

Individual Research Project

ESR 5

THE PROJECT: Sites and mechanisms involved in stress/anxiety-induced chronification of post-operative pain.

Objectives

- 1/ To determine whether pre-operative stress/anxiety results in exacerbation and/or chronification of post-operative pain in rats
- 2/ To determine whether stress/anxiety-induced amplification of post-operative pain is associated with alterations in neuronal activity in the amygdala
- 3/ to determine whether stress/anxiety amplification of post-operative pain is associated with endocannabinoid system alterations in the amygdala.

Methodology

The successful candidate will work on a research programme that will employ an integrative, multidisciplinary, whole-systems neuroscience approach to investigate the effects of repeated restraint stress on post-surgical pain-related behaviour (e.g. motor activity, mechanical hypersensitivity, place-escape avoidance paradigm) in rats. In vivo electrophysiological recording from the amygdala. RT-qPCR, Western blotting, RNA scope and/or immunohistochemistry for analysis of amygdalar cannabinoid receptor expression, and HPLC with mass spectrometry for measurement of amygdalar endocannabinoid levels. Targeted pharmacological studies will determine the effects of manipulating the endocannabinoid system.

Expected Results

This project will provide novel data on the role of the endocannabinoid system and amygdala in stress-induced exacerbation of post-surgical pain. This project will also examine if sex-differences exist in the neurobiology underpinning chronic post-surgical pain. The recruited researcher will be trained in and use state-of-the-art methodologies, learn about neurobiology of post-surgical pain, the psychobiology of affective processes, the endocannabinoid system, amygdala, and examine possible novel treatment targets for chronic post-surgical pain.

Supervisors and host organisations

Main supervisors and recruiting organisation:

David Finn and Michelle Roche

Pharmacology and Therapeutics, Physiology, School of Medicine, National University of Ireland Galway

Co-supervisor (academic partner):

Rohini Kuner

University of Heidelberg,
Germany

Co-supervisor (non-academic partner):

European Pain Federation (EFIC; Sam Kynman), ESR to be based in Galway

Planned mobility track and secondments:

NUI Galway, Ireland: M4-19, M35-39: Behavioural studies and endocannabinoid system analysis using molecular and neurochemical methodologies.

University of Heidelberg, Germany: M23-34: Training in *in vivo* electrophysiology.

European Pain Federation (EFIC): M1-4: Activities related to the Federation's biennial scientific congress (ESR will be located in Galway for this).

Enrolment in Doctoral degrees:

National University of Ireland Galway and University of Heidelberg/ Joint Diploma

THE POSITION

Duration

36 months

Salary

Living allowance €3780 per month (gross)

Allowance

Mobility allowance €600 per month. Family allowance €250 per month.

THE CANDIDATE PROFILE

Academic prerequisite

Candidates must hold a first class or upper second class honours MSc in a relevant biology-based subject (physiology, pharmacology, neuroscience, anatomy, biochemistry, biomedical science, or equivalent). A significant research experience (>6months) would be an advantage.

Knowledge on specific topics

Applicants must demonstrate a keen interest in pre-clinical research in the area of neuroscience and the endocannabinoid system relating to affective disorders and pain

Technical skills

Experience in at least two of the following is desirable: Behavioural neuroscience; pre-clinical (rodent) models of pain, stress, anxiety, depression; stereotaxic/small animal surgery; intracerebral microinjection; *in vivo* electrophysiology; immunohistochemistry/immunocytochemistry; RNAscope; FACS analysis of inflammatory cells/mediators; Western immunoblotting; ELISA; RT-qPCR; radioligand binding ; HPLC ; Mass Spectrometry.

Exclusion criteria

Researchers can be of **any nationality**. However, the candidate **must not have resided** or carried out their main activity (work, studies, etc.) **in Ireland** 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 career and **have not been awarded a doctoral degree**.

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before the 1st August 2021**