

## Individual Research Project

# ESR 7

## THE PROJECT

Sex differences in comorbidity of chronic pain and anxiety: focus on the locus coeruleus

### Objectives

**1/** To investigate sex differences in the development of chronic pain-related emotional disorders. (UCA)

**2/** To evaluate the monosynaptic connections within the amygdala-locus coeruleus (LC) and LC-prefrontal cortex (PFC) pathways and their levels of activity in male and female mice submitted to neuropathic pain. (UCA)

**3/** To investigate alterations in the endocannabinoid system and microtubule dynamics in the amygdala-LC and LC-PFC pathways in long-term neuropathic pain. (NUIG/Transpharmation)

**4/** To explore the role of amygdala-LC and LC-PFC pathways on chronic pain-related affective disorders by optogenetic or pharmacogenetic manipulations. (NUIG/UCA)

### Methodology

Animal model of chronic pain and animal behavior tests

cTRIO method

Optogenetic and Pharmacogenetic approaches

Histology and immunohistochemistry of the LC and others LC projecting brain areas

Dissection of brain samples and biological analyses, e.g. western blot, qPCR and LiC-MS/MS

### Expected Results

Data will provide important insights into the relationships of pain-affective disorders comorbidity in female and male mice and the role of the endocannabinoid system. Additionally, these data may reveal specific alterations in amygdala-LC-PFC pathway predicting new therapeutic targets.

### Supervisors and host organisations

#### Main supervisors and recruiting organisation:

Esther Berrocoso/Meritxell Llorca-Torrallba  
Neuropsychopharmacology and Psychobiology Research group  
University of Cadiz, Spain

#### Co-supervisor:

David Finn/Michelle Roche

Galway Neuroscience Centre and Centre for Pain Research, NCBES, National University of Ireland, Galway

**Co-supervisor:**

Ewa Sokolowska/Jack Prenderville  
Transpharmation Limited, Trinity College Institute of Neuroscience  
Dublin, Ireland

**Planned mobility track and secondments:**

**Cadiz (Spain):** Nov. 2021 to Sept. 2022 (11 months): neuropathic pain model in mice, stereotaxic surgery for viral vector administration for cTRIO approach, behavioral test, histology and immunohistochemistry.

**Galway (Ireland):** Oct. 2022 to Sept. 2023 (12 months): Molecular biology techniques (qPCR, western blot) and optogenetic.

**TRANS:** Oct. 2023 to Dec 2024 (3 months): Training in analysis of neuroplasticity markers (immunohistochemistry, western blot)

**Cadiz (Spain):** Jan. 2024 to Oct. 2024 (10 months): Pharmacogenetic, data analysis, writing of the thesis manuscript and defense.

**Enrolment in Doctoral degrees:**

University of Cadiz and Galway / Double Diploma

## THE POSITION

### Duration

36 months starting Nov. 1<sup>st</sup> 2021

### Salary and allowance

The salary is competitive and complies with the MSCA Work Programme: approx. **2840 euros per month before taxes**, consisting of Living and Mobility allowance.

A conditional Family allowance of approx. 189 euros can be added to the salary.

Read about the employee/student accommodation benefits at the University of Cadiz and why the University of Cadiz is an excellent career choice: <https://atencionalumnado.uca.es/alojamiento-oficina-de-alojamiento/>.

## THE CANDIDATE PROFILE

### Academic prerequisite

- Hold a Master's degree in relevant scientific disciplines, e.g. neuroscience, biomedicine, pharmacology, medicine
- Good/excellent academic performance
- Proficient in English (oral and writing)

## Knowledge on specific topics

- Knowledge in pain and/or affective disorders and/or endocannabinoid system research

## Technical skills

- Demonstrate previous experience in a research laboratory (e.g. basic wet lab methods)

### Considered as advantage:

- Experimental animal course completed
- Experience in animal surgery, in vivo pharmacology, animal (rodents) behavior, molecular biology, immunodetection, microscopy, statistical data analysis

## Exclusion criteria

**Nationality is not a criterion:** Researchers can be of **any nationality**.

1/ 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 Spain** 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 Convention<sup>1</sup> are not taken into account.*

For the present project, the recruitment date is Nov. 1<sup>st</sup> 2021.

Eligible candidates will hence have NOT spent more than 12 months in Spain between Nov. 1<sup>st</sup> 2018 and Nov. 1<sup>st</sup> 2021.

2/ 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**.

**Apply for this position at <https://happy-form.u-strasbg.fr/>  
before the 1<sup>st</sup> of August, 2021**