How plants distinguish friends and foes: signaling crosstalks between eukaryotic microorganisms and the model legume *Medicago truncatula* leading to symbiosis or immunity

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Scientific objectives

Plants are able to recognize non-self molecules produced by microorganisms (Microbial Associated Molecular Patterns or MAMPs) through plasma membrane receptors, and their specific perception can trigger innate immune responses (Zipfel, 2008) or compatible symbiotic responses (Bonfante & Requena, 2011). These contradictory responses are triggered even though molecular patterns of pathogenic and symbiotic MAMPS, as well as their receptors, can be structurally similar. The first steps of the interaction between root tissues and symbiotic or pathogenic microbes are essentially identical, comprising adhesion to the plant tissue and penetration of the host. This raises the question of how the invaders (symbiotic or pathogens) can penetrate the cell wall and avoid the induction of defense responses. Our main objective is to better understand the molecular mechanisms by which plants distinguish foes and friends.

We will seek and characterize new disease- and symbiosis-associated signals produced by *Aphanomyces euteiches* and arbuscular mycorrhizal fungi and will study their perception and transduction in the model legume *Medicago truncatula*. We will study the influence of biotic and abiotic factors on signal production by microorganisms. Translocated pathogenic effectors involved in host cell reprogramming will be identified and characterized. The natural genetic diversity of *M. truncatula* will be exploited to identify genetic determinants involved in root-microorganism interactions and to investigate evolutionary constraints which govern these interactions.

Zipfel C. (2008). Pattern-recognition receptors in plant innate immunity. Curr Opin Immunol. 20:10-16.
Bonfante P, Requena N. (2011).Dating in the dark: how roots respond to fungal signals to establish arbuscular mycorrhizal symbiosis. Curr Opin Plant Biol. 14:451-457.

TULIP MTR

This project will mainly be integrated into MTR2 "***Organism - Organism interactions (two-partner interactions)***".

ETPs involved in the project : 5 (chercheurs/enseignants-chercheurs)