

Internship Proposal

Academic Year 2018-2019

1. Host team :

Research Unit (e.g. Department or Institute) : Neuroscience Paris Seine (UMR 8246)
Research Unit Director : Hervé Chneiweiss
Research Team Director : Pascal Legendre/Jean-Marie Mangin
Team name : Development of Spinal Cord Organization

Address :

Team Development of Spinal Cord Organization
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2. Internship project title:

Elucidating how glial action potentials generated by floor plate cells regulate the electrical activity and embryonic development of spinal locomotor networks in vertebrates.

3. Internship Description : In vertebrates, one of the most frequent phenomena observed during neural network development is the generation and propagation of spontaneous neuronal activity (SNA) across adjacent group of neurons. Although SNA influences axon pathfinding, fasciculation and synapse formation in a way that can result in their partition into functionally distinct domains (“fire together, wire together”), the underlying mechanisms remain unclear. For example, although spinal motoneurons are activated by recurrent burst of SNA as they form motor pools innervating distinct muscles, the origin of this activity has remained cryptic. The host lab recently discovered that SNA observed in motoneurons could in fact originate from the unique ability of embryonic floor plate radial glia to generate “glial action potential” propagating along the entire spinal cord. Using a combination of electrophysiology, optogenetic holographic stimulation and light-sheet Ca^{++} imaging, the project aims to elucidate how action potentials generated by floor plate glial cells influence and participate to pattern electrical activity in motoneurons during motor pool formation in the mouse and chick spinal cord. More specifically, the proposed project will investigate whether action potentials generated by floor plate cells lead to the release of gliotransmitters such as glycine onto motor neurons.