



6 months internship – master 2 level
in Grenoble

Some organic chemistry before life

Département de Chimie Moléculaire (DCM)
Team : SeRCO « Synthèse et Réactivité en Chimie Organique »

Context and project

Our team studies organic reactions that could have occurred in the conditions found 4 billion years ago on the early Earth (water, reductive atmosphere, some mineral surfaces...) and that could have led to a « protometabolism »: a primitive set of intertwined reactions that would have evolved over time to our current metabolic pathways.

Earth's atmosphere was very rich in CO₂ then. Were primitive versions of the current CO₂ fixation pathways effective in the formation of organic molecules? In particular, the reductive tricarboxylic acid cycle (also known as reverse Krebs cycle), which is active in some microorganisms today, displays two types of carbon-fixing reactions: the reductive carboxylation of thioesters and the α -carboxylation of ketones. Can we reproduce such reactions without enzymes?

The internship will deal with the (prebiotic) synthesis of substrates and the study of plausibly prebiotic carboxylation conditions (especially the nature of reductant and catalyst). Specific features will be performing a literature review, carrying out organic chemistry in water, conducting reactions under pressure or under UV irradiation and analyzing complex mixtures thanks to spectrometry (e.g. ¹H and ¹³C NMR spectroscopy (1D and 2D techniques), mass spectrometry).

Candidate's profile

Student in 2^d year of Master or 3rd year of Engineering School in chemistry, with good knowledge of organic chemistry, catalysis, spectrometric analytical methods and bibliographic searches. Knowledge of biochemistry and bioinorganic chemistry basics could be a plus.

Note: the working language in the lab will be either French or English.

Application

Candidates are invited to submit a full CV, a covering letter and academic transcripts for the last 2-3 years by email to Dr Véronique Blandin (veronique.blandin@univ-grenoble-alpes.fr).

Deadline for application: 12/11/2024

Internship start: January or February 2025