Supporting information

Characterization of novel cannabinoid based T-type calcium channel blockers with analgesic effects.

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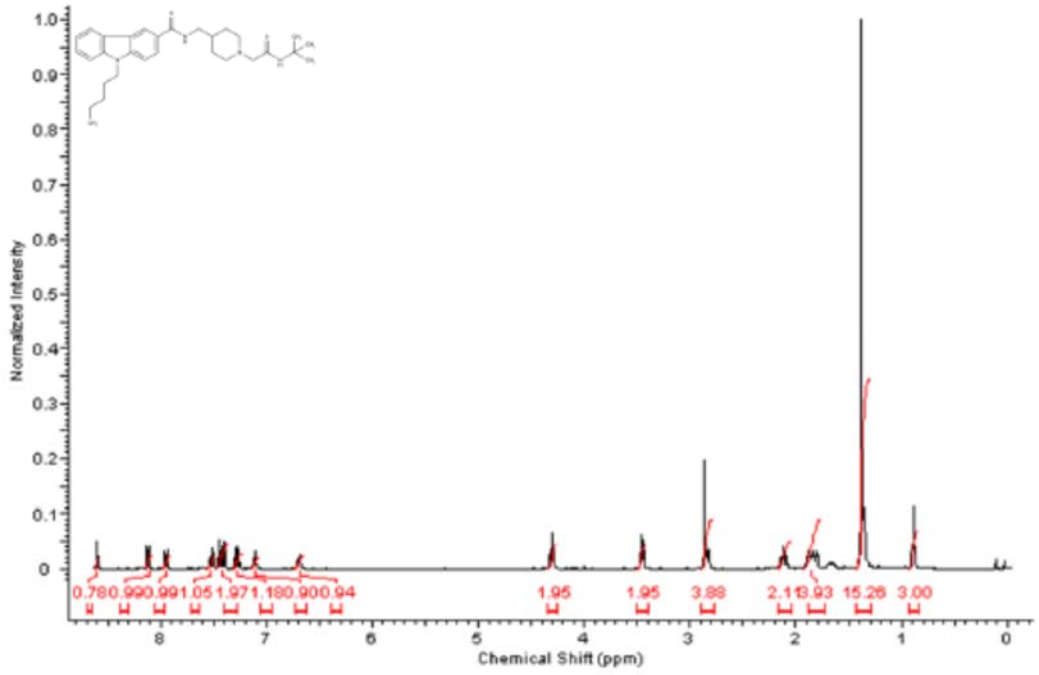
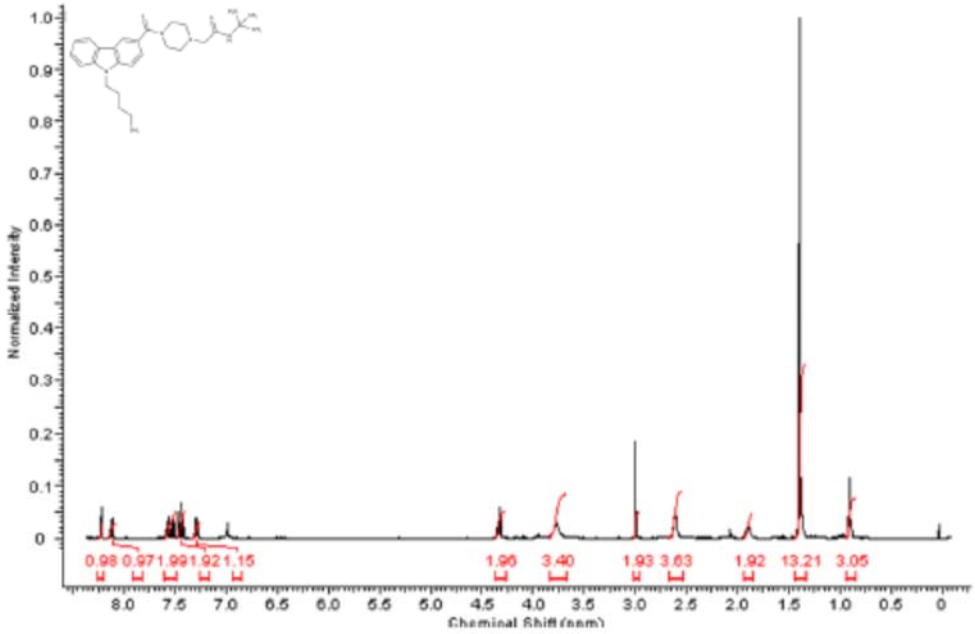


^{1}H-NMR of *N*-tert-butyl-2-[4-(9-pentyl-9H-carbazole-3-carbonyl)piperazin-1-yl]acetamide (10)



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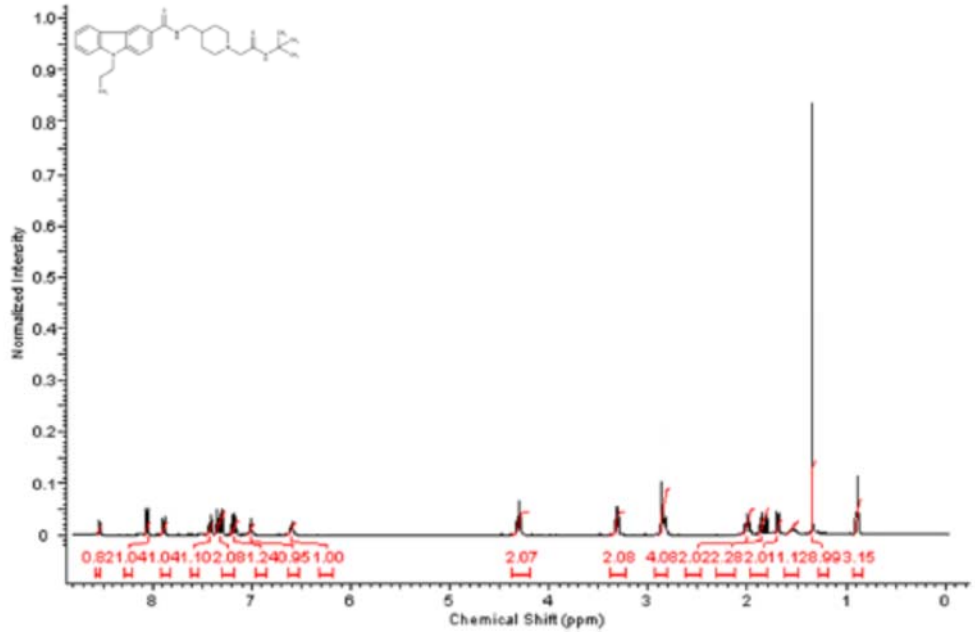
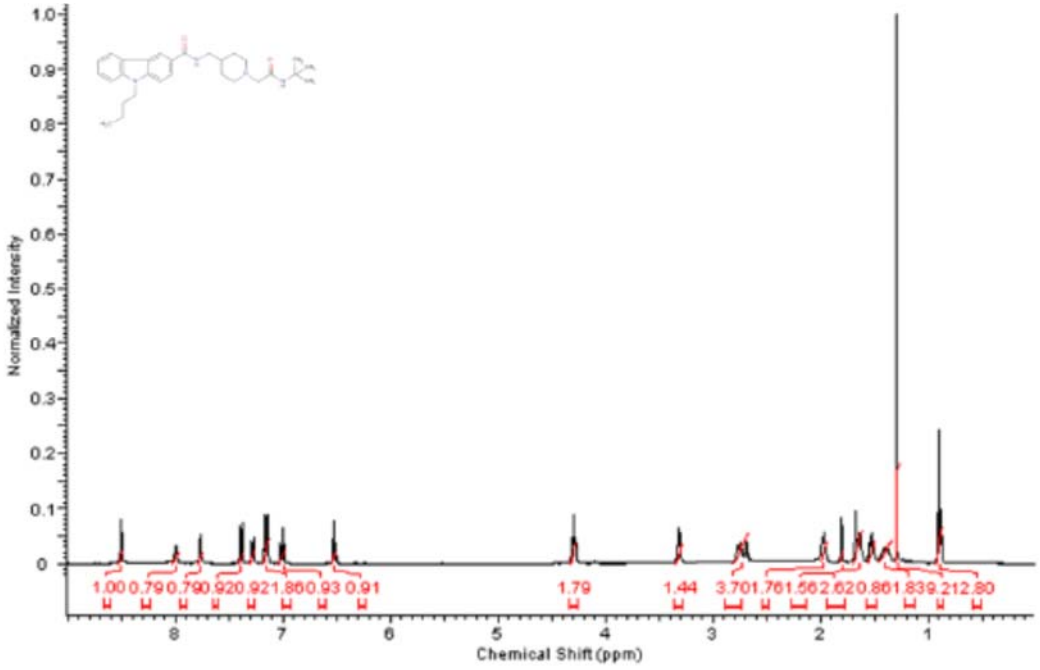
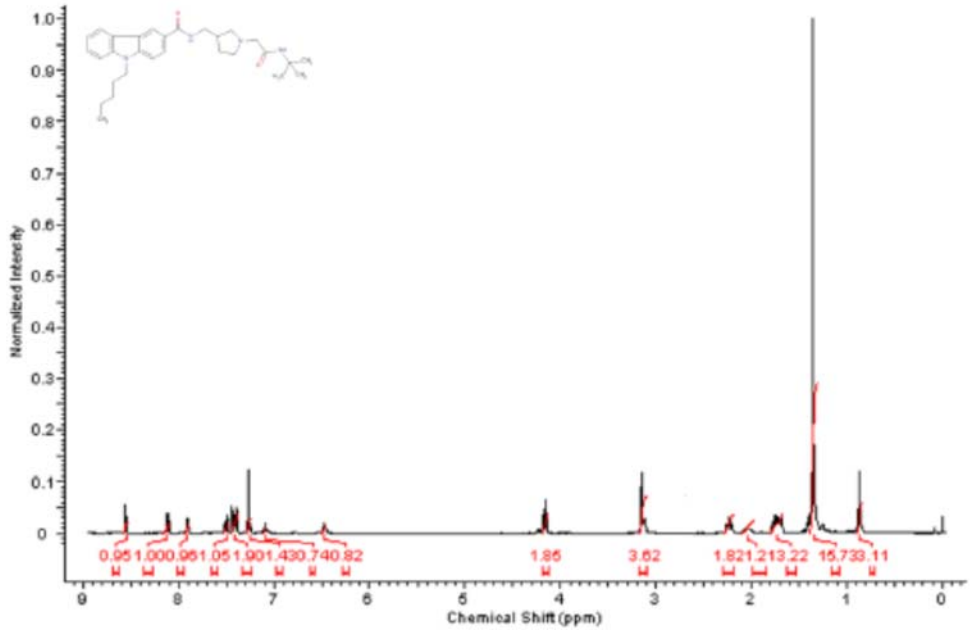


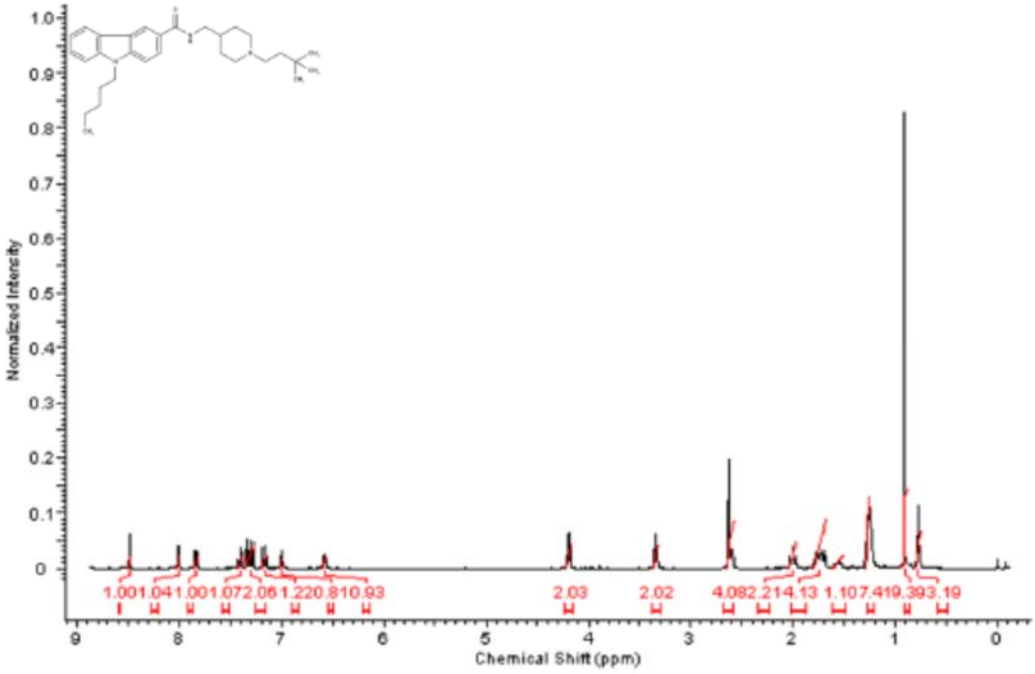
^{1}H-NMR of *N*-((1-(2-(tert-butylamino)-2-oxoethyl)piperidin-4-yl)methyl)-9-butyl-9H-carbazole-3-carboxamide (16)



^{1}H-NMR of *N*-((1-(2-(*tert*-butylamino)-2-oxoethyl)pyrrolidin-4-yl)methyl)-9-pentyl-9*H*-carbazole-3-carboxamide (19)



^{1}H-NMR of *N*-{[1-(3,3-dimethylbutyl)piperidin-4-yl]methyl}-9-pentyl-9H-carbazole-3-carboxamide (20)



LC/MS analyses

LC/MS analyses were obtained on a Waters ACQUITY UPLC-series liquid chromatography system equipped with a diode array detector and a Waters Quattro Premier Tandem Quadrupole mass spectrometer (ionization type electrospray). The liquid chromatrography conditions were as follows: a Waters ACQUITY UPLC column (BEH, C18, 1.7 um, 1.0x100 mm) was used, and it was eluted with a gradient made up of two solvent mixtures. Solvent A consisted of water and 0.2% formic acid. Solvent B consisted of methanol. The gradient was processed as follows:

Time (min)	Flow (ml/min)	%A	%B
Initial	0.200	90.0	10.0
1.00	0.200	90.0	10.0
8.00	0.200	5.0	95.0
12.00	0.200	5.0	95.0
12.10	0.200	90.0	10.0
15.00	0.200	90.0	10.0

Compound purity was assigned on the basis of 254-nM detection data assessed by comparing relative peak areas of the signals.

Compound	Molecular weight	$MW+H^+$	Purity (%)	Retention Time (min)
16	477.32	477.32	98	9.33
13	463.31	463.31	96	9.12
19	477.33	477.32	97	9.01
10	463.28	463.31	96	8.47
9	491.34	491.34	98	6.35
20	462.35	462.35	96	8.12