

Seminar in Microbiology

Monday, 13th February, 2017

Salle de séminaire, E07.3347.a, CMU

11:30 – 12:30



Dr. Etienne Maisonneuve

Laboratoire de Chimie Bactérienne, CNRS-Aix Marseille
Université, Institut de Microbiologie de la Méditerranée, FR

Control of Bacterial Persistence and Stress Response by the Alarmone Synthetase SpoT

Difficult-to-treat chronic and recurrent bacterial infections are due to bacteria that enter a state of low metabolic activity called persistence in which they are tolerant to otherwise deadly assaults, including antibiotics. The Maisonneuve group focuses on the role of the general bacterial stress response, known as “the stringent response” in persistence. They found that stochastic variation of the stringent response regulator (p)ppGpp triggers persister formation in *Escherichia coli*. However, the molecular mechanisms by which environmental cues activate the stringent response are still largely unknown and represent one of the most fundamental, unsolved problems in prokaryotic molecular biology. Moreover the stringent response is also required for virulence of almost all bacterial pathogens, strongly arguing that novel insights into (p)ppGpp biology will lead to novel methods to combat infections. Their work illuminates the molecular mechanisms regulating the activity of the enzymes responsible for synthesis and degradation of (p)ppGpp in bacterial persistence.

Recent key publications:

- Mechanisms of bacterial persistence during stress and antibiotic exposure. Harms A, Maisonneuve E, Gerdes K. *Science*. 2016
- Stochastic induction of persister cells by HipA through (p)ppGpp-mediated activation of mRNA endonucleases. Germain E, Roghanian M, Gerdes K, Maisonneuve E. *Proc Natl Acad Sci U S A*. 2015
- Molecular mechanisms underlying bacterial persisters. Maisonneuve E, Gerdes K. *Cell*. 2014
- (p)ppGpp controls bacterial persistence by stochastic induction of toxin-antitoxin activity. Maisonneuve E, Castro-Camargo M, Gerdes K. *Cell*. 2013
- Bacterial persistence and toxin-antitoxin loci. Gerdes K, Maisonneuve E. *Annu Rev Microbiol*. 2012
- Bacterial persistence by RNA endonucleases. Maisonneuve E, Shakespeare LJ, Jørgensen MG, Gerdes K. *Proc Natl Acad Sci U S A*. 2011