Insect egg-derived phospholipids trigger immune responses in Arabidopsis thaliana

Philippe Reymond

Department of Plant Molecular Biology, University of Lausanne

Arabidopsis recognizes insect egg-derived phosphatidylcholine (PC) and triggers defense responses, including a burst of reactive oxygen species, salicylic acid accumulation, defense gene expression and localized cell death. Intriguingly, PC is converted to phosphatidic acid (PA) in the extracellular space by plant phospholipases D. PA then interacts with membrane-localized receptors LecRK-I.1 and LecRK-I.8 to activate downstream signalling events. Furthermore, the glutamate receptor like 2.7 modulates immunity by inducing cytosolic Ca2++ accumulation upon activation by a potential release of glutamate from eggs. Thus, although they appear as inert structures deposited on leaves, insect eggs contain chemical signals that drastically affect their interaction with host plants. Also, our data provide a rare example of extracellular modification of a non-self molecule to trigger defenses.