

Publication

The family of Peps and their precursors in Arabidopsis : differential expression and localization but similar induction of pattern-triggered immune responses

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In Arabidopsis thaliana, the endogenous danger peptides, AtPeps, have been associated with plant defences reminiscent of those induced in pattern-triggered immunity. AtPeps are perceived by two homologous receptor kinases, PEPR1 and PEPR2, and are encoded in the C termini of the PROPEP precursors. Here, we report that, contrary to the seemingly redundant AtPeps, the PROPEPs fall at least into two distinct groups. As revealed by promoter- β -glucuronidase studies, expression patterns of PROPEP1-3, -5, and -8 partially overlapped and correlated with those of the PEPR1 and -2 receptors, whereas those of PROPEP4 and -7 did not share any similarities with the former. Moreover, bi-clustering analysis indicated an association of PROPEP1, -2, and -3 with plant defence, whereas PROPEP5 expression was related to patterns of plant reproduction. In addition, at the protein level, PROPEPs appeared to be distinct. PROPEP3::YFP (fused to yellow fluorescent protein) was present in the cytosol, but, in contrast to previous predictions, PROPEP1::YFP and PROPEP6::YFP localized to the tonoplast. Together with the expression patterns, this could point to potentially non-redundant roles among the members of the PROPEP family. By contrast, their derived AtPeps, including the newly reported AtPep8, when applied exogenously, provoked activation of defence-related responses in a similar manner, suggesting a high level of functional redundancy between the AtPeps. Taken together, our findings reveal an apparent antagonism between AtPep redundancy and PROPEP variability, and indicate new roles for PROPEPs besides plant immunity.

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