- Presentation sheet :

UMR CNRS 6023 Laboratoire Microorganismes : Génome et Environnement, Clermont Université (D. DEBROAS)

Supervisor : *Damien BALESTRINO (MCU-HDR), damien.balestrino@uca.fr*

Phenotypic characterization of biofilm-dispersed bacteria

Biofilms constitute reservoirs of bacteria that are able to survive and persist to external aggression. This mode of growth is not fixed since some bacteria escape from these structures. This phenomenon, called dispersion, is genetically regulated, but the molecular mechanisms directly involved and the physiology of the released bacteria are poorly understood.

While biofilms are difficult to eradicate with classical antibacterial agents, an ideal treatment would be to induce the dispersal process and exert a lytic effect on the dispersed bacteria. However, the development of such a treatment requires a perfect understanding of (i) the molecular mechanisms of the dispersion process and of (ii) the specific properties of the dispersed bacteria. The objectives of this thesis project are to study these different aspects using the pathogen *Klebsiella pneumoniae*.

First, mutants deficient in biofilm dispersal will be constructed and their phenotype will be characterized by imaging approaches in microfluidic systems. Then, the behavior of dispersed bacteria towards antimicrobial molecules (i.e. tolerance, potentiation of biofilm formation, formation of persisters) will be characterized. Finally, the impact of dispersion in the bacterial dissemination and in the colonization of new sites will be analyzed in *in vivo* models using a non-invasive imaging approach.

Guilhen et al. (2019). Colonization and immune modulation properties of *Klebsiella pneumoniae* biofilm-dispersed cells. NPJ Biofilms Microbiomes. 5:25.

Guilhen et al. (2016). *Transcriptional profiling of Klebsiella pneumoniae defines signatures for planktonic, sessile and biofilm-dispersed cells. BMC Genomics. 17(1):237.*