Master's degree in Biology – Chemistry-Biology Department

Master 2 internship project
Year 2020-2021

Laboratory/Institute: IBS
Teams: IRPAS/MEM

Director: Winfried Weissenhorn
Head of the teams: Nicole Thielens/Guy Schoehn

Name and status of the scientist in charge of the project: Jean-Baptiste REISER, Ph.D.
HDR: yes ■ no ☐
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Program of the Master’s degree in Biology:

■ Immunology, Microbiology, Infectious Diseases ■ Integrative Structural Biology
☐ Physiology, Epigenetics, Differentiation, Cancer ☐ Neurosciences and Neurobiology
☐ Planta International

Title of the project:
Characterization of the interaction between new recombinant Immunoglobulins M and the complement

Objectives (up to 3 lines):
The overall goal of the master internship is focused on the characterization of the interaction between the main activators of the classical complement pathway -- the Immunoglobulins M (IgM) and the C1 complex, the first molecule that initiates this pathway.

Abstract (up to 10 lines):
The project is part of a more general project to decipher the molecular mechanisms of the activation of the initiation complex of the classical complement pathway by its activator, a biological process that challenged immunologists for several decades. It will focus on the C1/IgM/antigen bindings by taking advantages of the new developments in the protein engineering, biophysics and structural biology. In particular, the internship project will address and answer the following points:
- routine expression, purification and control quality of recombinant native IgMs, as well as specific antigen templates
- development of biochemical and biophysical characterization of the interaction between C1q, IgMs and their cognate antigens
- development of structural characterization of IgM constructs (full length and Fc core)

Methods (up to 3 lines):
Cellular biology for IgM expression (HEK293 cells), biochemistry for purification and sample preparations (FPLC), Biophysics for interaction characterization (SPR/BLI), (Cryo)-Transmission Electron microscopy and single particle analysis for structural characterization.
Up to 3 relevant publications of the team:


Requested domains of expertise (up to 5 keywords):
Immunology, biochemistry, structural biology, transmission electron microscopy, computer skills