

Documents

Cunha, L.^a, Baete, K.^{b c}, Leijen, C.^d, Jamar, F.^e

Main challenges in radiation protection with emerging radionuclide therapies

(2023) *The quarterly journal of nuclear medicine and molecular imaging : official publication of the Italian Association of Nuclear Medicine (AIMN) [and] the International Association of Radiopharmacology (IAR), [and] Section of the Society of...*, 67 (1), pp. 14-28. Cited 1 time.

DOI: 10.23736/S1824-4785.22.03502-6

^a Department of Nuclear Medicine and Molecular ImagingAzores, Portugal

^b Department of Nuclear Medicine, University Hospitals Leuven, Leuven, Belgium

^c Nuclear Medicine and Molecular Imaging, Department of Imaging and Pathology, University of Leuven, Leuven, Belgium

^d Department of Radiation Protection, University Medical Center UtrechtUtrecht, Netherlands

^e Department of Nuclear Medicine, Saint-Luc University Clinic and Institute of Clinical and Experimental Research (IREC), Université Catholique de Louvain (UCLouvain), Brussels, Belgium

Abstract

The recent development of radionuclide therapy and radioligand therapy has raised a call for achieving the highest quality standards, for either radiopharmacy or radiation protection. Novel radionuclides are now being used, either under the form of in-house production radiopharmaceuticals or available from companies. Over the last 20 years, they include radiolabeled microspheres for selective internal radiotherapy (SIRT), the introduction of the first commercially available alpha emitter radiopharmaceutical, ²²³Ra, and the radiosynoviorthesis which is highly variable across Europe. More important is the development of radioligand therapy, often called theranostics. In this concept, a diagnostic radiopharmaceutical can determine the chance of success of a therapeutic one. Typically, diagnostic radiopharmaceuticals for positron emission tomography, are labeled with ¹⁸F or ⁶⁸Ga, such as the PSMA ligands or somatostatin analogs, and the therapeutic radiopharmaceutical is labeled with ¹⁷⁷Lu. This has revolutionized the world of Nuclear Medicine, but also all concepts that shall be applied to properly apply quality assurance and radiation protection in the field. This article will follow the example of ¹³¹I as the main used radionuclide for therapy during the last 80 years. Proposals can be general, and in parallel expert's articles will give specific guidance on issues with particular radionuclides, i.e., alpha emitters and ¹⁷⁷Lu. This article will also give insight in the radiation protection issues related to the use of microspheres radiolabeled with either ⁹⁰Y or ¹⁶⁶Ho.

Index Keywords

radioactive iodine, radiopharmaceutical agent; human, positron emission tomography, radiation protection, scintiscanning; Humans, Iodine Radioisotopes, Positron-Emission Tomography, Radiation Protection, Radionuclide Imaging, Radiopharmaceuticals

Publisher: NLM (Medline)

ISSN: 18271936

PubMed ID: 36598760

Language of Original Document: English

Abbreviated Source Title: Q J Nucl Med Mol Imaging
2-s2.0-85150396449

Document Type: Article

Publication Stage: Final

Source: Scopus