Laboratory title : 

Supervisor

Name : Thesis title :
Optogenetic control of the properties and function of hippocampal circuits by the manipulation of its medio-septal afferences

Keywords : hippocampus, septum, electrophysiology, optogenetics, neural coding

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Abstract

The hippocampus is a key structure for the online processing of spatial information and for its offline consolidation, the functional basis of episodic memory. Previous studies have established that the hippocampus is under the direct and powerful influence of the medial septum. However, the role of the different populations of medial septal neurons in controlling hippocampal function is still unclear. In this project, we will identify and manipulate septal GABAergic and cholinergic neurons in vitro and in vivo using optogenetic and pharmacogenetic tools. Sophisticated electrophysiological recordings with multi-site silicon probes and in-vivo patch clamp will allow detailed investigation of the septo-hippocampal system at the single cell and population levels. In addition to better understand the importance of medial septum for hippocampal function, these results will contribute to the ongoing debate regarding the role of oscillatory activity patterns in information coding and storage.

Qualification required

Prior experience of in vitro or in vivo electrophysiology is required.
Programming skills (Matlab or C/C++) and prior experience of Linux environment would be highly appreciated