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URLs

IN BRIEF

EVO–DEVO

An ancient chordin-like gene in organizer formation of *Hydra*

Rentzsch, F. *et al. Proc. Natl Acad. Sci. USA* **104**, 3249–3254 (2007)

Localized signalling centres — or organizers — establish polarity and cell fate in vertebrate development, but when during evolution did they first arise? The authors show that the function of the bone morphogenetic protein antagonist Chordin in zebrafish organizers can be substituted by an orthologous protein from the freshwater polyp *Hydra*. Expression of the chordin orthologue is upregulated during regenerative growth in *Hydra*, suggesting that it has a similar role to that in vertebrates and therefore that organizers arose long before the origin of vertebrates.

DNA REPAIR

Multiple-pathway analysis of double strand break mutations in *Drosophila*

Johnson-Schlitz, D. M., Flores, C. & Engels, W. R. *PLoS Genet.* 21 February 2007 (doi:10.1371/journal.pgen.0030050.eor)

Several pathways can repair double-strand breaks, but how do they interact with each other? The authors measured the usage of these pathways in fruitflies that were mutant for 11 components of different pathways. In most cases, defects were compensated by increased use of another pathway, but the choice of the substituting pathway depended on which component was mutated. On the basis of these quantitative results, the authors propose a decision circuit by which the cell chooses a repair mechanism for each break.

NETWORK BIOLOGY

Specificity and evolvability in eukaryotic protein interaction networks

Beltrao, P. & Serrano, L. *PLoS Comput. Biol.* **3**, e25 (2007)

Differences between species can be understood at the level of protein interaction maps. The authors therefore measured the rates at which protein interactions have changed in yeast, worms, flies and humans. The overall rate — 10,000 changes every million years in humans — is in itself informative, but there is also interesting variation between types of interaction. Interactions between proteins encoded by duplicated genes, proteins and smaller peptides, proteins that interact with many other proteins, and immune proteins, have evolved more rapidly, so these interactions are expected to differ more between species.

GENOME EVOLUTION

Parallel evolution of conserved non-coding elements that target a common set of developmental regulatory genes from worms to humans

Vavouri, T. *et al. Genome Biol.* **8**, R15 (2007)

Developmental genes in vertebrates are often associated with conserved non-coding elements (CNEs) that are thought to be transcriptional enhancers, but homologous sequences have not been found in invertebrates. Instead, the authors showed that nematode species have a completely independent, non-homologous set of CNEs. Strikingly, despite no sequence similarity between vertebrate and invertebrate CNEs, they are often associated with the same genes, implying that they have evolved convergently to regulate the same developmental networks.