IN VITRO AND IN VIVO EVALUATION OF ^{99m}Tc(I)-TRYCARBONIL COMPLEX WITH N-1-ETHYL-(2-IMIDAZOLIDINYL METHYLTHIO) ACETIC ACID (NSC5)

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AIM: New chelating agents have been synthesized with the aim toward the design and development of site specific radiopharmaceuticals. The aim of this study is to label N-1-Ethyl-(2-Imidazolidinyl methylthio) acetic acid (NSC5) with $[^{99m}Tc(CO)_3]^+$ and investigate its radiopharmaceutical potential.

MATERIALS AND METHODS: The sample of NSC was prepared by dissolving in water appropriate amount of substance for obtaining 10^{-3} mol dm^{-3} solutions. pH was adjusted to 5.0. ^{99m}Tc-carbonyl NSC 5 complex was prepared by addition of 0.1 ml of ligand solutions to 0.4 ml of $[^{99m}Tc(CO)_3(H_2O)_3]^+$ precursor with appropriate pH values. The vial was heated for 30 min in boiling water bath. The labelling efficiency of ^{99m}Tc-carbonyl targeted NSC was determined by gradient HPLC with 0.1%TFA/H_2O and 0.1%TFA/CH_3CN as mobile phase (flow rate 1.0ml/min). TCA precipitation method for determining the percentage of $^{99m}Tc(CO)_3$(NSC) bound to proteins (12% human albumin, incubation at 37^0C for different time intervals) was very useful. All lipophilicity measurements were done by solvent extraction method with n-octanol equilibrated with 0.15 M phosphate buffers (pH=6.0-7.5). Organ biodistribution studies were carried out on white Wistar rats (four weeks old). The animals were sacrificed 5 and 120 minutes after application of 0.1 ml of $^{99m}Tc(CO)_3$-labelled compound. The radioactivity per organ of interest was measured in a NaI (Tl) detector.

RESULTS: The radiochemical purity was found to be more than 95%. The percentage of protein binding was around 47%. The distribution coefficient was around 0.66 and independent from pH. Biodistribution studies showed minimal organ retention except liver (10.461%/g), intestine (3.012%/g) and kidneys (3.388%/g) of the injected dose at 1 hour p.i.

CONCLUSION: The labelled agent has been shown to be very stable, and due to its relative lipophilicity has a very good biodiodistribution profile. With these points in mind this chelathing agent provide a promising architecture for use in labelling tumor specific biomolecules.