



Proposition d'un sujet de stage au M2 ADAM (2017-2018)

Titre	The role of protein-protein interaction in regulation of programmed cell death and resistance of <i>Arabidopsis thaliana</i> against <i>Xanthomonas campestris</i>	
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Equipe(s)	Quantitative Immunity in Plants – LIPM	
Résumé	<p>Plants possess different systems of pathogen defence responses. In contrast to the well studied PAMP-Triggered Immunity (PTI) and Effector-Triggered Immunity (ETI), the molecular mechanisms of Quantitative Disease Resistance (QDR) are poorly understood. Recently our lab identified RKS1 as a major component of QDR against the bacterial plant pathogen <i>Xanthomonas campestris</i> pv. <i>campestris</i> (<i>Xcc</i>) (Huard-Chauveau et al. 2013). <i>RKS1</i> encodes for an atypical kinase and it is a member of a gene cluster with 8 genes.</p> <p>Experiments in our lab showed that transient overexpression of RKS1 in <i>N. benthamiana</i> leads to the development of programmed cell death (PCD) like symptoms, while the overexpression of RKS1 in <i>A. thaliana</i> does not have any effect. Interestingly, RKS1 induced PCD in <i>N. benthamiana</i> can be suppressed by coexpression of at least three members of the RKS1 cluster. Furthermore, we identified mutant versions of these proteins failing in suppressing RKS1 induced PCD</p> <p><i>In vivo</i> studies of protein-protein interactions indicate a direct interaction of RKS1 with these three members of the cluster. Taken together, the results show that RKS1 activity might be negatively regulated by other members of the gene cluster.</p> <p>We will use cell-biological, biochemical and genetic approaches to further characterize these protein-protein interactions between RKS1 and the cluster members and their function in defense responses of <i>A. thaliana</i> against <i>Xcc</i>. Furthermore we will characterize the biochemical properties of these cluster members.</p> <p>Huard-Chauveau, C., Percepied, L., Debieu, M., Rivas, S., Kroj, T., Kars, I., Bergelson, J., Roux, F. and Roby, D. (2013) An Atypical Kinase under Balancing Selection Confers Broad-Spectrum Disease Resistance in Arabidopsis. <i>PLoS Genet.</i>, 9.</p>	
Photo	<div style="display: flex; justify-content: space-around;"> <div style="text-align: center;"> <p>Molecular interactions</p> <p>* mutation</p> </div> <div style="text-align: center;"> <p>Phenotypes</p> <p>Induction of PCD</p> <p>Suppression of PCD</p> <p>Induction of PCD</p> </div> </div>	<p>Figure 1: Working model for suppression of RKS1 induced cell death</p> <p>Expression of RKS1 alone induces PCD in <i>N. benthamiana</i>. (top row).</p> <p>Co-expression of cluster members leads to direct interaction with RKS1 and block of PCD (middle row).</p> <p>Mutant version of KS-proteins fail to suppress RKS1 induced PCD (bottom row)</p>