Master's degree in Biology – Chemistry-Biology Department

Master 2 internship project
Year 2020-2021

Laboratory/Institute: BGE-IRIG-CEA Grenoble
Team: Gen&Chem

Director: Xavier Gidrol
Head of the team: Marie-Odile Fauvarque

Name and status of the scientist in charge of the project: Laurence Aubry Chercheur CNRS
HDR: yes ☑ no ☐

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Program of the Master’s degree in Biology:
☐ Immunology, Microbiology, Infectious Diseases
☐ Integrative Structural Biology
x Physiology, Epigenetics, Differentiation, Cancer
☐ Neurosciences and Neurobiology
☐ Planta International

Title of the project: Function of the ESCRT protein CHMP1B in membrane remodelling

Objectives (up to 3 lines):
The aim of this project is to provide knowledge at the molecular level on the function and regulation of the ESCRT protein CHMP1B in the process of membrane remodeling.

Abstract (up to 10 lines):
Cell response to external signals is dependent on cell surface receptors that are tightly controlled by endocytosis. Their endocytic trafficking relies in part on the ESCRT-III complex. This flexible multi-subunit machinery is able to form spiral polymers and to drive a topologically unique membrane deformation and scission event, required for the biogenesis of intra-endosomal vesicles, as well as cytokinesis, autophagy and virus budding. This project proposes to dissect the role of an atypical member of the ESCRT III protein family, the protein CHMP1B. We will 1) characterize the CHMP1B polymers and tubules induced by the protein in HeLa cells by electron and confocal microscopy approaches, 2) explore the contribution of lipids to CHMP1B recruitment to specific membranes using purified recombinant human CHMP1B and in vitro assays, and 3) investigate the role of the deubiquitinase USP8 on CHMP1B polymer formation using mutated forms of these proteins. This last point will provide a deeper understanding of CHMP1B regulation by USP8 whose uncontrolled activity/expression is associated with Cushing’s disease and chemoresistance in lung cancers.

Methods (up to 3 lines):
Molecular biology (subcloning, PCR…), cell biology (cell culture, transfection, immunostaining, confocal and electron microscopy), biochemistry (Immunoprecipitation, protein purification, Western blot…)

Up to 3 relevant publications of the team:


Requested domains of expertise (up to 5 keywords):
Cellular biology and biochemistry, and knowledge in cell signaling.