MmpS4 promotes glycopeptidolipids biosynthesis and export in Mycobacterium smegmatis.

Submitted by Caroline Deshayes on Wed, 02/11/2015 - 10:33

MmpS4 promotes glycopeptidolipids biosynthesis and export in Mycobacterium smegmatis.

Type de publication: Article de revue

Auteur: Deshayes, Caroline [1], Bach, Horacio [2], Euphrasie, Daniel [3], Attarian, Rodgoun [4], Coureuil, Mathieu [5], Sougakoff, Wladimir [6], Laval, Françoise [7], Av-Gay, Yossef [8], Daffé, Mamadou [9], Etienne, Gilles [10], Reyrat, Jean-Marc [11]

Editeur: Wiley

Type: Article scientifique dans une revue à comité de lecture

Année: 2010

Langue: Anglais

Date: 2010 Nov

Pagination: 989-1003

Volume: 78

Titre de la revue: Molecular Microbiology

ISSN: 1365-2958

Mots-clés: Bacterial Proteins [12], Genetic Complementation Test [13], Glycolipids [14], Glycopeptides [15], Membrane Proteins [16], Mycobacterium smegmatis [17], Single-Chain Antibodies [18]

Résumé en anglais: The MmpS family (mycobacterial membrane protein small) includes over 100 small membrane proteins specific to the genus Mycobacterium that have not yet been studied experimentally. The genes encoding MmpS proteins are often associated with mmpL genes, which are homologous to the RND (resistance nodulation cell division) genes of Gram-negative bacteria that encode proteins functioning as multidrug efflux system. We showed by molecular genetics and biochemical analysis that MmpS4 in Mycobacterium smegmatis is required for the production and export of large amounts of cell surface glycolipids, but is dispensable for biosynthesis per se. A new specific and sensitive method utilizing single-chain antibodies against the surface-exposed glycolipids was developed to confirm that MmpS4 was dispensable for transport to the surface. Orthologous complementation demonstrated that the MmpS4 proteins are exchangeable, thus not specific to a defined lipid species. MmpS4 function requires the formation of a protein complex at the pole of the bacillus, which requires the extracytosolic C-terminal domain of MmpS4. We suggest that MmpS proteins facilitate lipid biosynthesis by acting as a scaffold for coupled biosynthesis and transport machinery.

URL de la notice: http://okina.univ-angers.fr/publications/ua7636 [19]

DOI: 10.1111/j.1365-2958.2010.07385.x [20]


Identifiant (ID) PubMed: 21062372 [21]
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Publié sur Okina (http://okina.univ-angers.fr)