

MASTER 2 BMC PARCOURS GENOPATH ANNÉE 2021-2022

Titre du sujet de stage :

Dynamic control of gene expression in *Saccharomyces cerevisiae*

Nom, adresse de l'Unité d'accueil / Nom du responsable de l'unité :

Laboratoire de Biologie et Modélisation de la Cellule (LBMC), UMR5239.
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Nom, adresse de l'Equipe d'accueil / Nom du responsable d'équipe :

Equipe génétique des variations intra-espèces (LBMC).
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Sujet de stage :

The regulation of gene expression is a fundamental process involved in the adaptation of living organisms to dynamically changing environments. Yet, the cost and benefits of regulating the expression of particular genes remain largely unknown, despite being essential for understanding and predicting evolution in fluctuating environments. To fill this knowledge gap, we will artificially control the expression dynamics of stress response genes in yeast cells and quantify how it affects proliferation rates in periodic stress conditions. To this end, the student will adapt and calibrate a system allowing for inducible degradation of a protein of interest in yeast. She/he will characterize three critical properties of the inducible system: its efficiency, its specificity and its toxicity. This project will offer the opportunity to learn basic molecular biology techniques, CRISPR/Cas9 genome editing, flow cytometry, quantification of growth rates and computational analyses while addressing a fundamental biological question.

Technologies utilisées :

Molecular biology, CRISPR/Cas9 genome editing, flow cytometry, growth assays, data analysis with R.

Mots clés : Inducible expression, dynamic control, periodic stress, fitness, *S. cerevisiae*.

Publications d'intérêt :

Papagiannakis *et al.* 2017 <https://www.nature.com/articles/s41598-017-04791-6>
Keren *et al.* 2016 <https://www.sciencedirect.com/science/article/pii/S009286741630931X?via%3Dihub>
Bleuven and Landry 2016 <https://royalsocietypublishing.org/doi/10.1098/rspb.2016.1458>
Duveau *et al.* 2018 <https://elifesciences.org/articles/37272>