Contribution ID: **2** Type: **talk**

Radionuclides for nuclear medicine: the triumphs and challenges

Tuesday, 23 July 2019 11:30 (2 hours)

Terbium is a unique element, as it provides a quadruplet of radionuclides suited for diagnostics and therapy in nuclear medicine [1]. Much success has been gained from the PSI-ISOLDE collaboration, with the collection and purification of 149Tb (α-emitter, T1/2 = 4.1 h), used for preclinical therapy studies [2] and PET imaging [3], and 152Tb (β+-emitter, T1/2 = 17.5 h), for preclinical [4] and clinical [5] PET imaging, respectively.
Mass-separated beams of 149Tb and 152Tb, respectively, were implanted at ISOLDE-CERN into Zn-coated Au foils. With 1.5 hours of collection and 2 hours decay of co-implanted activities, up to 200 MBq 149Tb could be transported to PSI. Collections of 152Tb lasted 4 to 6 hours and up to 600 MBq 152Tb could be shipped to PSI. Both the means of collection at ISOLDE/CERN, as well as the chemical separation system at PSI, have been updated over the years, with the most significant upgrades taking place in 2017.
The Tb was separated from its isobars and contaminants and directly employed for radiolabeling of various pharmaceuticals. PET/CT scans were performed with tumor-bearing mice at different time points after injection of the Tb-labelled radiopharmaceutical in question.
The successful experimental runs have prepared the collaboration for proposed extended preclinical imaging and therapy experiments in future. This, along with more regular radionuclides produced for nuclear medicine, will be discussed.

[1] C. Müller et al., J. Nucl. Med. 53, 1951 (2012).
[2] C. Müller et al., J. Nucl. Med. 54, 124 (2013).
[3] C. Müller et al., EJNMMI Radiopharmacy and Chemistry 1, 5 (2016).
[4] C. Müller et al., EJNMMI Research 6, 35 (2016).
[5] R. Baum et al., Dalton Transactions, 46, 14638 (2017).

Presenter: VAN DER MEULEN, Nick