been proposed by Henrique Malvar, Meyer, with typical modesty, named these functions Malvar's wavelets.) The last four chapters discuss some applications of wavelets to image analysis, fractals, turbulence, and astronomy, mentioning work in progress and referring the reader to the literature. In many respects the book is a personal view of the field, and others would no doubt have tackled the undertaking quite differently; this actually adds to the book's interest. There are still mathematical formulas on almost every page, so that I would not recommend the book to mathophobes, but I believe it is accessible to any scientifically minded reader with rudimentary knowledge of Fourier analysis; furthermore, the seasoned mathematician will find discussions of many interesting nonmathematical topics, so that the book is by no means superfluous for readers of the other book under review here. The translation is slightly less close to the original lecture notes, but that can be considered a plus, since a very close translation would not have captured the casual style of the notes. Some of the material has been revised and updated by the translator, Robert D. Ryan, in collaboration with Meyer. I noticed a few typos, and I guess Ryan is not a musician, since on page 6 of the English translation the reader is still told that "ré mineur" is a musical note. But these are minor blemishes, and I recommend the book as a delightful introduction to wavelets.

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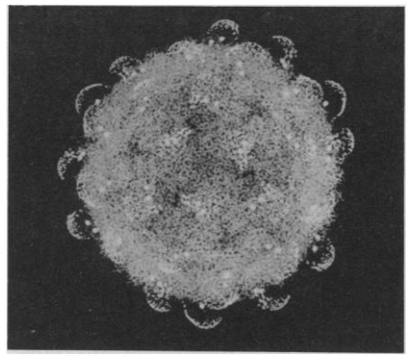
Cell-Mediated Immunity

Viruses and the Cellular Immune Response. D. BRIAN THOMAS, Ed. Dekker, New York, 1993. xviii, 524 pp., illus. $185.

In the past few years fundamental information concerning the recognition of viral antigens by receptors on $CD4^+$ and $CD8^+$ T lymphocytes has become available. Although much remains to be learned, as exemplified by our ignorance of the basic immunopathogenesis underlying HIV-1 infection, we now have a solid scientific basis for modeling cellular immune responses to virus infections, especially for viruses that induce diseases in mice.

With this book D. Brian Thomas has attempted to unify the current literature on cellular immunity to viruses, which he thinks is "fragmented," with cellular immunologists and virologists focusing on different aspects of the problem. I concur that most virologists are concerned with molecular aspects of antigenicity and viral replication and often consider neutralizing antibody to be the primary (if not the sole) determinant of immune protection. Likewise, as Thomas states, some cellular immunologists have concentrated on using virus systems to address basic questions of antigen processing and positive and negative selection of the T cell repertoire. Other immunologists, however, including some of the contributors to this book, have explored in fine detail the interactions between the infecting virus and the immune system of the host.



"Computer graphic representation of the crystal structure of [foot and mouth disease virus] serotype O1. The majority of the protein structure was clearly resolved by X-ray crystallographic techniques. However the G-H loop of VP1 (amino acids 136–159) was too disordered to produce meaningful electron density. The spaces potentially occupied by these 'invisible' regions are represented by clouds of dots." [From Francis and Rowlands's chapter in *Viruses and the Cellular Immune Response*; courtesy of David Stuart, University of Oxford]

The first few chapters provide an overview of some of the complexities of immune responses in the virus-infected host and of developing concepts of the processing of viral antigens for T cell receptor recognition. Following are useful reviews of the roles of dendritic cells and of the roles of cytokines in infectious diseases. The bulk of the book consists of detailed reviews of individual viruses, focusing on cell-mediated immunity. These provide a good beginning for the reader interested in learning about specific cellular immune responses. Particularly interesting are the chapters on the complex interactions of adenoviruses, cytomegalovirus (CMV), and Epstein-Barr virus (EBV) with the T cell responses of the infected host. It is clear that we need to learn more about how T cells control the polyclonal stimulation of B cells by EBV and why CMV causes fatal pneumonias in some transplant recipients and retinitis in AIDS patients. There are three chapters devoted to HIV-1, including a thorough review by Venet, Gomard, and Lévy of human T cell responses. The book concludes with a brief and insightful review by Allison of current vaccine development efforts incorporating concepts of $CD4^+$ and $CD8^+$ T cell responses as well as protective antibodies.

Not covered are class I–restricted $CD8^+$ cytolytic T lymphocyte responses to influenza A viruses and lymphocytic choriomeningitis virus, which have been fruitful for the study of cellular immune responses and immunopathology, and vaccinia virus, which was successfully used to eliminate smallpox. It might have been more appropriate to devote space to these important viruses and to omit coverage of some of the less-studied viruses.

Recent breakthroughs in the understanding of T cell receptor recognition of major histocompatibility complex (MHC)–peptide complexes by crystallography and the characterization of natural peptides that serve as epitopes for T cell receptors have been based on studies of virus-specific T cell clones and virus-infected cells. Although some of these accomplishments are carefully reflected in this book, others (for example, the definition of natural peptide epitopes on virus-infected cells) are not. In addition, the inclusion of color figures of some of the structures (for example, the MHC-peptide binding site, the influenza hemagglutinin molecule), would have helped the reader to better understand structure-function relationships. Despite these flaws, this is a useful reference book for anyone interested in learning more about cellular immune responses to viruses.

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Life and Computers

Artificial Intelligence and Molecular Biology. LAWRENCE HUNTER, Ed. AAAI, Menlo Park, CA, and MIT Press, Cambridge, MA, 1993. x, 470 pp., illus. Paper, $39.95 or £35.95.

Artificial intelligence (AI) comprises activities ranging from straightforward applied programming to the development of general theories of problem solving. Molecular biology is perhaps less broad, but is arguably equally ambitious as a discipline. In considering a book entitled *Artificial Intelligence and Molecular Biology* it is worth asking just what aspects of these two fields are covered, and for whom. Lawrence Hunter's collection of papers is surprisingly eclectic, both