Everything is determined, the beginning as well as the end, by forces over which we have no control. It is determined for the insect, as well as for the star. Human beings, vegetables, or cosmic dust, we all dance to a mysterious tune, intoned in the distance by an invisible piper.

Albert Einstein

In my life, the invisible piper has long been and will continue to be “science.” Indeed, in 1967, during my second year in pharmacy school, while reading general books on science, I first learned that an unstable atom emits radiation, which might be used as a beacon or a signal for detecting the exact location of that atom. This initial introduction to atomic physics had a significant impact on my view of the universe and all that is within, and has shaped my academic and scientific career in a way I could not have foreseen, then.

The discipline of nuclear medicine has tremendously enriched my professional and personal life and several people have been instrumental in shaping my destiny. Professor Walter Wolf, who ignited my research interests in the development of radiopharmaceuticals, Professor Henry Wagner, Jr., the ambassador of nuclear medicine, Professor Michael Phelps, the pioneer and visionary of PET, in particular, have been my inspirational and intellectual gurus. Also, Professor Sanjiv Sam Gambhir, one of the founders of molecular imaging as a scientific discipline in diagnostic radiology, has been a continuous source of inspiration not only to me but to a whole new generation of young investigators. Words cannot express my gratitude to Professor Stanley J. Goldsmith, who for almost three decades has instigated many challenging discussions, supported me in all my scientific endeavors, and is now a part of my family.

Molecular imaging is a fascinating and important technology in radiology that grows more diverse every day. Imaging based on radioisotopes is the major theme of this book and emphasizes both the basic and clinical science of nuclear medicine, based exclusively on radiopharmaceuticals for PET and SPECT. This book grew out of many lectures and my own struggles to more fully understand this subject. My goal in writing this book was not to discuss, in depth, the chemistry of radiopharmaceuticals. Instead it was my intention to provide a broad view of clinical applications in molecular imaging and, thereby, make the readers better understand and appreciate the importance of radiopharmaceutical design and development in the optimization of molecular imaging technology. Finally, although Chapter 2, which provides a history of the atom, is not necessarily relevant to the practical and clinical applications of molecular imaging, it is my way of paying tribute to those extraordinary scientists who have systematically studied “nature” and demonstrated the reality of atoms.
It is impossible to acknowledge every technologist, scientist, and student, who has contributed to my understanding of nuclear medicine. However, I especially thank Ms. Helena Lipszyc not only for working with me on countless research projects, but most of all for her friendship. I also express my gratitude to Dr. Harry M. Lander, Associate Dean for Research at Weill Cornell Medical College, for encouraging me to write this book.

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