

Human Absorbed Dose Estimation of a New In-111 Imaging Agent Based on Rat Data

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Abstract : The measurement of organ radiation exposure dose is one of the most important steps to be taken initially, for developing a new radiopharmaceutical. In this study, the dosimetric studies of a novel agent for SPECT-imaging of the bone metastasis, ^{111}In -1,4,7,10-tetraazacyclododecane-1,4,7,10 tetraethylene phosphonic acid (^{111}In -DOTMP) complex, have been carried out to estimate the dose in human organs based on the data derived from rats. The radiolabeled complex was prepared with high radiochemical purity in the optimal conditions. Biodistribution studies of the complex was investigated in the male Syrian rats at selected times after injection (2, 4, 24 and 48 h). The human absorbed dose estimation of the complex was made based on data derived from the rats by the radiation absorbed dose assessment resource (RADAR) method. ^{111}In -DOTMP complex was prepared with high radiochemical purity of >99% (ITLC). Total body effective absorbed dose for ^{111}In -DOTMP was 0.061 mSv/MBq. This value is comparable to the other ^{111}In clinically used complexes. The results show that the dose with respect to the critical organs is satisfactory within the acceptable range for diagnostic nuclear medicine procedures. Generally, ^{111}In -DOTMP has interesting characteristics and can be considered as a viable agent for SPECT-imaging of the bone metastasis in the near future.

Keywords : In-111, DOTMP, Internal Dosimetry, RADAR

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