Root Vasculature:
A story of Plant's *circulatory system* during stress

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Ever wondered how plants survive adverse environmental conditions even without moving? As the evolution occurs, plants seem to have developed multiple mechanisms to deal with stress conditions. One of which is its vasculature. Like blood vessels in animals, vascular tissues support plants in conducting water, nutrients, etc. that are required for the its normal growth. But unlike animals plants cannot move, hence as the plant grows the vasculature starts to provide mechanical strength in the form of wood and fibers.

But what happens when plant happens to go through stress like drought conditions, or salt stress or pathogen attack? Well, these changes lead to alterations in its growth and development pathways in plants. One such alteration is production of a hormone called abscisic acid. Abscisic acid is known to cause many alterations in expression of numerous genes and developmental pathways of plant when plant encounters stress. Some of them include, modifications in stomata to prevent water loss and pathogen entry, increasing seed dormancy, promoting root growth etc. And we wanted to understand how abscisic acid is affecting the plant vascular system. We choose a plant called *Arabidopsis thaliana*, which is one of favorite plant of plant biologists because of its small size and fast growth.

We analyzed plants that are mutated in abscisic acid synthesis and signaling, and we found there are multiple defects in the vascular tissue formation, which shows that abscisic acid is important for proper vascular tissue development. We also found that abscisic acid is also affecting the function of other phytohormones like auxin and cytokinin, and another gene that enhances stress tolerance. By creating stress conditions, we show that ABA accumulated during stress supports plant to regain normal growth by inhibiting normal function of cell and enhancing mechanisms that are required for growth of plant like water conductivity etc.

Taken together, our results give an insight into the unexplored areas of abscisic acid influence in vascular development. Several questions remain unanswered at the moment, and a future study is required focused on determining if defects in vascular channel are supporting root in any way to enhance its water storage, or for any other reason. This work will be important for assisting research related to plant breeding programs for stress tolerant varieties.

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