

DROPmode

J1-70029 DROPmode

J1-70029 Modulation of lipid droplet metabolism to overcome metabolic deficiency in neurodegeneration
J1-70029 Spreminjanje metabolizma lipidnih kapljic za premagovanje presnovne pomanjkljivosti pri neurodegeneraciji

Funded by



Project team

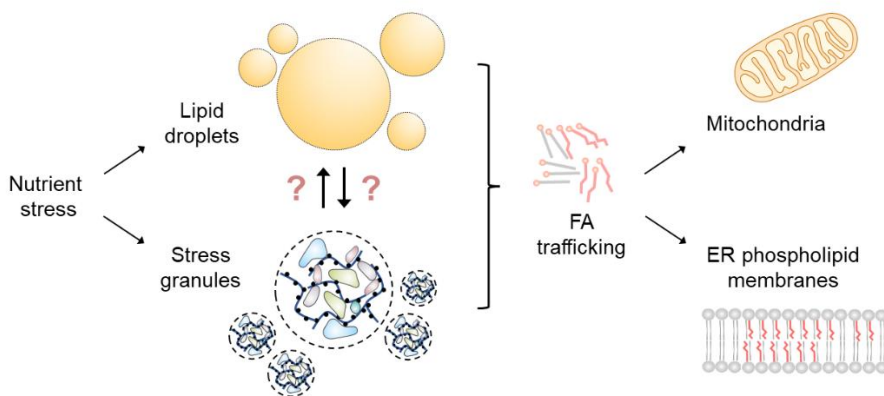
Project manager: dr. Eva Jarc Jovičič

The project is coordinated by Eva Jarc Jovičič from Jožef Stefan Institute (JSI), Department of Molecular and Biomedical Sciences. Her group at Petan Lab at JSI focuses on lipid droplets, membrane remodelling and lipid signalling. They will perform the key cell-based mechanistic perturbation studies exploring the interplay between lipid droplets and stress granules. The group of Boris Rogelj from the Department of Biotechnology at JSI will provide neuronal-specific molecular tools and expertise in stress granule research and the group of Nina Vardjan from the Faculty of Medicine, University of Ljubljana will work on primary astrocytes and generate unique genetic fruit-fly models. This unique consortium will investigate how changes in lipid metabolism underpin stress responses and metabolic deficiency in neurodegeneration.

Collaboration partners and researchers: [SICRIS](#)

Project description

DROPmode addresses poorly understood fundamental mechanisms that regulate metabolic stress responses in neurodegeneration. Specifically, the project seeks to understand how neurons direct the trafficking of fatty acids (FAs) to mitochondria and endoplasmic reticulum membranes in order to alleviate energy deficiency and preserve endoplasmic reticulum homeostasis. We propose that crosstalk between lipid droplets and stress granules, constitutes an adaptive mechanism that governs stress-induced reprogramming of FA distribution and oxidation. DROPmode aims to counteract neuronal metabolic deficiency by selectively modulating the FA intracellular distribution to enhance the equilibrium in neuronal energy and membrane homeostasis. The results will provide fundamental and transformative insights, addressing critical gaps in our understanding of organelle-mediated responses to metabolic stress.



Project objectives

The main aim of DROPmode is to overcome neuronal metabolic deficiency by selectively modulating the turnover of stress response organelles, namely lipid droplets (LD) and stress granules (SG), in order to preserve the equilibrium in neuronal energy generation and membrane homeostasis. The second aim is to explore the relation between disturbances in glial LD metabolism and neuronal stress response changes, including organelle dynamics, energy and membrane homeostasis.

DROPmode addresses three major questions:

1. How do neuronal LDs and SGs respond to acute and long-term depletion of specific nutrients?
2. Does modulation of these responses affect neuronal FA distribution and energy and membrane homeostasis?
3. How do disruptions in glial LD metabolism impact neuronal stress response in vitro and in vivo?

References

[SICRIS: Modulation of lipid droplet metabolism to overcome metabolic deficiency in neurodegeneration \(DROPmode\)](#)