

**Master 2 internship project
Year 2021-2022**

Laboratory/Institute: Grenoble Institute of Neuroscience **Director:** Frédéric Saudou
Team: Brain aging and repair **Head of the team:** Mickael Decressac

Name and status of the scientist in charge of the project:

Dr Mickael Decressac, Researcher/Group leader, Inserm **HDR:** yes no

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Program of the Master's degree in Biology:

- Immunology, Microbiology, Infectious Diseases Structural Biology of Pathogens
 Physiology, Epigenetics, Differentiation, Cancer Neurosciences and Neurobiology

Title of the project: Characterization of a novel mouse model of Parkinson's disease

Objectives (up to 3 lines):

The objective of this project is to characterize a new mouse model of Parkinson's disease at the behavioral, cellular and molecular level. The pathology will be examined in the central nervous system, retina, heart and gut.

Abstract (up to 10 lines):

To date, modelling Parkinson's disease (PD)-like phenotype in rodents requires the use of toxic substances or excellent skills in stereotaxic surgery. These methods go along with variabilities in the results which limit the attractiveness of these models. In parallel, transgenic mouse models of PD only mimic pre-symptomatic forms of the disease. Hence, it is crucial to develop novel models of PD that are relevant, reproducible, and that elicit behavioral and cellular phenotypes reminiscent to the human pathology. We will take advantage of a novel viral vector allowing, via a simple systemic injection, to express a transgene throughout the central nervous system. We will combine this new tool with a genetic construct expressing human alpha-synuclein under the control of a dopamine neuron-specific promoter to induce a Parkinson-like phenotype. Behavioral tests will be used to assess locomotor and non-motor symptoms and the neuronal pathology will be studied with a broad range of histological, biochemical and molecular techniques.

Methods (up to 3 lines):

The student will learn: plasmids and AAV vectors production, intravenous vector injection in mice, behavioral test (motor and cognitive tests), post-mortem analysis including histology, immunohistochemistry, confocal microscopy, western blotting, tissue clearing, light-sheet microscopy.

Up to 3 relevant publications of the team:

Reynaud-Dulaurier et al., (2020) *Brain* ; PMID : 32413099

Tamburrino et al., (2015) *Acta Neuropathologica Communications* ; PMID: 26666562

Decressac et al., (2012) *Science Translational Medicine* ; PMID: 23220632

Requested domains of expertise (up to 5 keywords):

No specific expertise required.