



Cell-cycle, Cell Dynamics and Mechanics

11h A.M

THURSDAY
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“Organelle proteostasis in cell fate and disease”

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Summary:

Proteostasis or protein homeostasis network (PN) is a multi-compartmental system with a central role in regulating protein synthesis, folding, trafficking, disaggregation, and ultimately degradation. The main function of PN is to ensure the maintenance of proteome fidelity and integrity in order to preserve homeostasis in the cell.

The coordination of PN is complex and commits several signalling cascades including anabolic and catabolic signals. PN trigger global cellular signals (epigenetic, transcription, translation...) or specific response toward organelles: a process named “organelle proteostasis”.

Indeed, nutrient fluctuations upstream of different metabolic programs inflict profound restructure of organelles in composition of protein complexes and other macromolecules.

Our project aims to address how organelles such nuclei, ER, lysosome and mitochondria organise their proper PN to ensure optimal function in the context of cell differentiation and organ function.

We explore organelle proteomics, metabolomics and lipodomics in order to address how enzymes toward lipid second messengers (phosphoinositides) impact proteostatic response at the organelle level.

We investigate these processes during muscle cell differentiation and maintenance where proteostasis is highly active to ensure stem cell fate and tissue remodeling.

We use cell and mice models to integrate and connect organelle molecular signature to the physiopathology of genetic diseases linked to loss of function of phosphoinositide-metabolizing enzymes.

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