

Fiche de proposition de stage de L3-Biologie
UFR Chimie et Biologie
Si possible limitez-vous à 1 page (recto)

(Date limite le Vendredi 29 Octobre 2021)

Adresse et appartenance du laboratoire :

Institut de Biologie Structurale – CNRS (UMR5075) / CEA / UGA
71, avenue des Martyrs - CS10090
38044 Grenoble Cedex 9, France

Thématique générale du laboratoire ou du groupe de recherche (par mots clés)

Groupe Pneumocoque, dirigé par Cécile Morlot.
Morphogenesis of the bacterial cell. Bacterial sporulation. Bacterial division.
Specialized secretion systems. Macromolecular protein complexes. SpoIIIA-SpoIIQ complex. Cell wall.
Structural and cellular biology. Crystallography. Electron microscopy. Super-resolution fluorescence microscopy. PALM/dSTORM.

Thème du stage proposé (en 10 lignes, si possible)

TITRE : Study of a new secretion system involved in *Bacillus subtilis* sporulation
DESCRIPTION :

Bacterial sporulation is a differentiation process leading to the development of a highly resistant spore (temperature, antibiotics), which cause the dissemination and persistence of important human pathogens. Spore development requires the assembly of the A-Q membrane complex, which is a new secretion system that transports yet-to-be discovered molecules between the mother cell and the developing spore (see Figure) (Rodrigues et al., 2016; Morlot and Rodrigues, 2018). Although the importance of A-Q proteins for spore maturation was discovered more than 45 years ago, the structure and function of this complex remain enigmatic. During this internship, the student will produce and purify recombinant forms of various A-Q proteins and perform preliminary crystallography and/or electron microscopy analyses to characterize the structure of the protein(s) of interest.

- Morlot, Rodrigues (2018). *Trends Microbiol.* pii: S0966-842X(18)30001
- Rodrigues, ..., Morlot (2016). *Proc. Natl. Acad. Sci. USA* 113(41):11585

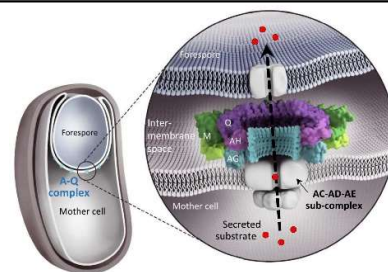


Fig. Model of the A-Q secretion system involved in bacterial sporulation. The AC-AD-AE sub-complex (unknown structure) would load substrates (red circles) into the transport channel formed by AG (experimental ring structure). Putative rings formed by AH, M and Q were modeled *in silico*.

Méthodologies et/ou techniques qui seront utilisées

Production and purification of recombinant proteins (membrane and soluble forms).
Affinity and size-exclusion chromatography. Western blots.
SEC-MALLS. Protein-protein interaction assays.
Protein crystallization. Electron microscopy.

Personne à contacter (préciser si nécessaire les créneaux horaires) :

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Fiche de renseignement à retourner par Email à : mohamed.benharouga@cea.fr
enregistrée en format PDF

Sous: nom_Stage-L3-Bio2021