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) : Institut de la Vision
Research Unit Director : José Sahel
Research Team Director : Alain Chédotal
Team name : Role of Axon guidance Molecules

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2. Internship project title:

Function of meteorins in commissural axon guidance

3. Internship Description :

In most animal species characterized by an almost perfect symmetry along the anteroposterior Body axes, commissural axons connect neurons on the left and right side of the nervous system. Abnormal axon midline crossing during development causes a whole range of neurological disorders ranging from congenital mirror movements to a severe impairment of binocular vision such as in albino patients. Understanding the cellular and molecular mechanisms guiding commissural axons to the midline of the nervous system has been a central question for developmental neurobiologists. Studies in vertebrates and invertebrates identified evolutionary conserved proteins that attract commissural axons to the midline. Despite extensive studies in the past three decades, mounting evidence suggests that the molecular repertoire for midline guidance is more diverse than initially envisaged at not fully understood.

The goal of the project is to evaluate the function of Meteorin (Metrn) and Meteorin-like (Metrnl), which define a new class of midline-secreted proteins, in commissural axon guidance and to elucidate the biochemical signaling pathways that they activate.

The first aim is to study the function of Meteorin and Meteorin-like proteins in commissural axon guidance. We are generating a meteorin conditional knockout line (with the mouse clinic institute in Strasbourg) which will be crossed to various Cre-drive lines to inactivate meteorin expression in specific cell types. The M2 student will analyze brain development in this conditional line. The phenotypic analysis of the mutant mice will be facilitated by the use of whole-organ clearing and 3D imaging methods. The second aim is to identify Metrn and Metrnl receptor(s) and characterize their fuction in the developing nervous system.

This project, supported by ANR is done in collaboration with Dr Del Bene who studies meteorin function in the zebrafish.