Development of an automated system for preparation of [^{18}F]fluoromethylcholine

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Abstract

[^{18}F]fluoromethylcholine ([^{18}F]FCH), which has a longer half life than its [^{11}C] analogue, is a promising candidate as an oncologic probe in application for brain tumors and prostate carcinoma. For effective synthesis of [^{18}F]FCH, the existing system for synthesizing [^{18}F]FMeBr was modified to add a silver triflate column through which the [^{18}F]FMeBr is converted to [^{18}F]fluoromethyl triflate, a more reactive [^{18}F]fluoromethylating reagent. With this system connected to a module for synthesizing choline, [^{18}F]FCH was produced, resulting in the average radiochemical yield of 15.9% at the end of the syntheses (EOS). Using 3.7 GBq of [^{18}F]F^{-} as the starting activity, 0.59 GBq of [^{18}F]FCH is obtained, which enables a couple of clinical PET studies in a day. The total synthesis time is 20 min from the end of bombardment. The renewd system has proved to be reliable and reproducible.