

EDITORIAL

The major challenge in Health Sciences is to generate knowledge that facilitates both the early detection and diagnosis of diseases and the development of useful techniques to adequately treat pathological processes. Radioactivity, using both sealed and unsealed sources, has proved to be invaluable both in diagnosis and in treatment. In the field of nuclear medicine, radiolabeled complexes, or radiopharmaceuticals have been used successfully to diagnose numerous diseases, both benign and malignant. Techniques such as single photon emission computed tomography (SPECT) and positron emission tomography (PET) permit the acquisition of high definition images of various parts of the body. These procedures, by facilitating important clinical decision-making processes, have become indispensable tools for the various professionals that work in Health Sciences. ¹⁸Fluorine-fluorodeoxyglucose (FDG) provides information about the metabolism of specific tissues and organs; FDG-PET images often are referred to as metabolic images. In patients with malignancies, FDG-PET imaging is a useful adjunct to radiation therapy. The information of these studies provides helps to determine whether radiotherapy should be delivered with radiopharmaceuticals or via external beam, as well as the dose administered. In cases where external beam treatment is planned, FDG-PET imaging aids in the focusing of the radiation beam by delineating the anatomic region to be treated. Such information is crucial for the calculation of the radiation dose to be used.

Nuclear Medicine also plays a direct role in treatment. Radioactive iodine has been a mainstay in the treatment of hyperthyroidism and thyroid carcinoma for many years. More recently, radiolabeled antibodies have demonstrated their value in the treatment of lymphoma. Radionuclides also are used for palliation of painful bone metastases, and for radiation synovectomy in patients with non-malignant disorders of the joints.

The development of useful radiobiocomplexes is an arduous task, requiring a multidisciplinary approach that depends on the joint efforts of professionals with expertise in chemistry, biology, pharmacy, pharmacology and nuclear physics. This multitude of scientists must work together in an integrated way to research, develop, and evaluate, through strict quality control processes, every new product that is contemplated for use in human beings.

The Sociedade Brasileira de Biociências Nucleares (Brazilian Society of Nuclear Biosciences) operates under the principles and promise of developing scientific approaches, involving the use of sources of radiation, to generate, discuss and disseminate knowledge that can be used to improve the quality of life, while simultaneously minimizing the impact on the environment.

A scientific meeting, or Congress, is an excellent opportunity to present, discuss and disseminate knowledge, formulate new scientific ideas and define future research directions. In the sixth Congress of the Sociedade Brasileira de Biociências Nucleares, recent developments and new trends related to the

application of radiobiocomplexes in the medical sciences will be presented, related both to agents already in clinical use, and to new approaches for radiopharmaceutical development that are in various stages of investigation. The basic science concepts underlying the current developments in Nuclear Biosciences, such as the use of molecular biology in radiobiocomplex design will be discussed, revealing both the challenges that have been overcome, and those that lie ahead. The biological effects and the consequences of the use of radiation also will be discussed. Finally, safe models will be suggested to increase the safety of use of these sources in processes involving humans.

We are grateful for the opportunity to present this information in an issue of the Brazilian Archives of Biology and Technology, facilitating the dissemination of this knowledge among our colleagues, near and far.

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