

Metabolic regulation of neural stem cells. The role of lipid droplets in the brain during development, adulthood and in aging.

Prof. Marlen Knobloch

Our laboratory's main focus lays on neural stem cells, which generate neurons and astrocytes during brain development and persist throughout adulthood. We are studying the intrinsic and extrinsic metabolic regulation of neurogenesis, with a specific interest in lipid metabolism. We have recently shown that lipid droplets (LDs), the lipid storing organelles, play a crucial role for adult neural stem cells (Ramosaj Madsen et al. Nat. Commun. 2021). We have generated an exciting novel endogenous LD reporter mouse line (Madsen et al., BioRxiv 2022), which allows the staining free visualization of LDs in living and fixed tissues and cells, and have discovered a wide abundance of LDs in the healthy mouse brain in many brain cell types, including neural stem cells. Interested candidates can discuss suitable MD-PhD topics with Prof. Knobloch

In our lab, we are using innovative techniques such as virus-mediated gene expression in vitro and in vivo, time-lapse imaging, single cell RNA sequencing, as well as proteomic, metabolomic and lipidomic approaches. To tackle our questions, we use various mouse models and mouse primary cell cultures as well as human iPSC-derived neural stem cells and brain organoids.