

Book Review

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C. elegans Atlas. D. H. Hall & Z. F. Altun. Cold Spring Harbor Laboratory Press. 2008. 348 pages. ISBN 978-087969715-0. Price \$125 (concealed wire binding). ISBN 978-087969794-5. Price \$175 (hardback).

One of the primary reasons for studying the key model biological system, the nematode worm *Caenorhabditis elegans*, is its simplicity. With just 959 somatic nuclei in the adult hermaphrodite, and the developmental origin of each defined in the cell lineage, *C. elegans* appears an attractive target through which a full comprehension of an animal's developmental mechanisms and other biological processes might be achieved. Yet, a browse through the '*C. elegans Atlas*' will reveal the astounding complexity even of this animal, at the level of individual cells, and emphasize the scale of the problem of achieving a complete understanding of development in more complicated animals.

The '*C. elegans Atlas*' provides a beautifully illustrated and detailed description of the adult *C. elegans* hermaphrodite anatomy, each chapter tackling a different tissue or organ system. More than half of the book is composed of high quality figures depicting the structure of the animal at the cellular and sub-cellular levels. Carefully selected images of the actual organism, captured with scanning or transmission electron microscopy, differential interference contrast microscopy or epifluorescence microscopy, are interpreted through rendered graphic line diagrams. A colour code is used throughout with a different colour for each tissue or organ and different shades of each colour to distinguish component parts. The accompanying text guides the reader through the diagrams.

The authors, David Hall and Zeynep Altun, are also principal authors of the web accessible '*WormAtlas*' (<http://www.wormatlas.org>) from which the contents of the book '*C. elegans Atlas*' are drawn. Comparison to this quite excellent web resource does reveal limitations of the book format, some presumably a reflection of page number restrictions. The book concentrates on the hermaphrodite with the

anatomy of the male only referred to when explaining differences between the sexes. Indeed, while the book is packed full of the best images, there are far more images available from *WormAtlas*. For example, rendered graphic diagrams are provided on the web to illustrate the axonal projections of all of the 302 nerve cells that make up the adult *C. elegans* nervous system. Minor errors in the book, inevitable in a work containing this much detail, are listed on the *WormAtlas* web site, but can and have been immediately corrected in the web-based version. The index of the book provides ready access to relevant pages, but the search functions and hyperlinks of the web are much more powerful. Dipping into the book, for example to examine the structure of a particular organ, can lead to indecipherable abbreviations, spelt out at earlier use in the book but not in a glossary. In contrast a lengthy glossary is provided from the front page of *WormAtlas* along with a detailed key to the colour code used throughout both media. *WormAtlas*, although already very detailed and comprehensive, is a work in progress and additional anatomical descriptions, such as the changes through development by which the already described adult structures are generated, can easily be incorporated progressively into the web site.

The main advantage of the book over the web version is in providing a paper copy that can be easily referred to, for example while examining *C. elegans* yourself, at a microscope. Although most research microscopes now have a computer conveniently close by that would provide ready access to *WormAtlas*, some prefer having a hard copy of such information, in hand, that can be examined closely. My laboratory has been generating GFP expressing transgenic strains of *C. elegans* for many years but these depictions of the anatomy still remain invaluable for interpretation of unusual expression patterns. For example, the tight packing of cells, with marvellously complex shapes, in the tip of the head is disentangled, facilitating specific cell identification in this complex region of the anatomy.

Many in the field incorporate the freely available and excellently rendered graphics into their own talks,

a practice generously encouraged by the authors of the '*C. elegans* Atlas', and a copy of the book in each *C. elegans* laboratory would be the least that might be expected in support of their endeavours. *C. elegans* Atlas and WormAtlas provide an invaluable aid to the study of this important research subject and will

make a vital contribution to future progress with this model system.

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