ORIGINAL ARTICLE

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Biodistribution and breast tumor uptake of 16α-[^{18}F]-fluoro-17β-estradiol in rat

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To evaluate the usefulness of 16α-[^{18}F]-fluoro-17β-estradiol (FES) for the assessment of estrogen receptor (ER), we examined the tissue distribution and kinetics of FES in immature female Sprague-Dawley rats and then examined FES uptake in rat breast tumors induced by 7,12-dimethylbenz(a) anthracene (DMBA). The FES uptake by the uterus, an ER-rich tissue, was highly selective and it was 3.34 ± 0.79%ID/g at 60 minutes and 1.57 ± 0.57%ID/g at 120 minutes after injection. The FES uptakes in ER-negative tissues were 0.12 ± 0.05%ID/g or less and 0.05 ± 0.03%ID/g or less, respectively. Coadministration of unlabeled β-estradiol showed marked depression of uterine FES uptake. The FES uptake by rat breast tumors was 0.14 ± 0.06%ID/g at 60 min and 0.12 ± 0.09%ID/g at 120 min. The FES uptake by rat breast tumors correlated with the ER concentration ($r = 0.45$, $p < 0.05$). In conclusion, these results suggest that the FES uptake by tissue is mainly ER mediated and FES is thus useful for detecting ER positive breast tumors.

Key words: breast cancer, estrogen receptor, ^{18}F-estradiol