

Publication

The Arabidopsis Pep-PEPR system is induced by herbivore feeding and contributes to JA-mediated plant defence against herbivory

JournalArticle (Originalarbeit in einer wissenschaftlichen Zeitschrift)

ID 3178869

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Year 2015

Title The Arabidopsis Pep-PEPR system is induced by herbivore feeding and contributes to JA-mediated plant defence against herbivory

Journal Journal of experimental botany

Volume 66

Number 17

Pages / Article-Number 5327-5336

Keywords Arabidopsis, DAMP, herbivory, jasmonic acid, oral secretions, Pep, PEPR, Spodoptera littoralis

A number of plant endogenous elicitors have been identified that induce pattern-triggered immunity upon perception. In *Arabidopsis thaliana* eight small precursor proteins, called PROPEPs, are thought to be cleaved upon danger to release eight peptides known as the plant elicitor peptides Peps. As the expression of some PROPEPs is induced upon biotic stress and perception of any of the eight Peps triggers a defence response, they are regarded as amplifiers of immunity. Besides the induction of defences directed against microbial colonization Peps have also been connected with herbivore deterrence as they share certain similarities to systemins, known mediators of defence signalling against herbivores in solanaceous plants, and they positively interact with the phytohormone jasmonic acid. A recent study using maize indicated that the application of ZmPep3, a maize AtPep-orthologue, elicits anti-herbivore responses. However, as this study only assessed the responses triggered by the exogenous application of Peps, the biological significance of these findings remained open. By using *Arabidopsis* GUS-reporter lines, it is now shown that the promoters of both Pep-receptors, PEPR1 and PEPR2, as well as PROPEP3 are strongly activated upon herbivore attack. Moreover, *pepr1 pepr2* double mutant plants, which are insensitive to Peps, display a reduced resistance to feeding *Spodoptera littoralis* larvae and a reduced accumulation of jasmonic acid upon exposure to herbivore oral secretions. Taken together, these lines of evidence extend the role of the AtPep-PEPR system as a danger detection mechanism from microbial pathogens to herbivores and further underline its strong interaction with jasmonic acid signalling.

Publisher Oxford University Press

ISSN/ISBN 0022-0957

edoc-URL <http://edoc.unibas.ch/41175/>

Full Text on edoc No;

Digital Object Identifier DOI 10.1093/jxb/erv250

PubMed ID <http://www.ncbi.nlm.nih.gov/pubmed/26034129>

ISI-Number WOS:000359688700017

Document type (ISI) Article