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 : Collège de France, CNRS UMR 7241 / Inserm U1050
Research Unit Director : Alain Prochiantz
Research Team Director : Dr. Nathalie Rouach
Team name: Neuroglial Interactions in Cerebral Physiopathology

Address : Collège de France
11, place Marcelin Berthelot
75005 Paris

Supervisor of the Research Intern for this project : Armelle Rancillac
Telephone : 01.44.27.12.85
E-mail : armelle.rancillac@college-de-france.fr

2. Internship project title: *Deciphering the role of astrocytes in the regulation of inhibitory synaptic transmission in the hippocampus.*

3. **Internship Description :**

Astrocytes are glial cells in the nervous system that are interconnected by gap junctions formed by connexins. Gap junctions are regulated pores that enable the connected cells to function as a unit by rapidly passing cytosolic signals. In particular, the gap junction subunits connexin 30 (Cx30), one of the two main astroglial gap-junction subunits, was recently shown to play a critical regulator of synaptic strength by controlling the synaptic location of astroglial processes. The modulation of astroglial morphology and synaptic transmission was shown to involve an unconventional, non-channel function of Cx30. Mice deficient in Cx30 protein showed decreased excitatory synaptic transmission mediated by AMPA receptors and impaired synaptic plasticity through modulation of synaptic glutamate levels. However, the role of Cx30 in the regulation of inhibitory synaptic transmission remains to be investigate.

Astrocytes were already shown to act as intermediary in activity-dependent modulation of inhibitory synapses in the hippocampus. Moreover, Cx30 expression could regulate interneurones maturation. Indeed, parvalbumin positive (PV+) interneurons development was shown to depend on the production of specific extracellular matrix proteins, partly secreted by astrocytes.

The aim of the present internship will be to investigate how Cx30 regulates the inhibitory synaptic transmission. We will investigate the electrophysiological properties of PV interneurons in the hippocampus of wild type and in Cx30 KO mouse. Diffusion of biocytin during the recording, will allow Neurolucida reconstructions of these neurons to correlates electrophysiological alteration to morphological alterations.

All these results will provide a better understanding of the functional role of Cx30 and astrocytes in the neuronal network properties of the hippocampus.