Book Review

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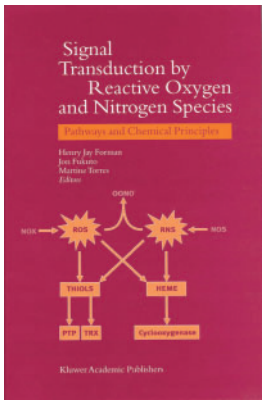
Radical Information

*Chris Burns**



Signal Transduction by Reactive Oxygen and Nitrogen Species

Edited by
Henry J. Forman,
Jon Fukuto, and
Martine Torres
Kluwer 2003, 436 pp.
ISBN 1-4020-1117-2
Hardcover, €140

All organisms living aerobically are continually exposed to metabolites of oxygen. These metabolites, known as reactive oxygen species (ROS), include the superoxide anion (O_2^-), hydroxyl radical, and hydrogen peroxide. Normally such species are eliminated through a delicate redox balance involving antioxidants such as glutathione and a variety of phase II enzymes such as NAD(P)H. However if this balance is disturbed, accumulation of ROS can lead to a variety of diseases including cancer, diabetes, and Alzheimer's.

ROS and reactive nitrogen species (RNS) are however not simply unwanted metabolic by-products of oxygen metabolism, as they are also involved in the process of shuttling information within cells—so-called signal transduction. The first such species unequivocally demonstrated to be involved in signal transduction was the free radical nitric oxide (NO) in the process of vasodilation, though its role in neurotransmission, inhibition of platelet aggregation, and post-translational modification of proteins, amongst others has been subsequently demonstrated. Potential roles for many of the ROS and RNS detected in cells, predominantly in the processes of cellular proliferation, differentiation, and apoptosis, have since been postulated.

The elucidation of the biochemical roles these short-lived species (1–1000 ns) play in organisms, and the mechanisms by which they are created and destroyed, is a complex and multidisciplinary task. The aim of this excellent 400-page book is to give the current (to mid-2002) understanding of many aspects of ROS and RNS in signal transduction and disease processes.

The book is divided into three sections covering basic chemical principles of ROS and RNS signalling (5 chapters), more thorough discussion covering various specific processes of ROS and RNS signalling (9 chapters), and the physiology and pathophysiology resulting from these processes (6 chapters). The initial chapters provide a good framework for understanding the subsequent chapters' more specific discussions, though each chapter is a complete whole and can be read in isolation.

A book with 20 chapters, each written by different authors, is bound to have some repetition, and that occurs in this work as well. Chemists may find the lack of molecular structures annoying, and a list of abbreviations would also have been useful. However the main problem with this book is the inadequate index which lists, for a limited selection of keywords, only the pages upon which they occur and not their context. This is particularly frustrating for a volume that will be a very useful reference work for some time for those working in the field or in related areas.

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