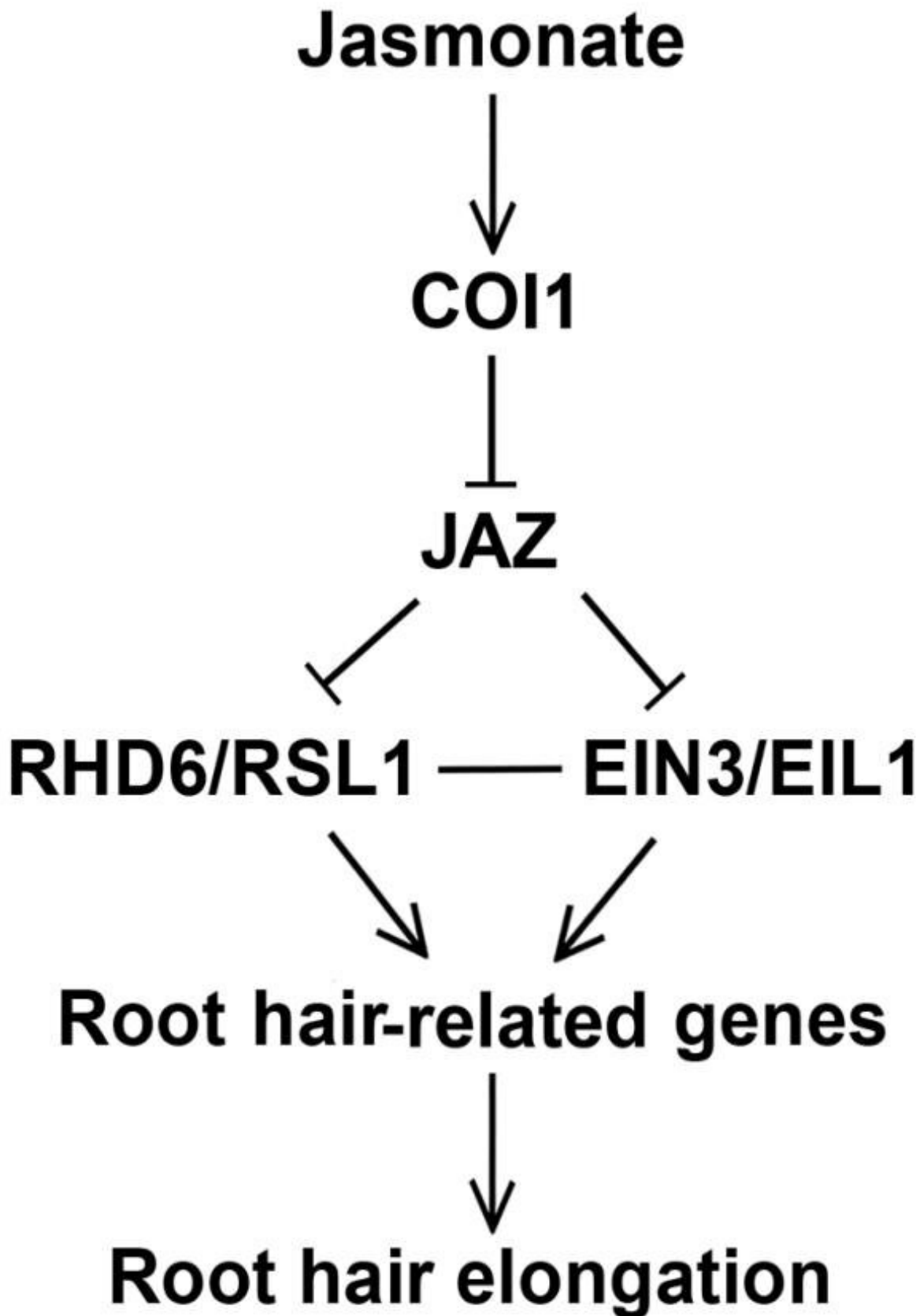


Mechanism of jasmonate-promoted root hair growth in Arabidopsis

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A simplified model for jasmonate-stimulated root hair development in arabidopsis. Credit: HAN Xiao

Root hairs are tubular polarized extensions of root epidermal cells and are crucial for plant anchorage, nutrient acquisition, and environmental interactions. The plant hormone jasmonate has been reported to promote root hair growth. However, it remains unclear about the molecular mechanisms underlying the stimulation of root hair development by jasmonate.

In a study published in *The Plant Cell*, researchers from Xishuangbanna Tropical Botanical Garden (XTBG) revealed a key signaling module in which jasmonate zim-domain (JAZ) repressors of the jasmonate pathway directly modulate root [hair](#) defective 6 (RHD6) and RHD6-like1 (RSL1) [transcription factors](#) to integrate jasmonate signaling and the root hair developmental process.

To investigate the [molecular mechanisms](#) underlying how jasmonate promotes root hair development, the researchers first confirmed that exogenous application of methyl jasmonate (MeJA) significantly increased the length of [root hairs](#).

They also discovered that the endogenous coronatine-insensitive1 (COI1) and JAZ-mediated jasmonate signaling pathway is critical for root hair development. The disruption of the COI1 receptor or accumulation of a JAZ repressor (e.g. JAZ4 or JAZ8) decreased root hair length.

Further investigation showed that several JAZ repressors interacted with

RHD6 and RSL1, two bHLH transcription factors crucial for root hair development. JAZ proteins repressed the transcriptional function of RHD6 and interfered with the interaction between RHD6 and RSL1.

Phenotypic analysis showed that jasmonate promoted root hair growth in a manner dependent on RHD6 and RSL1. It also showed that overexpressing RHD6 largely rescued the root hair-defective phenotypes of *coi1-2* and *JAZ8-ΔJas-9* plants.

"Our study provides a mechanistic understanding of how JAZ repressors directly regulate RHD6/RSL1 transcription factors to integrate jasmonate signaling and root hair development in *Arabidopsis*," said Prof. Hu Yanru, principal investigator of the study.

More information: Xiao Han et al. *Arabidopsis* JAZ Proteins Interact with and Suppress RHD6 Transcription Factor to Regulate Jasmonate-Stimulated Root Hair Development, *The Plant Cell* (2020). [DOI: 10.1105/tpc.19.00617](https://doi.org/10.1105/tpc.19.00617)

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