LABEX TULIP

PLANT AND BACTERIAL RESPONSES TO ABIOTIC ENVIRONMENTAL CHANGES

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Scientific objectives

From prokaryotes to complex eukaryotic organisms, changes of abiotic environmental factors such as temperature, water availability, pH, redox state or salinity limit organism fitness. To limit their effects, organisms have evolved various strategies which mainly rely on reorganization of genetic expression and result in a number of morphological, physiological and/or metabolic changes. The aim of the project is, using different biological systems as models, to describe these responses and the pathways of signal perception/transduction/gene regulation which govern them.

Because they are sessile, plants are particularly exposed to changes in their abiotic environment. They have evolved complex signal perception and regulatory pathways based on hormonal inter-cellular coupled with molecular intra-cellular signalling. We aim at describing the interplay between hormones in transcription regulation in response to different abiotic stresses (such as drought, osmotic and saline stresses) in sunflower, where abiotic stress tolerance is the most limiting factor of yield and constitutes the main target for breeders.

Most bacteria are exposed to environmental variations in natural settings, which menace their ability to survive. To cope with these changes, they have evolved two kinds of responses, known as “specific” or “general” stress responses. We are studying both kinds of responses using as models rhizobia, soil bacteria able to establish a nitrogen-fixing symbiosis with legume plants. As these bacteria are used as inoculants of legume cultures in the fields, their survival is a particular source of concern in agriculture, and we aim at providing tools to improve their resistance to stress.

TULIP MTR

The first MTR entitled: “Organism - abiotic environment interactions (the scale of the sole organism)”, deals with the interactions between one organism and its environment (habitat and social context). This project falls entirely in this project since it directly aims at describing how organisms adapt to changes in their environment.

Note that part of this project also falls in the second MTR entitled “Organism-organism interactions” as rhizobia are involved in symbiotic interactions with legume plants, and are faced with abiotic environmental changes during host colonization too.

FTEs involved in the project

Staff involved from teams “Responses to stress and environmental signals in rhizobia” and “Genetics and Genomics of Sunflower” of LIPM (partner 2) are respectively indicated below:

FTE researchers : 2 : Eq Bruand / 2.5 : Eq Langlade
FTE engineers and technicians : 1 : Eq Bruand / 2.5 : Eq Langlade
FTE contracted staff and PhD students: 1.5 : Eq Bruand / 3 : Eq Langlade