Essential Immunology for Surgeons
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Edited by

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Immunology has a reputation amongst clinicians for being difficult. Yet it is clearly relevant to many facets of disease. For surgeons, these include transplantation, cancer, inflammation and sepsis; all of major clinical importance. Contact with immunology is unavoidable. Patient management may involve potent biological therapies with antibodies such as herceptin or avastin. Many similar approaches are just around the corner, nearly a third of drugs under late stage development are ‘biologicals’. Many new small molecule drugs target specific pathways in immune cells. Furthermore, expression profiling of gene expression in cancers can identify immunological targets. New imaging approaches may use antibodies to identify different cell types. In order to follow what is going on and what the clinical implications are, some understanding of immunology is becoming essential.

Why is immunology difficult? This book will tell you that it is not! Immunology before the 1980s was mired in phenomenology that could only be understood with mental acrobatics. However the advances in molecular biology and genetics in the last thirty years have changed this dramatically. Most of the phenomena have been explained, and validated, in quite simple molecular terms. For example, the old mysterious magic of adjuvants (such as alum) in enhancing immunizations is explained by the presence of pattern recognition receptors on macrophages and related cells, which set up inflammatory responses and release cytokines that activate antigen specific lymphocytes. Even the last of the unexplained 1970s phenomena, the suppressor T cell has yielded to more molecular approaches: production of immunosuppressive cytokines by a subset of T cells, called regulatory T cells, is controlled by a single protein, FoxP3, that regulates expression of their genes. Indeed, one no longer needs to try to understand the phenomenology until there is a molecular explanation; good journals now follow this principle. This book explains immunology on a base of secure and understandable molecular mechanisms.

Immunology also appears difficult because of the abbreviations and acronyms. This is an unnecessary hindrance that is addressed in this book by an index right at the front. However, the use of an abbreviation such as ‘MHC’ rather than ‘major histocompatibility complex’ is less cumbersome for both author and reader. Therefore, some limited ‘language learning’ may be necessary but it is not difficult, given a good dictionary.

Finally, immunology may be difficult because of the speed of change. It is very exciting because it moves so fast, but this can make it appear formidable to non-experts. Where there is already a clear molecular explanation of how things work, this rarely changes. What can happen is that further modulations of particular systems are found. These are of interest to those directly working in that area, but the rest of us can stand back a little and only really get excited by major paradigm shifts, which are rare. The apparent speed of change can make one wary of reading or buying textbooks,
however books that are well grounded in the basics of the subject will not go out of date. This book is in this category and should form a secure platform on which to build an understanding of advances in the field.

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Preface

Our knowledge and understanding of immunology has undergone major expansion and very significant changes over the last two decades. This has led to a much better understanding of the pathogenesis of various disease states and processes; in many diseases, to more effective management. Since the publication of our textbook, *The Immunological Basis of Surgical Science and Practice* in 1992, specifically targeted to a surgical readership, the scope of surgical immunology has broadened substantially, encompassing new aspects of practice in traditional areas (e.g., new therapeutic approaches in transplantation rejection, novel vaccination strategies in cancer treatment as well as a better understanding of the beneficial effects of standard chemotherapy). In a range of diseases the immune response has been manipulated to lead to more targeted and effective humoral therapy – transplantation, cancer and musculoskeletal disorders. There have been major advances in our understanding of gut immune mechanisms and their importance to good health and state of well-being, the metabolic disturbances and associated dysfunction of host defences induced by severe trauma and sepsis and the resultant consequences to the critically ill patient. Anaesthesiologists and Intensive Care Physicians are recognizing the significant derangements of immune function in the critically ill patient and the possible therapeutic approaches to manage such patients.

This new textbook provides the reader with a concise and up-to-date account of immunology in general and its translation into key areas of clinical practice. This book aims to inform, educate, and provide the reader with a helpful biomedical template for a better understanding and management of important areas of clinical practice relevant to the surgeon and the critical care physician. Although targeted predominantly to the surgical trainee intending to sit the appropriate specialist examination, we hope that the more senior clinician in consultant practice, both surgical and non-surgical (gastroenterology, anaesthesiology), as well as undergraduate medical students, may find sections of the book informative, and a stimulant to further reading. Key references to more in-depth study are provided at the end of each chapter.

The two Senior Editors have been fortunate in having experts in their clinical disciplines and/or field of immunology from the UK, Spain, and the USA contributing to this book. All the contributors have been given the remit outlined above and all sections have undergone a rigorous editorial process to ensure a coherent volume and uniform style. We hope that our readers find the text interesting, informative, and stimulating. If you have comments/criticisms about the book, in particular suggestions about improvements in future editions, please write to the Editorial Team.
Lastly, the editors are very grateful to Professor Sir Andrew McMichael, world leading immunologist, for writing a Foreword to the book.

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