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An experimental study on *O*-[^{18}F]fluoromethyl-L-tyrosine for differentiation between tumor and inflammatory tissues

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Objective: *O*-[^{18}F]fluoromethyl-L-tyrosine (^{18}F-FMT) is a recently developed tumor-detecting agent with simple preparation and high radiochemical yields. The aim of this study was to assess the potency of ^{18}F-FMT for differentiating tumor and inflammatory tissues using an animal model with an implanted tumor and experimentally induced inflammatory foci. ***Methods:*** An ascites hepatoma cell line, AH109A, turpentine oil and *Staphylococcus aureus* were inoculated subcutaneously into Donryu rats as a tumor model, aseptic inflammation model and bacterial infection model, respectively. The biodistribution of radioactivity was assessed in rats at 5, 10, 30, 60, and 120 min after injection with ^{18}F-FMT. Dual tracer whole-body and macro autoradiographies were performed 60 min after injection with a mixture of ^{18}F-FMT and 2-deoxy-D-[1-^{14}C]glucose (^{14}C-DG). ***Results:*** Tumor uptake of ^{18}F-FMT was on average 1.27% injected dose per gram of tissue (%ID/g) and 1.43%ID/g at 30 min and 60 min, respectively and significantly higher than that in other normal tissues, except the pancreas (3.48%ID/g at 60 min). The uptakes in the aseptic and bacterial inflammatory tissues were very low and were not different from those of the background tissues. Dual tracer whole-body and macro autoradiographic studies showed that tumor uptake of ^{18}F-FMT was clearly higher than uptake by the other tissues, while ^{18}F-FMT accumulated much less both in aseptic and bacterial inflammatory tissues. In contrast, the ^{14}C-DG images showed high accumulations not only in tumors but also in aseptic and bacterial inflammatory tissues. ***Conclusion:*** ^{18}F-FMT seems to be a promissing tracer for the differentiation between tumor and inflammation because of higher specificity to tumor.

Key words: *O*-[^{18}F]fluoromethyl-L-tyrosine, 2-deoxy-D-[1-^{14}C]glucose, ^{18}F-FDG, tumor, inflammation