

Friday, October 9, 11:45 a.m.-12:35 p.m.

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Heterotrimeric G-protein signaling and abiotic stress responses in plants

Heterotrimeric G-proteins comprised of $G\alpha$, $G\beta$ and $G\gamma$ subunits are important signal transducers in all eukaryotes. In plants, G-proteins are involved in the regulation of multiple biotic and abiotic stresses, as well as many developmental processes, even though their repertoire is significantly limited compared to that in metazoan systems. One $G\alpha$, 1 $G\beta$ and 3 $G\gamma$ proteins represent the heterotrimeric G-protein complex in Arabidopsis, and a single regulatory protein, RGS1, is one of the few known biochemical regulators of this signaling complex. This quantitative disparity between the number of signaling components and the range of processes they regulate is rather intriguing. We now present evidence that the phospholipase $D\alpha 1$ protein is a key component and modulator of the G-protein complex during regulation of a subset of signaling pathways. We also show that the same G-protein subunits and their regulators exhibit distinct physiological and genetic interactions depending on specific signaling and developmental pathways. Such developmental plasticity and interaction specificity likely compensates for the lack of multiplicity of individual subunits, and helps to fine-tune plants' responses to constantly changing environments.