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Synthesis and characterization of a $\{ReO\}^{3+}$ complex with S- and N-donor ligands and of its ^{99m}Tc analog

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A novel mixed-ligand ^{99m}Tc complex with mercaptobenzothiazole (mer) as ligand and aminothia- zole (amino) as coligand was prepared and evaluated as potential brain radiopharmaceutical. Preparation at tracer level was accomplished by substitution, using ^{99m}Tc- gluconate as precursor and a coligand/ ligand ratio of 5. Under these conditions, the labeling yield was over 97% and the major product with radiochemical purity >97% was isolated by HPLC and used for biological evaluation. The reaction of $[ReO(Citrate)2]^-$ with mer and amino in hot MeOH yields $[ReO(mer)(amino)OH(H_2O)_2]$. The DFT study demonstrated that the complex con- tains distorted octahedral ReO(V). The Re coordination sphere consists of the terminal oxo group, the S donor atom of the deprotonated mer, the N atom of the deprotonated amino, OH group, and two water molecules. Biodistribution in mice demonstrated early brain uptake, fast blood clearance, and excretion through hepatobiliary system. Although the brain/blood ratio increased significantly with time, the novel ^{99m}Tc complex did not exhibit ideal properties as brain perfusion radiopharmaceutical since brain uptake was too low.

Biography

N S Al-Hokbany is an Assistant Professor in the Department of Chemistry at Science College of King Saud University where she has been a faculty member since 2005. She has a PhD (King Saud University, 2010) in Inorganic Chemistry (Radiopharmaceuticals) with collaboration with King Fasial Hospital Research Center in Riyadh. She is working with Radioactive Materials since 2002 of many radionuclides (9mTc, 68/76Ga, 188Re, 153Sm, 64Cu, etc.). She collaborates with Ruhr University of Bochum in Germany.

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