



Contribution ID: 76

Type: **Invited**

Medical Isotope Production and Use, with a special view on the need for ISOLDE and other big science facilities

Monday 15 December 2014 11:15 (30 minutes)

Medical use of radioactive isotopes for diagnosis and therapy is a widespread and commonly accepted application of radioactivity. It has historical roots back to Curie, Hevesy and Lawrence, and while the principles are the same as a 100 years ago, the number of applications, their sophistication and precision, and not least the clinical benefits are growing each day.

Although "new" isotopes are being introduced to medicine each year, by far the most procedures are carried out using just a dozen of well known and trivial radioisotopes, either derived from fission of uranium in reactors or from simple compound nuclear reactions in small to medium energy accelerators. As the talk will explain some of the large scale infrastructure necessary for continuous growth of nuclear medicine is now under attack, as is the case with the aging research reactors used for Mo-99 and I-131 production. New facilities and new technologies can fill in the gap, if conceived, funded and build in time, but decisions and foresight is needed now.

Big Science facilities do not easily fit into such demanding routine production commitments, but they may very well help demonstrate and develop the technology needed. Production of neutrons by spallation and extraction of isotopes from spallation targets are good examples. There are also cases of some isotopes with special imaging or therapy applications, where spallation and isotope separation is the only road to get them, and these examples will be discussed.

However, big science involvement is not the ultimate answer to the needs of nuclear medicine. A recent and very interesting development is the global dissemination of hundreds of small medical cyclotrons, initially intended only for PET, but each also capable of making other isotopes than F-18 and C-11. Even therapeutic applications are conceivable with this "cottage industry" platform. It has the benefit of flexibility, multiplicity, quick reaction time and very simple distribution logistics, - and in this way much more failure-resistant. Perhaps it can even be characterised as "sustainable". With further development of chemistry and automation, it may well change and improve the future use of nuclear medicine imaging.

The talk will try to use past and present experience to predict the future role and the future gaps in medical use of radioactive isotopes.

Author: Prof. JENSEN, Mikael (DTU-NUTECH, Technical University of Denmark)

Presenter: Prof. JENSEN, Mikael (DTU-NUTECH, Technical University of Denmark)

Session Classification: Applications