A NOVEL PROTEINACEOUS PAMP FROM ASCOMYCETES INDUCES PLANT CELL DEATH IN *SOLANACEAE*

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Plant recognition of conserved microbial elicitors, also known as pathogen- or microbe-associated molecular patterns (P/MAMPs), initiates PAMP-triggered immunity (PTI). PAMPs are conserved across classes of microorganisms and are important to the microbial lifestyle. Although a number of microbial PAMPs have been identified the full repertoire remains unknown.

R. commune, the causal agent of scald, is one of the most destructive and economically important diseases of barley. It is a hemibiotroph with an extended asymptomatic phase. Following conidia germination on the leaf surface and cuticle penetration *R. commune* hyphae spread between the plant epidermal cells without directly penetrating them. Like several other important fungal pathogens of cereals, including *Zymoseptoria tritici*, *Magnaporthe orysae*, and *Parastagonospora nodorum*, *R. commune* belongs to the Ascomycota. This phylum also contains major pathogens of dicots, such as *Sclerotinia sclerotiorum* and *Botrytis cinerea*, as well as the model fungus *Neurospora crassa*.

Sequencing of the *R. commune* transcriptome from an early time point during barley infection revealed a highly abundant transcript encoding a small secreted fungal protein with four cysteine residues of unknown function, which we called RcINS1 (Inducing Necrosis in *Solanaceae*). It is most highly up-regulated at the onset of barley infection with *R. commune*. RcINS1 and its homologues from different fungal species, including *Zymoseptoria tritici*, *Magnaporthe oryzae* and *Neurospora crassa*, produced using *Pichia pastoris*, exhibit PAMP activity triggering cell death in *Solanaceae* but not in other families of dicots or monocots. Using virus-induced gene silencing (VIGS) of known components of PTI in *Nicotiana benthamiana*, RcINS1-triggered cell death was shown to be BAK1 and SGT1 dependent. In contrast, CMPG1 and MAPKKKe were not involved in *N. benthamiana* response to RcINS1. Identification of the plant receptor involved in RcINS1 recognition in *N. benthamiana* will provide a valuable resource for engineering non-host resistance in monocots.