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	**Understanding the role of ARGONAUTE1 in plant intracellular immune receptor function**
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Equipe(s)	Plant resistance pathways dynamics and adaptation to climate change
Résumé	Plant immunity relies on transmembrane and intracellular immune receptors. Most intracellular immune receptors belong to the NOD-like receptor (NLR) family and confer rapid and strong immune responses upon recognition of pathogen effector. This specific recognition often culminates in cell death. Members of the NLR family typically induces immune signalling (cell death) via their N-terminal domain, which consist of a coiled-coil (CC) or Toll-interleukin-1 receptor (TIR) domain. Despite the considerable advances in the last decade, major gaps and questions remain in the understanding of how NLRs function[1]. ARGONAUTE proteins are core components of the RNA interference pathways in eukaryotes. ARGONAUTE1 (AGO1) is involved in post-transcriptional gene silencing and plays an important role in plant immunity, notably in response to PAMPs (pathogen associated molecular pattern)[2]. A recent study suggests that AGO1 is also involved in effector-triggered immunity[3]. Yet, how AGO1 participates in the induction of NLR-mediated immune signalling is unclear. Interestingly, we recently obtained evidence that AGO1 physically interacts with several known NLRs. This was shown in two independent biochemical screens (protein pull down-LC/MS) aiming at identifying AGO1 interacting proteins (collaboration with L. Navarro, IBENS, Paris), or NLR signalling partners (interactors of TIR and/or CC signalling domains), respectively. The goal of this project is to further characterise the interaction of AGO1 with NLRs to understand how and where in the cell does AGO1 function with NLRs. The obtained results will shed light on a yet undescribed role of AGO1 in NLR-mediated immunity and will open new perspectives for further functional characterization. Aims and approaches: **1. Test the specificity and subcellular localization of AGO1-NLR interactions *in planta*** Preliminary results indicate that AGO1 interacts with one well characterised NLR in the nucleus (FRET-FLIM). The same approach will be used to further investigate the specificity of this interaction (with other AGO family members) and to study the interaction of AGO1 with other NLRs (subcellular localization and isolated protein domain analysis). Co-immunoprecipations will be used as a complementary approach to further validate these interactions. **2. Test if AGO1 is required for effector recognition and/or NLR-mediated downstream signalling** The role of AGO1 in effector recognition by matching NLRs will be determined in loss of function *ago1* Arabidopsis mutant (pathogen infection assay and Pfo-mediated effector delivery). NLR downstream signalling can be activated in absence of pathogen effector by overexpression of isolated TIR or CC domains. This can be visualised by the induction of cell death. Requirement of AGO1 in NLR signalling will be tested using inducible lines expressing TIR or CC domains crossed with the *ago1* mutant (seedling cell death assays will be performed on selected F2 plants). [1]**Zhang, X.X., Dodds, P.N., and Bernoux, M. (2017). Annual *Re*view of Phytopathology, Vol 55 *55*, 205-229.** [2]**Vaucheret**, H. (2008). Trends Plant Sci. *13*, 350-358. [3]**Thiebeauld** O. et al. (2017). Biorxiv, https://doi.org/10.1101/215590
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