Master de Sciences et Technologies
Mention Biologie Intégrative et Physiologie
Parcours : Neurosciences
Responsable : Professeur Régis Lambert

Internship Proposal
Academic Year 2019-2020

1. Host team :

Research Unit (e.g. Department or Institute) : INSERM Unité 1000 « Neuroimagerie et Psychiatrie »

Research Unit Director : Jean - Luc Martinot
Research Team Director : R. Marchitelli / ML Paillere
Team name : U1000

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2. Internship project title:

Emotion disorders in adolescence and longitudinal brain imaging

3. Internship Description :

Laboratory Website: https://www.inserm-u1000.u-psud.fr/

- Context. Emotion disorders are a major cause of disability. In >30% of cases, these disorders begin in adolescence. Early onset of these disorders is a risk factor for mental illness and addiction in adulthood. Therefore, research in adolescents is required to determine the neural basis of these mental disorders. In adolescence, the brain undergoes a critical period of maturation: grey matter volume reduces, white matter volume increases, and connectivity between structures relevant to psychopathology is established. Adolescence is thus understood as a period of both resilience and vulnerability where environmental factors may contribute to a trajectory of neurodevelopmental impairment and to the onset of major emotional disorders.

- Objective. The project aims to link the psychological and behavioural characteristics of (healthy or patient) adolescents and young adults and the maturation of their grey or white matter and function, as explored using high-field magnetic resonance brain imaging.

- Method. The Master will be defined to assess the changes in brain networks involved in the regulation of emotions, throughout adolescence. Participants' baseline and follow up data are already available from an exceptional database in a large European cohort of European adolescents: measures were prospectively repeated in the same participants to assess their development from age 14 to 23. The techniques used include Magnetic Resonance Imaging (MRI), Anatomic Imaging and Diffusion (DTI), or Functional MRI. One

brain imaging modality will be selected with the master student, who will test specific hypotheses.

The master student will look for longitudinal relationships between brain imaging data and selected psycho-behavioral assessments in healthy adolescents, and in adolescents with a diagnostic of mental disorder involving emotional deviation. Clinical and behavioral data include Psychometry questionnaires, and Neuropsychology tests that tap on cognitive and emotional information processing; genetic data are available. The master student will assist psychiatric, neuropsychologic, and multimodal MRI acquisitions in Paris ICM – CENIR in Salpétrière Hospital.

The results obtained in one imaging modality will be compared to the psychometric and behavioral characteristics of the participants, both quantitatively and categorically. Statistical analyzes will be performed to compare subgroups of adolescents, and to establish correlations between the imaging data and the psycho-behavioral variables.

Ultimately, determinations of the predictive values of selected features migth be attempted in individuals, using a machine – learning (i.e. artificial intelligence) approach.