## Contents

## Contributors xv Author biographies xix

1.	Natural remedies and functional foods as angiogenesis modulators	,
	Mehmet Varol	
	Angiogenesis definition and background	]
	Molecular mechanism of angiogenesis	3
	Screening methods of angiogenesis modulators	Ę
	Natural angiogenesis modulators	5
	Concluding remarks and future perspective	18
	References	18
2.	Targeted cancer therapy with bioactive foods	2.
	and their products Pankaj Gupta	33
	Introduction	33
	Pathophysiology of cancer	34
	Classification of anticancer bioactive foods	35
	Classification of anticancer bioactive foods based on origin	36
	Classification of anticancer bioactive foods based	
	on the mechanism of action	39
	Classification based on the chemical nature of anticancer	
	bioactive food components	42
	Conclusion	43
	References	43

3.	Natural compounds and anticancer effects: The whole is greater than the sum of its parts	47
	Simona Martinotti and Elia Ranzato	
	Cancer research	47
	Anticancer products from nature	47
	Main natural cancer therapeutics	48
	Cancer prevention or natural chemopreventive agents	52
	An example of synergistic interaction	53
	Conclusion	54
	References	55
4.	Relationship between functional food and tumor	
	metabolism	59
	Mohammad Mostafizur Rahman and Md. Abdul Khaleque	
	Introduction: Functional foods	59
	Functional foods exert their beneficial effects mostly through cellular metabolism	6]
	Metabolic dysregulation in tumor cells	61
	Tumor metabolism: Glycolysis and acidosis	62
	Tumor metabolism: Mitochondria and altered TCA cycle fate	63
	Functional foods: Metabolic reprogramming in tumor cells	
	and emerging concepts in therapeutic strategies	64
	Conclusion	67
	References	68
5.	Adiponectin-enhancing dietary constituents in cancer	
	prevention	73
	Amitabha Ray and Debopam Acharya	
	Introduction	73
	Inflammation in carcinogenesis	76
	Antiinflammatory adiponectin and allied compounds	77

	Omega-3 PUFAs and adiponectin	86
	Conclusion	89
	References	89
6.	Lentils (Lens culinaris L.): A candidate chemopreventive and antitumor functional food  Mo'ez Al-Islam E. Faris, Mohammad G. Mohammad, and Sameh Soliman	99
	Introduction	99
	Anticancer chemical constituents of lentils	100
	Epidemiological evidence on the chemopreventive potential of lentils	106
	Experimental evidence	108
	Remarks and conclusions	113
	References	114
7.	Evidence for anticancer properties of honey with emphasis on mechanistic overview Avinash Kundadka Kudva, Suresh Rao, Pratima Rao, Michael L.J. Pais, Mohammed Adnan, Karkala Sreedhara Ranganath Pai, and Manjeshwar Shrinath Baliga	121
	Introduction	121
	Chemistry of honey	122
	Pharmacological uses of honey	125
	Honey stimulates the immune system	125
	Honey as antioxidants	127
	Honey as antiinflammatory agents	127
	Antimutagenic effects of honey	128
	Antiapoptotic effects of honey	128
	Antiproliferative effects of honey	130
	Conclusion	130
	References	131

Contents vii

8.	Curcumin in cancer prevention and therapy  Meher Un Nessa and Fazlul Huq	137
	Introduction	137
	Carcinogenesis, chemoprevention, and plant-derived products	137
	Curcumin: A super magical chemopreventive and	
	therapeutic agent	138
	Hallmarks of cancer and molecular targets	
	for chemoprevention and treatment	139
	Molecular mechanisms of curcumin action	142
	Effect of curcumin on normal cells	150
	Resistance to conventional chemotherapy	151
	Conclusion	152
	References	152
9.	Usefulness of grape seed polyphenols in the prevention	
	of skin cancer: A mini review	159
	Faizan Kalekhan, Nandakishore Bala, Suresh Rao,	
	Michael L.J. Pais, Mohammed Adnan, Simon Sajan,	
	and Manjeshwar Shrinath Baliga	
	Introduction	159
	Grape seed and their polyphenols	160
	Grape seed polyphenols are effective in prevention of cancer	161
	Grape seed polyphenols are effective in preventing	
	UV-induced skin carcinogenesis	163
	Conclusion	164
	References	165
10.	Indian herbal medicine and their functional components	
	in cancer therapy and prevention	169
	Jiwan S. Sidhu and Tasleem A. Zafar	
	Introduction	169

	Turmeric (Curcuma longa)	170
	Ginger (Zingiber officnale Roscoe)	173
	Tamarind (Tamarindus indica L.)	174
	Onion (Allium cepa L.) and garlic (Allium sativum L.)	175
	Moringa ( <i>Moringa oleifera</i> Lam)	176
	Neem (Azadirachta indica)	178
	Pomegranate (Punica granatum)	181
	Amla ( <i>Phyllanthus emblica</i> L.)	181
	Sugar beet (Beta vulgaris)	182
	Bitter gourd (Momordica charantia)	183
	Future research needed	184
	References	185
	Further reading	194
11.	Antioxidant phytochemicals in cancer prevention	*
	and therapy—An update	195
	Abraham Wall-Medrano and Francisco J. Olivas-Aguirre	
	Introduction	195
	Cancer: Public health burden and ACM	196
	Cancer and oxidative stress	197
	Antioxidant phytochemicals (APH)	199
	APH in cancer prevention	202
	APH in cancer therapy	208
	Metabolic fate of APH	210
	APHs as prooxidants	212
	Conclusion	213
	Acknowledgments	213
	References	213
	Further reading	220

12.	Prooxidant anticancer activity of plant-derived polyphenolic compounds: An underappreciated	
	phenomenon	221
	Husain Y. Khan, Sheikh Mumtaz Hadi,	
	Ramzi M. Mohammad, and Asfar S. Azmi	
	Introduction	221
	Cancer chemoprevention and polyphenols	224
	A copper-mediated prooxidant anticancer mechanism	
	of polyphenols	225
	Making sense of the prooxidant action of polyphenols	230
	Conclusion	231
	References	231
13.	Plant-based products in cancer prevention and treatment Md. Atiar Rahman, Md. Rakibul Hassan Bulbul, and Yearul Kabir	237
	Introduction	237
	Cancer and oxidative stress	238
	Antioxidant therapeutics in cancer	239
	Phytochemicals as anticancer therapeutics	240
	Cellular mechanism of actions of phytochemicals	241
	Nutraceuticals as anticancer therapy	245
	Therapeutic efficacy and purification of anticancer	
	phytochemicals	251
	Development and use of synthetic analogs to plant-derived substances	253
	Conclusion	253
	References	253
	Further reading	259
14.	Overview of probiotics in cancer prevention and therapy Jiwan S. Sidhu and Dina Alkandari	261
	Introduction	261
	General health henefits of probiotics	263

	Probiotics in immune modulation	265
	Probiotics, Helicobacter pylori, and stomach cancer	265
	General influence of gut microbiome on cancer	266
	Probiotics in colorectal cancer	268
	Probiotics and upper body cancers	269
	Delivery systems for probiotics	270
	Conclusion	274
	References	275
	Further reading	282
15.	Plant-derived functional foods with chemopreventive and therapeutic potential against breast cancer: A review of the preclinical and clinical data Peter Kubatka, Alena Liskova, Martin Kello, Jan Mojzis, Peter Solar, Zuzana Solarova, Pavol Zubor, Anthony Zulli, Jan Danko, and Yearul Kabir	283
	Introduction	283
	Antioxidant and genoprotective effects of phytochemicals	284
	Possible targets of phytochemicals in breast cancer cell	285
	signaling	203
	Anticancer properties of plant-derived functional foods in preclinical breast cancer research	289
	Epidemiological and clinical breast cancer studies	294
	Discussion and future directions	299
	Conclusion	302
	Acknowledgment	303
	Conflicts of interest	303
	References	303
16.	Complementary and alternative medicine (CAM) in head and neck malignancy and its impact on treatment Norhafiza Mat Lazim	315
	Introduction	315
	Reasons for use of CAM	317

	Types of CAM—Natural products	318
	CAM and pain	321
	Selected randomized control trials for CAM in head and neck	322
	Application of CAM in head and neck malignancy	323
	Effects of CAM on head and neck malignancy treatment	324
	Integration of CAM in tertiary hospital	324
	Conclusion	325
	References	325
	Further reading	327
17.	Targeting cancer stem cells with phytoceuticals	
	for cancer therapy	329
	In Sil Park, Jae Hyun Cho, Youngjin Han, Ki Won Lee, and Yong Sang Song	
	Introduction	329
	CSC generation	330
	Targeting signaling pathways of CSCs	330
	Targeting the CSC niche	336
*	Phytoceuticals and their analogues with the potential	
	to target CSCs	342
	Conclusion and future perspectives	346
	References	348
18.	Nutrigenomics and functional food: Implications for	
	Cancer prevention and treatment	359
	Maria Gabriela Valle Gottlieb, Vilma Maria Junges, Vera Elizabeth Closs, and Raquel Seibel	
	Nutrigenomics and functional food	359
	Nutrigenomic and functional foods: Cancer prevention	363
	Nutrigenomic and functional foods: Cancer treatment	369

	Final considerations	370
	References	378
	Further reading	386
19.	Harnessing personalized nutrigenomics for cancer prevention and treatment through diet-gene interaction Atiqur Rahman, Sajib Chakraborty, and Yearul Kabir	387
	Introduction	387
	The emerging field of nutrigenomics	388
	Nutrient-gene interactions	388
	Interaction of diets and genes in cancers	389
	Impact of dietary modification in cancer	391
	Glycemic index and cancer risk	393
	Nutritional epigenomics	393
	Dietary factors, cancer prevention, and treatment: Preclinical and clinical studies	394
	Conclusion	395
	References	396
20.	Functional foods in cancer prevention and therapy: Recent epidemiological findings S.M. Rafiqul Islam and Towfida Jahan Siddiqua	405
	Introduction	405
	Foods and dietary components for possible associations with increasing cancer risk	406
	Functional foods and their role in cancer	408
	Future perspective of functional foods in cancer management, especially in children and aged people	422
	Conclusion	423
	References	424

21.	lifestyle—Current guidelines and mechanisms	435
	Rakesh Sharma, Arunporn Itharat, Robert Moffatt, and Arvind Trivedi	
	Introduction	435
	Cancer-causing food additives	436
	Physiological factors cause cancer	437
	Regulatory guidelines by federal, governmental,	
	or international agencies for cancer survivors	440
	Emerging role of healthy diet and LONGLIVE lifestyle	
	for cancer survivors	446
	Diet and nutrition's impact on carcinogenesis at the	
	molecular level	447
	Cancer survivors can follow opulent LONGLIVE lifestyle	457
	Guideline to physicians and nurses on longevity among	
	cancer survivors	459
	Conclusion	465
	Acknowledgments	466
	References	466
	Further reading	470

Index 471