Master's degree in Biology – Chemistry-Biology Department

Master 2 internship project
Year 2025-2026

Laboratory/Institute: Grenoble Institut Neurosciences **Director:** E. Barbier
Team: Brain aging and repair **Head of the team:** M. Decressac

Name and status of the scientist in charge of the project: M. Decressac – Inserm researcher
HDR: yes ☒ **no** ☐
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Program of the Master's degree in Biology:

☐ Microbiology, Infectious Diseases and Immunology ☐ Biochemistry & Structure
☐ Physiology, Epigenetics, Differentiation, Cancer ☒ Neurosciences and Neurobiology

Title of the project: Molecular hypoxia as a therapeutic strategy for Parkinson's disease

Objectives:

The overall objective of this project is to determine to effect of an hypoxia-mimicking drug in rodent models of Parkinson's disease.

Abstract:

Parkinson's disease is a multifactorial disease characterized by the progressive loss of nigral dopamine neurons. Interestingly, a large percentage of patients report improvements in symptoms when mountain hiking or during flights at high altitude which could be due to the hypoxic environment. It could also explain why smoking, which produces transient hypoxia, is protective in Parkinson's disease. Experimental hypoxia has been shown to provide therapeutic benefit in several conditions. However, at sea level, the clinical translation of hypoxia is challenging and can only be performed using hypobaric chambers that can replicate the effect of altitude. Drugs targeting components of the hypoxic response fail to mimic the entire molecular cascade.
In this project, we propose to test a new molecule that strengthens the binding of oxygen to hemoglobin thereby closely replicating an hypoxic state. This drug will be tested in two complementary models of Parkinson's disease.

Methods:

Behavioral test, disease modeling, histology, biochemistry, light and fluorescence microscopy imaging, mitochondrial bioenergetics

Requested domains of expertise:

Knowledge in neurosciences, neurodegenerative diseases and physiology