

CONTENTS

<i>Contributors</i>	<i>ix</i>
<i>Preface</i>	<i>xi</i>
1. Peptide Immunotherapy in Vaccine Development: From Epitope to Adjuvant	1
Hyun Yang and Dong Seok Kim	
1. Introduction	1
2. Cancer Vaccine	2
3. Allergy Vaccine	5
4. Alzheimer's Disease Vaccine	6
5. Adjuvant and Delivery	8
6. Perspectives and Conclusions	10
References	10
2. The Use of Liposomes to Shape Epitope Structure and Modulate Immunogenic Responses of Peptide Vaccines Against HIV MPER	15
Beatriz Apellániz and José L. Nieva	
1. Introduction	16
2. MPER: A Site of Vulnerability on HIV-1 Env and a Linear Epitope	18
3. Structural Organization of MPER	23
4. Lipid Vesicles: Adjuvants and Devices to Shape MPER Structure	33
5. Immunogenicity Studies of MPER-Derived Peptides in Liposomes	38
References	46
3. Recombinant Lipoproteins as Novel Vaccines with Intrinsic Adjuvant	55
Pele Chong, Jui-Hsin Huang, Chih-Hsiang Leng, Shih-Jen Liu, and Hsin-Wei Chen	
1. Introduction	56
2. Establishment of High Expression Recombinant Lipoprotein System	58
3. The Lipid Structure of Lipoprotein	59
4. Recombinant Lipoprotein with Intrinsic Adjuvant Properties	62
5. To Engineer Chimeric Lipoproteins with Intrinsic Adjuvant for Novel Vaccine Development	64

6. Recombinant Chimeric Lipoproteins Can Activate BMDCs	65
7. A Robustness Up- and Downstream Processes for Lipoprotein Production	67
8. Recombinant Lipoprotein-Based Subunit Vaccine Induces High Titers of Neutralizing Antibody and Longer Memory Immune Responses	68
9. Recombinant Lipidated Human Papillomavirus E7 Induces Cellular Immune Responses and Protective Immunity Against Cervical Cancer in the TC-1 Mouse Model	70
10. Conclusion	70
Acknowledgment	71
References	72
 4. Perspective of Peptide Vaccine Composed of Epitope Peptide, CpG-DNA, and Liposome Complex Without Carriers	 75
Younghee Lee, Young Seek Lee, Soo Young Cho, and Hyung-Joo Kwon	
1. Introduction	76
2. Licensed Adjuvants	78
3. CpG-DNA: Adjuvant	79
4. Phosphodiester Bond CpG-DNA	81
5. Liposomes: Adjuvants	82
6. Adjuvants for Peptide Vaccine	83
7. Peptide Vaccine Composed of Epitope Peptide, CpG-DNA, and Liposome Complex Without Carriers	84
8. Perspectives	89
Acknowledgments	90
References	91
 5. Chemical Platforms for Peptide Vaccine Constructs	 99
Suhas Ramesh, Prabhakar Cherkupally, Thavendran Govender, Hendrik G. Kruger, Fernando Albericio, and Beatriz G. de la Torre	
1. Introduction	100
2. Multiple Antigenic Peptide System Using a PolyLys Core: A Boon to Synthetic Peptide Vaccines	102
3. Synthetic Antigen Carrier Bearing <i>N</i> -(<i>S</i> -acetylmercaptoacetyl)-Glutamyl Residues	104
4. Thioester as a Replacement for Natural Peptide Bond (Chemical Ligation): Construction of Proteins	105
5. Synthetic Peptide Dendrimer with Thiazolidinyl Pendant	107
6. Oxime Chemistry for Synthetic Peptide-Based Vaccines	108

7. Polyoxyethylene-Based Heterobifunctional Cross-Linking Reagents	109
8. Double Orthogonal Chemoselective Ligation via a Hydrazone Linkage	110
9. Multiple Antigenic Peptides with Synthetic Chimeric Epitopes	111
10. Gold Nanoparticles as Antigen Carriers	112
11. Branched Lipopeptide Candidate Vaccine	114
12. Antigenic Mimicking with Cys-Based Cyclized Peptides	115
13. "Reverse" Thioether Ligation as an Alternative Route for MAPs Construction	116
14. Self-Adjuvanting Polymer–Peptide Conjugates as Therapeutic Vaccine Candidates	117
15. Maleimide as a Tool to Increase Peptide Immunogenicity	119
16. Tetra-Branched Maleimido Derivatives as Platforms for Vaccine Preparation	120
17. Bromomaleimide-Hexanoic Acid as a Linker for Multibranched Peptides	121
18. Comparative Account of Different Presentation Systems for HIV Peptide Immunogen	124
19. Merits and Demerits of Chemoselective and SPPS Reactions: M2e Epitope of Influenza Virus as a Case Study	125
20. Summary and Outlook	126
Acknowledgment	127
References	127
 6. Understanding Amino Acid Mutations in Hepatitis B Virus Proteins for Rational Design of Vaccines and Drugs	 131
Ke Shen, Li Shen, Jing Wang, Zhi Jiang, and Bairong Shen	
1. Introduction	132
2. Mutation Data and Distribution Analysis	135
3. Bioinformatics Analysis of the Mutations	143
4. Discussion and Conclusion	150
Acknowledgments	151
References	151
 <i>Author Index</i>	 <i>155</i>
<i>Subject Index</i>	<i>173</i>