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Radio Labeling and Characterization of Cysteine and Its Derivatives with Tc99m and Their Bio-Distribution

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Abstract : An extensive series of radiopharmaceuticals have been explored in order to discover a better brain tumour diagnostic agent. Tc99m labelling with cysteine and its derivatives in liposomes shows effective tagging of about 70% to 80 %. Due to microscopic size it successfully crossed the brain barrier in 2 minutes which gradually decreases in 5 to 15 minutes. HMPAO labelled with Tc99m is another important radiopharmaceutical used to study brain perfusion but it comes with a flaw that it's only functional during epilepsy. 1, 1 ECD is purely used in Tc99m ECD formulation; because it not only tends to cross the blood brain barrier but it can be metabolized which can be easily entrapped in human brain. Radio labelling of Cysteine with Tc99m at room temperature was performed which yielded no good results. Hence cysteine derivatives with salicylaldehyde were prepared that produced about 75 % yield for ligand. In order to perform it's radio labelling a suitable solvent DMSO was selected and physical parameters were performed. Elemental analyser produced remarkably similar results for ligand as reported in literature. IR spectra of Ligand in DMSO concluded in the absence of SH stretch and presence of N-H vibration. Thermal analysis of the ligand further suggested its decomposition pattern with no distinct curve for a melting point. Radio labelling of ligand was performed which produced excellent results giving up to 88% labelling at pH 5.0. Clinical trials using Rabbit were performed after validating the products reproducibility. The radiopharmaceutical prepared was injected into the rabbit. Dynamic as well as static study was performed under the SPECT. It showed considerable uptake in the kidneys and liver considering it suitable for the Hypatobilliary study.

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