

Soluble cell products in the immune response

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Biology of the Lymphokines. Edited by S. Cohen, E. Pick and J.J. Oppenheim. p.626. (Academic: New York, San Francisco and London, 1979.) \$42.50; £27.60.

THE word lymphokine was originally invented to denote those cell-free soluble factors, other than immunoglobulins, generated *in vitro* during the interaction of sensitised lymphocytes with specific antigen, and with biological activities consistent with them functioning as regulators of immune responses *in vivo*. Subsequent work has shown that the same, or similar, activities may be produced from other cells of both lymphoid and non-lymphoid origin under a variety of circumstances. The editors have therefore taken the view (with which there might be some disagreement) that their terms of reference for topics discussed in this book should be wide, and include "soluble cell products of all categories to which a function in the central or peripheral regulation of the immune response has been attributed, with the exception of classical antibodies". Within the potentially enormous list of substances which could be discussed in this context,

the editors have made a clearly stated selection of those which will receive attention and those which will not. This book is therefore about the activities of some soluble cell products, mostly derived and demonstrable *in vitro*, which are at present considered relevant to the regulation of immune responses *in vivo*. However, it is not simply a list of factors, but more interestingly an attempt to focus on some aspects of current lymphokine research, and in particular mechanisms of action.

The book consists of twenty chapters by different authors, most of whom have considerable experience of experimental work with lymphokines. The first, by the editors, entitled "The lymphokine concept", clearly explains the problems surrounding the definition, origin and relevance of lymphokines, and sets the stage for the ensuing chapters. The second entitled "Lymphokines as inflammatory mediators", includes a useful discussion of all the available, compelling, although inconclusive, evidence that these substances, the activities of which are based on *in vitro* assays, do have a role *in vivo*, and provides a basis for argument with those who regard lymphokines as test-tube artificats. Thereafter follow sixteen chapters, some of which review 'classical' lymphokine activities (migration inhibitory, cytotoxic and mitogenic factors) and some of which describe more recent fashionable additions to the lymphokine repertoire (factors affecting T cell - B cell cooperation, antigen-specific regulatory factors, and specific and non-specific suppressor T cell

factors). In addition, there is an interesting chapter by L. Epstein comparing the properties of classical and immune interferons, a chapter on the important and difficult problems of purification and characterisation of lymphokines, and several chapters on lymphokine activities derived from a variety of cell sources of both lymphoid and non-lymphoid origin. The book concludes with two general reviews; the first a stimulating article on the role of intracellular mediators in the immune response by C. Parker, which although it makes little reference to lymphokines, was presumably included on the basis that the editors feel that future research on their biology may focus on such mechanisms; and the second an overview of the biology of lymphokines by B. Waksman.

The topics selected for inclusion in this book reflect current aspects of the study of lymphokines which the editors view as important. Within our present state of limited knowledge about soluble cell products involved in immune regulation, and in particular their biochemical purification and characterisation, the relative importance of the subjects discussed remains a matter of speculation. Nonetheless, the book brings together information and concepts which can form the basis of useful discussion amongst those actively involved in lymphokine research, as well as those more generally interested in biological control mechanisms. □

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Simple qualitative molecular orbital theory

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Molecular Structure and Bonding: The Qualitative Molecular Orbital Approach. By B. M. Gimarc. Pp. 224. (Academic: New York, San Francisco and London, 1979.) £11.70.

THIS book endeavours to explain how a knowledge of simple qualitative molecular orbital theory can give a detailed understanding of the shapes of molecules. It is rather limited in scope, covering only H_3 , H_4 , AH_2 to AH_4 , AB_2 to AB_6 , HAB and H_2AB , A_2H_2 , A_2H_4 and A_2H_6 , and dimers of AB , AB_2 and AB_3 (where A and B are first or second row elements; there is no mention of transition-metal compounds) but these molecules are discussed in considerable detail, with many references to experimental and *ab initio* data. The book is aimed at senior undergraduates or first-year graduates, though it is not

entirely consistent in level: for example, it is not thought necessary to explain what is meant by the Hartree-Fock method with configuration interaction, but the simple molecular-orbital picture of H_2 is discussed in some detail. Similarly the reader is not expected to know or learn any group theory beyond "a knowledge of symmetry classifications", but the molecular orbitals of the various species are given, in qualitative form, without any hint of the group-theoretical procedures used in their derivation. Such theoretical explanation as is given (for example, of the change in the form of the orbitals on bending on AH_2 molecule) is woolly and unconvincing. Students who had not met Walsh diagrams before would have difficulty with the treatment of AH_2 , let alone the more complicated examples.

However, the main limitation of this book is its single-minded commitment to one approach. Changes of energy on passing from one structure to another are to be viewed wholly in terms of changes in overlap. There is no mention, in the main text, of Walsh, whose classic series of papers dealt with most of these molecules 25 years ago, or of the Jahn-Teller effect or the pseudo-Jahn-Teller effect. The only

concession to other methods of tackling these problems is a couple of pages at the end of the book, in which other approaches are briefly mentioned, almost as if to counter the accusation that the author has never heard of them, but there is no attempt whatever to integrate these ideas into the book as a whole. In the discussion of H_4 for example, three possible structures are considered, namely tetrahedral, square-planar and linear. The overlap criterion is used to rank these in order of energy, and it is concluded, not very convincingly, that the linear structure lies lowest. But application of the Jahn-Teller theorem shows conclusively that the ground state *cannot* be tetrahedral or square-planar, because either of these structures would, according to the theorem, distort spontaneously. The reader should be told about this far more rigorous approach.

In summary, the book contains a good deal of useful information on a rather restricted subject, but it is discussed from a very narrow point of view. A disappointing book. □

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