

# Master 2 internship project Year 2024-2025

### Laboratory/Institute: IBS

**Director:** Winfried Weissenhorn Team: Bacterial Pathogenesis and Cellular Responses (PBRC) Head of the team: Ina Attrée

Name and status of the scientist in charge of the project: Lama Shamseddine

HDR: yes  $\Box$  no x

Address: IBS, 17 rue des Martyrs, 38054 Grenoble Cedex 09 **Phone:** 04 57 42 86 53 e-mail: lama.shamseddine@ibs.fr

# Program of the Master's degree in Biology:

**x** Microbiology, Infectious Diseases and Immunology Structural Biology of Pathogens □ Physiology, Epigenetics, Differentiation, Cancer □ Neurosciences and Neurobiology

# <u>Title of the project</u>: Assessing MreD Interactome and its Role in Bacterial Fitness

#### Objectives (up to 3 lines):

To get new insights into MreD function in Pseudomonas aeruginosa

#### Abstract (up to 10 lines):

The peptidoglycan (PG), the main component of the bacterial cell wall, determines the cell shape and shields it from external pressure and internal turgor. In rod-shaped bacteria, two protein complexes, responsible for PG synthesis, exist and lead to lateral and septal wall formation: the elongasome and the divisome, respectively. The core components of the elongasome are MreB, MreC, MreD, and PBP2. MreB forms filaments providing a track for PG synthesizing enzymes, PBP2 modulates PG crosslinking, MreC provides regulatory functions, whereas the role of MreD remains to be elucidated. Aiming to understand MreD function, a preliminary experiment focused on Pseudomonas aeruginosa transposon mutant affected in mreD expression. Synthetic lethality screens using this latter strain allowed the determination of MreD genetic interactome. The majority of products of the identified genes are involved in cell division, elongation, or PG recycling. In light of these results, this project aims to characterize the functional relationship between MreD and its potential partners.

#### Methods (up to 3 lines):

Molecular Biology, Fluorescence and Confocal Microscopy, Western Blotting

# Up to 3 relevant publications of the team:

- Martins A et al. Nat Commun. (2021) Self-association of MreC as a regulatory signal in bacterial cell wall elongation. doi: 10.1038/s41467-021-22957-9.

- Janet-Maitre M, et al. mBio (2024). Pseudomonas aeruginosa MipA-MipB envelope proteins act as new sensors of polymyxins. doi: 10.1128/mbio.02211-23

- Janet-Maitre, M. (2022). Réponses et adaptation de Pseudomonas aeruginosa aux stress de l'enveloppe (PhD thesis). University Grenoble Alpes, Grenoble.

Requested domains of expertise (up to 5 keywords): Molecular biology, fluorescence microscopy, microbiology