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
SORBONNE UNIVERSITY /
INSERM S968/ UPMC UM80 / CNRS UMR7210
Fondation Voir et Entendre

Research Unit Director : Pr JOSE-ALAIN SAHEL
Research Team Director : Dr ALAIN CHEDOTAL
Team name : Team S1: Role of Axon Guidance Molecules
Address : 17, rue Moreau, 75012 PARIS
Tel : +33 1 53 46 25 15

Supervisor of the Research Intern for this project t: Dr YORICK GITTON
Telephone : 01 53 46 25 37
E-mail : Alain.chedotal@inserm.fr & Yorick.gitton@inserm.fr ;

2. Internship project title:

A new method to analyze at unprecedented resolution the development of the Human Nervous System.

3. Internship Description :

Our understanding of the development of the peripheral nervous system (motor, sensory, autonomous) in the human embryo is still based upon studies mostly performed during the first half of the XXth century. The methods used since then (tissue sections and histological sections) do not preserve the tridimensional organization and fail to characterize the molecular organization of cells and their projections. The opacity of biological tissues prevents imaging deeper than 150µm with confocal microscopy, and 800µm with bi-photon microscopy. Our team has designed an innovative imagery method which allows for 3D analysis through digital slices of thick specimens. Immunohistochemistry protocols have been optimized to allow deep antibody penetration throughout the specimens. Whole labelled samples are then cleared using organic solvents and scanned using a light sheet microscope. The compilation of digital slices then allows the 3D reconstruction of the labelled cells within the intact specimens. The present project applies this strategy to the development of the nervous system; with a specific emphasis upon the challenging goal to reconstruct the neuromuscular organization between motor neurons and their target muscular groups. This study is part of our general initiative to produce the 3D cellular atlas of the human embryo at an unprecedented resolution (www.transparent-human-embryo.com). This project will be a decisive progress towards grasping the etiology of congenital neuropathies.