Development of an automated system for synthesizing ^{18}F-labeled compounds using [^{18}F]fluoromethyl bromide

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Abstract

An automated system was developed to synthesize [^{18}F]fluoromethyl bromide ([^{18}F]FMeBr), which is ^{18}F-labeled compound for a synthetic precursor. [^{18}F]fluoromethylcholine (fluoromethyl-dimethyl-2-hydroxyethylammonium[FCH]) is a promising candidate as a oncologic probe in applications for brain tumors, prostate carcinoma. Using 3.7 GBq of [^{18}F]F^{-} as starting activity, [^{18}F]FMeBr was obtained in a radiochemical yield of 20-43% (based on [^{18}F]fluoride-) at end of the syntheses (EOS). [^{18}F]FCH was prepared by the passage of [^{18}F]FMeBr through an cation exchange cartridge which is charged with 2-dimethylaminoethanol in a radiochemical yield of 56% (based on [^{18}F]FMeBr, corrected for decay). The total synthesis time was 42 min from the end of bombardment and the developed system has proved to be reliable and reproducible.