

Contents

VOLUME I

PART I INTRODUCTION, 1

- 1 Mileposts in Nuclear Medicine History, 3
Millard N. Croll
- 2 Decision Making, Statistics, and Informatics, 10
Stephen P. Bartold
Gale G. Hannigan
- 3 Radiation Safety, 30
Norman McElroy

PART II THE SCIENTIFIC BASIS OF NUCLEAR MEDICINE, 41

A PHYSICS, 43

- 4 Basic Physics of Nuclear Medicine, 43
W. Earl Barnes
- 5 Gas-Filled Ionization Radiation Detectors in Nuclear Medicine, 64
Douglas J. Simpkin
- 6 Scintillation Detectors and Scintillation Detector Counting Systems, 74
Mark T. Madsen
- 7 Gamma Camera Imaging Systems, 85
Guy Simmons
- 8 Collimator Characteristics and Design, 96
Donald L. Gunter
- 9 Scintillation Camera Imaging Performance and Quality Control, 125
L. Stephen Graham
- 10 Whole-Body Counting, 147
Leroy F. Booth
- 11 Neutron Interactions and Neutron Activation Analysis, 156
Leroy F. Booth
- 12 Nuclear Counting Statistics, 159
Mark T. Madsen
- 13 Semiconductor Detectors in Nuclear Medicine: Progress and Prospects, 168
H. Bradford Barber
James M. Woolfenden
- 14 Computer Basics, 185
James R. Halama
- 15 Representation of Gamma Camera Images by Computer, 199
James R. Halama
- 16 Image Content and Image Filtering Techniques, 205
Stephen Glick

- 17 In Vivo Quantitation of Activity by Planar Imaging, 216
W. Earl Barnes

- 18 Theory of Tomographic Image Reconstruction, 222
Michael V. Yester

- 19 SPECT Imaging with Rotating Gamma Camera Systems, 232
Frederic H. Fahey
Beth A. Harkness

- 20 Dedicated SPECT Systems, 247
Wei Chang

- 21 SPECT Image Display Techniques, 254
Thomas Milo

- 22 Quantitative SPECT, 260
Benjamin M. W. Tsui

- 23 Production of PET Radioisotopes and Principles of PET Imaging, 279
Richard D. Hichwa

- 24 Tracer Kinetics: Principles of Compartmental Analysis and Physiologic Modeling, 292
Robert A. Koeppe

- 25 Internal Radiation Dosimetry, 316
Michael G. Stabin

B RADIOPHARMACY, 334

- 26 Principles of Radiopharmacy, 334
Stephen M. Karesh

- 27 Pathway for FDA Approval of New Radiopharmaceuticals, 350
David H. Woodbury with
Lionel Lieberman
Eldon Leutzinger
Linda DeWitt
Raymond J. Farkas

- 28 Radionuclides: Cyclotron, Reactor, and Fission Products, 358
Leonard F. Mausner

- 29 Radionuclide Generators: Design, Operation, and Clinical Utility, 372
Katherine A. Harrison
Samuel C. Augustine
David Jacobson
Glenn Dalrymple

- 30 The Chemistry of Technetium and the Metallation of Proteins, 379
Susan Z. Lever

- 31 Radiopharmaceutical Chemistry: Iodination Techniques, 390
Bruce H. Mock

- 32 Radiolabeling Formed Elements of Blood: Methods and Mechanisms, 397**
 Ronald J. Callahan
 Karen L. Ramberg
- 33 Quality Control in the Hot Lab, 410**
 Stephen M. Karesh
- 34 Microbiological Purity: Tests for Endotoxins and Sterility, 421**
 James F. Cooper
- 35 Positron Radiopharmaceutical Agents and their Chemistry, 429**
 S. John Gatley
- 36 In Vivo Nonimaging Studies, 445**
 Helena R. Balon
 Howard J. Dworkin
- 37 Principles and Applications of Radioassays, 472**
 Michael J. Blend
 Syed Farhat Quadri
- 38 Adverse Reactions to Radiopharmaceutical Agents, 485**
 Edward B. Silberstein
- 39 Basic Principles of Radiation Biology, 493**
 William F. Ward

PART III IMMUNOLOGIC ASPECTS OF NUCLEAR MEDICINE, 509

- 40 New Approaches to Radiolabeling Monoclonal Antibodies, 511**
 A. Michael Zimmer
- 41 New Approaches to Improved Antibody Targeting, 516**
 Alan L. Epstein
- 42 Overview of Imaging Procedures with Radiolabeled Monoclonal Antibodies in Cancer Patients, 534**
 Michael J. Blend
- 43 Human Antimurine Antibodies, 550**
 Denise I. Webber
- 44 Radiation Dosimetry of Radiolabeled Monoclonal Antibodies: Practical Considerations, 558**
 Peter K. Leichner
- 45 Monoclonal Antibodies for Diagnostic Imaging and Therapy: Emphasis-Experience with Tc-99m Antibody Fragments, 563**
 Geoffrey Levine
 W. Newlon Tauxe
 Ronald B. Herberman
- 46 Clinical Experience with Indium-111-Labeled Satumomab Pendetide (Oncoscint CR/OV), 581**
 Allan N. Maroli
 Robert T. Maguire
 Virginia L. Pascucci
 Janice M. Pruch

- 47 Radioimmunotherapy of Lymphomas and Leukemias, 594**
 Timothy M. Kuzel
 Steven T. Rosen
- 48 Radioimmunotherapy of Solid Tumors, 601**
 Ruby F. Meredith
 Donald J. Buchsbaum

PART IV CLINICAL ORGAN SYSTEM STUDIES, 609

- A CARDIOVASCULAR**
 INTRODUCTION: CLINICAL APPLICATIONS OF CARDIOVASCULAR NUCLEAR MEDICINE, 611
 Paul A. Sobotka
- 49 Radiopharmaceutical Agents for Cardiac Imaging, 613**
 Raymond E. Gibson
 H. Donald Burns
- 50 Cardiac Function: Gated Cardiac Blood Pool and First Pass Imaging, 626**
 Mark W. Groch
- 51 Computer Aspects of Perfusion Imaging, 644**
 Kenneth F. Van Train
 Guido Germano
 Daniel S. Berman
- 52 Functional Cardiac Imaging, 672**
 Robert H. Wagner
 Paul A. Sobotka
- 53 Clinical Applications of Myocardial Perfusion Imaging, 696**
 Kim A. Williams
- 54 Radiopharmaceuticals for Myocardial Infarct Imaging, 734**
 Padmakar V. Kulkarni
- 55 Infarct Avid Imaging, 742**
 James R. Corbett
 Robert W. Parkey
 Frederick J. Bonte
 L. Maximilian Buja
 James T. Willerson
- 56 MIBG Imaging, 760**
 Jerry V. Glowniak
- 57 Positron Emission Tomography of the Cardiovascular System, 772**
 John F. Walsh
 Robert J. Gropler
- 58 Peripheral Vascular Disease: Arterial and Venous, 798**
 Michael E. Siegel
 Charles A. Stewart
- B ENDOCRINE**
 INTRODUCTION: CLINICAL APPLICATIONS OF ENDOCRINE NUCLEAR MEDICINE, 828
 Donald L. Gordon

- 59 The Thyroid Gland, 830**
Hee-Myung Park
- 60 Scintigraphic Imaging of the Adrenals and Neuroectodermal Tumors, 855**
Rick V. Hay
Brahm Shapiro
Milton D. Gross
- 61 Parathyroid Scintigraphy, 877**
John E. Freitas
Anne E. Freitas
- 62 Correlative Endocrine Imaging, 886**
Caryl G. Salomon
Katherine R. Vickery
- VOLUME II**
- C GASTROINTESTINAL**
INTRODUCTION: CLINICAL APPLICATIONS OF GASTROINTESTINAL NUCLEAR MEDICINE, 920
Ali Keshavarzian
- 63 Radiopharmacy Aspects of Gastrointestinal Imaging, 922**
Linda C. Knight
- 64 Salivary Glands, 933**
Parvez Shirazi
- 65 Esophageal Transit and Reflux and Gastric Emptying, 948**
Jean-Luc C. Urbain
Marie-Christiane M. Vekemans
Leon S. Malmud
- 66 Radiopharmaceuticals for Liver and Spleen Imaging, 966**
William B. Hladik III
Jeffrey P. Norenberg
- 67 Liver and Spleen Imaging, 977**
James M. Sylvester
- 68 Radiopharmaceuticals for Hepatobiliary Imaging, 986**
William B. Hladik III
Jeffrey P. Norenberg
- 69 Hepatobiliary Imaging, 997**
Darlene Fink-Bennett
- 70 Evaluation of Gastrointestinal Bleeding by Nuclear Medicine Techniques, 1016**
Katherine L. Kostamo
- 71 Scintigraphy in Liver Transplantation, 1023**
David D. Casalino
William B. Martin
Richard C. Reba
- 72 Peritoneovenous Shunts: Patency Studies, 1041**
Amolak Singh
- D GENITOURINARY**
INTRODUCTION: CLINICAL APPLICATIONS OF GENITOURINARY NUCLEAR MEDICINE, 1053
David A. Hatch
- 73 Radiopharmaceuticals for Renal Imaging, 1055**
Dennis Eshima
Alan R. Fritzberg
- 74 Glomerular Filtration, 1065**
Gary F. Gates
- 75 Diagnosis of Renovascular Hypertension by Radionuclide Renal Studies, 1084**
Alain Prigent
Dan G. Pavel
- 76 Evaluation of Renal Transplants, 1097**
Eva V. Dubovsky
- 77 Testicular Imaging, 1110**
Maria R. Beltran
- E MUSCULOSKELETAL**
INTRODUCTION: CLINICAL APPLICATIONS OF MUSCULOSKELETAL NUCLEAR MEDICINE, 1123
Terry R. Light
- 78 Bone Imaging Radiopharmaceuticals, 1125**
Richard P. Spencer
Ronald Weiner
Fazle Hosain
- 79 Skeletal Scintigraphy in Non-Neoplastic Osseous Disorders, 1141**
Edward B. Silberstein
Abdelhamid H. Elgazzar
Mariano Fernández-Ulloa
Hiroschi Nishiyama
- 80 Nuclear Medicine and the Sports Physician, 1198**
John V. Marymont
- 81 Malignant Bone Disease, 1208**
Donald A. Podoloff
- 82 Bone Marrow Scintigraphy, 1223**
Chun Ki Kim
S.N. Reske
Abass Alavi
- 83 Bone Mineral Analysis, 1250**
Michael V. Yester
- 84 Bone Mineral Measurements, 1256**
Heinz W. Wahner
- F NEUROLOGY**
INTRODUCTION: CLINICAL APPLICATIONS OF NEUROSURGICAL AND NEUROLOGICAL NUCLEAR MEDICINE, 1271
Andrew S. Zelby
- 85 Radiopharmaceuticals for Cerebral Imaging, 1273**
H. Donald Burns
Raymond E. Gibson
- 86 Cerebral Perfusion Imaging, 1289**
Robert W. Burt

- 87 Cerebrospinal Fluid Imaging, 1313**
Mark A. Boles
- 88 The Role of Positron Emission Tomography in the Investigation of Neurological Disorders, 1331**
Andrew B. Newberg
Abass Alavi
- G PULMONARY**
INTRODUCTION: CLINICAL APPLICATIONS OF PULMONARY NUCLEAR MEDICINE, 1360
Edward R. Garrity, Jr.
- 89 Radiopharmaceuticals for Pulmonary Imaging, 1362**
Jeffrey P. Norenberg
William B. Hladik III
- 90 Ventilation/Perfusion Scintigraphy, 1382**
William G. Spies
- 91 Pulmonary Imaging for Nonthrombotic Disease, 1440**
Henry D. Royal

PART V SPECIAL ONCOLOGIC STUDIES, 1459

INTRODUCTION: CLINICAL APPLICATIONS OF ONCOLOGICAL NUCLEAR MEDICINE, 1461
Kenneth Craig Micetich

- 92 Gallium Imaging of Tumors, 1463**
Gary L. Dillehay
Frank Papatheofanis
- 93 Thallium-201 Chloride and Technetium-99m Sestamibi in Tumor Imaging, 1493**
Donald A. Podoloff
- 94 Lymphoscintigraphy in Oncology, 1504**
Güneş N. Ege
- 95 Positron Emission Tomography: Applications in Oncology, 1524**
Richard L. Wahl

PART VI THERAPY WITH UNSEALED SOURCES, 1547

- 96 Therapy of Hyperthyroidism, 1549**
Judith M. Bender
Howard J. Dworkin
- 97 The Treatment of Thyroid Malignancies, 1557**
Edward B. Silberstein

- 98 Radionuclide Therapy in the Peritoneum, Pleura, Synovium, and Hematopoietic System, 1568**
Richard P. Spencer
- 99 Therapy for Painful Skeletal Metastasis, 1583**
D. F. Preston
K. G. Baxter

PART VII DIAGNOSIS OF INFLAMMATORY DISEASE, 1595

- 100 Gallium Imaging, 1597**
Carlos Bekerman
Sundeep M. Nayak
- 101 Indium-111 Labelled Leukocyte Imaging in the Diagnosis of Infection and Inflammatory Disease, 1619**
Lee Forstrom
- 102 Imaging Inflammation and Infection Tc-99m HMPAO Labeled Leukocytes, 1636**
A. M. Peters
- 103 Infection Imaging Using Labeled Antibodies, 1656**
Donald S. Schauwecker
- 104 Correlative Imaging of Abdominal Infection, 1662**
Harold V. Posniak
Mary C. Olson

PART VIII PEDIATRICS, 1683

- 105 Radiopharmaceuticals for Pediatric Imaging, 1685**
Susan C. Weiss
- 106 Pediatric Skeletal Scintigraphy, 1690**
Leonard P. Connolly
S. Ted Treves
James J. Conway

Index, 1725

- Color plates 1 through 6, after page 524.
Color plates 7 through 9, after page 652.
Color plates 10 through 20, after page 716.
Color plates 21 through 25, after page 748.
Color plates 26 through 32, after page 780.
Color plates 33 through 42, after page 1314.
Color plates 43 through 47, after page 1570.