M2 internship proposal

"Selection, purification and characterization of mutations of a trans-membrane protein"

The **context** of this M2 internship is in our biotechnological application of a 3D compartmental system made by liposomes, in which we utilize the transmembrane protein called NhaA that facilitates an electrogenic sodium/proton exchange. The reconstitution NhaA within lipid bilayer membranes of the liposomes has allowed us to create a 3D compartmental system capable of producing and storing energy. More details of the overall project are available at https://cordis.europa.eu/project/id/101142533.

The **goal** of this M2 internship is to assist in modifying the characteristics of this ionic exchange made by NhaA by creating either targeted mutations by using primers or random mutations by using a low fidelity polymerase.

The **objectives** of this M2 internship are to *(i)* create mutants of the NhaA protein by targeted or random mutations, *(ii)* select functional mutants by a screening assay developed in our team, *(iii)* purify the selected functional mutants by using a purification method, and *(iv)* characterize the selected functional mutants by an *in vitro* activity assay based on electrophysiological method and to compare the results to the characteristics of the NhaA WT.

Methods to be utilized:

Selection of mutant NhaA proteins

- Targeted and random mutations

Overexpression and purification of membrane proteins

- Cell culture
- Bacterial culture on Petri dish
- Membrane preparation
- His-tag purification followed by desalting

In vitro activity assay – Electrophysiology

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Tasks and **skills** expected from the intern:

- Capability to work autonomously in a multidisciplinary and international environment
- Good level of English (spoken, written expression)
- Data processing
- Report on the results

Profile of the intern:

- Master 2 in pharmacology, biochemistry or related fields
- Particular interest in protein sciences
- It is desirable to have some experience and knowledge in cell/molecular biology

Practical information:

- Duration: 6 months
- Location: LMGP, Grenoble INP-UGA, 3 Parvis Louis Néel, 38000 Grenoble
- Start: mid-February/early-March 2026 (flexible)

Contact:

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