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

Internship Proposal
Academic Year 2018-2019

1. **Host team :**
Research Unit (e.g. Department or Institute) : FR3636 CNRS - Fédération de Recherche en Neurosciences du Centre de recherche des Saints Pères

Research Unit Director : Daniel Zytnicki

Research Team Director : **Cendra AGULHON**

Team name : **Glia-Glia & Glia-Neuron Interactions**

Address : UFR Biomédicale – Université Paris Descartes – 45 rue des Saints Pères – 75006 Paris

Supervisor of the Research Intern for this project : **Cendra AGULHON**

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Note : Two possible projects are presented but only one student will be selected to develop one of these projects

2. Internship project titles:

Title #1: Investigating the role of satellite glial cells in the physiopathology of sensory neurons: implications for normal sensory processing, proprioception and pain

Title #2: Investigating the role of astrocytic signaling in neurodevelopmental disorders

3. **Internship Descriptions :**
Project #1: Although astrocyte-neuron interactions in the central nervous system have been the subject of intense research, glia-neuron interactions in the peripheral nervous system have been hardly studied. This Master 2 project will investigate the interactions between satellite glial cells (SGGs) and sensory neurons (SNs) of the dorsal root ganglia (DRG). Satellite glial cells are the main type of glial cells in sensory ganglia and closely contact SN somata and express a large array of G protein-coupled receptors (GPCRs). Their GPCRs are able to be activated by ATP, glutamate or calcitonin gene related peptide (CGRP). Additionally, even though SNs do not have synapses in the DRG, their soma exhibit the remarkable characteristic to be excitable and to release glutamate, as well as pain-related neurotransmitters (ATP, CGRP) following membrane depolarization. Our hypothesis is that SN activity-mediated SGC activation leads to the release of neuroactive molecules from SGCs to modulate back SN activity, and thus play important roles in the

physiopathology of proprioception and pain. The Master 2 student will address some aspects of this question using a combination of one or two of the following technical approaches: Ca2+ imaging, behavior, biochemistry, and immunohistochemistry.

Project #2: Severe mental disorders such as schizophrenia, bipolar disorder, and autism are leading contributors to cognitive illness, imposing emotional burdens on families as well as individuals. Based on recent literature, we hypothesize that postnatal inflammation - and associated proinflammatory mediators - can lead to abnormal activation of astrocytic protein-coupled receptors (GPCRs), which may trigger transmitter and inflammatory mediator release from astrocytes. Both of these effects could consequently alter synaptic transmission during postnatal brain development, and contribute to abnormal long-term changes of excitatory synaptic transmission and plasticity, and thus to changes in sensory processing and the pathogenesis of neuropsychiatric disorders. We propose to directly test this hypothesis using the rodent visual cortex as a model system, chemogenetics, *in vivo* electrophysiology, behavioral tests for measuring visual memory, and biochemistry. The Master 2 student interested to join our laboratory will contribute to this ambitious project using one or two of these techniques.