

Non-HPLC Methods for the Production of F-18, C-11 and Ga-68 PET Tracers

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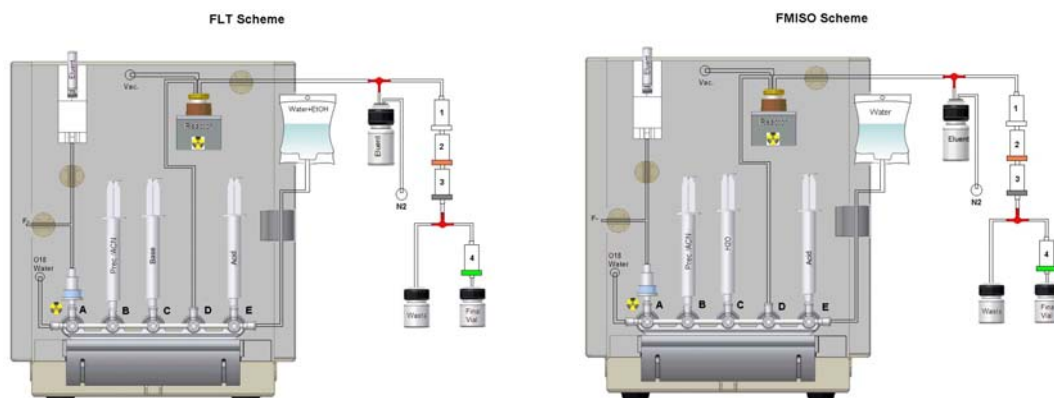
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The most popular PET radionuclides in routine clinical use are C-11 and F-18, although other radionuclides, such as Ga-68, continue to make headlines. This is due to their well established chemistry, their utility for labeling low molecular weight compounds, and their ease of production in modern PET cyclotrons or via commercially available generators. Their relatively short half-lives, along with the global trend toward Good Manufacturing Practice in PET drug production has necessitated the development of aseptic, robust and rapid labeling methodologies. This is achieved by the use of automated radiochemistry systems, which, in turn, has allowed radiosynthesis scale-up and multiple dose preparation.

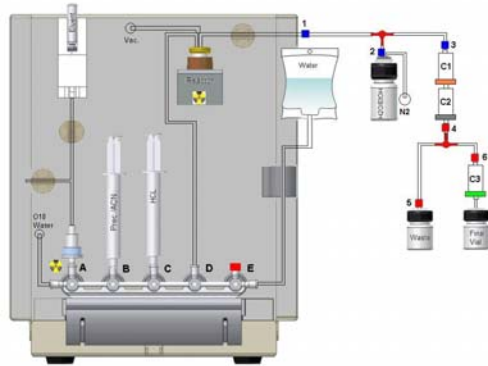
Major impediments to routine production of a number of useful C-11, F-18 and Ga-68 PET tracers, and to new tracer development, remain: 1) the necessity of thorough system clean up in between consecutive runs; and 2) inconsistent yields and prolonged synthesis time when using HPLC methods for final product separation and purification. To address these issues, new radiochemistry applications have been developed for the radiochemistry modules:

- a) for F-18: FLT Lite, F-MISO Lite, F-Choline Lite, and FET Lite;
- b) for C-11: Acetate, Methyl Iodide, Methionine, Choline;
- c) for Ga-68: DOTA-Peptides.

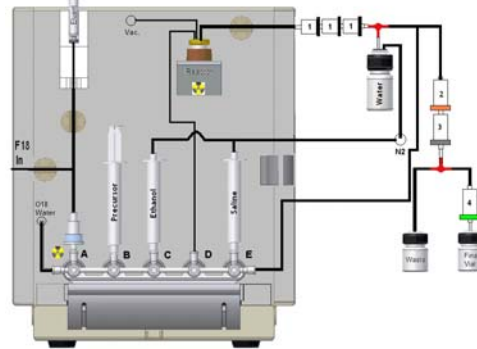
These methods utilize sterile disposable kits, and allow for the PET tracers to be purified and isolated with SPE cartridges only, thus eliminating the need for HPLC separation. The processes and the radiochemical yields obtained with these methods will be presented, and their utility discussed.



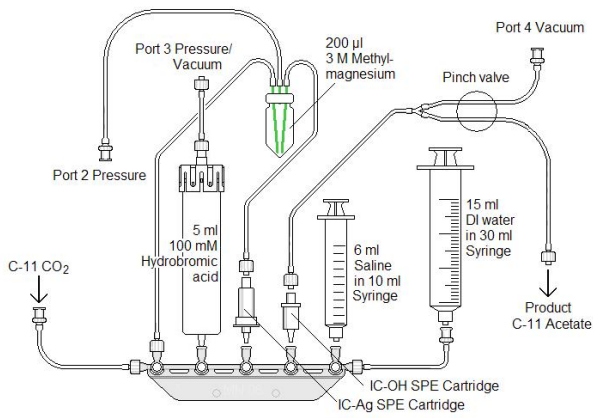
FET Scheme



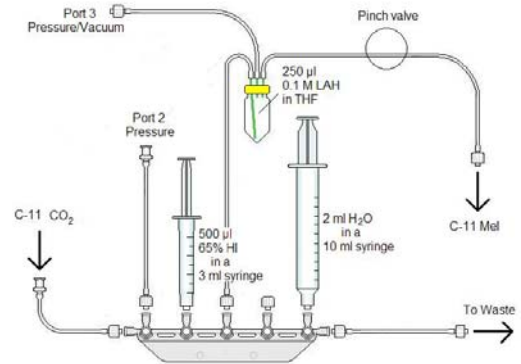
¹⁸F-Choline Scheme



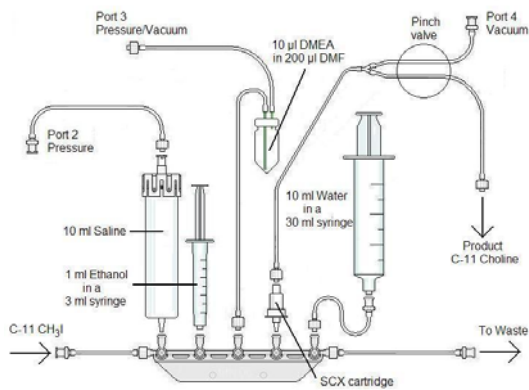
^{C-11} Acetate



^{C-11} Methyl Iodide



^{C-11} Choline



^{C-11} Methionine

