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Biodistribution of 99mTc-2-aminoestrone-3-methyl ether as a potential radiotracer for inflammation imaging

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Estrogens participate in several biological processes through different molecular mechanisms. Their final actions consist of a combination of both direct and indirect effects on different organ and tissues. Estrogen may have pro- and anti-inflammatory properties depending on the situation and the involved tissue. 2-aminoestrone-3-methyl ether as an estrogenic derivative was prepared with a yield of 55% and well characterized. 99mTc-2-aminoestrone-3-methyl ether radiotracer was synthesized to study its inflammatory binding specificity as a novel selective radiopharmaceutical for inflammation imaging. Effect of 2-aminoestrone-3-methyl ether concentration, stannous chloride dihydrate ($SnCl_2.2H_2O$) concentration, pH and reaction time on the percent labeling yield of 99mTc-2-aminoestrone-3-methyl ether complex was studied in details. 99mTc-2-aminoestrone-3-methyl ether complex was obtained at a maximum yield of 98.6% by mixing 60 mg of 2-aminoestrone-3-methyl ether with 1mg $SnCl_2.2H_2O$ at pH 1 and 30 min reaction time. Biodistribution study of 99mTc-2-amino estrone-3-methyl ether complex in both bacterial infection and sterile inflammation showed high and rapid accumulation of 99mTc-2-aminoestrone-3-methyl ether complex at the site of sterile inflammation compared to bacterial infection sits [(target-to-non target, T/NT) ratio equal to 4.12±0.02]. High biological accumulation in inflamed cells suggests that 99mTc-2-aminoestrone-3-methyl ether complex may be suitable as a potential selective radiotracer able to image inflammatory sites.

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