IN BRIEF

➔ DEVELOPMENT

Model of leaf morphogenesis

How a group of cells develops into a tissue or an organ with a well-defined shape is a long-standing puzzle in developmental biology. Kuchen *et al.* have used a combination of tracking clones of cells and experimental manipulation in *Arabidopsis thaliana* leaves, along with computer modelling, to produce a model that accounts for observed growth dynamics and shape changes. In the model, growth orientation is specified by tissue polarity, and this polarity deforms during growth. The model also correctly predicts patterns of clones in growing *Antirrhinum majus* leaves.

ORIGINAL RESEARCH PAPER Kuchen, E. E. *et al.* Generation of leaf shape through early patterns of growth and tissue polarity. *Science.* **335**, 1092–1096 (2012)

➔ EVOLUTION

Speciation in archaea despite gene flow

The authors sequenced the genomes of multiple closely related strains of an archaeal species, *Sulfolobus islandicus*, from a hot spring. On the basis of sequence, the strains fell into two groups, which also show lower than expected levels of gene flow. They show that the groups are progressively diverging: a finding that is consistent with ongoing speciation. There are no physical barriers to gene flow between the groups, and the data support the idea of ecological differentiation, which is a mode of speciation that is increasingly being recognized in eukaryotes but that is not expected in microorganisms.

ORIGINAL RESEARCH PAPER Cadillo-Quiroz, H. *et al.* Patterns of gene flow define species of thermophilic archaea. *PLoS Biol.* **10**, e1001265 (2012)

➔ CANCER

Profiling the translational targets of mTOR signalling

The mammalian target of rapamycin (mTOR) kinase is hyperactivated in various human cancers, but the specific mRNA targets of this translational regulator are poorly characterized. To investigate the mTOR translational landscape, Hsieh *et al.* carried out ribosomal profiling (high-throughput sequencing of ribosome-bound mRNAs) from an mTOR-hyperactivated prostate cancer cell line in the presence or absence of multiple mTOR inhibitors. The authors identified targets in cancer-relevant processes, including proliferation and invasion. They also developed a new class of mTOR inhibitor that effectively restricted the translation of invasion genes and controlled tumour invasion in mice.

ORIGINAL RESEARCH PAPER Hsieh, A. C. *et al.* The translational landscape of mTOR signalling steers cancer initiation and metastasis. *Nature* 22 Feb 2012 (doi:10.1038/nature10912)

➔ GENETIC ARCHITECTURE

Statistical approach to detecting maternal genetic effects

Maternal genetic influences on offspring development are difficult to quantify because of the confounding caused by the correlation between the genotypes of the mother and her offspring. The authors present a conceptual framework, 'statistical cross fostering', that allows the separation of indirect maternal effects from those mediated by the offspring genotype. Application of the formal model to an experimental population of mice identified six maternal loci that affect offspring body size. The approach can be adapted to analyse maternal genetic effects in any system.

ORIGINAL RESEARCH PAPER Wolf, J. B. & Cheverud, J. M. Detecting maternal effect loci by statistical cross fostering. *Genetics* 29 Feb 2012 (doi:10.1534/genetics.111.136440)