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**WRINKLED1, a key regulator of oil biosynthesis, also affects hormone homeostasis**

The Arabidopsis WRINKLED1 transcription factor affects auxin homeostasis in roots.

**The Science**

In this study, we further characterized a mutant gene (*wri1-1*) in the plant Arabidopsis that leads to strong reduction in seed oil content. We also identified a primary root defect and confirmed altered homeostasis in auxin, a growth regulator that plays an important role in plant development.

**The Impact**

Knowing that the transcription regulator WRINKLED1 (WRI1) affects hormone homeostasis could help us to engineer crops for increased oil content.

**Summary**

WRINKLED1 (WRI1) is a key transcriptional regulator of fatty acid biosynthesis genes in diverse oil-containing tissues. Loss of function of Arabidopsis *WRI1* leads to a reduction in the expression of genes for fatty acid biosynthesis and glycolysis, and concomitant strong reduction of seed oil content. The *wri1-1* loss-of-function mutant shows reduced primary root growth and decreased acidification of the growth medium. Additional characterization of the mutant revealed: increased content of a conjugated form of the plant growth hormone auxin (indole-3-acetic acid (IAA)-Asp); increased expression of *GH3.3*, a gene encoding an enzyme involved in auxin degradation; decreased auxin transport; and reduction of some *PIN* genes, which encode IAA carrier proteins. DNA binding assays demonstrated that AtWRI1 bound to the promoter of *GH3.3* and some *PIN* genes. It is well known that auxin exerts its maximum effects at a specific, optimal concentration in roots requiring a finely balanced auxin homeostasis. This process appears to be disrupted when the expression of WRI1 and in turn a subset of its target genes are misregulated, highlighting a role for *WRI1* in root auxin homeostasis.

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**Publications**

Kong, Q. *et al.* “The Arabidopsis WRINKLED1 transcription factor affects auxin homeostasis in roots**.”** *Journal of Experimental Botany* (2017) [DOI: 10.1093/jxb/erx275].

**Related Links**

<https://academic.oup.com/jxb/article/doi/10.1093/jxb/erx275/4095571/The-Arabidopsis-WRINKLED1-transcription-factor>

**PM Recommendation for SC Web Publication**