IN BRIEF

DEVELOPMENTAL BIOLOGY

Chiral blastomere arrangement dictates zygotic left–right asymmetry pathway in snails

Kuroda, R. *et al. Nature* 25 Nov 2009 (doi:10.1038/nature08597)

The establishment of left–right (L/R) patterning can be investigated in embryos of the snail *Lymnaea stagnalis*, in which shells coil clockwise or anticlockwise. Physically inverting the chirality of the third cleavage division led to normal snails that show completely reversed chirality. Handedness in *L. stagnalis* is determined by a maternal locus; the authors show that this maternal system controls the cytoskeletal dynamics of blastomere division and lies upstream of the L/R asymmetry gene *nodal*, the expression of which is also reversed by the micromanipulation.

SEX DETERMINATION

Mutations in two independent pathways are sufficient to create hermaphroditic nematodes

Baldi, C. *et al. Science* **326**, 1002–1005 (2009)

The evolution of hermaphroditism in *Caenorhabditis elegans* may have occurred in just two genetic steps. In *C. elegans* inhibition of TRA-2 receptor activity is required for male development; lowering *tra-2* expression by RNAi in females of a male/female species, *C. remanei*, caused the development of spermatids as well as oocytes. However, the sperm became functional only if expression of *swm-1* (which prevents premature sperm activation) was also reduced. Self-fertile hermaphrodites may therefore have arisen by altering sex determination and sperm activation pathways.

GENE REGULATION

A physiological role for gene loops in yeast

Lainé, J. P., *et al. Genes Dev.* **23**, 2604–2609 (2009)

Gene loops function to maintain transcriptional memory through interaction with the nuclear pore complex

Tan-Wong, S. M., Wijayatilake, H. D. & Proudfoot, N. J. *Genes Dev.* **23**, 2610–2624 (2009)

'Transcriptional memory' allows inducible genes that have been activated to respond more quickly to re-stimulation, but it is poorly understood. The authors of two papers found that transcriptional memory at inducible genes in yeast, such as the GAL genes, is dependent on loops between the promoter and the 3′ end of a gene: these form on transcriptional initiation and are maintained during repression. Tan-Wong and colleagues also showed that the association of these loops with the nuclear pore complex was required for transcriptional memory.

DIFFERENTIATION

Neuronal subtype specification within a lineage by opposing temporal feed-forward loops

Baumgardt, M. *et al. Cell* **139**, 969–982 (2009)

This study identifies a novel genetic mechanism that controls the temporal determination of cell fate decisions in the *Drosophila melanogaster* central nervous system. An upstream regulator, castor, simultaneously triggers two feed-forward loops: the first specifies a unique cell fate and the second suppresses the first loop in a subset of cells, which then have a different fate. The authors suggest that opposing feedback loops might exert temporal control in other cell lineages.