Auxin drives leaf flattening

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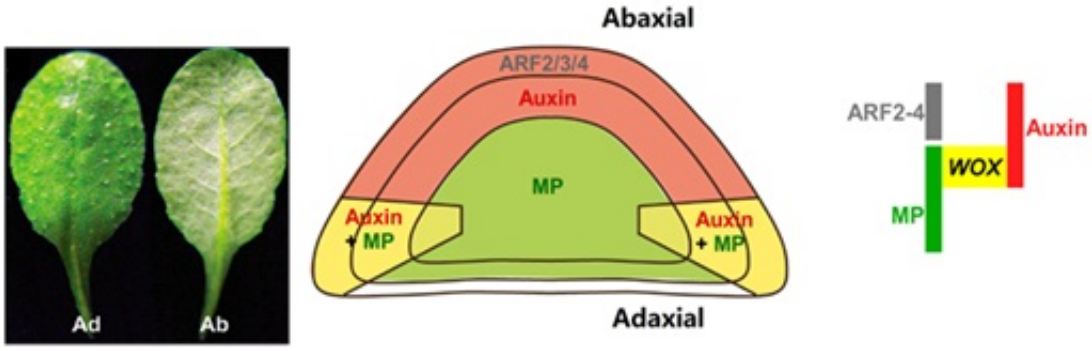

Conceptual model of how spatial auxin signaling controls leaf patterning. Credit: IGDB

The vast majority of higher plants use leaves to harvest solar energy. A common feature of leaves is their flat blades. Scientists from the Institute of Genetics and Developmental Biology in Beijing have discovered that the classical phytohormone auxin enables leaf blade expansion and leaf flattening.

The flattening of leaves to form broad blades is an important adaptation that maximizes photosynthesis. However, the molecular mechanism underlying this process remains unclear. A new study led by JIAO Yuling from the Institute of Genetics and Developmental Biology of the Chinese Academy of Sciences (CAS) shows that spatial auxin signaling defines the expression of two redundant genes, WOX1 and PRS, enabling leaf blade expansion and flattening.

Following their previous report on the auxin regulation of leaf polarity patterning, the researchers further found that auxin and auxin response factors (ARFs) have limited overlaps, which refines auxin signaling in the middle domain of leaf primordium. Furthermore, they found that MP/ARF5, an ARF activator directly activates the expression of WOX1 and PRS, which promote the marginal meristem and enable leaf flattening. On the other hand, ARF repressors expressed in the abaxial (ventral) domain inhibit WOX1 and PRS expression.

"The new findings in this work explain how adaxial-abaxial (dorsal-ventral) polarity patterns the mediolateral axis and subsequent lateral expansion of leaves", said Dr. JIAO Yuling. He also mentioned that other recent research of their group described auxin regulation of leaf development at the biomechanical level. "Finding how leaves get flattened is necessary to maintain and enhance yield in cultivated plants and crops," said JIAO.

This study, titled "Spatial auxin signaling controls leaf flattening in *Arabidopsis*," has been published online in *Current Biology*.

More information: Chunmei Guan et al, Spatial Auxin Signaling Controls Leaf Flattening in Arabidopsis, *Current Biology* (2017). DOI: 10.1016/j.cub.2017.08.042

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