IN BRIEF

GENOME EVOLUTION

Metabolic functions of duplicate genes in *Saccharomyces cerevisiae*.

Kuepfer, L., Sauer, U. & Blank, L. M. *Genome Res.* **15**, 1421–1430 (2005)

Why are duplicated genes maintained in the genome? Although many duplicate genes can provide a back-up role when their paralogue is knocked out, this is unlikely to be the reason that selection maintains duplicates. These authors applied a systems biology approach to duplicated genes that are involved in yeast metabolism. Using *in silico* predictions, single-mutant phenotypes and network analysis, they show that back-up function and increased gene dosage are less important in the maintenance of duplicates than functional divergence, which gives the paralogues distinct, although overlapping, roles.

REGULATORY NETWORKS

Regulated cell-to-cell variation in a cell-fate decision system.

Colman-Lerner, A. *et al*. *Nature* **437**, 699–706 (2005)

There is considerable variation in the response to signals between seemingly identical cells — how much of this is due to noise in the system? The authors used pheromone-induced expression of a fluorescent reporter gene to answer this question in budding yeast. Little of the cell-to-cell variation could be attributed to noise; instead, it was due to differences in the cells' capacities to transmit signals through the pathway and to express proteins. They also found that the variation was regulated in several ways.

FUNCTIONAL GENOMICS

Second-generation shRNA libraries covering the mouse and human genomes.

Silva, J. M. *et al. Nature Genet.* 2 October 2005 (doi:10.1038/ng1650)

This paper reports the construction of new and improved small-hairpin RNA (shRNA) libraries that cover a large proportion of mouse and human genes. The design of the shRNAs was modified from previous libraries in the light of recent advances in understanding microRNA biogenesis and other factors that affect the efficiency of RNAi. Validation using biochemical and phenotypic assays showed that the new constructs are significantly more efficient than first-generation versions. The collection can be accessed at http://codex.cshl.edu/.

EVOLUTION

Urochordate βγ-crystallin and the evolutionary origin of the vertebrate eye lens.

Shimeld, S. M. *et al. Curr. Biol.* **15**,1684–1689 (2005)

This study furthers our understanding of the evolutionary origins of the vertebrate eye. The lens — a key eye component — exists only in vertebrates. However, the authors showed that the urochordate *Ciona intestinalis*, which diverged from the vertebrate lineage before lens evolution, encodes a member of the βγ-crystallin family of proteins that give the lens its unique properties. The promoter region of the gene was able to drive reporter-gene expression in the *Xenopus laevis* visual system, indicating that pre-existing regulatory mechanisms were co-opted during vertebrate eye evolution.