Abstract

Immune-related hybrid incompatibility (HI) is one form of post-zygotic reproductive isolation, frequently caused by allelic mismatches of genes involved in plant immunity.

Immune-related HI between the North European Landsberg *erecta* (L*er*) and Central Asian Kashmir-2 (Kas-2) *Arabidopsis thaliana* (*A.t.*) accessions likely arose as a by-product of adaptation to the biotic environment. It is due to the recessive genetic interaction between a highly variable *RECOGNITION OF PERONOSPORA PARASITICA1* (*RPP1*)-like resistance gene cluster in L*er* and Kas-2 alleles of the receptor-like kinase-encoding gene *STRUBBELIG RECEPTOR FAMILY 3* (*SRF3*). Similar to *A.t.* autoimmune-mutants, this epistasis exposes a temperature-dependent trade-off between immunity and growth. Some RPP1 receptors are known to be involved in pathogen effector recognition, culminating in effector-triggered immunity. However, the precise sub-cellular localization and molecular function of SRF3 in *A.t.* was still undefined, when this work was initiated. Previous work showed that compatible *SRF3*-forms ($SRF3^{Ler}$) in Kas-2 backgrounds dampen activation of defensive MPK4 and MPK6 upon perception of the bacterial PAMP-epitope flg22 and enhance susceptibility to *Pseudomonas syringae*.

The work presented integrates SRF3 in the context of PAMP-triggered immunity (PTI). SRF3-GFP localizes to the plasma membrane and plasmodesmata (PD). $SRF3^{Ler}$-GFP-associated proteins identified in a proteomics approach are enriched for plasmodesmal and plasma membrane proteins involved in PTI and callose deposition. Contrary to MAPK activation, presence of $SRF3^{Ler}$ in a Kas-2 genetic background leads to enhanced ROS burst and restriction of PD-flux upon flg22 treatment, but renders Kas-2 almost insensitive to seedling growth inhibition in the presence of flg22. The results presented, suggest that $SRF3^{Ler}$ differentially affects independent PTI signalling branches downstream of the PRR complex and provide an example how studying immune-related HI can be used to identify molecular components involved in plant defence.