

IQ-domain proteins connect auxin and calcium signaling during Arabidopsis development

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Plant development follows a highly coordinated route and many of its processes are controlled by the phytohormone auxin. Embryonic root apical meristem initiation is a key developmental event where auxin plays an important role, mainly through the action of the AUXIN RESPONSE FACTOR5/MONOPTEROS (MP) transcription factor. Disruption of MP function leads to a variety of defects on different levels, ranging from transcriptional responses to disturbed cellular processes. Although a number of downstream targets of MONOPTEROS have been identified and characterized, an open question remains how cellular processes that govern cell shape and function are directed by this transcription factor. By comparing different transcriptomic datasets we have identified a subclade of IQ-domain proteins acting downstream of MP. Both functional and molecular characterization show that IQD15-18 are transcriptionally controlled by auxin, that they interact with Calmodulins and microtubules *in vivo*, and that subcellular localization of IQD18 protein is cell cycle-dependent. Loss- and gain- of-function analyses revealed a role for these proteins in both auxin and calcium signaling. These findings place the IQD15-18 proteins at the hinge between two important signaling pathways and shed light on how cellular processes may be directed by MONOPTEROS.