

Company/laboratory/public institution: Laboratory for Vascular Translational Science - INSERM U1148

Address: CHU X. Bichat – 46, rue Henri Huchard 75018 Paris

Supervision of trainee: Cédric Chauvierre

Name of tutor:

Position: Head of Nanotechnologies for Vascular Medicine and Imaging Team

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Internship period: 20 January - 18 July 2025

Title of the project: Fucoïdan radiotracer for TIA patient management using ischemic memory

Project description:

Cardiovascular diseases are the leading cause of death in Europe, with approx. 4 million deaths per year from coronary heart disease and stroke. Despite decades of research and millions of euros spent, clinical and biological knowledge of these diseases has not provided functional diagnostic tools to accurately distinguish low-risk from high-risk patients and/or to identify specific sites in the vascular system that may have contributed to the acute event. Accurate diagnosis is essential to rapidly implement tailored therapeutic regimens that improve health while avoiding harm and adverse side effects. In patients with TIA, most of the time MRI brain imaging (gold standard) does not show any lesion or thrombus. Therefore, the diagnosis of TIA is based solely on medical history. Despite the uncertainty of the TIA diagnosis, a long-term antithrombotic regimen is prescribed based on the probability of stroke occurrence, but with significant bleeding risk to the patient.

The objective of this project is to develop a PET radiotracer based on Fucoïdan and Gallium⁶⁸ for the molecular diagnosis of the ischemic memory thanks to the P-selectin overexpression.

The proposed specific aims of this project are the following ones:

The trainee will be involved in a collaborative work and the feasibility of the use of the companion diagnostics tracer (⁶⁸Ga-Fucoïdan) in patient studies is supported by a successful Phase I biotolerance study in volunteers using ^{99m}Tc-Fucoïdan. The trainee will be in charge to i) modify the fucoïdan with clinical chelators; ii) purify and characterize this new product; iii) evaluate its P-selectin targeting property and its cytocompatibility; and iv) validate after its loading with Gallium⁶⁸ its ability to diagnose ischemic memory molecularly by PET scintigraphy in mouse models.

The trainee will integrate an International Team with 2 Engineers, 2 Post-Doc and 5 PhD students, and during the internship, she or he will participate in weekly meetings of the Team, as well as in journal clubs to present scientific articles, and seminars with the other teams in the laboratory.

This project will focus on medical innovations and will address the following scientific areas: Polysaccharides; Chemistry; Radiotracers; Scintigraphy; Molecular diagnosis; Thrombotic diseases.