

Book review

From DNA to Diversity: Molecular Genetics and the Evolution of Animal Design

Sean B Carroll, Jennifer K Grenier and Scott D Weatherbee
Blackwell Science Ltd, Oxford, 2001; 214 pp. £29.95, paperback. ISBN 0-632-04511-6.

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As I shall go on to explain, this book is an excellent introduction to the field of Evolution and Development, suitable for advanced undergraduates, postgraduates and academics alike. Carroll *et al* set out to address fundamental issues of this emerging discipline in a clear and succinct way. The book is laid out in a manner that allows you to understand the principles and ideas behind the molecular biology of evolution and development, while maintaining a focus on the most recent and interesting developments in the field.

The book is divided into seven chapters and starts with a 'brief history of animals' looking at the fossil record, and explaining that all the forms we see are built using the same building blocks: it is the DNA of one taxon that allows us to compare it with the different taxa that we see. Chapters two and three move on to discuss animal development. From the toolkit genes, the genes such as the *Hox* family that seem to be required universally to coordinate development, and gene hierarchies we see how axis formation is set up and the basic form takes shape. Gene regulation is also a major area discussed in chapter three, as is the evidence for the sharing of the toolkit among Phyla. Chapter four then describes the evolution of the basic toolkit genes through processes such as gene duplication, and how this leads to the rich diversity that we see in animals with bilateral symmetry today. The remaining chapters concentrate on the diversity in body plans, evolution of novelty and finally on how all of the subjects described in previous chapters are themselves subject to the evolution of regulatory elements – in a chapter called 'From DNA to Diversity: the primacy of regulatory evolution'.

The book is richly illustrated, most of which is in full colour. Rarely a page is turned without finding a figure to help further explain a point made in the text. At the end of each chapter is a short, but targeted, reference list with many of the major publications in the field of evol-

utionary developmental biology from nearly every major name in the field today; a good place to start those early literature reviews for your project.

At the end, a glossary gives simple definitions to some of the terms used throughout. This is very useful. Although it gives only brief descriptions it gives enough information to understand the context, rather than going to another book and breaking your flow.

I have only one criticism of the book. Early in the book Carroll *et al* take the three-clade model of the Bilateria (Adoutte *et al*, 1999) to describe animal phylogeny, but then make almost no reference to the embryonic development of the Lophotrochozoa in the rest of the text. Instead the main emphasis of the book falls onto the two other bilaterian clades the ecdysozoans, mainly *Drosophila*, and the deuterostomes, mainly the vertebrates.

The book is a reference work making the ever-expanding area of Evo-Devo accessible to the advanced undergraduate, new postgraduate, post-doc and academic wanting to know at what stage the field is now. It is not as heavy going as a lot of text books in the field, weighing in at just 214 pages, but it loses none of its punch. It is very readable, to my mind, because it is not too long and unnecessarily drawn out. I would think it could become a very valuable undergraduate text. The book is also very useful to help remind scientists further up the academic tree that more is happening in the world of Evo-Devo than just their project. Even if you are not working on a project directly tied to development I would recommend this title as essential background reading.

Although this book is surprisingly up to date for a text book, a second volume or edition will soon be necessary to keep up with the 'evolution and development' of the field. However, this book should be on the shelves of all evolutionary-developmental biologists. They should read it as well.

Reference

Adoutte A, Balavoine G, Lartillot N, de Rosa R (1999). Animal evolution: the end of the intermediate taxa. *Trends Genet* 15: 104–108.

NJ Gostling
The School of Animal and Microbial Sciences
The University of Reading
Whiteknights, PO Box 228
Reading, RG6 6AJ, UK
E-mail: n.j.gostling@reading.ac.uk