

Studying functional and anatomical plasticity of the motor cortex after a large photothrombotic stroke

Project outline:

Reductions in blood flow to the brain of sufficient duration and extend lead to stroke, which results in damage to neuronal networks and the impairment of sensation, movement or cognition. Stroke is the leading cause of chronic adult disability and the third cause of death in North America and these facts have led a recent effort to develop strategies for neural repair after stroke.

Often patients that have experienced a stroke exhibit continued functional recovery for many years following their initial injury. Similar patterns of improved behavioural performance are also observed in animal stroke models and can be facilitated by behavioural training and/or inhibition of growth inhibitory factors.

The present study aims to assess the role of S1PR2 and S1PR5, two newly discovered receptors for the well-known growth inhibitor Nogo-A, in functional and anatomical recovery after a large photothrombotic stroke to the motor cortex in mice. To evaluate the functional recovery, mice are tested for fine motor skills using different paradigms before and after injury. After one month, mice are euthanized and the anatomical reorganisation in the brain is investigated. Furthermore, experiments are conducted to study the anatomical rearrangement of the newly grown fibres in the spinal cord itself.

Techniques to learn:

Our lab is equipped with state-of-the art devices and techniques (Professor Martin Schwab, <http://www.hifo.uzh.ch/research/schwab.html>). The student will learn a wide variety of lab techniques including mainly *in vivo* work: animal handling, behaviour and surgery (under supervision), tissue processing, histology and immunohistochemistry; epifluorescence, confocal and bright-field microscopy, data processing (ImageJ, Imaris, Neurolucida 3D reconstructions), and statistical analysis (GraphPad, R).

This Master thesis offers a possibility for a co-authorship publication in a peer-reviewed journal.

Location, supervision:

The project will be located at the Irchel Campus in the research group of Professor Martin E. Schwab, laboratory of Neural Regeneration and Repair, Brain Research Institute, University of Zürich and ETH Zürich.

Noémie Jordi, a third year PhD student, will directly supervise the student.

Duration:

6 (for ETH students) or 12 (for UZH students) months.
Start date between January and June 2016.

Student's profile:

Ambitious, motivated students with accurate working skills can send their application including a letter of motivation, a CV and bachelor scores to jordi@hifo.uzh.ch