Oxygen Free Radicals and Tissue Damage

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Edited by D. W. Fitzsimons
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Published volumes of symposia proceedings continue to flood onto the market. Many of them are worthless, consisting only of a collection of unrefereed manuscripts, any useful data in which already has been or will be published in conventional scientific journals. There is often no record of the discussions that took place, perhaps the most valuable part of any symposium.

Such criticisms cannot be levelled at the CIBA Foundation series and in particular they do not apply in any way to the above volume. It reports the proceedings of a Conference on Oxygen Free Radicals and Tissue Damage held in London on 6–8th June, 1978. The number of participants was restricted to 25 and they were carefully selected from the active workers in the field to represent a wide range of backgrounds, from pure chemists through biochemists and pharmacologists to clinicians. The papers presented have, in most cases, been carefully prepared to represent an overview of the topic discussed rather than just concentrating on the work of the authors. Discussions were recorded and edited, finally being presented in a form, detailed but not verbose, that is perhaps the most useful feature of the book.

A clear understanding of the role of oxygen radical in vivo requires a thorough grasp of their chemistry. The book begins with detailed reviews of oxygen chemistry (Hill) and the reactivity of the hydroxyl radical (Willson). It becomes clear that the superoxide radical is a relatively unreactive species an observation supported by Bielski et al. in their studies of the ability of this radical to react with amino acids. The toxicity of superoxide-generating systems (reviewed by Fridowich) is probably therefore due to other oxygen-derived species generated from superoxide, such as singlet oxygen or hydroxyl. Conversion of superoxide into the hydroxyl radical is catalysed by transition metals, especially iron, in vitro. To assess the significance of such reactions in vivo it is necessary to know the state and distribution of iron in living organisms, which is reviewed excellently by Crichton. Generation of hydroxyl from superoxide in vitro requires the presence of hydrogen peroxide. One of the major mechanisms by which H_2O_2 is removed in vivo is by the action of glutathione peroxidase, and our current knowledge of this enzyme is summarised by Flohe.

One of the major damaging effects of oxygen radicals upon cells may be the induction of lipid peroxidation, and this is reviewed in detail by Slater and by Cohen. There are similarities in the processes of lipid peroxidation and prostaglandin synthesis, and so a review of the latter by Flower is a useful addition. The two processes are brought together in an article by McCord et al., who consider the role of oxygen radicals in inflammation. There are several articles on the production of oxygen radicals and H_2O_2 by white blood cells as part of their killing mechanism (Segal, Roos, Klebanoff). The conclusions of these authors seem at first sight contradictory in some respects, but this is largely resolved in the discussion section.

Finally, Goldstein discusses ozone toxicity, and the role of oxygen radicals in paraquat poisoning is critically examined by Smith et al.

Overall, this is an excellent volume that I enjoyed reading and that I heartily recommend to workers in this field. It sets a standard of presentation that editors and publishers of conference proceedings should try to match.

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