Protein-protein interactions in the jasmonate signalling cascade

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Jasmonates (JAs) are plant-specific hormones, found throughout the plant kingdom, that steer the delicate balance between growth and the activation of defence programs, such as the production of bioactive secondary metabolites[1].

Within the signalling cascades that are triggered by JAs, the JASMONATE-ZIM DOMAIN (JAZ) repressor proteins play a central role. The endogenous bioactive JA-isoleucine conjugate mediates the binding of JAZ proteins to the F-box protein CORONATINE INSENSITIVE 1 (COI1), part of the Skp1/Cullin/F-box SCF^{COI1} ubiquitin E3 ligase complex. Upon the subsequent destruction of the JAZ proteins by the 26S proteasome, multiple transcription factors are relieved from JAZ-mediated repression, allowing them to activate their respective downstream responses[1,2].

This central module of the JA signalling cascade has been first discovered in the model plant *Arabidopsis thaliana*, and found to be conserved across the plant kingdom. Many questions remain regarding the targets, specificity, function, and regulation of the different JAZ proteins or many of the other proteins that form part of the central module. Recent studies provided essential and novel findings and underscored the value of protein-protein interaction studies to acquire fundamental insight into hormonal signalling pathways[2].

By using cutting-edge functional genomics tools, in particular Tandem Affinity Purification, we aim to identify novel components acting in the JA signalling network, in the model plants *Arabidopsis* and *Medicago truncatula*. In subsequent reverse genetics screenings we try to reveal how they impinge on the central JA signalling module and regulate its activity.

Knowledge gathered in our model plants will eventually be useful to create a toolbox for engineering of the JA signalling pathway in medicinal plants that synthesize high-value bioactive compounds, such as pharmaceuticals.

[1]De Geyter, N., Gholami, A., Goormachtig, S. & Goossens, A. Transcriptional machineries in jasmonate-elicited plant secondary metabolism. Trends Plant Sci. 17, 349-359 (2012).

[2]Pauwels, L. & Goossens, A. The JAZ proteins: a crucial interface in the jasmonate signaling cascade. Plant Cell 23, 3089-3100 (2011).