

DOWNSTREAM CHITIN SIGNALING MEDIATED BY CERK1 IN ARABIDOPSIS

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ABSTRACT

Recent work identified a LysM-domain membrane associated receptor-like kinase (CERK1) as the chitin receptor in *Arabidopsis thaliana*. In order to further study downstream chitin signaling, we screened an Arabidopsis EMS-mutagenized population for mutants defective in chitin responses. We also conducted a yeast two-hybrid (Y2H) screen for proteins interacting with AtCERK1. A total of six EMS mutants showed a specifically defective chitin response, of which two mutants were shown to be allelic to *CERK1*. The Y2H screening identified fifty-four putative CERK1-interactors. We were able to identify T-DNA insertions in 43 of the 54 putative interactors and these mutants were tested for their chitin response. Sixteen of the 43 mutants were responded differently from the wild-type upon chitin addition. These 16 mutants were also tested for their defense response to the bacterial pathogen, revealing a leucine-rich repeat receptor-like kinase (LRR-RLK) mutant found to be more resistant to the bacteria. The gene was subsequently named PAMP responsive protein kinase 1 (PRPK1). We further studied PRPK1's involvement in chitin-triggered immunity. Interestingly, *prpk1* mutants were resistant to the hemibiotrophic pathogen, but highly susceptible to the necrotrophic pathogen. The *prpk1* mutants showed a reduced expression of genes involved in the jasmonic acid (JA) and ethylene (ET) responsive defense pathways. Taken together, the data suggest that PRPK1 plays a key role in PAMP-triggered immunity, perhaps by regulating downstream hormone signaling pathways.