

Release of GTP exchange factor mediated regulation of abscisic acid signal transduction through ABA-induced rapid processing of RopGEFs

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Abiotic stress leads to activation of ABA signal transduction, which is mediated by the core components: PYL/RCAR ABA receptors, PP2C-type protein phosphatases and protein kinases. Small GTPases of the ROP/RAC family act as negative regulators of ABA signal transduction. However, the mechanisms by which ABA controls the behavior of ROP/RACs have remained unclear. We will present data showing that an *Arabidopsis* guanine nucleotide exchange factor RopGEF protein is rapidly sequestered to intracellular particles in response to ABA and is degraded. Interestingly, RopGEF1 directly interacts with specific PP2C protein phosphatases and undergoes constitutive processing in higher order *pp2c* mutant plants, revealing that active PP2C protein phosphatases protect and stabilize RopGEF1 from translocation. In addition we have found that ABA-mediated processing of RopGEF1 also plays an important role in ABA-mediated regulation of lateral root growth. The presented findings point to a PP2C-RopGEF-ROP/RAC control loop model that is proposed to aid in shutting off ABA signal transduction, to counteract leaky ABA signal transduction caused by “monomeric” PYL/RCAR ABA receptors in the absence of stress and amplifies signaling in response to ABA.