Supporting Information

Compound Characterization

A novel corrector for variants of SLC6A8: a therapeutic opportunity for Creatine Transporter Deficiency

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General method

All reagents and solvents were purchased from commercially available sources and used without further purification. Unless otherwise noted, reactions were run under air atmosphere. Nuclear magnetic resonance (NMR) spectra were collected using Agilent 400 MHz spectrometer. Chemical shifts are reported in δ units, parts per million (ppm), and were calibrated to the residual signals for DMSO-d6 (2.50 ppm ^{1}H, 39.5 ppm ^{13}C) or MeOD-d4 (3.31 ppm ^{1}H, 49.0 ppm ^{13}C) in the deuterated solvent. Coupling constants (*J*), when given, are reported in hertz. The following abbreviations were used to express the multiplicities: s = singlet; d = doublet; t = triplet; q = quartet; m = multiplet (range of multiplets given). HRMS analyses were performed using an Agilent ESI-TOF instrument. Reaction progress was monitored by liquid chromatography mass spectrometry (LCMS) using Waters Acquity UPLC system (SM-FTN, BSM, CM, PDA and QDA) equipped with Acquity UPLC BEH C18 column (2.1×50 mm, 1.7 μM) with 10−90% MeCN (0.1% TFA) in water, 2.5 min run, flow rate 0.8 mL/min. High-performance liquid chromatography (HPLC) purification was carried out on a Teledyne ISCO ACCQPrep HP150 equipped with a Symmetry C18 Prep column (19×150 mm) with 10−90% MeCN (0.1% TFA) in water, 27 min run, flow rate 17 mL/min, UV detection (λ = 220, 254 nm). All compounds used for biological assays were purified by HPLC and are at least of 95% purity.

List of Abbreviations

Abbreviation	Name
HATU	*N*-[(Dimethylamino)-1H-1,2,3-triazolo-[4,5-b]pyridin-1-ylmethylene]-Nmethylmethanaminium hexafluorophosphate N-oxide
DIPEA	*N,N*-Diisopropylethylamine
DMF	Dimethylformamide
LCMS	Liquid chromatography / mass spectrometry
SFC	Supercritical fluid chromatography
HPLC	High performance liquid chromatography
NMR	Nuclear Magnetic Resonance
HCl	Hydrochloric acid
DMSO	Dimethyl sulfoxide
NMM	*N*-Methylmorpholine
NMP	*N*-Methyl-2-pyrrolidone
EDCI	1-Ethyl-3-(3-dimethylaminopropyl)carbodiimide
HOBt	*Hydroxybenzotriazole*

Synthesis of 3-(3-(but-3-yn-1-yl)-3H-diazirin-3-yl)-N-(1-(3-fluorobenzyl)cyclobutyl)propanamide (1, JN-1318)

JN-1318

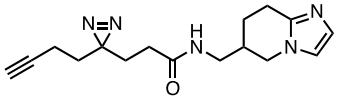
To a solution of 3-(3-but-3-ynyldiazirin-3-yl)propanoic acid (32.4 mg, 194.7 μmol) and HATU (80.2 mg, 210.9 μmol) in DMF (1 mL) was added DIPEA (70.7 μL, 405.7 μmol). The reaction was stirred at room temp for 5 min before 1-[(3-fluorophenyl)methyl] cyclobutanamine (35 mg, 162.3 μmol, HCl) was added. The resulting mixture was allowed to stir at room temp for 5 min, upon which LC/MS showed full conversion. The crude was directly subjected to prep HPLC to provide product as white solid (30.5 mg, 57%).

^{1}H NMR (400 MHz, *d*-DMSO) δ 7.77 (s, 1H), 7.31 (td, *J* = 8.2, 6.3 Hz, 1H), 7.02 (td, *J* = 8.2, 2.7 Hz, 1H), 6.95 (d, *J* = 8.2 Hz, 1H), 6.91 – 6.90 (m, 1H), 3.29 (s, 1H), 3.09 (s, 2H), 2.79 (t, *J* = 2.6 Hz, 1H), 2.12 – 2.04 (m, 2H), 2.04 – 1.97 (m, 4H), 1.88 – 1.78 (m, 4H), 1.64 (t, *J* = 7.7 Hz, 2H), 1.58 (t, *J* = 7.7 Hz, 2H).

^{13}C NMR (101 MHz, *d*-DMSO) δ 169.7, 161.9 (d, $^{1}J_{CF}$ = 242.6 Hz), 141.3 (d, $^{3}J_{CF}$ = 7.2 Hz), 129.5 (d, $^{3}J_{CF}$ = 8.4 Hz), 126.0 (d, $^{4}J_{CF}$ = 2.7 Hz), 116.3 (d, $^{2}J_{CF}$ = 20.6 Hz), 112.6 (d, $^{2}J_{CF}$ = 20.7 Hz), 83.1, 71.6, 56.7, 40.7, 32.2, 31.5, 29.6, 28.2, 28.0, 14.6, 12.6.

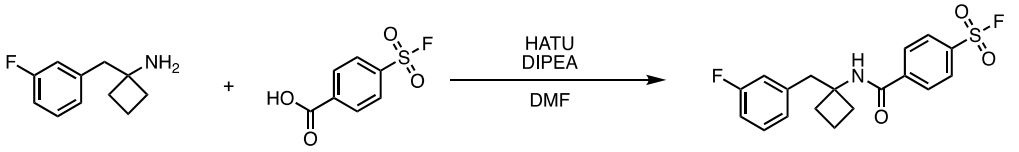
HRMS (m/z): [M]+ calcd. for $C_{19}H_{23}FN_3O$, 328.1825; found, 328.1827.

JN-1953 (RAP)



Commercially available compound (Enamine, ID Z2866906292) purchased in 100% purity.

Synthesis of 4-((1-(2-fluorobenzyl)cyclobutyl)carbamoyl)benzenesulfonyl fluoride (2, JN-3923)



JN-1318

To a solution of 4-fluorosulfonylbenzoic acid (34.1 mg, 166.9 µmol) and HATU (67.8 mg, 180.8 µmol) in DMF (1 mL) was added DIPEA (60.5 µL 347.7 µmol). The reaction was stirred at room temp for 5 min before1-[(2-fluorophenyl)methyl]cyclobutanamine (30.0 mg, 139.1 µmol, HCl) was added. The resulting mixture was allowed to stir at room temp for 5 min, upon which LC/MS showed full conversion. The crude was directly subjected to prep HPLC to provide product as white solid (50.3 mg, 98%).

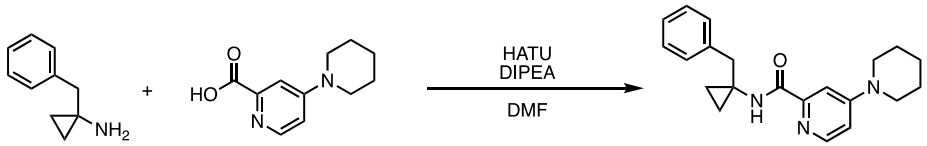
^{1}H NMR (400 MHz, *d*-DMSO) δ 8.70 (s, 1H), 8.22 (d, *J* = 8.4 Hz, 2H), 8.11 (d, *J* = 8.4 Hz, 2H), 7.27 – 7.17 (m, 2H), 7.14– 7.08 (m, 2H), 3.28 (s, 2H), 2.24 (t, *J* = 7.9 Hz, 4H), 1.88 (q, *J* = 7.9 Hz, 2H).

^{13}C NMR (101 MHz, *d*-DMSO) δ 163.7, 161.1 (d, $^{1}J_{CF}$ = 243.4 Hz), 142.1, 133.2 (d, $^{2}J_{CF}$ = 23.7 Hz), 132.5 (d, $^{4}J_{CF}$ = 5.3 Hz), 129.0, 128.4, 128.2 (d, $^{3}J_{CF}$ = 8.0 Hz), 124.9 (d, $^{3}J_{CF}$ = 16.0 Hz), 123.9, 115.0 (d, $^{2}J_{CF}$ = 22.9 Hz), 57.7, 34.1, 32.2, 14.8.

^{19}F NMR (376 MHz, *d*-DMSO) δ –70.2 (d, *J* = 711.1 Hz), -117.0 (dt, *J* = 10.9, 6.2 Hz).

HRMS: (m/z): $[M+H]^+$ for $C_{18}H_{18}F_2NO_3S$: calculated: 366.0975, measured: 366.0976.

Synthesis of N-(1-benzylcyclopropyl)-4-(piperidin-1-yl)picolinamide (3, JN-4965)



JN-4965

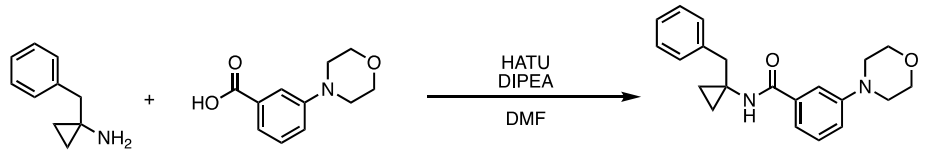
To a solution of 4-(1-piperidyl)pyridine-2-carboxylic acid (59.4 mg, 244.5 µmol, HCl) and HATU (100.7 mg, 264.9 µmol) in DMF (1 mL) was added DIPEA (88.7 µL, 509.5 µmol). The reaction was stirred at room temp for 5 min before (1-phenylcyclopropyl) methanamine (30 mg, 203.8 µmol) was added. The resulting mixture was allowed to stir at room temp for 5 min, upon which LC/MS showed full conversion. The crude was directly subjected to prep HPLC to provide product as white solid (65.0 mg, 95%)

^{1}H NMR (400 MHz, *d*-DMSO) δ 8.71 (s, 1H), 8.09 (d, *J* = 6.6 Hz, 1H), 7.47 (d, *J* = 2.9 Hz, 1H), 7.33 – 7.25 (m, 4H), 7.18 (t, *J* = 7.0 Hz, 1H), 7.03 (dd, *J* = 6.6, 2.9 Hz, 1H), 3.59 (d, *J* = 6.0 Hz, 2H), 3.54 – 3.51 (m, 4H), 1.67 – 1.55 (m, 6H), 1.01 – 0.98 (m, 2H), 0.83 – 0.80 (m, 2H).

^{13}C NMR (101 MHz, *d*-DMSO) δ 162.9, 155.7, 143.1, 128.2, 128.0, 126.1, 108.9, 105.5, 47.0, 46.8, 25.0, 24.8, 23.6, 12.1.

HRMS: (m/z): $[M+H]^+$ for $C_{21}H_{26}N_3O$: calculated: 336.2076, measured: 336.2085.

Synthesis of *N*-(1-benzylcyclopropyl)-3-morpholinobenzamide (JN-4966)



JN-4966

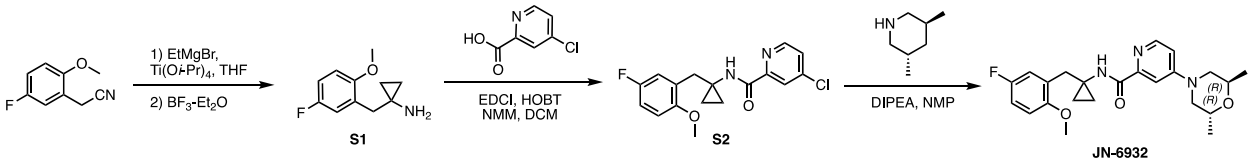
To a solution of 3-morpholinobenzoic acid (50.7 mg, 244.5 µmol) and HATU (100.7 mg, 264.9 µmol) in DMF (1 mL) was added DIPEA (88.7 µL, 509.5 µmol). The reaction was stirred at room temp for 5 min before (1-phenylcyclopropyl)methanamine (30.0 mg, 203.8 µmol) was added. The resulting mixture was allowed to stir at room temp for 5 min, upon which LC/MS showed full conversion. The crude was directly subjected to prep HPLC to provide product as white solid (48.0 mg, 70%)

^{1}H NMR (400 MHz, *d*-DMSO) δ 8.26 (t, *J* = 6.0 Hz, 1H), 7.34 – 7.32 (m, 2H), 7.29 – 7.25 (m, 4H), 7.22 (dd, *J* = 7.6, 1.3 Hz, 1H), 7.19 – 7.15 (m, 1H), 7.08 – 7.05 (m, 1H), 3.75 (t, *J* = 4.9 Hz, 4H), 3.54 (d, *J* = 5.8 Hz, 2H), 3.13 (t, *J* = 4.9 Hz, 4H), 0.97 – 0.95 (m, 2H), 0.77 – 0.74 (m, 2H).

^{13}C NMR (101 MHz, *d*-DMSO) δ 166.7, 150.7, 143.7, 135.5, 128.7, 128.2, 128.0, 125.9, 118.0, 117.6, 113.7, 66.0, 48.2, 46.4, 25.1, 11.7.

HRMS: (m/z): $[M+H]^+$ for $C_{21}H_{25}N_2O_2$: calculated: 337.1916, measured: 337.1969.

Synthesis of 4, JN-6932



Step 1: Synthesis of 1-(5-fluoro-2-methoxybenzyl)cyclopropan-1-amine (S1)

To a solution of $Ti(O\text{-}iPr)_4$ (2.07 g, 7.27 mmol) in anhydrous THF (20 mL) was added EtMgBr (4.2 mL, 3 M in Et_2O) dropwise at -78 °C under N_2 atmosphere. The reaction mixture was stirred at -78 °C for 1 hr. Then a solution of 2-(5-fluoro-2-methoxyphenyl)acetonitrile (1.0 g, 6.06 mmol) in anhydrous THF (15 mL) was added into the above mixture and the resulting mixture was stirred from -78 °C to room temperature slowly for 3 hrs. Then boron trifluoride diethyl etherate (1.81 g, 12.73 mmol) was added into the above mixture and the resulting mixture was stirred at room temperature for 1 hr. After completion, the mixture was quenched with 1 N HCl solution (40 mL) and extracted with MTBE (50 mL) twice, the aqueous phase was zseparated, basified with 1 N aq. NaOH to pH>12 and then extracted with EtOAc (50 mL) three times. The combined EtOAc phase were washed with brine (60 mL), dried over anhydrous Na_2SO_4, filtered and the filtrate was evaporated to dryness. The residue was purified by flash column chromatography (eluted with DCM/MeOH= 100: 0 to 100: 4) to give **S1** (453 mg, 38.3 % yield) as colorless oil.

^{1}H NMR (400 MHz, MeOD) δ 7.02 – 6.99 (m, 1H), 6.95 – 6.93 (m, 2H), 3.81 (s, 3H), 2.82 (s, 2H), 0.60 – 0.58 (m, 4H).

^{13}C NMR (101 MHz, MeOD) δ 118.6, 118.3, 114.5, 114.3, 112.8, 112.7, 56.3, 39.5, 35.1, 13.6.

^{19}F NMR (376 MHz, MeOD) δ -126.37 (s).

HRMS: (m/z): $[M+H]^+$ for $C_{11}H_{15}FNO$: calculated: 196.1138, measured: 196.1136.

Step 2: Synthesis of 4-chloro-N-(1-(5-fluoro-2-methoxybenzyl)cyclopropyl)picolinamide (S2)

To a mixture of **S1** (300 mg, 1.54 mmol) and 4-chloropicolinic acid (243 mg, 1.54 mmol) in DCM (10 mL) was added EDCI (443 mg, 2.31 mmol), HOBt (312 mg, 2.31 mmol) and NMM (467 mg, 4.62 mmol). The resulting mixture was stirred at room temperature for 16 hrs. Then the mixture was diluted with H_2O (40 mL) and extracted with DCM (30 mL) twice. The combined organic layers were washed with brine (40 mL), dried over anhydrous Na_2SO_4, filtered and concentrated to dryness. The residue was purified by flash column chromatography (eluted with DCM/MeOH= 100: 0 to 100: 1) to give **S2** (450 mg, 87.6 % yield) as light-yellow solid.

^{1}H NMR (400 MHz, MeOD) δ 8.47 (d, J = 5.2 Hz, 1H), 8.08 (d, J = 1.5 Hz, 1H), 7.58 – 7.57 (m, 1H), 6.95 – 6.80 (m, 3H), 3.59 (s, 3H), 3.02 (s, 2H), 0.95 – 0.87 (m, 4H).

^{13}C NMR (101 MHz, MeOD) δ 166.0, 158.1 (d, $^1J_{CF}$ = 236.6 Hz), 155.4 (d, $^4J_{CF}$ = 2.0 Hz), 152.9, 150.9, 146.8, 130.3 ($^3J_{CF}$, J = 7.2 Hz), 127.6, 123.1, 118.5 (d, $^2J_{CF}$ = 23.1 Hz), 114.3 (d, $^2J_{CF}$ = 22.7 Hz), 112.3 (d, $^3J_{CF}$ = 8.4 Hz), 56.1, 35.9, 34.5, 13.6.

^{19}F NMR (376 MHz, MeOD) δ -126.51 (s).

HRMS: (m/z): $[M+H]^+$ for $C_{17}H_{17}ClFN_2O_2$: calculated: 335.0963, measured: 335.0964.

Step 3: Synthesis of 4-((2R,6R)-2,6-dimethylmorpholino)-N-(1-(5-fluoro-2-methoxybenzyl) cyclopropyl)picolinamide (4, JN-6932)

To a mixture of **S2** (100 mg, 0.30 mmol) and DIPEA (116 mg, 0.90 mmol) in NMP (5 mL) was added (3R,5R)-3,5-dimethylpiperidine (69 mg, 0.60 mmol). The resulting mixture was stirred at 160 °C for 11 hrs in a sealed tube. After cooling, the mixture was diluted with water (40 mL) and extracted with EtOAc (40 mL) twice. The combined organic layers were washed with brine (40 mL), dried over anhydrous Na_2SO_4, filtered and the filtrate was concentrated to dryness in vacuo. The residue was purified via prep-HPLC to give **compound 4** (19 mg, 15.37 % yield) as light-yellow solid.

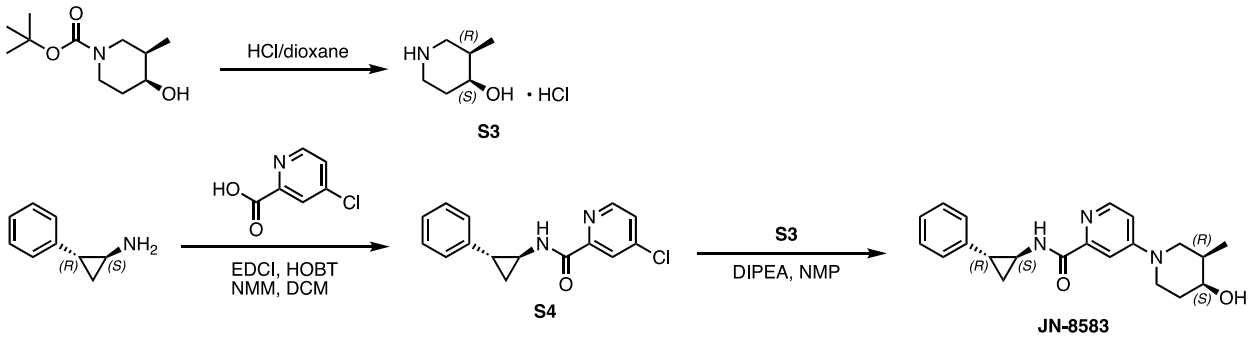
^{1}H NMR (400 MHz, MeOD) δ 8.08 (d, I = 5.9 Hz, 1H), 7.49 (d, I= 1.6 Hz, 1H), 6.92 – 6.79 (m, 4H), 4.13 – 4.09 (m, 2H), 3.59 (s, 3H), 3.53 – 3.45 (m, 2H), 3.19 – 3.14 (m, 2H), 3.00 (s, 2H), 1.23 (d, I = 6.4 Hz, 6H), 0.92 – 0.83 (m, 4H).

^{13}C NMR (101 MHz, MeOD) δ 167.6, 158.1 (d, $^1J_{CF}$ = 236.5 Hz), 157.6, 155.4 (d, $^4J_{CF}$ = 2.1 Hz), 151.2, 149.4, 130.4 (d, $^3J_{CF}$ = 7.1 Hz), 118.5 (d, $^2J_{CF}$ = 23.1 Hz), 114.3 (d, $^2J_{CF}$ = 22.8 Hz), 112.3 (d, $^3J_{CF}$ = 8.4 Hz), 110.4, 106.7, 67.5, 56.1, 51.6, 35.8, 34.4, 18.1, 13.6.

^{19}F NMR (376 MHz, MeOD) δ -126.33 (s).

HRMS: (m/z): $[M+H]^+$ for $C_{23}H_{29}FN_3O_3$: calculated: 414.2193, measured: 414.2191.

Synthesis of 4-((3R,4S)-4-hydroxy-3-methylpiperidin-1-yl)-N-((1S,2R)-2-phenylcyclopropyl) picolinamide (5, JN-8583)



Step 1: Synthesis of (3R,4S)-3-methylpiperidin-4-ol hydrochloride salt (S3)

A round-bottom flask was charged with tert-butyl (*3R,4S*)-4-hydroxy-3-methylpiperidine-1-carboxylate (200 mg, 0.93 mmol) and HCl (4 mol/L in dioxane) (6.0 mL). The reaction mixture was stirred at room temperature for 1 hr. LCMS indicated the complete consumption of the starting material. Then the mixture was concentrated to dryness under reduced pressure to give crude **S3** (106 mg, 99.1 % yield) as white solid which was used in the next step directly without further purification.

Step 2: Synthesis of 4-chloro-*N*-((1*S*,2*R*)-2-phenylcyclopropyl)picolinamide (S4)

To a mixture of (1*S*,2*R*)-2-phenylcyclopropan-1-amine (300 mg, 2.25 mmol) and 4-chloropicolinic acid (355 mg, 2.25 mmol) in DCM (10 mL) was added EDCI (648 mg, 3.38 mmol), HOBt (456 mg, 3.38 mmol) and NMM (683 mg, 6.76 mmol). The resulting mixture was stirred at room temperature for 16 hrs. Then the mixture was diluted with H_2O (40 mL) and extracted with DCM (30 mL) twice. The combined organic layers were washed with brine (50 mL), dried over anhydrous Na_2SO_4, filtered and concentrated to dryness. The residue was purified by flash column chromatography (eluted with DCM/MeOH= 100: 0 to 100: 1) to give **S4** (430 mg, 70.19 % yield) as white solid.

^{1}H NMR (400 MHz, MeOD) δ 8.52 (d, *J* = 5.3 Hz, 1H), 8.06 (d, *J* = 2.0 Hz, 1H), 7.56 (dd, *J* = 5.3, 2.0 Hz, 1H), 7.27 – 7.23 (m, 2H), 7.17 – 7.13 (m, 3H), 3.08 (ddd, *J* = 7.9, 4.6, 3.4 Hz, 1H), 2.21 (ddd, *J* = 9.7, 6.4, 3.4 Hz, 1H), 1.37 (ddd, *J* = 9.7, 5.8, 4.6 Hz, 1H), 1.30 (ddd, *J* = 7.9, 5.8, 6.4 Hz, 1H).

^{13}C NMR (101 MHz, MeOD) δ 166.5, 152.6, 151.0, 146.8, 142.1, 129.3, 127.7, 127.3, 127.0, 123.3, 33.5, 25.3, 16.1.

HRMS: (m/z): $[M+H]^+$ for $C_{15}H_{14}ClN_2O$: calculated: 273.0795, measured: 273.0794.

Step 3: Synthesis of 4-((3*R*,4*S*)-4-hydroxy-3-methylpiperidin-1-yl)-*N*-((1*S*,2*R*)-2-phenylcyclopropyl) picolinamide (5)

To a mixture of **S4** (100 mg, 0.37 mmol) and DIPEA (143 mg, 1.11 mmol) in NMP (5 mL) was added **S3** (85 mg, 0.74 mmol). The resulting mixture was stirred at 160 °C for 11 hrs in a sealed tube. After cooling, the mixture was diluted with water (50 mL) and extracted with EtOAc (40 mL) twice. The combined organic layers were washed with brine (40 mL), dried over anhydrous Na_2SO_4, filtered and the filtrate was concentrated to dryness in vacuo. The residue was purified via prep-HPLC to give **compound 5** (40 mg, 31.00 % yield) as white solid.

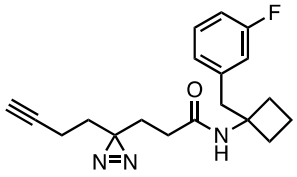
^{1}H NMR(400 MHz, MeOD) δ 8.31 (s, 1H), 8.06 (d, *J* = 6.4 Hz, 1H), 7.52 (d, *J* = 2.5 Hz, 1H), 7.22– 7.19 (m, 2H), 7.12 – 7.10 (m, 3H), 6.91 (dd, J = 6.4, 2.5 Hz, 1H), 3.84 – 3.82 (m, 1H), 3.60 (dt, *J* = 13.1, 4.1 Hz, 1H), 3.52 (dd, *J* = 13.1, 3.6 Hz, 1H), 3.27 (td, *J* = 3.2, 2.0 Hz, 1H), 3.18 (dd, *J* = 13.1, 10.1 Hz, 1H), 3.02 (ddd, *J* = 7.9, 4.6, 3.4 Hz, 1H), 2.15 (ddd, *J* = 9.7, 6.4, 3.4 Hz, 1H), 1.83 – 1.69 (m, 3H), 1.31 (ddd, *J* = 9.7, 5.8, 4.6 Hz, 1H), 1.23 (ddd, *J* = 7.9, 5.8, 6.4 Hz, 1H), 0.94 (d, *J* = 6.9 Hz, 3H).

^{13}C NMR (101 MHz, MeOD) δ 167.6, 167.0, 157.5, 149.0, 147.5, 142.1, 129.4, 127.2, 127.1, 110.3, 107.0, 68.8, 42.8, 36.5, 33.7, 32.7, 25.3, 16.1, 14.4.

HRMS: (m/z): $[M+H]^+$ for $C_{21}H_{26}N_3O_2$: calculated: 352.2025, measured: 352.2025

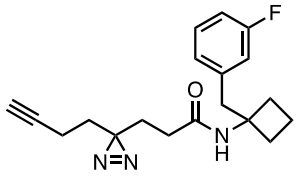
$[\alpha]_D$ +191 (c 0.1, MeOH)

Compound 1 (JN-1318)



1

^{1}H NMR, DMSO-d_6



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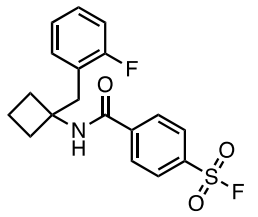
^{13}C NMR, DMSO-d$_6$

Compound 2 (JN-3923)



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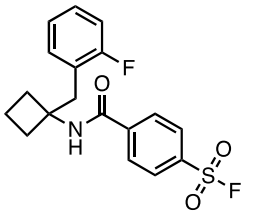
^{1}H NMR, DMSO-d_6



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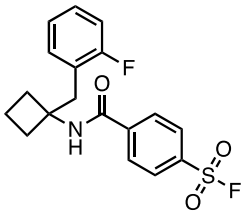
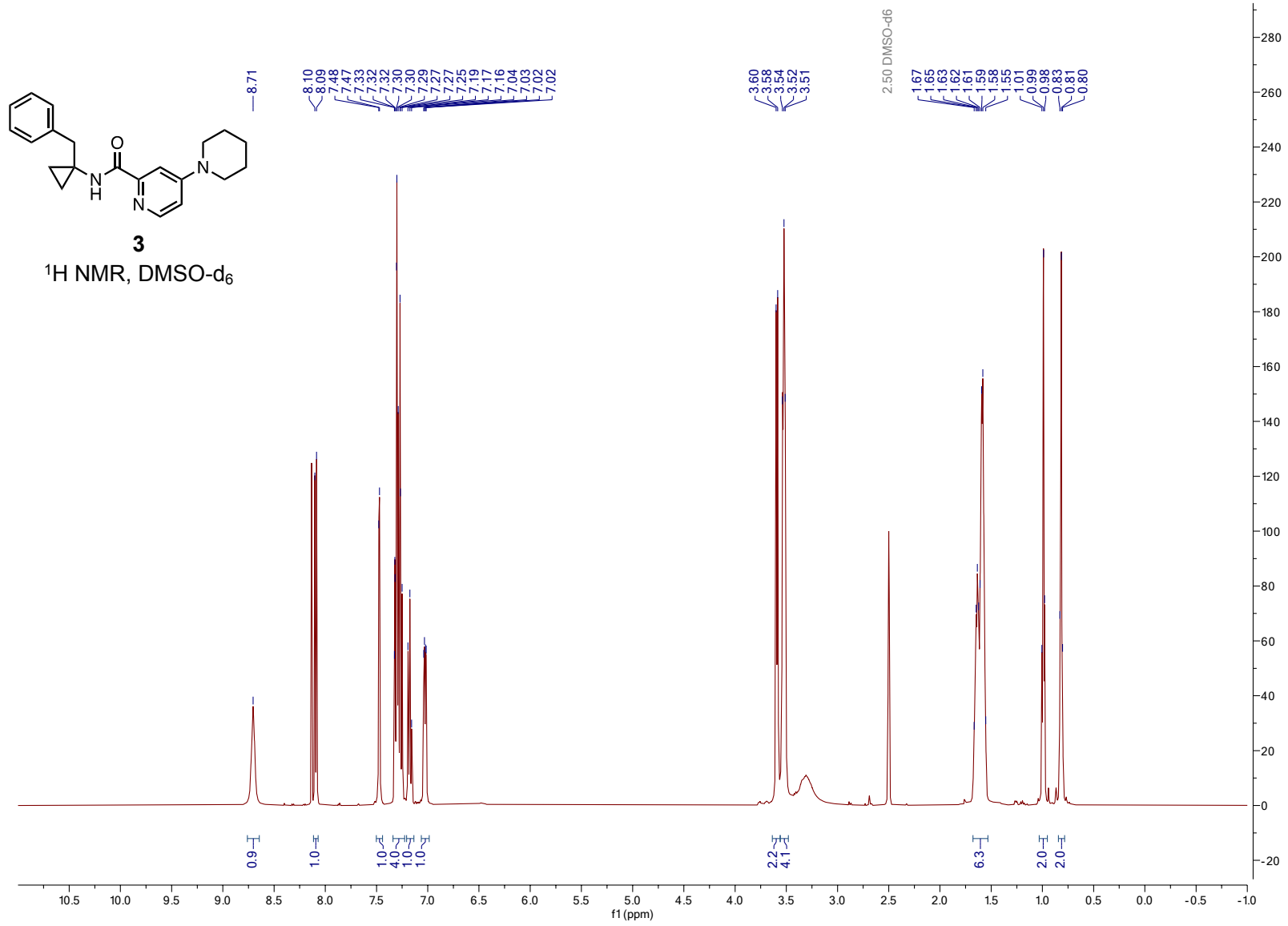
^{13}C NMR, DMSO-d_6

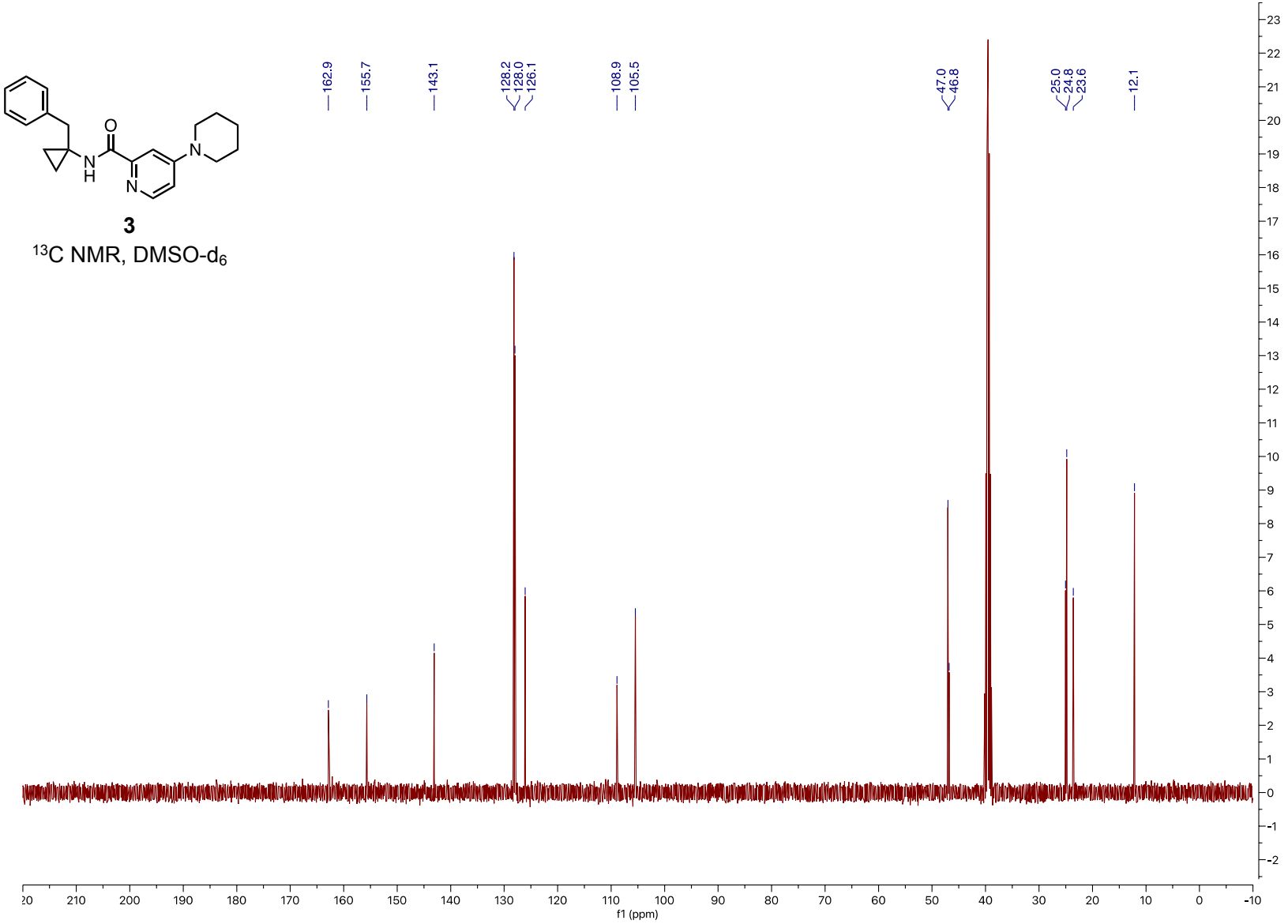


2

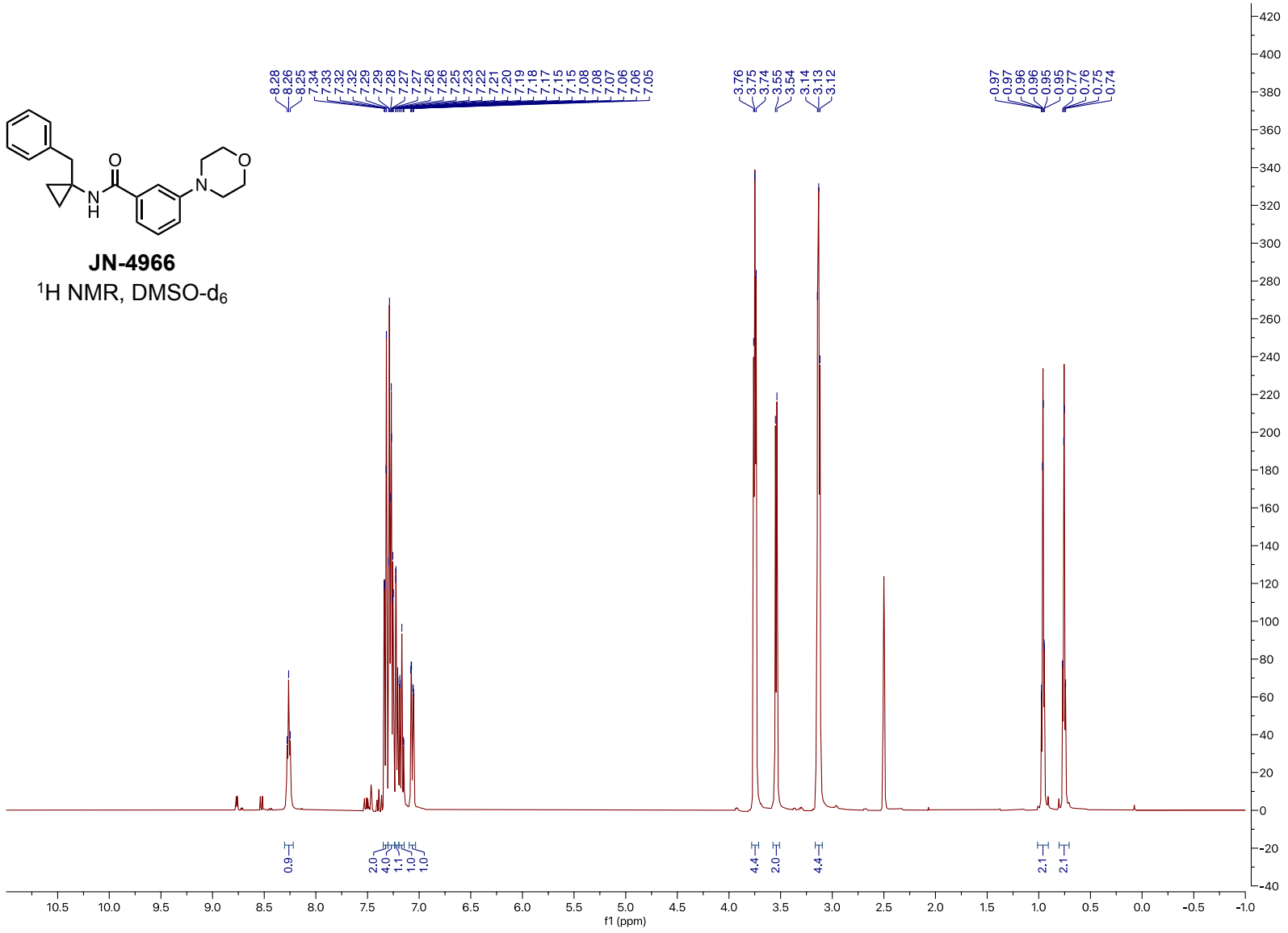
^{19}F NMR, DMSO-d_6

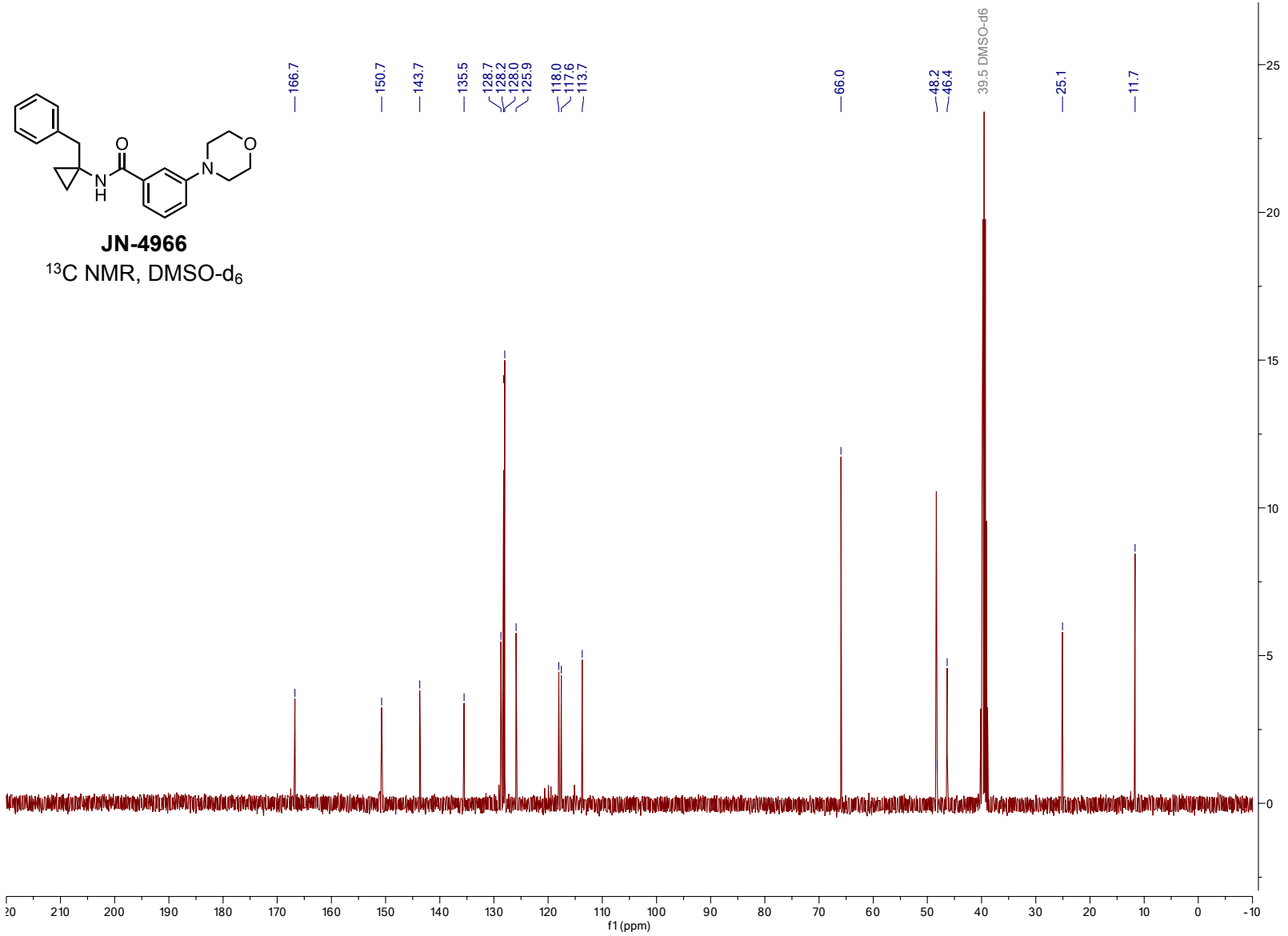
Compound 3 (JN-4965)



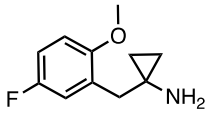

O
N
H
N
N
3
13C NMR, DMSO-d6
162.9
155.7
143.1
128.2
128.0
126.1
108.9
105.5
47.0
46.8
25.0
24.8
23.6
12.1
f1 (ppm)

Compound S1 (JN-4966)



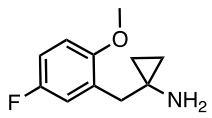

166.7
150.7
143.7
135.5
128.7
128.2
128.0
125.9
118.0
117.6
113.7
66.0
48.2
46.4
39.5 DMSO-d6
25.1
11.7
O
N
H
O
N
JN-4966
13C NMR, DMSO-d6
f1 (ppm)

Compound S1



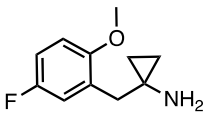
S1

^{1}H NMR,CD_3OD-d_4



S1

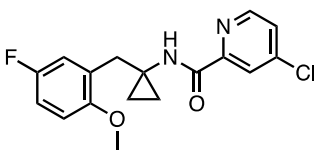
^{13}C NMR,CD_3OD-d_4



S1

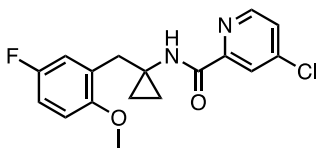
^{19}F NMR,CD_3OD-d_4

Compound S2



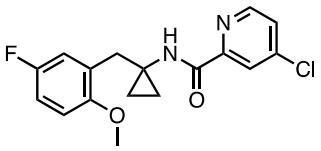
S2

^{1}H NMR,CD_3OD-d_4



S2

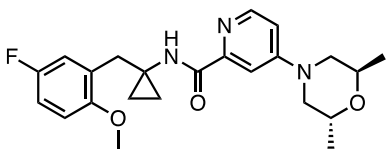
^{13}C NMR,CD_3OD-d_4



S2

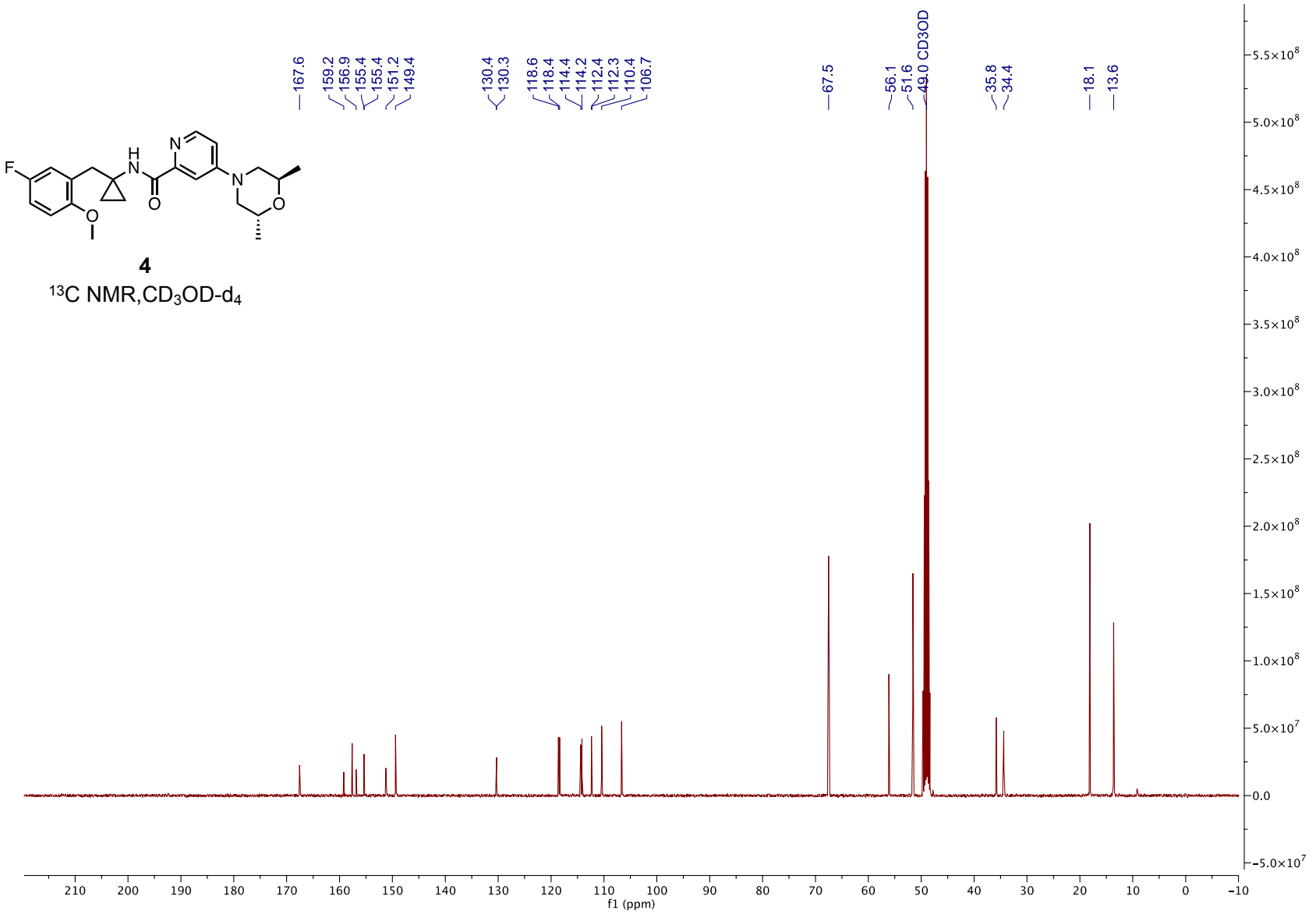
^{19}F NMR,CD_3OD-d_4

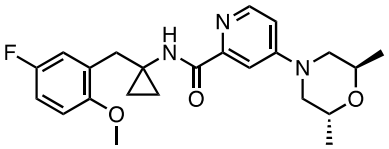
Compound 4



4

^{1}H NMR,CD_3OD-d_4

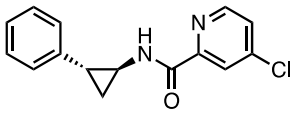

167.6
159.2
156.9
155.4
155.4
151.2
149.4
130.4
130.3
118.6
118.4
114.4
114.2
112.4
112.3
110.4
106.7
67.5
56.1
51.6
49.0 CD3OD
35.8
34.4
18.1
13.6
F
H
N
N
O
N
O
O
4
13C NMR,CD3OD-d4
5.5×10^8
5.0×10^8
4.5×10^8
4.0×10^8
3.5×10^8
3.0×10^8
2.5×10^8
2.0×10^8
1.5×10^8
1.0×10^8
5.0×10^7
0.0
-5.0×10^7
210 200 190 180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0 -10
f1 (ppm)



4

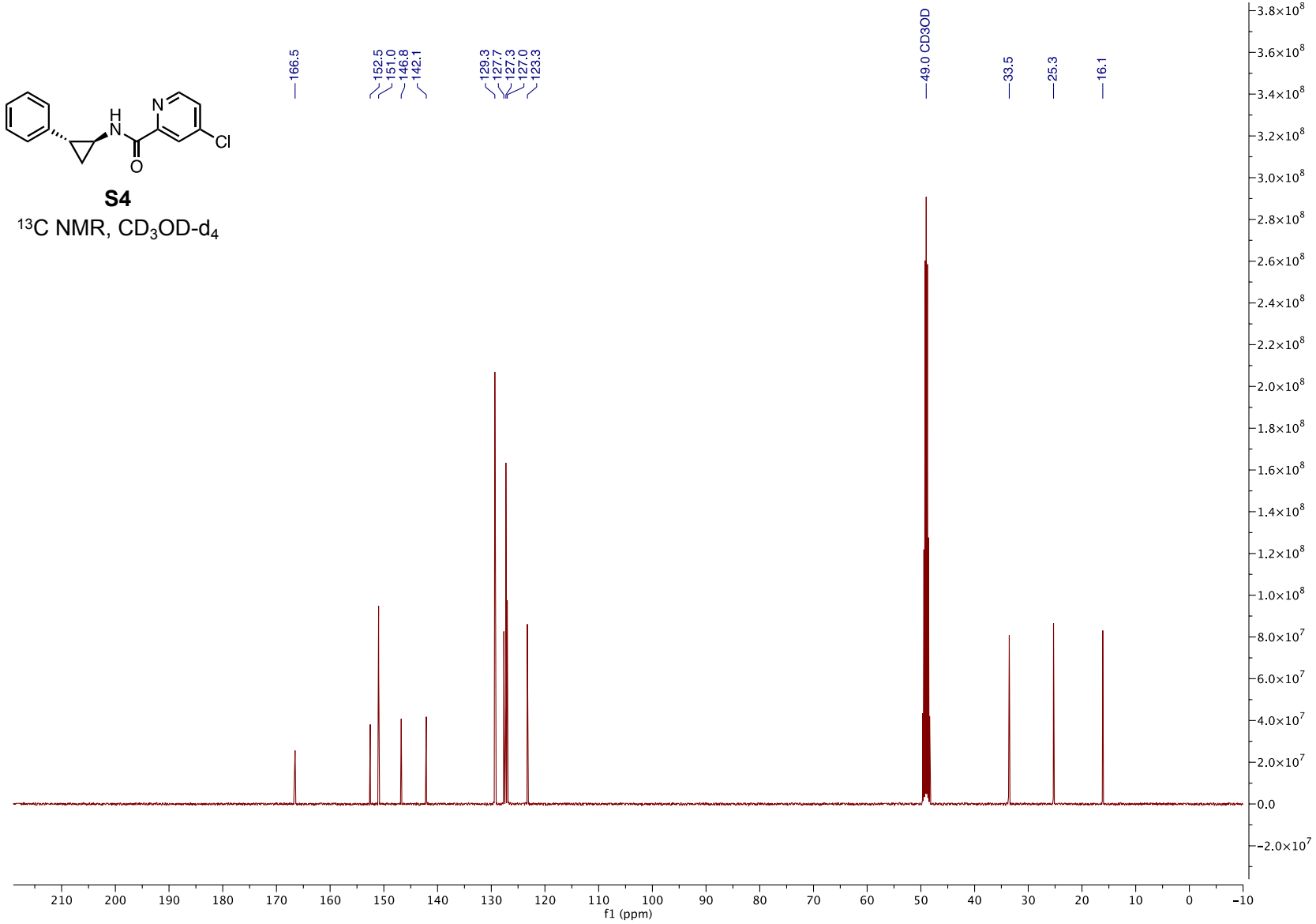
^{19}F NMR,CD_3OD-d_4

Compound S4



S4

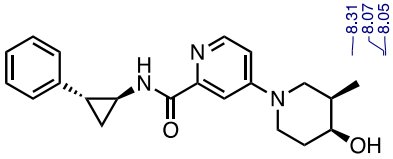
^{1}H NMR, CD_3OD-d_4



S4

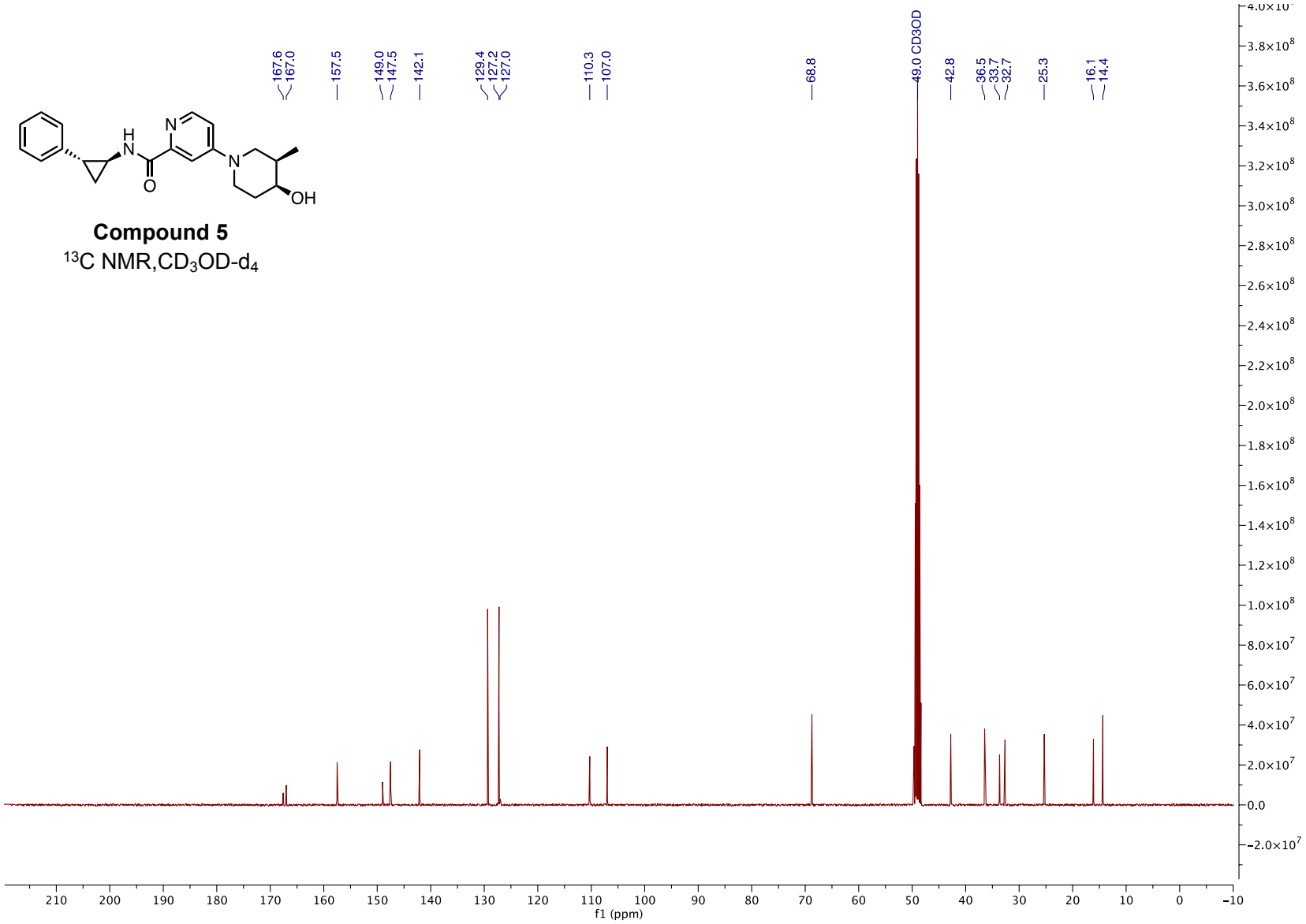
^{13}C NMR, CD_3OD-d_4

Compound 5



Compound 5

^{1}H NMR,CD_3OD-d_4



Compound 5

^{13}C NMR,CD_3OD-d_4