

Transient efflux inhibition improves plant regeneration by natural auxins

Abstract

Efficient plant regeneration is fundamental for crop improvement, clonal propagation, and plant genome editing. Traditionally, somatic embryogenesis (SE) and de novo shoot regeneration rely on synthetic auxins such as 2,4-D, while natural auxins are often ineffective. Our recent work demonstrates that transient inhibition of auxin efflux converts natural auxins, such as indole-3-acetic acid (IAA) and 4-Cl-IAA, into highly effective inducers of plant regeneration across species, leading to more synchronized and homogeneous seedling development compared to 2,4-D. Building on these findings, our current research aims to unravel the molecular mechanisms by which auxin promotes the acquisition of embryonic identity in *Arabidopsis thaliana*. By integrating regeneration biology with mechanistic insights into auxin-driven cellular reprogramming, we seek to establish innovative and more sustainable strategies for plant propagation and crop biotechnology.