Bacteriology-2013

OMICS Group Conferences
Accelerating Scientific Discovery

International Congress on
Bacteriology & Infectious Diseases

November 20-22, 2013 DoubleTree by Hilton Baltimore-BWI Airport, USA

Structural and functional investigation of MexA/ MexB / OprM, a multidrug efflux pump from Pseudomonas aeruginosa

Martin Picard
Universite Paris Descartes, France

Abstract

Among the various mechanisms developed by the bacteria to counter to the effect of antibiotics, active efflux is on the front line. In *Pseudomonas aeruginosa*, a Gram-negative bacteria, efflux transporters are organized as multicomponent systems where MexB, the efflux pump located in the inner membrane, works in conjunction with MexA, a periplasmic protein, and OprM, an outer membrane protein. MexB acts as a proton motive force-dependent pump with broad substrate specificity.

In collaboration with the group of P. Minard, we are adapting a new set of synthetic scaffolds (dubbed α-reps for "artificial alpha repeat protein") to help us crystallize the efflux pumps. Such interactants are selected through *in vitro* screening of the membrane proteins targets. We make use of amphipathic polymers (amphipols) to stabilize and immobilize the proteins onto solid support so that the library of possible interactants can be screened.

As a complementary approach, we are working on the functional reconstitution of the pumps into proteoliposomes. Very recently we have designed a functional test for MexB. This original activity assay uses bacteriorhodopsin (BR), a light-activated proton pump, to generate a tunable, robust and reversible proton gradient. In this system, upon illumination with visible light, the photo-induced proton gradient created by the BR is shown to be coupled to the active transport of substrates through the pump. We are now working on the reconstitution of the whole efflux pump.

Biography

Martin Picard obtained his Ph.D in Biochemistry from Pierre and Marie Curie University in 2004. Under the supervision of P. Champeil, he investigated key structure-function aspects of the SR Ca(2+)-ATPase. In 2005, he moved to Aarhus University (Denmark) as a postdoc in the group of Poul Nissen to investigate the calcium pump from a structural point of view. Then, he joined the group of Dr. Popot working on the use of amphipatic polymers as membrane protein stabilizers. He was hired in 2007 as a CNRS researcher and is working on efflux pumps from the Gram negative bacteria *Pseudomonas aeruginosa*.