Sujet de stage Semestre 4 - Master 2ème année
IBMP | 2026-2027

Titre/Title Study the Activity of the Target of Rapamycin (TOR) Complex (TORC) in Response to Genotoxic Stress in Plants.

Contacts

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Lien page web de l'équipe

Description du projet (20 llignes max) | *Project Description (20 lines max.)*

Français :

English :

All living organisms cope with multitude of stressors throughout their life cycle. The DNA Damage Response (DDR) and Target of Rapamycin (TOR) signaling orchestrate DNA repair and cell growth respectively. However, the cooperative action between these pathways remains contradictory.

The TOR kinase is critical for cell growth and development. It associates with regulatory subunits RAPTOR and LST8 to form the functional TOR complex (TORC), which phosphorylates myriads of downstream substrates and modulates transcription, ribosome biogenesis, protein synthesis and autophagy-mediated degradation, as part of prosurvival and adaptational responses. Active TORC does not operate in a simple on/off mode, instead, it shows remarkable substrate specificity, precisely aligned with the exact upstream stimuli. The nuclear TOR function remains controversial in both yeast and mammals. In our laboratory, we are currently investigating the crosstalk between TOR signaling, the nucleus and transcriptional reprogramming in response to various stress conditions including genotoxic stress, in the model plant *Arabidopsis thaliana*.

This Master project aims to understand the molecular mechanisms of TORC translocation to the nucleus, mediated by the DDR pathway. We will use GFP-TOR expressing transgenic lines to monitor stress-induced TORC translocation into the nucleus. DDR-deficient lines combined with application of specific PIKK kinase inhibitors will provide a robust chemical and genetic tools. Using immunoprecipitation coupled with tandem mass spectrometry (IP-MSMS) we will characterize nuclear TORC activity and identify its specific nuclear downstream targets.

Méthodologies (mots clés) : microscopy ; western blot ; plant growth assay ; co-IP ; Y2H

Références (maximum 3) :

Illustration (1 photo ou 1 schéma, petit format)

Parcours de Master (cochez le ou les parcours souhaités) :

Master « Sciences du Vivant », Faculté des Sciences de la Vie, Université de Strasbourg

1- Biologie et génétique moléculaire : X
7- Autres masters équivalents en France ou à l'étranger : X

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