

Initial evaluation of dynamic human imaging using ^{18}F -FRP170 as a new PET tracer for imaging hypoxia

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^{18}F -FRP170, 1-(2-fluoro-1-[hydroxymethyl]ethoxy)methyl-2-nitroimidazole, is a new hypoxia imaging agent for positron emission tomography. This compound was synthesized by ^{18}F -labeling of RP170, which was developed as a new hydrophilic 2-nitroimidazole analog. In the present study, we analyzed dynamic whole-body imaging in healthy volunteers and dynamic tumor imaging in three patients with lung cancer. **Methods:** Four healthy male volunteers and three lung cancer patients were enrolled in this study. Volunteers underwent dynamic whole-body scans just after injection of ^{18}F -FRP170 for about 90 min, while the lung cancer patients underwent dynamic tumor imaging for about 60 or 120 min. Data are expressed as standardized uptake values (SUV). Regions of interest were placed over images of each organ or tumor to generate time-SUV curves. **Results:** The series of dynamic whole-body scans showed rapid elimination of ^{18}F -FRP170 from the kidneys following elimination from the liver. Very low physiological uptake was observed above the diaphragm. ^{18}F -FRP170 uptake in the lung cancer lesion could be visualized clearly from early after injection. The changes of tumor SUV, tumor/blood ratio, or tumor/muscle ratio about 30 min after injection or later were small. **Conclusions:** Dynamic imaging using ^{18}F -FRP170 demonstrated rapid elimination from the kidney, suggesting the high hydrophilicity of this imaging agent. The background activity above the diaphragm was very low, and patients with lung cancer showed clear tumor uptake of ^{18}F -FRP170 early after injection.

Key words: hypoxia, PET, nitroimidazole, RP170, FRP170