NENS Graduate School Fair

The NENS Graduate School Fair is open
to visitors throughout the FENS Forum
(9-13 July 2022)

Don’t miss the live session on
Tuesday 12 July, from 15:30 to 17:30

FENS | Federation of European Neuroscience Societies

www.fens.org/nens

Welcome to
NENS Graduate School Fair 2022

hosted by FENS Committee for Higher Education and Training (CHET)

The Network of European Neuroscience Schools (**NENS**) represents over 200 graduate schools and programmes across 28 European countries that offer MSc, PhD and MD-PhD degrees in neuroscience.

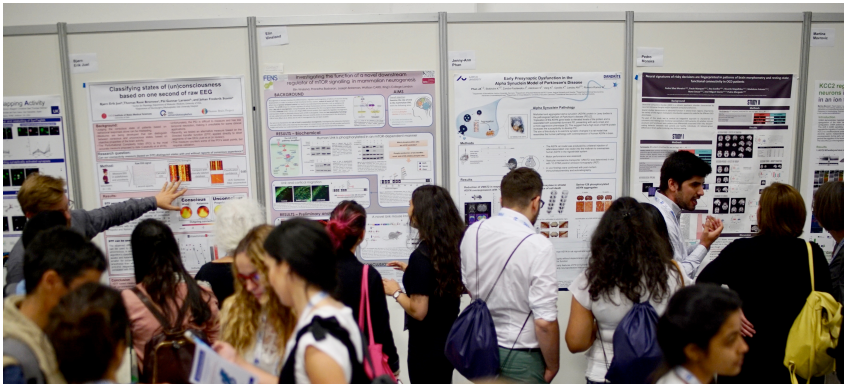
Are you interested in further developing your career, and plan to enroll in a MSc or PhD graduate school programme?

By visiting the NENS Graduate School Fair, you will have the chance to:

1. Ask your questions and get first-hand insights on the opportunities offered by the **30 MSc and PhD graduate neuroscience programmes** attending the Fair.

2. See the **work of the best 10 selected students** enrolled with a NENS programme, who would be there to present their research, interact and respond to your queries.

Don't miss the live session of the NENS Fair on **July 12 from 15:30 to 17:30**, where you will have the opportunity to interact on site with the selected students and the school programme representatives.



www.fens.org/nens

MSc and PhD neuroscience school programmes attending the Fair

NENS School Programme	Degree	Country	No
Master Program in Interdisciplinary Brain Sciences	MSc	CH	1
Master of Science in Neurosciences	MSc	DE	2
MSc Integrative Neuroscience	MSc	DE	3
MSc Interdisciplinary Neuroscience	MSc	DE	4
Euro-Mediterranean master of Neuroscience - Online	MSc	FR	5
Master in Biomedical Sciences – Specialisation Medical Neurosciences	MSc	NL	6
Master Program in Neurobiology	MSc	RO	7
Norwegian Research School in Neuroscience	MSc	NO	8
Cognitive Sciences and Technologies: from Neuron to Cognition	MSc	RU	9
Cognitive Neuroscience: Mind and Brain	MSc	SE	10
Master's Programme in Neuroscience	MSc	FI	11
Doctoral Programme Brain & Mind	PhD	FI	12
Master in Neuroscience	MSc	PT	13
PhD in Neuroscience	PhD	PT	14
Neuroschool	MSc, PhD	FR	15

NENS School Programme	Degree	Country	No
Neurobiology - Neurophysiology	MSc, PhD	RS	16
Neurobiology and Human Biology	MSc, PhD	HU	17
Lemanic Neuroscience Doctoral School (LNDS)	PhD	CH	18
International Max Planck Research School for Brain and Behavior	PhD	DE	19
PhD programme in neurosciences of University of Tartu	PhD	EE	20
PhD in Neuroscience (Turin)	PhD	IT	21
PhD in Neuroscience (Naples)	PhD	IT	22
Bordeaux Neurocampus Graduate Program	PhD	FR	23
European Graduate School of Neuroscience	PhD	NL	24
International PhD Programme in Cognitive Neuroscience (CogNeS)	PhD	PL	25
Warsaw PhD School in Natural and BioMedical Sciences	PhD	PL	26
Centre for Neurodevelopmental Disorders	PhD	UK	27
Sussex Neuroscience 4-year PhD Programme	PhD	UK	28
Mainz Research School of Translational Biomedicine (TransMed)	MSc, PhD, MD-PhD	DE	29
EURIDOL Graduate School of Pain	Graduate School	FR	30,31
Master BIP Neurosciences, Sorbonne Université	MSc	FR	52

Poster Board 1

Master Program in Interdisciplinary Brain Sciences

University of Zurich

Winterthurerstrasse 190
Zurich, Switzerland, 8057

W: https://www.neuroscience.uzh.ch/en/Master-Studies.html

E: sophie.masneuf@neuroscience.uzh.ch

The University of Zurich and the Swiss Federal Institute of Technology in Zurich (ETH) are jointly offering a new interdisciplinary Master's degree in brain sciences.
The MSc in Interdisciplinary Brain Sciences (IDB) is devoted to the following three main areas with a strong axis on practice:

- Brain Biology
- Systems, Computation and Neural Technology
- Clinical and Cognitive Neuroscience

The goal of the Master IDB is to train experts who understand the relationships between biology, technology, and clinical neurology, and to familiarize them with the broad range of measurement, analysis, and treatment methods in neuroscience. All three thematic areas include a six-week laboratory work. The students then have six months to deepen and supplement their knowledge while producing a Master's thesis, in addition to an eight-week internship in a clinic or with a partner company. Graduates are equally well-prepared for a career in university research as for one in clinical research or in industry. The program also delivers biological and technological tools for a career in medical technology.
The MSc IDB is open to international students with a Bachelor's degree in various disciplines from e.g. biology to engineering, computer sciences, psychology or mathematics.

Poster Board 2

Master of Science in Neurosciences
University of Bonn

Venusberg Campus 1
Bonn, Germany, 53127
W: https://www.neurosciences.uni-bonn.de/
E: neurosciences@uni-bonn.de

The Master of Science in Neurosciences at the University of Bonn is a two-year research-oriented, international study program. The curriculum is taught entirely in English and divided into modules, combining courses, lectures, seminars and laboratory work. The major objective of the M.Sc. in Neurosciences program is to train talented students in the rapidly expanding field of Neuroscience. Successful graduates will be proficient to engage in future groundbreaking research and start careers in a large variety of associated medical and biological fields.

Poster Board 3

MSc Integrative Neuroscience
Otto von Guericke University

Leipziger Strasse 44, Haus 91
Magdeburg, Germany, 39120
W: https://www.neuroscience-magdeburg.de
E: nicole.zenker@ovgu.de

Integrative neuroscience considers neural components in their functional context. All levels of analysis are of interest: How do molecular and cellular components build functioning neurons and synapses? How do brain cells work together to form operational circuits? How do circuits jointly generate behaviour and cognition? How are individual brains shaped by their interaction with other brains and with the natural environment?

The integrative study of the nervous system involves newer developments such as functional brain imaging, application of molecular biology, genetics and immunology, as well as more traditional areas like neurophysiology, neuroanatomy, animal behaviour, or psychophysics. In addition, neural modelling, and quantitative analyses are growing rapidly in importance. Accordingly, the programme introduces students to a wide variety of techniques from different disciplines.

Poster Board 4

MSc Interdisciplinary Neuroscience

Goethe University Frankfurt

Theodor-Stern-Kai 7, Universitätsklinikum Frankfurt
Frankfurt, Germany, 60590

W: https://www.izn-frankfurt.de/master/

E: neurosciences@uni-frankfurt.de

The MSc Interdisciplinary Neuroscience offers a highly research-oriented training that will provide students with a broad overview over the most relevant fields of neuroscience, including basic neuroscience, clinical neuroscience, cognitive neuroscience, and computational neuroscience as well as applied aspects of neuroscience. This also includes relevant practical skills. The program will confront students with various levels of complexity of neural functions from molecular biology to systems neuroscience. A major characteristic comprises the optional training in clinical neuroscience that will familiarize students with neuropathology and aspects of neurology and will provide them with hands on information on current technical approaches applied in clinical research.

Poster Board 5

Euro-Mediterranean master of Neuroscience - Online

University of Bordeaux

Centre Broca Nouvelle-Aquitaine, 3ème étage, 146 rue Léo Saignat - CS 61292 - Case 28
Bordeaux Cedex, France, 33076

W: https://emn-online.org/

E: marc.landry@u-bordeaux.fr

EMN-Online is a 2-year Master programme in Neurosciences, delivered entirely online. The programme boasts an international curriculum, with identical courses and evaluation offered by each of the 14 partners from Europe and the South Mediterranean area. Opportunities for taking part in laboratory-based internships are also provided. Students also benefit from innovative and interactive e-learning methods and online tools, e.g. an online teaching platform, a virtual classroom and possibility of virtual discussion and meetings, as well as webinars and animated scientific aids.

Poster Board 6

Master in Biomedical Sciences – Specialisation Medical Neurosciences

Radboud University Medical Center Nijmegen

Geert Grooteplein Zuid 10
Nijmegen, The Netherlands, 6525 GA
W: https://www.ru.nl/english/education/masters/biomedical-sciences/
E: d.schubert@donders.ru.nl

In the Master Biomedical Sciences at the Radboudumc you choose a specialisation to further improve the structure and depth in your program. Specifically, the course offering of the first course periods in the BMS program have been subdivided into 7 specializations which the students can choose form. An eighth option is for student to assemble their Master's program individually and design his/her own specialisation (free specialisation). As such, the specialisations on offer are:

- Medical Neuroscience
- Immunology and host defence
- Clinical human movement sciences
- Epidemiology
- Health Technology Assessment
- Drug Safety and Toxicology
- Molecular Medicine
- Free specialisation

A specialisation provides substantive structure and depth on a number of core topics. Following a specialisation is not mandatory, but the student must ensure that he/she meets the entrance level of courses he/she wants to take. A student is free to compile his/her own set of courses. So, you are allowed to only follow a part of a specialisation or take courses from different specialisations (= free specialisation).

Poster Board 7

Master Program in Neurobiology

University of Bucharest

Splaiul Independentei, 91-95
Bucharest, Romania, 050095
W: https://www.bio.unibuc.ro/index.php/departamente/anatomie-fiziologie-animala-si-biofizica/45-neurobiology/378-master-in-neurobiology
E: violeta.ristoiu@bio.unibuc.ro

The Master in Neurobiology is an interdisciplinary program in the field of neurosciences.

Main objectives of the program:

- To offer theoretical and practical knowledge required to perform neuroscience research
- To prepare the students for integration in the work field
- To prepare the students for enrolling in a PhD program

Competencies acquired during the Master in Neurobiology program:

- Ability to understand neurocognitive, neurobiological, neurophysiological, neuropsychological and neurobiophysical processes
- Ability to perform a critical analysis on a scientific paper, from methods to data, by interpreting the information in a broader scientific context
- Ability to plan a scientific experiment in neuroscience
- Ability to use laboratory techniques in the neuroscience field
- Ability to apply ethical guidelines in research
- Ability to learn independently, to use scientific databases, to analyse and organize scientific literature
- Ability to work in a team, according to deadlines
- Ability to write a summary or a complete scientific paper
- Ability to present scientific data in front of an audience made of specialist or of lay people Ability to apply neuroscience knowledge in other fields and in diverse working environments

Poster Board 8

Norwegian Research School in Neuroscience by the Kavli Institute for Systems Neuroscience

Norwegian University of Science and Technology

Olav Kyrres Gate 9, MH, NTNU, Postbox 8905
Trondheim, Norway, 7491

W: https://www.ntnu.edu/studies/msneur

E: mussie.debesai@ntnu.no

Are you wondering how thoughts and emotions arise in the nerve cells in the brain? Do you want to use a wide range of methods from the natural sciences to investigate how the brain works, and what goes wrong when disease occurs? If so, NTNU's interdisciplinary MSc in Neuroscience is the right choice for you. The program is hosted by the Kavli Institute for Systems Neuroscience, which is under the direction of May-Britt and Edvard Moser (Nobel laureates of 2014).

Poster Board 9

Cognitive Sciences and Technologies: from Neuron to Cognition

HSE University

4 Armyansky lane, Building 2
Moscow, Russia, 101000

W: https://www.hse.ru/en/ma/cogito/

E: cogito@hse.ru

The Master’s programme 'Cognitive Sciences and Technologies: From Neuron to Cognition' offers courses that explore cognitive psychology, cognitive neuroscience, and neuro-modelling. Taken together, these subjects cover how memory, emotions, cognition, and consciousness actually work. The programme combines lectures in English with practical training at prominent laboratories in Moscow and at international partner institutions. Leading scientists supervise students' practical training and writing of Master's thesis during the second year.

Poster Board 10

Cognitive Neuroscience: Mind and Brain

University of Skövde

Högskolevägen 3
Skövde, Sweden, 541 45

W: https://www.his.se/en/education/bioscience/cognitive-neuroscience-mind-and-brain-masters-programme-medha/
E: andreas.kalckert@his.se

The University of Skövde offers a one-year master's programme in Cognitive Neuroscience: Mind and Brain, taught entirely in English. This is a demanding master's programme for students with a background in cognitive neuroscience / neuroscience or consciousness studies, or in closely related subjects. It may also be suitable as a conversion programme for students with an interest in these subject areas and a background in a subject such as psychology, cognitive science, or philosophy. The programme provides a sound basis for research and teaching at a higher level within cognitive neuroscience. It requires ongoing, focused studies over the course of a year (two consecutive semesters).

Poster Board 11

Master's Programme in Neuroscience

University of Helsinki

Viikinkaari 1, P.O.Box 65
Helsinki, Finland, 00014
W: https://www.helsinki.fi/en/degree-programmes/neuroscience-masters-programme
E: katri.wegelius@helsinki.fi

The Master's Programme in Neuroscience at the University of Helsinki is a 2-year (120 ECTS) interdisciplinary programme with two complementary study tracks. The Master's degree consists of 60 ECTS of advanced studies, including a research project (Master's thesis) and 60 ECTS of other elective studies. English is the language of instruction.

Neuroscience study track provides students with an understanding of both fundamental and cutting-edge neuroscience, studying the brain and the entire nervous system at different levels of organization, from genes and molecules to nerve cells and networks; and beyond.

Cell and Systems Physiology track provides students with a holistic view of the integrated mechanisms that govern the functions of organisms, from cells to functional systems, from development to aging, and in health and disease.

Poster Board 12

Doctoral Programme Brain & Mind

University of Helsinki

Viikinkaari 1, P.O.Box 65
Helsinki, Finland, 00014
W: www.brain-mind.fi
E: katri.wegelius@helsinki.fi

The Doctoral Programme Brain & Mind (B&M) is based on a multidisciplinary network of leading neuroscience research groups at the University of Helsinki and Aalto University. The doctoral candidates have a background in medicine, biosciences, psychology, cognitive sciences, humanities, technology or physics and chemistry.

Poster Board 13

Master in Neuroscience

University of Lisbon | Faculty of Medicine

Av. Prof Egas Moniz
Lisboa, Portugal, 1649-028
W: https://www.medicina.ulisboa.pt/en/master-degrees
E: anaseb@medicina.ulisboa.pt

The Master in Neurosciences is a two-year course, aiming to provide skills for the research in Neurosciences, from molecules to cognition, from physiology to pathology. During the 1st year the students is expected to acquire skills that will enable her/him to develop a full-time research project during the 2nd year.

Key skills to acquire during the 1st year are:

- fundamentals of scientific methodology,
- fundamentals of neurosciences, and recognition of its interdisciplinary nature, from basics to clinical applications.
- identification of main methodologies in neuroscience research.
- critical analysis of the literature.
- hypothesis-driven reasoning/project design.

Throughout the 1st year each student has to build a project, with the aid of a supervisor, and to present it by the end of 1st year Once accepted, the project will be carried out during the 2nd year, in a full-time research basis.

Poster Board 14

PhD in Neuroscience

University of Lisbon | Faculty of Medicine

Av. Prof Egas Moniz
Lisboa, Portugal, 1649-028
W: https://www.medicina.ulisboa.pt/en/doutoramento
E: anaseb@medicina.ulisboa.pt

The PhD in Neurosciences has a first, the curricular year, where the student acquires fundamental knowledge and 'soft skills' necessary for scientific research, including critical reasoning and the grounds of the scientific method, and contacts with a wide range of investigators for an informed and mature choice of the experimental project to be developed in subsequent years. There are a few obligatory Curricular Units – Molecular and Cellular Neurosciences, Neuroethics, Biostatistics, Project Planning. The remaining programme of the 1st year is 'tailor made' as a function of the student needs and objectives. Choices cover a with range of topics to be obtained in any School of the University of Lisbon under the scope of the Mind-Brain College of the University of Lisbon.

The second part of the programme (2nd to 4th year) is devoted to the accomplishment of an original experimental work, under supervision. By the end of the programme the student has publish as 1st author at least 1 original paper in an indexed Journal. It is expected that the student by the end of the programme has attained a considerable degree of scientific maturity to be able to pursue a scientific career, if desired.

Poster Board 15

Neuroschool (PhD and Master Program)

Aix-Marseille University

27 bd Jean Moulin, Faculté des sciences médicales et paramédicales, Aile verte, 1st floor
Marseille, France, 13005
W: https://neuro-marseille.org/en/
E: isabelle.virard@univ-amu.fr

NeuroSchool, Marseille's graduate school in neuroscience, brings together three degrees (3rd year of Bachelor, Master, PhD) which represents over 300 students each year. It offers a comprehensive and innovative neuroscience curriculum. The master program aims to train students in the various fields of neuroscience (molecular and cellular neurobiology, neurodevelopment, neurophysiology, behavioural and cognitive neuroscience...), giving them a common training base as well as skills in one of the three tracks of the master's: Molecular and Cellular Neuroscience; Integrative, Cognitive and Behavioural Neuroscience; the EMN-Online programme, Euro-Mediterranean Master in Neurosciences and Biotechnology.

Through the NeuroSchool PhD program, PhD students have access to training dedicated to neuroscience and join the dynamic community of the Neuromarseille Institute. They benefit from a variety of scientific events (basic and specialized courses, monthly tutored seminars, clinical training…), as well as professional, social, and networking events in which they can actively participate in and/or organize (NeuroDays, special events). These events are constantly evolving and are selected each year to best meet the needs of our PhD students.

Poster Board 16

Neurobiology - Neurophysiology

University of Belgrade | Faculty of Biology

Studentski trg 3
Belgrade, Serbia, 11000
W: https://bio.bg.ac.rs/studijski-program-molekularna-biologija-doktorske
E: pandjus@bio.bg.ac.rs

This module with an interdisciplinary approach provides integral knowledge on the Neurophysiology from the cell as the basic unit of the physiological behaviour to higher cognitive processes. This approach is included in the basic, obligatory course of Cellular Neurophysiology and the elective courses covering multidisciplinary aspects of neurophysiology: Biomedicine, Neuropsychology and Biophysics. Lecturers recruited for the module are selected from young emerging researchers and experienced professors and PIs. The lecturers` main fields of expertise are molecular biology, physiology and medicine. Subjects within the submodule curricula provide a combination of practical/technical courses on electrophysiology or advanced microscopy (with organized visits to relevant laboratories) and theoretical courses of biomedical orientation, thus extending the knowledge of neurobiology. To follow this Neurophysiology module some previous knowledge is preferred (but not obligatory) of General physiology, Neurobiology and Basic systems biophysics. The submodule is primarily intended for graduates of Biology, but also for scholars in related fields such as Medicine, Defectology, Physics, Chemistry and Physical Chemistry.

Poster Board 17

Neurobiology and Human Biology

Eötvös Loránd University

Pázmány Péter sétány 1C
Budapest, Hungary, 1117
W: https://biologia.elte.hu/bio-MSc-en
E: schlett.katalin@ttk.elte.hu

Bringing together 12 departments and several Research Groups founded by external sources, including ERC grants, the Institute of Biology is the most diversified biology community in Hungary with approx. 70 permanent university lecturers and cca 1400 students. Our Biology MSc programme offers training in 6 specialisations, including Neurobiology and Human Biology. The Biology Doctoral School has 9 doctoral programmes, having Neurobiology and Human Biology as one of these. All MSc and PhD courses are available in English. We have experience in organizing online courses besides the regular in-person classes and have already running courses by foreign lecturers, therefore exchange programmes can be organized in person as well as in virtual form.

Poster Board 18

Lemanic Neuroscience Doctoral School (LNDS)

Universities of Geneva and Lausanne

Coordination office: UNIL-Sorge, POL316
Lausanne, Switzerland, 1015
W: www.lemanic-neuroscience.ch
E: lnds@unil.ch

The Lemanic Neuroscience Doctoral School (LNDS) organizes student training both in theoretical and experimental aspects of neuroscience. Research projects take place in affiliated laboratories in Geneva and Lausanne. Around 180 PhD candidates are currently enrolled in the program (as of December 2021) and receive training via comprehensive coursework within the LN Program and by attending seminars, journal clubs and workshops.

Poster Board 19

International Max Planck Research School for Brain and Behavior

Max Planck Institute for Neurobiology of Behavior

Ludwig-Erhard-Allee 2
Bonn, Germany, 53175
W: https://imprs-brain-behavior.mpg.de/
E: imprs.info@mpinb.mpg.de

The International Max Planck Research School (IMPRS) for Brain & Behavior is a fully funded PhD program in Bonn, Germany that offers a competitive world-class PhD training and research program in the field of neuroethology and neuroscience. IMPRS for Brain & Behavior is a collaboration between Max Planck Institute for Neurobiology of Behavior (MPINB), the University of Bonn, and the German Center for Neurodegenerative Diseases. Establishing the link between brain circuits and behaviour is known as 'neuroethology', which aims to understand how the collective activity of the vast numbers of interconnected neurons in the brain gives rise to the diversity of animal behaviours. To gain a full understanding of brain circuitry underlying a specific behaviour requires the combination of research approaches focusing on different levels of detail - ranging from the anatomical reconstruction of neural circuits to the quantitative behavioural analysis of freely moving animals and natural behaviour. The IMPRS for Brain & Behavior is unique and distinguishes itself from other graduate schools in the field of neuroscience by focusing its efforts on providing theoretical and methodological training in neuroethology and modern neuroscience methods.

Poster Board 20

PhD programme in neurosciences of University of Tartu

University of Tartu

Ravila 19
Tartu, Estonia, 50412
W: https://meditsiiniteadused.ut.ee/en/content/doctoral-programme-medicine-and-sport
E: kattri-liis.eskla@ut.ee

Neurosciences is one of the four specialities under the doctoral programme of Medicine and Sport at the Faculty of Medicine, University of Tartu. Our speciality includes board range of classes, rigorous research work, specialised seminar series, and training in paper writing and other professional skills. Students are mentored by faculty who are passionate about their research topics and using state-of-the-art technologies.

Poster Board 21

PhD in Neuroscience

University of Turin

Via Cherasco 15
Turin, Italy, 10126
W: https://dott-neuroscienze.campusnet.unito.it/do/home.pl
E: andrea.calvo@unito.it

The PhD in Neuroscience aims at providing students with knowledge and scientific methodologies necessary for the integrated study of the nervous system in areas ranging from molecular and cellular neurobiology through cognitive science and clinical neuroscience. In keeping with the complex and multifaceted nature of neurosciences, the PhD programme offers an interdisciplinary training at both theoretical and experimental levels. A major goal of the programme is to provide students with innovative tools to deal with the complexity of brain disciplines and to form future doctors capable of autonomous and independent research work.

Poster Board 22

PhD in Neuroscience

University of Naples "Federico II"

Via Pansini 15
Napoli, Italy, 80131
W: http://neuroscienze.dip.unina.it/
E: mtaglail@unina.it

The PhD program in Neuroscience consists of coursework on different topics that require advanced knowledge of Neuroscience and in a research project.

Research project

Each student is required to complete rotations, typically two weeks each, in nine different research labs of the Neuroscience dept during the first year of the PhD program; then he/she will be assigned to the PhD project which best suits their expectations. Each student will write a comprehensive thesis, which undergoes external evaluation by at least two experts in the specific field. The PhD student will defend his/her dissertation in front of a committee of professors, including their advisor.

Training requirements

PhD students are expected to participate to at least one International and one National Meeting per year. Authorship in at least one international, peer-reviewed publication, possibly as first author, is expected at the end of the PhD program. Finally, students are strongly encouraged to spend at least six months of their 3-year training program in an abroad laboratory; participation to the present proposal will strongly facilitate this important training requirement.

Poster Board 23

Bordeaux Neurocampus Graduate Program

University of Bordeaux

Campus Carreire – CGFB – 2ème étage – Bur. 203 , 146 Rue Léo Saignat
BORDEAUX , France, 33076 BORDEAUX Cedex
W: https://neurocampus-graduateprogram.u-bordeaux.fr/
E: cristina.lemos@u-bordeaux.fr

The PhD Program in Neuroscience is part of the Bordeaux Neurocampus Graduate Program, supported by the University of Bordeaux Graduate Research School. The PhD Program takes place within the research laboratories of the dynamic neuroscience community of Bordeaux Neurocampus, which is composed of the 7 following research units:

- Institute for Interdisciplinary Neuroscience (IINS)
- Institute of Neurodegenerative Diseases (IMN)
- Aquitaine Institute for Cognitive and Integrative Neuroscience (INCIA)
- Magendie Neurocenter
- Nutrition and Integrative Neurobiology (NutriNeuro)
- Sleep, Addiction and Neuropsychiatry (SANPSY)
- Pathophysiology of Hearing (EA)

Bordeaux Neurocampus also boasts a specific service unit dedicated to imaging (Bordeaux Imaging Center). The program addresses a wide range of topics concerning complex brain functions and diseases. Our teams and partners have diverse as well as complementary expertise, that includes: imaging and biology of neural cells and synapses, animal and human behaviour, physiology of neural networks, mechanisms of neurodegenerative and mental disorders. Multidisciplinary technological approaches and multiscale analyses are employed, at the molecular, cellular, systemic, behavioural, and clinical levels. Selected as a French Initiative of Excellence, the PhD Program in Neuroscience focuses on knowledge, innovation and cross-disciplinarity, with the support of public research organisations. The PhD Program in Neuroscience prepares students for different career opportunities (research, teaching, project management, scientific mediation, etc.) in the academic as well as the private sector.

Poster Board 24

European Graduate School of Neuroscience

European Graduate School of Neuroscience

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Maastricht, The Netherlands, 6229 ER
W: www.euronschool.eu
E: secr.euron@maastrichtuniversity.nl

The European Graduate School of Neuroscience (EURON) its focus is on education, scientific collaboration, and on enhancing skills in networking and research by engaging a multidisciplinary staff working in an international context. EURON is a Graduate School, consisting of institutes and departments of seven universities in Belgium (UC Louvain and University of Hasselt), Germany (RWTH Aachen University and Universität Köln), France (Université de Lille), Luxembourg (Université de Luxembourg) and the Netherlands (Maastricht University) and is coordinated by the School for Mental Health and Neuroscience (MHeNs) of Maastricht University.

The EURON partners aim to share expertise, knowledge and infrastructure to offer PhD students a unique chance to broaden their (research) competencies by offering a high-level training programme with a broad orientation on neuroscience (from basic to clinic) consisting of courses and workshops, by stimulating mobility between the partners and through facilitating the organization of joint doctorates between the partner universities.

Poster Board 25

International PhD Programme in Cognitive Neuroscience (CogNeS)

Jagiellonian University

Institute of Psychology, Jagiellonian University, Ingardena 6
Krakow, Poland, 30-060

W: https://social-sciences.phd.uj.edu.pl/en_GB/cognes

E: michal.wierzchon@uj.edu.pl

The International PhD Program in Cognitive Neuroscience, CogNeS is held in English. It offers a flexible and individualised program so to meet the individual educational needs of our PhD students.

The program offers a selection of specialised courses with a focus on advanced methodology, data analysis, academic writing, presentation skills, and theoretical knowledge in the specific subdisciplines related to individual projects. We also put an emphasis on close cooperation between a PhD student and supervisor. Lectures are conducted by both local and international scientists in the field associated with the Centre for Brain Research (brain.uj.edu.pl). On top of the regular courses, the program offers a selection of short, intensive courses run by foreign experts.

Poster Board 26

Warsaw PhD School in Natural and BioMedical Sciences

Nencki Institute of Experimental Biology

Pasteura 3

Warsaw, Poland, 02-093

W: https://warsaw4phd.eu/en/

E: phdoffice@warsaw4phd.eu

Warsaw Doctoral School in Natural and BioMedical Sciences [Warsaw-4-PhD] started its activities on October 1st, 2019 and educates doctoral students in 4 scientific disciplines: biology, chemistry, physics, medicine.

The school is based on cooperation of 9 independent scientific institutions: Nencki Institute of Experimental Biology PAS, Institute of Organic Chemistry PAS, Institute of Physical Chemistry PAS, Institute of Physics PAS, Center for Theoretical Physics PAS, Institute of High-Pressure Physics PAS, Maria Sklodowska - Curie National Institute of Oncology State Research Institute, Institute of Psychiatry and Neurology and International Institute of Molecular and Cell Biology in Warsaw.

Each institution educates doctoral students in the leading scientific field. The school educates doctoral students from all over the world, among others from Italy, Brazil, Turkey, India, Iran, China. Students have the opportunity to participate in international conferences and exchange programs, as well as in many interesting scientific projects. The school offers doctoral fellowships during four years of study. In addition, the School offers the opportunity to cooperate with the best international and domestic research centres. Students have access and the opportunity to work in modern laboratories with high-quality research equipment. Students also have the chance to develop their academic career and research interests under the supervision of outstanding researchers, whose competence and openness will help the students to fulfil their ambitions. The graduates of the School have the opportunity to work in best scientific centres in Poland and abroad. Candidates may apply for admission to doctoral studies several times a year.

Poster Board 27

Centre for Neurodevelopmental Disorders
King's College London

4th Floor, New Hunt's House, Guy's Campus
London, UK, SE1 1UL

W: https://devneuro.org/cndd/training.php

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King's College London is one of Europe's largest institutions for research in the fields of developmental neuroscience and psychiatry. Building on the outstanding clinical and basic science research base, the Centre for Neurodevelopmental Disorders incorporates internationally renowned researchers in this arena, drawn from different departments across King's. This prestigious 4-year PhD programme in Neurodevelopmental Disorders (1 year of 3 lab rotations as MRes, 3 years PhD), funded by the Medical Research Council, has been designed to equip a new generation of basic and clinical scientists with the skills to work with each other at the forefront of research into these disorders.

The Centre hosts a unique combination of neuroscientists and clinical researchers working on developmental disorders of the brain, with a focus on autism, epilepsy and schizophrenia. This collaboration between scientists, neurologists and psychiatrists provides an ideal environment to train and become part of the next generation of world leaders in this field. The Centre encompasses three central London sites and is part of an exciting and vibrant university and city.

Poster Board 28

Sussex Neuroscience 4-year PhD Programme

University of Sussex

School of Life Sciences, University of Sussex
Falmer, Brighton, England, BN1 9RG
W: https://www.sussex.ac.uk/research/centres/sussex-neuroscience/phd/4yearphd
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Sussex Neuroscience is a thriving community of over 50 neuroscience research groups based on a single campus, set in beautiful countryside at the edge of the South Downs National Park. Research strengths cover all major areas and technical approaches in contemporary neuroscience. Some of our largest interdisciplinary themes are: Sensory neuroscience; Neural circuits of behaviour; Learning and memory; Neurodegeneration; Consciousness and cognition; Computational neuroscience and AI.

Our 4-year PhD Programme offers a rotation year where students choose placements in three different labs across the broad range available, plus a selection of taught modules and courses, before choosing their PhD supervisor for years 2-4. Our community is committed to student support, opportunity and diversity, and researchers at all stages enjoy a truly integrated, interdisciplinary environment across the different neuroscience groups on campus.

Poster Board 29

Mainz Research School of Translational Biomedicine (TransMed)

UMC of the Johannes Gutenberg-University Mainz

Langenbeckstr. 1
Mainz, Germany, 55131

W: https://www.blogs.uni-mainz.de/ftn-eng/md-phd-phd-program/
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The MD-PhD / PhD Program of "Translational Biomedicine" at the Johannes Gutenberg University in Mainz is a structured training program, which combines biomedical and translational research with clinical training elements. Whereas medical graduates typically face the problem of simultaneously acquiring research skills and dealing with clinical obligations, natural science graduates need to gain insight into relevant unmet medical needs and to obtain access to patient material.

A central purpose of our program is to develop young medical graduates and natural science graduates with an aim to enabling them to become future leaders in the field of biomedical Neuroscience, both in academia as well as in the pharmaceutical industry.

Poster Board 30 & 31

EURIDOL Graduate School of Pain

University of Strasbourg

8 allée du Général Rouvillois
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The EURIDOL Graduate School of Pain proposes a 5-year training-research programme on pain and its treatments, based on the University of Strasbourg's laboratories of excellence in partnership with the CNRS and INSERM.

Pain is a transversal theme and calls upon several university disciplines. EURIDOL thus brings together researchers from fundamental and clinical neurosciences as well as from the human and social sciences, pharmaco-chemists capable of defining and developing new treatments, but also health professionals, patient associations and industrial partners.

Students join the Graduate School of Pain after a bachelor's degree in the fields of biology and health, to prepare their master's degree in neuroscience with a major in pain. During the master's study, the EURIDOL "research through research" training programme is taught in English. Semester after semester, the pain-specific training becomes the majority, allowing all students to begin their doctoral studies with a solid basic knowledge in neuroscience and pain. The doctoral work is carried out in one of the laboratories of the Strasbourg Pain Initiative, the EURIDOL research consortium. It is also possible to enter the Graduate School at the beginning of the doctorate through our calls for applications (attractiveness).

Poster Board 52

Master BIP Neurosciences, Sorbonne Université
Sorbonne Université

Campus Pierre et Marie Curie, Sorbonne Univ, 9 quai Saint Bernard
Paris, France, 75005

W: https://sciences.sorbonne-universite.fr/formation-sciences/masters/biologie-integrative-et-physiologie/parcours-neurosciences-neuro
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This two-year Masters programme provides a strong basis in physiology followed by specialized neurosciences coursework and a 6 month neurosciences internship. Paris is an important center for research in the neurosciences, and a broad range of internship laboratory projects are available to our students. Students in the second year can follow specialized tracks in 1) Cellular and Integrated Neurosciences; 2) Cognitive and Behavioural Neurosciences; 3) Neurodegenerative Diseases (iMIND); 4) Neuropsychiatric Disorders; or 5) Vision Sciences Most courses are taught in English, and students who wish to are encouraged to undertake their research internship abroad.

10 Best Posters – NENS Students

Student Finalist	Poster Title
Anna Rappe (MSc)	Spatiotemporal profiling of physiological mitophagy in the aging mouse brain
Javier Romero (MSc)	Role of the organic anion transporter 1 in memory and synaptic plasticity
Angelica Donati (PhD)	Spontaneous activity of striosomal projection neurons supports maturation of striatal inputs to substantia nigra dopaminergic neurons
Aurélien Fortoul (PhD)	Development of thalamocortical connectivity and cortical representation of facial whiskers in mouse models of grey matter heterotopia
Catherine Marneffe (PhD)	Role of presynaptic plasticity at mossy fiber-CA3 synapses: consequences of Syt7 abrogation in DG cells on CA3 circuits and memory encoding
Dávid Keller (PhD)	A thalamo-preoptic pathway promoting social touch
Janina Kupke (PhD)	DNA methylation promotes memory persistence by facilitating systems consolidation and cortical engram stabilisation
Mar Anibal-Martinez (PhD)	Intramodal functional plasticity in the developing somatosensory system.
Mohammad Aldahabi (PhD)	Ill-primed vesicles cause low release probability at CA1 hippocampal excitatory synapses
Sunaina Devi (PhD)	Primary sensory cortices of a mouse model of CDKL5 deficiency disorder show atypical myelination.

Poster Board 32

Spatiotemporal profiling of physiological mitophagy in the aging mouse brain

Anna Rappe (MSc)
Master's Programme in Neuroscience – Helsinki, FI

Aims: Mitochondrial damage is neutralised by mitophagy, thereby preventing cellular dysfunction and apoptosis. The selective autophagy of mitochondria (mitophagy) has long been linked to age-dependent neurodegenerative disorders such as Parkinson's and Alzheimer's disease. A prodigious body of work has studied mitophagy in cell-based systems and short-lived model organisms, yet little is known about how basal mitophagy proceeds in the aging mammalian brain. Our aim was to profile in vivo mitophagy in the aging mammalian brain.

Methods: We analysed physiological mitophagy in neural tissues from longitudinal cohorts of mito-QC reporter mice, using high resolution confocal microscopy and quantitative cell biology.

Results: We report widespread changes in mitophagy in the mammalian nervous system during natural aging. Longitudinal quantitative profiling of mitophagy reporter mice cohorts from young (3 months) to geriatric (>26 months) reveals cell and tissue-specific alterations in mitochondrial turnover between distinct populations of neurons and non-neuronal cells.

Conclusions: Our findings establish a new landscape of in vivo mitophagy through neural space and time. This comprehensive resource will enable more refined pre-clinical therapeutic strategies to target age-mitochondrial dysfunction in the mammalian brain.

Poster Board 33

Role of the organic anion transporter 1 in memory and synaptic plasticity

Javier Sánchez Romero (MSc)
Molecular Biosciences – Major Neuroscience – Heidelberg, DE

The molecular mechanisms of synaptic plasticity have been extensively studied. Nevertheless, many events occurring at the synapse during physiological and pathological neuroadaptations are still unclear. New modulators of synaptic physiology are recurringly discovered. The organic anion transporter 1 (OAT1), a multi-specific kidney transporter involved in drug excretion and regulation of systemic metabolite levels, could belong to this category of newly identified plasticity modulators. Until recently, very little was known about OAT1 expression and function in the central nervous system. A few reports indicated its expression in the brain and choroid plexus. Our group recently showed that OAT1 expression in the mouse spinal cord is key to the establishment and maintenance of hypersensitivity in chronic inflammatory pain. Thus, a function for OAT1 as a mediator of maladaptive plasticity was identified for the first time. Whether OAT1 is involved in additional plasticity mechanisms has not been studied. Here, we systematically characterized OAT1 expression in the adult mouse brain. Using OAT1-knockout mice, we studied the involvement of OAT1 in hippocampus-dependent memory tasks. We found that OAT1 deficiency results in changes in several molecular players of synaptic plasticity and their downstream signaling events in both primary hippocampal cultures and hippocampal tissue. Furthermore, metabolomics analysis of the OAT1-KO hippocampus and cerebrospinal fluid reveals pathway alterations similar to those previously reported in the plasma, hinting at candidate OAT1 substrates that might explain the involvement of OAT1 in synaptic signaling. Taken together, our results suggest OAT1 as a novel regulator of plasticity in the central nervous system.

Poster Board 34

Spontaneous activity of striosomal projection neurons supports maturation of striatal inputs to substantia nigra dopaminergic neurons

Angelica Donati (PhD)
Doctoral Programme Brain & Mind – Helsinki, FI

During neurodevelopment, a critical time window defines the striatum neuronal network maturation, and any impairments in this critical period may lead to neurodevelopmental movement disorders. Due to heterogeneity of striatal spiny projection neurons (SPNs), precise identification of the critical time window for striatum is complicated.

We characterized the spatial and temporal profile of neonatal spontaneous activity in the striatum. Using neonatal Drd1a-Cre/tdTomato and Adora2a-Cre/tdTomato mice, we demonstrated a clustered organization of fluorescent direct-pathway SPNs (dSPNs) and indirect-pathway SPNs (iSPNs), which correspond to striosomes. Using in vitro electrophysiological recordings, we evaluated domain-specific intrinsic excitability and passive membrane properties of SPNs. Our data show that neuronal activity in developing striatum depends on age and domain. The age-dependent spontaneous activity was more evident in striosomes than in matrix SPNs. In both compartments, iSPNs retained this activity longer than dSPNs. Next, we investigated the role of the SPNs' spontaneous activity in the maturation of the basal ganglia network. We injected at P0 a viral vector to induce expression of the inhibitory DREADDs that specifically respond to clozapine-N-oxide (CNO) in striosomal dorsal striatum SPNs of Oprm1-Cre mice and suppress neuronal activity in neonatal mice. The results show that suppression of spontaneous activity of striosomal SPNs during prospective critical time window causes a significant and persistent decrease in the frequency of the miniature inhibitory postsynaptic currents (mIPSCs) in substantia nigra pars compacta dopaminergic neurons of CNO injected adult mice.

These results elucidate the mechanisms possibly underlying neurodevelopmental movement disorders linked to striatal functions.

Poster Board 35

Development of thalamocortical connectivity and cortical representation of facial whiskers in mouse models of grey matter heterotopia

Aurélien Fortoul (PhD)
Neuroschool Marseille graduate school in Neuroscience – Marseille, FR

Aims: Cortical representations of the sensory periphery – or somatosensory maps – are topographically organized sub-fields of the murine somatosensory cortex. Among these, the so-called barrel field is composed of neuronal aggregates (barrels) in layer 4 (L4) that receive thalamocortical afferents (TCAs) and form a somatotopic map of facial whiskers.
Here, we investigated the development of barrels and TCAs in two murine models of grey matter heterotopia (GMH), in which masses of ectopic neurons (or heterotopia) accumulate below the cortex and create an apparent duplicated cortex. Our aim is to determine if whisker maps are properly formed, altered or duplicated in this context.

Methods: We used viral tracing approaches and immunohistochemistry to characterize the development of whisker maps and TCAs in two GMH mouse models resulting from the conditional, telencephalon-specific knockout (cKO) of Eml1 or RhoA.

Results: In the two models, aggregates of neurons with a L4 identity are present at the expected location in the cortex, forming topographically organized barrels receiving TCAs. Unexpectedly, we also observed in the heterotopia similar barrel-like aggregates of ectopic L4 neurons that receive TCAs navigating either ventrally to the heterotopia in Eml1-cKO or dorsally in RhoA-cKO. This duplicated, ectopic whisker map is aligned with the normally positioned one, denoting an areal conservation between the heterotopia and cortex.

Conclusions: Ectopic L4 neurons maintain their ability to instruct TCA connectivity, suggesting that intrinsic cortical programs are sufficient for areal specification of the barrel field.

Poster Board 36

Role of presynaptic plasticity at mossy fiber-CA3 synapses: consequences of Syt7 abrogation in DG cells on CA3 circuits and memory encoding

Catherine Marneffe (PhD)
Bordeaux Neurocampus Graduate Program – Bordeaux, FR

The hippocampus is known to play a major role in the storage and recall of information depending on different forms of activity-dependent synaptic plasticity. Mossy fibers synapses between the axons of the dentate gyrus (DG) cells and CA3 pyramidal cells (Mf-CA3 synapses) display a high dynamic range of presynaptic plasticity which endow these synaptic connections with detonator properties. The pattern of action potential firing, in the form of high-frequency bursts in the DG strongly controls the amplitude of synaptic responses and information transfer to CA3. Presynaptic short-term plasticity is thought to play a major role in the process of spike transfer within local circuits. Here we aim at investigating the role of presynaptic facilitation at Mf- CA3 synapses in the operation of CA3 circuits in vivo and in memory encoding. Syt7 is a calcium sensor that has been shown to be necessary for presynaptic facilitation. We have selectively abrogated Syt7 expression in DG granule cells using conditional Syt7 KO mice. We confirm that presynaptic facilitation is suppressed at Mf-CA3 synapses in the absence of presynaptic Syt7. We have next used simultaneous silicon probe recordings in DG and CA3 to understand how the network adapts to changes in presynaptic plasticity, in reference to brain states. Finally, we describe the behavioural consequences of DG-selective Syt7 deletion in DG-dependent tasks, with a focus on memory encoding. This approach will bring a new understanding of the role in presynaptic facilitation and specifically on the detonator properties of DG-CA3 synapses.

Poster Board 37

A thalamo-preoptic pathway promoting social touch

Dávid Keller (PhD)
Neuroscience Doctoral School, Semmelweis University – Budapest, HU

We previously identified the posterior intralaminar thalamic nucleus (PIL) as a relay station of socially relevant sensory information innervating and activating oxytocin-secreting neurons upon social encounter. Here, we addressed to characterize the exact role of the PIL neurons and their projections to the preoptic area of the hypothalamus in the control of the social behaviour. First, we determined the effect of chemogenetic stimulation of PIL neurons on social interactions between familiar adult female rats. The projections of PIL neurons were analyzed using anterograde tract-tracing. The selective chemogenetic stimulation of the preoptic area-projecting PIL neurons was performed using double viral injections and also by CNO administration directly into the preoptic area.

PIL projects to several socially implicated brain regions, such as the medial amygdala, the medial preoptic area and the infralimbic cortex. Chemogenetic stimulation of the PIL resulted in the activation of previously anatomically identified target areas and increased the duration of social grooming. Direct contact during social interaction caused the largest increase in the activity in the medial preoptic area. Specific chemogenetic stimulation of the PIL-preoptic pathway led to elevated direct social contact.

The results suggest that posterior thalamic PIL neurons convey socially relevant information to a variety of different forebrain centers, among which the preoptic area is involved in the processing of physical contact.

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Poster Board 38

DNA methylation promotes memory persistence by facilitating systems consolidation and cortical engram stabilisation

Janina Kupke (PhD)
PhD Programme of the Interdisciplinary Center for Neurosciences (IZN) – Heildelberg, DE

Persistence is a key characteristic of memory that relies on systems consolidation, a process classically defined as the gradual transfer of information from the hippocampus to the cortex for long-term memory storage. However, the underlying molecular mechanisms enabling persistence are still unknown. Using contextual fear conditioning (CFC) and ensemble tagging tools in mice, we found that reactivation of cortical ensembles reflects systems consolidation and discovered higher engagement of cortical ensembles selectively in persistent fear memory. As DNA methylation is a long-term regulatory signal, it therefore is a prime candidate to regulate memory duration and stabilisation within neuronal ensembles – the physical substrate of a memory. To address whether DNA methylation underlies persistent memory storage and neuronal ensemble reactivation, we overexpressed DNA-methyltransferase 3a2 (DNMT3a2) in dorsal hippocampi of mice during CFC. Strikingly, we detected a conversion of short-lasting into long-lasting (persistent) memory. Moreover, reactivation of cortical neuronal ensembles was improved, and fear generalisation increased, mimicking the ensemble dynamics and behavioural trait of persistent memory, respectively. To uncover the molecular signals mediating these processes, we next performed RNA-sequencing analysis of dorsal hippocampi of mice overexpressing DNMT3a2. We identified eight differentially expressed and methylated genes, that have potentially a mechanistic involvement in memory persistence. These genes are functionally associated with structural plasticity, indicating that DNMT3a2-mediated DNA methylation may play an important function in circuitry remodelling.

In summary, overexpressing hippocampal DNMT3a2 converts short-lasting into persistent memory by stabilising cortical neuronal ensembles and regulating the expression of key target genes. These findings suggest that hippocampal DNMT3a2 facilitates systems consolidation likely through circuit remodelling.

Poster Board 39

Intramodal functional plasticity in the developing somatosensory system

Mar Anibal-Martinez (PhD)
PhD Program in Neurosciencie – Alicante, ES

Sensory systems are represented in the primary sensory areas of the brain, organized in anatomical and functional maps. Understanding how the brain adapts to the sensory loss might help us to better decipher the role of intrinsic and extrinsic mechanisms involved in cortical maps development. We are interested in understanding the mechanisms that trigger the establishment of territories during sensory systems development. To this end, we developed a mouse model in which whisker pad is cauterized unilaterally at the embryo stage (embWPC) to induce changes in the territories representing the distinct body sensory maps. These mice showed an intra-modal enlargement of the antero-lateral barrel subfield (ALBSF) area both in the thalamus and primary somatosensory cortex (S1) before the onset of sensory experience. Furthermore, dye tracing studies and in vivo calcium imaging in the embWPC mice showed severe structural changes of the somatosensory point-to-point axonal topography from embryonical stages suggesting that prenatal whiskers deprivation, before experience-dependent activity, induces functional rearrangements within a critical window. Moreover, blockade of the patterned spontaneous activity in the thalamus of the embWPC mice revealed that these reorganizations of sensory territories are independent of thalamic activity. Finally, we have found changes in the patterns of gene expression in ALBSF of the embWPC, providing evidence of a region-specific transcriptional signatures that confer regional identity to different somatosensory territories from embryonical stages.

In sum, our results showed that the territories and sensory maps designated to distinct peripheral representations within a sensory system rely on prenatal mechanisms that are mainly based on axonal competition rules while patterns of spontaneous activity would play a crucial role in their later refinement.

Poster Board 40

Ill-primed vesicles cause low release probability at CA1 hippocampal excitatory synapses

Mohammad Aldahabi (PhD)
Neuroscience Doctoral School, Semmelweis University – Budapest, HU

Setting the synaptic efficacy and short-term plasticity based on the postsynaptic target cell type is one of the most intriguing synaptic mechanisms that enhance the computational power of the cortical network. Here, using whole-cell patch-clamp paired recordings, we show that adult mouse hippocampal CA1 pyramidal cell (PC) connections on fast spiking interneurons (FSIN) have 15-fold larger unitary EPSC amplitudes than those made by PCs on oriens lacunosum-moleculare (O-LM) interneurons. Freeze-fracture replica immunolabeling showed similar nano-topologies and coupling distances between Ca2+ channels (Cav2.1) and synaptic vesicle release sites (Munc13-1 clusters) in both synapses and showed only 20% higher density of Cav2.1-type Ca2+ channels in the active zones targeting FSINs. Consistent with this, 2-photon [Ca2+] imaging showed 40% larger AP-evoked [Ca2+] transient peak amplitudes in FSIN-targeting boutons. Increasing the Ca2+ influx at PC – O-LM synapses by 40% with the K+ channel blocker 4-AP caused only 2.6-fold increase in uEPSC amplitudes. However, application of a phorbol ester analog (PDBU) resulted in a larger augmentation of uEPSC amplitudes at PC – O-LM synapses (5-fold) than at PC – FSIN synapses (1.8-fold), suggesting incomplete docking or priming of vesicles at PC – O-LM synapses. Serial section electron microscopy (EM) and EM tomography ruled out low release site occupancy, as there was no difference in the density of docked vesicles between the two types of synapses. Our results demonstrate that ill-primed docked vesicles limit the output of PC – O-LM synapses.

Poster Board 41

Primary sensory cortices of a mouse model of CDKL5 deficiency disorder show atypical myelination.

Sunaina Devi (PhD)
PhD in Neuroscience University of Turin– Turin, IT

CDKL5 deficiency disorder (CDD) is a rare neurodevelopmental condition without a cure caused by mutations in the cyclin-dependent kinase-like 5 (CDKL5) gene and characterized by early-onset epilepsy, severe cognitive dysfunctions, sensorimotor and intellectual disabilities. CDKL5 is a serine/threonine kinase that is expressed early during postnatal development in neurons where it phosphorylates epigenetic factors, elements of both axonal and dendritic compartments and microtubule-associated proteins (MAP1S, EB2) which are crucial in nucleation and assembly of microtubules. Along with neurons, CDKL5 is also expressed in oligodendroglia, the underlying myelination process. Although growing evidence indicates that the organization of myelin sheath is severely compromised in autism spectrum disorders and other neurodevelopmental diseases, whether CDKL5 mutation affects myelin is still unknown. We here evaluated both the extent and developmental trajectory of myelination, and the expression of molecules modified by myelin deposition or axonal injury – i.e.: Myelin basic protein (MBP) and neurofilaments (NF)– in both young (PND15) and adult (PND56) Cdkl5-KO mice. This analysis showed a reduction of both MBP and phospho-NFs expression in both S1 and V1 cortices of Cdkl5-KO mice. The g-ratio analysis of myelinated axons investigated by electron microscopy revealed that myelin sheath thickness is decreased in mutant mice. Finally, the density of mature oligodendrocytes was reduced in adult mutant mice whereas oligodendrocyte precursor cells were not affected. In conclusion, our data indicate that primary cortical areas in CDD animals exhibit a global reduction/distortion of the myelination process and disclose a novel consequence of CDKL5 loss, likely of pivotal importance for CDD.

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