Identification of a highly substrate-specific phosphatase representing an entry point into purine nucleotide catabolism

Katharina J. Winkel, Institute of Plant Nutrition, Leibniz Universität Hannover

Purine nucleotide catabolism plays an important role in senescence-related nutrient remobilization. The nucleotides AMP and GMP are degraded by a catabolic route running from the nucleotides through guanosine to xanthosine and further to the production of glyoxylate and the release of carbon dioxide and ammonia. We identified a novel phosphatase, which specifically dephosphorylates the nucleotide XMP to xanthosine *in vitro*. This phosphatase might represent an alternative entry point into purine nucleotide catabolism in addition to the established route through guanosine. Interestingly, the *XMPP* protein is not constitutively present *in vivo* in Arabidopsis, but is induced or stabilized upon methyl-jasmonic acid treatment and infiltration of *Pseudomonas syringae* (ES4326). Considering the findings for the xanthine dehydrogenase (*XDH*) of Ma *et al.* (2016), we build a working model postulating that reactive oxygen species produced by XDH at a fungal infection site are quenched by the production of uric acid by XDH upon the induction of XMPP and increased metabolite flux through the purine nucleotide catabolism in the surrounding leaf tissue. Thus, *XMPP* may be an important player in constraining plant defense reactions and protecting plant tissue surrounding the infection site.