

reviews

Immunoglobulins

The Antigens. Vol. 1. Edited by Michael Sela. Pp. xiii+573. (Academic: New York and London, January 1974.) \$31; £14.90.

THE appearance of a multivolume work about any topic is a sign that the subject has now become part of the body of accepted scientific knowledge. A period of rapid progress is coming to an end and there is a sufficient volume of fact and theory to form the basis of undergraduate courses as well as to be an essential part of the background of all scientists working in related fields. In biochemistry, proteins were the first subject to receive this accolade some twenty years ago followed quickly by enzymes, nucleic acids and many others. The aim was to present research workers, teachers and advanced students with a rather full account of the field and on the whole they have served a useful purpose, though of necessity they have been a year or two out of date by the time they reached the libraries. Now it is the turn of immunochemistry, or as some would have it, molecular immunology. How does it match up?

The first glance is disconcerting as volume 1 of *The Antigens* contains four chapters on antibodies, one general chapter on protein evolution and only two on antigens. Volume 2, of which the contents are listed, will have three chapters, each on antibodies and antigens. This is perhaps not important, as any potential reader will be well aware that it is hardly possible to write of antigens without extensive reference to antibodies and indeed much of the progress in knowledge of antibody structure, genetics and synthesis has come from study of their antigenic properties, but it would have been helpful if the title had given a better guide to the contents.

The antigens chosen for discussion in this volume are nucleic acids by Dr David Stoller and enzymes by Dr Ruth Arnon. The former are difficult to handle as injection of purified nucleic acids into an animal of different species rarely gives rise to a significant immune response and specific antibodies are found only when protein-nucleic acid complexes are used; that is the nucleic acids are behaving as large molecular weight haptens. Nevertheless, in recent years satisfactory antisera have been obtained (and have been found to

occur spontaneously in pathological conditions) and have been used effectively in investigations of the structure and function of nucleic acids in cell and subcellular fractions and a useful summary of the work is given here. Enzymes are much more easy to handle as antigens and Dr Arnon has led much of the work directed to using specific antisera to gain information about their structure and catalytic activity. This has proved a valuable adjunct to the very extensive studies of enzymes by protein chemists, X-ray crystallographers, enzymologists and all the others and, over an increasing range, has complemented and confirmed knowledge of these key molecules.

Immunoglobulins are the major subject of this book, about a quarter of which is given to their structure, and rather less space given in turn to the immunoglobulin allotypes, phylogeny of immunoglobulin and the chemistry and biology of immunoglobulin E. Dr Gall has given a good account of the chemical structure which is now well understood, but it is unfortunate that the article was written just too early to include the recent work of the X-ray crystallographers which is clarifying the nature of the combining site and other topics which he discusses. Allotypes have long had a fascination for some of us, particularly the *a* locus allotypes of the rabbit which remain the odd man out in most of the work on these allelic variants of the immunoglobulins. These investigations have contributed greatly to knowledge of their genetic origin and the conviction remains that when their behaviour is fully understood it will give a much clearer understanding of the source of the multiplicity of form of immunoglobulins. This chapter by Dr Rose Mage and colleagues has got all the facts and some of the speculation well presented. Dr Ishizaka has given perhaps the most personal account in his chapter on IgE, the minor immunoglobulin class responsible for immediate type hypersensitivity and apparently of major importance in the immune defence of the host against a variety of parasites. Of obvious clinical importance, this is a field where the myeloma proteins, for a long time the only source of large amounts of homogeneous immunoglobulin, have been of exceptional importance.

A general chapter on protein evolution by Dr Norman Arnhem serves as an introduction to the phylogeny of

immunoglobulins by Drs Kubo, Zimmerman and Grey. This is another way to try and understand the genetic origin of the complexity of immunoglobulin structure and, although the contributions from this approach have not so far been of major importance, it is well worthwhile from this point of view as well as for its intrinsic interest in biology. The transition from invertebrates to vertebrates seems to have been the most important point in the development of a specific immune response and much of the work described centres on the immunoglobulins of the lower vertebrates. No evidence has, however, been found so far for the original gene product of 11-12,000 molecular weight from which the immunoglobulins of present vertebrates are believed to have been derived by gene duplication.

The chapters are reasonably balanced in content, but their arrangement seems arbitrary. Together with the second volume a fair coverage is given of the more biochemical aspects of immunology, though there are surprising omissions such as the absence of any discussion of immunoglobulin biosynthesis. Perhaps with the title of 'The Antigens' this is not surprising, but with more than half the space given to immunoglobulins, biosynthesis would seem a stronger candidate for inclusion than, say, the individual classes of immunoglobulin. The editor's difficulties are apparent and it is perhaps questionable whether these multivolume works are the most effective way of summarising present information. The alternative of an advanced textbook giving a briefer but more integrated survey and supplemented, for the enthusiast, by the annual volumes of reviews on specialised topics has much to commend it. There is no doubt room for both and this volume and its successor should be a useful source of reference for some time to come.

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Betas and muons

Beta Decay and Muon Capture. By Masato Morita. Pp. xi+361. (Benjamin: Reading, Massachusetts and London, March 1974.) \$19.50.

THIS is a curious book, though it will probably be very useful to a specialised audience. It has grown from a course of postgraduate lectures given at the University of Osaka. Judging by the