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

Transmembrane signaling through a heme or hemophore receptor

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Abstract

The outer membrane (OM) of Gram-negative bacteria acts as a selective permeation barrier. The nutrients that cannot pass through porins are internalised *via* OM specific transporters by an active process depending on the energy given by an inner membrane complex. This is the case of iron sources, heme, vitamin B12, etc. We study on such an active transport system acting through an OM transporter, HasR. HasR is a central component of a heme acquisition system "Has" developed by several Gram-negative bacteria to satisfy their need of iron. It functions in synergy with a secreted heme carrier protein, a hemophore called HasA. HasA extracts heme from host hemoproteins as hemoglobin and then shuttles it to HasR, wherein it is internalized. The energy for HasR functioning is brought by the inner membrane complex HasB. The OM receptor HasR binds heme and HasA on its extracellular side and HasB on its periplasmic side. Using structural and biophysical approaches (NMR, Xray, SAXS, ITC) we show that the binding of the substrate on the extracellular face of HasR modulates the interaction with HasB on the periplasmic face. The transmitted signal depends on the nature of the substrate.

Biography

Izadi-Pruneyre is a young leader of a group composed of six scientists (post-doctoral researcher, PhD student, permanent researchers and engineers). The group makes part of the Institut Pasteur's NMR unit. Dr Izadi-Pruneyre has a strong expertise in NMR and biophysical methods. For more than 12 years she has been studying the structural and molecular aspects of bacterial heme acquisition systems. The results of her work is published in over 25 articles (PNAS, JACS, JBC, NSB, etc). As an expert in bacterial heme and iron acquisition systems, she is often invited to review articles and projects, as well as to write book chapters in this field.