



Postdoctoral position – Institut Pasteur, Paris, France

Structural biology of type IV pili machineries

Research Project

Type IV pili machineries are bacterial molecular nanomachines that perform the dynamic assembly and disassembly of type IV pili, filamentous helical protein structures. They are present in a broad range of bacteria including human pathogens making them potential drug targets. Although most of the components are now known, how these molecular machines function is still unclear. They are composed of about 15 proteins located in the inner and outer membrane of bacteria which constitute the moving parts of these machines. We are combining different approaches to better understand how type IV pili machinery function using mass spectrometry-based in situ cross-linking (Rey, Anal Chem, 2021), single particle cryo-EM and Cryo-Electron Tomography. Availability of small molecule inhibitors also provide unique tools to understand how these structures work (Aubey *et al*, PNAS, 2019) by blocking machineries at specific steps of the assembly sequence.

Host lab

This ERC AdG funded project will be hosted by the Pathogenesis of Vascular infections Unit (Head: Guillaume Duménil) at Institut Pasteur (Paris, France). The candidate will be integrated in an interdisciplinary team that combines biochemistry, microbiology, cell biology, biophysics and animal models of infection. This project will take advantage of the vivid scientific environment of the campus and the numerous available core facilities available including the presence of TFS Aquilos, Glacios and Titan Krios microscopes for CryoEM and CryoET.

Activities

The successful candidate will participate in innovative and integrated biochemical approaches to understand the function of protein nanomachines related to bacterial secretion systems. This includes protein purification, enzymatic assays, single particle Cryo-EM and Cryo-Electron Tomography. All these expertises are present in the host labs and reinforced by well-established collaborations with the technological platforms at Institut Pasteur.

Knowledge and skills

We are looking for a motivated young scientist with prior training in integrated structural biology. The candidate should feel comfortable with interdisciplinary science including biophysics and engineering. The successful candidate should have:

- A PhD in structural biology, biochemistry or related disciplines
- Some experience in cryo-EM/cryo-ET data acquisition and processing
- Experience in protein purification and sample characterization.
- Experience and interest in microbiology or immunology
- Ability to work creatively, independently and as a team.
- Basic programming skills
- Excellent communicational and presentational skills in English.
- Experience in other structural biology techniques, such as X-ray crystallography, is encouraged but not required

Please send CV and motivation letter to Guillaume Duménil guillaume.dumenil@pasteur.fr, Institut Pasteur, Unité "Pathogénèse des infections vasculaires", 28 Rue du Dr Roux, 75015 Paris, 01 44 38 93 83.