Supporting Information Table 1. Enhancers of oligodendrocyte formation identified by screening of a 3,000-molecule bioactives library

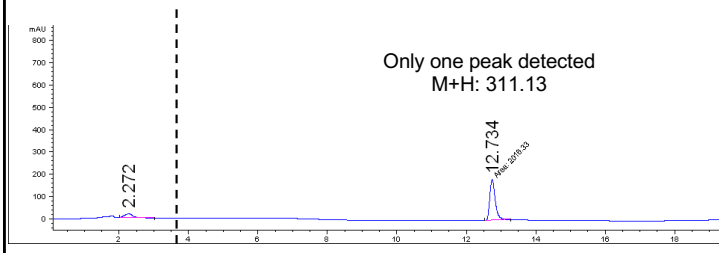
Name	Total Cells	% Oligos	MW	DMSO% oligos_ Mean	DMSO% oligos_StdDev	cell viability (% relative to DMSO)	fold-change in % MBP+ oligodendrocytes
Isoconazole nitrate	584	53.25	479.14	7.95	3.66	106.98	**6.70**
EPZ005687	610	50.00	539.67	8.47	2.61	91.36	**5.90**
Clotrimazole	666	27.93	344.85	4.75	2.75	122.50	**5.88**
Ketoconazole	847	52.77	531.44	9.33	3.87	121.51	**5.65**
Butoconazole nitrate	809	46.85	474.79	8.92	2.63	122.03	**5.25**
Sertaconazole nitrate	777	39.38	500.78	7.52	1.87	134.49	**5.23**
Pyrimethamine	604	43.87	248.71	8.92	2.63	91.11	**4.92**
Ifenprodil Tartrate	693	41.41	475.53	8.47	2.61	103.79	**4.89**
Varenicline tartrate	783	22.86	361.36	4.75	2.75	144.02	**4.81**
Raloxifene HCl	777	35.01	510.04	7.29	3.37	114.37	**4.80**
Hydroxyzine 2HCl	896	40.63	447.83	8.47	2.61	134.19	**4.80**
Ziprasidone HCl	1003	34.10	449.40	7.29	3.37	147.64	**4.68**
Bifonazole	820	40.98	310.39	8.92	2.63	123.69	**4.59**
SB408124	704	39.63	356.37	8.92	2.63	106.19	**4.44**
Sulconazole Nitrate	700	37.57	460.76	8.47	2.61	104.84	**4.44**
Pentamidine isethionate	758	41.29	592.69	9.33	3.87	108.75	**4.42**
Clemastine fumarate	449	20.49	459.97	4.75	2.75	82.59	**4.31**
Raltegravir (MK-0518)	768	38.02	444.42	8.92	2.63	115.85	**4.26**
Fenticonazole Nitrate	687	35.66	518.41	8.92	2.63	103.63	**4.00**
Mubritinib (TAK 165)	779	31.45	468.47	7.95	3.66	142.71	**3.95**
Pramoxine HCl	755	32.98	329.86	8.47	2.61	113.08	**3.89**
TMB-8 hydrochloride	758	18.47	432.00	4.75	2.75	139.42	**3.89**
(±)-Vesamicol hydrochloride	821	34.23	295.86	8.84	3.16	112.02	**3.87**
Clotrimazole	748	34.36	344.84	8.92	2.63	112.83	**3.85**
Fulvestrant	758	18.21	606.79	4.75	2.75	139.42	**3.83**
Raloxifene hydrochloride	924	33.33	510.06	8.84	3.16	126.07	**3.77**
Praziquantel	728	33.24	312.41	8.92	2.63	109.81	**3.72**
Ziprasidone hydrochloride monohydrate	851	32.78	467.42	8.84	3.16	116.11	**3.71**
LY2784544	480	28.75	469.94	7.95	3.66	87.93	**3.62**
Ifenprodil tartrate	739	33.69	801.00	9.33	3.87	106.02	**3.61**
L-745,870 hydrochloride	647	32.61	363.29	9.33	3.87	92.82	**3.49**
Hexahydro-sila-difenidol hydrochloride, p-fluoro analog	654	26.76	386.03	7.68	3.55	95.08	**3.49**

KEY

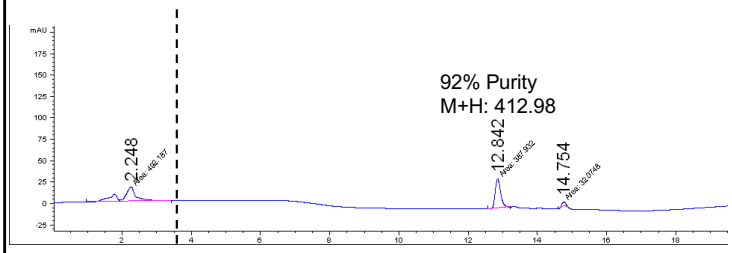
Imidazole antifungal
Enhances oligodendrocyte formation and causes sterol intermediate accumulation
False positive (did not confirm as enhancing oligodendrocyte formation)
not retested

Supporting Information Table 2. Purity of compounds estimated using liquid chromatography-mass spectrometry (LC-MS). Dashed line indicates solvent front.

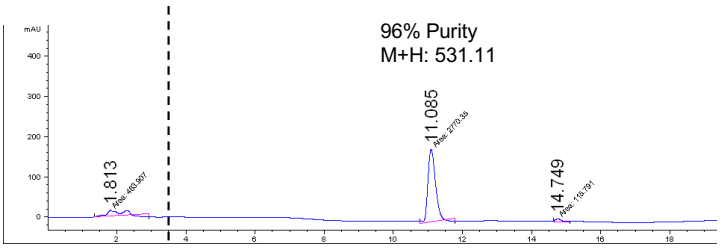
Bifonazole



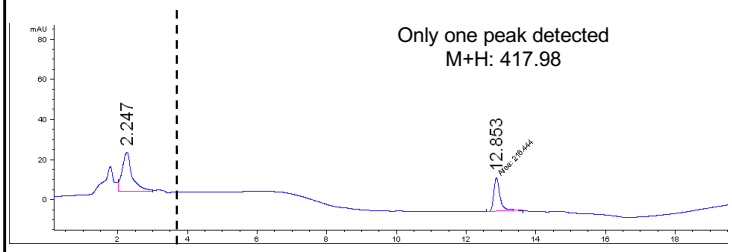
Butaconazole



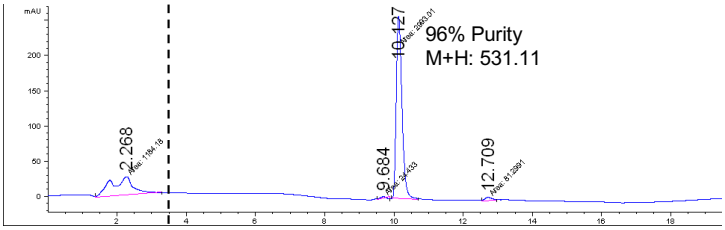
Ketoconazole



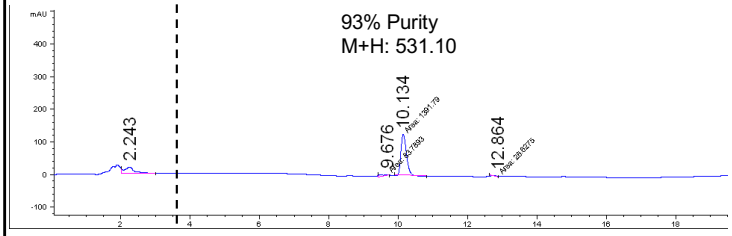
Miconazole



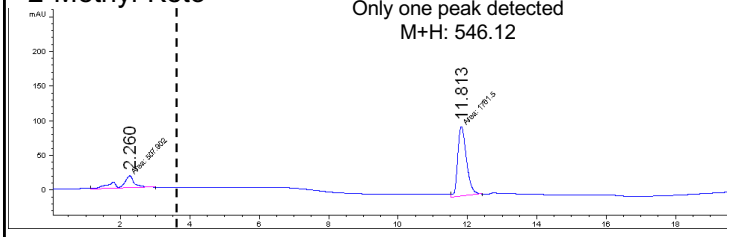
R-Trans-Keto



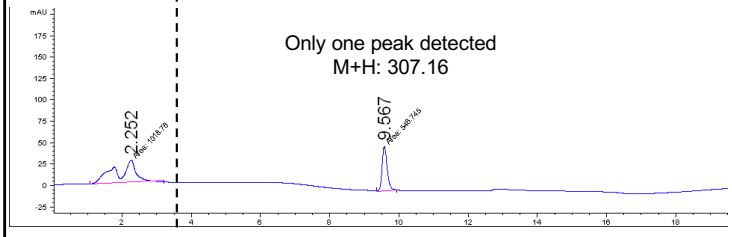
S-Trans-Keto



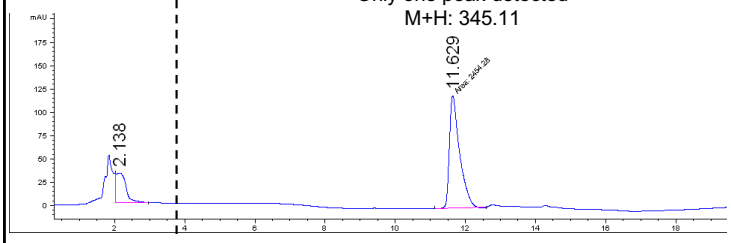
2-Methyl-Keto



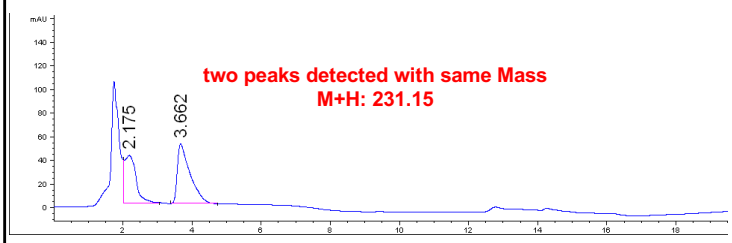
Fluconazole



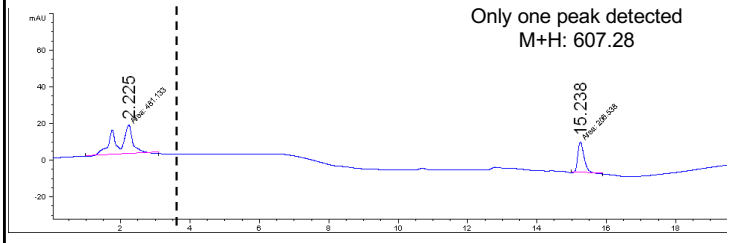
Clotrimazole



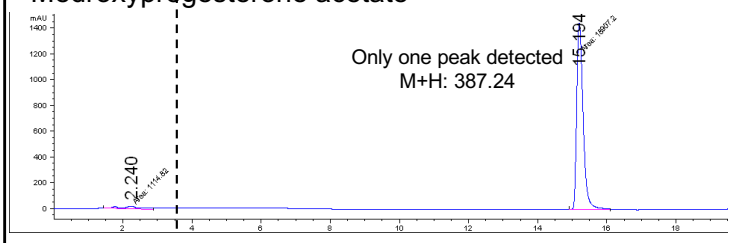
Imidazole 124



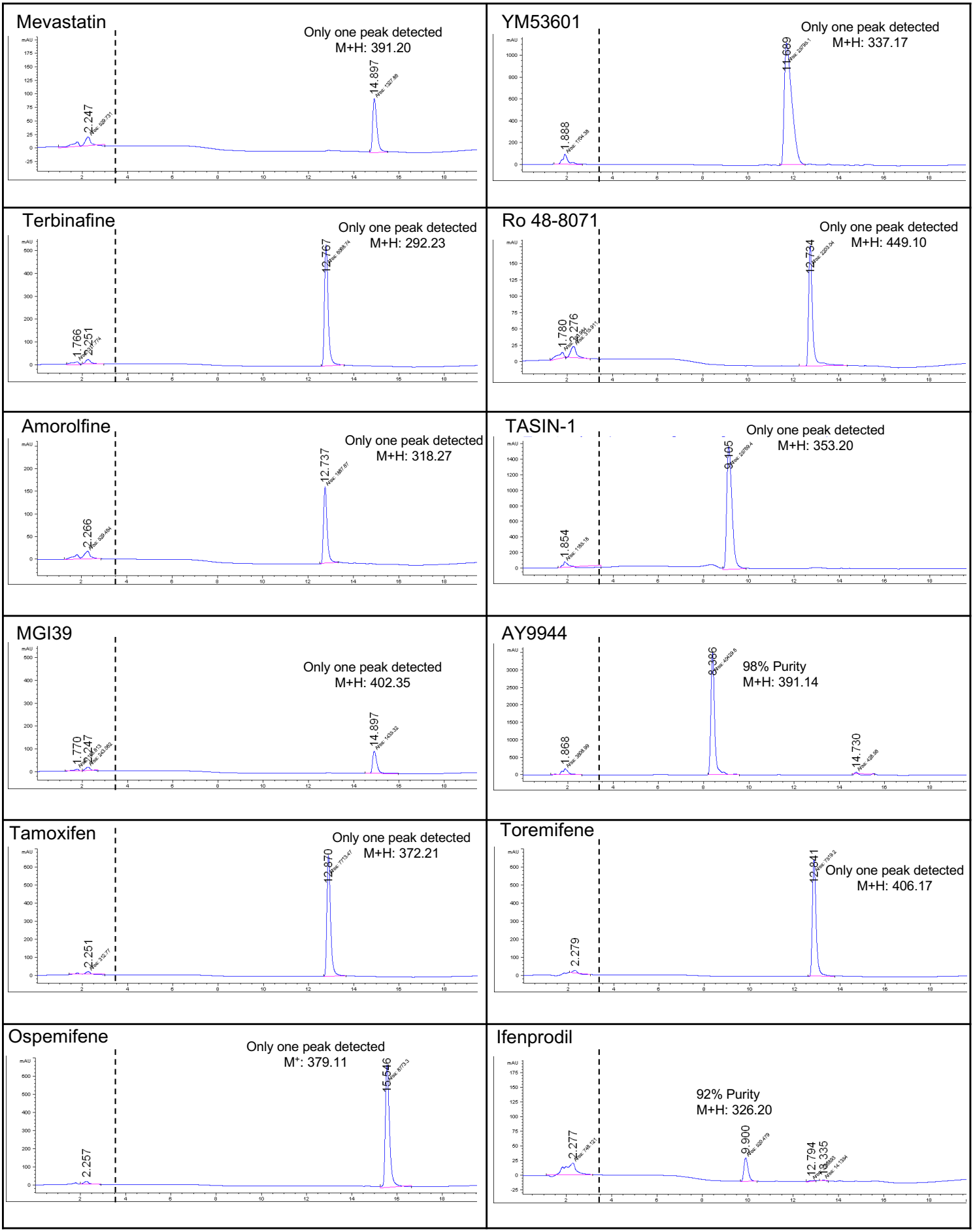
Fulvestrant



Medroxyprogesterone acetate

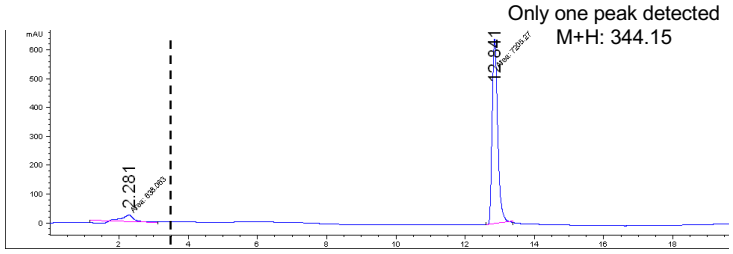


Supporting Information Table 2, continued. Purity of compounds estimated using liquid chromatography-mass spectrometry (LC-MS).

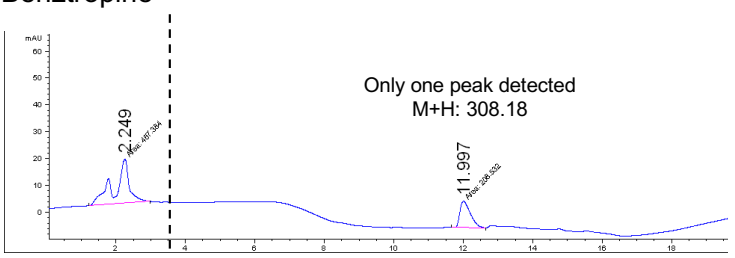


Supporting Information Table 2, continued. Purity of compounds estimated using liquid chromatography-mass spectrometry (LC-MS).

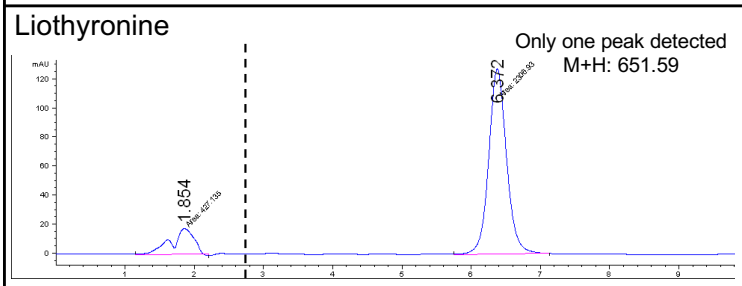
Clemastine



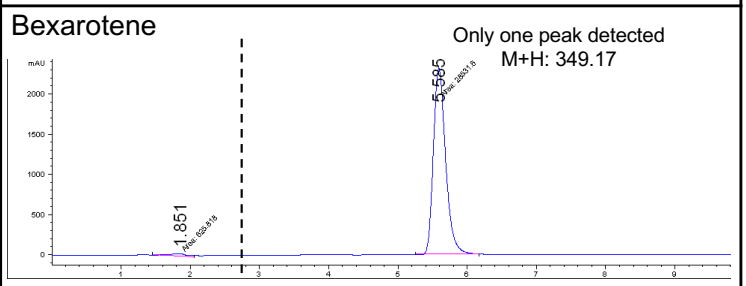
Benztropine



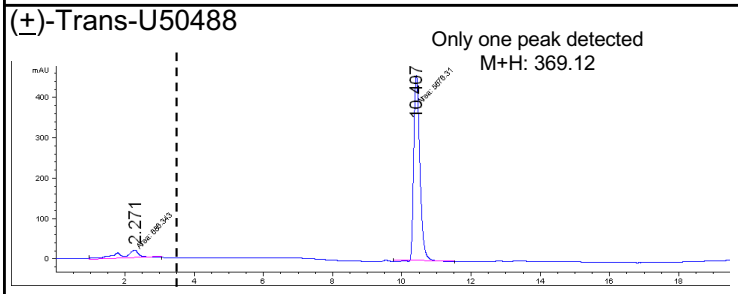
Liothyronine



Bexarotene



(±)-Trans-U50488



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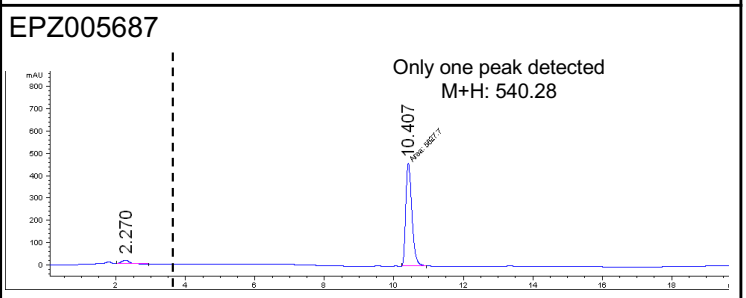
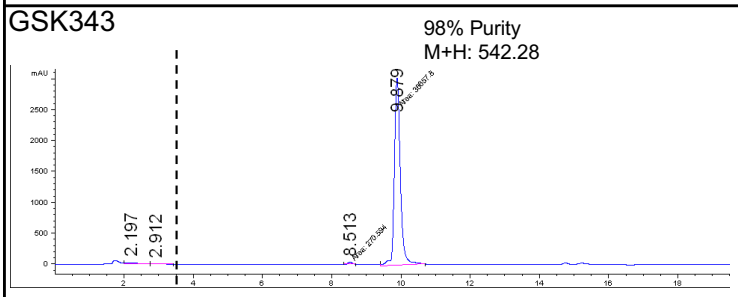
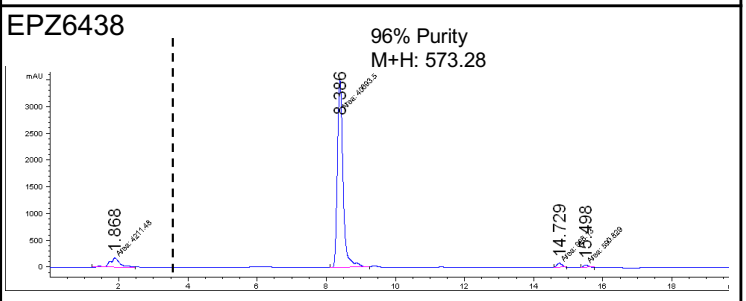


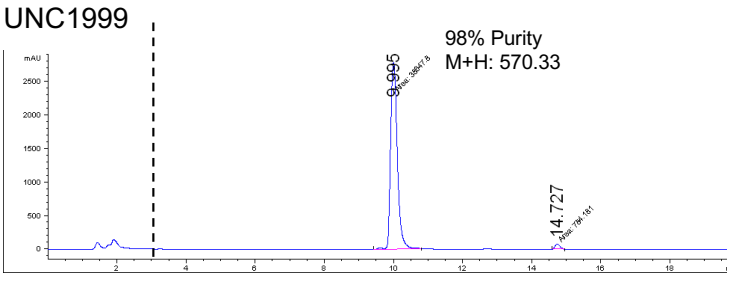
GSK343



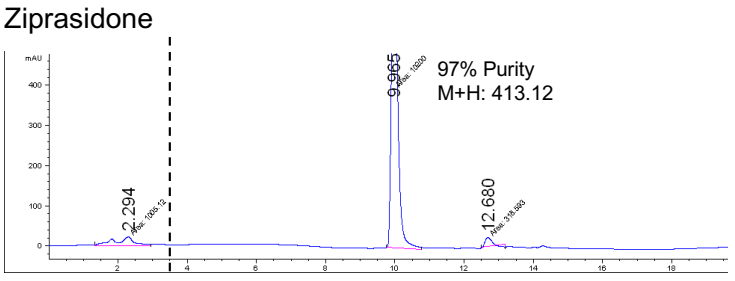
EPZ6438



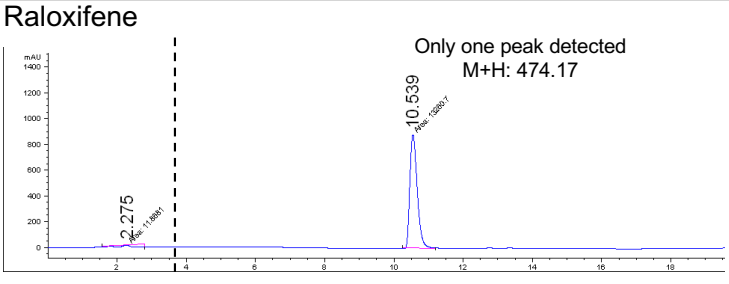
UNC1999



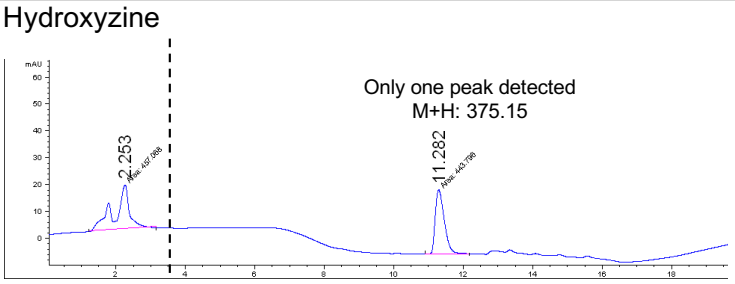
Ziprasidone



Raloxifene

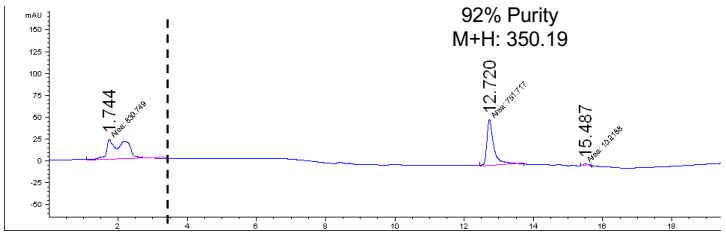


Hydroxyzine

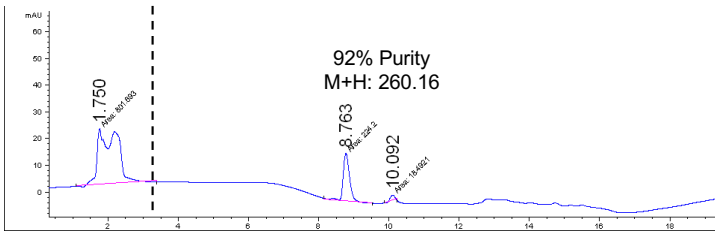


Supporting Information Table 2, continued. Purity of compounds estimated using liquid chromatography-mass spectrometry (LC-MS).

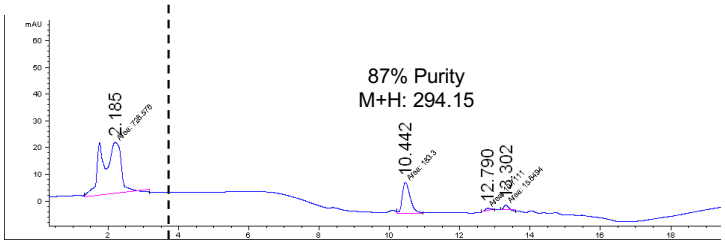
Sigma H127



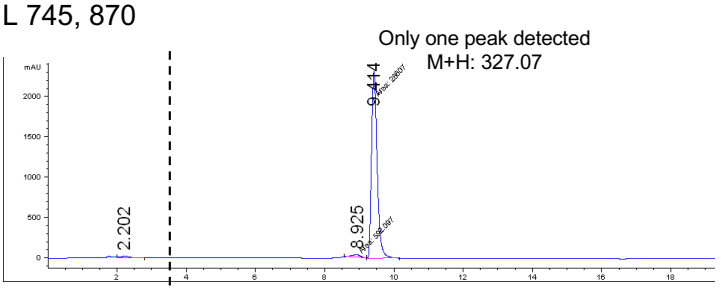
Vesamicol



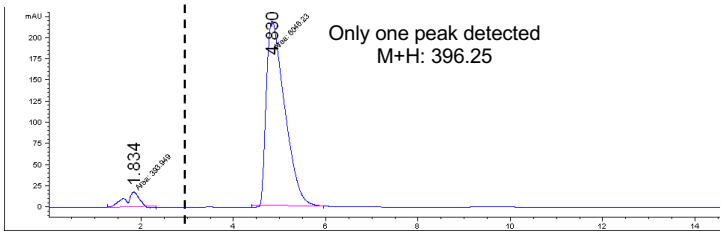
Pramoxine



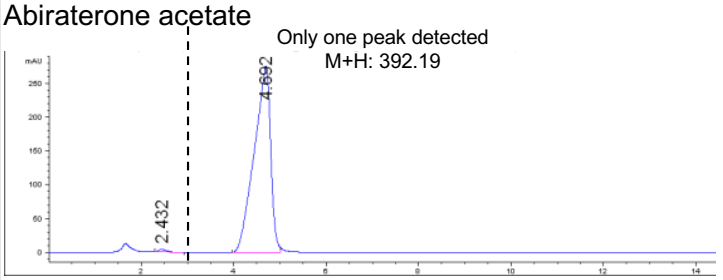
L 745, 870



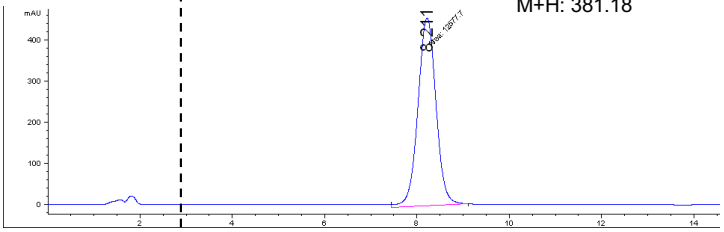
TMB-8



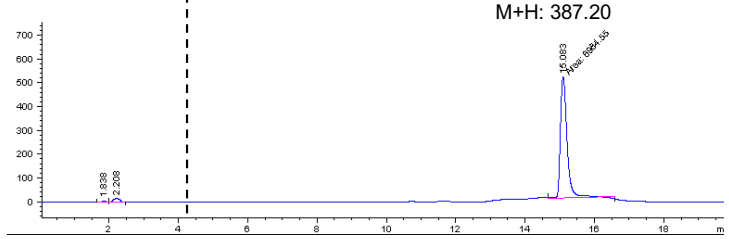
Abiraterone acetate



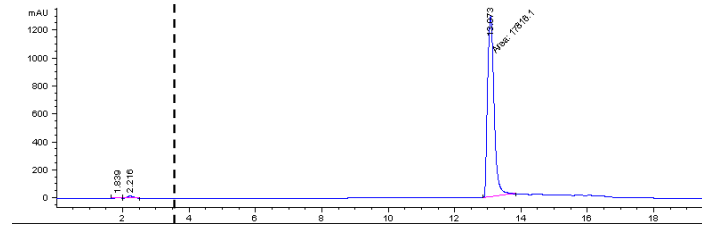
Varespladib



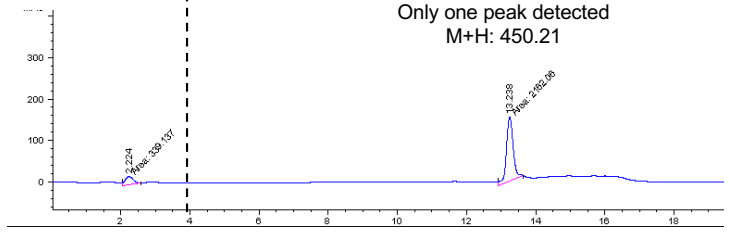
Medroxyprogesterone acetate



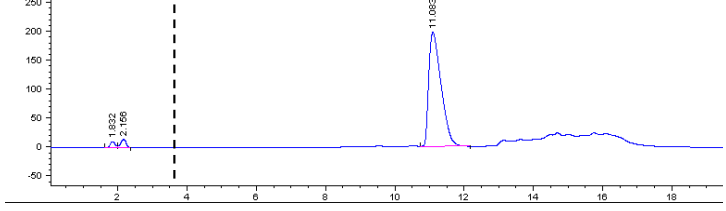
4-Hydroxytamoxifen



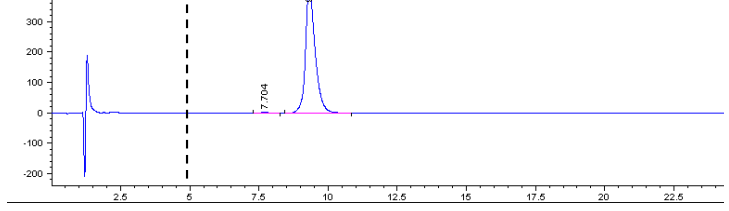
TASIN-449



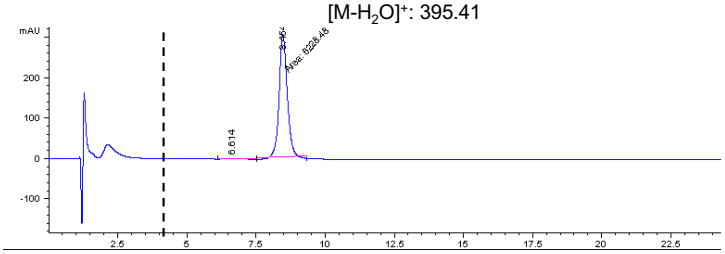
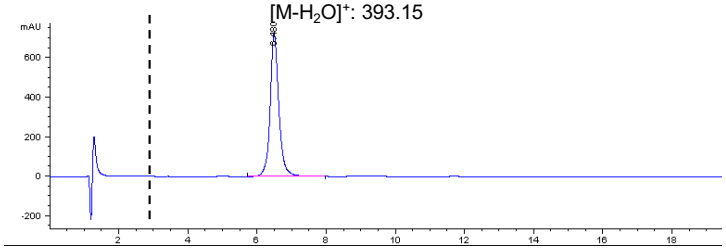
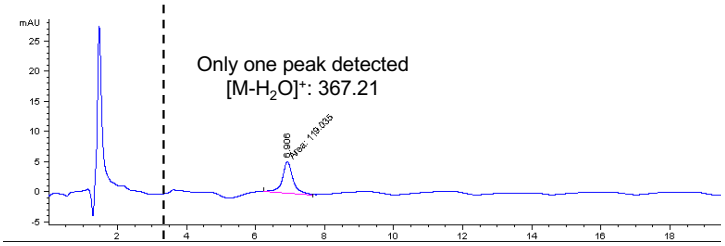
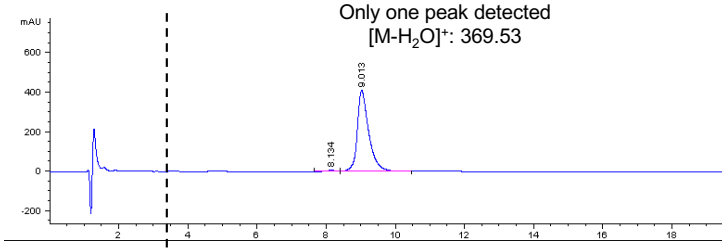
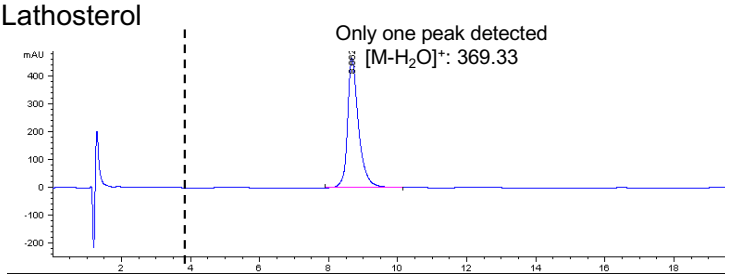
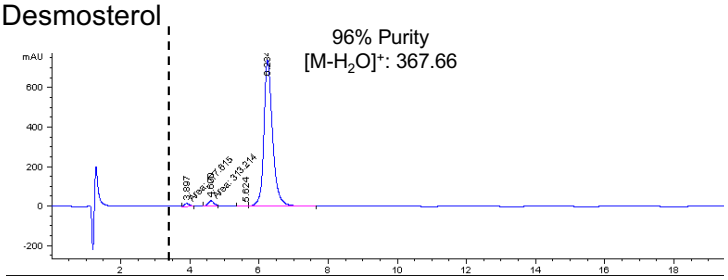
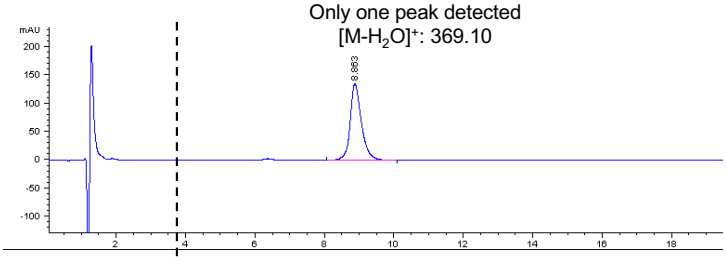
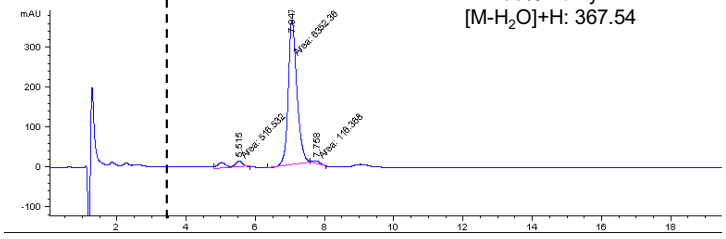
2-Methyl-ketoconazole



Lanosterol



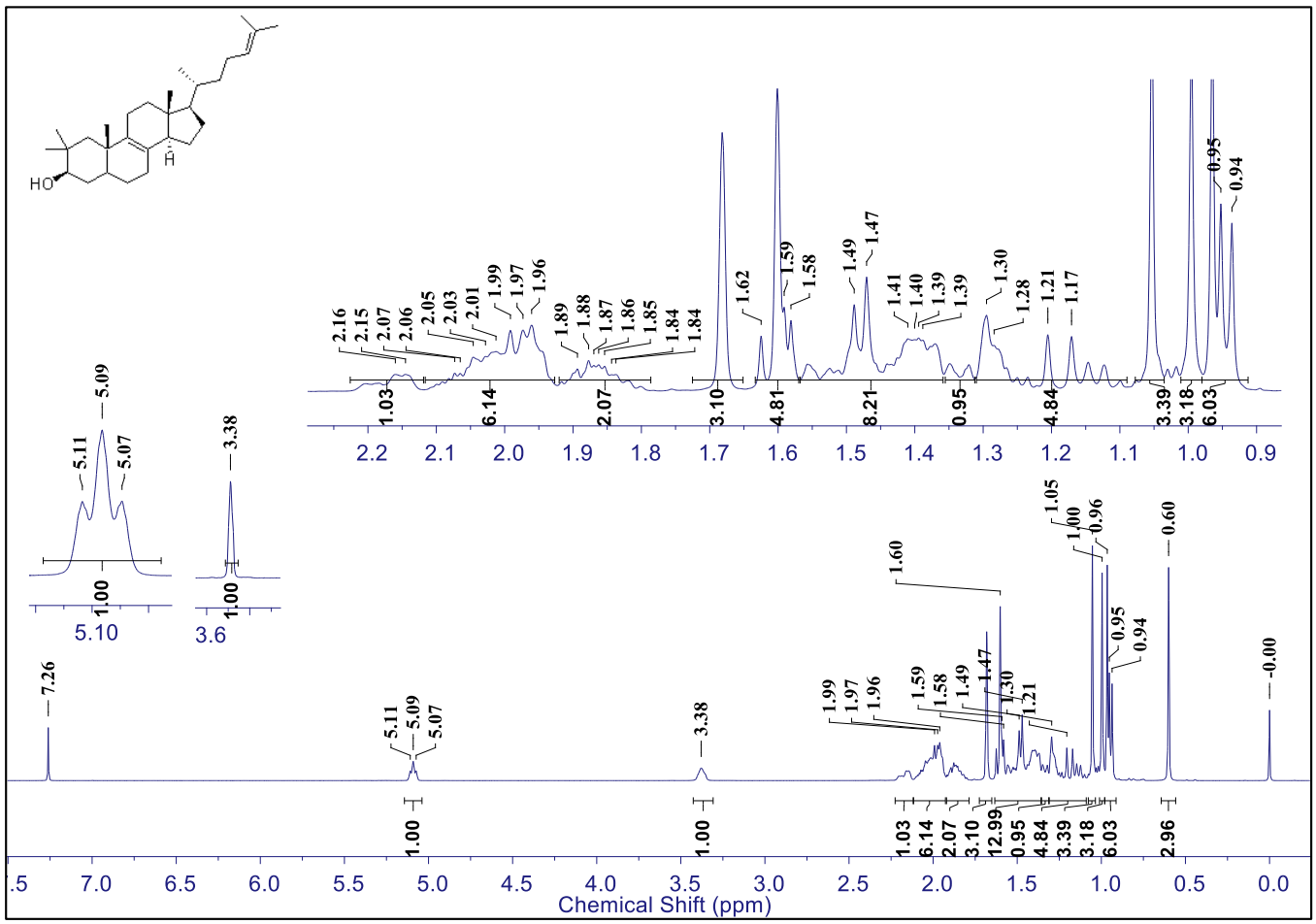
Supporting Information Table 2, continued. Purity of compounds estimated using liquid chromatography-mass spectrometry (LC-MS).

2,2-Me-Zymosterol Only one peak detected $[M-H_2O]^+$: 395.41 	FF-MAS Only one peak detected $[M-H_2O]^+$: 393.15 
14-Dehydrozymostenol Only one peak detected $[M-H_2O]^+$: 367.21 	Zymostenol Only one peak detected $[M-H_2O]^+$: 369.53 
Lathosterol Only one peak detected $[M-H_2O]^+$: 369.33 	Desmosterol 96% Purity $[M-H_2O]^+$: 367.66 
Cholesterol Only one peak detected $[M-H_2O]^+$: 369.10 	8,9-Dehydrocholesterol 93% Purity $[M-H_2O]+H$: 367.54 

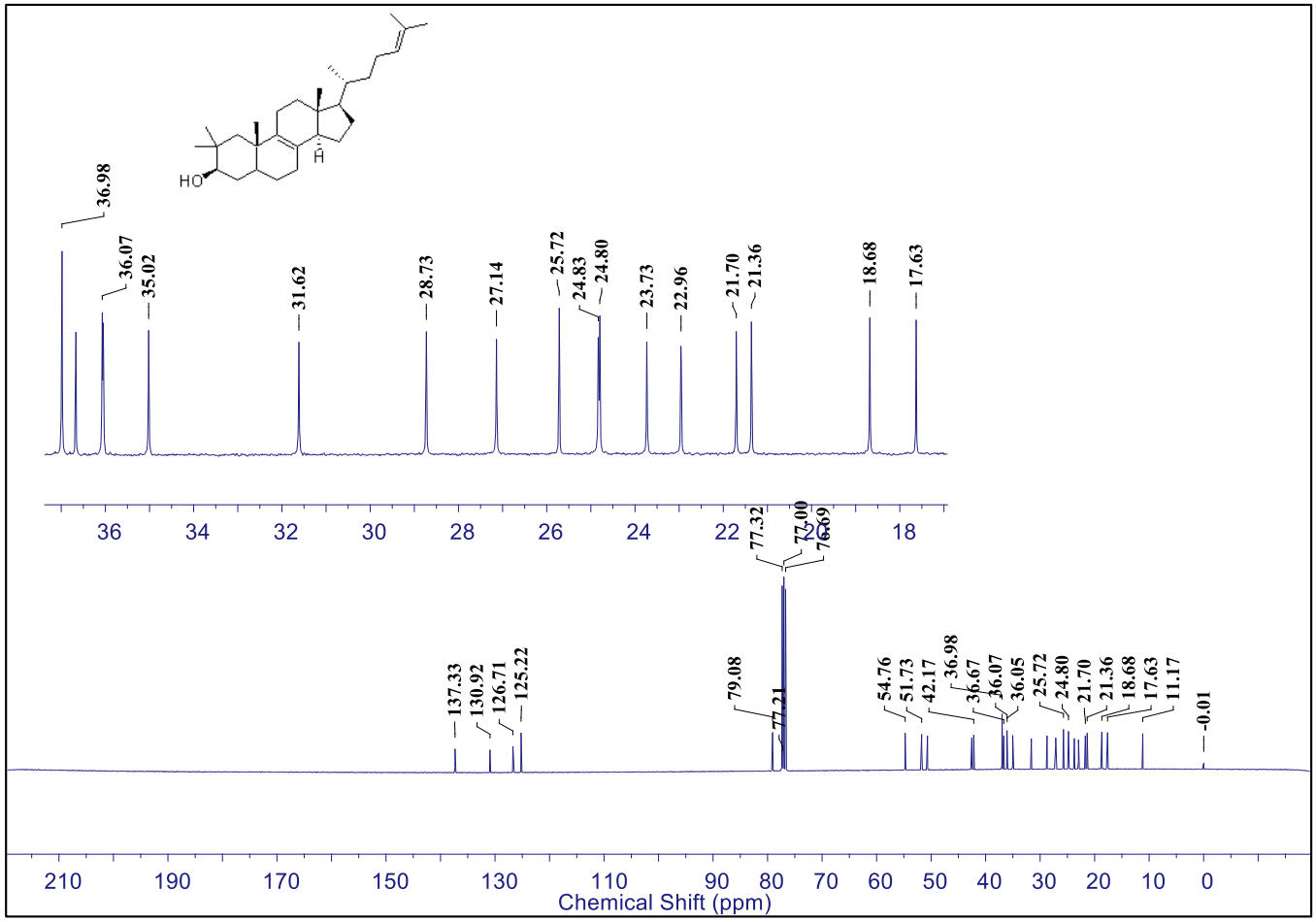
Supporting Table 3. NMR data for 2,2-dimethyl-5α-cholesta-8,24-dien-3β-ol (2,2-Dimethylzymosterol, or 2,2-Me-zymosterol):

^{1}H NMR (400 MHz, $CDCl_3$) δ: 5.09 (t, *J* = 7.0 Hz, 1H), 3.38 (s, 1H), 2.17 (dd, *J* = 16.3, 6.9 Hz, 1H), 2.12 – 1.93 (m, 6H), 1.86 (tt, *J* = 9.8, 8.3 Hz, 2H), 1.68 (s, 3H), 1.63 – 1.36 (m, 13H), 1.33 (d, *J* = 11.2 Hz, 1H), 1.31 – 1.09 (m, 5H), 1.05 (s, 3H), 1.00 (s, 3H), 0.98 – 0.91 (m, 6H), 0.60 (s, 3H). ^{13}C NMR (101 MHz, $CDCl_3$) δ: 137.3, 130.9, 126.7, 125.2, 79.1, 76.7, 54.8, 51.7, 50.7, 42.5, 42.2, 37.0, 36.7, 36.1, 36.0, 35.0, 31.6, 28.7, 27.1, 25.7, 24.8, 24.8, 23.7, 23.0, 21.7, 21.4, 18.7, 17.6, 11.2. MS (ESI, +Ve) for $[C_{29}H_{49}O+H]^+$ Calcd., 413.4, found 413.6.

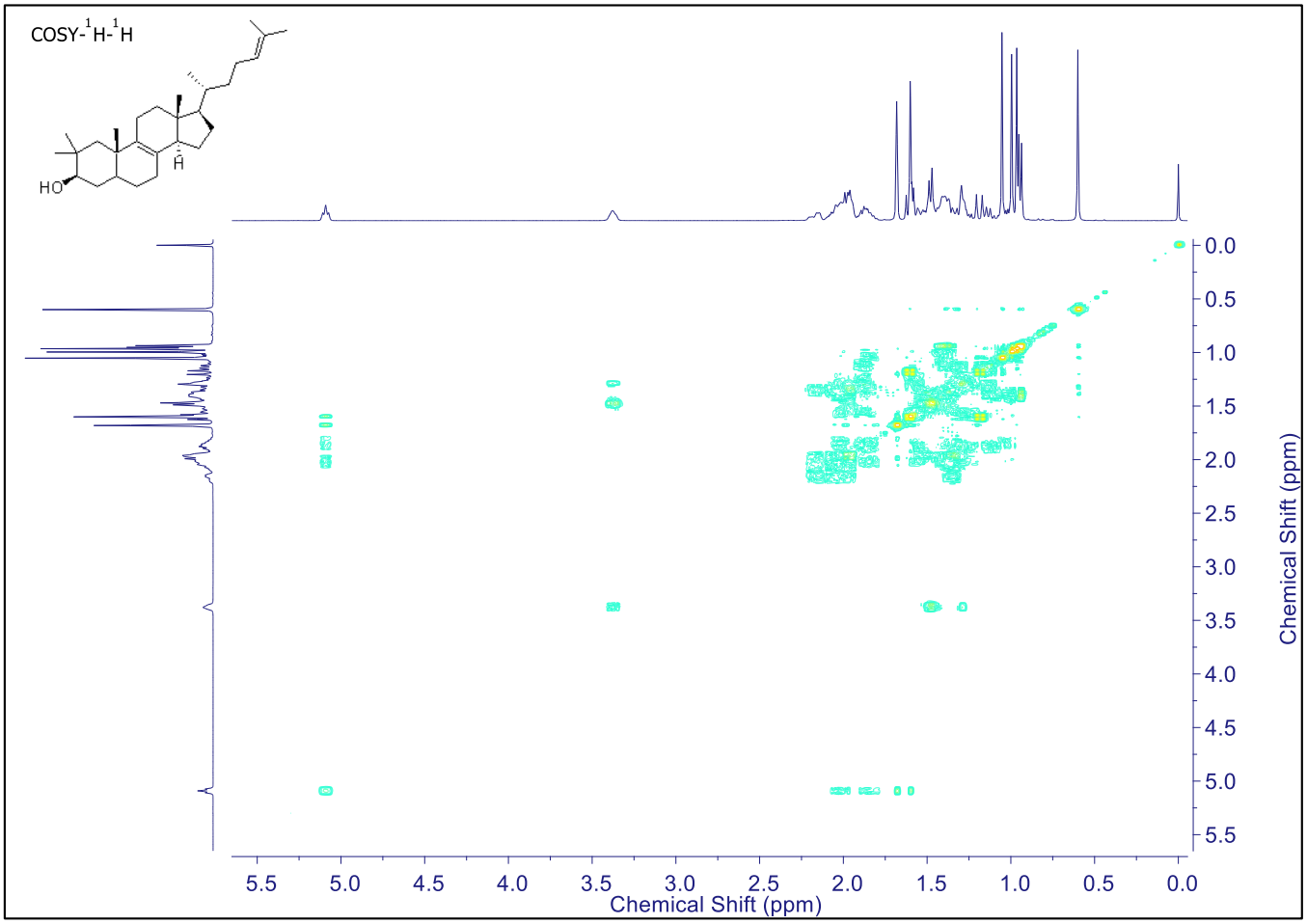
^{1}H NMR of 2,2-Me-Zymosterol

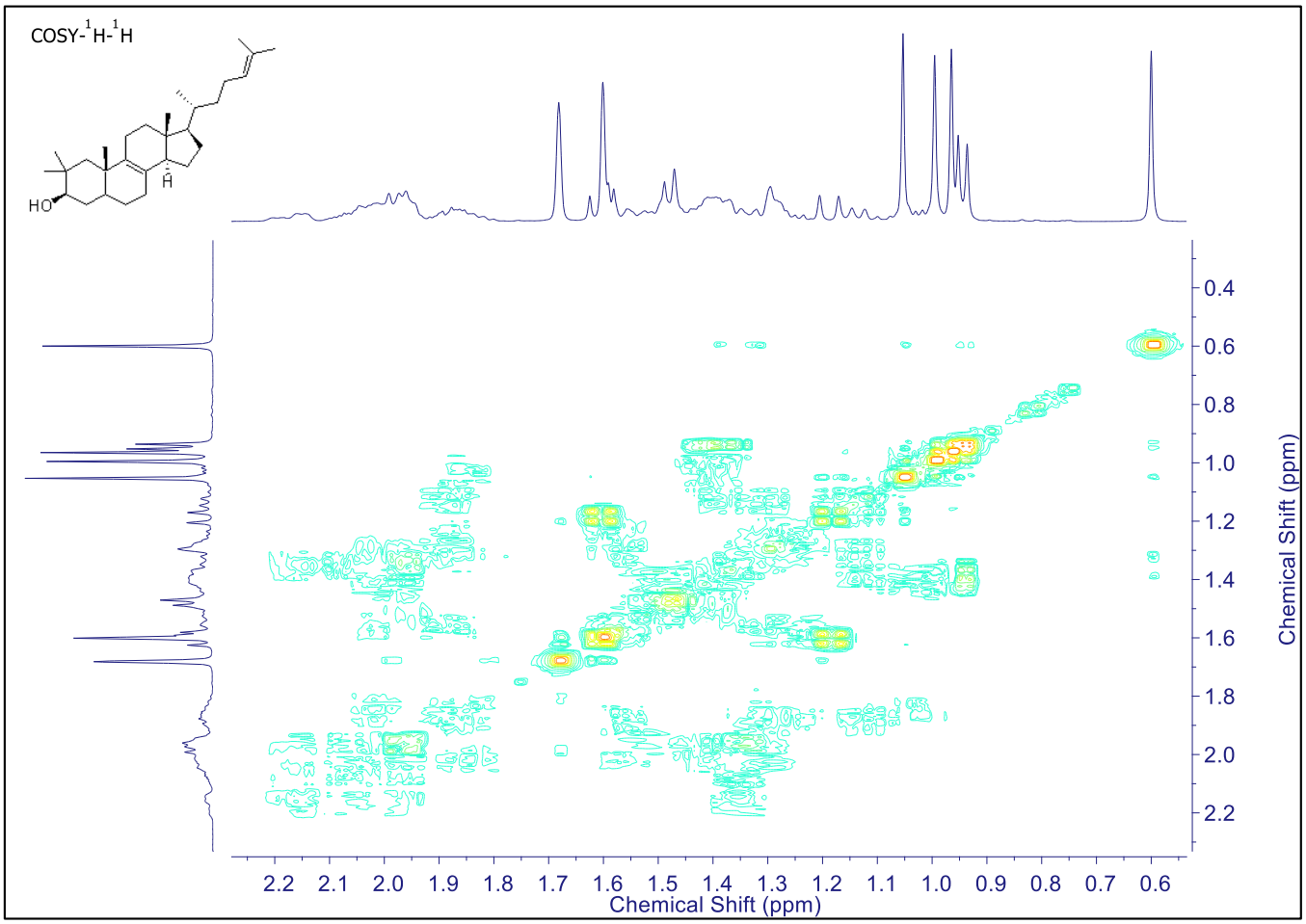


^{13}C NMR of 2,2-Me-Zymosterol

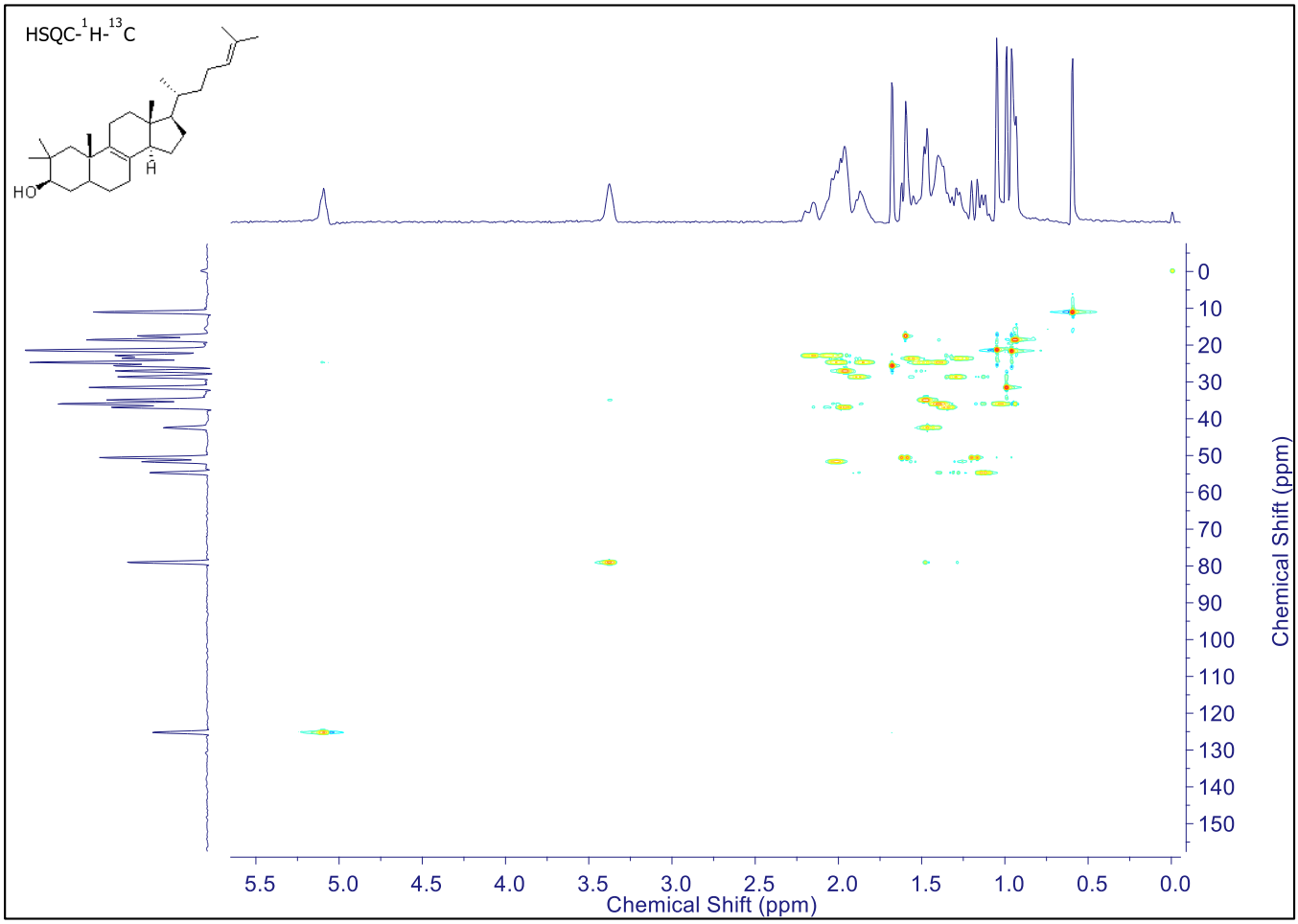


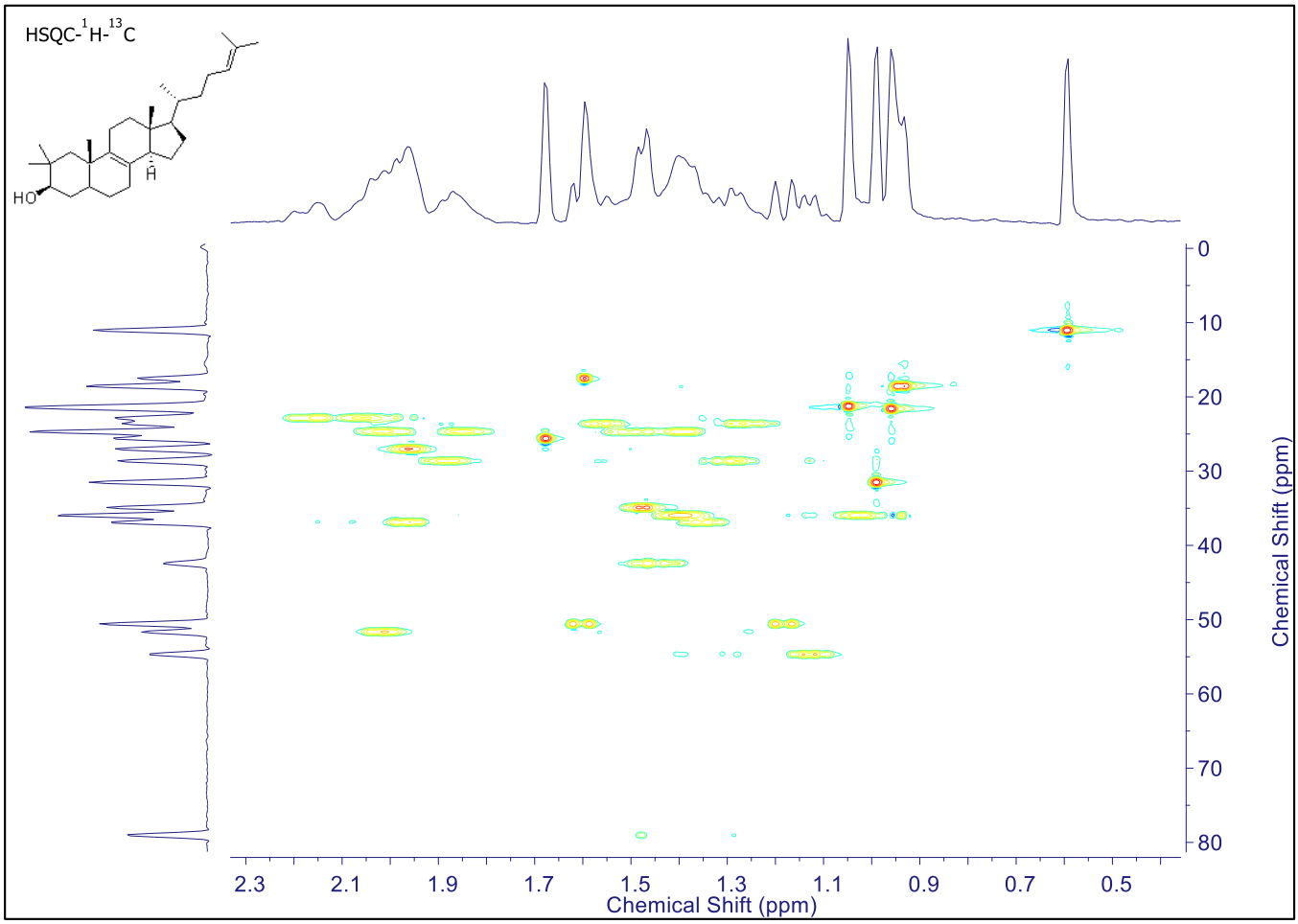
^{1}H-^{1}H COSY of 2,2-Me-Zymosterol





^{1}H-^{13}C HSBC of 2,2-Me-Zymosterol





^{1}H-^{13}C HMBC of 2,2-Me-Zymosterol