

In house preparation and biodistribution of ^{64}Cu -ATSM, ^{64}Cu -PTSM and ^{64}Cu -DOTATATE for theranostic application

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Abstract

In this work the radiolabeling and biodistribution of ^{64}Cu -ATSM, ^{64}Cu -PTSM and ^{64}Cu -DOTATATE were carried out. A routine production method of no-carrier-added $^{64}\text{CuCl}_2$ was performed through the nuclear reaction $^{68}\text{Zn}(p,\alpha n)^{64}\text{Cu}$ from high current solid target. By using suitable proton energy, the amount of ^{67}Cu has been neglected end of synthesis which constitute about 1%. High quality ATSM, PTSM and DOTA-TATE were synthesized in our laboratory then characterized by NMR, FTIR spectroscopies and MS spectrometer. All compounds were successfully labeled with ^{64}Cu and the Radiolabelling yields of the labeled compounds were greater than 98%. Biodistribution of ^{64}Cu -DOTATATE were performed at 0.5, 1 and 1.5 hours. Whereas the biodistribution of ^{64}Cu -ATSM and ^{64}Cu -PTSM were carried out at 1, 2 and 3 hours. The results show that ^{64}Cu -DOTATATE, ^{64}Cu -ATSM and ^{64}Cu -PTSM are rapidly and efficiently cleared from the blood. Only less than 1% of the injected activity/g remains in blood pool. Normal ^{64}Cu -DOTATATE biodistribution in kidneys increase and stabilize at 10% of the injected dose per gram at one-hour post injection. Whereas stabilize at 2.5 % of injected dose per gram in the liver healthy cells. ^{64}Cu -ATSM shows a lower uptake in the myocardium than ^{64}Cu -PTSM.

Keywords: ^{64}Cu -ATSM, ^{64}Cu -PTSM and ^{64}Cu -DOTATATE, biodistribution, Radiolabelling,

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