M2 Parcours MMPEM
Microbiologie Moléculaire, Pathogénie, Ecologie Microbienne

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PROPOSITION SUJET de MASTER 2017-2018

TITRE : Real-time visualisation of drug resistance acquisition by bacterial conjugation

Nom, Prénom du Maitre de Stage : LESTERLIN Christian

Qualité : Responsable d'équipe au MMSB-UMR5086 (CR1 INSERM)

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Nom, Prénom du co-encadrant éventuel :

Qualité :

Téléphone : **E-mail :**

Laboratoire d'accueil, Responsable et équipe :
Equipe Cell-to-cell DNA transfer in Bacteria (Responsable: LESTERLIN Christian)
Molecular Microbiology and Structural Biochemistry CNRS-UMR5086-Lyon 1

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Nom du candidat éventuellement proposé :

S'il n'est pas retenu, acceptez-vous un autre candidat ? Oui (sur entretient)

Description du sujet au verso ⇒

Sujet (objectif, démarche et technique, collaboration(s),...) :

Our research focuses on bacterial conjugation, the paradigm mechanism of horizontal gene transfer by which DNA is transferred from a donor to a recipient bacterial cell by cell-to-cell contact. Genetic information acquired by conjugation can confer a wide range of new metabolic properties to the recipient cell, including pathogenesis, resistance to anti-microbial drugs, environmental adaptation or symbiotic life-style, which will accelerate diversification, adaptation and ultimately, survival of recipient cells in changing habitats. Probably the most prominent effect of conjugation is the global spread of resistance to antibiotics, often associated with emerging and re-emerging infectious species. The molecular basis of conjugation is extensively documented and the factors required for completion of the DNA transfer have been characterised through genetic and biochemistry approaches *in vitro.* However, the mechanistic details of what reactions occur where and when *in vivo* at the cellular scale remain to be described.

The main objective of this project is to investigate the mechanism of acquisition and establishment of drug resistance by conjugation. To do so, we will use the F conjugative plasmid carrying fluorescent fusion to tetracycline resistance genes *tetA* and *tetR*, encoding TetA efflux pump and TetR the repressor, respectively. Live bacterial cells microscopy imaging will be performed to reveal TetA and TetR intracellular concentrations and localisation during conjugation. We will also test whether membrane of cytoplasmic proteins can be transferred directly from donor to recipient cells during conjugation.

Technologies utilisées: Bacterial genetics; fluorescence microscopy (conventional and high-resolution microscopy), microbiology and molecular biology routine assays.

Mots clés: Cell biology of DNA conjugation, acquisition of drug resistance, live cell microscopy.