

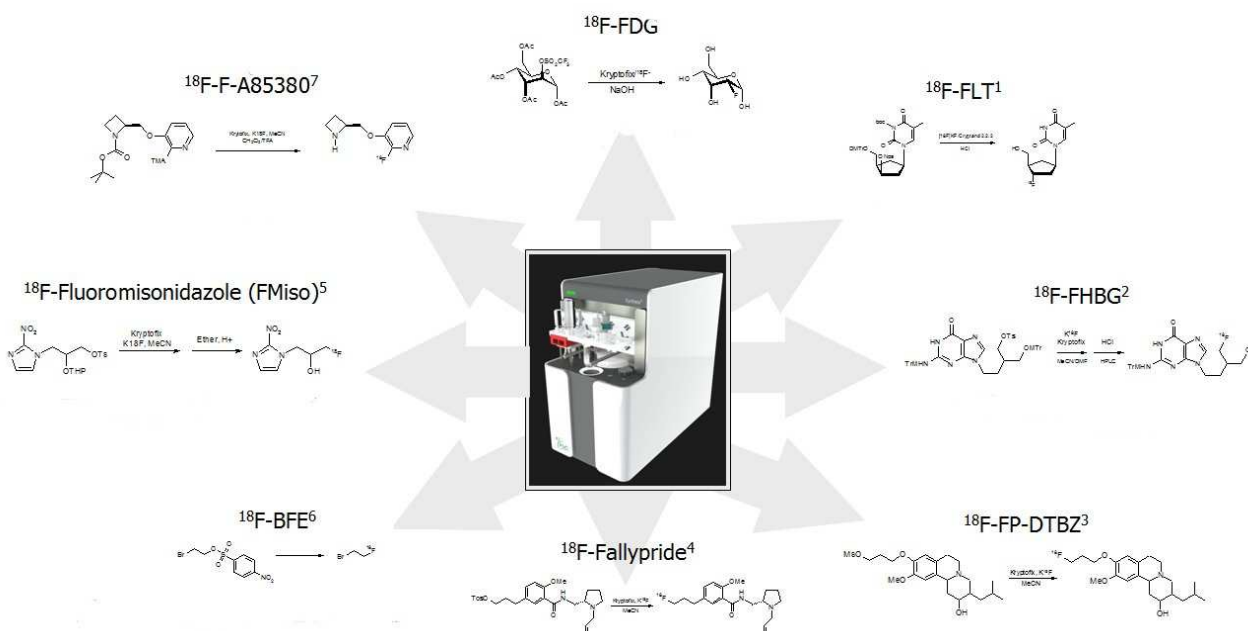
Nucleophilic labeling reactions on a multipurpose synthesis platform.Alexander Schmitz¹, Richard Freifelder¹¹University of Pennsylvania, Dept. of Radiology, 3400 Spruce St., Philadelphia, PA 19128, USA.

Objectives: The Synthera synthesis unit was originally designed for the cGMP compliant manufacture of FDG. It uses an IFP (integrated fluidic processor) disposable system, reagent components and is designed for a single synthesis per kit. The goal was to adapt our manual synthesis method of ¹⁸F-radiotracers to this automated synthesis unit with minimum changes to the existing commercially available IFP Nucleophilic cassette (same as for FDG).

Methods: Synthesis scripts were modified in a logical and systematic fashion by varying the reaction parameters such as: heater temperature, heating time, and concentration of certain reagents with respect to the desired radiotracer and tested with multiple synthesis runs. After achieving the best parameter sets for each compound, several test runs were made to ensure consistent results.

Results: Four ¹⁸F-radiotracers (FLT, FHBG, Fallypride and FP-DTBZ) were synthesized at UPenn manually. We were able to adapt these methods to this synthesizer. The resulting automated production runs for these radiotracers showed improved yields and reliability. Syntheses of BFE, FMiso¹ and F-A85380² were successfully developed on Synthera directly. Yields were high and consistent and the unit performed reliably (Table I). Commercially available synthesis disposables (IFP) were used for all compounds and experiments and no additional hardware modifications were necessary.

tracer	Production runs	Average yield [d.c.%]	Improvement over manual	tracer	Production runs	Average yield [d.c.%]
FLT	62	13.6	doubled	BFE	7	23.7
FHBG	8	9	doubled	Fmiso	6	31.4
FP-DTBZ	2	6	similar	F-A85380	10	34.3
Fallypride	10	36.2	by 60%			

Table 1: ¹⁸F Radiotracers synthesized on Synthera, Yields and ImprovementsFigure 1: ¹⁸F Radiotracers synthesized on Synthera using the IFP Nucleophilic.

Conclusion: The automated Synthera synthesis unit offers a convenient and flexible way to synthesize the aforementioned radiotracers under remote conditions. Huge advantages of the automatic syntheses in comparison to the previously done manual syntheses are less exposure, shorter synthesis duration, improved and stable yields.

Research Support: IBA Molecular, Chemin du Cyclotron 3, 1348 Louvain-La-Neuve, Belgium.

References (selection):

1. C.W.Chang, T.K.Chou, R.S.Liu, S.J.Wang, W.J.Lin, C.H.Chen, H.E.Wang, Applied Radiation and Isotopes, 65 (2007), 682.
2. A.Schildan, M.Patt, O.Sabri, Applied Radiation and Isotopes 65, (2007), 1244.