

rationale, giving the naïve reader a helpful sense of the advantages and power of the experimental model, illustrated with informative images. While protocols for many of the methods mentioned were not detailed, useful references and websites were offered for further exploration. Given the success of this chapter, I hope that the next edition contains similar chapters on *Caenorhabditis elegans* and *Arabidopsis thaliana*. Other chapters in *Cell-Cell Interactions* read more like collections of methods currently in use in a given laboratory. For example, only half of the *Xenopus* chapter contains frog methods; the second half switches systems and discusses useful methods for working with cultured epithelial monolayers, protein expression in reticulocyte lysates, GST-pulldown methods and protocols to measure dissociation constants of individual protein-protein interactions. All useful methods, to be sure, but a bit of a surprise in the advertised frog context.

The volume notably lacks any systematic discussion of approaches to specifically stimulate or interfere with protein expression as a means to study protein function. Although mentioned in the *Xenopus* chapter, the ability to specifically block protein expression using antisense injection was not explored, and the novel methods to generate transgenic frogs were completely absent. Similarly, the use of siRNA silencing as a tool to investigate protein function in cell-cell interactions was not discussed by any of the vertebrate authors. In the areas of keratinocytes and tight and gap junctions, the use of targeted gene disruption in mice, in some cases temporally and spatially controlled using tissue-specific recombinase activity, was only mentioned *en passant*.

In conclusion, it is difficult to summarize the utility of this book. My feeling is that it is too grand a subject to attempt to treat in one volume, unless one is prepared to engage in a Sambrook *et al.* [1] extravaganza. Each generic subject, such as adhesion, communication or paracellular permeability could easily occupy its own volume, which would be more useful as a comb-bound, laboratory workbook. While certain protocols might be of interest to the researcher in a given field, it might be better for each chapter to present the experimental usefulness of each model system to answer specific questions relevant to cell-cell interactions.

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Reference

- 1 Sambrook, J. *et al.* (1989) *Molecular Cloning. A Laboratory Manual*, Cold Spring Harbor Laboratory Press

No-frills developmental biology

Essential Developmental Biology

By Jonathan Slack. Blackwell Science, 2001.
£19.95 pbk (321 pages) ISBN 0 632 05233 3



The discipline of developmental biology has undergone a revolution in the past two decades, and it is a privilege to be around to see it happen. Much of it was due to the

successes of *Drosophila* genetics, coupled with giant leaps in molecular biology techniques. The classical embryologists had defined the major biological questions, and the geneticists and molecular biologists together contributed to answering many of them. In turn, this brought into the field an influx of yet more molecular biologists looking for interesting problems to which they could apply their powerful technology, but sometimes in need of some guidance for defining the most interesting questions. A simple book was needed to help them along the way, one that would define the major developmental concepts rigorously but in an easy-to-follow style. Enter Slack's first developmental biology book, *From Egg to Embryo* (Cambridge University Press, First edition, 1983; Second edition, 1991). It was a must-read, both for established embryologists and for newcomers, but probably impenetrable to most first-year undergraduates (especially the first edition, with its large section on mathematical models). Although the new paperback presents itself with a completely new cover and the stated aim of becoming a staple undergraduate textbook for developmental biology,

in many ways it is a completely reworked and vastly improved version of the older book.

Most other developmental biology textbooks are arranged by developmental events and combine findings made in different organisms to achieve an understanding of the mechanisms regulating each process, usually presented as a historical progression within each chapter. This book takes a different approach. After starting with some exceedingly clear general definitions of terminology (which everyone should re-read at regular intervals!) and descriptions of the basic techniques, most of the chapters focus on one 'model' organism at a time, highlighting some of the major findings made in each. This has the significant advantage that the reader can easily become familiar with the principal technologies that can be applied to each species and to get a flavor for how people using that organism think. On the other hand, it can make it seem as if each animal develops quite differently, despite some cross-referencing. Sometimes this can have serious consequences. To choose one example, the topics of 'stem cells', 'asymmetric cell division' and 'Numb' are all discussed, but only connected very superficially in the context of cell division in the mammalian cortex. None of the beautiful work from *Drosophila* and *Caenorhabditis elegans* on *Notch/lin-12*, asymmetric cell division and cell localization is included, which is a great pity because it would have been a perfect example of how cell biology, embryology, molecular biology and genetics can cooperate to generate an understanding of the mechanisms behind a defined biological problem.

The guided tour through selected model species starts with *Xenopus*, as did the earlier book, which is useful to reinforce the definitions of major concepts presented earlier in the book and to provide more concrete examples. Each is presented authoritatively, but avoiding jargon as much as possible, and succeeds in allowing readers to become more familiar with each organism than do other textbooks. As an unavoidable consequence, however, some interesting organisms (including leech, sea urchin, urodeles, *Amphioxus*, *Ciona*) are neglected just because they are not mainstream, despite the undeniable fact

that each of these has contributed tangibly to understanding several important events and in some cases has defined important problems – for example, it is difficult to understand gastrulation or to get a glimpse of the complexity of gene regulatory networks without at least a passing reference to the sea urchin. The book then ends with a section on ‘Organogenesis and regeneration’, now arranged more conventionally by organ system rather than by organism. Again there are some holes: for example, germ cell migration is discussed in the vertebrate but not in the fly, where some details of the molecular players are starting to be understood. There is almost nothing about congenital anomalies,

which might have helped to bring the events described in the book nearer to home for many students, and very little about developmental processes occurring after birth (for example, aging) except for a discussion of stem cells in the adult and of cancer in a developmental context.

But the book’s great strengths are those of its predecessor: the clarity of the definitions (and of the thoughts behind them), the accessible no-frills language and illustrations, and the affordable price. It is even more of a must-read than the earlier book because the more esoteric bits have been removed, replaced with more important, concept-oriented material. I don’t see it as a main undergraduate textbook for those being confronted with

developmental biology for the first time, but it will be a very useful companion to other mainstream texts (Gilbert, Wolpert and others) particularly for final-year undergraduates and for starting postgraduates just entering the field. More importantly, it should be on the shelves of any self-respecting professional with even the most superficial interest in development. There is no question that it lives up to its title of ‘Essential’, even if it is not also ‘Sufficient’.

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Cell-biological Trends

The following articles might be of interest to cell biologists and have been published in the most recent issues of our sister *Trends* journals. Find them online in the Reviews section of BioMedNet at: <http://reviews.bmn.com>

Biogenesis of the mitochondrial TOM complex

Doron Rapaport (2002) *Trends in Biochemical Sciences* 27, 191–197

Filamentous fungi as cell factories for heterologous protein production
Peter J. Punt *et al.* (2002) *Trends in Biotechnology* 20, 200–206

Genetic analysis of insulin signaling in *Drosophila*

Robert S. Garofalo (2002) *Trends in Endocrinology and Metabolism* 13, 156–162

Unravelling heterochromatin: competition between positive and negative factors regulates accessibility

Niall Dillon and Richard Festenstein (2002) *Trends in Genetics* 18, 252–258

Defining the dynamics of self-assembled Fas-receptor activation

Suneel D. Mundle and Azra Raza (2002)
Trends in Immunology 23, 187–194

Bacterial avoidance of phagocytosis

Jean Celli and B. Brett Finlay (2002) *Trends in Microbiology* 10, 232–237

Caretaker tumour suppressor genes that defend genome integrity

Nicola C. Levitt and Ian D. Hickson (2002)
Trends in Molecular Medicine 8, 179–186

Ephrins are not only unattractive

Johan Holmberg and Jonas Frisén (2002) *Trends in Neurosciences* 25, 239–243

Does complexity constrain organelle evolution?

William Zerges (2002) *Trends in Plant Science* 7, 175–182

