

BOOK REVIEWS

AUTOXIDATION OF UNSATURATED LIPIDS

Edited by H W-S CHAN

Academic Press 1987

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The editor set out to chart in **Autoxidation of Unsaturated Lipids** the advances made in recent years in the understanding of the reaction mechanisms and the effect of autoxidation in complex tissues. If it is realized that the book is one of a series of monographs centred on Food Science and Technology, then the emphasis on the significance of autoxidation of unsaturated lipids to food is invaluable.

The book begins with an examination of the mechanism of autoxidation. Subsequent chapters discuss in detail lipid hydroperoxides, reactions of hydroperoxides with a consideration of products of high molecular weight and those of products of low molecular weight hydroperoxides, major factors affecting the autoxidation of lipids, oxidation of lipids in food systems and the oxidation of lipids in biological membranes and intracellular consequences.

The chapters are well written and clearly presented. As a guide to a reader new to the field, it would have been more appropriate to include an introductory chapter on the concept of oxygen free radical reactions in biological systems.

A notable editorial flaw in the book is repetition as exemplified by the discussions in chapter 1 (written by Chan) and chapter 5 (written by Pokorny) both dealing with the mechanism and kinetics of autoxidation. The author for chapter 7 is cited as P J O'Brien University of Toronto. However, in the list of contributors and in the contents, the author was identified as R J O'Brien Memorial University of Newfoundland. This oversight should have not gone beyond the proof reading stage.

The book is a specialist monograph and does, despite minor editorial oversight, deserve to be on the reader's bookshelf.

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METHODS OF BIOCHEMICAL ANALYSIS Vol. 33
(Ed. David Glick, John Wiley INTERSCIENCE, 1988).

This volume contains 7 chapters each of which reviews their subject-matter. In addition, some, initialled LM in this review, contain detailed recipes of the author's own laboratory methods in the area.

Chapter 1 "Protein Blotting; a Manual" by J.M. Gershoni (LM) explains the methods in great detail and includes a 2-page glossary of Blot Terms including some from the nucleic acid field. A number of the detailed procedures mentioned are likely to be of interest even to established "blotters". Exact dimensions and construction details for several items of blotting apparatus are given.

Chapter 2 "Methods for Measurement of Hydroxyl Radicals in Biochemical Systems: Deoxyribose Degradation and Aromatic Hydroxylation" by B. Halliwell, J.M.C. Gutteridge and M. Grootveld. (LM) One of the shorter chapters with the longest title, this rehearses some of the arguments for hydroxyl radical ($\text{OH}\cdot$) – formation *in vivo* and how these may be detected, discussing in particular the utility of measuring specific aromatic hydroxylations of exogenous or endogenous compounds for this purpose. The mechanism and measurement of deoxyribose degradation *in vitro* to follow $\text{OH}\cdot$ - formation is also described. Finally, the case is lucidly made that provided no stronger iron binding agents are present this may be a site-specific $\text{OH}\cdot$ - attack, catalysed by iron weakly-bound to deoxyribose. Otherwise $\text{OH}\cdot$ in free solution appears to be responsible for the deoxyribose degradation.

Chapter 3 "Analysis of Processes Causing Thermal Inactivation of Enzymes" by T.J. Ahern and A.M. Klibanov. Here a venerable biochemical theme is explored in review form. Reversible, potentially reversible and irreversible enzyme inactivations are distinguished. Methods for detecting them and possible mechanisms for these different modes of inactivation are discussed.

Chapter 4 "The Use of Fluorescence Dequenching Measurements to Follow Viral Membrane Fusion Events" by A. Loyter, V. Citovsky and R. Blumenthal. Here the mechanisms, measurement and applications of self-dequenching and of fluorescence energy transfer techniques, the latter employing much less probe, to study fusion of a number of viruses, are mainly reviewed. Viral fusion with eucaryotic and procaryotic cells, with intracellular organelles and with differently constituted liposomes are discussed. Emphasis is placed on the ready quantitation of these methods and on the quality of information that they yield about the mechanism of fusion.

Chapter 5 "Detection and Quantitation of Biological Sulphydryls" by A. Russo & E.A. Bump. (LM). Set in no particular physiological context, this review covers in considerable depth and breadth sulphydryl chemistry and the detection and measurement of sulphydryls by more than 5 different methods, emphasising approaches to maximize the SH-specificity of these. Coverage extends from much early literature to very recent advances such as the use of monochlorobimane, a fluorescent reagent, which enables cells containing different amounts of GSH or GSH S-transferase to be tagged and separated by flow cytometry and grown up as variants differing as much as 10-fold in GSH.

Chapter 6 "Methods for Study of Normal and Abnormal Skeletal Muscle Mitochondria" by H.S.A. Sherratt, N.J. Watmough, M.A. Johnson & D.M. Turnbull (LM). This is a careful, in depth coverage of a clinically relevant area which is rich in laboratory details and theoretical coverage. Among many aspects is a reference to the possibility of NADH-cytochrome b5 reductase + cytochrome b5 donating electrons to the respiratory chain at the level of cytochrome c, a mechanism which would both

provide a novel link from cytosolic NADH to the respiratory chain and one where energy conservation is presumably poor.

Chapter 7 "Liposomes: Preparation, Characterization, and Preservation" by D. Lichtenberg and Y. Barenholz. This is a very wide-ranging chapter of 125 pages so it is impossible to do it justice within the confines of a short review. It begins by discussing which classes of amphiphiles will form liposomes (those with packing parameters close to 1, although species different from this may be entrained components.) Then the characterization of amphiphiles is discussed and a wide range of methods for preparing liposomes is reviewed. Most of these methods yield heterogeneous preparations with respect to size and number of lamellae: fractionation is therefore urged and methods to do this are discussed together with techniques, with their limitations, for characterizing the separated liposome fractions. Finally, stability and preservation of liposomes is considered with emphases on how to limit lipid peroxidation where polyunsaturated acyl chains or cholesterol are employed and on how to decrease lipid hydrolysis. For liposomes to be part of a pharmaceutical preparation they must be stable for at least 2 years at 4°C while for over-the-counter preparations stability for 2 years at room temperature is a pre-requisite. In the light of these requirements liposome-technologists are faced with far-from-trivial problems.

Taken as a whole, this volume contains a wealth of invaluable theoretical and technical information, much of it from the writers' own direct laboratory experience. It merits a place in any life-science or biomedical library which aims to cover the high-quality literature.

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FREE RADICALS, OXIDANT STRESS AND DRUG ACTION

Edited by Catherine Rice-Evans
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455 Pages

This book is a collection of twenty three papers presented at a meeting of the Society for Free Radical Research held in December, 1986. The book ranges selectively over the field of free radical research in experimental medicine and will be useful to readers with corresponding interests. The subjects covered include ischaemia, reperfusion and free radical damage; inflammation, rheumatoid arthritis and free radical activity; free radical detection in specific disease states; iron overload, iron chelation and disease; erythrocytes as models for oxidant stress; antibiotics and oxygen radicals; and the action of glutathione and *alpha*-tocopherol. The articles combine useful reviews of current thinking and new experimental material on free radicals in various disease states.

This is the second book on wide ranging aspects of free radicals and disease edited by Catherine Rice-Evans. It is useful to have compactly and to hand the material she is collecting in these books. In the present book she has kept her penchant for classical mottoes. This time it is Virgil: *Felix qui potuit rerum cognoscere causas*. More fortunate still, I suppose, is he or she who can tell between causal and casual connections of free radicals in pathological states. This is the hub of the matter in free radical research. An appropriate note is struck in the paper by David Hearse on postischaemic myocardium. In a thoughtful assessment of various interventions on free radicals he notes: "It must of course be conceded that many of these findings only allow an indirect association to be made between the observed protection and the manipulation of free radicals. In all instances alternative mechanisms of action may be proposed" (page 39). Nevertheless, free radicals offer the possibility of important advances in our knowledge of various pathological states. No-one will deny the importance of critical sifting of evolving knowledge and it is for this reason that one welcomes books like this. The snag is that readers may have to do their own shifting and inference. Causal inference is no easy matter. David Hume remarked "whatever we conceive is possible, at least in a metaphysical sense: but whenever a demonstration takes place, the contrary is impossible, and implies a contradiction". How often has any causal inference in this sense materialized in free radical research? Readers of this book will have much occasion to ponder on this matter.

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