

MIRD Monograph: Radiobiology and Dosimetry for Radiopharmaceutical Therapy with Alpha-Particle Emitters

MIRD Radiobiology and Dosimetry for Radiopharmaceutical Therapy with Alpha-Particle Emitters was supported by the SNMMI MIRD Committee to provide clinicians information on radiopharmaceutical therapies that utilize alpha-particle emitters. George Sgouros, MIRD Committee Chair, stated the objective of this book is to “provide guidance and recommendations for human dosimetry” in these therapies.

The book begins with an introduction of alpha-particles and a historical review of the use of radioactivity and alpha-emitters. It is a great overview of how radioactivity has been used since 1896. The next couple of sections explain the radiobiology of alpha-particles and the relative biological effectiveness. It is important to understand how alpha-particles work and what the radiation dose to patients can be.

Section E covers radiation dosimetry. This can help provide clinicians with guidance for planning treatments for radiopharmaceutical therapies. This section helps the reader understand how alpha-particles affect all parts of the body, including the bone marrow and normal organs as well as at the cell level. Understanding this can help a clinician tailor a treatment to each specific patient. The challenges concerning detection of alpha-particles is discussed in Section F. Understanding the instruments capable of detecting alpha-particles is an important piece of the puzzle.

The delivery of the alpha-particles is explained in Section G. It is important to understand how the different alpha-particle-emitting tracers are delivered and this section does a great job of detailing the different methods of localization.

The next section details those alpha-particle emitters that either are being used in humans or may have a possibility of human use. It is an extremely comprehensive section. The readers get an overview of each alpha-particle emitting radionuclide. The overview covers six alpha-particle emitters and includes information on each of the radionuclide’s properties. Preclinical and clinical studies utilizing each of these agents is also discussed.

Dosimetry recommendations are discussed in Section I. This section does a good job of explaining the importance of utilizing dosimetric measurements. Alpha therapies can be highly effective but they can also be extremely toxic. Understanding how dosimetry can be used to accurately determine dose is essential.

The book ends with a section on radiation safety and regulatory considerations. Radiation safety concerns are not as much of a concern as are potential contamination issues. Regulatory requirements and licensure must be met and this section briefly touches upon these two topics.

While the book is only approximately 60 pages, it contains all of the information a clinician would need to gain a better understanding of radiopharmaceutical therapies with alpha-

particle emitters. Technologists can gain an understanding of alpha-particle emitters with this book, but it is better geared toward clinicians.

I think the stated objective of this book is met and anyone wanting to learn more about alpha-particle emitters should consider this book. The use of charts, graphs and pictures aids the reader in understanding the material. With over 500 publications referenced, readers have the ability to read and refer to those publications.

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