**Master 2 internship project**

**Year 2023-2024**

**Laboratory/Institute:** TIMC **Director:** A. MOREAU-GAUDRY

**Team:** TrEE (https://www.timc.fr/TrEE) **Head of the team:** F. PIERREL

**Name and status of the scientist in charge of the project:** Morgane Roger-Margueritat, PhD student **HDR: yes ☐ no ☒**

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

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

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

**Title of the project: Quinone exchanges on the gut microbiota**

Objectives (up to 3 lines): Validate bacterial candidates for the exchange of quinones in the gut microbiota and determine the function of produced quinones for recipient species.

Abstract (up to 10 lines):

 Isoprenoid quinones are lipophilic molecules shuttling electrons in the respiratory chain of most organisms. This participates to generate the proton gradient used to produce ATP. However, some bacterial species, typically found in the gut microbiota, are known to have quinone-dependent enzymes but without having complete quinone biosynthesis pathways (Ravcheev et al., 2016). A possible way for these bacteria (called recipient species) to obtain quinones might be the uptake of quinone biosynthetic precursors or even quinones, if other species (called donor species) can release these molecules. This model is reinforced by the fact that quinones can act as growth factors in difficult-to-cultivate bacteria from the gut (Fenn et al., 2017). However, the exchange of quinones between donor and recipient species has never been characterized. We identified different candidate species by bioinformatics approaches and tested experimentally one bacterial genera which produced quinones when precursors where added to the medium. The aim of this internship will be to experimentally validate these potential donor and recipient species and to determine the role of produced quinones and the underlying mechanisms enabling the quinone exchange.

Methods (up to 3 lines):

Molecular biology, bacterial cultures in complex media, quinone quantifications by HPLC chromatography coupled to electrochemical and mass spectrometry detections

Up to 3 relevant publications of the team:

Abby et al., Advances in bacterial pathways for the biosynthesis of ubiquinone[, BBA Bioenergetics (2020) 1861:148259](https://doi.org/10.1016/j.bbabio.2020.148259)

Requested domains of expertise (up to 5 keywords):

Biochemistry, Microbiota, Microorganisms, Metabolism