



Université Claude Bernard Lyon 1



INSTITUT DES
SCIENCES
ANALYTIQUES



Internship project Master 2
“Lipidome mapping of *Gammarus fossarum*”
Institute of Analytical Sciences, Lyon, France

Project

Aquatic ecosystems are exposed to environmental stressors such as chemical micropollutants from natural environment or anthropogenic activities. These chemical contaminations may result in alterations of the internal biochemical homeostasis of the aquatic organisms. The major limitation in the mechanistic knowledge of environmental chemical toxicity effects on aquatic organisms is the absence of molecular information notably at the genome wide scale in environmentally relevant species. The “omics” technologies - such as Transcriptomics, Proteomics, Lipidomics, Metabolomics - offer a great opportunity to elucidate molecular responses to exposures in aquatic organisms during specific and vulnerable life cycle stages.

Lipid metabolism is the major fundamental metabolic pathway producing energy in animals. In fresh water organisms, lipids play a pivotal role in vulnerable stages like molting, reproduction, development. Recently, it has been shown that pharmaceutical drugs like hypolipidemic drugs have been detected in sewages, affecting the reproduction and population growth of crustacean amphipods (genus *Gammarus*). To understand and predict the effects of toxic exposures, it is crucial to describe the lipidome in the organism and to identify the affected metabolic networks. The project aims to gain a mechanistic understanding of toxic effects of hypolipidemia drugs (statins and fibrates) on the sentinel organism, *G. fossarum*.

In this context, we will deploy an innovative multi-omics approach (proteomics and lipidomics) to monitor metabolic perturbation at different development stages and reproductive cycles of *G. fossarum* after exposure to hypolipidemia drugs. We will focus on the mapping of the lipidome and sterol analysis of *G. fossarum* by targeted mass spectrometry. Then statistical analysis methods will be employed to identify the molecular signatures discriminating the different development stages, as well as to discover the affected metabolic pathways and toxicity biomarkers.

Profile

We are looking for a highly motivated and enthusiastic Master 2 student curious to discover the area of lipidomics. The following skills are expected from the candidate:

- Strong biochemistry background with lipid biochemistry knowledge
- Experience in biological sample preparation techniques
- A significant level of technical knowledge and experience in mass spectrometry
- Knowledge in chemometrics - data mining

Benefits

The candidate will be working on an ANR funded project with a net salary of ~568 € per month. The duration is 6 months starting from January 2020.

The candidate will gain solid expertise on biological sample analysis with MS and LC-MS in our ANABIO group. He/she will also have the opportunity to interact with the chemometrics platform in the institute and gain expertise on statistical analysis of omics data.

Contacts

Laboratory/Institute: Institute of Analytical Sciences (ISA), UMR 5280 CNRS. <https://isa-lyon.fr/>

Team: ANABIO-MS team

Supervisors: Sophie Aycirix sophie.aycirix@univ-lyon1.fr, Tingting Fu tingting.fu@univ-lyon1.fr

Address: 5 rue de la doua - 69100 Villeurbanne

Please send a CV and a cover letter (including references)