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Book Reviews

The Colours of Life: An Introduction to the Chemistry of Porphyrins and Related Compounds: Lionel, R. Milgrom, *Oxford University Press, 1997*

This relatively short paperback (249 pages) on porphyrins covers much ground. It opens by describing the structure and general biochemical properties of these compounds including a handy guide on how to draw the macrocyclic ring structure and get all the rings in perspective. This is followed by an account of porphyrin biosynthesis including evidence for prebiotic synthesis. The next few chapters concern the reactivity and functions of porphyrins and how their properties may be modified by different ligands and proteins. The aromaticity of porphyrins and their importance in photosynthesis is discussed and then followed by a chapter on their role as haem in proteins such as haemo/myoglobin, cytochrome c, catalase, cytochrome P_{450} and ligninase. The concluding chapters are concerned with porphyrin degradation in plants and animals, disorders of human porphyrin metabolism and a very interesting final chapter entitled "porphyrins for the future" which includes not only the use of porphyrins as agents in cancer therapy but also a fairly detailed account of the use of porphyrins in solar energy conversion and electronics.

As an introduction to porphyrins, the book is excellent and comprehensive. It is written in an interesting and reasonably gripping style which holds the reader's interest. I enjoyed reading it and would unreservedly recommend it to the non-specialist chemists or biochemists who wish to extend their knowledge of porphyrins.

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Free Radicals and Iron: Chemistry, Biology and Medicine
M.C.R. Symons and J.M.C. Gutteridge
Oxford University Press, Oxford, UK, 1998

This small monograph discusses the free radical reactions of iron from both a chemical and a biological perspective. Professor Gutteridge is renowned for his contributions to understanding the role of transition metals in free radical biochemistry, and Professor Symons equally for his insights into chemistry. Putting together the skills of these two authors should produce a world-class text that could enlighten chemist and life scientist alike.

In many places, the text does sparkle. I particularly enjoyed the pithy summary of the basics of Fenton chemistry (Chapter 5) and the introduction of the term "iron signalling" (Chapter 8). Also good were the discussions of how to represent oxo-iron species (p. 30) and why haem is such a unique iron chelate (p. 34).

Now for the bad news. My main criticism of the book is that the authors, for the most part,

appear not to have talked to each other. Why, for example, was haem chemistry not linked to the properties of haemoglobin and myoglobin? The definitions of free radicals on p. 6 are self-contradictory, as are the descriptions of the chemistry of $O_2^{\bullet -}$ and $HO_2^{\bullet}$ (compare p. 22 with p. 123). Why have an appendix dealing with reduction potentials (Appendix 5) but then not illustrate their applicability by considering the reduction potentials of iron chelates, or of the oxygen radicals? Why have an appendix on ESR without discussing in detail the pitfalls of its application to biological systems? Chapter 7 is rather dated, not surprisingly because it is largely copied from a text written in 1988.

Other criticisms are less significant. Not many scientists would agree with the description of O_2 binding to haem on p. 36 (of course, this does not mean it is wrong). The chemistry section describes the structure of almost all the reactive oxygen species, but strangely the electronic configuration of ground-state O_2 and the controversial concept of the spin restriction are not covered. Both Professor Gutteridge and myself have been criticised for the alleged "over-simplistic" descriptions of these topics in *Free Radicals in Biology and Medicine* (OUP, 1989) and I would have appreciated a chemist of the stature of Professor Symons setting the record straight. P. 45 line 20 does not make sense, and it is not helpful to quote incomplete references (e.g. p. 230). It seems unlikely to me that omitting iron from the bleomycin assay allows one to measure Fe^{2+} in body fluids (p. 80): surely this will be confounded by all the endogenous reducing agents? The authors' novel aconitase assay seems much more promising. The description of DETAPAC chemistry on p. 132 does not accord with most literature data.

Overall, I enjoyed this book and recommend it to all in the free radical field, since some of the concepts and explanations are novel and even the older ones need restating for novices. It is a "good read", and will stimulate debate. My disappointment is that I expected more from two such distinguished scientists: here, the whole is not more than the sum of its parts, and in some cases it is less.

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