Activation and Polarity Control of PIN-FORMED Auxin Transporters by Phosphorylation.

Abstract:
Auxin controls almost every aspect of plant development. Auxin is distributed within the plant by passive diffusion and active cell-to-cell transport. PIN-FORMED (PIN) auxin efflux transporters are polarly distributed in the plasma membranes of many cells, and knowledge about their distribution can predict auxin transport and explain auxin distribution patterns, even in complex tissues. Recent studies have revealed that phosphorylation is essential for PIN activation, suggesting that PIN phosphorylation needs to be taken into account in understanding auxin transport. These findings also ask for a re-examination of previously proposed mechanisms for phosphorylation-dependent PIN polarity control. We provide a comprehensive summary of the current knowledge on PIN regulation by phosphorylation, and discuss possible mechanisms of PIN polarity control in the context of recent findings.