

ESR 12

THE PROJECT

Longitudinal and sex-specific analysis of brain rhythm changes in the comorbidity of chronic pain and mood disorder

Objectives

- 1/ To study oscillatory activity changes in prefrontal and somatosensory cortices, as well as in basal forebrain during key stages of neuropathy-associated pain, depression and anxiety;
- 2/ To investigate timely correlation of specific frequency bands;
- 3/ To identify the correlation of phase-coupling in specific frequency bands with particular brain regions and key stages of the pain model;
- 4/ Study the causal link by optogenetic approaches.

Methodology

Peripheral nerve injury model will be used to induce chronic neuropathic pain induced. A battery of behavioural tests will be used to evaluate the mechanical hypersensitivity, anxiety and depressive-like behaviours. Sensory testing and tests for anxiety- and depression-like behaviours will be applied throughout the time course of the neuropathic model in male and female mice. Multi-side oscillatory frequencies will be measured simultaneously in prefrontal cortex, somatosensory cortex and amygdala across delta, theta, alpha, beta and gamma frequencies in a time-resolved manner. Optogenetic manipulation will be carried out to investigate the effects of neuronal manipulation on alleviating pain and negative affective symptoms.

Expected Results

These experiments will enable us to correlate brain oscillatory activity in the prefrontal cortex, somatosensory cortex and amygdala regions with the time-course of the pain behaviours and the key phases of comorbidities herewith.

Supervisors and host organisations

Main supervisors and recruiting organisation:

Rohini Kuner,
University of Heidelberg, UKHD, Germany

Co-supervisor (academic partner):

Ipek Yalcin

CNRS, Institut des Neurosciences Cellulaires et Intégratives (INCI, UPR3212), University of Strasbourg, Strasbourg, France

Co-supervisor (non-academic partner):

Emile Andriambeloson and Stephanie Wagner,
Neurofit, Strasbourg,
France

Planned mobility track and secondments:

Host 1: UKHD (RK), M5-M8, M27-40: Tetrode implantation and recording of oscillations;

Host 2: CNRS (IY) M9-23: Optogenetics, animal model of chronic pain and anxiety-and depression like measurements.

Host 3: Neurofit (SW), M24-26: Development and implementation of novel behavioural or cytological assays.

Enrolment in Doctoral degrees:

University of Heidelberg/ University of Strasbourg

THE POSITION

Duration

36 mo

Salary

3 171.90 €/ per month (gross)

Allowance

Mobility allowance 600/per month (gross), family allowance if applicable 500/per month (gross)

THE CANDIDATE PROFILE

Academic prerequisite

We are looking for a student with a Master degree in Biology or related fields.

Knowledge on specific topics

Candidates should have a strong background in Physiology and Neuroanatomy. A good knowledge of Neurosciences is expected.

Technical skills

Prior experience in neuroscience research or at least in biology is desirable, as well as experience in the experimental manipulation of living animals, in particular rodents. Experience in electrophysiology or optogenetic approaches is a plus. Programming skill in Matlab or Python is necessary.

Exclusion criteria

Nationality is not a criterion: Researchers can be of **any nationality**. Rather the location of the researcher's residence or main activity during the 3 years prior to their recruitment is determining. Indeed, the candidate **must not have resided** or carried out their main activity (work, studies, etc.) **in Germany** (the country of the recruiting beneficiary) for more than 12 months in the 3 years immediately before the recruitment date. Compulsory national service, short stays such as holidays, and time spent as part of a procedure for obtaining refugee status under the Geneva Convention¹ are not taken into account.

The candidate shall, at the time of recruitment, be in the **first four years** (full-time equivalent research experience) of their research careers and **have not been awarded a doctoral degree**.

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before the 1st of August, 2021**