

Seminar in Microbiology

Monday, 11th September, 2017

Salle de séminaire, E07.3347.a, CMU

11:30 – 12:30

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Cell division licensing in *Vibrio cholerae*, a bacterium with a divided genome

Cell division must be coordinated with chromosome replication and segregation to ensure the faithful transmission of genetic information during proliferation. In most bacteria, assembly of the division apparatus, the divisome, starts with the polymerization of a tubulin homologue, FtsZ, into a ring-like structure at mid-cell, the Z-ring. It typically occurs at half of the cell cycle when most of the replication and segregation cycle of the unique chromosome they generally harbour is achieved. The chromosome itself participates in the regulation of cell division, at least in part because it serves as a scaffold to position FtsZ polymerization antagonists. However, about 10% of bacteria have more than one chromosome, which raises questions about the way they license cell division. For instance, the genome of *Vibrio cholerae*, the agent of cholera, is divided between a 3 Mbp replicon that originates from the chromosome of its mono-chromosomal ancestor, Chr1, and a 1 Mbp plasmid-derived replicon, Chr2. Here, we show that Chr2 harbours binding motifs for an inhibitor of Z-ring formation, which helps accurately position the *V. cholerae* divisome at mid-cell and postpones its assembly to the very end of the cell cycle.

Recent publications:

- WGADseq: Whole Genome Affinity Determination of Protein-DNA Binding Sites. Poidevin M, Galli E, Yamaichi Y, Barre FX. **Methods Mol Biol.** 2017.
- Enhancing multiplex genome editing by natural transformation (MuGENT) via inactivation of ssDNA exonucleases. Dalia TN, Yoon SH, Galli E, Barre FX, Waters CM, Dalia AB. **Nucleic Acids Res.** 2017
- Fast growth conditions uncouple the final stages of chromosome segregation and cell division in *Escherichia coli*. Galli E, Midonet C, Paly E, Barre FX. **PLoS Genet.** 2017
- Late assembly of the *Vibrio cholerae* cell division machinery postpones septation to the last 10% of the cell cycle. Galli E, Paly E, Barre FX. **Sci Rep.** 2017.
- Cell division licensing in the multi-chromosomal *Vibrio cholerae* bacterium. Galli E, Poidevin M, Le Bars R, Desfontaines JM, Muresan L, Paly E, Yamaichi Y, Barre FX. **Nat Microbiol.** 2016
- Differential management of the replication terminus regions of the two *Vibrio cholerae* chromosomes during cell division. Demarre G, Galli E, Muresan L, Paly E, David A, Possoz C, Barre FX. **PLoS Genet** 2016.