

Internship Proposal Academic Year 2018-2019

1. Host team :

Research Unit (e.g. Department or Institute) : Institut de la Vision
Research Unit Director : José-Alain SAHEL
Research Team Director : Jean Livet
Team name : Neurogenesis and circuit development

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2. Internship project title: *Assaying neural progenitor output and regulation during central nervous system development with a genome-integrative strategy*

3. Internship description :

Neural progenitor cells (neural stem cells) of the embryo exert a major influence on the architecture of the central nervous system, as key determinants of neural cell number. Major progress has been made in the study of these progenitors at the whole population level, but their individual contribution to the construction of neural tissue is not well characterized, nor the mechanisms regulating their neurogenic activity. This limits our understanding of brain development and pathologies.

Our laboratory has established new methodologies based on fluorescent color makers encoded by genome-integrative vectors to identify clones of neurons generated by individual neural progenitors in the intact nervous system and to experimentally manipulate these cells (Loulier *et al. Neuron* 2014).

The proposed Master 2 project will consist in applying these methodologies in the retina, a region of the central nervous system with highly stereotyped organization that can be easily accessed and imaged by fluorescence microscopy. The student will label progenitor cells taken at different stages of the neurogenesis process in order to characterize their output and identify how it may vary among cells and over time. In a second part of the project, we will assay the role of specific molecular pathway in regulating retinal progenitor output, using genome-integrative transgenes to experimental perturb these pathways.

This project will enable the student to acquire a solid training in neurodevelopment, genetic engineering approaches and fluorescence microscopy.