Molecules for Life and for Energy

Modern science is continuously leaning towards Chemistry. In Life Sciences, Materials or Environment, researchers realize that pertinent answers are hidden at the molecular scale. Amongst more than 30 research groups, our key activities aim to progress in fine molecules with biological interests, understanding of biological mechanisms, energy conversion and storage, catalytic processes, biosensors, and development of new analytical tools.
Mélanie Zeller: “This Master’s degree offers a broad choice of courses in the main areas of chemistry. I discovered medicinal chemistry, a topic I’m very interested in and specifically research against cancer. I will realize my Master project with an EPFL professor who works in the field of biomolecular imaging. This Master is more oriented toward research and I’m thinking about doing a PhD.”

Aleksandar Salim: “You can apply your knowledge everywhere. And it is fun! I take it as a game. Imagine yourself doing some problem solving, puzzling, all the time.”

Watch the video: Oligoprolines as MRI Contrast Agents - A Preliminary Study

Gaëlle Lapicorey

Magnetic resonance imaging (MRI) is an indispensable non-invasive clinical tool allowing 3D images of the body with high spatial resolution. It makes use of the property of nuclear magnetic resonance to image the nuclei of atoms inside the body. Contrast agents improve the contrast and the sensitivity using paramagnetic species as gadolinium. The contrast of the MRI image depends on the variation of relaxation for different tissues. Efficiency of contrast agents is measured in terms of relaxivity.

The aim of this project was to determine the relaxivities of two complexes of gadolinium composed of long rigid oligoprolines and gadolinium chelates of the common DOTA type. The oligoproline are in this case composed of 19 or 20 single prolines which are amino acids present in humans. The two compounds differ only by the place where the chelate is fixed: For the first compound, it is fixed on the first proline of the chain whereas for the second one it is fixed on the middle of the chain. This different way of fixation will sense the motion of the rigid, stick-like molecule in different ways. This will help to design new and more efficient contrast agents in future.

Towards the Functionalization of Bioceramics for the Developement of Bone Implants

Stéphanie Prior

This work aims to synthesize multi-functional ligands for surface modification of new synthetic bone scaffolds for synthetic grafts. They all have to be porous to match the bone's composition, can be made in diverse shapes and physical properties, and some can be resorbable, so that the bone remodelling will slowly replace the graft.

Depending on the patient’s situation, permanent implants are also investigated. Ceramics bone implant matches all of those criteria.
Master of Science in
**MOLECULAR & BIOLOGICAL CHEMISTRY**

2-year program - 120 ECTS

Students must choose 3 modules in Specialization modules I and 12 ECTS in Specialization modules II.

Students can opt for a 30 ECTS Minor instead of the research internship preferably in:
- Management, Technology and Entrepreneurship
- Science, Technology and Area Studies

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