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 : Laboratoire Neuroscience Paris Seine (UMR 8246)
Research Unit Director : Hervé Chneiweiss
Research Team Director : Elim Hong
Team name : Formation and Interaction of Neural Networks

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2. Internship project title:

Understanding the role of acetylcholine in neuronal activity

3. Internship Description :

The evolutionarily conserved, habenulo-interpeduncular (Hb-IPN) pathway is important for mediating aversive behavior in normal (fear, anxiety) and pathophysiological conditions (nicotine withdrawal symptoms). In larval zebrafish, the bilaterally located habenula exhibits left-right asymmetry in gene expression, afferent and efferent projections and function. For example, the right habenula is mainly composed of neurons co-releasing glutamate and acetylcholine, while the left habenula consists of mostly glutamatergic neurons. While acetylcholine functions as a neurotransmitter at the peripheral nervous system, in the CNS, it is generally thought to function as a neuromodulator. However, how acetylcholine influences neuronal activity and even the site of release within a neuron is yet unclear in vivo. We have generated CRISPR mutants for the vesicular acetylcholine transporter, in which acetylcholine release is perturbed. The project will entail characterizing these mutants to understand the contribution of acetylcholine in neuronal activity in the habenula, a major cholinergic region in the brain. The student will be trained in recording and analyzing calcium activity in larval zebrafish using bi-photon and spinning disk microscopies. In addition, they will carry out in situ hybridization assay to see whether genes involved in cholinergic signaling are altered due to compensatory mechanisms in these mutants.