

Màj 25/05/2020

UE 2.2. Current concepts in Neurosciences
12 ECTS
Parcours « Cellular, Integrative and Translational Neurosciences »
ST4: Cognition in neurological and psychiatric disorders

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This seminar aims to show what impact neurological and psychiatric disorders can have on cognition and behavior; to demonstrate that these disorders can serve as "in vivo" models to better understand high-level brain functions.

Duration: 2 days

Organization

The seminar is divided into four half-day sessions (3h). Each session starts with a 45-minute topo on the thematic, followed by a period of answers to students' questions. The rest of the session is held in the form of problem-based learning. Students are submitted with an experimental problem related to the thematic and must propose, in small groups, solutions to solve this problem. To this end, students will have to study, before the seminar, short videos (available on Moodle) addressing the contributions and limits of innovative techniques in the field of functional neurosciences (Neurophysiological bases and principles of EEG and MEG, anatomical and functional MRI, Transcranial magnetic stimulation, Brain-machine interface, Pharmacology and imaging, Modeling and computational psychiatry, Meta-analysis in MRI). Additional videos present the main experimental paradigms used in Cognitive and Affective Neuroscience (Posner's paradigm and its derivatives, Stroop task, Dot-probe task, Threshold measurement, etc.). Each session ends with a general conclusion and an illustration of the thematic by presenting the work of one of the speakers.

Program
Day 1

9h00-12h00	Attention and executive functions	Kathy Dujardin Arnaud Delval Fabien D'Hondt
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Attention and executive functions are high-level cognitive processes, which are essential for the adaptation of the individual to his environment. They are particularly fragile and affected in most brain pathologies. After a quick presentation of the current models of these processes, we will show via the study of some specific diseases (e.g., schizophrenia, Parkinson's disease, attention deficit disorder with/without hyperactivity, addiction, anxiety disorders, or post-traumatic stress disorder), the central place that occupies the study of these processes in the understanding of these disorders.

14h00-16h00	Social cognition	Kathy Dujardin Xavier Delbeuck Fabien D'Hondt
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Or how social neuroscience contributes to the identification of early diagnostic markers (e.g., frontotemporal dementia) or of the evolution of specific diseases (e.g., addiction). After a quick presentation of the concept of social cognition and the associated current models, we will show why the study of this process contributes in a primordial way to the understanding of many neurological and psychiatric disorders, in particular from a developmental and/or degenerative perspective.

Day 2

9h00-12h00	Learning and brain plasticity	Ali Amad
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Throughout life, brain plasticity will allow the individual to evolve in his environment. This plasticity is intimately linked to the learning process. We will start from the content taught in the STB2 seminar to identify the brain markers of this plasticity and show how their study contributes to the understanding of the mechanisms involved in specific disorders (anxiety disorders, schizophrenia, etc.).

14h00-17h00	Subjectivity	Delphine Pins Renaud Jardri
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The study of cognition and behavior is based on explicit, directly measurable variables, but also on a large number of latent variables (motivation, awareness, ...). Despite their relatively subjective nature, these latent variables must be studied with

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maximum objectivity. We will show during this session how current neuroscience methods attempt to meet this challenge to improve the understanding of key symptoms (e.g., hallucinations, pain, ...) in many neurological and psychiatric diseases.

Educational team Ali Amad, Xavier Delbeuck, Arnaud Delval, Fabien D'hondt, Kathy Dujardin, Renaud Jardri, Delphine Pins