

Novel synthetic auxin and its receptor that control gene expressions at specific part of the plant

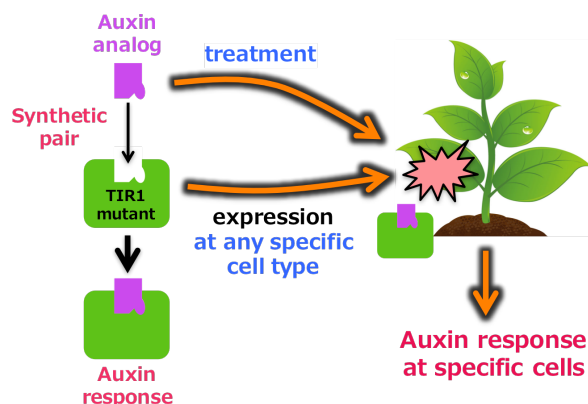
Background

Auxin is one of powerful plant growth hormones that has different physiological functions in specific part of plant such as flower, stem and root. Also, the application of auxin at very high concentration displays the growth deficient phenotype at certain parts of plant. In fact, it can lead to inhibit root elongation by applying *Auxin* onto whole plant at a same concentration for the growth of flowers and stems. Therefore, it requires an extreme care and tremendous work to apply Auxin only at inflorescence part in crop plant for fruit development and maturation while avoiding spraying any other part such as leaves and young shoots.

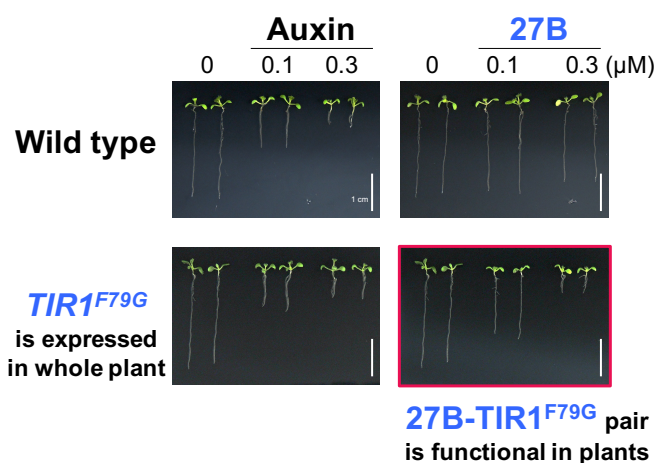
Technology Overview

Nagoya University researchers have succeeded in developing the auxin receptor ($TIR1^{F79G}$) *by mutating an amino acid residue, and the novel synthetic auxin (27B) that specifically binds to $TIR1^{F79G}$. To examine its effect on plant, *Arabidopsis* plant seedlings are used for root growth test. In wild type plant, root growth is inhibited by Auxin but not 27B. On the other hand, in plant expressing $TIR1^{F79G}$, root growth is affected by both Auxin and 27B in a *dose-dependent manner*. Therefore, these results confirm that 27B can bind only to the $TIR1^{F79G}$ receptor without interfering the endogenous auxin signal. Furthermore, this observation suggests that it might be possible to express the mutated receptor by site specific promoter, at the specific part of plant, which is to be targeted by the synthetic auxin. The application of this synthetic auxin, 27B and its receptor might provide more effective fruit development and maturation by splaying whole plants rather than immense hand work.

*TRANSPORT INHIBITOR RESPONSE 1 (TIR1) protein is known as an auxin receptor.



Synthetic Auxin and its Receptor



Root growth inhibition by Synthetic Auxin and its Receptor

Further Details: Naoyuki Uchida et al.

“Chemical hijacking of auxin signaling with an engineered auxin-TIR1 pair.” *Nature Chemical Biology*. Published online January 22, 2018. doi 10.1038/nchembio.2555.

Applications: Constructing transgenic plants expressing the mutated auxin receptor only in inflorescence. Applicable plants are tomato, mini tomato, eggplant, melon and zucchini.

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