognitivas Universidad de San Andrés, Buenos Aires, Argentina 2° National Scientific and Technical Research Council (CONICET) Buenos Aires, Argentina 3° Facultad de Ingeniería. Universidad de Buenos Aires (FIUBA), Argentina 4° Latin American Brain Health (BrainLat), Universidad Adolfo Ibáñez, Santiago, Chile 5° Center for Social and Cognitive Neuroscience (CSCN), School of Psychology, Universidad Adolfo Ibanez, Santiago, Chile 6° Departamento de Matemática y Ciencias, Universidad de San Andres, Victoria, Buenos Aires, Argentina 7° Departamento de Física, Universidad de Buenos Aires and Instituto de Física de Buenos Aires (IFIBA – CONICET), Buenos Aires, Argentina 8°Instituto de Ingeniería Biomédica, Universidad de Buenos Aires, Buenos Aires, Argentina 9° Unidad de Neurología Cognitiva, Hospital César Milstein, Buenos Aires, Argentina 10°Neuropsychology and Clinical Neuroscience Laboratory, Physiopathology Department, ICBM, Neurosciences Department, Faculty of Medicine, University of Chile, Chile 11° Gerosciences Center for Brain Health and Metabolism, Santiago, Chile 12°

Memory and Neuropsychiatric Clinic (CMYN) Neurology Department, Hospital del Salvador & University of Chile, Santiago, Chile 13° Servicio de Neurología, Departamento de Medicina, Clínica Alemana-Universidad del Desarrollo, Santiago, Chile 14° Instituto de Envejecimiento, Department of Psychiatry, School of Medicine, Pontifical Xaverian University, Bogotá, Colombia 15° Department of Mental Health, Hospital Universitario Santa Fe de Bogotá, Bogotá, Colombia 16° Centro de Memoria y Cognición. Intellectus-Hospital Universitario San Ignacio, Bogotá Colombia 17° Pontificia Universidad Javeriana, Departments of Physiology, Psychiatry and Aging Institute Bogotá, Colombia 18°Global Brain Health Institute, University of California-San Francisco, San Francisco, California, 18 and Trinity College Dublin, Ireland 19 National Scientific and Technical Research Council (CONICET), Buenos Aires, Argentina 20° Departamento de Lingüística y Literatura, Facultad de Humanidades, Universidad de Santiago de Chile, Chile

Verbal fluency tasks, a cornerstone in Alzheimer's disease (AD) assessments, have been historically underexploited. Outcomes are typically restricted to correct responses, which fails to reveal drivers of lexico-semantic deficits and discriminate AD from other disorders. We recruited 32 patients with AD, 32 with behavioral variant frontotemporal dementia, 19 with Parkinson's disease and 27 healthy controls (HCs). Participants performed phonemic and semantic fluency tasks, as well as an executive function test to capture cognitive symptom severity. We counted correct responses and then, from each word, extracted distributional features of six psycholinguistic variables: granularity, frequency, neighborhood, length, familiarity, and imageability. While correct responses revealed significant deficits in each patient group, granularity, frequency and neighborhood did so only in AD. Also, these features, as derived from semantic fluency, predicted executive function outcomes exclusively in AD. A logistic regression classifier integrating all psycholinguistic features robustly discriminated between AD and HCs (AUC=.89), yielding near-chance results for the other two patient groups. Our findings show that objective multivariate psycholinguistic analysis of verbal fluency can reveal fine-grained, disease-specific, and severity-sensitive patterns of semantic memory disintegration in AD, contributing to clinical characterization, differential diagnosis, and cognitive phenotyping.

163 | DETECTION OF PRODROMAL EARLY PHENOTYPES AND POTENTIAL THERAPEUTIC WINDOW IN A MODEL OF TAUOPATHY

Disorders of the Nervous System

Author: Javier Andrés Muñiz Muñiz | email: javier.muniz88@gmail.com

Javier Andrés Muñiz [1°], Carolina Lucia Facal [1°], Ezequiel Pereyra [1°], German Falasco [3°], Indiana Páez Paz [1°], Juan Ferrario [2°], Ana Damianich [1°], M. Elena Avale [1°]

1° Laboratorio de Terapéutica Experimental en Procesos Neurodegenerativos – INGEBI
2° Neurobiología de la enfermedad de Parkinson – Instituto de Biociencias, Biotecnologia y Biologia Translacional
3° Laboratorio de Imagen Preclínica, Centro de Imagen Molecular – FLENI

Tau is a microtubule-associated protein predominantly expressed in neurons, which participates in microtubule polymerization and axonal transport. The alternative splicing of exon 10 (E10) in the Tau transcript produces protein isoforms with three (3R) or four (4R) microtubule binding repeats, which are expressed in equal amounts in the normal adult human brain. Here aimed to characterize early phenotypes of htau mice, at 3, 6 and 12 months old, to establish the time course of the progression state of tau pathology and identify the brain nuclei involved in these phenotypes. We performed behavioral tests to identify cognitive deficits, anxiety phenotypes, motor impulsivity and loss of behavioral inhibition. In addition, we assessed electrophysiological neuronal activity during the time course of pathological phenotypes, as well as molecular and histological markers. Finally, using an RNA trans-splicing strategy to modulate E10 inclusion (Sonia/ani) we demonstrate that local shifting of 3R to 4R tau into the striatum of htau mice improved some of the htau phenotypes. Together, our results suggest that tau isoforms imbalance could develop early phenotypes that can be identified to generate elaborate strategies to restore the isoform balance.

165 | Alpha synuclein selectively affects intracellular trafficking dynamics

Disorders of the Nervous System

Author: Milagros Ovejero | email: movejero@immf.uncor.edu

Milagros Ovejero [1°], Mariano Bisbal [1°], Alfredo Cáceres [2°], Agustín Anastasía [1°2°]

1° Instituto Ferreyra (INIMEC-CONICET-Universidad Nacional de Córdoba), Córdoba, Argentina
2° Instituto Universitario de Ciencias Biomedicas de Cordoba (IUCBC), Córdoba, Argentina

Intracellular trafficking is an extremely complex process that is highly regulated in neurons since this cell type has a particular architecture in which the correct functioning of the exocytic pathway plays a fundamental role for its survival. Alpha synuclein (AS) is a widely studied protein for its role in different neurodegenerative diseases such as Parkinson's disease and a group of pathologies called synucleinopathies. Despite being the focus of several studies, its normal function it is still partly unknown and the manner in which this protein is involved in neuronal death is still not clearly known. One of the most interesting hypothesis suggests that AS may be affecting intracellular trafficking and thus affecting neuronal survival (Lindquist Lab 2006; experiments in yeast). Our focus is to study the effects of AS on the intracellular trafficking in mammalian neurons. We use a special system that allows us to synchronize the exocytic pathway and thus analyze if there are changes in the dynamics of protein trafficking. Using this synchronization system, we found that AS affects protein trafficking, but not in a general way. Instead, our results suggest that AS acts on the fission machinery of axonal trafficked proteins, but not somato-dendritic targeted proteins. These findings shed light on the mechanism by which AS may be acting in neurodegenerative diseases.

167 | Effects of LPC-induced demyelination of the anterior piriform cortex on mouse sociability

Disorders of the Nervous System

Author: Mauro Federico Ramirez | email: mauroramirez.ar@gmail.com

Mauro Federico Ramirez [1°2°], Mariana Graciarena [1°], Amaicha Mara Depino [1°3°]

1° Institute for Physiology, Molecular Biology and Neurosciences (IFIByNE-UBA-CONICET).
2° Department of Physiology, Molecular and Cellular Biology, Faculty of Exact and Natural Sciences, UBA.
3° Department of Biodiversity and Experimental Biology, Faculty of Exact and Natural Sciences, UBA.

The Piriform Cortex (Pir) is a structure involved in the sense of smell which has been shown to regulate social behavior in rodents. Our lab has validated a pharmacological model where mice prenatally exposed to Valproic Acid (VPA) express sociability alterations, along with a higher glucose metabolism, increased cFos activity, and reduced myelinization in the Piriform Cortex. With these experiments, we aimed to understand whether the demyelination of the anterior piriform cortex may alter the sociability of adult mice. First, we performed a three-chamber social interaction and novelty test (SI+SN) to assess the basal sociability levels of naive C57BL/6 mice. The next day, through stereotaxic surgery, we administered 1µl of Lysolecithin (LPC) bilaterally in the Pir, to elicit LPC-induced demyelination. As early myelin loss has been detected 7 days after the exposure to LPC, we performed a second SI+SN test at that moment to evaluate sociability. Animals were then euthanizeded and tissue collected for further analysis. We found that LPC injection in the Pir has no effect over the sociability of mice 7 days after. We will characterize myelination to determine if demyelination of the Pir is irrelevant to social behavior or whether the effects of LPC on myelin have different temporal dynamics in the Pir, compared with previous characterizations of the prefrontal cortex.

169 | Regional neurodegeneration and ultrastructural changes in the brain of a conditional TDP-43 mouse model of frontotemporal dementia/amyotrophic lateral sclerosis

Disorders of the Nervous System

Author: Pablo Silva Pintos | email: pablosilvapinto@gmail.com

Pablo Silva [1°], Jorge Goldstein [2°], Laura Caltana [3°], Lionel Muller Igaz [1°]

1° IFIBIO Houssay, Grupo de Neurociencia de Sistemas, Facultad de Medicina, Universidad de Buenos Aires – CONICET, Buenos Aires, Argentina
2° IFIBIO Houssay, Laboratorio de Neurofisiopatología, Facultad de Medicina, Universidad de Buenos Aires – CONICET, Buenos Aires, Argentina
3° IBCN (CONICET), University of Buenos Aires School of Medicine, Buenos Aires, Argentina

TDP-43 proteinopathy is the main pathology in amyotrophic lateral sclerosis and frontotemporal dementia, suggesting that these diseases share underlying mechanisms. We generated transgenic mice conditionally overexpressing human wild-type TDP-43 protein in forebrain neurons, recapitulating core features of FTD/ALS. However, the role of TDP-43 in neurodegeneration is still unclear. Here, we analyzed neuronal loss (using immunofluorescence against NeuN) in specific brain regions, including somatosensory (SSC) and motor (MC) cortices and hippocampal subfields. Our results show that after post-weaning transgene (TG) induction during 1 month, these mice display neurodegeneration on both SSC and MC, but not on hippocampal CA1 region. Moreover, after two weeks of TG suppression this phenotype is still present, indicates that the suppression protocol does not prevent early neuronal loss in this model. Ultrastructural analysis of suppressed animals by Transmission Electron Microscopy showed signs of perivascular and intracellular edema, accompanied by increased lumen of the rough endoplasmic reticulum in neurons, astrocytes and oligodendrocytes. Additionally, mitochondrial alterations with cristae disorganization, irregular formations composed of intracellular membranes and pyknotic nuclei were observed. Together, our findings contribute to understand disease mechanisms and specifically how TDP-43 dysregulation is associated with neurodegeneration and ultrastructural alterations.

171 | Regional analysis of synaptic, axonal and dendritic markers in transgenic mice expressing a mislocalized form of TDP-43: implications for ALS/FTD pathogenesis

Disorders of the Nervous System

Author: María Florencia Vassallu | email: florencia.vassallu@gmail.com

Florencia Vassallu [1°], Laura Caltana [2°], Lionel Muller Igaz [1°]

1° IFIBIO Houssay, Grupo de Neurociencia de Sistemas, Facultad de Medicina, Universidad de Buenos Aires – CONICET, Buenos Aires, Argentina.
2° IBCN (CONICET), University of Buenos Aires School of Medicine, Buenos Aires, Argentina

TDP-43 is the main component of the pathological cytoplasmic inclusions found in both amyotrophic lateral sclerosis (ALS) and frontotemporal dementia (FTD), two neurodegenerative diseases for which there is no known cure. TDP-43 is a protein localized in the nucleus and involved in RNA metabolism, among other functions. Our transgenic mice with inducible cytoplasmic expression of TDP-43 in forebrain neurons recapitulate behavioral phenotypes, neurodegeneration and gene expression changes that occur in both diseases. In order to evaluate the early effects of TDP-43-NLS overexpression, we analyzed presynaptic markers Syntaxin 1 (Stx1) and Synaptophysin (Syn), and cytoskeleton proteins MAP2 (a protein associated to microtubule whose expression is specific to dendrites and cellular bodies) and NF200 (a neurofilament component and axonal marker). TDP-43-NLS mice showed evidence of decreased hippocampal Stx1 immunoreactivity (IR) in mossy fiber terminals projecting to CA3 and Syn IR in hippocampal CA1 and auditory cortex, suggesting synaptic loss. Study of IR levels for MAP2 and NF200 will reveal axonal and dendritic structure in different cortical areas and hippocampal subfields. The analysis of these neuronal markers will provide further evidence on the pathological abnormalities displayed by this animal model of TDP- 43 proteinopathies, and help us to delineate the early events triggered by mislocalizedTDP-43 before overt neurodegeneration is observed.

173 | Multiple early alterations in developing prefrontal-raphe circuits by postnatal exposure to SSRI antidepressants in mice

Neural Circuits and Systems Neuroscience

Author: Tamara Sol Adjimann | email: tamara.adjimann@gmail.com

Tamara S. Adjimann [1°], Sebastian P. Fernandez [2°], Jacques Barik [2°], Mariano Soiza-Reilly [1° 1°]

1° Instituto de Fisiología, Biología Molecular y Neurociencias (IFIBYNE), Consejo Nacional de Investigaciones Científicas y Técnicas (CONICET) – Universidad de Buenos Aires, Argentina. 2° Université Côte d'Azur, Nice, France; Institut de Pharmacologie Moléculaire & Cellulaire, CNRS UMR7275, Valbonne, France.

The prefrontal cortex to dorsal raphe nucleus (PFC-DRN) circuit is crucially engaged in stress-coping and emotional behaviors. Mice exposed to the selective serotonin reuptake inhibitor (SSRI) fluoxetine from P2 to P14 (PN-FLX) show alterations in the connectivity of the PFC-DRN circuit, accompanied by increases in depressive-like and anxiety behaviors in adult life. To investigate the early impact of PN-FLX on the developing PFC-DRN circuit, we combined the use of high-resolution synaptic anatomy (array tomography) and ex-vivo electrophysiology. As early as at P15, a selective 40% increase in the density of prefrontal glutamate synaptic afferents was found in the DRN of PN-FLX mice in comparison to controls. Consistently, an increased frequency of excitatory postsynaptic currents was also detected on DRN serotonin neurons indicating the presence of more functional glutamate synapses. Next, we evaluated the activation of PFC projection-neurons engaged in the PFC-DRN circuit in response to an acute stress (forced swim). Using layer-specific markers and c-fos immunohistochemistry, we determined that PN-FLX differentially enhanced the activity of subsets of PFC projection-neurons. Our results show multiple early effects of PN-FLX on the developing PFC-DRN circuitry that could contribute to long-term emotional alterations.

175 | Early-life stress modulates the development of prefrontal-raphe circuits and stress-responses of serotonin neurons

Neural Circuits and Systems Neuroscience

Author: Carla Veronica Argañaraz | email: carlavarganaraz@gmail.com

Carla Veronica Argañaraz [1°], Mariano Soiza Reilly [1°]

1° Instituto de Fisiología, Biología Molecular y Neurociencias (IFIBYNE), Consejo Nacional de Investigaciones Científicas y Técnicas (CONICET) – Universidad de Buenos Aires, Argentina.

Early adversity represents a main risk factor for the emergence of psychiatric disorders in adult life. In mice, the stress of maternal separation (MS) during postnatal days (P) 2 to 14 produces anxiety and depressive-like phenotypes in adult life. We found that MS during this period alters the maturation of prefrontal circuits, producing a hyperinnervation of the prefrontal cortex (PFC) to dorsal raphe nucleus (DRN) synaptic circuit. This pathway is crucially involved in stress-coping strategies in response to uncontrollable stress and mood control by modulating serotonin (5-HT) release from DRN neurons. However, whether such changes in synaptic innervation could modify the stress-response of DRN 5-HT neurons that may contribute to adult emotional alterations remains unexplored. To tackle this, we assessed the early activation (at P15) of DRN 5-HT neurons in maternally-separated mice in response to a swim stress known to engage the PFC-to-DRN circuit. Our study involved a behavioral challenge in the forced swim test (FST) and c-Fos/5-HT immunofluorescent labeling in the DRN. These investigations will contribute to expand the current understanding of how early-life stress can influence the activity of developing 5-HT networks.

177 | Adaptive coding in piriform cortex neurons after odor-spatial context associative learning

Neural Circuits and Systems Neuroscience

Author: Noel Federman | email: noelfederman@gmail.com

Noel Federman [1°], Sebastian Alejo Romano [1°], Lucca Salomon [1°], Antonia Marin Burgin [1°]

1° Ibioba-MPSP-CONICET

Primary sensory cortices are considered as brain regions functionally specialized to encode physico-chemical attributes of the sensory environment. However, the animal´s internal state as well as its ongoing motor behavior can affect cortical activity. We study how activity in the primary olfactory cortex of mice is modulated by sensory and non-sensory variables related to an odor-spatial context associative task, before and after learning. For this, we recorded piriform cortex (PC) activity in head-fixed mice trained to explore a virtual corridor in which they learn that a specific odor is associated with a reward only when presented in a particular visual context. We found that neurons in the PC respond not only to odors but also to several task-relevant variables. Furthermore, the ability of neurons to encode more than one variable is acquired with learning, since animals in the first session of training have fewer multiplexing neurons. Importantly, by using the activity of the population of PC neurons we can decode trial contextual information during expert animals´ behavior, while only odor information can be decoded from populational activity of first session animals´ neurons, further indicating that associative learning dynamically modifies the representation in the PC to reflect experience. This suggests an adaptive coding in this primary sensory cortex useful to adjust behavior after learning.

179 | NEURAL CIRCUITS INVOLVED IN SOCIAL MEMORIES IN RODENTS: A PRELIMINARY STUDY

Neural Circuits and Systems Neuroscience

Author: Paula Funaro | email: paufunaro@gmail.com

Paula Funaro [1°], Veronica de la Fuente [1°]

1° INSTITUTO DE FISIOLOGÍA, BIOLOGÍA MOLECULAR Y NEUROCIENCIAS (IFIBYNE-UBA-CONICET), FACULTAD DE CIENCIAS EXACTAS Y NATURALES, UNIVERSIDAD DE BUENOS AIRES

The ability to learn and remember conspecifics is critical to the stability of social groups. Lack of social interaction predisposes to depression and anxiety. Social interactions depend on the ability to recognize peers and decipher their expressions and emotions. Disturbances in these abilities represent a hallmark of some psychiatric, neurodevelopmental, and neurodegenerative disorders. In rodents, social recognition tasks (SRT) reflect their ability to identify and remember conspecifics. The general aim of our long-term project is to gain knowledge of the neural circuits involved in social recognition and social memory. In this project, we first assessed different parameters that could affect the saliency of the mice used as stimuli. Then, we aimed to determine which areas of the brain are active after the SRT using the neural activity marker cFOS. So far our results indicate that using stimuli from the same home-cage have similar salience than using stimuli from different home-cages. In regard to the immunohistochemistry studies, mice that underwent a SRT have cFOS positive cells in the paraventricular nucleus of the hypothalamus -a brain zone that expresses oxytocin-, and in the CA2 region of the hippocampus, which has been shown to participate in social memory formation. We hypothesize that the number of cFOS positive cells will be higher in these mice than in controls. Future experiments will be discussed in order to continue the project.

181 | Spread of rhythmic activity among couple oscillators

Neural Circuits and Systems Neuroscience

Author: Graciela Ines Kearney | email: graciela.kearney@gmail.com

Graciela Ines Kearney [1°], Lidia Szczupak [1°]

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

In animal motor behaviors, the segments along the antero-posterior axis perform movements in a coordinated manner. Leeches are an outstanding model to analyze the underlying neuronal network controlling this function because the 21 segments that compose the body are virtually identical, simplifying the question on intersegmental coordination to that on interactions among iterated units. Leeches crawl over solid surfaces through successive elongation and contraction body waves. Each segment bears all the neurons required to produce this rhythmic motor pattern and dopamine evokes fictive crawling in isolated midbody ganglia. Coordinated rhythmic motor pattern can be also elicited in chains of 3 ganglia. The pattern of activity in both experimental conditions is highly similar, and fits behavioral parameters. Within the chain, the intersegmental interactions give rise to a global network, turning each segmental circuit refractory to local perturbations. To analyze the nature of these intersegmental signals, we used a chamber that allows chemical compartmentalization of the chain. Application of dopamine in a single ganglion elicited crawling in anterior and/or posterior ganglia. These results show that local crawling oscillators provide excitatory drive bidirectionally, which operates tonically upon neighboring circuits spreading the rhythmic activity.

183 | Neural organization of the third optic neuropil, the lobula, in the highly visual semiterrestrial crab Neohelice granulata

Neural Circuits and Systems Neuroscience

Author: Maria Grazia Lepore | email: lepore.mgrazia@gmail.com

Maria Grazia Lepore [1°], Daniel Tomsic [1°], Julieta Sztarker [1°]

1° Instituto de Fisiología, BiologíaMolecular y Neurociencias (IFIBYNE), UBA-CONICET, Universidad de Buenos Aires, Facultad de Ciencias Exactas y Naturales, Buenos Aires, Argentina. Departamento de Fisiología, Biología Molecular y Celular “Dr HéctorMaldonado”, Facultad de Ciencias Exactas y Naturales, Universidad de Buenos Aires, Buenos Aires, Argentina

Vision is essential for animals as it allows them to acquire, process and transform visual information to build an internal representation of the environment and to select appropriate behavioral responses. The semiterrestrial crab Neohelice granulata possesses a highly developed visual system and displays conspicuous visually guided behaviors. The brain structures that processes visual information are called optic neuropils. Here, we present the first anatomical study of individual columnar elements composing the third optic neuropil, the lobula. This is involved in motion processing, binocular and multimodal integration and learning-induced plasticity. Using Golgi staining and camera lucida reconstructions, we characterized 140 types of elements, including input, translobular, centrifugal, and input columnar elements, each of them morphologically distinct in the distribution of their arborizations, their size, and shape. In the present work, we divided the lobula into 13 layers to separate the arborization patterns seen in the reconstructed elements together with available descriptions of tangential layers in the lobula. Our results reveal a complex and dense neuropil presenting many synaptic layers and an important number of lobula columnar neurons that could encode behaviorally relevant visual features. We analyze and discuss our findings considering the similarities and differences found between the layered organization and components of crustacean and insect lobul.

185 | Dorsal striatum coding for the timely execution of action sequences

Neural Circuits and Systems Neuroscience

Author: Maria Cecilia Martinez | email: ceciliamartinez256@gmail.com

Maria Cecilia Martinez [1°], Camila Zold [1°], Marcos Coletti [1°], Gustavo Murer [1°], Mariano Belluscio [1°]

1° Laboratorio de Fisiología de Circuitos Neuronales, Grupo Neurociencia de Sistemas, IFIBIO-Houssay, Facultad de Medicina, Universidad de Buenos Aires-CONICET
2° Dto. Fisiología y Biología Molecular y Celular, FCEN, UBA.

The automatic initiation of actions can be highly functional. But occasionally these actions cannot be withheld and are released at inappropriate times, impulsively. Striatal activity has been shown to participate in the timing of action sequence initiation and it has been linked to impulsivity. Using a self-initiated task, we trained adult male rats to withhold a rewarded action sequence until a waiting time interval has elapsed. By analyzing neuronal activity we show that the striatal response preceding the initiation of the learned sequence is strongly modulated by the time subjects wait before eliciting the sequence. Interestingly, the modulation is steeper in adolescent rats, which show a strong prevalence of impulsive responses compared to adults. We hypothesize this anticipatory striatal activity reflects the animals' subjective reward expectation, based on the elapsed waiting time, while the steeper waiting modulation in adolescence reflects age-related differences in temporal discounting, internal urgency states or, explore-exploit balance.

187 | Unique potential of immature adult-born neurons for the remodeling of CA3 spatial maps

Neural Circuits and Systems Neuroscience

Author: Matias Mugnaini Mugnaini | email: matiasmugnaini@gmail.com

Matias Mugnaini [1°], Mariela Trinchero [2°], Alejandro Schinder [2°], Emilio Kropff [1°], Verónica Piatti [2°]

1° Laboratorio de Fisiología y Algoritmos del Cerebro, Instituto Leloir (IIBBA)
2° Laboratorio de Plasticidad Neuronal, Instituto Leloir (IIBBA)

Adult hippocampal circuits undergo extensive remodeling by means of activity-dependent synaptic modification and by the generation of new dentate granule cells. While plasticity is fundamental for basic hippocampal functions such as learning, memory and spatial processing, the specific contributions of the distinct mechanisms of circuit modification remain unclear. To investigate the role of adult-born granule cells (aGCs) in spatial processing, we optogenetically stimulated cohorts of aGCs at 4 (young) or 8 weeks of age (mature) and recorded CA3 neural activity while mice freely foraged in an open field environment. Activation of young (but not mature) aGCs resulted in remapping of a substantial proportion of CA3 place cells despite the fact that they evoked CA3 activity in rare cases. Repetition of the protocol on subsequent days failed to induce further remapping, but a sharp increase in evoked activity similar to mature aGC levels was observed. These findings suggest that immature aGCs bear unique transient capabilities for synaptic transmission and spatial processing, granting them a potential for activity-dependent modification of CA3 spatial maps that decays with functional maturation.

189 | Input specific distal feed forward inhibition alteration in the mPFC of a mouse model important for the study of schizophrenia

Neural Circuits and Systems Neuroscience

Author: Diego Esteban Pafundo | email: dpafundo@fmed.uba.ar

Diego E Pafundo [1°], Carlos A Pretell Annan [1°], Nicolás M Fulginiti [1°], Juan E Belforte [1°]

1° Grupo de Neurociencia de Sistemas, Instituto de Fisiología y Biofísica Bernardo Houssay (IFIBIO-Houssay), UBA-CONICET, Buenos Aires, Argentina.

Schizophrenia (SZ) is a devastating disease characterized by cognitive disorders. Inputs from distal regions to the prefrontal cortex such as the ventral hippocampus (vHP) are important for cognition, and deficits in the vHP-prefrontal connection are found in patients. Parvalbumin positive interneurons (PVin) function and connectivity are crucial for normal circuits function and their disfunction is associated with cognitive deficits in SZ. Furthermore, the reciprocal synapses between PVins and pyramidal neurons (PNs) can control local activity by feedback and feedforward inhibition (FFI). In the latter, inputs recruit PNs and interneurons and thus have important consequences for synaptic integration. Inputs from the vHP directly synapse both PNs and PVins in the mPFC, thus altered vHP-mPFC connectivity may disrupt mPFC function in a complex manner. Knowing the relative synaptic strength to these neurons is crucial to understand circuit disfunction in SZ. Here we use a mouse model where the NMDA receptor is eliminated from corticolimbical interneurons during early postnatal development that shows functional and structural deficits in the prefrontal circuit as well as a vHP-mPFC disconnection and behavioral impairments compatible with SZ. We found that the relative strength of vHP-mPFC inputs to PVins and PV is altered in the KOs reducing the effect of FFI in a specific manner since the relative callosal mPFC-mPFC connections to PNs and PVins remain unaltered in the KOs.

191 | Enhancement of synchronizability related to increase of interhemispheric connectivity in the connectomes of chronic migraine patients

Neural Circuits and Systems Neuroscience

Author: Sebastián Risau Gusman | email: srisaug@gmail.com

Sebastián Risau Gusman [1°], Tomás Hüttebräucker [1°], Álvaro Planchuelo-Gómez [2°], David García-Azorín [3°], Ángel L. Guerrero [3°], Rodrigo de Luis-García [2°]

1° Departamento de Física Médica, Centro Atómico Bariloche
2° Laboratorio de Procesado de Imagen, Universidad de Valladolid
3° Servicio de Neurología, Hospital Clínico Universitario de Valladolid

The human brain can be characterized as a set of interconnected regions, using the idea of connectome. In migraine sufferers, the connectome is altered, in that some connections are significantly different between migraineurs and healthy subjects. However, relating these alterations to the symptoms of migraine is a difficult task. One possible approach is to study their effect on the dynamic processes taking place in the brain connectome. One ubicuous process is the synchronization of neuronal populations. It depends on the network and also on the specific synchronizing units, but the contribution of network structure can be calculated independently, defining the network synchronizability. To study the correlation between migraine and synchronizability and connectivity we analyzed data from diffusion-weighted magnetic resonance (dMRI) images of episodic and chronic migraine patients (CM) and healthy controls (HC). We found that whole-brain synchronizability is significantly enhanced in CM than in HC. Moreover, this enhancement is larger in subnetworks containing regions from different hemispheres. In agreement with this, we found that the number of interhemispheric streamlines is significantly larger in CM than in HC, whereas no such difference appears for intrahemispheric streamlines. We also found that the largest contribution comes from the interhemispheric connections from three regions: left superior frontal cortex, right precentral cortex, and right caudate.

193 | Neuroanatomical analysis of neuronal sets that co-express the growth hormone secretagogue receptor and the cannabinoid receptor type 1 in the mouse brain

Neural Circuits and Systems Neuroscience

Author: Camila Saenz Saenz | email: cami.saenz@gmail.com

Camila Saenz [1°], Gimena Fernandez [1°], Franco Barrile [1°], Nicolas De Francesco [1°], Mario Perelló [1°]

1° Grupo de Neurofisiología, Instituto Multidisciplinario de Biología Celular (IMBICE). Universidad Nacional La Plata (UNLP), Consejo Nacional de Investigaciones Científicas y Técnicas (CONICET) y Comisión de Investigaciones Científicas de la Provincia de Buenos Aires (CIC-PBA). La Plata, Argentina

The growth hormone secretagogue receptor (GHSR) is a G-protein coupled receptor (GPCR) expressed in the brain, that mediates the effects of ghrelin. GHSR acts via ligand-independent mechanisms, like constitutive activity and allosteric modulation of other GPCRs. The cannabinoid receptor type 1 (CB1) is also a GPCR highly expressed in the brain, and it is activated by cannabinoids. GHSR and CB1 expression have been observed within many of the same brain nuclei, suggesting that these may act on common neuronal sets to mediate those neurobiological effects. Here, we explored the extent of this putative GHSR and CB1 interaction in male mice brain. To map GHSRs distribution, we used complementary approaches: 1) binding with fluorescent-labelled ghrelin (Fr-ghrelin) in wild-type mice and 2) visualizing the fluorescence of GHSR-eGFP mice, in which GHSR promoter drives the expression eGFP. In both cases, the presence of CB1 was shown by immunofluorescence using a validated antibody against CB1. Using the Fr-ghrelin labelling strategy, we found that cells containing both GHSR and CB1 are mainly located in the amygdala and hippocampus. In brain sections of GHSR-eGFP mice, we found cells containing both GHSR and CB1 mainly located in the dorsomedial hypothalamic nucleus and hippocampus area. In contrast, the simultaneous presence of GHSR and CB1 was less extensive elsewhere in the brain. Thus, we started to elucidate some of the neuronal populations where GHSR and CB1 may directly act.

195 | Analysis of correlations between neuroanatomical features in a sample of healthy human volunteers

Neural Circuits and Systems Neuroscience

Author: Ines Samengo | email: ines.samengo@gmail.com

Bautista Arenaza [1°], Mariana Vallejo Azar [2°], Bautista Elizalde Acevedo [3°], Sergio Lindenbaum [4°], Lucía Alba Ferrara [2°], Mariana Bendersky [2°], Paula González [2°], Sebastián Risau Gusmán [1°], Inés Samengo [1°]

1° Department of Medical Physics, Centro Atómico Bariloche, CONICET.
2° Estudios en Neurociencias y Sistemas Complejos, ENyS (Consejo Nacional de Investigaciones Científicas y Técnicas, Universidad Nacional Arturo Jauretche, Hospital El Cruce)
3° Instituto de Investigaciones en Medicina Traslacional (IIMT), CONICET-Universidad Austral.
4° Instituto de Tecnologías Nucleares para la Salud, Bariloche, Río Negro.

MRI scans provide highly detailed information about human neuroanatomical data. Here we model the population statistics of the geometrical properties of different cortical areas of a sample of 193 South American healthy adults (both sexes, aged 18-60) using a hierarchical Bayesian model. We find that, at the population level, areas and thicknesses of different cortical parcels are largely independent from each other, suggesting that the factors that determine the area of a region are independent from those shaping the thickness. Both types of measures exhibit strong correlations with the homologous contralateral brain region, except for prefrontal regions identified with language processing. Intra-hemispheric correlations are shown to be smaller in size than inter-hemispheric ones. The fact that they are always positive suggests that there is no evident competition for space between different regions. A segmentation of the correlation graph in communities reveals that brain regions whose areas or thicknesses are correlated tend to be anatomically contiguous. This result suggests that the events that determine the size of a given brain area affect also its neighbours, as expected, for example, during early brain development stages.

197 | Place cells encode the internal representation of contexts

Neural Circuits and Systems Neuroscience

Author: Azul Silva | email: asilva@fmed.uba.ar

Azul Silva [1°], Pedro Bekinschtein [2°], Mariano Belluscio [1°]

1° Grupo de Neurociencia de Sistemas, Instituto de Fisiología y Biofísica Bernardo Houssay (IFIBIO-Houssay), UBA-CONICET
2° Instituto de Neurociencia Cognitiva y Traslacional, Fundación INECO, CONICET

Place cells (PC) are hippocampal neurons with location-specific firing which generally change their firing when the context changes (remapping). As a population, PCs are thought to form a cognitive map of events, providing the spatial dimension of episodic memory. PC can also encode other aspects of an experience, such as object identity, reward valence, or time, suggesting that they can map non-spatial information. Several studies had shown PC remapping as a consequence of environmental changes. However, it is unclear if remapping is directly related to the expression of different episodic memories. This project aims to understand the role of PC activity in the retrieval of overlapping contextual memories. To this aim, we performed electrophysiological recordings in CA3 and CA1 (two hippocampal regions) while animals were executing a spontaneous object recognition task. This task allows discriminating if animals recognize a context as new or familiar based on object exploration. We recorded 326 CA3 PC and 318 CA1 PC. In both regions, we found different patterns of PC activity only when animals discriminate between contexts and similar patterns when animals recognize the context as familiar, regardless of changes in available contextual cues. These results suggest that PC are encoding animal internal representations of contexts instead of purely environmental differences.

199 | Leptin deficiency leads to a functional dysregulation of HCN and potassium channels in the somatosensory thalamus of the mouse

Neural excitability, synaptic transmission and neuron-glia interactions

Author: Florencia Paz Correa | email: florenciacorrea92@hotmail.com

Florencia P. Correa [1°], Nazarena Rodriguez [1°], Francisco J. Urbano [1°], Paula P. Perissinotti [1°]

1° Ifibyne (UBA-Conicet)

The ventrobasal (VB) is the main somatosensory projection nucleus in the thalamus. Our group reported trophic effects of leptin on the murine thalamocortical somatosensory circuit. The Hyperpolarization-activated Cyclic Nucleotide-gated (HCN2/4) channel and members of the two-pore-domain background potassium (K2P) channel family (TASK and TREK) are abundantly expressed in the thalamus. The pivotal function played by HCN and K2P channels stems from their unique ability to influence membrane properties such as resting membrane potential and input resistance, which in turn are important for determining a given neuron's role within a circuit. Here, we studied the electrophysiological expression of HCN and K2P channels in VB neurons in thalamic slices from the leptin-deficient mouse (ob/ob). We observed that simultaneous blocking of HCN (30 uM ZD7288) and K2P (3 mM Ba2+) channels produced an aberrant and spontaneous firing of VB neurons, which was ended after blocking L-type calcium channels (1 uM nitrendipine). We found that development of the thalamocortical system in the absence of endogenous leptin altered the functional expression of HCN and K2P channels in the VB nucleus. HCN current decreased by 22% (n=23, 22; WT, ob/ob) whereas the K2P current increased by 70% (n=5, 5; WT, ob/ob). A fine balance between HCN and K2P channels could regulate neuronal intrinsic excitability. In fact, the transmission mode was increased in VB neurons from the ob/ob.

201 | Analysis of synaptic properties of GABA/glutamate co-releasing Synapses at the Lateral Habenula

Neural excitability, synaptic transmission and neuron-glia interactions

Author: Claudia Mosquera | email: claudia.mosquera@correounivalle.edu.co

Claudia Mosquera [1°], Joaquin Piriz [1°]

1° IFIBYNE (UBA-CONICET)

The Lateral Habenula (LHb) is a small epithalamic nucleus that has been linked to mood disorders such as depression, drug addiction or anxiety. Neurons of the LHb are almost the unique brain structure to be innervated by synapses that co-release GABA and glutamate. Thus GABA/glutamate co-releasing synapses constitute an attractive target to selectively manipulate neuronal activity of the LHb in the search for new treatment for those diseases. Here we present our studies analyzing the properties of those synapses in mice model that selectively allows its activation.

203 | Characterization of the dopaminergic system in the anterior insular cortex of mice

Neural excitability, synaptic transmission and neuron-glia interactions

Author: Mara Jesús Trujillo | email: jesutruji@gmail.com

María Jesús Trujillo [1°], Fernando Kasanetz [1°]

1° IFIBIO Houssay, Facultad de Medicina, UBA-CONICET

Pain is a sensory and emotional experience arising from distributed brain activity. A key brain region for the perception of pain is the anterior insular cortex (AIC), a cortical hub for sensory, emotional, motivational and cognitive functions. Furthermore, the mesolimbic dopaminergic system, which typically responds to motivationally relevant events, modulates pain perception and is compromised during pathological pain. In addition to the effects on other mesolimbic targets, dopamine release in the AIC also affects nociception, with D1 receptors (D1R) exerting an analgesic effect. Despite this, the mechanism by which dopamine affects AIC activity is not clear. Here we combined neuronal tracing, immunohistochemistry and electrophysiology to characterize in detail the dopaminergic system of the AIC. Our preliminary results indicate that D1R -bearing neurons located in superficial layers of the AIC are preferentially inhibitory interneurons, whereas D1R-positive cells from deeper layer comprised both pyramidal cells and interneurons. Then we investigated the effect of D1R stimulation on the activity of dopamine-sensitive cells and on the excitation/inhibition balance of AIC projection neurons. Together, this data will help elucidate how dopamine affects the integration of information in AIC microcircuits. In future experiments, we will address how dopamine modulate AIC responses to noxious stimuli and how this system is affected during pathological pain.

207 | Mitochondrial bioenergetics in brain cortex synaptosomes and evaluation of mouse motor performance during aging

Neurochemistry and Neuropharmacology

Author: Paulina Lombardi | email: paulina.lombardi@gmail.com

Paulina Lombardi [1°], Analía G. Karadayian [1°], Juan I. Guerra [1°], Rodolfo Cutrera [1°], Silvia Lores Arnaiz [1°]

1° Instituto de Bioquímica y Medicina Molecular (IBIMOL, UBA-CONICET), Facultad de Farmacia y Bioquímica, Universidad de Buenos Aires
2° Instituto de Fisiología y Biofísica Bernardo Houssay, (IFIBIO, UBA-CONICET), Facultad de Medicina, Universidad de Buenos Aires

Age-related changes in mitochondrial bioenergetics as well as in motor and cognitive functions have been described, although the mechanisms underlying these changes at synaptic level remain to be elucidated. With the purpose of analyzing the effect of aging in motor performance and mitochondrial function in nerve terminals, 3-, 10- 17- 20-and 24-month-old mice were used. Motor performance was evaluated by tightrope and footprint tests. Brain cortex synaptosomes were isolated by a Ficoll gradient procedure and mitochondrial membrane potential, the activity of enzymatic respiratory complexes and superoxide levels were determined. Behavioral results showed a decrease in neuromuscular coordination at all the ages studied, with maximal changes at 24 months (88%). Mitochondrial membrane potential was unaffected in 10- and 20-months old mice but an increment (37%) was observed at 24 months, together with changes in enzymatic activity of mitochondrial respiratory complexes. A progressive increase in superoxide levels (11-21-25% for 10-, 20- and 24-months) was observed. Motor performance is impaired with aging. Synaptic bioenergetic function seems to be preserved until the age of 20 months, probably by the compensatory changes in mitochondrial respiratory complexes. At more advanced ages, the mechanisms of modulation of mitochondrial function are impaired resulting in alterations in mitochondrial membrane potential and increased levels of superoxide.

209 | Cannabidiol did not prevent the ethanol-induced neurotoxicity evaluated in primary culture of rat cerebellar granule neurons

Neurochemistry and Neuropharmacology

Author: Catalina Madarnas | email: cata.madarnas@gmail.com

Catalina Madarnas [1°], Jimena Fagetti [2°], Federico Vignolo [3°], Alicia Brusco [1°], Scorza Cecilia [2°], Carolina Echeverry [3°]

1° Instituto de Biología Celular y Neurociencia (IBCN), Universidad de Buenos Aires, CONICET, Buenos Aires, Argentina
2° Departamento de Neurofarmacología Experimental, Instituto de Investigaciones Biológicas Clemente Estable (IIBCE), Montevideo, Uruguay
3° Laboratorio de Mecanismos de Neuroprotección y Neurodegeneración, IIBCE, Montevideo, Uruguay

Cannabidiol (CBD), a non-psychotomimetic phytocannabinoid, has been associated with multiple therapeutic benefits and also with neuroprotective properties in in vitro models. On the other hand, the adverse effect of ethanol on neural survive is widely known. The aim of this work was to analyze the effect of ethanol on primary culture of cerebellar granule neurons (CGN), and the ability of CDB to attenuate the neurotoxic effect of ethanol. For this purpose, two experimental paradigms were used: 1) ethanol acute exposure in mature neurons; 2) ethanol repeated exposure during neuronal differentiation. The effect of CBD on cell viability of CGN exposed to different ethanol concentrations was evaluated. Mature CGN showed high resistance to ethanol toxicity, being 350 mM the dose in which the viability was reduced at 50%, and 100 mM on repeated exposure during neuronal differentiation. In mature CGN, pretreatment of CBD was unable to preserve cell viability against the ethanol-induced neurotoxicity. When CGN were exposed both to ethanol and CBD during neuronal differentiation, we found that CDB did not preserve cell viability and induced toxicity per se. These results suggest that the reported positive effects of CBD on cell viability do not apply to ethanol injury on CGN cultures. In addition, it also sheds light on possible negative effects of CBD according to the neuronal type and the period of neuronal differentiation in which the exposition occurs.

211 | Heteropterys glabra, an argentine plant species with potential effects on targets related to neurodegenerative diseases

Neurochemistry and Neuropharmacology

Author: Marina Rademacher | email: marina.radem@gmail.com

Marina Rademacher [1°], Carolina Marcucci [1°], Valentina Pastore [1°], Fabiola Kamecki [1°], Leonardo Martín Anconatani [2°], Ignacio Agudelo [2°], Rafael Ricco [2°], Natalia Colettis [1°], Mariel Marder [1°]

1° Universidad de Buenos Aires. Consejo Nacional de Investigaciones Científicas y Técnicas. Instituto de Química y Fisicoquímica Biológicas Prof. Dr. Alejandro C. Paladini (IQUIFIB). Facultad de Farmacia y Bioquímica. Buenos Aires, Argentina.
2° Universidad de Buenos Aires. Facultad de Farmacia y Bioquímica. Departamento de Farmacología. Cátedra de Farmacobotánica. Buenos Aires, Argentina.

Heteropterys glabra (“tilo del campo”) is a shrub native to Argentina that grows mainly in the “Chaco Húmedo” region. Its fruits are collected from the wild or cultivated and traditionally consumed as an infusion, showing sedative and/or anxiolytic properties. Herbal medicine is widely used, and it is a source of novel compounds with diverse central nervous system activities. We evaluated potential anti neurodegenerative effects of this plant. A screening of plant extracts revealed that the hydroalcoholic (70%) extract (HAE) of Heteropterys glabra inhibited hMAO-B (IC50 (95%CI): 1,48 (0.47 to 4.62) mg/mL) and hMAO-A (1 mg/mL: (72,5 ± 0,5) % inhibition) enzymes. Additionally, it was unable to inhibit hBChE or muAChE. The phytochemical composition of the aqueous (AE) and HAE extracts of this plant was determined: total phenolic content (AE: 129,6 and HAE: 136,2 mg gallic acid eq./g dried extract), flavonoid content (AE: 72,3 and HAE: 59,0 mg rutin eq./g dried extract) and hydroxycinnamic acid content (AE: 112,2 and HAE: 75,9 mg chlorogenic acid eq./g dried extract). Finally, its antioxidant properties were evaluated (DPPH and ABTS radicals’ assays). The results indicate that the HAE has a better capacity to scavenge radicals than the AE, that could be associated with its higher total phenolic content. Our study is a contribution for the discovery of unknown native herbal products with CNS effects to develop novel therapeutical agents to treat neurodegenerative diseases.

213 | Effects on adult neurogenesis, neuronal activity, and memory tasks in adult mice after postnatal fluoxetine exposition

Neurochemistry and Neuropharmacology

Author: Karen Melany Stefani | email: karen.stefani.1995@gmail.com

Karen M. Stefani [1°], Alba Vieites Prado [2°], Patricia Gaspar [2°], Nicolas Renier [2°], Silvina L. Diaz [1°]

1° Instituto de Biología Celular y Neurociencias "Prof. E. De Robertis" (IBCN), Facultad de Medicina, Universidad de Buenos Aires
2° Institut du Cerveau (ICM)/Paris Brain Institute

Perinatal exposure to antidepressants may have long term consequences in affective behaviors during childhood. These impairments have been also well characterized in adult mice after postnatal exposition to selective serotonin reuptake inhibitor (SSRI) antidepressants. Nevertheless, the impact of this kind of exposition on memory tasks as well as on the process of adult neurogenesis has been less explored so far. We orally treated C57BL/6 male and female mice from P2 to P14 with the SSRI fluoxetine (10 mg/kg) or vehicle. The survival of newborn neurons in the hippocampus of 3-month-old animals was analyzed through EdU and BrdU labeling, showing a significant decrease of immature neurons in mice that have received fluoxetine. In addition, SSRI-treated mice assayed in the memory object recognition test had a significant worse performance than control animals. We also conducted the object pattern separation test, and confirmed that mice that have received postnatal fluoxetine were less able to pattern separate, an ability that is linked to the role of immature neurons. Brain 5-HT levels and expression of the immediate early gene c-fos in the dorsal and ventral hippocampus were also affected by the SSRI treatment. All in all, our results show that early exposition to SSRI antidepressants in mice affects the development of newborn neurons in the hippocampus with lasting consequences on memory abilities.

215 | Striatal structural plasticity beyond dopamine agonist-induced abnormal involuntary movements

Neurochemistry and Neuropharmacology

Author: Liliana Teresita Tribbia | email: teresita.tribbia@uner.edu.ar

Liliana T. Tribbia [1°], Juan E. Belforte [2°], Gustavo Murer [2°], Oscar S. Gershanik [3°], Irene R. E. Taravini [1°]

1° Laboratorio de Neurobiología Experimental. LNE-ICTAER-UNER-CONICET, Gualeguaychú, Entre Ríos, Argentina.
2° Grupo de Neurociencia de Sistemas, IFIBIO-Houssay, UBA-CONICET, Ciudad de Buenos Aires, Argentina.
3° Consultor Emérito Laboratorio de Neurobiología Experimental, LNE-ICTAER-UNER-CONICET, Gualeguaychú, Entre Ríos, Argentina.

Parkinson's disease (PD) is the second most prevalent neurodegenerative disease worldwide. L-DOPA administration is currently the most effective symptomatic drug therapy, but long-term treatment leads to the development of L-DOPA-induced dyskinesia (LID). There is consensus that striatal neurons undergo changes in their dendritic and synaptic microarchitecture associated with LID. However, there is little information on the occurrence of changes in striatal microarchitecture in animals that develop abnormal involuntary movements (AIM) due to chronic treatment with selective D1 or D2 agonists. We propose to determine if striatal neurons undergo structural plastic changes after the development of AIMs by chronic treatment with selective dopamine agonists in an animal model of PD. C57BL/6J mice lesioned with a unilateral injection of 6-OHDA or vehicle in the mfb were treated with SKF-38393 D1R agonist (2mg/kg), QUINPIROLE D2R agonist (QP) (0.5mg/kg) or distilled water for 15 days. Axial, limb and orofacial AIMs were measured after each administration, using a validated rating scale.The fixed brain tissue is being processed to analyze the striatal synaptic structure. AIMs analysis showed that lesioned mice treated with QP developed more severe axial AIMs, while mice treated with SKF exhibited orofacial AIMs mainly.Analysis of the density of dendritic spines will allow correlating the occurrence of structural changes in the synapses of striatal neurons with the development of AIMs

217 | Implication of 5-HT7 receptor in early-life stress modulation of developing prefrontal-raphe circuits in mice

Neurochemistry and Neuropharmacology

Author: Grace Wu Wu | email: grace34wu@gmail.com

Grace Wu [1°], Carla Argañaraz [1°], Tamara Adjimann [1°], Mariano Soiza-Reilly [1°]

1° Instituto de Fisiología, Biología Molecular y Neurociencias (IFIBYNE), Consejo Nacional de Investigaciones Científicas y Técnicas (CONICET) – Universidad de Buenos Aires, Argentina

Maternal separation (MS) stress during postnatal days 2 to 14 (P2-14) in mice produces depressive-like and anxiety phenotypes in the adult life. These changes are accompanied by enhanced connectivity of the prefrontal cortex (PFC) to dorsal raphe nucleus (DRN) synaptic circuit (PFC-DRN), a main pathway involved in stress-coping responses and mood control. Similar changes were found in mice treated with the antidepressant fluoxetine during the same period. In that model, activation of 5-HT7 receptors has been shown to mediate both the alterations on the PFC-DRN synaptic circuit and adult emotional responses. In this study, we investigated if the activity of the 5-HT7 receptors could also mediate the synaptic changes observed in the model of MS. To this aim, we exposed mice to MS during P2-14 while administering a selective 5-HT7 receptor antagonist (SB-269970, s.c. 20mg/kg/day). At P15 we analyzed the synaptic innervation of the PFC-DRN circuit with the high-resolution immunofluorescent technique array tomography in maternally-separated SB-269970-treated mice and their saline controls. Our study will help to determine if 5-HT7 receptors have a role in the early-life stress vulnerability of prefrontal circuits.

219 | Sex differences in active DNA demethylation machinery during the critical period of brain masculinization

Neuroendocrinology and Neuroimmunology

Author: Rocio Bigarani | email: robigarani@mi.unc.edu.ar

Rocío Bigarani [1°], Macarena Villarreal [1°], María Julia Cambiasso [1°3°], Carla Daniela Cisternas [1°2°]

1° Instituto de Investigación Médica M y M Ferreyra, INIMEC-CONICET-UNC, Córdoba, Argentina.
2° Cátedra de Fisiología Animal, Facultad de Ciencias Exactas, Físicas y Naturales, Universidad Nacional de Córdoba, Argentina.
3° Cátedra de Biología Celular, Facultad de Odontología, Universidad Nacional de Córdoba, Argentina.

In mammals, perinatal peaks in gonadal testosterone organize a sex-typical neural circuitry during sensitive periods of development and a growing body of evidence suggest that epigenetic mechanisms are implicated. Some of the hormonal effects determine stable, sex-specific patterns of gene expression in neurons leading to the differentiation of neurochemical phenotypes relevant for the display of complex social behaviors in adulthood. We recently found that a neonatal inhibition of DNA methylation or demethylation reduces or eliminates sex differences in neurochemical phenotypes found in hypothalamic regions of the mouse brain. Here, we evaluated gene expression of TET 1-2-3, GAD45a-b and TDG (involved in the removal and replacement of 5-methylcytosine and 5-hydroxymethylcytosine) and the mRNA expression of the oxytocin receptor (OTR). mRNA expression was evaluated by qPCR in brain punches of prefrontal cortex (PFC) and preoptic area (POA) at postnatal day (P) 7 and P20. In PFC, we found sex differences (males > females) in TET3, TDG and Gad45b expression ($p<0.05$) and a trend for higher OTR-expression in males ($p=0.06$) at P7 suggesting higher DNA demethylation during the critical period of sexual differentiation. No sex differences were found at P20. Other brain regions and oxytocin expression are being evaluated. Overall, these results suggest that a sex-specific pattern of active DNA demethylation machinery could underline the organizational effects of hormones.

221 | Employing Drosophila to study the relationship between sleep and immunity

Neuroendocrinology and Neuroimmunology

Author: Analía Mercedes Ferreyra | email: analiaferreyra0@gmail.com

Analía Mercedes Ferreyra [1°], Crystal Vincent [2°], Alfonso Soler Bistue [3°], Marc Dionne [2°], Esteban Javier Beckwith [1°]

1° Instituto de Fisiología, Biología Molecular y Neurociencias (IFIBYNE) – UBA – CONICET, Argentina
2° MRC Centre for Molecular Bacteriology and Infection, Imperial College London, London, UK
3° Instituto de Investigaciones Biotecnológicas (IIBio)-CONICET – UNSAM, Argentina

The interplay between sleep and immunity is well established, and this relationship is bidirectional in nature. On one hand, during the regular sleep-wake cycle, many immune parameters oscillate and, globally, at the beginning of the rest period a pro-Inflammatory state is constituted, while wakefulness is characterized by anti-inflammatory activities. There is evidence that sleep has a supportive role in initiating an adaptive immune response and stimulates the acquisition of immunological memory. On the other hand, host behavioural changes are among the most apparent effects of infection. The so-called “sickness behaviour” can involve a variety of symptoms, including anorexia, depression, and changed activity levels. Employing Drosophila melanogaster, we modelled systemic infections by thoracic injections of an array of bacteria. We followed the behaviour of the infected flies with a video-recording tracking device and showed that these animals respond with a marked increase in activity, which leads to a drop in sleep levels. These changes upon activation of the immune system are dependent on the presence of the Toll pathway in the fat body and the brain. Currently, we are focused on evaluating how chronic sleep restriction, achieved by a combination of video-tracking and robotics, influences the progression of bacterial infections, and how the different pathways of the immune system present in insects, and conserved in vertebrates, are affected by lack of sleep.

223 | Study of ghrelin internalization and transport in hypothalamic tanycytes

Neuroendocrinology and Neuroimmunology

Author: Ivana María Gomez | email: igomez@imbice.gov.ar

Ivana María Gómez [1°], Daniel Castrogiovanni [1°], Maia Uriarte [1°], Mario Perelló [1°], Pablo Nicolás De Francesco [1°]

1° Laboratorio de Neurofisiología- Instituto Multidisciplinario de Biología Celular (IMBICE, CIC-CONICET-UNLP)

Hypothalamic tanycytes are polarized glial cells that line the base of the third ventricle. Their somas contact the cerebrospinal fluid (CSF), while their terminal side (endfeet) contact the capillaries of the blood-brain barrier (BBB) or the fenestrated capillaries of the median eminence, forming a relevant anatomical interface for the transport of molecules between blood and CSF. We recently described that tanycytes are involved in the transport of the orexigenic hormone ghrelin. Here, we study the cellular mechanisms of ghrelin uptake by hypothalamic tanycytes and its transport direction. Specifically, we incubated primary cultures of rat hypothalamic tanycytes with a fluorescent variant of ghrelin (Fr-ghrelin) in basal conditions or after pharmacological blockage of either clathrin-mediated internalization using Pitstop, or intracellular transport using colchicine. We then quantified fluorescence intensity in soma, process and endfeet of each cell. We found that intracellular fluorescence: 1) is found predominantly in the soma of tanycytes after a 5 min incubation; 2) increased in somas, processes and terminals after 30 min incubation, as compared to 5 min incubation; 3) was reduced only in terminals in the presence of colchicine; and 4) decreased in all compartments in the presence of Pitstop. This evidence shows that tanycytes are able to internalize ghrelin through clathrin-mediated endocytosis and presumably to transport it from the apical side to the terminal side.

225 | The Role of Premotor Area in Decision-Making: Corticomuscular Connectivity as a Functional Biomarker for Motor Planning.

Sensory and Motor Systems

Author: Leonardo Ariel Cano | email: lcano@herrera.unt.edu.ar

Leonardo Cano [1°], Alvaro Pizá [2°], Eduardo Fernández Jover [3°], Fernando Farfán [2°]

1° Faculty of Physical Education, National University of Tucuman, Argentina. AND Higher Institute of Biological Research, National Council of Scientific and Technological Research, Tucuman, Argentina.
2° Bioengineering Department, Faculty of Exact Sciences and Technology, National University of Tucuman, Argentina. AND Higher Institute of Biological Research, National Council of Scientific and Technological Research, Tucuman, Argentina.
3° Bioengineering Institute, Miguel Hernandez University, Elche, Spain.

There are several theories about the role of the cerebral cortex areas related to motor planning and muscle activation. The aim of the present work has been to determine if there is a differentiation between hemispheres of the premotor area (PMA) in decision-making and movement planning. 17 (9 8) healthy adult volunteers participated in an individualized study of motor reaction ability. We combined noninvasive recording techniques: EEG & EMG to quantify functional connectivity, motion capture & reactimeter to determine the stages of the task. The protocol included two conditions: simple and complex reaction, consisting of selecting and moving one arm to touch a luminous target. We used the former condition as a control and the latter to indicate functional differences during the decision time. We used the percentage change of corticomuscular coherence -in the beta band, 15 to 30 Hz- to compute corticomuscular synchronization/desynchronization, using a 1-second window before the onset of agonist contraction. The results revealed there were no differences in the control condition. While in the complex reaction condition, the contralateral PMA showed significantly ($p<0.05$) greater synchronization (5%) than the ipsilateral desynchronization (-6%). Functional differentiation between hemispheres was observed before muscle contraction began. This method could be useful for identifying decisions during fast movement and contribute to understanding the role of PMA in motor planning.

227 | Olfactory learning and changes in early olfactory processing in the fly brain.

Sensory and Motor Systems

Author: Lautaro Duarte | email: duartelautaro5@gmail.com

Lautaro Alejandro Duarte [1°], Nicolás Pírez [1°], Fernando Locatelli [1°]

1° Instituto de Fisiología, Biología Molecular y Neurociencias, UBA-CONICET
2° Departamento de Fisiología y Biología Molecular y Celular

Odorants are detected by olfactory receptor neurons (ORNs) that project to the antennal lobe (AL), the first olfactory neuropil in the insect brain. Once in the AL, ORNs make synaptic contacts with: i) projection neurons (PNs) that send olfactory information to other brain areas; and ii) local neurons (LNs) that form a dense network of lateral interactions within the AL. Anatomical and functional studies indicate that this local network redistributes sensory information, presumably to enhance perception of meaningful odors. In this project we investigate the role of the GABAergic interactions in relation to learning dependent neural plasticity in the AL. For that aim, first we performed calcium imaging of odorant evoked responses in ORN before and after blocking GABAergic neurotransmission to reveal and measure the effect of the inhibitory local interactions in odor representations. Next, we tested how experience alters the representation of a binary mixture in which one of its constituents is subject to aversive learning. Preliminary results show that the representation of the mixture in the antennal lobe changes after an aversive learning in a way that the learned odor becomes more evident. Future experiments are directed to evaluate whether blocking the LNs activity using temperature sensitive shibire impairs learning dependent changes and the ability to detect the learned odor.

229 | Adapting to the environment: characterization of olfactory sensory adaptation.

Sensory and Motor Systems

Author: Federico Andrés Gascue | email: fgascue@gmail.com

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

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

The olfactory system is continuously exposed to an extraordinary range of chemical stimuli. To maintain sensitivity to meaningful odors the system must be adjusted based on animal's experience. One of the main phenomena that adjust the system is sensory adaptation, which is defined as a decrease in sensitivity or response to an odor after a sustained exposure to it and depends on the immediately close experience of the animal. In this project, we investigate the role and the mechanisms involved in olfactory sensory adaptation using honey bees. By performing electroantennograms we measured the activity of olfactory receptor neurons (ORNs) and characterized temporal aspects of this phenomenon such as induction, duration, and recovery time. We also analyzed whether adaptation depends on odor identity. We found that adaptation at the ORNs level, is odor specific and that odors that are relevant for the animal show a certain degree of resistance to adaptation. We also performed calcium imaging experiments to measure odor induced signals in the antennal lobe, the first olfactory neuropil in the insect brain. This allowed us to observe how adaptation changes the neural representation of odors and we describe that cross-adaptation occurs among odors that share activated glomeruli in the response pattern. The results emphasize that sensory adaptation is critical to maintain the olfactory system unsaturated and ready to detect changes in the olfactory context.

231 | Highly synchronized neural activity in songbird sensory-motor nucleus

Sensory and Motor Systems

Author: Javier Nahuel Lassa Ortiz | email: javi.lassa@gmail.com

Javier N. Lassa Ortiz [1°], Gabriel B. Mindlin [1°], Ana Amador [1°]

1° Departamento de Física, FCEN, UBA and IFIBA-CONICET, Buenos Aires, Argentina

Songbirds are established as a model for studying the neural mechanisms involved in vocal production. The sensory-motor neural nucleus HVC (proper name) is involved in song learning, production and maintenance. One major characteristic is its similar neural activity while the bird is singing or listening to a playback of the bird's own song (BOS) while anesthetized or asleep. We used a multi-shank silicon probe (64 channels, NeuroNexus) to record neural activity in sleeping zebra finches (Taeniopygia guttata). Extracellular recordings were obtained in HVC during the presentation of different auditory stimuli including the BOS and 2 controls: temporal reverted BOS and a conspecific song. Previous studies show high gamma and 30Hz local field potential bands increase its amplitudes while the bird is singing. In our work we found that the 30Hz band increases its amplitude while the bird listens to the BOS. We did not observe an increase in the high gamma band, being usually associated with motor activity. Moreover we found that the multiunit neural activity (MUA) is highly correlated along HVC during the presentation of the auditory stimulus BOS. Correlation values upon 0.5 were found in channels separated 600um. These results suggest that neural activity in this nucleus is more synchronized than previously known and requires further investigation.

233 | Changes in ASIC1 expression levels in pain related areas in a Fabry mouse model

Sensory and Motor Systems

Author: Georgina Oriana Mingolo Malnati | email: georginamingolo@gmail.com

Georgina Oriana Mingolo Malnati [1°], Mayra Micaela Montes [1°], Libia Catalina Salinas Castellanos [1°], María Natalia Gobetto [1°], Osvaldo Daniel Uchitel [1°], Carina Weissmann [1°]

1° IFIBYNE

Neuropathic pain is a key feature of -galactosidase A (Gla) deficient Fabry Disease (FD). Ion channels play an important role at each step in the pain pathway. Ion channels affect the sensation of pain by modulating the excitability of specialized neurons in the pain pathway (Xie, 2007). Acid-sensing ion channels (ASICs) are sensors involved in neural modulation in the central nervous system and pain-associated tissue acidosis in the peripheral system. Upregulation of ASIC1 was documented in many pathological conditions. Our previous results in cell cultures showed that the incorporation of Gb3 led to the upregulation of ASIC1a. In this work, we analyzed the Gla knockout mouse (GlaKO) (Ohshima et al.,1997) model that accumulates Gb3. We detected higher levels of ASIC1 at the Anterior Cingulate Cortex (ACC), spinal cord (SC) and Dorsal root ganglia (DRG) in the Glako mice. We subdivided the analysis in lumbar, thoracic and cervical regions. The increase for SC and DRGs was greater at lumbar regions. Also, we compared the expression of ASIC1 at 4 and 8 months and in male and female mice. We detected higher expression levels in older mice as well as in female mice. In all cases, the increase was accompanied by higher levels of ERK phosphorylation. This work confirms the results obtained in cell lines and points at altered channel levels in the pain pathway, signaling pathways involved, and ASIC1 as a potential target to analyze in the model for future therapies in pain in FD.

235 | Sleep within the consolidation window improves motor memory retention and promotes the spindle-SO coupling over the contralateral motor network

Sensory and Motor Systems

Author: Agustín Solano | email: asolano@bioingenieria.edu.ar

Agustín Solano [1°], Gonzalo Lerner [1°], Pedro Caffaro [1°], Luis Alberto Riquelme [1°], Daniel Perez-Chada [2°], Valeria Della-Maggiore [1°]

1° CONICET-Universidad de Buenos Aires, IFIBIO Houssay, Buenos Aires, Argentina
2° Internal Medicine, Pulmonary and Sleep Service, Austral Univ. Hosp., Pilar, Argentina

Strong evidence suggests that sleep benefits declarative memories (DM). However, its contribution to motor learning is controversial. Recently, we showed that learning a motor adaptation (MA) task shortly before sleep enhances the delta power and the coupling between spindles and slow oscillations (SO), similarly to what is observed in DM. Here, we tested the hypothesis that the beneficial effect of sleep in MA depends on its overlap with the consolidation window. First, we tracked MA memory retention through a 24h window. We found that it decayed initially and stabilized at 6h post training, and remained constant overnight ($p<0.001$), suggesting that sleep does not benefit MA if the time proximity between learning and sleep is not controlled. To control the interval between learning and sleep we then tracked the time course of MA memory consolidation using an anterograde interference protocol. We found that release from interference started about 6h post learning ($p<0.001$), implying that MA consolidates within such a time window. Finally, we trained two groups of subjects so that sleep occurred outside (~14h; group T-14h) or inside (~10min; group T-10min) the consolidation window, and recorded EEG overnight. We found that T-10min retained 30% more than T-14h ($p<0.05$). This sleep benefit was accompanied by an increment in the spindle-SO coupling and delta band power over the brain hemisphere contralateral to the trained hand ($p<0.05$), supporting our hypothesis.

237 | The absence of the potassium channel KCNQ4 affects the visual function

Sensory and Motor Systems

Author: Marcela Sonia Vera | email: marceverita@gmail.com

Marcela Vera [1°2°], Sofía Stupniki [1°2°], Manuel Bruera [3°], María Constanza Paz [3°], Leonardo Dionisio [1°2°], Alan Vater [4°5°], Paula Schaiquevich [4°5°], María Ana Contín [3°], Guillermo Spitzmaul [1°2°]

1° Instituto de Investigaciones Bioquímicas de Bahía Blanca (INIBIBB), CONICET/UNS.
2° Departamento de Biología, Bioquímica y Farmacia (BByF), UNS.
3° Departamento de Química Biológica de Córdoba, RC. CIQUIBIC-CONICET/UNC
4° Hospital de Pediatría J.P. Garrahan, Buenos Aires, Argentina
5° Consejo Nacional de Investigaciones Científicas y Técnicas (CONICET)

Voltage-gated KCNQ potassium channel subunits are responsible for the M-current that regulates neuronal excitability. We found expression of KCNQ4 in the retinal pigmented epithelium (RPE) and in the ciliary body (CB) of mouse eyes, suggesting that it could participate in visual processing and aqueous humor formation. Using Kcnq4 knockout (KO) and wild-type (WT) mice we studied the role of KCNQ4 in vision. First, we analyzed Kcnq gene expression by qPCR. We found that in KO mice, the expression of Kcnq3 and -5 in the RPE/retina did not change. On the other hand, in CB the expression of Kcnq3 increased 2.5-fold while the expression of Kcnq5 decreased 30%. Then, we tested light perception by testing the innate aversion of rodents to it. We did not find any differences between the KO and WT in the test performance. To analyze the function of the neuronal visual pathway, we recorded electroretinogram (ERG) in both genotypes. We observed no differences in a- and b-wave peaks and latency times between WT and KO in young animals, whereas in 50 weeks-old mice we observed a reduction trend in b-wave peak in KO while a-wave showed no differences. We also measured intraocular pressure (IOP) in young animals to evaluate CB function. We found a slight increase in the IOP in KO mice (13.6±1.0 to 15.8±1.1 mm Hg). In conclusion, the presence of the KCNQ4 subunit is necessary for the proper expression of the other Kcnq subunits and it would contribute to CB and retinal function.

239 | In silico modeling and analysis of the periodic skeleton interactome associated with the axonal actin and spectrin membrane

Theoretical and Computational Neuroscience

Author: Guillermina Bruno | email: gbruno@immf.uncor.edu

Guillermina Bruno [1*], Nahir Guadalupe Gazal [2*], Fabián Orlando Ramos [3*], Nahuel Zamponi [4*], Nicolás Unsain [4*]

1° 1Laboratorio 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° Division of Hematology and Oncology, Weill Cornell Medicine, NY, Estados Unidos

The actin/spectrin membrane-associated periodic skeleton (MPS) is a periodic protein structure consisting of actin “rings” located transversely to the axon and separated every 190 nm by α/β-spectrin tetramers “spacers”. In mature neurons, the MPS is organized along almost the entire axonal axis. Little is known about the functionality of this conserved structure. In the present work, public databases and bioinformatics tools were used to elucidate the MPS proteome and interactome, from their fundamental components: actin, α-spectrin and β-spectrin. We compared our in silico interactome (protein-protein interaction network, PPI) with recently published immunoprecipitation and mass spectrometry results. We compared the ubiquity of the axonal MPS proteome with proteomes from non-neuronal cells of the three germinal layers. We recognized topological parameters of the PPI network, such as dimensionality, the presence of central nodes, the existence of modules and their correlation with different cellular functions, etc. We also comparatively analyzed PPI networks arising from phylogenetically distant organisms, but in which the MPS has also been found, such as in Caenorhabditis elegans, Drosophila melanogaster, mouse and human. Since proteins do not act alone, performing this type of analysis could provide new insights into the molecular biology of MPS.

241 | Selective connectivity enhances storage capacity in attractor models of memory function

Theoretical and Computational Neuroscience

Author: Facundo Emina | email: facuemina@gmail.com

Facundo Emina [1°2°], Emilio Kropff [1°]

1° Fundación Instituto Leloir – IIBBA/CONICET, Buenos Aires, Argentina
2° Departamento de Física; FCEN, UBA

Autoassociative neural networks provide a simple model of how memories can be stored through Hebbian synaptic plasticity as retrievable patterns of neural activity. However, their modest theoretical storage capacity has remained a major constraint. We explore the possibility of optimizing network performance by selective connectivity between neurons, that could be implemented in the brain through creation and pruning of synaptic connections. We show through numerical simulations that a reconfiguration of the connectivity matrix can improve the storage capacity of autoassociative networks up to one order of magnitude compared to randomly connected networks. Our results indicate that the signal-reinforcement scenario is not only the best performing but also the most adequate for brain-like highly diluted connectivity. In this scenario, the optimized network tends to select synapses characterized by a high consensus across stored patterns. We also introduced an online algorithm in which the network modifies its connectivity while learning new patterns. We observed that, similarly to what happens in the human brain, creation of connections dominated in an initial stage, followed by a stage characterized by pruning, leading to an equilibrium state that was independent of the initial connectivity of the network. Our results suggest that selective connectivity could be a key component to make attractor networks in the brain viable in terms of storage capacity.

243 | From a microscopic to a macroscopic representation of the reading process in dyslexia

Theoretical and Computational Neuroscience

Author: Marcos Miguel Meo | email: marcos.meo@uns.edu.ar

Marcos Meo [1°], Francisco Iaconis [1°], Jessica Del Punta [1°], Gustavo Gasaneo [2°]

1° Universidad Nacional del Sur – IFISUR, 8000 Bahía Blanca, Argentina
2° Centro Integral de Neurociencias Aplicadas, 8000 Bahía Blanca, Argentina

Studies show that around 10% of the children population suffers some of the various learning disorders related to reading abilities. Dyslexia, a disorder mainly characterized by a difficulty in reading decoding, is one of the most studied. The relationship between eye movements and cognitive processes has been widely studied in recent years. In this context, detailed knowledge of the eye movements of children with dyslexia during reading can help improve early diagnosis and suggest efficient clinical treatment by providing otherwise inaccessible details of the reading process. In the present work, the eye movements of 12 children diagnosed with dyslexia and 30 typically developed children were studied. Fixations and saccades were characterized and compared. This allowed us to propose a model, based on the continuous time random walk, to describe the eye movements dynamics of dyslexic and typical readers. The model provides a quantitative description of each group and allows to identify global macroscopic features, such as reading speed, the memory present on the reading process through the Hurst exponent and the variability on the jump lengths through the statistical complexity and Jensen-Shannon entropy.

245 | Data-driven discovery of canonical large-scale brain dynamics

Theoretical and Computational Neuroscience

Author: Juan Ignacio Piccinini | email: piccijuan@gmail.com

Juan Ignacio Piccinini [1°], Yonatan Sanz Perl [2°], Enzo Tagliazucchi [1°]

1° Buenos Aires Physics Institute and Physics Department, University of Buenos Aires, Buenos Aires, Argentina & National Scientific and Technical Research Council (CONICET), CABA, Buenos Aires, Argentina
2° Center for Brain and Cognition, Computational Neuroscience Group, Universitat Pompeu Fabra, Barcelona, Spain

Human behavior and cognitive function correlate with complex patterns of spatio-temporal brain dynamics, which can be simulated using computational models with different degrees of biophysical realism. We used a data-driven optimization algorithm to determine and classify the types of local dynamics that enable the reproduction of different observables derived from functional magnetic resonance recordings. The phase space analysis of the resulting equations revealed a predominance of stable spiral attractors, which optimized the similarity to the empirical data in terms of the synchronization, metastability, and functional connectivity dynamics. For stable limit cycles, departures from harmonic oscillations improved the fit in terms of functional connectivity dynamics. Eigenvalue analyses showed that proximity to a bifurcation improved the accuracy of the simulation for wakefulness, while deep sleep was associated with increased stability. Our results provide testable predictions that constrain the landscape of suitable biophysical models, while supporting noise-driven dynamics close to a bifurcation as a canonical mechanism underlying the complex fluctuations that characterize endogenous brain activity.

247 | A diverse and large dataset for studying brain-evoked responses to mismatching auditory stimuli with low-cost consumer-grade EEG acquisition devices

Theoretical and Computational Neuroscience

Author: Maria Paula Saavedra | email: mapaulasaavedra@gmail.com

M. Paula Saavedra [1°], Catalina M. Galván [1°], Ruben D. Spies [1°], Victoria Peterson [1°]

1° Instituto de Matemática Aplicada del Litoral, IMAL, UNL, CONICET, Argentina

Auditory evoked potentials (AEPs) are reproducible electrical responses elicited by the brain when specific auditory stimuli are presented in a time-locked manner. In particular, mismatch negativity (MMN) is an AEP tipically observed in acoustic oddball paradigms and often used to study auditory discrimination. Although the typical waveform of such AEPs is well-known in the literature, changes may be observed due to the protocol, stimulus settings, reference electrode location and age of the participants. Here, we present a large and diverse electroencephalography (EEG) dataset coming from 64 participants aged between 7 and 70 years, acquired by a low-cost consumer-grade system. The stimulation protocol, based on the MMN paradigm, consisted of standard (1000 Hz beep, 30 ms) and deviant stimuli (500 Hz beep, 75 ms). Three protocol runs of 500 stimuli each were completed by each subject. Participants were instructed to watch a muted video while the stimuli were played in the background. The EEG was acquired at 250 Hz using an Electro-Cap System connected to an OpenBCI Cyton board. Eight EEG electrodes were placed on the frontal and central areas, using the ear lobes as reference and ground electrodes. A custom Python-based software was employed. Data analysis indicates that AEPs of similar waveshapes correspond to same-age groups and that such waveshapes are similar but not identical to those reported in the literature for different recording systems.

249 | Critical dynamics in the neuronal activity of C. elegans.

Theoretical and Computational Neuroscience

Author: Carlos Eduardo Valencia Urbina | email: carlos.valencia@ib.edu.ar

Carlos Eduardo Valencia Urbina [1°], Sergia A. Cannas [2°], Pablo M. Gleiser [3°]

1° 1 Departmento de Fisica Medica, Centro Atómico Bariloche, CNEA, CONICET
2° Instituto de Física Enrique Gaviola de Córdoba, CONICET-UNC
3° Instituto Tecnológico de Buenos Aires

Understanding the relationship between brain architecture and function is a central question in neuroscience. With this goal in mind, many studies have focused on animal models with small nervous systems, such as the worm Caenorhabditis elegans (C. elegans). This is the first organism for which its connectome, i.e., its neurons and how they are connected at the synaptic level, is known. This allows an abstraction of the neuronal system into a set of weighted nodes and links, enabling the development of a theoretical framework for studying the general principles of organization of neuronal structures. Furthermore, it establishes the first step in the study of the relationship between network structure and function, i.e., on the dynamic processes that enable these structures. In this work we analyze experimental data on the neuronal dynamics of C. elegans. We study these time series as point processes, reducing the continuous signals, observing only the maximum values of the neuronal dynamics signals. We find that the distribution of times between maxima presents a broad distribution, with a slow decay. Using information from the worm connectome, we performed numerical simulations of the neural dynamics using a model proposed by Haimovici et al. (Physical Review Letters, 110:178101, 2013). In this model, each node in the network has a three-state variable associated with it, corresponding to a quiescent, excited, or refractory state. Using synchronized cluster size information.

251 | A mathematical model for measuring contrast-sensitivity using innate behaviors in rats with intact and impaired visual function

Tools Development and Open Source Neuroscience

Author: Juan Salvador Calanni Calanni | email: salvadorcalanni@gmail.com

Juan Salvador Calanni [1°], Nathaly Bernal [1°], Damián Dorfman [1°], Ruth Estela Rosenstein [1°]

1° CEFYBO (UBA-CONICET)

For rodents, avoiding aerial predators (e.g., hawks and owls) is a central survival function and drives instinctive behaviors guided by sensory cues. Based on this concept, a visually-guided behavior test, the “looming test”, has been developed for laboratory mice. Looming stimuli are intended to simulate a rapidly approaching aerial predator, and come in the form of a computer- generated expanding black disk. Although mice response to the looming stimuli has been intensively studied, the information about the rat response in the looming arena is scarce, and has not being previously used as a proxy for the visual system intactness. For the first time, we modeled the relationship between rat response and the magnitude of the disk-background contrast in the looming arena with a Generalized Linear Model, and we showed that rat response was sex-, age-, and daytime-dependent. A sigmoid-like contrast-response curve was observed in young female rats, and young, and old males, but the curve shifted to the right in old male rats, and to the left in young females, as compared to young males. Young males showed higher contrast sensitivity at night than at noon. Rat response in the looming test with contrast variation (LTCV) showed a significantly lower response in rats submitted to experimental optic neuritis, unilateral or bilateral ischemia. Therefore, the LTCV could be a new inexpensive, training-free, and non-invasive test to assess contrast sensitivity in rats.

POSTER SESSION 2

002 | Role of neuroligin-2 in the establishment of perisomatic inhibition in adult-born neurons

Cellular and Molecular Neurobiology

Author: Andrea Aguilar Arredondo | email: aaguilar310780@gmail.com

Andrea Aguilar-Arredondo [1°], Damiana Giacomini [1°], Alejandro Schinder [1°]

1° Leloir Institute Foundation, Neural plasticity lab

GABAergic signaling is crucial for the development and function of adult-born granule cells (aGCs). Parvalbumin interneurons (PV-INs) exert perisomatic inhibition onto aGCs that becomes functionally mature at 6 weeks of neuronal age. The molecular mechanisms orchestrating the establishment of this synapse are unknown. We investigated whether neuroligin-2 (NL2), a postsynaptic adhesion molecule involved in the development of inhibitory contacts, plays a role in perisomatic GABAergic synaptogenesis in aGCs. Using confocal microscopy, we first characterized the development of synapses formed by PV-INs expressing tdTomato onto aGCs expressing GFP, by measuring the size of perisomatic appositions at different time points. We observed a substantial increase in synaptic size from 2 to 4 weeks, with no further changes at later times. We next delivered a retrovirus expressing a shRNA against NL2 and monitored the effect of NL2 knockdown on the PV-IN to GC synapse. We found smaller synaptic contacts accompanied by an important reduction of perisomatic appositions of the vesicular GABA transporter VGAT, suggesting impaired synaptic function. Moreover, we analyzed the expression of the presynaptic active zone protein bassoon, which showed a reduction in the number of puncta within terminals of PV-INs contacting aGCs in shNL2 expressing cells. Our results reveal NL2 as a critical player in the delayed functional maturation of perisomatic inhibition in aGCs of the adult brain.

004 | Altered cholesterol trafficking in astrocytes during aging. Rescue by endocannabinoids.

Cellular and Molecular Neurobiology

Author: LEANDRO GERMAN ALLENDE | email: lallende@immf.uncor.edu

LEANDRO G. ALLENDE [1°], MAURICIO G. MARTÍN [1°]

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

The brain is the most cholesterol-rich organ in the human body, containing about 25% of the body's total cholesterol. In neurons, cholesterol has been shown to play a critical role in neurite growth, synaptogenesis, and the proper function of pre and post-synaptic compartments. Due to the incapacity of cholesterol to cross the blood-brain barrier, the brain cholesterol homeostasis is strictly controlled through synthesis de novo, mainly carried out by glial cells. Mature neurons depend mainly of cholesterol synthesized by astrocytes, which is imported in the form of ApoE-Cholesterol complexes. Once endocytosed, the cholesterol is released from the endolysosomal system by the cooperative action of the Niemann-Pick Type C proteins 1 and 2 (NPC1 and NPC2), which allow the incorporation of this lipid into the intracellular pool. In this work we show that aging results in increased miR33 which triggers a Niemann Pick phenotype in senescent astrocytes which accumulate cholesterol in lysosomal compartments. Furthermore using astrocyte-neuron cocultures we found that the cholesterol delivery from astrocytes to neurons is also impaired in astrocytes aged in vitro. Interestingly, cholesterol accumulation in aged astrocytes could be alleviated by endocannabinoid treatment. We believe that understanding these mechanisms will allow the identification of new targets for therapies or prevention of central nervous system pathologies associated with aging.

006 | Neurite outgrowth induced by stimulation of Angiotensin II AT2 receptors in SH-SY5Y neuroblastoma cells involves c-Src activation

Cellular and Molecular Neurobiology

Author: Maria Elena Arce | email: earce.arce7@gmail.com

Helga Myrna Blanco [1°], Celia N. Perez [1°], Claudia Banchio [2°], Sergio Eduardo Alvarez [1°], Maria Elena Arce [1°], Gladys Maria Ciuffo [1°]

1° IMIBIO-SL CONICET. Univ. Nacional de San Luis. San Luis, Argentina.
2° IBR- CONICET. Rosario, Argentina

It is well known that neurite outgrowth could be induced by Angiotensin II (Ang II) AT2 receptors; however, the signaling pathways that link AT2 receptor activation with neurite outgrowth remain unclear. Neural differentiation and protection induced by AT2 receptors also involves the activation of NGF (nerve growth factor). Certainly, Ang II stimulates the receptor tyrosine kinase A (TrkA) phosphorylation. Moreover, it has also been shown that NGF-induced neurite extension requires the activation of sphingosine kinase 1(SphK1). We showed that Ang II and CGP42112A (AT2 receptor agonist) promote neuronal differentiation by inducing neurite outgrowth in SH-SY5Y neuroblastoma cells. Then, we explored the participation of three different pathways in the neurite outgrowth induced by Ang II or CGP42112A by using specific inhibitors of c-Src (PP2), MEK (UO126), TrkA (AG879) and SphK (SKI-II). We conclude that stimulation of Ang II AT2 receptors induce neurite outgrowth in SH-SY5Y cells through a signaling mechanism that involves MEK/ERK,SphK and c-Src and provide evidence for a possible involvement of TrkA receptors in the pathway.

008 | Sex differences in locomotor response associated with amphetamine administration

Cellular and Molecular Neurobiology

Author: Maria Mercedes Benedetto | email: mbenedetto@immf.uncor.edu

Maria Mercedes Benedetto [1*+], Osvaldo Martin Basmadjian [1*+], Julieta Agostina Cettra-Zarate [1°], Anahi Rodríguez [1°], Maria Julia Cambiasso [1°2°+], María Gabriela Paglini [1°3°+]

1° Instituto de Investigación Médica M y M Ferreyra, INIMEC-CONICET-UNC
2° Cátedra de Biología Celular, Facultad de Odontología, Universidad Nacional de Córdoba
3° Instituto de Virología "Dr. J.M.Vanella" Facultad de Ciencias Médicas, Universidad Nacional de Córdoba

Drug addiction is known as a chronic relapsing disease that affects both women and men. There are evidence that indicate the existence of sex-dependent differences in its etiology, epidemiology, and progression. Moreover, the neuroadaptive responses that underlie drug abuse and addiction may involve structural and functional synaptic plasticity processes. We aimed to evaluate whether there are sex dependent differences in the behavioral response and neuronal plasticity associated with amphetamine (Amph) exposure. For this, male and female thy-1 eGFP transgenic mice of 21 and 35 days (PN) were injected with Amph (4mg/kg) or vehicle and their locomotor activity was quantified; after 1 day withdrawal, the animals were challenged with the same administration protocol to evaluate sensitization. Four hours after the last Amph exposure, brain samples were obtained to analyze the density and type of dendritic spines of the pyramidal neurons of the CA1 hippocampal area. The results showed that acute Amph exposure induced hyperlocomotion in males at both PN 21 and 35, but not in females. Furthermore, re-exposure to the drug induced a greater locomotor response only in males, indicating sex differences in sensitization to Amph. Finally, preliminary results reveal that Amph induced an increase of stubby and mushroom spines in females at PN 21. These results show evidence of a sex dimorphic effect of Amph at behavioral level. Moreover, Amph induce hippocampal synaptic plasticity in females.

*+*contributed equally*

010 | Pro differentiation effects of gold nanoparticles in primary cultures of neural stem cells.

Cellular and Molecular Neurobiology

Author: Agustin Jesus Byrne | email: agusbyrne08@gmail.com

Agustin Jesus Byrne [1°], Yamila Molinari [1°], Maria Julia Perez [1°], Romina Glisoni [3°], Juan Manuel Lazaro Martinez [2°], Paula Franco [1°]

1° Universidad de Buenos Aires, Facultad de Farmacia y Bioquímica. Departamento de Química Biológica. IQUIFIB CONICET. Buenos Aires, Argentina
2° Universidad de Buenos Aires, Facultad de Farmacia y Bioquímica. Departamento de Ciencias Químicas. IQUIMEFA CONICET. Buenos Aires, Argentina
3° Universidad de Buenos Aires, Facultad de Farmacia y Bioquímica. Departamento de Tecnología Farmacéutica. NANOBIOTEC, CONICET. Buenos Aires, Argentina

In the last few years, gold nanoparticles (GNP) were shown to stimulate the differentiation of several cell types. As the development of new therapies to promote remyelination is a high priority for Multiple Sclerosis (MS), here we used neurospheres (NS) cultures to study the effects of GNP on the different mechanisms involved in brain repair. Polyethyleneimine-stabilized GNP of 55 nm of hydrodynamic diameter were synthesized and used to treat NS cultures. We found a 30% reduction in the metabolic activity of cultures by MTT assay. Although NS numbers were not affected at any dose, we detected a significant reduction in NS diameter at 10 ppm GNP, which was attributed to the downregulation of proliferation observed by BrdU incorporation assay. In addition, we found a significant inhibition of cell migration in response to GNP treatment and observed some abnormalities in cell adhesion. Finally, NS cultures undergoing cell differentiation and treated with GNP showed a marked increase in the number of mature oligodendrocytes respect to controls. All these results indicate that GNP inhibit NSC/NPC proliferation and promote cell differentiation towards the oligodendroglial lineage. These findings support the idea that GNP could be used for the development of new regenerative strategies for the CNS.

012 | 24(S)hydroxycholesterol as predisposing agent for Alzheimer's disease

Cellular and Molecular Neurobiology

Author: Gabriel Cataldi | email: gcataldi@immf.uncor.edu

Gabriel E. Cataldi [1°], Mauricio G. Martin [1°]

1° Instituto Ferreyra, INIMEC-CONICET-UNC, Universidad Nacional de Córdoba, Córdoba, Argentina.

CYP46 carries out the hydroxylation of cholesterol to 24(S)HOC, which is the main mechanism of cholesterol elimination from the brain. CYP46 has been mainly reported in neuronal populations, however, in cases of brain damage such as traumatic brain injury or Alzheimer's disease CYP46 increases its expression in astrocytes. However, the role that CYP46 would play in astrocytes in pathological conditions is unknown. We found that CYP46 levels are greatly increased in reactive astrocytes treated with lipopolysaccharide (LPS) and IL-6. Accordingly, IL-6 was able to increase APP synthesis in primary astrocytes. Providing a link between CYP46 and APP, our results show that 24(S)HOC-treated primary cortical astrocytes showed a marked increase in APP levels compared to control cells. Our data indicate that 24(S)HOC appears to exert its role through epigenetic mechanisms. We propose that under a proinflammatrory context, as for example a microbial infection in the brain, 24(S)HOC would mediate the production of APP and A in astrocytes to face the aggression but on the other side it would predispose to Alzheimer's disease.

014 | Participation of fast cycling RhoD GTPase in neuronal polarity and development

Cellular and Molecular Neurobiology

Author: CLARA INES CHUNGARA | email: cchungara@immf.uncor.edu

Clara Inés Chungara [1°], Gonzalo Quassollo [1°], Josefina Inés Martín [1°], Mariano Bisbal [1°]

1° Institute of Medical Research Mercedes and Martin Ferreyra. Friuli 2434 – INIMEC – CONICET – UNC. Córdoba – Argentina

Neurons are highly polarized cells typically extending a long thin axon and multiple short branched dendrites. This compartmentalization requires specific cytoskeletal dynamics events, including actin and microtubules cytoskeleton assembly, and the addition of membranes in neuron specialized regions. Most of them are highly regulated by several small Rho GTPases with their specific effectors. Even though most studies have been focused on the canonical Rho GTPases RhoA, Rac1 and Cdc42, other less studied members of this family like RhoD suggest to have unique effects on cytoskeleton and membrane dynamics. RhoD is the only Rho GTPase to be expressed exclusively in mammals and has a higher intrinsic GTP exchange activity. In order to study spatio-temporal activation patterns of RhoD activity, we successfully develop and characterize a fluorescence resonance energy transfer (FRET)-based biosensor that will be used in our neuronal systems. Furthermore, expression of RhoD activity mutants alters neuritic outgrowth and development in cultured hippocampal neurons as well as neuronal migration during cortical development in situ. In addition, using a state-of-the-art system to synchronize the secretory pathway, we observe that the expression of a dominant negative RhoD mutant induces a delay in the anterograde trafficking of post-Golgi plasma membrane protein carriers. Altogether, our data suggest that RhoD plays an important role in neuronal development and neuritic outgrowth.

016 | Temporal order recognition memory: behavioral characterization and ERK1/2 involvement in learning

Cellular and Molecular Neurobiology

Author: Santiago D`hers | email: dhers.santiago@gmail.com

Santiago D`hers [1°], Santiago Ojea Ramos [1°], Juan Santiago Guidobono [3°], Arturo Romano [2°], Mariana Feld [4°]

1° Instituto de Fisiología, Biología Molecular y Neurociencias (IFIBYNE), UBA-CONICET.
2° Instituto de Fisiología, Biología Molecular y Neurociencias (IFIBYNE), UBA-CONICET. Departamento de Fisiología, Biología Molecular y Celular “Dr. Héctor Maldonado”, Facultad de Ciencias Exactas y Naturales, Universidad de Buenos Aires.
3° Laboratorio de Ecología de Poblaciones. Instituto de Ecología, Genética y Evolución de Buenos Aires, UBA-CONICET. Departamento de Ecología, Genética y Evolución. Facultad de Ciencias Exactas y Naturales, Universidad de Buenos Aires.
4° Instituto de Fisiología, Biología Molecular y Neurociencias (IFIBYNE), UBA-CONICET. mfeld@fbmc.fcen.uba.ar

Recognition memory depends on identification and judgment of the prior occurrence of events. It is a very sensitive declarative memory and the use of the temporal component of memory might have a relevant predictive power for early diagnosis of Alzheimer’s disease (AD). Evidence suggests that medial prefrontal cortex (PFC) and hippocampus (HIP) are important for this memory. Here, we characterized a temporal order recognition memory (TORM) induced by a two-session protocol in mice. Retention was assessed at 3 or 24 h in males and females. We also initiated the study of molecular and cellular bases underlying learning of this task. Particularly, we studied ERK1/2 (extracellular-signal regulated kinase 1/2) activation, which was initially associated to cell division and differentiation and was later shown to play a very important role in learning and memory processes. However, its role in temporal memories has not been elucidated yet. We found no significant differences in performance between sexes at 2 months of age, but 3 month-old males expressed less total exploration and better discrimination indexes than females in a 24 h test. Finally, although results are preliminary, we found clear tendencies in TORM-induced cytosolic ERK2 activation kinetics in both structures. These promising results lead to further study the behavioral effects of local pharmacological intervention of the pathway in order to understand its role in the formation of temporary memories.

018 | Analysis of the antioxidant and anti-inflammatory effect of yerba mate as a neuroprotective mechanism of action in hemiparkinsonian mice

Cellular and Molecular Neurobiology

Author: Florencia Echeverria | email: florencia.echeverria@uner.edu.ar

Florencia Echeverria [1°], Liliana Teresita Tribbia [1°], Andrea Cecilia Cura [1°], Roy Cristian Rivero [2°], Irene Rita Eloisa Taravini [1°]

1° Laboratorio de Neurobiología Experimental. LNE-ICTAER-UNER-CONICET, Gualeguaychú, Entre Ríos, Argentina.
2° Desarrollo y mejoramiento de alimentos de calidad a partir de recursos de Entre Rios. DyMACRER-ICTAER-UNER-CONICET, Gualeguaychú, Entre Ríos, Argentina.

The progressive death of dopaminergic neurons in the substantia nigra leads to the onset of Parkinson's disease (PD). Numerous studies have reported that the consumption of yerba mate (YM) is associated with a lower risk of develop PD. We have observed that long-term administration of YM exerts a neuroprotective effect on dopaminergic neurons in an animal model of PD. In vivo and in vitro studies have shown that YM exerts beneficial effects in different pathologies, associated with its antioxidant capacity. Our objective is to evaluate whether the antioxidant and anti-inflammatory properties of YM are related to its neuroprotective effect on the nigrostriatal system of hemiparkinsonian mice. The animals received an infusion of YM or water for 4 months. They were then lesioned by unilateral striatal injection with 6-OHDA and sacrificed at 2 or 30 days after lesion. YM-treated animals showed increased locomotor activity in an open field after injury compared to controls. The level of YM bioactive compounds in plasma was verified by HPLC. We are analyzing the antioxidant capacity in the striatum and the ventral midbrain and the expression of GFAP in the striatum. The behavioral analyses suggest that long-term treatment with YM has a modest effect on locomotor behavior. We hope that the results of the postmortem analysis will allow us to expand our knowledge about the possible anti-inflammatory and antioxidant effect of long-term YM treatment on the injured nigrostriatal system.

020 | PHLDA restricts the anti-apoptotic effects of GDNF by inhibiting Ret-mediated Akt signaling pathway

Cellular and Molecular Neurobiology

Author: Fernando Federicci | email: fer.federicci@gmail.com

Fernando Federicci [1°], Fernanda Ledda [2°], Gustavo Paratcha [1°]

1° Instituto de Biología Celular y Neurociencias (IBCN)-CONICET-UBA.
2° Fundación Instituto Leloir, Instituto de Investigaciones Bioquímicas de Buenos Aires.

GDNF is a potent survival factor for different neuronal populations in the peripheral and central nervous system, including spinal cord motor neurons. While the signaling pathways by which GDNF promotes survival are relatively well established, the molecular mechanisms that restrict the anti-apoptotic effect of this neurotrophic factor remain unknown. In the current study, we show that in the motor neuron-derived cell line MN1, GDNF induces a significant increase in the protein levels of PHLDA (Pleckstrin Homology-Like Domain family A), a molecule originally described as pro-apoptotic. Short-term GDNF stimulation of MN1 cells overexpressing PHLDA promotes the localization and recruitment of PHLDA (a protein mainly cytoplasmic) towards the plasma membrane, indicating that PHLDA could regulate proximal downstream signaling events triggered by GDNF and its tyrosine kinase receptor Ret. In line with this finding, we show that PHLDA has the ability to inhibit Akt, but not MAPK activation in response to GDNF. Finally, the overexpression of PHLDA restricts the neuroprotective effect of GDNF on cellular apoptosis induced by serum deprivation. Together, these results provide an insight into PHLDA function and establish a new molecular mechanism to restrict signaling and biological responses induced by GDNF and its receptor Ret in neuronal cells.

022 | Sprouty at the crossroads of Trk neurotrophin receptor signaling suppression by glucocorticoids

Cellular and Molecular Neurobiology

Author: Facundo Nahuel Ferrero Restelli | email: facuferrero@gmail.com

Facundo Ferrero Restelli [1°], Fernando Federicci [1°], Fernanda Ledda [2°], Gustavo Paratcha [1°]

1° Laboratorio de neurociencia molecular y celular, Instituto de biología celular y neurociencias “Prof. E De Robertis”, Universidad de Buenos Aires-CONICET
2° Fundación Instituto Leloir, Instituto de investigaciones bioquímicas de Buenos Aires, CONICET

Glucocorticoids affect neuronal plasticity, development and function of the nervous system by inhibiting neurotrophin-induced Trk signaling. It has been established that pretreatment with dexamethasone (DEX) restricts Neurotrophin-induced neurite outgrowth by inhibiting Trk-dependent activation of Ras-Erk1/2 signaling pathways. However, the precise molecular mechanism through which DEX interferes neurotrophin signaling and Trk-mediated neurite outgrowth has not been clearly defined yet. Here, we observed that in PC12 cells DEX treatment promotes the transcription of Sprouty, a regulatory molecule that is part of a negative feedback module that specifically abrogates Ras to Erk1/2 signaling in response to NGF. In line with this, either knockdown of Sprouty or overexpression of a dominant negative form, rescue the inhibition of NGF/TrkA-promoted neurite outgrowth and Erk1/2 phosphorylation induced by DEX. Likewise, treatment of hippocampal neurons with DEX induces the expression of Sprouty and its knockdown abrogates the inhibitory effect of DEX on primary neurite formation, dendrite branching and Erk1/2 activation induced by BDNF. Thus, these results suggest that the induction of Sprouty mRNA by DEX translates into a significant inhibition of Trk to Erk1/2 signaling pathway. Together, these findings bring new insights into the crosstalk between DEX and neurotrophin signaling and demonstrate that Sprouty mediates the inhibitory effects of DEX on neurotrophin function.

024 | Arginyl-transferase regulates Oligodendrocyte Differentiation and Central Nervous System Myelination

Cellular and Molecular Neurobiology

Author: Mauricio Raul Galiano | email: mauricio.galiano@unc.edu.ar

Anabela Palandri [1°], Laura Vanesa Bonnet [1°], Maria Gimena Farias [1°], Marta Elena Hallak [1°], Mauricio Raul Galiano [1°]

1° Centro de Investigaciones en Química Biológica de Córdoba (CIQUIBIC), Dpto. Química Biológica Ranwel Caputto, Fac. Ciencias Químicas, Univ. Nacional de Cordoba

Arginyl-tRNA-protein transferase (Ate1) mediates the post-translational addition of arginine from Arg-tRNA to different protein substrates, participating in cellular processes such as cell migration, cytoskeletal arrangement, and apoptosis. In mammalian central nervous system (CNS), Ate1 was found to modulate neuronal differentiation and associated with neurodegenerative disorders. Our studies aim to elucidate the role of Ate1 in glial development, including oligodendrocyte (OL) differentiation and myelination in the CNS. In primary OL cultures, we found a peak in Ate1 protein expression during the myelination process. Whereas transcriptional downregulation of Ate1 reduces the number of OL processes and branching complexity. To study Ate1 function and axonal myelination in vivo, we conditionally ablated Ate1 in mice from OLs using CNP-promoter (Ate1-KO mice). In the corpus callosum of 14-day-old Ate1-KO mice, we found a temporary delay in OL differentiation, compared to wild-type controls, while local proliferation of OL precursor cells normalizes mature OL populations in 21-day-old Ate1-KO mice. However, 5-month-old Ate1-KO mice showed reductions in mature OLs and myelin thickness along with subtle alterations in motor behaviors. Our results indicate that Ate1 contributes to proper OL differentiation and axonal myelination, in part by modulating the OL actin cytoskeleton. These findings reveal an essential role for protein arginylation in the maintenance of CNS myelin.

026 | Protein malnutrition induces postpartum anxiety- and depressive-like behavior in dams and deregulates DNA methylation/demethylation machinery of the offspring

Cellular and Molecular Neurobiology

Author: Erika Ines Georgieff | email: georgiefferikaines@gmail.com

Erika Georgieff [1°], Carolina D Alberca [1°], Jennifer Miranda [1°], Eduardo T. Cánepa [1°], Mariela Chertoff [1°]

1° Universidad de Buenos Aires, Facultad de Ciencias Exactas y Naturales, Departamento de Química Biológica, Laboratorio de Neuroepigenética, Buenos Aires, Argentina.
2° Universidad de Buenos Aires, Facultad de Ciencias Exactas y Naturales, Departamento de Química Biológica, Laboratorio de Neuroepigenética, Buenos Aires, Argentina.CONICET-Universidad de Buenos Aires, Instituto de Química Biológica de la Facultad de Ciencias Exactas y Naturales – CONICET (IQUIBICEN), Buenos Aires, Argentina.

A deficiency in the maternal diet has long-term consequences affecting the brain development of the progeny, along with dam's behavior. In particular, DNA methylation has been proposed as the main mechanism used by neurons to adapt to a changing environment. In the present work, female mice exposed to a normal-protein or a low-protein diet during gestation and lactation were evaluated for anxiety- and depressive-like behaviors and gene and protein expression have been measured in dams and offspring. We have demonstrated that a low protein diet during pregnancy and lactation produces socio-emotive disorders, such as anxiety-like behavior and anhedonia in dams. Protein malnutrition during the perinatal period produces a delay in physical and neurological development in offspring of both sexes. DNA methylation/demethylation machinery is modulated by a low protein diet in the offspring. Specifically, malnourished female pups exhibited a significant increase in the expression of Dnmt3a, Gadd45b, and Fkbp5 and a reduction in Bdnf exon VI and GR protein expression. Male pups exposed to a low protein diet only showed a reduction in Dnmt1 expression. The postpartum disorders observed in malnourished dams might be mediated by the reduction of hippocampal GR expression. Additionally, several genes involved in DNA methylation/demethylation are differentially deregulated in female and male mice, providing an insight into sex-specific mechanisms due to protein malnut.

028 | The adhesion molecules, Neuroplastin and neuronal ICAM-5, regulate neuronal glycoprotein M6a-induced plasticity

Cellular and Molecular Neurobiology

Author: Rocio Gutierrez Fuster | email: rgutierrezfuster@iib.unsam.edu.ar

Rocio Gutiérrez Fuster [1°], Antonella Leon [1°], Gabriela Ines Aparicio [1°], Rodrigo Herrera Molina [2°], Camila Scorticati [1°]

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° Center for Behavioral Brain Sciences, Magdeburg, Germany

The molecular mechanisms underlying structural neuronal plasticity are not completely understood. In this regard, neuronal membrane glycoprotein M6a induces structural plasticity through mechanisms that have not been fully established yet. The relevance of studying the mechanisms by which M6a promotes neuronal plasticity raised from existing variants of the GPM6A gene or inadequate expression levels linked to neuropsychiatric disorders, such as schizophrenia, depression, Alzheimer and claustrophobia. Since the extracellular loops of M6a (ECs) command its function, previous results from our laboratory determined that cellular adhesion molecules (CAMs) neuroplastin (NPTN) and the intercellular adhesion molecule ICAM5 are candidates to interact with the ECs of M6a and modify its function. Here, we aimed to study the possible physical-functional association of M6a, NPTN and ICAM5 in hippocampal culture neurons and cell lines. Both ICAM5 and NPTN colocalize in cis with M6a at the membrane of culture neurons. Also, both CAMs colocalize with M6a in cis and trans in N2a and HEK293 cells. Hippocampal neurons co-expressing M6a/ICAM5 showed significantly higher filopodia number compare to neurons overexpressing M6a or ICAM5 alone. By contrast, in M6a/NPTN co-expressing neurons filopodia density significantly decrease. Together, even though both CAMs colocalize with M6a at the neuronal membrane, ICAM5 acts synergistically and NPTN antagonistically.

030 | Unraveling the molecular patterns of neuronal development in the aging dentate gyrus by single-nuclei RNAseq

Cellular and Molecular Neurobiology

Author: Magalí Herrero | email: mherrero@leloir.org.ar

Magalí Herrero [1°], Natalí B. Rasetto [1°], Damiana Giacomini [1°], Ariel Berardino [2°], Tomás Vega Waichman [2°], Mariela F. Trinchero [1°], Daniela Di Bella [3°], Paola Arlotta [3°], Ariel Chernomoretz [2°], Alejandro F. Schinder [1°]

1° Laboratory of Neuronal Plasticity, Leloir Institute-CONICET, Buenos Aires, Argentina.
2° Laboratory of Integrative Systems Biology, Leloir Institute-CONICET, Buenos Aires, Argentina.
3° Department of Stem Cell and Regenerative Biology, Harvard University, Cambridge, MA, USA.

The dentate gyrus of the adult hippocampus has a distinctive plasticity mechanism that consists in the generation and integration of granule cells (GCs) in the preexisting circuit. The development of new GCs takes about 8 weeks and can be divided into 4 phases based on electrophysiological and morphological features. In previous studies we have shown that the development of new neurons is largely delayed in the aging brain. However the molecular basis underlying this slowdown remain unknown. We hypothesized that these maturation stages are driven by changes in the transcriptional program, which can be revealed by transcriptomic analysis. Using high-throughput single nucleus RNA sequencing, our laboratory has generated one data set containing new GCs from young adult mice, and one from neurons born in aging mice. Preliminary bioinformatic analysis allowed us to distinguish defined clusters corresponding to different cell types and neuronal maturation stages. We are currently interrogating the gene expression profile differences between neurons born in young and middle-aged mice in order to investigate the molecular basis underling the protracted development of GCs during aging.

032 | Subunit composition critically define ROS modulation of GABAA receptors.

Cellular and Molecular Neurobiology

Author: Manuel Ignacio López Pazos | email: manupazos89@gmail.com

Manuel Ignacio López Pazos [1°], Mariana del Vas [2°], Andrea Nora Beltrán González [1°], Daniel Juan Calvo [1°]

1° Laboratorio de Neurobiología Celular y Molecular. IFIByNE-UBA-CONICET
2° Instituto de Biotecnología, CICVyA, INTA

Reactive oxygen species (ROS) were involved in neuronal signalling and plasticity in normal physiology, aging and neurodegenerative disorders. Besides, GABAergic neurotransmission is sensitive to redox agents, including ROS. We previously reported the modulation of tonic responses mediated by GABAA'1 receptors by hydrogen peroxide (H2O2) through thiol modification of cysteines. We also showed that endogenous redox agents modulate phasic GABAA receptor subtypes, but diverse molecular mechanisms of action appear to underlie these effects. We characterized H2O2 effects on different GABAA receptor subtypes by expression in Xenopus laevis oocytes followed by electrophysiological recording. In the presence of H2O2 (1mM) responses mediated by receptors containing ?? and ??? subunits were potentiated, while the presence of the ?2 subunit conferred resistance to ROS modulation. H2O2 effects on GABAA?1?2 responses were reversible, dose and use-dependent, voltage-insensitive and partially prevented by irreversible alkylation of sulfhydryl groups with NEM. Increases in agonist concentration partially reduced effects exerted by H2O2. Concentration-response curves in the presence of H2O2 showed a leftward shift, compared to control values, and an increase in the maximal response. Further experiments will help to describe the actual mechanisms of action underlying the effects of H2O2 on the different GABAA receptor subtypes. Supported by ANPCyT and CONICET

034 | Gamma audiovisual stimulation induces plasticity in granule cells born in the aging hippocampus

Cellular and Molecular Neurobiology

Author: AGOSTINA MIRANDA | email: AGOSTINAMIRANDA43@GMAIL.COM

Agostina Miranda [1°], Magalí Herrero [1°], Alejandro F. Schinder [1°], Mariela F. Trinchero [1°]

1° Laboratorio de Plasticidad Neuronal, Fundación Instituto Leloir (CONICET)

Non-invasive audiovisual stimulation at gamma frequency (40 Hz) can reduce levels of amyloid beta peptide and improve memory performance in several mouse models of Alzheimer's disease. While light and sound stimulation at 40 Hz ("gamma flickering") was shown to increase the gamma frequency component of hippocampal oscillations, the mechanisms that transduce these stimuli into cellular and circuit changes remain elusive. Because neurogenesis in the adult hippocampus is particularly sensitive to behavioral stimuli, the effects of gamma flickering might be revealed by analyzing its impact on developing new neurons. Using light and sound pulses at 40 Hz, we studied their impact on the development of neurons born in the dentate gyrus of young adult (2-month-old) and aging mice (8-month-old). Gamma flickering accelerated growth of newly generated neurons in aging but not young mice, resulting in boosted circuit remodeling by neurogenesis. These findings reveal that audiovisual stimuli awaken mechanisms that promote neuronal plasticity not only under pathological conditions, but also in the healthy aging brain.

036 | Adeno-associated viral vectors overexpressing neurotrophic factors in hippocampal astrocytes as a potential therapeutic technology for neurodegenerative diseases

Cellular and Molecular Neurobiology

Author: Facundo Peralta | email: facundoperaltaunlp@gmail.com

Facundo Peralta [1°], Juliette López Hanotte [1°], Juan Ignacio Posada [1°], Tomas Björklund [2°], Paula Cecilia Reggiani [1°], Joaquín Pardo [1°2°]

1° Biochemistry Research Institute of La Plata Professor Doctor Rodolfo R. Brenner (INIBIOLP) – School of Medical Sciences, National University of La Plata, Argentina.
2° Molecular Neuromodulation, Wallenberg Neuroscience Center, Lund University, Lund, Sweden.

Neuroinflammation is one of the hallmarks of neurodegenerative diseases (ND) characterized by reactive glial cells that undergo several morphological and transcriptional changes. The most prevalent age-related ND is sporadic Alzheimer's disease (sAD), a condition in which the hippocampus (Hc) is severely affected and where astrocytes have been shown to become reactive, decreasing their neuronal trophic support. In this regard, gene therapy and the use of potent neurotrophic factors, such as Insulin-Like Growth Factor 1 (IGF1) and Glial Cell-Derived Neurotrophic Factor (GDNF), are emerging as promising therapeutic approaches. In a rat sAD model generated by intracerebroventricular (icv) injection of streptozotocin (STZ), we previously studied the morphologic changes of reactive astrocytes. In order to genetically modulate these cells in sAD rats and restore brain homeostasis, we constructed and characterized, in vivo, 3 bicistronic adeno-associated viral vectors that simultaneously overexpress in astrocytes the IGF1, GDNF or GFP genes followed by the TdTomato reporter gene. Vectors were injected in the Hc of adult rats and 3 weeks after injection, overexpression of the transgenes were confirmed by RT-qPCR. By fluorescence and immunohistochemistry, we observed that 97% of transduced cells were astrocytes. Next, we will assess the neuroprotective potential of preventive gene therapy with IGF1 and GDNF in hippocampal astrocytes of icv-STZ treated rats.

038 | Unraveling neuronal development in the adult hippocampus using single-nuclei RNA-seq

Cellular and Molecular Neurobiology

Author: Natali Belen Rasetto | email: rasettonatali@gmail.com

Natalí B. Rasetto [1*], Damiana Giacomini [1*], Ariel Berardino [2*], Tomás Vega Waichman [2*], M. Luz Vercesi [2*], Daniela Di Bella [3*], Juliana Brown [3*], Chiara Gerhardinger [3*], Sara Sime [3*], Paola Arlotta [3*], Ariel Chernomoretz [2*] and Alejandro Schinder [1*]

1° Laboratory of Neuronal Plasticity, Leloir Institute-CONICET, Buenos Aires, Argentina.
2° Laboratory of Integrative Systems Biology, Leloir Institute-CONICET, Buenos Aires, Argentina
3° Department of Stem Cell and Regenerative Biology, Harvard University, Cambridge, MA, USA

Adult hippocampal neurogenesis plays a critical role in spatial memory formation and retrieval, context discrimination, and clearance of memory traces. In the mouse dentate gyrus, the maturation of adult-born granule cells (GCs) lasts several weeks and can be divided in 4 phases based on electrophysiological and morphological features. Behavioral stimuli such as spatial learning and physical exercise can modulate the duration of these stages. However, the molecular mechanisms underlying neuronal maturation remain unknown. We propose that such progression is driven by sequential changes in gene expression programs that might be revealed by transcriptomic analysis. Clusterization of two separate datasets obtained by single nuclei RNAseq experiments identified multiple partitions that define a pathway from radial glia-like cells to a mature neuronal phenotype. Several clusters represent intermediate stages of maturation that were previously unknown. Among them, we identified a cluster of immature GCs resembling a state of high activity, as well as mature GCs that reveal transcriptional differences revealing their dorso-ventral location within the hippocampus. Finally, the emergence of novel transcriptional markers for the intermediate states was validated by in situ hybridization using RNAscope. This analysis allowed to reconstruct the signatures involved in adult neuronal development and function with high temporal resolution.

040 | Effects of nuclear receptors RXRγ and PPARγ activation in Neural progenitor cell and Oligodendroglial progenitor cell primary cultures

Cellular and Molecular Neurobiology

Author: Debora Vanesa Rodriguez | email: rodriguez-debora@hotmail.com

Débora Rodríguez [1°], Patricia Mathieu [2°], Ana M. Adamo [3°]

1° Débora Rodríguez
2° Patricia Mathieu
3° Ana M. Adamo

CNS demyelination is a pathological process through which myelin is lost from around axons, while remyelination is the process of myelin formation by oligodendrocytes (OLs). Retinoid X receptors (RXRs) are nuclear receptors forming homodimers or heterodimers with peroxisome proliferator-activated receptors (PPARs), which regulate OL differentiation and maturation. The aim of the present work was to study the activation of RXR by specific ligand 9 cis retinoic acid (9 cis Ra) in neural progenitor cell (NPC) and oligodendroglial precursor cell (OPC) primary cultures and whether such activation is mediated by heterodimerization with PPAR. NPCs obtained from the subventricular zone of young adult rats and OPCs obtained from the cerebral cortex of newborn rats were treated with 9 cis Ra or vehicle for 4 days and in the presence or absence of PPAR antagonist T0070907. NPC cultures show that 10 μM 9 cis Ra promoted a decrease in the proportion of Ki67+/PDGFR?+ cells and an increase in the proportion of mature MBP+ OLs. Also, 9 cis Ra promoted NPC glial cell fate, expanding the proportion of Nestin-/GFAP+ cells. Moreover, 1, 5 and 10 μM 9 cis Ra promoted an increase in the morphological complexity of PDGFR?+ OPCs, while 5 μM 9 cis Ra boosted the morphological complexity of mature MBP+ OLs. These results suggest that RXR? participates in OPC proliferation and differentiation and may be thus considered possible therapeutic targets in the treatment of demyelinating diseases.

042 | SPONTANEOUS ELECTRICAL ACTIVITY REGULATES AXONAL ARBOR GROWTH AND MATURATION IN DEVELOPING ZEBRAFISH LATERAL LINE AFFERENT NEURONS

Cellular and Molecular Neurobiology

Author: Lucia Salatino | email: lu.salatin@gmail.com

Lucia Salatino [1°], Ana Belen Elgoyhen [2°], Paola V. Plazas [1°]

1° Instituto de Farmacología, Facultad de Medicina, UBA
2° INGEBI, CONICET

Spontaneous electrical activity (SEA) is required for the proper assembly of sensory circuits in early stages of development; however the mechanisms underlying this phenomenon are still unknown. We use the Zebrafish (Danio rerio) lateral line system (zLL) in order 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). zLL HC are innervated by afferent (Aff) and efferent neurons, and share structural, functional and molecular similarities with HC in the vertebrate inner ear. zLL Aff exhibit SEA between 5 and 7 days post-fertilization. In order to silence SEA in single zLL Aff we stochastically over-expressed inward rectifier K+ channels and analyzed the phenotype and the dynamics of axonal arbor growth. Our results indicate that suppression of SEA in single zLL Aff led to a decrease in the innervation area in the hindbrain and affects axonal arbor complexity. Moreover, silenced neurites display higher motility, formation and elimination rates, as well as lower number of synapses than WT ones, which are features of immature neurons. We provide an in vivo demonstration that SEA regulates axonal arbor growth and maturation, in developing zLL Aff.

044 | Enriched environment reduces body weight and adiposity in neonatal overfed rats involving an anorectic hypothalamic neuropeptide signal.

Cellular and Molecular Neurobiology

Author: Rocio Schumacher Schumacher | email: rociosch09@gmail.com

Rocio Schumacher [1°], Florencia Rossetti [1°], Guillermina Canesini [2°], Cora Stoker [1°], Pamela Fernandez [1°], Florencia Andreoli [3°], Guillermo Ramos [1°]

1° Instituto de Salud y Ambiente del Litoral (ISAL), UNL-CONICET, Santa Fe, Argentina.
2° Cátedra de Nutrición en Situaciones Patológicas, FBCB-UNL, Santa Fe, Argentina.
3° Instituto de Desarrollo e Investigaciones Pediátricas (IDIP) Hospital de Niños de la Plata – CIC-PBA, La Plata, Argentina.

The enriched environment (EE) is a model of inanimate and social stimulation. Our aim was to study how EE prevents alterations in adiposity, body weight and hypothalamic gene expression observed in neonatally overfed rats as a model of early obesity. Male Wistar rats raised in small litters (SL) were exposed from weaning to postnatal day (PND)90 to EE (SL-EE, n=14) or standard environment (SL-SE, n=14). Control group rats were raised in normal litter and a standard environment (NL-SE, n=14). Body weight and food intake were monitored weekly until sacrifice when epididymal adipose tissue (EAT) weight was obtained. The arcuate nucleus of the hypothalamus was isolated using the Palkovits micro-punch technique and gene expression of pro-opiomelanocortin (POMC), cocaine and amphetamine-regulated transcript (CART), neuropeptide Y, Agouti-related peptide (AgRP), leptin, insulin and ghrelin receptors were measured by RT-qPCR. SL-SE presented a higher EAT weight than NL-SE ($p=0.043$), while EE prevented this effect. Body weight was also lower in SL-EE ($p=0.046$ vs NL-SE and $p<0.0001$ vs SL-SE). Although cumulative food intake remained unaffected, AgRP expression was higher ($p=0.0276$ vs SL-SE). CART ($p=0.035$ vs NL-SE) and POMC ($p=0.0004$ vs SL-SE; $p=0.0036$) expression was increased, as well as leptin receptor expression ($p=0.0092$ vs NL-SE). In summary, EE was effective in decreasing body weight and epididymal adipose tissue through an anorectic POMC and CART signaling in the hypothalamus.

046 | Oligodeoxynucleotide IMT504: Role on the microglial cell activation and oligodendrocyte progenitor cell proliferation and differentiation

Cellular and Molecular Neurobiology

Author: Alexis Eduardo Silva Silva | email: silva.alexis1996@gmail.com

Alexis Silva Silva [1°], Débora Rodríguez [1°], Patricia Mathieu [1°], Ana Adamo [1°]

1° Departamento de Química Biológica, Facultad de Farmacia y Bioquímica. IQUIFIB. UBA-CONICET

Demyelination is a pathological process characterized by myelin loss from around axons, while remyelination is the repair response through the restoration of myelin and the resolution of functional deficits.Multiple sclerosis is a high-incidence inflammatory demyelinating disease in which remyelination frequently fails. IMT504 (IMT) is a non-CpG oligodeoxynucleotide consisting of 24 nucleotides and characterized by 2 specific PyNTTTTGT sequences.Based on IMT immunomodulatory effects and regenerative properties, this work aims to study its role in microglial activation and OL precursor (OPC) proliferation and differentiation. Primary cultures of OPCs and microglia were prepared from cerebral cortical tissue of 1- to 2-d-old rats. Microglia were treated for 24 h with IMT for RNA extraction. qPCR analyses were carried out to evaluate microglial IL-1?, iNOS, Arg1 and TGF-? transcript expression. OPCs were treated with or without IMT, cultured for 2, 4 and 6 d and fixed for immunocytochemical assays on PDGFR?+ OPCs, mature MBP+ OLs and Ki67+ proliferating cells.IMT produced an abrupt change in cell morphology compatible with microglial activation and an increase in IL-1? and iNOS transcript levels. IMT also reduced the percentage of OPCs after 4 d and increased the percentage of mature OLs after 4 and 6 d.These findings unveil potentially beneficial properties of IMT in neuroinflammation and oligodendrogenesis which may aid therapy development for demyelinating diseases.

048 | An alternative model to study stress signals carried by extracellular vesicles

Cellular and Molecular Neurobiology

Author: Giuliana Torchiana | email: torchianagiuliana@gmail.com

Giuliana Torchiana [1°], Catalina Logan [1°], Silvia Billi [1°], Marcela A. Brocco [1°], Melisa C. Monteleone [1°]

1° Instituto de Investigaciones Biotecnológicas, Universidad Nacional de San Martín (UNSAM) – CONICET. 2° Escuela de Bio y Nanotecnologías (EByN-UNSAM)

Chronic stress produces glucocorticoid hypersecretion that can cause cognition and mood alterations. Notably, stressed individual serum contains proteins linked to stress and neuropsychiatric diseases. Many of such proteins are carried by extracellular vesicles (EVs). Among them, we have identified M6a, a stress-responsive neuronal protein. Now we aim to further study “stressed derived” EVs to find new molecules that could mediate the stress response. First, to ascertain EVs biodistribution, we stained EVs with the DiR dye and administered them intranasally into mice. The stain was observed in the brain and other organs indicating that EVs can reach different tissues. To study the effect of stressed EVs in animal behavior and gene expression high EV amounts are needed. To obtain them avoiding the use of large animal cohorts, we isolated EVs from hippocampal neurons and from the hippocampal cell line HT22 treated with the synthetic glucocorticoid dexamethasone (DEX). As a measure of DEX effects, M6a levels in cells and EVs were analyzed. We found that DEX increased cellular M6a levels compared to control in both neurons and HT22 cells. DEX also increased M6a levels in EVs. Effects of DEX-EVs administration in mice will be explored. Our results suggest that DEX might induce differential loading of molecules on EVs. Thus we present here an in vitro source of EVs loaded with stress molecules to be used as an alternative tool to investigate stress signal molecules and effects.

050 | Early sex differences in histone methyltransferase EZH2 expression in developing hypothalamus of the mouse brain

Cellular and Molecular Neurobiology

Author: Macarena Villarreal | email: maca.villarreal@mi.unc.edu.ar

Macarena Villarreal [1°], Rocío Bigarani [1°], Camila Sosa [1°], Lucas Ezequiel Cabrera-Zapata [1°], Carla, Daniela Cisternas [1°2°], María Julia Cambiasso [1°3°]

1° Instituto de Investigación Médica M y M Ferreyra, INIMEC-CONICET-UNC, Córdoba, Argentina.

2° Cátedra de Fisiología Animal, Facultad de Ciencias Exactas, Físicas y Naturales, Universidad Nacional de Córdoba, Argentina.

3° Cátedra de Biología Celular, Facultad de Odontología, Universidad Nacional de Córdoba, Argentina.

In mammals, the primary agents causing phenotypic sex differences are encoded by sex chromosomes. Many of X-and Y-linked genes are epigenetic modifiers and pivotal evidence in past 7 years implicates epigenetic mechanisms as mediators in brain sexual differentiation. We have recently demonstrated that X?linked histone H3K27 demethylase Kdm6a regulates sexually dimorphic differentiation of hypothalamic neurons through a direct regulation of Neurogenin 3. Kdm6a interacts with numerous epigenetic modifiers, such as histone methyltransferases (HMT), implying that both epigenetic marks could act together, influencing each other in a context-dependent manner, writing a histone crosstalk language. Since H3K27 methylation regulate Ngn3 we first evaluated the mRNA expression of the HMT enzymes EZH1/2 in the hypothalamus of male and female mice at embryonic day 15 by qPCR. We found sex specific expression of Ezh2, higher in males than in females ($p = 0.01$). We next used the Four Core Genotype Mouse Model to evaluate a direct regulation of sex chromosomes (XX vs XY) independently of gonadal type. No differences were observed between genotypes ($p > 0.05$). Our results suggest that early sex differences in Ezh2 enzyme could determine a sexually dimorphic crosstalk between posttranslational histone modifications acting on H3K27 residues during development. Current experiments are evaluating the effect of Ezh2 inhibition on Ngn3 expression in neuronal hypothalamic cultures.

052 | Co-expression of opposing neurotransmitters in clock neurons: a search for coherence in the circadian network

Chronobiology

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

Christian Mauricio Carpio Romero [1°], Lia Frenkel [2°], María Fernanda Ceriani [1°]

1° Laboratorio de genética del comportamiento – Fundación Instituto Leloir – Instituto de Investigaciones Bioquímicas de Buenos Aires (CONICET)
2° Laboratorio de Neurociencias del tiempo – IB3 – Facultad de Ciencias Exactas y Naturales – Universidad de Buenos Aires (CONICET)

Living organisms have an internal biological clock that oscillates with a period of approximately 24 hours, regulating different aspects of physiology, namely metabolism and behaviour differentially throughout the day. In Drosophila, the central circadian clock comprises 150 neurons organized in different clusters, which receive inputs from the environment, process information and organize the animal activity pattern daily. The interaction among these clusters through neuropeptides has extensively been studied. However, more recently, the impact of communication through classical neurotransmitters and their role in the temporal organization of daily activities has been uncovered. In this work we explored the role of the different neurotransmitters released by a group of neurons in the circadian network. Previous work in our laboratory had established that the sLNvs release both glycine and acetylcholine. Spatially and temporally altering either neurotransmission system (or both), triggered unexpected circadian phenotypes. Next we sought to define their postsynaptic targets and contribution to the circadian network. For this purpose we took advantage of Trans-tango, a genetic tool that lights up post-synaptic candidates by anatomical proximity. These results show that the sLNvs could communicate among themselves, as well as with additional clock clusters, namely the LNds, to which the regulation of the activity in the day-night transition is attributed.

054 | EFFECT OF A PPARγ SYNTHETIC AGONIST ASSOCIATED WITH RETINOIC ACID ON DAILY RHYTHMS OF BAX AND BCL-2 IN AN EXPERIMENTAL MODEL OF ALZHEIMER DISEASE

Chronobiology

Author: Ivanna Carla Castro Pascual | email: iccastro@email.unsl.edu.ar

Belen Cangiano [1°], Ivanna Castro-Pascual [1°], Mayra Cortez [1°], Carina Ledesma [1°], Cinthia Coria-Lucero [1°], Andrea Castro [1°], Ana Cecilia Anzulovich [1°], Silvia Delgado [1°], Lorena Navigatore-Fonzo [1°]

1° Laboratorio de Cronobiologia-IMIBIO-CONICET-UNSL

Alzheimer's disease (AD) is an irreversible neurodegenerative disorder. The accumulation of amyloid-? (A?) peptide in the brain is associated with cognitive déficits. Bcl-2 is the primary protein that inhibits cell apoptosis whereas Bax promotes apoptosis. Synthetic PPAR? agonists such as pioglitazone have been shown to improve cognitive performance in patients with AD. Previous studies indicate that retinoic acid rescues memory déficits. Previously, we found that an intracerebroventricular injection of A?(1-42) modified the daily patterns of Bax and Bcl-2 expression in the rat hippocampus. Taking into account those observations, the objectives of this study were: first, to investigate the effects of pioglitazone-retinoic acid (Pio-RA) on the daily rhythms of Bax, Bcl-2 and Bmal1; second, to evaluate the effect of Pio-RA on cognitive performance. Four-month old males Holtzman rats were used in this study. Groups were defined as: 1) control 2) A?-injected 3) A?-injected treated with Pio-RA. Bax and Bcl-2 mRNA levels were determined by RT-PCR and clock protein levels were analyzed by immunoblotting in hippocampus samples isolated every 6h throughout a 24-h period. The cognitive function was evaluated by Novel Object Recognition test. We found that treatment of Pio-RA reestablished the daily rhythms of Bax, Bcl-2 and Bmal1 and improved cognitive disorders. These findings suggest that the administration of Pio-RA would be a novel therapeutic strategy for AD.

056 | Role of the circadian clock in motivation: effects of time-restricted feeding and chronic jet lag

Chronobiology

Author: Manuel Tomás Crespo | email: manuel.crespo94@outlook.com

Manuel Tomás Crespo [1°], Julieta Acosta [1°], Diego Andrés Golombek [1°], Juan José Chiesa [1°], Patricia Verónica Agostino [1°]

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

The circadian system regulates behavioral and physiological processes, including the response to natural and drug rewards. In mammals, light is the main synchronizer. On the other hand, when food is temporally restricted, animals display an anticipatory food activity (FAA) controlled by a food-entrainable oscillator (FEO). We have previously shown that mice exhibit a circadian rhythm in motivation for food reward. In this work, we further explored motivation behavior through two different approaches: when food is the main synchronizer (by a time-restricted feeding protocol, TRF) and when circadian disruptions of the light/dark (LD) cycle occur (by a chronic jet lag protocol, CJL). In the TRF protocol, mice were allowed to consume food only 3 hours/day. Results show that mice are highly motivated to work for food reward when FAA is present regardless of the time of day, suggesting that components related to reward pathways might be activated and consequently generate an increase in motivation. In the CJL protocol – which consisted of 6-hour phase advances of the LD schedule every 2 days –the CJL group showed diminished motivation compared to controls, suggesting that forced circadian desynchronization affects reward-related behaviors. Together, these findings contribute to gain knowledge in potential mechanisms of circadian modulation of motivational states in order to improve treatment related to psychiatric disorders or drugs of abuse.

058 | Evolutionarily conserved circadian proteins (LIN-42 and KIN-20) identified in the regulation of the molecular clock in the nematode C. elegans

Chronobiology

Author: Melisa Luciana Lamberti | email: melisalamberti@gmail.com

Melisa Luciana Lamberti [1°], María Eugenia Goya [2°], Claire Bénard [3°], Diego Andrés Golombek [1°]

1° Laboratorio de Cronobiología , Universidad Nacional de Quilmes, Buenos Aires, Argentina.
2° Centre for Integrative Physiology, The University of Edinburh, Scotland, United Kingdom
3° Département des sciences biologiques, Université du Québec à Montréal, Canada

Circadian rhythms are biological processes that display endogenous oscillations close to 24h in different variables. These endogenous rhythms are regulated by a central clock, made up of “clock genes” that interact with each other in a complex manner, generating a transcriptional-translational feedback loop (TTFL). The central clock is entrained by a Zeitgeber (synchronizer), such as light and temperature cycles. The mechanism of circadian rhythms has been extensively studied in various organisms; here we use the powerful model organism C. elegans to uncover the general principles of regulation of circadian rhythms. The aim of this work is to decipher the molecular components of the clock, using a reporter system based on bioluminescence. In particular, we focus on the study of evolutionarily conserved circadian proteins (KIN-20 and LIN-42). We observed a lengthening of the endogenous period in mutant strains for the KIN-20 and LIN-42 proteins, in turn, when rescuing the mutations, the endogenous period returns to its normal values, close to 24h. In addition, we found that both proteins are expressed in the same regions in the nematode, and an alteration in the KIN-20 protein generates a decrease in the expression of the LIN-42 protein. In summary, our results show that KIN-20 and LIN-42 could be an important component of the central clock that regulates the circadian rhythms of adult nematodes.

060 | Born to be a wild worm: differential circadian rhythms between domesticated N2 and wild Caenorhabditis elegans isolates

Chronobiology

Author: Osvaldo Franciso Silva | email: Fransilvaj@gmail.com

Francisco Silva [1°], Rosana Rota [1°], Diego Golombek [1°], Maria Laura Migliori [1°]

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

Circadian rhythms represent an adaptive feature, ubiquitously found in nature, which grants living beings the ability to anticipate daily variations in their environment. The nematode C. elegans provides an excellent model for genetics and neuro-behavioral studies and is currently used as a novel model for circadian research. The strain of C. elegans currently used in laboratories is the N2, and is considered a domesticated or laboratory strain. Various studies show that recent isolates of C. elegans are highly divergent at the genomic level with respect to the N2 strain due to the accumulation of numerous mutations. In this work, using a locomotor activity recording system we present a circadian screening of wild C. elegans isolates. Our results show that both the N2 and the wild MY23 strain populations were synchronized to a cold-warm (CW) cycle. N2 populations exhibited significant masking, while MY23 tended to be truly synchronized to the zeitgeber. Indeed, ~66% of the N2 strain populations were synchronized to a cold-warm cycle, increasing to 73% and 82% in the wild MY23 and DL238 strain populations, respectively. All strains retained circadian rhythms of ~24 h under constant conditions. Circadian characterization of wild C. elegans isolates, together with genomic data, would make it possible to identify genomic regions (or even genes) involved in synchronization.

062 | Cerebral mapping of figurative language in temporal lobe epilepsy: an fMRI study shedding light on brain plasticity

Cognition, Behavior, and Memory

Author: Lucia Alba-Ferrara | email: lucia.alba@fultra.org

Bautista Elizalde ACEVEDO [2°], Valentina Aguero Vera [2°], Silvia Kochen [1°], Lucia Alba-Ferrara [1°]

1° ENyS CONICET
2° IIMT Universidad Austral

Temporal lobe epilepsy (TLE) could affect eloquent areas, such as those underlying language processing, when the epileptogenic zone overlaps linguistic nodes. We applied a non-invasive task called International Lexical Decision Task (ILDT), and it uses dichotic listening, overcoming the tongue spoken by the participant [1], to assess the lateralization of lexical processing in refractory TLE. Method: Patients with left TLE (LTLE) (N=12), right TLE (RTLE) (N=15) and controls (N=16) were evaluated using ILDT. An ANCOVA analysis was performed, with the stimulus presented to the left visual field, to the right, or a baseline condition as an intrasubject factor and group as a between subject factor. Result: A main effect of stimuli was found (F1.35)=21,P<0.05), by which all type of stimuli differed from each other. The baseline improved performance (M=54.78,SD=3.41), stimuli presented to the right obtained an intermediate performance (M=36.07,SD=1.32) and to the left resulted in lower performance (M=29.30,SD=1.46). A main effect of group was found (F(2.71)=10,P<0.05). Pairwise comparisons showed that the controls (M=52.07,SD=2.67) outperformed both patient groups. The groups of LTLE (M=31.74,SD=3.96) and RTLE (M=36.35,SD=2.71), did not differ from each other. A trend of interaction between group and stimulus was found by which LTLE patients found particularly difficult to identify stimuli presented to the right visual field, although such trend did not reach significance.

064 | TIME CONSTRAINT INCREASES SUSCEPTIBILITY TO REPETITION PRIMING IN COMPLEX DECISION-MAKING

Cognition, Behavior, and Memory

Author: Tomas Alves Salgueiro | email: tomasalvessalgueiro@gmail.com

Tomas Alves Salgueiro [1°], Axel Brzostowski [2°], Ayelén Caramés [1°], Pablo Nicolás Fernández Larrosa [1°]

1° Instituto de Fisiología, Biología Molecular y Neurociencias (IFIBYNE-UBA-CONICET)
2° Departamento de Computación, FCEN-UBA

Complex Decision-Making (DM) usually involves processes that require a higher level of cognitive engagement, evidenced by a prolonged reflection over time. Previously, we conducted cognitive experiments under the hypothesis that greater exposure to a face (Repetition Priming, RP) would induce its preference in a task-dependent manner (top-down modulation). For this purpose, participants were randomly assigned to 2 experimental groups: 1) choosing a face for an important task (IT), or 2) without any specification (NS). Our previous results showed that IT decision was not susceptible to RP and lasted longer, regarding to NS results, supporting our hypothesis. But do these top-down mechanisms operate early or late in the DM process? To start answering this question, we designed a new experiment in which subjects had to choose with time constraint (TC; 5 or 3 seconds) on some trials and without on others (NC). When choosing in less than 5 seconds, IT group shows no evidence of susceptibility to RP, like in NC condition. However, when participants must choose within 3 seconds, IT group showed to be susceptible to RP (like NS group). If the top-down modulation occurs later, shortening the time available would disrupt this process, and this would be reflected in the results of group IT, showing differences between the two temporal conditions. Conversely, if the top-down mechanism operates earlier, there should be no difference. Our results support the former scenario.

066 | Use of chemogenetic approach to study cholinergic modulation of learning in a Go/NoGo visual discrimination task

Cognition, Behavior, and Memory

Author: Macarena Amigo Durán | email: macky.amigo@gmail.com

Macarena Amigo Durán [1°], Noel Federman [1°], Sebastian A. Romano [1°], Antonia Marin Burgin [1°]

1° IBioBA – MPSP – CONICET

Acetylcholine (ACh) has a role in hippocampal-related cognitive functions, including learning and memory. Previous work in the laboratory has shown that endogenous ACh release into the dentate gyrus of the hippocampus produces a reconfiguration of inhibitory circuits, which results in a net disinhibition of excitatory neurons, favoring plasticity of incoming inputs. Our hypothesis is that an endogenous release of acetylcholine can promote learning. For this, we developed a behavioral task to study contextual discrimination in head fix mice, using virtual reality. We used a chemogenetic approach to endogenously release ACh during learning by using Chat-HM3DQ mice injected with CNO. Water restricted animals were trained to perform a GO/NO GO visual discrimination task, in which the animal learns to drink water or not depending on the virtual visual context. We designed four increasingly difficult visual discrimination contexts to evaluate cholinergic modulation of learning. Preliminary results show that animals with increased cholinergic activity learn the task faster than control animals. In conclusion, we developed a behavioral paradigm suited to probing the neural basis of learning spatial context and its flexibility with neuromodulators.

068 | Role of the memory systems in the behavioural change induced by social isolation in Drosophila melanogaster

Cognition, Behavior, and Memory

Author: Gerson Asti | email: gersonasti8@gmail.com

Gerson Asti [1°], Beatriz Gil Marti [2°], Francisco Martin [2°], Esteban Javier Beckwith [1°]

1° Instituto de Fisiología, Biología Molecular y Neurociencias (IFIBYNE) – UBA – CONICET, Argentina
2° Cajal Institute, Madrid, Spain

Social interactions perceived as positive are associated with improved health. On the contrary, social isolation has been shown to negatively affect behaviour and health. The consequences of a socially impoverished environment, such as increased aggression, anxiety, food consumption and activity are observed in humans and other species. The fly Drosophila melanogaster is an ideal organism for studying the genetic basis of behaviour, where social isolation leads to an increase in locomotor activity. Our hypothesis is that the changes in locomotor activity caused by social isolation are sustained by long-term memory generated by the experience of loneliness. As a first step to test this idea, we implemented a socialization/isolation paradigm followed by the recording of sleep and wake behaviour in flies employing a video-tracking device. Later, we deepen the characterization of the effect of isolation on behaviour and evaluate the role of the rutabaga and dunce genes, which are involved in the acquisition and consolidation of memories, in the behavioural change induced by isolation. Preliminary experiments with dunce mutants show that, while the mutation had an impact on locomotor activity, the flies show the effect of isolation. Our plan future plan is to evaluate the functional role of mushroom bodies, the main memory storage centre of the insect brain, as well as sleep-regulating centres, in behavioural change induced by social isolation.

070 | Physical activity as a modulator of the consolidation and retrieval of memory and creativity in a school environment

Cognition, Behavior, and Memory

Author: Alejo Barbuzza | email: barbuzza.alejo@gmail.com

Alejo Barbuzza [1°2°], Pedro Benedetti [1°2°], Celina Goyeneche [1° 2°], Fabricio Ballarini [1°2°]

1° Instituto Tecnológico de Buenos Aires, Av. Madero 399, Ciudad Autónoma de Buenos Aires, Argentina
2° Instituto de Biología Celular y Neurociencia "Prof. E. De Robertis" (IBCN), Facultad de Medicina, UBA-CONICET, Ciudad Autónoma de Buenos Aires, Argentina.

Currently, it has been widely proven that physical activity (PA) not only generates benefits on physical fitness, but also on cognition. Nevertheless different results have been observed in memory. While some research shows a positive effect of PA on different types of memory, others find no such effect. However, it should be noted that none of them have found negative effects. In addition, there are few investigations carried out outside the laboratory in ecological and natural environments. For this reason, the objective of this work is to try to elucidate the possible effects of PA on the consolidation and retrieval of a graphic memory in a school context. For this we used the Rey figure as a memory paradigm, Alternative Uses Test for creativity and the physical education classes of secondary school students as a modulator for these processes. When the physical education class took place immediately before the retrieval of the Rey figure and the creativity task, it was observed that this group improved their performance in both tests compared to the control group that did not perform PA. However, when the PA was separated one hour before or after the learning of the Rey figure, no improvement was observed in the performance of the long-term memory test (testing 48 hours after the acquisition).

072 | Extent of memory strengthening due to reconsolidation in episodic memories.

Cognition, Behavior, and Memory

Author: Juan Cruz Beron | email: juanberon1991@gmail.com

Juan Cruz Beron [1°], Rodrigo Sebastián Fernández [1°], Maria Eugenia Pedreira [1°]

1° Instituto de Fisiología, Biología Molecular y Neurociencias (IFIBYNE)- CONICET, Ciudad de Buenos Aires, Argentina.
2° Universidad de Buenos Aires, Facultad de Ciencias Exactas y Naturales, Ciudad de Buenos Aires, Argentina.

Memory reconsolidation is the mechanism by which consolidated memories are updated in strength and/or content. An underlying hypothesis to these findings suggests that reconsolidation would be “reactivation specific”, implying that only the reactivated elements would be susceptible to modifications. Our main goal was to study the extent of the strengthening due to reconsolidation, that is, to see whether it affects not reactivated elements. To test this hypothesis, we conducted a 3-day study. On day-1, subjects learned face-name pairs (target memory) along with the interleaved presentation of common use objects (peripheric elements). Subjects were instructed to learn the face-name pairs (target memory) and between these presentations they were asked to make a judgment call on a certain aspect of the object shown. On day-2 two, types of reminders of the target memory were used. The group called RC received a reminder with prediction error that leads to reconsolidation, and the other group, RX, received a reminder without prediction error that doesn’t involve reconsolidation. On day-3 both the target and peripheric elements of the memory were evaluated. In accordance with previous experiments, the memory for target elements was strengthened in group RC, but not in RX. Here we found that the RC group also showed better recognition of the new objects (peripheric memory) than the RX group and also showed greater sensitivity at discriminating between conditions.

074 | Lockdown consequences on different age ranges on episodic memory

Cognition, Behavior, and Memory

Author: Matias Bonilla Bonilla | email: bonillamatias@gmail.com

Matias Bonilla [1°2°], Vanessa Vidal [1°2°], Candela Sofia Leon [1°2°], Facundo Antonio Urreta [1°2°3°], Luis Ignacio Brusco [2°4°], Pablo Ezequiel Flores-Kanter [1°2°], Aylin Vazquez Chenlo [1°2°], Cristian Dario Garcia Bauza [2°5°], Cecilia Forcato [1°2°]

1° Laboratorio de Sueño y Memoria, Departamento de Ciencias 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° Innocence Project Argentina, Buenos Aires, Argentina.
4° CENECON. Centro de Neuropsiquiatría y Neurología de la Conducta (CENECON), Buenos Aires, Argentina.
5° PLADEMA, Universidad Nacional del Centro, Tandil, Buenos Aires, Argentina

Covid-19 pandemic had devastating effects worldwide. Anxiety and depression values aroused, and sleep quality decreased. While all age ranges were affected, young adults were less able to cope with the difficulties that the lockdown isolation brought in comparison with older adults. Episodic memory is highly susceptible to mood states such as anxiety and depression, and to sleep quality. Thus, we aimed to study the differential effects of the Covid-19 pandemic situation on memory processes in young and older adults. We expected that as young adults were the most affected, their age benefit on episodic memory will be lost due to their higher levels of anxiety and depression as well as the decreased sleep quality. To test this, we compared two age groups, young and older adults, in a set of tests that collected information about their anxiety, depression and sleep quality levels. Then all participants went through a recognition task, a free recall task and a temporal order task. As expected, both groups had higher means of depression and anxiety values than before the pandemic. In addition, younger adults had significantly higher values of anxiety as well as depression than older ones. In the free recall task, older adults had a significantly higher performance but regarding the temporal order task both groups had a similar performance. Finally, in the recognition task younger adults had a significantly better performance.

076 | Ethanol binge-like exposure and possible amelioration of Omega-3 Fatty Acid derived on anxiety-like behavior in adolescent rats

Cognition, Behavior, and Memory

Author: Valentin Cabrera | email: valentin.cabrera@unc.edu.ar

Valentín Cabrera [1°], Paula Abate [1°], Ana Fabiola Macchione [1°], Verónica Balaszczuk [1°]

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

A report from the Panamerican Health Organization placed Argentina among Latin American countries with the highest per capita alcohol consumption. Alcohol consumption and the problems associated with it show patterns related to age, being adolescents the most exposed. Alcohol exposure may cause neurobiological and behavioral disorders. We can find that ethanol exposure may provoke an increase in anxiety-like behaviors in rodents. On the other hand, long chain polyunsaturated fatty acids ω-3 have proven to decrease alcohol induced anxiety-like behaviors in neonate rats. However, no literature was found about this effect in the adolescent stage. The aim of the present study is to analyze the neurobehavioral effects of a binge-like ethanol exposure and the possible amelioration of an ω-3 treatment in adolescent rats. We administered a dose of 2 g/kg or 0 g/kg of EtOH via i.g. at postnatal days (PDs) 28, 30 and 32. Fifteen min after administration, each animal received a dose of 1mg/kg or 0mg/kg of docosahexaenoic acid (DHA), a member of the ω-3 family via i.p. We are currently studying anxiety-like behavior at PD34 where subjects are being evaluated in an Elevated Plus Maze. Moreover, we assessed the expression of serotonin and GABA in the amygdala, a brain area associated with emotion processing by immunofluorescence technique. We hypothesize that ethanol exposure will produce anxiety-like behaviors and the treatment with DHA can decrease these ethanol induced anxiety.

078 | Study of changes in neuronal dynamics in sleep cycles during aging in dogs.

Cognition, Behavior, and Memory

Author: Magaly Belén Catanzariti | email: magalybelenc92@gmail.com

Magaly Catanzariti [1°], Alejandra Mondino [2°], Diego Mateos [1°]

1° Instituto de Matemática Aplicada del Litoral–CONICET–UNL, CCT CONICET, Santa Fe, Argentina.
2° Department of Clinical Sciences, North Carolina State University, Raleigh, NC.

The study of brain dynamics in sleep and waking states is crucial for understanding basic and complex behavioral functions. In humans, electroencephalographic (EEG) recordings have shown that these dynamics are affected by aging. The strong analogy between human and canine social skills encourages the use of domestic dogs as an interesting model for comparative cognition research. In this regard, the present study evaluated differences in brain dynamics in sleep-wake cycles of 16 senior dogs (over 10 years old) and 11 young adults (between 1 and 7 years old), through the analysis of electroencephalographic signals (EEG). The signals were obtained on the channels F3, F4, Fz and Cz and stratified in four states: awake, drowsiness , Non-REM and REM. On these signals, studies of power spectral density (PSD) and nonlinear analysis of information measures based on ordinal patterns such as permutation entropy and complexities were performed. Among the results obtained was an increase in power in the high bands (20Hz-40Hz) during Non-REM status in senior dogs. In addition, a significant increase in entropy was observed in senior dogs in all behavioral states.. These results suggest that neuronal dynamics in different sleep states are modified with the course of aging.

080 | EVALUATING MICROGLIA DIVERSITY THROUGHOUT RAT LIFE SPAN

Cognition, Behavior, and Memory

Author: Sofia Cervellini | email: soficervellini@gmail.com

Sofia Cervellini [1°], Franco Juan Cruz Dolcetti [1°], Macarena Lorena Herrera [2°], Eugenia Falomir-Lockhart [1°]

1° INIBIOLP-CONICET, Facultad de Medicina, Universidad Nacional de La Plata, La Plata, BA, Argentina.
2° IFEC-CONICET, UNC, Córdoba, Córdoba, Argentina

During aging, the central nervous system (CNS) undergoes a variety of morphological and functional changes. We are interested in studying glia in their natural environment and how aging affects their numbers and functions. Although glial cells are critical for CNS development and maintenance, there is little published research addressing their distribution in different brain regions across the lifespan. Most studies involve mice, which limits extrapolation of data to the rat. Our aim was to investigate how the number and morphology of microglial cells changes in naïve rats at different ages and whether there is a relationship with behavior. Behavioral tests were performed with female Sprague-Dawley rats at 2, 6, 12, and 24 months of age to examine depression-like behavior, short- and long-term memory, exploratory and anxiety-like behavior. We also analyzed immunoreactive Iba1 cells. We observed impaired spatial memory and anxiety- and depression-like behavior in 24-month-old rats compared with 6- and 12-month-old rats. As for microglia, there was a significant increase in the number of Iba1+ in the hippocampus and stratum radiatum in 24-month-old rats compared with 6-month-old rats. Morphology data showed a difference between young and old rats. Our results suggest that the behavior of female rats is age-dependent, as is the distribution and morphology of microglia. Further studies are needed to explore the phenotype and functions of microglial cells.

082 | The use of spaced learning as a teaching strategy for memory persistence in elementary-school students

Cognition, Behavior, and Memory

Author: Julieta Andrea Correa | email: correajulietaa@gmail.com

Julieta Correa [1°], Alejo Barbuzza [1°2°], Juan Riboldi [1°], Fabricio Ballarini [1°2°], Haydee Viola [1°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

Several studies showed the superiority of spaced over massed learning in the formation and persistence of long-term memories (LTM). Thus, this effect could be used to improve the memory duration of students in a school scenario. Here, we studied the effects of spaced learning to promote memory persistence in elementary-school students. We designed a task of two learning sessions to test graphic memory based on Rey Osterrieth´s figure test and evaluated different inter-trial intervals (ITI) between sessions. Students were allowed to copy a figure at the training session and they were asked to draw it again during the test session. The control group realized a single copy session, the retraining group had two identical copy sessions, and a third group performed a copy session and a test session as the second learning. The memory persistence was evaluated 7 days after the second session. The LTM evaluated in the control group dropped significantly over the weeks. We found an LTM-persistence enhancement in the group of students that received a second learning session (test or retraining) 2, 7 or 14 days after the first one. However, when the ITI between sessions was 21 days, the retraining was more effective to promote memory persistence than the test session. This effect could depend on the students’ memory retention level at the time of the second learning session. These findings contribute to designing a strategy to improve memory persistence in elementary-school students.

084 | Time-dependent Inhibition of Rac1 in the VTA Enhances Long-term Memory: Implications for the Active Forgetting of Aversive Memories

Cognition, Behavior, and Memory

Author: Juliana Fátima Dalto | email: julianadalto@hotmail.com

Juliana Fátima Dalto [1°], Jorge Horacio Medina [1°]

1° Instituto de Biología Celular y Neurociencias “Prof. Eduardo de Robertis”, Facultad de Medicina, UBA-CONICET

Understanding the mechanisms by which memory is naturally forgotten is as important as understanding how it is stored. Recently, we demonstrated that dopamine neurotransmission in the hippocampus (HP) and the ventral tegmental area (VTA) of the rat is involved in the active forgetting (AF) of consolidated appetitive memories. Now, we aim to unravel the processes underlying the forgetting of consolidated aversive memories (CAMs). So far, we found no evidence for a role of dopamine or GABA neurotransmission in the AF of CAMs. Other studies proposed that the GTPase Rac1 has an active role in the forgetting of different types of memories. However, the participation of this protein in the AF of CAMs is not well understood. Here, we assessed the role of Rac1 in the AF of inhibitory avoidance (IA) memory at different regions of the brain and different moments after acquisition. In the HP, the inhibition of Rac1 after training or after retrieval did not affect IA memory. However, post-training but not post-retrieval inhibition of Rac1 in the VTA potentiated IA memory at 24 h and 14 d after training. This effect was not due to facilitation of memory formation since memory at 1 h after training was not altered even with a weaker training. Moreover, the inhibition of Rac1 in the VTA at 12 h after training reduced the expression of the IA memory at 24 h suggesting the possibility that this protein could have different effects on memory depending on the moment after acquisition.

086 | Exploring the influence of dysfunctional personality traits on metacognition and confidence

Cognition, Behavior, and Memory

Author: Iair Embon | email: iairembon@gmail.com

Iair Embon [1°2°], María Agostina Gerbaudo [2°3°], Alberto Andrés Iorio [3°], Alejandro Ramos Usaj [1°], Pablo Barttfeld [2°], Guillermo Solovey [1°]

1° Instituto de Cálculo, Facultad de Ciencias Exactas y Naturales, UBA-CONICET, Buenos Aires, Argentina. CP: 1428
2° Cognitive Science Group, Instituto de Investigaciones Psicológicas (IIPsi, CONICET-UNC), Facultad de Psicología, Universidad Nacional de Córdoba, Córdoba, Argentina. CP: 5000
3° Instituto de Investigaciones en Psicología, Facultad de Psicología, Universidad de Buenos Aires, Buenos Aires, Argentina. CP: 1207

Metacognition is defined as the capacity to evaluate one's own cognitive processes. That evaluation is accompanied by a sense of confidence about whether it was correct or not. Their relation with dysfunctional personality traits (DPT) is still unknown, although it has been suggested that people with some personality disorders have difficulties knowing their own mental states. The present research aims at exploring the relationship between metacognition and DPT, as well as confidence and DPT. We conducted an online experiment in which neurotypical adults performed a perceptual task and then completed the Personality Disorder Inventory for DSM-5 (PID-5). Furthemore, a multiverse analysis approach was performed for each question in this exploratory study. We found that Anxiousness was positively associated with metacognitive sensitivity and Grandiosity was positively related with confidence level. No other statistically significant dysfunctional personality traits or domains were observed in any or most of the analyses. The results of the present study support the link between metacognition and anxiety, and between confidence levels and grandiosity, also provide a possible association between metacognition and mental health.

088 | Lockdown consequences on different age ranges on episodic memory: Structural differences between young and old adults by graph analysis

Cognition, Behavior, and Memory

Author: Pablo Ezequiel Flores Kanter | email: pflores@itba.edu.ar

Pablo Ezequiel Flores-Kanter [1°2°], Matias Bonilla [1°2°], Vanessa Vidal [1°], Luis I Brusco [2°3°], Cecilia Forcato [1°2°]

1° Laboratorio de Sueño y Memoria, Departamento de Ciencias 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° CENECON. Centro de Neuropsiquiatría y Neurología de la Conducta (CENECON), Buenos Aires, Argentina.

Memory is a dynamic process that can be modulated by different factors. In addition to age, emotional variables (e.g. anxiety, depression, and stress) impact memory formation. During COVID-19 pandemic these emotional variables increased, being young adults the most affected. This has given rise to Bonilla et al. (2022) hypothesizing that young adults would present a greater deterioration in episodic memory compared to older adults, being the latter less affected by the pandemic. These authors evidenced during the COVID-19 pandemic a lower performance in young adults in aversive episodic memory encoding compared to older adults. In the present study, we deepened the analyzes of Bonilla et al. (2022), reanalyzing the data obtained through network analysis using graph modeling. These measurements may reveal emergent system properties only visible when the network is considered as a whole. Thus, this work aimed to (a) compare the structure of the memory network between young and older adults; and (b) compare the network analysis with the conventional analysis used to reveal episodic memory deficits. The results showed that the structures of the semantic networks presented a deterioration in the narrative in healthy older adults, typical of aging. These data complement the initial results described in Bonilla et al. (2022) and report the applicability and relevance of network modeling for the analysis of episodic memories in natural language.

090 | Dream content during lucid dreams and out-of-body experiences, differences and similarities

Cognition, Behavior, and Memory

Author: Francisco T Gallo | email: frgallo@itba.edu.ar

Francisco T Gallo [1°5°], Nerea L Herrero [1°5°], Antonela Tommasel [2°], Luis I Brusco [3°], Daniela Godoy [2°], Pablo M Gleiser [4°5°], Cecilia Forcato [1°5°]

1° Laboratorio de Sueño y Memoria, Departamento de Ciencias de la vida, Instituto Tecnológico de Buenos Aires (ITBA).
2° Laboratorio de Neurociencia de Sistemas Complejos, Instituto Tecnológico de Buenos Aires (ITBA).
3° ISISTAN – Instituto Superior de Ingeniería de Software Tandil (CONICET/UNCPBA), Tandil, Bs. As., Argentina
4° Centro de Neuropsiquiatría y Neurología de la Conducta- CENECON, Facultad de Ciencias Médicas, Universidad de Buenos Aires.
5° Consejo Nacional de Investigaciones Científicas y Tecnológicas (CONICET)

During sleep, humans experience offline experiences that we call dreams, which lack rational judgment about their strangeness. However, during lucid dreaming (LD), subjects know they are dreaming and can control the dream content. Another type of aware dream experience is the out-of-body experience (OBE) initiated from sleep paralysis. Although the differences between non-LD, LD and OBEs are evident, some authors claim OBEs are a kind of LDs. We analyzed a set of 1014 dream reports (824 non-LDs, 122 LDs and 68 OBEs) obtained from 60 participants that kept a dream journal for two months. The collected dreams were analyzed by automatic methods of analysis of emotions such as EmoLex and Sentisense, also with classifiers such as Empath. The dream stories provided by the participants were scored with a series of ratings using a method based on Hall and Van de Castle's dream content scoring system upon which we developed variations and additional measures to adapt to the requirements of our task. Overall, we found that OBEs have significantly more negative emotions and less positive emotions, as measured by automatic methods. OBEs against Lucid reports show significantly more physical sensations and a broad variety of them, and they also refer more to their own movements. Lucid reports have more references to themselves and to the dream environment than OBE reports. These content differences support the idea that OBEs are unique experiences and distinct from LDs.

092 | Under-representation of discriminating neurons in the medial prefrontal cortex of a schizophrenia mouse model during a social discrimination task

Cognition, Behavior, and Memory

Author: Javier Gonzalez Sanabria | email: javiergs89@gmail.com

Javier Gonzalez Sanabria [1°], María Florencia Santos [1°], Juan Emilio Belforte [1°], Camila Zold [1°]

1° Grupo de Neurociencia de Sistemas, Instituto de Fisiología y Biofísica, IFIBIO-Houssay, UBA-CONICET

Schizophrenia (SZ) is a complex neuropsychiatric disease that affects the way patients think and cope with daily life including poor social functioning. Recent studies in mouse models have focused on the social cognition impairments related to SZ. Previously, we reported that restricted ablation of NMDA receptors in cortical GABAergic interneurons during early postnatal development results in a SZ-like phenotype in adulthood (KO). The medial prefrontal cortex (mPFC) controls many high cognitive functions impaired in SZ including aspects of social interactions. However, it remains unclear how mPFC ensembles encode social information and how this representation might be disrupted in SZ. In this work we recorded the activity of putative pyramidal mPFC neurons in KO and control mice while they performed a discrimination task on an enriched linear track with an encaged social target (novel adult male) on one end and an encaged novel object on the other. Here we identified cortical ensembles of coding neurons capable of responding to different aspects of the task, including a preference for the social or the object side. Furthermore, KO animals displayed a lower proportion of discriminating neurons and an impoverished ensemble dynamics that could explain the behavioral alterations observed with a re-exposure to the task. These findings help to elucidate how mPFC assigns cognitive resources to encode social information and how this representation becomes altered in SZ.

094 | Internal states and modulation of the expression of a neutral verbal memory

Cognition, Behavior, and Memory

Author: Lisa Guizzardi | email: lisa.guizzardi@gmail.com

Lisa Guizzardi [1°], Nicolas Fernandez Larrosa [1°], Francisco Javier Maza [1°], Alejandro Delorenzi [1°]

1° Instituto de Fisiología, Biología Molecular y Neurociencias (IFIBYNE-UBA-CONICET), Ciudad Universitaria, Pabellón IFIBYNE, Argentina.
2° Departamento de Fisiología, Biología Molecular y Celular, Facultad de Ciencias Exactas y Naturales, Universidad de Buenos Aires, Ciudad Universitaria, Argentina.

Incorporating the Wagner's Affective Extension of Sometimes Opposing Processes model, our current working hypothesis posits that the development of internal states are determinants of the behavioral expression of reactivated memories. During consolidation and reconsolidation, endogenous neuromodulators activated by concurrent experiences may control the likelihood that memories will guide future behaviors. Recent results show the first evidence of the Hypothesis in verbal memories (Rey Auditory Verbal Learning Test, RAVLT). Administration of a cold pressor stress (CPS) specifically during reconsolidation impaired long-term memory expression. Actually, an increase in arousal was revealed in the testing session when CPS was administered concurrently with reconsolidation. It follows from those results that it will be necessary to assess whether the internal state (high arousal) is a determinant in the effects that CPS has on changes in LTM expression. We postulate that the induction of positive internal states prior to evaluation will reverse the impairing effect induced by the CPS. Here, firstly, we consider to a) test the induction of a positive emotional state via the presentation of selected IAPS (International Affective Picture System) photos and b) evaluate whether such induction modulates the short-term expression of RALVT memory. For this purpose, we have developed a protocol in PsychoPy designed to incorporate the induction of emotional states into the RALVT paradigm.

096 | Effect of environmental enrichment on long-term memory and neurotrophins in the crab Neohelice granulata.

Cognition, Behavior, and Memory

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

María Luz Iglesias [1°], Arturo Gabriel Romano [1°]

1° IFIByNE

Environmental enrichment (EE) has important physiological effects in the nervous system, such as synaptogenesis, adult neurogenesis, etc. In rodent models, EE has shown memory enhancement. However, little evidence is available on EE effect in invertebrates. We are studying the consequence of exposing the crabs in the laboratory to EE in comparison to standard conditions of maintenance. On the one hand, memory enhancement was found in crabs maintained in EE under weak training condition in which no memory retention was shown in standard conditions maintained animals. On the other hand, we are initiating the study of the effect of EE on the level of neurotrophins-like proteins in the central brain. We identified by western blots, using a brain derived neurotrophic factor (BDNF) polyclonal antibody, proteins compatible with conserved neurotrophic factors (NT) of arthropods. We project to comparing the level of such proteins in central brains of animals maintained in EE with those of animals maintained in standard conditions. The study of EE effects in arthropods contributed to the understanding of the relevance of this treatments in comparative studies.

098 | The role of the BDNF Val66Met polymorphism on dopaminergic function

Cognition, Behavior, and Memory

Author: Constanza Milena Jandar Paz | email: cjandarpaz@immf.uncor.edu

Milena Jandar Paz [1°], Candela Panozzo [1°], Agustín Anastasía [1°2°]

1° Instituto Ferreyra (INIMEC-CONICET-Universidad Nacional de Córdoba)
2° Instituto Universitario de Ciencias Biomédicas de Córdoba (IUCBC)

A SNP in the BDNF gene is present in approximately 25% of the world population. The SNP results in a valine for methionine substitution at position 66 (Val66Met) within the BDNF prodomain (pBDNF) sequence. This SNP is highly associated with increase predisposition to develop anxiety, addictions, and cognitive deficit and progression of Parkinson's disease. All these disorders involve CNS dopaminergic systems dysfunction. Therefore, we hypothesize that the Met variant of pBDNF alters the structure and function of dopaminergic neurons and increase their vulnerability to degenerate. First, we studied in mice if a specific dopaminergic neurotoxin (6-OHDA) affects dopamine-related behaviours in the presence of at least one Met allele. Using anxiety-related and motor behavioral test, we determined that mice injected with 6-OHDA with at least one Met allele displays motor behavioral abnormalities and anxiety-related behaviors. Then, we determine if pBDNF Met could alter dopaminergic neuron structure in vivo and in vitro. Regardless of the expression of pBDNF receptors (p75NTR and SorCS2), only endogenous expression of pBDNF Met reduce dopaminergic neurons axonal length, compared to ectopic administration that was inert. Our results suggest that pBDNF Met alters intracellular processes (i.e. trafficking) resulting in dopaminergic dysfunction.

100 | Time flies like an arrow; fruit flies like a banana: The role of context in semantic ambiguity processing

Cognition, Behavior, and Memory

Author: Julieta Laurino | email: julilaurino@gmail.com

Julieta Laurino [1°], Laura Kaczer [1°]

1° Instituto de Fisiología, Biología Molecular y Neurociencias (IFIByNE – UBA – CONICET)

Many of the words we use have more than one meaning, which is known as semantic ambiguity. But how do we decide which meaning is appropriate each time we encounter an ambiguous word? In this study, we assessed the role of context in the evocation of meaning in ambiguous words. First, we evaluated whether it is possible to bias the interpretation of an ambiguous word by previously presenting a context related to one of its meanings. Furthermore, we explored the extent to which short-term memory contributes to this process by evaluating word meaning access at a longer interval. Results showed that recent context influences preference for an ambiguous word meaning, and that this effect decays over time. However, the question remains whether it is the time interval itself or the presence of unrelated contexts that promotes the decay in the interpretation bias. Ongoing experiments explore this question by including a semantically unrelated task (math task) during the interval. Future work will evaluate if a physiological correlate of ambiguity and context effects can be observed in pupil dilation as a result of a higher attentional demand. We expect ambiguous words to present greater pupil dilation, and even greater if the ambiguous word is preceded by a context related to its less common meaning. Taken together, these results suggest that adults' lexical-semantic representations are highly malleable, being able to update to their most recent experience.

102 | GABAergic modulation in the formation of declarative and recognition memories: preliminary results

Cognition, Behavior, and Memory

Author: Candela Sofía Leon | email: cleon@itba.edu.ar

Candela S. Leon [1°2°], Matias Bonilla [1°2°], Facundo Urreta Benitez [1°2°], Jaqueline Toledo [4°], Natividad Olivar [4°], Luis I. Brusco [2°4°], Cecilia Forcato [1°2°]

1° Laboratorio de Sueño y Memoria, Departamento de Ciencias de la vida, Instituto Tecnológico de Buenos Aires (ITBA).
2° Centro de Neuropsiquiatría y Neurología de la Conducta- CENECON, Facultad de Ciencias Médicas, Universidad de Buenos Aires.
3° Innocence Project Argentina, Buenos Aires, Argentina.
4° Centro de Neuropsiquiatría y Neurología de la Conducta- CENECON, Facultad de Ciencias Médicas, Universidad de Buenos Aires.

The recognition memory is essential in judicial decisions. However, memory is malleable and can lead to false memories. Furthermore, different neurotransmission systems modulate memory processes, being the GABAergic a fundamental one. There is broad consensus that Benzodiazepines impair encoding, but there are disparate results regarding its role in consolidation: It was observed that consolidation was impaired in aversive memories, while in neutral declarative memories it favors consolidation and reconsolidation. Additionally, given the high consumption of anxiolytics and that, in turn, they are prescribed to reduce the witness/victim anxiety, it is important to investigate this effect. Thus, considering that memory of a criminal act is generally aversive, we hypothesize that consolidation will be impaired by this drug. To assess this, a double-blind paradigm of two days was designed. On day 1, people watched a video of a robbery, and then consumed a pill of clonazepam 0.25 mg/placebo. One week later, memory was assessed using a culprit present and a culprit absent lineup. Preliminary results indicated no differences for the culprit present lineup. However, in the culprit absent lineup, it was observed a trend that could indicate that clonazepam negatively affects correct rejections, leading to more innocents being chosen. This possible deficit may be relevant in the judicial field to assess the reliability of eyewitnesses' choices.

104 | BEHAVIORAL AND HIPPOCAMPAL IMPAIRMENT IN INTRACEREBROVENTRICULAR STREPTOZOTOCIN-INJECTED FEMALE AND MALE RATS

Cognition, Behavior, and Memory

Author: Juliette López Hanotte | email: julietteloha@gmail.com

Juliette López Hanotte [1°], María Florencia Zappa Villar [1°], Facundo Peralta [1°], Ana Abril Vidal Escobedo [1°], Paula Cecilia Reggiani [1°]

1° Instituto de Investigaciones Bioquímicas de La Plata

Male rodents have been the default model organism in neuroscience research, including for the intracerebroventricular (icv) streptozotocin (STZ)-induced AD model. Our objective was to study the effect of icv-STZ in female rats with and without ovaries, and to compare it with STZ-injected males. Male rats were separated into Sham and STZ groups. Half of female rats were ovariectomized (OVX) 14 days before icv-STZ injection and separated into Sham, STZ, OVX, and OVX+STZ groups. Two weeks post injection, we conducted behavioral tests: Marble Burying, Novel Object Recognition, Barnes Maze, and Forced Swimming test. Immunohistochemistry analyses were performed in hippocampus. STZ-males showed overt behavioral deficit, hippocampal damage and neuroinflammation evidenced by reduced immature neurons and an increase in reactive microglia. In females, STZ affected behavioral performance differently depending on the presence of ovaries, with STZ affecting mainly ovariectomized rats. At the morpho-histochemical level, as well as males, STZ reduced the number of immature neurons in the Dentate Gyrus (DG), and this loss was higher in OVX rats. Regarding microglia, STZ increased reactive cells but also OVX+STZ group showed an increase in the total cell number. Unlike males, STZ increased GFAP immunoreactive area in the DG. We confirmed the importance of conducting studies comparing sex differences and considering the ovarian status relevance in modulating icv-STZ neurodegenerative effects.

106 | Comparing face-to-face vs. online working memory tests: Letter Number Sequencing and Running Span.

Cognition, Behavior, and Memory

Author: Jonathan Gabriel Marrujo Sucno | email: jmarrujo@psi.uba.ar

Jonathan G. Marrujo [1°], Magalí Ayelén Martínez [2°], Federico Martín González [1°], Juan Pablo Barreyro [2°], Débora I. Burin [2°]

1° Instituto de Investigaciones, Facultad de Psicología, Universidad de Buenos Aires
2° Instituto de Investigaciones, Facultad de Psicología, Universidad de Buenos Aires; CONICET

Online and remote studies are increasing in neurocognitive research, due to its cost-effectiveness, participant reach, and other advantages in data collection. Working memory (WM) is a limited capacity cognitive system in charge of temporal maintenance and active processing, supporting complex cognitive tasks. We report two studies comparing the face-to-face version and their online adapted versions, of two verbal working memory tests, Letter-Number Sequencing (LNS) and Running Span (RS). Four first year psychology students' samples completed LNS (N = 234) or RS (N = 106) in face-to-face small groups, and LNS (N = 115) or RS (N = 251) online. LNS was implemented in synchronic Zoom sessions with small groups, and Quizzit; RS was implemented with PsyToolkit 3.3.2 and tested asynchronously. Reliability was adequate for both (DNS ? Cronbach = .78, CI95 [.72 – .85]; RS ? Cronbach = .81, CI95% [.78 – .84]. For both, difficulty increased as a function of item and set size. However, for LNS, data needed more cleaning, and discrepancies between original and online testing for initial and final items' distribution were observed. In conclusion, remote, online WM tests require careful implementation and psychometric analyses before using them for neurocognitive research.

108 | Bibliometric study on the configuration of neurosciences in Argentina (1980-2020)

Cognition, Behavior, and Memory

Author: Agustin Mauro | email: agustinfmauro@gmail.com

Agustin Mauro [1°]

1° Instituto de Humanidades, CONICET-UNC

In the last decades, neurosciences have grown and undergone several transformations. Understanding these processes allows better decisions making when managing different spaces for the production and dissemination of neuroscientific knowledge. This article proposes to characterize the conformation and configuration of neurosciences in Argentina through a bibliometric study. To this end, the questions it seeks to answer are: How was configured the current neuroscientific research in Argentina? Who are the main researchers? What do they research? Where do they published? What are the collaboration networks like? What are the main research topics and methodologies? How do each of these dimensions change over time? The results show that in the first periods studied there is research on the brain associated with studies in neurophysiology and neurochemistry, but which cannot be considered as “neurosciences”, and that in the last twenty years neurosciences configure as a distinctive area of research, characterized by interdisciplinarity, a great variety of topics, methodologies, researchers and institutions.

110 | Beyond Attention: Claustrum and the Journey to Learning and Memory

Cognition, Behavior, and Memory

Author: Candela Medina Medina | email: candela.eme@gmail.com

Candela Medina [1°], María C Krawczyk [1°], Ojea Ramos Santiago [2°], Millán Julieta [1°], Mariano G Blake [3°], Mariano M Boccia [1°]

1° Laboratorio de Neurofarmacología de Procesos de Memoria, Cátedra de Farmacología, Facultad de Farmacia y Bioquímica – UBA
2° Instituto de Fisiología, Biología Molecular y Neurociencias (IFIBYNE), UBA-CONICET
3° Instituto de Fisiología y Biofísica (IFIBIO UBA-CONICET), Facultad de Medicina – UBA

The claustrum is a highly conserved but enigmatic cerebral structure, since little is known about its cytoarchitecture, neural circuits, function and physiology. Recent studies report projections between claustrum and the entire cortical mantle, together with subcortical regions. This densely connected structure is thought to be involved in several cognitive functions, such as regulation of sleep, attention, stimuli salience processing and neural mechanisms of consciousness. Be that as it may, few studies evaluate the participation of this structure in learning and memory processes, despite requiring most of the aforementioned mechanisms. Our working hypothesis is that neural activity of the claustrum partakes in the formation and stabilization of a long-term memory. Preliminary results show that administering Lidocaine immediately after training session or memory reactivation induces an impairment in the animals' behavioral performance in an inhibitory avoidance task. On top of that, a similar effect was evidenced in their performance in a hole-board test, which entails different motivational, sensorial and motor requirements than an aversive task. Future directions of this project include evaluation of the role of the cholinergic system in these mnemonic processes within the claustrum, studying both the modulatory input of acetylcholine and the cholinergic output that projects to other subcortical regions relevant to memory formation.

112 | Physical and social context changes due to the lockdown during the COVID-19 pandemic modified alcohol consumption in a sample of Argentine college students

Cognition, Behavior, and Memory

Author: Sonia Jazmín Molina | email: molinasonia.j@gmail.com

Candela Sofía Carreira Caro [1°], Ángel Emanuel Lietti [1°], Gustavo Ezequiel Buján [2°], Jesica Formoso [3°], Angelina Pilatti [4°], Laura Ruth Guelman [1°], Sonia Jazmín Molina [1°]

1° Universidad de Buenos Aires. Consejo Nacional de Investigaciones Científicas y Técnicas. Centro de Estudios Farmacológicos y Botánicos (CEFyBO, UBA-CONICET). Facultad de Medicina, Buenos Aires, Argentina.
2° Universidad de Buenos Aires. Facultad de Medicina. 1ª Cátedra de Farmacología. Buenos Aires, Argentina.
3° Universidad de Buenos Aires, Facultad de Psicología. Instituto de Investigaciones. Buenos Aires, Argentina.
4° Universidad Nacional de Córdoba, Facultad de Psicología. Córdoba, Argentina.

Considering that alcohol consumption (AC) is highly prevalent in college students (CS) and can cause health alterations, it is relevant to identify risk factors that might promote AC, such as drinking contexts. Thus, this work aimed to study the role of drinking contexts, including the lockdown due to the COVID-19 pandemic, in promoting AC in CS of Buenos Aires. Argentinean CS (N= 1762; 74.8% women; Mean age= 23.25 ± 2.64) completed an online survey that assessed AC and drinking contexts before and during the lockdown. Different statistical analyzes were performed, including Latent Class Analysis (LCA) and ANOVA. LCA identified a 6-classes model for contexts that showed different AC patterns, both in terms of quantity and frequency. Several contexts were associated with AC, but especially those related to social meetings with peers. Additionally, the majority of CS use alcohol in a wide range of contexts -including intimate contexts as well- and present a more problematic and less flexible AC pattern. Finally, the lockdown modified drinking contexts and decreased AC in most cases. In conclusion, alcohol is widely used by CS in a plethora of contexts, which is worrying considering that it can induce health disturbances. Moreover, it is important to consider not only the influence of drinking contexts on AC but also diverse social aspects such as the lockdown -that could modify contexts and their influence on AC- to devise prevention and intervention strategies to reduce AC.

114 | Role of ERK1/2 dimerization in memory and plasticity.

Cognition, Behavior, and Memory

Author: Santiago Ojea Ramos | email: ojea.santiago@gmail.com

Santiago Ojea Ramos [1°], María del Carment Krawczyk [2°], Candela Medina [2°], Julieta Millan [2°], María Florencia Acutain [3°], María Verónica Baez [3°], Arturo Gabriel Romano [1°], Mariano Martin Boccia [2°], Mariana Feld [1°]

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).

While ERK1/2 phosphorylation has been extensively studied regarding memory and plasticity, little is known about the role of dimerization in those processes. Here we report preliminary results using native gel electrophoresis to assess the level of ERK2 dimerization generated by glycine-induced chemical long-term potentiation (cLTP) in mature primary cultures of rat cortex neurons, and in mice hippocampus after inhibitory avoidance (IA) memory reactivation. We also evaluated the effect of DEL-22379, a recently developed specific ERK dimerization inhibitor (non affecting phosphorylation), on IA memory reconsolidation and cLTP. We found that cLTP induced ERK2 dimerization in mature cultured neurons, which was inhibited by DEL-22379 addition to the culture media. Additionally, memory reactivation induced a significant decrease of ERK2 dimerization in IA trained mice. Furthermore, intrahippocampal infusion of DEL-22379 after memory reactivation had a surprising bidirectional effect: while it blocked reconsolidation of a strong IA memory, the opposite effect was observed on reconsolidation of a weak IA memory, resulting in its enhancement. This is the first report showing ERK dimerization in neuronal tissues and DEL-22379 effect on plasticity and memory processes. Although more research is needed, these initial findings suggest a relevant role of ERK dimerization in plasticity and memory.

116 | Regulation of cued fear conditioning by the Lateral Habenula

Cognition, Behavior, and Memory

Author: María Paula Ospital | email: ospitalpaula@gmail.com

María Paula Ospital [1°], Tomás Sachella [2°], Joaquín Piriz [1°]

1° Instituto de Fisiología, Biología Molecular y Neurociencias (IFIBYNE) (UBA-CONICET)
2° Instituto de Biología Celular y Neurociencia “Profesor Eduardo De Robertis” (IBCN), Facultad de Medicina, UBA, CONICET

To survive in a dynamic environment, animals must be able to avoid dangerous situations that put their survival at risk. A key aspect of this process is to form aversive memories that allow information about the danger of stimuli encountered in the past to be retained and evoked. The cerebral nucleus of the Lateral Habenula (LHb) is a small and epithalamic brain region responsible for indicating negative consequences of actions and it is related to pathological states, such as depressive disorders or addictions. Recently, our group has characterized the role of the LHb in the formation of the aversive memory of the Pavlovian Fear Conditioning (FC). The objective of this project is to understand in greater depth how LHb fulfills this function by identifying the underlying neural circuits. For this purpose, we selectively perform pharmacological inhibition or optogenetic activation in the neurons of LHb-centered circuits, along the different stages of the FC protocol.

118 | Acetylcholine and dopamine interact in the medial prefrontal cortex to modulate cocaine-associated memory

Cognition, Behavior, and Memory

Author: VERONICA PASTOR PASTOR | email: verpastor@fmed.uba.ar

Verónica Pastor [1°], Juliana F Dalto [1°], Marta C Antonelli [1°], Jorge H Medina [1°]

1° CONICET-Universidad de Buenos Aires, Instituto de Biología Celular y Neurociencia “Prof. Eduardo De Robertis” (IBCN), Buenos Aires, Argentina.

Neuromodulation of the medial prefrontal cortex (mPFC) is essential for cortical control of behaviors induced by appetitive stimuli, such as cue-induced seeking behavior after the formation of drug-context associative memories. We have recently reported that the antagonism of mPFC alpha 7 nicotinic receptors (nAChRs) by methyllycaconitine (MLA) blocked cue-induced cocaine memory retrieval in a non-transient manner. However, the interaction between modulatory systems in the mPFC and their role in memory processing is a question which remains unanswered. Previous work showed that the activation of alpha 7 nAChRs in the mPFC increases dopamine release and that dopamine signaling through D1 receptors (D1R) is necessary for cocaine memory retrieval. Thus, we hypothesized that cholinergic signaling through alpha 7 nAChRs is needed in the mPFC to allow cue-induced cocaine memory retrieval by interacting with dopaminergic D1R activation. Using pharmacologic and behavioral techniques we demonstrate that D1R activation reversed MLA-induced blockade of cocaine CPP retrieval. Moreover, the modulatory role of D1R was evident only in the presence of nAChRs antagonism. These results suggest that alpha 7 nAChRs and D1R signaling interact in the mPFC for allowing cue-induced cocaine memory retrieval. Acknowledgements: International Society for Neurochemistry, CAEN grant (VP)

120 | Individual differences in heart rate analysis during tasks requiring cognitive control

Cognition, Behavior, and Memory

Author: Verónica Adriana Ramírez Ramírez | email: veronica.adriana.ramirez@gmail.com

Verónica Adriana Ramírez [1°], Sophie Mizrahi [2°], Eliana Ruetti [3°]

1° Unidad de Neurobiología Aplicada, UNA, CEMIC-CONICET; Facultad de Psicología, Universidad de Buenos Aires
2° Facultad de Ciencias Humanas y de la Conducta, Universidad Favaloro
3° Unidad de Neurobiología Aplicada, UNA, CEMIC-CONICET

Introduction. How emotions are processed affects people's cognition and behaviour. One of the most used measures to study the physiological component of emotions is heart rate (HR), where greater HR variation (range) implies greater emotional processing. Several investigations established the importance of gender modulation of these processes due to the different cultural treatment given to emotions among genders. However, very heterogeneous results are reported today, and few studies incorporated these parameters when investigating emotion modulation of cognitive processes according to individual factors. Aim. This study analyzes the role of individual differences in HR variation during a cognitive control task (Stroop) under two different emotional conditions. Methods. Participants were 60 adults aged between 19-35. They were randomly assigned to positive or neutral video visualization, and their HR was registered. Results. There was a tendency for women to have higher HR during positive videos than in neutral. Although there were no differences in HR during the video, men presented a higher HR in the positive condition than in neutral in every Stroop block. No significant correlations were found between HR and age. Discussion. The visualization of the positive video could have generated an autonomic activation that was launched in response to cognitive demand. This study illustrates the importance of including gender variables in emotional processing studies.

122 | Astrocytic glutamate uptake as a key mechanism involved in spatial memory formation and disruption

Cognition, Behavior, and Memory

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

Juan G. Riboldi [1*], Julieta Correa [1*], Matias Renfijes [1*], Pablo Budriesi [1*], Ramiro Tintorelli [1*], Haydeé Viola [1*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), Universidad de Buenos Aires (UBA), Buenos Aires, Argentina.

The objective of this work was to study the role of Glutamate transporter GLT-1, specifically located in astrocytes, in learning and memory processes. Here, we used the spatial object recognition (SOR) task in rats to study the effect of GLT-1 inhibition. In this task, a strong training session induced long-term memory (LTM) formation and a weak training session only induced short-term memory (STM) but not LTM. We administered dihydrokainic acid (DHK), a selective GLT-1 inhibitor, in the hippocampus to affect different stages of memory. Our results suggest that DHK has different effects when applied either in a strong or a weak SOR training. The inhibition of GLT-1 promoted LTM formation from a weak training session in a protein-synthesis dependent manner. This effect was dependent on brain-derived neurotrophic factor and the expression of the activity-regulated cytoskeletal protein, which are plasticity related proteins necessary for memory consolidation. Furthermore, DHK impaired memory expression, reconsolidation and persistence, when administered before a test session, after a reactivation session, or before a second training session, respectively. On the other hand, chronic systemic administration of Ceftriaxone, which is known to enhance the synthesis of GLT-1, did not affect acquisition and STM expression, but impairs LTM formation. These findings reveal that glutamate homeostasis mediated by GLT-1, is a key mechanism involved in memory formation and disruption.

124 | An Initial Image analysis for the study of the interrelationship between expression of memories and internal states in Neohelice

Cognition, Behavior, and Memory

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

Juan Francisco Robuschi [1°], Francisco Maza [2°], Alejandro Delorenzi [1°]

1° 4Instituto 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. Electronic address: delorenzi@fbmc.fcen.uba.ar.
2° 1Instituto de Fisiología, Biología Molecular y Neurociencias (IFIBYNE-UBA-CONICET), Ciudad Universitaria, Pabellón IFIBYNE, Argentina.

In the group's working hypothesis, an adaptive function of reconsolidation — and consolidation — is to enable the induction of changes in memory expression by endogenous processes activated by concurrent experiences. A central goal is to show that the integration of internal states (e.g. emotions) to the memory trace is part of the process(es) that determines the expression of reactivated memories. Here, in the Neohelice aversive memory paradigm, we evaluate the possibility of combining the analysis of changes in behavior triggered both by reactivation of the mnesic trace and by variations of internal states in the same animal. We propose, via individual video analysis, the dissection of the escape response triggered by the visual danger stimulus from other behaviors in the training-testing arena (e.g. active freezing response, place preference) during both the exposure to the training-context and the visual danger stimulus. Parameters such as the shift of the area occupied by the crab, the trajectory distance or the immobility periods, seem to be suitable for this approach. For instance, all these parameters disclose significant differences during the training session. The initial analysis shows that this data-obtaining system might be a really reliable tool to keep track of the different possible behaviors.

126 | Temporo-parietal aslant tract: Connections

Cognition, Behavior, and Memory

Author: Agostina Roggero | email: agostinaroggero@gmail.com

Agostina Roggero [1°], Isadora Boing [1°], Gimena Jurado [1°], Ayrton Bovier [1°], Mariana Bendersky [1°], Pablo Sebastián Paolinelli [2°], Julian Cicler [2°], Valentín Iglesias [2°], Axel Omar Colombo [2°]

1° Laboratorio de Anatomía Viviente de la UBA (UBACyT) – III Cátedra de Anatomía – Facultad de Medicina – Universidad de Buenos Aires
2° Laboratorio 6 de Neuroanatomía – III Cátedra de Anatomía – Facultad de Medicina – Universidad de Buenos Aires

The temporo-parietal aslant tract (TPAT) connects the temporal lobe with the inferior parietal lobe and seems to be involved in language. This study aims to analyze these connections bringing functional and anatomic-surgical information of the TPAT. Methods: tractography was performed using DSI Studio in 20 3T magnetic resonance images of healthy males and females aged 22-35 years old chosen from the Human Connectome Project. Then 6 human cadavers hemispheres were tackled with Kingler's white matter dissection method. Connections of the dorsal and ventral portions of TPATs were analyzed. Results: the left dorsal TPAT (ldTPAT) was found within the angular gyrus (ANg)(100%) and the medium temporal (MTg)(95%) and posterior inferior temporal gyri (PITg)(95%); the left ventral TPAT (lvTPAT) between the supramarginal gyrus (SMg)(100%) and the MTg (100%); the right dorsal TPAT (rdTPAT) among the ANg (100%) and the PITg (100%) and MTg (85%); the right ventral TPAP (rvTPAP) between the ANg (94.44%) and SMg (94.44%) and the MTg (100%) and PITg (61.11%), it was absent in 2 subjects. Fiber dissection evidenced: 1- Connection between the superior temporal gyrus and MTg with the SMg. 2- Connections linking the MTg and PITg with the ANg. Conclusions: the ldTPAT may be involved in semantic skills; the lvTPAT in word repetition and lexical-semantic comprehension; the rdTPAT and the rvTPAT in visuospatial and language comprehension, the rdTPAT also in visual semantic memory storage.

128 | Emotional effects on auditory word recognition for bilinguals: Differences on L1 and L2 processing

Cognition, Behavior, and Memory

Author: Leticia Sarli | email: leti.sarli@gmail.com

Leticia Sarli [1°], Nadia Justel [1°]

1° a Laboratorio Interdisciplinario de Neurociencia Cognitiva (LINC), Centro de Investigación en Neurociencias y Neuropsicología (CINN), Universidad de Palermo
2° Consejo Nacional de Investigaciones Científicas y Técnicas (CONICET)

Visual and auditory word processing differences have been reported on monolinguals; differences between people's first (L1) and second (L2) language are, however, still a developing field in cognitive neuroscience. Previous research shows that word recognition is modulated by the emotional content of the stimuli, since emotional stimuli shows better recognition accuracy and speed than neutral items. The aim of this study was to assess auditory emotional word recognition on L1 vs. L2. Thirty-four bilingual volunteers performed an online auditory lexical decision task in which they had to decide whether a given sound was a word (positive, neutral, or negative) or not, either on L1 or L2. Participants were split into two groups: L1 (n = 18) and L2 (n = 17). Results indicated that participants showed higher sensitivity (d') scores for L1 than L2. Likewise, the L1 group had over all shorter response times. Positive words were recognized faster than neutral and negative words only by the L2 group. Bias index (C) analyses showed higher tendency to answer "word" for positive items in L2 but not in L1; this group showed higher tendency to answer "pseudoword" for neutral stimuli. Therefore, even though word recognition is more efficient in L1, emotionality seems to have a differential effect on L1 and L2 for auditory processing.

130 | Role of noradrenergic signaling in behavioral tagging and memory reconsolidation

Cognition, Behavior, and Memory

Author: MATIAS NICOLAS SCHROEDER | email: matias.nicolas.sch@gmail.com

Matias Nicolas Schroeder [1°], Diego Moncada [1°]

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

The behavioral tagging (BT) hypothesis postulates that memory stabilization relies on the setting of experience-specific tags at appropriate neural substrates, and the capture of newly synthesized plasticity related proteins (PRPs) at said substrates. We have previously shown this mechanism underlies both memory consolidation and reconsolidation. Here, we study the role of the locus coeruleus (LC) and the ?-adrenergic in the BT process underlying memory reconsolidation. Infusion of ?-adrenergic receptors antagonist propranolol 15 minutes before reactivation of spatial object location (SOR) memory impaired its reconsolidation. This amnesic effect could be prevented if a novel open field (OF) was explored 60 minutes before or after memory reactivation, but not 3 hours after. This rescuing effect was protein synthesis dependent. Furthermore, the inactivation of the LC also prevented memory reconsolidation, effect which was once again countered by the exploration of a OF. We also saw the amnesic effect of protein synthesis inhibitor emetine (eme) could be prevented with the electrical stimulation of the LC, provided ?-adrenergic receptors were functional. Finally, we analyzed the expression of proteins associated to memory stabilization after memory was reactivated in the presence of propranolol, and how the exploration of an OF affected this expression. Taken together, these results suggest noradrenergic signaling regulated PRPs synthesis required for memory reconsolidation.

132 | Learning alternate paths to the same goal is enhanced by dentate gyrus processing

Cognition, Behavior, and Memory

Author: Natalia Soldi | email: natalia.soldi@gmail.com

Natalia Soldi [1°], Sabrina Benas [2°], Emilio Kropff [2°], Alejandro F. Schinder [1°], Verónica C. Piatti [1°]

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

Animals need to remodel stored memories of their nest location and feeding sites due to continuous changes in the environment. The dentate gyrus (DG) of the hippocampus is one of the most plastic brain regions because it is a niche of continuous adult neurogenesis. We used chemogenetic inhibition of DG circuits in mice to study their role for learning two alternate routes to the same reward position in a crossword maze. We found that the DG is critical for rapid learning of the second alternate path when the task requires high cognitive demand. The DG is known to play a critical role in the discrimination of similar spatial contexts, but it is also involved in improving performance in challenges requiring complex working memory. We therefore asked what function of the DG is most relevant for resolving the alternate routes to the same goal in the crossword maze. We hypothesize that it may be required for: 1) helping to reduce the interference of the memory trace of the first path when navigating the second one; or 2) it may enhance the capacity to hold complex memory sequences of the successful trajectories. To address these questions, we are currently building data matrices holding all the navigation data to extract relevant features of mice behaviors and choices to reach the reward. Preliminary analysis suggests that mice are able to simultaneously hold two sequences for the alternate paths for several minutes in the same environment, which supports the second hypothesis.

134 | Impact of a short nap on declarative memory encoding in older adults: Preliminary results.

Cognition, Behavior, and Memory

Author: LEONELA MAGALÍ TASSONE | email: ltassone@itba.edu.ar

LEONELA MAGALÍ TASSONE [1°2°], MALEN DAIANA MOYANO [1°2°], VANESSA VIDAL [1°2°], MATÍAS PRETEL [1°], IGNACIO BRUSCO [2°3°] CECILIA FORCATO[1°2°]

1° Laboratorio de Sueño y Memoria, Departamento de Ciencias de la vida, Instituto Tecnológico de Buenos Aires (ITBA).
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.

Normal aging is accompanied by deficits in several memory processes: encoding, consolidation and evocation. Nevertheless, encoding information is the most affected. Furthermore, during wakefulness, the constant encoding of new information leads to an increase in the net synaptic strength in the brain that saturates learning. According to the synaptic homeostasis hypothesis, slow-wave sleep serves to globally downscale synaptic strength, that restores cellular homeostasis and allows the synapsis available for future encoding. We hypothesize that a short nap can positively impact cognition in older adults, improving memory encoding. Here we will discuss preliminary data of the impact of a daytime nap before declarative memory encoding in older adults.

136 | A case of false recognition in the Argentine justice

Cognition, Behavior, and Memory

Author: Facundo Antonio Urreta Benitez | email: facu.urreta@gmail.com

Facundo A. Urreta Benitez [1°2°3°], Candela S. Leon [1°2°], Matías Bonilla [1°2°], Cecilia Forcato [1°2°]

1° Laboratorio de Sueño y Memoria, Departamento de Ciencias de la vida, Instituto Tecnológico de Buenos Aires (ITBA).
2° Consejo Nacional de Investigaciones Científicas y Tecnológicas (CONICET), Buenos Aires, Argentina.
3° Innocence Project Argentina, Buenos Aires, Argentina.

On June 14, 2008, a group of robbers entered a supermarket located in the province of Buenos Aires. The episode ended tragically, with the murder of one of the workers. A local man was tried for the crime and sentenced to life in prison. A decade later, his case was reopened thanks to the work of Innocence Project Argentina, revealing a series of errors in the judicial process, and leading to the release of the inmate. The Laboratorio de Sueño y Memoria team was invited to participate in the review of the case, analyzing from a neuroscientific perspective the validity of the lineups that concluded with the wrongful identification of the suspect. Here we discuss the analyses made in the light of current theories on the formation of false memories, memory updating through the reconsolidation process, memory forgetting and general errors in recognition.

138 | Measuring Executive Functions with a computerized software: results for unsupervised interventions

Cognition, Behavior, and Memory

Author: Melina Vladisauskas | email: m.vladisauskas@gmail.com

Melina Vladisauskas [1°], Verónica Nin [3°], Laouen Belloli [2°], Hernán Delgado-Vivas [3°], Alejandra Carboni [3°], Diego Fernández Slezak [2°], Andrea P. Goldin [1°]

1° Laboratorio de Neurociencia – Universidad Torcuato di Tella – CONICET
2° Laboratorio de Inteligencia Artificial Aplicada, FCEyN – CONICET
3° Centro de Investigaciones Básicas en Psicología, UDELAR – ANII

Mate Marote is an open source cognitive-training software aimed at children between 4 and 8 years old. It consists of a set of computerized games specifically tailored to train and evaulate executive functions (EF): a class of processes critical for purposeful, goal-directed behavior, including working memory, planning, flexibility, and cognitive control. During the last ten years several studies were performed using this software to measure and train children EF at their own schools in supervised interventions. Since 2015, we have started to conduct unsupervised, but controlled, interventions with children's own teachers help. In this study we show that children EF performance obtained in unsupervised interventions is mostly comparable to the data collected in the testing phase of supervised settings, at least for 2 of the 5 tests included in the analysis. For this cognitive evaluations we performed mixed models analysis and were able to replicate in unsupervised interventions the difficulty effects, an age effect and a socioeconomic status effect that were previously observed in supervised interventions. Further studies with a greater sample size are required to understand whether the other 3 tests can be used to measure EFs in unsupervised interventions.

140 | Validation of a mouse model of double burden of malnutrition to study the long-lasting effects on behavior and metabolism

Development

Author: Claudio Dario Barrios | email: Claudiobarrios@outlook.com

Claudio Dario Barrios [1°], Amaicha Depino [1°], Evelin Elia [1°], Claudio Barrios [2°], Amaicha Depino [3°], Evelin Elia [3°]

1° IFIBYNE
2° FBMC
3° DBBE

Malnutrition compromises both undernutrition and overweight/obesity, and they are both known to alter development and affect multiple systems. In the recent years a new phenomenon has been observed specially in developing countries: the “doble burden of malnutrition” (DBM). DBM consists of children suffering from undernutrition during their early stages of development followed by overweight/obesity later in life. To date there is no animal model that recapitulates DBM and allows to study its effects on metabolism and neurodevelopment In this work we attempted to generate a mouse model of DBM by combining maternal separation from postnatal day (P) 5 to P21 (undernutrition) and cafeteria diet from P21 to adulthood (obesity). We observed a decrease in weight and size during maternal separation, followed by a steep gain of weight in animals offered with cafeteria diet. We then subjected adult animals to a battery of behavioral tests and found no differences in anxiety and depression-related behaviors. Further characterization of behavior, metabolism and endocrine function will be necessary to identify the long-lasting effect of DBM.

142 | Lrig protein controls neural stem cell homeostasis in the developing neocortex

Development

Author: Ana Paula De Vincenti | email: anadevin8@gmail.com

Ana Paula De Vincenti [1°], Antonela Bonafina [1°], Fernanda Ledda [2°], Gustavo Paratcha [1°]

1° Laboratorio de neurociencia molecular y celular, Instituto de biología celular y neurociencias “Prof. E De Robertis” (IBCN), Universidad de Buenos Aires-CONICET
2° Fundación Instituto Leloir, Instituto de investigaciones bioquímicas de Buenos Aires, CONICET

The mammalian cerebral cortex is a highly organized structure responsible for cognitive, sensory and motor functions. It’s development requires coordination of crucial processes such as cell proliferation, migration, differentiation and acquisition of layer specific identities. Many extracellular cues and intrinsic factors have been identified as regulators of this process. However, further investigation is needed to understand how this complex architecture is achieved. In this work, we show that Leucine-rich repeats and immunoglobulin-like domains proteins (Lrig) are expressed in the embryonic neocortex during the period of neurogenesis. We identified a member of Lrig family as a regulator of cortical cell proliferation and self-renewal, disrupting mitogenic activity of trophic factors. We show that genetic ablation of Lrig modifies the population of proliferating cortical precursors in vivo, which in turn gives rise to an abnormal number of excitatory neurons in mice postnatal cortex. These results indicate that Lrig plays a key physiological role functioning as a homeostatic regulator of glutamatergic cortical neurogenesis.

144 | Nkx6.2 expressing progenitors generates somatostatin and parvalbumin cortical interneurons from the dorsal medial ganglionic eminence following an opposite timed developmental course.

Development

Author: Diego Matias Gelman | email: diegogelman@yahoo.com.ar

Maria Lucila Bechelli [1°], Maria Eugenia Tomasella [1°], Sofia Lopez Cardoso [1°], Diego Matias Gelman [1°]

1° IBYME

A wide diversity of cortical interneurons is generated from the subpallial region of the developing telencephalon by a combinatorial expression of transcription factors in a precise spatiotemporal program. Most cortical interneurons are derived from the medial ganglionic eminence that specifies both somatostatin and parvalbumin interneurons. It has been shown a preference for somatostatin specification from the dorsal region of the medial ganglionic eminence and a bias for parvalbumin interneuron specification from the ventral region. Despite our current understanding of interneuron specification, the molecular pathway segregating parvalbumin and somatostatin interneuron subtypes from the medial ganglionic eminence remains unknown. Here, we used a non-inducible Nkx6.2 transgenic mouse line to label the population of cortical interneurons derived from the dorsal region of the medial ganglionic eminence. Our results show that this transcription factor specifies over a third of the total population of cortical somatostatin interneurons preferentially at early developmental time points and that all Nkx6.2 derived somatostatin interneurons co-express reelin, calretinin or NPY. However, at late developmental stages, Nkx6.2 expressing progenitors shift to parvalbumin interneuron specification. Our results show that Nkx6.2 have the potential to specify both somatostatin and parvalbumin interneurons in an opposite timed course and suggest that a precise developmental control of Nkx6.2

146 | Alcohol And Early Ontogeny. Study Of Possible Effects Of Omega 3 On Reinforcing Aspects Of Alcohol, In An Instrumental Conditioning Scheme For Children

Development

Author: María Belén Luciani | email: beluciani.011@gmail.com

Belén Luciani [1°], Paula Abate [1°]

1° Facultad de Psicología – UNC

We propose to study the mechanisms that explain how alcohol exposure, during late gestation and/or the first postnatal weeks, evokes alcohol memories in neonates and infants. We intend to investigate whether the administration of Omega3 attenuates certain changes induced by moderate exposure to alcohol. The hypothesis is based on the fact that early ontogeny is a sensible period for the reinforcing aspects of the drug. And these experiences would modulate the neurobiological systems involved in the processing and expression of alcohol search and consumption behaviors. The general objective is to evaluate how prenatal alcohol exposure, in moderate doses, evokes alcohol memories in infant rats. Applying an infant instrumental conditioning procedure using alcohol as a positive reinforcer. We will evaluate if the administration of Omega3 mitigates the changes induced by alcohol, during late gestation. Offspring prenatally exposed to alcohol, with or without omega-3 administration, will be tested under the infant operant conditioning procedure (PDs 16 to 18) reinforced by alcohol or an alternative appetitive reinforcer. The representative animals of the different experimental groups will be sacrificed and the brains will be extracted to carry out dissections to analyze the expression of proteins involved in apoptotic neuronal death of the caspase 3 and 9 type by immunohistochemistry.

148 | Fate and distribution of adult-born neurons in the pallium of zebrafish

Development

Author: Fernanda Ruth Román | email: fernanda.r.roman@gmail.com

Fernanda R Román [1°2°], Julieta De Anna [1°3°], Lucas A Mongiat [1°2°]

1° Departamento de Física Médica, Centro Atómico Bariloche, Comisión Nacional de Energía Atómica, San Carlos de Bariloche, Argentina.
2° CONICET
3° CNEA-FONCYT

Lower vertebrates as teleost fish exhibits numerous neurogenic niches throughout their adult brain. The pallium of zebrafish is one of the most studied neurogenic regions among the teleost taxa, however little is known about the fate and distribution of the generated neurons. We recently demonstrated that cognitive activity modulates adult-born neurons addition to the zebrafish pallium. Here, we characterized the temporal dynamic of adult neurogenesis throughout the pallial subregions. To this end, we labeled a cohort of mitotic neural stem cells by EdU administration (10 mM) and followed them over time to analyze survival, proliferation and cell fate. Half of the EdU-labeled population survived after two months, indicating the death of a portion of these cells, whereas approximately a third part of neural stem cells is still proliferating for several days after labeling. Next, we characterized the neuronal fate of labeled cells by analyzing NeuroD expression (as a proxy of glutammatergic immature neurons) and GABAergic phenotype by using a tg(gad1b:GFP) fish line. We found an early and constant expression of NeuroD in EdU-labelled cells throughout the pallium, whereas the GABA-EdU colocalization decreased over time. Further experiments should be performed to discern between a possible death of GABAergic adult-born neurons or a developmental switch in gad1b expression. Our results point to a fine characterization of adult-born neurons fate in the pallium of zebrafish.

150 | GALLEIN-LOADED NANOPARTICLES OF HUMAN ALBUMIN ARE EFFECTIVE PREVENTING THE TOXIC EFFECTS OF Aβ IN IN VITRO MODELS OF ALZHEIMER'S DISEASE.

Disorders of the Nervous System

Author: ROMINA SOLEDAD ALMIRON | email: ralmiron@immf.uncor.edu

ROMINA SOLEDAD ALMIRON [1°], CECILIA TETTAMANTI [2°], SOFIA MARTINEZ [2°], MAGDALENA ANTONINO [1°], ALFREDO LORENZO [1°], DANIEL ALLEMANDI [2°], DANIELA QUINTEROS [2°], ELENA ANAHI BIGNANTE [1°]

1° INIMEC-CONICET-UNC
2° UNITEFA-UNC

Achieve a good cerebral bioavailability of drugs for treatment of neuropathologies is one of the great challenges of medicine and pharmacotechnics. The objective of this work is the design and in vitro characterization of gallein-loaded nanoparticles of human albumin for further evaluation in vivo models of Alzheimer's disease (AD) (Antonino et al. 2022). We obtained human serum albumin nanoparticles without and with gallein (GAL) (NP, NP-GAL) by the method of desolvation and thermal stabilization. The incorporation of the Evans Blue (EB) dye did not affect the encapsulation of GAL to the system (NP-EB, NP-EB-GAL) and allowed us to observe its location through the fluorescence that it presents when binding to albumin. We found that NP-EB and NP-EB-GAL entered to N2a cells and rat cortical neurons and adhered to extracellular A?40 fibers. We observe that NP-EB-GAL were effective in reducing the APP interaction with BACE1 induced by A? to the same degree as free GAL did. We also observed the ability of NP-EB-GAL, and interestingly of NP-EB, to reduce neuritic dystrophy and A?-induced loss of synaptophysin in primary cortical neurons. These results allow us to validate a method of preparation of NPs-GAL, effective in reducing A? toxicity in in vitro models of AD, with potential utility to halt A? deposition and neurodegeneration in animal models of disease and with translational possibility in human patients.

152 | Ceftriaxone prevents the impairment of glutamate homeostasis in the nucleus accumbens core and behavioral cross-sensitization to cocaine following chronic restraint stress

Disorders of the Nervous System

Author: Maria Paula Avalos | email: mp.avalos@unc.edu.ar

Maria Paula Avalos [1°], Andrea Susana Guzman [1°], Bethania Mongi-Bragato [1°], Marianela Adela Sanchez [1°], Georgina Vedelago [1°], Gastón Diego Calfa [1°], Flavia Andrea Bollati [1°], Liliana Marina Cancela [1°]

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

Though the facilitating influence of stress on drug abuse is well documented, the mechanisms underlying this interaction have yet to be fully elucidated. The present study explores the glutamatergic mechanisms in the nucleus accumbens core (NAcore) underpinning the sensitized response to the psychomotor-stimulating effects of cocaine following chronic restraint stress (CRS). Adult male Wistar rats were restrained for 2 hours/day for seven days (day 1-7). From day 17 until completing the experimental protocol (day 17-21), animals received a 5-day systemic treatment with ceftriaxone, a known enhancer of the glutamate transporter GLT-1, or vehicle. On day 21, all animals were randomly assigned to behavioral, microscopic, biochemical or neurochemical tests. Our results demonstrated that ceftriaxone prevents the increase of basal extracellular glutamate concentrations and changes in structural plasticity in the NAcore of CRS-experienced animals. These alterations were thought to underlie CRS-induced behavioral cross-sensitization to cocaine, since by restoring glutamate transport in the NAcore with ceftriaxone, the facilitating influence of stress on the sensitized response to the psychomotor-stimulating effects of cocaine was blocked. These results emphasize the biological importance of GLT-1 in the NAcore as a vulnerability marker in the comorbidity between stress and substance use disorders.

154 | What is the environment in autism studies? An epistemological analysis from a canguilhemian perspective

Disorders of the Nervous System

Author: Clara Nicole Castañares | email: ccastanares@immf.uncor.edu

Clara Nicole Castañares [1°], Pablo Helguera [1°], Guillermo Folguera [2°]

1° Instituto Ferreyra (IMMF-CONICET-UNC)
2° Instituto de Filosofía “Dr. Alejandro Korn”, FFyL y FCEN, UBA

Research on the relationship between environment and autism has increased substantially in recent years. Here we inquire about the regimes of perceptibility that arise from defining autism as a highly inherited, heterogeneous, multifactorial neurodevelopmental disorder and how this viewpoint shapes the way the environment is considered in the neuroscientific approach to autism. Regardless of the level of organization studied, it becomes evident that mainly unidirectional (environment affects the individual) and unidimensional (only biological aspects of the environment) notions of environment are reproduced. Based on Canguilhem’s work, we propose that this occurs as a consequence of three operations of conceptualization on the environment: simplification of the notion of environment, hierarchization of the genetic over the environmental, and disqualification of the individual-environment relationship. On the other hand, domains of imperceptibility, which arise from contrasting a certain viewpoint with other perspectives, allow us to understand what environment is not from a neuroscientific perspective and what environment could be if neuroscience could consider more holistic approaches generally excluded in the research on a phenomenon as complex as autism.

156 | 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 Delville [1°], Javier Andrés Muñiz [1°], Carolina Lucía Facal [1°], Ezequiel Pereira [1°], Melina Bordone [2°], Juan Esteban Ferrario [2°], Maria Elena Avale[1°]

1° Instituto de Investigaciones en Ingeniería Genética y Biología Molecular (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. 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.

158 | The stimulatory tone of dMSN on locomotion is preserved despite neonatal dopaminergic lesion.

Disorders of the Nervous System

Author: Camila Coll | email: collcami@gmail.com

Camila Coll [1°], Ettel Keifman [1°], Cecilia Tubert [1°], Rodrigo M. Paz [1°], Juan E. Belforte [1°], M. Gustavo Murer [1°], Bárbara Y. Braz [1°]

1° Grupo de Neurociencias de Sistemas, Instituto de Fiosiología y Biofísica (IFIBIO) Bernardo Houssay; UBA-CONICET

In Parkinson's Disease patients and rodent models, dopaminergic neuron loss (DAN) results in severe motor disabilities. In contrast, general motility is preserved after early postnatal DAN loss in rodents. In animals rendered parkinsonian by lesioning midbrain dopaminergic neurons during adulthood, medium spiny neurons (MSN) of the dorsomedial striatum (DMS) that belong to the direct pathway (dMSN) are markedly hypoactive and optogenetic activation of DMS-dMSN rescues locomotor activity. Previously we showed that dMSN are hyperexcitable and fully responsive to cortical input in neonatally lesioned mice. Therefore, we asked if preserved locomotion in these animals depends on dMSN activity tone. With this aim, we performed a chemogenetic inhibition of DMS-dMSN in lesioned animals and their control littermates, and we analyzed its effect on locomotion. We found that chemogenetic inhibition of DMS-dMSN has a more marked inhibitory effect on general motility in lesioned mice than in their controls, indicating that expression of normal levels of locomotion and general motility depend on dMSN activity after early DAN loss. Contrastingly, DMS-dMSN inhibition did not ameliorate a characteristic phenotype of the DAN lesioned animals in a marble burying task demanding higher behavioral control. Thus, increased dMSN excitability likely promoting changes in corticostriatal functional connectivity may contribute to the distinctive behavioral phenotype emerging after developmental DAN loss.

160 | Local Tau reduction rescues cognitive impairments and pathological phenotypes in a preclinical model of tauopathy

Disorders of the Nervous System

Author: Carolina Lucía Facal | email: carolinaluciafacal@gmail.com

Carolina Lucía Facal [1°], Javier Andrés Muñiz [1°], A. Ezequiel Pereyra [1°], Ramiro Clerici Delville [1°], Indiana Páez Paz [1°], Mariano Soiza Reilly [2°], Germán Falasco [3°], Ana Damianich [1°], María Elena Avale [1°]

1° Instituto de Investigaciones en Ingeniería Genética y Biología Molecular "Dr. Héctor N. Torres" (INGEBI – CONICET)
2° Instituto de Fisiología, Biología Molecular y Neurociencias (IFIBYNE – CONICET)
3° Laboratorio de Imágenes Moleculares, FLENI

Tauopathies are neurodegenerative diseases characterized by intraneuronal accumulation of hyperphosphorilated Tau protein, leading to neuronal dysfunction and neurodegeneration. Recent evidence suggests selective vulnerability of specific brain nuclei to initiate Tau pathology, from where pathological Tau propagates to other areas. Therefore, we aimed to validate a novel strategy for local Tau knock-down into specific brain nuclei in a mouse model of tauopathy. We analyzed the hTau mouse model of tauopathy, which primarily accumulates hyperphosphorylated Tau in the prefrontal cortex (PFC) and develops cognitive impairments and cortical-pyramidal neuronal firing deficits from 6 months-old. Artificial microRNAs designed to target the MAPT transcript were delivered into the PFC of hTau mice by lentiviral vectors, either before (3 months-old) or after (6 months-old) phenotypic onset. microRNAs efficiently reduced endogenous Tau in vivo by 50% in the PFC. Tau knock-down from 3 months-old prevented Tau pathology and cognitive impairments. Phenotypic rescue was also observed when microRNAs were administered at mid-stage (6 months-old) of Tau pathology onset. No adverse effects were observed neither in hTau nor wild type mice after microRNAs administration. Our results provide proof of concept for the potential use of microRNAs to locally reduce pathological Tau accumulation as a therapeutic approach for tauopathies.

162 | Analysis of molecular pathways involved in social behavior reduction in a murine model of cerebellar neuroinflammation

Disorders of the Nervous System

Author: Florencia Alejandra Kloster | email: florkloster96@gmail.com

Florencia Kloster [1°], Amaicha Mara Depino [1°], Verónica Murta [1°]

1° Laboratory of Neurobiology of Autism and Social Behaviors (IFIBYNE, UBA-CONICET)

The cerebellum is known for orchestrating motor functions, however recent evidence points to a role in higher cognitive functions, including language and affect. In autism, a disorder characterized by social impairment, chronic neuroinflammation in the cerebellum was reported. Our lab showed that injection of the proinflammatory agent lipopolysaccharide (LPS) in the cerebellum (lobule VII) decreased the sociability of adult mice. The aim of this project was to analyze molecular pathways associated to this model. To that end, mice were pretreated with anti-inflammatory drugs: ibuprofen or dexamethasone. Our goal was to assess the effect of the treatments on sociability, on lobule VII structure and on local neuroinflammation. We reconfirmed that LPS reduced sociability after 24 hours. Ibuprofen and dexamethasone completely prevented LPS effect on sociability. We measured morphometric parameters in histological sections and found no effects between any of the experimental groups, indicating these treatments had no effect on lobule structure after 24 hours. In the future we will quantify the expression of IL-1? mRNA using Real-Time PCR to describe the inflammatory process in the cerebellum. We expect an increase in IL-1? mRNA expression as a consequence of LPS treatment, that could be prevented by both anti-inflammatory drugs. To conclude, we think our results will contribute to uncover the mechanisms underlying the reduction in sociability in our neuroinflammation model.

164 | Cytoplasmic expression of the ALS/FTD protein TDP-43 leads to early, region-specific microgliosis in a conditional transgenic mouse model.

Disorders of the Nervous System

Author: Gabriela Verónica Nieva | email: gabynieva@gmail.com

Gabriela Verónica Nieva [1°], Lionel Muller Igaz [1°]

1° IFIBIO Houssay, Grupo de Neurociencia de Sistemas, Facultad de Medicina, Universidad de Buenos Aires – CONICET, Buenos Aires, Argentina

TDP-43 pathology is observed in a broad spectrum of frontotemporal dementia (FTD) and amyotrophic lateral sclerosis (ALS) cases. Activated microglial cells play an important role in immune and inflammatory responses in central nervous system and neurodegenerative diseases. Microglia-driven neuroinflammation is related with the onset of ALS/FTD and it is an important contributor to their pathogenesis and progression. After 1 month of post-weaning induction of the transgene, our mouse model conditionally overexpressing a cytoplasmic form of human TDP-43 (TDP-43-?NLS) in forebrain neurons recapitulate several of the motor, cognitive and social deficits observed in ALS-/FTD. Previously, we have shown that transgenic mice display higher levels of microglial activation in motor (MC) and somatosensory cortices (SSC) as well as hippocampal regions (CA1 and DG) compared to controls. To extend these findings, we now performed a quantitative assessment of microglial morphology using Iba1 immunofluorescence. We found longer perimeter and larger soma size in prefrontal cortex (PFC), MC and SSC, in addition to an increased number of Iba-1-labelled microglia in SSC. We are currently evaluating microgliosis in hippocampal subregions and performing Sholl analysis in all these brain areas in order to have more information about the branch complexity and the variations in microglial phenotypes. These results will help us elucidate the specific role of microglia in TDP-43 proteinopathies.

166 | Structural connectivity and excitation/inhibition balance in an early postnatal NMDA receptor knockout mouse model useful for the pathophysiological study of schizophrenia

Disorders of the Nervous System

Author: Carlos Alfredo Pretell Annan | email: carlos.a.pretell@gmail.com

Carlos A. Pretell Annan [1°], Diego E. Pafundo [1°], Juan E. Belforte [1°]

1° Grupo de Neurociencia de Sistemas, Instituto de Fisiología y Biofísica Bernardo Houssay (IFIBIO-Houssay), UBA-CONICET, Ciudad de Buenos Aires, Argentina.

Schizophrenia (SZ) is a chronic mental disorder frequently emerging between adolescence and adulthood. Although its etiology is still misunderstood, alterations of the prefrontal cortex (PFC) are considered to be pathophysiologically fundamental. Pathological modifications of the PFC microcircuit affect both excitatory pyramidal neurons (PNs) (reductions in dendritic spine density and excitatory synapses) and inhibitory GABAergic interneurons (INs) (diminished levels of GAD67 and PV). The normal wiring of cortical circuits relies on the proper postnatal maturation of GABAergic INs. The increment in inhibition during adolescence leads to the establishment of an adult excitation/inhibition (E/I) balance. Evidence of alterations in both the excitatory and the inhibitory components of the medial PFC microcircuit points towards an E/I imbalance in SZ, probably related to its neurodevelopmental aspect. We have shown that an early postnatal ablation of NMDA receptors in cortical GABAergic INs –mainly PV INs– from mice results in SZ-like neurochemical and behavioral phenotypes that emerge during adulthood. However, the structural E/I balance had not been evaluated. Here we analyzed local and distal excitatory afferents and inhibitory contacts to sparsely labeled PFC PNs. Although we did not find a reduction in spine density nor in excitatory contacts from the contralateral PFC, we found a reduction in the density of inhibitory contacts, yielding a structural E/I imbalance in the PFC.

168 | Geraniol delays age-related locomotion decline in C. elegans Parkinson's disease models

Disorders of the Nervous System

Author: Stéfano Romussi | email: stefaromussi@gmail.com

Stéfano Romussi [1°2°], Natalia Andersen [1°2°], Diego Rayes [1°2°], María José De Rosa [1°2°]

1° Conicet -INIBIBB
2° Departamento de Biología, Bioquímica y Farmacia (Bahía Blanca)

Due to the increase in life expectancy worldwide, age-related disorders such as neurodegenerative diseases (NDs) have become more prevalent. Elevated levels of oxidative stress could modulate the progression of NDs. For example, in Parkinson's Disease (PD) it has been shown that compromising the capacity to scavenge free radicals can exacerbate α-synuclein (α-syn) aggregation and proteotoxic damage. Geraniol (GL), a plant-derived essential oil, has recognized antioxidant properties. Considering that oxidative stress contributes to proteotoxic disease progression, compounds with antioxidant activity have been postulated as potential therapeutic agents. C. elegans is widely used in biomedical research. There is a high level of homology between C. elegans and mammalian genes (including proteins involved in cytoprotective mechanisms). In fact, several NDs can be recapitulated in this animal. In this work, we use C. elegans PD models to evaluate the in vivo effects of GL. We found that GL delays age-related locomotion decline in PD worms. Interestingly, GL also decreases α-syn aggregation. These preliminary results indicate a potential antiproteotoxic effect in C. elegans models of PD. Therefore, we propose, to combine genetic, microscopy and behavioral techniques to unravel GL effect in C. elegans ND models. These studies could provide a proof of concept of the potential of GL as a promising compound to retard proteotoxic diseases.

170 | Eye-tracking as potential biomarker of treatment outcome in ADD patients: a single case study

Disorders of the Nervous System

Author: Ángel Javier Tabullo | email: angeljtabullo@gmail.com

Ángel Javier Tabullo [1°], Jessica Adriana Del Punta [2°], Francisco Iacionis [3°], Gustavo Gasaneo [3°]

1° INCIHUSA, CCT-MENDOZA, CONICET
2° DEPARTAMENTO DE MATEMÁTICA, UNIVERSIDAD NACIONAL DEL SUR
3° IFISUR, UNIVERSIDAD NACIONAL DEL SUR
4° CENTRO INTEGRAL DE NEUROCIENCIAS APLICADAS

This study examined the eye-tracking correlates of visual attention and executive function on a young adult ADD subject. The patient was a 18 year old male diagnosed with attention deficit disorder (ADD, predominantly innatentive subtype) and anxiety. He completed neuropsychological assessment before starting treatment (metilfenidate and psychotherapy) and after two months. In addition, computerized versions of two sustained and selective attention tests were administered: Trail making test A – TMTA and Perception of Differences (CARAS). His eye movements were recorded with aportable eye-tracker. Improvement in TMTA performance by time 2 is supported by several parameters, including a faster total time, increased average speed (per item), and a reduction in the number of fixations. In addition, fixations became more efficient (7% more “on-target”, 2% less repetitions). Moreover, specific parameters suggest a better working memory performance: within-trial fixation repetition and fixation on previous numbers were reduced by 6% and 5%, respectively. Regarding CARAS, the number of fixations required to solve the items was significantly reduced. These changes were accompanied by an improvement on executive test scores and clinical symptoms. The results highlight the potential of eye-tracking to detect subtle and specific changes in cognitive performance on ADD patients, acting as a complement to neuropsychological evaluation and a potential biomarker of treatment outcome.

172 | Resveratrol upregulates sirtuin 1/2, prevents neurotoxicity and enhances locomotion after kainate-induced spinal cord injury.

Disorders of the Nervous System

Author: Benjamin Alejandro Zylberberg | email: BZylberberg-iimt@austral.edu.ar

Benjamín A. Zylberberg [1°], Martina Poodts [1°], Julieta Roncoroni [1°], M. Florencia Coronel [1°], Graciela L. Mazzone [1°]

1° Instituto de Investigaciones en Medicina Traslacional – CONICET – Universidad Austral, Av. Pte. Perón 1500, B1629AHJ, Pilar, Buenos Aires, Argentina

Excitotoxicity is a major contributor to the pathophysiology of spinal cord injury (SCI), due to the over-activation of glutamate receptors with important consequences for neuronal death, locomotor function loss and neuropathic pain development. We have shown in our previous studies that 1h kainate application (100 µM, KA) induced the endogenous release of glutamate and irreversibly suppressed fictive locomotion. Our objective was to evaluate the neuroprotective effects of resveratrol (RESV, 50 mg/kg), a natural polyphenol, after KA-induced SCI, using in vivo and in vitro models. Locomotor behaviors were evaluated in an open field by applying the Basso Mouse locomotor scale rating (BMS), footprinting and horizontal ladder analysis, 1 or 8 days after KA application. RESV co-application with KA demonstrated a significant increase in the BMS score. The histological analysis confirmed that KA reduced the number neurons, while significant neuroprotection was observed after RESV administration in the ventral, central and dorsal spinal regions. Indeed, the application of RESV significant induced sirtuin 1 and 2 expression, evaluated by immunofluorescence, which was dismissed by co-application of KA. Despite the molecular mechanisms of RESV actions need further clarification, our data suggest that excitotoxic damage may be counteracted by RESV, offering a novel perspective for neuroprotective strategies after SCI.
Supported by Universidad Austral and CONICET.

174 | STUDY OF THE MECHANISM OF ENRICHMENT OF APP IN ENDOSOMES INDUCED BY Aβ AND ITS MODULATION BY Gβγ SIGNALING

Neural Circuits and Systems Neuroscience

Author: Magdalena Antonino | email: mantonino@immf.uncor.edu

Magdalena Antonino [1°], Paula Marmo [1°], Alfredo Lorenzo [1°], Elena Anahí Bignante [1°]

1° INIMEC-CONICET-UNC

Alzheimer´s disease is characterized by the deposition of aggregated species of amyloid beta (A?) in the brain, which leads to progressive cognitive deficits and dementia. We recently found that A? assemblies, oligomers and fibrils, increase APP and BACE1 interaction in recycling endosomes of human neurons derived from iPSCs by a mechanism dependent of APP/Go/G?? signaling. Now, we are interested on deepen in the APP trafficking in the endo-lysosomal pathway in order to understand the mechanism underlying such effect. We found that A? induced an enrichment of APP in recycling endosomes at the expense of a decrement of its levels in lysosomes. This change in APP intracellular distribution is drive by G?? signaling. Moreover, we found that the changes on APP distribution correlate with an increase in its interaction with BACE1, also modulates by a G?? signaling. Together, these results suggest that A? pathological assemblies induce a re-direction of APP from its physiological route to lysosomes, to recycling endosomes which favors its encounter with BACE1. These finding elucidate the intracellular process which sustain the feed-forward mechanisms implicated in the amyloidogenesis induced by pathological assemblies of A?.

176 | Neural correlate of novelty and memory using EEG

Neural Circuits and Systems Neuroscience

Author: Pedro Benedetti | email: pbenedetti@itba.edu.ar

Pedro Benedetti [1°], Rodrigo Ramele [2°], Fabricio Ballarini [3°], Pedro Bekinschtein [1°]

1° INCYT (Universidad Favaloro-INECO-CONICET)
2° Instituto Tecnológico de Buenos Aires
3° Instituto de Biología Celular y Neurociencias “Prof. E. De Robertis” (IBCN-Facultad de Medicina-UBA)

Novelty is seen as a factor that triggers exploration of an environment. Such exploration has been interpreted as a way to build and update a model of the world that can then be used for action planning. However, since the world is complex and permanently changing, mismatches can be generated between it and the generated mental model. Such differences, when perceived, generate the feeling of surprise. Moreover, this effect is a signal that the mental model needs to be updated, thus playing an important role in learning and memory processes. Novelty, produced by a violation of expectations, before or during learning has been shown to trigger an adaptive encoding mechanism, enhancing memory. The present project aims to characterize its neuroelectrical correlation in EEG signals. An initial experiment proposed is based on replicating results already known from the Oddball paradigm. In the future, the aim is to generate a protocol containing components that can emulate natural memory processes and then characterize their neuroelectrical correlates in the cerebral cortex. A final stage of the project would be to be able to generate these same activations in a controlled manner and without requiring novel events, which could have a potential stimulating effect on memory.

178 | Exploring the role of GABA in the sleep homeostat of Drosophila melanogaster

Neural Circuits and Systems Neuroscience

Author: Florencia Fernandez-Chiappe | email: florenciafch@gmail.com

Florencia Fernandez-Chiappe [1°], Nara I Muraro [1°]

1° Biomedicine Research Institute of Buenos Aires – CONICET – Partner Institute of the Max Planck Society

It has been previously proposed that GABAergic inputs to the large lateral ventral neurons (lLNvs) of Drosophila may be responsible for informing those highly integrative arousal neurons about the sleep homeostat status. Meanwhile, the current paradigm proposes that the main circadian pacemaker of the Drosophila brain, the small lateral ventral neurons (sLNvs), have only minor influence in the control of sleep behavior. Starting from this point, our aim is to describe the mechanisms of GABAergic inhibition in both sLNvs and lLNvs, their influence on sleep behavior and their role on the sleep homeostat. For this, we have performed specific genetic manipulations and quantified sleep behavior under basal and sleep deprivation conditions. Moreover, we have collected electrophysiological recordings to identify the extent of the role of the neurotransmitter GABA in the neuronal circuit studied, given that our final goal is to describe this network in detail. Our findings confirm that the lLNvs receive information about the sleep homeostat status via the GABAA receptor Rdl through a complex neuronal circuit. They also suggest that the sLNvs are involved not only in the control of the circadian sleep timing but also, through GABAergic inputs, can regulate the quantity and quality of sleep.

180 | MIP-SPR signaling controls a developmentally-programmed behavioral subprogram of Drosophila pupariation

Neural Circuits and Systems Neuroscience

Author: Andres Garelli | email: andres.garelli@gmail.com

Magdalena Fernandez Acosta [1°], Heredia Fabiana [1°], Juliane Menezes [1°], Rebeca Zanini [1°], Katja Prüger [1°], Agustina Dronseck [2°], Maite Arana [2°], Joana Pereirinha [1°], Jan Veenstra [3°], Christian Wegener [4°], Alisson Gontijo [1°]*, Andrés Garelli [2°]*

1° iNOVA4Health, NOVA Medical School|Faculdade de Ciências Médicas, Universidade Nova de Lisboa, Lisbon, Portugal.
2° INIBIBB, Universidad Nacional del Sur-CONICET, Bahía Blanca, Argentina.
3° INCIA UMR 5287 CNRS, Université de Bordeaux, allée Geoffroy St Hillaire, Pessac, France.
4° Neurobiology and Genetics, Theodor-Boveri-Institute, Biocenter, University of Würzburg, Würzburg, Germany.

Drosophila pupariation consists of a series of innate behaviors and morphogenetic changes that lead to the formation of a hardened pupal case (puparium) from the larval cuticle and its attachment to a substrate. The latter is achieved by the glue expulsion behavior (GSB). GSB is preceded by strong body-remodelling contractions, termed pre-GSB. The steroid hormone ecdysone coordinates the whole pupariation process, inducing initiation of pre-GSB and its progression to GSB by inducing an epidermis-to-CNS relaxin-like Dilp8-Lgr3 signaling event. The factors that induce GSB and post-GSB behaviors downstream of ecdysone remain to be defined. Here we use neuronal-specific RNAi against a series of neuropeptides to identify Myoinhibiting peptide (MIP) as a critical peptide required for GSB. In its abscence, GSB is attempted, yet it is abnormal, and glue is not expulsed. MIP acts spatially and temporally downstream of the Dilp8 pathway. Cell-type-specific MIP RNAi showed that MIP is required in a single bilateral descending brain neuron for proper GSB. Mutation of the MIP receptor Sex-peptide receptor (SPR) or RNAi of SPR in specific neurons mimics the MIP mutant phenotype, indicating that MIP acts via neuronal SPR to ensure proper GSB. Our results advance our molecular and cellular understanding of pupariation control, reveal the complexity of glue expulsion and spreading behavior control, and contribute to the understanding of how multi-step innate behaviors are coordinated in time.

*Corresponding authors: alisson.gontijo@nms.unl.pt and agarelli@inibibb-conicet.gob.ar

182 | The metabotropic glutamate receptor homologs MGL-1 and MGL-2 are key for sensing nutritional status in C. elegans

Neural Circuits and Systems Neuroscience

Author: Ailin Lacour | email: alacour@inibibb-conicet.gob.ar

Ailin Lacour [1°2°], Gabriela Blanco [1°2°], Agustina Zabala [1°2°], María José De Rosa [1°2°], Diego Rayes [1°2°]

1° INIBIBB (Conicet Bahia Blanca)
2° Departamento de Biología, Bioquímica y Farmacia (UNS)

The mechanisms that allow the nervous system to sense nutritional state and adapt animal behavior are poorly understood in most species. The simplicity of its NS and its known connectome make C. elegans a useful system to study these mechanisms. Results from our laboratory showed that inhibition of the tyraminergic neuron RIM during fasting, enhances serotonin release from other neurons when the animal reencounters food, allowing it to slow down locomotion and start feeding. Mutations in the GPCRs, MGL-1 and MGL-2, located in two presynaptic interneurons to RIM have been reported to induce autophagy even in well-fed animals. Here, we performed behavioral assays on mgl-1; mgl-2 mutants. We found that these animals, even when well fed, show a significant decrease in locomotion when they find food similar to fasted wild-type animals. Moreover, when we exposed these mutants to GFP-expressing bacteria, the fluorescence in the intestine is higher than that of wild-type animals, suggesting a higher feeding rate. These initial results suggest that the metabotropic receptors MGL-1 and MGL-2 are key for C. elegans to censor satiation molecules. We propose, therefore, to determine what these satiety signals are and the neuronal circuits involved. Given that this behavioral plasticity modulated by the nutritional state is observed throughout the animal kingdom, and that several fundamental processes are highly conserved, these results may provide universally relevant information.

184 | Early ethanol exposure effects in hypoxic conditions on 5HT levels at medullary raphe in neonate rats

Neural Circuits and Systems Neuroscience

Author: Ana Fabiola Macchione | email: ana.macchione@unc.edu.ar

Catalina Giacinto [1°], Tomás Palmeri [1°], Ana Fabiola Macchione [1°], Ana Fabiola Macchione [2°]

1° Instituto de Investigaciones Psicológicas IIPsi-CONICET-UNC. Córdoba-Argentina.
2° Facultad de Psicología, UNC. Córdoba-Argentina.

Ethanol is commonly consumed during gestation and lactation, impacting on the fetus and neonate. EtOH affects neurovegetative functions, such as breathing. One of the main ethanol targets on the CNS is the serotonin (5HT) neurons that also are involved in breathing modulation. Preclinical studies, that employ chronic and severe EtOH consumption during pregnancy and lactation, showed a decrease in the number of 5HT-neurons and 5HT levels in the raphe system. However, the status of the 5HT-system in animal models with low/moderate neonatal EtOH exposure are understudied. In previous studies we found that the first EtOH intoxication decreases the 5HT levels in the raphe obscurus-ROb, but the pre-exposure to the drug induces a compensatory effect unaltering the 5HT levels in this area. In this study we evaluate 5HT levels by immunofluorescence in other areas of the medullary raphe (ROb, magnus and pallidus) in neonate rats exposed to EtOH and challenged with hypoxia (3 episodes of 5 min). At postnatal days-PD 3, 5 and 7, pups were administered with EtOH or vehicle (2.0 or 0.0g/kg, ig). At PD 9, pups were EtOH re-intoxicated or not (vehicle-administered). This design allows us to discriminate the effects of EtOH pre-exposure from those of acute EtOH intoxication. These results become important when associating the function of the medullary raphe on respiratory response and breathing disturbances induced by EtOH in neonate rats and humans, such as Sudden Infant Death Syndrome.

186 | Neural coding of multisensory integration in the larval zebrafish brain

Neural Circuits and Systems Neuroscience

Author: Nicolás Martorell | email: martorellnicolas1995@gmail.com

Nicolás Martorell [1°], Violeta Medan [1°]

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

The process of synthesizing different sensory signals related to a stimulus is called multisensory integration. This process increases the collective impact of biologically relevant signals, but how it is implemented at the level of the nervous system remains, mostly, an open question. To understand how multisensory integration is represented in specific brain regions we performed in vivo calcium imaging of neural activity of larval zebrafish. Using the genetically encoded pan-neuronal elav3:GCaMP6f calcium sensor we imaged 4-7 dpf larval zebrafish with a confocal microscope. This allowed us to identify single units and compare their responses to multisensory stimuli and its unisensory components in specific brain regions. Analysis of the optic tectum, torus semicircularis and thalamus showed sparse representation of multisensory stimuli in the three areas, with a low proportion (<10%) of neurons responding consistently to repeated stimulation. Importantly, multisensory stimuli recruited more neurons when compared to visual or auditory stimuli alone although the level of activation of each unit was similar. Although preliminary, these findings suggest that multisensory integration is distributed in diverse but specific brain regions and that its impact in information processing can be studied through in vivo calcium imaging with this audiovisual stimulation paradigm.

188 | Analysis Of The Activity Of Individual Hippocampal Neurons During Epileptic Seizures In Patients With Drug-Resistant Epilepsy Candidates For Surgery

Neural Circuits and Systems Neuroscience

Author: Alejandro Nasimbera Nasimbera | email: alejandro_nasimbera@hotmail.com

Alejandro Nasimbera [1°], Santiago Cordisco Gonzalez [1°], Brenda Giagante [1°], Silvia Oddo [1°], Ines Mintz [1°], Patricia Solis [1°], Juan Pablo Princich [1°], Pablo Seoane [1°], Silvia Kochen [1°]

1° ENyS CONICET – Hospital de Alta Complejidad en Red El Cruce “Néstor Kirchner” – Universidad Nacional Arturo Jauretche

Patients with focal drug-resistant epilepsy could benefit from surgical treatment if the epileptogenic zone(EZ) is identified. Intracranial electroencephalography with macro-microelectrodes allows the recording of local field potentials(LFP), the extracellular activity of multiple neurons(MUA) and the activity of single neurons(SN). Objective: to evaluate the behavior of the SN during epileptic seizures. MATERIALS AND METHODS: Macro-microelectrodes were implanted in patients with drug-resistant epilepsy and the signal was recorded with the Cervello system filtered between 1-9000 Hz and sampled at 30 kHz. SN activity were analyzed in 100-ms windows from 5 min before ictal onset and 1 min after in the ictal onset zone (IOZ) and in the propagation zone(ZP). Firing rates(FR), stereotypy, and Fano Factor(FF) were determined. The signal was processed in MATLAB using WAVE_CLUS and FieldTrip. RESULTS: A total of 150 SN from 4 patients in 59 seizures were analyzed, 78 in IOZ and 72 in PZ. As for the firing rate, three distinct ictal patterns of the SN were identified: increased, decreased and unchanged FR. The FF showed a significant increase in the neurons involved in the IOZ. All neurons involved in the IOZ showed a high degree of stereotypy. CONCLUSIONS: The analysis of the behavior of the SN allowed to describe patterns of ictal activity, contributing to understand the dynamics neural networks during seizures. Future analyzes could identify biomarkers of the EZ at the microscale.

190 | Neural circuits involved in odor representations and its modulation by spatial context

Neural Circuits and Systems Neuroscience

Author: Olivia Pedroncini Pedroncini | email: olipedroncini@gmail.com

Olivia Pedroncini [1°], Noel Federman [1°], Antonia Marin-Burgin [1°]

1° IBioBA CONICET-MPSP

The piriform olfactory cortex (PC), receives afferent sensory inputs from the olfactory bulb and extensive inputs from higher-order areas such as the lateral entorhinal cortex (LEC) - involved in processing of spatial context information.To understand the contribution of LEC to the representation of odors, we study its functional and anatomical connectivity to excitatory and inhibitory neurons in the PC. We recorded in acute brain slices, EPSCs, IPSCs and spiking in pyramidal L2/3 neurons and interneurons, in response to optogenetic activation of LEC excitatory projections. We observed that LEC projections preferentially contact L2 pyramidal neurons and Parvalbumine interneurons (PV). In addition, we found that LEC stimulation evokes different excitation to inhibition balance in each type of neuron. L2 neurons and PV receive more excitation than inhibition along a 10Hz stimulation train compared with L3 pyramidal neurons and Somatostatin interneurons, suggesting a differential routing of inputs within the microcircuit. To assess the role of LEC in the processing of odors in vivo, we conducted experiments to inactivate this region during a GO-NOGO task that involves associations between odors and spatial contexts. We trained transgenic mice expressing the inhibitory receptor hM4di in LEC excitatory neurons and after they reached performance, we injected CNO to silence LEC bilaterally.We observed that both discrimination of contexts and odors were affected under the CNO effect.

192 | ROLE OF INHIBITION IN RHYTHMIC MOTOR CONTROL

Neural Circuits and Systems Neuroscience

Author: Martina Radice | email: radicemarti@gmail.com

Martina Radice [1°], Agustín Sanchez Merlinsky [2°], Lidia Szczupak [1°]

1° Departamento de Fisiología, Biología Molecular y Celular, FCEN, UBA
2° Instituto de Fisiología, Biología Molecular y Neurociencias, UBA – CONICET

The execution of rhythmic motor behaviors requires multiple control mechanisms to adjust the behavioral output, narrowing down the degrees of freedom of a system with many units. Leeches crawl on solid surfaces through a succession of elongation and contraction body waves, anchored on the posterior and anterior suckers. Each segmental ganglion contains all the neurons required to produce this rhythmic motor pattern and dopamine evokes fictive crawling (crawling) in isolated midbody ganglia. The pair of premotor NS (nonspiking) neurons, similar to vertebrate Renshaw cells, are connected to motoneurons through a central network that provides recurrent inhibitory signals onto the motoneurons. We aim at understanding the role of NS in the context of crawling. During crawling NS neurons receive inhibitory signals tuned to its contraction phase, monitored through the DE-3 motoneuron. The results suggest that the inhibitory signals in NS are delivered by the rhythmogenic circuit that controls the motoneuron output. Thus, excitatory signals onto DE-3 are correlated with inhibitory signals in NS that, in turn, could restrict the motoneuron activity. Extracellular recordings combined with spike sorting analysis allowed the simultaneous study of multiple motoneurons in the course of crawling. An NS manipulation that transiently removes the recurrent inhibitory pathway enhanced the firing frequency of motoneurons firing during the contraction phase and expanded the duty cycle.

194 | Studying the role of the piriform cortex in an olfactory-contextual conditioning paradigm

Neural Circuits and Systems Neuroscience

Author: Lucca Salomon | email: luccasalomon@gmail.com

Lucca Salomon [1°], Noel Federman [1°], Sebastián Alejo Romano [1°], Antonia Marin-Burgin [1°]

1° Biomedicine Research Institute of Buenos Aires (IBioBA) – CONICET – Partner Institute of the Max Planck Society

Increasing evidence indicates that representation of sensory stimuli in cortical areas is plastic and can be modified by experience. In particular, a unique feature of olfactory processing is its high dependence on past experience, context, and the animal's internal state. To study contextual modulation of sensory learning we developed a GO/NO GO associative learning task in a virtual reality environment: animals learn to associate an odor with a water reward when presented in a particular visual context. Mice learn the task in around 6 days showing anticipatory licking responses only in the rewarded odor-context association. In addition, other behavioral variables, like inhalation rate and speed, are adapted through learning. To test the importance of the piriform cortex (PC) in the learned association we used three different methods to bilaterally silence PC in expert animals: i) application of GABA agonist muscimol; ii) a chemogenetic approach to express hM4Di to silence excitatory neurons with the artificial ligand CNO iii) optogenetic activation of inhibitory PV neurons in PC (still setting up). Preliminary results with muscimol and chemogenetics show that animals with silenced PC have a decrease in performance suggesting a critical role of the PC in the behavior. Interestingly, silencing PC not only affected the ability to distinguish odors, but also the visual contexts, suggesting that the PC participates in the association between odors-contexts-reward.

196 | Reward modulation of primary visual cortex and basal forebrain activity

Neural Circuits and Systems Neuroscience

Author: María Florencia Santos | email: santos.mflorencia@gmail.com

María Florencia Santos [1°], Camila Lidia Zold [1°]

1° Grupo de Neurociencias de Sistemas, Instituto de Fisiología y Biofísica B. Houssay (IFIBIO-Houssay), UBA-CONICET

The activity of the primary visual cortex (V1) encodes basic properties of visual stimuli. Experience dependent plasticity has been observed in V1 to improve visual perception. Further studies have shown that when rodents experience an association between a visual stimulus and a contingent future reward, a proportion of V1 neurons develop reward timing activity. Thus, V1 activity is also related to the behavioral significance of the cue. Cholinergic projections from the basal forebrain (BF) have been shown to be necessary and sufficient to induce V1 reward timing activity. However, little is known about how BF and V1 reward timing activity emerge and evolve during learning. To unveil this, we implant C57BL/6 adult male mice in V1 and BF and record electrophysiological activity in head-fixed mice learning a visually cued rewarded task. So far, we have trained 9 mice to initiate a lick sequence after a visual cue presentation to obtain a water reward. Animals showed a decrease in the time initiation of the lick sequence and an increase of correct trials and reward rate. On the other hand, we identified a high percentage of V1 neurons that showed reward timing activity after training. Also, we found that BF neurons show an excitatory response to reward acquisition, an inhibitory response to reward omission, and reward timing activity after training. Overall, this suggests that reward timing activity in V1 may be induced by BF reward activity.

198 | Proton control of spontaneous activity in the cochlea during development

Neural excitability, synaptic transmission and neuron-glia interactions

Author: Camila Catalano Di Meo | email: ccatalano98@gmail.com

Camila Catalano Di Meo [1°], Regis Nouvian [2°], Juan Goutman [1°]

1° INGEBI (CONICET)
2° The Institute for Neuroscience of Montpellier

During the development of the auditory system, sensory independent activity drives neurons to spike in a coordinated manner that is important for shaping brain connections. This activity originates in the cochlea where inner hair cells (IHCs) fire action potentials eliciting the release of tens of glutamate-filled vesicles onto auditory nerve neurons. Due to the mechanism for concentrating glutamate into the vesicular lumen, a very low pH is also found in this organelle. Protons are co-released with neurotransmitter into the synaptic cleft producing a transient reduction of the extracellular pH. Here, we investigated the effect of protons on the spiking activity of the developing IHCs. Recording these cells, we found that the perfusion of an extracellular solution with low pH (6.8) produced a reduction of the firing rate, whereas the opposite occurred in pH 8.2. Seeking for the mechanisms of this modulation, IHCs conductances were measured at these two pH values. Ca2+ and K+ channels (L-type and inward rectifier, respectively) showed a modest change that could not account for the effect observed on the spiking rate. Efferent cholinergic fibers originating in the brainstem contact IHCs and produce synaptic inhibition which is key for regulating its spiking rate. The effect of pH on this synapse is also insufficient to explain the global action on IHCs excitability and therefore, other conductances should also be evaluated to understand IHCs activity during development.

200 | Microglia's pathological pruning of synaptic structures in Parkinson's Disease and L-DOPA induced dyskinesia models.

Neural excitability, synaptic transmission and neuron-glia interactions

Author: Felix Fares Taie | email: ffarestaie@fmed.uba.ar

Felix Fares Taie [1°], Lorena Rela [1°], Juan Belforte [1°], Irene Taravini [1°], Diego Pafundo [1°], Jesica Unger [1°]

1° Instituto de Fisiología y Biofísica Bernardo Houssay (IFIBIO Houssay), Universidad de Buenos Aires y CONICET

Parkinson's disease results from the degeneration of mesencephalic dopaminergic neurons that innervate the striatum, a key structure for action selection and initiation. L-DOPA is the most effective treatment to restore the dopaminergic tone, however, it can lead to L-DOPA-induced dyskinesia (LID). Animal models show that the striatal dopaminergic denervation produces abnormal excitability and dendritic spine loss in striatal medium spiny neurons, that can be aggravated by L-DOPA. We will evaluate the role of microglia in such changes, both in the context of parkinsonism and LID. We hypothesize that activated microglial cells in parkinsonian and dyskinetic animals participate in the pathologic pruning of striatal synaptic structures. Doxycycline reduces microglial activation. We will evaluate its effect on plasticity of striatal neurons in mouse models of Parkinson's disease and LID, through morphological analyses of single cells, immunohistochemistry and electrophysiological recordings, and correlations with behavior. We expect that inhibition of microglìa will prevent some of the plastic processes associated with Parkinsonism and dyskinesia. We also expect to reveal which plastic phenomena are compensatory or contribute to the pathology. If the results support our hypothesis, they will contribute to position microglia-mediated processes as potential therapeutic targets to treat the disease and/or LID.

202 | Minocycline is a modulator of olfactory nerve regeneration

Neural excitability, synaptic transmission and neuron-glia interactions

Author: Ana Paula Sieben Samek | email: anapsieben1@campus.fmed.uba.ar

Ana Paula Sieben Samek [1°], Javier Fotti [1°], Agustina Stahl [1°], Verónica Risso [1°], Lorena Rela [1°]

1° Instituto de Fisiología y Biofísica Bernardo Houssay (IFIBIO Houssay), Universidad de Buenos Aires y CONICET

Olfactory nerve regeneration after toxic damage is associated with increased density and reactivity of myeloid cells along the afferent olfactory pathway. Whether the reactivity and proliferation of these cells contribute with regeneration remains controversial. Here we evaluated whether minocycline, a modified tetracycline that inhibits proliferation and reactivity of myeloid cells, has an effect on the rate of regeneration of the damaged olfactory epithelium. We treated C57BL/6 mice with the olfatotoxin methimazole (75 mg/kg) and 2 days later half the animals received minocycline (0.25 mg/ml in drinking water) or regular water during 2 weeks. We found that minocycline significantly increased the degree of recovery of olfactory epithelium thickness (38% by week 1 and 10% by week 2 after damage). This improvement was not reflected in the proportion of mature neurons produced during regeneration at the observed time points. However, the minocycline treatment produced a larger proportion of immature neurons during early regeneration and a smaller proportion of immature neurons during late regeneration ($p=0.0468$ and $p=0.006$, post-hoc tests after significant interaction in 2-way ANOVA). These results indicate that minocycline is a modulator of olfactory nerve regeneration. A more detailed time course analysis of regeneration including additional cell identity markers will shed light on the dynamics of this modulation.

204 | Angiotensin II receptors in a rotenone rat model of Parkinson's Disease

Neurochemistry and Neuropharmacology

Author: Maria Elena Arce | email: earce.arce7@gmail.com

Maria Elena Arce [1°], Georgina Pulcini [1°], Sergio Gustavo Ochoa Munafo [1°], Susana Ines Sanchez [1°], Gladys Maria Ciuffo [1°]

1° IMIBIO -SL CONICET. Universidad Nacional de San Luis. San Luis , Argentina.

Parkinson's Disease (PD) is the second most common neurodegenerative disease worldwide. PD is characterized by nigrostriatal dopaminergic cell degeneration, loss of striatal dopamine, glial activation and development of a-synuclein(a-Syn) aggregates. The brain Renin Angiotensin System regulates multiple physiological functions, activating Angiotensin II (Ang II) AT_1 and AT_2 receptors. It has been demonstrated the existence of both Ang II receptor subtypes in the *Substantia nigra* (SN) which are considered as participants of neurodegenerative process. The aim of this work is to provide more specific evidence for the validity of the rotenone rat model of PD, which it was assayed previously by our group. Immunohistochemical analysis of Ang II receptors, tyrosine hydroxylase (TH) and a-Syn were performed in the SN of rotenone-treated animals. In coincidence with our previous results, we confirm the presence of both Ang II receptors in SN of rotenone-treated rats. We found in these animals loss of dopaminergic neurons and decreased immunoreactivity against anti-TH antibodies. Whereas we observed many nigral cells with a-Syn positive aggregates. These findings contribute to understand the potential role of the brain renin angiotensin system in neurodegenerative processes and allows us to maximize the utility of the rotenone rat model.

206 | Blockage of BDNF/TrkB pathway in two mice models of altered serotonergic system

Neurochemistry and Neuropharmacology

Author: Rocío Beatriz Foltran Foltran | email: rbfoltran@conicet.gov.ar

Rocío B Foltran [1°], Karen M Stefani [1°], Silvina L Diaz [1°]

1° Inst. de Biología Celular y Neurociencias. UBA-CONICET. Buenos Aires, Argentina

Modulation of serotonergic neurotransmission has revealed as an exciting tool to study the process of neurogenesis in the adult hippocampus (HC). Paradoxically, different models of mice with altered levels of serotonin (5-HT), both increased or depleted, show enhanced survival of newborn neurons in the HC. We're interested in understanding the role of the brain derived neurotrophin factor (BDNF) signaling pathway in the link between neurogenesis and 5-HT. To study this, we administered ANA-12, an antagonist of the BDNF receptor TrkB, to mice chronically treated with a serotonergic antidepressant. We conducted the Object Pattern Separation (OPS) task, since it has been reported that mice performance in this test depends on newborn neurons in the HC. We weren't able to find significant changes in a pattern separation test. However, ANA-12 prevented the increase in newborn neurons in the HC of antidepressant-treated mice. On the other hand, in Pet1-/- mice most of serotonergic neurons do not differentiate, leading to an 80% depletion of serotonin. In the OPS test, these mice with increased neuronal survival showed a better discrimination index than control mice. On the other hand, when they were treated with ANA-12, Pet1-/- mice presented a decreased performance in the task. Our results show that the BDNF/TrkB pathway could be involved in the enhancement of survival of newborn neurons in the HC when 5-HT is altered, with differential effects on behavioral patterns.

208 | Morphological brain alterations in adolescent mice prenatally exposed to a cannabinoid agonist

Neurochemistry and Neuropharmacology

Author: Fernando Macías Martín | email: fmaciasmartin@fmed.uba.ar

Fernando Macías Martín [1°], Alicia Brusco [1°], Laura Caltana [1°]

1° Universidad de Buenos Aires. Facultad de Medicina. Instituto de Biología Celular y Neurociencias “Prof. E. De Robertis”. Buenos Aires. Argentina.

The Endocannabinoid system is present in the brain from early stages of embryonic development and it regulates key processes of brain development. Human studies have shown alterations in attention and memory process, hyperactivity and childhood depression in those whose mothers consumed cannabinoids during pregnancy. The aim of this work was to study structural changes in the adolescent brain of CB1R+/+ and CB1R-/- mice prenatally exposed to the synthetic non selective cannabinoid agonist WIN 55212-2 (WIN). Pregnant CB1R+/+ and CB1R-/- female mice were injected with WIN from GD5-GD20. After birth, lactation was performed from a substitute non-WIN exposed mother. At postnatal day 35 male pups were fixed and immunofluorescence staining was performed in coronal slices of the brain to analyze the expression of NeuN, MAP2, GFAP and NF200. CA1 hippocampal area showed a reduction in the number of neurons and astrocytes in CB1+/+ mice prenatally exposed to WIN, a reduction of the number of neurons and an increase in the astrocytic reaction in CB1-/- prenatally exposed mice. There were no changes in the dendritic arborization between CB1+/+ and CB1-/- mice, independently of WIN exposure. Motor cortex showed a non-significant decrease in the axonal area in the CB1+/+ and CB1-/- at M1 and M2 anterior cortex. CA1 hippocampal area is sensitive to prenatal WIN exposure and its alteration depends on the presence of CB1R. These changes could explain cognitive deficits observed in humans.

210 | Biased allosteric modulation of agonist-induced β-arrestin recruitment by M2 muscarinic receptor autoantibodies from Chagas disease patients with cardiac dysautonomia

Neurochemistry and Neuropharmacology

Author: Laura Camila Carrera Paez | email: Laurapaez_21315@hotmail.com

Laura C Carrera Paez [1°], Sabrina P Beltrame [1°], Yina M Carpintero Polanco [1°], Sergio R Auger [2°], Ahmad H Sabra [2°], Claudio R Bilder [3°], Claudia I Waldner [4°], Juan C Goin [1°]

1° Laboratorio de Farmacología Molecular, Centro de Estudios Farmacológicos y Botánicos (CEFYBO-CONICET-UBA) and II Cátedra de Farmacología, Facultad de Medicina, Universidad de Buenos Aires. Paraguay 2155, Piso 16, (C1121ABG) Buenos Aires, Argentina.
2° Hospital D.F. Santojanni, Pilar 950, PB, (C1408INH) Buenos Aires, Argentina
3° Laboratorio de Neurogastroenterología, Fundación Favaloro-Hospital Universitario, Av. Belgrano 1746, 1er Piso, (C1093AAS) Buenos Aires, Argentina.
4° Laboratorio de Inmunidad Celular y Molecular, Centro de Estudios Farmacológicos y Botánicos (CEFYBO-CONICET-UBA), Facultad de Medicina, Universidad de Buenos Aires. Paraguay 2155, Piso 16, (C1121ABG) Buenos Aires, Argentina.

Serum levels of IgG autoantibodies against M2 muscarinic receptors (M2R AAb) correlate with the degree of cardiac vagal impairment in chronic Chagas disease (CCD). Recent data showed that the exposure of cardiac M2R to M2R AAb could attenuate agonist-induced Gi protein activation and arrestin-2 (Arr-2) recruitment in heterologous mammalian cells. In this study, we used Bioluminescent Resonance Energy Transfer to investigate the ability of M2R AAb from CCD patients with dysautonomia to modulate agonist-induced β-arrestin recruitment through an allosteric mechanism. Carbachol treatment of HEK 293T cells expressing M2R fused to Renilla luciferase (RM2-RLuc) and Arr-2 (or Arr-3) fused to yellow fluorescent protein (Arr-2-YFP or Arr-3-YFP) (BRET pair) stimulated the interaction between M2R and Arr-2 (or Arr-3) in the presence of GRK2. However, treatment of cells with serum IgG fractions from seropositive patients for M2R AAb (IgG Ch+) or IgG from uninfected individuals (control IgG) failed to promote Arr-2 or Arr-3 translocation, suggesting that these AAb are unable to desensitize M2R. Preincubation of cells coexpressing the BRET pair and GRK2 with IgG Ch+, followed by the addition of carbachol, resulted in a noncompetitive inhibition of Arr-2 recruitment (but not Arr-3), whereas control IgG was unable to modulate the translocation of either β-arrestin. This study suggests that M2R AAb act as Arr-2-biased allosteric modulators of agonist efficacy.

212 | Sex differences on the impact of Social Isolation during adolescence over cocaine effects in rats: possible role of Wnt canonical pathway.

Neurochemistry and Neuropharmacology

Author: Abraham Ramirez | email: abrahamrami477@gmail.com

Abraham Ramirez [2°], Martin Yoldjian [1°], Alejandrina Funes [1°], Cintia Konjuh [1°], Alejandra Pacchioni [2°]

1° Laboratorio de Toxicología Experimental – Facultad de Ciencias Bioquímicas y Farmacéuticas -Universidad Nacional de Rosario
2° CONICET-CCT Rosario

Cocaine use disorder is a chronic disease characterized by the loss of control over drug-seeking and taking. It has been hypothesized that the transition between social use and loss of control is mainly associated with vulnerable users. Such susceptibility depends on environmental and biological factors. Our group is focused on understanding the role of Social Isolation (SI) and sex, as environmental and biological factors respectively, in the vulnerability to cocaine in rats. Furthermore, we are interested in evaluating the role of the Wnt canonical pathway by measuring the levels of b-catenin in brain areas. Recently, we showed that 5 days of SI from postnatal days (PND) 30 to 35 decrease b-catenin levels in Prefrontal Cortex (PFC); and increase cocaine response in adult male rats. In the present study, we evaluate if 5 days of SI (PND30-35) would induce cocaine sensitization on PND45 as well as changes on b-catenin levels in PFC, in female and male rats. Our results showed that SI induced cocaine (5mg/kg i.p.) sensitization only in male rats ($p<0,05$). Also, isolated males displayed lower exploratory response ($p<0,05$) and higher anxiety levels ($p<0,05$) than control. In contrast, female rats showed similar cocaine responses regardless previous SI exposure. Moreover, levels of b-catenin in PFC will be analyzed. Our working hypothesis is that SI increases cocaine vulnerability by decreasing the activity of the Wnt canonical pathway in PFC in a sex specific manner.

214 | Effect of a ketogenic diet on the expression of potassium channels controlling neuronal excitability

Neurochemistry and Neuropharmacology

Author: Sofia Stupniki | email: sofistupniki@gmail.com

Sofia Stupniki [1°2°], Eugenio Aztiria [1°2°], Guillermo Spitzmaul [1°2°]

1° Instituto de Investigaciones Bioquímicas de Bahía Blanca (INIBIBB)-CONICET/UNS.
2° Departamento de Biología, Bioquímica y Farmacia (BByF), UNS.

The ketogenic diet (KD) contains a high amount of fat and very low carbohydrates which leads to ketone bodies (KB) synthesis as an energy source. In our laboratory, we elaborated a KD (70% fat, 25% proteins, <1% carbohydrates) to evaluate if KB modify the gene expression of Kv channels that regulate neuronal excitability, and the social behavior. KD was administered to P21 C57BL/6 male mice after weaning for 3 weeks with ad libitum intake. We kept a control group (CG) with normal diet. The blood KB and glucose levels were measured on days (D) 0, D7, D14 and D21. After one week of KD administration, the animals reached the highest amount of blood KB (2.81 ± 0.69 mmol/L) while the CG remained at 0.71 ± 0.13 mmol/L. KB levels in the CG did not change during the assay while decreased to 1.44 ± 0.43 mmol/L in the KD group. The body weight of KD mice was 25% lower than CG up to D14 reaching similar values thereafter. Using qPCR, we analyzed the expression of Kcnq2-5 mRNA in different brain regions. We found a significant increase of Kcnq3 in cerebellum and Kcnq4 in cortex. We performed behavioral tests after 3 weeks of KD consumption. The self-grooming behavior and thigmotaxis as well as the sociability and the social novelty presented no differences between KD group and CG. Our results suggest that KB modify Kcnq expression, then could modulate neuronal excitability, and may contribute to explaining the clinical effects of KD in refractory epilepsy and autism spectrum disorders.

216 | Physiological role and molecular function of Caenorhabditis elegans betaine-sensitive nicotinic receptors

Neurochemistry and Neuropharmacology

Author: Ornella Turani | email: ornellaturani@gmail.com

Ornella Turani [1°], Guillermina Hernando [1°], Cecilia Bouzat [1°]

1° Instituto de Investigaciones Bioquímicas de Bahía Blanca (INIBIBB)

The free-living nematode Caenorhabditis elegans is a model of parasitic nematodes. It has a great variety of nicotinic receptors (nAChR), some of which may be novel antiparasitic drug targets. Because resistance of parasitic nematodes to the limited number of anthelmintic drugs available has become an important problem in human and veterinary health, elucidation of the functional roles and drug selectivity of their targets is of great importance for the development of novel drugs. ACR-23 is a nAChR subtype present in neuronal and muscle cells of nematodes but not in vertebrates. It is a cation-selective channel activated by betaine (BE) and sensitive to monepantel (MNP), one of the newest anthelmintic drugs. By performing locomotion assays of wild-type adult worms we showed that exogenous BE significantly increased motility. This effect was not observed in acr-23 mutants, indicating that the enhancement of ACR-23 activity causes worm hypermotility. The exposure of worms to MNP produced the opposite effect, resulting in reduced motility. It also induced spastic paralysis and inhibited egg hatching, indicating important anthelmintic ability. By using a primary culture of C. elegans muscle cells, we described for the first time the properties of BE-elicited single-channel currents and their modulation by MNP. Our study provides insights into the molecular basis of anthelmintic action, which pave the way for the development of novel drugs.

218 | Growth hormone secretagogue receptor (GHSR) signalling in the lateral hypothalamic area of male mice induces orexin receptor 1 dependent activation of neuropeptide Y neurons in the arcuate nucleus

Neuroendocrinology and Neuroimmunology

Author: Franco Barrile Barrile | email: francobarrile@gmail.com

Franco Barrile [1°], Daniela Cassano [2°], Guadalupe García Romero [1°], Mario Perelló [1°]

1° CONICET
2° Agencia (MINCyT)

Ghrelin is a stomach-derived hormone that promotes a variety of functions and acts via the growth hormone secretagogue receptor (GHSR). GHSR is highly expressed in the brain including the arcuate nucleus (ARC) and the lateral hypothalamic area (LHA), both regions involved in energy balance, feeding and reward-related behaviors, among others. Within the LHA, the orexin (LHAorexin) neurons have been suggested to be key mediators of ghrelin's actions. Here we wanted to gain insights into the role of the LHAorexin neurons and its connections to the ARC nucleus mediating the orexigenic effects of ghrelin. First, we tested the effect of ghrelin administration into the LHA of male mice and found that it increases food intake and cFos induction in the LHAorexin neurons and in the ARC nucleus. Using ARC-ablated mice, we found that ARC is necessary to increase food intake after intra-LHA ghrelin administration. Also, we found that the injection of an orexin 1 receptor antagonist (SB) blocked the increase in food intake induced by intra-LHA ghrelin administration. In terms of the neuronal populations involved in these changes, we showed that intra-LHA ghrelin administration increases cFos induction in ARCNPY neurons and that such effect is abrogated by SB treatment. Strikingly, LHAorexin neurons did not express GHSR. Our results indicate that ghrelin action in the LHA indirectly activate orexin neurons, which in turn induced the activation of the ARCNPY and increased food intake.

220 | Study of the neurobiological mechanisms which regulate reward eating behaviors during caloric restriction: role of the hormone ghrelin and its receptor GHSR

Neuroendocrinology and Neuroimmunology

Author: Daniela Alejandra Cassano | email: danicassano@hotmail.com

Daniela Alejandra Cassano [1°], Franco Barrile [2°], Mirta Reynaldo [3°], García Romero Guadalupe [2°], Mario Perelló [2°]

1° AGENCIA (MINCyT)
2° CONICET
3° CIC

Ghrelin is a stomach-derived hormone that acts via growth hormone secretagogue receptor (GHSR). Plasma ghrelin levels and consummatory behaviours towards rewarding stimuli increase in calorie restricted (CR) animals. Since ghrelin is known to regulate reward-related behaviours, we tested here if GHSR signalling mediates the enhancement of consummatory behaviours in CR mice and its putative neurobiological basis. Using a CR protocol, in which mice were daily exposed to a saccharine solution for 4h before food intake, we found that CR GHSR-deficient mice consumed less saccharine and showed smaller induction of cFos in key centers of the mesolimbic pathway, such as the lateral hypothalamic area (LHA) and the nucleus accumbens (Acb), than WT mice indicating that GHSR is required to enhance rewarding consummatory behaviours in CR mice. Using mice with ablation of the arcuate nucleus (ARC), we found that the ARC is not required for the increase of saccharine consumption or cFos activation in the LHA and Acb observed in CR mice. Also, we found that CR mice with GHSR expression in dopamine neurons showed saccharine consumption as seen in CR GHSR-def mice indicating that GHSR only in dopamine neurons is not sufficient to enhance consummatory behaviors in CR. Also, CR mice with GHSR expression exclusively in the LHA showed increased saccharine intake, as compared to GHSR-def mice. Thus, we conclude that GHSR in the LHA could mediate the enhancement of consummatory behaviors under CR.

222 | CENTRAL TARGETS AND EFFECTS OF LIVER-EXPRESSED ANTIMICROBIAL PEPTIDE 2, A RECENTLY RECOGNIZED GROWTH HORMONE SECRETAGOGUE RECEPTOR LIGAND

Neuroendocrinology and Neuroimmunology

Author: Lucia Giovanini | email: luciagiovanini5@gmail.com

Lucia Giovanini [1°], María Paula Cornejo [1°], Franco Barrile [1°], Guadalupe Garcia Romero [1°], Antonella Fittipaldi [1°], Daniel Castrogiovanni [1°], Julieta Aguggia [1°], Mario Perello [1]

1° IMBICE

Liver-expressed antimicrobial peptide 2 (LEAP2) is an endogenous ligand of the growth hormone secretagogue receptor (GHSR), a receptor mainly expressed in the brain that is implicated in the regulation of energy balance. In humans and rodents, LEAP2 acts as an antagonist of GHSR blocking the effects of ghrelin, a peptide hormone with orexigenic effect. We aim to study the extent to which LEAP2 reaches the central nervous system. We used mice to examine the presence of LEAP2 in the brain parenchyma and the cerebrospinal fluid (CSF). Using enzyme immunoassays, we found that LEAP2 is present in the CSF of ad libitum fed mice and becomes undetectable in the CSF of fasted mice. Strikingly, we could not detect LEAP2 in the brain parenchyma of satiated mice using immunohistochemistry. Then, we studied the inhibitory effect of LEAP2 on ghrelin-induced food intake. The central administration of LEAP2 blocks the orexigenic effect of peripherally administered ghrelin, this effect last less than 24 hours and diminishes overnight food intake and body weight of mice. We also found that central LEAP2 treatment does not affect the levels of the marker of neuronal activation c-Fos in any brain nuclei. Finally, we found that central injections of LEAP2 block the delayed orexigenic effect of peripherally administered ghrelin. Altogether, our results suggest that LEAP2 reaches the brain via the CSF and that central LEAP2 acutely blocks the orexigenic effect of exogenously administered ghrelin.

224 | Construction and characterization of an adenoviral vector which expresses interleukin 6 to study its role in cortical inflammation

Neuroendocrinology and Neuroimmunology

Author: Emilia Haberfeld | email: ehaberfeld@leloir.org.ar

Emilia Haberfeld [1°], Carina Cintia Ferrari [1°], Berenice Anabel Silva [1°], María Isabel Farías [1°], Fernando Juan Pitossi [1°], María Celeste Leal [1°]

1° Leloir Institute Foundation – Institute for Biochemical Investigations of Buenos Aires (IIBBA, CONICET), Buenos Aires, Argentina

Multiple sclerosis (MS) is a chronic demyelinating disease that causes neurological disabilities in young adults. Although it has been described as an autoimmune disorder, its aetiology is still unknown. By overexpressing interleukin 1 ß in the cerebral cortex, our group has developed a rat MS model that presents the characteristic inflammatory and demyelinated cortical lesions of the progressive forms of the disease. Interleukin 6 (IL-6) was found among the cytokines whose expression was induced in these lesions. Therefore, the aim of this work is to study the effects of IL-6 on the cortex. In order to obtain a long-term overexpression of IL-6 in the cortex of rats, we constructed a non-replicating adenoviral vector which encodes IL-6 and GFP genes with an IRES in between, downstream a strong constitutive promoter. To produce a viral stock, we used the HEK293A complementing cell line, achieving a standard titer. In addition, we obtained a viral stock of an adenoviral vector which expresses ß-galactosidase and GFP to use as a control. With the purpose of analysing the efficiency of transduction of the vectors and the expression levels of the genes of interest, we transduced the non-complementing cell line HeLa. Finally, we injected stereotaxically different doses of the vectors into the prefrontal cortex of adult rats, observing inflammatory lesions after 7 days. These results suggest a fundamental role of IL-6 in the development of inflammatory lesions in the cortex.

226 | Tracking the functional connectivity dynamics of the hippocampus during motor sequence learning: a high temporal resolution analysis

Sensory and Motor Systems

Author: Alvaro Deleglise | email: alvarodeleglise@gmail.com

Alvaro Deleglise [1°], Patricio Donnelly-Kehoe [2°], Florencia Jacobacci [1°], Guillermina Griffa [1°], Jorge Jovicich [4°], Jorge Armony [3°], Julien Doyon [3°], Valeria Della-Maggiore [1°]

1° CONICET – Universidad de Buenos Aires. IFIBIO Houssay. Buenos Aires, Argentina.
2° Departamento de Investigación e Innovación , Kozaca SA. Rosario, Argentina
3° McConnell Brain Imaging Center, Montreal Neurological Institute, McGill University, Montreal, QC, H3A 2B4, Canada
4° Center for Mind/Brain Sciences, University of Trento, Rovereto, 38068, Trento, Italy

Recent studies point to a role of the hippocampus in motor sequence learning (MSL). Here we analyzed its functional connectivity dynamics at the high-temporal resolution by applying the Leading Eigenvector Dynamics Analysis approach while subjects performed a MSL task alternating blocks of practice with rest periods. We used unsupervised learning techniques at the volume level to detect a discrete number of phase-locking (PL) states that characterize MSL, based on the phase relationship between brain areas, and define state trajectories for each participant. Using metrics from the physics of dynamical systems we then examined how different PL states differed between task and rest epochs, and between early and late learning. During task periods, MSL increased both the probability of occurrence and the time spent in a state composed by regions from sensorimotor and attentional networks. When comparing early and late rest epochs, we found an increased occurrence of a bilateral hippocampus-default-mode network state during early training. In contrast, late training was associated with a higher occurrence of a state composed by regions of the default-mode. Altogether, these findings highlight the participation of the hippocampus in different states with distinct dynamic features across training. Given that MSL gains in performance occur during early training, our results suggest that they could be supported by the increased excursion into an hippocampal-default mode PL state.

228 | Biomechanics of birds respiratory system during song

Sensory and Motor Systems

Author: Facundo Fainstein | email: facu.fainstein@gmail.com

Facundo Fainstein [1°], Ana Amador [1°], Gabriel B. Mindlin [1°]

1° Departamento de Física, FCEN, UBA and IFIBA-CONICET, Buenos Aires, Argentina

Birdsong is a complex behavior that emerges from the interaction of the nervous system, a biomechanical device and the environment. Motor instructions from the central nervous system drive the respiratory system and the syrinx, the avian vocal organ. How these neural instructions change the configuration of the syrinx and how that is related to sound frequency control has been recently studied [1]. However, the way in which pressure patterns necessary for sound production emerge from motor instructions remains unknown. Moreover, many species use air sac pressure for frequency modulation. Here, we perform experiments to measure expiratory muscles activity and air sac pressure in singing canaries (Serinus Canaria). We propose a simple biophysical model with the main dynamical elements found in an avian respiratory system and we show that it can reproduce the pressure patterns observed, using the electrical activity recorded in the muscle as input. This provides a framework to assess how biomechanics constraints singing timescales and provides robustness to perturbations. Altogether these works show the possibility to have a unified biomechanical model that synthesizes birdsong from motor instructions. References: [1] J. F. Döppler, A. Bush, F. Goller, and G. B. Mindlin, From electromyographic activity to frequency modulation in zebra finch song, J. Comp. Physiol. A, 204(2), 209-217 (2018).

230 | Unveiling the contribution of the human hippocampus to procedural motor learning

Sensory and Motor Systems

Author: Guillermina Griffa | email: guillegriffa@gmail.com

Guillermina Griffa [1°], Florencia Jacobacci [1°], Valeria Della Maggiore [1°]

1° CONICET – Universidad de Buenos Aires. IFIBIO Houssay. Buenos Aires, Argentina.

The hippocampus has been long associated with the codification of declarative memories. Recently, however, a few studies have linked it to the encoding of non-declarative memories. Using magnetic resonance imaging (MRI) in humans, we found that learning a novel motor sequence (MSL) is associated with an increment in hippocampal activity as assessed with fMRI, and microstructural plasticity 30 min post learning, as assessed with diffusion MRI (DWI). Here, we carried out two additional DWI studies to establish further the role of the hippocampus in procedural learning. To assess whether its function relates to the sequencing of items in space/time, we trained subjects on a visuomotor adaptation (VMA) task involving no sequencing. Next, to assess whether it relates to processing the explicit component of the task typically engaged during early stages of learning, we trained a different group of subjects on an implicit version of the VMA task (IVMA). DWI were obtained before, 30 min and 24 hs after training. We found that training on either VMA or IVMA decreased MD in the left hippocampus 30 min post-learning. These changes returned to baseline values at 24 hs for VMA but persisted for IVMA. This difference may stem from the supremacy of the implicit component leading to stronger memory retention. Our results support a role of the hippocampus in procedural motor learning regardless of the task.

232 | CHARACTERIZATION OF AUDITORY NEURONAL ACTIVITY IN A SENSORIMOTOR NUCLEUS IN ADULT MALE CANARIES (Serinus canaria)

Sensory and Motor Systems

Author: Fiamma Liz Leites | email: fiamma.liz17@gmail.com

Fiamma L. Leites [1°], Cecilia T. Herbert [1°], Santiago Boari [1°], Gabriel B. Mindlin [1°], Ana Amador [1°]

1° Departamento de Física, FCEN, UBA and IFIBA-CONICET, Buenos Aires, Argentina

The telencephalic nucleus HVC (proper name) is a brain area involved in the motor control and auditory processing of birdsong. Electrophysiological recordings have shown that HVC neurons have selective auditory responses, firing more to the presentation of the bird's own song (BOS) than to almost all other sounds. The songs of canaries (Serinus canaria) have a complex structure composed by a sequence of phrases formed by the repetition of stereotyped units called syllables, which can be grouped into defined categories according to their expiratory pressure pulses and have specific syllabic repetition rate. We analyzed recordings of extracellular neuronal activity in the nucleus HVC responding to the presentation of auditory stimuli in freely behaving canaries. The stimuli were the bird's own song (BOS), the temporarily reversed bird´s song, and the song of a conspecific. We observed that neurons in HVC respond selectively to BOS at certain phrases, and categorized the neural activity according to particular properties. For this work, we selected two syllable types for an exhaustive analysis. In one of them, we observed that neural responses occur at two specific instances of the syllable. In the second syllable type, there was one instance where neural activity increased. Very little is known about the auditory activity in HVC during wakefulness in canaries, so these results open a new line of research.

234 | Chronic versus acute regulatory mechanisms of ASIC1 expression in pain-related areas in a Fabry mouse model

Sensory and Motor Systems

Author: Mayra Micaela Montes | email: mayramontes1997@gmail.com

Mayra Micaela Montes [1°], Georgina Oriana Mingolo Malnati [1°], Libia Catalina Salinas Castellanos [1°], María Natalia Gobetto [1°], Osvaldo Daniel Uchitel [1°], Carina Weissmann [1°]

1° IFIBYNE

Neuropathic pain is one of the key features of ?-galactosidase A (Gla) deficient Fabry Disease (FD). Ion channels play an important role in the pain pathway: the detection of local stimuli, the transmission of electrical impulses to the brain, and their interpretation as pain signals. Acid-sensing ion channels(ASICs) are sensors involved in neural modulation in the central nervous system and pain-associated tissue acidosis in the peripheral system. Upregulation of ASIC1 channels has been documented in many pathological conditions. ASIC1 exists in two variants, ASIC1a and ASIC1b, alternative splice isoforms. Most antibodies detect both isoforms. This work aims at analyzing ASIC1 RNA levels in FD. Previous work by the group in a formalin acute pain mouse model showed an increase in ASIC1 levels at different regions of the pain pathway. In this work, we analyzed the Gla knockout mouse (GlaKO) (Ohshima et al., 1997) model that accumulates Gb3. We detected higher levels of ASIC1 at the anterior cingulate cortex (ACC), spinal cord (SC) and Dorsal Root Ganglia (DRG) in the Glako mice, the same regions that showed an acute increase in the formalin model. However, contrary to the formalin model were RNA levels are not altered, preliminary results showed ASIC1a and ASIC1b RNA levels change in the ACC, SC and DRG of GlaKO mice compared to the wt animals. This work suggests different mechanisms contribute via ASIC1 to pain (and might be modulated in therapies) in acute and chronic models.

236 | Participation of p75NTR in the recruitment of the inflammatory component in a mouse model of choroidal neovascularization

Sensory and Motor Systems

Author: Paula Virginia Subirada Caldarone | email: psubirada@gmail.com

Paula Virginia Subirada [1°], Albana Tovo [2°], María Victoria Vaglienti [2°], Nicolás Ribotta [3°], José Domingo Luna Pinto [3°], Horacio Uri Saragovi [4°], María Cecilia Sánchez [2°], Agustín Anastasía [1°5°], Pablo Federico Barcelona [2°]

1° Instituto Ferreyra, INIMEC-CONICET-UNC. Córdoba, Argentina
2° Departamento de Bioquímica Clínica, CIBICI-CONICET, Facultad de Ciencias Químicas, Universidad Nacional de Córdoba. Córdoba, Argentina.
3° Centro Privado de Ojos Romagosa. Fundación VER. Córdoba, Argentina.
4° Lady Davis Research Institute, Department of Pharmacology and Therapeutics, Center for Experimental Therapeutics, Department of Ophthalmology and Vision Sciences, McGill University, Montreal, Canada.
5°Instituto Universitario de Ciencias Biomédicas de Córdoba (IUCBC), Córdoba, Argentina.

With the advent of old age, pathologies that drive to a decline in the retinal function appear. Particularly in the wet age-related macular degeneration, the retinal pigmented epithelium (RPE) cells are known to diminish their trophic support to photoreceptors. Moreover, mononuclear phagocytic cells (MPCs) accumulate in the subretinal space, leading to an inflammatory chronic state that promote choroidal neovascularization (CNV) and further photoreceptor degeneration. The mechanisms by which MPCs participate in the development of the vascular growth associated to this pathology remain cryptic. The p75 neurotrophin receptor (p75NTR) has been extensively involved in vascular changes. Here, we inquire if p75NTR has a role in the recruitment of MPCs to the injured area in a mouse model of laser-induced CNV. Western blot assay showed increased p75NTR expression in RPE-Choroids 4 days after laser. Confocal images of RPE-choroid wholemounts of CNV mice evidenced the presence of p75NTR in MPCs (F4/80+). Interestingly, flow cytometry analysis revealed a reduction of MPCs in the RPE-Choroids and retinas of p75NTR KO mice, respect to WT mice. Pharmacological inhibition of p75NTR in vivo also exhibited a reduction in the number of MPCs in RPE-Choroids and retinas, confirming that p75NTR is involved in MPCs recruitment. Our research contributes to understand the mechanisms of wet age-related macular degeneration.

238 | Using dynamical metrics hypergraphs to study epilepsy dynamics.

Theoretical and Computational Neuroscience

Author: Dalma Anahi bilbao | email: bilbaodalmaanahi@gmail.com

Dalma Anahi Bilbao [1°], Hugo Aimar [1°], Diego Martin Mateos [1°]

1° IMAI conicet Santa Fe

The analysis of connectivity networks is one of the fundamental tools in the study of neuroscience. Generally, this analysis is carried out using graph theory, which describes the pairwise relationship between the components of a network. However, in the brain, the relationship between its components (neurons, brain areas, etc.) has more complex relationships. To address this problem, hypergraph theory can represent the multiple relationships between its components. In this work, we use the metric hypergraph method to study brain dynamics during an epileptic seizure. Initially, we applied the basic Kuramoto model, which simulates a hypersynchronisation of the system (seizure). Subsequently, magnetoencephalography signals from two particular cases of generalized epilepsy were analyzed. Through this analysis, we can study the dynamics of the synchronization phenomenon in an epileptic seizure.

240 | Predicting brain health in older adults via automated speech analysis

Theoretical and Computational Neuroscience

Author: Ivan Caro | email: ivan.caro.strokes@gmail.com

Ivan Caro [1°], Enzo Tagliazucchi [2°], Adolfo Martín García [1°]

1° Cognitive Neuroscience Center, Universidad de San Andrés, Buenos Aires, Argentina
2° Departamento de Física, Universidad de Buenos Aires and Instituto de Física de Buenos Aires (IFIBA-CONICET) Pabellón I Ciudad Universitaria, CABA, Buenos Aires, Argentina

Increased life expectancy in contemporary society implies a rise in aging-related neurocognitive alterations. These form a continuum ranging from subjective cognitive impairment (SCI) to mild cognitive impairment (MCI) and Alzheimer's disease dementia (ADD). Automated speech metrics offer an objective, affordable, and scalable approach to predict those neurocognitive states. However, no study has used this approach to predict and anticipate neuropsychological and neural alterations along this continuum. We aim to generate a machine learning model that meets these goals. We have obtained data from 300 people over 70 years old, 60 of whom underwent a second evaluation two years later. All of them completed seven speech tasks (from which we will extract acoustic and linguistic features), neuropsychological tests (MMSE, IFS), and MRI/fMRI recordings (from which we will extract neuroimaging features). Using canonical correlation analyses, we will examine whether acoustic and linguistic features can predict (a) MMSE and IFS scores and (b) neuroimaging features. Then we will apply XGBoost regressors to obtain the models that optimally predict (a) and (b) along the SCI-MCI-ADD continuum. Finally, we will employ the same approach over the variables obtained two years later. The resulting model will favor the automatic detection of brain health profiles in older adults, offering an affordable and scalable alternative to the high costs and low availability of standard approaches.

242 | PySimMIBCI: Realistic motor imagery EEG simulation for data augmentation in deep learning

Theoretical and Computational Neuroscience

Author: Catalina María Galván | email: catalinamgalvan@gmail.com

Catalina M. Galván [1°], Rubén D. Spies [1°], Diego Milone [2°], Victoria Peterson [1°]

1° Instituto de Matemática Aplicada del Litoral, IMAL, UNL, CONICET, Argentina
2° Instituto de Investigación en Señales, Sistemas e Inteligencia Computacional, sinc(i), FICH-UNL, CONICET, Argentina

Decoding algorithms for Brain-Computer Interfaces (BCIs) based on Electroencephalography (EEG) still experience several data-related limitations which bother their practical use. In this context, EEG simulation strategies play a crucial role in providing well-defined data for the development, validation and interpretation of EEG-BCI models. Moreover, in motor imagery (MI) BCIs for rehabilitation, large-scale subject-specific data is hardly accessible due to the high cost of human experiments and the reduced number of publicly available databases. This data volume has become more critical with the adveniment of deep learning (DL) models, whose performance strongly depends on how much training data is available. For such complex models, realistic simulation of MI-BCI recordings enables a strategy for data augmentation, boosting its performance and robustness in both a time- and cost-efficient fashion. In this work, we present a simulation framework, called PySimBCI, that can be used to generate realistic EEG-like signals based on specific model assumptions. We show that our artificially generated signals are electrophysiologically similar to real MI-EEG data. Experimental results exhibit that the performance of DL models can be effectively improved when the simulated data is introduced during the training process. Moreover, the proposed augmentation strategy yields a significant improvement over other state-of-the art augmentation methods.

244 | Allometry behind cognitive processes evaluated with eye tracking

Theoretical and Computational Neuroscience

Author: Marcos Miguel Meo | email: marcos.meo@uns.edu.ar

Marcos Meo [1°], Jessica Del Punta [1°], Gustavo Gasaneo [2°]

1° Universidad Nacional del Sur – IFISUR, 8000 Bahía Blanca, Argentina
2° Centro Integral de Neurociencias Aplicadas, 8000 Bahía Blanca, Argentina

Human cognition remains one of the greatest enigmas of science. Many important cognitive processes, such as reading, require an input of information based on vision. That is why in this work we will address the study of the characteristics of eye movements associated with various cognitive processes. Recently, it has been reported that a particular characteristic of biological systems is their allometry, that is, a kind of long-term memory that governs the equilibrium of the system. This characteristic is linked to the way in which the system moves or evolves. It has been shown that the variability of systems is related to their fractal nature. To our knowledge, this behavior has not been discussed in terms of cognitive processes. In this work we show that each cognitive process has a characteristic allometry which is associated with a specific fractality. This association provides quantitative parameters that characterize globally the different cognitive processes and particularly the peculiarities of each individual.

246 | Optimal social information use and metacognition: an agent-based model

Theoretical and Computational Neuroscience

Author: Alejandro Ramos Usaj | email: aler.usaj@gmail.com

Alejandro Ramos Usaj [1°], Guillermo Solovey [1°]

1° Instituto de Calculo, FCEyN, UBA.

Recent evidence has pointed out that confidences drives a confirmation bias of new information at the brain level and a recent agent-based model showed that having a confirmation bias is adaptive when coupled with efficient individual metacognition. To extend these lines of resarch we consider social learning as type of information integration process in which individuals integrate personal and social information to improve their own accuracy. We develop a model were an individual samples information from a noisy stimulus, formalized as sampling from a known distribution with a mean fixed at the true signal for the stimulus and a variance reflecting individual reliability (or hability). In light of this information the individual makes a binary decision following an indicator function with fixed thresholds and we estimate confidence in this initial decision by calculating the log-odds in favour of the chosen option. For each individual we calculate metacognitive efficiency using stablished signal decision theory measures modulated by the correlation between individual reliability and the confidence calculation. We show that optimal social information use does not depend solely on individual metacognition but also on the number of agents providing the individual with social information and the reliability of each agent. Finally we explore the theorethical and empirical implications of our findings for future works.

248 | Modelling of neural representations in the hippocampal formation with recurrent neural networks trained to jointly represent space and time

Theoretical and Computational Neuroscience

Author: Federico Szmidt Szmidt | email: fszmidt@gmail.com

Federico Szmidt [1°], Camilo J. Mininni [1°]

1° Instituto de Biología y Medicina Experimental – CONICET

The entorhinal cortex is a key brain region regarding the neural representation of space and time. Neurons in the medial (MEC) and lateral (LEC) entorhinal cortex respectively show a preference for coding the animal's position or the passage of time, although some mixed selectivity can also be found. Several models have been proposed that explain the emergence and mechanisms behind space and time coding. However, how the representations interact within these interconnected regions is not well understood. In this work we trained recurrent neural networks to encode an agent's position, by integrating speed from simulated trajectories, together with the elapsed time between discrete stimuli presentations. We studied the emerging codes, comparing them between networks, and with results from experiments in behaving animals. Trained networks exhibited neurons that coded position by firing in a quasi periodic fashion, reminiscent of grid cells in MEC, and neurons with firing rates that correlated with elapsed time since the last stimulus, reminiscent of ramping activity as reported in LEC. Most neurons specialized in coding either space or time, conforming two separated populations, with a reduced number of neurons with mixed selectivity. Our results suggest that independent codes for space and time are the expected solution to a joint space-time optimization problem.

250 | Development of an algorithm for categorizing behavioral patterns of zebrafish in response to danger stimuli

Tools Development and Open Source Neuroscience

Author: Valentín Agulló | email: valentin_a_98@hotmail.com

Valentín Agulló [1°], Nicolás Martorell [1°], Violeta Medan [1°]

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

Our behavior determines how we interact with the environment. However, understanding of how the brain processes information to organize behavior is still incomplete. Critically, detection of dangerous stimuli (predators) determine the escape (avoiding death). Here, we recorded responses of zebrafish larvae to different visual and auditory stimuli (separately or in combination) and analyzed the kinematics of the locomotor response. We developed a tracking algorithm based on OpenCV (Python) followed by computational analysis to extract different quantitative parameters of the trajectory. Our goal was to find relevant variables to perform an automatic categorization of behavioral escape patterns. For this, locomotor activity was segmented into discrete events by defining thresholds taken in the phase space of linear and angular velocity. This allowed separation of slow events (such as normal swimming bouts, n?8900) and fast events (FE, n=588). Next we compared maximum speeds and accelerations, maximum twist angle, etc. between a subset of FE categorized by an observer as C-start (oCS, n=167) and all FE. Importantly, the method labeled >95% of all oCS as FE. Results show that 1) rapid escape events can be automatically classified based on a low number of kinetic variables, 2) auditory escapes have higher maximum velocities than visual escapes, 3) audiovisual escapes show a bimodal distribution and 4) substantial variability in FE requires additional parameters to be categorized.