



PhD Proposal : October 2021

Subject

Synthetic methodology for the creation of carbon-astatine bonds. Development of new molecular platforms for the design of astatine-211 radiopharmaceuticals.

Key words

Organic Synthesis, heterocyclic chemistry, radiochemistry, medicinal chemistry, methodology, hit to lead optimization, chemical biology, radiolabeling, biomarkers.

Project description

This PhD proposal involves organic chemistry and the development of synthetic methodology applied to medicinal chemistry/chemical biology/ and radiolabeling. The laboratory is located on the Faculty of science campus of the University of Orleans at the Institute of Organic and Analytical Chemistry (ICOA).

The objective of this project is to develop innovative strategies for the labelling of biologically active molecules with astatine (At) to make new radiotherapy agents. More specifically, we will focus our efforts on the design of imaging and therapeutic agents for multiple myeloma using MCL-1 inhibitory anti-apoptotic molecules as vectors. To do this, it is important to develop methods for the functionalization of various molecular platforms, thus allowing the vectorization of radiolabeled compounds.

A first part of our project will explore a new methodology for labelling heteroaromatic molecules with astatine. A second part will be devoted to the synthesis of novel vinyl astatines. This will then give us access to small molecular platforms that will allow the incorporation of astatine into more complex bioactive molecules. Our ultimate goal is to design astatine-labeled radiopharmaceuticals that will be evaluated by clinicians for use in the treatment of multiple myeloma.

This project is part of two French Labex: Iron (50%) and Synorg (50%) and will be carried out in collaboration with the CRCINA in Nantes. The ICOA (Orléans) will work on synthetic methodology with iodine (cold) and the transposition to radiolabeled conditions (iodine-125 and astatine-211) will be carried out in Nantes. Each step of the work will lead to valorization in the form of patents, communications and publications.

We will give a more complete presentation of the subject during the interview process. A visit to Orléans is required.

Starting date : 04/10/2021 (October 4th 2021)

Funding : Grant LABEX IRON and SYNORG

Presentation of the University and laboratory

The Institute of Organic and Analytical Chemistry (ICOA) is a laboratory of 120 people located within the Faculty of Science of the University of Orleans. The institute is a mixed research unit (UMR 7311) of the University and the French National Center for Scientific Research (CNRS).

The different research topics developed at the Institute are directed towards the design, synthesis and analysis of small biologically active molecules.

The PhD research will be carried out in the group of Pr. Sylvain Routier (12 members) under the supervision of Dr. Karen Plé (CNRS) and Pr. Routier.

Internet :

<http://www.univ-orleans.fr/icoa/synthese/routier/>

Profile

Applicants for this position must have an M2 degree or equivalent (école d'ingénieur diploma), and have followed coursework in organic chemistry and have an interest in medicinal chemistry.

A successful internship in academia or industry is required.

Limit for application : 30/04/2021 (April 30th 2021)

Required documents

Please send a CV, cover letter, grades for the M1 and M2 or equivalent (years 2 and 3 from an école d'ingénieur). A copy of the M2 diploma or equivalent (école d'ingénieur diploma) obtained in an organic chemistry program.

The contact details of the person in charge of the most recent internship, or a recommendation letter from them.

These documents should be sent to sylvain.routier@univ-orleans.fr and karen.ple@univ-orleans.fr