

# The evolution of auxin homeostasis mechanisms

Ph.D. thesis

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## Abstract

The *streptophyte* lineage consists of land plants (embryophytes) and several groups of primarily freshwater green algae called charophytes. While the phytohormone auxin is a conserved regulator of land plant development, little has been known of the possible origins of auxin response mechanisms in charophytes. We found that one of these mechanisms, the cellular auxin efflux via the PIN family of transport proteins, is most likely a deeply conserved feature in streptophytes. Additionally, we investigated the state of conservation in the green lineage (*Viridiplantae*) of the gene families known to be involved in auxin transport in land plants. We revealed that some families are deeply conserved outside land plants, but not others. We also helped uncover a unique radiation within the PIN family in *Charophyceae*. Striving to uncover the native significance of auxin transport in charophytes, we discovered a growth response to exogenously-applied auxin in *Closterium*, though the effort to produce stable mutant lines in the native PIN homolog is still underway. Altogether, we brought important insights into the evolution of auxin transport and response in the streptophyte lineage, though many questions still remain.