

## BOOK REVIEW

### OXYGEN RADICALS: SYSTEMIC EVENTS AND DISEASE PROCESSES

Edited by D.K. Das and W.B. Essman

This small well-produced book contains seven reviews describing some recent advances in our understanding of the pathophysiology of oxygen radicals. It will be useful to a variety of readers in the fields of biochemistry, toxicology and pathology. It is unlikely, however, that many people will add this book to their personal libraries, because of its high cost (\$118?) and variability in the quality of the reviews. Most of the chapters are also written from a personal viewpoint and are by no means comprehensive.

Chapter 1 by Catherine Rice-Evans describes the biochemistry of oxygen radical production in erythrocytes during the disease states such as sickle cell anaemia, thalassaemia and glucose 6-phosphate dehydrogenase deficiency. However, the relevance of these reactions in the overall pathological consequences is poorly described.

Chapter 2 by Christine C. Winterbourn describes the biochemical mechanisms of oxidant radical production in neutrophils. This chapter is very well written. She concludes that hydroxyl radical and singlet oxygen production are probably not involved in the overall neutrophil-mediated toxic reactions. She describes a novel mechanism of hypochlorous acid formation by a myeloperoxidase-dependent system involving superoxide and hydrogen peroxide. The relevance of this mechanism in cytotoxic reactions mediated by neutrophils is not clear, however. She also describes the possible pathological consequence of neutrophil oxidant-mediated injury during chronic inflammatory diseases such as rheumatoid arthritis. All in all this is an excellent chapter with more than 250 references.

Chapter 3 by Henry J. Forman is also well written, which describes and compares the lung injury induced by hyperoxia and paraquat. While the primary target cell for hyperoxia-induced lung damage is the type I cell, the primary target cell for paraquat-induced lung damage is the type II cell. The author concludes that selective uptake of paraquat by type II cells is the major cause of the differences in hyperoxia- and paraquat-induced pulmonary injury. This chapter also describes the role of enzymic- and nonenzymic-antioxidants in the defence against oxygen radical-mediated lung injury.

Chapter 4 by Dipak K. Das and Richard M. Engelman reviews a well studied model of oxygen radical-mediated injury i.e., ischaemic myocardial reperfusion injury. They review the relative roles of different sources of oxygen radicals such as neutrophils, the xanthine oxidase/xanthine system, mitochondria and arachidonic acid metabolism in myocardial injury. Lipid peroxidation of arachidonic acid to prostaglandins, malondialdehyde and leukotrienes is presented as a possible mechanism of ischaemic myocardial reperfusion injury.

Chapter 5 by T. Galeotti *et al.* should have been edited before inclusion in the book. The chapter contains many long, incomprehensible sentences that confuse the reader. Moreover, much of the work described was performed in Morris hepatomas and is therefore of little relevance to human cancer cells.

Chapter 6 by Malcolm J. Jackson is well written and well illustrated. The possible role of free radicals in skeletal muscle disorders is described. While the chapter seems a little out of place in this book, because it does not discuss "Oxygen Radicals" *per se*, it is a useful review for both newcomers and established investigators.

The final chapter, by W.B. Essman and S.B. Wollman, attempts to review the role of oxygen-derived and other free radical species in nervous system injury. Potentially, this should have been a very interesting chapter, but the scholarship of the authors is questionable. They spell MPTP (1-methyl-4-phenyl-1,2,3,6-tetrahydro-pyridine) and its putative toxic metabolite MPP<sup>+</sup> (1-methyl-4-phenylpyridinium ion) incorrectly and go on to conclude "There can be little doubt that the free radicals are responsible, if not directly then indirectly, for the neurotoxicity of MPTP". In fact, there is very little evidence for such a role. MPTP is thought to be toxic to dopaminergic neurons via the selective accumulation of MPP<sup>+</sup>, which inhibits Complex 1 and blocks electron transport and ATP synthesis in mitochondria. Biased listings of possible roles for free radicals in tissue injury serve no purpose and only confuse newcomers to the field.

In conclusion, this book contains both well-written and poorly-written reviews. The few good reviews make the book a reasonable addition to a University library, but the high price and poor quality of some of the reviews should discourage people from adding it to their personal libraries.

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