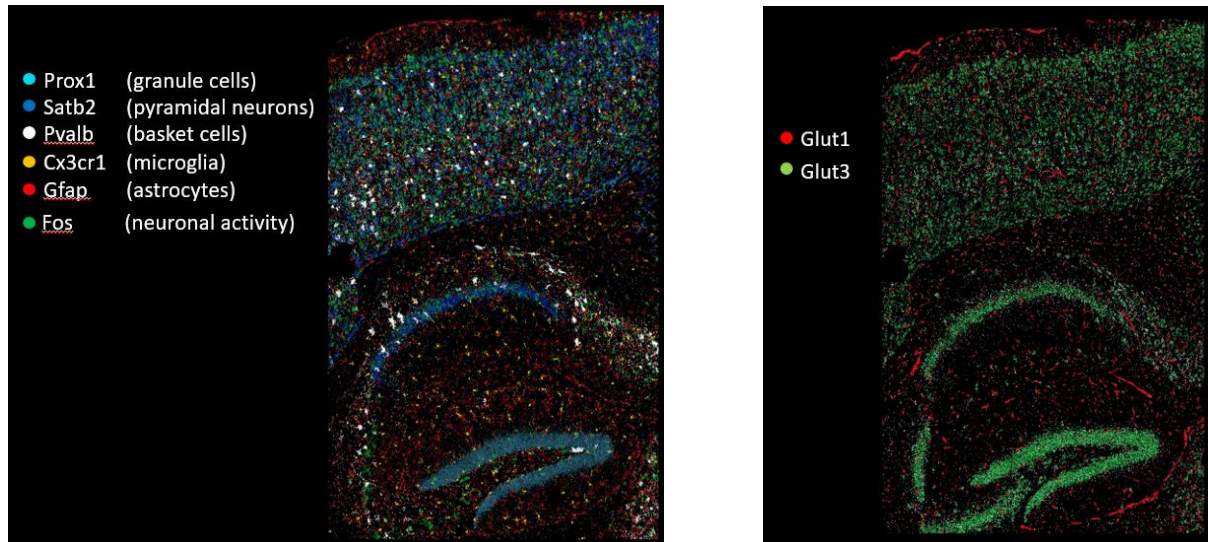


Bioinformatics Master Thesis Project in Molecular Neuroscience



Combinatorial single-molecule fluorescent in-situ hybridization (smFISH) in a section of the mouse hippocampus, a brain area that is important for learning and memory. 8 out of a total of 35 analyzed transcripts are illustrated.

About the project

Optimal regulation of energy metabolism is essential for neuronal function. Accordingly, impaired neuronal energy metabolism is emerging as a key factor in the development of neurological diseases. Interestingly, expression of key metabolic enzymes in neurons is controlled by synaptic activity. In this project, we aim to understand how neuronal activity during a learning task in mice contributes to maintaining metabolic fitness of neuronal and non-neuronal cell types in the brain. In addition, we investigate how metabolic adaptations are affected during brain aging. This thesis project is part of a larger study that includes behavioral, molecular, histological and histochemical analyses.

Your task

Your main task will be an in-depth analysis of a recently acquired spatial gene expression dataset. This includes optimization of image segmentation parameters, and development of an R-pipeline for quantitative comparison of gene expression between cell types and experimental conditions.

About the lab

Our lab recently moved to the University of Frankfurt and is located at the Neuroscience Center on Campus Niederrad. We have a long-standing interest in molecular mechanisms of neuronal adaptations and how they are affected in neurological diseases. To address these questions, we are using a combination of molecular biology, biochemistry and multiparametric live imaging in primary hippocampal neurons and organotypic hippocampal slice cultures.

What we offer

We offer a highly interactive and committed research environment. We provide close supervision and a thorough introduction to the neuroscience background that is required for this thesis. Expert bioinformatics support will be provided by thesis co-supervisor Prof. Marcel Schulz (Center for Molecular Medicine) and by bioinformaticians at Resolve Biosciences.

Contact

If you are interested in this project, please contact Prof. Bas-Orth to schedule a brief introductory meeting: basorth@med.uni-frankfurt.de