MBG FOCUS TALK

hosted by Section for Structural Biology

MBG Focus Talks in Molecular Biology

Tuesday 21 April 2015 at 13:15-14:00

The conference room (3130-303), 3. floor, Gustav Wieds Vej 10C, Aarhus

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Glycan-binding domains from yeast adhesion proteins / Nanolithography-assisted protein crystallization

During my talk I will focus on two different topics, linked to my research activity:

- Glycan-binding domains from yeast adhesion proteins - The ability of yeasts, either to form cell clumps in starvation conditions, or to adhere to human epithelial and endothelial tissues for host colonization and invasion, is mediated by specialized families of cell-wall anchored adhesion proteins (or adhesins). In some cases, these proteins can specifically interact with glycan molecules present on the surface of the target cells. Although Flo (Saccharomyces spp.) and Epa (Candida glabrata) adhesin families are endowed with different glycan specificities – as they promote two different in vivo behaviors – both of them are characterized by the presence of a PA14 domain, found in several carbohydrate-interacting proteins from eukaryotic and prokaryotic organisms. A combined structural and functional study of the PA14 domains from Flo and Epa adhesins was performed. The adhesion domains were crystallized and their 3D structures, in complex with their carbohydrate ligands, were solved and linked to their respective biological functions. Interactions of the PA14 domains with carbohydrates and glycoproteins ligands were then assessed in physiological conditions, as well as in the presence of binding inhibitors, by using a combination of biophysical techniques.

- Nanolithography assisted protein crystallization - Dip-pen nanolithography (DPN) is a scanning probe–based nanofabrication technique, which allows surface patterning of small organic molecules, polymers and biomolecules by taking advantage of the high resolution of the Atomic Force Microscopy (AFM) technology. We applied the DPN technology to the crystallization of proteins on functionalized lipid layer arrays, and we used streptavidin as a model protein for crystallization. Independently of the crystallization system used and the geometry of the lipid patterns, nucleation of streptavidin crystals occurred specifically on the DPN-printed structures. We demonstrated the use of DPN in directing and inducing protein crystallization on specific surface locations.

Host: Poul Nissen, Dept. Molecular Biology & Genetics, Aarhus University