

INTERNSHIP PROPOSAL

Institute and Group: IBS, group PG

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Research project title: Bacterial cell wall synthesis: reconstitution in vitro

5 Keywords to describe the project: antibiotic resistance, bacterial membrane, liposomes, penicillin-binding proteins, peptidoglycan

Description of the project (aims, experimental techniques, recommended background):

Antibiotic resistance is a global problem on the rise. Penicillin-binding proteins (PBPs) are the enzymes that catalyse the final steps of peptidoglycan assembly, the main constituent of the cell wall. To combat resistance to penicillin and other beta-lactams, we need to understand how their target enzymes, the PBPs, function normally. To this aim, we will reconstitute in vitro the process of bacterial cell wall synthesis using recombinant enzymes from the human pathogen *Streptococcus pneumoniae*, in solution and at the surface of lipid membranes. We are looking for a young motivated researcher with strong interest in biochemistry and a taste for experimental challenges.

Relevant publications of the team:

1. Philippe, J., Gallet, B., Morlot, C., Denapaite, D., Hakenbeck, R., Chen, Y., Vernet, T. and **Zapun, A. (2015)** Mechanism of β -lactam action in *Streptococcus pneumoniae*: the piperacillin paradox. *Antimicrob. Agents Chemother.* *59*, 609-21.
2. Zapun, A., Philippe, J., Abrahams, K., Signor, L., Roper, D.I., Breukink, E., and Vernet, T. **(2013)** *In vitro* reconstitution of peptidoglycan assembly from the Gram-positive pathogen *Streptococcus pneumoniae*. *ACS Chem. Biol.* *8*, 2688-96.
3. Noirclerc-Savoie, M., Lantez, V., Signor, L., Philippe, J., Vernet, T. and **Zapun, A. (2013)** Reconstitution of membrane protein complexes involved in pneumococcal septal cell wall assembly. *PLoS One.* *8*(9):e75522.