

RADIOACTIVE ION BEAMS: FROM LARGE SCALE FACILITIES TO NUCLEAR MEDICINE APPLICATIONS

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Large scale isotope mass separation facilities have been actively developed and operated across different countries for the scientific community active in the investigation of nuclear structures, nuclear physics and superheavy elements.

In parallel, Nuclear Medicine, and more particularly the so-called theranostics approach based on the combination of diagnostics and treatment drugs, has seen recent breakthroughs, originating from radionuclides made newly available notably for academic and industrial R&D medical scientists.

A striking example is the development and marketing of targeted radiopharmaceuticals directed to the Prostate Specific Membrane Antigen (PSMA) and Somatostatin Receptor targeted therapy with ^{177}Lu beta-emitter.

Improved access to a portfolio of selected radionuclides, bioconjugates and radiopharmaceuticals is an important requirement for preclinical evaluations, clinical trials, and ultimately their translation as new drugs. The production of these radionuclides is complex and sometimes requires lengthy irradiations using powerful reactors, cyclotrons in combination with now dedicated isotope mass separation facilities.

During the presentation, I will introduce some of the recent challenges and developments that were witnessed over the past few years and show how the development of ion beam production techniques has allowed the production and test of new radiotherapeutics. Coordinated programs, like the National Isotope Development Center in USA, and more notably, PRISMAP-The European Medical Radionuclide Programme, involving major large-scale facilities will be described.

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