Structural and functional studies of PA-IL lectin.

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Pseudomonas aeruginosa is the most important bacterial pathogen associated with chronic respiratory infection and has a major contribution to mortality in patients with cystic fibrosis. The virulence of *Pseudomonas aeruginosa* is associated with its ability to develop antibiotic resistance, to adhere to epithelial cell surfaces and to form biofilm. The bacterium produces several carbohydrate-binding proteins (lectins) which binds to glycoconjugates at the surface of host cells.

We focused our study on PA-IL (LecA) lectin, a cytosolic protein of 13 KDa [1], specific for D-galactose and binding strongly to terminal nonsubstituted Galα1→Gal extremities on polysaccharides [2]. The structure of PA-IL in complex with galactose has been solved but the biological role is far from being elucidated [3]. PA-IL has been proposed to be invovled in attachment to apical surfaces of epithelial cells by interaction with fibronectine [4] and also in biofilm maturation [5]. The lectin has a strong level of cytotoxicity and its production is under quorum sensing control.

The aim of this work is the biochemical and structural characterization of the interaction between PA-IL and different epitopes: Galα1-2Gal-O-methyl, Galα1-3Galβ1-4Glc, Galα1-4Galβ1-4Glc, Galα1-6Glc. The combine use of microcalorimetry, crystallography and molecular modelling data allow for understanding the structural and thermodynamical basis of the interactions in the active site. Therapeutical application would be the inhibition of *P. aeruginosa* infection that could provide an alternative or a complement to antibiotics treatment.

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