

## BOOK REVIEW

B. HALLIWELL & J.M.C. GUTTERIDGE,

Free Radicals in Biology and Medicine,  
Clarendon Press, Oxford, 1985, 346 pp.

This book is an *introduction* to the world of free radicals. It is perplexing why this has not been stated in the title. *Caveat lector!* What are free radicals?, and What do free radicals do in biological systems? are current questions in the life sciences. This book sets out to provide answers to these questions mainly at a level appropriate to students (free radicals have yet to find the place they deserve in biochemistry text-books), non-specialists, and the proverbial general reader. It assumes very little. This aspect might be tightened in a future edition. Anyone in the life sciences who has got to the stage of inquiring about free radicals can be considered likely to have some notions in chemistry.

The question, What are free radicals? can be given a definite answer: "A free radical is any [chemical] species capable of independent existence that contains one or more unpaired electrons" (Chapter 1). This ropes in transition metal ions with conventional free radicals. This might appear strange practice but transition metal ions are bedfellows of the free radicals in toxicity reactions and the book does well to give them adequate consideration.

In practice biologically significant free radicals are often oxygen-centred radicals. These are amply shown to be a biologically important class of free radicals (Chapters 2, 3, 4 and elsewhere). The existence of other important classes, however, such as the class of carbon-centred free radicals, does not clearly emerge, except by implication, throughout the book.

The question, What do free radicals do in biological systems? has up till now constrained the science of free radicals to operate as an art of the plausible. This clearly holds for the popular superoxide theory of oxygen toxicity (Chapter 3) and free radical theories of ageing and disease (Chapter 8). The immense interest in superoxide and superoxide dismutase (in 1979 it was possible for Linus Pauling to write that during the previous five years more papers had appeared on superoxide dismutase than on any other enzyme) shows no abating. This interest is well captured by the authors but more place should be found in a future edition for dissenting views. Attempts to falsify hypotheses are the life-blood of science.

In general free radicals are, or are held to be, toxic species. The secretion of superoxide by phagocytic cells is probably a bacterial killing mechanism. Otherwise the question of whether free radicals apart from those bound as enzymatic intermediates can be useful species in biological milieus is a hazy area which needs very critical assessment (Chapter 7).

This book can be used for browsing or for dedicated reading. It is written with patience and humour. The suggestions for further reading are reasonably representative. The index is comprehensive and useful. The book is remarkably free from the bane of misprinting. A list and definition of non-standard abbreviations would not be out of place. One may have difficulty, for instance, with things like ABTS (p. 25 and Index) which is a trade-mark!

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