

Proposition d'un stage de Master 2 au sein de l'Unité de Microbiologie Structurale à l'Institut Pasteur (Paris).

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Titre du sujet de recherche :

Structural studies of membrane protein complexes in bacteria by cryo-electron microscopy

Résumé du projet:

In the Unit of Structural Microbiology at the Institut Pasteur, we investigate multiprotein complexes implicated in bacterial survival and pathogenesis.

The Master student will work under the supervision of Dr. F. Gubellini on a project coupling crystallography and cryo-electron microscopy to study the Type 7 Secretion Systems (T7SSs). These machines, inserted in the bacterial membranes, were discovered initially in *Mycobacterium tuberculosis*, and are present in the majority of Gram-positive bacteria. They secrete different effectors, such as toxins killing other bacteria and proteins modulating the human immune system. We use non-pathogenic model systems (*Bacillus subtilis* and *Corynebacterium glutamicum*) to visualize these complexes, in order to understand their architecture and mechanism. This will allow, in the long term, to design drugs modulating their activity.

The master student will produce proteins of interest using classical molecular biology techniques, purify them using chromatography, analyse their biophysical properties with the support of the Institut Pasteur's Biophysics facility. Crystallization screening will be performed at the Crystallography facility.

During this internship the master student will also participate in the cryo-electron microscopy part of the project, including samples preparation, screening, data collect and analysis. The Institut Pasteur has state-of-the-art facilities including different electron microscopes able to generate high-resolution data.

The master student will integrate our dynamic and international group with regular meetings (including labmeetings, departmental seminars, technical trainings). The Institut Pasteur offers a great environment for young scientists, including social and scientific events.