

## Publication

Arabidopsis MAP kinase phosphatase 1 and its target MAP kinases 3 and 6 antagonistically determine UV-B stress tolerance, independent of the UVR8 photoreceptor pathway

### **JournalArticle (Originalarbeit in einer wissenschaftlichen Zeitschrift)**

**ID** 1006536

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**Year** 2011

**Title** Arabidopsis MAP kinase phosphatase 1 and its target MAP kinases 3 and 6 antagonistically determine UV-B stress tolerance, independent of the UVR8 photoreceptor pathway

**Journal** Plant Journal

**Volume** 68

**Number** 4

**Pages / Article-Number** 727-37

Plants perceive UV-B radiation as an informational signal by a pathway involving UVR8 as UV-B photoreceptor, activating photomorphogenic and acclimation responses. In contrast, the response to UV-B as an environmental stress involves mitogen-activated protein kinase (MAPK) signalling cascades. Whereas the perception pathway is plant specific, the UV-B stress pathway is more broadly conserved. Knowledge of the UV-B stress-activated MAPK signalling pathway in plants is limited, and its potential interplay with the UVR8-mediated pathway has not been defined. Here, we show that loss of MAP kinase phosphatase 1 in the mutant *mkp1* results in hypersensitivity to acute UV-B stress, but without impairing UV-B acclimation. The MKP1-interacting proteins MPK3 and MPK6 are activated by UV-B stress and are hyperactivated in *mkp1*. Moreover, mutants *mpk3* and *mpk6* exhibit elevated UV-B tolerance and partially suppress the UV-B hypersensitivity of *mkp1*. We show further that the MKP1-regulated stress-response MAPK pathway is independent of the UVR8 photoreceptor, but that MKP1 also contributes to survival under simulated sunlight. We conclude that, whereas UVR8-mediated acclimation in plants promotes UV-B-induced defence measures, MKP1-regulated stress signalling results when UV-B protection and repair are insufficient and damage occurs. The combined activity of these two mechanisms is crucial to UV-B tolerance in plants.

**Publisher** Wiley

**ISSN/ISBN** 0960-7412 ; 1365-313X

**edoc-URL** <http://edoc.unibas.ch/46920/>

**Full Text on edoc** No;

**Digital Object Identifier DOI** 10.1111/j.1365-313X.2011.04725.x

**PubMed ID** <http://www.ncbi.nlm.nih.gov/pubmed/21790814>

**ISI-Number** 000297514900014

**Document type (ISI)** Journal Article