

**Master 2 internship project
Year 2023-2024**

Laboratory/Institute: IBS
Team: PB&RC

Director: Winfried Weissenhorn
Head of the team: Ina Attrée

Name and status of the scientist in charge of the project: Ina Attrée **HDR:** yes no

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Program of the Master's degree in Biology:

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

Title of the project: *Pseudomonas aeruginosa* adhesin, PdtA, as a target for anti-biofilm strategy using human antibodies

Objectives (up to 3 lines): The aim is to characterize the phenotype of the *pdtA* deletion mutant, and then to set-up a functional screen to isolate human antibodies capable of inhibiting PdtA-dependent phenotypes.

Abstract (up to 10 lines): PdtA is a 430kDa protein attached to the bacterial surface. Clinical strains expressing PdtA form aggregates/biofilms in the medium mimicking chronic cystic fibrosis environment. The formation of those aggregates depends on PdtA. We also discovered that sera from several patients infected by *P. aeruginosa* possess anti-PdtA antibodies. The goal is to further characterize PdtA function and its structural features, and use human antibodies to detect PdtA on bacterial surface by fluorescent and electron microscopy. We will also work in close collaboration with P. Pognard Team, CHUGA/IBS, for isolation of antibodies HuMAbs, using single B cell isolation, and for their characterization in functional assays (biofilm formation, cell-to-cell adhesion, ELISA). The student will work in a highly collaborative and multidisciplinary environment.

Methods (up to 3 lines): Standard procedure in molecular microbiology (genetics and cloning). Biochemistry (isolation of bacterial membranes, western blot, ELISA). Microscopy. Functional assays (aggregate/biofilm formation, cell-to-cell essays) in presence of antibodies.

Up to 3 relevant publications of the team:

Janet-Maitre M, Pont S, Masson FM, Sleiman S, Trouillon J, Robert-Genthon M, Gallet B, Dumestre-Perard C, Elsen S, Moriscot C, Bardeol BW, Rooijackers SHM, Cretin F, Attrée I. (2023) Genome-wide screen in human plasma identifies multifaceted complement evasion of *Pseudomonas aeruginosa*. *PLoS Pathog.*, 25;19(1):e1011023. doi: 10.1371/journal.ppat.1011023.

Job V, Gomez-Valero L, Renier A, Rusniok C, Bouillot S, Chenal-Francisque V, Gueguen E, Adrait A, Robert-Genthon M, Jeannot K, Panchev P, Elsen S, Fauvarque MO, Couté Y, Buchrieser C, Attrée I. (2022) Genomic erosion and horizontal gene transfer shape functional differences of the ExlA toxin in *Pseudomonas* spp. *iScience*, 14;25(7):104596. doi: 10.1016/j.isci.2022.

Trouillon, J., Han, K., Attrée, I., Lory, S. (2022) The core and accessory Hfq interactomes across *Pseudomonas aeruginosa* lineages. *Nat Comm.*, 13(1):1258. doi: 10.1038/s41467-022-28849-w.

Requested domains of expertise (up to 5 keywords): Microbiology, microscopy, ELISA