



Proposition d'un sujet de stage au M2 ADAM (2018-2019)

Acceptez-vous que ce sujet soit proposé aux étudiants de l'itinéraire « Pro » ? OUI/~~NON~~

Titre	The study of two receptors that control both immunity and symbiotic signalling in plants
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Equipe(s)	Equipe Signalisation Symbiotique, LIPM
Résumé	<p>Plants can establish symbiotic interactions with soil microbes that lead to improved plant nutrition. Thus, most plant roots can be colonised by arbuscular mycorrhizal (AM) fungi, and legume plants have the additional ability to be nodulated by nitrogen-fixing bacteria. Both the AM and the Rhizobium-legume (RL) symbioses require fine-tuning of plant immunity, but little is known about the interconnections between symbiotic and defence signaling pathways. In <i>Medicago truncatula</i> we have identified two LysM domain receptor proteins called MtNFP (for Nod Factor Perception) and MtLYK9 (LysM Receptor Kinase 9) that have dual roles in controlling symbiosis and plant immunity. Furthermore, while both proteins control plant immunity, they each specifically also control establishment of one symbiosis; NFP also controls the RL symbiosis and, for MtLYK9, we have recently shown that it also controls the AM symbiosis. This suggests different mechanisms of control of immunity for the RL and the AM symbiosis. One important component of both immune and symbiotic signaling is the regulation of reactive oxygen species (ROS) production.</p> <p>Objectives : The aim is to further characterise our <i>mtnfp</i> and <i>mtlyk9</i> mutants for their symbiotic and defence-related phenotypes to better understand the functioning of MtNFP and MtLYK9, as well as the mechanisms by which plants discriminate symbiotic and pathogenic microbes. To help understand how the same protein can control such contrasted outcomes, we have generated new point mutations in MtNFP, and our first data suggest that they uncouple the different roles of MtNFP. To help characterise these mutants, as well as our <i>mtlyk9</i> mutants, we have also recently set up new biosensors to measure levels of ROS production during plant-microbe interactions.</p> <p>Methods: nodulation and mycorrhization tests, visualisation of symbiotic infection by light microscopy; early detection of ROS production in plants in response to microbes or symbiotic and immune-related molecules, using biosensors and different detection methods (colorimetry, fluorimetry, confocal microscopy). Q RT-PCR of symbiotic and defence-related genes in response to microbes or symbiotic and immune-related molecules.</p> <p>References: Gough C and Jacquet C. (2013) The Nod factor perception protein carries weight in biotic interactions. Trends in Plant Science. Gough, C., Cottret, L., Lefebvre, B., Bono, J. (2018). Evolutionary history of Plant LysM receptor proteins related to root endosymbiosis. Frontiers in Plant Science.</p>
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