

Preparation of a fine powder of 2-deoxy-2-[^{18}F]fluoro-D-glucose suitable for inhalation to diagnose lung diseases by means of PET

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Fine 2-deoxy-2-[^{18}F]fluoro-D-glucose (^{18}FDG) powder was obtained by adding diethyl ether into a methyl alcohol solution of ^{18}FDG and other sugar as seed. When micronized particles of sodium N-acetyl-neuraminate (Neu5Ac-Na) were used as seed crystals, particles containing ^{18}FDG were obtained and 80% of them were smaller than 10 μm in size. More than 60% of these crystals were 4–6 μm in size. In a preclinical study of forced inhalation in a dog, the ^{18}FDG fine powder was mainly distributed in the trachea. The radioactivity in the trachea then increased once and a gradual decrease followed. The radioactivity was transferred into the blood and radioactivity incorporation into the heart was observed. After a normal volunteer inhaled ^{18}FDG dry powder aerosol, the radioactivity was found in the respiratory tract and the peripheral area of the lung by means of PET. Absorption and *in vivo* dynamics of the ^{18}FDG were also analysed.

Key words: PET study, ^{18}FDG dry powder aerosol, Mucociliary clearance