Funded PhD project in Integrated Structural & Cell Biology in Grenoble, France

Title of the PhD project:
DUCS - Deubiquinating enzymes and Calcium Signalling

PhD supervisor:
Alexandre Bouron

Host laboratory:
Laboratoire Biosciences et bioingénierie pour la Santé
Genetics and Chemogenomics team

Project summary:
Ubiquitination consists in the attachment of ubiquitin (Ub) to target proteins. This post-translational modification controls the fate of proteins (via proteasomal or lysosomal mechanisms) and is imperative in the regulation of various key cellular processes such as endocytosis, subcellular localization and activity of proteins. Ubiquitination can be reversed by deubiquitinating enzymes (DUBs), a class of proteases that regulate degradative processes and contribute to the recycling of Ub molecules. Deregulation of the Ub conjugation/deconjugation system has been linked to the pathogenesis of various human diseases like cancers and neurodegenerative disorders. It is now clear that maintaining a balanced interplay between ubiquitinating and deubiquitinating reactions is of crucial pathophysiological importance for the brain.
The project aims at charactering the effects of brain deubiquitinating enzymes on the activity and trafficking of selected neuronal Ca^{2+} channels. The thesis should also explore the involvement of the Ub conjugation/deconjugation system in the control of intracellular Ca^{2+} stores. The work will be done in collaboration with the group of Prof C. Meyer-Schwesinger (Hamburg, Germany).

Preferred skills: Applicants must have expertise in at least one of the following techniques: cellular and molecular biology, biochemistry, live-cell calcium imaging, electrophysiology.

Student role: The PhD student will apply molecular, cell biological, biochemical and live-cell fluorescence and confocal imaging techniques. The PhD student will have access to new pharmacological tools to gain comprehensive insight into the biological importance of DUBs in neuronal pathophysiology

Keywords: neuronal calcium channels, calcium signalling, ubiquitination, neuronal physiology, intracellular trafficking

Relevant publications of the team:

Bouron A, Fauvarque MO (2022). Genome-wide analysis of genes encoding core components of the ubiquitin system during cerebral cortex development. Molec Brain, 15: 72.

Bouron A (2020). Transcriptomic profiling of Ca2+ transport systems during the formation of the cerebral cortex in mice. Cells, 9:1800.