

# Comparative Evaluation of Therapeutic Radiopharmaceuticals

International Atomic Energy Agency

Vienna, Austria: IAEA, 2007, 309 pages, \$92.50

This book, report 458 in the IAEA technical series, is based on contributions by the members of the coordinated research project sponsored by the IAEA Division of Physical and Chemical Sciences under the guidance of Dr. M.R.A. Pillai.

The chapters fall into 2 main sections. In part I (Overview of the Coordinated Research Project), chapter 1 describes the rationale and objectives and identifies DOTA-Tyr3-octreotate (DOTATATE) as the model compound of choice for this study. It recommends that future coordinated research projects address the development of other therapeutic radiopharmaceuticals and importantly concludes that  $^{177}\text{Lu}$ -DOTATATE should be developed at the clinical level. Chapter 2 provides a detailed description of the preparation and quality control of  $^{177}\text{Lu}$ -DOTATATE, based on the papers presented in part II.

Part II (Reports by Participants in the Coordinated Research Project) comprises 14 chapters written in research paper style, 12 of which focus on radiolabeled DOTATATE. The radionuclides studied include  $^{90}\text{Y}$ ,  $^{111}\text{In}$ ,  $^{125}\text{I}$ ,  $^{131}\text{I}$ ,  $^{153}\text{Sm}$ ,  $^{166}\text{Ho}$ ,  $^{177}\text{Lu}$ , and  $^{188}\text{Re}$ , primarily as octreotate-type DOTATATES. The respective topics of chapters 11 and 15 are laboratory methods to evaluate therapeutic radiopharmaceuticals and preclinical development of therapeutic radiopharmaceuticals. All chapters include substantial experimental detail.

Appendix I reports protocols developed by the participants in support of their laboratory evaluations, and appendix II lists related publications by the participants. The volume closes with a list of participants in the coordinated research project.

Report 458 concentrates on the preclinical evaluation of  $^{177}\text{Lu}$ -DOTATATE and in this sense falls short of the promise in its broad title. Useful comparisons are drawn to DOTATATEs radiolabeled with several other radiotherapeutic radionuclides. The 2 chapters that address general principles and laboratory handling of therapeutic radiopharmaceuticals are valuable additions to the volume but are unfortunately lost among the remaining 12 reports. The report is not a general resource for the development of therapeutic radiopharmaceuticals but does present a comprehensive preclinical evaluation of  $^{177}\text{Lu}$ -DOTATATE and demonstrates its robustness through these assessments in a range of laboratories. This book will be an invaluable resource to investigators interested in specific aspects of the development of radioisotope-based radiotherapy.

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