

Visualisation of plant morphogenesis

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Morphogenesis is a cellular process, driven by interplay between gene expression and a growing network of cell interactions. Cells within a plant meristem form a complex non-linear system, and possess self-organising properties. To date, molecular genetic tools have provided the greatest insight into the network of interactions that underlie plant morphogenesis, and these have allowed the identification of key genes and pathways. However, these analyses do not provide an explicit description of the many parallel molecular, cellular and physical interactions between cells that characterise morphogenesis. We have developed a battery of microscopic and genetic tools to allow clear and quantitative visualization of individual cells inside living plant tissues and have the means to manipulate them. This allows the use of computer segmentation methods for the numerical description of cell arrangements in plant tissue, and the creation of morphogenetic models for plant growth and morphogenesis. These systems provide an ideal platform for engineering of plant morphogenesis.