

## BOOK REVIEWS

### **Oxygen Free Radicals in Tissue Damage** **Editors Merrill Tarr and Fred Samson** **Birkhäuser, Boston, 1993**

The role of oxygen free radicals and reactive oxygen species in disease is a topic of great interest and this book contains 14 chapters based on the contributions made at a workshop on "Oxygen Free Radicals in Tissue Damage", held at the University of Kansas Medical Center in December 1990.

In chapter 1 the superoxide theory of oxygen toxicity is introduced by Fridovich and covers superoxide inactivated enzymes and site-specific oxidative attack. A useful overview of the involvement of oxygen free radicals in tissue injury is provided by Borg in chapter 2 and includes an introduction to free radical chemistry and in chapter 4 Kanofsky considers the generation and measurement of singlet oxygen in biological systems.

The role of oxygen radicals in central nervous system trauma, including the deleterious process of radical-initiated peroxidation of neuronal cell membranes is discussed by Hall in chapter 9 and in chapter 11 the ability of neuroprotective agents including vitamin E and the 21-aminosteroids (i.e. lazaroids) to protect against lipid peroxidation is considered by Audus. The detection of oxygen radical species *in vivo* is described in chapter 5 by Floyd and the detection of reactive oxygen species in rat brain extracellular fluid by the use of microdialysis in combination with chemiluminescence is covered by Layton and Pazdernik in chapter 6. The role of nitric oxide (now established to be endothelium-derived relaxing factor EDRF) in mediating cerebral blood-flow, synaptic plasticity and superoxide-mediated brain injury is discussed by Beckman *et al.* in chapter 10.

Oxygen-induced modifications of cardiac electrophysiology are covered by Tarr and Valzeno in chapter 14 and the use of photosensitizers to study reactive oxygen effects is described in chapter 3 by Valzeno and Tarr. The importance of oxidative stress in the pathogenesis of the phenomenon of myocardial "stunning" (post-ischemic ventricular dysfunction) is examined in chapter 12 by Zughaib *et al.* and in chapter 13 Weiss *et al.* consider the role played by oxygen free radicals in the pathophysiology of myocardial ischemia/reperfusion. In addition, the ability of oxygen radicals to mediate ischemia-reperfusion-induced leukocyte-endothelial cell adhesive interactions is examined by Harris *et al.* in chapter 7. The activation of neutrophils leads to a large increase in their oxygen up-take. This is known as the respiratory burst and is discussed in relation to drug metabolism discussed in chapter 8 by Uetrecht. The oxygen is converted to superoxide by NADPH oxidase, which is subsequently converted to hydrogen peroxide. The reaction of superoxide and hydrogen peroxide with transition metal ions to produce the hydroxyl radical, which can attack DNA bases has recently been found to be involved in oxidative damage to DNA in inflammatory diseases and is likely to be important in malignant progression.

This book provides a very useful contribution to the current state of knowledge in this exciting and rapidly expanding area. The major challenge in this field clearly

lies in the development of suitable strategies for the prevention of the tissue damage caused by oxygen free radicals.

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**Free Radicals in Medicine**  
edited by K.H. Cheeseman and T.F. Slater  
**British Medical Bulletin** volume 49 no. 3  
Churchill-Livingstone 1993

This attractive little book, a volume in the well-established *British Medical Bulletin* series, is dedicated to the memory of Trevor Slater and aims to review the current status of knowledge about free radicals in medicine. On the whole, it succeeds very well.

The book begins with two well-written and concise chapters giving an introduction to free radicals, antioxidant defences and methods of measuring free radical reactions *in vivo*. Equally well-written chapters then deal with free radicals in inflammation, carcinogenesis (with excellent discussion of the relevance of DNA base modification and of redox modulation of gene expression), atherosclerosis, brain metabolism and pathology, lung disorders, liver damage by toxins (including ethanol and iron, in iron overload diseases), kidney injury, muscle damage (e.g., after exercise and in myopathies), diabetes and free radicals in pre-term babies. Other topics covered are myocardial reperfusion injury, shock syndromes and the role of free radicals in ageing.

The book ends with two chapters on prospects for the future. Gey reviews the data showing that dietary antioxidants may help to protect against cancer and heart disease and points to the fact that "the potentials of plant components [other than vitamins C, E and  $\beta$ -carotene] . . . await exploration." Rangan and Bulkley discuss prospects for the therapeutic use of antioxidants in humans.

Overall, I found this to be an excellent short book. I particularly recommend it to clinicians and students needing a basic introduction to the field.

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