



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

Titre	Functional analysis of candidate ethylene and cytokinin receptors of <i>Rhizophagus irregularis</i>
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Equipe(s)	Symbiose Endomycorhizienne et Signalisation Cellulaire Acceptez-vous que ce sujet soit également proposé à l'itinéraire PRO ? <input checked="" type="checkbox"/> OUI <input type="checkbox"/> NON X
Résumé	<p>Many microorganisms interacting with plants produce phytohormones, but the role of these compounds in their own life cycle remains largely unexplored. Our group studies the Arbuscular Mycorrhizal (AM) symbiosis, which associates the roots of most plants with microscopic soil fungi.</p> <p>AM fungi respond to root-exuded hormones called strigolactones, and this is important for the early steps of the symbiosis. Analysis of AM genome sequences identified candidate genes for ethylene and cytokinin receptors ^[1], suggesting that AM fungi may also respond to these phytohormones. The effect of CK and ethylene on fungal growth <i>in vitro</i> is currently evaluated, and the capacity of the candidate receptors to bind their respective ligands and transduce the signal is investigated (ANR project Mycormones).</p> <p>In parallel to these studies, the aim of this M2 project is to determine if these receptors are required in the symbiosis. A functional analysis will be undertaken using Host-Induced Gene Silencing (HIGS). This strategy involves transforming a host plant with an RNAi construct designed to target a fungal gene. It will be implemented in <i>Marchantia paleacea</i> and <i>Medicago truncatula</i>, in interaction with the AM fungus <i>Rhizophagus irregularis</i>. Transformed plants (<i>Ma. paleacea</i>) or hairy root clones (<i>Me. truncatula</i>) will be selected for:</p> <ol style="list-style-type: none"> 1. Strong expression of the introduced construct 2. Silencing of the targeted fungal gene <p>Selected lines will be carefully phenotyped for AM symbiosis : timing, intensity and distribution of colonization. In addition, we will evaluate the ability of the fungus to colonize a new plant when the candidate receptor genes are silenced. Finally, in the case of <i>Ma. paleacea</i>, we will assess the symbiotic response of the plant (measured as the growth increase conferred by AM inoculation), in silenced vs non-silenced lines. Together, these measurements will allow to determine whether the perception of cytokinin or ethylene is important for the symbiotic capacity of <i>R. irregularis</i>.</p> <p>[1] Hérivaux <i>et al.</i> (2017) MBio 8, e01739-16. doi:10.1128/mBio.01739-16</p>
Photo	<div style="display: flex; justify-content: space-between;"> <div style="width: 45%;"> <p>AM symbiosis in <i>Marchantia paleacea</i></p> </div> <div style="width: 45%;"> <p>Candidate genes for ethylene and cytokinin receptors in <i>R. irregularis</i>, compared to their homologs in <i>Arabidopsis</i></p> </div> </div>