

The past, present and future trends in radiopharmaceuticals production in Brazil

Tuesday, 29 October 2019 12:15 (15 minutes)

The origins of the Nuclear and Energy Research Institute (IPEN), formerly known as Institute of Atomic Energy (IEA), date back to the 30's with the coming of European teachers to the University of São Paulo (USP) that generated the Physics section of the Faculty of Philosophy, Sciences and Letters. The confluence of interests between the National Council for Scientific and Technological Development (CNPq) and USP, together with the donation of a nuclear research reactor by the Atoms for Peace Program, made possible the creation of the IEA of the Faculty of Physics of USP in 1956.

In 1959, IPEN, through its former Department of Radioactive Material Processing, pioneered the experimental production of ¹³¹I radioisotope for medical application in Brazil. With the growing interest in the nuclear medical community, in 1961, IPEN started to produce ⁴²K and ⁵¹Cr radioisotopes. Over the years the demand for radioisotopes grew and in 1976 the Radiopharmacy Center (CR) was inaugurated to exclusively house the production and quality control of radioisotopes and labeled molecules. By the end of 1980, IPEN embraced the technological advancement and began the distribution of technetium generators in parallel with a growing number of freeze-dried kits for the diagnosis of several diseases. The acquisition of the Cyclone 30 - IBA (1998) and CV-18 - IBA (2008) and cyclotrons allowed the production of ¹²³I and ¹⁸F radioisotopes and the preparation of the ¹⁸F-FDG radiotracer (the gold standard radiotracer for cancer diagnosis).

Currently, IPEN stands out in the Latin America and Caribbean for providing the highest number of radiopharmaceuticals that account for more than 1.7 million procedures/year in the nuclear medicine clinics. The CR supplies 13 lyophilized kits for labeling with ^{99m}Tc, the technetium generator and 18 ready-to-use radiopharmaceuticals for diagnostic and therapeutic purposes all over Brazil.

IPEN is presently enrolled in the creation of conditions to face up the society needs for new radiopharmaceuticals by implementing a number of initiatives in order to boost innovation. Among them, CR is pursuing active research and development aiming for radiopharmaceuticals to reach market deployment and, has settled the goal to attract and involve young people in the field, ensuring the transfer of knowledge associated with decades of radiopharmaceuticals development. Moreover, the Brazilian Multipurpose Reactor (RMB) Project, will certainly impact the radiopharmacy allowing Brazil to be self-sufficient in the production of radioisotopes, such as molybdenum-99, which are nowadays imported and depend on the foreign market and exchange rate fluctuation.

Here we provide an overview of the past achievements, the present state of the radiopharmacy and the future milestones we identified to encourage young generations and universities to engage in the radiopharmaceutical production activity. We expect IPEN to keep expanding the knowledge, use and access of nuclear medicine, providing a better quality of life, to the Brazilian population.

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Session Classification: S.5