Role of the Anterior cingulate cortex – Raphe nuclei pathway in neuropathic pain: Proof of concept for the closed-loop stimulation

URL: /Offres/Doctorant/UPR3212-IPEYAL-007/Default.aspx
Reference : UPR3212-IPEYAL-007
Work Location: Strasbourg, Aalborg, Helsinki
Contract Type: Fixed-term (PhD Candidate)
Contract Duration: 36 months
PhD Start Date: September 1, 2025
Work Schedule: Full-time
Salary: €3,038.74
CN Section(s): 25 - Molecular and Cellular Neurobiology, Neurophysiology
Scientific Supervisor: Ipek YALCIN (main supervisor), Daniel Ciampi de Andrade, Jarome Laine

This PhD position is supported by the Frontier Research Competences for Neuro-modulation and Oscillations in Pain (FRESCO4NoPain), an EU-funded Doctoral Network (DN) under the Marie Sklodowska-Curie Actions (MSCA). This program aims to provide a multidisciplinary training program for young researchers (PhD candidates) to explore innovative therapeutic strategies for the treatment of chronic pain. The program focuses on using cutting-edge, non-invasive techniques for neuro-modulation and the study of brain oscillations to better understand and manage chronic pain.

Chronic pain affects approximately one in five individuals, representing a significant economic and societal burden, often accompanied by emotional disorders Despite its widespread impact, only a limited number of treatments have demonstrated significant therapeutic efficacy. To tackle this issue, Dr. Ipek YALCIN's laboratory, where this PhD project will primarily take place, has developed a murine model of neuropathic pain that induces an anxious-depressive phenotype. The laboratory has also identified several brain structures involved in this comorbidity, notably the anterior cingulate cortex (ACC), a critical region implicated in the pain-emotion interaction (cf. Yalcin et al., 2011; Barthas et al., 2015, 2017; Sellmeijer et al., 2018; Journée et al., 2023; Becker et al., 2023).

The candidate will focus on characterizing the role of the afferent pathway from the ACC to the dorsal raphe (a serotonergic structure involved in the descending pain control mechanisms) in nociceptive and aversive responses, as well as its involvement in the comorbidity with mood disorders, using a murine neuropathic pain model. This project will provide the candidate with strong expertise in the neurophysiology of brain circuits and advanced technical skills, including stereotactic surgery, optogenetics, and rodent behavior analysis. The PhD will be carried out in collaboration with two additional partners: an academic partner at the University of Aalborg (Denmark) and a non-academic partner, NexStim (Finland).

Work context

The candidate will be primarily based at the Institute of Cellular and Integrative Neurosciences (INCI, CNRS, Strasbourg), working within the "Pain and Psychopathology" team under the direction of Dr. Ipek YALCIN. Additionally, they will complete secondment at the University of Aalborg in Denmark (academic partner) with Dr. Daniel Ciampi de Andrade, and a secondment at NexStim in Finland (non-academic partner).

Skills

- Solid background in neuroscience.
- Strong experience in scientific research on animal models.
- An expertise in stereotaxic surgery, optogenetic and electrophysiology in vivo will be a plus
- Good communication skills (written and oral).

Additional Information

Applicants must NOT have lived or carried out their main activity France for more than 12 months in the past 3 years immediately prior to the application deadline.

Constraints and risks

- The candidate will be expected to live in three different countries during the course of this PhD: France, Danemark, and Finland.
- Potential risks related to working with live animals (e.g., bites, exposure to allergens) and handling chemical and biological substances.
- The candidate will be required to work on certain weekends and public holidays.

All the application should be done using CNRS platform:

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