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Synthesis and evaluation of ^{11}C-PK 11195 for *in vivo* study of peripheral-type benzodiazepine receptors using position emission tomography

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The biodistribution of ^{3}H-PK 11195, an antagonist of the peripheral-type benzodiazepine receptors, was studied in mice. High accumulations of radioactivity in the heart, lung, spleen, kidney and adrenal were observed after intravenous injection of tracer amounts of ^{3}H-PK 11195 into the mice. The radioactivity in the heart, lung, spleen, kidney and adrenal was significantly decreased by the coadministration of carrier PK 11195, which indicated that PK 11195 specifically binds to the receptors. No radioactive metabolites were observed in the heart, lung and brain 20 min after intravenous administration of ^{3}H-PK 11195. The accumulation of ^{3}H-PK 11195 in the lung was not affected by pretreatment with either α-methyl benzylamine or imipramine, suggesting that ^{3}H-PK 11195 specifically binds to the receptors. The ratios of radioactivity of the kidney, adrenal and spleen to blood increased as a function of time, whereas that of the lung and heart rapidly reached to a steady state. ^{11}C-PK 11195 was synthesized by the N-methylation of desmethyl precursor yielding more than 100 mCi with high specific activity (more than 1.4 Ci/μmol). The labeling and purification procedure was completed within 23 min after the end of bombardment (EOB). The ^{11}C-PK 11195 solution for injection seems to have a high potential for the *in vivo* study of the peripheral-type benzodiazepine receptors in the living human by means of positron emission tomography (PET).

Key words: PK 11195, Peripheral-type benzodiazepine receptor, Positron emission tomography, *In Vivo* binding, Carbon-11