Essential Clinical Immunology

The ways in which we can better understand cancer, HIV, and other autoimmune diseases through clinical immunology are of great interest to all scientists, from students to post-graduate practitioners. Designed as an introduction to science students (MD, MD–PhD, PhD) as well as to more advanced PhDs and medical practitioners, this book focuses on the importance of immunological concepts in disease states. Essential Clinical Immunology begins with the basic concepts and then details the immunological aspects of various disease states involving major organs of the body. The book explores how we can better understand disease and its treatment through clinical immunology. Looking forward, each chapter concludes with patterns for future research.

John B. Zabriskie (M.D., Columbia College of Physicians and Surgeons) is Professor Emeritus and former head of the Laboratory of Clinical Microbiology and Immunology at The Rockefeller University, New York, New York. He has written numerous articles on immunology, microbiology, and neurology.
Essential Clinical Immunology

Edited by

John B. Zabriskie

The Rockefeller University
# Contents

List of Contributors vii

1 Basic Components of the Immune System 1  
John B. Zabriskie, M.D.

2 Immunological Techniques 21  
John B. Zabriskie, M.D.

3 Immune Regulation 33  
Nina Bhardwaj, M.D., Ph.D., David O’Neill, M.D., and Thomas Waldmann, M.D.

4 Immunological Aspects of Infection 45  
Kumar Visvanathan, M.D., Ph.D., Christopher M. MacIsaac, M.D., Ph.D.,  
William W. Hall, M.D., Ph.D., and Vincent A. Fischetti, Ph.D.

5 Immunological Aspects of Immunodeficiency Diseases 61  
Dinakantha S. Kumararatne, M.D.

6 Autoimmunity 91  
Haoyang Zhuang, Ph.D., Matthew Kosboth, M.D., Jennifer A. Sipos, M.D.,  
Minoru Satoh, M.D., Ph.D., Lijun Yang, M.D., and Westley H. Reeves, M.D.

7 Chronic Lymphocytic Leukemia 119  
Nicholas Chiorazzi, M.D., and Manlio Ferrarini, M.D.

8 Immunology of HIV Infections 131  
Anders G. Vahne, M.D., Ph.D.

9 Immunological Aspects of Allergy and Anaphylaxis 145  
Paul M. Ehrlich, M.D., and Jonathan D. Field, M.D., F.A.A.A.I.

10 Immunological Aspects of Skin Diseases 163  
James G. Krueger, M.D., Ph.D., and Lisa Zaba, M.D., Ph.D.
<table>
<thead>
<tr>
<th>Chapter</th>
<th>Title</th>
<th>Pages</th>
</tr>
</thead>
<tbody>
<tr>
<td>11</td>
<td>Experimental Approaches to the Study of Autoimmune Rheumatic Diseases</td>
<td>175</td>
</tr>
<tr>
<td></td>
<td>Dalit Ashany, M.D., and Mary K. Crow, M.D.</td>
<td></td>
</tr>
<tr>
<td>12</td>
<td>Immunological Aspects of Cardiac Disease</td>
<td>199</td>
</tr>
<tr>
<td></td>
<td>John B. Zabriskie, M.D., Allan Gibofsky, M.D., J.D., Wesley C. Van Voorhis, M.D., Ph.D., Frederick S. Buckner, M.D., and Noel R. Rose, M.D., Ph.D.</td>
<td></td>
</tr>
<tr>
<td>13</td>
<td>Immunological Aspects of Chest Diseases: The Case of Tuberculosis</td>
<td>231</td>
</tr>
<tr>
<td></td>
<td>Ernesto Muñoz-Elias, Ph.D., and Robert J. Wilkinson, Ph.D., FRCP</td>
<td></td>
</tr>
<tr>
<td>14</td>
<td>Immunological Aspects of Gastrointestinal and Liver Disease</td>
<td>251</td>
</tr>
<tr>
<td></td>
<td>Christine Moung, M.D., and Lloyd Mayer, M.D.</td>
<td></td>
</tr>
<tr>
<td>15</td>
<td>Immunological Aspects of Endocrine Disease</td>
<td>277</td>
</tr>
<tr>
<td></td>
<td>Jean-François Bach, M.D.</td>
<td></td>
</tr>
<tr>
<td>16</td>
<td>Immune-Mediated Neurological Syndromes</td>
<td>293</td>
</tr>
<tr>
<td></td>
<td>Jacqueline Friedman, M.D.</td>
<td></td>
</tr>
<tr>
<td>17</td>
<td>Immunological Aspects of Renal Disease</td>
<td>313</td>
</tr>
<tr>
<td></td>
<td>Gil Cu, M.D., and John B. Zabriskie, M.D.</td>
<td></td>
</tr>
<tr>
<td>18</td>
<td>Immunological Aspects of Transplantation</td>
<td>331</td>
</tr>
<tr>
<td></td>
<td>Jeffrey M. Venstrom, M.D., and James W. Young, M.D.</td>
<td></td>
</tr>
</tbody>
</table>

Index 349
Contributors

Dalit Ashany, M.D.
Assistant Attending Physician,
Hospital for Special Surgery
Assistant Professor of Medicine,
Weill Medical College of Cornell University
Hospital for Special Surgery
New York, NY

Jean-François Bach, M.D.
Professor of Immunology,
Necker Hospital, Paris
Secrétaire perpétuel
Académie des sciences
Paris, France

Nina Bhardwaj, M.D., Ph.D.
Director of Tumor Vaccine Center
New York Cancer Institute
New York, NY

Frederick S. Buckner, M.D.
Associate Professor
Department of Medicine, Division of Infectious Diseases
University of Washington
Seattle, WA

Nicholas Chiorazzi, M.D.
Investigator and Director, Laboratory of Experimental Immunology
Feinstein Institute for Medical Research
Manhasset, NY

Mary K. Crow, M.D.
Senior Scientist

Gil Cu, M.D.
Assistant Professor and Medical Director
Department of Medicine, Division of Nephrology and Hypertension
University of Florida, Jacksonville
Jacksonville, FL

Paul M. Ehrlich, M.D.
Clinical Assistant Professor
Department of Pediatrics
New York University School of Medicine
New York, NY

Manlio Ferrarini, M.D.
Istituto Nazionale per La Ricerca sul Cancro, IST
Genova, Italy

Jonathan D. Field, M.D., F.A.A.A.I.
Director, Pediatric Allergy and Immunology Clinic
New York University/Bellevue Medical Center
New York, NY

Vincent A. Fischetti, Ph.D.
Head, Laboratory of Bacterial Pathogenesis
Rockefeller University
New York, NY
Jacqueline Friedman, M.D.
Clinical Professor
Department of Neurology
New York Harbor
VA Medical Center
New York, NY

Allan Gibofsky, M.D.
Professor
Department of Medicine and Public Health
Weill Medical College of Cornell University
New York, NY

William W. Hall, M.D., Ph.D.
Professor
Department of Medical Microbiology
University College Dublin
Dublin, Ireland

Matthew Kosboth, M.D.
Rheumatology Fellow
Division of Rheumatology and Clinical Immunology
University of Florida
Gainesville, FL

James G. Krueger, M.D., Ph.D.
Professor/Medical Director
Rockefeller University
New York, NY

Dinakantha S. Kumaratne, M.D.
Consultant in Immunology
Department of Clinical Biochemistry and Immunology
Addenbrooke’s Hospital
Cambridge, UK

Christopher M. MacIsaac, M.D., Ph.D.
Candidate
Centre for Inflammatory Diseases
Monash Institute of Medical Research
Clayton, Victoria, Australia

Lloyd Mayer, M.D.
Professor and Chairman,
Immunobiology Center
Dorothy and David Merksamer Professor of Medicine
Chief, Division of Clinical Immunology
Chief, Division of Gastroenterology
Mount Sinai Medical Center
New York, NY

Christine Moung, M.D.
Department of Pathology
Mount Sinai Medical Center
New York, NY

Ernesto Muñoz-Elías, Ph.D.
Postdoctoral Fellow
Department of Microbiology
Tufts University
Boston, MA

David O’Neill, M.D.
Assistant Professor of Pathology
Director, NYUCI Vaccine and Cell Therapy Core Facility
New York University School of Medicine
New York, NY

Westley H. Reeves, M.D.
Marcia Whitney Schott Professor of Medicine
Division of Rheumatology and Clinical Immunology
University of Florida
Gainesville, FL

Noel R. Rose, M.D., Ph.D.
Professor of Pathology
Professor of Molecular Microbiology and Immunology
Director, Johns Hopkins Center for Autoimmune Disease Research
Bloomberg School of Public Health
Baltimore, MD
Minoru Satoh, M.D., Ph.D.
Associate Professor
Division of Rheumatology and Clinical Immunology
University of Florida
Gainesville, FL

Jennifer A. Sipos, M.D.
Assistant Professor
Division of Endocrinology
University of Florida
Gainesville, FL

Anders G. Vahlne, M.D., Ph.D.
Professor of Clinical Virology
Department of Immunology, Microbiology, Pathology, and Infectious Diseases
Karolinska University Hospital, Huddinge
Stockholm, Sweden

Jeffrey M. Venstrom, M.D.
Fellow, Hematology-Medical Oncology
Department of Medicine
Memorial Sloan-Kettering Cancer Center
New York, NY

Kumar Visvanathan, M.D., Ph.D.
Director, Innate Immunity Laboratory and Infectious Diseases Physician
Centre for Inflammatory Diseases
Department of Medicine (Monash Medical Centre)
Monash University
Clayton, Victoria, Australia

Wesley C. Van Voorhis, M.D., Ph.D.
Training Program Director, Infectious Diseases
Professor of Medicine

Adjunct Professor of Pathobiology
University of Washington
Seattle, WA

Thomas Waldmann, M.D.
Head, Cytokine Immunology and Immunotherapy Section
Metabolism Branch Chief
Center for Cancer Research, National Cancer Institute
National Institutes of Health
Washington, DC

Robert J. Wilkinson, Ph.D., FRCP
Institute of Infectious Diseases and Molecular Medicine
University of Cape Town
Cape Town, South Africa

Lijun Yang, M.D.
Associate Professor
Department of Pathology, Immunology and Laboratory Medicine
University of Florida
Gainesville, FL

James W. Young, M.D.
Chief (Interim), Adult Allogeneic Bone Marrow Transplantation
Attending Physician and Member
Professor of Medicine, Weill Medical College of Cornell University
Division of Hematologic Oncology
Department of Medicine
Memorial Sloan-Kettering Cancer Center
New York, NY

Lisa Zaba, M.D., Ph.D.
Biomedical Fellow
Rockefeller University
Krueger Laboratory
New York, NY
John B. Zabriskie, M.D.
Professor Emeritus, Laboratory of Clinical Microbiology and Immunology
Rockefeller University
New York, NY

Haoyang Zhuang, Ph.D.
Graduate Assistant
Division of Rheumatology and Clinical Immunology
University of Florida
Gainesville, FL