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

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Abstract
In this work the radiolabeling and biodistribution of 64Cu-ATSM, 64Cu-PTSM and 64Cu-DOTATATE were carried out. A routine production method of no-carrier-added 64CuCl2 was performed through the nuclear reaction 68Zn(p,αn) 64Cu from high current solid target. By using suitable proton energy, the amount of 67Cu 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 64Cu and the Radiolabelling yields of the labeled compounds were greater than 98%. Biodistribution of 64Cu-DOTATATE were performed at 0.5, 1 and 1.5 hours. Whereas the biodistribution of 64Cu-ATSM and 64Cu-PTSM were carried out at 1, 2 and 3 hours.The results show that 64Cu-DOTATATE, 64Cu-ATSM and 64Cu-PTSM are rapidly and efficiently cleared from the blood. Only less than 1% of the injected activity/g remains in blood pool. Normal 64Cu-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. 64Cu-ATSM shows a lower uptake in the myocardium than 64Cu-PTSM.
Keywords:64Cu-ATSM, 64Cu-PTSM and 64Cu-DOTATATE, biodistribution, Radiolabelling,

Primary authors: Dr ASSAAD, Thaer (AECS); Dr AL RAYYES, Abdul. H (AECS); Dr AL-KTAIFANI, Mahmoud (AECS)

Presenter: Dr ASSAAD, Thaer (AECS)