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Structure of two membrane proteins BacA and bsPgpB involved in the metabolism of undecaprenyl-phosphate C₅₅-P

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Undecaprenyl-phosphate C₅₅-P is a key lipid carrier of glycan intermediate required for the synthesis of a variety of cell wall polymers such as Peptidoglycan (PG), Lipopolysaccharides (LPS) O-antigen wall teichoic acids, capsular polysaccharide, common enterobacterial antigen, membrane-derivative oligosaccharides and exopolysaccharides. In bacteria, during peptidoglycan synthesis, the phospho-N-acetylmuramoyl (-pentapeptide) -N-acetyl glucosamine is the essential motif carried by the C₅₅-P. The resulting lipid, C₅₅-PP-MurNAc-(pentapeptide)-GlucNAc (lipid II), is translocated towards the periplasmic side by several putative flippases. The MurNAc-(pentapeptide)-GlucNAc is added to the elongating chains of PG and C₅₅-P is released as C₅₅-PP. This precursor is also provided by the *de novo* synthesis in the cytosol that is catalyzed by a Cis-Prenyl Pyrophosphate Synthase, UPPS, which successively adds eight isoprene units from C₅-PP on farnesyl pyrophosphate. Two families of phosphatases can perform the subsequent dephosphorylation of C₅₅-PP into C₅₅-P, common to the *in vitro* synthesis and carrier lipid recycling. In *E. coli*, 1 BacA and 3 phosphatidic acid phosphatases 2 (PgpB, YbjG and LpxT), active on C₅₅-PP have been identified. PgpB being also involved in the phosphatidyl glycerol metabolism and LpxT transferring the phosphate from C₅₅-PP to lipid A. Whereas *Bacillus subtilis* has three C₅₅-PP phosphatases 1 BacA (YubB) and 2 phosphatidic acid phosphatases 2 (YwoA and YodM). We obtained the structure of BacA using lipidic cubic phase method. The crystal structure at 2.6 Å revealed an unexpected fold according to the previous biochemical studies. Moreover, we solved the structure of bsPgpB (yodM) in the presence and absence of its favorite substrate, phosphatidyl glycerol.

Biography

Meriem El Ghachi has completed her PhD from Paris University of Paris-Sud, France. He is a Post-doctorate at University of Liege, Belgium. She has published 17 papers in reputed journals.

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