

**M1-Molecular and Cellular Biology (MCB)  
Internship Proposal Form  
Chemistry-Biology Department**

**(Deadline Friday 16<sup>th</sup> December 2022)**

**Laboratory Address and Affiliation:**

Institut de Biologie Structurale  
Groupe Pneumocoque  
71 av. des Martyrs, 38000 Grenoble

**Laboratory/Team Research area (Keyword)**

Bacterial cell wall, bacterial morphogenesis, Streptococcus pneumoniae, super-resolution microscopy

**Summary of the Proposed Internship Project (10 lines)**

Title: **Membrane heterogeneity in dividing pneumococcus**

**DESCRIPTION:**

The bacterial shape is determined by that of its cell wall. The shape of the cell wall results from the activity and localization of cell wall synthases and hydrolases and regulatory proteins. The cellular localization of these proteins is determined by various systems. In ovoid bacteria such as Streptococcus pneumoniae, we have shown that membrane lipid phase segregation might underlie protein localization (Calvez et al. 2019, Frontiers in Microbiology 10:351. Doi: 10.3389/fmicb.2019.00351).

We wish to investigate further membrane heterogeneity by analyzing membrane composition differences between the bacterial division site and the rest of the cell. Towards this goal, the aim of this M1 project is to purify tagged proteins of the cell wall and division machinery (such as PBP2b or MapZ) following solubilization of the membranes using SMA (styrene maleamic acid) copolymers (Brown et al. 2021, Curr. Op. Struct. Biol. 69:70. Doi: 10.1016/j.sbi.2021.03.008) or a classical detergent. The lipid profiles will be compared.

**Methodologies and/or Techniques to be used**

Pneumococcal bacterial cultures, membrane preparation, protein purification, thin layer chromatography.

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**Additional information**