

CONTENTS

List of Contributors and Affiliations	xiii
Preface	xvii
Editor — Chawnshang Chang, Ph. D.	xix
1 Hormonal Therapy for Prostate Cancer: Clinical and Experimental Evidence	1
<i>Hiroshi Miyamoto and Chawnshang Chang</i>	
Introduction	1
The AR and Androgens	1
Strategies of Androgen Deprivation	3
Concluding Remarks	20
References	21
2 Immunotherapies for Prostate Cancer	33
<i>Kelley M. Harsch, Jason E. Tasch and Warren D. W. Heston</i>	
Introduction	33
Inflammation	34
The Immune System	36
Targets of Immunotherapy	37
Cytokines	38
Growth Factors	39
Tumor Antigens	39
Monoclonal Antibody Therapy	40
Modulation of T-Cells	42
Vaccines	43

T-Bodies	46
Summary	46
References	47
3 Radiation Therapy and Hormonal Therapy for Prostate Cancer	55
<i>Ralph A. Brasacchio</i>	
Introduction	55
Conventional and Conformal Radiation Therapy	56
Radiation Therapy With or Without Androgen Ablation Therapy	58
Hormone Therapy and Brachytherapy	65
Potential Mechanisms of Androgen Ablation and Radiation Therapy	65
Future Directions	68
References	68
4 Gene Therapy for Prostate Cancer	75
<i>Juan Antonio Jiménez, Chinghai Kao, Sang-Jin Lee, Chaeyong Jung and Thomas A. Gardner</i>	
Introduction	75
Gene Therapy Strategy	76
Tissue-Specific Promoters	79
Past Approaches	84
Future Directions	96
Conclusion	97
References	98
5 Chemotherapy for Prostate Cancer	107
<i>Samuel K. Kulp, Kuen-Feng Chen and Ching-Shih Chen</i>	
Introduction	107
Present Chemotherapies for HRPC	108
Future Therapies for HRPC	109
Conclusions	124
References	125

6 Chemoprevention for Prostate Cancer	137
<i>Noahiro Fujimoto</i>	
Introduction	137
Chemopreventive Agents, Rationale and Clinical Trials	138
Others	148
Conclusions	148
References	149
7 Neuroendocrine Differentiation and Androgen-Independence in Prostate Cancer	157
<i>Sonal J. Desai, Clifford G. Tepper and Hsing-Jien Kung</i>	
Introduction	157
Neuroendocrine Differentiation	159
Androgen-Independent Growth	169
Summary	174
References	175
8 Biology of Prostatic Acid Phosphatase and Prostate-Specific Antigen and Their Applications in Prostate Cancer	191
<i>Suresh Veeramani, Ta-Chun Yuan, Siu-Ju Chen, Fen-Fen Lin and Ming-Fong Lin</i>	
Introduction	191
Historical Review — Discovery and Clinical Applications of PAcP and PSA	192
PAcP	193
PSA	197
Androgen-Independent PSA Secretion	198
Future Perspectives	202
Acknowledgments	203
References	204

9	Epigenetics in Prostate Cancer	213
	<i>Jose A. Karam, Elie A. Benaim, Hong Chen, Rey-Chen Pong and Jer-Tsong Hsieh</i>	
	Introduction	213
	The Role of CpG Dinucleotides in DNA Methylation	213
	Methyl Binding Proteins (MBP)	214
	DNA Methyltransferases (DNMTs)	215
	DNMT Inhibitors	216
	Histones	217
	Histone Deacetylases (HDACs)	220
	Histone Deacetylase Inhibitors (HDIs)	220
	The Interaction Between DNA Methylation and Histone Modifications in Gene Regulation	221
	Epigenetics in the Pathogenesis and Diagnosis of PCa	222
	Membrane Receptors	224
	Nuclear Receptors	225
	Nuclear Proteins	227
	Conclusion	228
	References	228
10	Significance of 5α-Reductase in Prostate Cancer	243
	<i>Jun Shimazaki</i>	
	Introduction	243
	5 α -Reductase	243
	Formation and Metabolism of DHT in Cancerous Prostate	245
	Risk of DHT Formation	246
	Treatment with Inhibitors	249
	Prevention	250
	Conclusion	252
	References	252

11 Roles of Vitamin E in Prostate and Prostate Cancer	263
<i>Shuyuan Yeh, Jing Ni, Eugene Chang, Yi Yin and Ming Chen</i>	
Introduction	263
Vitamin E and its Analogs	264
Vitamin E Absorption and Transport	264
Functional Mechanisms of Vitamin E in Prostate Cancer	265
<i>In vivo</i> Animal Study of Vitamin E's Role in Prostate and Prostate Cancer	268
Clinical Study of Vitamin E in Prostate Cancer	269
Summary	271
References	272
12 Vitamin D and Prostate Cancer	277
<i>Yi-Fen Lee, Huei-Ju Ting and Bo-Ying Bao</i>	
Introduction	277
Epidemiology Study	278
Vitamin D Action	279
Mechanism of Anti-tumor Action in Prostate Cancer by Vitamin D	280
Development of New Vitamin D Analogs and their use in Combination Therapy for Prostate Cancer	283
Vitamin D-Based Clinical Trials	284
Loss of Vitamin D Anti-proliferative Responsiveness in Prostate Cancer	285
Future Perspectives	286
References	287
13 Functions of Estrogen Receptor in Prostate and Prostate Cancer	293
<i>Shuyuan Yeh, Ming Chen, Jing Ni, Yi Yin, Eugene Chang, Min Zhang and Xingqing Wen</i>	
Introduction	293
Distribution of ER α and ER β in Prostate Tissues, Cancer Specimens and Cancer Cell Lines	294

Estrogen Regulated Genes in Prostate Cancer	296
ER Coregulators in Prostate	297
Histological Changes in Prostates of α ERKO and β ERKO Mice	298
Estrogen Imprinting Effect on the Development of Prostate	298
Estrogen Treatment of α ERKO, β ERKO, and Hypogonadal (<i>hpg</i>) Mouse Models	299
Estrogen Effect on Initiation, Growth, and Progression of Prostate Cancer	302
Conclusion	305
References	305
14 Epidemiology of Prostate Cancer	315
<i>Ann W. Hsing and Anand Chokkalingam</i>	
Introduction	315
Rates and Patterns	321
Risk Factors	331
Challenges of Studies with Common Polymorphisms	344
Summary	346
References	347
15 Profiling Gene Expression Changes in Prostate Carcinoma	365
<i>Peter S. Nelson</i>	
Introduction	365
Methods for Profiling Gene Expression Alterations	366
Microarray Studies of Gene Expression in Prostate Carcinoma	367
Transcript Profiling and Predicting Cancer Outcomes	369
Proteomic Approaches for Assessing Gene Expression in Prostate Carcinoma	374
Conclusion and Future Directions	377
Acknowledgments	378
References	378

16 Study of Androgen–Androgen Receptor Roles in Prostate Cancer using Mice Lacking Functional Prostate Androgen Receptor	383
<i>Chun-Te Wu, Shuyuan Yeh, Qingquan Xu, Zhiming Yang, Philip Chang, Yueh-Chiang Hu and Chawnshang Chang</i>	
Introduction	383
Generation of Androgen Receptor Knockout (ARKO) Mice	384
Prostate Development and Carcinogenesis in Prostate-Specific ARKO Mice	385
TRAMP Mice Lacking the Endogenous AR but Carrying the T877A Mutated Transgene	386
ARKO Mice with AR-97Q and AR-24Q Transgene Expression	387
Inducible ARKO and ARKO TRAMP Mice	387
ARKO Human Prostate Cancer CWR22R Cells	388
Conclusion	390
References	390
17 Capturing Signal Anomalies of Human Prostate Cancer into Mouse Models	393
<i>Hong Wu, Ani Khodavirdi and Pradip Roy-Burman</i>	
Introduction	393
Cell Surface Signaling Molecules	395
Intracellular Signaling Molecules	400
Collaboration Between Signaling Molecules	408
Summary and Conclusions	410
Acknowledgments	411
References	412
Index	423