

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

Laboratory/Institute: Grenoble Institut Neurosciences - GIN **Director:** E. Barbier
Team: Translational regulation in normal and pathological conditions **Head of the team:** S. Belin

Name and status of the scientist in charge of the project: Stéphane Belin **HDR:** yes no
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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: Promoting Central Nervous System regeneration and functional recovery

Objectives (up to 3 lines):

Our lab is interested in axon regeneration and neuroprotection mechanisms. Our project uses in vivo and in vitro approaches to decipher processes controlling axonal growth, neuroprotection, circuit formation in adult in order to treat patient after traumatic or chronic injury of the central nervous system.

Abstract (up to 10 lines):

Unlike the peripheral nervous system, neurons from the central nervous system (brain, spinal cord) are not able to regrow axons after injury. Therefore, any lesion to the CNS leads to permanent motor and/or cognitive impairment. To this day, no treatment is available to overcome CNS injuries. It is now well established that modulating neurons themselves promotes axonal growth. The challenge now is to identify neuronal targets and molecular pathways that are required for axon regeneration. The project is to determine the role of protein synthesis regulation after CNS injury in order to define new way to promote axon regeneration. We are using a combination of in-vitro, in-vivo assay, molecular biology and biochemistry to characterized new cellular pathway implicated in neuroprotection and axonal growth in order to develop new therapeutic strategies.

Methods (up to 3 lines):

Methods developed in the team are: in-vivo model of central nervous system injury, western-blot analysis, immunofluorescence and microscopy, images analysis. Biochemistry technics link to the analysis of ribosome and ribosomal proteins.

Up to 3 relevant publications of the team:

1- Customization of translational complex regulates mRNA-specific translation to control CNS regeneration. Julia Schaeffer, Noemie Vilallongue, Beatrice Blot, Nacera El Bakdouri, Charlotte Decourt, Elise Plissonnier, Blandine Excoffier, Antoine Paccard, Jean-Jacques Diaz, Sandrine Humbert, Frederic Catez, Frederic Saudou, Homaira Nawabi, **Stephane Belin. Neuron**

2- The RSK2-RPS6 axis promotes axonal regeneration in the peripheral and central nervous systems
Charlotte Decourt, Julia Schaeffer, Beatrice Blot, Antoine Paccard, Blandine Excoffier, Mario Pende, Homaira Nawabi, **Stephane Belin. PLoS Biol.** 2023 Apr 17;21(4):e3002044. doi:10.1371/journal.pbio.3002044.
eCollection 2023 Apr.

3- Guidance landscapes unveiled by quantitative proteomics to control reinnervation in adult visual system.
Noemie Vilallongue, Julia Schaeffer, Anne-Marie Hesse, Céline Delpéch, Antoine Paccard, Yohan Couté, **Stephane Belin**, Homaira Nawabi-co-last **Nature Communications** 2022 Oct 13;13(1):6040. doi: 10.1038/s41467-022-33799-4.PMID: 36229455

Requested domains of expertise (up to 5 keywords): Neurology, molecular and cellular biology