

# Radiosynthesis of 1-(2-[<sup>18</sup>F]Fluoroethyl)-L-Tryptophan using a One-pot, Two-step Protocol

Xuyi Yue<sup>1,2</sup>, Rahul M. Nikam<sup>1,2</sup>, Heidi H. Kecskemethy<sup>1,2</sup>, Vinay V. R. Kandula<sup>2</sup>, Stephen J. Falchek<sup>3</sup>, Lauren W. Averill<sup>1,2</sup>, Sigrid A. Langhans<sup>1,4</sup>

<sup>1</sup>Diagnostic & Research PET/MRI Center, Nemours/Alfred I. duPont Hospital for Children <sup>2</sup>Department of Radiology, Nemours/Alfred I. duPont Hospital for Children <sup>3</sup>Department of Neurology, Nemours/Alfred I. duPont Hospital for Children <sup>4</sup>Department of Biomedical Research, Nemours/Alfred I. duPont Hospital for Children

## Corresponding Author

Xuyi Yue

xuyi.yue@nemours.org

## Citation

Yue, X., Nikam, R.M., Kecskemethy, H.H., Kandula, V.V.R., Falchek, S.J., Averill, L.W., Langhans, S.A. Radiosynthesis of 1-(2-[<sup>18</sup>F]Fluoroethyl)-L-Tryptophan using a One-pot, Two-step Protocol. *J. Vis. Exp.* (175), e63025, doi:10.3791/63025 (2021).

## Date Published

September 21, 2021

## DOI

10.3791/63025

## URL

jove.com/video/63025

## Materials

Name	Company	Catalog Number	Comments
[ <sup>18</sup> F]Fluoride in [ <sup>18</sup> O]H <sub>2</sub> O	PETNET Solutions Inc.	N/A	
4,7,13,16,21,24-hexaoxa-1,10-diazabicyclo[8.8.8]hexacosane	ACROS	291950010	Kryptofix 222 or K222, 98%
Acetic acid	ACROS	222142500	99.8%
Acetonitrile	Sigma-Aldrich	271004	anhydrous, 99.8%
Agilent 1260 HPLC system	Agilent Technologies	Agilent 1260	Agilent 1260 series
Analytical chiral HPLC column	Sigma-Aldrich	12024AST	Astec CHIROBIOTIC T, 25 cm × 4.6 mm
Carbon dioxide, 60 LBS	Airgas	REFR744R200S	99.99%
D-FETrp standard reference	Affinity Research Chemicals Inc	N/A	Custom synthesis
Empty sterile vial	Jubilant HollisterStier	7515	20 mm closure, 10 mL
Ethanol	Decon Labs	2716	200 proof, USP grade. ≥99.9%
Fisherbrand 13 mm Syringe Filter, 0.22 μm, PVDF, sterile	Fisher Scientific	09-720-3	
Hydrochloric acid	Sigma-Aldrich	30721	≥37%
Isopropanol	Decon Labs	8316	70%, sterile
L-[ <sup>18</sup> F]FETrp radiolabeling precursor	Affinity Research Chemicals Inc	N/A	Custom synthesis
L-FETrp standard reference	Affinity Research Chemicals Inc	N/A	Custom synthesis
Light C8 cartridge	Waters	WAT036770	Sep-Pak C8 plus light cartridge
Needle, 20 G x 1	Becton-Dickinson & Co.	305175	
Needle, 20 G x 1 ½	Becton-Dickinson & Co.	305176	
Needle, 21 G x 2	Becton-Dickinson & Co.	305129	
Neutral aluminum oxide	Waters	WAT023561	Sep-Pak alumina N plus light
Nylon membrane (0.20 μm )	MilliPore	GNWP04700	47 mm
Pall Acrodisc 25 mm syringe sterile filter	Pall Corporation	4907	

PETCHEM radiochemistry synthesis system	PETCHEM Solutions Inc. Pinckney, MI	N/A	Radiosynthesizer
pH strips 2.0 - 9.0	EMD Millipore	1.09584.0001	
Potassium carbonate	Sigma-Aldrich	367877	99.995%
Quaternary methylammonium light cartridge	Waters	186004051	Sep-Pak QMA light
Semi-preparative C18 HPLC column	Phenomenex	00D-4253-N0	100 × 10 mm
Semi-preparative chiral HPLC column	Sigma-Aldrich	12034AST	Astec CHIROBIOTIC T, 25 cm × 10 mm
Sodium chloride injection 23.4%	APP Pharmaceutical, LLC	18730	USP grade
Sodium chloride injection 0.9%	Hospira	NDC 0409-4888-10	USP grade
Sodium hydroxide	Honeywell	306576	99.99%
Spinal needle, 20 G x 3 ½	Becton-Dickinson & Co.	405182	
Sterile alcohol prep pads	BioMed Resource Inc.	PC661	
Sterile empty vials, 2 mL	Hollister Stier	7505ZA	13 mm closure
Sterile empty vials, 30 mL	Jubilant HollisterStier	7520ZA	20 mm closure
Syringe PP/PE, 3 mL, Luer Lock	Air-Tite	4020-X00V0	
Syringe PP/PE, 5 mL, Luer Lock	Becton-Dickinson & Co.	309646	
Syringe, PP/PE, 10 mL, NORM-JECT	Air-Tite	4100-000V0	
Syringe, 1 mL, Luer Slip	Becton-Dickinson & Co.	309659	
Syringe, 3 mL, Luer-Lock	Becton-Dickinson & Co.	309657	
Ultra high purity argon	Airgas	AR UHP300	99.999%
Ultrapure water	MilliporeSigma	ZRQSV300	Direct-Q 3 tap to pure and ultrapure water purification system