UMR 1107 INSERM/UCA

Internship proposal – Master 2

An internship is available at the NEURODOL lab in Clermont-Ferrand (UMR 1107 INSERM/Université Clermont Auvergne).

Title: Role of central and peripheral TREK1 potassium channels in pain and itch

Supervisor: Dr Stéphane Lolignier

Internship period: January to June 2025

Deadline for application: 28 June 2024

Project summary:

We have shown that the TREK1 potassium channel, known to be involved in pain sensitivity and widely expressed in the nervous system, is involved in the analgesic effect of morphine but not in its adverse effects. This makes it a particularly interesting target for the development of new analgesic drugs with an improved benefit/risk ratio. However, questions remain regarding the mechanisms involving TREK1 in pain and, given TREK1 widespread expression, we need to explore its possible role in other physiological functions to better evaluate the safety of future drugs acting on TREK1. We also recently discovered a role of TREK1 channels in the perception of itch which must be explored further. To better understand the contribution of TREK1 channels to the pathophysiology of pain and itch, and the possible adverse effects triggered by pharmacological modulation of TREK1, we wish to study its expression in the nervous system and various organs, and to perform functional studies aiming at characterizing the role of peripheral and central TREK1 channels in neuronal activity, in physiological functions and in pain/itch perception. Accordingly, the objectives of this internship are as follows:

- Study TREK1 expression in nervous and non-nervous tissues using a fluorescent reporter mouse and immunohistochemistry, tissue clearing and light sheet microscopy.
- Determine the role of peripheral and central TREK1 channels in pain and itch in vivo using behavioral analyses in conditional knock-out mice (constitutive and/or induced using viral vectors) as well as in vivo two-photon calcium imaging in sensory neurons.

Profile: We're looking for a highly motivated student with a background in neuroscience, pharmacology and/or physiology, with a desire to undertake a PhD thesis after this internship. Validated qualification for experimenting on animals is preferable but not mandatory.

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