Graduate School Event

Thesis Defense:Cell-Surface Auxin Signaling: Linking molecular pathways to plant development

Aline Monzer (Friml Group)
Friml Group

Host: Mario de Bono

Plant growth and development rely significantly on phytohormones, with auxin serving as a master regulator, orchestrating processes from embryogenesis to organogenesis, vascular patterning, and environmental adaptation. Since its conceptual proposition by Charles Darwin in 1880 as an endogenous chemical signal influencing phototropism in grass, auxin has captivated scientists seeking to understand how such a small molecule exerts a profound influence on plant development.One particularly fascinating aspect of auxin function is its ability to self-organize its transport. Through a feedback mechanism between auxin perception and directional transport—primarily mediated by PIN auxin transporters—auxin establishes narrow transport channels. This phenomenon, known as auxin canalization, is fundamental to vascular formation, regeneration, and other key developmental processes. Despite advances in our understanding, driven by experimental studies and computational models, auxin canalization remains an enigma, with many unanswered questions.Like other hormones, auxin functions through intricate signaling pathways. It operates through at least two distinct signaling mechanisms: the well-characterized canonical pathway and the less understood non-canonical pathway. While significant progress has been made in elucidating the canonical pathway, the non-canonical mechanisms remain less defined and require further investigation.In this study, we revisit the non-canonical auxin signaling pathway mediated by the cell-surface complex Auxin Binding Protein 1-Transmembrane Kinase 1 (ABP1-TMK1), with a particular focus on its downstream phosphorylation events. We reveal that this auxin-mediated phosphorylation is conserved across the green lineage, underscoring its fundamental role in plant development. We explore key phosphorylation targets, particularly PIN2, which is essential for root gravitropism. To further understand TMK1's role in diverse developmental processes, we identified and investigated its interactors as potential co-receptors or regulatory components within its signaling network.Given the previously established role of ABP1-TMK1 in auxin canalization, we sought to further investigate this process and identified several TMK1 interactors also involved in this intricate mechanism.These findings provide new insights into the complex regulation of auxin canalization, highlighting a broader and more interconnected signaling framework than previously understood.

Monday, March 3, 2025 10:00am - 11:00am

Central Bldg / O1 / Ballroom (I01.O1.006) and Zoom

This invitation is valid as a ticket for the ISTA Shuttle from and to Heiligenstadt Station. Please find a schedule of the ISTA Shuttle on our webpage: https://ista.ac.at/en/campus/how-to-get-here/ The ISTA Shuttle bus is marked ISTA Shuttle (#142) and has the Institute Logo printed on the side.