

PhD position - October 2024 - Contrat doctoral

Synthesis of innovative peptide-lipid conjugates for the development of lipid nanocapsules for antibiotic delivery

Sciences Chimiques de Rennes, Université de Rennes, Ecole Nationale Supérieure de Chimie de Rennes

Subject description: The research and development of new lipid nanoparticles for drug delivery has become a major area of research since the recent appearance of RNA-based vaccines against COVID19. A whole area of molecular engineering around lipids has been set up to propose new therapeutic approaches based on the use of lipid nanovectors in oncology, neurology, infectiology and vaccination. Although liposomes formed from standard phospholipids can be used to encapsulate active ingredients such as peptides and nucleic acids, their efficacy remains inadequate for several medical applications (particularly oral administration). The aim of the thesis project is to develop a new generation of lipid capsules with new functionalities capable of crossing current technological barriers (oral route) via the chemical functionalisation of natural lipids with peptides and formulation using microfluidic methodology. The encapsulation of antibiotic molecules will also be addressed during this research. The PhD student will work on the Villejean campus (Rennes) with Dr Charlène Gadais on the automated synthesis of peptides and at the Ecole Nationale Supérieure de Chimie de Rennes (Beaulieu campus, Rennes) with Professor Thierry Benvegnu, on the synthesis of peptide-lipid conjugates, their formulation in lipid nanocapsules and the encapsulation of active ingredients with antibiotic properties. Collaboration with teams of biologists and pharmacists in Angers, Rennes and Brest is also planned for the biological evaluations.

Keywords: Organic chemistry, peptide synthesis, bioconjugation, lipids, formulation of lipid nanoparticles, encapsulation of active ingredients

Applicant profile: We are looking for a motivated candidate with solid knowledge of **organic synthesis** and excellent theoretical and practical skills. Experience in peptide synthesis and/or HPLC and/or nanoparticle formulation will be appreciated but is not a prerequisite. We are looking for a researcher who is committed to his/her project, curious, with a degree of autonomy and rigour, and who is highly motivated. The candidate should also have good communication skills and be a team player.

To apply, please send a CV, a cover letter, and the names of two referees to:

Pr. Thierry Benvegnu, thierry.benvegnu@ensc-rennes.fr, Dr. Charlène Gadais, charlene.gadais@univ-rennes.fr

Deadline for applications: 30 March 2024