



M2 internship project

The effect of tubulin post-translational modifications on neuronal aging in *C. elegans*

institutCurie

Location: Institut Pierre-Gilles de Gennes / Institut Curie, 75005 Paris

Team/Lab: Quantitative Developmental Biology / UMR168 Physico Chimie Curie

Supervisors: Wolfgang Keil / Nagesh Kadam

Duration: 6 months

Desired starting date: November 2021 (flexible)

In this project, we study how neuronal cells cope with the animal's age, specifically how neurodegeneration affects neuronal morphology and axonal transport. We use *Caenorhabditis elegans* (*C. elegans*), a simple multicellular organism with ~1000 cells with a well-defined nervous system as our model system. The project employs multiple cutting-edge techniques in cell and molecular biology, live microscopy, and image data analysis.

This internship aims to study the role of tubulin code; expression of different tubulin isoforms, and their posttranslational modifying enzymes (PTMs), which give a unique identity to microtubules (MTs) in different cells to carry out different functions. We will be looking at the MTs and PTMs in *C. elegans* mechanosensory neurons. We will use PTMs null mutants and the age or time-dependent depletion of each desired PTM protein with the help of CRISPR/Cas9 and Auxin inducible degron (AID) system. During the internship, the candidate will learn how to acquire and analyse confocal microscopy images to monitor and quantify aging-associated changes in the morphology of neurons. The last part of the internship will be dedicated to interpreting the data and relate them to the tubulin code model.

The host laboratory at Institut Curie and Institut Pierre-Gilles de Gennes will give the candidate the opportunity to interact with scientists from different backgrounds in a highly international environment.

Applications, in English, should include a short cover letter, a CV, the names of 1-2 references and should be sent to wolfgang.keil@curie.fr with the subject M2 PTM internship.

Recommended readings

Janke, C., Magiera, M.M. The tubulin code and its role in controlling microtubule properties and functions. *Nat Rev Mol Cell Biol* 21, 307–326 (2020). <https://doi.org/10.1038/s41580-020-0214-3>

Gadadhar, S. et al., The tubulin code at a glance. *J Cell Sci* 130 (8): 1347–1353 (2017) <https://doi.org/10.1242/jcs.199471>