ABSTRACT

"Integration and specificity in brassinosteroid signaling"

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Perception of different signals and their integration into appropriate responses is an essential element of the living plant cell, requiring robust yet adaptable biochemical networks. These networks are largely composed of proteins that can interact, move to specific cellular locations, be modified or degraded. The integration of these events often leads to activation or inactivation of downstream transcription factors, which then induce or repress genes. The main interest of the group is to use the brassinosteroid signaling as a model system and to address the question how specificity and integration is achieved at the cellular level. Our resent research revealed that brassinosteroid signaling pathway shares signaling components with the signaling pathway controlling stomatal development in the leaf and hypocotyl epidermis (Gudesblat et al., 2012, Nature Cell Biol.). Conversely, incorporation of shared signaling components into distinct protein complexes through scaffolding molecules and localization of the pathways to different cellular compartments can also ensure crosstalk. Endomembrane trafficking is an integral part of signal transduction as it attenuates signaling and provides spatial and temporal dimensions to signaling events. BRASSINOSTEROID INSENSITIVE1 perceives its ligand, the brassinosteroid hormone at the cell surface and is constitutively endocytosed. We recently uncover the importance of endocytosis for brassinosteroid signaling. A bioactive, fluorescent brassinosteroid was developed and used to visualize endocytosis of brassinosteroid receptor-ligand complexes in living cells. Clathrin- , AP-2- and ARF GEF-dependent endocytic regulation of brassinosteroid signaling from the plasma membrane was postulated (Irani et al., 2012 Nature Chem. Biol.; Di Rubbo et al., 2013 Pant Cell).