PHD POSTION (M/F/X): SYNTHESIS OF LIPID-POLY(N-VINYL AMIDE) CONJUGATES AS AN ALTERNATIVE TO PEG IN THE STABILIZATION OF LIPIDIC VECTORS

AREA: POLYMER CHEMISTRY/HEALTHCARE/GENE THERAPY

START DATE: 15/09/2024

DEADLINE OF APPLICATION: 22/04/2024

The University of Liège is the biggest French-speaking public university in Belgium. It employs more than 5,700 staff members across four campuses, including 3,600 active teachers and researchers in all fields of the human and social sciences, science and technology, and health sciences. In hosts nearly 27,000 students of 123 different nationalities in one of the most multicultural and dynamic cities in Europe, less than an hour from Brussels and Cologne, two hours from Paris, and three hours from London and Amsterdam.

Actively involved in the social and environmental transition, ULiège supports students to fulfil their roles as responsible citizens (training in sustainable development, Green Office, etc.) and promotes ethical, multidisciplinary and open research. ULiège is committed to the region in which it operates and contributes towards local socio-economic development. It has developed numerous partnerships, notably with the university hospital. International and united, it participates in the European University of Post-Industrial Cities, UNIC initiative and has one of the most extensive collaborative networks in the world.

ULiège offers attractive career prospects in a high-quality working environment, promoting well-being, diversity and equality of opportunity. Since 2011, ULiège has been proud to display the European *Human resources strategy for researchers* (HRS4R) label, which reflects its commitment to open, transparent and merit-based procedures. In addition, it recognises the quality and diversity of research in line with the recommendations of the *Coalition for Advancing Research Assessment* (CoARA). ULiège encourages its academic staff to travel internationally and welcomes international researchers through its EURAXESS centre.

ABOUT THE RESEARCH PROJECT

This PhD project aims at developing innovative lipid-poly(N-vinyl amide) conjugates as alternative to PEG in the stabilization of lipidic vectors to improve the efficiency and safety of lipid nanoparticles used in gene therapy. Indeed, pegylation is commonly used to prolong the circulation time of nanocarriers but the increasing presence of anti-PEG antibodies in the human population and the internalization issues associated to PEG provide strong incentives to search for better alternatives. The PhD will be conducted in the Center for Education and Research on Macromolecules (CERM) at ULiege in collaboration with the Laboratory of Pharmaceutical Technology and Biopharmacy (LPTB).

This project is part of the GT4health program, funded by the Walloon Region in the frame of its Win4Excellence program, which aims to develop various disruptive technologies as solutions to major challenges in the gene therapy sector. This multidisciplinary project involves ten partners from five French-speaking Belgian universities (ULiège, ULB, UCL, UNamur and UMons), as well as the CER Group research centre.

JOB DESCRIPTION

The PhD candidate will play a pivotal role in the GT4health program by synthesizing and characterizing innovative lipid-poly(N-vinyl amide) conjugates for decorating lipid nano-vectors. Through up-to-date methodologies, the candidate will explore the potential of these polymer conjugates to formulate a new generation of lipidic nano-vectors that will be tested in gene therapy application within the GT4Health consortium. In close collaboration with researchers at CERM and LTPB, the candidate will delve into cutting-edge research to advance the field of nanomedicine and gene therapy.

SPECIFIC DUTIES & ACTIVITIES

- Design and execute synthetic strategies for the preparation of lipid-polymer conjugates.
- Purify the lipid-polymer conjugates in the perspective of their biomedical application.
- Characterize the structure and physicochemical properties of the polymer conjugates using analytical and spectroscopic methods.
- Provide lipid-polymer conjugates to the GT4Health partners.
- Formulate and characterize lipid nanoparticles with the polymer conjugates.
- Collaborate closely with interdisciplinary teams in the GT4health program.
- Present research findings at seminar, workshops and international conferences.
- Disseminate results through peer-reviewed publications.
- Assist in mentoring undergraduate students and junior lab members as needed.

YOUR PROFILE

REQUIRED SKILLS :

- The candidate must hold or is about to complete (on July 2024) a Master's degree in Chemistry or equivalent strongly focused on organic and/or macromolecular synthesis.
- Strong background in organic and/or polymer synthesis.
- Familiar with some of the following common analytical methods: NMR, chromatography, DLS, mass spectrometry, ...
- Strong motivation to contribute to macromolecular engineering and polymer synthesis at the service of cutting edge developments in gene therapy.
- Excellent communication skills.

- Excellent level of spoken and written English (ability to communicate effectively with colleagues and present research findings with clarity).
- Ability to write scientific reports and publications in English.

- **DESIRABLE SKILLS :**
  - Experience and knowledge in nanotechnologies, nanoparticles, nanomedicine, are highly welcome.
  - Experience in the synthesis of organic compounds or polymers dedicated to pharmaceutical or biomedical applications is highly welcome.
- **SOFT SKILLS :**
  - Excellent organizational skills.
  - Ability to work independently and collaboratively in a multidisciplinary team environment.
- **LANGUAGES :**
  - Excellent level of spoken and written English is necessary (from upper intermediate (B2) to proficient (C2)). Ability to communicate effectively and fluently with colleagues and present research findings with clarity.
  - French knowledge is a plus but is not mandatory.

TERMS OF EMPLOYMENT

- Type of contract: PhD thesis Position
- Working schedule: 5 days/week, 38h
- Contract duration: 48 months
- Start date : 15th September 2024

OUR OFFER

With your career path and personal details, ULiège Human Resources Department can assess the gross monthly salary. Employment benefits such as reimbursement of public transportation fees and access to a variety of training opportunities are also included.

WORK ENVIRONMENT

The PhD thesis will take place in the Center for Education and Research on Macromolecules (CERM) renowned for its expertise in the synthesis, characterization, and processing of polymers. CERM is composed of about 30 members (including four permanent researchers and a technical staff of 4 members) and produces innovative polymer materials whose structure and properties are tailored to specific applications, particularly in the pharmaceutical and biomedical areas. CERM offers a collaborative, stimulating and supportive research environment with ample opportunities for networking (participation to local, regional, national and international research networks). The PhD thesis will be carried out under the supervision of Dr. Antoine Debuigne, FNRS Senior Research Associate, who focuses on the development of macromolecular engineering methods and polymer synthesis for biomedical applications. The

PhD thesis will be performed in close collaboration with Prof. G. Piel of the Laboratory of Pharmaceutical Technology and Biopharmacy (LTPB) of the ULiege.

HOW TO APPLY

Please send the following documents in pdf to adebuigne@uliege.be (with email subject "PhD Application GT4Health") by April 22, 2024: a cover letter, a detailed CV, contact information for at least 2 professional references. Please ensure that all documents are submitted in English.

SELECTION PROCEDURE

- **Application submission:** Applications should be sent via email to adebuigne@uliege.be by April 22, 2024.
- **Initial Screening:** A first screening will be conducted to assess the candidate qualifications, research experience, and alignment with the position requirements.
- **Interview Stage:** Shortlisted candidates will be invited to participate in an interview (in person or via video conference) in May with Dr. Antoine Debuigne. The interview will be held in English.
- **Final Selection:** The selected candidate will be notified of its acceptance in May-June, and further instructions regarding enrolment and onboarding will be provided.

CONTACT DETAILS AND FURTHER INFORMATION

Informal inquiries about the project are welcome. Please feel free to contact Antoine Debuigne by email adebuigne@uliege.be

Release date: 02/04/2024

Privacy policy

Personal data collected following your application will be processed by Dr. Antoine Debuigne of the University of Liege for the sole purpose of recruitment.

The data will be processed within the framework of pre-contractual measures (art. 6-1, b. of the General Data Protection Regulation) and kept for up to 9 months after the publication of the vacancy. Your personal data will not be passed on to any third parties.

In accordance with the provisions of the GDPR (EU 2016/679), you may exercise your data protection rights (right of access, rectification, erasure, restriction, and portability) by contacting ULiège Data Protection Officer (dpo@uliege.be - Mr. Data Protection Officer, Bât. B9 Cellule "GDPR", Quartier Village 3, Boulevard de Colonster 2, 4000 Liège, Belgium). You may also lodge a complaint with the Data Protection Authority (https://www.autoriteprotectiondonnees.be , contact@apd-gba.be).