Does an auxin-adjuvant urea derivative interfere with the vascular pattern formation? Preliminary results

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The vascular system is essential for land plants by providing a long distance transport of water, nutrients and signaling molecules. Our knowledge about its structure comes from the study of the continuous conductive system of Arabidopsis leaves, that is composed of interconnected veins organized in a hierarchical network: a single primary vein, loops of secondary veins, lateral veins, marginal veins, tertiary-connected veins. Auxin is the key factor guiding the vascular network differentiation in all organs and the continuous polar auxin transport reflects the continuity of conductive tissues. Indeed, auxin cell-to-cell movement involves, at least, influx and efflux carriers located at the plasma membrane (AUX1/LIKE AUX1 family and PIN-FORMED family, respectively) and receptor/receptors through which auxin signaling mechanism operates. According to the canalization hypothesis, auxin induces the formation of self-organizing channels by a feedback regulation of its own transport.

Auxin Binding Protein 1 (ABP1) is the first auxin-binding protein identified, predominantly located in the endoplasmic reticulum, while a small fraction remains in the apoplast. In this acidic region, it binds auxin acting as a receptor that mediates auxin canalization.

Here, we report preliminary results about the interference between ABP1 and an auxin-adjuvant urea derivative, the N,N'-bis(2,3-methylenedioxyphenyl)urea (2,3-MDPU).

The simple and regular vein patterns of Arabidopsis cotyledons will be used to study the effects of this urea derivative on vascular development.