# The whole truth?

*Brian Charlesworth*

**Life History Invariants: Some Explorations of Symmetry in Evolutionary Ecology.** By Eric L. Charnov. *Oxford University Press: 1993. Pp. 167. £25, $32.50 (hbk); £13.50, $16.95 (pbk).*

THERE has recently been a spate of books on the evolutionary biology of life histories. In contrast to books such as Michael Rose's *Evolutionary Biology of Ageing* and Stephen Stearns's *The Evolution of Life Histories*, which provide wide-ranging reviews, Eric Charnov's book is a research monograph. It focuses on presenting his recent work on life histories, and is aimed at an audience that is already familiar with the basic principles of life-history evolution. I suspect that members of this audience will find it a tough but rewarding read. The writing is terse, and a great deal of mathematical manipulation and data analysis is carried out within a small number of pages.

The intellectual framework of the book is the construction of evolutionary optimization models of life histories, and the comparison of the predictions of these models with data from the literature on life-history variables in a variety of taxa. Simplifying assumptions, such as stationary population size and age-independent mortality of adults, are used to produce the theoretical results. Charnov assumes that the life-history variables under consideration (such as age at maturity) are at evolutionary equilibrium, and can be predicted from the appropriate trade-off models by maximizing lifetime reproductive success.

This approach will be regarded as annoyingly conservative in some quarters, but it is difficult to see how a broad-brush interpretation of the comparative biology of life histories can be carried out otherwise. The novelty of Charnov's approach lies in the nature of the trade-offs that he invokes. The time-honoured reproductive-effort model, in which present reproduction is assumed to reduce future survival, is discarded. Instead, Charnov ingeniously develops the consequences of trade-offs between growth rate and final body size (for organisms such as fish that grow throughout life) or between growth and reproduction (for species such as mammals that cease to grow around the age at maturity).

Charnov's approach is daring, and remarkably successful in producing quantitative predictions that fit the comparative data. It is a first-rate contribution to life-history evolution. But there are some questions about whether it is the whole truth, although it surely contains part of the truth. The problem of whether other models of life-history evolution could generate at least some of the patterns revealed by the comparative data is not discussed. Charnov is clearly not interested in the testing of alternative hypotheses, and he pays no attention here to experimental tests of the assumptions of different life-history models. Similarly, I suspect that many evolutionary ecologists will be troubled by such assumptions as that adult body size in mammals is subject to selection solely through the influence of mortality rate and growth rate on optimal age at maturity. The book will undoubtedly play an important role in stimulating thought about where to go next in studies of life-history evolution. □

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# Facts at your fingertips

*Andrew McMichael*

**The Leucocyte Antigens FactsBook.** By A. Neil Barclay, Marian L. Birkeland, Marion H. Brown, Albertus D. Beyers, Simon J. Davis, Chamorro Somoza and Alan F. Williams. *Academic: 1993. Pp. 384. £19.50, $42 (pbk).*

THIS book is a much-needed compendium of information on the leukocyte surface antigens. Alan Williams played a large part in orchestrating the book; he put his last effort into its preparation, finishing only days before his untimely death. This was very much his field; he characterized the first new leukocyte differentiation antigen identified by a monoclonal antibody (CD4) and brought logic to bear on the structures by describing the immunoglobulin superfamily. The avalanche of monoclonal antibodies that followed the first few in the late 1970s was largely sorted out by the series of international workshops that initiated the CD nomenclature system. This book not only catalogues the 78 CD antigens but adds several more that have been sequenced.

The book opens with excellent reviews of the architecture of the cell surface, the protein superfamilies and the chromosomal location of the genes. This part is well illustrated with diagrams, tables and sequence charts. There should be enough information here to place a new sequence in the correct superfamily.

The description of each antigen is admirably concise, with an emphasis on structure, giving the amino-acid sequence in each case. Tissue distribution and functions are summarized, perhaps too briefly, but more can be found in the Leucocyte Typing Workshop volumes (for example, *Leucocyte Typing IV* edited by W. Knapp *et al.*, Oxford University Press, 1992). It is satisfying that so many of the molecules discussed have definable functions, often in adhesion or as receptors; some are paired as receptor–ligands, such as CD2–CD58 and CD5–CD72. The CD3/T-cell receptor complex, major histocompatibility complex molecules and integrins must have presented problems to the authors because of their complexity; they are dealt with concisely and, for those wanting further information, reference is made to other volumes, including R. Piggot's *The Adhesion Molecule FactsBook* (Academic, 1993) for the integrins.

This is an excellent book and a must for all biomedical laboratories with any interest in leukocytes. Of the two copies that I have bought, one has already vanished, a sure sign of an essential volume. The authors must be congratulated on their considerable efforts and it must be hoped that Neil Barclay and colleagues will revise the book or publish regular supplements. The appearance of this volume is very well timed with the fifth Leucocyte Workshop imminent; this will surely yield a new crop of CD antigens, structures and functions to be explored and eventually to go in the next volume. □

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