

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, biophysics or physical-chemistry of soft condensed matter.

Contact: Send before 30/05/2018 curriculum, motivation letter and references to: Juliette Jouhet (Juliette.jouhet@cea.fr) or Bruno Demé (deme@ill.fr)

Juliette Jouhet

UMR 5168 CNRS-CEA-INRA-UGA
CEA-Grenoble
17, rue des Martyrs
38054 Grenoble Cedex 9
France
Membrane Lipidomics Team
FR: <http://big.cea.fr/drf/big/PCV/LiPMB>
ENG:
<http://big.cea.fr/drf/big/english/PCV/LiPMB>
Tel. +33 (0)4 38 78 38 55
Fax +33 (0)4 38 78 50 91
Juliette.jouhet@cea.fr

Bruno Demé

Institut Laue-Langevin
71 avenue des Martyrs
CS 20156
38042 Grenoble Cedex 9
France
Large Scale Structures
ENG: <https://www.ill.eu/fr/users-en/scientific-groups/large-scale-structures/>
Tel. +33 (0)4 76 20 73 11
deme@ill.fr
