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## Fully automated synthesis of apoptosis probe PET-<sup>18</sup>F-ML-10 with a multipurpose chemistry platform

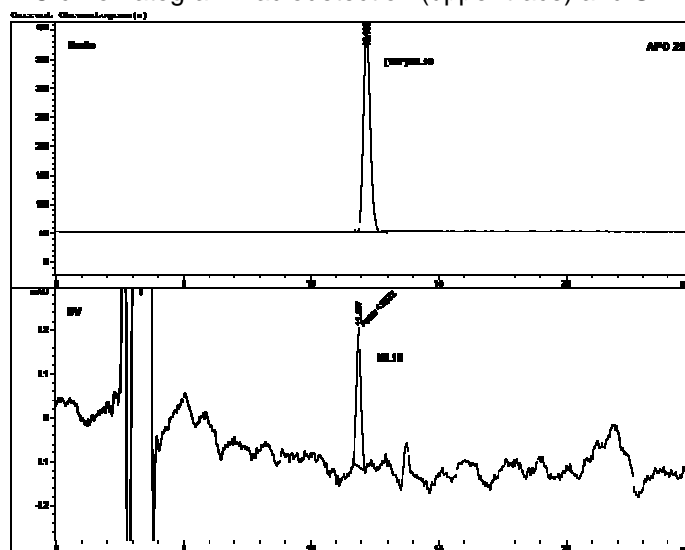
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**Objectives:** Real-time imaging of the apoptosis is of paramount importance in the assessment of tumor response to treatment improving personalized patient care. The apoptotic process is selectively tracked at its early stage by <sup>18</sup>F-ML-10 ( $\alpha$ -methyl <sup>18</sup>F-alkyl-dicarboxylic acid). In this work, a fully automated and optimized method for the two-step synthesis and purification of <sup>18</sup>F-ML-10 will be reported along with its quality control data.

**Methods:** Complete process is supported by Synthera platform, comprising an automatic synthesizer and an HPLC system. The synthesizer employs single-use auto-ejectable cassette.

**Results:** Numerous (n=52) tests (up to 10 Ci) were performed to optimize synthesis parameters and purification conditions in order to enhance radiochemical yield and purity profile. Both fluorination of the tosylated precursor in acetonitrile and subsequent hydrolysis with aqueous HCl were performed at 110°C for approximately 10 min. Buffered reaction mixture was then purified by reversed-phase HPLC using 90 % aqueous phosphate buffer/10 % ethanol as mobile phase. This eluent system prevents the need of time-consuming solvent replacement step. Radiochemical yields are > 40 % after 60 min (total synthesis time including HPLC purification). Final product presents high radiochemical and chemical purity (> 99%) (see HPLC chromatogram: radiodetection (upper trace) and UV 206 nm).



**Conclusions:** In this work, we have described a fully automated and reliable synthesis and purification of the apoptosis PET tracer <sup>18</sup>F-ML-10. This new synthesis procedure combines high and consistent yields, with the benefits of a disposable cassette system, which is in line with GMP guidelines. The final product shows high radiochemical and chemical purity.