



STudent REseArch Mobility Programme (STREAM) Project proposal

Host University:
Universität Zurich

Field (drop-down list):
Health and welfare

Specified field, subject:
Psychiatry, Neuroscience, Pharmacology

Research project title:
Dopamine transporter trafficking following methylphenidate (Ritalin) treatment in human dopaminergic neurons

Possible starting month(s):

Sep	Oct	Nov	Dec	Jan	Fev	Mar	Apr	May	Jun	Jul	Aug
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Possible duration in months:

1	2	3	4	5	6
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Exact starting and end dates will be discussed between the supervisor and the student

Suitable for students in: Bachelor level Master level

Prerequisites:

The project requires good knowledge in neurobiology, pharmacology and molecular biology, as well as some methodological basis in cell culture and data analysis.

Restrictions:

NONE

Description (maximum 2,000 characters):

Research project may be adapted according to the student profile and the period/timeline

Attention Deficit-Hyperactivity Disorder (ADHD) is one of the most frequent psychiatric disorders in children and adolescents, with up to 5% affected worldwide. Psychostimulant such as methylphenidate (MPH), are most effective treatment in ADHD, however, the molecular mechanism of action of MPH is still not fully elucidated. MPH is known to blocks the dopamine transporter (DAT) in the central nervous system, however, the effects on the dynamic DAT availability has not been assessed. The aim of this project is to investigate the effect of MPH on DAT trafficking and membrane availability. For this purpose, human neuroblastoma dopaminergic cell line SH-SY5Y will be used following transfection of HaloTag® labelled DAT and MARCKS-GFP (membrane specific labelling). DAT trafficking between the cytoplasm and the membrane will be assessed using live cell imaging microscopy after treatment with different doses of MPH (range of 1-100nM and 1-100µM). Time-lapse imaging will be acquired following by data assessment using several software, including FIJI ImageJ



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(exporting and drift correction), Illastik (for machine learning strategy), CellProfiler (image segmentation & quantification) and statistical software. The findings will elucidate whether MPH treatment alters DAT availability on the membrane and thus affects its functionality.

**Faculty and/or Department:**

Department of Child and Adolescent Psychiatry and Psychotherapy,
University Hospital of Psychiatry Zurich (PUK),

Contact person, including position:

Prof. Edna Grünblatt

Contact email:

edna.gruenblatt@kjpd.uzh.ch

Deadline for nomination to reach host university:

Ongoing

Notification of admission given by the end of:

Within 4 weeks

Additional information:

Motivation and high interest in neurodevelopmental psychiatric research and cellular modeling, with interest in individual development into independence.



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