

Cellular mechanisms regulating plant organ variability

How do organs form with consistent sizes and shapes, with substantial variability at the cellular level?

Current model is that a morphogen gradient spanning the organ provides cells with positional information that controls organ size. Nevertheless, recent evidences suggest that the simple interpretation of a global morphogen gradient is insufficient for size control. Moreover, a recently identified mutant showed less robust organ shapes than in wild type, and, counterintuitively, a more spatially homogeneous cell growth (Hong, 2016). We investigate the mechanisms enhancing or buffering cell variability and the consequences on reproducibility of organogenesis.

This talk will present a model for growth variability during the formation of 2D organs which is adapted to the morphogenesis of Arabidopsis sepals, studied by the team. We test different possible mechanisms entering into account in cellular variability. In a second time we determine how variability changes across scales, to understand how heterogeneous cells yield robust organs. We will confront these results to experimental observations.

* Hong L et al. (2016) Variable Cell Growth Yields Reproducible Organ Development through Spatiotemporal Averaging. Dev Cell 38, 15.