

CONTENTS

Contributors

vii

1. Immune Regulation by B Cells and Antibodies: A View Towards the Clinic

1

Kai Hoehlig, Vicky Lampropoulou, Toralf Roch, Patricia Neves,
Elisabeth Calderon-Gomez, Stephen M. Anderton, Ulrich Steinhoff,
and Simon Fillatréau

1. Introduction	2
2. Prevention of Rhesus D Hemolytic Disease of the Newborn with Anti-D Antibodies	5
3. Antibody-Based Treatment of Immune Thrombocytopenia Purpura	8
4. Immune Regulating Functions of Naïve and Activated B Cells	18
Acknowledgments	26
References	26

2. Cumulative Environmental Changes, Skewed Antigen Exposure, and the Increase of Allergy

39

Tse Wen Chang and Ariel Y. Pan

1. Introduction	41
2. Antigen Exposure during Times When the Immune System Evolved	42
3. Did Allergy Play a Role in the Evolution of the Human Immune System?	43
4. Environmental and Lifestyle Changes Alter Humans' Antigen Exposure	48
5. Significant Changes in Lifestyle and Environment since <i>H. sapiens</i> Stated to Use Fire	49
6. Significant Lifestyle and Environmental Changes since the Industrial Revolution	52
7. The Increase in Proportions of Environmental Antigens of Limited Varieties	55
8. Prevalence of Allergy is Related to Changes in Antigen Exposure	59
9. The Hygiene Hypothesis and Its Immunological Basis	61
10. Key Factors Affecting the IgE-Mediated Pathway in Allergic Responses	66
11. Total IgE vs. Allergen-Specific IgE	69
12. Allergenic Substances Become Dominant Mucosal IgE Stimulators	71
13. Molecular Mechanisms Delineating the Effects of the Skewed Antigen Exposure on the Sensitization of the IgE Pathway	73

14. Concluding Remarks	75
Acknowledgments	76
References	76
3. New Insights on Mast Cell Activation via the High Affinity Receptor for IgE	85
Juan Rivera, Nora A. Fierro, Ana Olivera, and Ryo Suzuki	
1. Introduction	86
2. A General Outline of FcεRI Signaling	87
3. Recent Advances in FcεRI Proximal Signaling	91
4. Regulation of Calcium Mobilization in Mast Cells	97
5. Sphingosine-1-phosphate: A Co-stimulatory Signal in FcεRI-mediated Mast Cell Activation	103
6. The Role of Genetics in Mast Cell Responsiveness	108
7. Summary and Perspectives	110
References	113
4. B Cells and Autoantibodies in the Pathogenesis of Multiple Sclerosis and Related Inflammatory Demyelinating Diseases	121
Katherine A. McLaughlin and Kai W. Wucherpfennig	
1. MS and Related Inflammatory Demyelinating CNS Diseases	122
2. Therapeutic Depletion of B Cells in MS with Rituximab	125
3. Which B Cell Functions are Critical in the Pathogenesis of MS?	126
4. Conclusions and Future Directions	138
References	139
5. Human B Cell Subsets	151
Stephen M. Jackson, Patrick C. Wilson, Judith A. James, and J. Donald Capra	
1. Introduction	152
2. Human B Cell Subsets: Current Separation Schemes	156
3. Transitions in Peripheral B cell Development	175
4. Monoclonal Antibodies from Human B Cell Subsets: Insights into Autoreactivity and Function	186
5. Vaccine-Induced Plasma Cells and Recombinant Antibodies: A Rapid Source of Fully Human Mabs	197
6. Autoimmune Disease and Human B Cell Subsets	199
7. Summary	206
References	206
<i>Index</i>	225
<i>Content of Recent Volumes</i>	231
<i>See Color Plate Section in the back of this book</i>	