Supplemental Materials

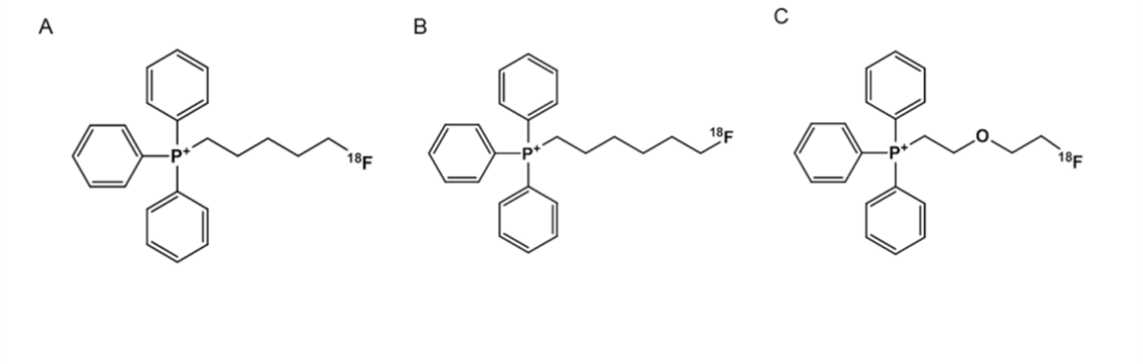
Tracer Preparation

^{18}F-FATPs were prepared following a previously described method (*1-3*). In brief, activated ^{18}F fluoride was added to 4.0 mg of precursor dissolved in 1.0 mL of anhydrous acetonitrile. The solution was heated for 5 min at 90°C in the closed state. The solution was then passed through a small silica Sep-Pak® cartridge (Waters). Triphenylphosphine (6.0 mg) was dissolved in 1.0 mL of toluene, added to the reaction vessel, and heated to 220°C for 3 min with no separation step. The solution was cooled and injected onto a semipreparative high-performance liquid chromatography (HPLC) system for purification. For identification of the radioproduct, the collected HPLC fraction was co-injected with its nonradioactive compound into an analytical HPLC system. The total reaction time of the ^{18}F-FATPs was within 60 min to be ready for tracer injection.

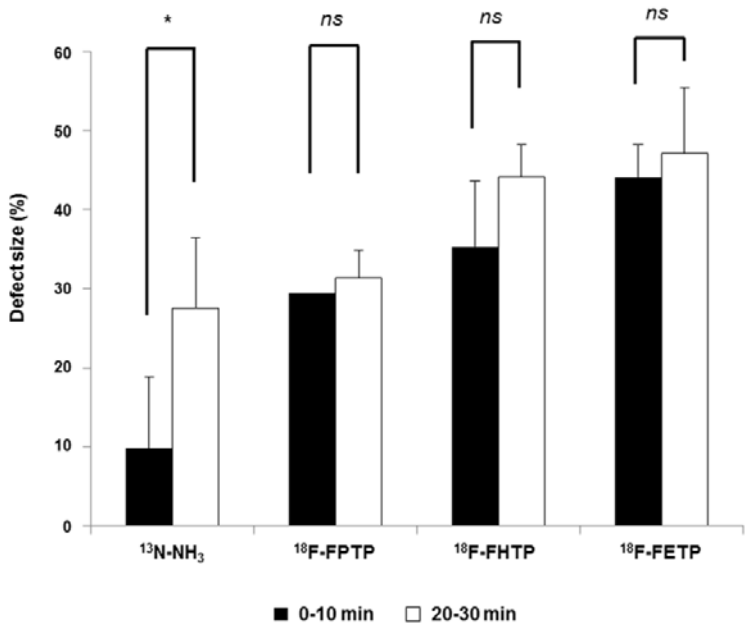
^{13}N-NH_3 was synthesized from the reduction of ^{13}N-NO_x, which was produced by an ^{16}O(p, α)^{13}N reaction on a GE PETtrace cyclotron (10 μA irradiation beam for 10 min). ^{13}N-NO_x was reacted with devardas alloy and sodium hydroxide in a disposable unit and then the radioproduct was dissolved in 0.9% sodium chloride. Finally, the solution was passed through a 0.20 μm membrane filter into a sterile multidose vial for in vivo studies.

Animal Model

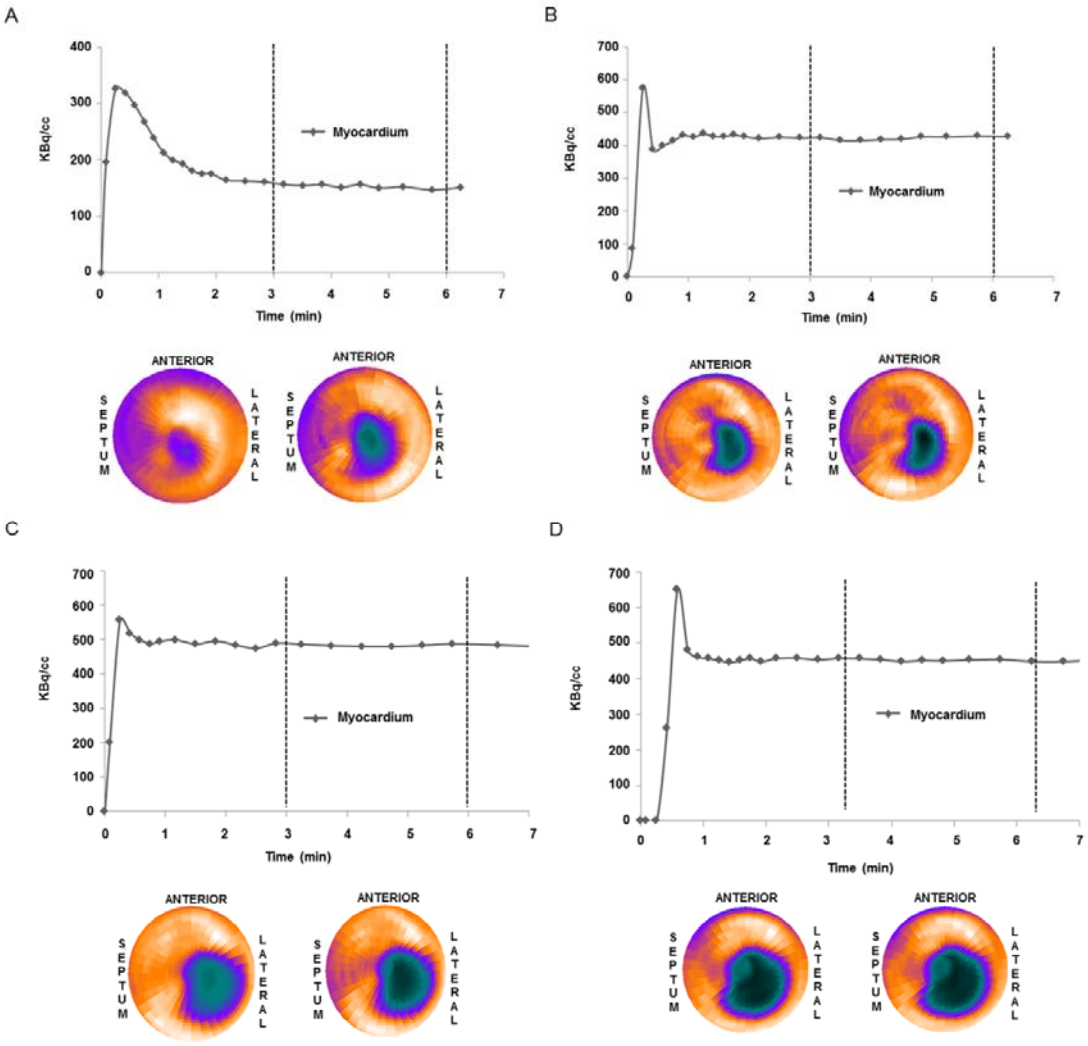
All microPET studies were performed with 8-week-old male Sprague-Dawley (SD) rats (weight, 250–260 g; Orient). SD rats underwent left coronary artery (LCA) ligation, as previously described (*4*). Animal care, experiments, and euthanasia were performed in accordance with protocols approved by the Chonnam National University Animal Research Committee and the Guide for the Care and Use of Laboratory Animals (8th edition, *The National Academies Press*, 2010).



Supplemental Figure 1. Structures of the ^{18}F-fluoroalkylphosphonium salts (^{18}F-FATPs). (A) (5-^{18}F-fluoropentyl)triphenylphosphonium cation (^{18}F-FPTP), (B) (6-^{18}F-fluorohexyl)triphenylphosphonium cation (^{18}F-FHTP), (C) (2-(2-^{18}F-fluoroethoxy)ethyl)triphenylphosphonium cation (^{18}F-FETP).



Supplemental Figure 2. Defect size (%) in the polar map generated from static images of each tracer in LCA-occluded rats between 0–10 and 20–30 min after radiotracer injection (n = 3, each tracer). * $P < 0.05$; ns = not significant.



Supplemental Figure 3. TACs for (A) ^{13}N-NH$_3$, (B) ^{18}F-FPTP, (C) ^{18}F-FHTP, or (D) ^{18}F-FETP in myocardium for 6 min after radiotracer injection (37 MBq) with polar maps generated from static images between 0–3 and 3–6 min.

References

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2. Kim DY, Kim HJ, Yu KH, Min JJ. Synthesis of ^{18}F-labeled (6-fluorohexyl)triphenylphosphonium cation as a potential agent for myocardial Imaging using positron emission tomography. *Bioconjug Chem.* 2012;23:431-437.

3. Kim DY, Kim HS, Le UN, et al. Evaluation of a mitochondrial voltage sensor, (^{18}F-fluoropentyl)triphenylphosphonium cation, in a rat myocardial infarction model. *J Nucl Med.* 2012;53:1779-1785.

4. Samsamshariat SA, Samsamshariat ZA, Movahed MR. A novel method for safe and accurate left anterior descending coronary artery ligation for research in rats. *Cardiovasc Revasc Med.* 2005;6:121-123.