



Immunity induction by leaf extracts – DAMPs as the active principle

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Hundreds of studies found an enhanced immunity in plants after the application of plant or algal extracts. In search for the active principle, we discovered that leaf extracts induce immunity-related signalling cascades and phenotypic resistance in common bean (*Phaseolus vulgaris*) and lima bean (*P. lunatus*). This induction was species-specific, i.e., extracts from plants of the same cultivar, or species, elicited a stronger response than extracts from taxonomically distant sources. One factor that explains this highly specific 'damaged-self recognition' is the action of extracellular DNA (eDNA) as a damage-associated molecular pattern (DAMP). Fragments of eDNA or cytosolic DNA are well known triggers of inflammation and immunity in mammals. In bean, only eDNA from the same species, but not from the congeneric lima bean, induced the formation of ROS, the activation of MAPKs, and phenotypic resistance⁸. eDNA bears an as yet unexplored potential as a future plant vaccine.

Martin Heil – CV

I studied Biology, Geology and Philosophy in Würzburg, Germany. PhD, thesis 'Cost-benefit analyses in a defensive ant-plant mutualism'. After a Postdoc at CEFÉ-CNRS in Montpellier, France, I joined Wilhelm Boland's Dpt. of Bioorganic Chemistry at the MPI for Chemical Ecology in Jena, Germany, as a Junior Group leader. Since then, field work in México. In 2004, I accepted a full professor's position as head of the Dpt. of General Botany and director of the Botanical Garden at University of Duisburg-Essen, which I left in 2007 to join CINVESTAV – Irapuato in México. My main research interests are ant-plant and microbe-plant mutualisms, manipulation in mutualism and parasitism, volatile-mediated signalling, induced immunity, DAMPs and - most recently – eDNA-mediated signalling in plants and mammals, particularly in the context of HIV-1 infection. Students graduated: 8 bachelor, 23 master, 9 PhD. Actually, 117 articles published in international journals, > 9,000 citations and H-Index 47 according to Research Gate.