

A conjugate of pentamethine cyanine and ^{18}F as a positron emission tomography/near-infrared fluorescence probe for multimodality tumor imaging

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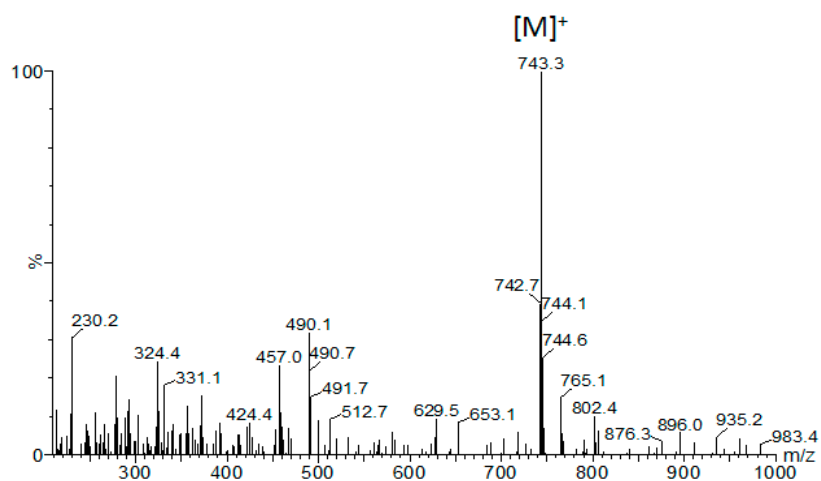


Figure S1. The mass spectrum of Cy5. Calculated for $[\text{M}]^+ = (\text{C}_{37}\text{H}_{47}\text{N}_2\text{O}_{10}\text{S}_2)^+ = 743.3$ m/z, Observed $[\text{M}]^+ = 743.3$ m/z.

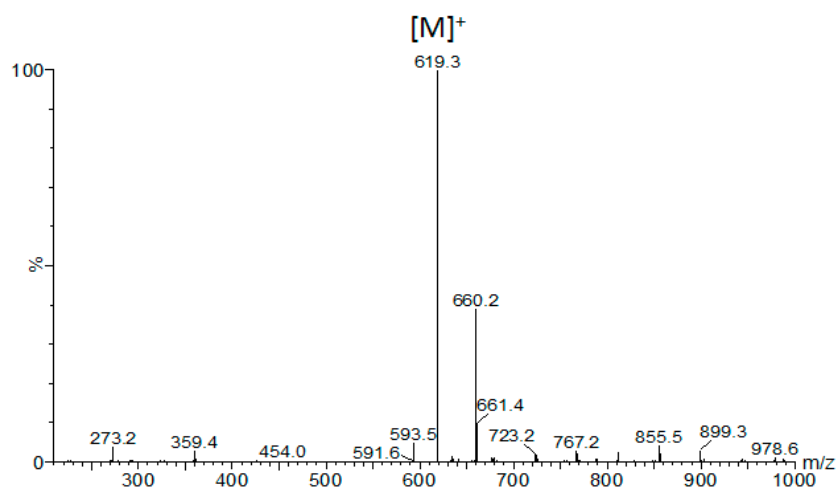


Figure S2. The mass spectrum of boronate. Calculated for $[\text{M}+\text{H}]^+ (\text{C}_{37}\text{H}_{31}\text{BF}_3\text{N}_2\text{O}_3)^+ = 619.2$, Observed $[\text{M}]^+ = 619.3$ m/z.

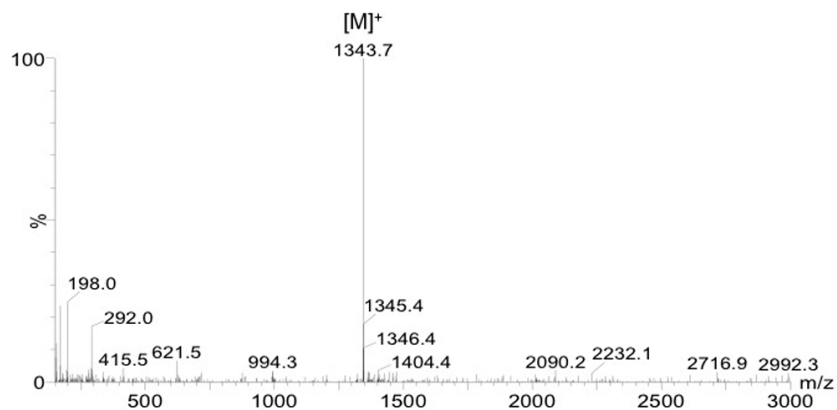


Figure S3. The mass spectrum of Cy5-B. Calculated for $[M]^+ = (C_74H_{75}BF_3N_4O_{12}S_2)^+ = 1343.5$ *m/z*. Observed $[M]^+ = 1343.7$ *m/z*.

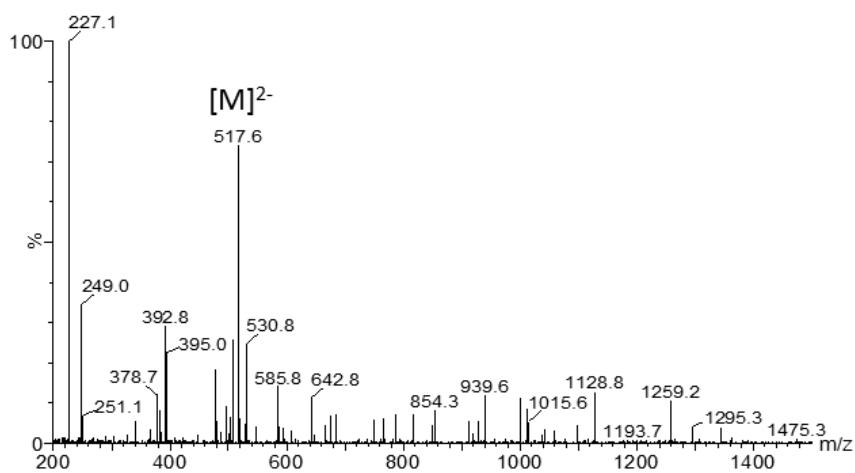


Figure S4. The mass spectrum of Cy5-BF₃. Calculated for $[M]^+ = (C_{48}H_{55}BF_6N_4O_{10}S_2)^+ = 1034.3$ *m/z*, $[M]^{2-} = 517.2$ *m/z*, Observed $[M]^{2-} = 517.6$ *m/z*.

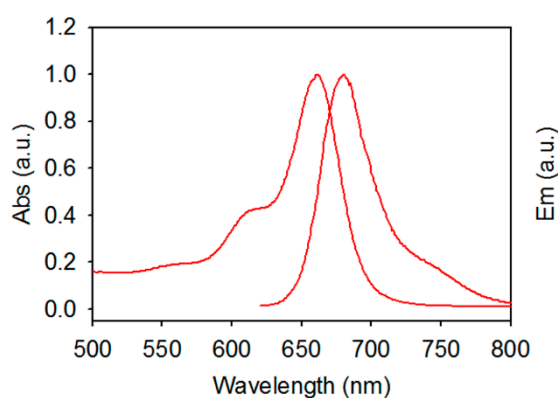


Figure S5. The absorption spectrum and emission spectrum of Cy5 in DMSO (Ex = 600 nm, Em = 680 nm).

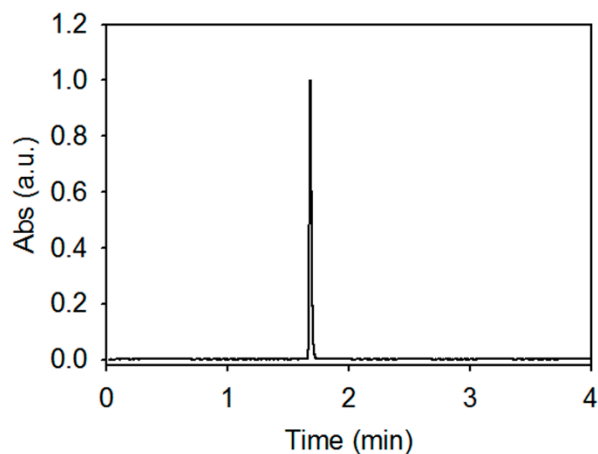


Figure S6. The HPLC profile of Cy5-B monitored at 650 nm wavelength (Reverse phase HPLC were performed on a Waters Acquity H class HPLC/ SQD2 mass spectrometer and a Phenomenex Kinetex 1.7 μm C18 100 \AA , 50 cm \times 2.1 mm I.D. column (00B-4475-AN), with a 1.5 min, a10-90% H₂O:acetonitrile (ACN) (0.05% TFA) gradient and a flow rate of 0.6 mL/min.

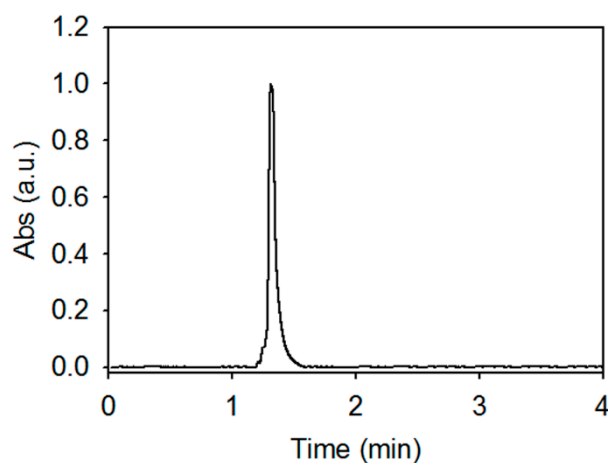


Figure S7. The HPLC profile of 19F-Cy5-BF₃ monitored at 650 nm wavelength (Reverse phase HPLC were performed on a Waters Acquity H class HPLC/ SQD2 mass spectrometer and a Phenomenex Kinetex 1.7 μm C18 100 \AA , 50 cm \times 2.1 mm I.D. column (00B-4475-AN), with a 1.5 min, a10-90% H₂O:acetonitrile (ACN) (0.05% TFA) gradient and a flow rate of 0.6 mL/min.

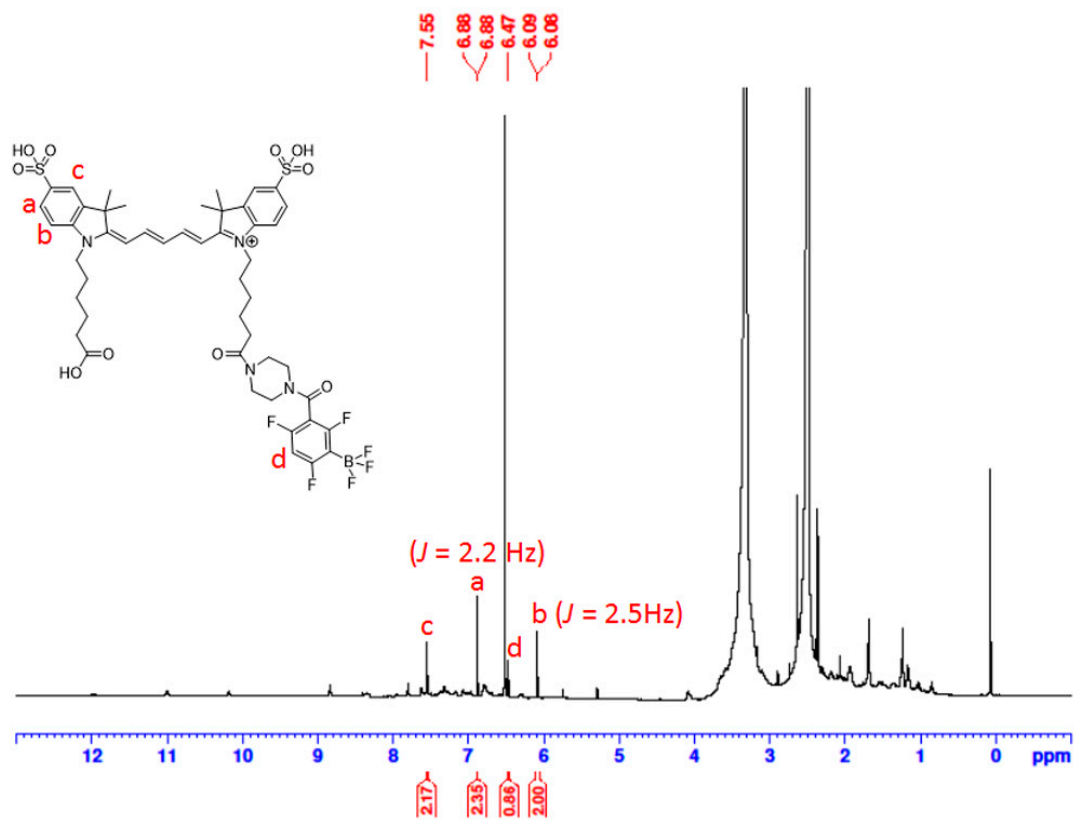


Figure S8. ¹H NMR (500 MHz, d₆-DMSO, 21 °C, TMS) for Cy5-BF₃ (F-19).

Procedure for preparing of ^{18}F -ion water

One will need a glass v-vial (A Thermo Scientific Reacti-Vial #13223 is recommended), 40 psi nitrogen (from a low-pressure nitrogen cylinder), and a 1.2 M HF solution. We recommend working with low volumes of HF (< 200 μL).

In a typical labeling, a 700 μL volume of [^{18}F]-fluoride-ion-containing water produced from a 19.2 MeV bombardment of [^{18}O]-water is flushed from a cyclotron target into a Teflon septa-sealed 5.0mL glass v-vial (Thermo Scientific Reacti-Vial #13223). The vial is transferred to a 100 $^{\circ}\text{C}$ heat block and is flushed with 40 psi N_2 gas through an 18 G inlet. N_2 flow is vented through 16 G tubing and bubbled through a 1 M solution of NaOH to prevent radioactive volatilization. In 15 to 22 min, the solution of [^{18}F]-fluoride is concentrated to a ~20–30 μL volume. It is important not to dry the [^{18}F]-fluoride completely to obtain maximum [^{18}F]-fluoride recovery.

A 10 μL volume containing ~ 100 mCi of ^{18}F -ion is added to 10 μL of a 1.2 M HF solution to give a 20 μL HF solution (0.6 M in water) containing 100 mCi of ^{18}F -ion.

^{18}F -ion water Reaction with Cy5-B

The prepared ^{18}F -ion water solution is incubated with equivolume quantities of Cy5-B to generate the ^{18}F -labeled fluorescent dye. A 1 h incubation at 50 $^{\circ}\text{C}$ is more than sufficient for complete Cy5-B conversion. This time is unoptimized. In the future, this synthesis can be made to proceed more rapidly using higher temperatures and/or a microwave reactor.