

## The Foundations of Immunology and Their Pertinence to Medicine

**Peter Bretscher**

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*From an innovative theorist and an elegant writer, this book is a valuable contribution to literature on medicine and disease.*

In *The Foundations of Immunology and Their Pertinence to Medicine*, research scientist Peter Bretscher summarizes historical discoveries and foundational concepts of immunology to encourage potential medical breakthroughs among nonspecialists, clinicians, and “broadly educated” thinkers.

The book presents overspecialization among scientists and medical professionals as a trend that limits the creative and synergistic study of human illness. Bretscher sees many possibilities for treating and curing a variety of human ailments, from seasonal allergies to leishmaniasis to cancer, through an understanding of the ways immune system components variously attack pathogens and cells within the body to cause autoimmune diseases.

Most of the book forwards a historical overview of immunology, from its beginnings in the eighteenth century with Edward Jenner’s observations of smallpox immunity among cowpox survivors through to the very latest research into the molecular structure and function of cells within the immune system. The chapters gradually build up the layers of information needed to understand how lymphocytes and other cells are triggered into action to fight off infection—and conversely, why they don’t in other circumstances.

Bretscher analyzes mountains of immunology literature and points out areas where further research could clarify previous findings or explain contradictory results. His is a thorough review that tosses out enough exciting ideas to occupy graduate students around the globe.

Though the author notes that this book is not as technical as most of his other writings, it is densely packed with information that requires careful reading before one can advance to the next topic. Immunology requires an understanding of its own concepts and a thorough grounding in basic biochemistry and microbiology as well. There is a lot of jargon throughout the work, and terms are helpfully explained in the text and indexed in the glossary.

The author succinctly rehashes pertinent ideas at the head of each new chapter. Illustrations also reinforce important ideas and intracellular reactions. Still, this is a book that presumes a fair amount of scientific or medical literacy, all of which is necessary for its text to be readily accessible. An immunology novice will find it a tough slog, especially if they are unfamiliar with lysis, interleukin-2, clonal selection theory, epitopes, or IgG4.

The final chapters are the most exciting and reveal specific avenues for potential immunological treatment for a number of diseases. The author’s analysis suggests that immune responses might be very specifically regulated to release certain antibodies, or to unleash one of the range of cell-mediated responses in specific situations, holding promise for many medical conditions. He envisions immunological scenarios allowing for the creation of vaccines against HIV and tuberculosis; targeted medical treatments for arresting multiple sclerosis and other autoimmune diseases; screening for susceptibility to certain kinds of cancers and inoculation to trigger immune protection; and

protocols for protecting against the rejection of transplanted organs and tissue.

Bretscher is an innovative theorist and an elegant writer, and this book is a valuable contribution to literature on medicine and disease. It provides ideas for further research into harnessing the body's highly individual immune response to vanquish ailments that have plagued humankind for centuries.

RACHEL JAGARESKI (February 10, 2017)

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