



MASTER 2 Fundamental and Clinical Neurosciences

Internship proposal 2023-2024

(internship from January to June 2024)

Host laboratory: CRNL, Bâtiment 462 - Neurocampus - CH le Vinatier, 95 bd Pinel, Bron-Lyon

Host team : Sleep Team

Internship supervisors : Nadia Urbain, CR1 INSERM, nadia.urbain@inserm.fr,
<https://nadiaurbainlab.wordpress.com/>)

Project title : Sensory gating in thalamic relay nuclei

Project summary :

A central issue in neuroscience is to understand how we select from the ongoing flow of sensory information what is relevant for a quick decision. For example, we adjust very quickly the racket position to return the ball in a tennis match, but sensory signals associated with the texture of the racket's grip are behaviorally irrelevant and should be ignored. Indeed, sensory-evoked responses in cortex can be modulated by contextual information and this process is essential to select pertinent information.

The rodent somatosensory system, which is very fast and efficient, offers a particularly interesting experimental model to study sensory inputs processing. Faithful transmission of sensory information from the periphery to the neocortex is largely attributed to the principal relay thalamic nuclei. In high-order thalamic nuclei, however, our previous studies showed that responses to sensory stimuli are delayed, impeded by inhibitory inputs from the zona incerta. We thus propose that the zona incerta dynamically regulates the recruitment of sensory-driven thalamic neurons, depending on animals' vigilance state or engagement in a task, and this is what this master project aims to study in mice. The candidate will familiarize him(her)self with electrophysiological techniques in non-anesthetized head-fixed mice.

Publications :

N. Urbain, N. Fourcaud-Trocmé, S. Laheux, P.A. Salin and L.J. Gentet. Brain-state-dependent modulation of neuronal firing and membrane potential dynamics in the somatosensory thalamus during natural sleep.
Cell Report, 2019, 26: 1443-1447.

N. Urbain, P.A. Salin, P.A. Libourel, J.C. Comte, L.J. Gentet and C.C. Petersen. Whisking-related changes in neuronal firing and membrane potential dynamics in the somatosensory thalamus of awake mice.
Cell Report, 2015, 13: 647-656.

Please send your proposal to marion.richard@univ-lyon1.fr for publication on the Master of Neuroscience website.