**Master 2 internship project**

**Year 2023-2024**

**Laboratory/Institute:** LPCV **Director:** Eric Maréchal

**Team:** Lipids **Head of the team:** Juliette Jouhet

**Name and status of the scientist in charge of the project:** Morgane Michaud

**HDR: yes ☐ no X**

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**Program of the Master’s degree in Biology:**

**☐** Microbiology, Infectious Diseases and Immunology **☐** Structural Biology of Pathogens

**X** Physiology, Epigenetics, Differentiation, Cancer **☐** Neurosciences and Neurobiology

**Title of the project:** Role of OMP24 in the regulation of chloroplasts-mitochondria contact sites in response to phosphate starvation in *Arabidopsis thaliana*

Objectives (up to 3 lines):

The objective is to understand how OMP24, a chloroplastic protein, regulates mitochondria lipid homeostasis and morphology, particularly during phosphate starvation. The project will explore the hypothesis of the involvement of OMP24 in the regulation of mitochondria-chloroplast association.

Abstract (up to 10 lines):

We recently identified OMP24, a chloroplastic protein of unknown function, as a key player in the regulation of mitochondria lipid homeostasis and morphology, in particular in response to the nutrient stress triggered by phosphate starvation. However, how OMP24 regulates mitochondrial function is currently unknown. The goal of the project is to investigate the potential role of OMP24 in chloroplast-mitochondria communication. The project will be organized around three axes: 1) investigating OMP24 partners; 2) investigating the role of OMP24 on mitochondrial lipid homeostasis and 3) studying the impact of OMP24 overexpression or KO on chloroplast-mitochondria association, in particular in response to phosphate starvation. This project will increase our knowledge about mitochondria-chloroplast communication, a fundamental process for plant development and adaptation to stress.

Methods (up to 3 lines):

- Plant and cell culture,

- Confocal microscopy,

- Biochemistry and molecular biology: organelle fractionation, lipid analyses, western blot, cloning

Up to 3 relevant publications of the team:

1-Leterme, S., and Michaud, M. 2022. Non-vesicular glycerolipids transport in plant cells. Lipids Plants Algae Fundam. Sci. Ind. Appl. 101:121–189. doi:10.1016/bs.abr.2021.07.001.

2-Michaud, M., V. Gros, M. Tardif, S. Brugière, M. Ferro, W.A. Prinz, A. Toulmay, J. Mathur, M. Wozny, D. Falconet, E. Maréchal, M.A. Block, and J. Jouhet. 2016. AtMic60 Is Involved in Plant Mitochondria Lipid Trafficking and Is Part of a Large Complex. Curr. Biol. CB. 26:627–639. doi:10.1016/j.cub.2016.01.011.

3-Michaud, M., and J. Jouhet. 2019. Lipid Trafficking at Membrane Contact Sites During Plant Development and Stress Response. Front. Plant Sci. 10:2. doi:10.3389/fpls.2019.00002.

Requested domains of expertise (up to 5 keywords):

Biochemistry, Cell Biology, Microscopy, Molecular Biology