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The body plan

The hallmark expression of Hox genes along anterior–posterior body regions has motivated many fruitful molecular studies into how animal bodies are patterned, but 40 years of research into Hox genes have only partially unravelled their 600 million years of evolution. The current status of this vast field is presented in four review articles in this month's Focus issue on The Body Plan, which is accompanied by a web focus (<http://www.nature.com/nrg/focus/bodyplan>).

The most detailed model for how a single cell is turned into a multicellular, segmented body comes from *Drosophila melanogaster*. This model has been exported, and in the process refined, up and down the evolutionary scale. But just how representative is it? New technologies such as RNAi make it possible to test predictions on species for which no genetic analysis exists. Mark Martindale (page 917) concentrates on four basal bilaterian taxa, which are the route to revealing how body complexity came about at the dawn of the Metazoa, whereas on page 905 Andrew Peel, Ariel Chipman and Michael Akam stress the need to examine other arthropods to reach a more informed and unbiased view of how Hox genes specify segmental identities.

One clue to the functional evolution of Hox genes is to observe how their genomic organization has arisen, as described by Jordi Garcia-Fernández (page 881). The ultimate goal, however, is to discover how combinations of Hox transcription factors translate into morphological identities. Joseph Pearson, Derek Lemons and William McGinnis (page 893) are sceptical that we will ever get to the bottom of such a complicated combinatorial process. Whether this scepticism is misplaced will depend on more tools, more models, and more time.



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