Supporting Information

Napyradiomycin Derivatives, Produced by a Marine-Derived Actinomycete, Illustrate Cytotoxicity by Induction of Apoptosis

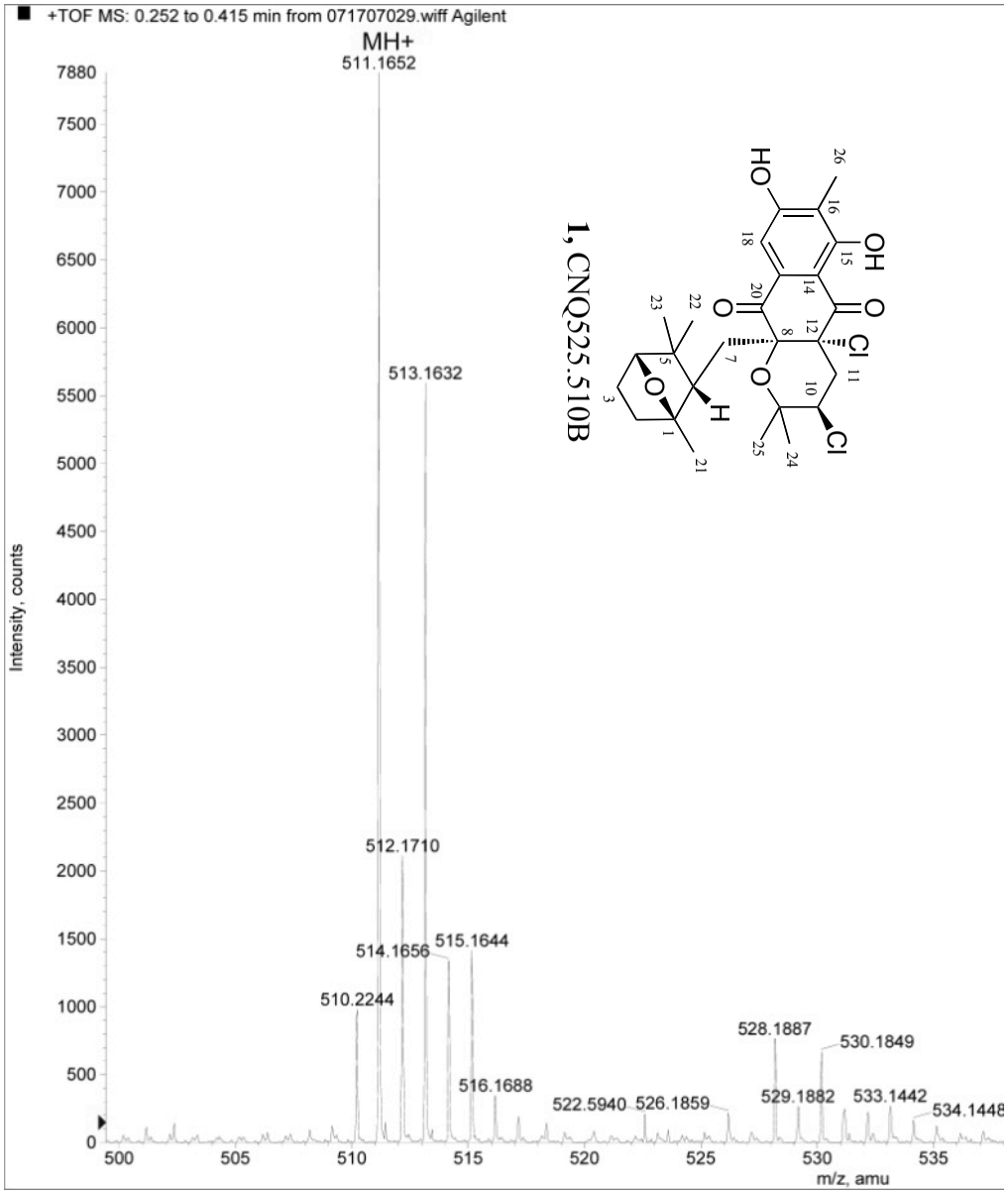
Lauga Farnaes,[†] Nicole G. Coufal,[§] Christopher A. Kauffman,[†] Arnold L. Rheingold,[‡] Antonio G. DiPasquale,[‡] Paul R. Jensen[†] and William Fenical*[†]

[†] *Center for Marine Biotechnology and Biomedicine, Scripps Institution of Oceanography, University of California at San Diego, La Jolla, CA 92093-0204*

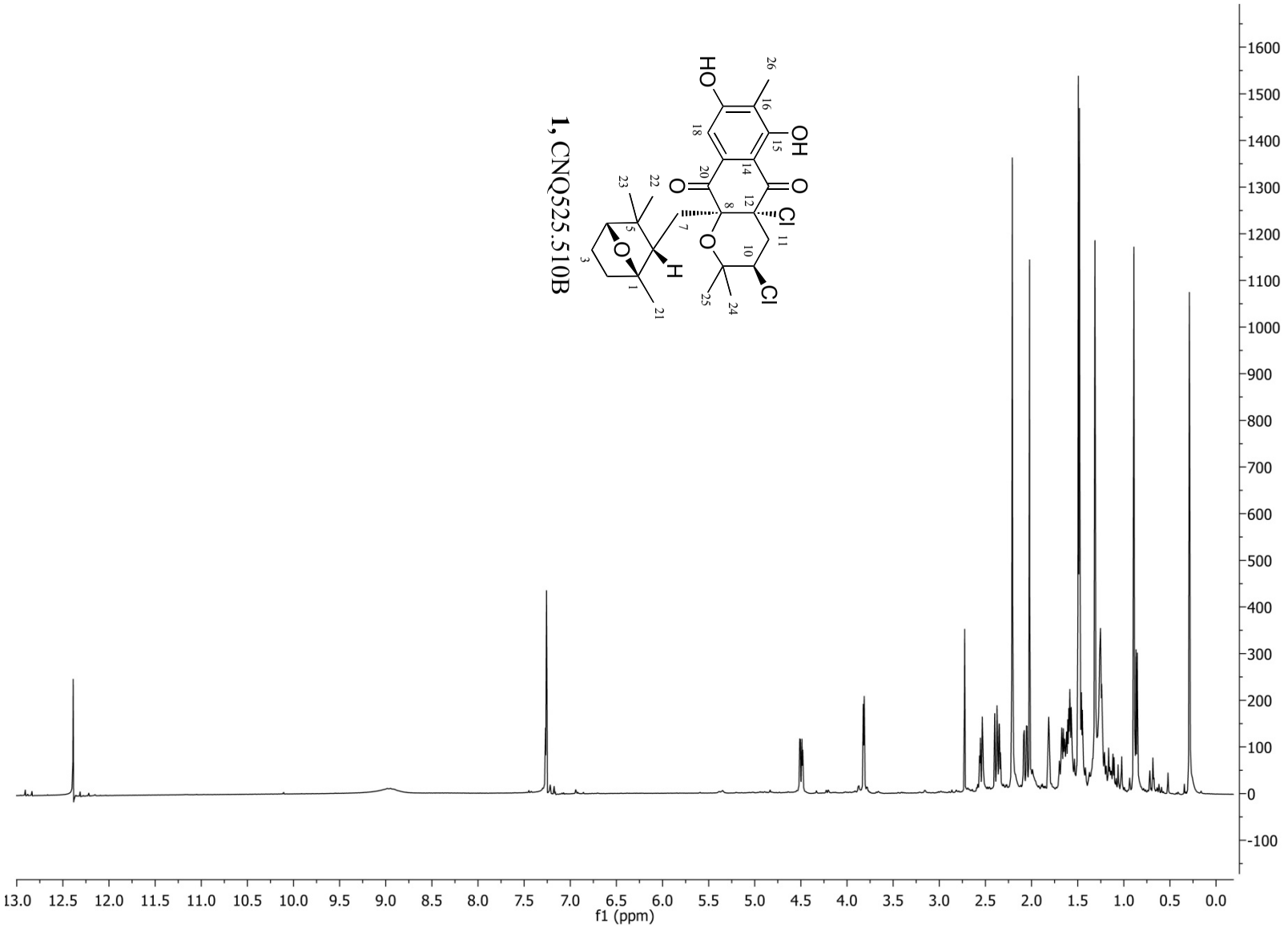
[§] *Graduate Program in Neurosciences, University of California at San Diego, La Jolla, CA 92093.*

Department of Chemistry and Biochemistry, University of California at San Diego, La Jolla, CA 92093-0358

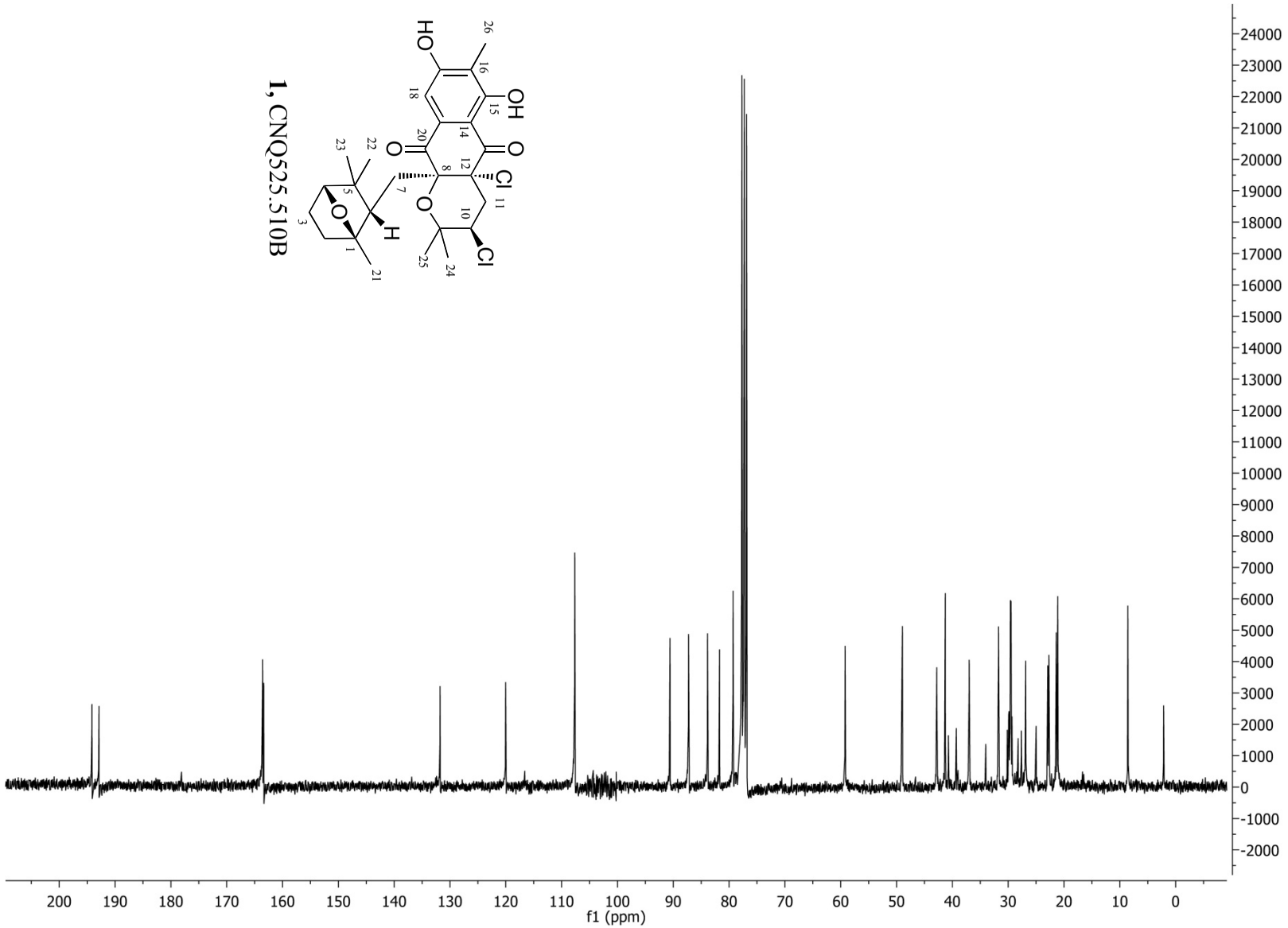
Table of Contents



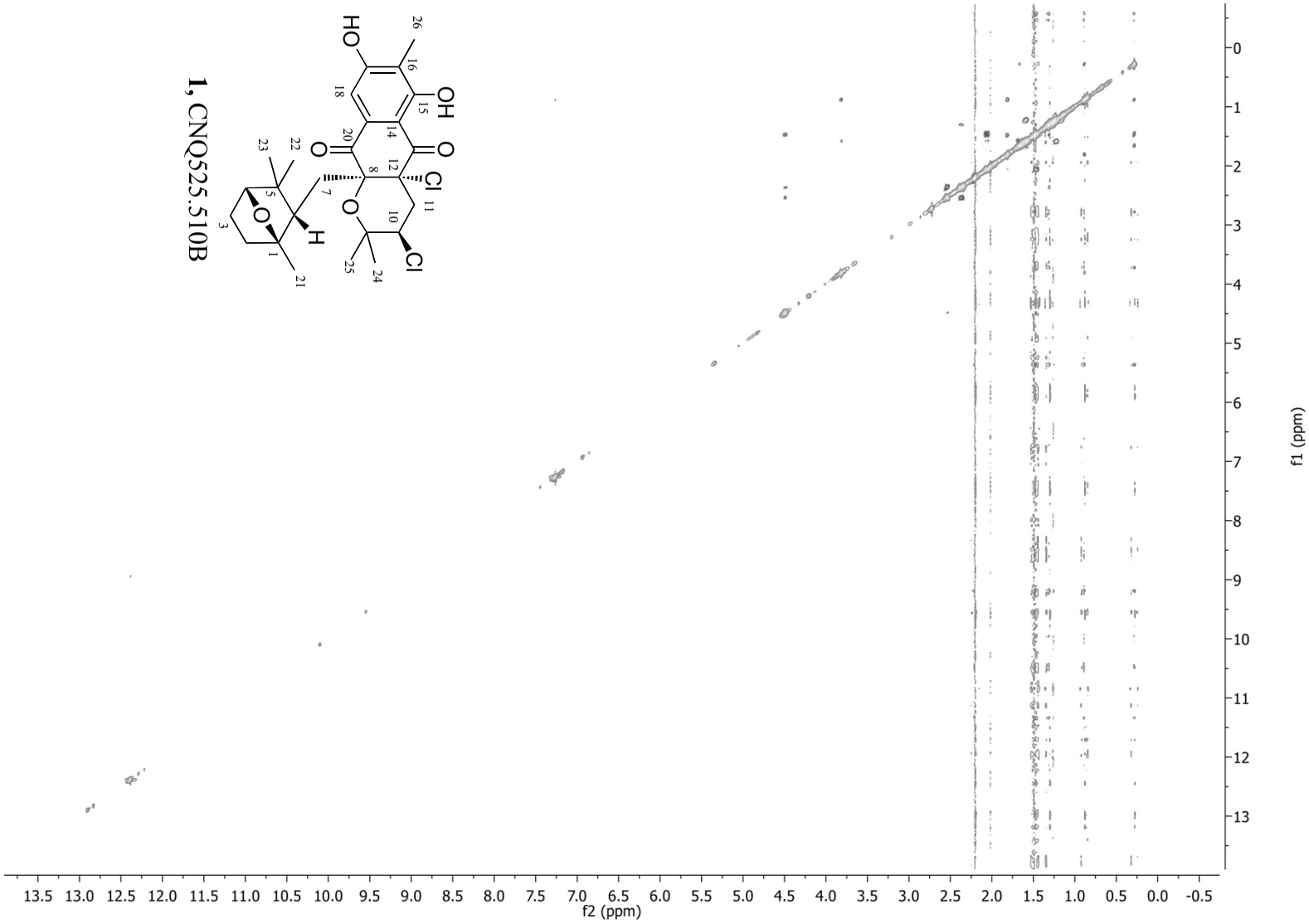
Napyradiomycin CNQ525.510B (1) HR-FTMS spectrum



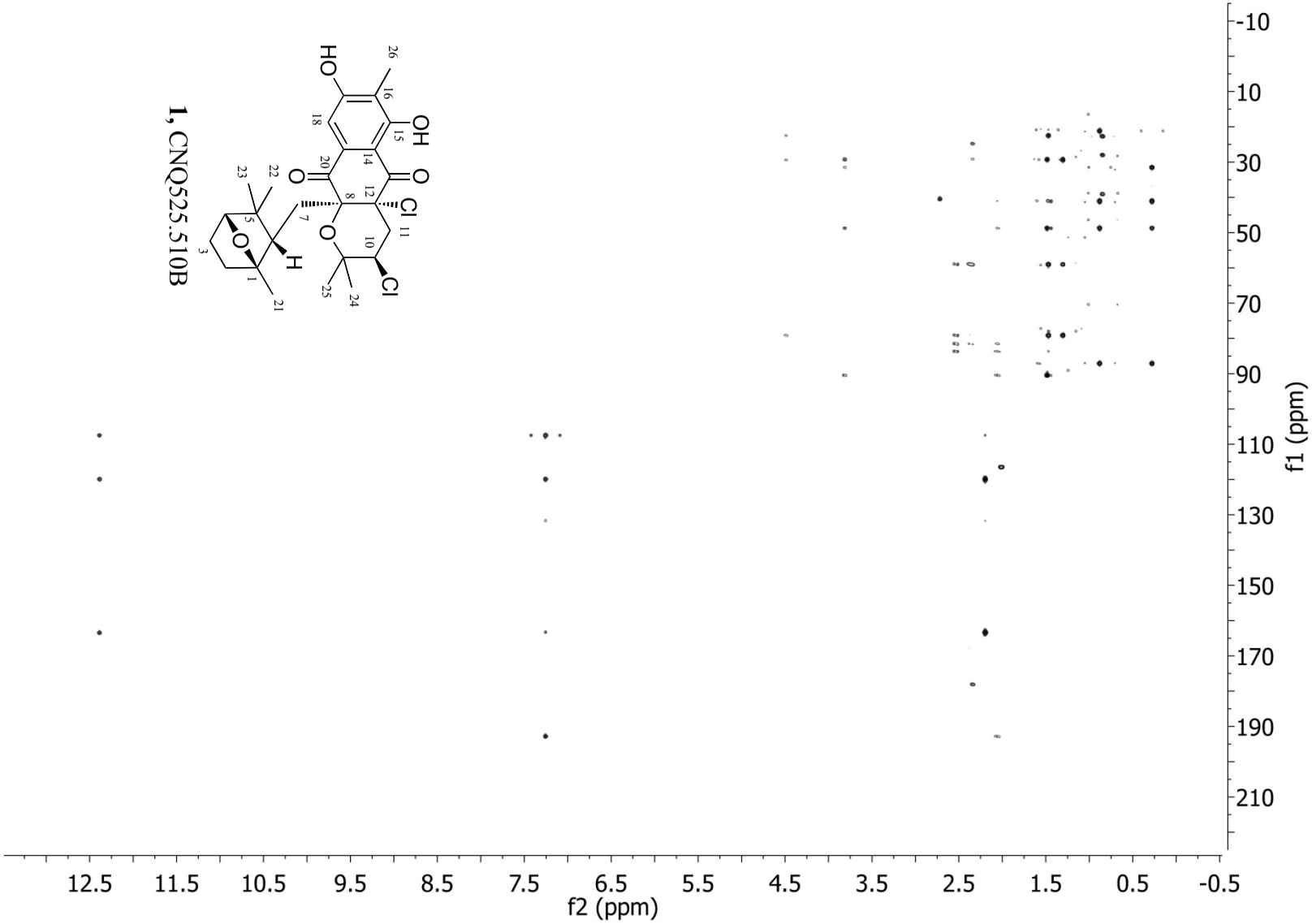
Napyradiomycin CNQ525.510B (1) ^{1}H NMR spectrum 500 MHz in $CDCl_3$



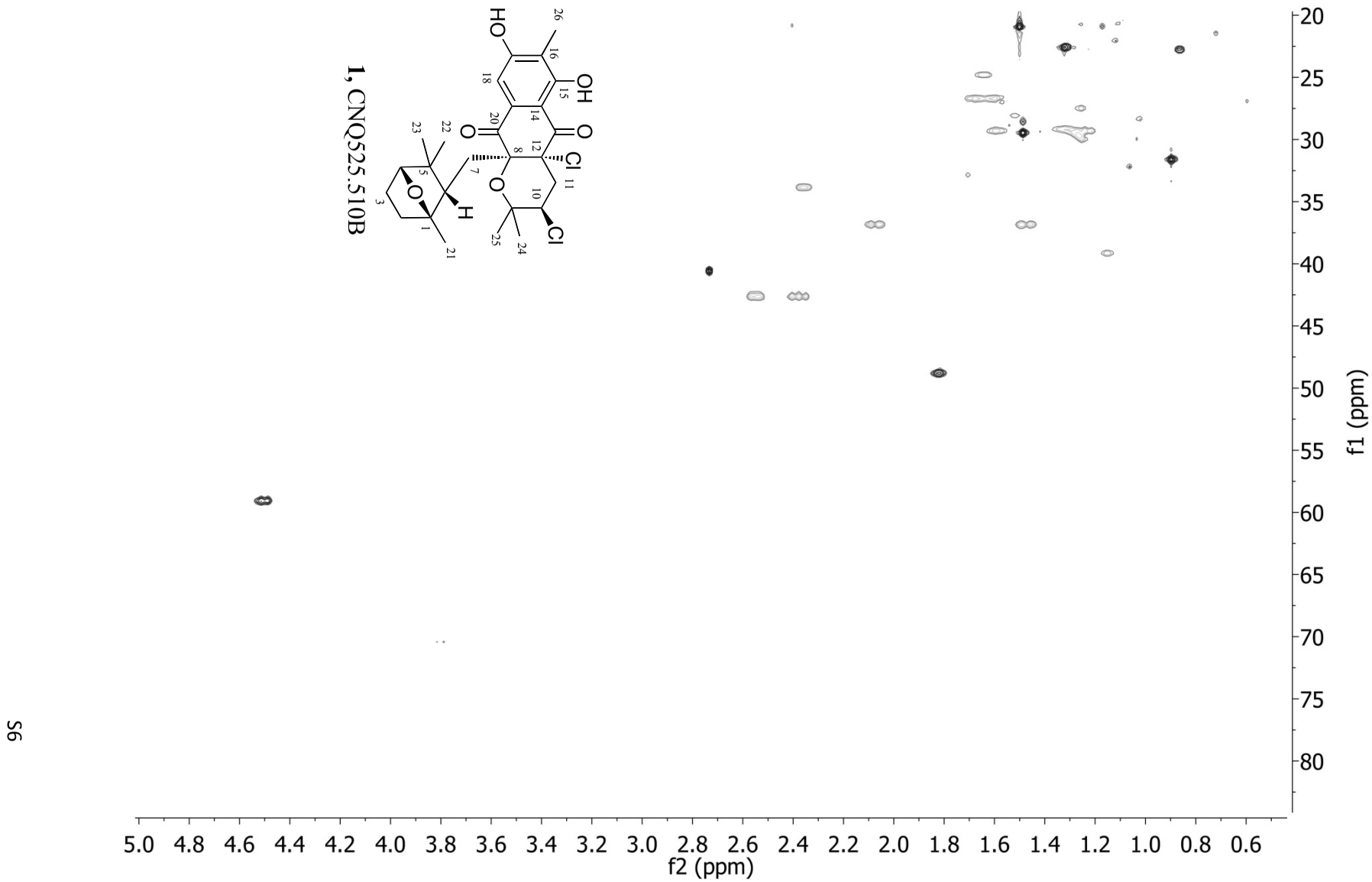
Napyradiomycin CNQ525.510B (1) ^{13}C NMR spectrum 500 MHz in $CDCl_3$



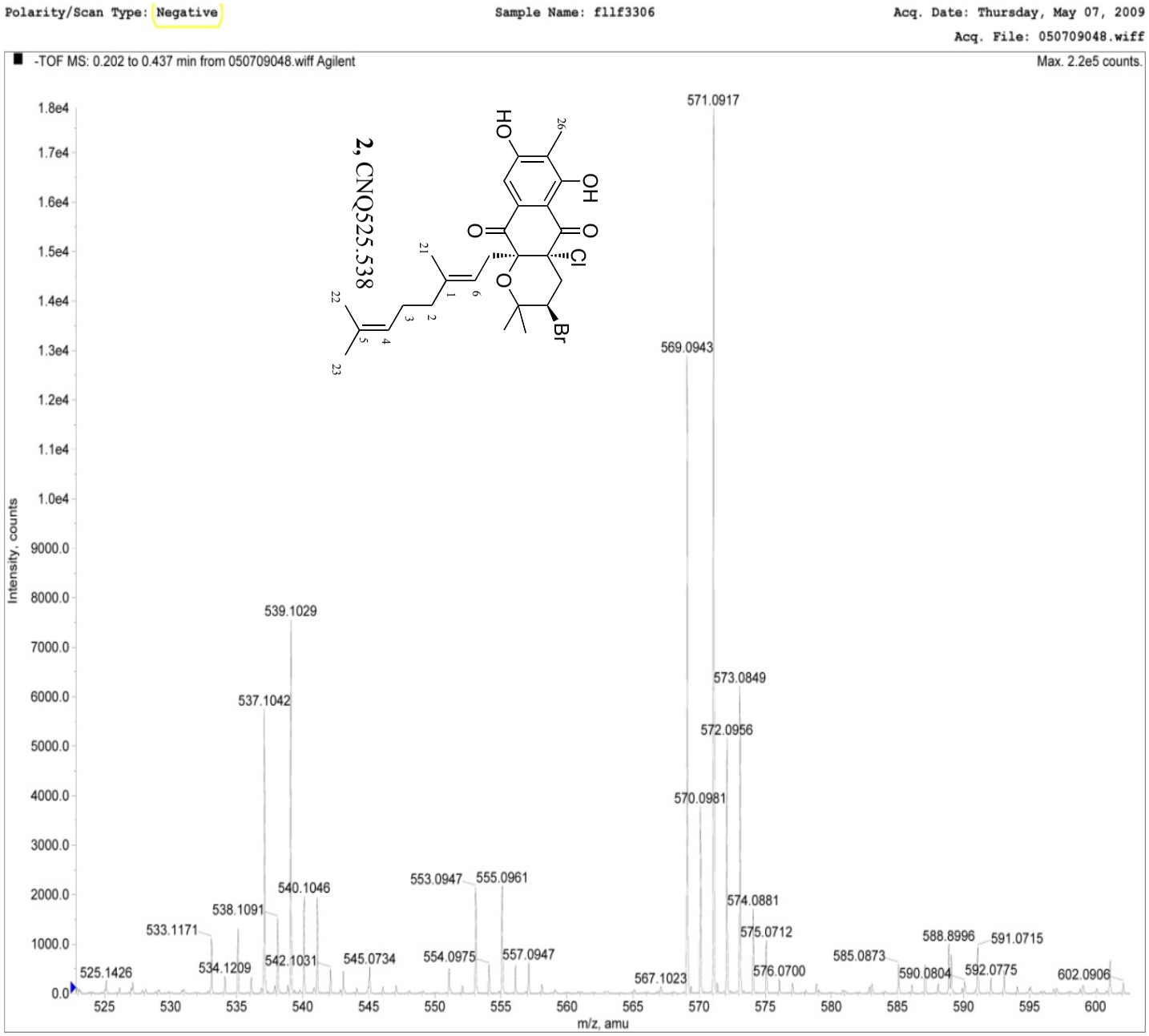
Napyradiomycin CNQ525.510B (1) COSY NMR spectrum 500 MHz in $CDCl_3$



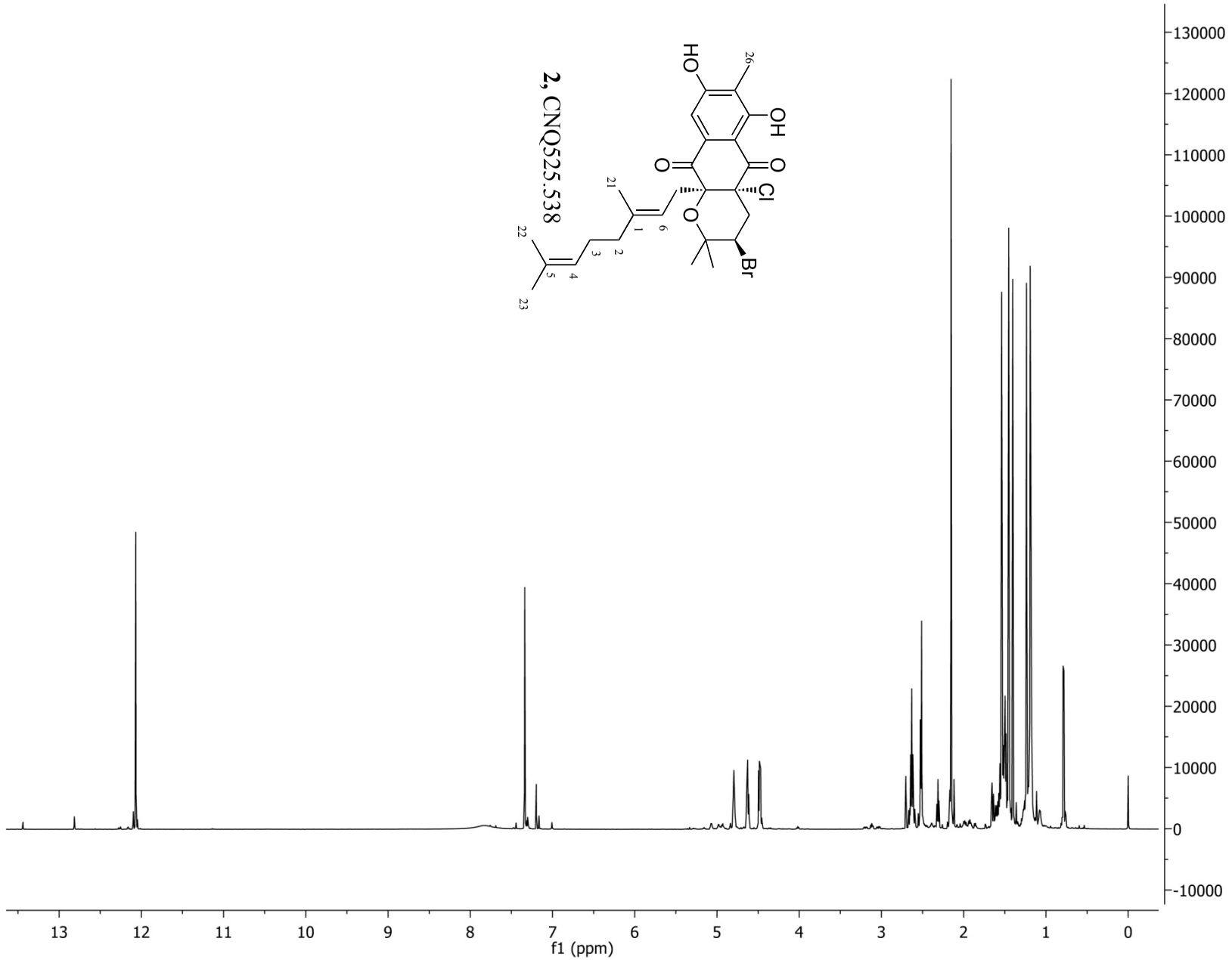
Napyradiomycin CNQ525.510B (1) HMBC NMR spectrum 500 MHz in $CDCl_3$



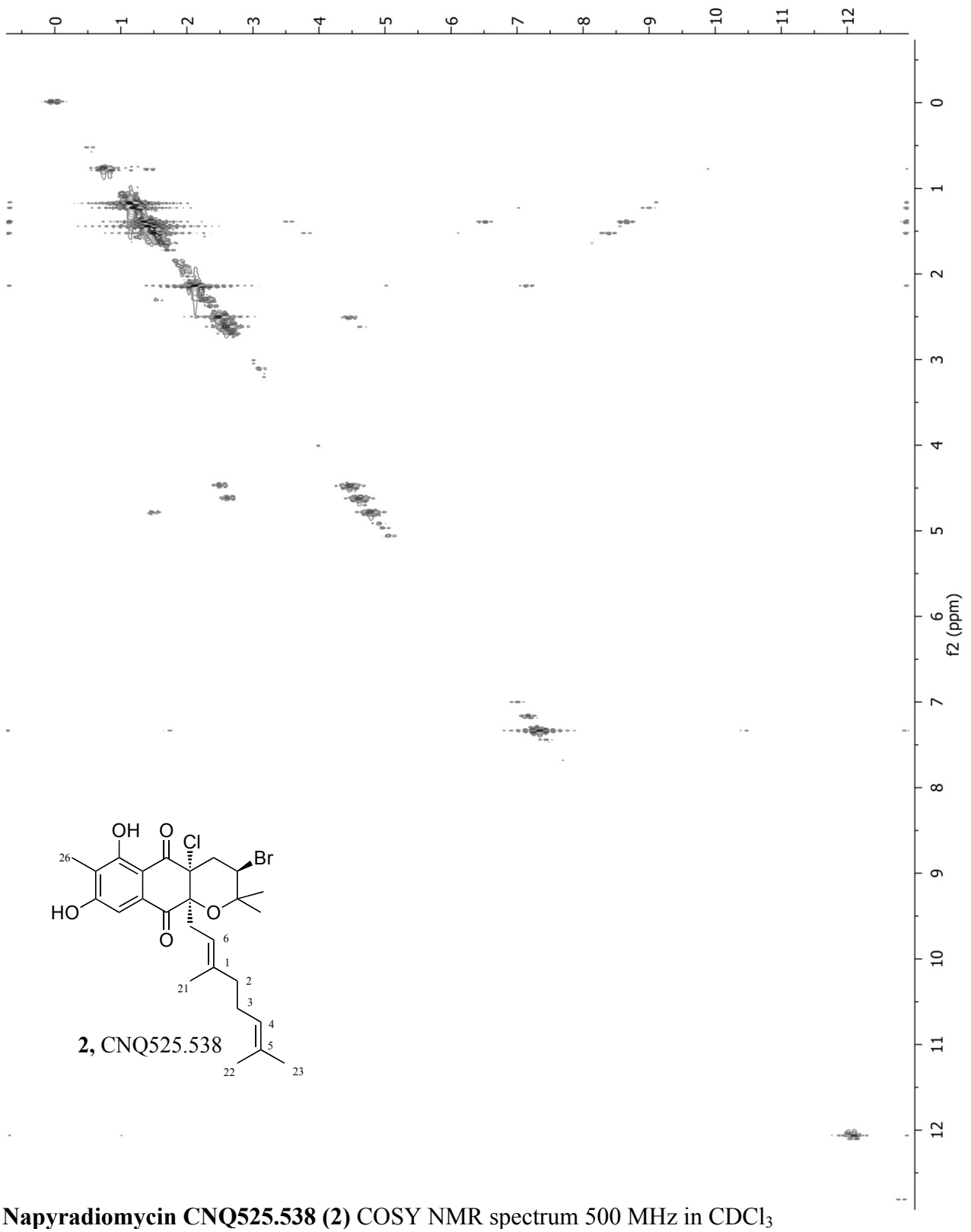
Napyradiomycin CNQ525.510B (1) HSQC NMR spectrum 500 MHz in $CDCl_3$



Napyradiomycin CNQ525.538 (2) HRMALDI TOF MS spectrum

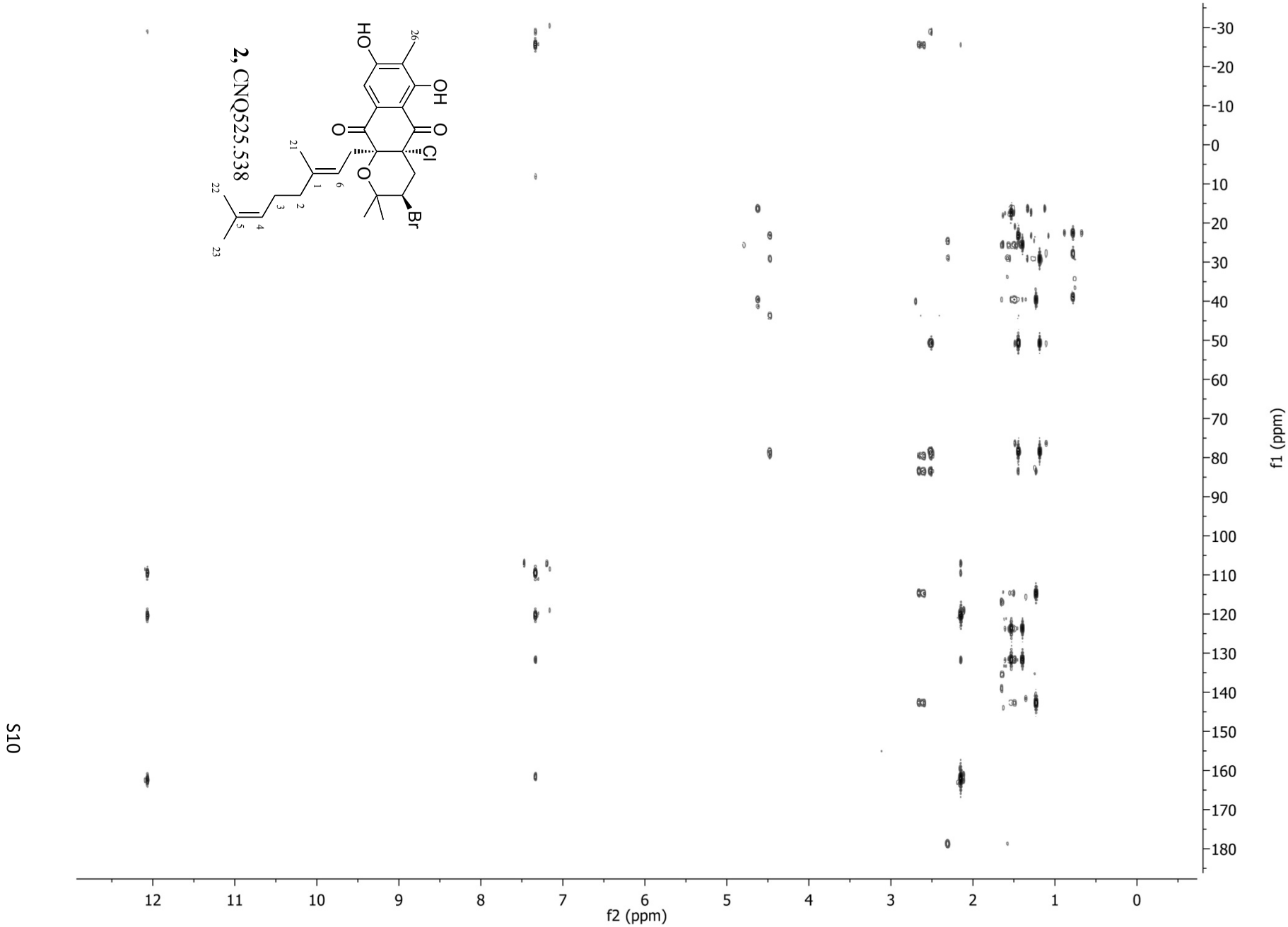


Napyradiomycin CNQ525.538 (2) ^{1}H NMR spectrum 500 MHz in $CDCl_3$

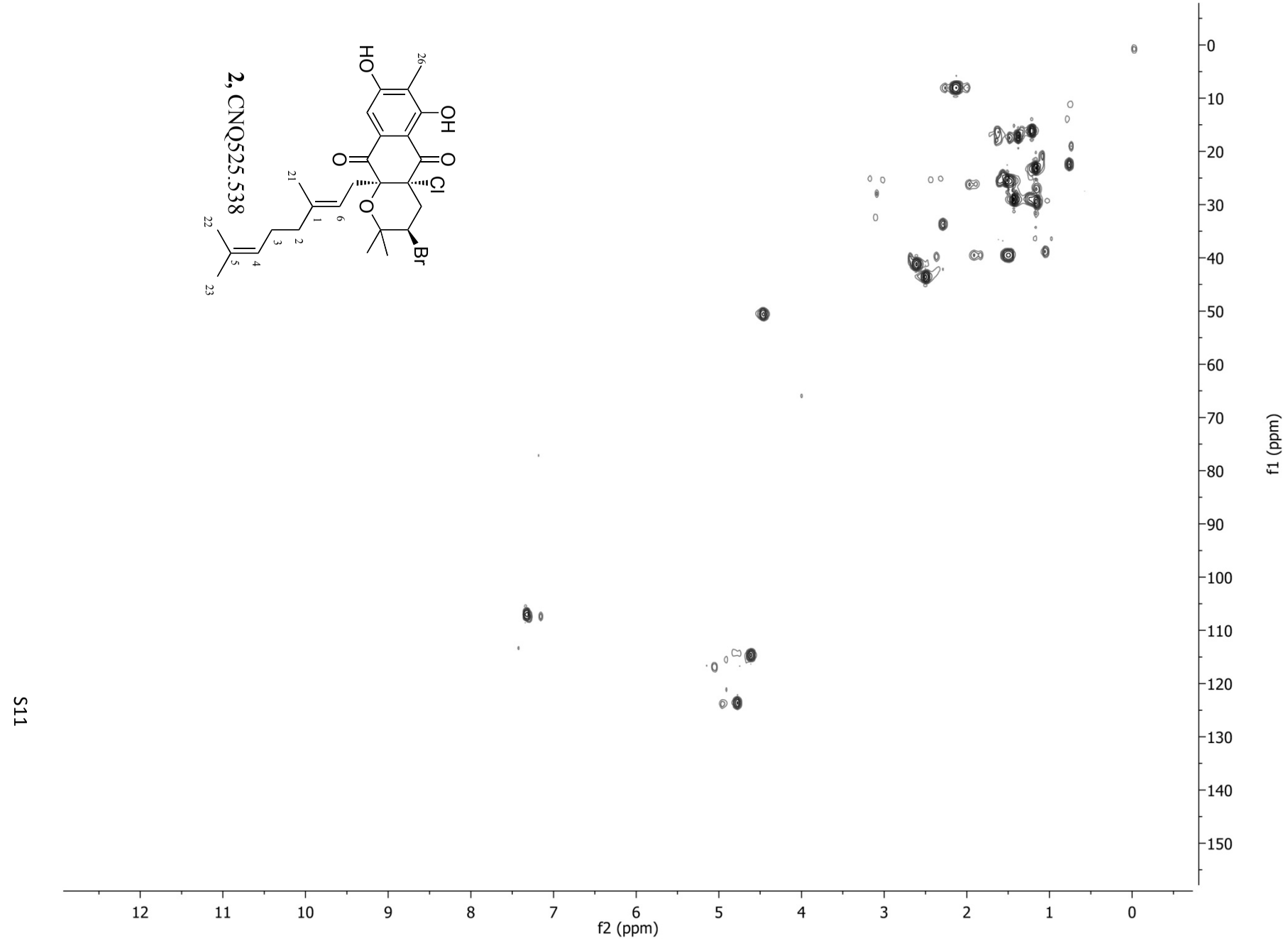


2, CNQ525.538

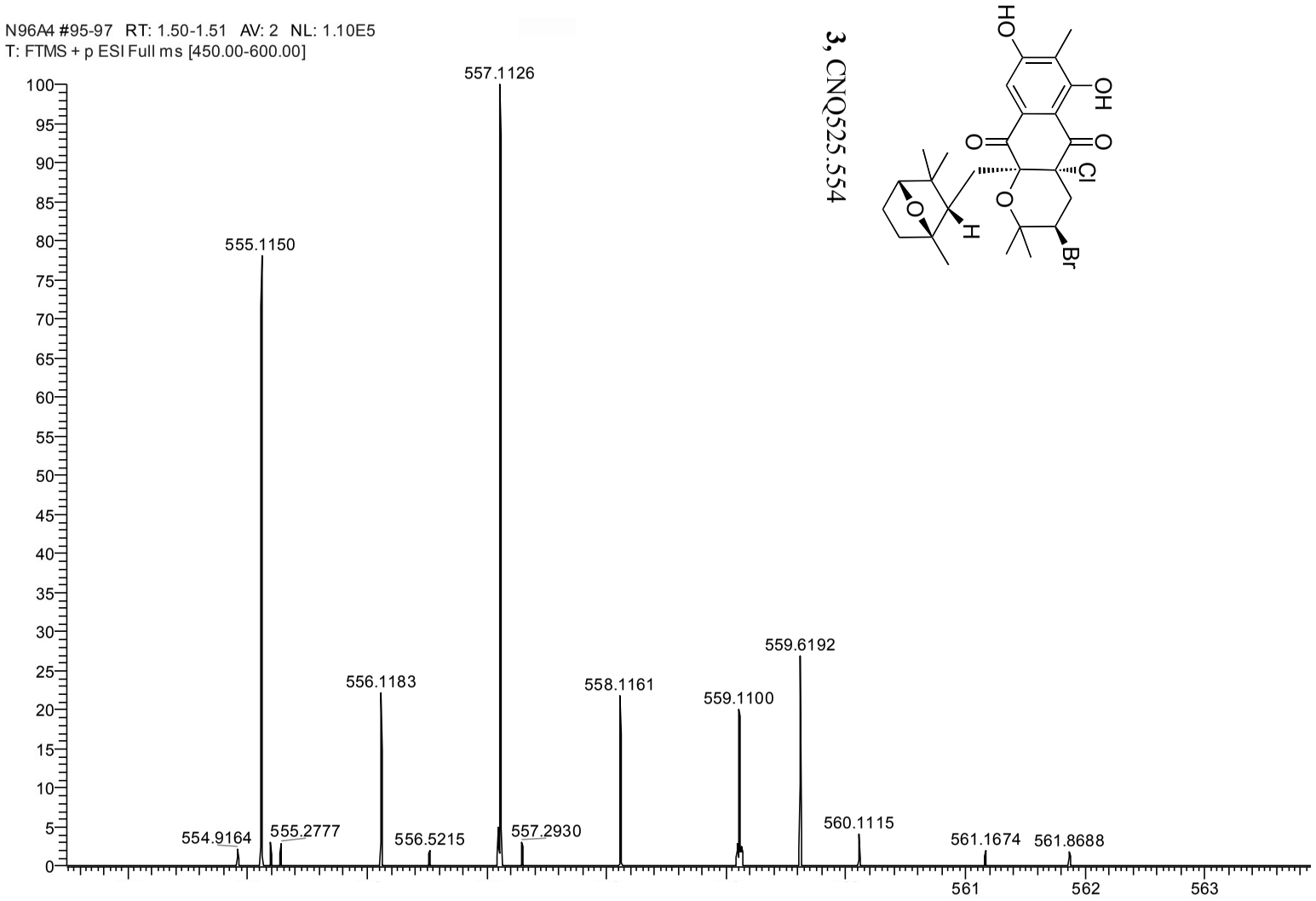
Napyradiomycin CNQ525.538 (2) COSY NMR spectrum 500 MHz in $CDCl_3$



Napyradiomycin CNQ525.538 (2) HMBC NMR spectrum 500 MHz in $CDCl_3$

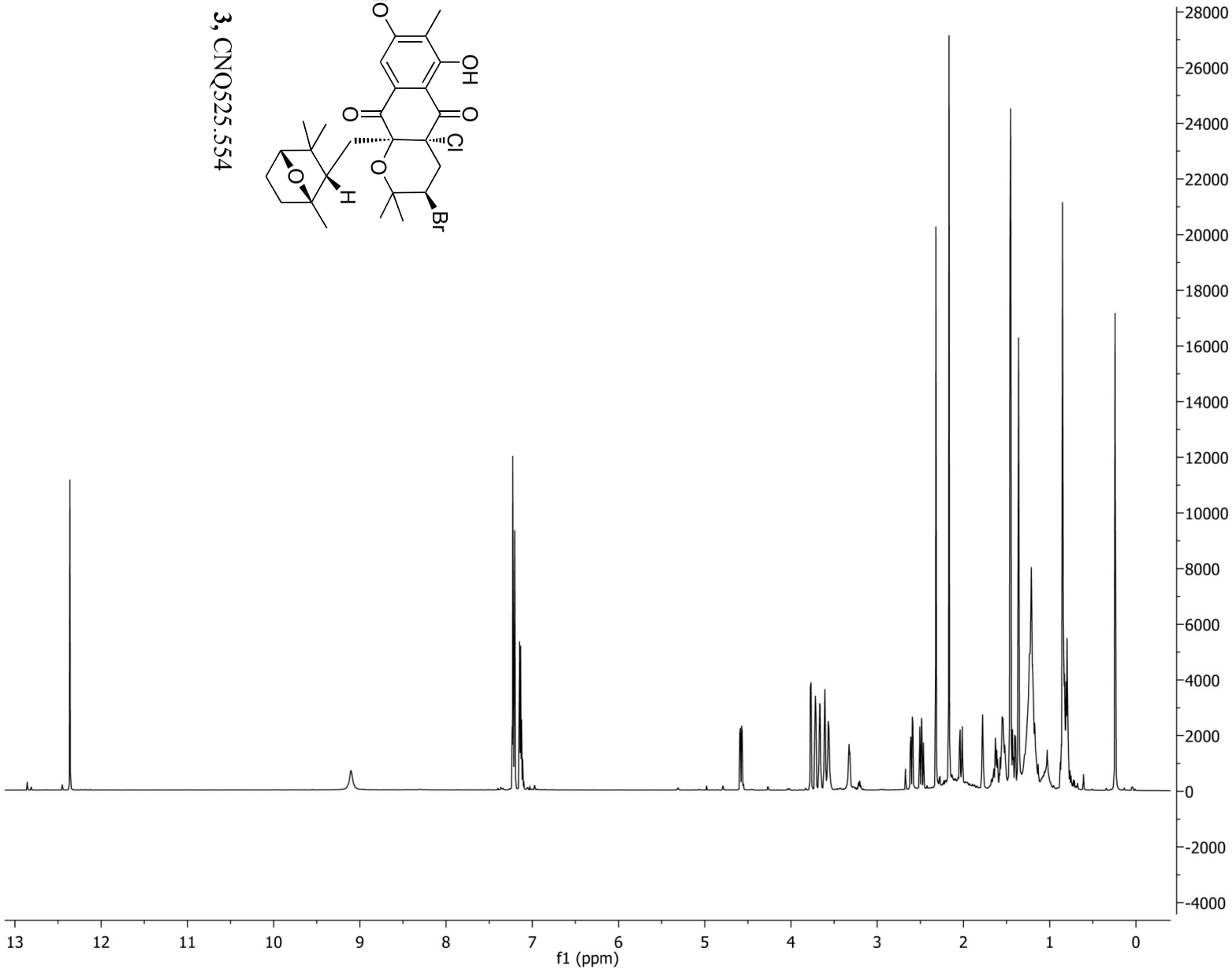


Napyradiomycin CNQ525.538 (2) HSQC NMR spectrum 500 MHz in $CDCl_3$

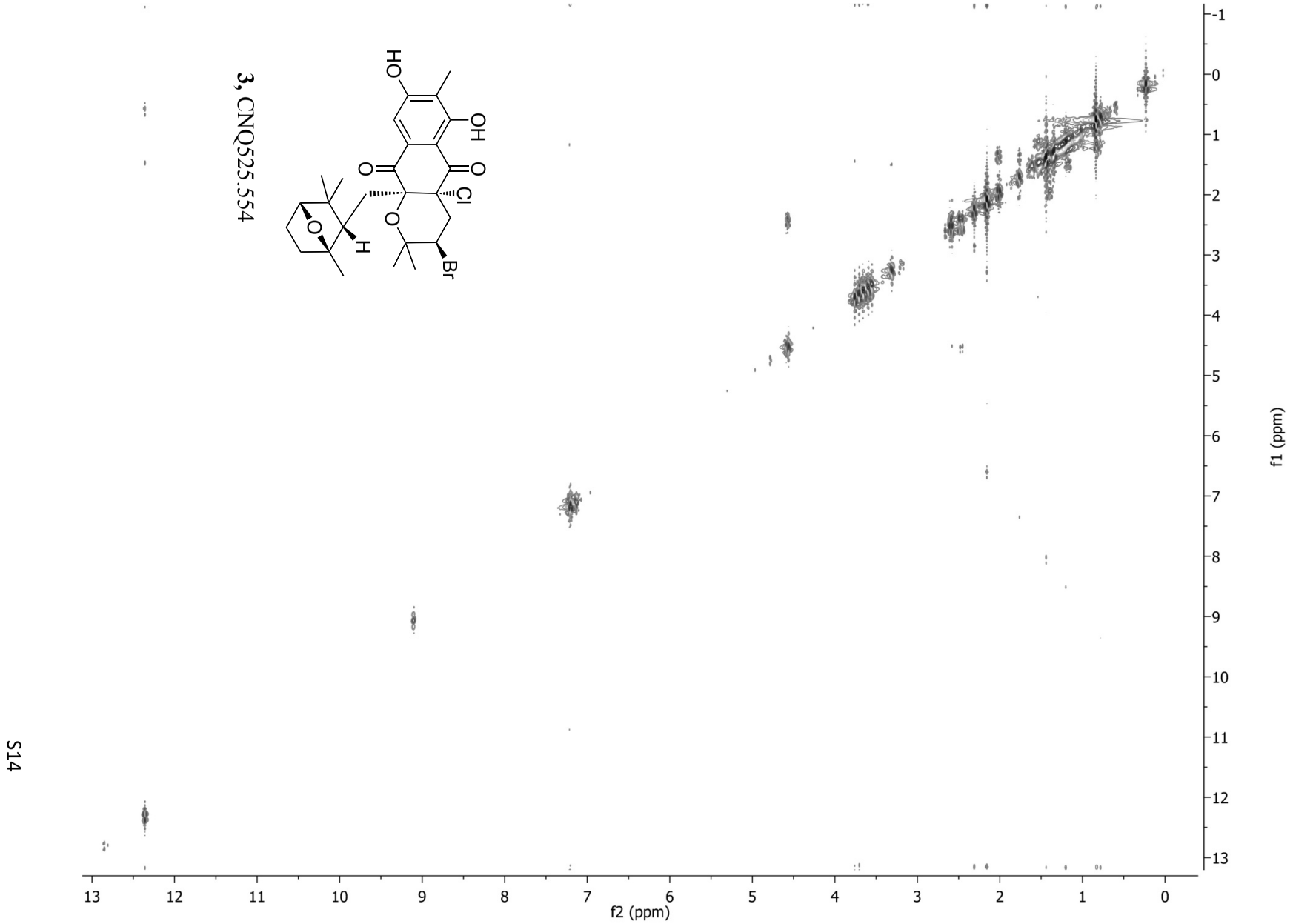


Napyradiomycin CNQ525.554 (3) -FTMS spectrum

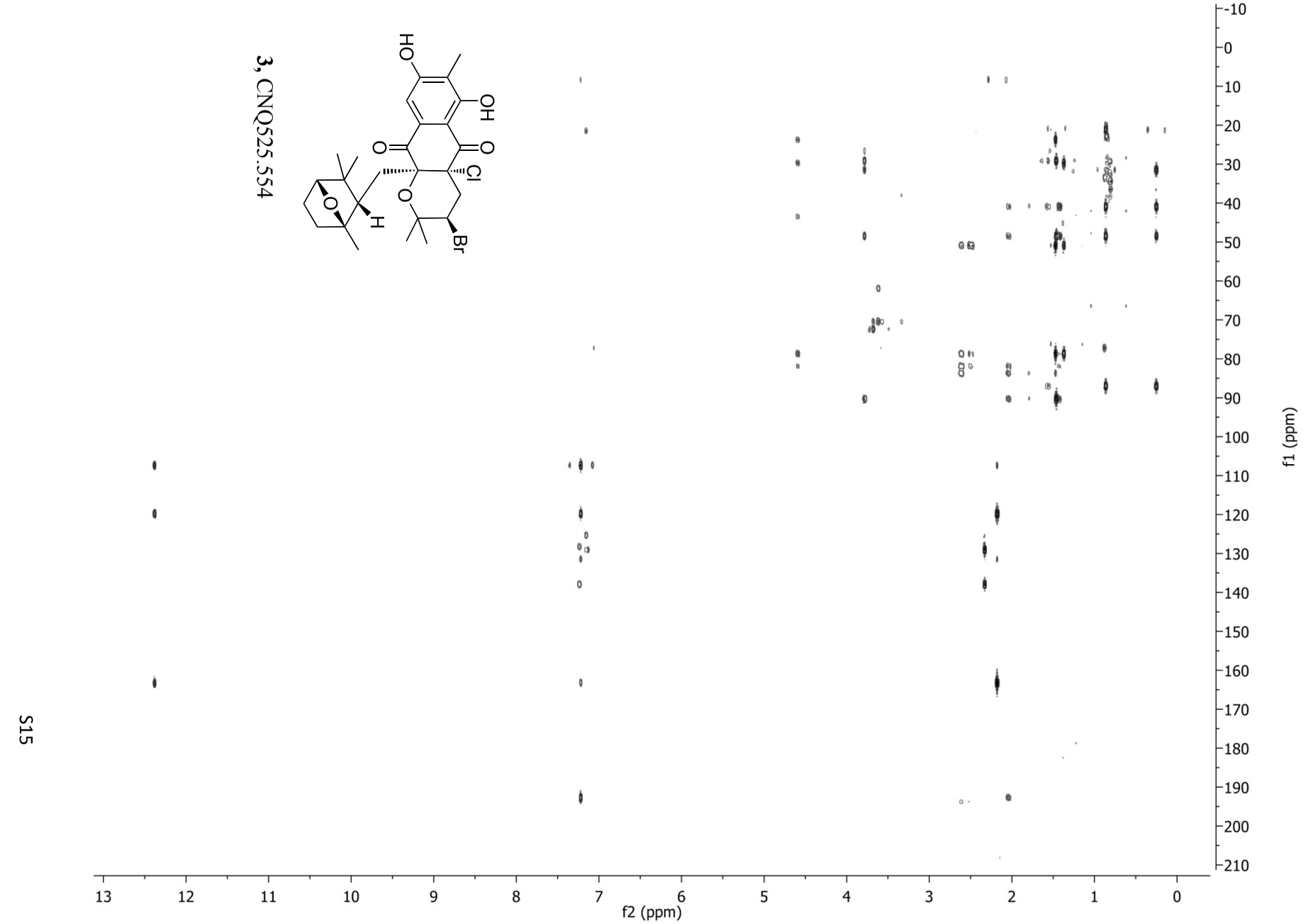
3, CNQ525.554



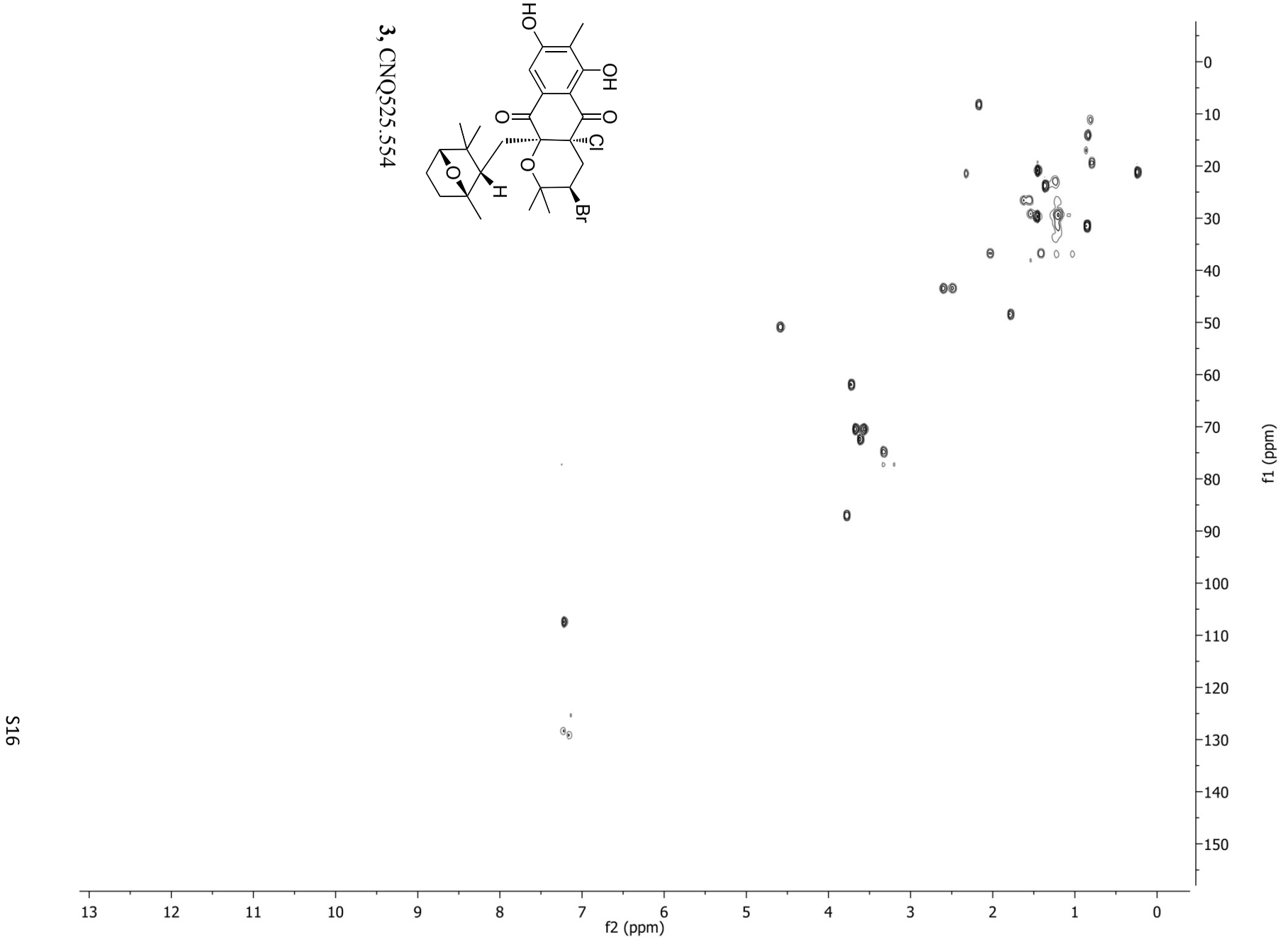
Napyradiomycin CNQ525.554 (3) ^{1}H NMR spectrum 500 MHz in $CDCl_3$



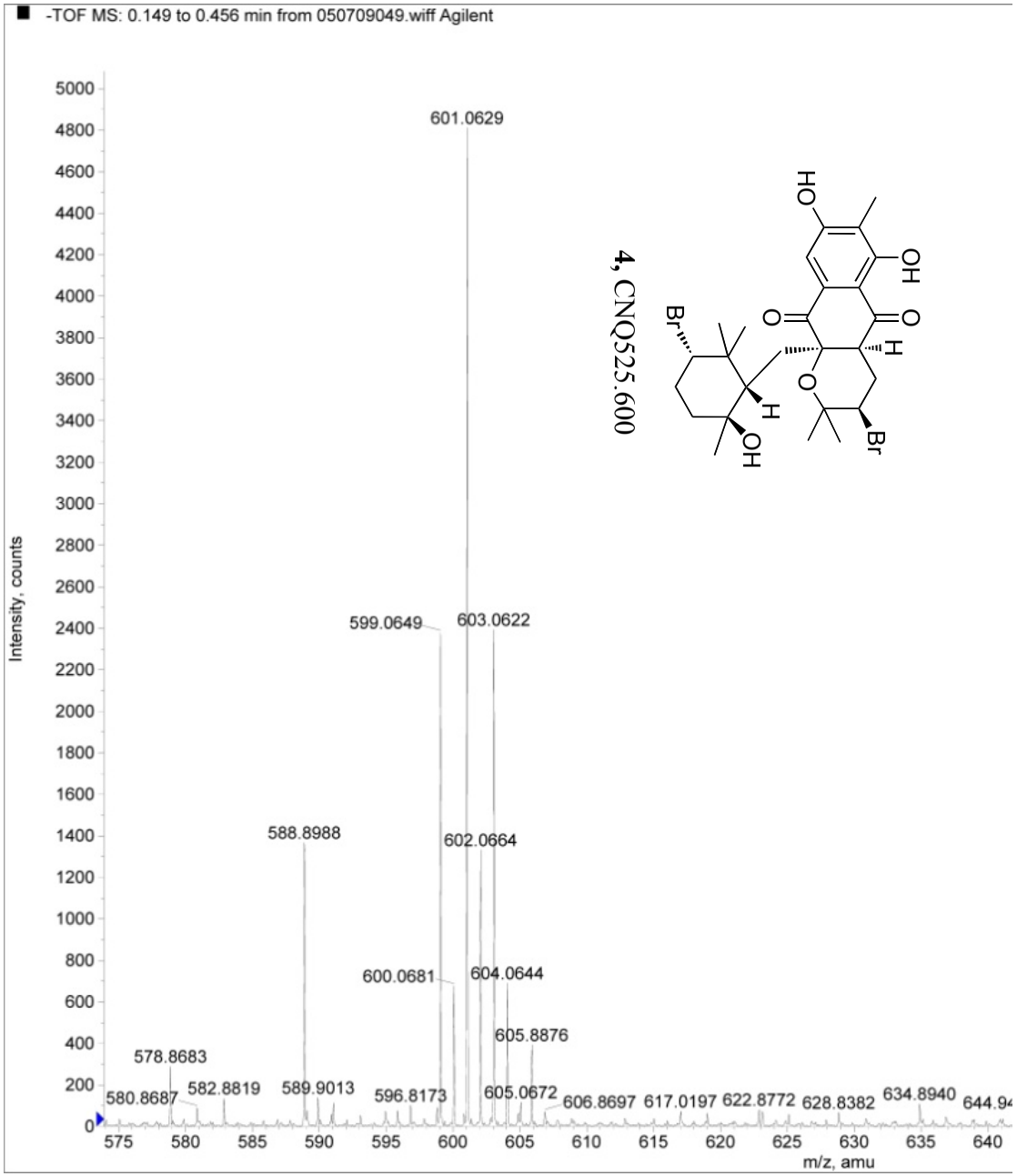
Napyradiomycin CNQ525.554 (3) COSY NMR spectrum 500 MHz in $CDCl_3$



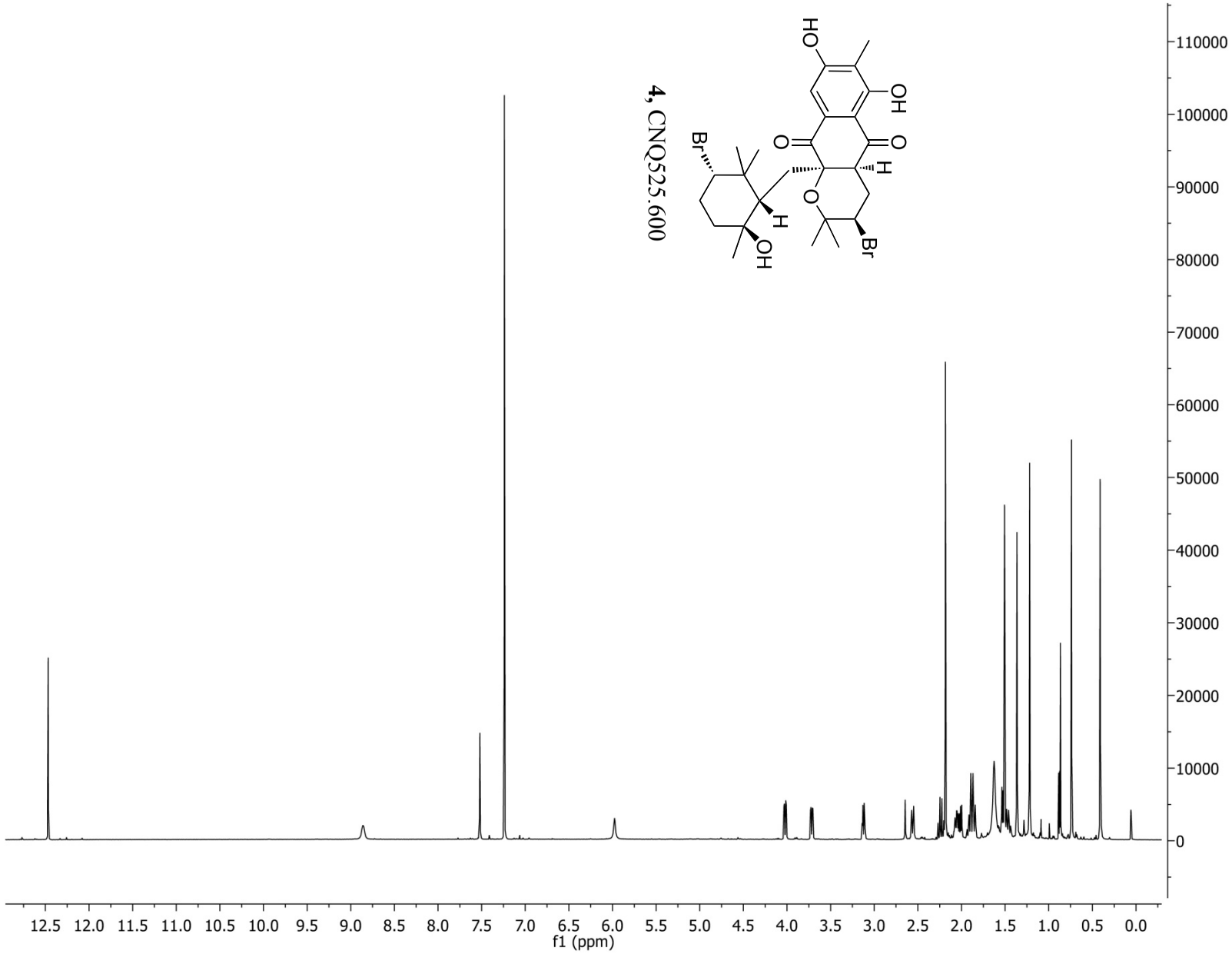
Napyradiomycin CNQ525.554 (3) HMBC NMR spectrum 500 MHz in $CDCl_3$



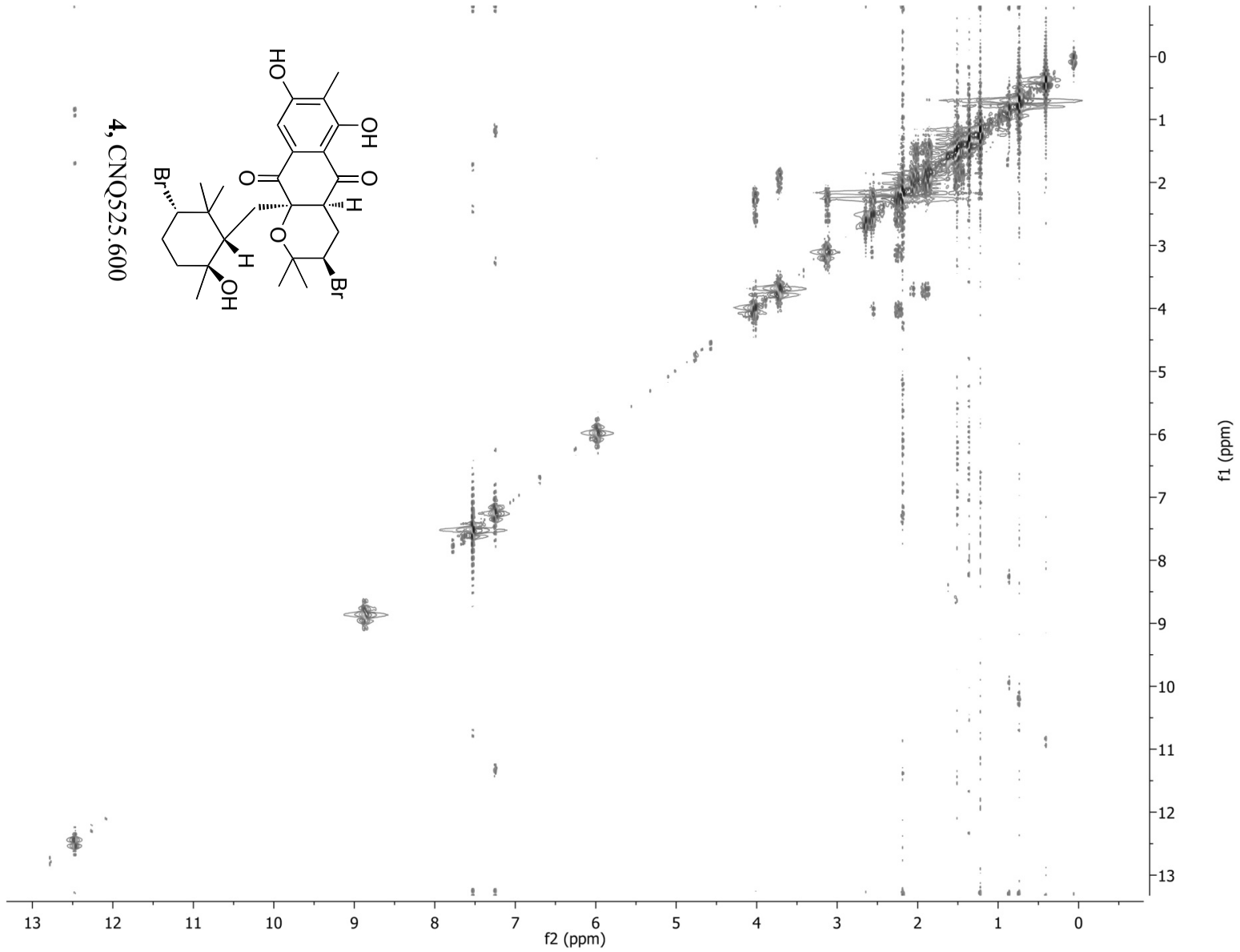
Napyradiomycin CNQ525.554 (3) HSQC NMR spectrum 500 MHz in $CDCl_3$



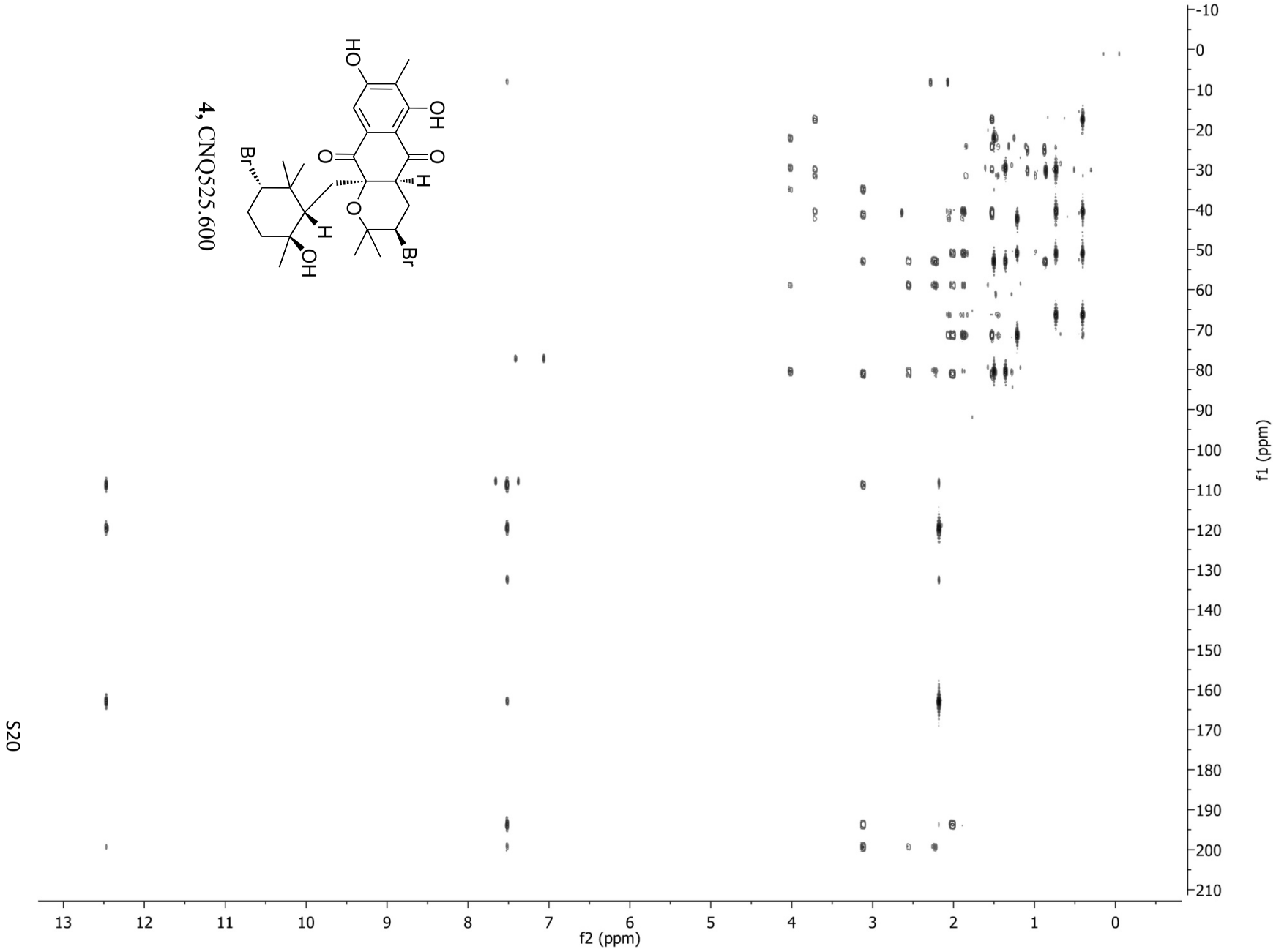
Napyradiomycin CNQ525.584 (4) HRMALDI TOF MS spectrum



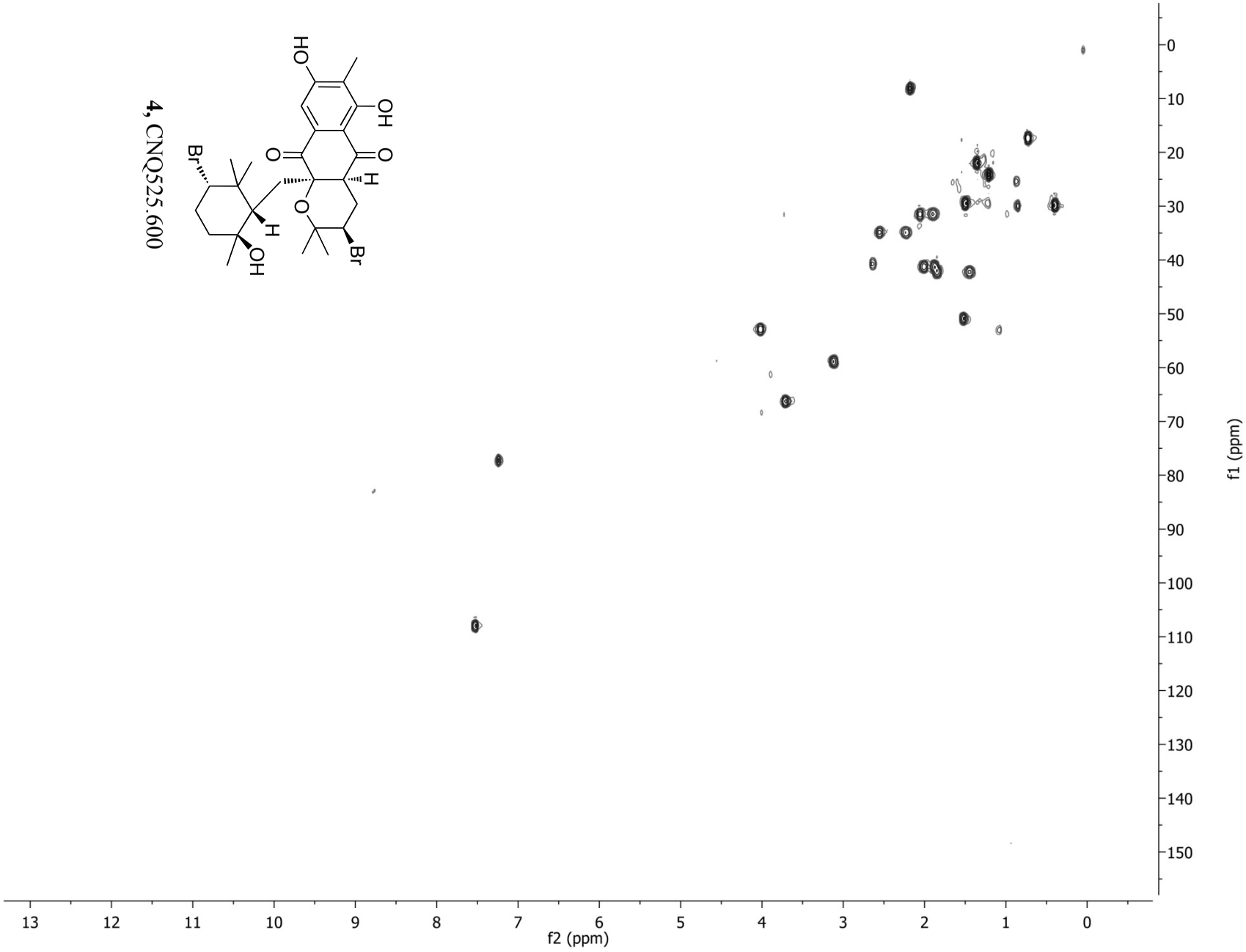
Napyradiomycin CNQ525.584 (4) ^{1}H spectrum 500 MHz in $CDCl_3$



Napyradiomycin CNQ525.584 (4) COSY NMR spectrum 500 MHz in $CDCl_3$



Napyradiomycin CNQ525.584 (4) HMBC NMR spectrum 500 MHz in $CDCl_3$



Napyradiomycin CNQ525.584 (4) HSQC NMR spectrum 500 MHz in $CDCl_3$

University of California, San Diego

Department of Chemistry and Biochemistry

Small Molecule X-ray Crystallography Facility

X-ray Crystal Structure Report

Sample ID: N16A9EI

X-ray ID: Napyradiomycin CNQ525.510B (**1**).

Submitted by: Lauge Farnaes

Principle Investigator: Prof. William Fenical

Report Date: August 11, 2007

Experimental Data. A colorless block 0.15 x 0.15 x 0.15 mm in size of napyradiomycin CNQ525.510B (**1**), was mounted on a Cryoloop with Paratone oil. Data were collected in a nitrogen gas stream at 100(2) K using phi and omega scans. Crystal-to-detector distance was 60 mm and exposure time was 5 seconds per frame using a scan width of 0.5°. Data collection was 98.2% complete to 67.00° in θ. A total of 7887 reflections were collected covering the indices, -11<=*h*<=12, -18<=*k*<=18, -12<=*l*<=12; 4187 reflections were found to be symmetry independent, with an R_{int} of 0.0191. Indexing and unit cell refinement indicated a primitive, monoclinic lattice. The space group was found to be P2(1) (No. 4). The data were integrated using the Bruker SAINT software program and scaled using the SADABS software program. Solution by direct methods (SIR-2004) produced a complete heavy-atom phasing model consistent with the proposed structure. All non-hydrogen atoms were refined anisotropically by full-matrix least-squares (SHELXL-97). All hydrogen atoms were placed using a riding model. Their positions were constrained relative to their parent atom using the appropriate HFIX command in SHELXL-97. Crystallographic data for napyradiomycin **2** have been deposited with the Cambridge Crystallographic Data Centre under the deposition number CCDC 944922. Copies of the data can be obtained, free of charge, on application to the Director, CCDC, 12 Union Road, Cambridge CB2 1EZ, UK (fax: +44-(0)1223-336033 or e-mail: deposit@ccdc.cam.ac.uk).

Table 1. Crystal data and structure refinement for Napyradiomycin CNQ525.510B (**1**).

X-ray ID	fen10	
Sample/notebook ID	N16A9EI	
Empirical formula	C30 H40 Cl2 O8	
Formula weight	599.52	
Temperature	100(2) K	
Wavelength	1.54178 Å	
Crystal system	Monoclinic	
Space group	P2(1)	
Unit cell dimensions	a = 10.2546(4) Å	α= 90°.
	b = 15.2873(7) Å	β= 117.3050(10)°.
	c = 10.5553(5) Å	γ = 90°.
Volume	1470.33(11) $Å^3$	
Z	2	
Density (calculated)	1.354 Mg/m^3	
Absorption coefficient	2.399 mm^{-1}	
F(000)	636	
Crystal size	0.15 x 0.15 x 0.15 mm^3	
Crystal color/habit	colorless block	
Theta range for data collection	4.98 to 69.35°.	
Index ranges	-11<=h<=12, -18<=k<=18, -12<=l<=12	
Reflections collected	7887	
Independent reflections	4187 [R(int) = 0.0191]	

Completeness to theta = 67.00°	98.2 %
Absorption correction	Numerical
Max. and min. transmission	0.7149 and 0.7149
Refinement method	Full-matrix least-squares on F^2
Data / restraints / parameters	4187 / 1 / 372
Goodness-of-fit on F^2	1.049
Final R indices [I>2sigma(I)]	R1 = 0.0253, wR2 = 0.0679
R indices (all data)	R1 = 0.0256, wR2 = 0.0680
Absolute structure parameter	0.036(8)
Extinction coefficient	0.0032(3)
Largest diff. peak and hole	0.318 and -0.290 e.$Å^{-3}$

Table 2. Atomic coordinates (x 10^4) and equivalent isotropic displacement parameters ($Å^2$x 10^3)

for Napyradiomycin CNQ525.510B (**1**). U(eq) is defined as one third of the trace of the orthogonalized U^{ij} tensor.

	x	y	z	U(eq)
C(1)	4442(2)	3928(1)	6334(2)	16(1)
C(2)	3366(2)	4705(1)	5860(2)	18(1)
C(3)	3086(2)	5160(1)	4514(2)	18(1)
C(4)	1918(2)	5730(1)	3936(2)	19(1)
C(5)	1580(2)	6152(1)	2648(2)	19(1)
C(6)	2375(2)	5990(1)	1892(2)	20(1)
C(7)	3545(2)	5398(1)	2483(2)	19(1)
C(8)	3942(2)	4982(1)	3808(2)	18(1)
C(9)	5216(2)	4416(1)	4435(2)	18(1)
C(10)	5722(2)	4085(1)	5967(2)	19(1)
C(11)	6811(2)	4746(1)	7010(2)	23(1)
C(12)	7313(2)	4430(1)	8536(2)	25(1)
C(13)	6027(2)	4318(1)	8884(2)	22(1)
C(14)	3524(2)	3116(1)	5533(2)	18(1)
C(15)	2186(2)	2924(1)	5779(2)	17(1)
C(16)	592(2)	3018(1)	4489(2)	21(1)
C(17)	-47(2)	2108(1)	4542(2)	26(1)
C(18)	550(2)	1368(1)	3975(2)	32(1)

C(19)	2153(2)	1310(1)	5172(2)	27(1)
C(20)	2168(2)	1977(1)	6274(2)	21(1)
C(21)	2000(2)	6436(1)	503(2)	27(1)
C(22)	5363(2)	5189(1)	8998(2)	28(1)
C(23)	6472(2)	3801(1)	10252(2)	28(1)
C(24)	-288(2)	3716(1)	4806(2)	28(1)
C(25)	517(2)	3205(1)	3033(2)	26(1)
C(26)	3214(2)	1784(1)	7800(2)	29(1)
C(27)	5760(2)	2271(1)	2516(2)	32(1)
C(28)	4167(2)	2436(1)	2086(2)	27(1)
C(29)	2054(2)	3227(1)	498(2)	32(1)
C(30)	1592(2)	3793(2)	-801(2)	38(1)
O(1)	4976(1)	3738(1)	7803(1)	18(1)
O(2)	2676(1)	4888(1)	6493(1)	22(1)
O(3)	467(1)	6730(1)	2086(1)	23(1)
O(4)	4283(1)	5237(1)	1732(1)	24(1)
O(5)	5946(1)	4235(1)	3812(1)	24(1)
O(6)	656(1)	1917(1)	6059(1)	26(1)
O(7)	3493(2)	2116(1)	2650(2)	37(1)
O(8)	3585(1)	3003(1)	996(1)	29(1)
Cl(1)	6722(1)	3081(1)	6151(1)	22(1)
Cl(2)	8653(1)	5181(1)	9746(1)	37(1)

Table 3. Bond lengths [Å] and angles [°] for Napyradiomycin **2** (CNQ525.510B).

C(1)-O(1)	1.417(2)	C(11)-C(12)	1.527(3)
C(1)-C(2)	1.540(2)	C(11)-H(11A)	0.9900
C(1)-C(10)	1.549(2)	C(11)-H(11B)	0.9900
C(1)-C(14)	1.553(2)	C(12)-C(13)	1.532(2)
C(2)-O(2)	1.209(2)	C(12)-Cl(2)	1.7972(18)
C(2)-C(3)	1.486(2)	C(12)-H(12)	1.0000
C(3)-C(4)	1.377(2)	C(13)-O(1)	1.456(2)
C(3)-C(8)	1.414(2)	C(13)-C(23)	1.520(3)
C(4)-C(5)	1.397(2)	C(13)-C(22)	1.525(2)
C(4)-H(4)	0.9500	C(14)-C(15)	1.538(2)
C(5)-O(3)	1.347(2)	C(14)-H(14A)	0.9900
C(5)-C(6)	1.400(2)	C(14)-H(14B)	0.9900
C(6)-C(7)	1.401(3)	C(15)-C(20)	1.542(2)
C(6)-C(21)	1.498(2)	C(15)-C(16)	1.583(2)
C(7)-O(4)	1.346(2)	C(15)-H(15)	1.0000
C(7)-C(8)	1.416(2)	C(16)-C(25)	1.529(2)
C(8)-C(9)	1.449(2)	C(16)-C(24)	1.531(2)
C(9)-O(5)	1.234(2)	C(16)-C(17)	1.550(2)
C(9)-C(10)	1.540(2)	C(17)-O(6)	1.453(2)
C(10)-C(11)	1.533(2)	C(17)-C(18)	1.532(3)
C(10)-Cl(1)	1.8071(17)	C(17)-H(17)	1.0000

C(18)-C(19)	1.550(3)	C(25)-H(25B)	0.9800
C(18)-H(18A)	0.9900	C(25)-H(25C)	0.9800
C(18)-H(18B)	0.9900	C(26)-H(26A)	0.9800
C(19)-C(20)	1.541(2)	C(26)-H(26B)	0.9800
C(19)-H(19A)	0.9900	C(26)-H(26C)	0.9800
C(19)-H(19B)	0.9900	C(27)-C(28)	1.502(3)
C(20)-O(6)	1.463(2)	C(27)-H(27A)	0.9800
C(20)-C(26)	1.499(3)	C(27)-H(27B)	0.9800
C(21)-H(21A)	0.9800	C(27)-H(27C)	0.9800
C(21)-H(21B)	0.9800	C(28)-O(7)	1.204(3)
C(21)-H(21C)	0.9800	C(28)-O(8)	1.342(2)
C(22)-H(22A)	0.9800	C(29)-O(8)	1.449(2)
C(22)-H(22B)	0.9800	C(29)-C(30)	1.503(3)
C(22)-H(22C)	0.9800	C(29)-H(29A)	0.9900
C(23)-H(23A)	0.9800	C(29)-H(29B)	0.9900
C(23)-H(23B)	0.9800	C(30)-H(30A)	0.9800
C(23)-H(23C)	0.9800	C(30)-H(30B)	0.9800
C(24)-H(24A)	0.9800	C(30)-H(30C)	0.9800
C(24)-H(24B)	0.9800	O(3)-H(3)	0.8400
C(24)-H(24C)	0.9800	O(4)-H(4A)	0.8400
C(25)-H(25A)	0.9800		

O(1)-C(1)-C(2)	111.93(13)	O(4)-C(7)-C(8)	121.05(15)
O(1)-C(1)-C(10)	111.00(13)	C(6)-C(7)-C(8)	121.93(15)
C(2)-C(1)-C(10)	111.16(13)	C(3)-C(8)-C(7)	117.91(15)
O(1)-C(1)-C(14)	105.44(13)	C(3)-C(8)-C(9)	121.45(15)
C(2)-C(1)-C(14)	105.98(12)	C(7)-C(8)-C(9)	120.60(15)
C(10)-C(1)-C(14)	111.09(13)	O(5)-C(9)-C(8)	122.09(16)
O(2)-C(2)-C(3)	120.99(15)	O(5)-C(9)-C(10)	119.46(15)
O(2)-C(2)-C(1)	120.82(15)	C(8)-C(9)-C(10)	118.32(14)
C(3)-C(2)-C(1)	117.87(13)	C(11)-C(10)-C(9)	108.75(13)
C(4)-C(3)-C(8)	120.83(15)	C(11)-C(10)-C(1)	110.20(14)
C(4)-C(3)-C(2)	117.83(15)	C(9)-C(10)-C(1)	113.43(13)
C(8)-C(3)-C(2)	121.26(14)	C(11)-C(10)-Cl(1)	107.00(11)
C(3)-C(4)-C(5)	120.00(15)	C(9)-C(10)-Cl(1)	107.04(11)
C(3)-C(4)-H(4)	120.0	C(1)-C(10)-Cl(1)	110.18(11)
C(5)-C(4)-H(4)	120.0	C(12)-C(11)-C(10)	109.30(14)
O(3)-C(5)-C(4)	120.84(15)	C(12)-C(11)-H(11A)	109.8
O(3)-C(5)-C(6)	117.57(15)	C(10)-C(11)-H(11A)	109.8
C(4)-C(5)-C(6)	121.59(15)	C(12)-C(11)-H(11B)	109.8
C(5)-C(6)-C(7)	117.69(15)	C(10)-C(11)-H(11B)	109.8
C(5)-C(6)-C(21)	121.47(16)	H(11A)-C(11)-H(11B)	108.3
C(7)-C(6)-C(21)	120.84(15)	C(11)-C(12)-C(13)	112.22(14)
O(4)-C(7)-C(6)	117.02(15)	C(11)-C(12)-Cl(2)	108.97(12)

C(13)-C(12)-Cl(2)	111.29(13)	C(25)-C(16)-C(17)	112.17(15)
C(11)-C(12)-H(12)	108.1	C(24)-C(16)-C(17)	108.48(14)
C(13)-C(12)-H(12)	108.1	C(25)-C(16)-C(15)	115.98(13)
Cl(2)-C(12)-H(12)	108.1	C(24)-C(16)-C(15)	110.76(14)
O(1)-C(13)-C(23)	102.73(14)	C(17)-C(16)-C(15)	100.05(13)
O(1)-C(13)-C(22)	113.35(14)	O(6)-C(17)-C(18)	101.37(15)
C(23)-C(13)-C(22)	109.22(15)	O(6)-C(17)-C(16)	102.46(14)
O(1)-C(13)-C(12)	106.78(14)	C(18)-C(17)-C(16)	113.35(15)
C(23)-C(13)-C(12)	111.71(15)	O(6)-C(17)-H(17)	112.9
C(22)-C(13)-C(12)	112.64(15)	C(18)-C(17)-H(17)	112.9
C(15)-C(14)-C(1)	115.15(13)	C(16)-C(17)-H(17)	112.9
C(15)-C(14)-H(14A)	108.5	C(17)-C(18)-C(19)	100.88(16)
C(1)-C(14)-H(14A)	108.5	C(17)-C(18)-H(18A)	111.6
C(15)-C(14)-H(14B)	108.5	C(19)-C(18)-H(18A)	111.6
C(1)-C(14)-H(14B)	108.5	C(17)-C(18)-H(18B)	111.6
H(14A)-C(14)-H(14B)	107.5	C(19)-C(18)-H(18B)	111.6
C(14)-C(15)-C(20)	112.73(13)	H(18A)-C(18)-H(18B)	109.4
C(14)-C(15)-C(16)	119.11(13)	C(20)-C(19)-C(18)	102.52(15)
C(20)-C(15)-C(16)	102.02(13)	C(20)-C(19)-H(19A)	111.3
C(14)-C(15)-H(15)	107.5	C(18)-C(19)-H(19A)	111.3
C(20)-C(15)-H(15)	107.5	C(20)-C(19)-H(19B)	111.3
C(16)-C(15)-H(15)	107.5	C(18)-C(19)-H(19B)	111.3
C(25)-C(16)-C(24)	108.98(15)	H(19A)-C(19)-H(19B)	109.2

O(6)-C(20)-C(26)	109.84(14)	H(23B)-C(23)-H(23C)	109.5
O(6)-C(20)-C(19)	101.47(14)	C(16)-C(24)-H(24A)	109.5
C(26)-C(20)-C(19)	115.79(15)	C(16)-C(24)-H(24B)	109.5
O(6)-C(20)-C(15)	100.53(13)	H(24A)-C(24)-H(24B)	109.5
C(26)-C(20)-C(15)	115.74(15)	C(16)-C(24)-H(24C)	109.5
C(19)-C(20)-C(15)	111.31(14)	H(24A)-C(24)-H(24C)	109.5
C(6)-C(21)-H(21A)	109.5	H(24B)-C(24)-H(24C)	109.5
C(6)-C(21)-H(21B)	109.5	C(16)-C(25)-H(25A)	109.5
H(21A)-C(21)-H(21B)	109.5	C(16)-C(25)-H(25B)	109.5
C(6)-C(21)-H(21C)	109.5	H(25A)-C(25)-H(25B)	109.5
H(21A)-C(21)-H(21C)	109.5	C(16)-C(25)-H(25C)	109.5
H(21B)-C(21)-H(21C)	109.5	H(25A)-C(25)-H(25C)	109.5
C(13)-C(22)-H(22A)	109.5	H(25B)-C(25)-H(25C)	109.5
C(13)-C(22)-H(22B)	109.5	C(20)-C(26)-H(26A)	109.5
H(22A)-C(22)-H(22B)	109.5	C(20)-C(26)-H(26B)	109.5
C(13)-C(22)-H(22C)	109.5	H(26A)-C(26)-H(26B)	109.5
H(22A)-C(22)-H(22C)	109.5	C(20)-C(26)-H(26C)	109.5
H(22B)-C(22)-H(22C)	109.5	H(26A)-C(26)-H(26C)	109.5
C(13)-C(23)-H(23A)	109.5	H(26B)-C(26)-H(26C)	109.5
C(13)-C(23)-H(23B)	109.5	C(28)-C(27)-H(27A)	109.5
H(23A)-C(23)-H(23B)	109.5	C(28)-C(27)-H(27B)	109.5
C(13)-C(23)-H(23C)	109.5	H(27A)-C(27)-H(27B)	109.5
H(23A)-C(23)-H(23C)	109.5	C(28)-C(27)-H(27C)	109.5

H(27A)-C(27)-H(27C)	109.5
H(27B)-C(27)-H(27C)	109.5
O(7)-C(28)-O(8)	123.75(18)
O(7)-C(28)-C(27)	125.01(19)
O(8)-C(28)-C(27)	111.23(16)
O(8)-C(29)-C(30)	107.66(16)
O(8)-C(29)-H(29A)	110.2
C(30)-C(29)-H(29A)	110.2
O(8)-C(29)-H(29B)	110.2
C(30)-C(29)-H(29B)	110.2
H(29A)-C(29)-H(29B)	108.5
C(29)-C(30)-H(30A)	109.5
C(29)-C(30)-H(30B)	109.5
H(30A)-C(30)-H(30B)	109.5
C(29)-C(30)-H(30C)	109.5
H(30A)-C(30)-H(30C)	109.5
H(30B)-C(30)-H(30C)	109.5
C(1)-O(1)-C(13)	120.62(13)
C(5)-O(3)-H(3)	109.5
C(7)-O(4)-H(4A)	109.5
C(17)-O(6)-C(20)	96.49(12)
C(28)-O(8)-C(29)	116.48(15)

Symmetry transformations used to generate equivalent atoms:

Table 4. Anisotropic displacement parameters ($Å^2 x\ 10^3$)for Napyradiomycin CNQ525.510B (**1**). The anisotropic displacement factor exponent takes the form: $-2\pi^2[\ h^2 a^{*2} U^{11} + ... + 2\ h\ k\ a^*\ b^*\ U^{12}\ ]$

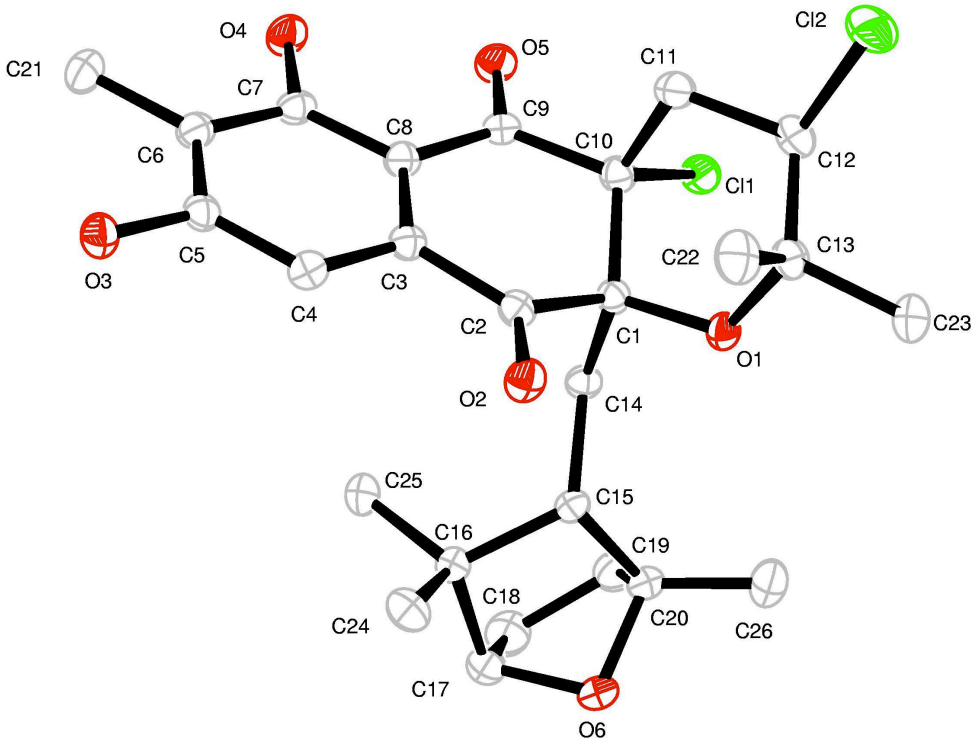
	U^{11}	U^{22}	U^{33}	U^{23}	U^{13}	U^{12}
C(1)	16(1)	18(1)	15(1)	0(1)	7(1)	1(1)
C(2)	18(1)	18(1)	17(1)	-2(1)	7(1)	-1(1)
C(3)	18(1)	18(1)	17(1)	-2(1)	8(1)	-2(1)
C(4)	22(1)	18(1)	20(1)	-1(1)	11(1)	0(1)
C(5)	17(1)	16(1)	19(1)	-1(1)	6(1)	-2(1)
C(6)	21(1)	22(1)	17(1)	-1(1)	8(1)	-5(1)
C(7)	21(1)	21(1)	18(1)	-2(1)	11(1)	-4(1)
C(8)	19(1)	19(1)	17(1)	-2(1)	9(1)	-2(1)
C(9)	18(1)	18(1)	20(1)	0(1)	10(1)	-2(1)
C(10)	18(1)	19(1)	20(1)	1(1)	9(1)	2(1)
C(11)	21(1)	25(1)	21(1)	0(1)	10(1)	-4(1)
C(12)	20(1)	29(1)	20(1)	-2(1)	5(1)	-4(1)
C(13)	22(1)	24(1)	16(1)	-3(1)	6(1)	-3(1)
C(14)	18(1)	19(1)	18(1)	-1(1)	10(1)	0(1)
C(15)	18(1)	19(1)	16(1)	1(1)	10(1)	-1(1)
C(16)	19(1)	25(1)	19(1)	4(1)	8(1)	0(1)
C(17)	21(1)	30(1)	23(1)	1(1)	6(1)	-7(1)
C(18)	36(1)	26(1)	30(1)	-3(1)	11(1)	-9(1)

C(19)	31(1)	21(1)	29(1)	-2(1)	14(1)	-4(1)
C(20)	20(1)	23(1)	22(1)	3(1)	11(1)	-1(1)
C(21)	29(1)	31(1)	23(1)	8(1)	13(1)	2(1)
C(22)	33(1)	27(1)	21(1)	-6(1)	10(1)	0(1)
C(23)	26(1)	35(1)	18(1)	4(1)	6(1)	0(1)
C(24)	20(1)	33(1)	32(1)	2(1)	11(1)	4(1)
C(25)	23(1)	34(1)	19(1)	6(1)	7(1)	1(1)
C(26)	32(1)	30(1)	23(1)	6(1)	12(1)	5(1)
C(27)	33(1)	25(1)	36(1)	-1(1)	14(1)	-1(1)
C(28)	37(1)	24(1)	22(1)	-6(1)	15(1)	-4(1)
C(29)	28(1)	41(1)	29(1)	-3(1)	15(1)	-1(1)
C(30)	37(1)	50(1)	31(1)	2(1)	18(1)	9(1)
O(1)	19(1)	20(1)	14(1)	1(1)	6(1)	-1(1)
O(2)	25(1)	24(1)	20(1)	1(1)	13(1)	4(1)
O(3)	22(1)	23(1)	22(1)	3(1)	8(1)	4(1)
O(4)	27(1)	30(1)	23(1)	4(1)	16(1)	3(1)
O(5)	24(1)	27(1)	26(1)	2(1)	16(1)	3(1)
O(6)	23(1)	30(1)	25(1)	6(1)	13(1)	-4(1)
O(7)	45(1)	38(1)	38(1)	3(1)	27(1)	0(1)
O(8)	28(1)	36(1)	25(1)	1(1)	14(1)	-3(1)
Cl(1)	20(1)	23(1)	27(1)	3(1)	13(1)	5(1)
Cl(2)	31(1)	48(1)	26(1)	-8(1)	6(1)	-18(1)

Table 5. Hydrogen coordinates (x 10^4) and isotropic displacement parameters ($Å^2$x 10^3) for Napyradiomycin **2** (CNQ525.510A).

	x	y	z	U(eq)
H(4)	1342	5836	4413	23
H(11A)	7669	4806	6823	27
H(11B)	6336	5326	6876	27
H(12)	7797	3848	8643	30
H(14A)	3180	3200	4498	21
H(14B)	4174	2596	5829	21
H(15)	2244	3322	6555	21
H(17)	-1143	2108	4109	31
H(18A)	510	1523	3047	39
H(18B)	12	815	3876	39
H(19A)	2386	714	5582	32
H(19B)	2860	1475	4816	32
H(21A)	1272	6895	337	41
H(21B)	1595	6007	-273	41
H(21C)	2888	6697	536	41
H(22A)	5135	5540	8145	42
H(22B)	6067	5505	9844	42

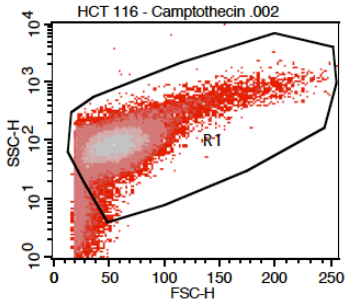
H(22C)	4462	5082	9078	42
H(23A)	5610	3708	10407	42
H(23B)	7217	4128	11057	42
H(23C)	6875	3234	10173	42
H(24A)	193	4286	4920	42
H(24B)	-336	3565	5685	42
H(24C)	-1284	3745	4014	42
H(25A)	-500	3148	2289	40
H(25B)	1136	2787	2854	40
H(25C)	865	3801	3024	40
H(26A)	3077	2213	8418	43
H(26B)	4224	1817	7934	43
H(26C)	3025	1195	8045	43
H(27A)	6139	1826	3268	48
H(27B)	6315	2814	2872	48
H(27C)	5865	2064	1688	48
H(29A)	1927	3546	1250	38
H(29B)	1448	2690	256	38
H(30A)	2234	4307	-562	57
H(30B)	575	3984	-1130	57
H(30C)	1666	3459	-1558	57
H(3)	-287	6478	1472	34
H(4A)	4929	4856	2154	37

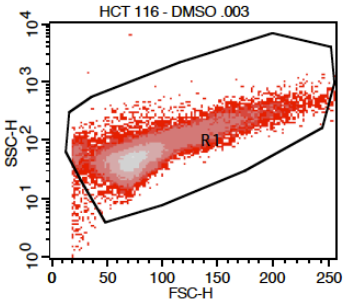


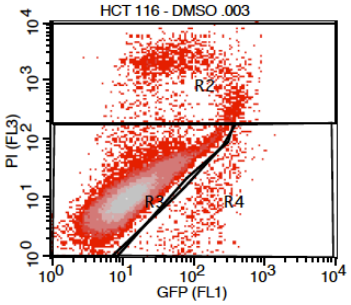
X-Ray computer drawing of the final structure of napyradiomycin CNQ525.510B (**1**), illustrating its absolute configuration.

Raw FACS Data for Four Napyradiomycin Derivatives

DMSO and Camptothecin (10 µM) Controls

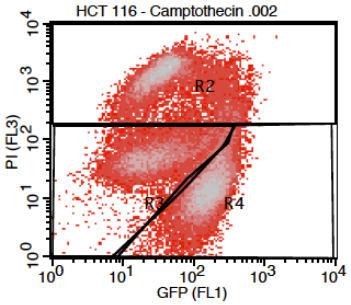


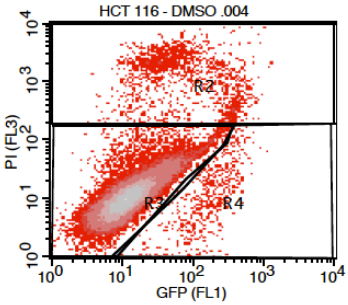




File: HCT 116 - DMSO .003
Acquisition Date: 22-Apr-08

Region	Events	% Gated	% Total
R1	49786	100.00	99.57
R2	1699	3.41	3.40
R3	47532	95.47	95.06
R4	543	1.09	1.09





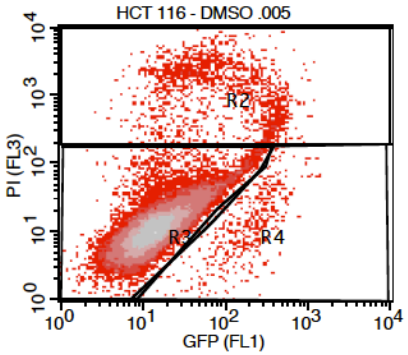
File: HCT 116 - Camptothecin .002
Acquisition Date: 22-Apr-08

Region	Events	% Gated	% Total
R1	45420	100.00	90.84
R2	14530	31.99	29.06
R3	13191	29.04	26.38
R4	17395	38.30	34.79

File: HCT 116 - DMSO .004
Acquisition Date: 22-Apr-08

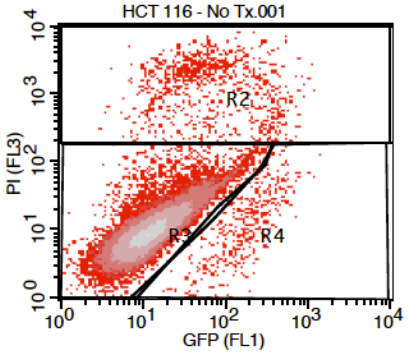
Region	Events	% Gated	% Total
R1	49769	100.00	99.54
R2	1765	3.55	3.53
R3	47451	95.34	94.90
R4	540	1.09	1.08

DMSO Only and No Treatment data and Napyradiomycin A80195B at 0.5 µg/mL



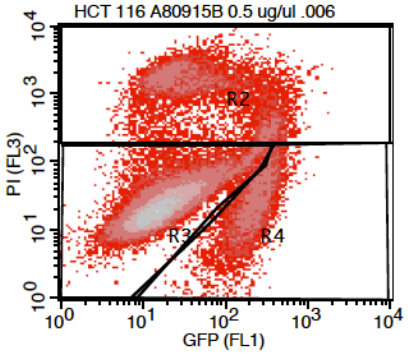
File: HCT 116 - DMSO .005
Acquisition Date: 22-Apr-08

Region	Events	% Gated	% Total
R1	49779	100.00	99.56
R2	1618	3.25	3.24
R3	47711	95.85	95.42
R4	423	0.85	0.85



File: HCT 116 - No Tx.001
Acquisition Date: 22-Apr-08

Region	Events	% Gated	% Total
R1	49787	100.00	99.57
R2	898	1.80	1.80
R3	48481	97.38	96.96
R4	393	0.79	0.79

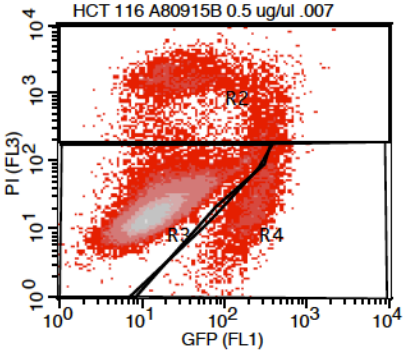


File: HCT 116 A80915B 0.5 ug/ul .006
Acquisition Date: 22-Apr-08

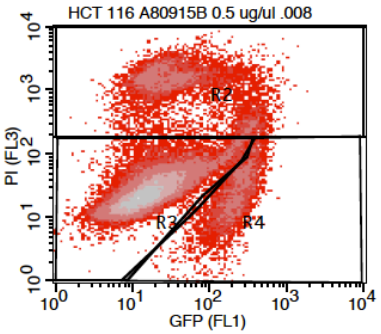
Region	Events	% Gated	% Total
R1	49385	100.00	98.77
R2	9020	18.26	18.04
R3	34157	69.16	68.31
R4	6171	12.50	12.34

File: HCT 116 A80915B 0.5 ug/ul .007
Acquisition Date: 22-Apr-08

Region	Events	% Gated	% Total
R1	49556	100.00	99.11
R2	4903	9.89	9.81
R3	41131	83.00	82.26
R4	3483	7.03	6.97

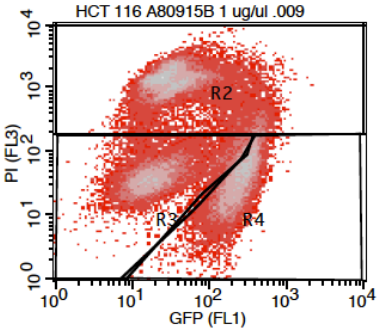


Napyradiomycin A80915B at 0.5 and 1.0 µg/mL



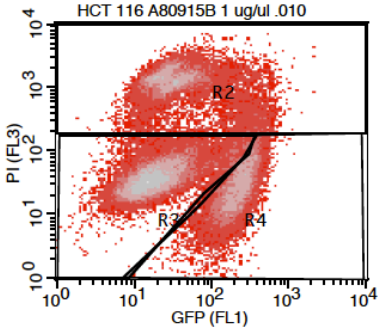
File: HCT 116 A80915B 0.5 ug/ul .008
Acquisition Date: 22-Apr-08

Region	Events	% Gated	% Total
R1	49421	100.00	98.84
R2	8186	16.56	16.37
R3	36461	73.78	72.92
R4	4722	9.55	9.44



File: HCT 116 A80915B 1 ug/ul .009
Acquisition Date: 22-Apr-08

Region	Events	% Gated	% Total
R1	48608	100.00	97.22
R2	20280	41.72	40.56
R3	15279	31.43	30.56
R4	13186	27.13	26.37

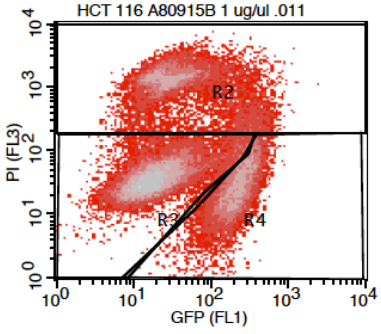


File: HCT 116 A80915B 1 ug/ul .010
Acquisition Date: 22-Apr-08

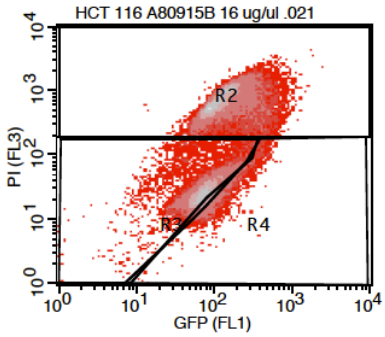
Region	Events	% Gated	% Total
R1	48619	100.00	97.24
R2	13909	28.61	27.82
R3	23228	47.78	46.46
R4	11489	23.63	22.98

File: HCT 116 A80915B 1 ug/ul .011
Acquisition Date: 22-Apr-08

Region	Events	% Gated	% Total
R1	48652	100.00	97.30
R2	12889	26.49	25.78
R3	24633	50.63	49.27
R4	11125	22.87	22.25

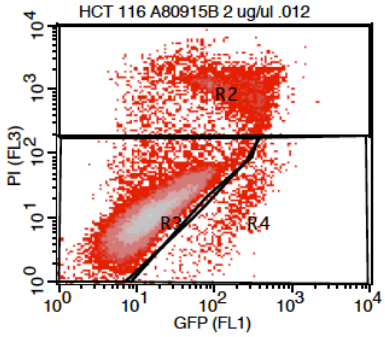


Napyradiomycin A80195B at 2 and 16 µg/mL



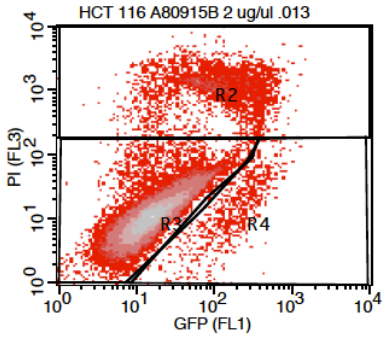
File: HCT 116 A80915B 16 ug/ul .021
Acquisition Date: 22-Apr-08

Region	Events	% Gated	% Total
R1	40548	100.00	96.72
R2	21111	52.06	50.35
R3	15463	38.14	36.88
R4	2625	6.47	6.26



File: HCT 116 A80915B 2 ug/ul .012
Acquisition Date: 22-Apr-08

Region	Events	% Gated	% Total
R1	49368	100.00	98.74
R2	3913	7.93	7.83
R3	44773	90.69	89.55
R4	657	1.33	1.31

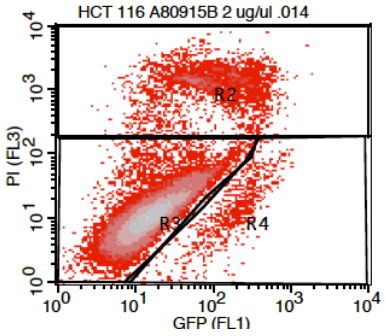


File: HCT 116 A80915B 2 ug/ul .013
Acquisition Date: 22-Apr-08

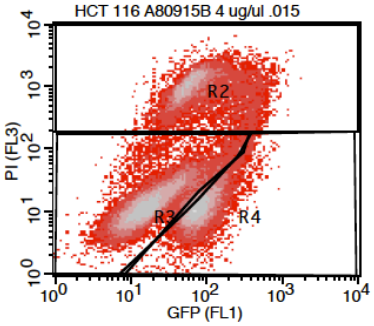
Region	Events	% Gated	% Total
R1	49522	100.00	99.04
R2	3698	7.47	7.40
R3	45085	91.04	90.17
R4	726	1.47	1.45

File: HCT 116 A80915B 2 ug/ul .014
Acquisition Date: 22-Apr-08

Region	Events	% Gated	% Total
R1	49570	100.00	99.14
R2	3679	7.42	7.36
R3	45110	91.00	90.22
R4	764	1.54	1.53

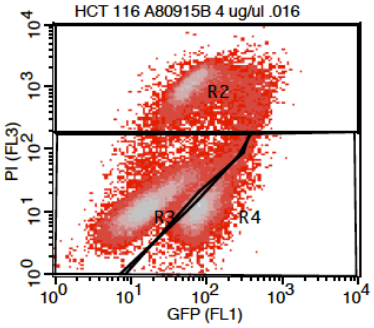


Napyradiomycin A80915B at 4 and 8 µg/mL



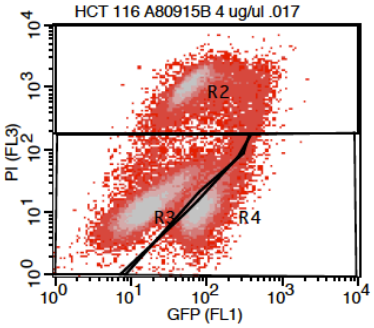
File: HCT 116 A80915B 4 ug/ul .015
Acquisition Date: 22-Apr-08

Region	Events	% Gated	% Total
R1	49176	100.00	98.35
R2	11684	23.76	23.37
R3	24012	48.83	48.02
R4	12115	24.64	24.23



File: HCT 116 A80915B 4 ug/ul .016
Acquisition Date: 22-Apr-08

Region	Events	% Gated	% Total
R1	49251	100.00	98.50
R2	11695	23.75	23.39
R3	24203	49.14	48.41
R4	12070	24.51	24.14

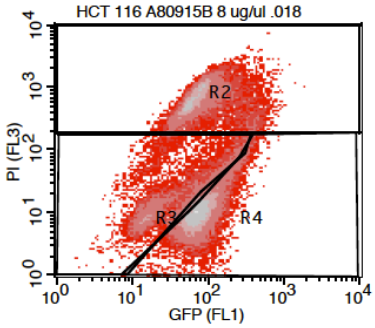


File: HCT 116 A80915B 4 ug/ul .017
Acquisition Date: 22-Apr-08

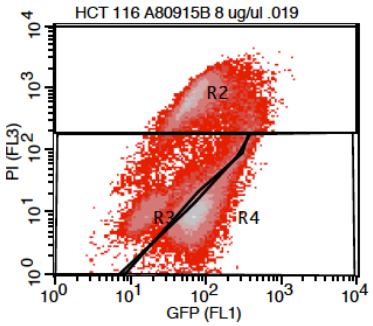
Region	Events	% Gated	% Total
R1	49217	100.00	98.43
R2	11987	24.36	23.97
R3	23972	48.71	47.94
R4	11999	24.38	24.00

File: HCT 116 A80915B 8 ug/ul .018
Acquisition Date: 22-Apr-08

Region	Events	% Gated	% Total
R1	48990	100.00	97.98
R2	15499	31.64	31.00
R3	10941	22.33	21.88
R4	20649	42.15	41.30

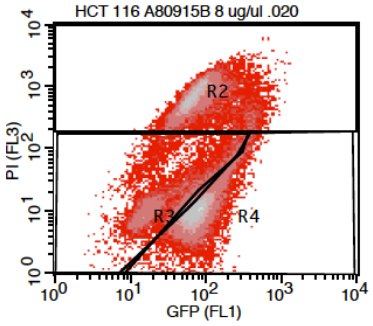


Napyradiomycin A80915B at 8 µg/mL and Napyradiomycin B3 at 0.5 µg/mL



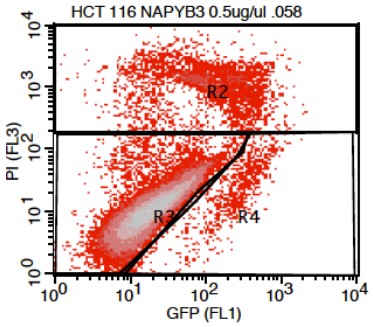
File: HCT 116 A80915B 8 ug/ul .019
Acquisition Date: 22-Apr-08

Region	Events	% Gated	% Total
R1	48975	100.00	97.95
R2	15993	32.66	31.99
R3	10427	21.29	20.85
R4	20666	42.20	41.33



File: HCT 116 A80915B 8 ug/ul .020
Acquisition Date: 22-Apr-08

Region	Events	% Gated	% Total
R1	48907	100.00	97.81
R2	16156	33.03	32.31
R3	10312	21.08	20.62
R4	20546	42.01	41.09

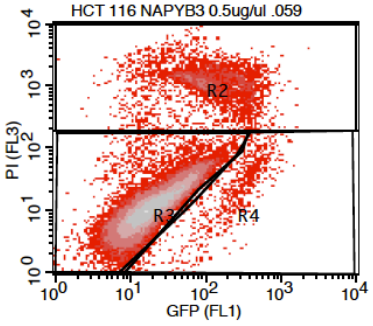


File: HCT 116 NAPYB3 0.5ug/ul .058
Acquisition Date: 22-Apr-08

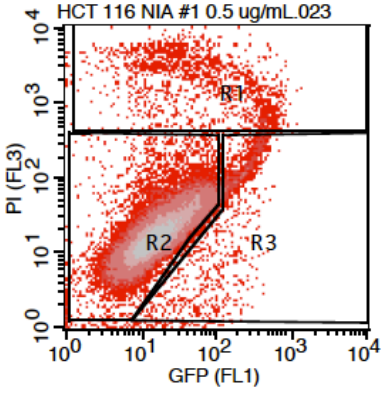
Region	Events	% Gated	% Total
R1	49404	100.00	98.81
R2	3709	7.51	7.42
R3	44897	90.88	89.79
R4	828	1.68	1.66

File: HCT 116 NAPYB3 0.5ug/ul .059
Acquisition Date: 22-Apr-08

Region	Events	% Gated	% Total
R1	49485	100.00	98.97
R2	4207	8.50	8.41
R3	44539	90.01	89.08
R4	751	1.52	1.50

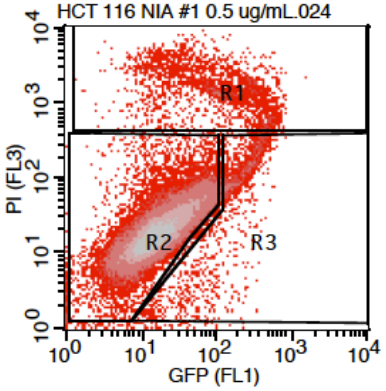


Napyradiomycin A80915A at 0.5 µg/mL



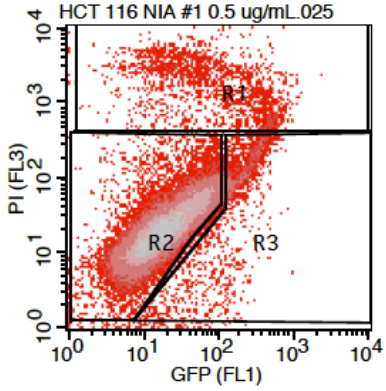
Sample ID: HCT 116 NIA #1 0.5 ug/mL
Acquisition Date: 13-Dec-07

Region	Events	% Total
R1	1616	3.23
R2	46100	92.20
R3	1694	3.39



Sample ID: HCT 116 NIA #1 0.5 ug/mL
Acquisition Date: 13-Dec-07

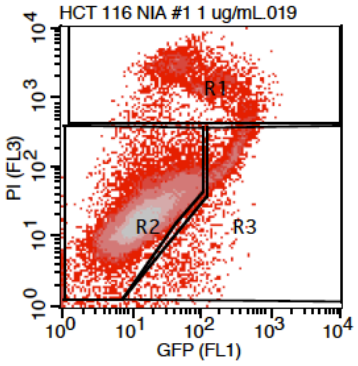
Region	Events	% Total
R1	2380	4.76
R2	45092	90.18
R3	1919	3.84



Sample ID: HCT 116 NIA #1 0.5 ug/mL
Acquisition Date: 13-Dec-07

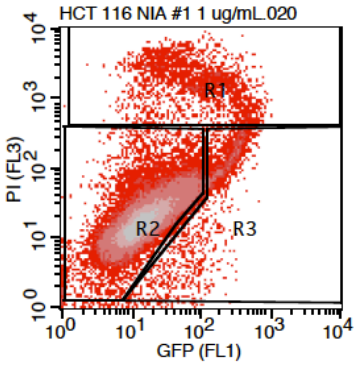
Region	Events	% Total
R1	2023	4.05
R2	45025	90.05
R3	2246	4.49

Napyradiomycin A80915A at 1.0 µg/mL



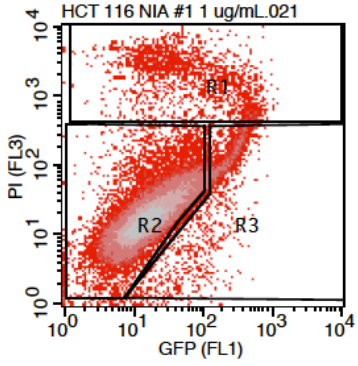
Sample ID: HCT 116 NIA #1 1 ug/mL
Acquisition Date: 13-Dec-07

Region	Events	% Total
R1	3276	6.55
R2	43454	86.91
R3	2568	5.14



Sample ID: HCT 116 NIA #1 1 ug/mL
Acquisition Date: 13-Dec-07

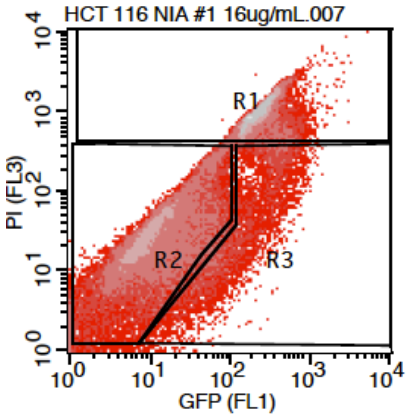
Region	Events	% Total
R1	2544	5.09
R2	44515	89.03
R3	2330	4.66



Sample ID: HCT 116 NIA #1 1 ug/mL
Acquisition Date: 13-Dec-07

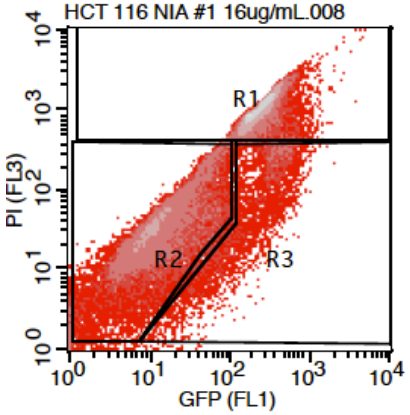
Region	Events	% Total
R1	2056	4.11
R2	44796	89.59
R3	2451	4.90

Napyradiomycin A80915A at 16 µg/mL



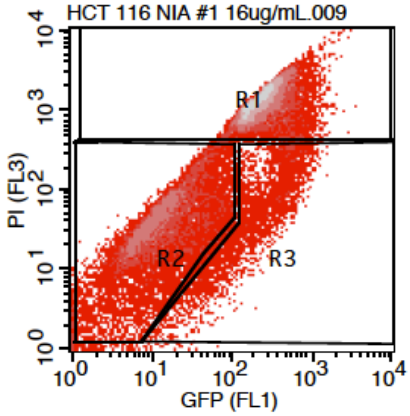
Sample ID: HCT 116 NIA #1 16ug/mL
Acquisition Date: 13-Dec-07

Region	Events	% Total
R1	13212	26.42
R2	29296	58.59
R3	5452	10.90



Sample ID: HCT 116 NIA #1 16ug/mL
Acquisition Date: 13-Dec-07

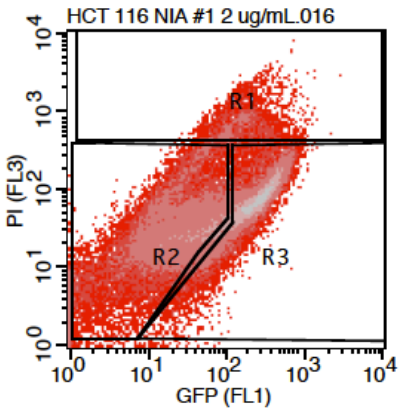
Region	Events	% Total
R1	20745	41.49
R2	23426	46.85
R3	4363	8.73



Sample ID: HCT 116 NIA #1 16ug/mL
Acquisition Date: 13-Dec-07

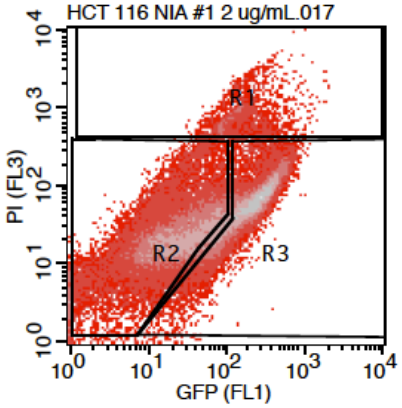
Region	Events	% Total
R1	32180	64.36
R2	13788	27.58
R3	3121	6.24

Napyradiomycin A80915A at 2 µg/mL



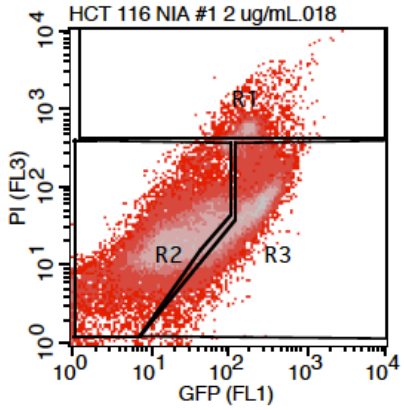
Sample ID: HCT 116 NIA #1 2 ug/mL
Acquisition Date: 13-Dec-07

Region	Events	% Total
R1	2927	5.85
R2	26008	52.02
R3	17689	35.38



Sample ID: HCT 116 NIA #1 2 ug/mL
Acquisition Date: 13-Dec-07

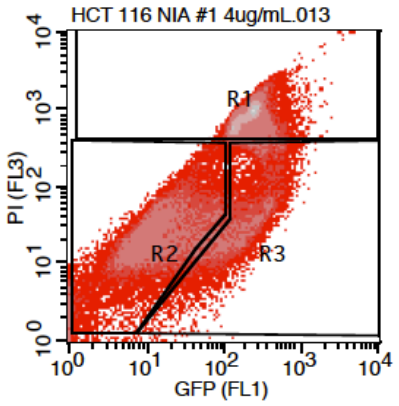
Region	Events	% Total
R1	2513	5.03
R2	26923	53.85
R3	17159	34.32



Sample ID: HCT 116 NIA #1 2 ug/mL
Acquisition Date: 13-Dec-07

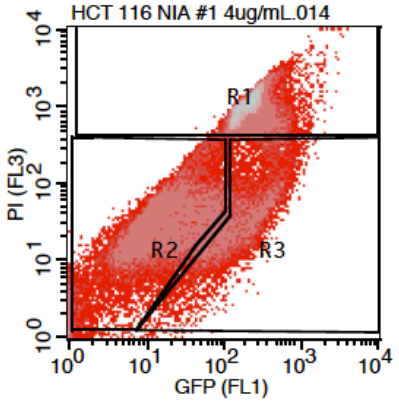
Region	Events	% Total
R1	2690	5.38
R2	29017	58.03
R3	14729	29.46

Napyradiomycin A80915A at 4 µg/mL



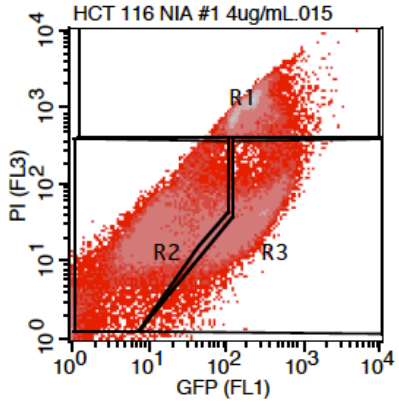
Sample ID: HCT 116 NIA #1 4ug/mL
Acquisition Date: 13-Dec-07

Region	Events	% Total
R1	15341	30.68
R2	22092	44.18
R3	10098	20.20



Sample ID: HCT 116 NIA #1 4ug/mL
Acquisition Date: 13-Dec-07

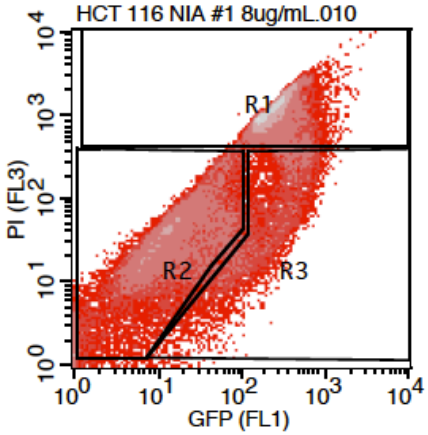
Region	Events	% Total
R1	17635	35.27
R2	21186	42.37
R3	8862	17.72



Sample ID: HCT 116 NIA #1 4ug/mL
Acquisition Date: 13-Dec-07

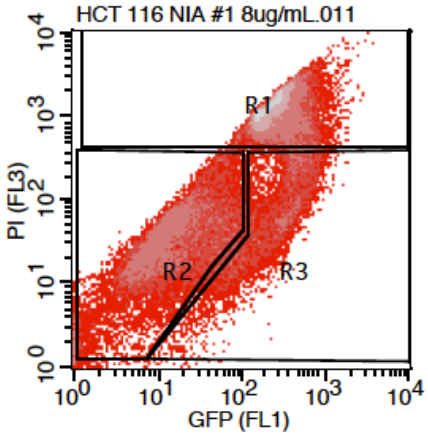
Region	Events	% Total
R1	12444	24.89
R2	21422	42.84
R3	13514	27.03

Napyradiomycin A80915A at 8 µg/mL



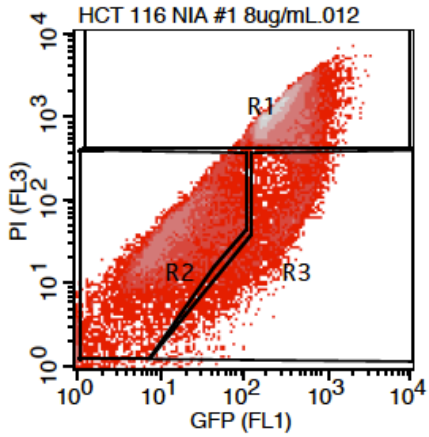
Sample ID: HCT 116 NIA #1 8ug/mL
Acquisition Date: 13-Dec-07

Region	Events	% Total
R1	19095	38.19
R2	21929	43.86
R3	6927	13.85



Sample ID: HCT 116 NIA #1 8ug/mL
Acquisition Date: 13-Dec-07

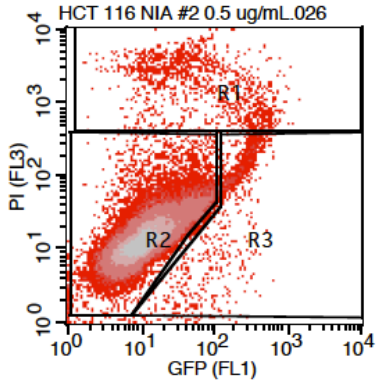
Region	Events	% Total
R1	26104	52.21
R2	16261	32.52
R3	6367	12.73



Sample ID: HCT 116 NIA #1 8ug/mL
Acquisition Date: 13-Dec-07

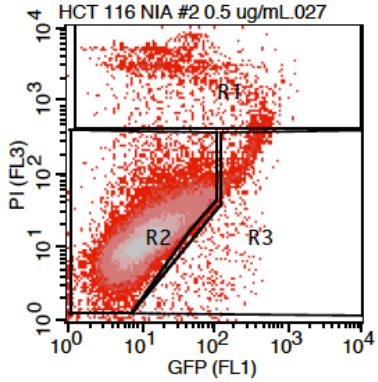
Region	Events	% Total
R1	30387	60.77
R2	13454	26.91
R3	4919	9.84

Napyradiomycin CNQ525.510B (**1**) at 0.5 µg/mL



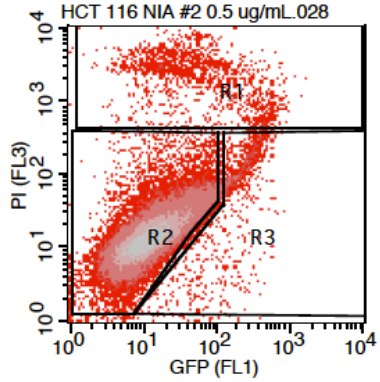
Sample ID: HCT 116 NIA #2 0.5 ug/mL
Acquisition Date: 13-Dec-07

Region	Events	% Total
R1	1319	2.64
R2	47144	94.29
R3	1140	2.28



Sample ID: HCT 116 NIA #2 0.5 ug/mL
Acquisition Date: 13-Dec-07

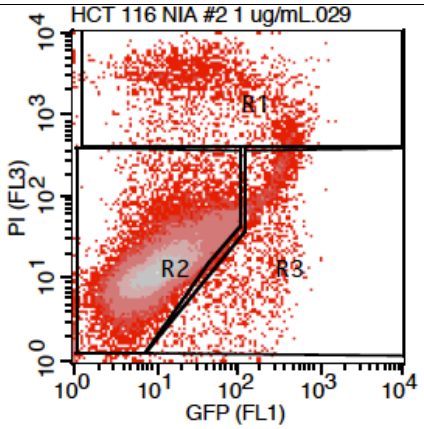
Region	Events	% Total
R1	1415	2.83
R2	46847	93.69
R3	1263	2.53



Sample ID: HCT 116 NIA #2 0.5 ug/mL
Acquisition Date: 13-Dec-07

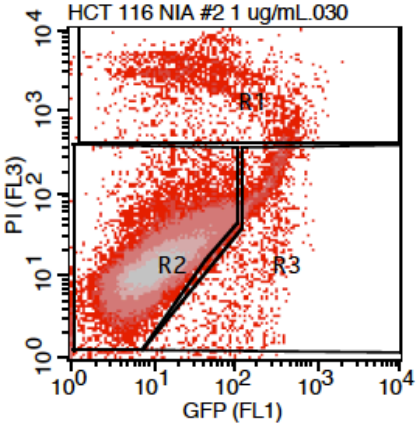
Region	Events	% Total
R1	1557	3.11
R2	46563	93.13
R3	1399	2.80

Napyradiomycin CNQ525.510B (**1**) at 1 µg/mL



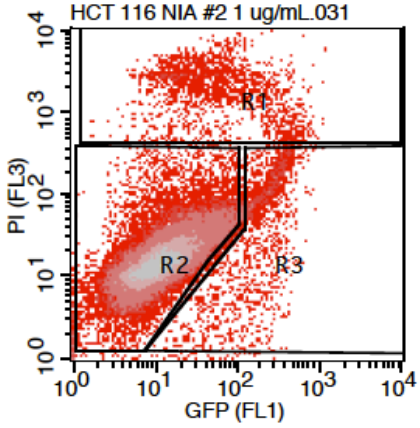
Sample ID: HCT 116 NIA #2 1 ug/mL
Acquisition Date: 13-Dec-07

Region	Events	% Total
R1	1925	3.85
R2	45537	91.07
R3	1876	3.75



Sample ID: HCT 116 NIA #2 1 ug/mL
Acquisition Date: 13-Dec-07

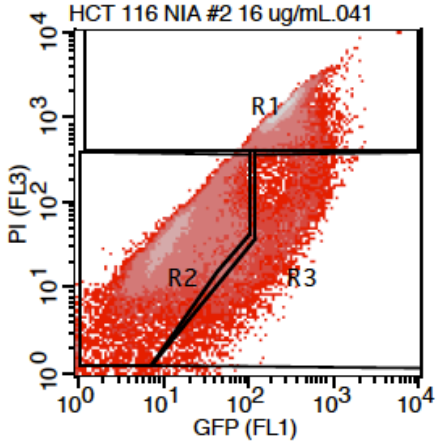
Region	Events	% Total
R1	2289	4.58
R2	45073	90.15
R3	1971	3.94



Sample ID: HCT 116 NIA #2 1 ug/mL
Acquisition Date: 13-Dec-07

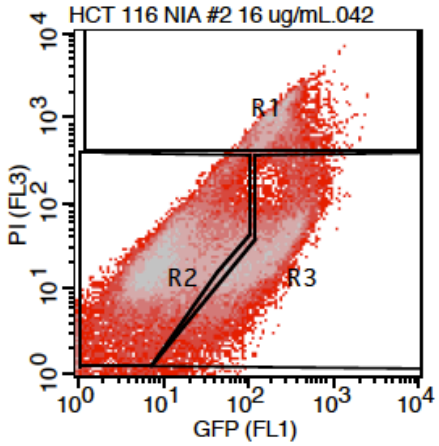
Region	Events	% Total
R1	1841	3.68
R2	45718	91.44
R3	1845	3.69

Napyradiomycin CNQ525.510B (**1**)at 16 µg/mL



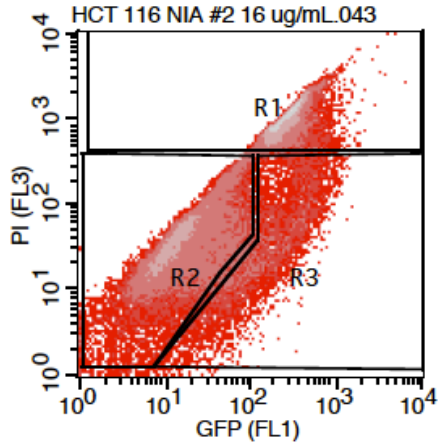
Sample ID: HCT 116 NIA #2 16 ug/mL
Acquisition Date: 13-Dec-07

Region	Events	% Total
R1	15728	31.46
R2	26312	52.62
R3	6428	12.86



Sample ID: HCT 116 NIA #2 16 ug/mL
Acquisition Date: 13-Dec-07

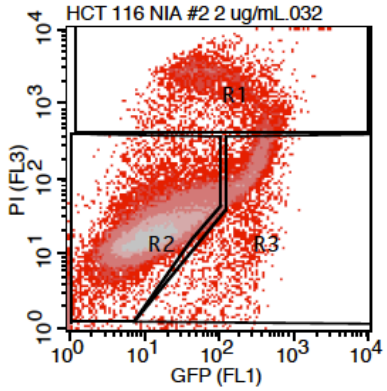
Region	Events	% Total
R1	5255	10.51
R2	27662	55.32
R3	14503	29.01



Sample ID: HCT 116 NIA #2 16 ug/mL
Acquisition Date: 13-Dec-07

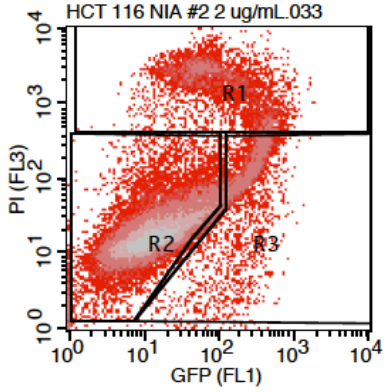
Region	Events	% Total
R1	16413	32.83
R2	25446	50.89
R3	6604	13.21

Napyradiomycin CNQ525.510B (**1**) at 2 µg/mL



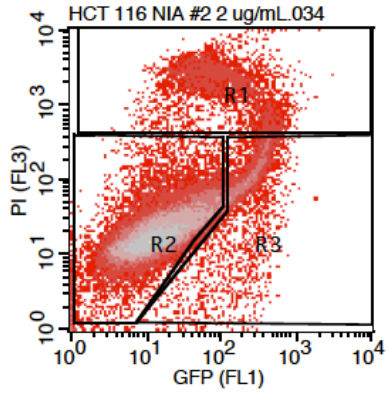
Sample ID: HCT 116 NIA #2 2 ug/mL
Acquisition Date: 13-Dec-07

Region	Events	% Total
R1	3144	6.29
R2	40799	81.60
R3	4986	9.97



Sample ID: HCT 116 NIA #2 2 ug/mL
Acquisition Date: 13-Dec-07

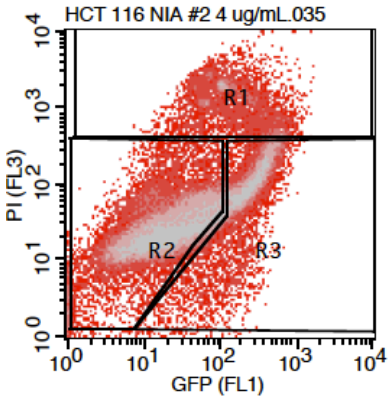
Region	Events	% Total
R1	4786	9.57
R2	39554	79.11
R3	4654	9.31



Sample ID: HCT 116 NIA #2 2 ug/mL
Acquisition Date: 13-Dec-07

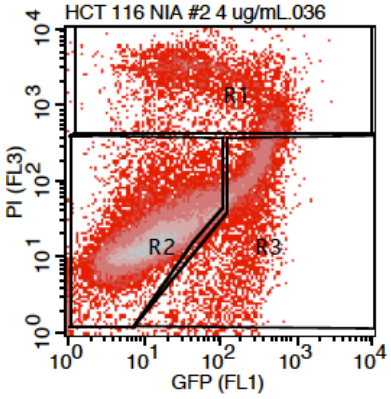
Region	Events	% Total
R1	4043	8.09
R2	39739	79.48
R3	5062	10.12

Napyradiomycin CNQ525.510B (**1**) at 4 µg/mL



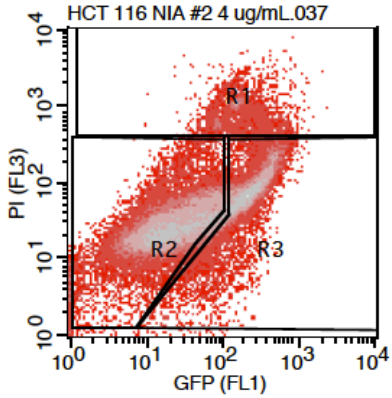
Sample ID: HCT 116 NIA #2 4 ug/mL
Acquisition Date: 13-Dec-07

Region	Events	% Total
R1	4674	9.35
R2	32121	64.24
R3	11253	22.51



Sample ID: HCT 116 NIA #2 4 ug/mL
Acquisition Date: 13-Dec-07

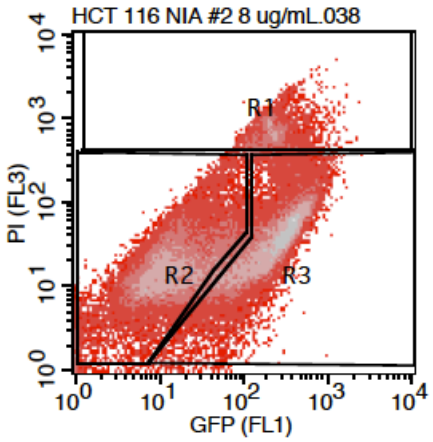
Region	Events	% Total
R1	4043	8.09
R2	38219	76.44
R3	6619	13.24



Sample ID: HCT 116 NIA #2 4 ug/mL
Acquisition Date: 13-Dec-07

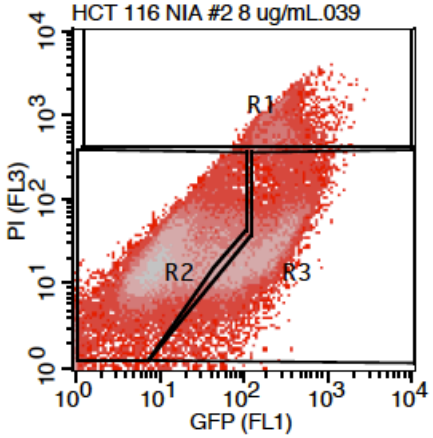
Region	Events	% Total
R1	2877	5.75
R2	31537	63.07
R3	13228	26.46

Napyradiomycin CNQ525.510B (**1**) at 8 µg/mL



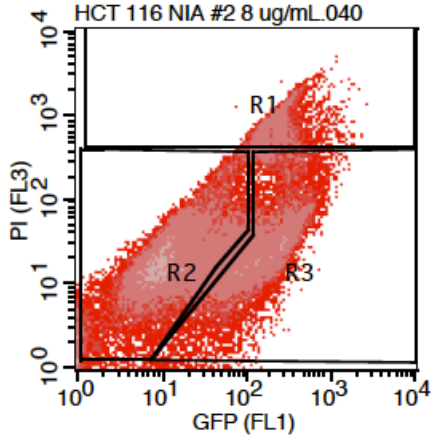
Sample ID: HCT 116 NIA #2 8 ug/mL
Acquisition Date: 13-Dec-07

Region	Events	% Total
R1	3632	7.26
R2	22738	45.48
R3	21128	42.26



Sample ID: HCT 116 NIA #2 8 ug/mL
Acquisition Date: 13-Dec-07

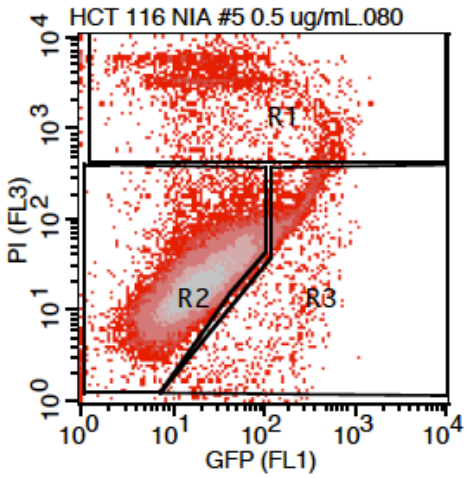
Region	Events	% Total
R1	3478	6.96
R2	28603	57.21
R3	15245	30.49



Sample ID: HCT 116 NIA #2 8 ug/mL
Acquisition Date: 13-Dec-07

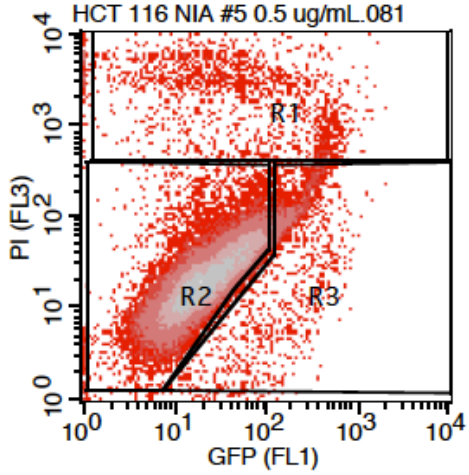
Region	Events	% Total
R1	4280	8.56
R2	26687	53.37
R3	16114	32.23

Napyradiomycin A80515C at 0.5 µg/mL



Sample ID: HCT 116 NIA #5 0.5 ug/mL
Acquisition Date: 13-Dec-07

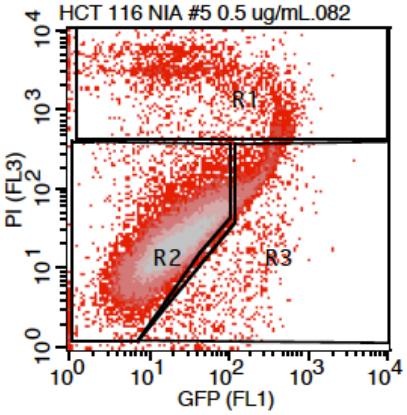
Region	Events	% Total
R1	2190	4.38
R2	45119	90.24
R3	2135	4.27



Sample ID: HCT 116 NIA #5 0.5 ug/mL
Acquisition Date: 13-Dec-07

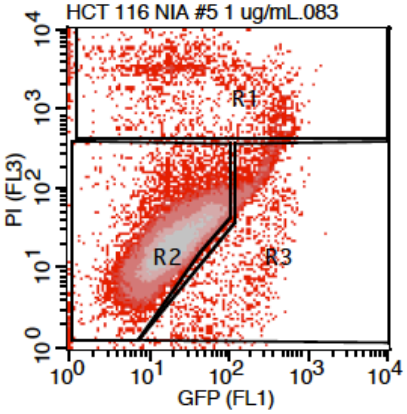
Region	Events	% Total
R1	1607	3.21
R2	45122	90.24
R3	2530	5.06

Napyradiomycin A80515C at 0.5 and 1 µg/mL



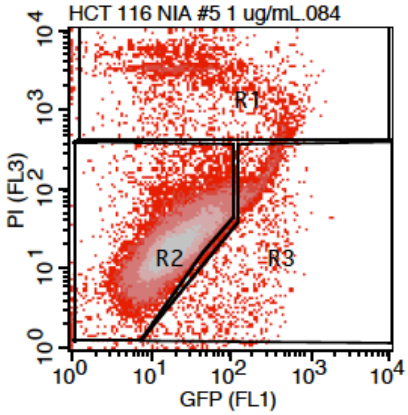
Sample ID: HCT 116 NIA #5 0.5 ug/mL
Acquisition Date: 13-Dec-07

Region	Events	% Total
R1	2091	4.18
R2	44445	88.89
R3	2662	5.32



Sample ID: HCT 116 NIA #5 1 ug/mL
Acquisition Date: 13-Dec-07

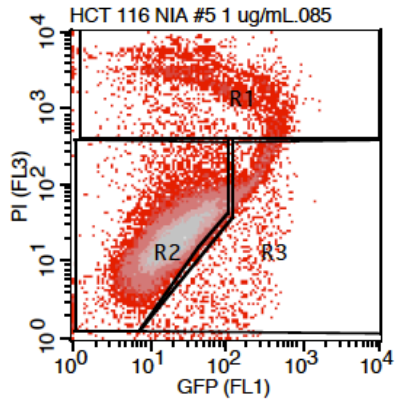
Region	Events	% Total
R1	1617	3.23
R2	45575	91.15
R3	2197	4.39



Sample ID: HCT 116 NIA #5 1 ug/mL
Acquisition Date: 13-Dec-07

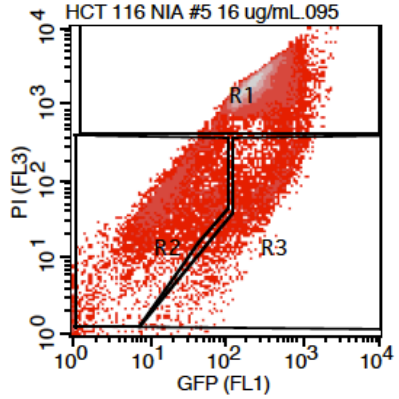
Region	Events	% Total
R1	2123	4.25
R2	45115	90.23
R3	2160	4.32

Napyradiomycin A80515C at 1 and 16 µg/mL



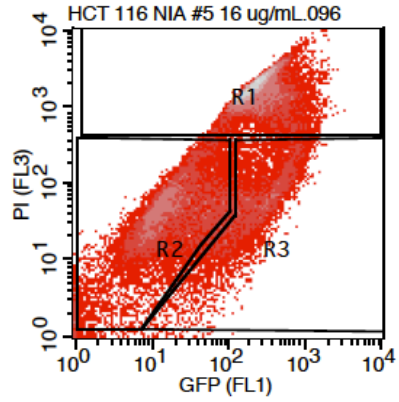
Sample ID: HCT 116 NIA #5 1 ug/mL
Acquisition Date: 13-Dec-07

Region	Events	% Total
R1	2640	5.28
R2	44561	89.12
R3	2183	4.37



Sample ID: HCT 116 NIA #5 16 ug/mL
Acquisition Date: 13-Dec-07

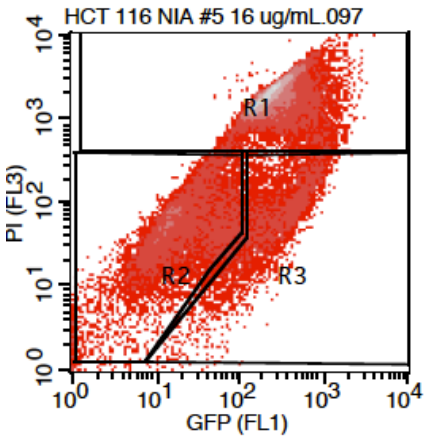
Region	Events	% Total
R1	41329	82.66
R2	5578	11.16
R3	2650	5.30



Sample ID: HCT 116 NIA #5 16 ug/mL
Acquisition Date: 13-Dec-07

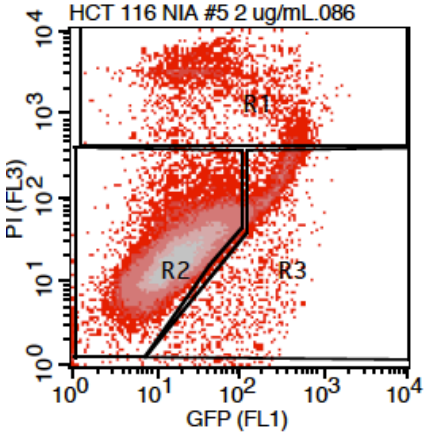
Region	Events	% Total
R1	27068	54.14
R2	14623	29.25
R3	7117	14.23

Napyradiomycin A80515C at 2 and 16 µg/mL



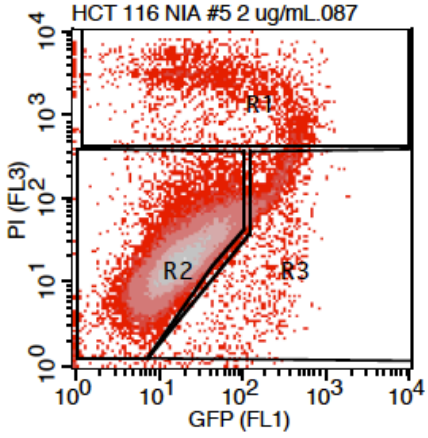
Sample ID: HCT 116 NIA #5 16 ug/mL
Acquisition Date: 13-Dec-07

Region	Events	% Total
R1	33832	67.66
R2	10559	21.12
R3	4898	9.80



Sample ID: HCT 116 NIA #5 2 ug/mL
Acquisition Date: 13-Dec-07

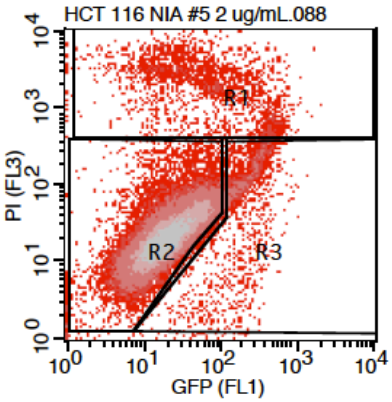
Region	Events	% Total
R1	2461	4.92
R2	44517	89.03
R3	2427	4.85



Sample ID: HCT 116 NIA #5 2 ug/mL
Acquisition Date: 13-Dec-07

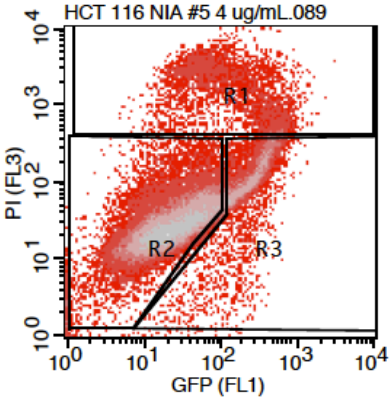
Region	Events	% Total
R1	2220	4.44
R2	44968	89.94
R3	2261	4.52

Napyradiomycin A80515C at 2 and 4 µg/mL



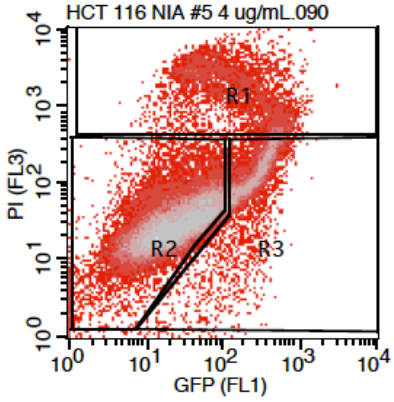
Sample ID: HCT 116 NIA #5 2 ug/mL
Acquisition Date: 13-Dec-07

Region	Events	% Total
R1	2337	4.67
R2	44778	89.56
R3	2317	4.63



Sample ID: HCT 116 NIA #5 4 ug/mL
Acquisition Date: 13-Dec-07

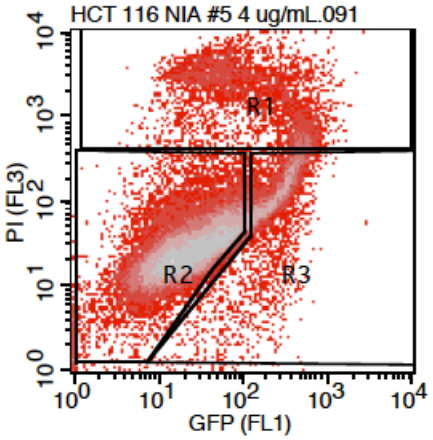
Region	Events	% Total
R1	4183	8.37
R2	36877	73.75
R3	7716	15.43



Sample ID: HCT 116 NIA #5 4 ug/mL
Acquisition Date: 13-Dec-07

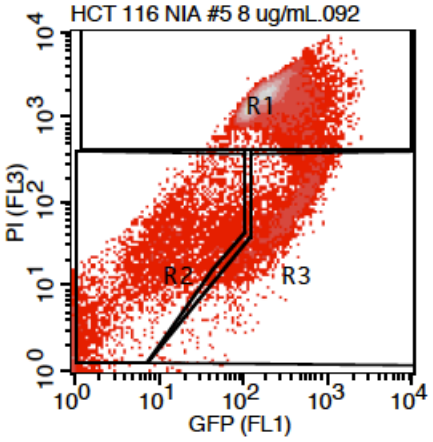
Region	Events	% Total
R1	4624	9.25
R2	36411	72.82
R3	7766	15.53

Napyradiomycin A80515C at 4 and 8 µg/mL



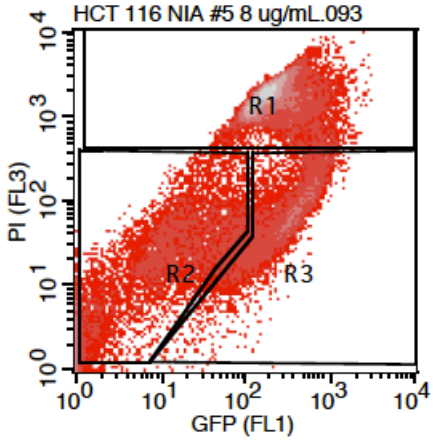
Sample ID: HCT 116 NIA #5 4 ug/mL
Acquisition Date: 13-Dec-07

Region	Events	% Total
R1	4618	9.24
R2	37297	74.59
R3	6941	13.88



Sample ID: HCT 116 NIA #5 4 ug/mL
Acquisition Date: 13-Dec-07

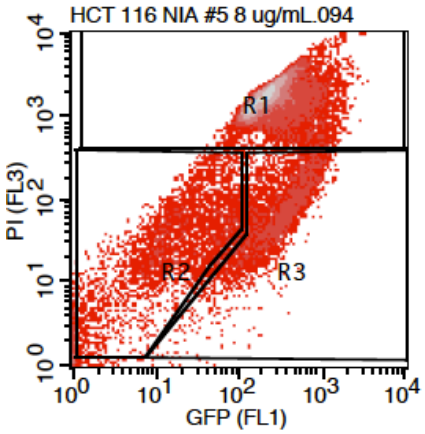
Region	Events	% Total
R1	41505	83.01
R2	3916	7.83
R3	3691	7.38



Sample ID: HCT 116 NIA #5 4 ug/mL
Acquisition Date: 13-Dec-07

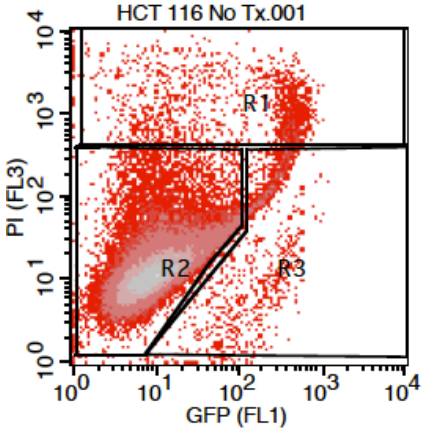
Region	Events	% Total
R1	33423	66.85
R2	7959	15.92
R3	6954	13.91

Napyradiomycin A80515C at 4 and 8 µg/mL and no treatment controls



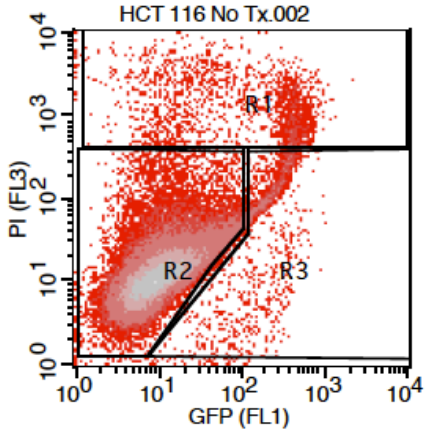
Sample ID: HCT 116 NIA #5 4
Acquisition Date: 13-Dec-07

Region	Events	% Total
R1	40845	81.69
R2	3980	7.96
R3	4346	8.69



Sample ID: HCT 116 No Tx
Acquisition Date: 13-Dec-07

Region	Events	% Total
R1	1610	3.22
R2	46449	92.90
R3	1530	3.06



Sample ID: HCT 116 No Tx
Acquisition Date: 13-Dec-07

Region	Events	% Total
R1	1833	3.67
R2	46067	92.13
R3	1658	3.32