MYB70 transcription factor modulates Arabidopsis seed germination and root development

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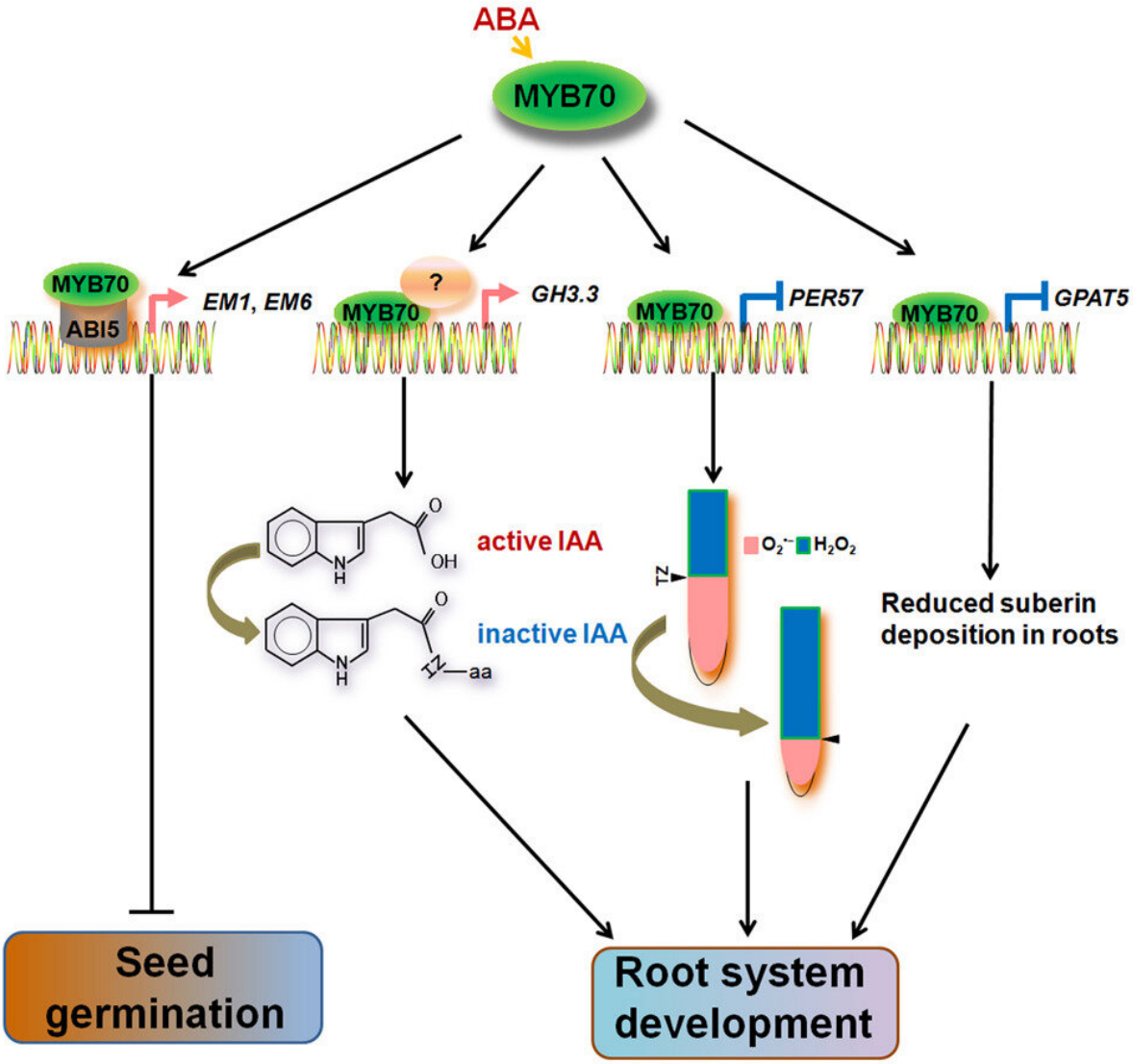

MYB70 modulates seed germination and root system development in Arabidopsis. Credit: WAN Jinpeng

Crosstalk among Abscisic acid (ABA), auxin, and reactive oxygen species (ROS) plays critical roles in modulating seed germination, root growth, and suberization. However, the underlying molecular mechanisms remain largely elusive.

The Arabidopsis MYB44, MYB70, MYB73, and MYB77 genes, which share structural similarity and are the members of subfamily 22, are involved primarily in the regulation of plant growth and development, as well as plant responses to environmental stresses. However, the functions of MYB70 in mediating plant growth and development have not yet been elucidated.

In a study published in *iScience*, researchers from the Xishuangbanna Tropical Botanical Garden (XTBG) of the Chinese Academy of Sciences revealed various functions of MYB70 in the modulation of plant growth and development. Analysis of the phenotypes of MYB70-overexpressing OX70 and myb70 plants at different developmental stages revealed various roles of MYB70 in responses to phytohormone signaling and developmental processes.

The researchers focused on characterizing the mechanisms of MYB70 involved in the processes of seed germination and root system development through the modulation of its dual transcriptional regulatory activities.

In seeds, MYB70 was shown to interact with Abscisic Acid Insensitive 5

(ABI5) both in vitro and in vivo, and the interaction increased ABI5 stabilization; and thus, improved ABI5's ability to transcriptionally modulate its target genes. In the roots, ABA-induced MYB70 modulated auxin signaling by increasing the content of conjugated Indole-3-Acetic Acid (IAA).

In addition, MYB70 negatively regulated the expression of peroxidase (PER) genes and suberin biosynthesis-related genes, thereby modulating ROS balance and decreasing suberization in the roots, which ultimately affected root system development (RSA).

"Our study showed that MYB70 integrates auxin, ROS and ABA signaling pathways to form a network regulating seed germination and root system development," said Wan Jinpeng of XTBG.

More information: Jinpeng Wan et al, MYB70 modulates seed germination and root system development in Arabidopsis, *iScience* (2021). DOI: 10.1016/j.isci.2021.103228

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