

CONTENTS

Contributors

vii

Preface. T Cells: Friends and Foes

ix

1. Transcriptional Programs Underlying Cd4 T Cell Differentiation and Functions

1

Fanny Chalmin, Etienne Humblin, François Ghiringhelli, and Frédérique Végan

1. Introduction 2
2. STAT Family in CD4 Differentiation 7
3. Master Regulators of CD4 T Cells Subsets 13
4. Additional Transcription Factors 21
5. Functions 34
6. Conclusion 40
- References 41

2. The Single-Cell Phenotypic Identity of Human CD8⁺ and CD4⁺ T Cells

63

Jolanda Brummelman, Karolina Pilipow, and Enrico Lugli

1. Introduction 64
2. Naïve and Memory Phenotypes 65
3. Tissue-Resident Memory T Cell Phenotypes 82
4. Phenotypes of T Cell Dysfunctionality 84
5. CD4⁺ T Cell-Specific Phenotypes 88
6. Conclusion 104
- Acknowledgments 105
- References 105

3. T Lymphocytes and Autoimmunity

125

Uqba Khan and Hareem Ghazanfar

1. Introduction 127
2. Mechanisms of Autoimmunity 128
3. What Goes Wrong in Autoimmunity With Regard to T Cells? 135
4. Role of Costimulatory Pathways 138
5. Role of Cytokines 141
6. Autoimmune Diseases 142

7. Type 1 Diabetes Mellitus	144
8. Systemic Lupus Erythematosus	147
9. Graves' Disease	150
10. Celiac Disease	151
11. Rheumatoid Arthritis	152
12. Multiple Sclerosis	156
13. Summary	159
References	159
4. Impact of Immunosuppressive Drugs on the Metabolism of T Cells	169
Nicolas Pallet, Ana A. Fernández-Ramos, and Marie-Anne Lorient	
1. Introduction	170
2. Immunosuppression and Immunological Diseases	171
3. Immunosuppressive Drugs and Their Impact on Cell Metabolism	174
4. Pharmacological Modulation of Energy Metabolism to Promote Immunosuppression	190
5. Conclusion	193
References	194
5. T Lymphocyte-Based Cancer Immunotherapeutics	201
Adrienne E. Borrie and Saman Maleki Vareki	
1. Introduction	202
2. Checkpoint Inhibitors	204
3. T-Cell Activating Molecules	230
4. Adoptive Cell Therapy	238
5. Oncolytic Virus Cell Therapy	249
6. Combination Therapy	252
7. Conclusion	256
References	256
6. Engineering Platforms for T Cell Modulation	277
John W. Hickey, Alyssa K. Kosmides, and Jonathan P. Schneck	
1. Introduction	278
2. T Cell Modulation—Properties to Consider When Choosing and Designing a T Cell Modulating Platform	285
3. Immunoengineering Approaches	300
4. Summary and Next-Generation Therapies	341
References	342