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Special Issue Reprint

## Advances in Plant Auxin Biology

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This Reprint brings together articles and reviews showcasing advances in plant auxin biology, a field undergoing major transformation. Auxin is a central regulator of plant growth, development, and environmental adaptation, and current research increasingly reveals that its action depends on a highly dynamic, multi-layered regulatory network extending beyond the classical nuclear signaling model. Contributions address biosynthesis, metabolism, conjugation, polar transport, signal perception, downstream responses, and interactions with other hormonal pathways. Reviews refine the theoretical framework through updated analyses of tryptophan-dependent IAA biosynthesis, GH3-mediated homeostasis, and emerging IAOx-dependent pathways in Brassicaceae. Other studies examine how auxin transport shapes plant developmental plasticity, highlighting evolutionary conservation and functional diversity. Additional contributions explore context-dependent functions, including year-round shooting in woody bamboo, regulation of specialized metabolite production, and allelic bias on auxin signaling in polyploid crops. The Reprint also emphasizes new analytical approaches, including Non-invasive Micro-test Technology (NMT), enabling real-time investigation of auxin transport and its coordination with ion fluxes. Such advances expand our ability to connect molecular mechanisms with physiological responses at the whole-plant level. Overall, this Reprint offers an integrated perspective on auxin as a central coordinator of plant life, spanning scales from molecular enzymology and cellular signaling to development, adaptation, and crop improvement.



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