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Équipes d'accueil : Team 2 – Cerebellar Neurophysiology

Titre du stage :

Exploring cerebellar molecular layer interneuron network activity and function during locomotion

Résumé :
We are proposing a M2 intership project at the SPPIN Lab (CNRS UMR 8003, Unviersité Paris Descartes, 45 rue des Saints-Pères, Paris, France) under the supervision of Michael Graupner (PhD). The candidate will be involved in a multifaceted project dedicated to studying the cerebelluar interneuron network during locomotion using calcium imaging and electrophysiolocial recordings in the awake, behaving animal. Neural recordings will be paired with deep-learning based techniques for behavioral analyses.

The cerebellum plays a crucial role for the timing and coordination of movements. It is thought that the cerebellar microcircuit processes sensorimotor inputs and makes immediate alterations of ongoing movements. The cellular underpinnings of such a task remain largely unknown. We study the role of the cerebellar molecular layer interneuron (MLI) network in awake mice walking on a treadmill. The project takes advantage of the recent advent in *in vivo* recording techniques as well as optogenetic approaches and proposes to combine activity measurements in an ensemble of MLIs through calcium-sensitive dyes with whole-cell patch-clamp recordings in the awake behaving animal. Our goal is to understand the functional role of the MLI population during locomotion and adaptation to environmental changes. The results will advance our understanding of the cerebellar microcircuit and its involvement in generating coordinated movements in mammals.

Applicants should pursue studies in/or related to neuroscience. The ideal candidate has practical skills for experimental work, some background in neurophysiology, and a deep desire to understand the principles underlying the functioning of the nervous system.

Available techniques : two-photon imaging, *in vivo* electrophysiology, machine learning- (deep-learning) based extraction of behavior, animal surgery, image processing.

Website : https://www.sppin.fr ; https://www.biomedicale.parisdescartes.fr/~mgraupe/