

**Master 2 internship project  
Year 2023-2024**

**Laboratory/Institute:** Grenoble Institut Neurosciences - GIN    **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, CRCN Inserm  
**HDR:** yes  no

**Address:** Bâtiment Edmond J. Safra, chemin Fortuné Ferrini, 38700 La Tronche, France

**Phone:** 04.56.52.06.75    **e-mail:** Michael.decressac@inserm.fr

**Program of the Master's degree in Biology:**

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

**Title of the project: Inter-cellular transfer of mitochondria in the brain**

**Objectives (up to 3 lines):**

The main objective of this project is to determine (1) whether the transfer of mitochondria occur between cells in the brain in both physiological and pathological conditions, (2) which cells are involved, (3) if it can help in the context of a gene therapy strategy.

**Abstract (up to 10 lines):**

Mitochondria are the powerhouse of cells and they are essential for the function and survival of energy-demanding cells for instance in the brain. Inter-cellular transfer of mitochondria is a poorly-studied mechanism that has been mostly documented in *in vitro* using co-culture systems. However, it remains unknown if this process also occurs *in vivo*, which cells exchange mitochondria, in which direction, is it modified in pathological conditions and can it help in the context of therapeutic strategies.

To address these questions, we recently generated a novel genetic construct that allows us to easily monitor inter-cellular transfer of mitochondria in cell culture and animals. After validating this tool, we will use it in cell cultures and in wild-type type as well as in a model of neurodegenerative disease.

**Methods (up to 3 lines):**

The student will use/explore complementary techniques: cell cultures, high-resolution and live microscopy, viral vector delivery, mouse handling, flow cytometry.

**Up to 3 relevant publications of the team:**

Reynaud-Dulaurier et al. (2020) Brain

Reynaud-Dulaurier *et al.* (2020) Frontiers in Bioengineering and biotechnology

**Requested domains of expertise (up to 5 keywords):**

Cell biology, mitochondria, neurodegenerative diseases, therapy