

reviews

Comparative immunology

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Comparative Immunology. By Edwin L. Cooper. Pp. 338. (Prentice-Hall: Englewood Cliffs, New Jersey, 1976.) \$19.95. £15.95.

THE evolutionary approach to cell-mediated and humoral immunity has gained increasing attention during the past decade. More biologists are eager to discover mechanisms and adaptive specialisations of immunocompetence because the survival of entire populations and species is involved. If mammals, including man, represent the quintessence of immunoresponsiveness with complex interdependent pathways, the less elaborate systems of immunity in lower phyla of animals offer insights of immediate biomedical interest. In a larger sense, wildlife conservation, management of food resources, and protection of ecosystems all hinge on understanding how diverse species cope with pathogenic or infectious agents. Seasoned biological scientists will find comprehensive summarisations of much work in this field in two recent volumes: *Immunologic Phylogeny* (ed. W. H. Hildemann and A. A. Benedict, Plenum: New York and London, 1975); *Phylogeny of Thymus and Bone Marrow-Bursa Cells* (ed. R. K. Wright and E. L. Cooper, North-Holland: Amsterdam, 1976).

In essence, different levels of immunorecognition and reaction to foreign agents are now discernible in phylogenetic progression all the way from coelenterates to mammals. The immune systems of higher vertebrates reveal specialisations of more general systems of receptors and mediators. Moreover, both immunological specificity and memory associated with leukocytic cells have been demonstrated in various invertebrate phyla, even though production of immunoglobulin antibodies first appears in vertebrates (that is, primitive fishes). Highly polymorphic systems of histocompatibility markers demonstrable as cell-surface alloantigens seem to be universal in Metazoa at all levels of phylogeny. These specificities evidently constitute immunorecognition molecules of exquisite discrimination in lower invertebrates sufficient to preclude the need for an additional system of immunoglobulin receptors. These two systems apparently function cooperatively in the separate T-lymphocyte and B-lymphocyte pathways of higher vertebrates.

Despite much progress, many in-

formation gaps and uncertainties remain at all levels of phylogeny. Until now, potential newcomers to comparative immunology have had no elementary reference to study, because the many immunology books available all deal almost entirely with placental mammals and man in a medical context. Ed Cooper has successfully pioneered in writing, according to his preface, "a unique beginning text for advanced undergraduate students of biology, zoology, and immunology . . ." The first four chapters provide a far-ranging introduction to the immune system and its phylogeny at a moderately advanced level. The subject matter anticipates later chapters and presupposes substantial understanding by the student of zoology, genetics and biochemistry.

Chapters 5, 6 and 11 focus in admirable breadth on invertebrate immune responses, a frontier subject the author handles with incisive enthusiasm. Only the recent discoveries of immunocompetence in corals and intraspecific incompatibilities in sponges are notably missing. Many immunologists would contest Cooper's assertion that even unicellular protozoa show quasi-immunorecognition. Indeed, the existence of specific immunocompetence in higher invertebrates has only recently gained reluctant acceptance. Although some may fault Cooper's protagonist stance in this connection, readers should enjoy the privilege of judging the evidence presented for themselves.

Chapters 8, 9 and 10 together cover transplantation immunology from both phylogenetic and ontogenetic viewpoints, with appropriate emphasis on the classes of non-mammalian vertebrates. More

attention could well have been given to the major histocompatibility complexes of mice (*H-2*) and men (*HLA*), although other excellent books emphasising these Immunogenetic systems (for example, J. Klein, *Biology of the Mouse Histocompatibility-2 Complex*, Springer: New York, 1975, and G. Snell, J. Dausset and S. Nathenson, *Histocompatibility*, Academic: New York and London, 1976) have recently appeared.

Chapters 12 and 13 deal with antibody synthesis and the immunoglobulins, respectively. These inseparable topics might better be considered earlier by many students, either along with chapter 7 on the "Machinery of the Immune System" or after the four introductory chapters. In the final chapter, Cooper presents a thoughtful epilogue focusing on unresolved questions concerning adaptive immunity. Beyond pedagogic questions of chapter sequence, the book suffers slightly from a number of poorly reproduced illustrations and an index with entries too abbreviated to identify topics with desirable precision.

All things considered, I wholeheartedly recommend *Comparative Immunology* as a widely useful reference for immunologists and zoologists alike. It can serve quite well as an immunobiology textbook for advanced undergraduates, or even graduate students other than dental, medical or public health students. Professor Cooper has made a specially valuable contribution to the literature of immunology. □

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Organic photochemistry

Aspects of Organic Photochemistry. By W. M. Horspool. Pp. viii+290. (Academic: London and New York, 1976.) £9.50; \$20.75.

THIS book sets out to bridge the gap between the many recent introductory texts on organic photochemistry and the more comprehensive books and reviews. It succeeds to a certain extent, providing three chapters of introductory material (Introduction to physical aspects of photochemistry, Experimental methods, Orbital symmetry correlations) and six chapters

of more detailed organic photochemistry. The later chapter headings (Photochemistry of unsaturated systems, Photochemistry of aromatic compounds, Reactions of ketones, Photochemistry of enones, Oxidation and reduction reactions, Miscellaneous reactions) resemble the divisions used in the Chemical Society's Specialist Periodical Reports, *Photochemistry*, but whereas this presentation is appropriate for a specialised annual survey it is less so for a textbook intended in the first place for final-year undergraduate and graduate students. A