

PhD position: role of microalgae lipids in membrane architecture and interactions

Starting date: 01/10/2018 for 3 years.

Location: Laboratoire de Physiologie Cellulaire Végétale (LPCV) and Institut Laue Langevin (ILL), Grenoble.

Context: Glycolipids have remarkable properties deriving from their polar heads. ILL and LPCV began studying these properties by the analysis of digalactolipids (lipids with a polar head made of 2 galactose residues). Neutron diffraction has shown that digalactolipids interact between each other and between neighboring membranes, leading to cohesive forces, consistent with the formation of stacks of membrane *in vivo* (photosynthetic membranes in the form of stacks). This work has led to publications in *FASEB J*, *Mol. Biosyst.* and *Nat. Commun.* Glycolipids of chloroplasts therefore have a structural role that can be explored by neutron diffraction. These studies have an interest in fundamental biology as well as in the biophysics of biomimetic membranes.

Project: Some microalgae are characterized by the presence of a sulfoglycolipid in which the sugar polar head (sulfoquinovose) is acylated. We do not know if the additional fatty acid is embedded/anchored within the membrane containing the sulfoglycolipid or if it could create a "bridge" with an adjacent membrane. These two hypotheses need to be evaluated. Furthermore, microalgae contain also another kind of lipid called betaine lipid whose biophysical properties were never explored. The PhD program will therefore seek to reconstruct biomimetic membranes, whose composition will reflect the natural conditions, but with varying proportions of each lipid class in order to elucidate the role of each one. The structural properties will be studied, in particular in the context of membrane stacks. The thesis therefore involves the purification and characterization of lipids at the LPCV and neutron diffraction on biomimetic membranes at ILL to study the biophysical properties of these lipids.

Required expertise: M2 level, with a background in biochemistry and bioinformatics. Experience in biophysics would be a plus.

Contact: Send before 25/05/2018 curriculum, motivation letter and references to: Juliette Jouhet (Juliette.jouhet@cea.fr) or Bruno Demé (deme@ill.fr)

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