Ecole Doctorale Sciences de la Vie et de la Santé - Call for proposals thesis 2019/2020

Laboratory title : CNRS UMR 5287 - Jean-René Cazalets

Supervisor

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Thesis title :
Locomotor recovery following a partial spinal cord lesion in the rat injured as neonate

Keywords : Spinal cord injury, Kinematic, Training, Locomotor Networks, Electrophysiology

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Abstract

Following a spinal cord injury, some of the lines of communication between the supraspinal centers (cortical and sub cortical) and the sub-lesional sensorimotor networks are interrupted leading to sensorimotor deficits. The importance and extent of these deficits mostly depend upon the extent and location of the spinal cord lesion. Interestingly, animal models of spinal cord injury have shown that some recovery of functions, especially the locomotor function, can be re-expressed thanks to plastic changes occurring both at the supra- and sublesional levels. For instance, this functional plasticity can be promoted by methods that aim at increasing the excitability of the locomotor networks such that electrical and/or pharmacological stimulations, or treadmill training. Interestingly also is the observation that the recovery of locomotor function is much better in animals spinalized as neonates. For instance, rats spinalized as neonates show some degree of spontaneous locomotor recovery that is not observed in rat spinalized as adult. In this context, the project aim at developing a neonatal rat model of partial spinal cord lesion (hemisection) to detail the recovery process with electrophysiological and kinematic approaches. In addition, we also aim at deciphering the role of the plasticity of the sub-lesional spinal networks in the recovery process.

Qualification required

Strong bases in neurobiology, animal experimentation and microsurgery