

Contents

1 Principles and Roots of Neutron Capture Therapy	1
Wolfgang A.G. Sauerwein	
Part I Neutron Sources	
2 Fission Reactor-Based Irradiation Facilities for Neutron Capture Therapy	19
Otto K. Harling and Kent J. Riley	
3 Accelerator-Based BNCT	41
Andres J. Kreiner	
4 Compact Neutron Generator for BNCT	55
Ka-Ngo Leung	
5 Californium-252 as a Neutron Source for BNCT	69
Albert Miller	
Part II Boron	
6 Boron Chemistry	77
Luigi Panza and Davide Prosperi	
7 Boron Compounds: New Candidates for Boron Carriers in BNCT	99
Hiroyuki Nakamura and Mitsunori Kirihaata	
8 Drugs for BNCT: BSH and BPA	117
Wolfgang A.G. Sauerwein, Pierre M. Bet, and Andrea Wittig	
Part III Analysis and Imaging	
9 Boron Analysis and Boron Imaging in BNCT	163
Andrea Wittig and Wolfgang A.G. Sauerwein	
10 Proteomic Investigations for Boron Neutron Capture Therapy ...	189
Pier Luigi Mauri and Fabrizio Basilico	

11 Analysis and Imaging: PET	201
Tadashi Nariai and Kiichi Ishiwata	
12 Boron Imaging: Localized Quantitative Detection and Imaging of Boron by Magnetic Resonance	213
Peter Bendel	

Part IV Physics

13 Physical Dosimetry and Spectral Characterization of Neutron Sources for Neutron Capture Therapy	227
David W. Nigg	
14 The Clinical Commissioning of Beams for Neutron Capture Therapy	259
Per Munck af Rosenschöld	
15 Prescribing, Recording and Reporting of BNCT	277
Jürgen Rassow and Wolfgang A.G. Sauerwein	
16 Treatment Planning	287
W.S. Kiger III and Hiroaki Kumada	

Part V Biology

17 Boron Neutron Capture Therapy: Application of Radiobiological Principles	329
John W. Hopewell, Gerard M. Morris, Amanda E. Schwint, and Jeffrey A. Coderre	
18 Tolerance of Healthy Tissues and Ideal Radiation Dose on BNCT	359
Yoshinobu Nakagawa and Teruyoshi Kageji	

Part VI Clinical Applications

19 Clinical Trials in BNCT: A Challenging Task	369
Andrea Wittig and Wolfgang A.G. Sauerwein	
20 External Beam BNCT for Glioblastoma Multiforme	377
Tetsuya Yamamoto and Akira Matsumura	
21 Clinical Results of Sodium Borocaptate (BSH)-Based Intraoperative Boron Neutron Capture Therapy (IO-BNCT)	389
Teruyoshi Kageji, Yoshinobu Nakagawa, and Hiroaki Kumada	
22 Boron Neutron Capture Therapy for Malignant Meningiomas ...	399
Shinji Kawabata and Shin-Ichi Miyatake	

23	Feasibility for Intramedullary Spinal Glioma	407
	Kei Nakai and Akira Matsumura	
24	BNCT for Advanced or Recurrent Head and Neck Cancer	417
	Teruhito Aihara and Norimasa Morita	
25	Studies on the Possible Application of BNCT to Thyroid Cancer	425
	Mario A. Pisarev, Maria A. Dagrosa, and Guillermo J. Juvenal	
26	Malignant Melanoma	433
	Junichi Hiratsuka and Hiroshi Fukuda	
27	Application of Neutron Capture Therapy for Locally Recurrent Breast Cancer	449
	Hironobu Yanagie	
28	Liver Metastases	461
	A. Zonta, L. Roveda, and S. Altieri	
29	Boron Neutron Capture Therapy for Children with Malignant Brain Tumors	505
	Yoshinobu Nakagawa and Teruyoshi Kageji	
30	Prevention of Vascular Restenosis After Vascular Angioplasty	513
	Wataro Tsuruta, Tetsuya Yamamoto, and Akira Matsumura	
31	Boron Neutron Capture Synovectomy	521
	Jacquelyn C. Yanch	
 Part VII Organizational Aspects and Management		
32	Managerial Aspects of BNCT at a Nuclear Research Reactor	533
	Wolfgang A.G. Sauerwein and Ray Moss	
	Index	543