Appendix A: Characteristics of the Small-Animal PET Camera System

The Mosaic® scanner uses a pixelated Anger-logic detector based on $2 \times 2 \times 10$ mm^3 GSO (gadolinium oxy-orthosilicate) crystals (*3*), which are coupled to a single annular light guide and an array of 288 19-mm-diameter photomultiplier tubes. The scanner diameter is 19.7 cm, with a reconstructed transverse field of view of 12.8 cm and an axial field of view of 11.9 cm. It operates exclusively in 3-dimensional (3D) volume imaging mode. The spatial resolution in the transverse direction is 2.3 mm full width at half maximum (FWHM) near the center while the axial resolution FWHM is 3.1 mm (*4*). Absolute coincidence sensitivity for a point source placed at the center of the field of view is 1.2% for an energy window of 385–665 keV. Each reconstructed matrix contained 120 transverse 128×128 images with cubic voxels of 1 mm.

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3. Surti S, Karp J, Perkins A, Cardi C, et al. Imaging performance of a small-animal PET camera. *IEEE Trans. Med. Imag.* 2005;24:844–52.
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Appendix B: Synthesis of ^{18}F-FHBG

Materials

Tetrabutylammonium hydroxide (Fluka), dry acetonitrile (Fluka) and potassium carbonate (Aldrich) were purchased from Sigma-Aldrich Chemie, Steinheim, Germany. $H_2{}^{18}O$ water was purchased from Marshall Isotopes LTD., Tel-Aviv, Israel. QMA and Silica Sep-pak cartridges were purchased from Waters (Milford, MA, USA), Millex-GV filters from Millipore Corp. (Bedford, MA, USA). The N^2-(*p*-anisyldiphenylmethyl)-9-[(4-tosyl)-3-*p*-anisyldiphenylmethoxymethylbutyl] guanine or Tos-FHBG and authentic cold FHBG were purchased from ABX advanced biochemical compounds, Germany. Radioactivity was continuously monitored by home-made γ-detectors.

Semipreparative HPLC was done on a Varian Vista 5500 liquid chromatograph with a reversed phase C18 column (25 cm × 10 mm, 5 μm, Discovery C18, SUPELCO) and monitored by UV detection at 254 nm and a γ-detector (BICRON Frisk-Tech).

Synthesis of ^{18}F-FHBG

The synthesis of ^{18}F-FHBG was performed based on a method previously described (*1*). For the preparation of the nucleophilic ^{18}F-fluoride ion, tetrabutylammonium carbonate has been used rather than the potassium carbonate/kryptofix 2.2.2. mixture. Tetrabutylammonium fluoride has been previously used for the cold FHBG synthesis (*1*).

No-carrier-added aqueous ^{18}F-fluoride ion was produced by irradiation of $H_2{}^{18}O$ water with 18 MeV protons using a cyclone 30 cyclotron (IBA, Louvain-la-Neuve, Belgium). $H_2{}^{18}O$ water containing ^{18}F-fluoride was passed through a QMA cartridge activated previously by flushing 5 mL 0.5 M K_2CO_3 followed by 10 mL deionized water. ^{18}F-Fluoride was eluted into the reaction vessel with 30 μL 40% aqueous tetrabutylammonium carbonate in 1 mL acetonitrile/water (1/1) solution. Aqueous tetrabutylammonium carbonate has been prepared by saturation of 40% aqueous tetrabutylammonium hydroxide with carbon dioxide. Water was removed by azeotropic distillation with acetonitrile (3 × 0.5 mL) under helium at 100°C. To the dry ^{18}F-tetrabutylammonium fluoride, cooled to 85°C, was added the solution of Tos-FHBG (2–3 mg) in dry acetonitrile (0.5 mL). The reaction vial was sealed, and the reaction mixture was heated for 15 min at 135°C in a heating block under magnetic stirring. After cooling, the crude product was passed through a Silica Sep-pak cartridge and the desired protected ^{18}F-FHBG eluted with 15% MeOH/CH_2Cl_2 (3.5 mL). The effluent was acidified with 1N HCl (200 μL) and the bottom of the reaction vial was heated at 125°C. The mixture was magnetically stirred under a stream of helium until the end of solvent evaporation. Slow decreasing of the radioactive signal indicated the end of the reaction. After the mixture was cooled, 4 mL water were added to the residue and the solution was neutralized with 1N NaOH (150 μL). After filtration through a 0.22 μ Millex-GV filter, the crude product was injected onto the semipreparative HPLC column. Pure ^{18}F-FHBG was isolated at 11 min using10% acetonitrile in water as the mobile phase at the flow of 2.5 mL/min. The HPLC solvent was evaporated under vacuum and the residue was diluted with 0.9% sodium chloride solution and conditioned before injection. Typical yields of 8%–10% (uncorrected) were routinely obtained in 90 min.