Séminaire ibs

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Conférencier invité

Vendredi 18 janv. 2013

A 11h - Salle des séminaires de l'IBS

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Using atomic force microscopy to probe the membrane organisation and function of photosynthetic complexes

Light harvesting and energy trapping in photosynthesis is achieved by macromolecular membrane assemblies, which bind thousands of chlorophylls, held in specific orientations and in close proximity to one another in order to ensure efficient energy transfer. The 3D structures of light-harvesting (LH) and reaction centre (RC) complexes have revealed the internal arrangements of chlorophyll-protein complexes that foster efficient solar energy harvesting and charge separation. In this lecture I will explain how atomic force microscopy (AFM) allows us to understand the next level of structural information, namely the supramolecular organization of individual complexes to form a 'photosynthetic unit'. New AFM approaches allow us to probe interactions at the membrane surface between the electron donor cytochrome c_2 and its acceptor, the RC-LH1-PufX complex. Now, we can dock atomic structures of complexes into AFM membrane maps to construct models of whole membrane assemblies, allowing us to predict energy transfer and trapping behaviour and to identify desirable design motifs for artificial photosynthetic systems. New genetic approaches, surface chemistries and patterning methods are being developed to facilitate the creation of innovative architectures for coupled energy transfer and trapping, both *in vivo* and *in vitro*. Such synthetic biology approaches will advance our understanding of natural energy-converting systems, and could guide the design and production of proof-of-principle devices for biomimetic systems to capture, convert and store solar energy.

Hôte : D. Bourgeois (IBS/DYNAMOP)