Laboratory title : 

Supervisor

Name : Nathalie

Thesis title : Role of Planar Polarity proteins on the Cytoskeleton dynamics in neurons

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Abstract

Dendritic spines are small post-synaptic structures exhibiting dynamic changes in morphology correlated with synaptic plasticity. The control of spine morphology depends on the actin cytoskeleton, adhesion proteins and signaling molecules. In recent years, planar cell polarity (PCP) signaling was found to play important roles during neuronal development, including axon guidance, dendrite and spine morphology as well as synaptogenesis. Mutations in PCP gene have been identified in human pathologies, such as ataxia, epilepsy, autism, and schizophrenia to cite a few. Because PCP components sculpt cell morphologies by inducing polarized changes in the cytoskeleton, they are excellent candidates for the regulation of actin dynamics during dendritic spines plasticity.

Our objective is to understand the impact of PCP proteins, mainly Vangl2 and its associated protein Scribble-1 (Scrib1), on the dynamic organization of actin and actin-regulatory proteins during spinogenesis and morpho-fonctional plasticity. We will adopt a multidisciplinary approach at the forefront of different fields and techniques with the development of original genetic tools, combine with molecular biology, biochemistry and PALM and STORM microscopy. We expect to identify clear and important roles for PCP genes in the control of the spines actin cytoskeleton

Qualification required

The student should have a solid background in neurobiology and a strong motivation for combined molecular and behavioral approaches. English speaking.