

Grenoble, FRANCE: PhD THESIS GRANT on diatom lipid metabolism deadline for application : 22 March 2013

A PhD grant is open in our laboratory, funded by the International IRTELIS Program of CEA (French commission of nuclear and alternative energies), starting in Oct. 2013.

The IRTELIS PhD Program is open to applications by high level students, completing their M.S. in 2013, and coming from any University worldwide.

Instructions for application can be found via the IRTELIS portal : <http://www-dsv.cea.fr/en/phd-program>

Contact : Eric Marechal (eric.marechal@cea.fr).

Please do not hesitate to ask for information and send your CV.

Reference of the PhD subject: SL-DSV-13-0048

Title : Characterization of the glycerolipid metabolism, subcellular compartmentalization and control in the diatom *Phaeodactylum tricornutum*

Abstract : Diatoms are major unicellular photosynthetic microorganisms (eukaryotes) in the phytoplanktonic biodiversity. They are usually bound by a cell wall made of silica and can be found in oceans, freshwater or soils. *Phaeodactylum tricornutum* is a recently introduced model allowing the study of these microalgae, from the molecular to the cell and population levels. In particular, 1) the growth of *Phaeodactylum* is perfectly monitored in the laboratory in a silica-free medium, 2) its genome is fully sequenced, 3) different morphotypes have been characterized, and 4) genetic engineering tools are available (overexpression, RNAi). Like the majority of the microorganisms studied to date for possible applications in the field of bioenergies, Diatoms accumulate oil when they grow in a medium deprived of nitrogen. Oil is a lipid consisting of 3 acyl groups (=fatty acids) esterified to a glycerol scaffold and is also called triacylglycerol (TAG = triacylglycerol = oil). The biosynthesis of TAG in the form of « oil bodies » in the cytosol is connected to the synthesis of membrane glycerolipids occurring in different compartments of the cell, in particular phosphoglycerolipids in the endoplasmic reticulum and galactoglycerolipids in the chloroplast. The PhD project will first contribute to the characterization of the complete glycerolipid metabolic scheme at the cellular scale, linking membrane glycerolipids and cellular compartmentalization. This first axis will combine information from available genomic data (bioinformatics) with subcellular localization of metabolic pathways using fluorescent protein fusions with selected proteins of the glycerolipid metabolic scheme. This will benefit from data generated previously as part of the DiaDomOil project. Transgenic diatoms expressing fluorescent protein fusions generated in the DiaDomOil consortium or in the course of the PhD program will be valuable tools to perform subcellular fractionation, purification and lipidomic and proteomic characterizations. The first axis of the PhD project will thus provide information on the glycerolipid metabolic scheme and compartmentalization in diatom cells, which is still missing to address the question of the orientation of biosyntheses toward the production of TAG or of some membrane glycerolipid classes. A second axis of the PhD project will exploit novel conditions triggering the accumulation of TAG in *Phaeodactylum* cells. Thus, the PhD project will advance our knowledge on a novel model of phytoplankton, and provide key information to comprehend the complex metabolism of glycerolipids, linked with the biogenesis of subcellular membranes but also of oil bodies within the cytosol. The physiological role of lipids will be deduced from genetic and chemical genetic studies. This PhD project will also be essential in the context of the use of Diatoms for the development of biofuels deriving from alga oils.

Location : Institut de Recherche en Technologies et Sciences pour le Vivant
Plant & Cell Physiology Lab. Grenoble, France
Membrane Lipidome Team
Starting date : 01/10/2013

More about the hosting team

<http://www-dsv.cea.fr/en/irtsv/lpcv/lipide>



Eric Maréchal

UMR 5168 CNRS-CEA-INRA-Université J. Fourier
Institut de Recherches en Technologies et Sciences
pour le Vivant
CEA-Grenoble
17, rue des Martyrs
38054 Grenoble Cedex 9
France

Membrane Lipidome Team

*** UPDATED WEBSITE ***

FR: <http://www-dsv.cea.fr/irtsv/lpcv/lipide>

ENG: <http://www-dsv.cea.fr/en/irtsv/lpcv/lipide>

Tel. +33 (0)4 38 78 49 85

Fax +33 (0)4 38 78 50 91

eric.marechal@cea.fr