

### Research Fellowship (m/f)

**Project title:** “Pre- and postsynaptic interactions between afferents supplying lamina I projection neurons in the lumbar and cervical spinal cord: impact for somatic pain and migraine”

*(financiado pelo Portugal 2020, no âmbito do Programa Operacional Competitividade e Internacionalização (COMPETE 2020) - e através da Fundação para a Ciência e a Tecnologia)*

**Reference:** PTDC/NEU-NMC/1259/2014

**Internal Reference:** PR391802

#### **Candidate profile:**

We are looking for candidates with a Master's degree in Biology or related fields with a final score of 14 or higher. Preference is given to candidates with FELASA B training, with experience histology and in lab management. We will also give preference to candidates with experience in neuronal cytoarchitectural three-dimensional reconstruction and morphological analyses using Neurolucida. English language, both spoken and written, and good inter-personal relationships in the context of a multidisciplinary research team are essential attributes.

#### **Background and work plan:**

Chronic pain highly impairs quality of life of patients, but available treatments are often inadequate. This is a consequence of our limited knowledge about the spinal and supraspinal neuronal circuitries processing pain. The most superficial layer of the spinal dorsal horn, lamina I, plays a key role in the nociceptive processing. It receives input from thin myelinated A $\delta$  and unmyelinated C afferents, and projects to specific areas of the brainstem and thalamus. In the lumbar spinal cord, alterations in the processing mode of lamina I neurons result in a chronic pain. In the upper cervical cord, considered as a part of the trigeminocervical complex, lamina I neurons relay afferent inputs from the cranial meninges and cervical somatic structures, and serve as the neural substrates of primary headache syndrome, e.g. migraine. Organization of the inputs to projection neurons, their pre- and postsynaptic interactions underlying nociception and functional disorders are poorly understood.

In this project, we shall study mechanisms of presynaptic inhibition and postsynaptic integration in anatomically classified lamina I projection neurons. Projection neurons in the lumbar and cervical cord will be labelled by injecting a retrograde tracer into their supraspinal projection areas. Low-threshold A $\beta$ /A $\delta$ -fiber-driven presynaptic inhibition of nociceptive A $\delta$  and C fiber inputs to projection neurons will be studied in the lumbar spinal

cord. In the isolated trigeminocervical complex we shall characterize cervical neurons receiving inputs from the trigeminal and spinal nerves as well as the presynaptic interactions between the trigeminal and spinal nerve inputs.

We expect to reveal mechanisms of pre- and postsynaptic interactions of fibers supplying lamina I projection neurons and their relevance for nociception and primary headache syndromes.

### **Application procedure:**

To apply for the Fellowship interested candidates must hold a Master degree and submit the following documents a) Complete CV; b) degree's certificate; c) Letter of Motivation; and d) Referee Letter, via the online application system: <http://www.ibmc.up.pt/gestaocandidaturas/index.php?codigo=PR391802> between August 1st and August 14st 2018.

**Legislation and applicable laws:** Employment at the IBMC is regulated by current laws relating to the Statute of Science Research Fellows of Fundação para a Ciência e Tecnologia, I.P. - 2015, namely Law 40/2004 of August 18, amended and republished by Decree-Law No. 202/2012 of 27 August and the Regulation of Scientific Research Studentships of the IBMC approved by Fundação para a Ciência e Tecnologia ([www.ibmc.up.pt/fellowships.php](http://www.ibmc.up.pt/fellowships.php)).

### **Evaluation of applications:**

Based on the written documentation (CV, motivation letter and references), the most qualified candidates will be selected for a personal interview. The total evaluation will be based on CV (50%) and interview (50%).

### **Jury:**

President: Boris Safronov (PhD);

Ordinary members: Nikolay Lukoyanov (PhD), Liliana Luz (PhD)

### **Grant conditions:**

The fellowship is due to start in September 15<sup>th</sup> 2018. The initial grant will be awarded for 3 months, eventually renewable until the end of the project in 30 June 2019, or if it extended for a maximum of 27 months. The monthly amount of the fellowship is € 980 (<http://alfa.fct.mctes.pt/apoios/bolsas/valores>) paid by bank transfer.