Contribution ID: **22** Type: **Invited Lecture**

INVITED LECTURE - Recoil and conversion electron implications to be taken into account in the design of therapeutic radiopharmaceuticals utilising in vivo generators

Monday 17 September 2012 15:00 (20 minutes)

The use of radionuclides as potential therapeutic radiopharmaceuticals is increasingly investigated. An important aspect is the delivery of the radionuclide to the target whereby the radionuclide is not lost from the chelating agent. For in vivo generators it is important whether the daughter radionuclide stays inside the chelator after decay of the parent radionuclide. In our previous work, we showed that the classical recoil effect for β decay only applies to decays with a Q value higher than 0.6 MeV. The loss of the daughter nuclide by a DOTA (1,4,7,10-tetraazacyclododecane-1,4,7,10-tetraacetic acid) chelator was measured for the 166Dy/166Ho generator (Q = 0.486 MeV) and the 90Sr/90Y generator (Q = 0.546 MeV) - transition via the Auger process is absent. It was found that 72% of the daughter (166Ho) was liberated from the DOTA chelator, in contrast to our recoil calculations but corresponding to the ratio of transition of holmium atoms via the Auger process. For the β 90Sr/90Y generator a 1% release from the DOTA chelator was recorded as compared to the estimated 10.2% from the β continuum spectrum of 90Sr. The discrepancy between the experimental and theoretically calculated release can be explained by a correction of the chemical bond energy to 4.4 eV.

Reference; JR Zeevaart, Z Szucs, S Takacs, J van Rooyen, DR Jansen. Recoil and conversion electron implications to be taken into account in the design of therapeutic radiopharmaceuticals utilising in vivo generators. Journal of Labelled Compounds and Radiopharmaceuticals, 2012, 55, 115-119

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