Phytohormone induced root growth

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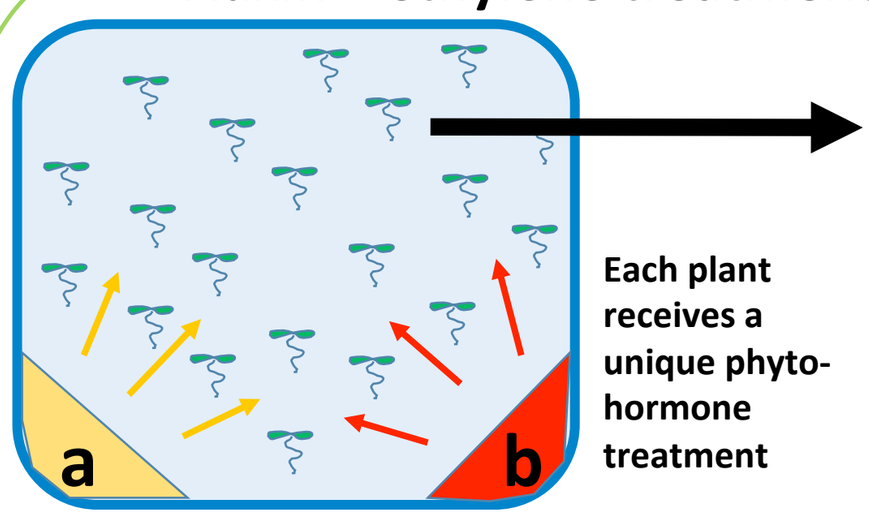
Plant hormones regulate physiological processes and development of new organs (morphogenesis). Phytohormone auxin is the key regulator of growth and development in plants. Interactions of auxin with other hormones are studied to an insufficient level. Phytohormone signaling pathways are characterized by the complexity of organization and key proteins' function redundancy. Identification of interactions in signaling systems of auxin, ethylene and other plant hormones is an actual problem at the moment. Another essential task is to find additional substances that affect plant morphogenesis. One of the candidates is epy lichens metabolite – usnic acid.

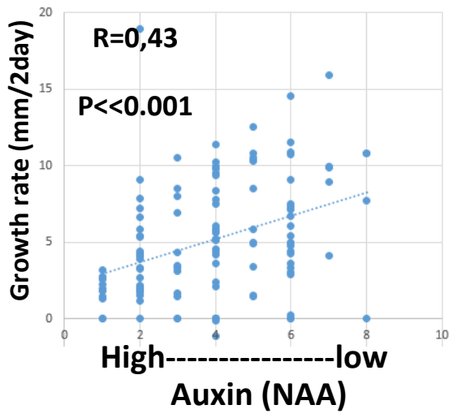
The aim of this project is to evaluate a combined action of auxin and other phytohormones on the root growth in *Arabidopsis thaliana* L., and to study morphogenetic action of the usnic acid in combination with other known phytohormones.

Auxin – ethylene treatment:

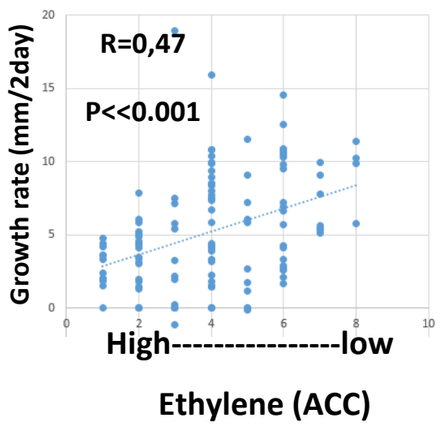


Each plant receives a unique phyto-hormone treatment

Dependence of the growth rate on the distance from the hormone source.

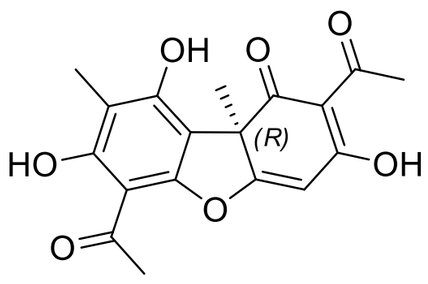


NO Interaction!! P> 0.1



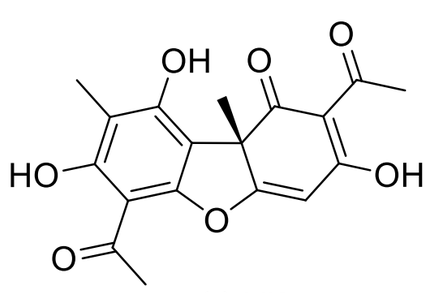
- Auxin and ethylene treatment bough show a similar dose dependent effect on the root growth rate.
- However, they do not show any interactions which favors the independence of particular regulatory pathways

Usnic acid (+) isoform on the NAA (Auxin) background dramatically inhibits plant growth



(+)-УК

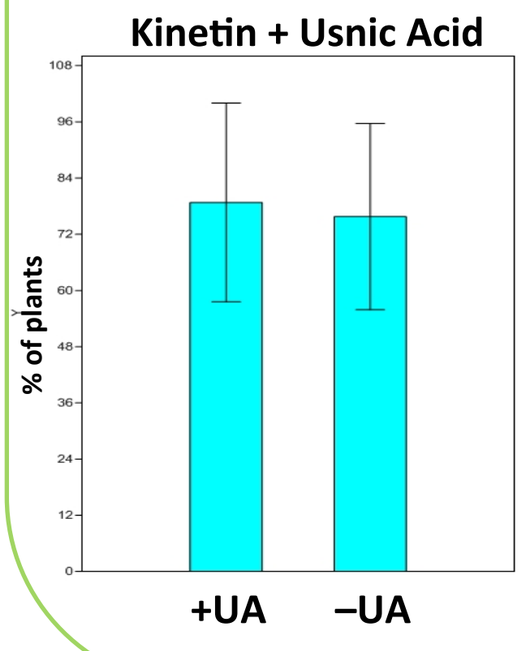
(+)-1

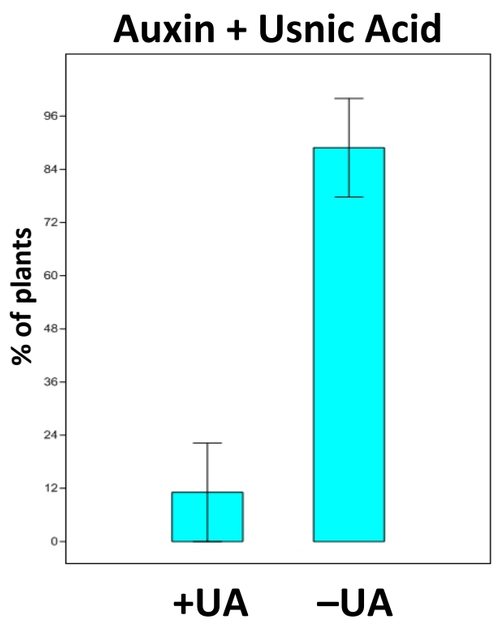


(-)-УК

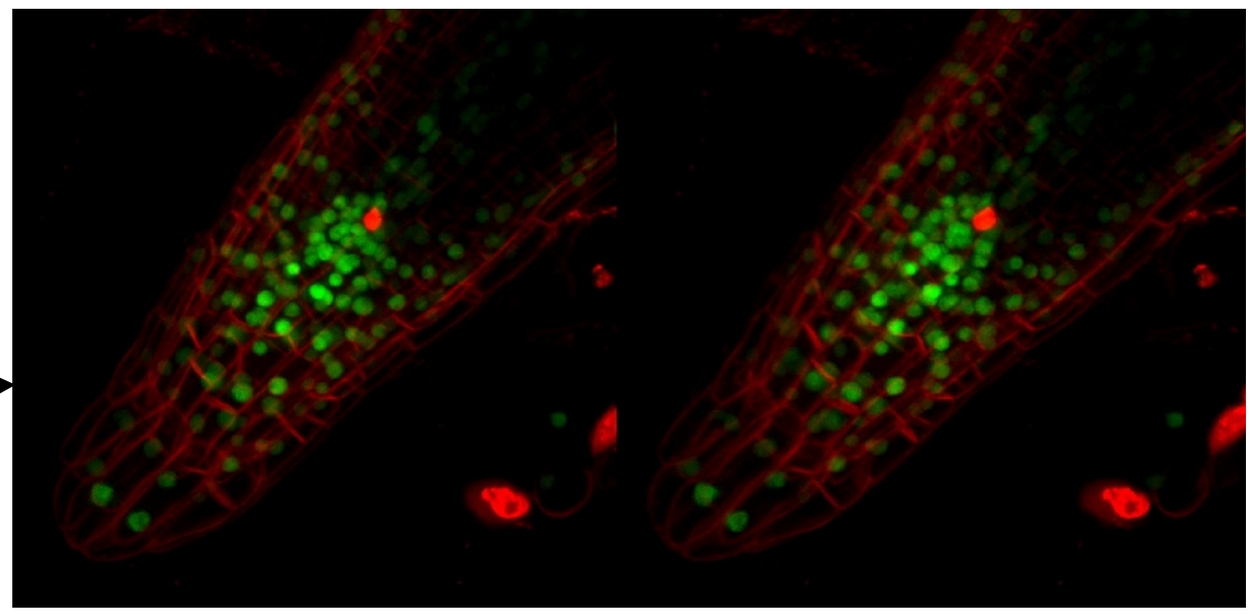
(-)-1

Relative amount of growing plants after the double treatments

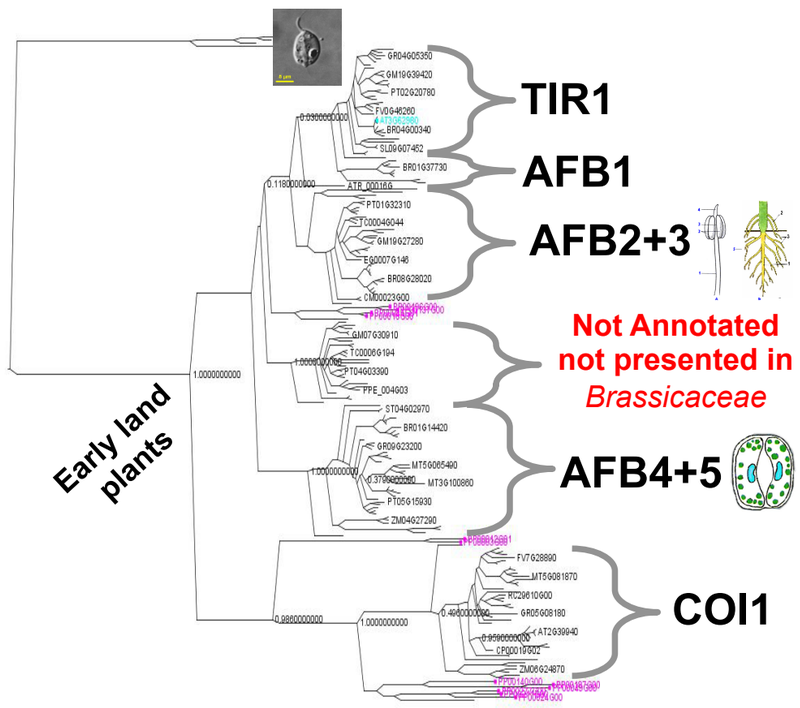




Stereopair of DR-5:GFP line root tip (nuclear localization) + PJ staining (red)



Analysis of the molecular evolution of the TIR1 auxin receptor

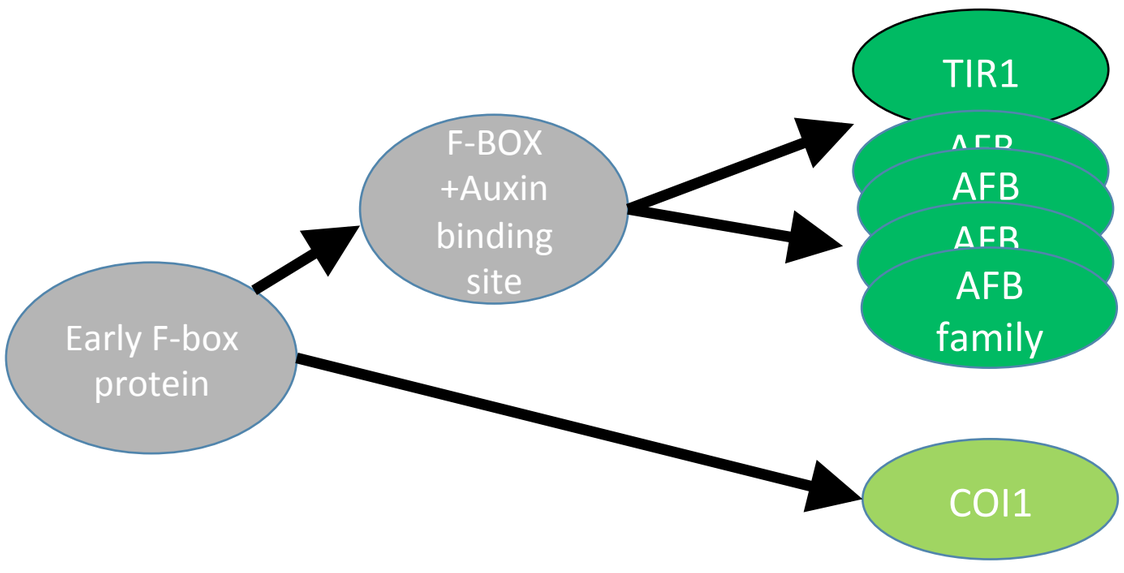


Main Auxin response

- Auxin response
- tissue specific
- response to nitrate.
- AFB3 Target of miR393.

JA and wound response

Scheme of TIR1 evolution:



- F-Box auxin-sensitive genes first appeared in the earliest land plants
- this genes in flowering plants presented as a family of functionally redundant genes
- We have found an additional member of the family which is not present in Brassicaceae