

Book reviews

Protein Evolution. László Patthy. Blackwell Science, Oxford. 1999. Pp. 228. Proce £24.95, paperback. ISBN 0 632 04774 7.

The stated major goal of this book is 'To provide a concise summary of recent advances in our understanding of the principles of the evolution of protein structure and function'. I found it to be written in a way that will enable undergraduates and newcomers to the field to grasp the sometimes complex ideas and theories under discussion. Key words are in bold and new terms are defined as they are introduced — this causes the text to read like an expanded scientific dictionary in places, but overall I found the approach helpful. Related chapters usually start with a summary of the main points arising from the previous chapter and there is frequent cross-referencing to figures and diagrams.

The author writes with conviction and enthusiasm for the subject and often gives helpful mini-summaries and alternative ways of looking at the same data. This conviction is frequently manifest in an assertive style of writing that claims 'proof' of some very complex ideas that some may more cautiously accept on the basis of the balance of probabilities. The author does not shy away from attempting to summarize difficult evolutionary debates, for example managing to summarize the whole selectionist versus neutralist debate in three paragraphs and the 'introns early' versus 'introns late' debate in two pages. This approach is helpful as it will allow the non-specialist reader to see an overview of the various debates and delve deeper into the literature to form their own view. A good selection of references are given at the end of most chapters and I found it helpful that the titles of the articles are provided as it makes it easy to choose which papers to pursue for further reading on selected topics.

The book begins with three chapters giving an overview of basic genetics, molecular biology, the physico-chemical properties of the amino acids and the interactions that help stabilize protein structure. This includes a section keying the newcomer into the idea that protein evolution is about selection for various shapes and structures. Chapter four discusses the evolution of protein-encoding genes, including methods for optimizing amino acid alignments, and gives examples showing that similar structures can be encoded by highly diverged amino acid sequences. Chapters five to seven discuss the evolution of orthologous and paralogous genes and the formation of novel protein-encoding genes. Chapter eight discusses in detail the evolution of proteins by assembly from modules. Chapter nine deals with genome evolution and protein evolution. Here the author writes in a way that gives a clear sense of the dynamic nature of the genome and gives a useful comparison of prokaryotic genomes with those of plants and animals. This chapter also illustrates a limitation of the book as it was written before the complete sequence of *Caenorhabditis elegans* was completed—if future editions of

this book are forthcoming updating this chapter would be useful. Similarly there is a good discussion about the minimum genome size and minimum number of genes necessary for autonomous life. There is also a good overview, with examples, of the problems with simplistic arguments about so-called 'junk DNA' and the fact that is possible to delete allegedly essential genes with no, or very slight, phenotypic changes.

In summary, I found this to be a very interesting and helpful book that achieves much of its stated purpose. This is a rapidly expanding field and at least for the next couple of years I will suggest this book as supplementary reading material for an undergraduate course I give on molecular evolution.

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Microsatellites — Evolution and Applications. Daniel B. Goldstein and Christian Schlötterer (eds). Oxford University Press, Oxford. 1999. Pp. 352. Price £27.50, paperback. ISBN 0 19 850407 1.

If you're still one of those biologists who think tandem repeats are something to do with bicycles then this is the book for you! Packed with need-to-know facts, well illustrated and not overburdened by technical jargon, the editors should be congratulated for having had the foresight to assemble 20 chapters, each by active leading experts in their field, which must become a standard reference work. Microsatellites — those short but enormously useful repeated stretches of DNA — are found in most species and exhibit exceptional variability, attributes which make them the marker of choice for everything from investigation of mutational mechanisms, population genetic analyses, fitness consequences of inbreeding, historical reconstruction of human populations, conservation genetics and detection of selective sweeps, as well as having a variety of forensic and medical applications.

The book begins with essays describing the mutational properties, generation, decay and possible functional roles of microsatellites, painlessly introducing the theoretical models which form the analytical basis necessary to interpret the wealth of information these markers provide. Although dealing with topics related to microsatellites several chapters, such as that by Armour *et al.* make useful comparisons with other repetitive markers such as minisatellites. Population geneticists will find the chapters on evolution, mutation and