Supplementary Information (SI) for RSC Chemical Biology.

Supporting Information

for

Tuning the Efficiency of Molecular Probes via Quinone Methide-based In Situ Labeling

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1. Materials and Methods

All required chemicals were procured from commercial providers and were used without further purification unless otherwise noted. High-performance liquid chromatography (HPLC) purification was performed on a Dionex Ultimate 3000 HPLC System (Thermo Scientific) equipped with HPG BX gradient pump and an in-line diode array UV-Vis detector. The preparative reversed-phase column used was a Luna® LC column (5 µm C18(2) 100Å, 250 x 21.2 mm, Phenomenex, Part No. 00G-4252-P0-AX). Liquid chromatography-Mass Spectrometry (LC-MS) analysis was performed on a Vanquish HPLC System (Thermo Scientific) equipped with VF gradient binary Pump and an in-line diode array UV-Vis detector coupled to an ISQ EM Mass Spectrometer System (Thermo Scientific). The analytical column used was an Accucore^{TM} C18 HPLC column (50 mm x 4.6 mm, particle size 2.6 µm, Thermo Scientific, Part No. 17126-054630). On the Dionex Ultimate 3000 HPLC System, acetonitrile/water gradient mobile phase containing 0.1% trifluoroacetic acid, whereas on the Vanquish HPLC System, methanol/water gradient mobile phase containing 0.1% formic acid instead. High resolution mass was recorded on the Thermo Fisher Q-Exactive Focus Mass Spectrometer. Deuterated solvents were purchased from Sigma-Aldrich, Merck Millipore, and Acros Organics. NMR spectra were recorded on Bruker instruments (500 MHz and 600 MHz for ^{1}H NMR; 126 MHz, 151 MHz, and 201 MHz for ^{13}C NMR) and internally referenced to the residual solvent signals (^{1}H: δ 7.26, ^{13}C: δ 77.16 for $CDCl_3$; ^{1}H: δ 3.31, ^{13}C: δ 49.0 for CD_3OD; ^{1}H: δ 2.50, ^{13}C: δ 39.52 for DMSO-*d6*). NMR chemical shifts (δ) and the coupling constants (J) for ^{1}H and ^{13}C NMR are reported in parts per million (ppm) and in Hertz, respectively. The following conventions are used for multiplicities: s, singlet; d, doublet; t, triplet; m, multiplet; dd, doublet of doublet. High resolution mass spectrometry was recorded on the Thermo Fisher Q-Exactive Focus Mass Spectrometer.

Calibration of Probe Stocks

Probe stock solutions **BG-FITC-1F**, **BG-FITC-OCONHEt**, **BG-FITC-F-1F**, **BG-FITC-OMe-1F**, or **BG-FITC-Me-1F** were prepared in DMSO and stored at -20°C. A solution of 20 mM of fluorescein isothiocyanate isomer I (FITC, 0633-500MG, Amresco®) in DMSO was prepared. Then, serial dilutions of fluorescein isothiocyanate isomer I (10, 5, 2.5, 1.25, 0.625, 0.3125 µM) in PBS (pH 7.4, 0.1% DMSO) were transferred to a 96-well plate in triplicate (100 µL per well). To the same 96-well plate, probes in PBS (0.1% DMSO) were added in triplicate (100 µL per well). The fluorescence emission intensity was measured at 530 nm (Excitation: 485 nm) using a BioTek Synergy H1 plate reader. A linear regression model of fluorescence versus concentration of fluorescein isothiocyanate isomer I in PBS was plotted to extrapolate the approximate probe stock solution concentrations.

Stability of Probes in Aqueous Solution

Solutions of probes were prepared in a total volume of 100 µL of serum-free RPMI 1640 without phenol red (catalog no. 11835030, Gibco^{TM}) containing 1% Penicillin-Streptomycin (P-S) in an Eppendorf tube (1.5 mL) to give a final probe concentration of 50 µM. The solutions contained in an Eppendorf tube were warmed-up to 37°C using a GeneMate digital dry bath (Benchmark scientific) for the 1-, 4-, 8-,14-, or 24-hours. After which, the solutions were injected immediately unto LC-MS for analysis of degradation (Method: 0-20 min, 2-100% MeOH/H_2O with 0.1% Formic Acid). The area under the curve (AUC) of the probe peak compared to all other peaks present (as a percentage) from HPLC traces (440 nm) was obtained. The AUC (%) was normalized to the probe trace in RPMI 1640 at room temperature (RT).

SDS-PAGE Experiments

To phosphate-buffered saline (PBS, 1X, pH 7.4) was added: 5 µL of BSA (10 µg/µL in PBS, 50 µg; A6003-5G, Sigma Aldrich), 5 µL of β-Galactosidase (β-Gal) from *Escherichia coli* (4 µg/µL or 1 unit/µL in aqueous glycerol suspension, 20 µg; G4155-1KU, Millipore Sigma), and 5 µL of **BG-FITC-1F**, **BG-FITC-OCONHEt**, **BG-FITC-F-1F**, **BG-FITC-OMe-1F**, or **BG-FITC-Me-1F** (50 µM in DMSO). The final concentrations of probes were 5 µM with 0.4 µg/µL of β-Gal and 1 µg/µL of BSA in a total volume of 50 µL. To assess non-QM-mediated labeling of BSA, reaction solutions contained the 5 µM probe and 50 µg of BSA only. The reactions contained in Eppendorf tubes (1.5 mL) were incubated for 4-hours at 37°C using a GeneMate digital dry bath (Benchmark scientific). After 4-hours, 10 µL of reducing Laemmli SDS sample buffer was added to each sample. The solutions were not heated to denature the proteins and 25 µL of reaction was immediately subjected to sodium dodecyl sulphate-polyacrylamide gel electrophoresis (SDS-PAGE, Bio-Rad Mini-PROTEAN® TGX^{TM} 4-15% Gel) according to manufacturer's protocols for electrophoresis at 90 V for 90 min. Images of both fluorescent (probe channel, FITC) and Coomassie staining of the gel were taken using the Bio Rad ChemiDoc^{TM} MP Imaging System. The fluorescence images were inverted and FITC-labeled BSA were quantified using ImageJ and normalized to the intensity of FITC-labeled BSA produced by **BG-FITC-1F**.

Molecular modeling of Probes with *E. coli* β-Galactosidase

The crystal structure of *Escherichia coli* β-Galactosidase was downloaded from Protein Data Bank (https://www.rcsb.org) for the following modeling and molecular docking study. The crystal structure 1JYX was selected for the following molecular modeling study due its good structural quality. The downloaded structure was first put through a series of preparation procedures: water molecules and ions outside of the binding pocket were removed; only one unit of the tetramer was kept. Then, the protein preparation module incorporated in Schrodinger Maestro was applied to further prepare the protein structure following the preparation wizard workflow. The alternative residue positions were solved; IPT located outside of the binding pocket was removed. Hydrogens were added considering the protonation states of the protein and ligands for a pH of 7 ± 0.5. IPT located in the binding pocket was used for grid box generation. The size of the inner grid box was 10 Å x 10 Å x 10 Å, buried in an outer box of 21 Å x 21 Å x 21 Å. OPLS 2005 force field was applied for the grid box generation. The β-galactoside ligands were built in Maestro suite and then prepared using the Ligand Preparation module in Schrodinger Maestro. Molecular docking was then performed to generate docking conformation for each molecule using Glide XP precision. The highest docking score conformations were elected for analysis. Protein-ligand interactions were then visualized, with π-π interaction shown as red dashed lines and hydrogen bonds as green lines. All observed interactions between ligands and residues in the binding pocket are labeled in Figure 3.

Cell Culture

CT26.WT and CT26.CL25 cells were purchased from ATCC. CT26.WT cells and CT26.CL25 cells were maintained in RPMI 1640 with phenol red (Catalog no. 1187593, Gibco^{TM}) supplemented with 10% FBS and 1% Penicillin-Streptomycin (P-S). All cells were incubated in a humidified atmosphere under 5% CO_2 at 37°C.

Flow Cytometry Experiments

CT26.WT and CT26.CL25 cells were seeded in 12-well plates at a density of 0.25 x 10^6 cells/well After adhering overnight in RPMI 1640 medium with phenol red (Catalog no. 1187593, Gibco^{TM}) containing 10% FBS and 1% P-S, the medium was aspirated, washed with PBS, and then cells were incubated with 5 µM of **BG-FITC-1F**, **BG-FITC-OCONHEt**, **BG-FITC-F-1F**, **BG-FITC-OMe-1F**, or **BG-FITC-Me-1F** in serum-free RPMI 1640 medium without phenol red (Catalog no. 11835030, Gibco^{TM}) containing 1% P-S for 4-hours at 37°C. After which, the cells were washed with PBS buffer, digested with 0.5% trypsin-EDTA without phenol red (Catalog no. 15400054, Gibco^{TM}), and collected for centrifugation at 350 rcf for 5 minutes. The resulting cell pellets were resuspended and fixed with 4% paraformaldehyde in PBS buffer and analyzed using a flow cytometer (CytoFLEX, Beckman Coulter, USA).

Fluorescence Cell Imaging Experiments

CT26.WT and CT26.CL25 cells were seeded onto poly-L-lysine coated cover glasses in 12-well plates at a density of 0.15 x 10^6 cells/well. After adhering overnight in RPMI 1640 medium with phenol red (Catalog no. 1187593, Gibco^{TM}) containing 10% FBS and 1% P-S, the medium was aspirated, washed with PBS, and then cells were incubated with 5 µM of **BG-FITC-1F**, **BG-FITC-OCONHEt**, **BG-FITC-F-1F**, **BG-FITC-OMe-1F**, or **BG-FITC-Me-1F** in serum-free RPMI 1640 medium without phenol red (Catalog no. 11835030, Gibco^{TM}) containing 1% P-S for 4-hours at 37°C. After which, the cells were washed with PBS buffer, followed by fixation using 4% paraformaldehyde in PBS for 10 minutes, and another PBS wash. Lastly, the cells were mounted onto tissue slides by ProLong^{TM} Gold Antifade Mountant with DNA Stain DAPI (Catalog no. P36935, Invitrogen). The fluorescence images were acquired using a Nikon Eclipse Ti2 fluorescence microscope (20X objective) with DAPI (blue, λ_{ex} = 375/28 nm, λ_{em} = 460/50 nm) and FITC (green, λ_{ex} = 480/30 nm, λ_{em} = 535/20 nm) filter sets.

X-Gal Staining

CT26.WT and CT26.CL25 cells were seeded onto poly-L-lysine coated cover glasses in 12-well plates at a density of 0.15 x 10^6 cells/well. Cells were stained using a Senescence β-Galactosidase Staining Kit (#9860, Cell Signaling Technologies) according to the manufacturer's instructions and imaged using the Nikon Eclipse Ti2 fluorescence microscope.

2. Supporting Figures

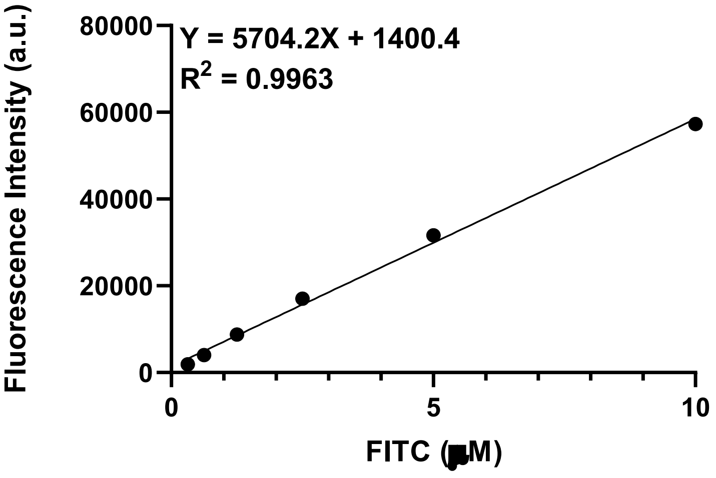


Figure S1. Calibration curve of FITC in PBS. The simple linear regression model was used to extrapolate the concentrations of probe stock solutions in DMSO.

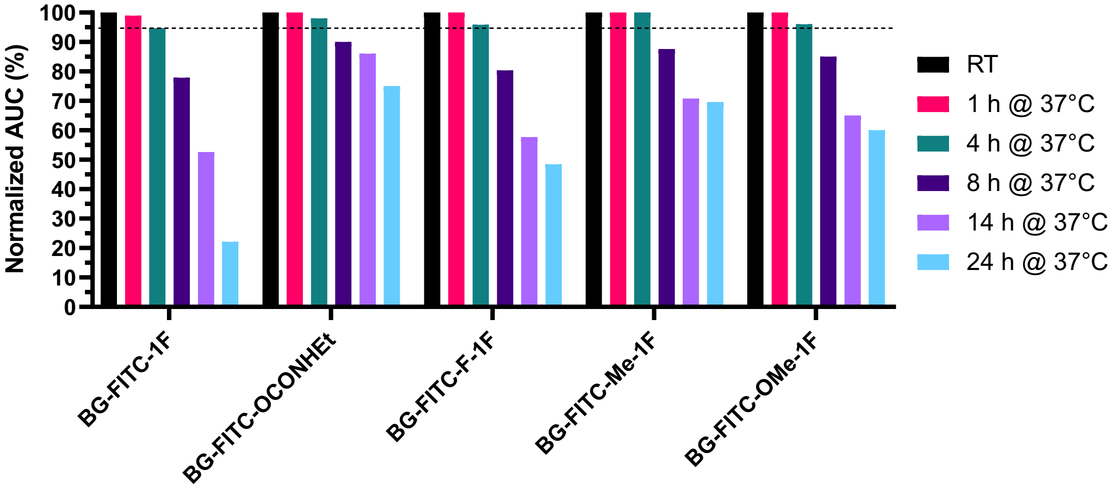


Figure S2. Quantification of stability profiles of probes in serum-free RPMI 1640 medium without phenol red containing 1% P-S as measured by HPLC. Solutions of probes in serum free RPMI 1640 were prepared in a total volume of 100 µL of in an Eppendorf tube (1.5 mL) to give a final probe concentration of 50 µM . The solutions contained in an Eppendorf tube were placed at 37°C using a GeneMate digital dry bath (Benchmark scientific) for the indicated time-period. After which, the solutions were injected unto LC-MS for analysis of degradation (Method: 0-20 min, 2-100% MeOH/H_2O with 0.1% Formic Acid).

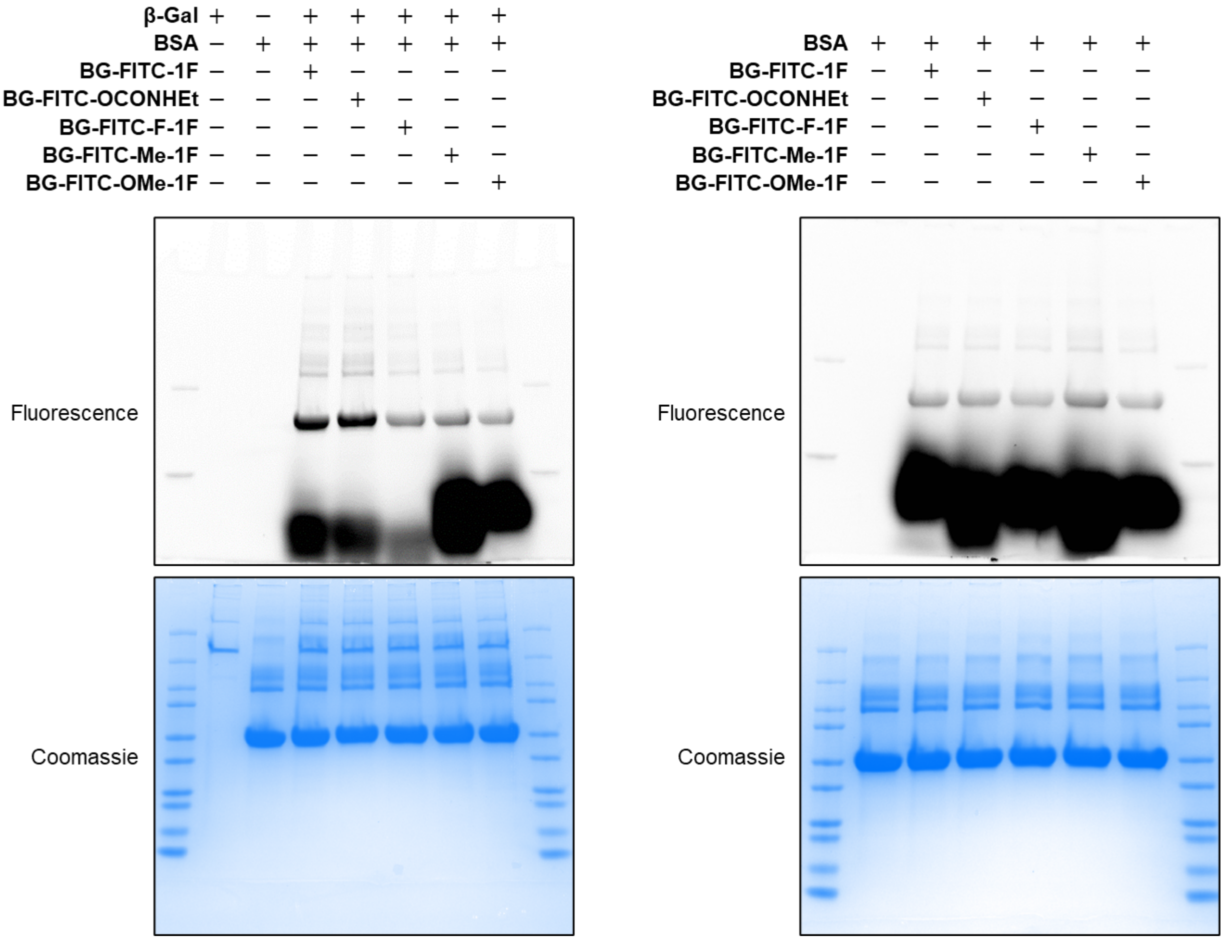
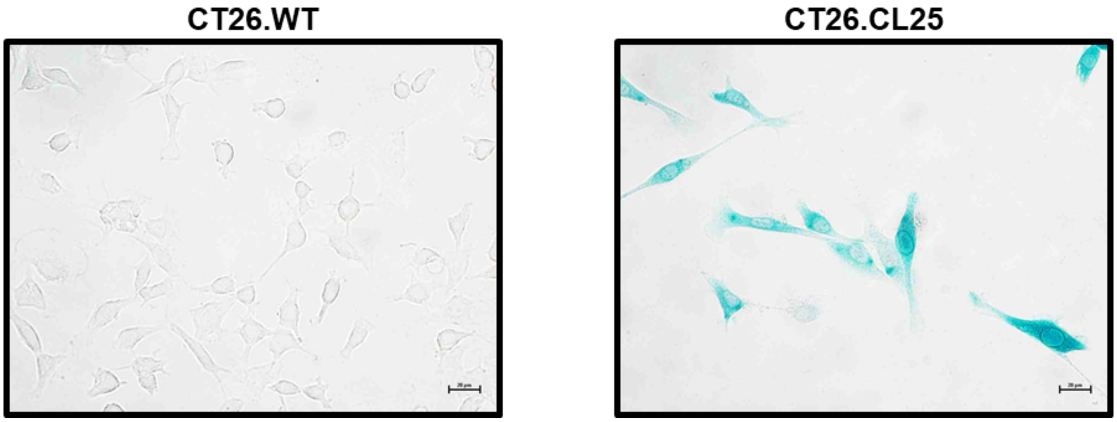


Figure S4. Full length SDS-PAGE gels. SDS-PAGE analysis of FITC-labeled BSA (50 μg) after incubation with probes (5 μM) in the presence (shown to the left) or absence (shown to the right) of β-Gal (20 μg) for 4-hours at 37°C. Images of both inverted fluorescence (top image; FITC channel) and Coomassie blue staining (bottom image; colorimetric channel) of the gel were captured using the Bio-Rad ChemiDoc^{TM} MP Imaging System.



CT26.WT

CT26.CL25

Figure S5. X-Gal staining of CT26.WT and CT26.CL25 cells. Scale bar: 25 μM.

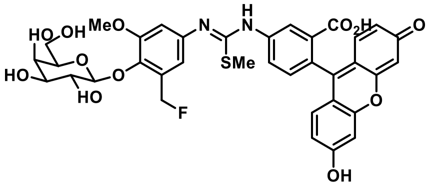
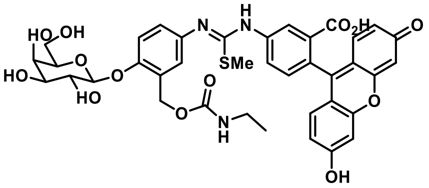
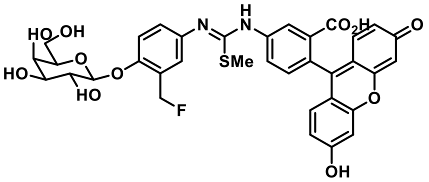
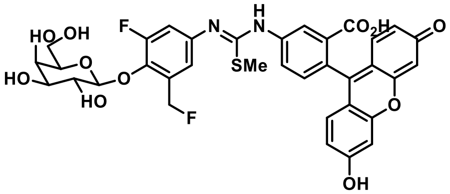
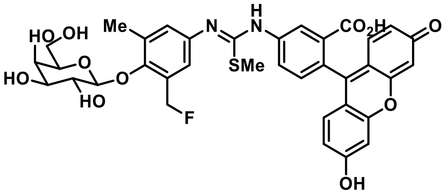
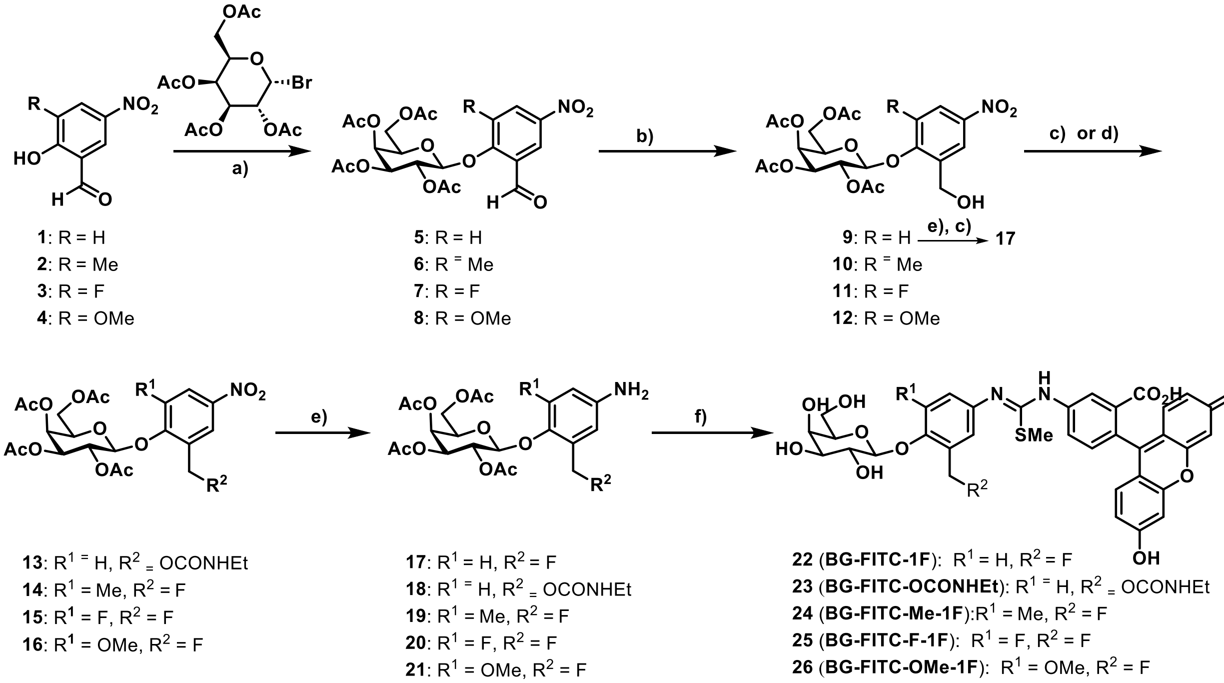
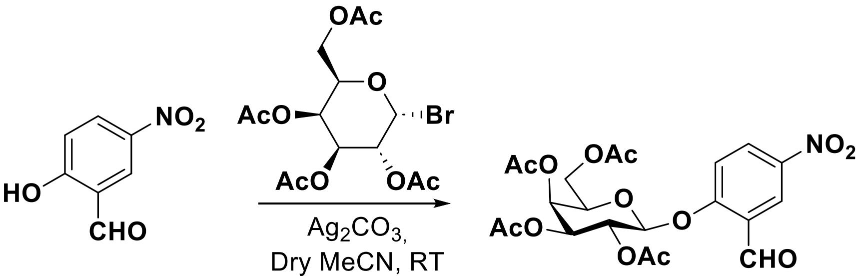
Name	Structure	cLogP[#]
BG-FITC-OMe-1F		1.28
BG-FITC-OCONHEt		1.42
BG-FITC-1F		1.54
BG-FITC-F-1F		1.62
BG-FITC-Me-1F		2.04

Table S1. The cLogP values of each probe. [#]The cLogP values were calculated using ChemDraw Professional version 20.0.0.41.

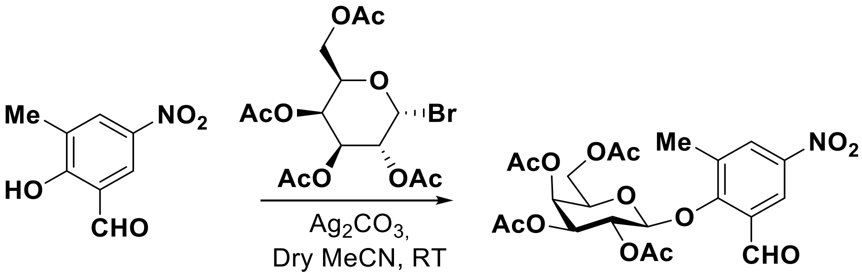
3. Synthesis and Characterization



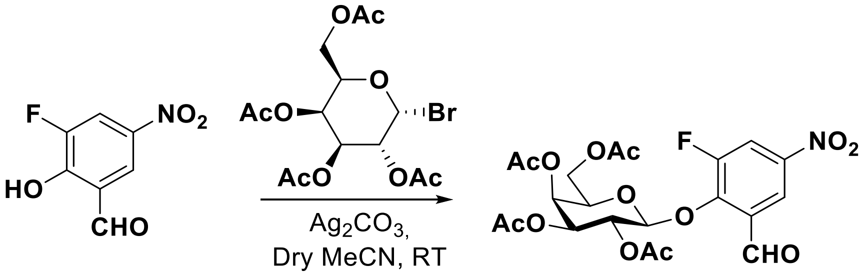
Scheme S1. Synthetic route to probes. Reagents and conditions: a) Ag_2CO_3, MeCN, RT; b) $NaBH_4$ (3 eq), silica gel, DCM, RT; c) DAST (3 eq), DCM, RT; d) Ethyl Isocyanate (20 eq), TEA (2 eq), DCM; e) Pd/C, H_2 (g), EtOAc, RT; f) (i) 25 wt% NaOMe in MeOH, MeOH, RT, (ii) 5-FITC (1 eq) then MeI (10 eq), DMF/TEA (9/1), RT.



Compound 5. To a solution of 2,3,4,6-Tetra-O-acetyl-α-D-galactopyranosyl bromide (618.8 mg, 1.5 mmol, 1 eq) in anhydrous acetonitrile (6 mL), compound **1** (250 mg. 1.50 mmol, 1 eq) and silver carbonate (623.25 mg, 3 mmol, 2 eq) was added. The reaction was allowed to stir at room temperature for 1-hour. Once the reaction was complete as monitored by TLC, the reaction mixture was filtered through Celite® and rinsed with ethyl acetate. The solution was then concentrated in-vacuo and purified by silica gel column (Hexanes/Ethyl acetate, 1:1) to give the product as a white solid (Yield: 470 mg, 63%). The spectral characteristics were analyzed and determined to consistent with literature values.[7]

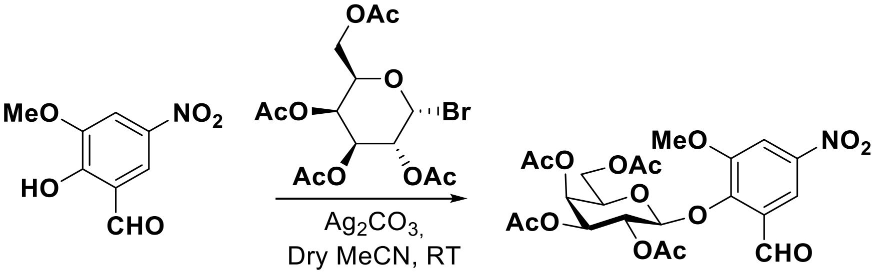


Compound 6. To a solution of 2,3,4,6-Tetra-O-acetyl-α-D-galactopyranosyl bromide (682.6 mg, 1.66 mmol, 1 eq) in anhydrous acetonitrile (6 mL), compound **2** (300 mg. 1.66 mmol, 1 eq.) and silver carbonate (457.7 mg, 1.66 mmol, 1 eq.) was added. The reaction was allowed to stir at room temperature for 4 hours. Once the reaction was complete as monitored by TLC, the reaction mixture was filtered through Celite® and rinsed with ethyl acetate. The solution was then concentrated in-vacuo and purified by silica gel column (Hexanes/Ethyl acetate, 1:1) to give the product as white solid (Yield: 727 mg, 86%). ^{1}H NMR (600 MHz, CDCl$_3$) δ 10.32 (s, 1H, -CHO), 8.50 (d, *J* = 2.9 Hz, 1H, H-4'), 8.30 (dd, *J* = 2.8, 0.9 Hz, 1H, H-6'), 5.57 (dd, *J* = 10.5, 8.0 Hz, 1H, H-2), 5.39 (dd, *J* = 3.5, 1.3 Hz, 1H, H-4), 5.09 (dd, *J* = 10.5, 3.4 Hz, 1H, H-3), 4.82 (d, *J* = 8.0 Hz, 1H, H-1), 4.03 (dd, *J* = 6.6, 1.8 Hz, 2H, H-6), 3.83 (td, *J* = 6.6, 1.2 Hz, 1H, H-5), 2.43 (s, 3H, Me-), 2.20 (s, 3H, CH3COO-), 2.16 (s, 3H, CH3COO-), 2.00 (s, 3H, CH3COO-), 1.92 (s, 3H, CH3COO-).^{13}C NMR (151 MHz, CDCl$_3$) δ 188.41 (-CHO), 170.15 (CH3COO-), 170.05 (CH3COO-), 169.88 (CH3COO-), 169.17 (CH3COO-), 159.81 (C-5'), 145.06 (C-1'), 134.63 (C-3'), 131.54 (C-4'), 130.78 (C-2'), 121.14 (C-6'), 101.68 (C-1), 71.36 (C-6), 70.51 (C-3), 68.80 (C-2), 66.67 (C-4), 60.73 (C-5), 20.68 (CH3COO-), 20.55 (CH3COO-), 20.40 (CH3COO-), 20.36 (CH3COO-), 16.18 (Me). HRMS (ESI) m/z calculated for $C_{22}H_{25}NO_{13}$ (M+Na)$^+$ 534.1218, found 534.1211.

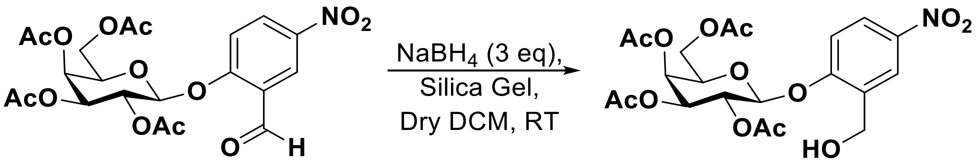


Compound 7. To a solution of 2,3,4,6-Tetra-O-acetyl-α-D-galactopyranosyl bromide (610.2 mg, 1.48 mmol, 1 eq.) in anhydrous acetonitrile (6 mL), compound **3** (274.8 mg. 1.48 mmol, 1 eq. and silver carbonate (409.2 mg, 1.48 mmol, 1 eq.) was added. The reaction was allowed to stir at room temperature for 4 hours. Once the reaction was complete as monitored by TLC, the reaction mixture was filtered through Celite® and rinsed with ethyl acetate. The solution was then concentrated in-vacuo and purified by silica gel column (Hexanes/Ethyl acetate, 1:1) to give the product as a white solid (Yield: 633 mg, 83%). ^{1}H NMR (600 MHz, CDCl$_3$) δ 10.37 (s, 1H, -CHO), 8.53 (dd, *J* = 2.8, 1.3 Hz, 1H, H-6'), 8.24 (dd, *J* = 10.2, 2.7 Hz, 1H, H-4'), 5.53 (ddd, *J* = 10.4, 7.9, 1.0 Hz, 1H,

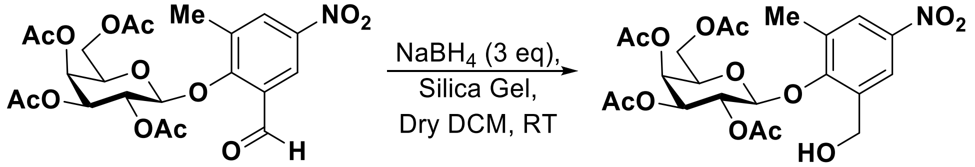
H-2), 5.43 (dd, *J* = 3.4, 1.2 Hz, 1H, H-4), 5.18 (dd, *J* = 7.9, 0.8 Hz, 1H, H-1), 5.13 (dd, *J* = 10.5, 3.4 Hz, 1H, H-3), 4.08 (dd, *J* = 6.6, 1.4 Hz, 2H, H-6), 3.96 (td, *J* = 6.6, 1.3 Hz, 1H, H-5), 2.20 (s, 3H, CH3COO-), 2.14 (s, 3H, CH3COO-), 2.02 (s, 3H, CH3COO-), 1.97 (s, 3H, CH3COO-). ^{13}C NMR (151 MHz, $CDCl_3$) δ 186.92 (d, J = 2.6 Hz, -CHO), 170.27 (CH3COO-), 170.11 (CH3COO-), 169.98 (CH3COO-), 169.63 (CH3COO-), 154.22 (d, *J* = 255.2 Hz, C-3'), 150.13 (d, *J* = 11.1 Hz, C-5'), 144.49 (d, *J* = 7.4 Hz, C-2'), 131.62 (C-1'), 118.83 (d, *J* = 3.3 Hz, C-6'), 117.28 (d, *J* = 24.4 Hz, C-4'), 101.96 (d, *J* = 4.4 Hz, C-1), 71.82 (C-6), 70.32 (C-3), 68.63 (C-2), 66.63 (C-4), 60.90 (C-5), 20.71 (CH3COO-), 20.67 (CH3COO-), 20.55 (CH3COO-), 20.54 (CH3COO-). HRMS (ESI) m/z calculated for $C_{21}H_{22}FNO_{13}$ $(M+Na)^+$ 538.0967, found 538.0960.



Compound 8. To a solution of 2,3,4,6-Tetra-O-acetyl-α-D-galactopyranosyl bromide (522.0 mg, 1.27 mmol, 1 eq.) in anhydrous acetonitrile (5 mL), compound **4** (250.0 mg. 1.27 mmol, 1 eq.) and silver carbonate (700.4 mg, 2.54 mmol, 1 eq.) was added. The reaction was allowed to stir at room temperature for 4 hours. Once the reaction was complete as monitored by TLC, the reaction mixture was filtered through Celite® and rinsed with ethyl acetate. The solution was then concentrated in-vacuo and purified by silica gel column (Hexanes/Ethyl acetate, 1:1) to give the product as a white solid (Yield: 342 mg, 51%). ^{1}H NMR (600 MHz, $CDCl_3$) δ 10.34 (s, 1H, -CHO), 8.23 (d, *J* = 2.6 Hz, 1H, H-6'), 7.94 (d, *J* = 2.7 Hz, 1H, H-4', 5.45 (dd, *J* = 10.5, 7.9 Hz, 1H, H-2), 5.36 (dd, *J* = 3.5, 1.2 Hz, 1H, H-4), 5.13 (d, *J* = 7.9 Hz, 1H, H-1), 5.10 (dd, *J* = 10.5, 3.4 Hz, 1H, H-3), 4.03 – 3.97 (m, 5H, MeO-/H-6), 3.85 (td, *J* = 6.7, 1.3 Hz, 1H, H-5), 2.15 (s, 3H, CH3COO-), 2.10 (s, 3H, CH3COO-), 1.97 (s, 3H, CH3COO-), 1.89 (s, 3H, CH3COO-). ^{13}C NMR (151 MHz, $CDCl_3$) δ 188.59 (-CHO), 170.33 (CH3COO-), 170.24 (CH3COO-), 170.15 (CH3COO-), 169.65 (CH3COO-), 152.94 (C-2'), 151.45 (C-3'), 145.32 (C-5'), 131.41 (C-1'), 114.61 (C-6'), 111.48 (C-4'), 101.06 (C-1), 71.33 (C-5), 70.44 (C-3), 68.85 (C-2), 66.71 (C-4), 60.83 (C-6), 56.92 (MeO-), 20.86 (CH3COO-), 20.74 (CH3COO-), 20.63 (CH3COO-), 20.59 (CH3COO-). HRMS (ESI) m/z calculated for $C_{22}H_{25}NO_{14}$ $(M+Na)^+$ 550.1167, found 550.116.

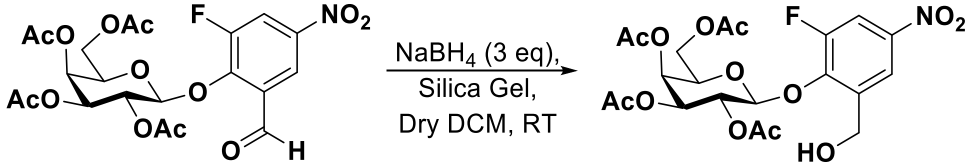


Compound 9. The procedure was adapted from the literature.[4] To a solution of the compound **5** (454.8 mg, 0.919 mmol, 1 eq.) in anhydrous dichloromethane (5 mL), sodium borohydride (105.0 mg, 2.76 mmol, 3 eq.) was added, followed by silica gel (1 g) to act as an acid-catalyst. The reaction was stirred at room temperature. Once the reaction was complete as monitored by TLC, the reaction mixture was quenched with H_2O, and extracted with dichloromethane (3x). The organic layer was dried over Na_2SO_4, concentrated in-vacuo, and purified by silica gel column (Hexanes/Ethyl acetate, 1:1) to give the product as a white solid (Yield: 372 mg, 81%). ^1H NMR (600 MHz, $CDCl_3$) δ 8.24 (d, *J* = 2.7 Hz, 1H, H-6'), 8.10 (dd, *J* = 9.0, 2.8 Hz, 1H, H-4'), 7.05 (d, *J* = 9.1 Hz, 1H, H-3'), 5.50 (dd, *J* = 10.5, 7.8 Hz, 1H, H-2), 5.47 (d, *J* = 3.4 Hz, 1H, H-4), 5.19 (d, *J* = 7.9 Hz, 1H, H-1), 5.16 (dd, *J* = 10.5, 3.5 Hz, 1H, H-3), 4.63 (s, 2H, H-7'), 4.24 – 4.11 (m, 3H, H-5/H-6), 2.17 (s, 3H, CH3COO-), 2.08 (s, 3H, CH3COO-), 2.04 (s, 3H, CH3COO-), 2.00 (s, 3H, CH3COO-). ^{13}C NMR (151 MHz, $CDCl_3$) δ 170.43 (CH3COO-), 170.21 (CH3COO-), 170.15 (CH3COO-), 170.08 (CH3COO-), 158.49 (C-2'), 143.08 (C-5'), 131.99 (C-1'), 124.54 (C-6'), 124.18 (C-4'), 113.74 (C-3'), 98.6 (C-1), 71.56 (C-5), 70.34 (C-3), 68.45 (C-2), 66.75 (C-4), 61.41 (C-7'), 59.85 (C-6), 20.81 (CH3COO-), 20.68 (CH3COO-), 20.65 (CH3COO-), 20.57 (CH3COO-). HRMS (ESI) m/z calculated for $C_{21}H_{25}NO_{13}$ $(M+Na)^+$ 522.1218, found 522.1208.

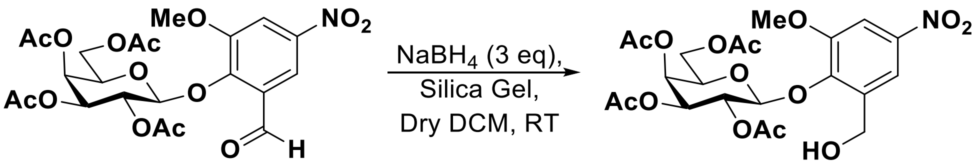


Compound 10. The procedure was adapted from the literature.[4] To a solution of the compound **8** (400.0 mg, 0.782 mmol, 1 eq.) in anhydrous dichloromethane (5 mL), sodium borohydride (88.8 mg, 2.35 mmol, 3 eq.) was added, followed by silica gel (1 g) to act as an acid-catalyst. The reaction was stirred at room temperature. Once the reaction was complete as monitored by TLC, the reaction mixture was quenched with H_2O, and extracted with dichloromethane (3x). The organic layer was dried over Na_2SO_4, concentrated in-vacuo, and purified by silica gel column (Hexanes/Ethyl acetate, 1:1) to give the product as a white solid (Yield: 233 mg, 58%). ^1H NMR (600 MHz, $CDCl_3$) δ 8.22 (d, *J* = 2.9 Hz, 1H, H-4'), 8.03 (d, *J* = 3.0 Hz, 1H, H-6'), 5.54 (dd, *J* = 10.5, 8.0 Hz, 1H, H-2), 5.40 (dd, *J* = 3.5, 1.2 Hz, 1H, H-4), 5.10 (dd, *J* = 10.5, 3.5 Hz, 1H, H-3), 4.94 – 4.86 (m, 2H, H-7'), 4.60 (d, *J* = 13.4 Hz, 1H, H-1), 4.17 (dd, *J* = 11.6, 7.4 Hz, 1H, H-6), 4.09 (dd, *J* = 11.6, 5.4 Hz, 1H, H-6), 3.85 (ddd, *J* = 7.2, 5.6, 1.2 Hz, 1H, H-5), 2.39 (s, 3H, CH3COO-), 2.22 (s, 3H, CH3COO-), 2.15 (s, 3H, CH3COO-), 2.02 (s, 3H), 1.92 (s, 3H). ^{13}C NMR (151 MHz, $CDCl_3$) δ 170.47 (CH3COO-), 170.28 (CH3COO-), 170.12 (CH3COO-), 169.36 (CH3COO-), 156.27 (C-6'), 144.87 (C-4'),

137.55 (C-5’), 132.56 (C-3’), 125.72 (C-1’), 122.35 (C-2’), 101.51 (C-1), 71.51 (C-5), 70.67 (C-3), 69.00 (C-2), 66.95 (C-4), 61.15 (C-6), 59.75 (C-7’), 20.81 (CH3COO-), 20.67 (CH3COO-), 20.53 (CH3COO-), 20.51 (CH3COO-). HRMS (ESI) m/z calculated for $C_{22}H_{27}NO_{13}$ $(M+Na)^+$ 536.1374, found 536.1366.

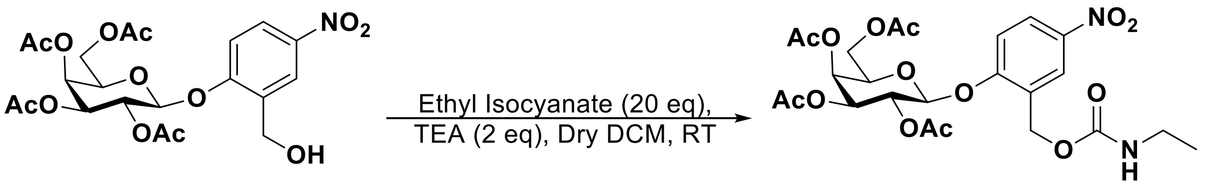


Compound 11. The procedure was adapted from the literature.[4] To a solution of the compound **7** (400.0 mg, 0.776 mmol, 1 eq.) in anhydrous dichloromethane (5 mL), sodium borohydride (88.0 mg, 2.33 mmol, 3 eq.) was added, followed by silica gel (1 g) to act as an acid-catalyst. The reaction was stirred at room temperature. Once the reaction was complete as monitored by TLC, the reaction mixture was quenched with H_2O, and extracted with dichloromethane (3x). The organic layer was dried over Na_2SO_4, concentrated in-vacuo, and purified by silica gel column (Hexanes/Ethyl acetate, 1:1) to give the product as a white solid (Yield: 333 mg, 83%). ^1H NMR (600 MHz, $CDCl_3$) δ 8.19 (d, *J* = 1.5 Hz, 1H, H-6’), 7.97 (dd, *J* = 10.6, 2.7 Hz, 1H, H-4’), 5.48 (ddd, *J* = 10.6, 8.0, 1.1 Hz, 1H, H-2), 5.43 (dd, *J* = 3.6, 1.2 Hz, 1H, H-4), 5.15 – 5.10 (m, 2H, H-3/H-1), 4.90 (d, *J* = 13.6 Hz, 1H, H-7’), 4.61 (d, *J* = 13.6 Hz, 1H, H-7’), 4.17 (dd, *J* = 11.5, 7.4 Hz, 1H, H-6), 4.11 (dd, *J* = 11.6, 5.4 Hz, 1H, H-6), 3.98 – 3.93 (td, 1H, H-5), 2.21 (s, 3H, CH3COO-), 2.13 (s, 3H, CH3COO-), 2.03 (s, 3H, CH3COO-), 1.96 (s, 3H, CH3COO-). ^{13}C NMR (151 MHz, $CDCl_3$) δ 170.53 (CH3COO-), 170.23 (CH3COO-), 170.08 (CH3COO-), 170.04 (CH3COO-), 153.56 (d, *J* = 252.0 Hz, C-3’), 146.21 (d, *J* = 10.4 Hz, C-5’), 144.42 (d, *J* = 8.2 Hz, C-4’), 138.76 (C-1’), 120.10 (d, *J* = 3.0 Hz, C-6’), 112.19 (d, *J* = 24.4 Hz, C-4’), 101.94 (d, *J* = 4.6 Hz, C-1), 71.98 (C-5), 70.40 (C-3), 68.82 (C-2), 66.85 (C-4), 61.33 (C-6), 59.82 (C-7’), 59.80 (C-7’), 20.85 (CH3COO-), 20.76 (CH3COO-), 20.64 (2 x CH3COO-). HRMS (ESI) m/z calculated for $C_{21}H_{24}FNO_{13}$ $(M+Na)^+$ 540.1124, found 540.1116.

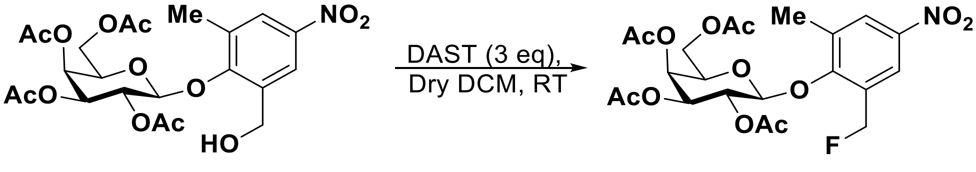


Compound 12. The procedure was adapted from the literature.[4] To a solution of the compound **8** (174.0 mg, 0.33 mmol, 1 eq.) in anhydrous dichloromethane (2 mL), sodium borohydride (37.5 mg, 0.99 mmol, 3 eq.) was added, followed by silica gel (1 g) to act as an acid-catalyst. The reaction was stirred at room temperature. Once the reaction was complete as monitored by TLC, the reaction mixture was quenched with H_2O, and extracted with dichloromethane (3x). The organic layer was dried over Na_2SO_4, concentrated in-vacuo, and purified by silica gel column (Hexanes/Ethyl acetate, 1:1) to give the product as a white solid (Yield: 157 mg, 90%). ^1H NMR (600

MHz, $CDCl_3$) δ 7.85 (d, *J* = 2.6 Hz, 1H, H-6'), 7.64 (d, *J* = 2.7 Hz, 1H, H-4'), 5.38 (dd, *J* = 10.6, 8.0 Hz, 1H, H-2), 5.36 (dd, *J* = 3.7, 1.3 Hz, 1H, H-4), 5.14 (d, *J* = 7.9 Hz, 1H, H-1), 5.10 (dd, *J* = 10.6, 3.5 Hz, 1H, H-3), 4.83 (d, *J* = 13.6 Hz, 1H, H-7'), 4.49 (d, *J* = 13.6 Hz, 1H, H-7'), 4.10 – 4.03 (m, 2H, H-6), 3.92 – 3.86 (m, 4H, MeO-/H-5), 2.16 (s, 3H, CH3COO-), 2.07 (s, 3H , CH3COO-), 1.97 (s, 3H , CH3COO-), 1.88 (s, 3H , CH3COO-). ^{13}C NMR (151 MHz, $CDCl_3$) δ 170.33 (CH3COO-), 170.17 (CH3COO-), 169.97 (CH3COO-), 169.75 (CH3COO-), 151.34 (C-5'), 146.63 (C-2'), 144.57 (C-3'), 137.54 (C-1'), 115.97 (C-6'), 106.37 (C-4'), 100.67 (C-1), 71.16 (C-5), 70.25 (C-3), 68.75 (C-2), 66.82 (C-4), 61.08 (C-6), 59.42 (C-7'), 56.15 (MeO-), 20.61 (CH3COO-), 20.46 (CH3COO-), 20.35 (CH3COO-), 20.31 (CH3COO-). HRMS (ESI) m/z calculated for $C_{22}H_{27}NO_{14}$ $(M+Na)^+$ 552.1324, found 552.1317.

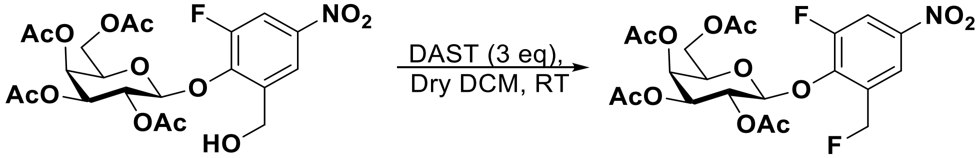


Compound 13. To a solution of compound **9** (150. mg, 0.200 mmol, 1 eq.) in anhydrous DCM (3 mL), triethylamine (55.8 µL, 0.400 mmol, 2 eq.) and ethyl isocyanate (158. µL, 4.00 mmol, 20 eq.) were added. The reaction was stirred at room temperature for 7 hours. Once the reaction was complete as monitored by TLC, the reaction mixture was quenched with MeOH, concentrated in-vacuo, and then purified by silica gel column (Hexanes/Ethyl acetate, 1:1) to give the product as a white solid (Yield: 105 mg, 92%). ^{1}H NMR (600 MHz, $CDCl_3$) δ 8.18 (d, *J* = 2.8 Hz, 1H, H-6'), 8.11 (dd, *J* = 9.0, 2.8 Hz, 1H, H-4'), 7.12 (d, *J* = 9.1 Hz, 1H, H-3'), 5.52 (dd, *J* = 10.5, 7.8 Hz, 1H, H-2), 5.47 (dd, *J* = 3.5, 1.0 Hz, 1H, H-4), 5.24 – 4.94 (m, 5H, H-1/H-3/H-7'/-OCONH-), 4.20 (dd, *J* = 12.9, 8.8 Hz, 1H, H-5), 4.18 – 4.12 (m, 2H, H-6), 3.22 (p, *J* = 7.0 Hz, 2H, H-8'), 2.17 (s, 3H, CH3COO-), 2.09 (s, 3H, CH3COO-), 2.04 (s, 3H, CH3COO-), 1.99 (s, 3H, CH3COO-), 1.14 (t, J = 7.2 Hz, 3H, H-9').^{13}C NMR (151 MHz, $CDCl_3$) δ 170.34 (CH3COO-), 170.17 (CH3COO-), 170.06 (CH3COO-), 169.51 (CH3COO-), 158.13 (C-1'), 155.65 (-OCONH-), 143.18 (C-5'), 128.65 (C-2'), 124.58 (C-4'), 123.52 (C-6'), 114.30 (C-3'), 98.99 (C-1), 71.54 (C-5), 70.44 (C-3), 68.12 (C-2), 66.77 (C-4), 61.44 (C-6), 60.02 (C-7'), 36.03 (C-8'), 20.67 (CH3COO-), 20.65 (CH3COO-), 20.63 (CH3COO-), 20.54 (CH3COO-), 15.17 (C-9'). HRMS (ESI) m/z calculated for $C_{24}H_{30}N_2O_{14}$ $(M+Na)^+$ 593.1589, found 593.1584.

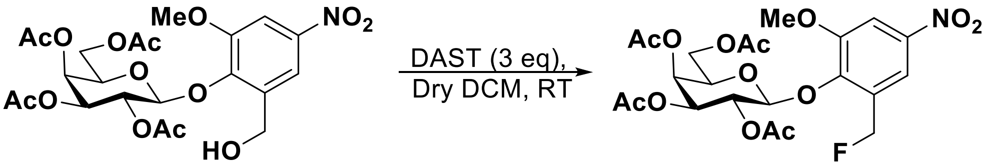


Compound 14. To a solution of compound **10** (100.0 mg, 0.195 mmol, 1 eq.) in anhydrous dichloromethane (3 mL), DAST (77.3 µL, 0.585 mmol, 3 eq.) was added. The reaction was stirred at room temperature for 3 hours. Once the reaction was complete as monitored by TLC, the reaction mixture was quenched with MeOH, concentrated in-

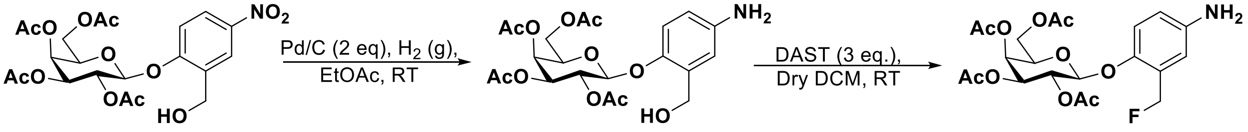
vacuo, and then purified by silica gel column (1:1 Hexanes: Ethyl Acetate) to give the product as a white solid (Yield: 85 mg, 85%).^{1}H NMR (600 MHz, $CDCl_3$) δ 8.17 (d, *J* = 2.8 Hz, 1H, H-6'), 8.07 (d, *J* = 2.8 Hz, 1H, H-4'), 5.61 – 5.44 (m, 3H, H-7'/H-2), 5.39 (dd, *J* = 3.5, 1.2 Hz, 1H, H-4), 5.08 (dd, *J* = 10.5, 3.5 Hz, 1H, H-3), 4.84 (d, *J* = 8.1 Hz, 1H, H-1), 4.09 (d, *J* = 6.7 Hz, 2H, H-6), 3.83 (td, *J* = 6.7, 1.2 Hz, 1H, H-5), 2.38 (s, 3H, Me-), 2.21 (s, 3H, CH3COO-), 2.14 (s, 3H, CH3COO-), 2.01 (s, 3H, CH3COO-), 1.94 (s, 3H, CH3COO-). ^{13}C NMR (151 MHz, $CDCl_3$) δ 170.31 (CH3COO-), 170.23 (CH3COO-), 170.09 (CH3COO-), 169.27 (CH3COO-), 156.06 (d, *J* = 4.8 Hz, C-2'), 145.02 (C-5'), 133.34 (C-3'), 132.95 (*d*, J = 18.3 Hz, C-1'), 126.64 (d, *J* = 1.9 Hz, C-4'), 121.84 (d, *J* = 9.8 Hz, C-6'), 102.19 (C-1), 79.54 (d, *J* = 167.6 Hz, C-7'), 71.33 (C-5), 70.74 (C-3), 69.00 (C-2), 66.80 (C-4), 60.86 (C-6), 20.84 (CH3COO-), 20.74 (CH3COO-), 20.59 (CH3COO-), 20.57 (CH3COO-), 16.85 (-Me). HRMS (ESI) m/z calculated for $C_{22}H_{26}FNO_{12}$ $(M+Na)^+$ 538.1331, found 538.1323.



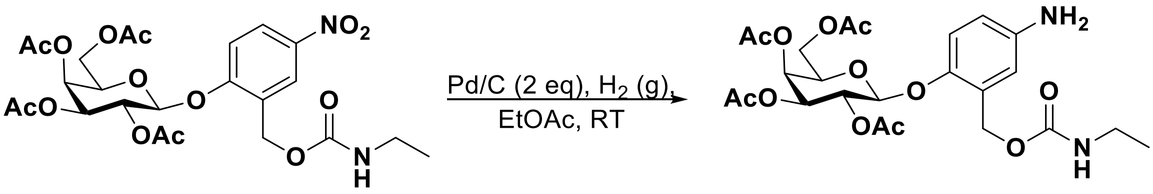
Compound 15. To a solution of compound **11** (200.0 mg, 0.386 mmol, 1 eq.) in anhydrous dichloromethane (3 mL), DAST (153 µL, 1.16 mmol, 3 eq.) was added. The reaction was stirred at room temperature for 3 hours. Once the reaction was complete as monitored by TLC, the reaction mixture was quenched with MeOH, concentrated in-vacuo, and then purified by silica gel column (1:1 Hexanes: Ethyl Acetate) to give the product as a white solid (Yield: 174 mg, 87%). ^{1}H NMR (600 MHz, $CDCl_3$) δ 8.17 – 8.07 (s, 1H, H-6'), 7.98 (dd, *J* = 10.7, 2.7 Hz, 1H, H-4'), 5.52 (d, *J* = 46.8 Hz, 2H, H-7'), 5.45 – 5.41 (dd, *J* = 8.28, 1.85 Hz, 1H, H-2), 5.41 (d, *J* = 3.34 Hz, 1H, H-4), 5.12 (d, *J* = 7.9 Hz, 1H, H-1), 5.09 (dd, *J* = 10.5, 3.5 Hz, 1H, H-3), 4.09 (dd, *J* = 6.6, 1.5 Hz, 2H, H-6), 3.96 – 3.91 (td, 1H, H-5), 2.18 (s, 3H, CH3COO-), 2.09 (s, 3H, CH3COO-), 1.99 (s, 3H, CH3COO-), 1.96 (s, 3H, CH3COO-). ^{13}C NMR (151 MHz, $CDCl_3$) δ 170.27 (CH3COO-), 170.14 (CH3COO-), 169.97 (CH3COO-), 169.59 (CH3COO-), 153.17 (d, *J* = 252.1 Hz, C-3'), 145.28 (dd, *J* = 11.0, 5.2 Hz, C-2'), 144.27 (d, *J* = 8.2 Hz, C-5'), 134.05 (dd, *J* = 19.4, 1.5 Hz, C-1'), 118.52 (dd, *J* = 10.6, 3.0 Hz, C-6'), 112.75 (dd, *J* = 24.5, 1.4 Hz, C-4'), 101.94 (d, *J* = 4.6 Hz, C-1), 78.93 (dd, *J* = 170.4, 2.7 Hz, C-7'), 71.62 (C-5), 70.39 (C-3), 68.66 (C-2), 66.71 (C-4), 60.96 (C-6), 20.66 (CH3COO-), 20.64 (CH3COO-), 20.52 (2 x CH3COO-). HRMS (ESI) m/z calculated for $C_{21}H_{23}F_2NO_{12}$ $(M+Na)^+$ 542.1080, found 542.1070.



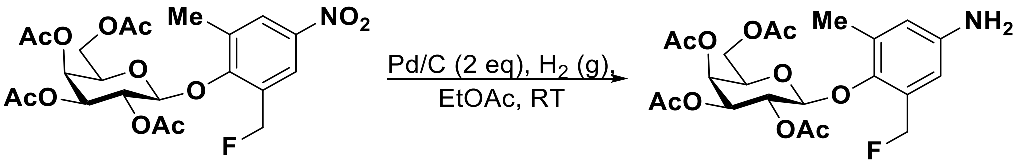
Compound 16. To a solution of compound **12** (300.0 mg, 0.567 mmol, 1 eq.) in anhydrous dichloromethane (3 mL), DAST (225 µL, 1.70 mmol, 3 eq.) was added. The reaction was stirred at room temperature for 3 hours. Once the reaction was complete as monitored by TLC, the reaction mixture was quenched with MeOH, concentrated in-vacuo, and then purified by silica gel column (1:1 Hexanes: Ethyl Acetate) to give the product as a white solid (Yield: 280 mg, 93%). ^{1}H NMR (600 MHz, $CDCl_3$) δ 7.98 (d, *J* = 2.7 Hz, 1H, H-6'), 7.77 (d, *J* = 2.6 Hz, 1H, H-4'), 5.63 – 5.46 (ddd, *J* = 47.4, 19.2, 13.4 12.9 Hz, 2H, H-7'), 5.44 – 5.37 (m, 2H, H-2/H-4), 5.15 – 5.08 (m, 2H, H-1/H-3), 4.11 (d, *J* = 6.7 Hz, 2H, H-6), 3.96 (s, 3H, MeO-), 3.85 (td, *J* = 6.7, 1.3 Hz, 1H, H-5), 2.20 (s, 3H, CH3COO-), 2.11 (s, 3H, CH3COO-), 2.01 (s, 3H, CH3COO-), 1.95 (s, 3H, CH3COO-). ^{13}C NMR (151 MHz, $CDCl_3$) δ 170.37 (CH3COO-), 170.30 (CH3COO-), 170.19 (CH3COO-), 169.67 (CH3COO-), 151.68 (C-2'), 146.02 (d, *J* = 5.6 Hz, C-3'), 145.19 (C-5'), 133.65 (d, *J* = 19.3 Hz, C-1'), 114.90 (d, *J* = 10.9 Hz, C-6'), 107.30 (d, *J* = 1.2 Hz, C-4'), 101.24 (C-1), 79.44 (d, *J* = 168.7 Hz, C-7'), 71.18 (C-5), 70.55 (C-3), 68.93 (C-2), 66.82 (C-4), 60.94 (C-6), 56.55 (MeO-), 20.87 (CH3COO-), 20.77 (CH3COO-), 20.66 (CH3COO-), 20.63 (CH3COO-). HRMS (ESI) m/z calculated for $C_{22}H_{26}FNO_{13}$ $(M+Na)^+$ 554.1280, found 554.1270.



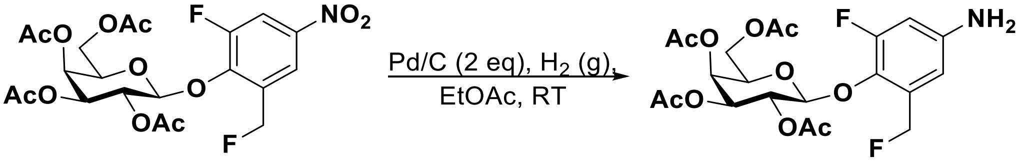
Compound 17. Compound **9** (164.8 mg, 0.33 mmol, 1 eq.) was placed in an argon-flushed 100 mL round-bottom flask and dissolved in ethyl acetate (10 mL). To this solution, Pd/C (16.0 mg, 0.150 mmol, 2 eq.) was added and a 3-way adaptor was installed on the flask with a balloon of hydrogen gas. The flask was purged three times with hydrogen gas using a high-vac. The reaction was stirred vigorously and allowed to stir at room temperature for 2 hours. After 2 hours, the reaction was complete as indicated by TLC. Ninhydrin stain was used to confirm the presence of the amine. Subsequently, the reaction was filtered through Celite® and rinsed with ethyl acetate (3x). The product was concentrated in-vacuo to give a white solid (Yield: 71 mg, 46%), which was used immediately in the next step. To a solution of the intermediate from the previous step (23.5 mg, 0.05 mmol, 1 eq.) in anhydrous dichloromethane (2 mL), DAST (20 µL, 0.15 mmol, 3 eq.) was added. The reaction was stirred at room temperature for 1 hour. Once the reaction was complete as monitored by TLC, the reaction mixture was quenched with water, extracted with DCM, and washed with brine. The organic layer was dried over Na_2SO_4, concentrated in-vacuo, and purified by silica gel column (1:1 Hexanes: Ethyl Acetate) to give the product as white solid (Yield: 17 mg, 70%). The product was used immediately for the next step.



Compound 18. Compound **13** (50.0 mg, 0.0876 mmol, 1 eq.) was placed in an argon-flushed 25 mL round-bottom flask and dissolved in ethyl acetate (2 mL). To this solution, Pd/C (18.6 mg, 0.175 mmol, 2 eq) was added and a 3-way adaptor was installed on the flask with a balloon of hydrogen gas. The flask was purged three times with hydrogen gas using a high-vac. The reaction was stirred vigorously and allowed to stir at room temperature for 3 hours. After 3 hours, the reaction was complete as indicated by TLC. Ninhydrin stain was used to confirm the presence of the amine. Subsequently, the reaction was filtered through Celite® and rinsed with ethyl acetate (3x). The product was concentrated in-vacuo and purified by silica gel column (1:1 Hexanes: Ethyl Acetate) to give the product as white solid (Yield: 32 mg, 68%). The product was used immediately in the next step.

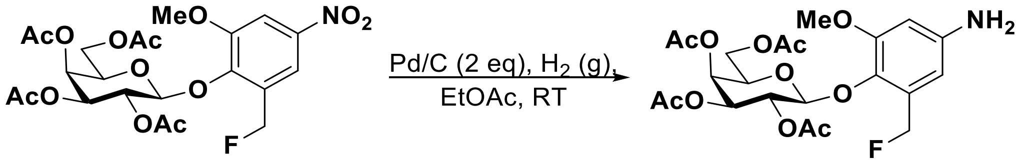


Compound 19. Compound **14** (41.0 mg, 0.0795 mmol, 1 eq.) was placed in an argon-flushed 25mL round-bottom flask and dissolved in ethyl acetate (2 mL). To this solution, Pd/C (33.8 mg, 0.318 mmol, 2 eq) was added and a 3-way adaptor was installed on the flask with a balloon of hydrogen gas. The flask was purged three times with hydrogen gas using a high-vac. The reaction was stirred vigorously and allowed to stir at room temperature for 3 hours. After 3 hours, the reaction was complete as indicated by TLC. Ninhydrin stain was used to confirm the presence of the amine. Subsequently, the reaction was filtered through Celite® and rinsed with ethyl acetate (3x). The product was concentrated in-vacuo to give the product as white solid (Yield: 38 mg, Quantitative). The product was used immediately in the next step.

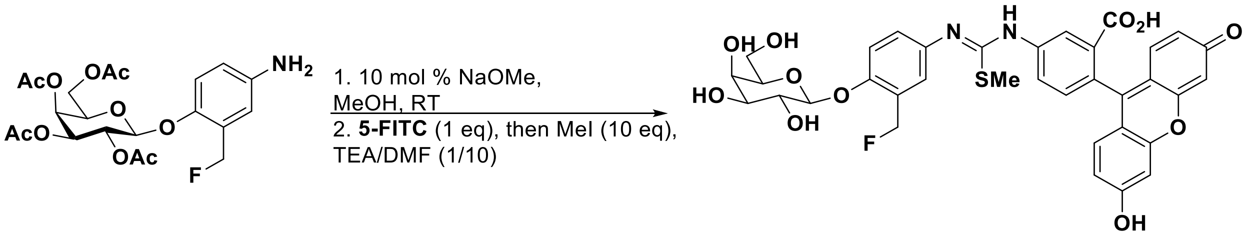


Compound 20. Compound **15** (50.0 mg, 0.0962 mmol, 1 eq.) was placed in an argon-flushed 25mL round-bottom flask and dissolved in ethyl acetate (2 mL). To this solution, Pd/C (41.0 mg, 0.384 mmol, 2 eq) was added and a 3-way adaptor was installed on the flask with a balloon of hydrogen gas. The flask was purged three times with hydrogen gas using a high-vac. The reaction was stirred vigorously and allowed to stir at room temperature for 3 hours. After 3 hours, the reaction was complete as indicated by TLC.

Ninhydrin stain was used to confirm the presence of the amine. Subsequently, the reaction was filtered through Celite® and rinsed with ethyl acetate (3x). The product was concentrated in-vacuo to give the product as a white solid (Yield: 47 mg, Quantitative). The product was used immediately in the next step.

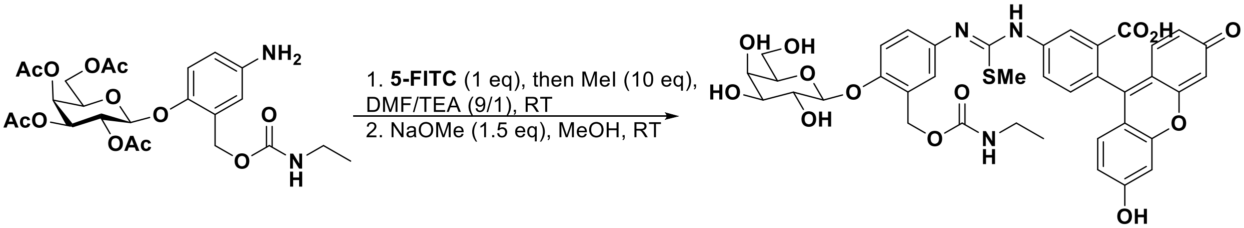


Compound 21. Compound **16** (123.6 mg, 0.232 mmol, 1 eq.) was placed in an argon-flushed 25mL round-bottom flask and dissolved in ethyl acetate (2 mL). To this solution, Pd/C (49.4 mg, 0.464 mmol, 2 eq) was added and a 3-way adaptor was installed on the flask with a balloon of hydrogen gas. The flask was purged three times with hydrogen gas using a high-vac. The reaction was stirred vigorously and allowed to stir at room temperature for 3 hours. After 3 hours, the reaction was complete as indicated by TLC. Ninhydrin stain was used to confirm the presence of the amine. Subsequently, the reaction was filtered through Celite® and rinsed with ethyl acetate (3x). The product was concentrated in-vacuo to give the product as a white solid (Yield: 116 mg, Quantitative). The product was used immediately in the next step.

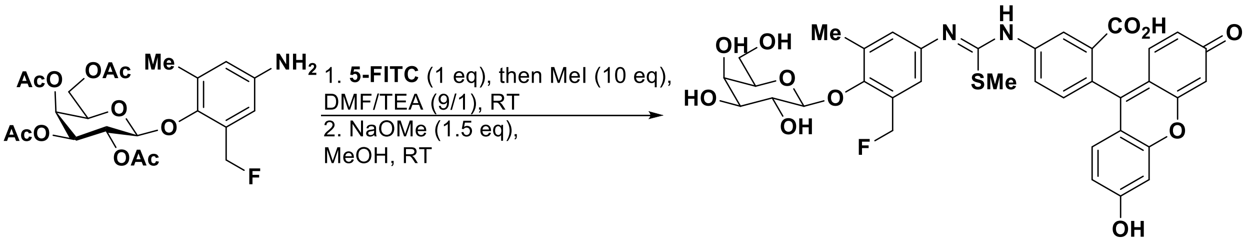


Compound 22 (**BG-FITC-1F**). Compound **17** (52.8 mg, 0.112 mmol, 1 eq) was added to a 20 mL vial and methanol (3 mL) was added, followed by 10 mol% (3 µL, 0.0112 mmol) of 25 wt% NaOMe in MeOH. The mixture was stirred at room temperature until the reaction was complete, which was monitored by HPLC. Upon completion, the reaction was quenched with acidic resin and filtered to give pure product (Yield: 23 mg, 68%). The resulting intermediate (9 mg, 0.03 mmol, 1 eq) was dissolved in a mixture of DMF/NEt_3 (10/1) and 5-FITC (11.6 mg, 0.03 mmol, 1 eq.) was added to the solution. The resulting mixture was stirred at room temperature, and the reaction was monitored by analytical HPLC. Upon the reactions' completion, MeI (18.7 µL, 0.3 mmol, 10 eq.) was added to the above mixture and further stirred at room temperature for an additional 16 hours. The reaction mixture was purified by preparative HPLC to give the product as a yellow solid (Yield: 11 mg, 50%). ^{1}H NMR (600 MHz, CD_3OD) δ 8.02 (s, 1H, H-9'), 7.75 (d, *J* = 6.9 Hz, 1H, H-12'), 7.47 – 7.17 (m, 4H, H-2'/H-3'/H-5'/H-13'), 6.76 (s, 2H, H-19'/H-22'), 6.66 (s, 4H, H-16'/H-17'/H-24'/H-25'), 5.64 – 5.46 (m, 2H, C*H*2F), 4.92 (d, *J* = 7.8 Hz, 1H, H-1), 3.94 (d, *J* = 3.1 Hz, 1H, H-4), 3.87 (dd, *J* = 9.7, 7.8 Hz, 1H, H-2), 3.78 – 3.74 (m, 2H, H-6), 3.74 – 3.67 (m, 1H, H-5), 3.60 (dd, *J* = 9.7, 3.4 Hz, 1H, H-3), 2.82 (s, 3H, -S*Me*). ^{13}C NMR (151 MHz, CD_3OD) δ 169.9, 162.2, 161.9, 155.9,

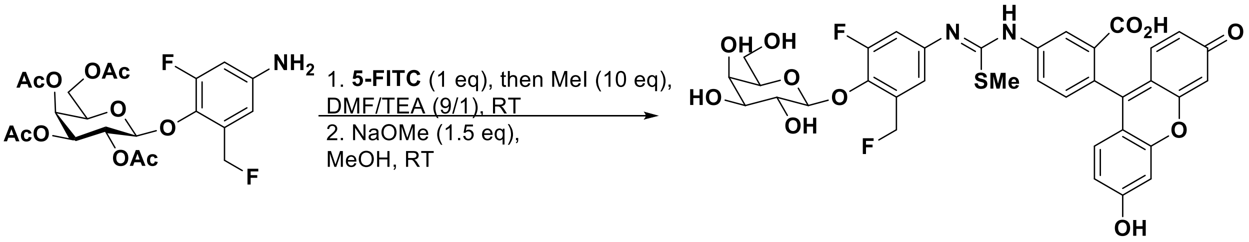
154.5, 139.5, 131.4, 130.4, 130.3, 130.0, 129.6, 129.5, 127.3, 126.3, 124.9, 122.7, 118.7, 117.9, 117.7, 116.8, 115.1, 114.3, 111.2, 103.6, 103.4, 103.4, 103.24 (C-1), 80.48 (d, *J* = 166 Hz, *C*H$_2$F), 77.23 (C-5), 74.87 (C-3), 72.13 (C-2), 70.19 (C-4), 62.42 (C-6), 15.11 (-S*Me*). HRMS (ESI): calculated for $C_{35}H_{30}FN_2O_{11}S^-$ [(M-H)$^-$] 705.1560; found: 705.1562.



Compound 23 (**BG-FITC-OCONHEt**). Compound **18** (20.8 mg, 0.0385 mmol, 1 eq) was added to a 3.7 mL vial and dissolved in 500 µL of DMF/NEt$_3$ (9/1). 5-FITC (15.0 mg, 0.0385 mmol, 1 eq.) was added to the solution and the resulting mixture was stirred at room temperature for 2 hours. The reaction was monitored by LC-MS. Upon the reactions' completion, MeI (24.0 µL, 0.385 mmol, 10 eq.) was added to the above mixture and further stirred at room temperature for an additional 16 hours. Upon completion, the reaction was extracted using ethyl acetate (3x) and washed with brine. The organic layer was dried over sodium sulfate, concentrated in-vacuo, and purified by preparative HPLC. The product was then dissolved in methanol (500 µL), followed by the addition of 1.5 eq of 25 wt% NaOMe (8.2 µL) in MeOH. The mixture was stirred at room temperature until the reaction was complete, which was monitored by LC-MS. Upon completion, the reaction was purified immediately by preparative HPLC to give the product as a yellow solid (Yield: 14 mg, 47% over 3 steps). ^{1}H NMR (600 MHz, CD$_3$OD) δ 7.98 (s, 1H, H-9'), 7.70 (d, *J* = 8.2 Hz, 1H, H-12'), 7.38 – 7.24 (m, 4H, H-2'/H-3'/H-5'/H-13'), 6.76 (m, 2H, H-19'/H-22'), 6.72 – 6.56 (m, 4H, H-16'/H-17'/H-24'/H-25'), 5.18 (dd, *J* = 40.3, 13.3 Hz, 2H, C*H*2OCONHCH2CH3), 3.92 (d, *J* = 3.4 Hz, 1H, H-4), 3.87 (dd, *J* = 9.7, 7.7 Hz, 1H, H-2), 3.76 – 3.74 (m, 2H, H-6), 3.72 – 3.68 (m, 1H, H-5), 3.59 (dd, *J* = 9.7, 3.4 Hz, 1H, H-3), 3.12 (q, *J* = 7.2 Hz, 2H, -OCONHC*H*2CH3), 2.80 (s, 3H, -S*Me*), 1.08 (t, *J* = 7.2 Hz, 3H, -OCONHCH2C*H*3). *Note: H-1 is contained within the H_2O peak.* ^{13}C NMR (151 MHz, CD$_3$OD) δ 168.3, 157.1, 155.1, 153.4, 137.6, 129.5, 129.2, 129.1, 128.8, 128.4, 126.2, 116.4, 113.4, 110.1, 102.2 (C-1), 75.8 (C-5), 73.3 (C-3), 70.8 (C-2), 68.8 (C-4), 61.0 (C-6), 60.6 (-*C*H$_2$OCONHCH$_2$CH$_3$), 35.3 (-OCONH*C*H$_2$CH$_3$), 13.9 (-S*Me*), 13.8 (-OCONHCH$_2$*C*H$_3$). HRMS (ESI) m/z calculated for $C_{38}H_{37}N_3O_{13}S$ (M+H)$^+$ 776.2120, found 776.2106.

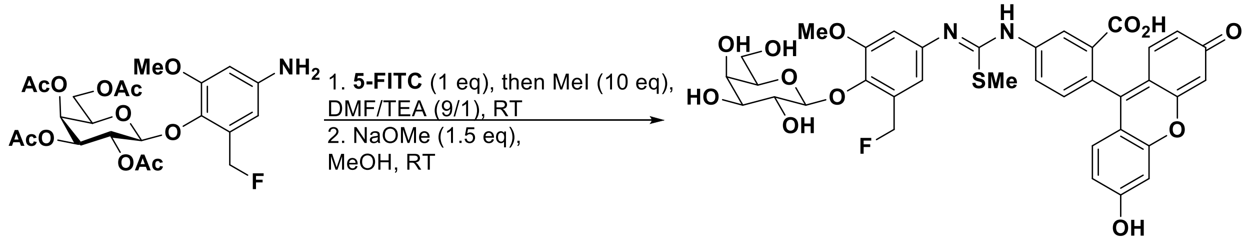


Compound 24 (**BG-FITC-Me-1F**). Compound **19** (17.9 mg, 0.0369 mmol, 1 eq.) was added to a 3.7 mL vial and dissolved in 500 uL of DMF/NEt_3 (9/1). 5-FITC (14.4 mg, 0.0369 mmol, 1 eq.) was added to the solution and the resulting mixture was stirred at room temperature for 2 hours. The reaction was monitored by LC-MS. Upon the reactions' completion, MeI (23.0 µL, 0.369 mmol, 10 eq.) was added to the above mixture and further stirred at room temperature for an additional 16 hours. Upon completion, the reaction was extracted using ethyl acetate (3x) and washed with brine. The organic layer was dried over sodium sulfate, concentrated in-vacuo, and purified by preparative HPLC. The product was then dissolved in methanol (500 µL), followed by the addition of 1.5 eq of 25 wt% NaOMe (12.7 µL) in MeOH. The mixture was stirred at room temperature until the reaction was complete, which was monitored by LC-MS. Upon completion, the reaction was purified immediately by preparative HPLC to give the product as a yellow solid (Yield: 7.4 mg, 28% over 3 steps). ^{1}H NMR (600 MHz, CD_3OD) δ 7.90 (s, 1H, H-9'), 7.67 (s, 1H, H-12'), 7.23 (m, 3H, H-3'/H-5'/H-13'), 6.73 (s, 2H, H-19'/H-22'), 6.69 – 6.48 (m, 4H, H-16'/H-17'H-24'/H-25'), 5.58 (ddd, *J* = 59.7, 47.6, 12.2 Hz, 2H, C*H*2F), 4.54 (d, *J* = 7.7 Hz, 1H, H-1), 3.87 – 3.82 (m, 2H, H-4/H-2), 3.72 (dd, *J* = 11.2, 5.7 Hz, 1H, H-6), 3.64 (dd, *J* = 11.1, 6.5 Hz, 1H, H-6), 3.52 (dd, *J* = 9.7, 3.4 Hz, 1H, H-3), 3.37 (t, *J* = 6.2 Hz, 1H, H-5), 2.81 (s, 3H, -S*Me*), 2.39 (s, 3H, -*Me*). ^{13}C NMR (201 MHz, CD_3OD) δ 168.4, 160.4, 160.3, 153.1, 151.9, 133.9, 133.3, 133.2, 132.3, 128.9, 128.4, 125.8, 122.2, 112.9, 109.8, 105.4, 102.2, 79.80 (d, *J* = 163.6 Hz, CH2F), 75.5, 73.5, 71.5, 68.6, 60.8, 15.7, 13.9. HRMS (ESI) m/z calculated for $C_{36}H_{33}FN_2O_{11}S$ $(M+H)^+$ 721.1862, found 721.1850.



Compound 25 (**BG-FITC-F-1F**). Compound **20** (46.5 mg, 0.0950 mmol, 1 eq) was added to a 3.7 mL vial and dissolved in 500 µL of DMF/NEt_3 (9/1). 5-FITC (37.0 mg, 0.0950 mmol, 1 eq.) was added to the solution and the resulting mixture was stirred at room temperature for 2 hours. The reaction was monitored by LC-MS. Upon the reactions' completion, MeI (59.1 µL, 0.950 mmol, 10 eq.) was added to the above mixture and further stirred at room temperature for an additional 16 hours. Upon completion, the reaction was extracted using ethyl acetate (3x) and washed with brine.

The organic layer was dried over sodium sulfate, concentrated in-vacuo, and purified by preparative HPLC. The product was then dissolved in methanol (500 µL), followed by the addition of 1.5 eq of 25 wt% NaOMe (7.7 µL) in MeOH. The mixture was stirred at room temperature until the reaction was complete, which was monitored by LC-MS. Upon completion, the reaction was purified immediately by preparative HPLC to give the product as a yellow solid (Yield: 23 mg, 34% over 3 steps). ^{1}H NMR (600 MHz, CD_3OD) δ 7.97 (s, 1H, H-9'), 7.69 (d, *J* = 8.1 Hz, 1H, H-12'), 7.33 – 7.21 (m, 3H, H-3'/H-5'/H-13'), 6.79 (s, 2H, H-19'/H-22'), 6.75 – 6.63 (m, 4H, H-16'/H-17'/H-24'/H-25'), 5.59 (ddd, *J* = 51.9, 47.3, 12.4 Hz, 2H, C*H*2F), 4.80 (d, *J* = 7.7 Hz, 1H, H-1), 3.87 (dd, *J* = 3.3, 1.1 Hz, 1H, H-4), 3.79 (t, *J* = 8.8 Hz, 1H, H-2), 3.71 (dd, *J* = 11.2, 5.7 Hz, 1H, H-6), 3.65 (dd, *J* = 11.2, 6.5 Hz, 1H, H-6'), 3.54 (dd, *J* = 9.7, 3.4 Hz, 1H, H-3), 3.47 (t, *J* = 7.0, 6.3 Hz, 1H, H-5), 2.71 (s, 3H, -S*Me*). ^{13}C NMR (151 MHz, CD_3OD) δ 169.4, 164.3, 156.8, 155.7, 155.2, 135.9, 135.8, 132.1, 131.0, 130.6, 128.2, 123.6, 120.8, 120.7, 115.7, 114.5, 112.7, 106.4 (d, *J* = 3.3 Hz, C-1), 103.6, 80.7 (dd, *J* = 165.9, 3.0 Hz, *C*H_2F), 77.1 (C-5), 74.7 (C-3), 72.8 (C-2), 70.0 (C-4), 62.1 (C-6), 15.3 (-S*Me)*. HRMS (ESI) m/z calculated for $C_{35}H_{30}F_2N_2O_{11}S$ $(M+H)^+$ 725.1611, found 725.1601.



Compound 26 (**BG-FITC-OMe-1F**). Compound **21** (20.0 mg, 0.0399 mmol, 1 eq) was added to a 3.7 mL vial and dissolved in 500 µL of DMF/NEt_3 (9/1). 5-FITC (15.5 mg, 0.0399 mmol, 1 eq.) was added to the solution and the resulting mixture was stirred at room temperature for 2 hours. The reaction was monitored by LC-MS. Upon the reactions' completion, MeI (24.8 µL, 0.399 mmol, 10 eq.) was added to the above mixture and further stirred at room temperature for an additional 16 hours. Upon completion, the reaction was extracted using ethyl acetate (3x) and washed with brine. The organic layer was dried over sodium sulfate, concentrated in-vacuo, and purified by preparative HPLC. The product was then dissolved in methanol (500 µL), followed by the addition of 1.5 eq of 25 wt% NaOMe (7.5 µL) in MeOH. The mixture was stirred at room temperature until the reaction was complete, which was monitored by LC-MS. Upon completion, the reaction was purified immediately by preparative HPLC to give the product as a yellow solid (Yield: 12 mg, 42% over 3 steps). ^{1}H NMR (600 MHz, CD_3OD) δ 7.93 (s, 1H, H-9'), 7.69 (d, *J* = 8.2 Hz, 1H, H-12'), 7.27 (d, *J* = 8.2 Hz, 1H, H-13'), 7.05 (s, 1H, H-5'), 6.99 (s, 1H, H-3'), 6.78 (s, 2H, H-19'/H-22'), 6.76 – 6.59 (m, 4H, H-16'/H-17'/H-24'/H-25'), 5.54 (ddd, *J* = 47.8, 39.8, 12.4 Hz, 2H, C*H*2F), 4.83 (d, *J* = 7.7 Hz, 1H, H-1), 3.86 (s, 3H, *Me*O-), 3.85 (dd, *J* = 3.4, 1.0 Hz, 1H, H-4), 3.78 (dd, *J* = 9.7, 7.7 Hz, 1H, H-2), 3.70 (dd, *J* = 11.3, 5.6 Hz, 1H, H-6), 3.62 (dd, *J* = 11.2, 6.5 Hz, 1H, H-6'), 3.53 (dd, *J* = 9.7, 3.4 Hz, 1H, H-3), 3.40 (t, 1H, H-5), 2.83 (s, 3H, -S*Me*).^{13}C NMR (151 MHz, CD_3OD) δ 169.5, 155.1, 154.1, 143.2, 139.4, 135.2, 135.0, 133.9, 130.6, 130.1, 127.7,

118.4, 116.5, 111.8, 105.4 (C-1), 103.6, 81.0 (d, *J* = 164.7 Hz, CH_2F), 77.0 (C-5), 74.8 (C-3), 73.0 (C-2), 70.1 (C-4), 62.2 (C-6), 56.9 (*Me*O-), 15.3 (-S*Me*). HRMS (ESI) m/z calculated for $C_{36}H_{33}FN_2O_{12}S$ $(M+H)^+$ 737.1811, found 737.1801.

4. NMR spectra, HRMS spectra, and purity analysis

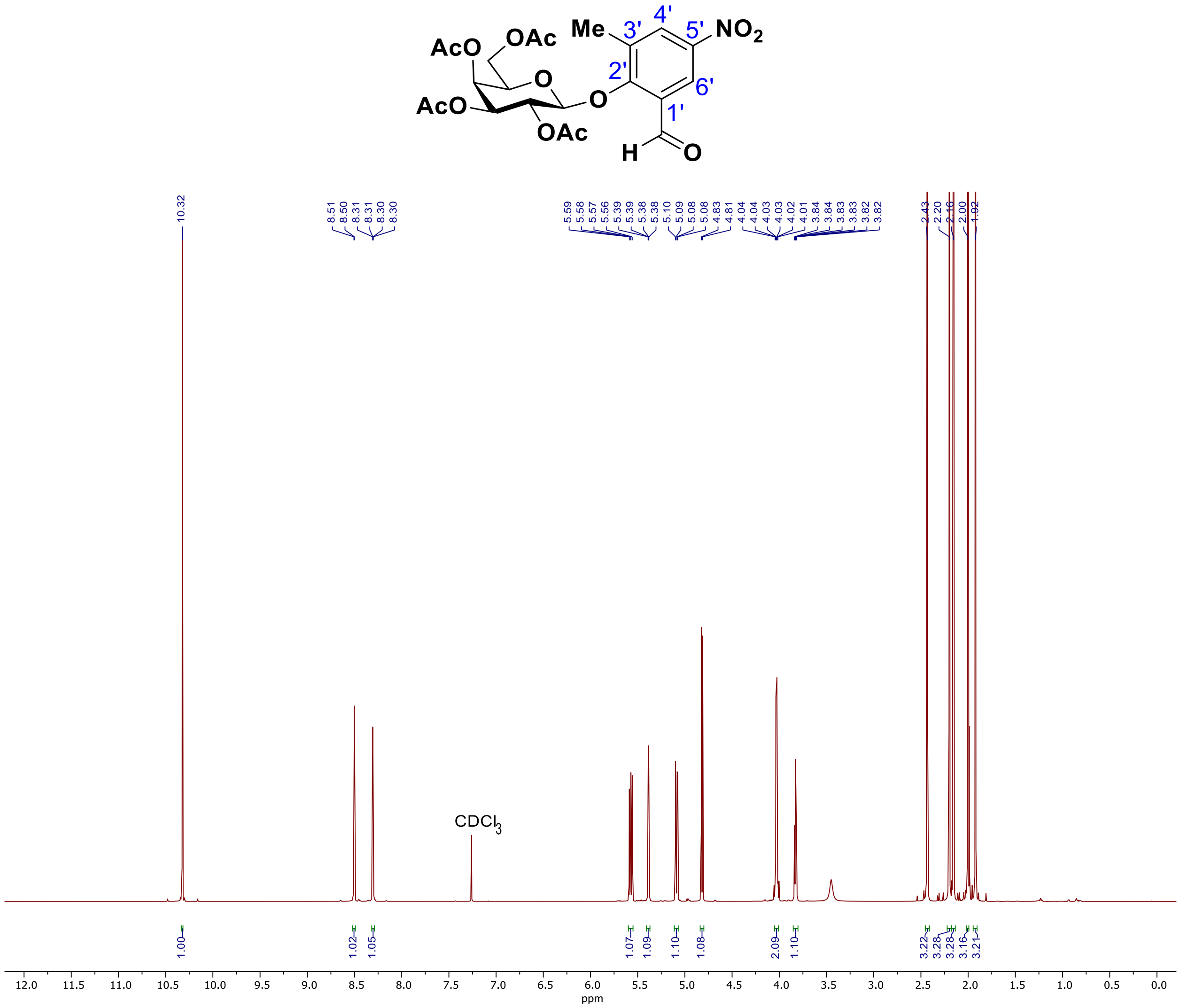


Figure S6. ^{1}H NMR spectrum of compound **6** in $CDCl_3$

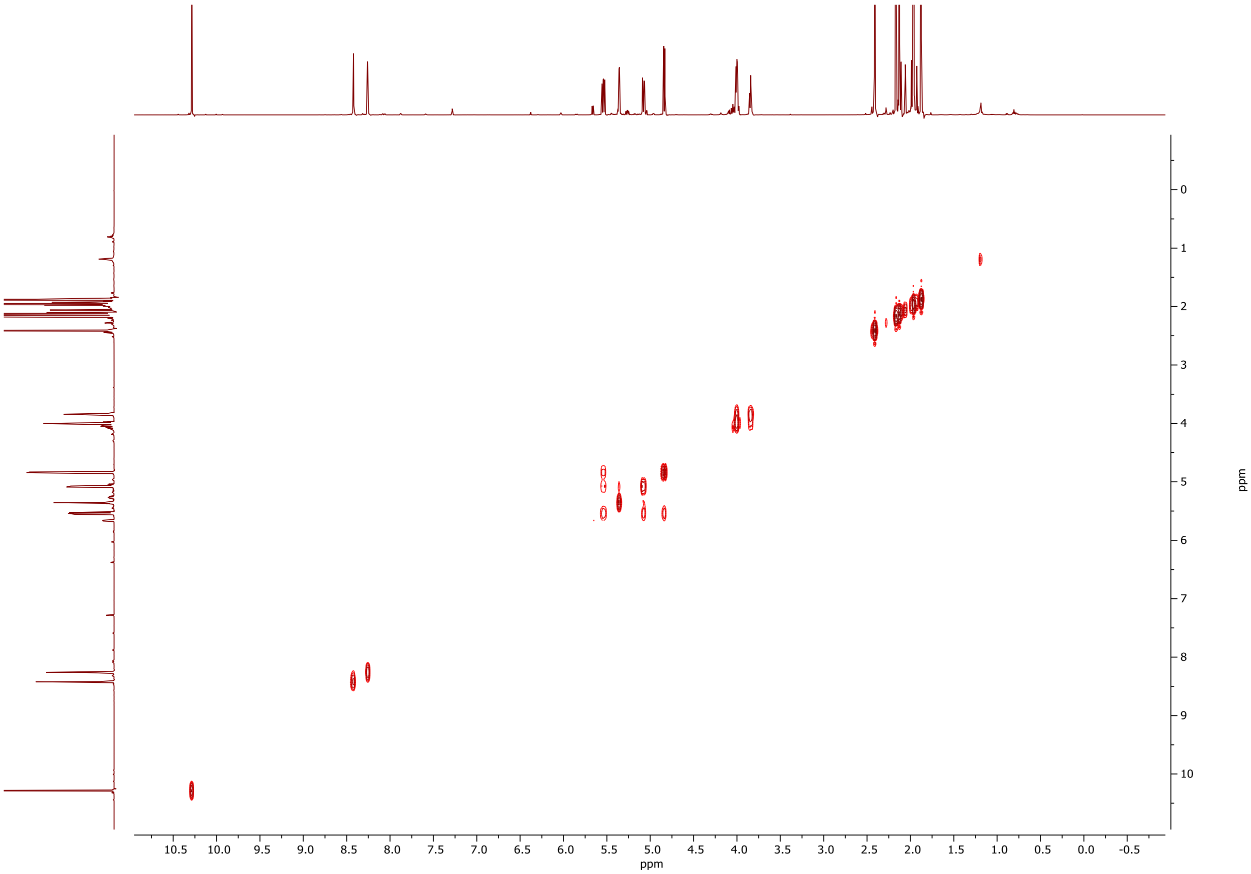


Figure S7. ^{1}H-^{1}H COSY NMR spectrum of compound **6** in $CDCl_3$

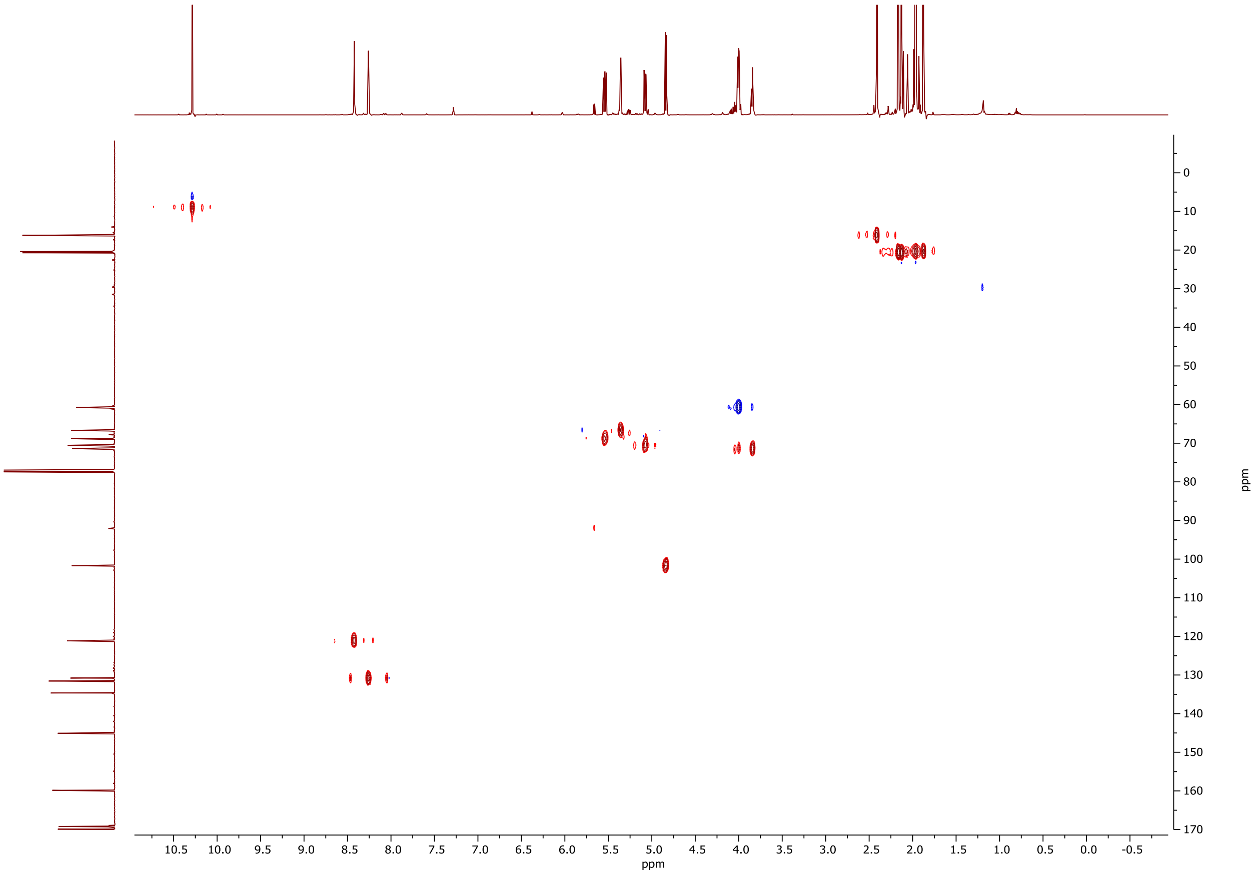


Figure S8. ^1H-^{13}C HSQC NMR spectrum of compound **6** in $CDCl_3$

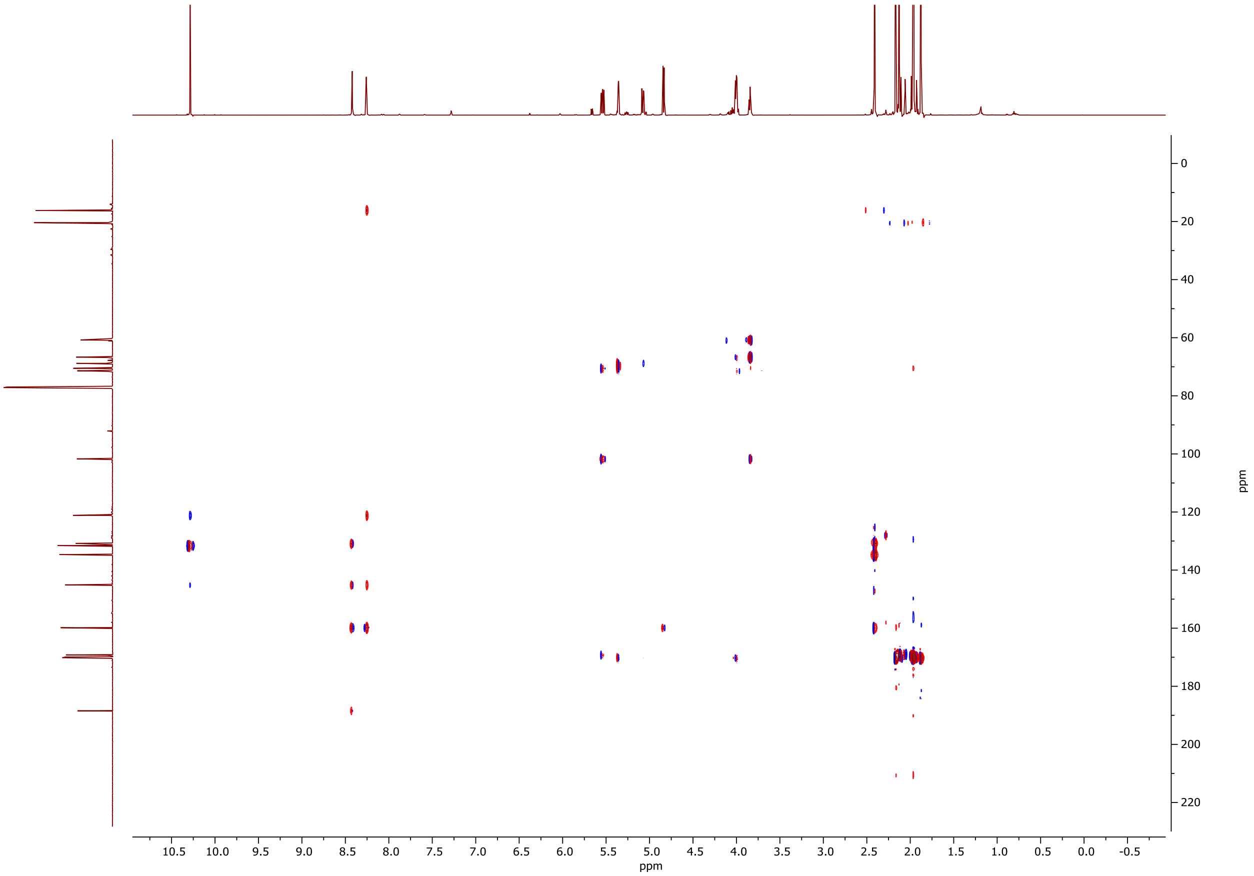


Figure S9. ^{1}H-^{13}C HMBC NMR spectrum of compound **6** in $CDCl_3$

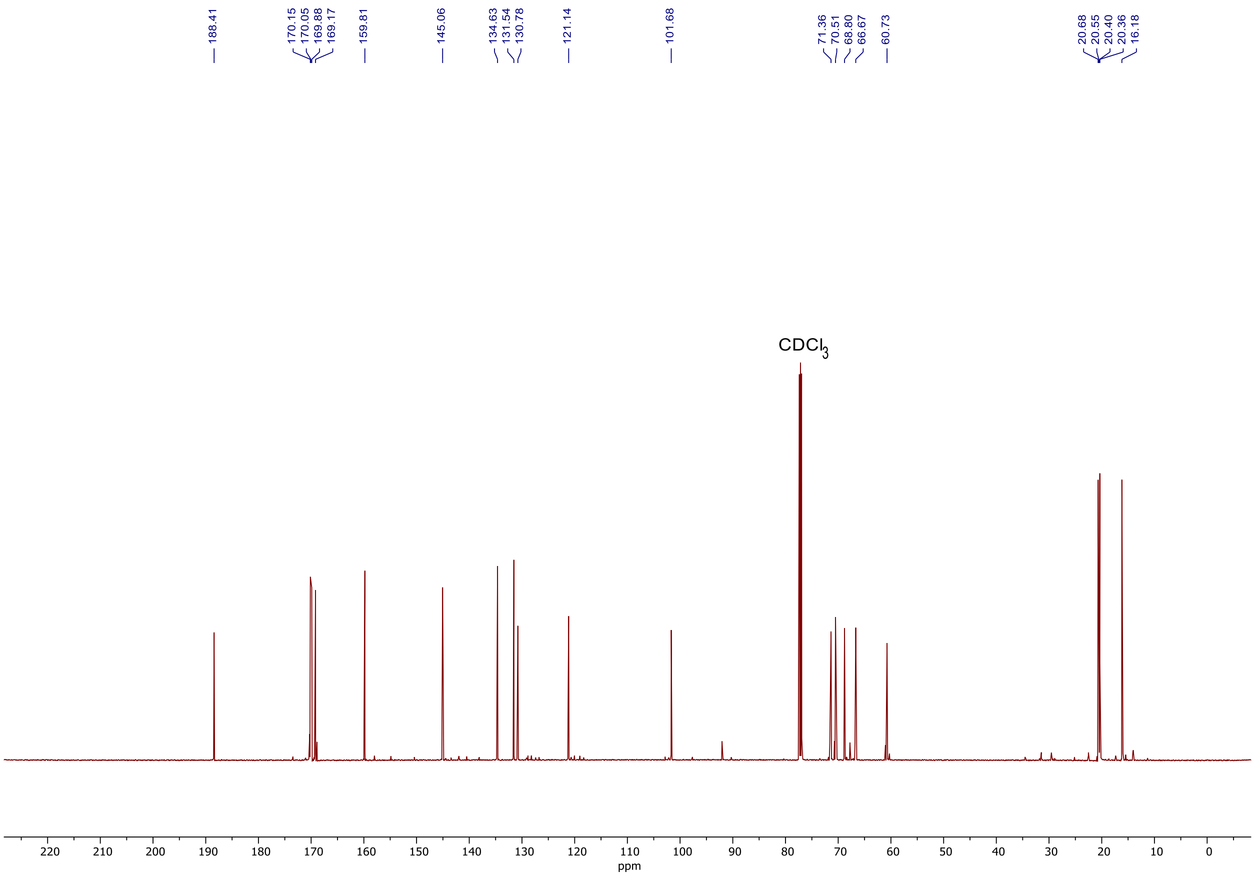
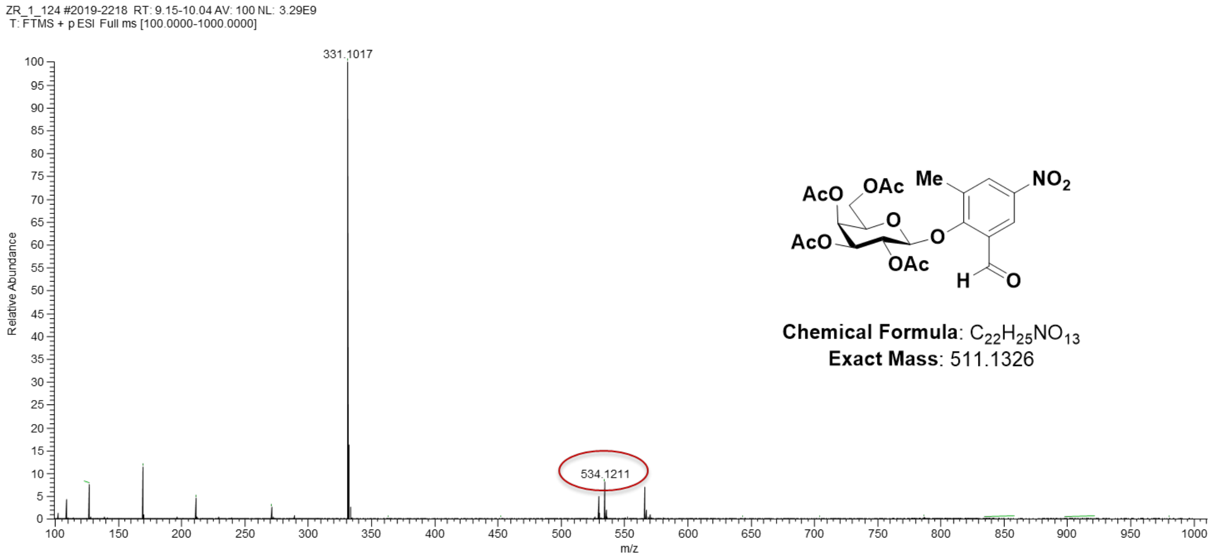


Figure S10. ^{1}H-^{13}C HMBC NMR spectrum of compound **6** in CDCl$_3$



Chemical Formula: $C_{22}H_{25}NO_{13}$
Exact Mass: 511.1326

Figure S11. ESI-MS spectrum of compound **6**

R_f = 0.46

1:1 Hexanes: Ethyl Acetate
UV (254 nm) (Circle)
10% H_2SO_4 in EtOH (Brown)

Figure S12. TLC of compound **6**

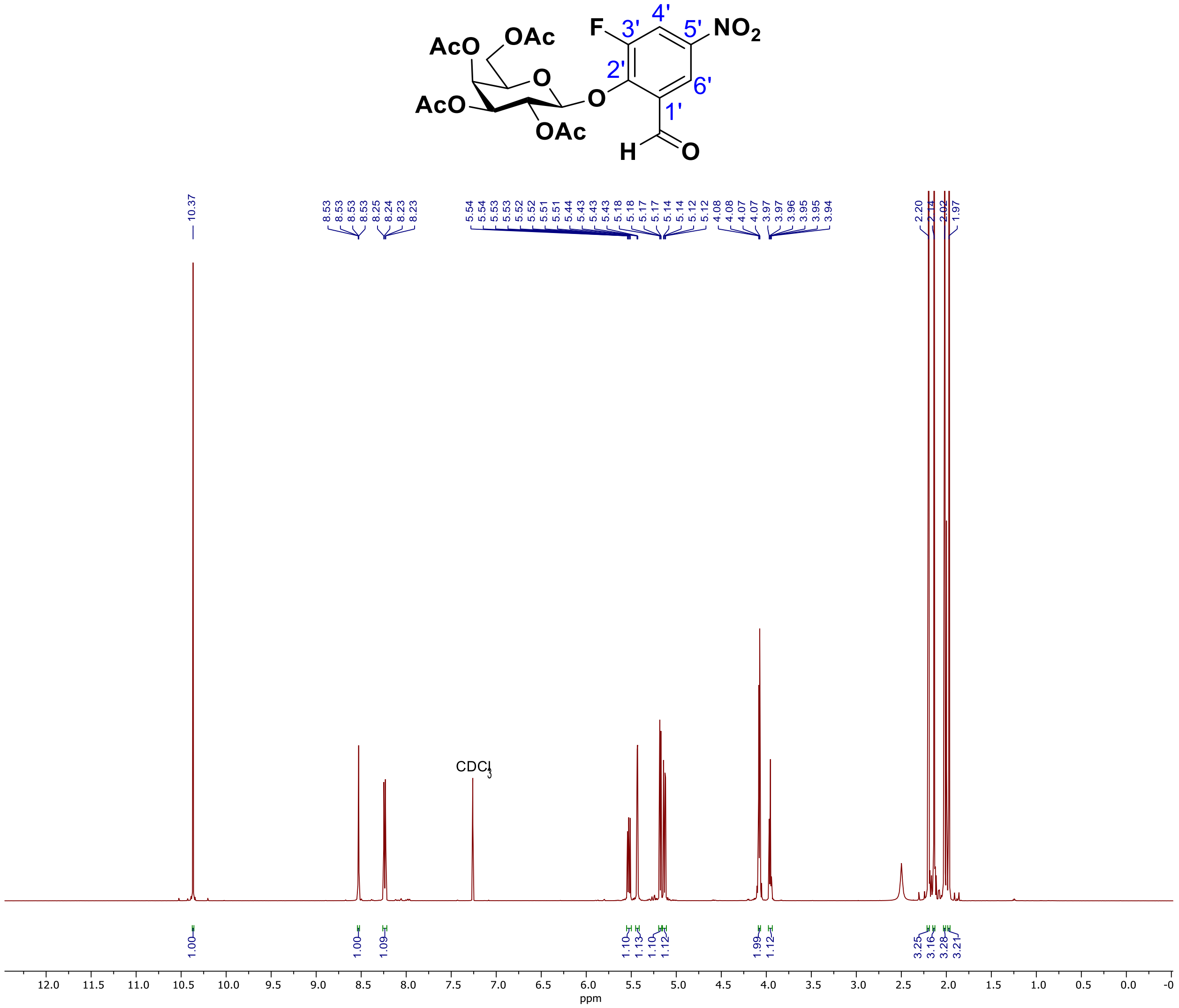


Figure S13. ^{1}H NMR spectrum of compound **7** in $CDCl_3$

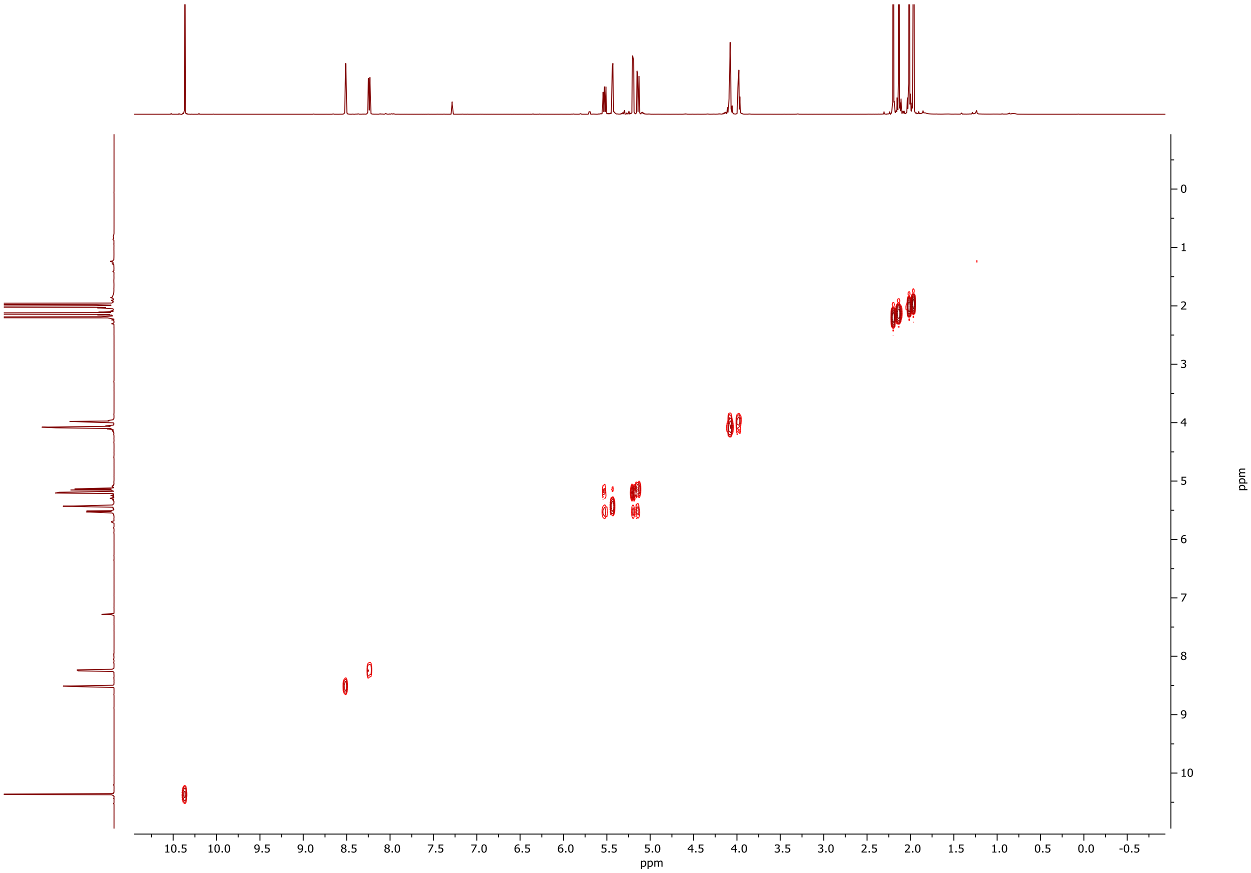


Figure S14. ^{1}H-^{1}H COSY NMR spectrum of compound **7** in $CDCl_3$

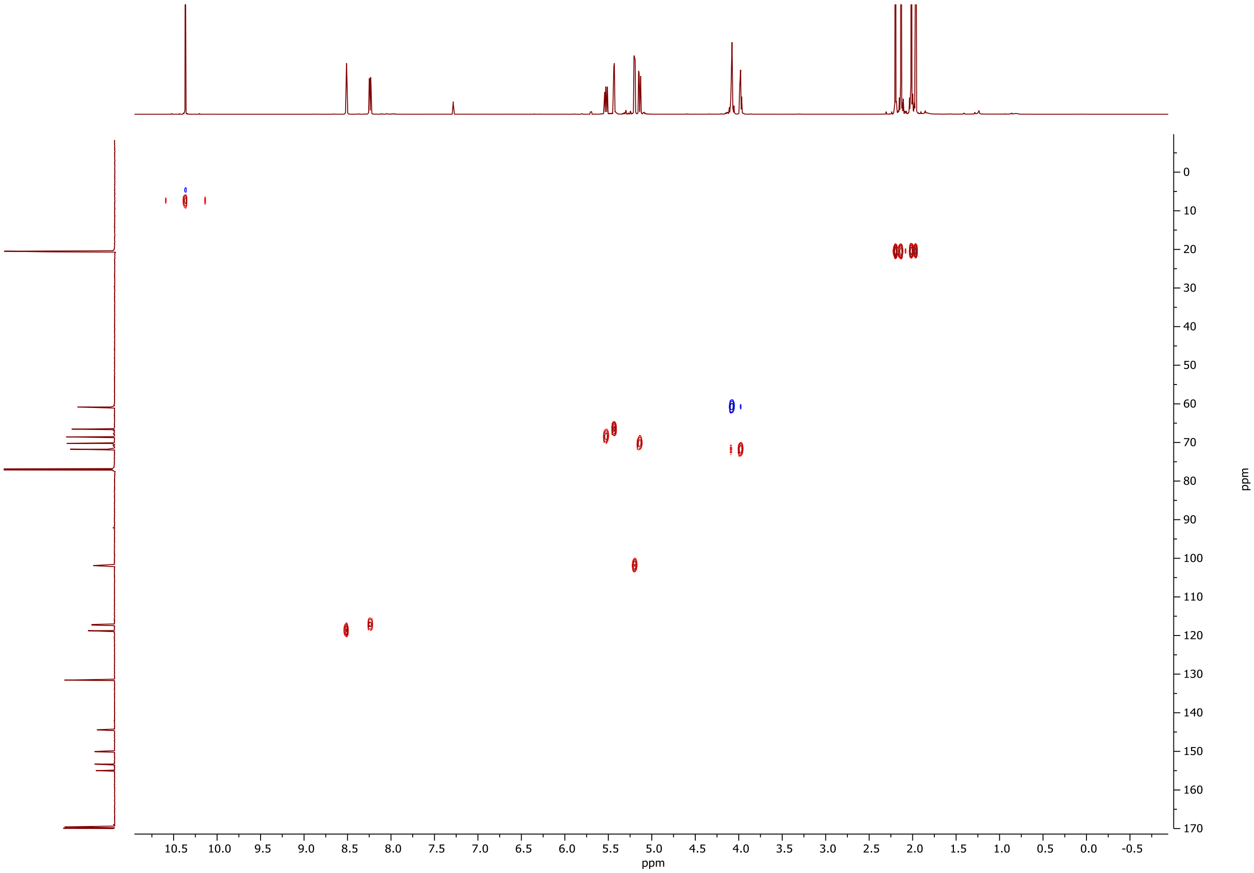


Figure S15. ^{1}H-^{13}C HSQC NMR spectrum of compound **7** in $CDCl_3$

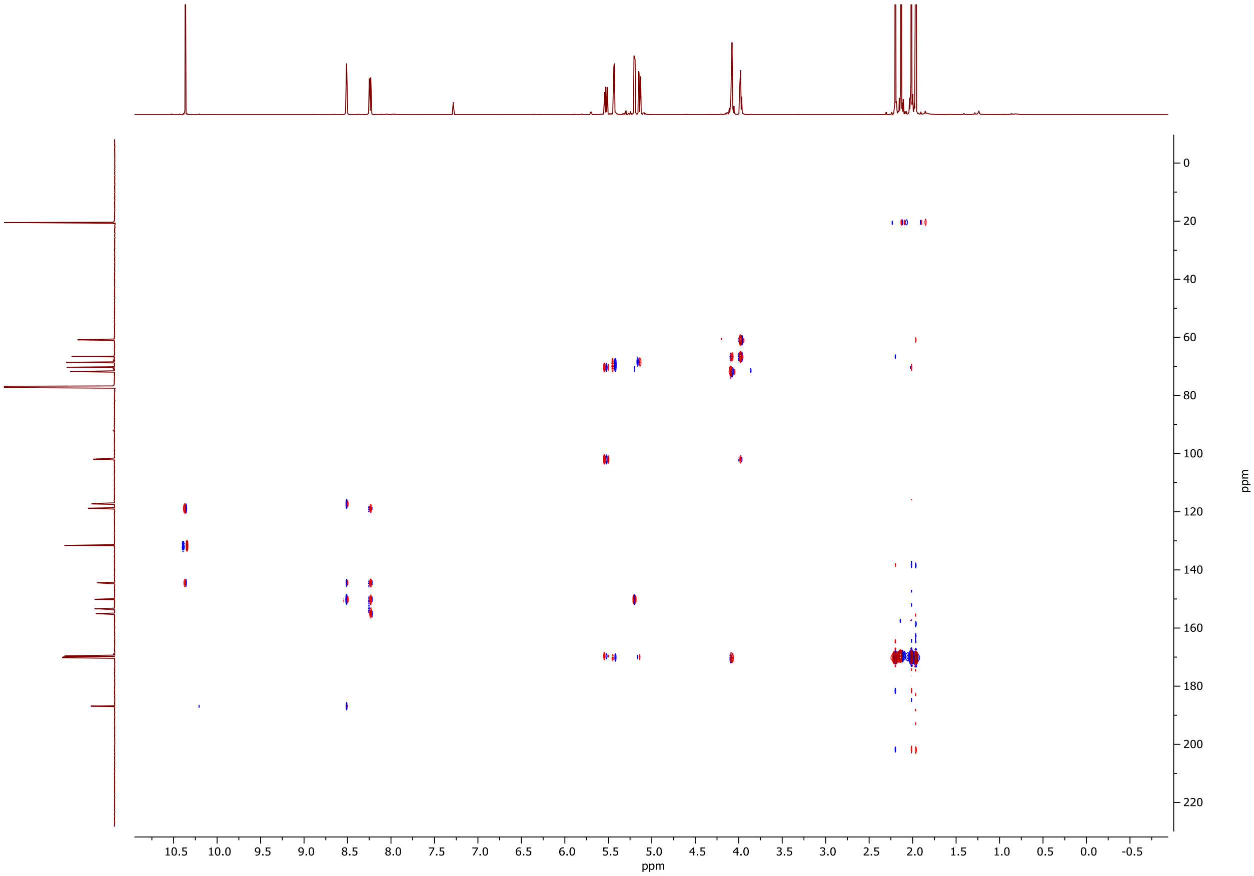


Figure S16. ^{1}H-^{13}C HMBC NMR spectrum of compound **7** in $CDCl_3$

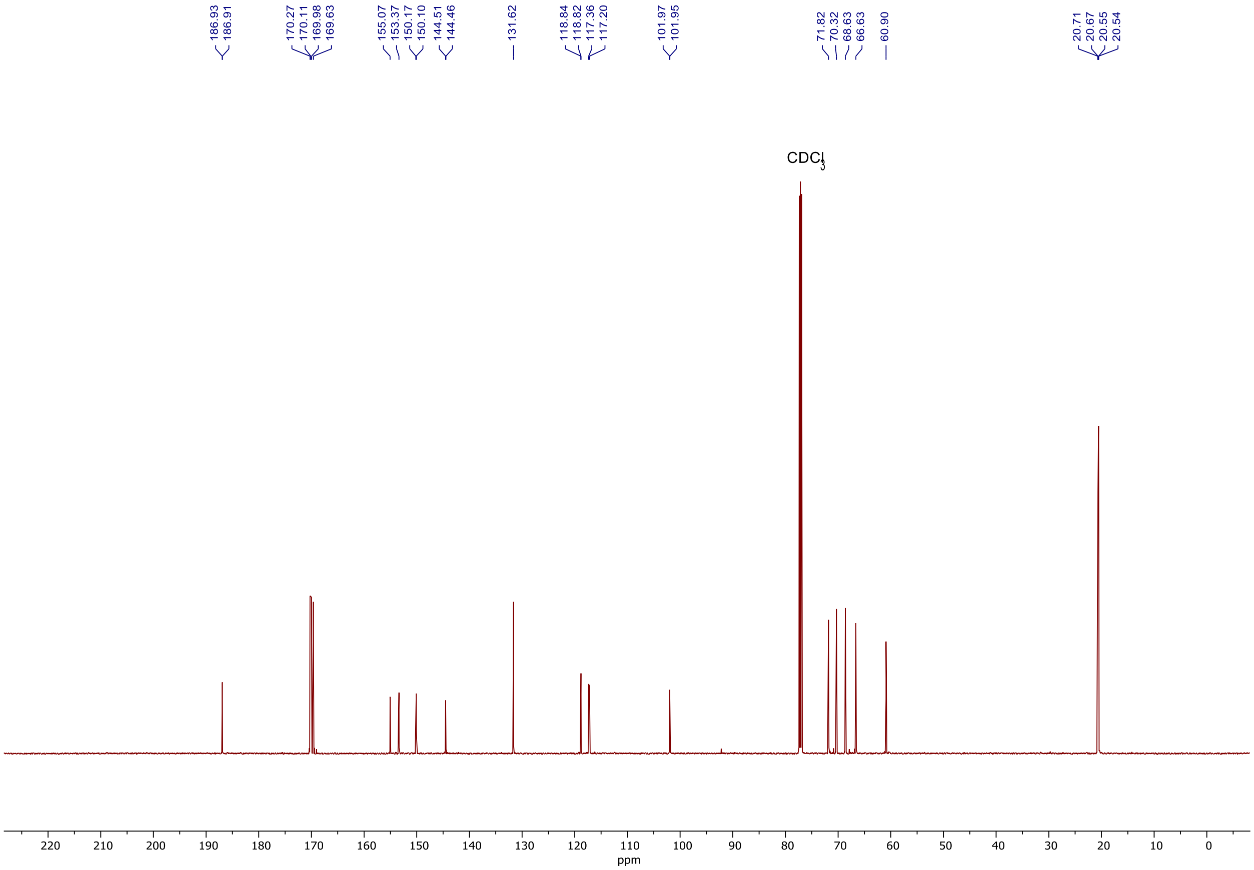


Figure S17. ^{13}C NMR spectrum of compound **7** in CDCl$_3$

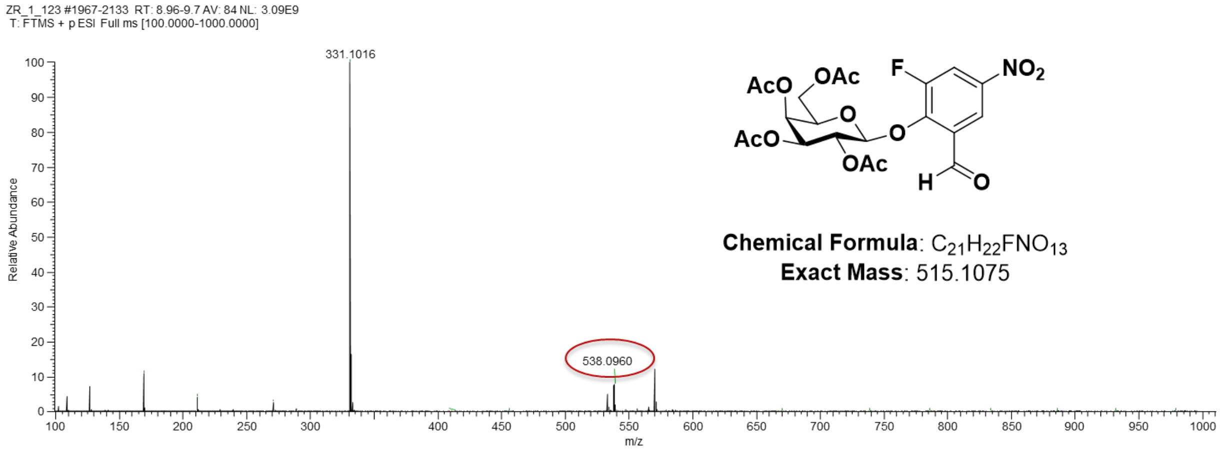


Figure S18. ESI-MS spectrum of compound **7**

R

R_f = 0.51

1:1 Hexanes: Ethyl Acetate
UV (254 nm) (Circle)
10% H_2SO_4 in EtOH (brown)

Figure S19. TLC of compound **7**

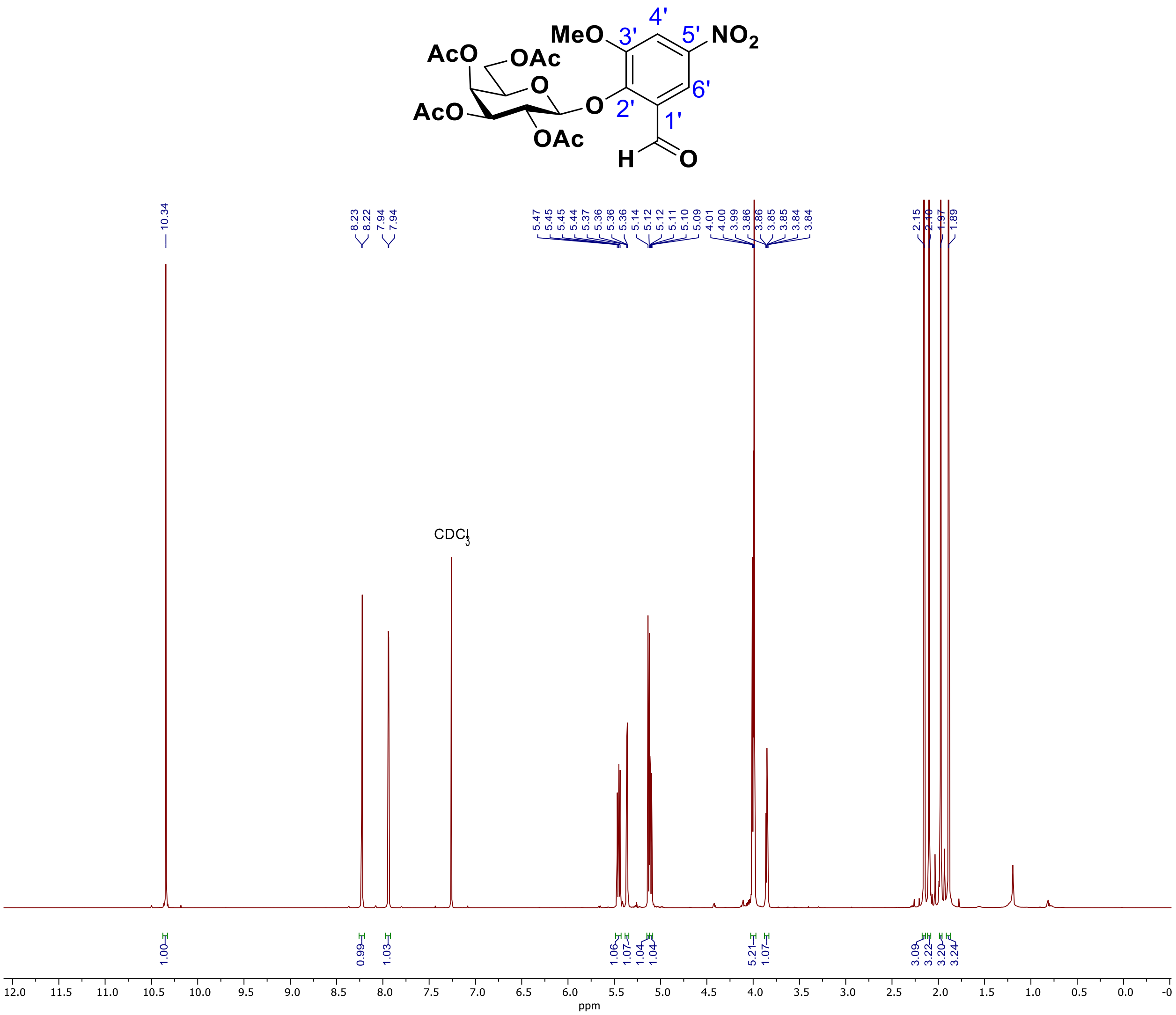


Figure S20. ^{1}H NMR spectrum of compound **8** in $CDCl_3$

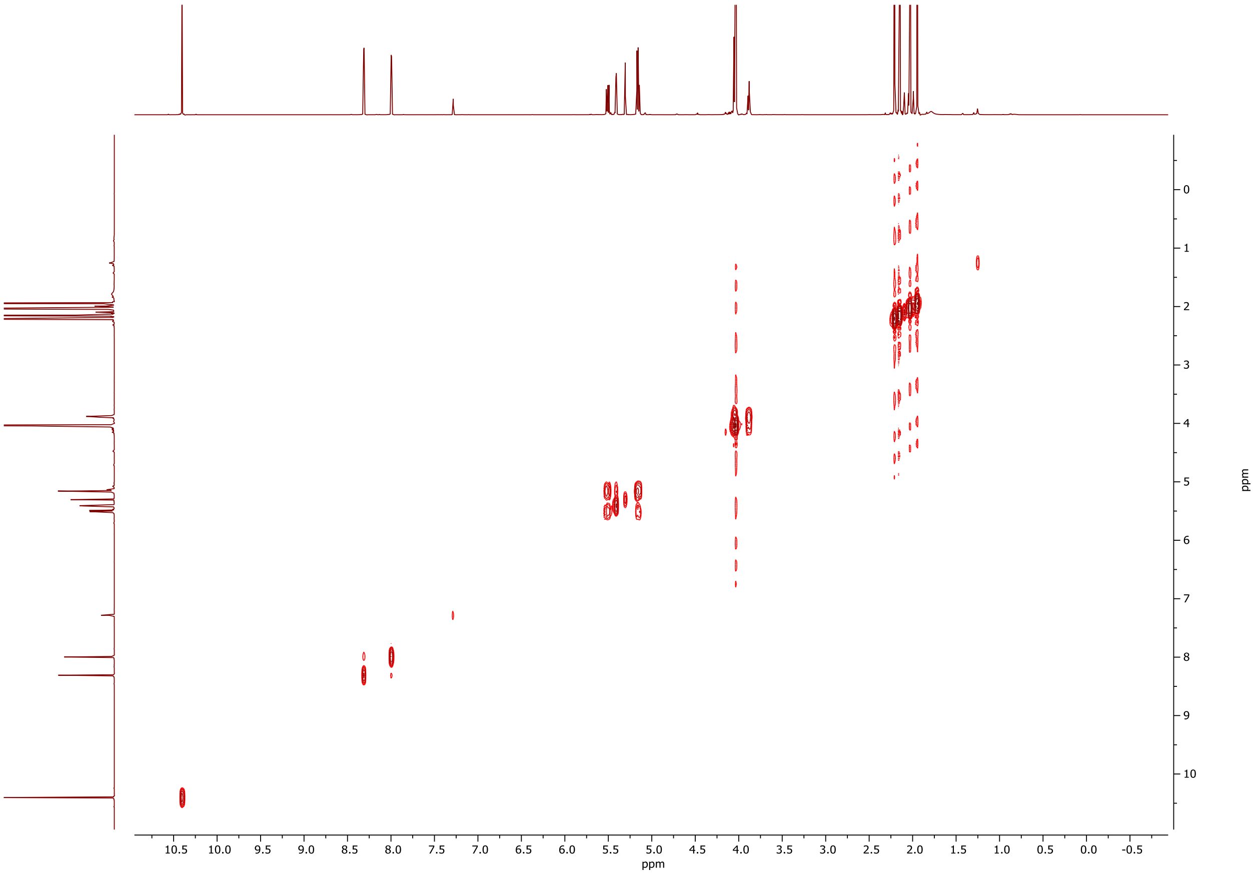


Figure S21. ^1H-^1H COSY NMR spectrum of compound **8** in $CDCl_3$

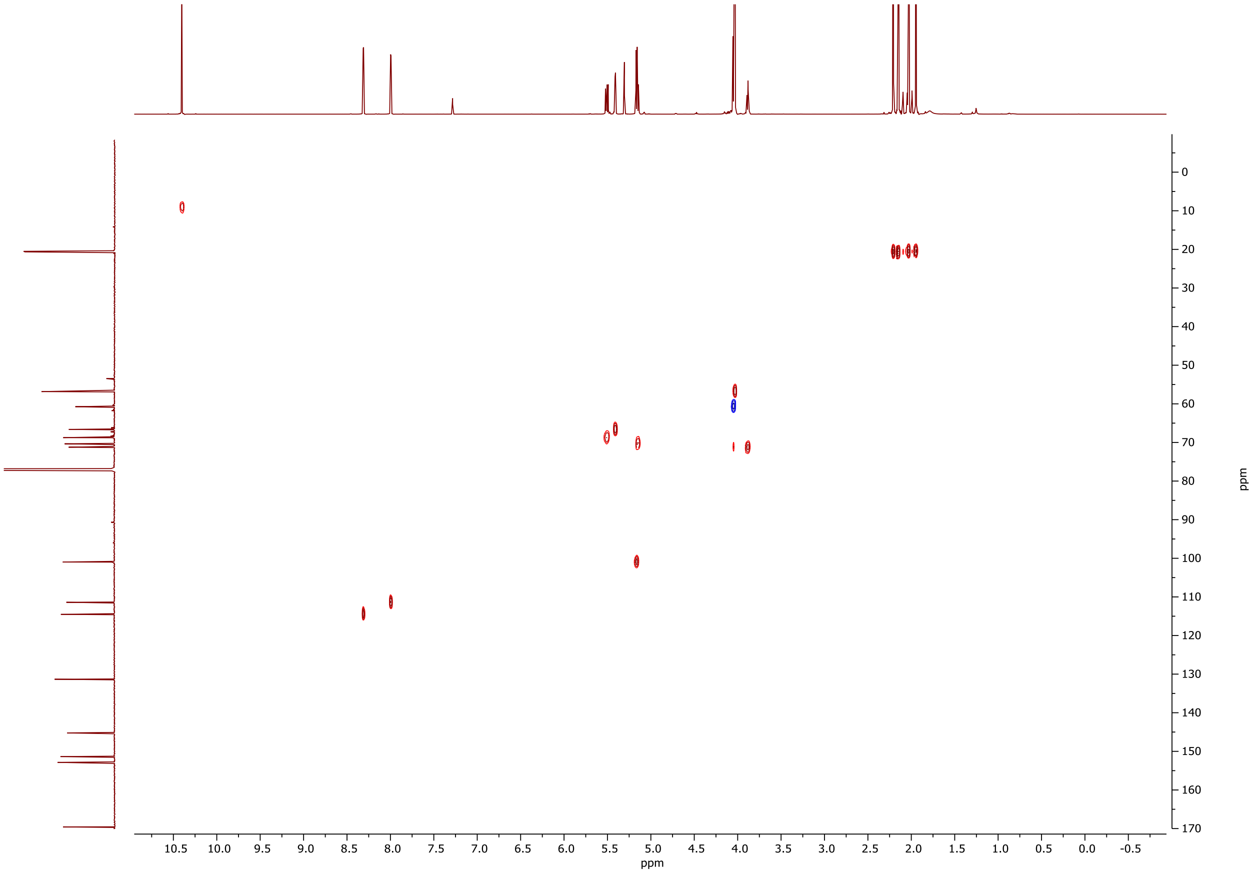


Figure S22. ^{1}H-^{13}C HSQC NMR spectrum of compound **8** in $CDCl_3$

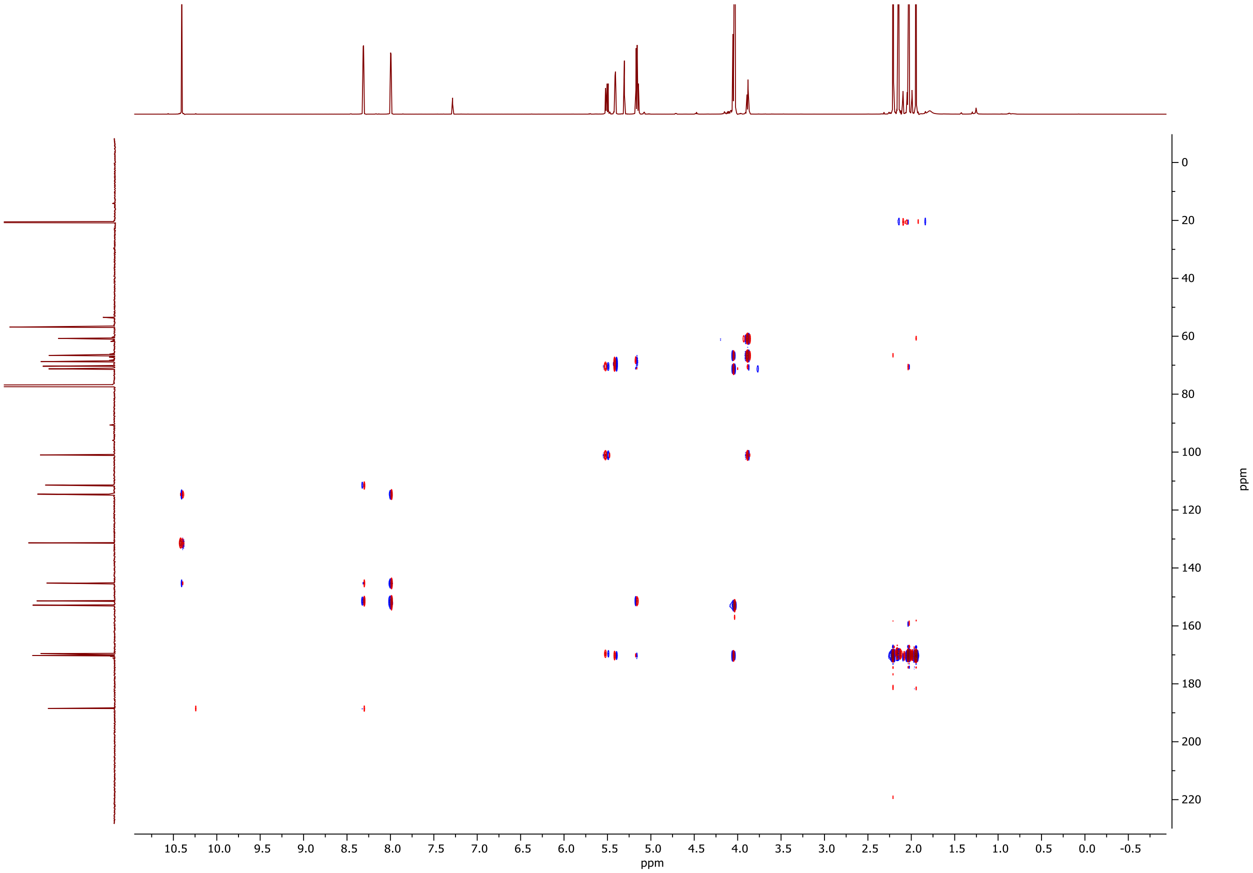


Figure S23. ^{1}H-^{13}C HMBC NMR spectrum of compound **8** in $CDCl_3$

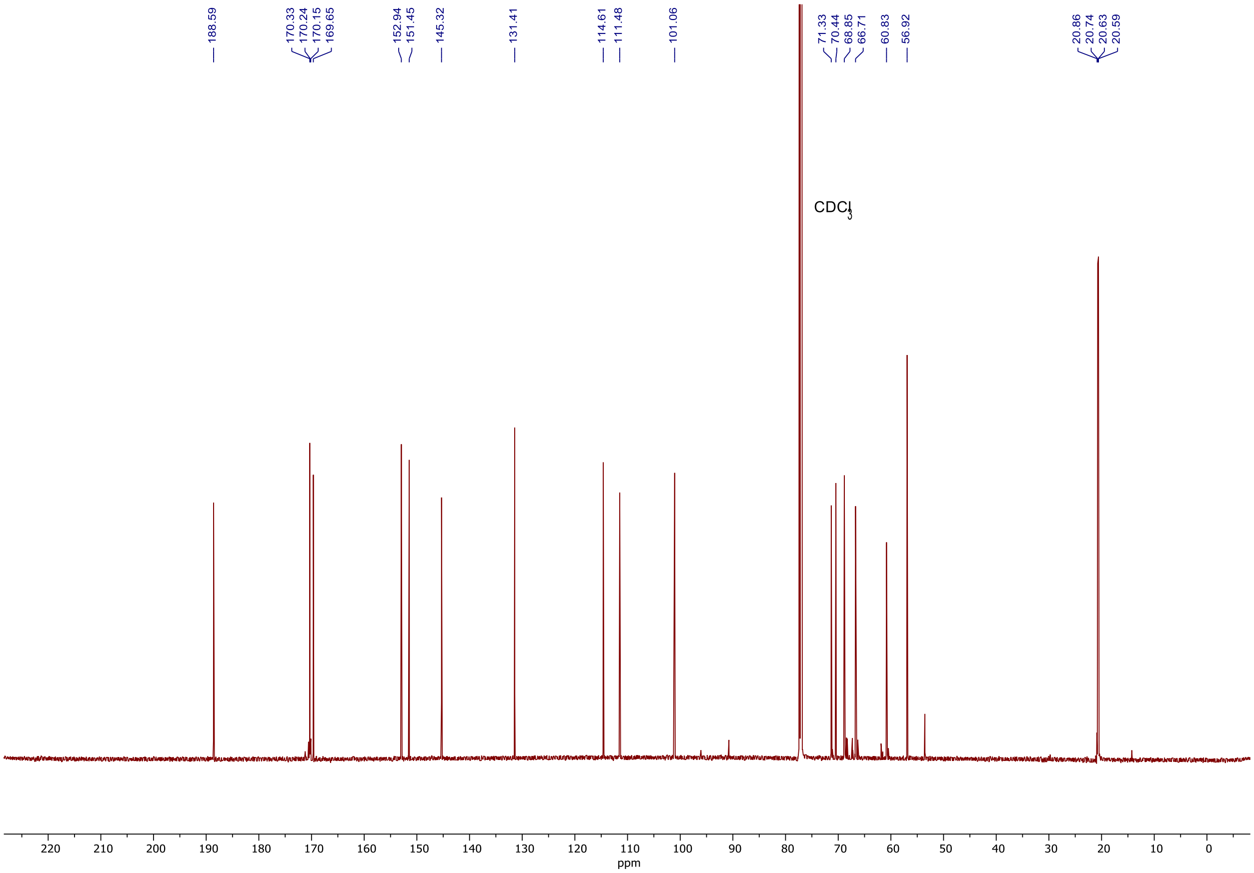


Figure S24. ^{13}C NMR spectrum of compound **8** in $CDCl_3$

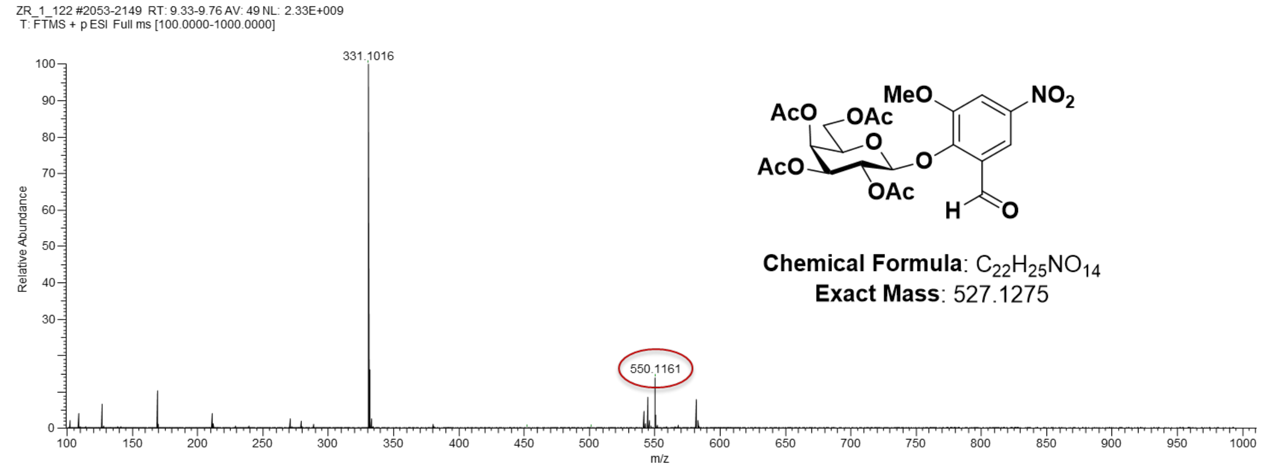
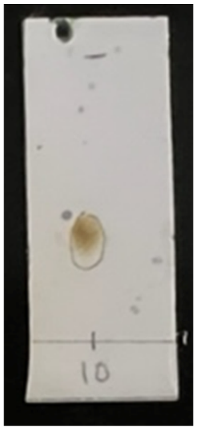


Figure S25. ESI-MS spectrum of compound **8**

R_f = 0.36



1:1 Hexanes: Ethyl Acetate
UV (254 nm) (Circle)
10% H_2SO_4 in EtOH (brown)

Figure S26. TLC of compound **8**

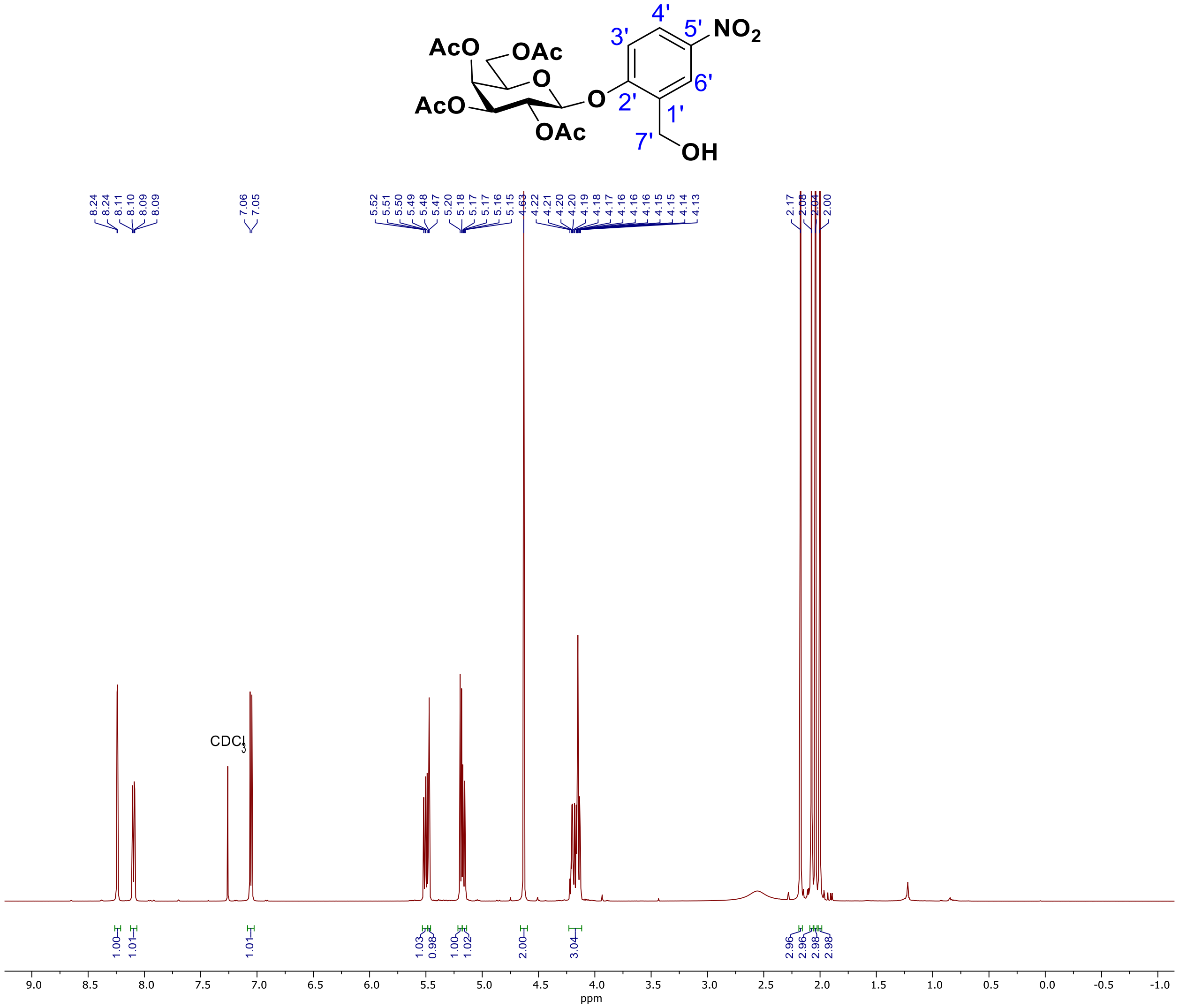


Figure S27. ^{1}H NMR spectrum of compound **9** in $CDCl_3$

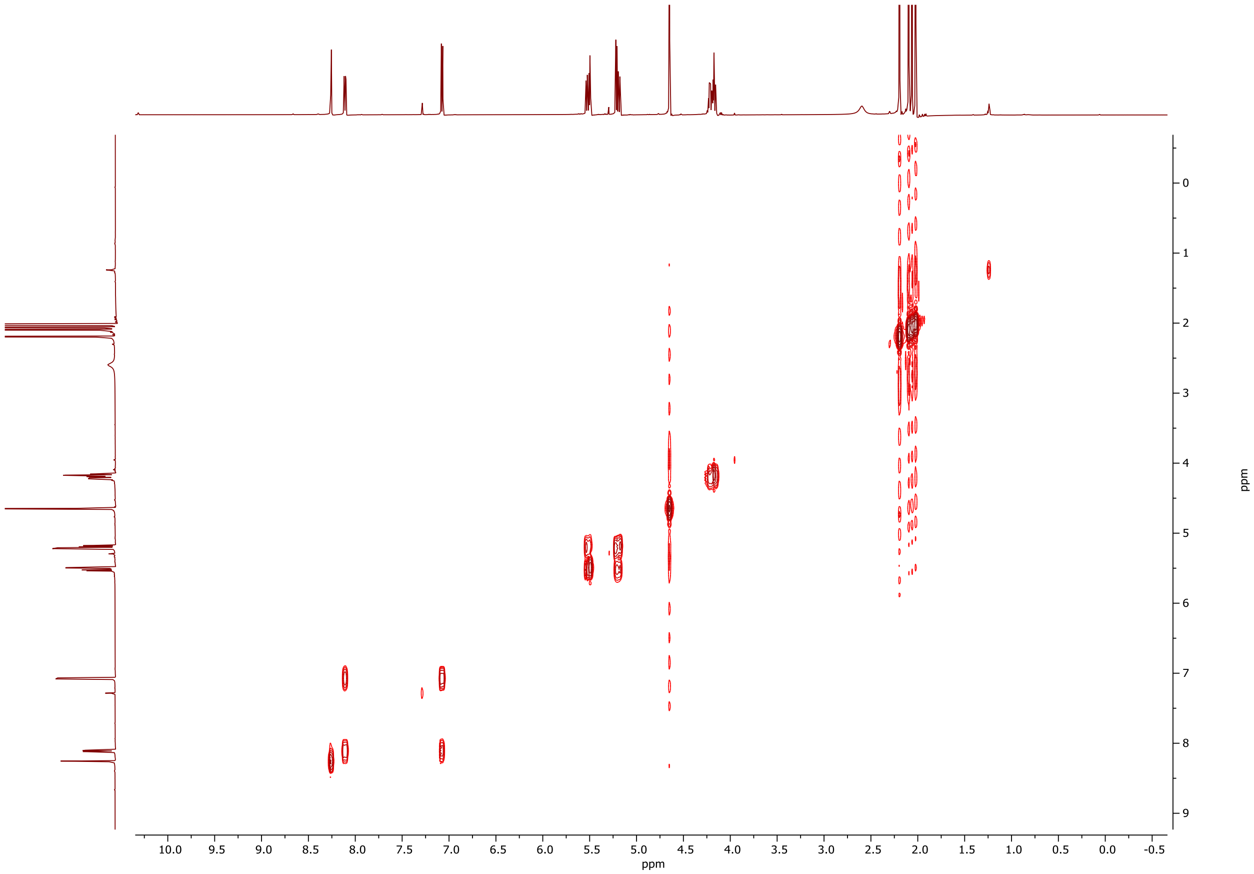


Figure S28. ^{1}H-^{1}H COSY NMR spectrum of compound **9** in $CDCl_3$

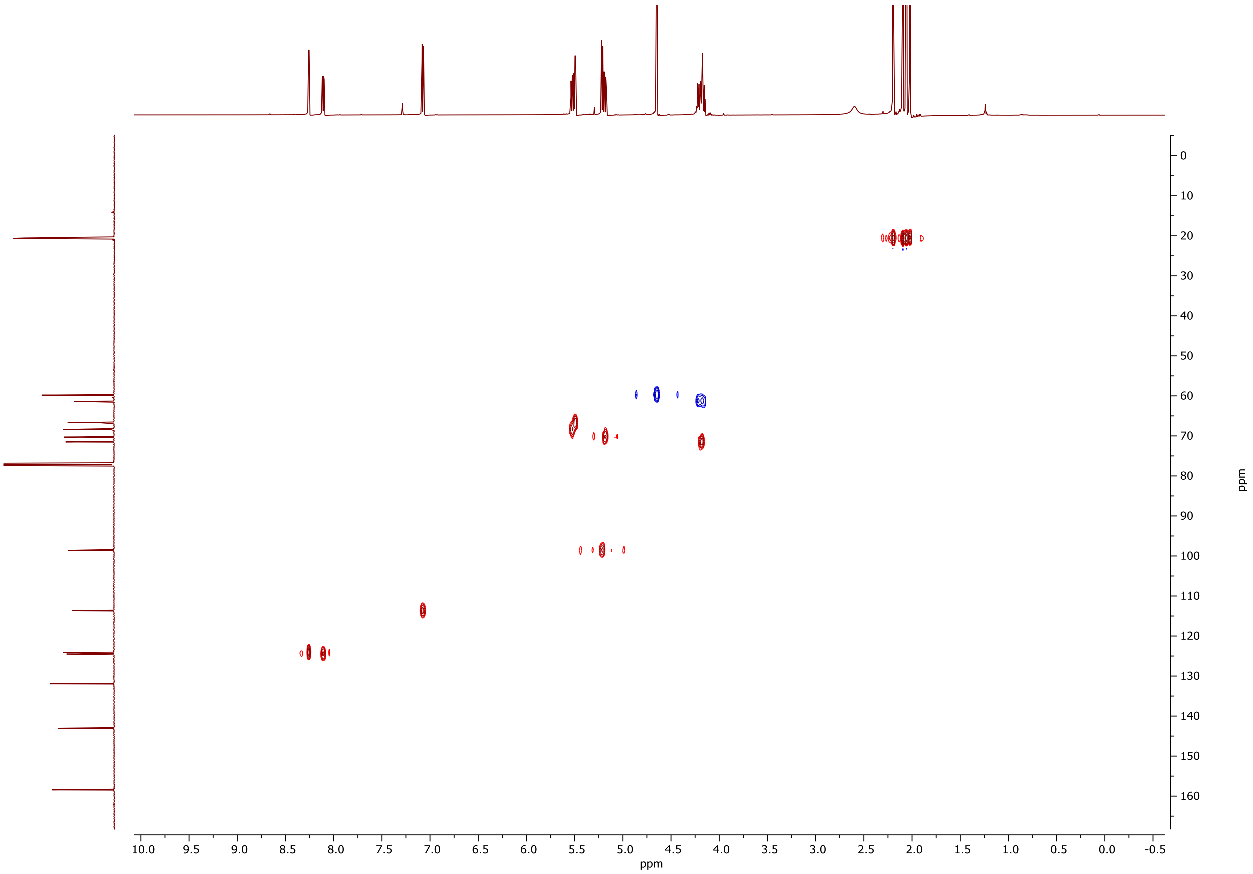


Figure S29. ^{1}H-^{13}C HSQC NMR spectrum of compound **9** in $CDCl_3$

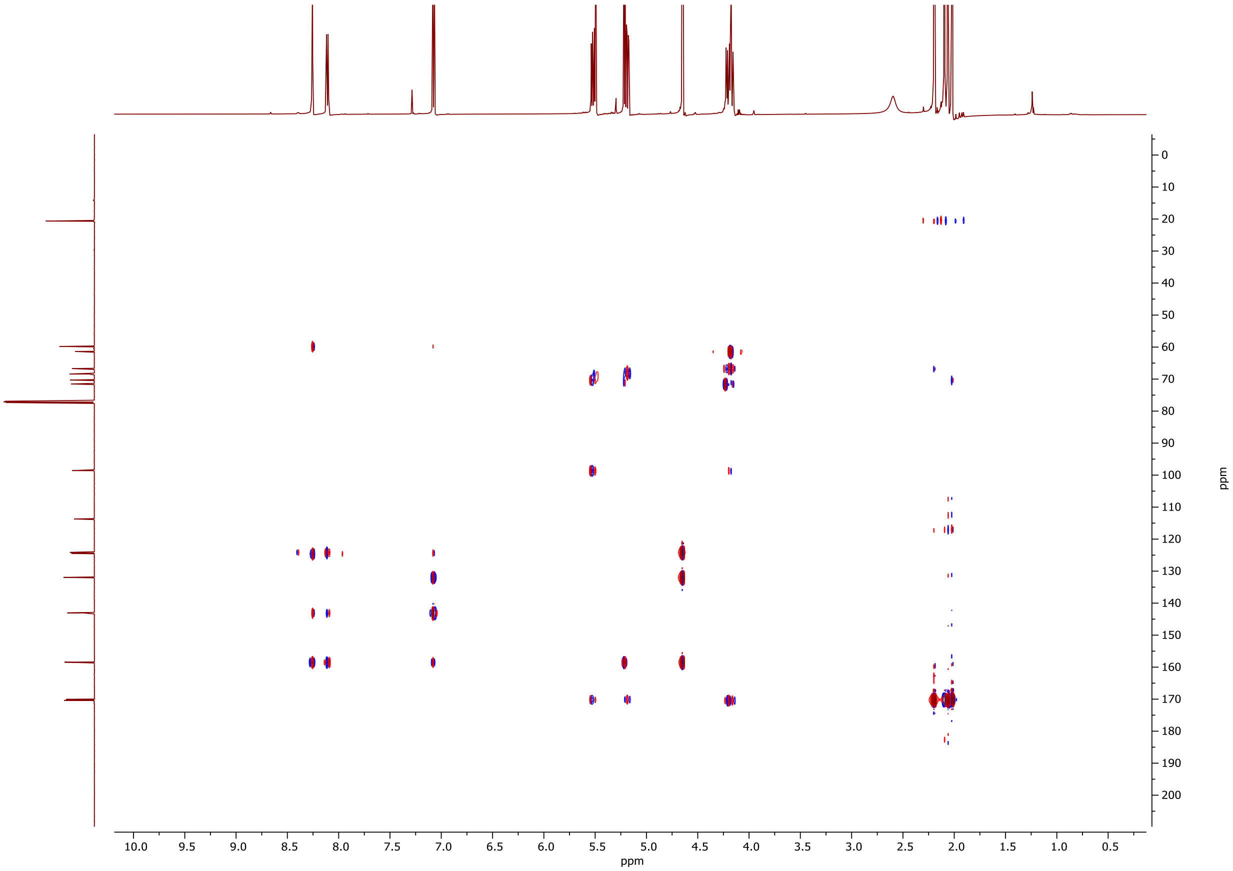


Figure S30. ^{1}H-^{13}C HMBC NMR spectrum of compound **9** in $CDCl_3$

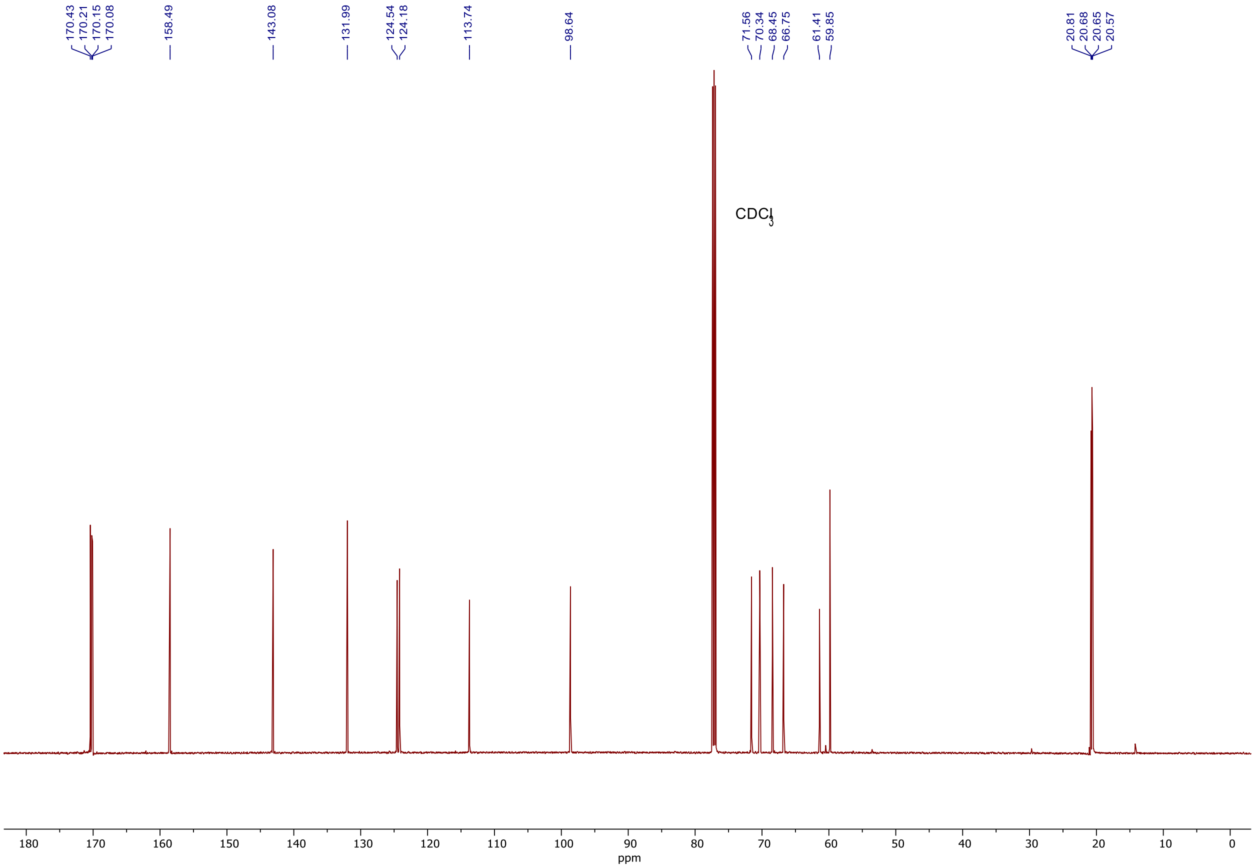
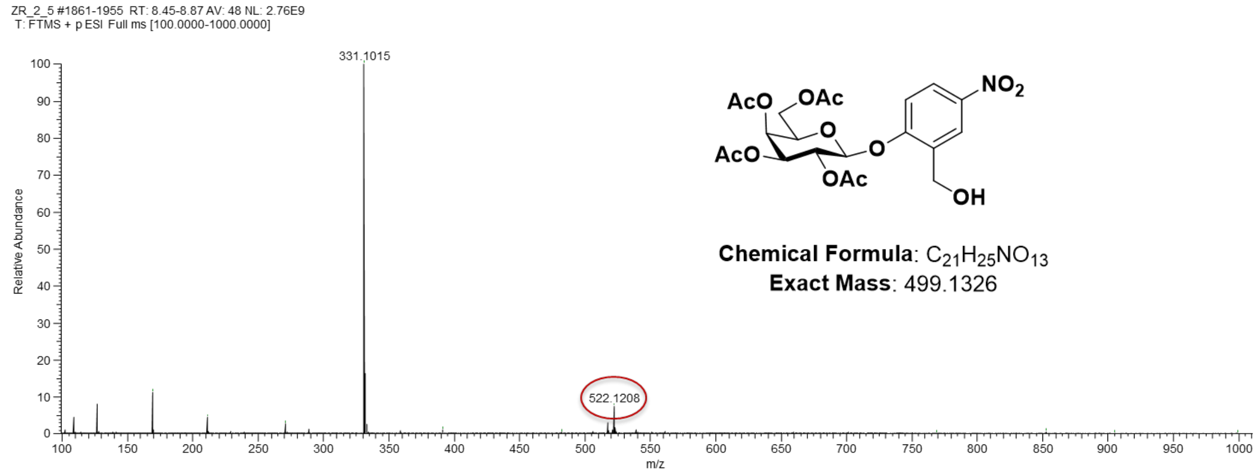


Figure S31. ^{13}C NMR spectrum of compound **9** in $CDCl_3$



Chemical Formula: $C_{21}H_{25}NO_{13}$
Exact Mass: 499.1326

Figure S32. ESI-MS spectrum of compound **9**

***R*$_f$ = 0.28**

1:1 Hexanes: Ethyl Acetate
UV (254 nm) (Circle)
10% H_2SO_4 in EtOH (brown)

Figure S33. TLC of compound **9**

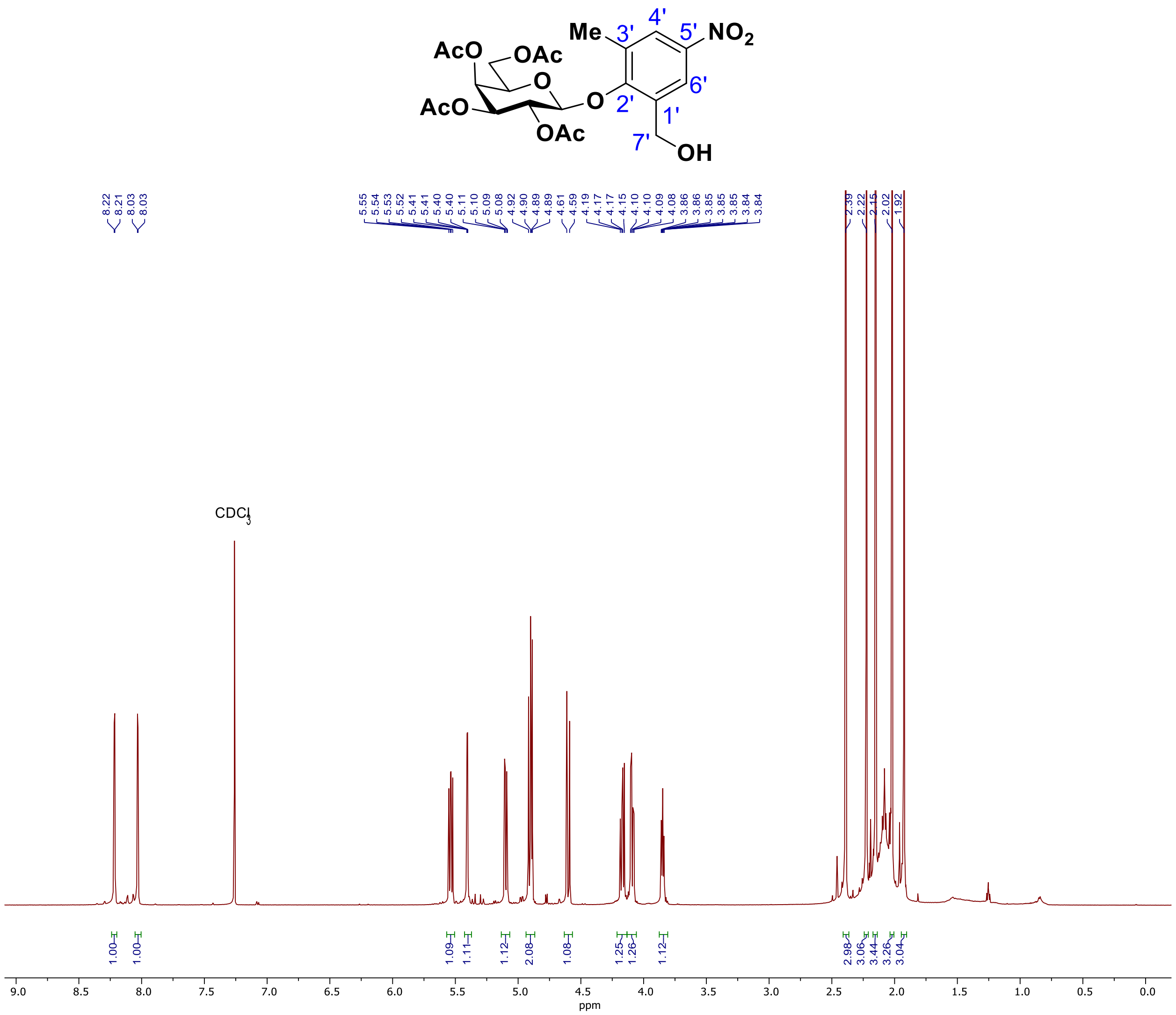


Figure S34. ^1H NMR spectrum of compound **10** in $CDCl_3$

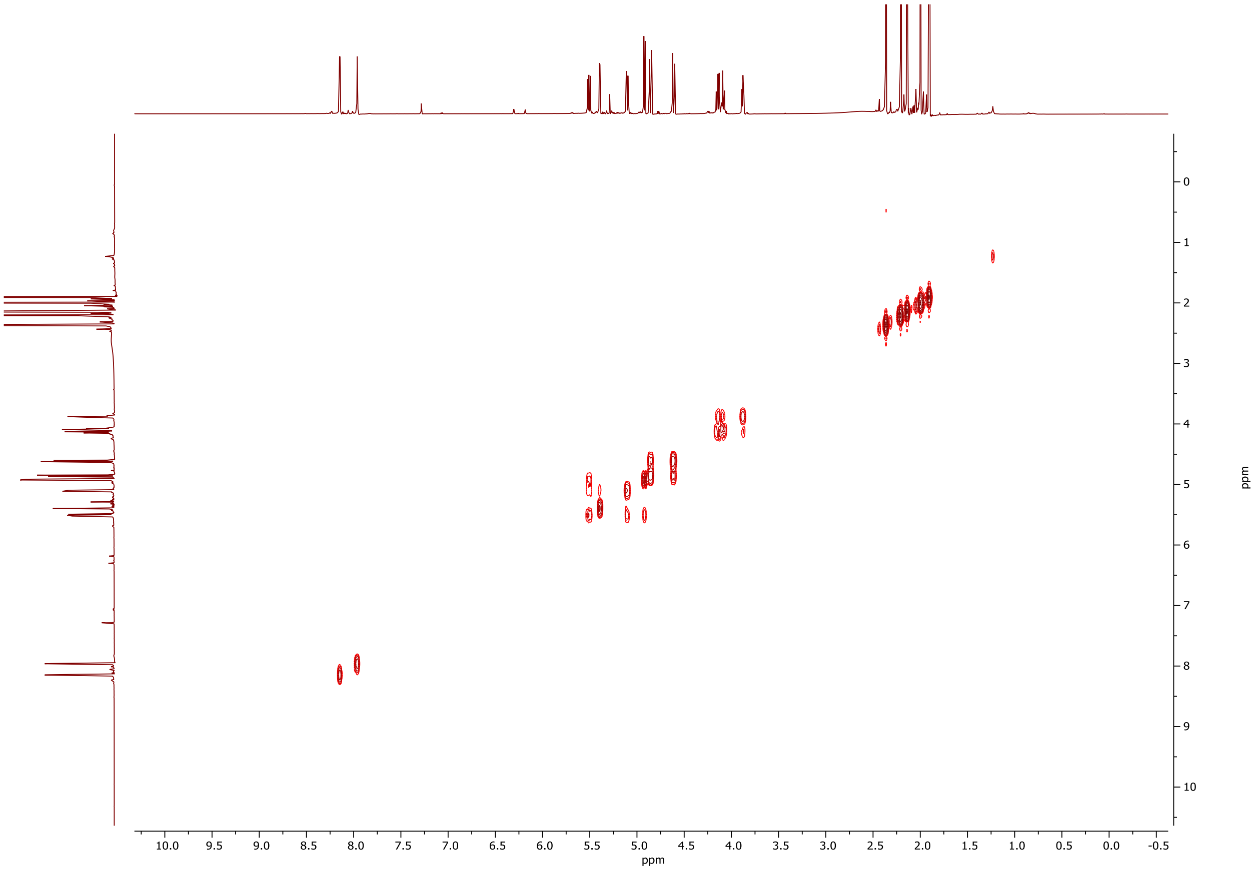


Figure S35. ^{1}H-^{1}H COSY NMR spectrum of compound **10** in $CDCl_3$

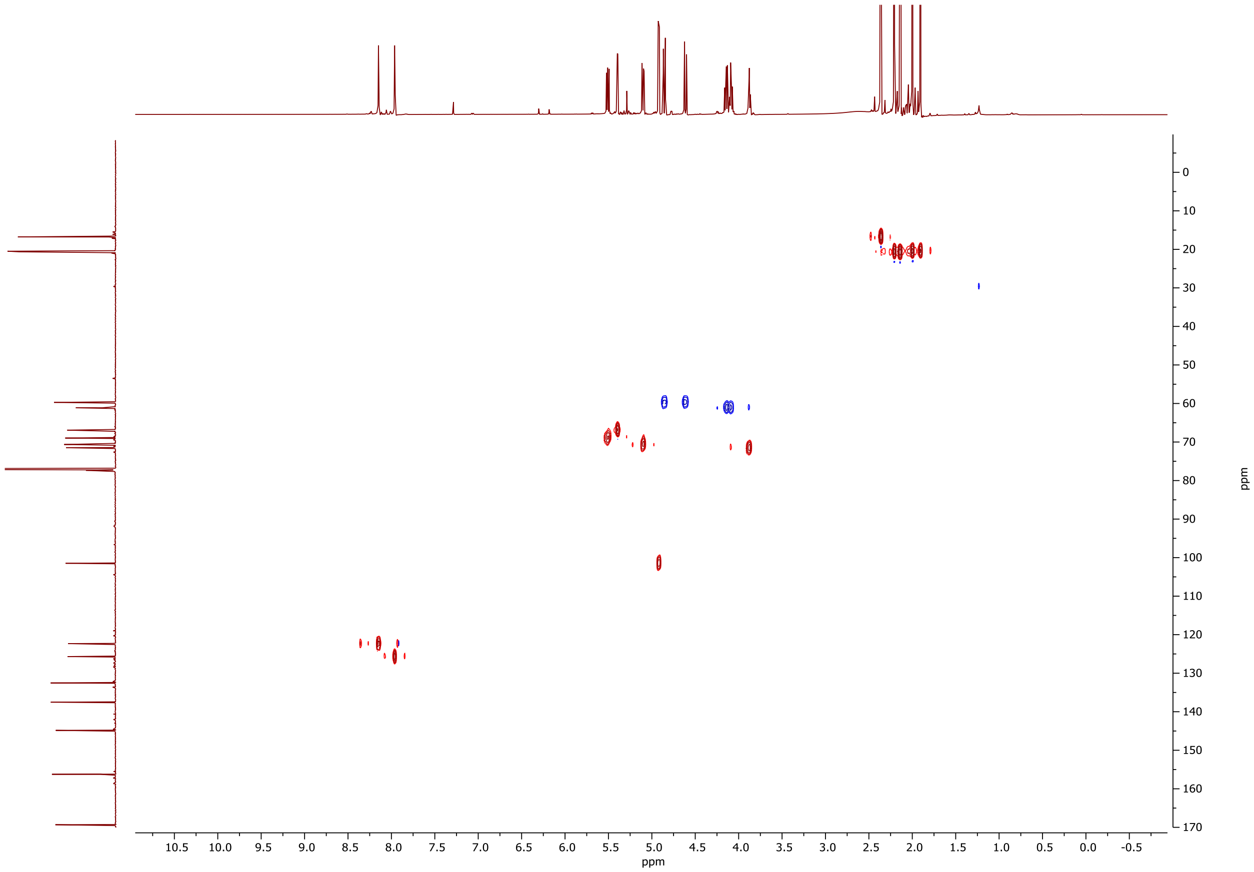


Figure S36. ^{1}H-^{13}C HSQC NMR spectrum of compound **10** in $CDCl_3$

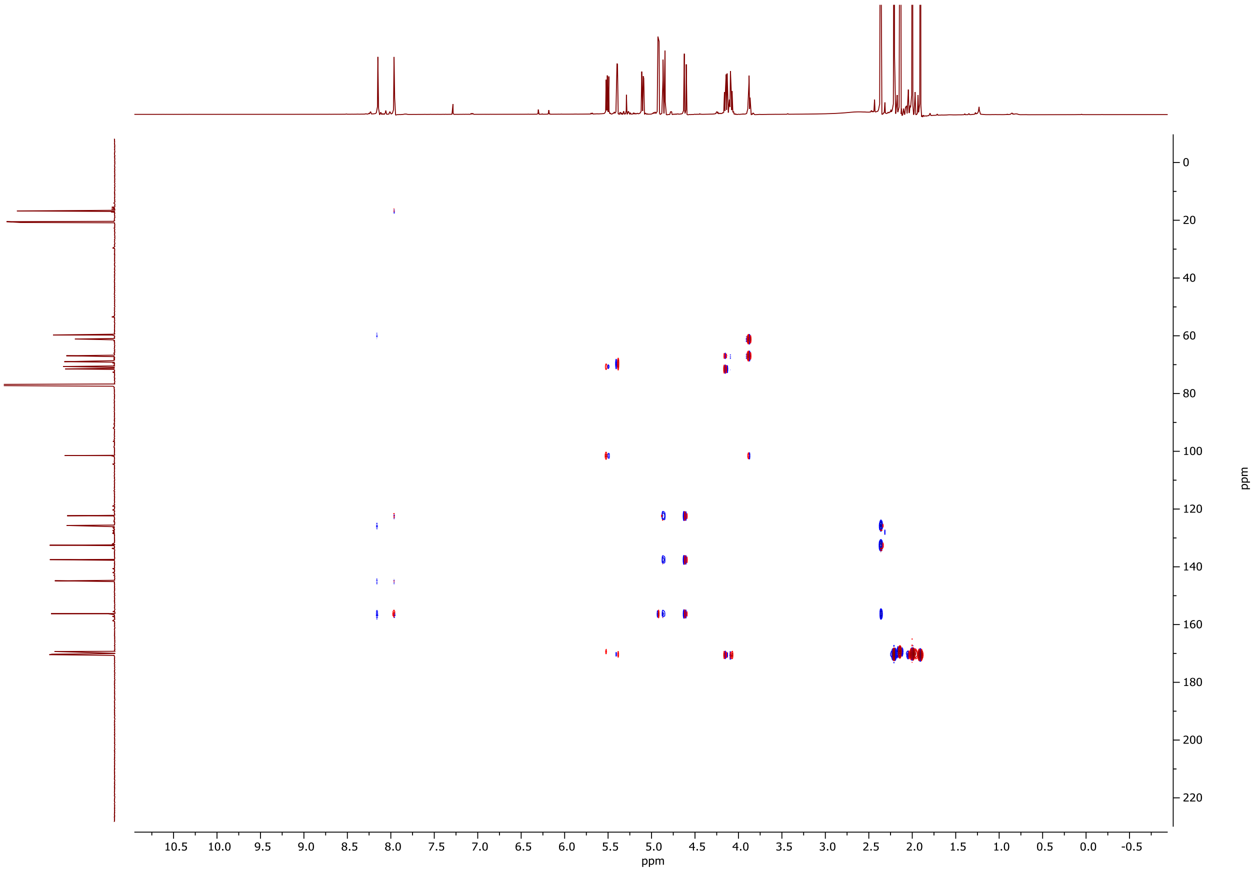


Figure S37. ^{1}H-^{13}C HMBC NMR spectrum of compound **10** in $CDCl_3$

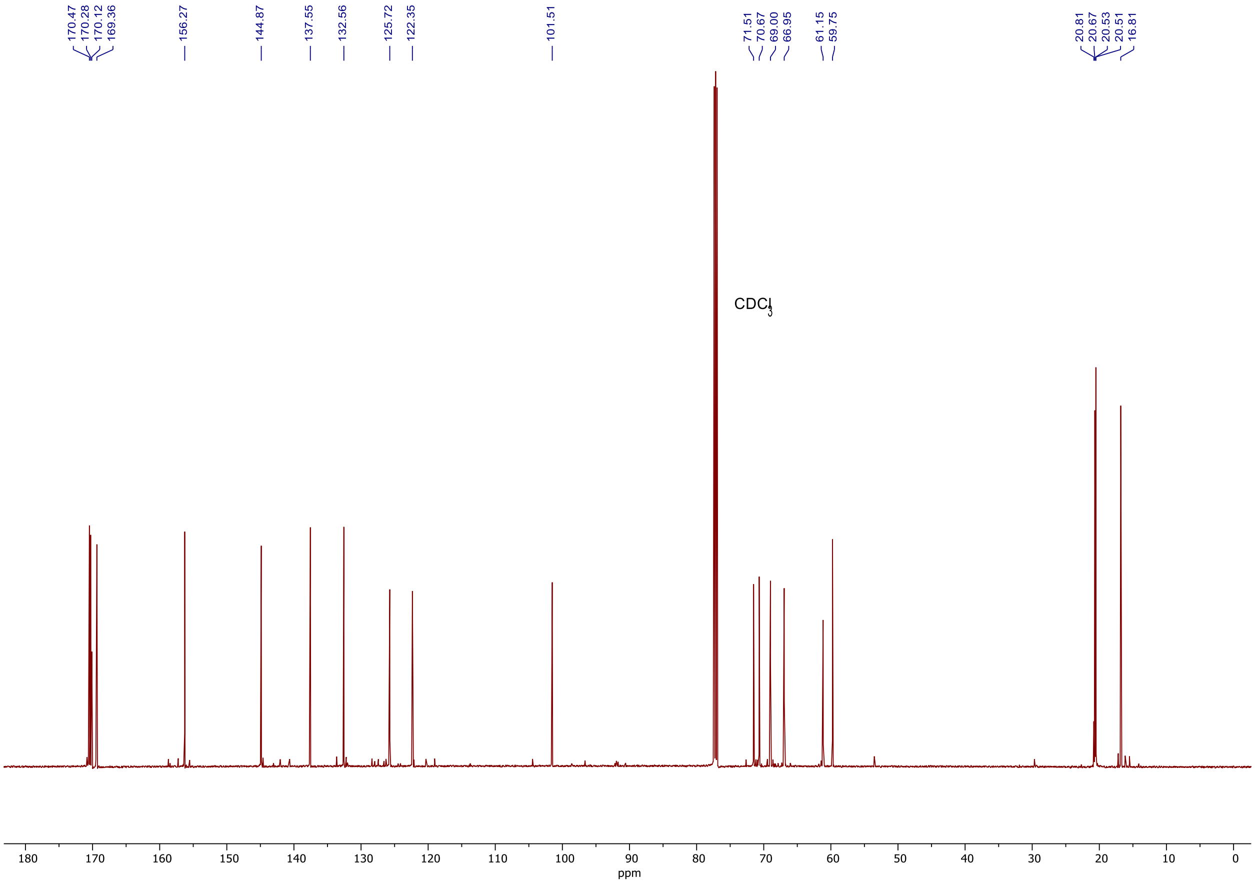
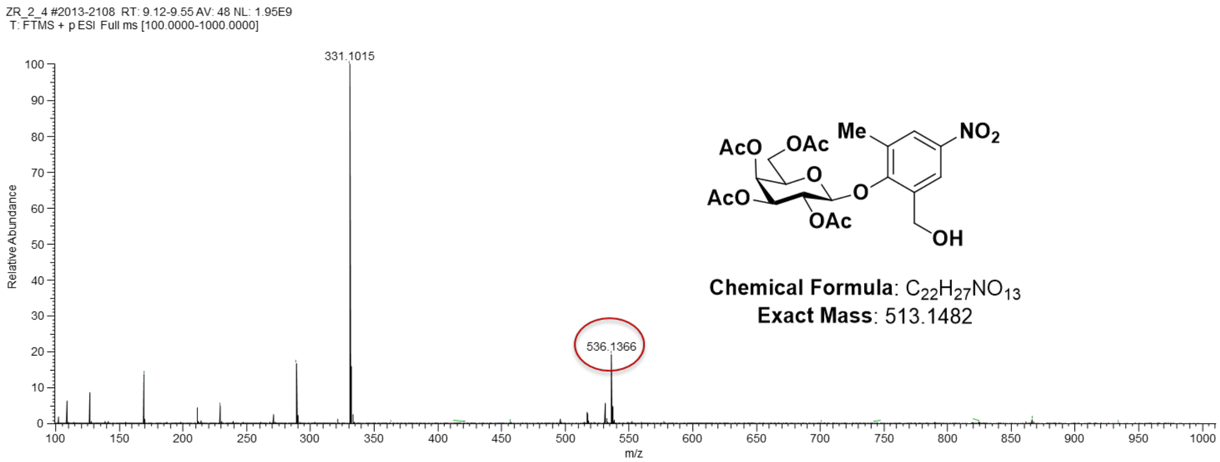


Figure S38. ^{13}C NMR spectrum of compound **10** in $CDCl_3$



Chemical Formula: $C_{22}H_{27}NO_{13}$
Exact Mass: 513.1482

Figure S39. ESI-MS spectrum of compound **10**

R_f = 0.34

1:1 Hexanes: Ethyl Acetate
UV (254 nm) (Circle)
10% H_2SO_4 in EtOH (brown)

Figure S40. TLC of compound **10**

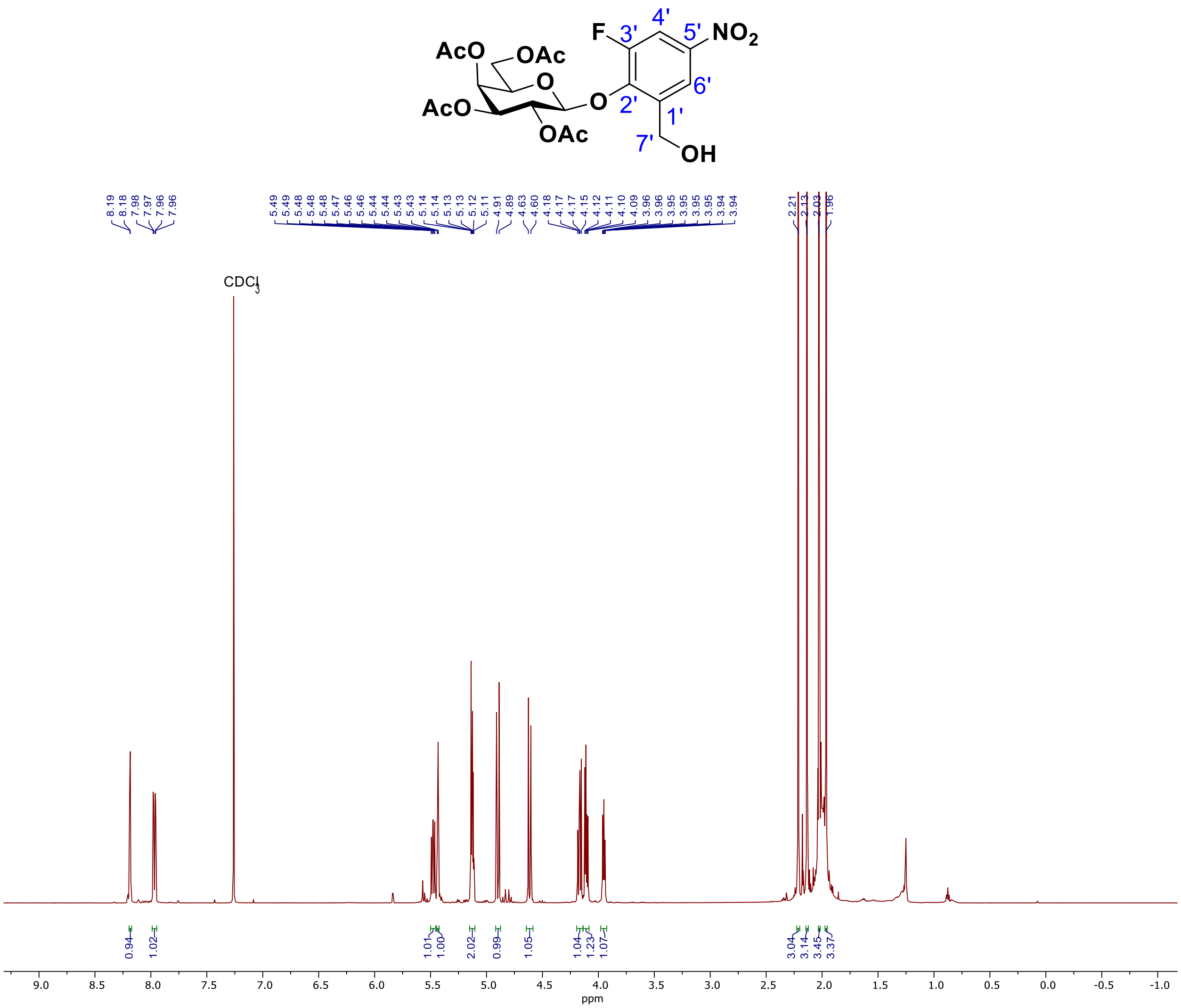


Figure S41. ^{1}H NMR spectrum of compound **11** in $CDCl_3$

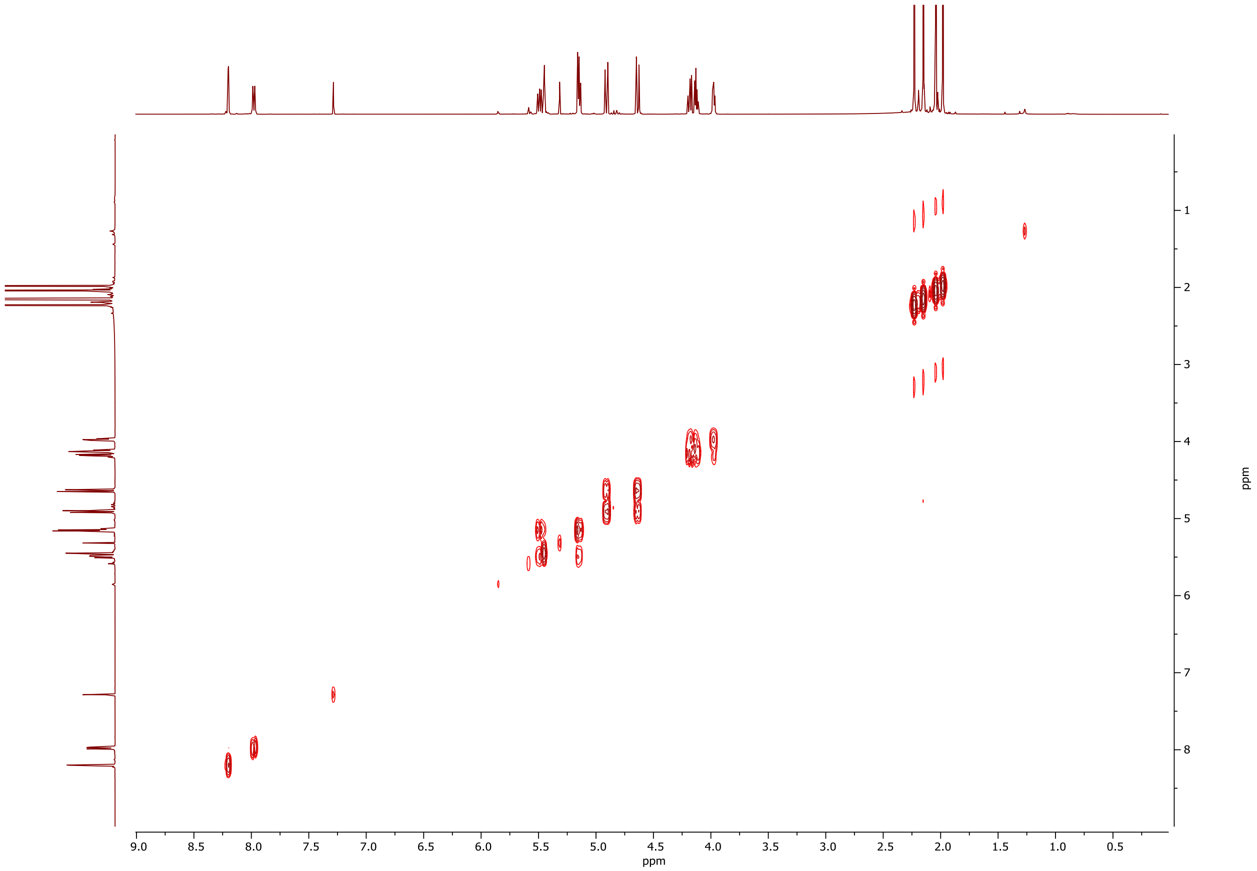


Figure S42. ^{1}H-^{1}H COSY NMR spectrum of compound **11** in $CDCl_3$

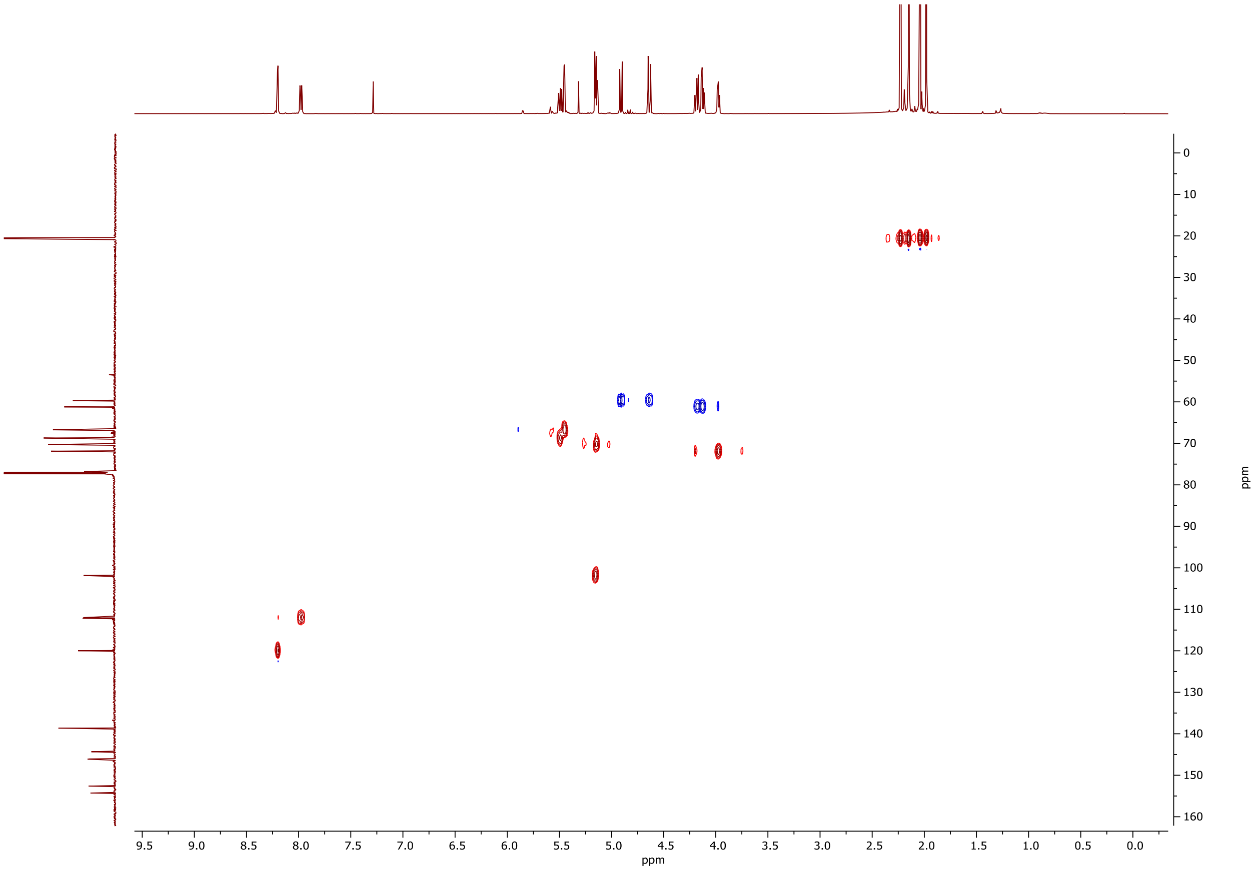


Figure S43. ^{1}H-^{13}C HSQC NMR spectrum of compound **11** in $CDCl_3$

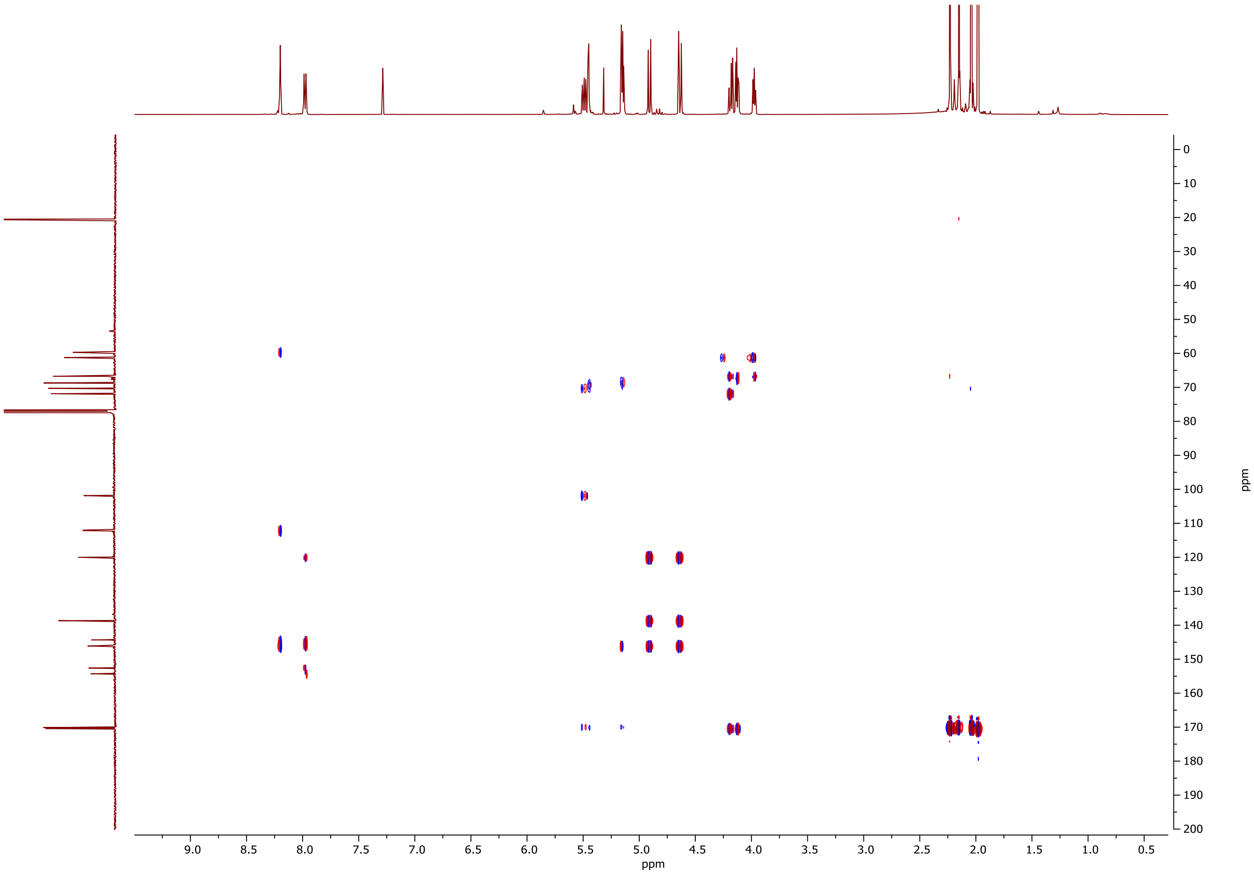


Figure S44. ^{1}H-^{13}C HMBC NMR spectrum of compound **11** in $CDCl_3$

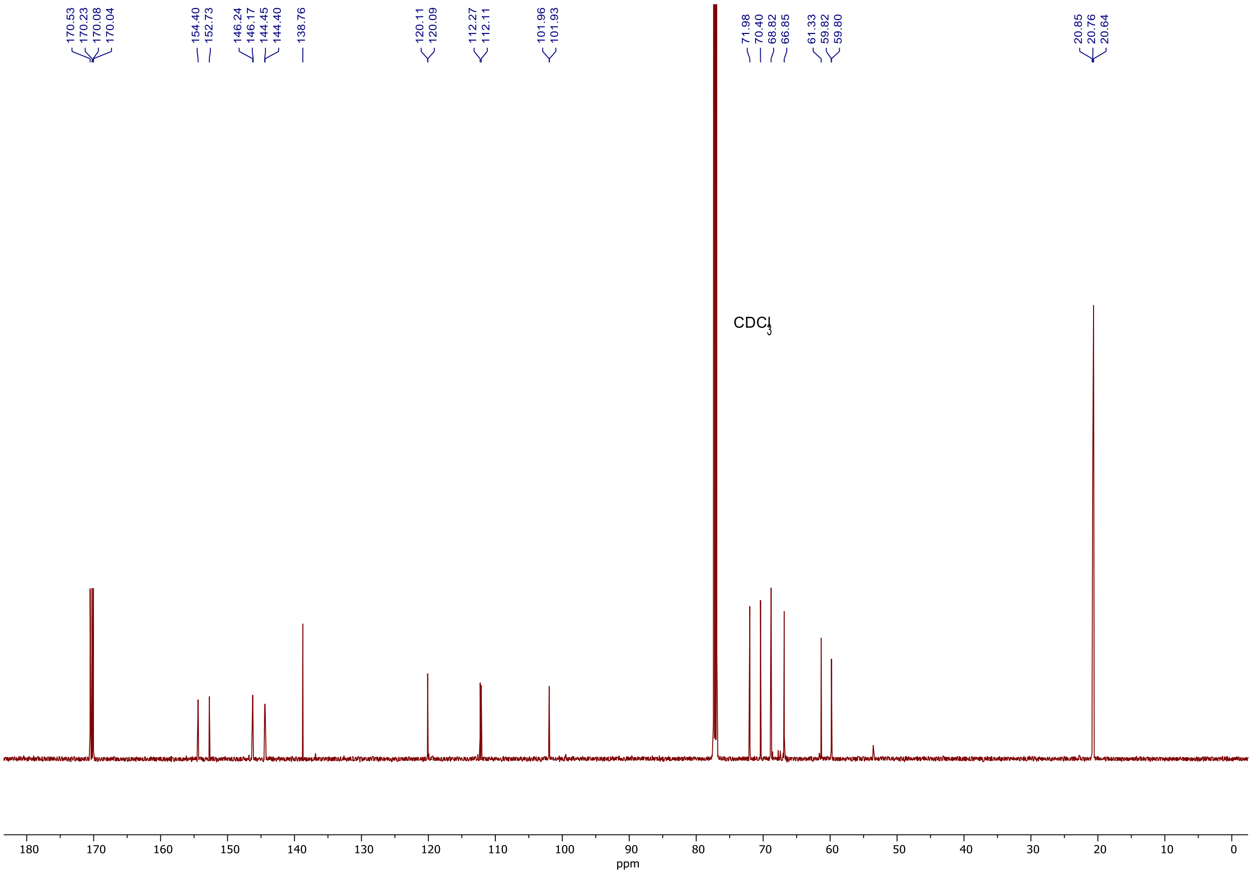


Figure S45. ^{13}C NMR spectrum of compound **11** in CDCl$_3$

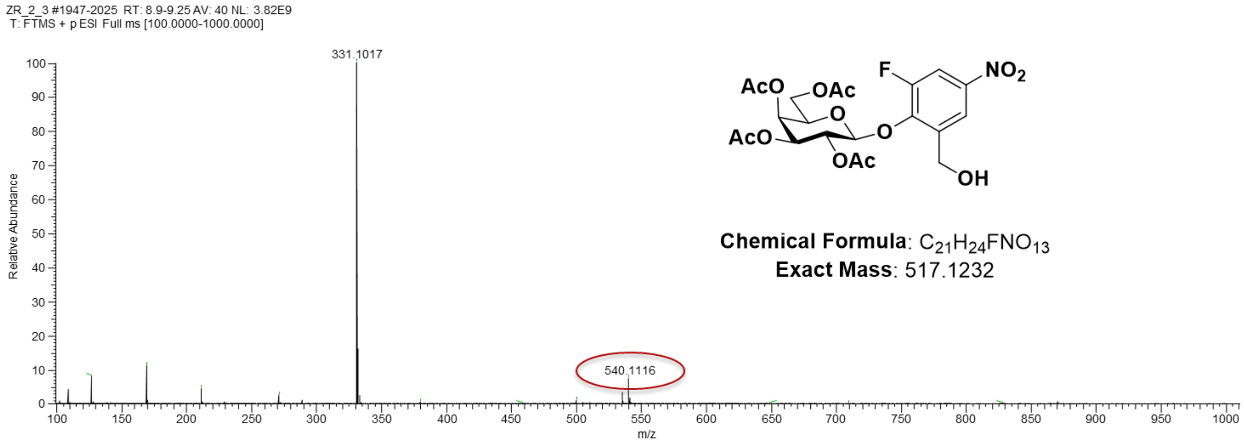


Figure S46. ESI-MS spectrum of compound **11**

***R$_f$* = 0.28**

1:1 Hexanes: Ethyl Acetate
UV (254 nm) (Circle)
10% H_2SO_4 in EtOH (brown)

Figure S47. TLC of compound **11**

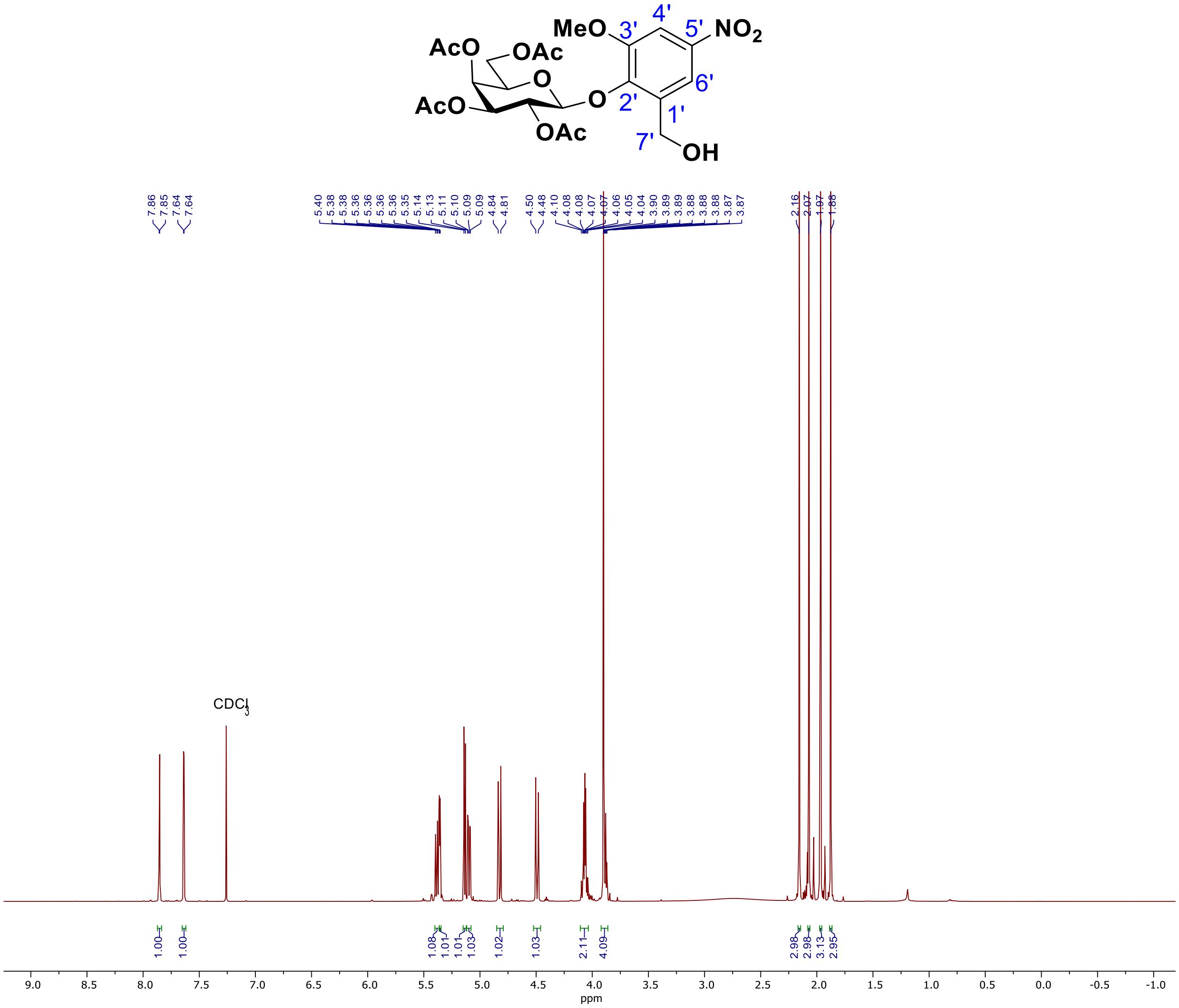


Figure S48. ^{1}H NMR spectrum of compound **12** in $CDCl_3$

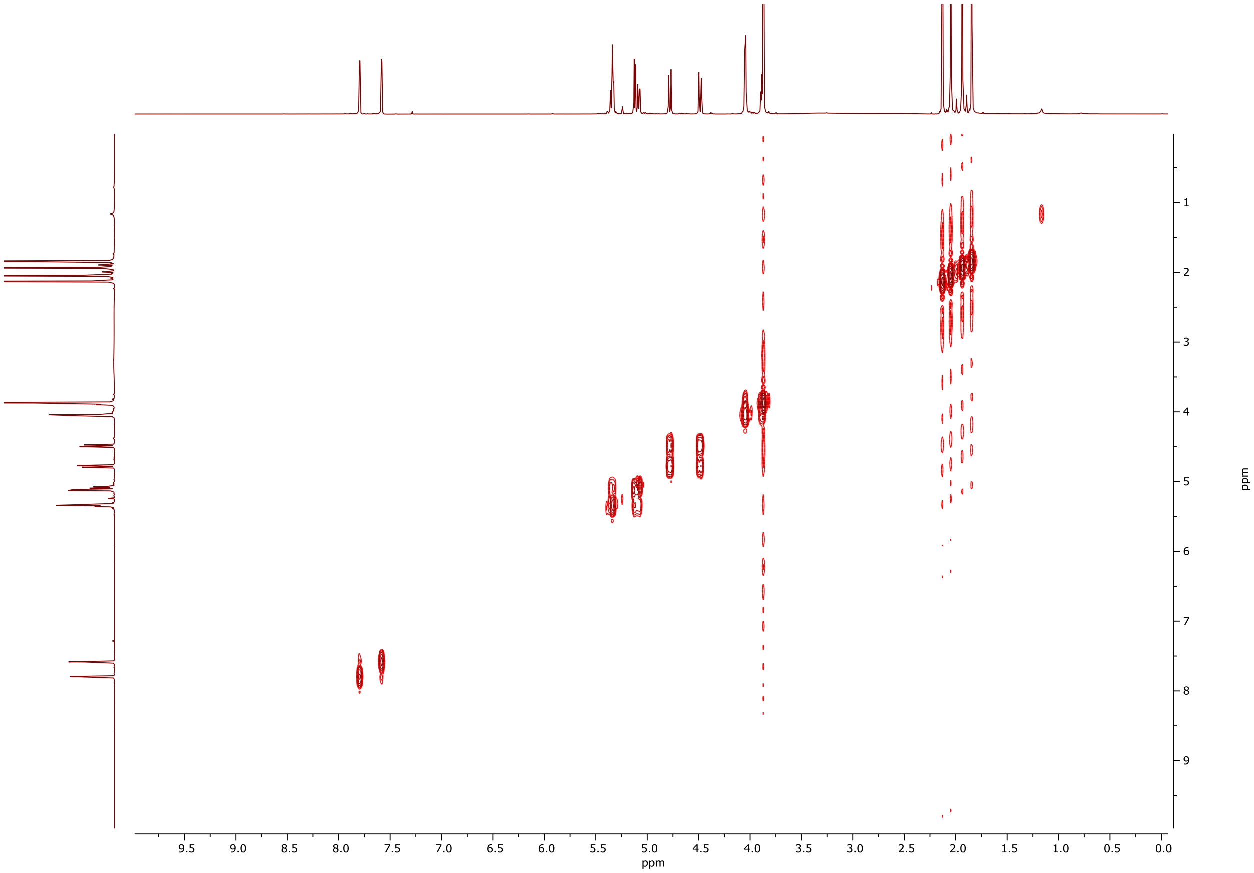


Figure S49. ^{1}H- ^{1}H COSY NMR spectrum of compound **12** in $CDCl_3$

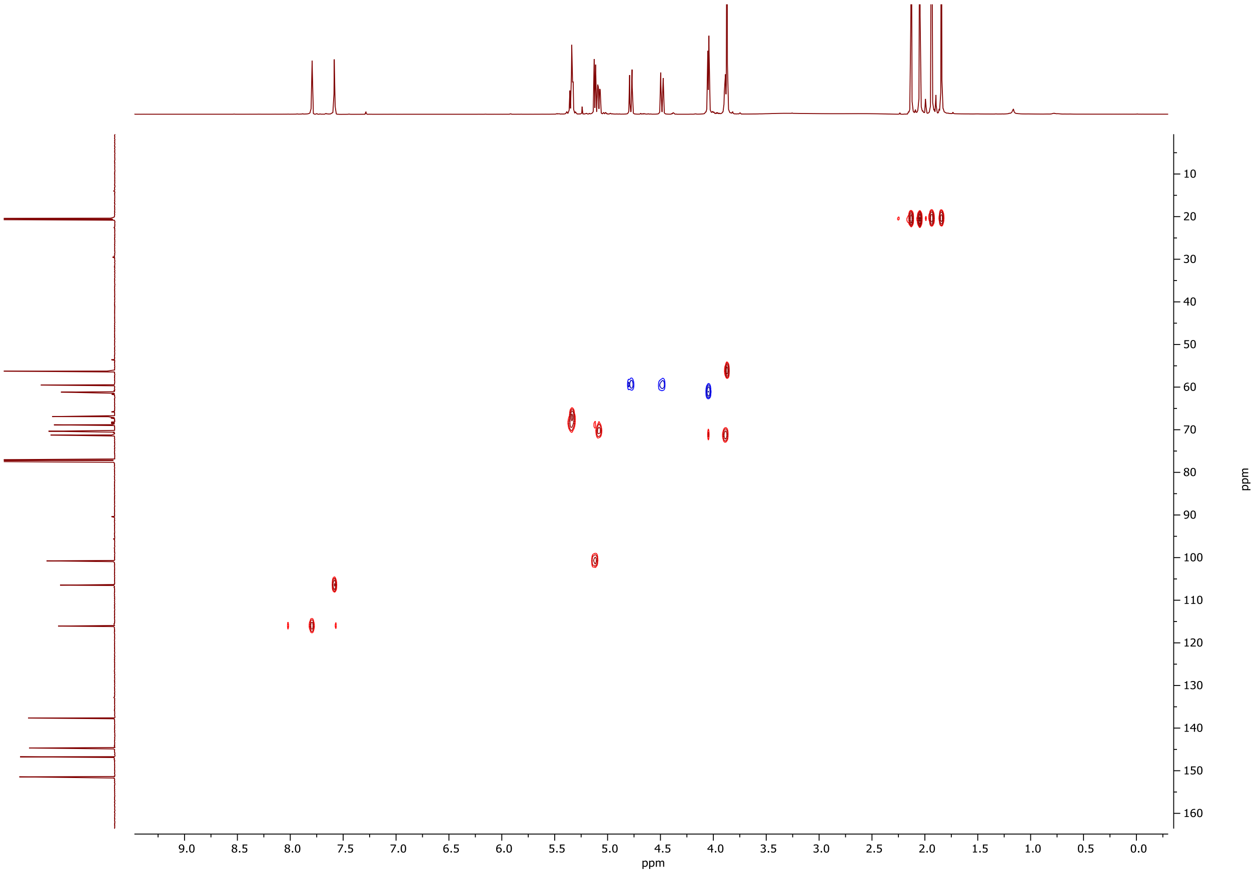


Figure S50. ^{1}H- ^{13}C HSQC NMR spectrum of compound **12** in CDCl$_3$

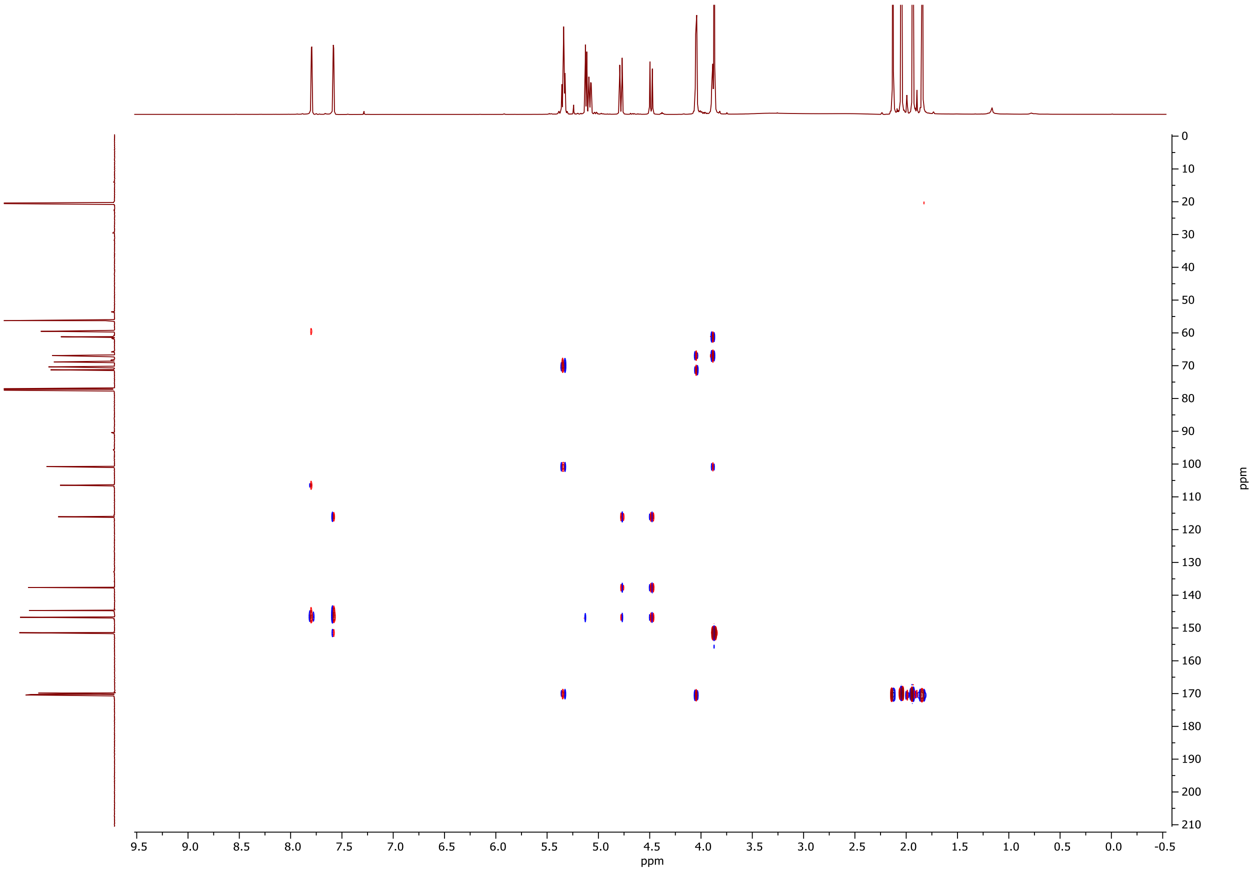


Figure S51. ^{1}H- ^{13}C HMBC NMR spectrum of compound **12** in CDCl$_3$

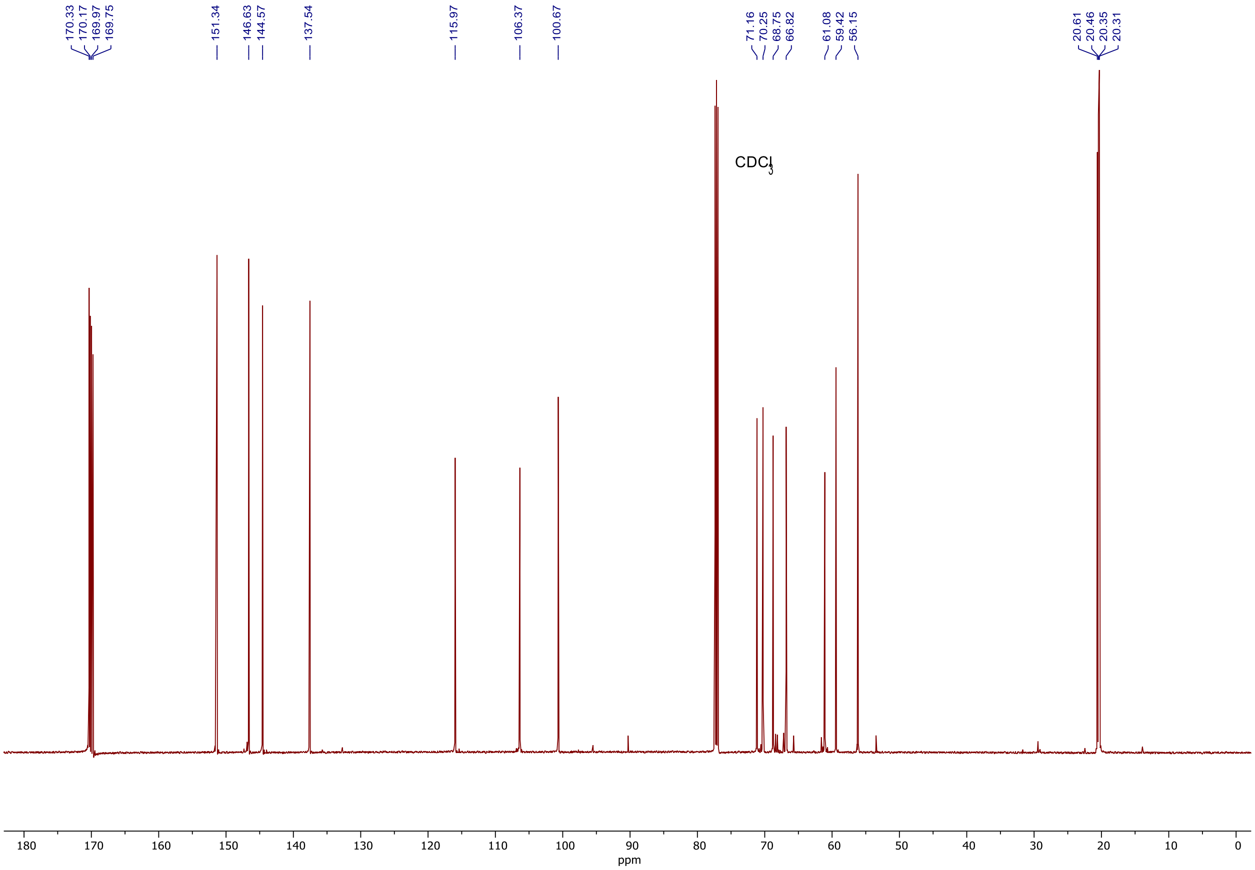
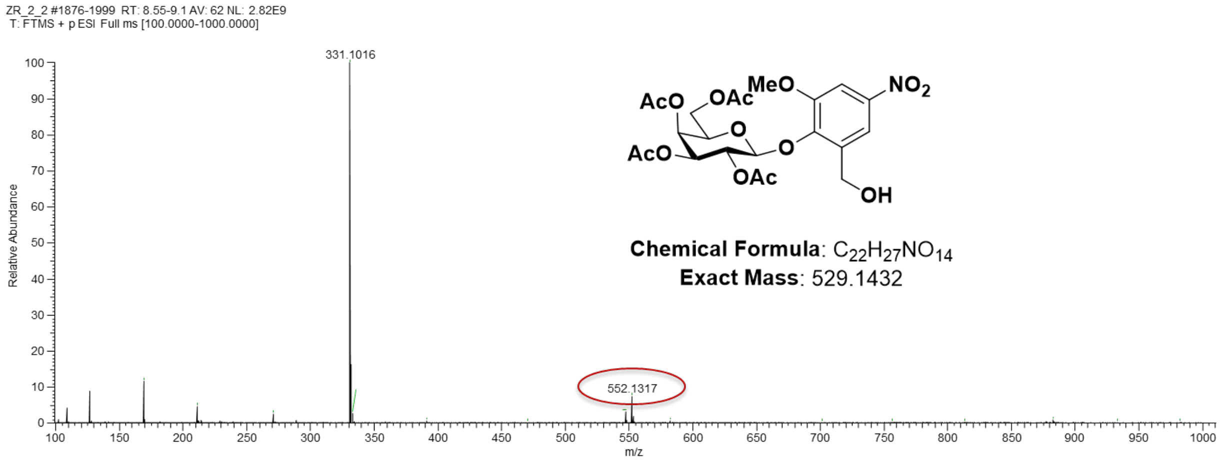


Figure S52. ^{13}C NMR spectrum of compound **12** in $CDCl_3$



Chemical Formula: $C_{22}H_{27}NO_{14}$
Exact Mass: 529.1432

Figure S53. ESI-MS spectrum of compound **12**

R_f = 0.26

1:1 Hexanes: Ethyl Acetate
UV (254 nm) (Circle)
10% H_2SO_4 in EtOH (brown)

Figure S54. TLC of compound **12**

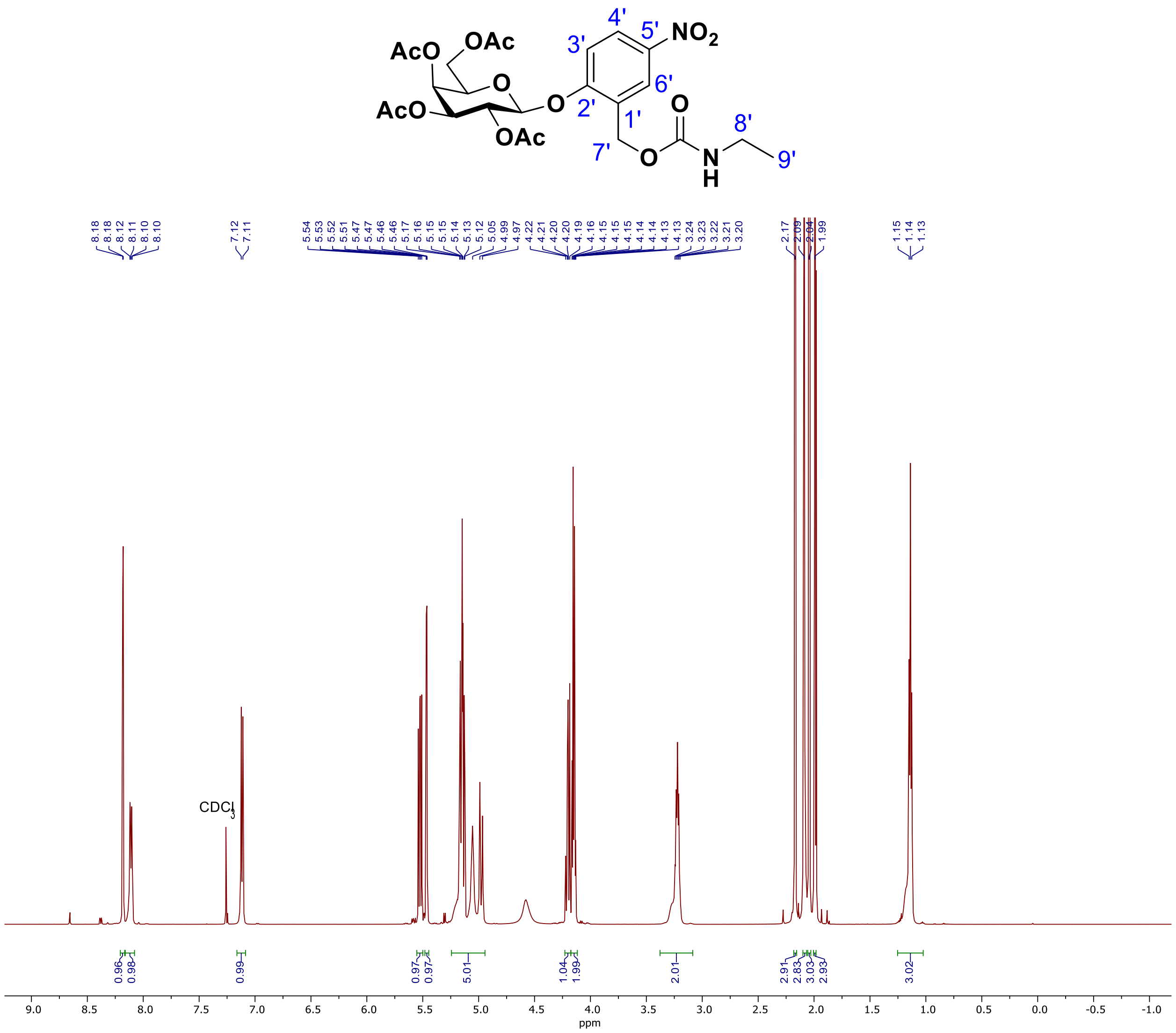


Figure S55. ^{1}H NMR spectrum of compound **13** in $CDCl_3$

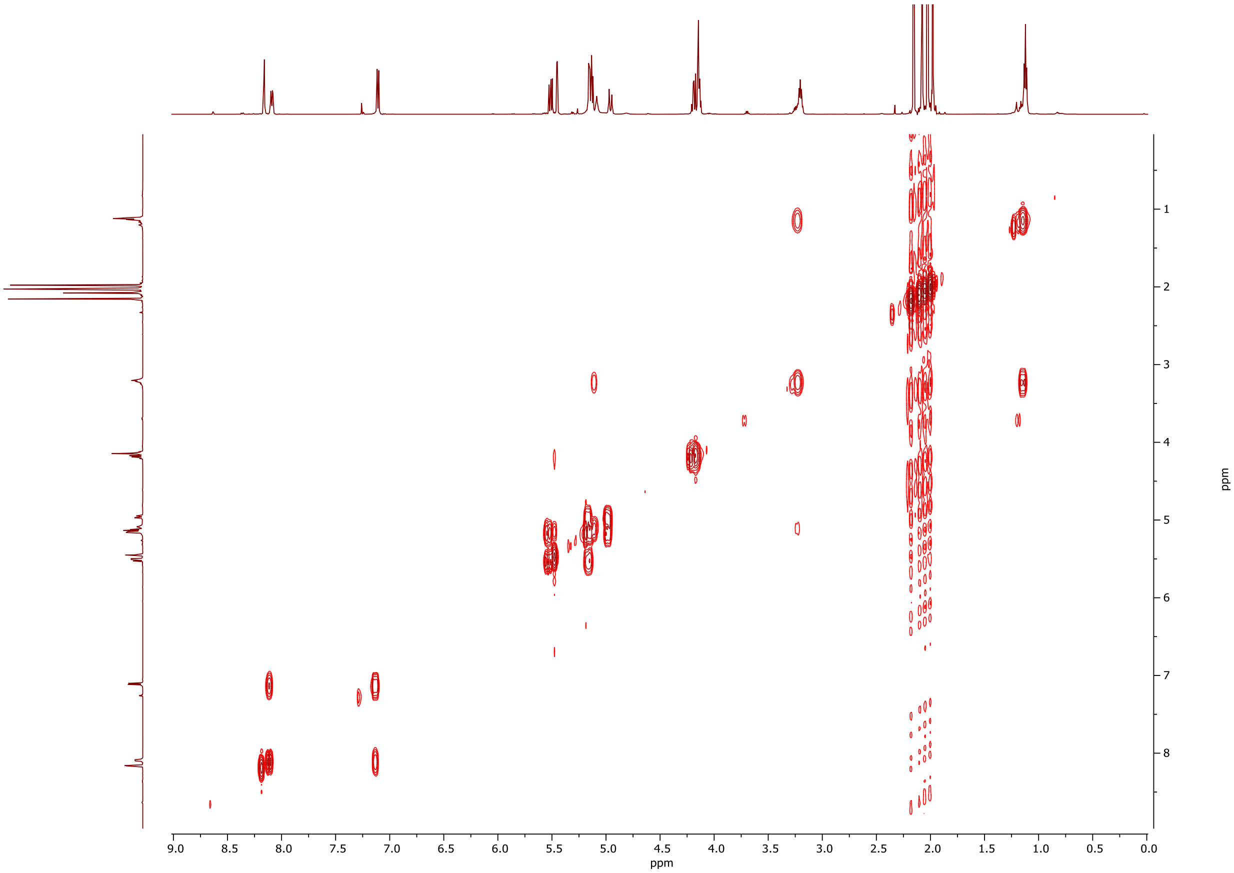


Figure S56. ^{1}H-^{1}H COSY NMR spectrum of compound **13** in $CDCl_3$

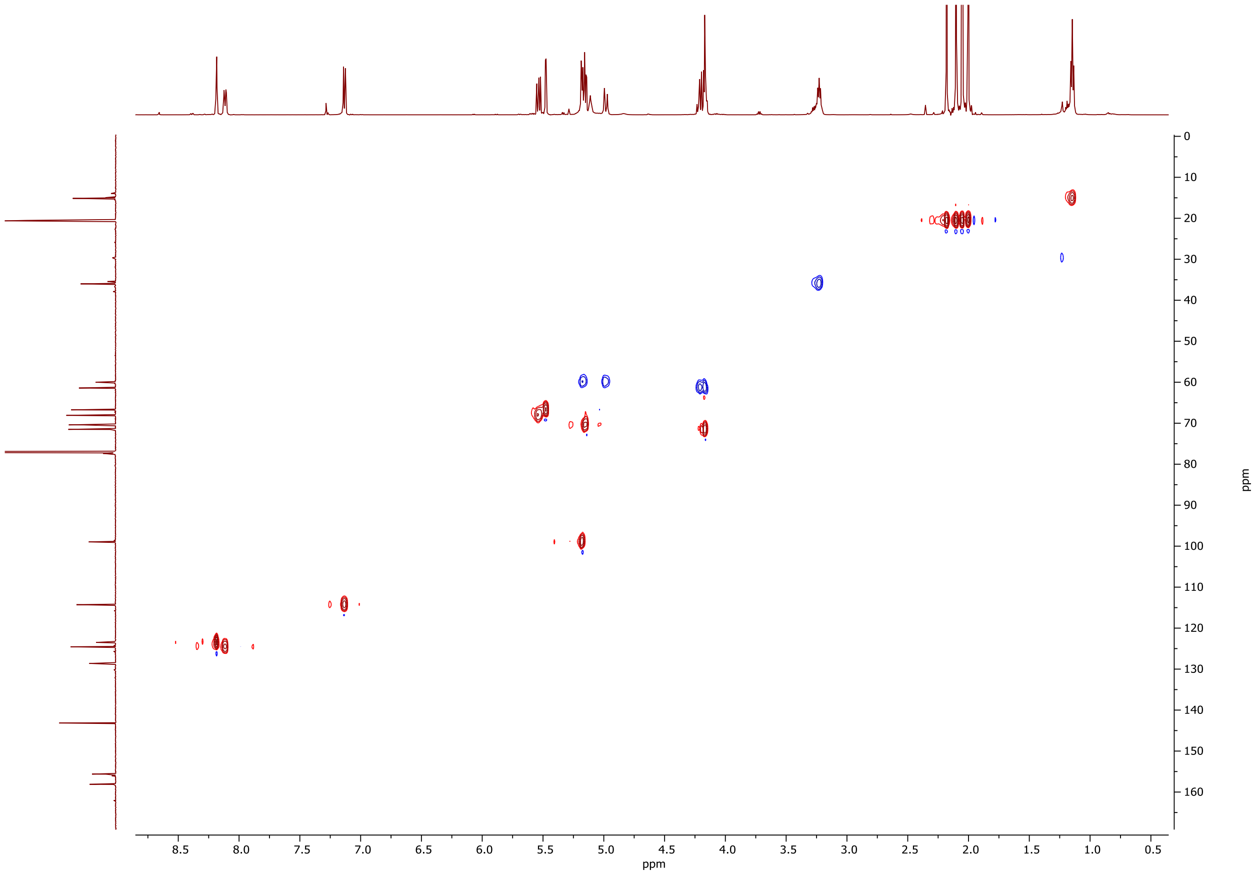


Figure S57. ^{1}H-^{13}C HSQC NMR spectrum of compound **13** in $CDCl_3$

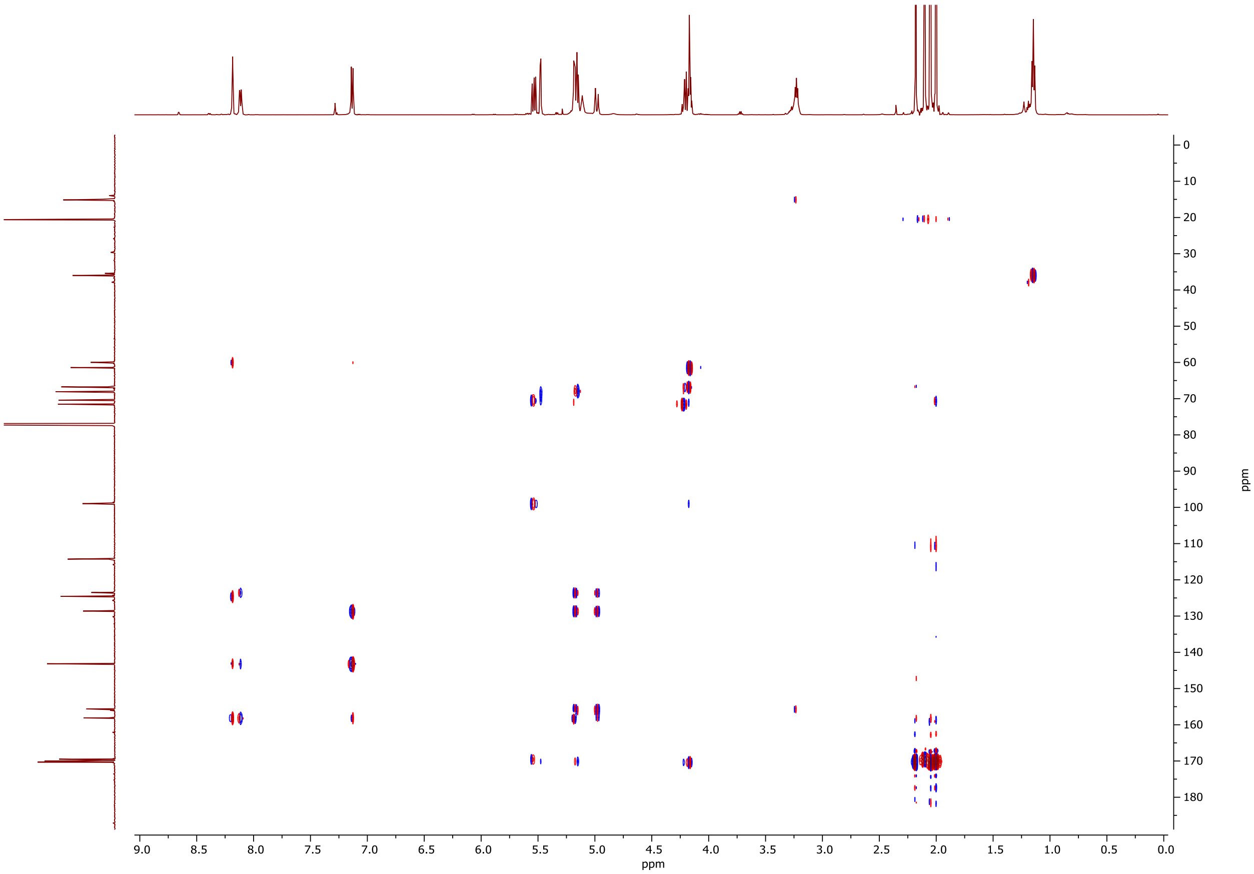


Figure S58. ^{1}H-^{13}C HMBC NMR spectrum of compound **13** in $CDCl_3$

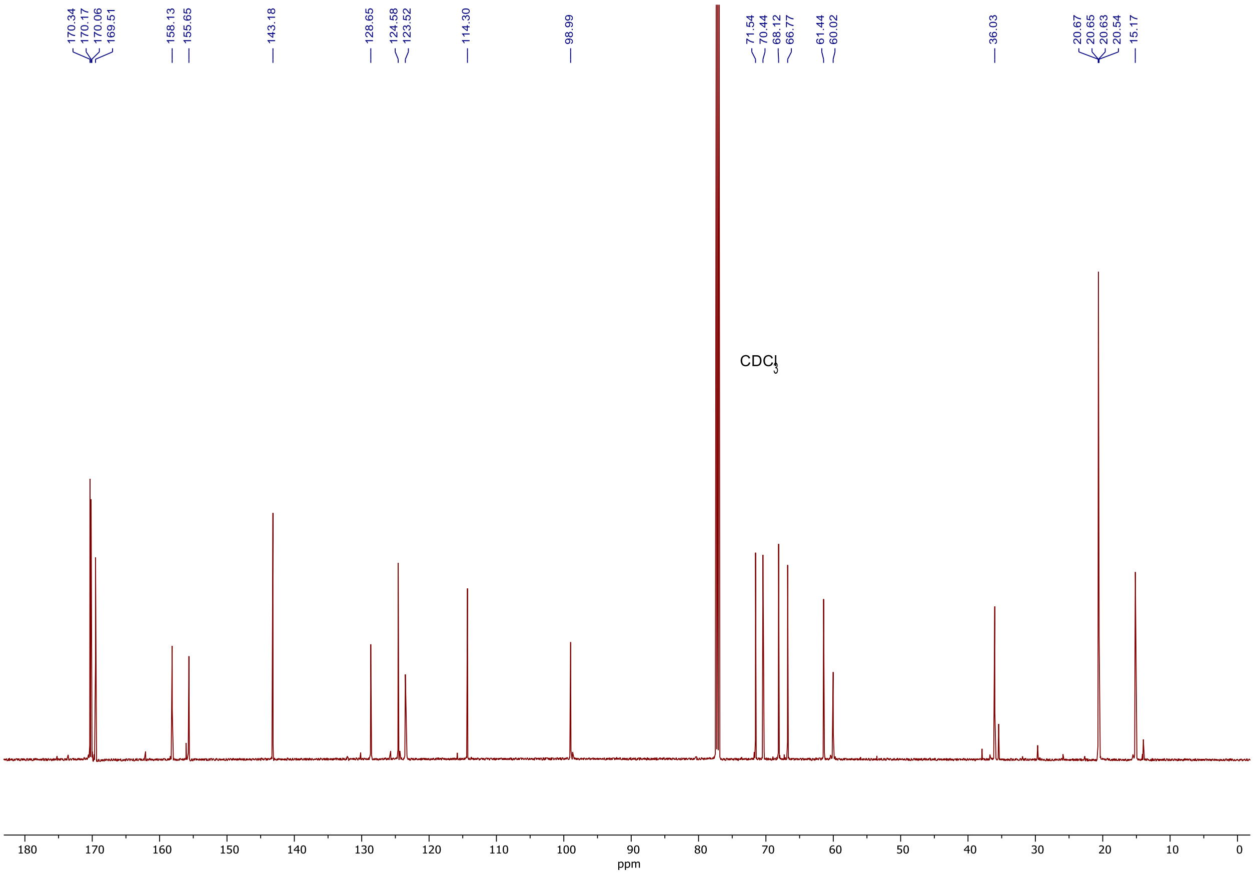
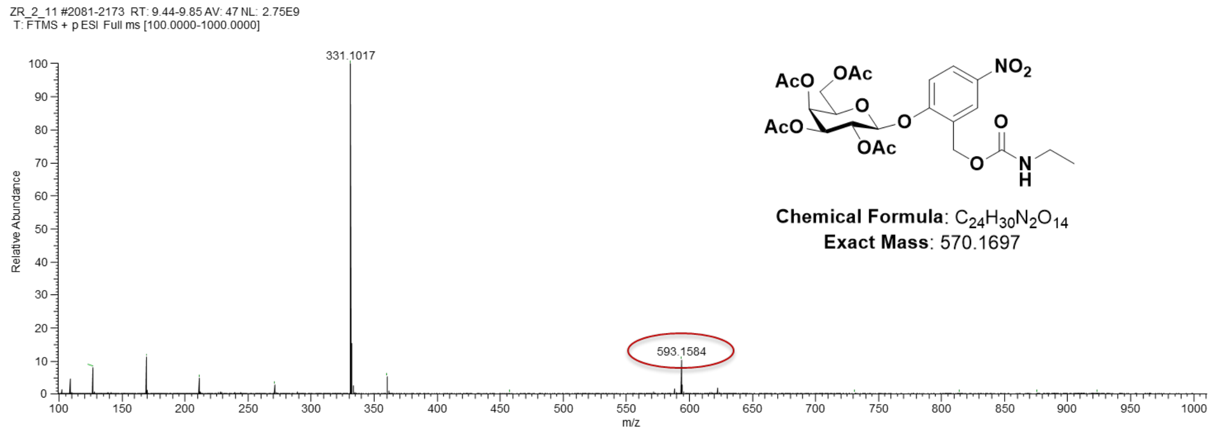


Figure S59. ^{13}C NMR spectrum of compound **13** in $CDCl_3$



Chemical Formula: $C_{24}H_{30}N_2O_{14}$
Exact Mass: 570.1697

Figure S60. ESI-MS spectrum of compound **13**

***R_f* = 0.29**

1:1 Hexanes: Ethyl Acetate
UV (254 nm) (Circle)
10% H_2SO_4 in EtOH (brown)

Figure S61. TLC of compound **13**

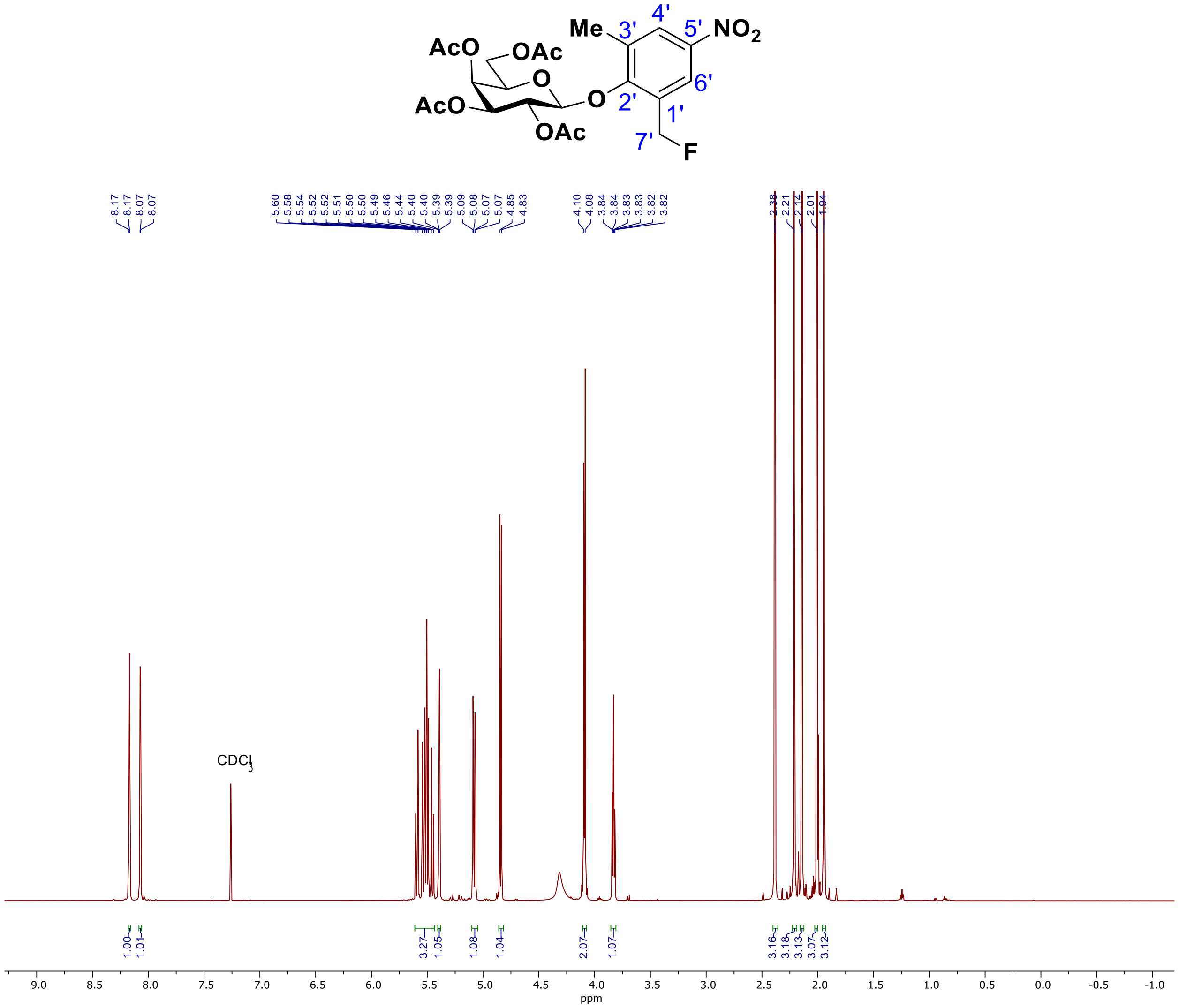


Figure S62. ^{1}H NMR spectrum of compound **14** in $CDCl_3$

Figure S63. ^{1}H-^{1}H COSY NMR spectrum of compound **14** in $CDCl_3$

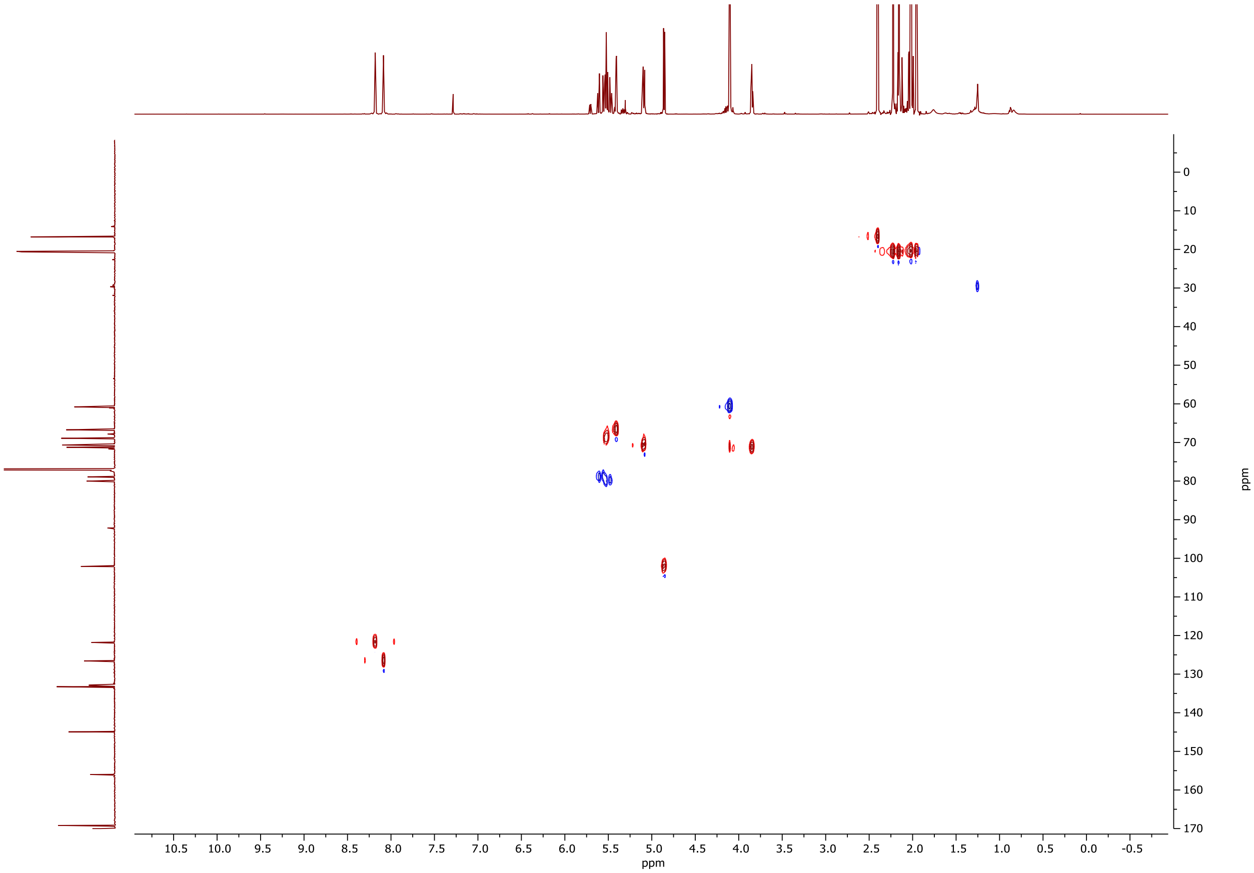


Figure S64. ^{1}H-^{13}C HSQC NMR spectrum of compound **14** in CDCl$_3$

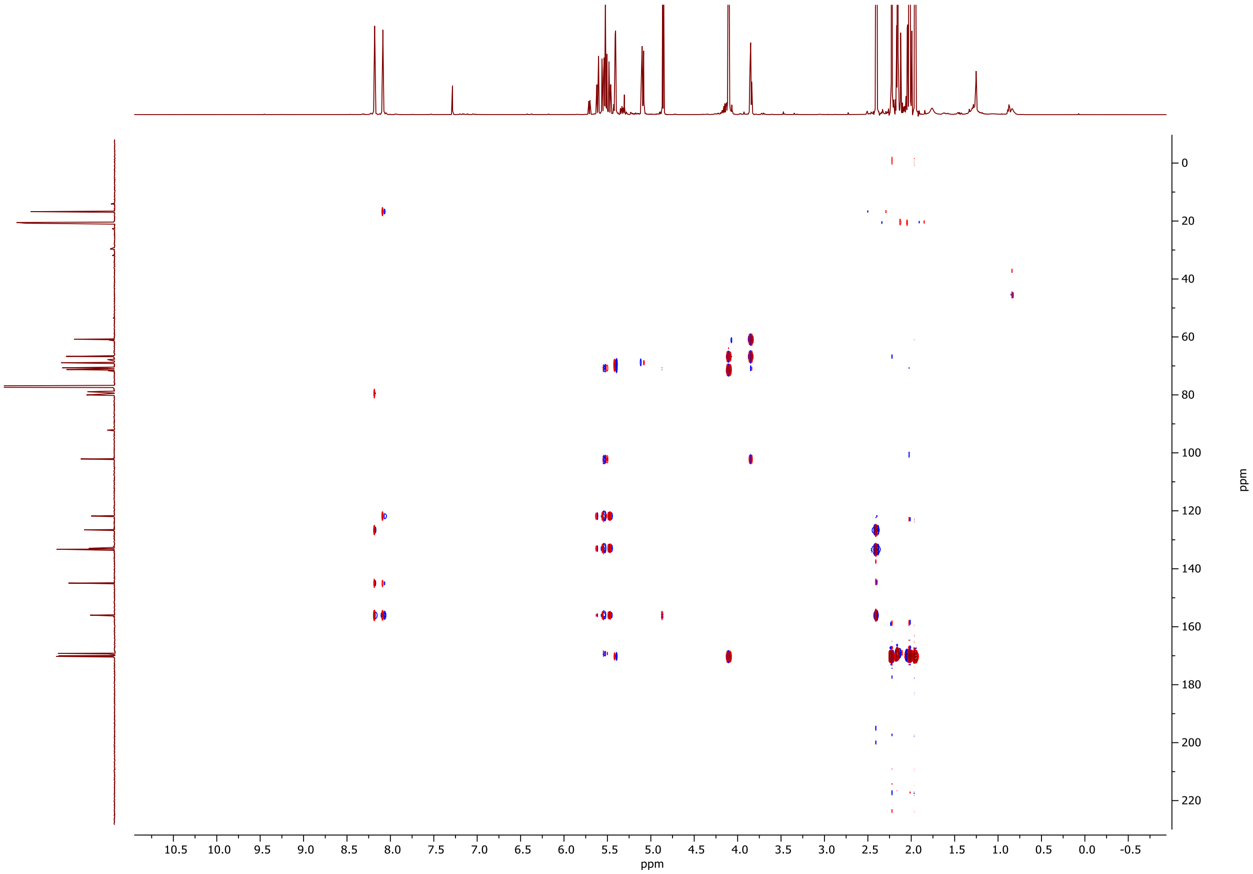


Figure S65. ^{1}H-^{13}C HMBC NMR spectrum of compound **14** in CDCl$_3$

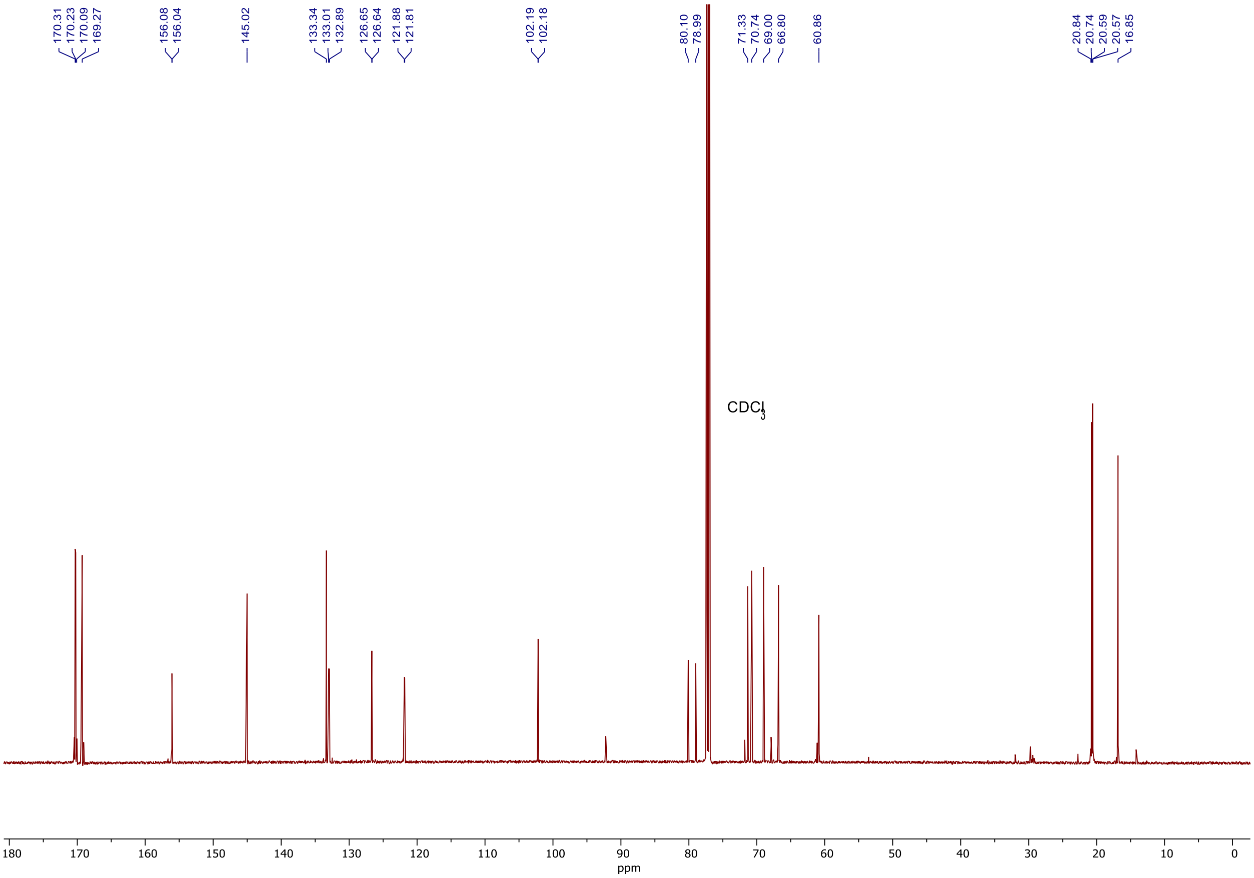


Figure S66. ^{13}C NMR spectrum of compound **14** in $CDCl_3$

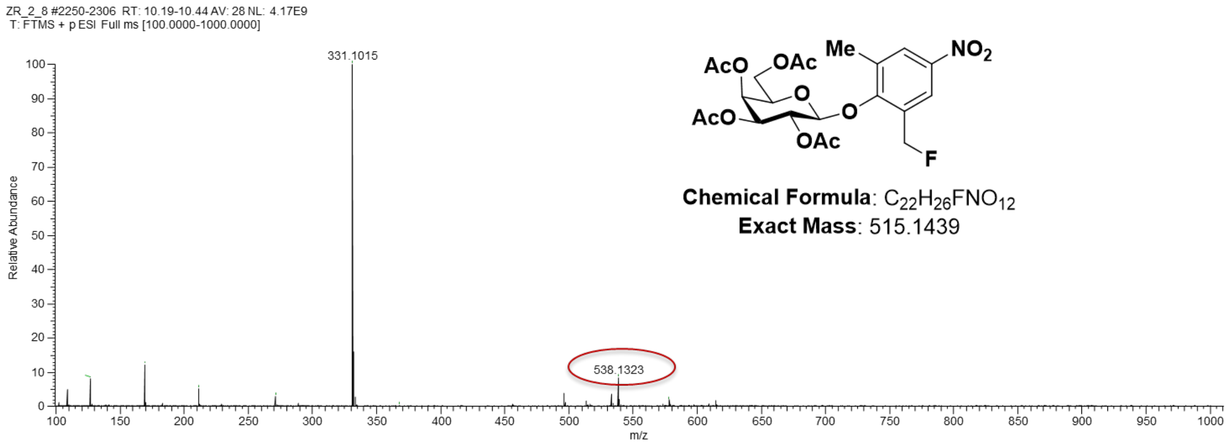


Figure S67. ESI-MS spectrum of compound **14**

***R_f* = 0.59**

1:1 Hexanes: Ethyl Acetate
UV (254 nm) (Circle)
10% H_2SO_4 in EtOH (brown)

Figure S68. TLC of compound **14**

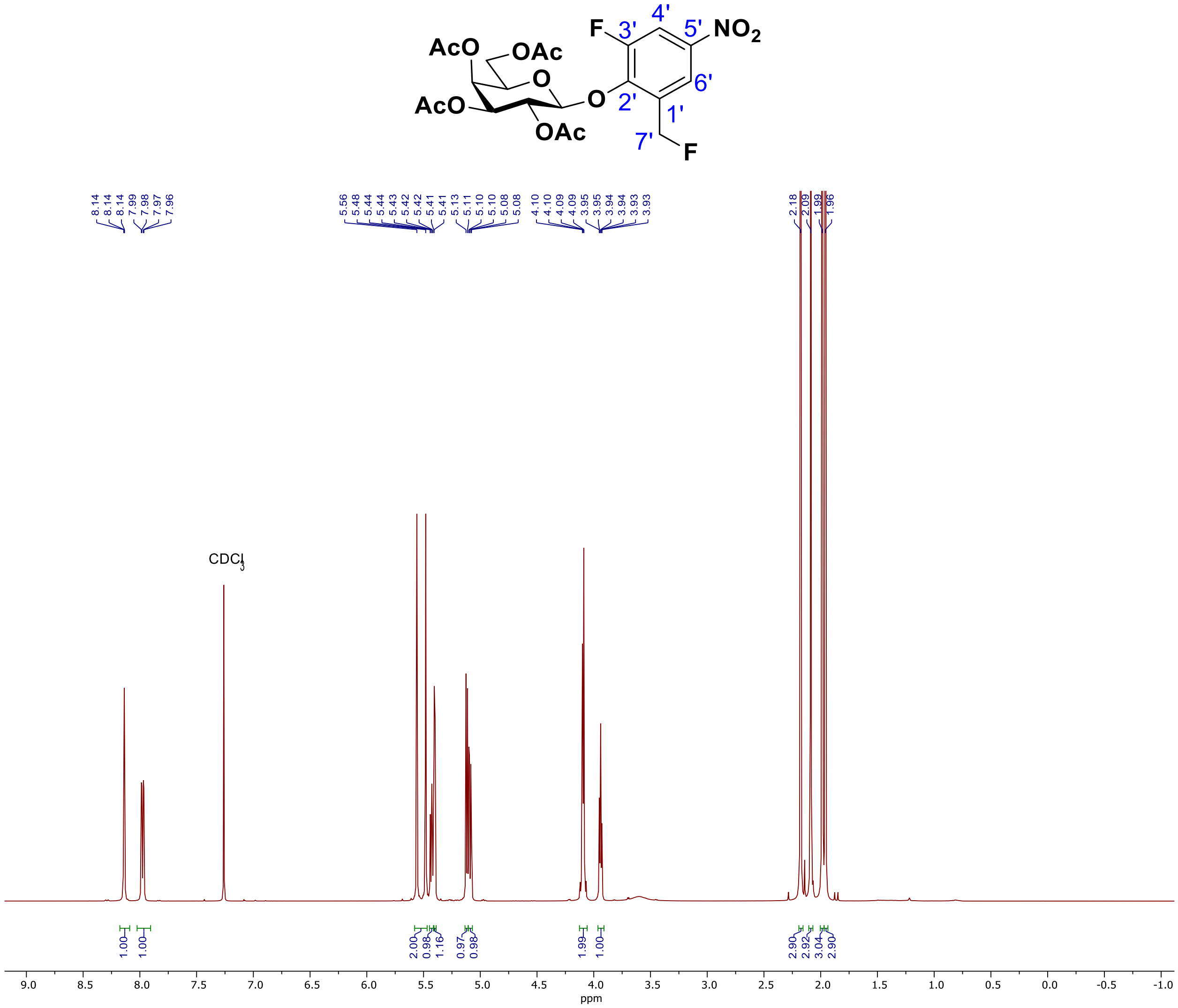


Figure S69. ^{1}H NMR spectrum of compound **15** in $CDCl_3$

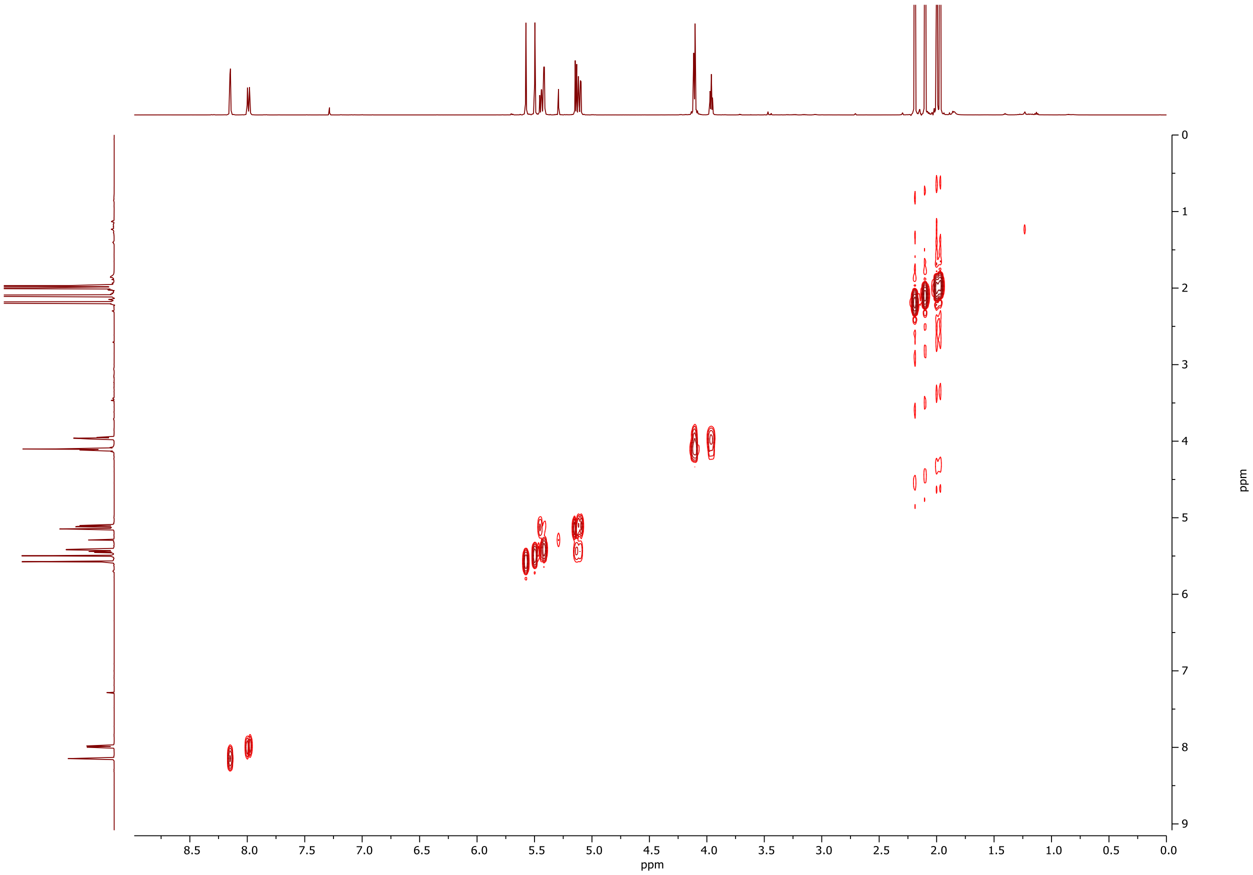


Figure S70. ^{1}H-^{1}H COSY NMR spectrum of compound **15** in $CDCl_3$

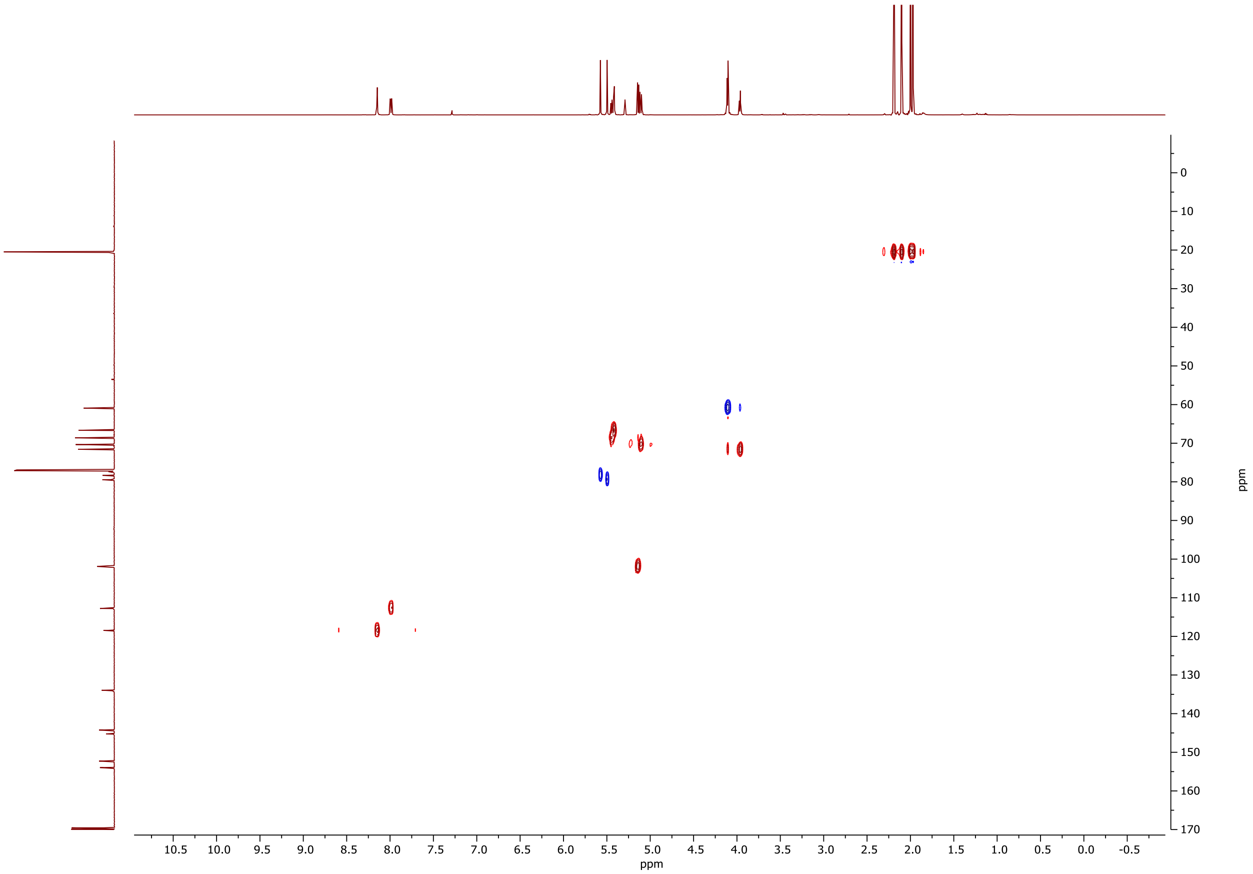


Figure S71. ^{1}H-^{13}C HSQC NMR spectrum of compound **15** in $CDCl_3$

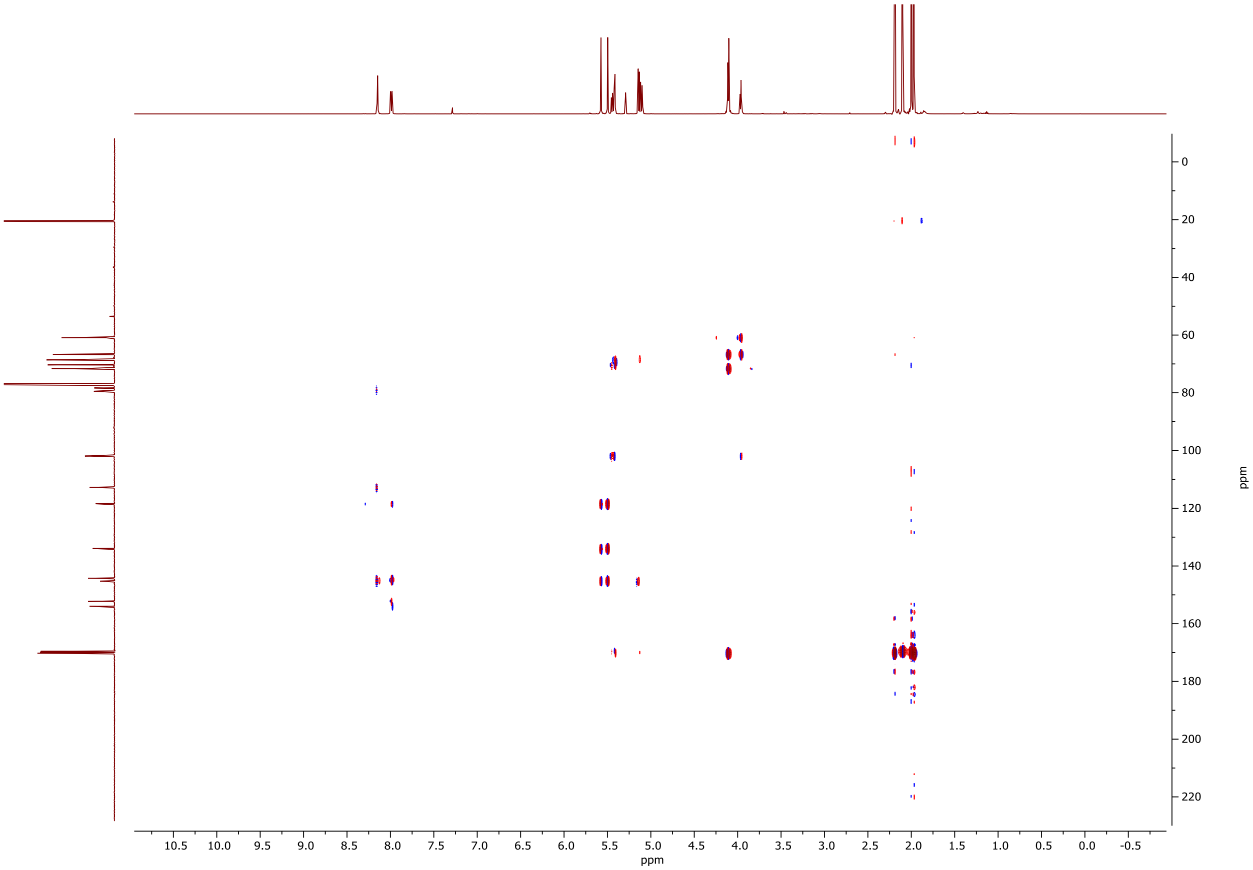


Figure S72. ^{1}H-^{13}C HMBC NMR spectrum of compound **15** in $CDCl_3$

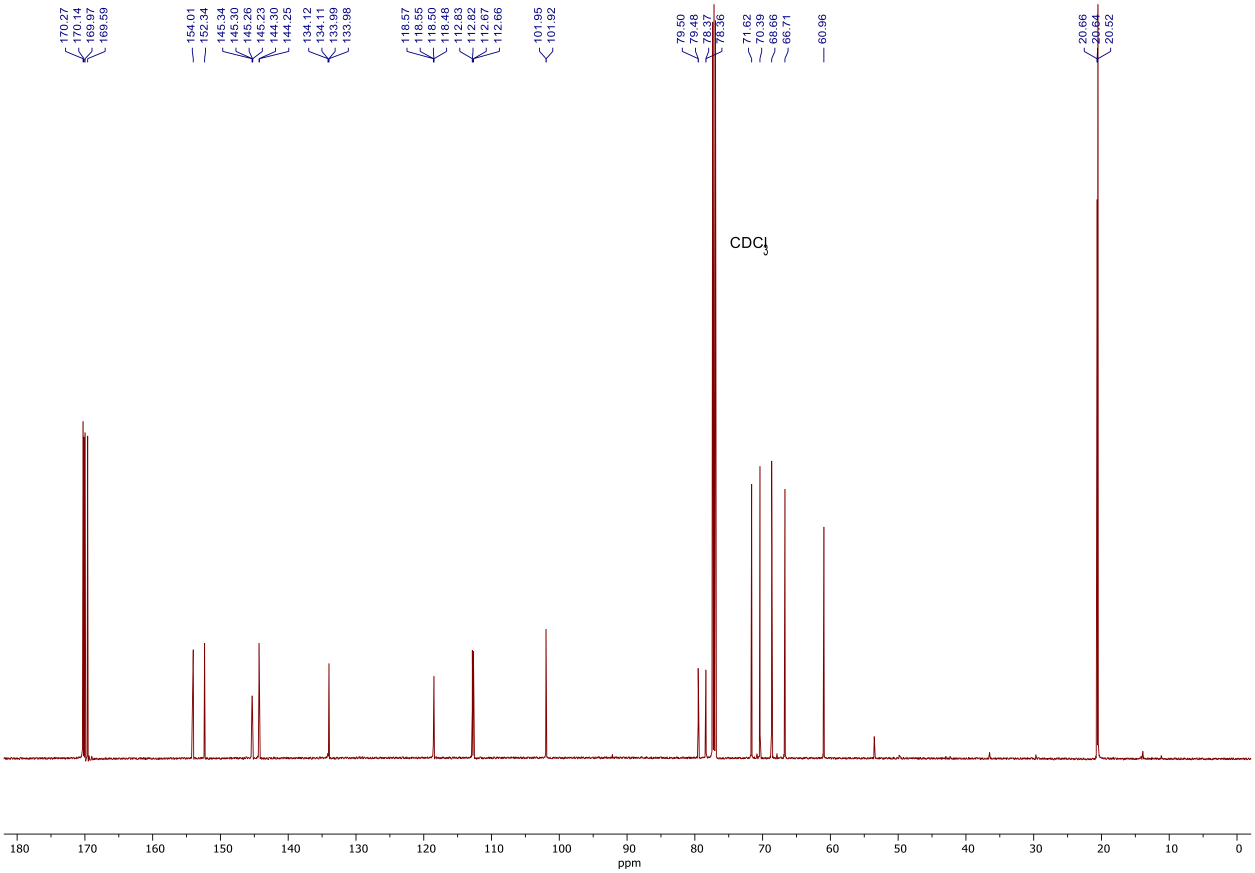


Figure S73. ^{13}C NMR spectrum of compound **15** in $CDCl_3$

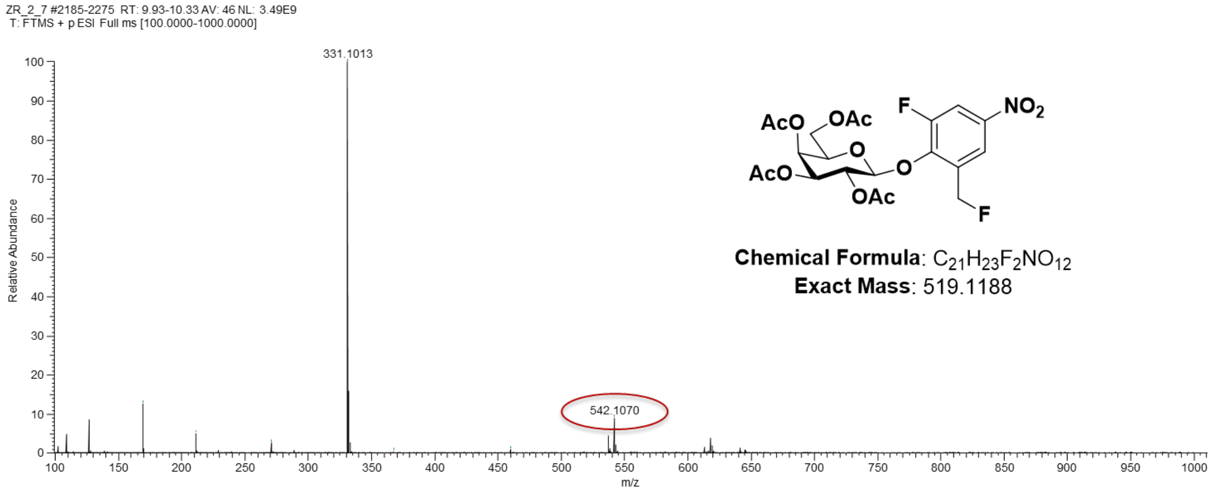


Figure S74. ESI-MS spectrum of compound **15**

***R_f* = 0.61**

1:1 Hexanes: Ethyl Acetate
UV (254 nm) (Circle)
10% H_2SO_4 in EtOH (brown)

Figure S75. TLC of compound **15**

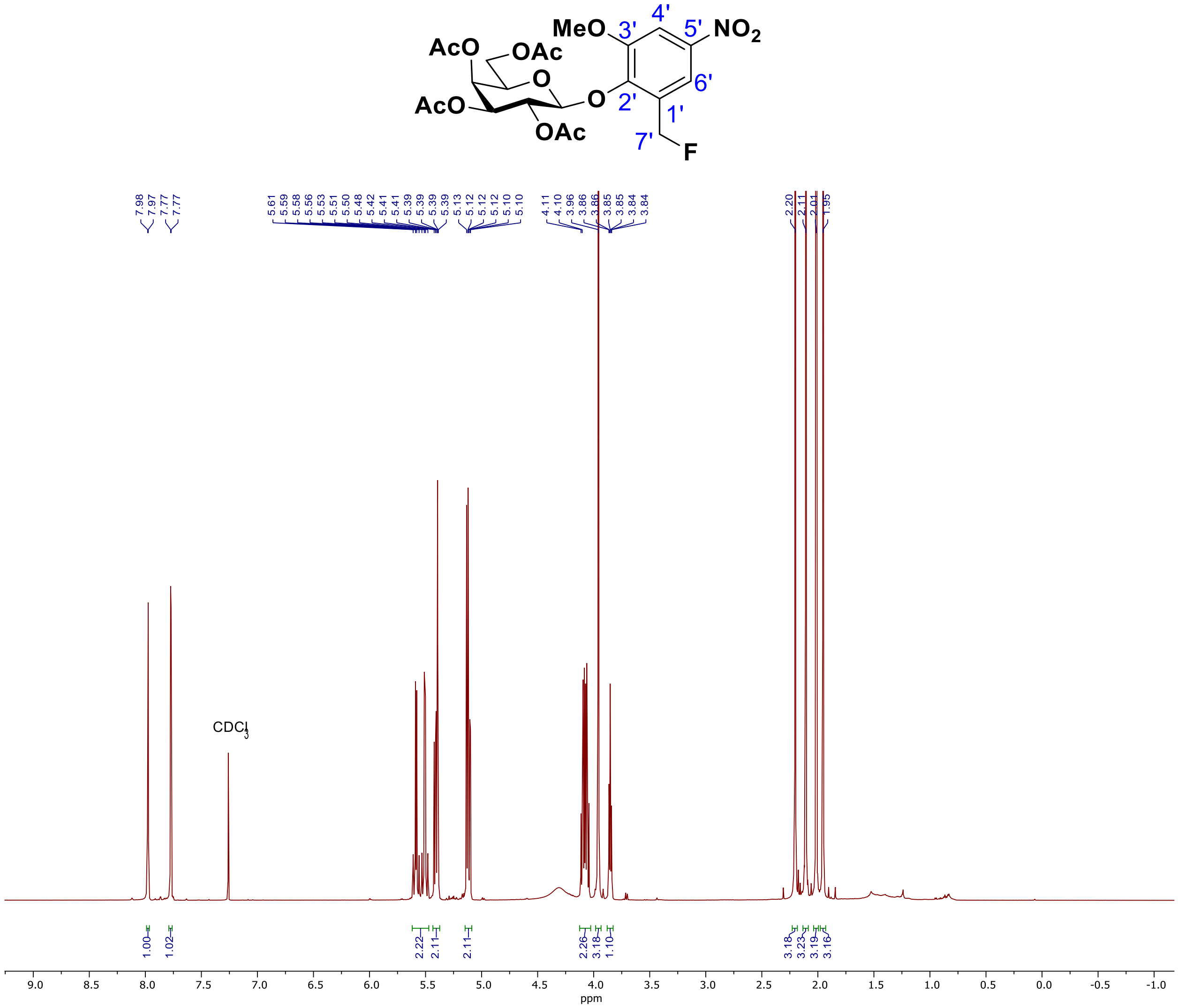


Figure S76. ^1H NMR spectrum of compound **16** in $CDCl_3$

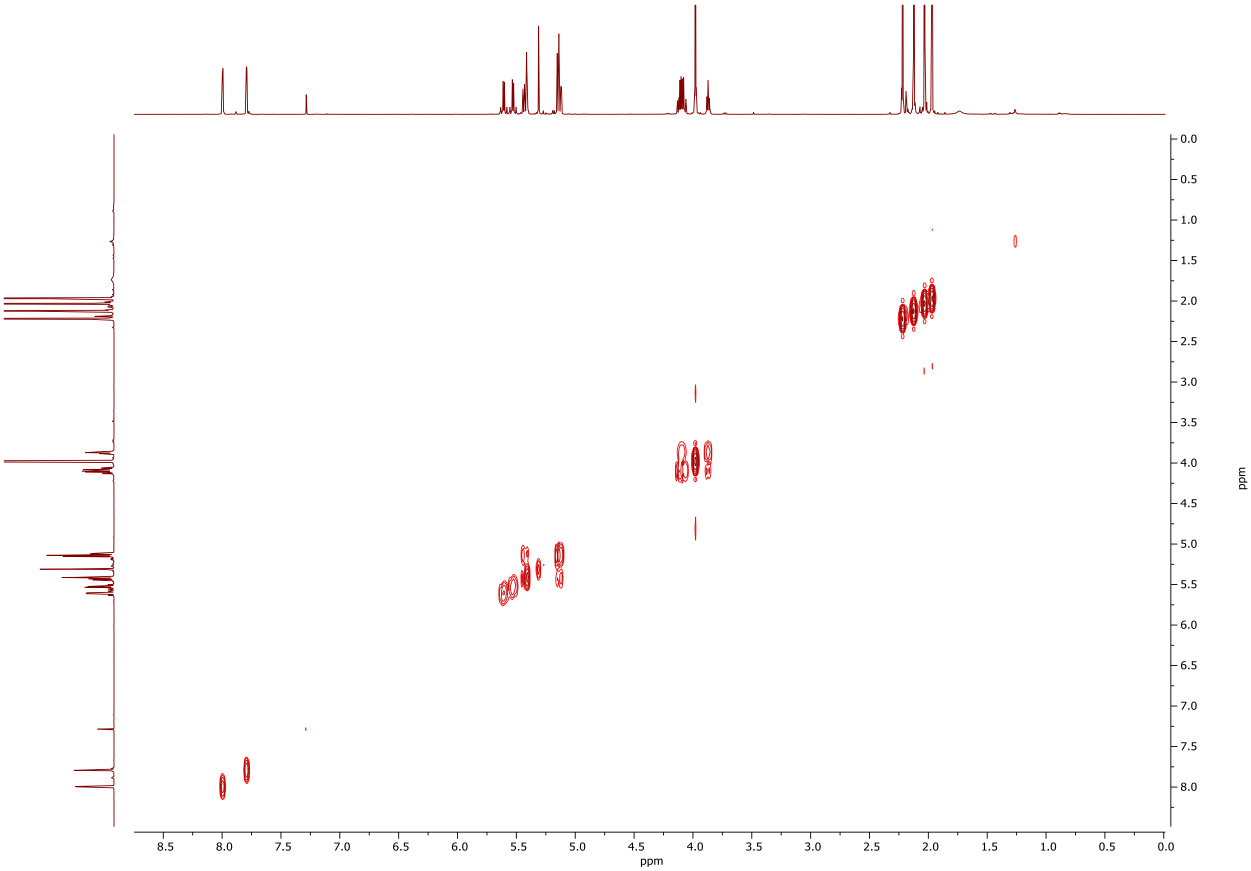


Figure S77. ^{1}H-^{1}H COSY NMR spectrum of compound **16** in $CDCl_3$

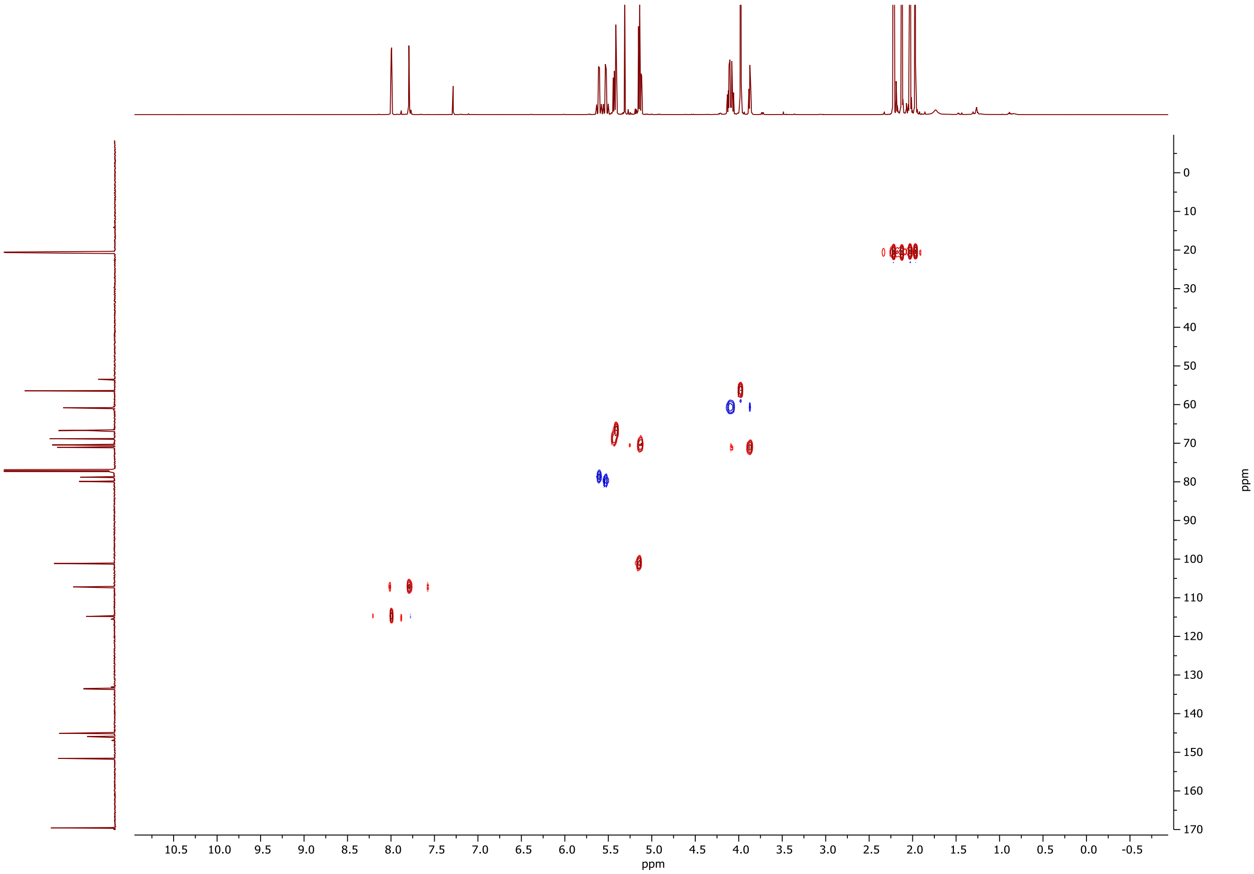


Figure S78. ^{1}H-^{13}C HSQC NMR spectrum of compound **16** in $CDCl_3$

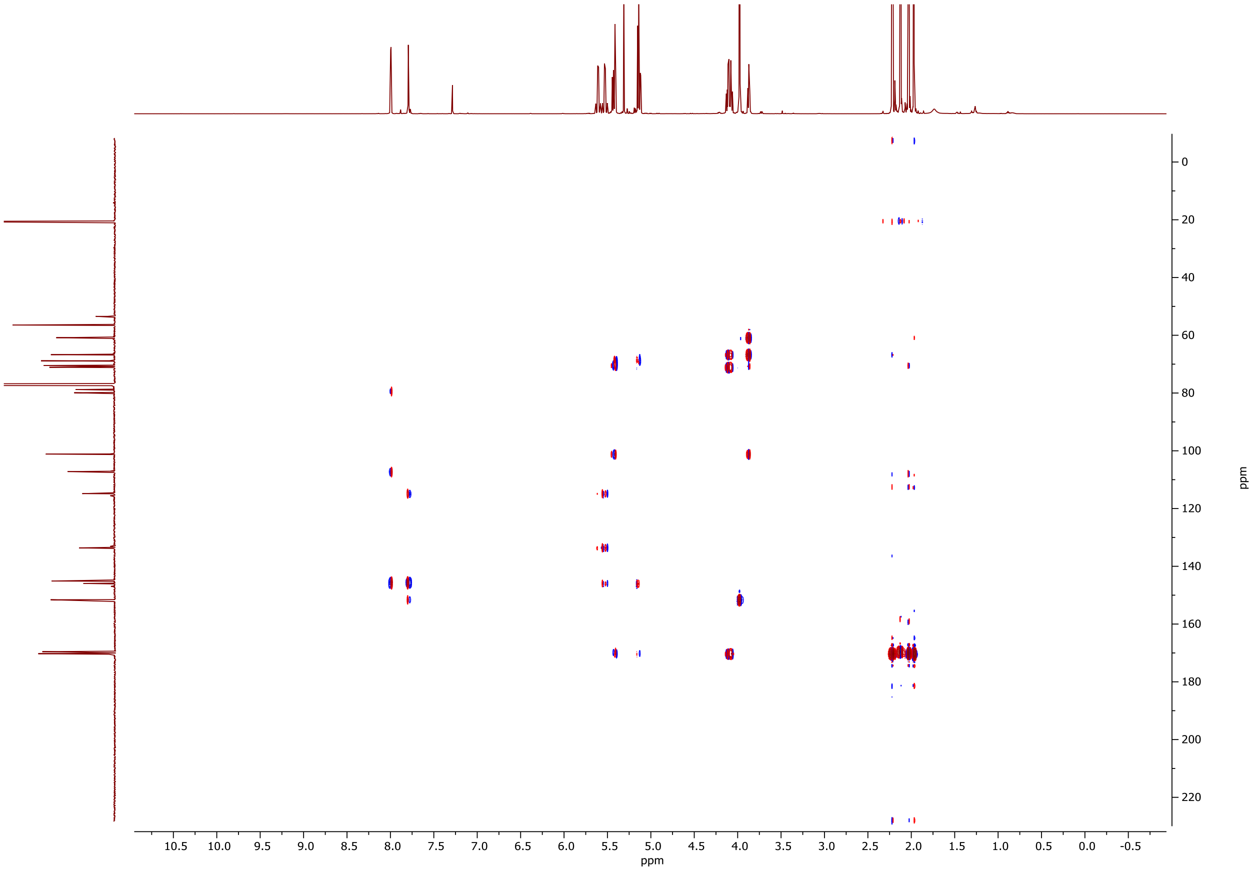


Figure S79. ^{1}H-^{13}C HMBC NMR spectrum of compound **16** in $CDCl_3$

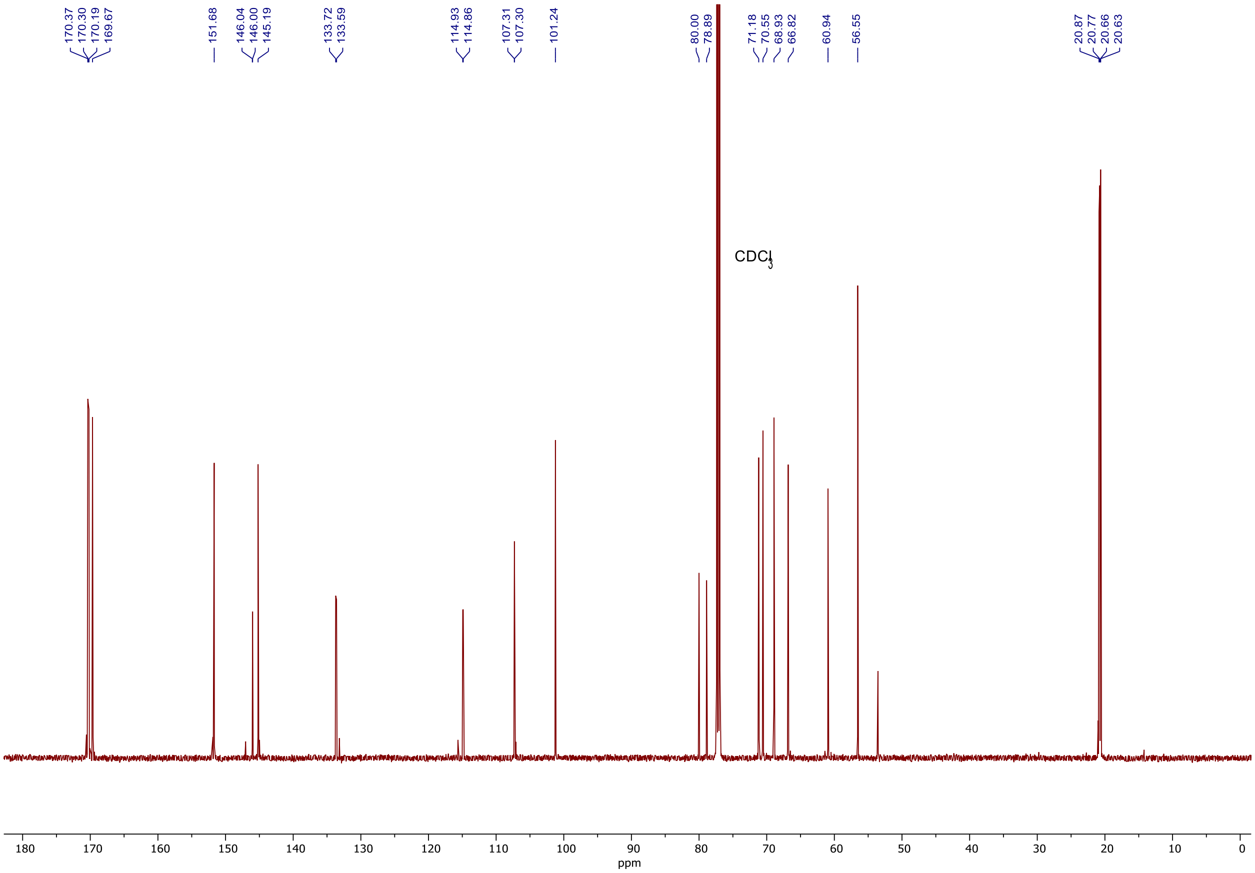


Figure S80. ^{13}C NMR spectrum of compound **16** in $CDCl_3$

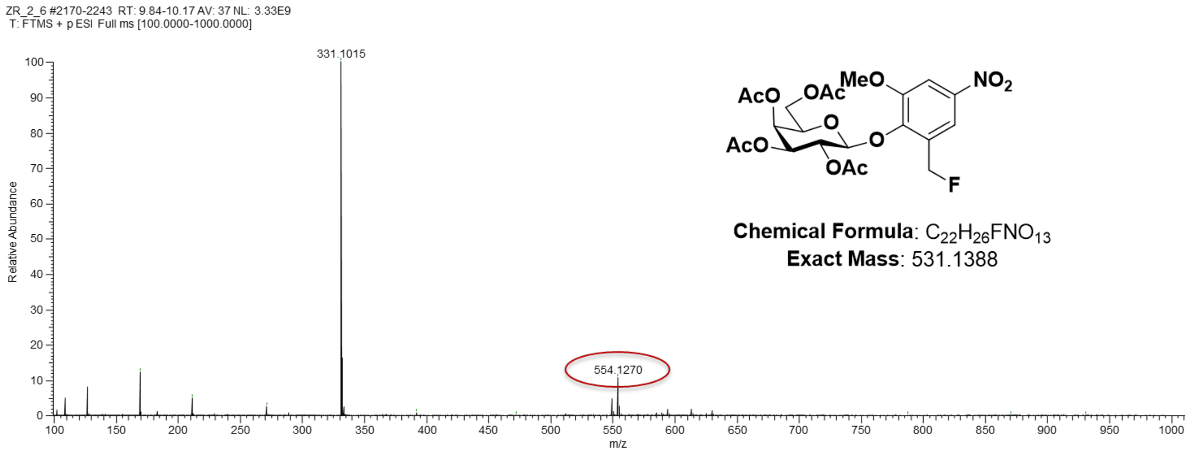


Figure S81. ESI-MS spectrum of compound **16**

R_f = 0.42

1:1 Hexanes: Ethyl Acetate
UV (254 nm) (Circle)
10% H_2SO_4 in EtOH (brown)

Figure S82. TLC of compound **16**

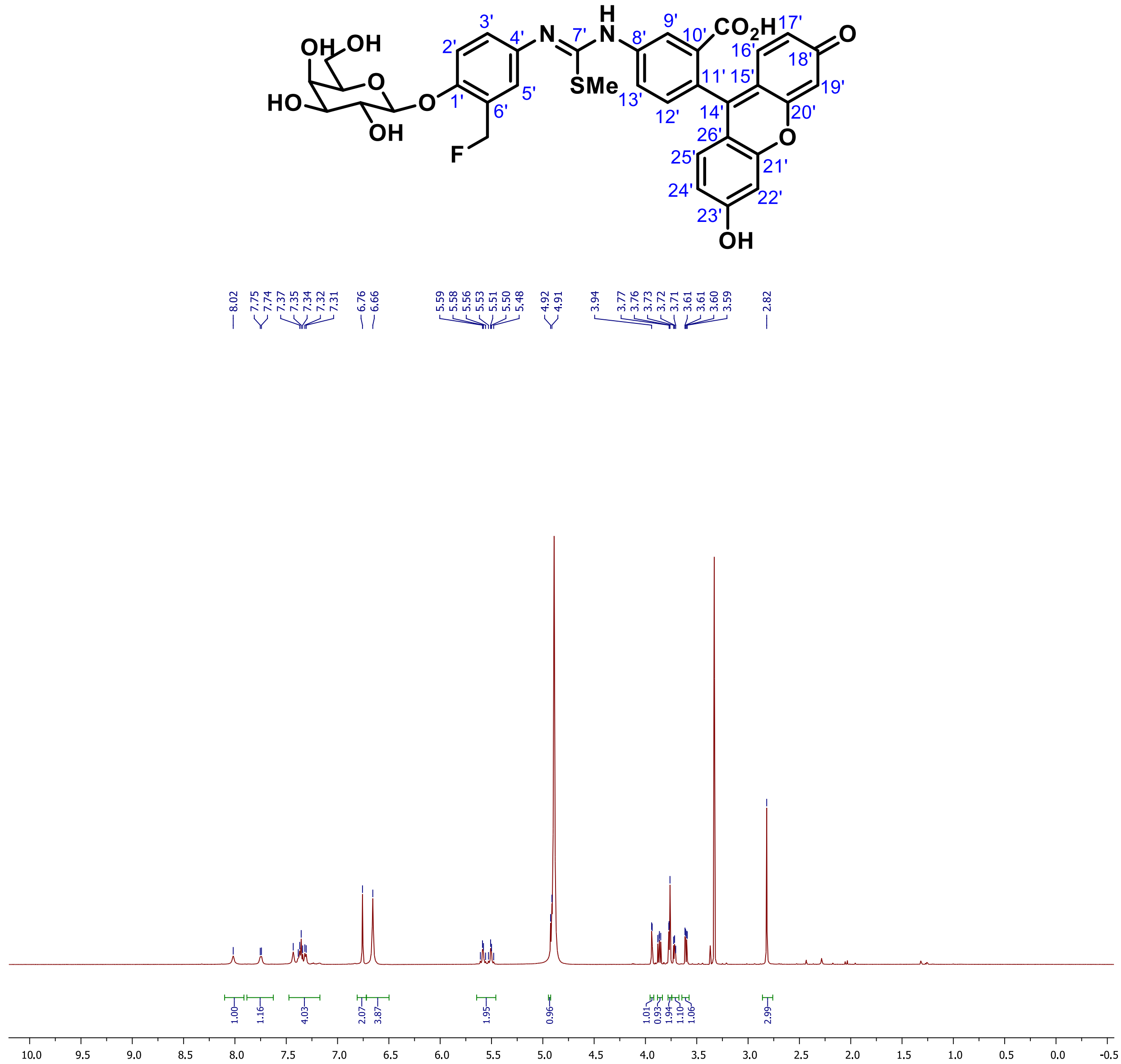


Figure S83. ^{1}H NMR spectrum of compound **22** (**BG-FITC-1F**) in CD3OD

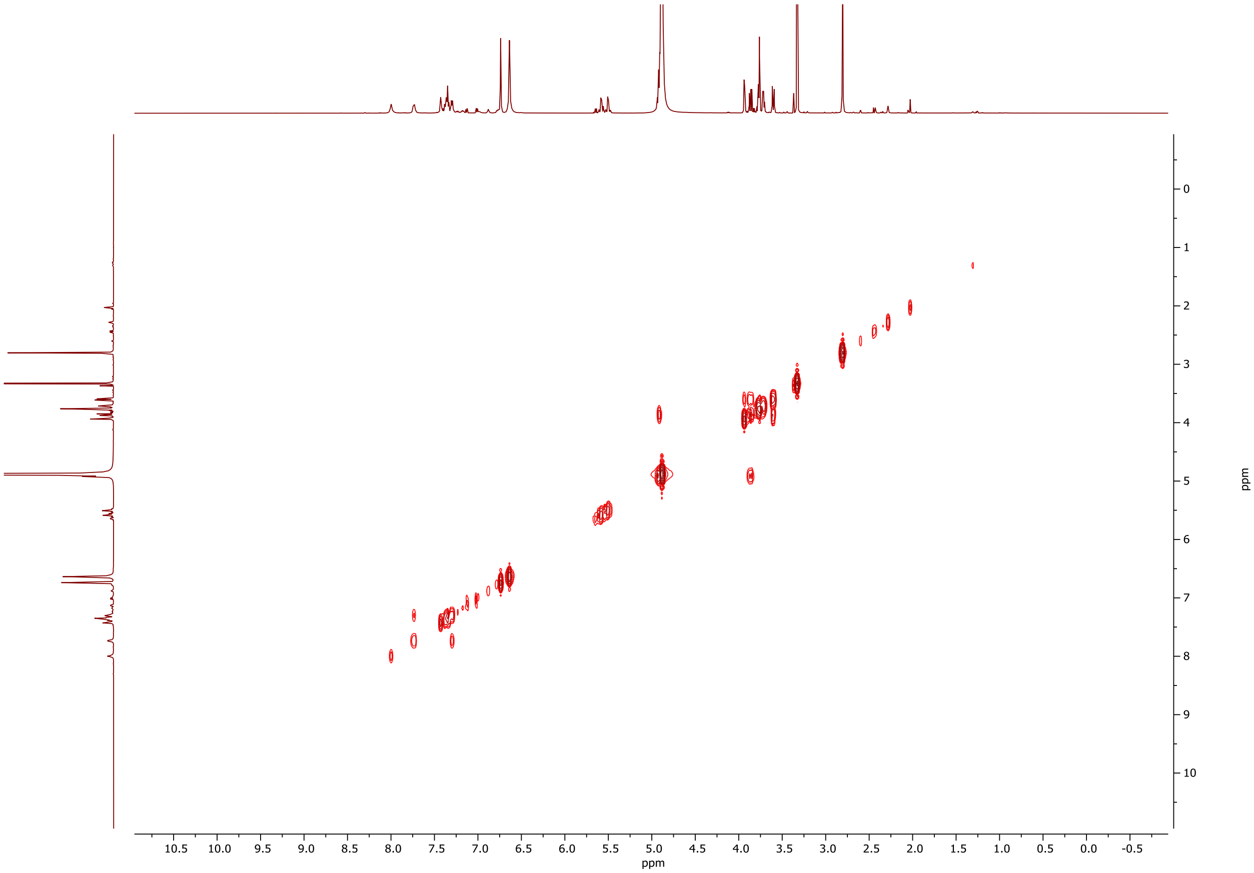


Figure S84. ^{1}H-^{1}H COSY NMR spectrum of compound **22** (**BG-FITC-1F**) in CD3OD

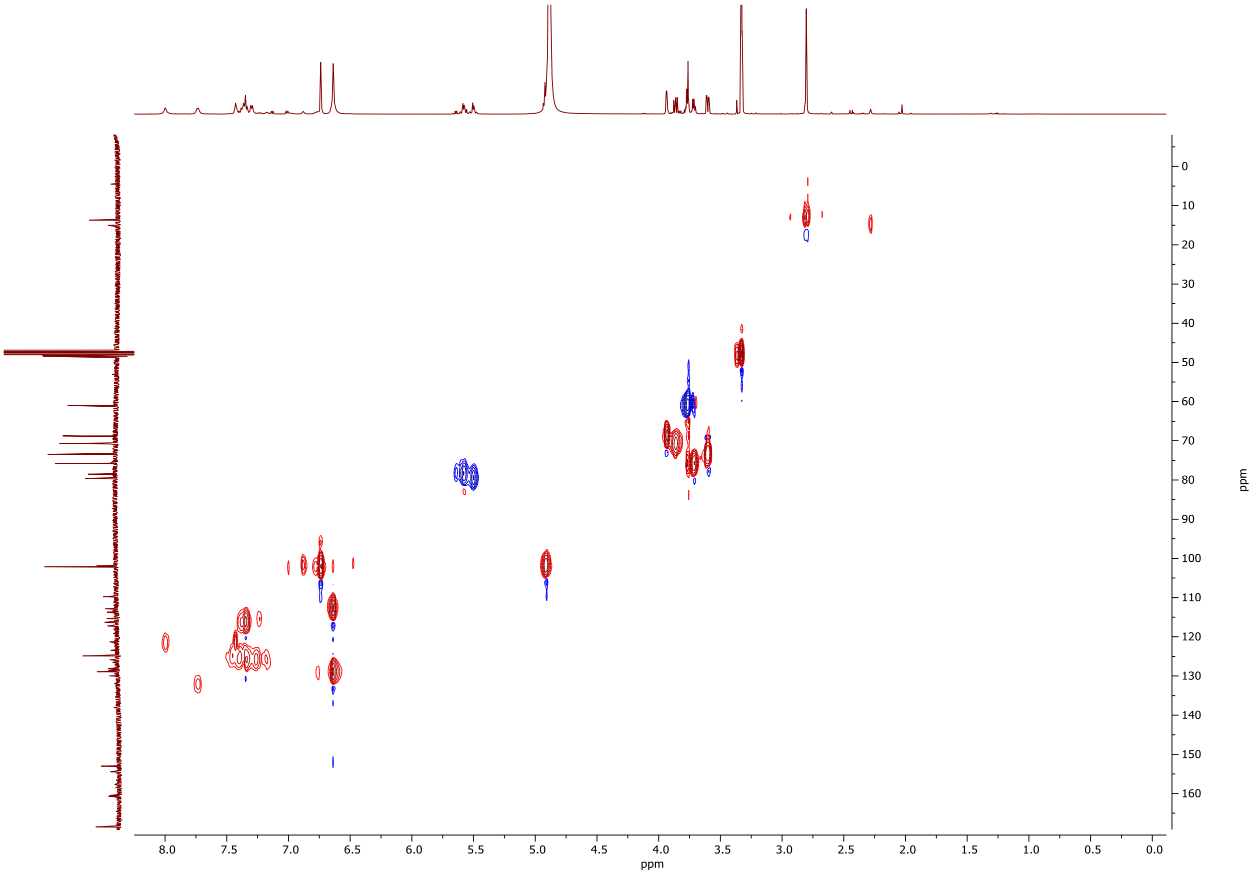


Figure S85. ^{1}H-^{13}C HSQC NMR spectrum of compound **22** (**BG-FITC-1F**) in CD3OD

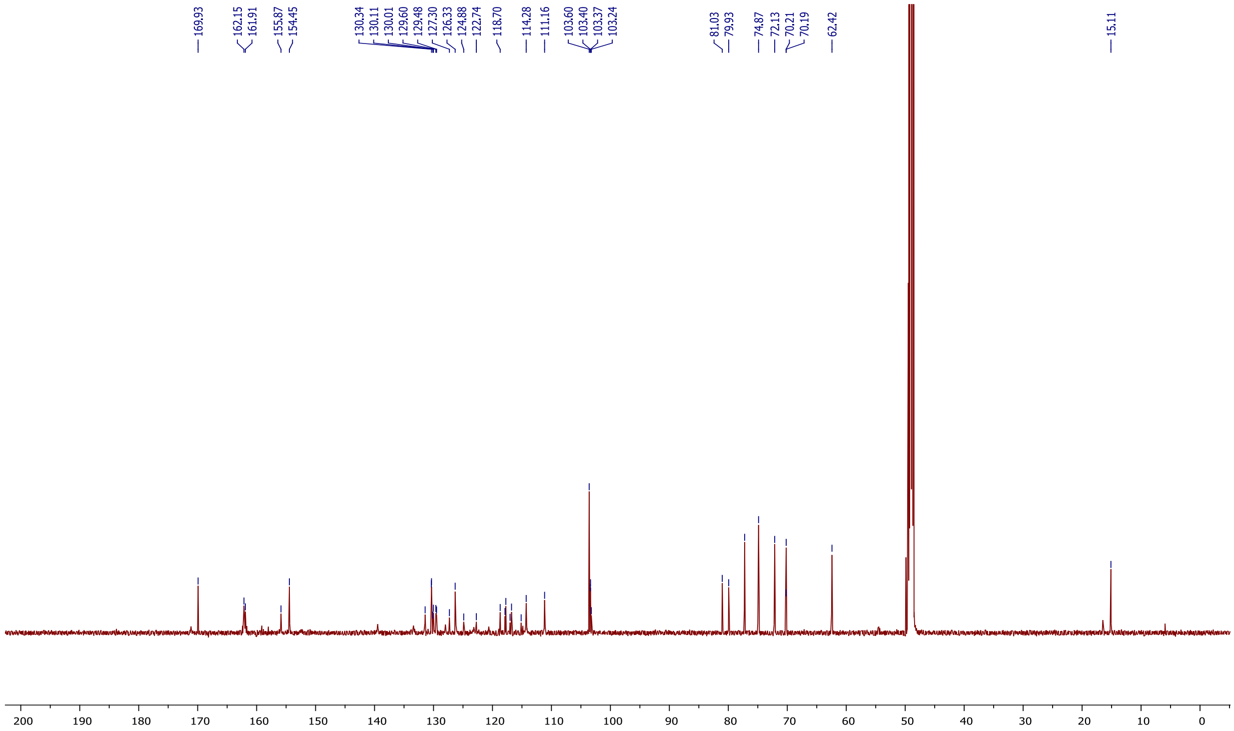


Figure S86. ^{13}C NMR spectrum of compound **22** (**BG-FITC-1F**) in CD3OD

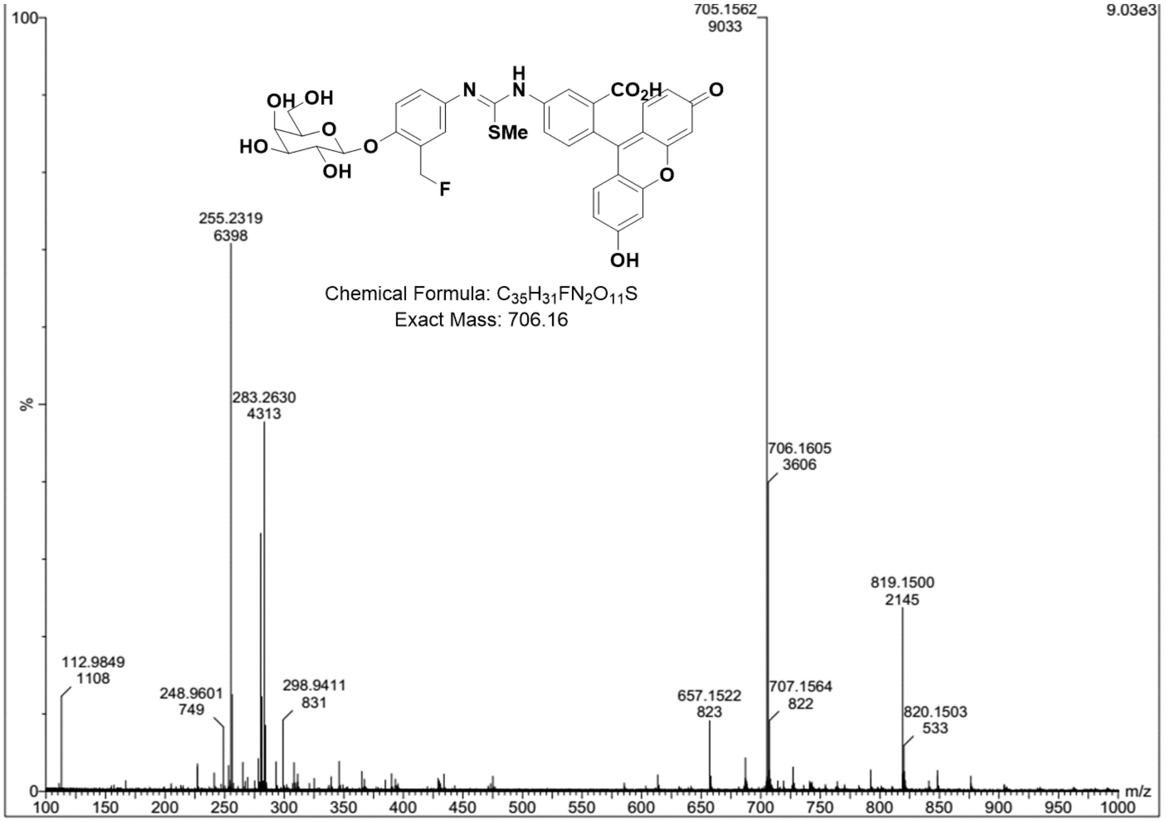


Figure S87. ESI-MS spectrum of compound **22** (**BG-FITC-1F**)

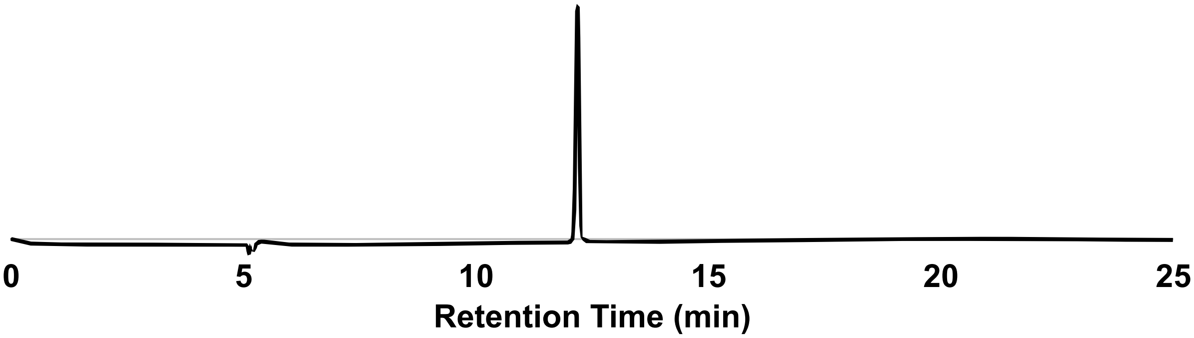


Figure S88. HPLC trace (440 nm) of compound **22** (**BG-FITC-1F**)

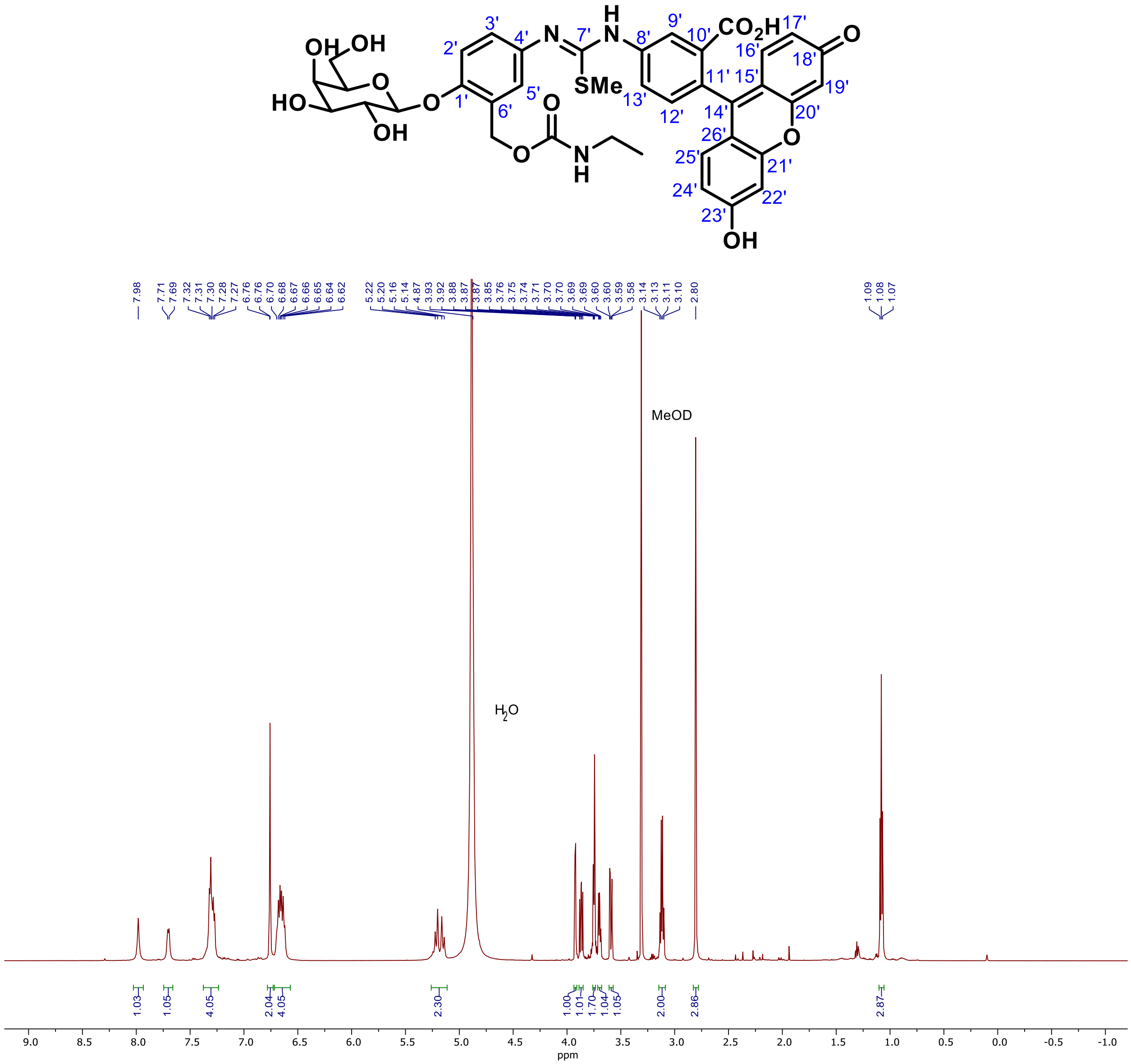


Figure S89. ^{1}H NMR spectrum of compound **23** (**BG-FITC-OCONHEt**) in CD3OD

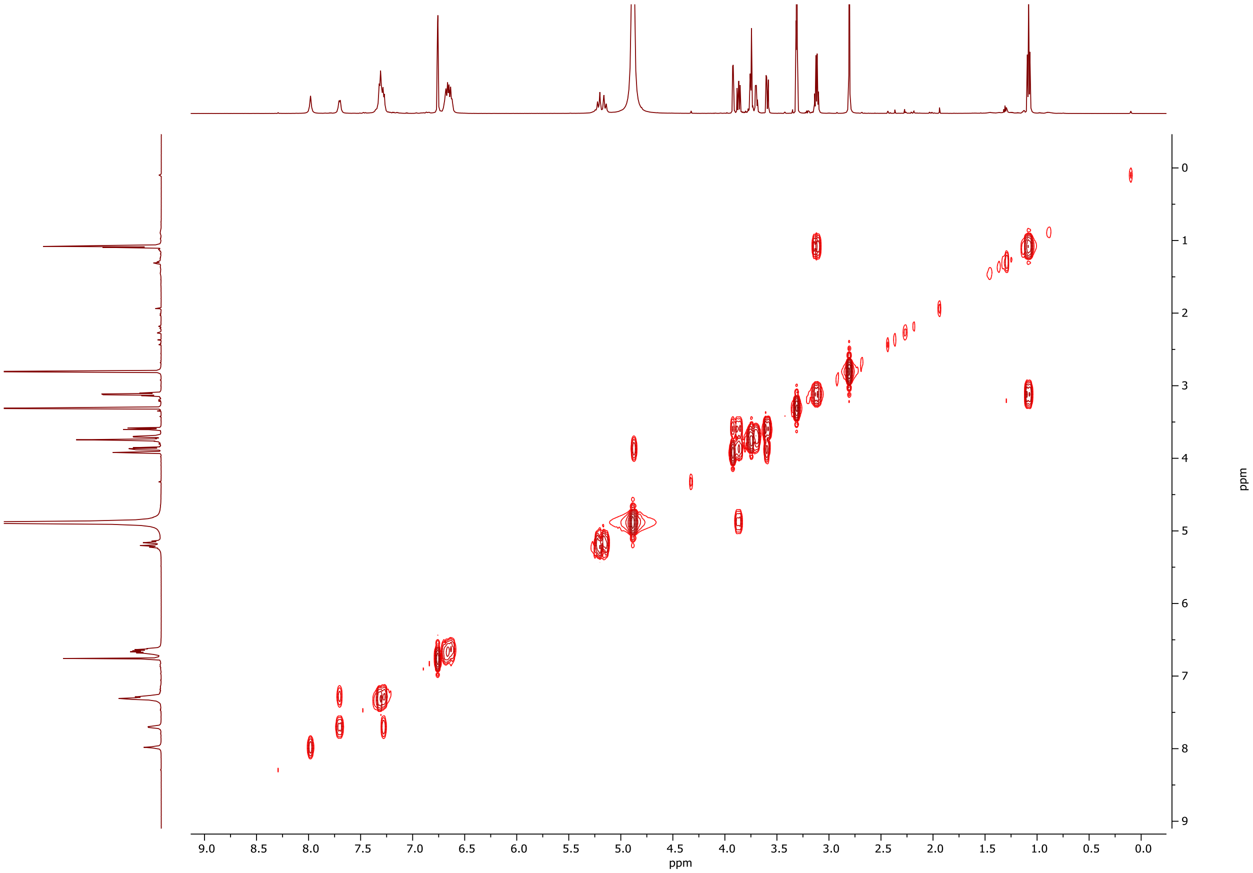


Figure S90. ^{1}H-^{1}H COSY NMR spectrum of compound **23** (**BG-FITC-OCONHEt**) in CD3OD

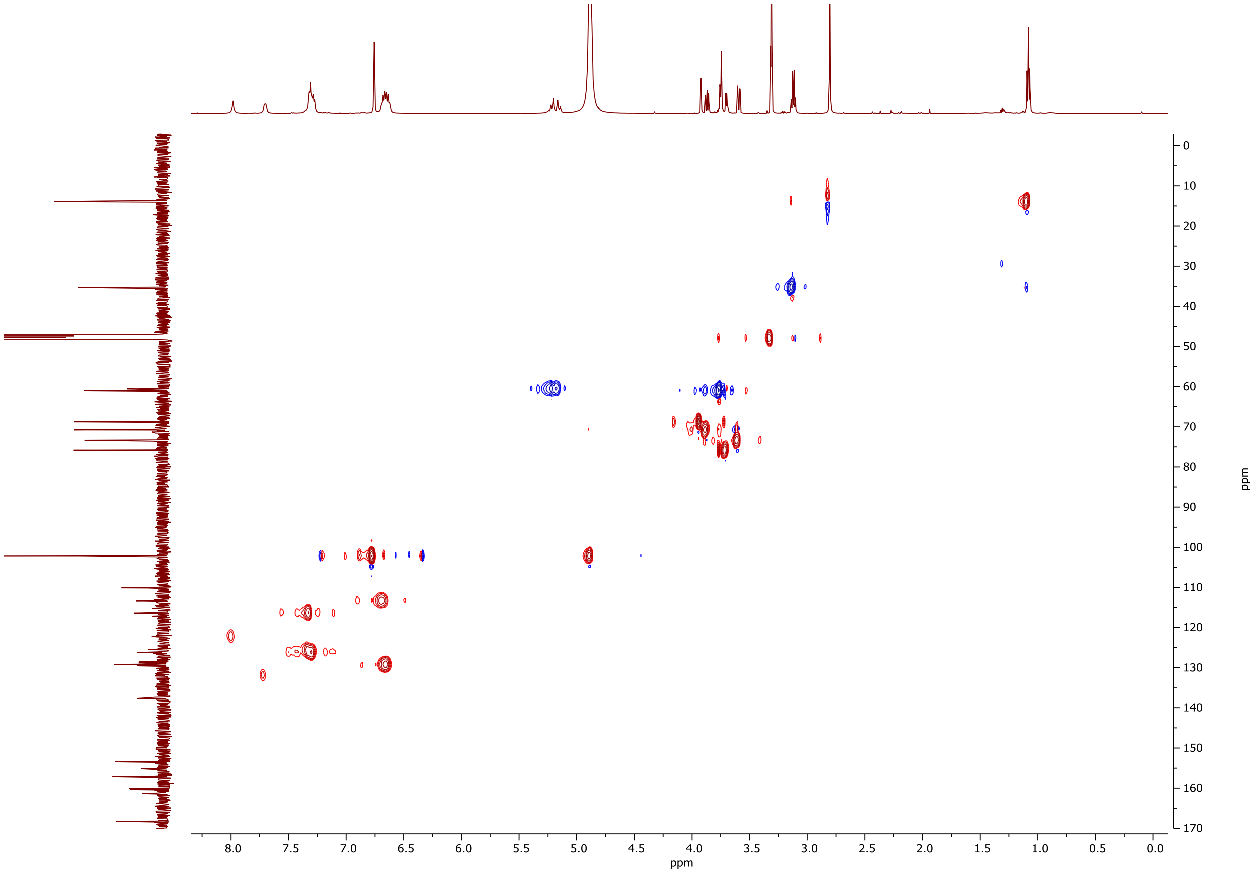


Figure S91. ^{1}H-^{13}C HSQC NMR spectrum of compound **23** (**BG-FITC-OCONHEt**) in CD3OD

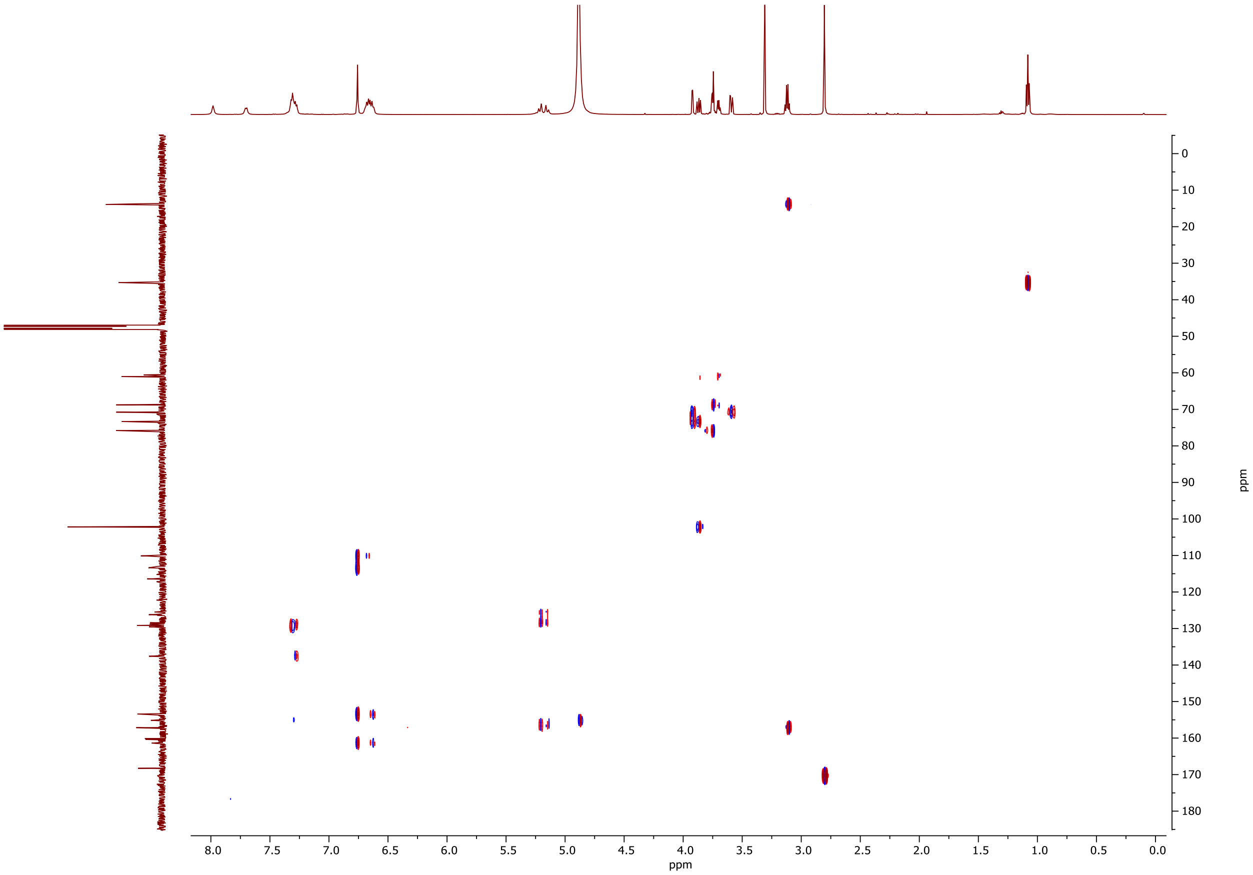


Figure S92. ^{1}H-^{13}C HMBC NMR spectrum of compound **23** (**BG-FITC-OCONHEt**)in CD3OD

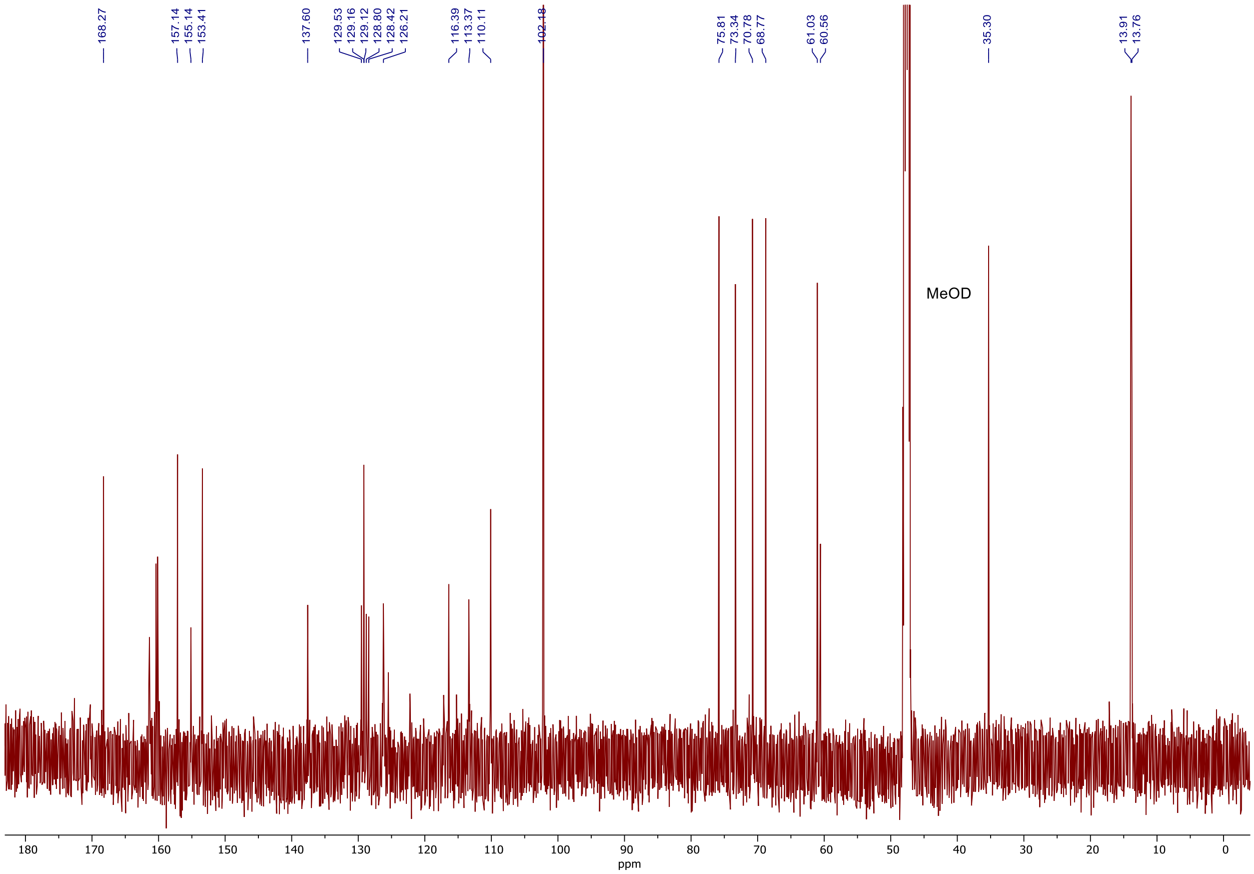


Figure S93. ^{13}C NMR spectrum of compound **23** (**BG-FITC-OCONHEt**) in CD3OD

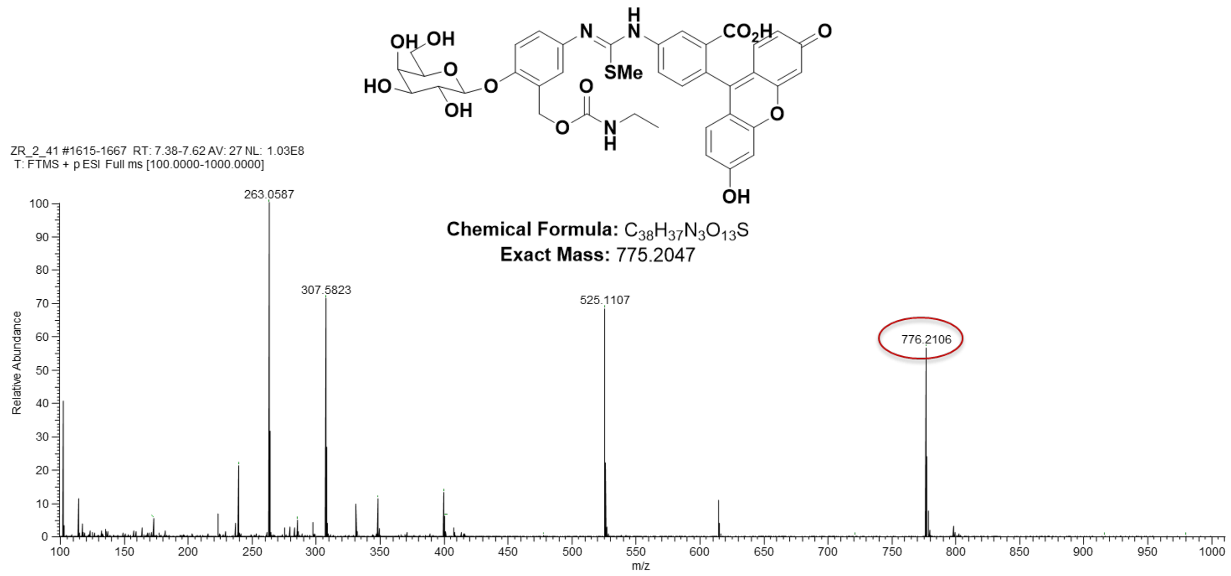


Figure S94. ESI-MS spectrum of compound **23** (**BG-FITC-OCONHEt**)

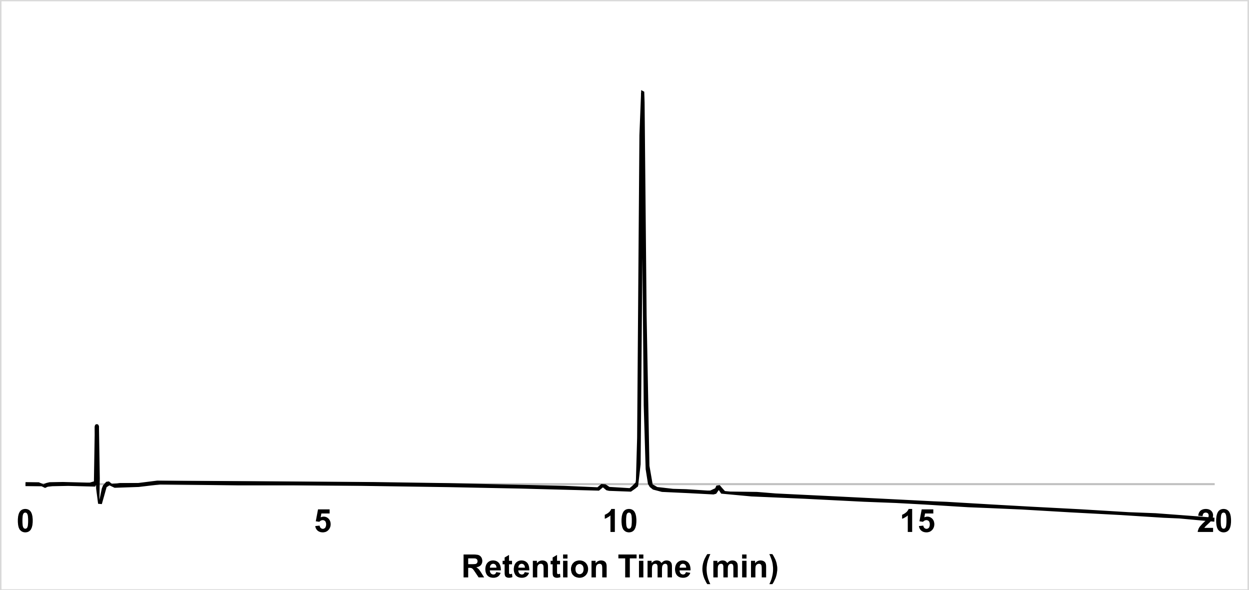
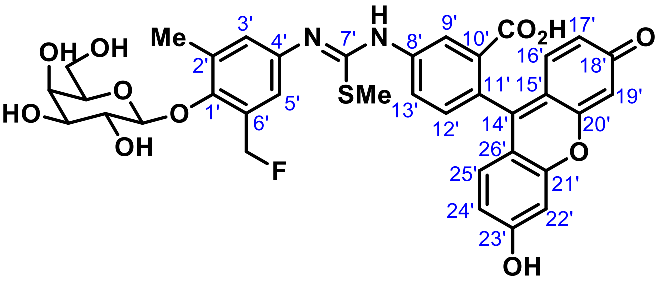


Figure S95. HPLC trace (440 nm) of compound **23** (**BG-FITC-OCONHEt**)



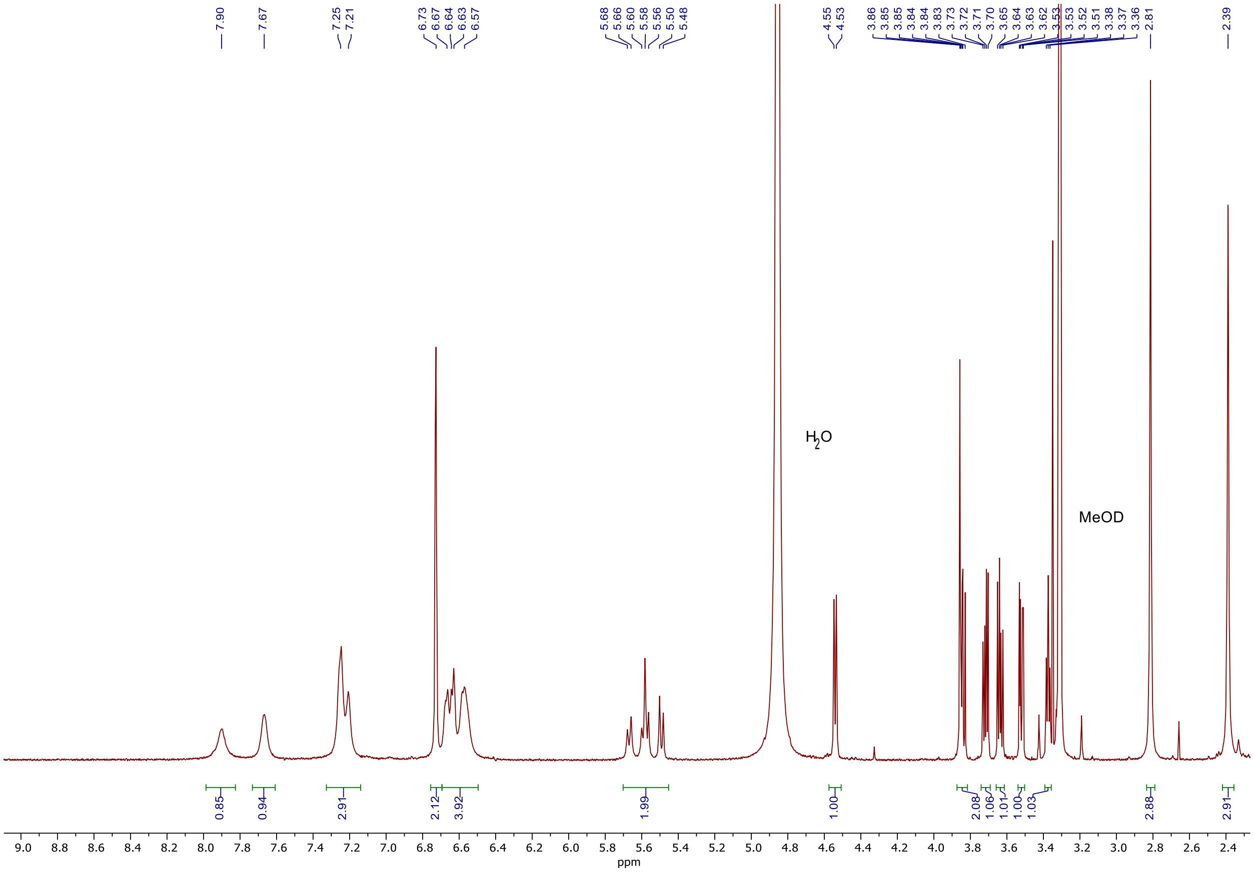


Figure S96. ^{1}H NMR spectrum of compound **24** (**BG-FITC-Me-1F**) in CD3OD

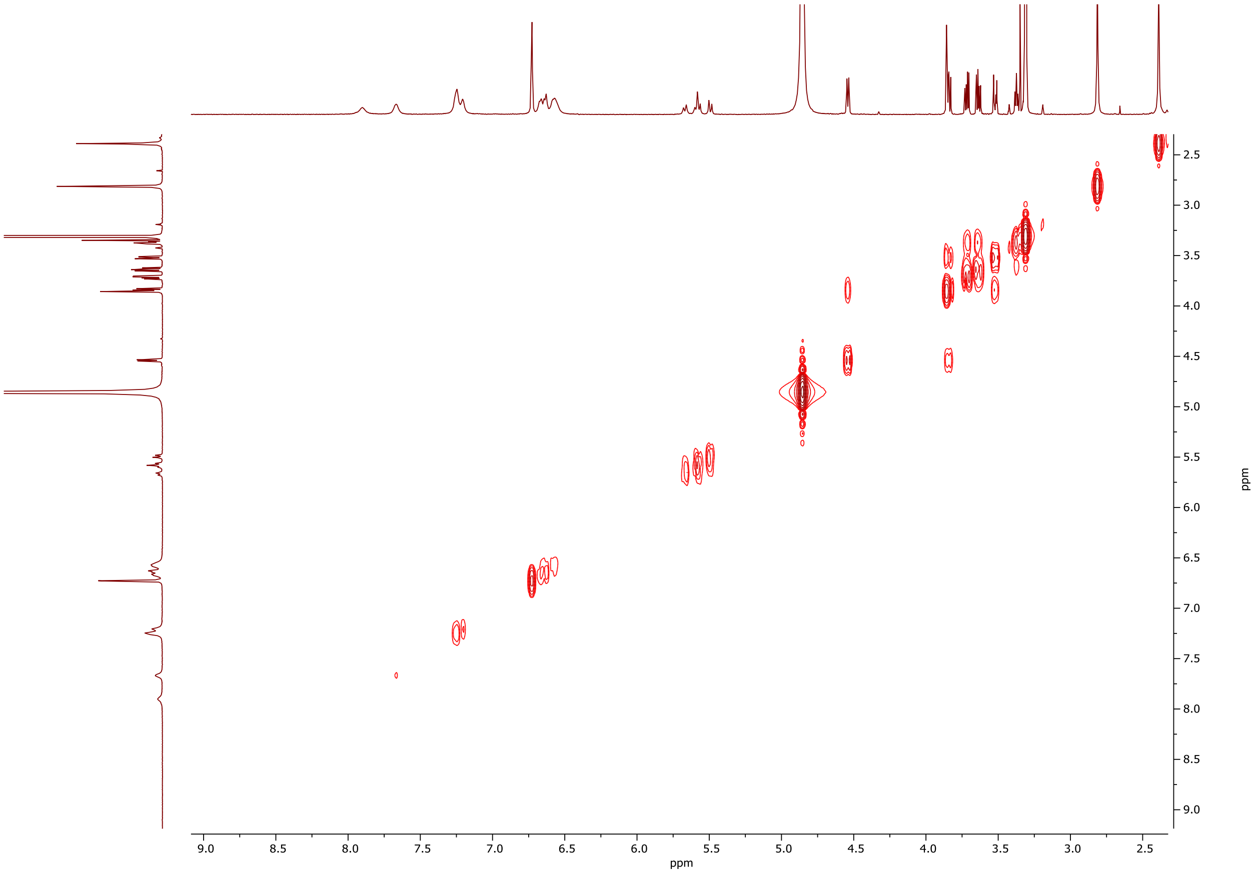


Figure S97. ^{1}H-^{1}H COSY NMR spectrum of compound **24** (**BG-FITC-Me-1F**) in CD3OD

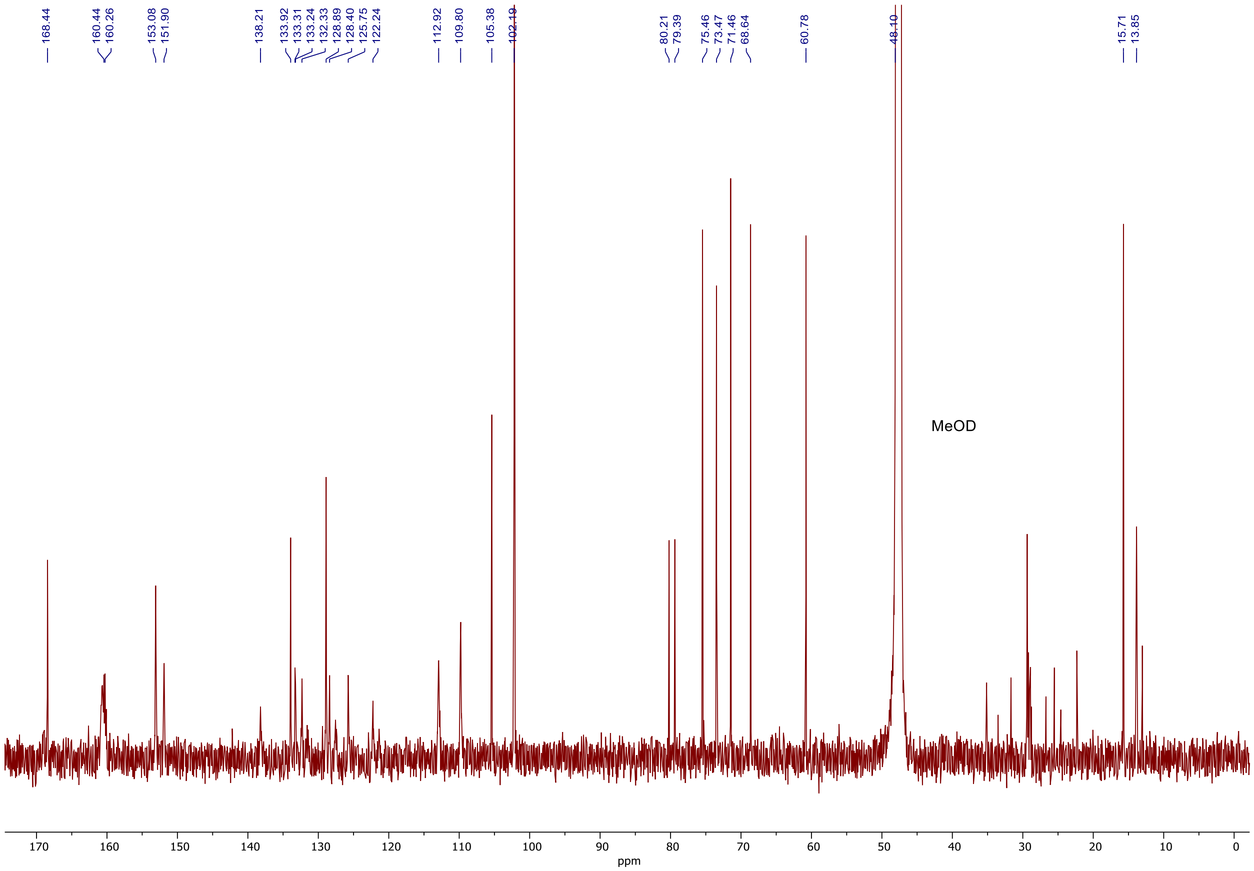


Figure S98. ^{13}C NMR spectrum of compound **24** (**BG-FITC-Me-1F**) in CD3OD

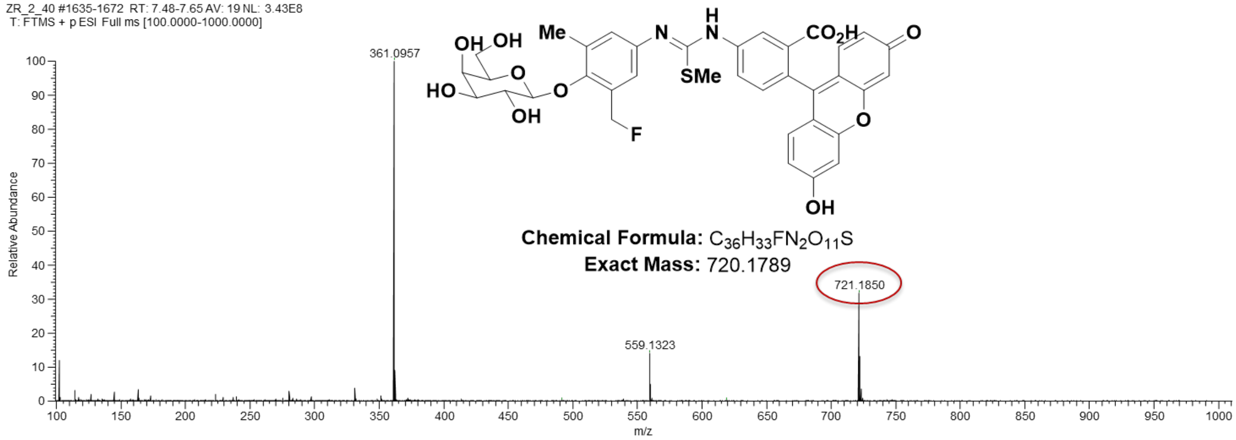


Figure S99. ESI-MS spectrum of compound **24** (**BG-FITC-Me-1F**)

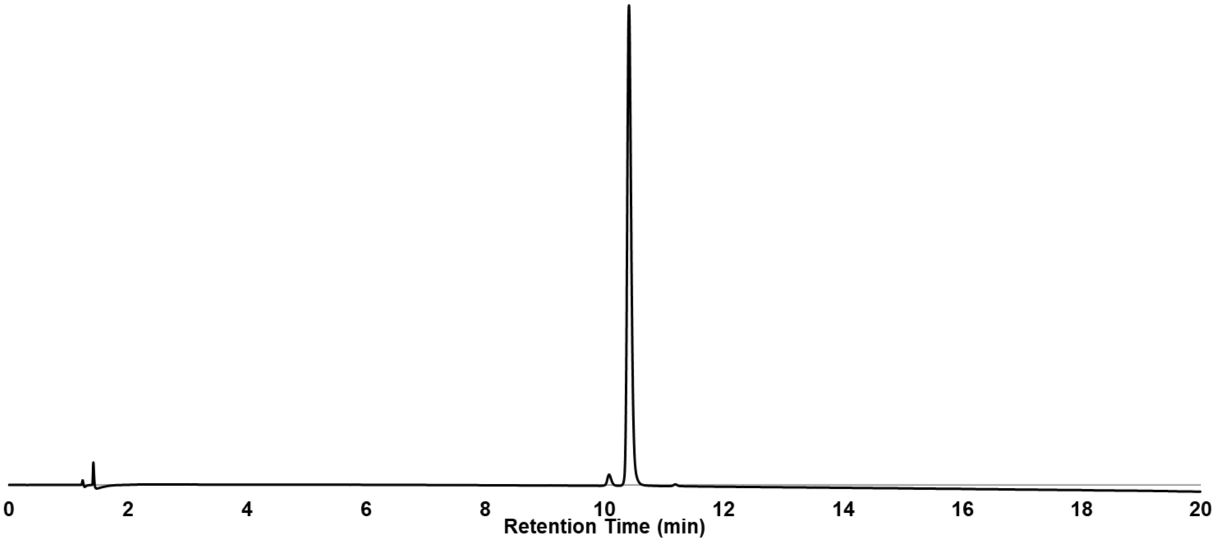


Figure S100. HPLC trace (440 nm) of compound **24** (**BG-FITC-Me-1F**)

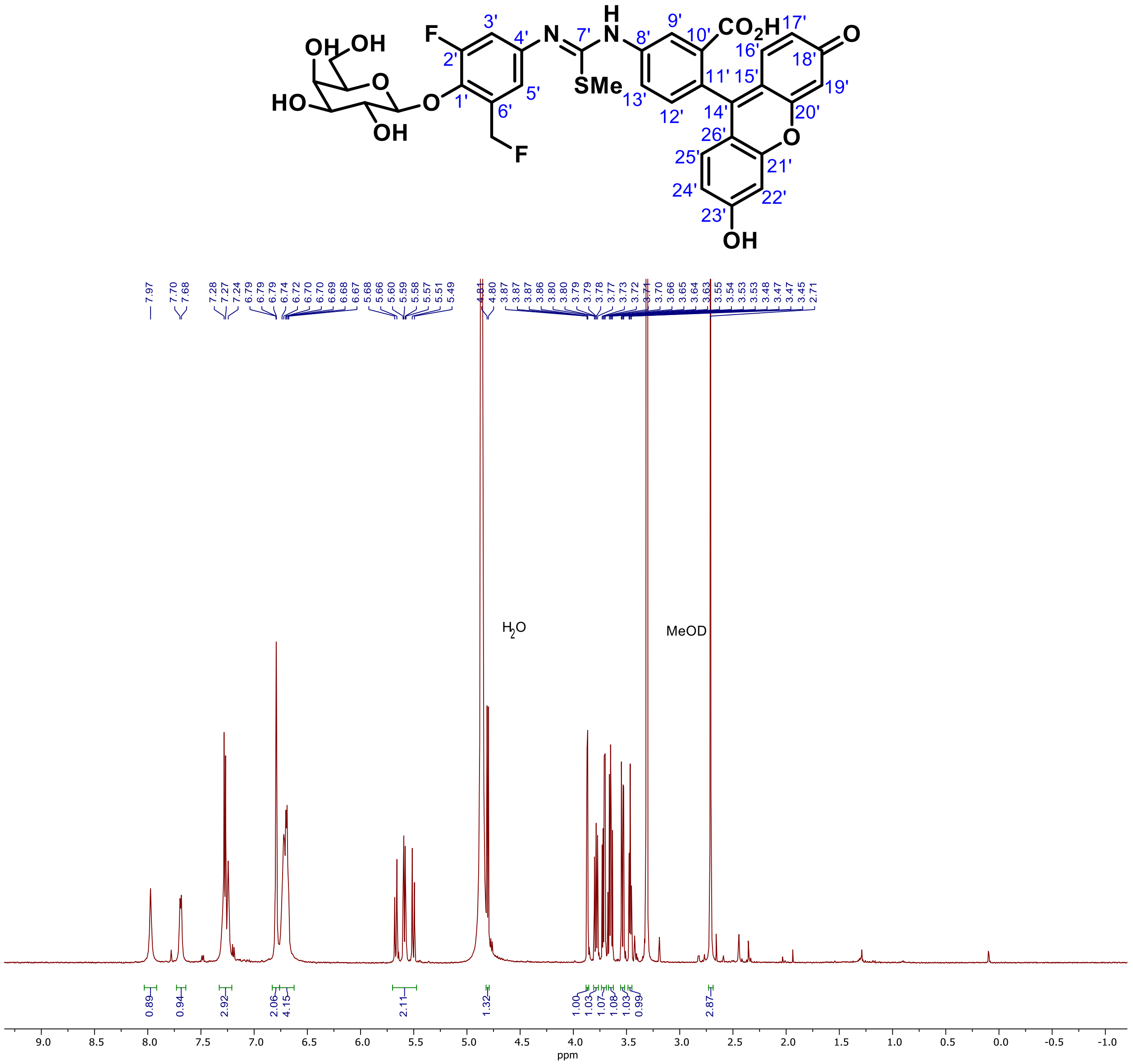


Figure S101. ^{1}H NMR spectrum of compound **25** (**BG-FITC-F-1F**) in CD3OD

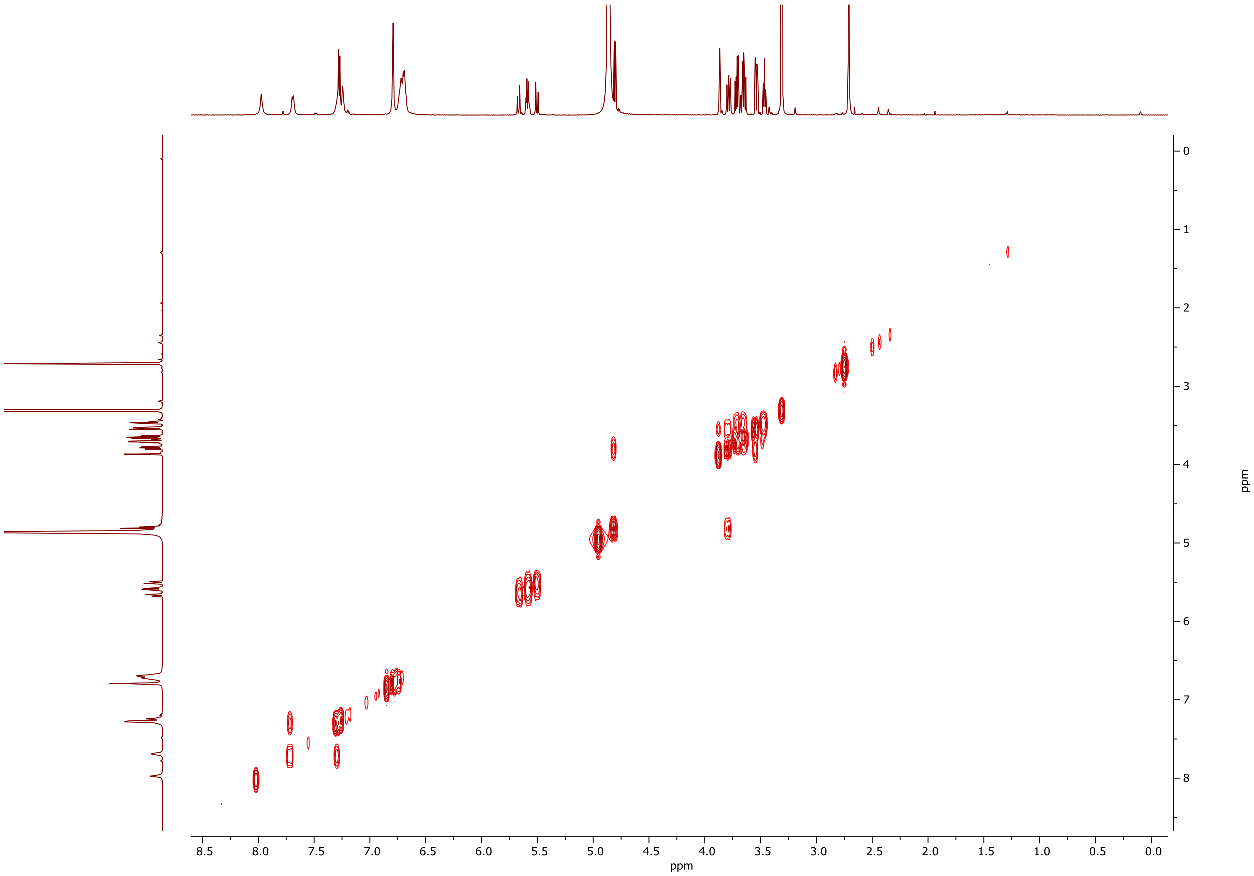


Figure S102. ^{1}H-^{1}H COSY NMR spectrum of compound **25** (**BG-FITC-F-1F**) in CD3OD

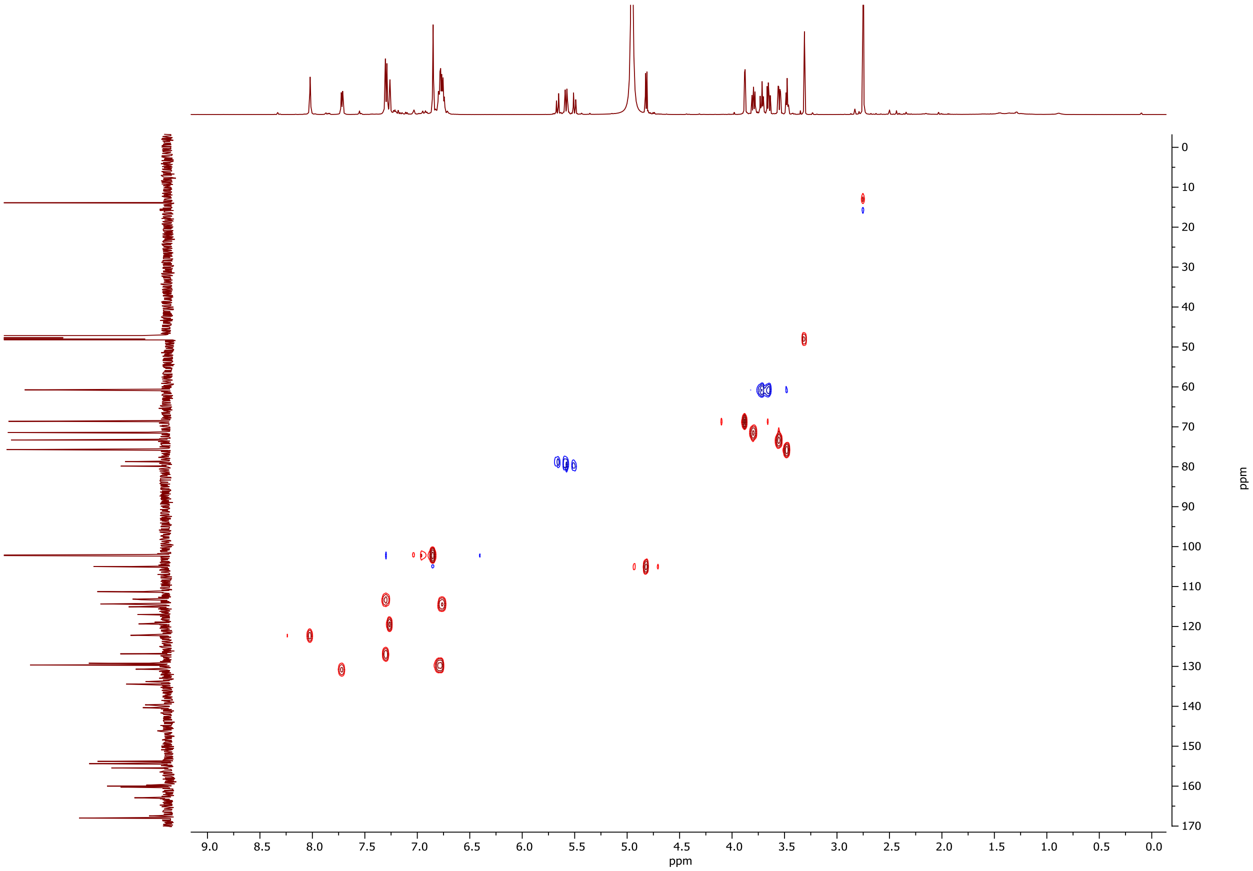


Figure S103. ^{1}H-^{13}C HSQC NMR spectrum of compound **25** (**BG-FITC-F-1F**) in CD3OD

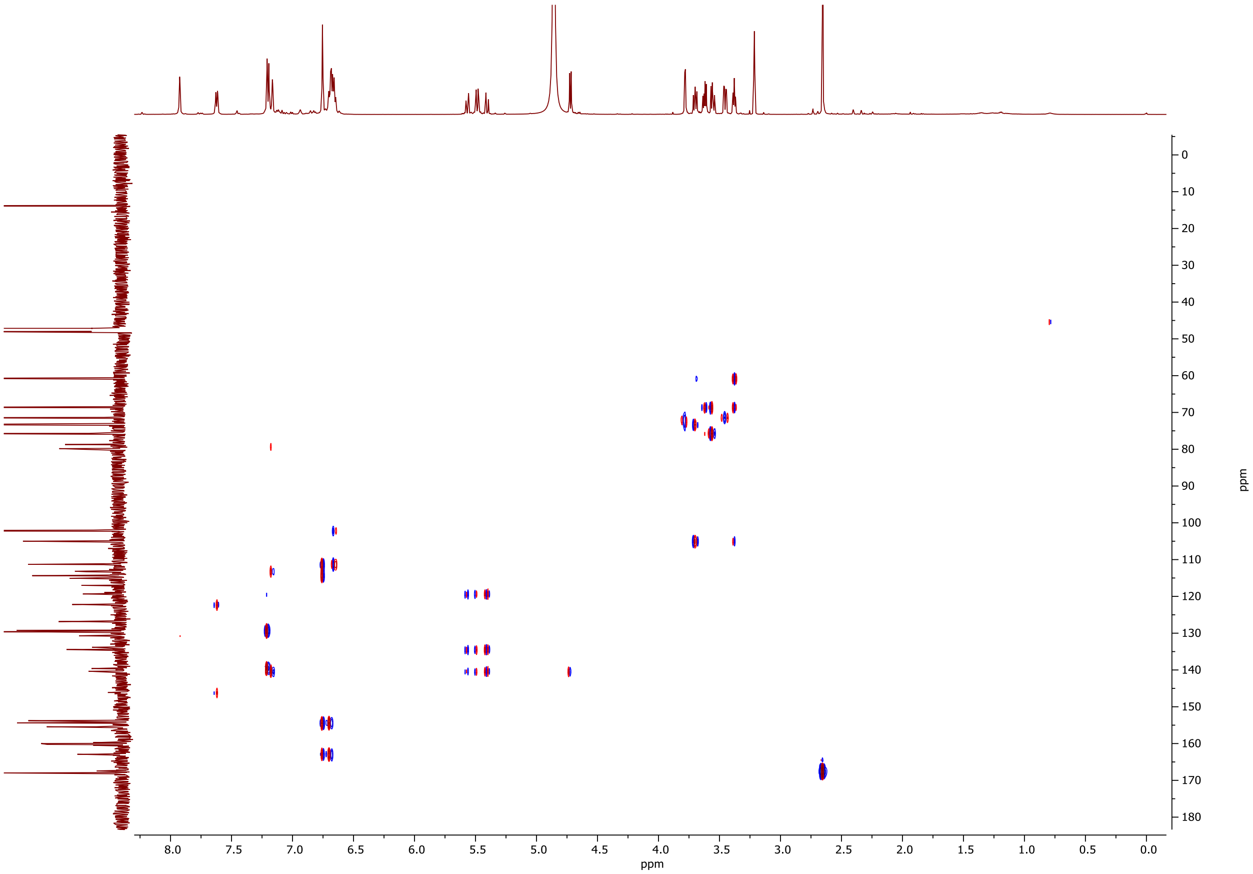


Figure S104. ^{1}H-^{13}C HMBC NMR spectrum of compound **25** (**BG-FITC-F-1F**) in CD3OD

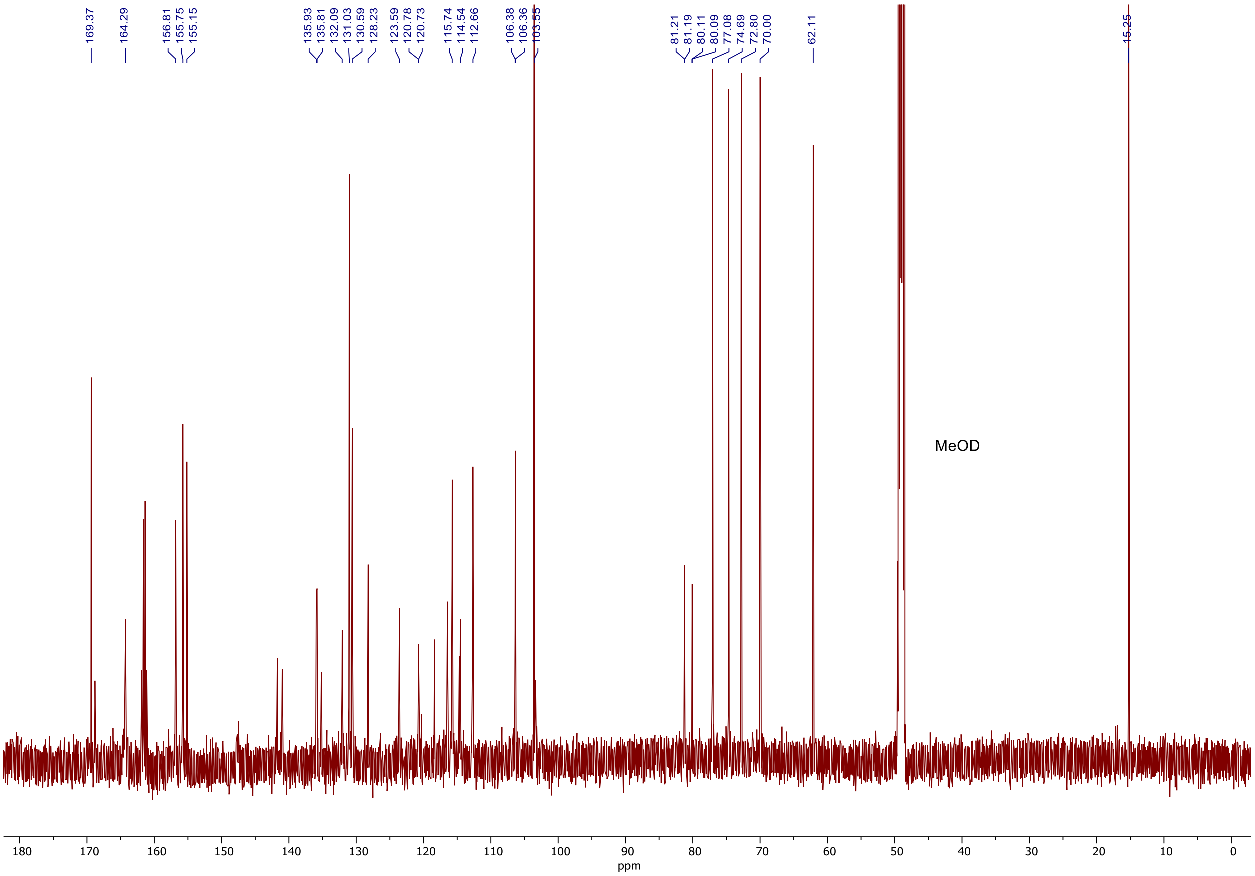


Figure S105. ^{13}C NMR spectrum of compound **25** (**BG-FITC-F-1F**) in CD3OD

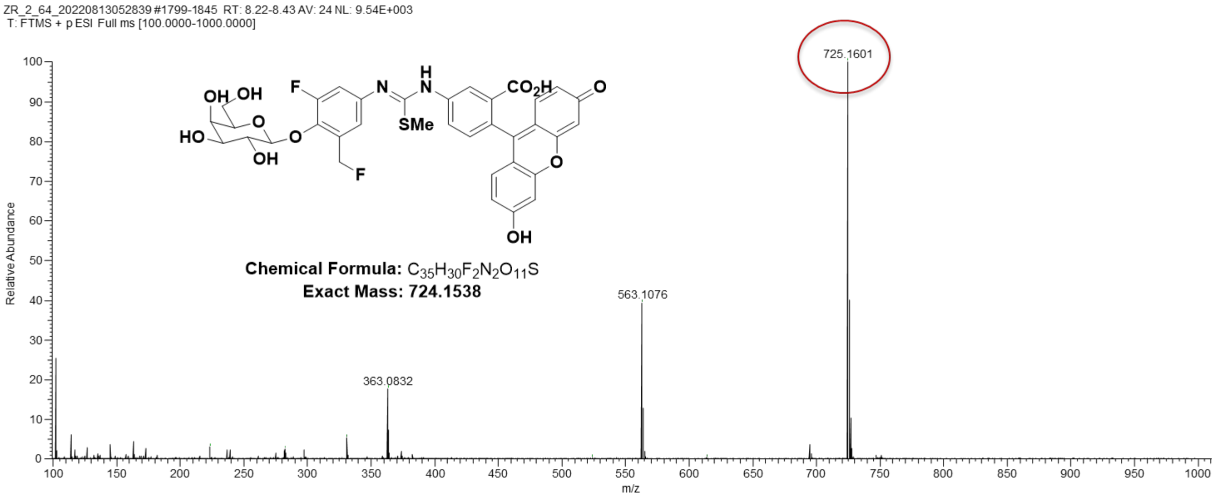


Figure S106. ESI-MS spectrum of compound **25** (**BG-FITC-F-1F**)

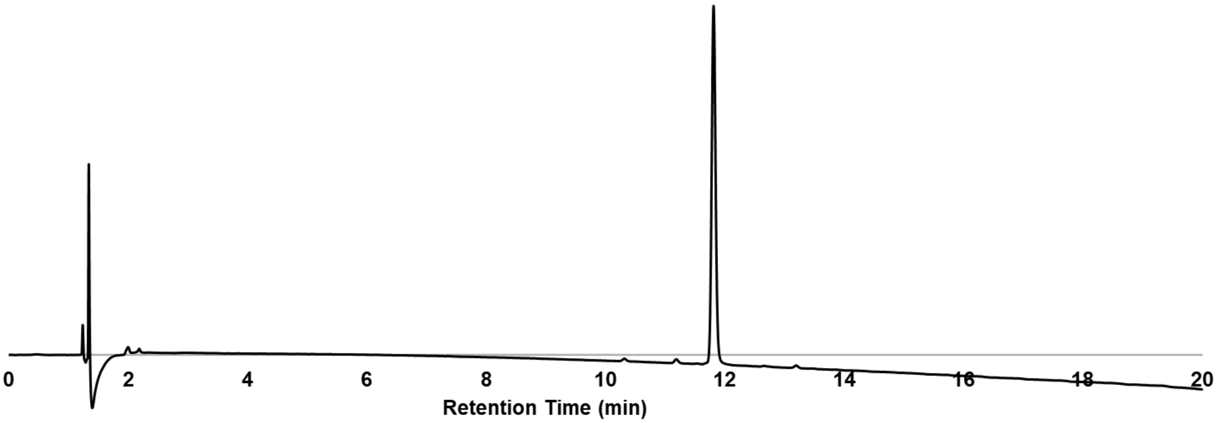


Figure S107. HPLC trace (440 nm) spectrum of compound **25** (**BG-FITC-F-1F**)

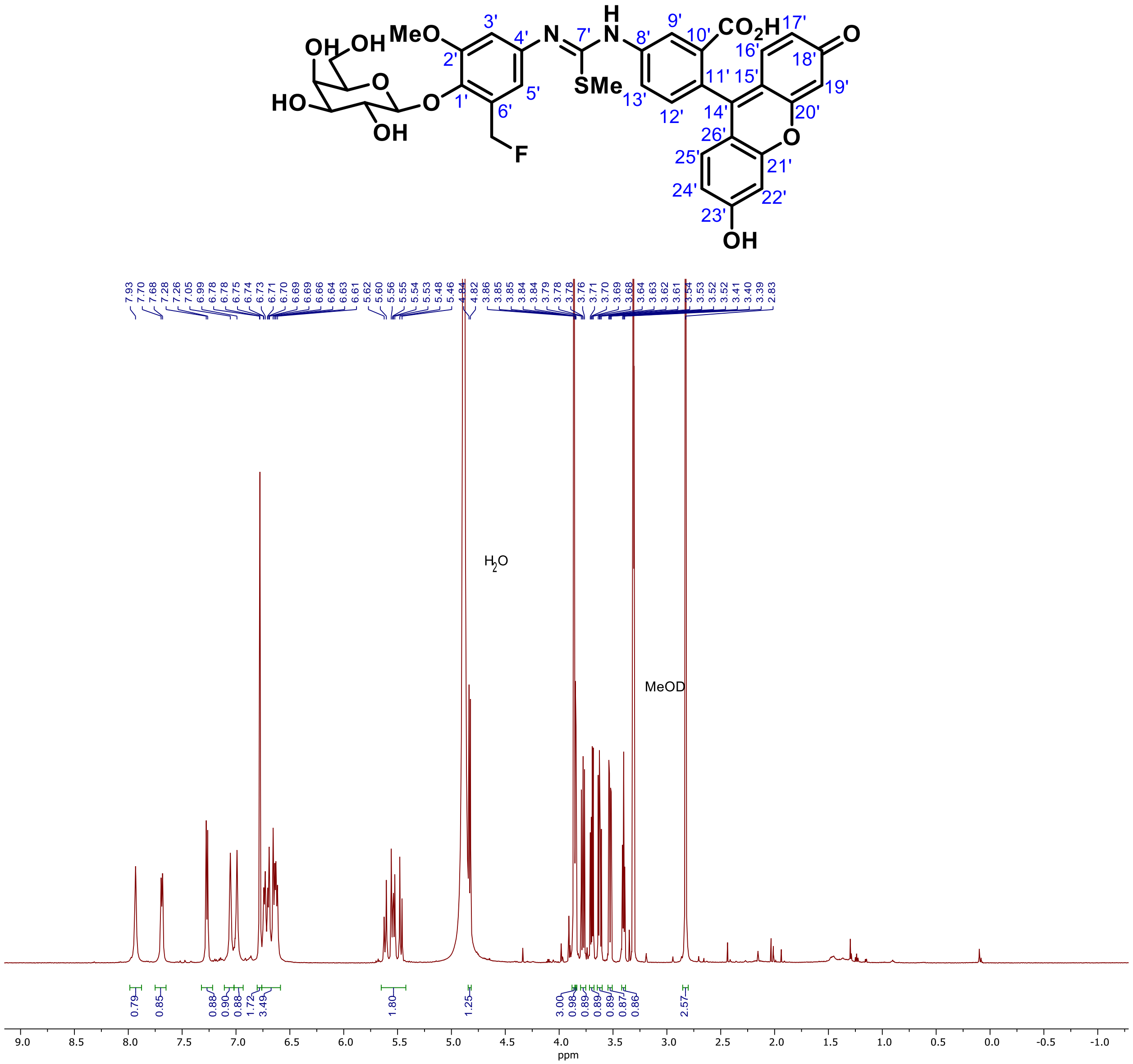


Figure S108. ^{1}H NMR spectrum of compound **25** (**BG-FITC-OMe-1F**) in CD3OD

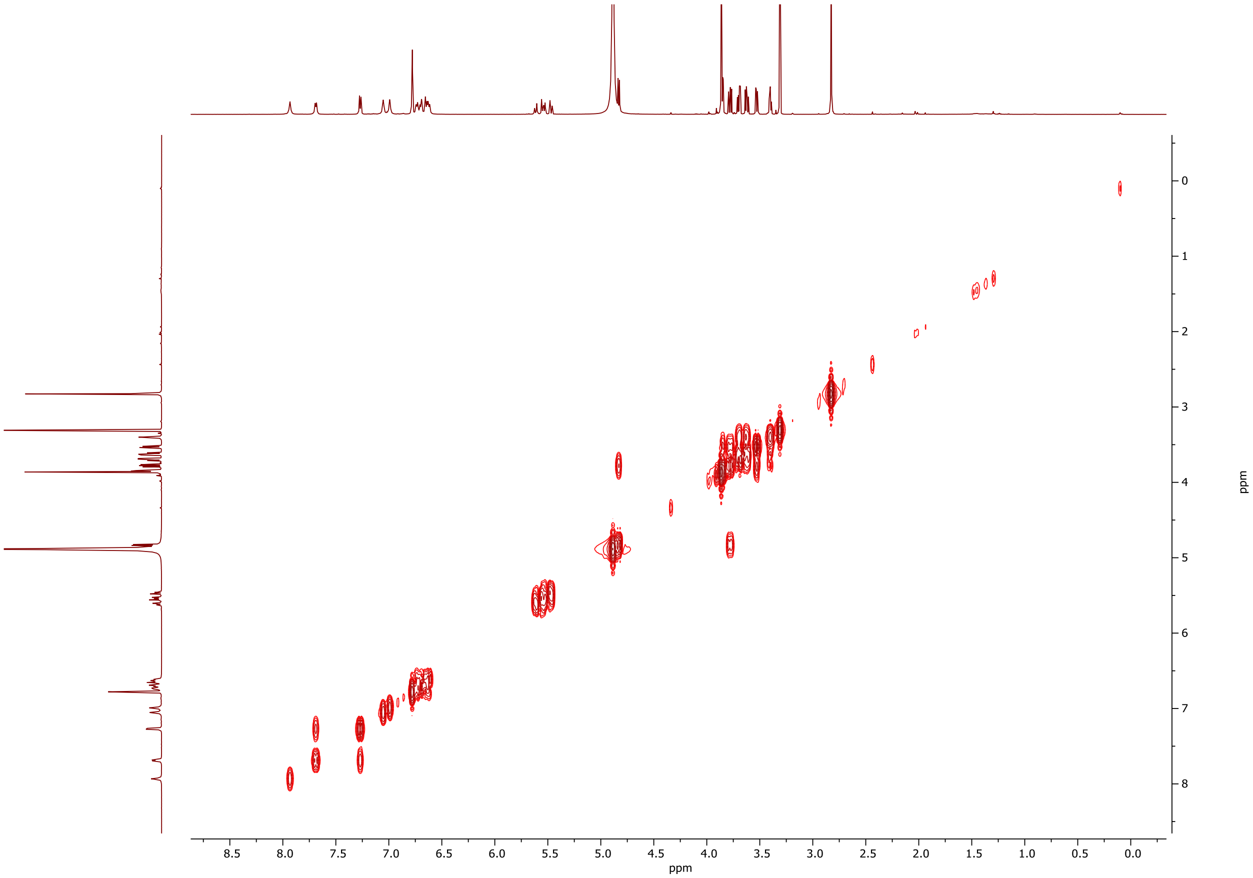


Figure S109. ^1H-^1H COSY NMR spectrum of compound **25** (**BG-FITC-OMe-1F**) in CD3OD

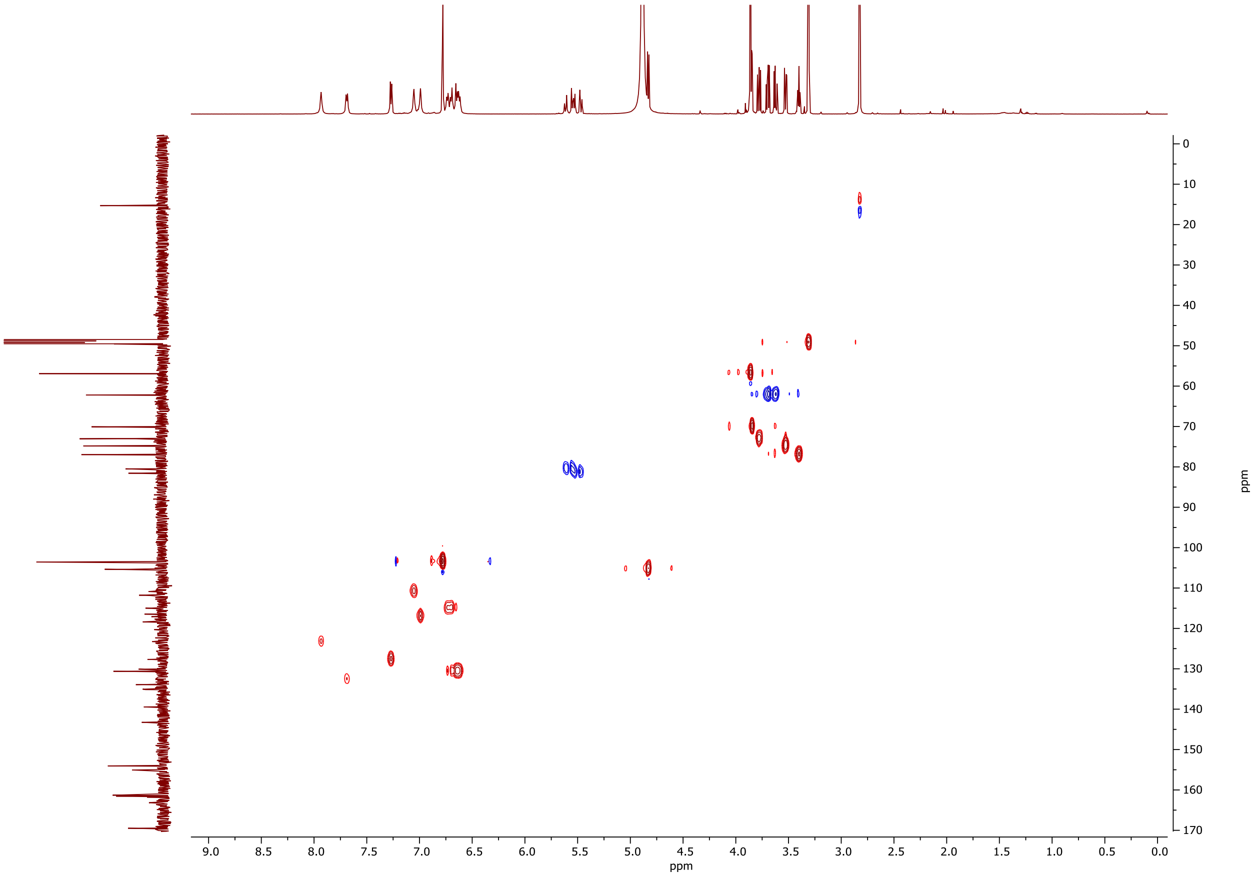


Figure S110. ^{1}H-^{13}C HSQC NMR spectrum of compound **25** (**BG-FITC-OMe-1F**) in CD3OD

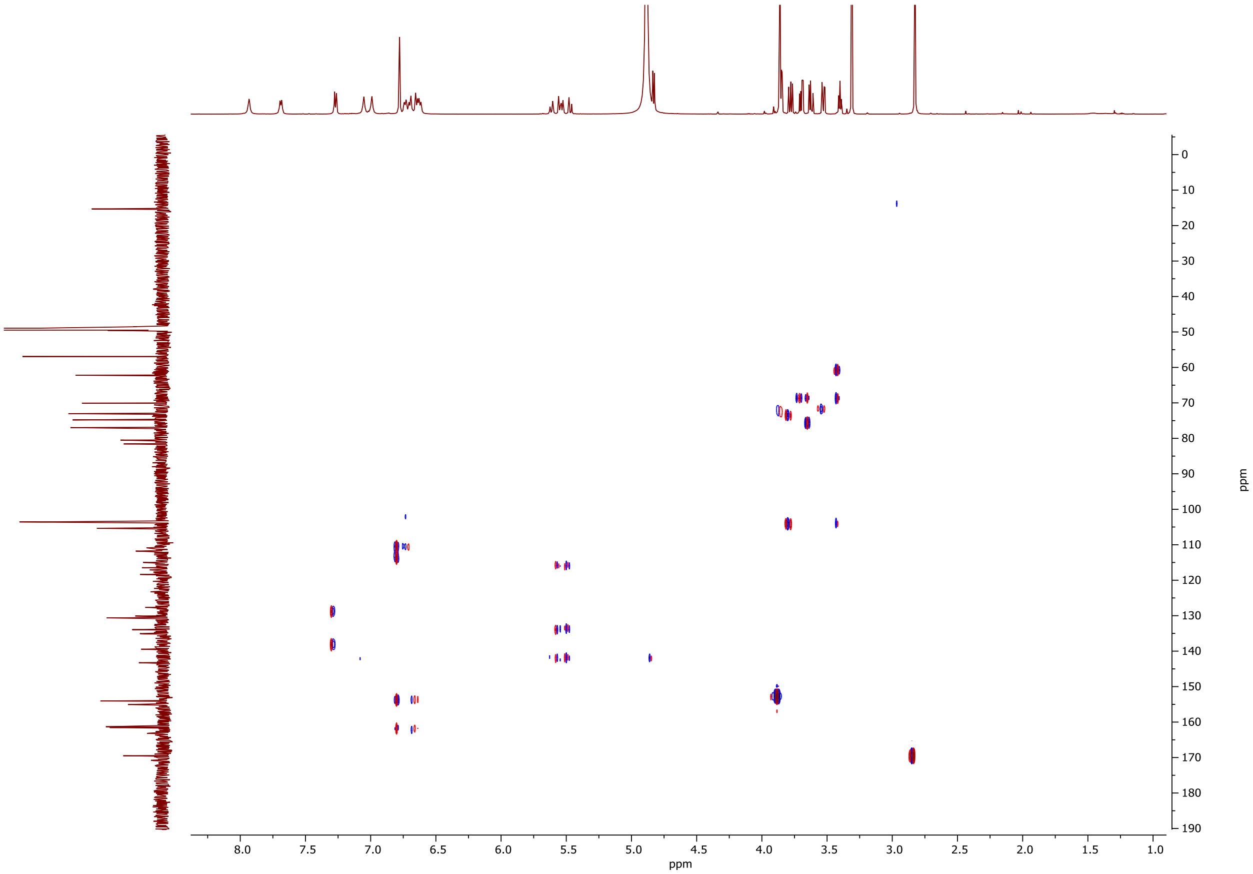


Figure S111. ^{1}H-^{13}C HMBC NMR spectrum of compound **25** (**BG-FITC-OMe-1F**) in CD3OD

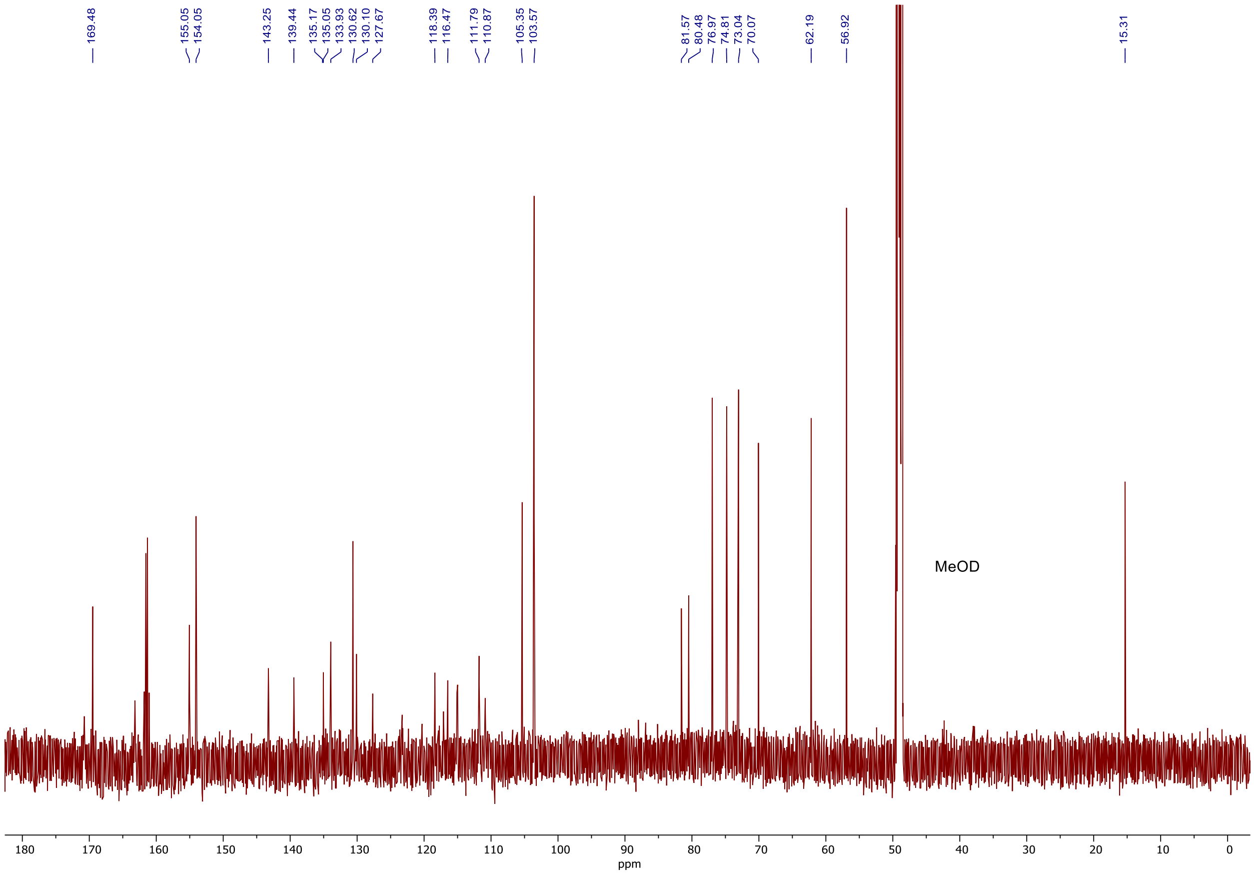


Figure S112. ^{13}C NMR spectrum of compound **25** (**BG-FITC-OMe-1F**) in CD3OD

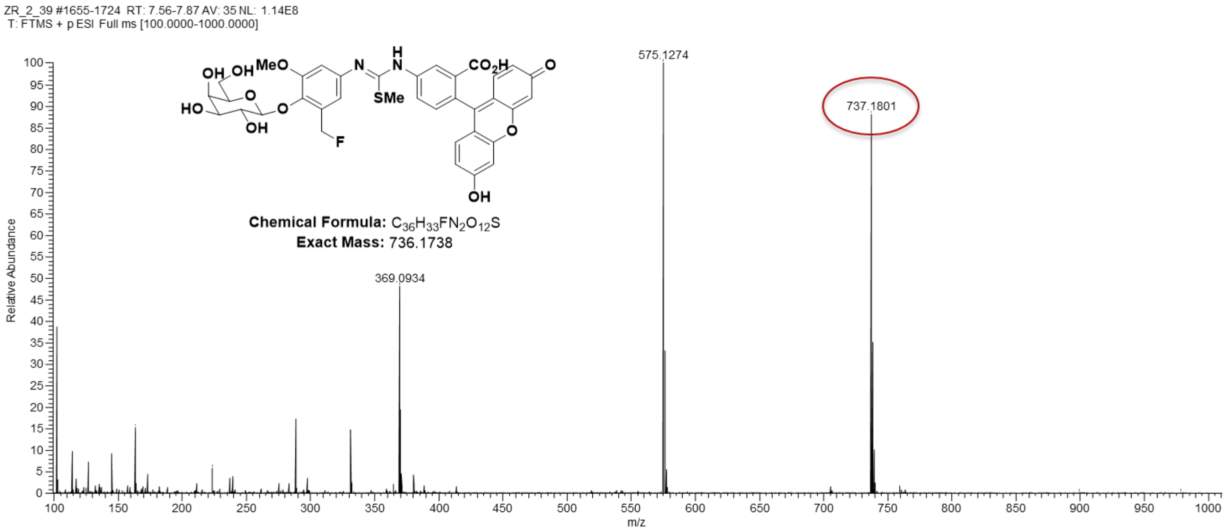


Figure S113. ESI-MS spectrum of compound **25** (**BG-FITC-OMe-1F**)

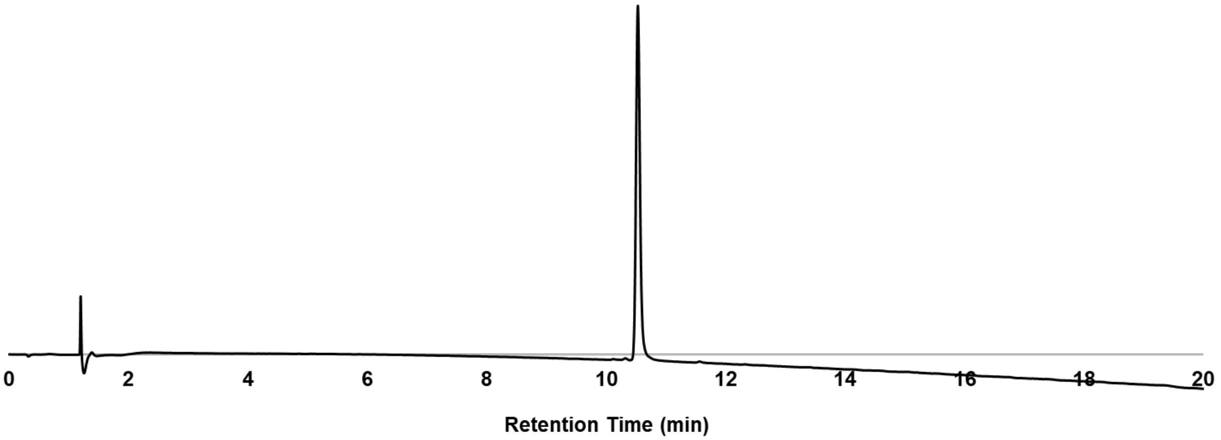


Figure S114. HPLC trace (440 nm) spectrum of compound **25** (**BG-FITC-OMe-1F**)

5. References

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