

CONTENTS

CHAPTER 1. GENERAL INTRODUCTION.....	1
CHAPTER 2. HUMAN RESOURCE DEVELOPMENT.....	5
2.1. Training of medical doctors.....	10
2.2. Training of nuclear medicine technologists.....	37
2.3. Training in radiopharmacy.....	41
2.4. Training in medical physics.....	44
2.5. Training in nuclear instrumentation.....	49
2.6. Training in radiation safety and radiation protection.....	50
Bibliography to Section 2.6.....	53
2.7. Training in molecular biology using radionuclide methods ...	53
2.8. Training in radioimmunoassay.....	57
2.9. Training of nurses.....	66
CHAPTER 3. ESTABLISHING NUCLEAR MEDICINE SERVICES.....	67
3.1. Introduction and categorization.....	67
3.2. In vivo diagnostic procedures.....	68
3.3. In vitro and radioimmunoassay laboratories.....	76
3.4. Radiopharmacies.....	85
3.5. Medical physics.....	90
3.6. Positron emission tomography.....	91
3.7. Cyclotrons.....	94
3.8. Establishment of a molecular biology laboratory.....	97
3.9. Radiation safety.....	103
Bibliography to Chapter 3.....	106
CHAPTER 4. INSTRUMENTATION.....	107
4.1. Introduction.....	107
4.2. Purchase of imaging equipment.....	108
4.3. Single photon imaging.....	113
4.4. Dual photon imaging.....	131
4.5. Other instrumentation.....	138
4.6. Computers and networking.....	151
4.7. Glossary of technical terms.....	157
Bibliography to Chapter 4.....	164

CHAPTER 5. GUIDELINES FOR GENERAL IMAGING.....	167
5.1. Introduction.....	167
5.2. Nuclear cardiology.....	171
5.3. Central nervous system.....	201
5.4. Nephrology and urology.....	228
5.5. Respiratory system.....	260
Bibliography to Section 5.5.....	267
5.6. Liver and gastrointestinal system.....	267
5.7. Nuclear medicine imaging studies in endocrinology.....	299
5.8. Musculoskeletal system.....	318
Bibliography to Section 5.8.....	335
5.9. Special procedures in oncology.....	336
5.10. Haematology.....	359
Bibliography to Section 5.10.....	376
5.11. Inflammation and infection.....	377
Bibliography to Section 5.11.....	393
5.12. Radioimmunoassay protocols.....	393
5.13. Molecular methods — Use of radionuclides in molecular biology.....	410
Bibliography to Section 5.13.....	430
CHAPTER 6. RADIONUCLIDE THERAPY.....	433
6.1. Setting up a unit.....	433
6.2. Radionuclide therapy — Safety principles.....	435
Bibliography to Section 6.2.....	448
6.3. Dosimetry and mathematical models in radiopharmaceutical therapy.....	449
6.4. Radioiodine therapy for thyrotoxicosis.....	451
6.5. Iodine-131 therapy in thyroid cancer.....	455
6.6. Palliative treatment of metastatic bone pain.....	461
6.7. Iodine-131 meta iodobenzylguanidine therapy.....	464
Bibliography to Section 6.7.....	468
6.8. Phosphorus-32 therapy in polycythemia rubra vera.....	469
6.9. Radiosynovectomy.....	471
Bibliography to Section 6.9.....	476
6.10. Iodine-131 Lipiodol.....	477
Bibliography to Section 6.10.....	487
6.11. Intracoronary radionuclide therapy using the Re-188 DTPA balloon system.....	487

6.12. Radiopeptide therapy for cancer	491
Bibliography to Section 6.12	494
6.13. Radioimmunotherapy	494

CHAPTER 7. QUALITY ASSURANCE AND QUALITY CONTROL

PROTOCOLS FOR RADIOPHARMACEUTICALS ..	499
7.1. Introduction	499
7.2. Requirements for documentation	499
7.3. Control of starting materials	500
7.4. Radionuclidic activity	501
7.5. Radionuclidic purity	501
7.6. Radiochemical purity	502
7.7. Chemical purity	503
7.8. Determination of particle size	504
7.9. Particulate contamination	504
7.10. Control of pH	505
7.11. Sterility and apyrogenicity	505
7.12. Ongoing evaluation of product performance	506
7.13. Conclusions	507
Bibliography to Chapter 7	508

CHAPTER 8. RADIATION SAFETY PRACTICE IN NUCLEAR MEDICINE

8.1. Introduction	509
8.2. Local rules	509
8.3. Radiation safety aspects of radiopharmaceutical preparation	511
8.4. Safety precautions: Ward and other non-nuclear medical staff	511
8.5. Disposal of radioactive waste	514
8.6. Administration of radionuclides to women of child bearing age or pregnant patients	515
8.7. Breast feeding patients	515
8.8. Typical radiation doses from diagnostic studies	517
8.9. Monitoring	518
8.10. Radiation safety infrastructure	520

CHAPTER 9. NUCLEAR MEDICINE: FUTURE TRENDS

9.1. Electronic data transfer	523
9.2. Radioimmunoassay and molecular biology	524
9.3. Imaging and therapy	526
9.4. Competence and education	528