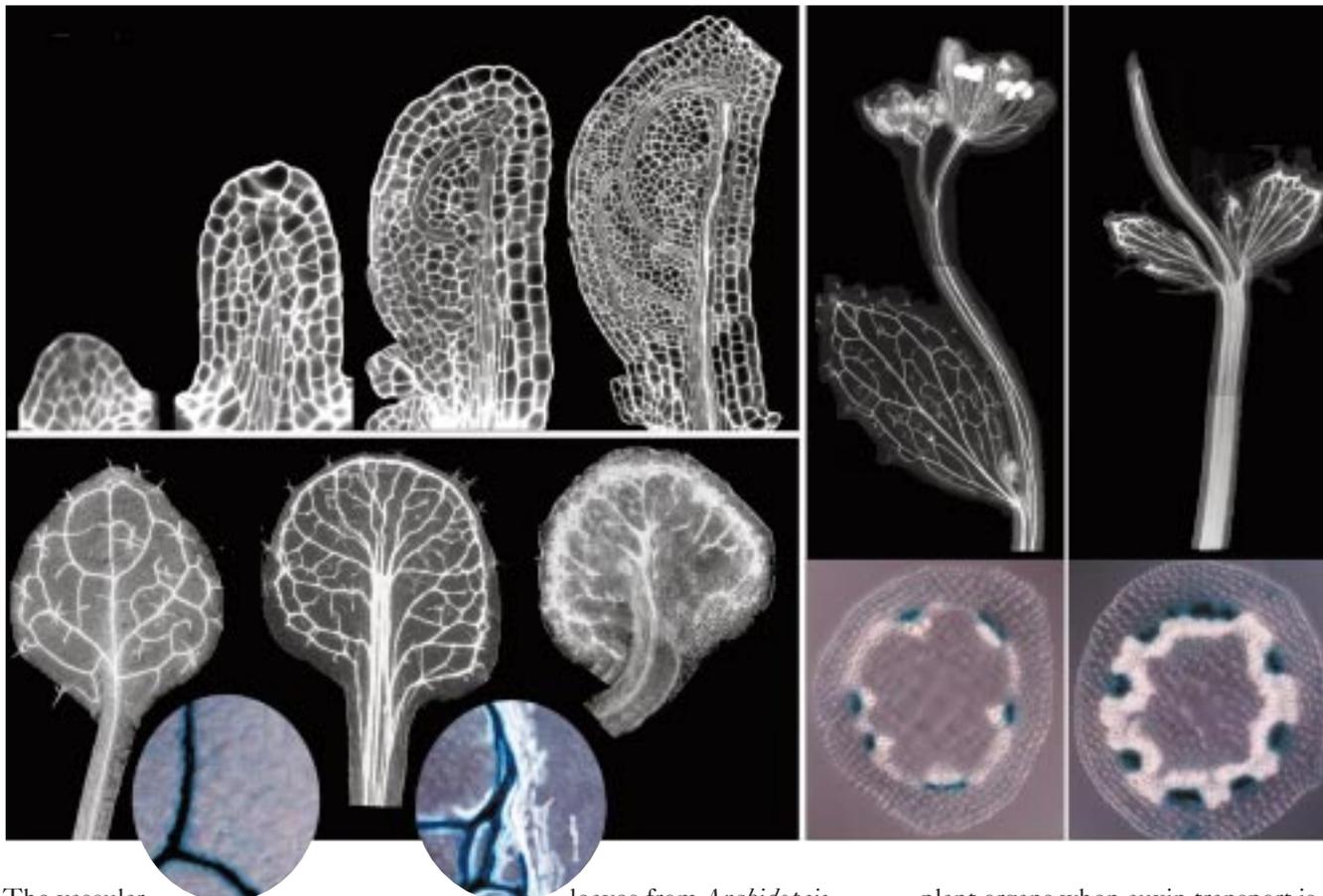


Biology in pictures

Grow with the flow



The vascular tissues of plants are organized as strands of aligned cells in all the main organs. They differentiate from narrow, interconnected provascular cells, which are visible in the early leaf primordia of *Arabidopsis thaliana* in the top left panel.

Plant hormones in the auxin class can induce the formation of additional vascular strands. Because auxins are produced in young leaves and then transported towards the rest of the plant, it is possible that naturally occurring vascular patterns reflect the preferred routes of flow for auxin.

Plants grown in the presence of auxin transport inhibitors develop vascular patterns that support this idea. The bottom left panel shows the vascular patterns of mature

leaves from *Arabidopsis* after development under normal (left leaf and left inset) and gradually more restricted (middle and right leaves and right inset) auxin transport. Reduced auxin flow results in the formation of more, less properly aligned vascular cells. This is particularly evident along the leaf margin (middle and right leaves), and strong enough inhibition of auxin flow also causes decreased vascular differentiation at the leaf base (right leaf).

These pattern changes suggest that auxin produced along the leaf margins cannot act further basally, but instead accumulates and induces excess vascular differentiation near its source.

Increased, less aligned vascular differentiation also occurs in other

plant organs when auxin transport is inhibited. This is visible in the stems in the middle (normal) and right (auxin transport inhibited) panels. Cross-sections of the stems are shown below. From the coloured images it's clear that both xylem (bright cells in all images) and phloem (stained blue) have been affected in these distortions of the vascular system.

For details see Mattsson J. *et al.*, *Development* 1999, **126**: 2979-2991. Images reproduced with permission from *Development* and provided by Jim Mattsson and Thomas Berleth, Department of Botany, University of Toronto, Toronto M5S 3B2, Canada, and Z. Renee Sung, Department of Plant and Microbial Biology, University of California, Berkeley, California 94720, USA.