

Radionanomedicine: Combined Nuclear and Nanomedicine

D.S. Lee (ed.)

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Nuclear medicine is practiced every day in the clinic by nuclear physicians in collaboration with nuclear biologists, chemists, and physicists. Nanomedicine is a medical application of nanotechnology, and it uses nanomaterials, biologic and nanoelectronic devices, biosensors, and possibly molecular nanotechnology. One way nanomedicine has expanded is into radionanomedicine, which relies on the labeling of radionuclides onto a small amount of nanomaterials for theragnosis. This expansion might help to solve the problems in the current practice of medicine, which includes oncology, infection/inflammation, and brain and heart diseases. Scientists would like to understand how to coordinate and implement the current knowledge of nanomaterials and their behavior in the human body to further the use of theranostics. This is the first book describing the combined efforts of physicians and radiopharmaceutical scientists in creating a new medical field, radionanomedicine.

The book was written by 35 contributors who are the experts in nuclear medicine and nanotechnology. It is organized into 8 parts with 22 chapters. Part I, with 4 chapters, deals with exogenous radionanomedicine, including inorganic, graphene-based and organic nanomaterials, as well as porphyrin and phthalocyanine radiolabeling. The 4 chapters in part II discuss endogenous radionanomedicine, including extracellular vesicles, radiolabeling, biodistribution and imaging as well as validation of therapeutic potential. Part III, with 2 chapters, handles surface modification and radiolabeling, and part IV, with 3 chapters, reviews targeted delivery using click chemistry and ^{18}F labeling. Part V (2 chapters) discusses in vivo biodistribution, including preclinical PET and SPECT as well as tracer kinetics, and part VI (3 chapters) deals with factors affecting biodistribution, including pharmacokinetics, polyethylene glycolation, excretion, and clearance. Part VII, with 2 chapters, discusses immune response and innate immunity to nanomaterials, and part VIII (2 chapters) provides prospects of molecular imaging and theranostics of radionanomedicine. There is a short summary in each part, which is educational. The illustrations are clear and informative, and tables are concise and helpful. References in each chapter are updated, and the index is useful.

The editor's purpose and vision of furthering the understanding of radionanomedicine is clearly met with this first book on the topic. I am sure that this book stimulates research workers in nanomedicine to improve nanotechnology and its application in medicine as nanomedicine affects almost all the aspects of health care. I highly recommend this book to all practitioners

as well as research workers in nuclear medicine, imaging, and nanotechnology.

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Nuclear Medicine Board Review: Questions and Answers for Self-Assessment, Fourth Edition

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This self-assessment question-and-answer review book provides a systematic review of key nuclear medicine concepts, with the intent of guiding trainees to pass the board examinations in nuclear medicine and radiology, as well as the specialty boards in nuclear radiology. Unlike traditional diagnostic radiology, nuclear medicine actively images physiologic and pathophysiologic processes to diagnose disease. Nuclear medicine has remained a highly specialized field with important applications, including the diagnosis, staging, and in some cases treatment of malignancy. The clinical relevance of this field results in a heightened importance of training a skilled, new generation of nuclear medicine physicians. The target audience for this book includes trainees with a strong knowledge base in the subject who are looking to test their understanding of key concepts and image interpretation. This book can be used for a concise review of all key facets of nuclear medicine before the board examination.

The first section, on essentials, is further subdivided into 4 chapters: radionuclides and radiopharmaceuticals, instrumentation, quality control, and radiation safety/legal requirements. Combined, this section reviews some key basic points in the physics of nuclear imaging, as well as some important safety concepts. The text pages are organized into side-by-side question-and-answer columns, with many of the questions in this section in a "fill-in-the-blank" format. Although some readers may not find this style particularly appealing, it is important to remember that this text is designed as a review source for those with a basic knowledge foundation, not as a primary learning source. The chapters on quality control and radiation safety/legal requirements include questions on high-yield, testable concepts for both nuclear medicine and diagnostic radiology trainees.

The next section of the book reviews single-photon applications, divided by organ system. The beginning of each chapter in this section includes relevant questions on basic radiotracer and physical