CMD InnoCARE (Innovation pour les maladies CArdiovasculaires, métaboliques et REspiratoires)

Master 2 Internship proposal (2025-2026)

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Profile(s) linked to the project:
☒ Experimental Biology *(Recherche expérimentale)*
☐ Research and Omics Data Analysis *(Recherche et analyse de données omiques)*
☐ Clinical Research *(Recherche clinique)*

Lab: L'Institut du Thorax INSERM UMR1087, CNRS UMR 6291

Team: Team III - Vascular & Pulmonary Diseases

Name and position of the supervisor: Anne-Clémence Vion - Chargée de Recherche CNRS

Email of the supervisor: anne-clemence.vion@univ-nantes.fr

Candidate (if known): -

Title of the internship: **Studying the in vitro role of NET1, a mechanosensitive exchange factor in smooth muscle cells**

Summary of the internship proposal:
Intracranial aneurysms (IAs) are generally asymptomatic cerebrovascular malformations affecting around 3% of the population. In the event of rupture, cerebral hemorrhage often lead to death or severe neurological sequelae. IAs are located at the arterial bifurcations of the circle of Willis, where blood flow and parietal tension are particularly high, subjecting the arterial wall to extreme mechanical stress. It is therefore considered that IAs results from a failure of the vascular cells (smooth muscle and endothelial) to adapt to these mechanical constraints.
Our research team has recently identified a mechanosensitive protein in smooth muscle cells: NET1.
This protein is an exchange factor that enables the activation of RhoA, a key protein in the control of the actin cytoskeleton and participating to the progression of many vascular pathologies.
The team is therefore seeking to understand the exact role of NET1 in smooth muscle cell function and, more generally, in aneurysmal pathology.
The internship project will fall within this context. The student will investigate the role of NET1, in particular its subcellular localization, in mechanisms such as migration, proliferation and contraction. To this end, the student will use lentiviral strategies for NET1 overexpression and silencing, coupled to an in vitro cell stretching system. Analyses will use a variety of molecular and cellular biology methods, from qPCR to confocal imaging.