عنوان مقاله:

Preparation and biomolecule conjugation of [۹۹mTc]Tc-MAG۳

محل انتشار:

مجله پزشکی هسته ای ایران, دوره 31, شماره 1 (سال: 1402)

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خلاصه مقاله:

Introduction: [۹۹mTc]Tc-MAG۳ is one of the routine renal radiopharmaceuticals being used in nuclear medicine centers, throughout the world. This study investigated the synthesis and ۹۹mTc-labeling of MAG۳, as well as the synthesis of the S-acetyl-MAG۳-NHS complexing agent, which was used for labeling bovine serum albumin (BSA) as a protein model using technetium-۹۹m.Methods: S-acetyl-MAG۳ was prepared by the reaction of S-acetyl thioglycolic acid and triglycine. It was also activated to its N-hydroxysuccinimide counterpart which was used for preparation of biomolecule conjugates. All compounds and intermediates were characterized by ۱H NMR and LC/Mass spectroscopy. Labeling of MAG۳ with ۹۹m-technetium was also well performed. The radiochemical purity and stability of labeled products was done by thin-layer chromatography. Also, biodistribution studies in mice was performed.Results: The spectroscopic results confirmed the structure of compounds. The stability of [۹۹mTc]Tc-MAG۳ and [۹۹mTc]Tc-MAG۳-BSA was determined over ۲۴h .It was found to drop from ۹۰% to ۶۰% and ۹۹% to ۸۰%, respectively. There was no difference between serum and buffer results. Biodistribution studies for [۹۹mTc]Tc-MAG۳ confirmed renal excretion with injected dose per gram (%ID/g) kidney of ۴۱.۲۸ ± ۴.۷۰ , ۴۵.۶۳ ± ۶.۳۶ and ۱۲.۲۲ ± ۲.۸۳ after ۱, ۴ and ۲۴h respectively.Conclusion: In this work, the rigorous purification processes were simplified through adjustment of molar ratios of reactants and the crude product obtained with higher yield was directly used for ۹۹mTc labeling. The prepared labeled biomolecules conjugates showed acceptable radiochemical purity and stability. MAG۳ was applicable for renal imaging according to biodistribution results.

کلمات کلیدی:

S-acetyl-MAG۳-NHS, Renal imaging, Bioconjugate, Technetium-۹۹m, Nuclear medicine