Master de Sciences,Technologies, Santé
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) : Center for Neurophysics, Physiology, Pathology
Research Unit Director : Claude Meunier
Research Team Director : Daniel Zytnicki
Team name : Spinal Physiology and Pathophysiology

Address : Université Paris Descartes, 45 rue des Saints-Pères, 75006 Paris

Supervisor of the Research Intern for this project : Marin MANUEL & Daniel ZYTNICKI
Telephone : 01 42 86 22 85
E-mail : marin.manuel@parisdescartes.fr; daniel.zytnicki@parisdescartes.fr

2. Internship project title: *Role of spinal network excitability in the degeneration of motor neurons in Amyotrophic Lateral Sclerosis*

3. Internship Description :

Amyotrophic Lateral Sclerosis (ALS) is an adult-onset neurodegenerative disease that affects motor neurons (the cells that command muscle fiber contraction). ALS leads to motor neurons degeneration, paralysis and ultimately patient death. To this day, there is no curative treatment for this fatal disease and the survival time usually does not exceed 3-5 years after diagnosis. One salient feature of ALS is that the motor neurons display a differential vulnerability to the disease depending on the contractile properties of the muscle fibers they innervate. Our team has developed a new mouse preparation in order to investigate the electrophysiological properties of motor neurons in vivo in adult anaesthetized mice. Our preparation allows us for the first time to perform stable intracellular recordings, to characterize the contractile properties of the motor units and to investigate the excitatory and inhibitory pathways that control the motor neuron activity. We have already demonstrated in murine models of ALS that the most vulnerable motor neurons display dramatic changes in their intrinsic excitability and we recently showed that excitatory inputs from proprioceptive and descending pathways are impaired. Our working hypothesis is that these alterations, affecting both motor neurons and pre-motor pathways, play a critical role in the degeneration process. To test this hypothesis, we are combining in vivo electrophysiological investigations, viral manipulations of motor neuron and interneuron excitability and molecular investigations of disease markers.

The student will contribute in testing this hypothesis. She/he will participate in the electrophysiological experiments, perform virus injections and histological processing of tissues collected during the experiments.