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Characterization of interactions between Phytophthora RxLR effectors and their host plant targets

Iga Tomczynska

The genus *Phytophthora* represents a group of eukaryotic fungus-like pathogenic microorganisms called Oomycetes. Successful colonization of the host plant is achieved by Phytophthora due to its reservoir of effectors, that are produced by the pathogen during infection in order to diminish immunity response of the plant or to provide better nutrient supply for the pathogen. One class of these molecules is the RxLR effectors that are transported into host cells, where they specifically interact with host proteins (targets) to change their function. Due to high economic impact of *Phytophthora* species, the function of effectors in changing plant metabolism is attracting more and more attention.

The characterization of the effector-target interaction was based on experiments that included among others co-immunoprecipitation techniques followed by MS, investigation of phenotype of Arabidopsis transgenic lines expressing the effector, localization of fluorescent tagged effector protein in planta and the consequences of effector action in plant cells.

The first analyzed effector, RxLR24 shows evolutionary conservation and extended sequence homology across different *Phytophthora* species. Homologous RxLR24 proteins derived from *P. infestans* and *P. brassicae* interact with members of the plant RABA GTPase family of the host plant potato and Arabidopsis, respectively. RABA GTPases are proteins involved in vesicular transport in the cell and accordingly, the action of RxLR24 perturbs delivery of vesicle cargos that plays a role in immunity responses. The experiment with pH dependent GFP epitope tag indicated that delivery of antimicrobial proteins such as PR-1 and PDF1.2 to the apoplast is inhibited in the presence of RxLR24. The second effector, RxLR3 from *P. brassicae*, interferes with regulatory mechanism of plasmodesmata (PD) gating via manipulation of the plant callose synthase. The interaction between RxLR3 and the callose synthase leads to diminished callose deposition at PD and increases flux through plasmodesmata. It is likely that during infection such an action supports cell to cell transport of other pathogen effectors. Both effectors can be used as valuable molecular tools for cell biology.

Jury:
Prof. Felix Mauch (thesis supervisor)
Prof. Sophien Kamoun (external co-examiner)
Dr. Markus Geisler (internal co-examiner)
Prof. Louis-Félix Bersier (president of the jury)