

SEMINAR

Who: Dr. Saber Abd Elkader
Queensland Brain Institute, Brisbane

Host: Prof. Dr. Marina Mikhaylova
Institute of Biology, HU Berlin

Title: Lipid-fuelled synaptic plasticity: integrating membrane turnover, β -oxidation and protein lipidation

2026

Thu

Sept.

17th

3 p.m.



Where: Institute for Biology
Philippstraße 13
10115 Berlin
Lecture Hall 9, Building 6, Ground Floor

Zoom Link:

<https://hu-berlin.zoom-x.de/j/68020655532?pwd=98FHKniqUix9rDSE3pIlZblqA3KOPI.1>

Abstract:

Synaptic plasticity requires the coordinated regulation of membrane remodelling, energy production, and protein turnover. However, how these processes are integrated at the molecular level remains unclear. Here, we propose that activity-dependent lipid flux represents a central mechanism linking these processes. Saturated fatty acids released from membrane phospholipids, triglycerides, or extracellular lipid uptake can be activated to acyl-CoA and directed to mitochondrial β -oxidation and synaptic protein lipidation. These represent two emerging, experimentally supported pathways rather than the only possible fates of synaptic fatty acids, which may also influence membrane biophysical properties, engage lipid-sensitive receptors and transcriptional programmes, enter complex-lipid synthesis or be re-esterified for storage. Recent work identifies DDHD2 as a mechanistic entry point into this broader synaptic lipid network. We place DDHD2-dependent lipid mobilisation in the wider context of glia-neuron lipid transfer and ApoE/sortilin-dependent fatty-acid uptake. This framework positions synaptic lipid metabolism as a flexible metabolic-signalling system that may complement glucose metabolism and help couple membrane turnover to energetic demand and long-term plasticity.