Table: Analytical data of the bis(ammonio)alkane compounds.

no.	Anal. (mol wt)	mp (°C)	IR (ν, cm^{-1})
1b	($C_{34}H_{48}Br_2N_4O_4$) C,H,N 736.6	223-226	2960, 1760, 1710, 1610, 1380, 730
1c	($C_{36}H_{52}Br_2N_4O_4$) C,H,N 764.7	237-238 (dec.)	2960, 1770, 1710, 1610, 1390, 730
2a	($C_{33}H_{46}Br_2N_4O_4$) C,H,N 722.6	239	2950, 1770, 1710, 1405, 1380, 730
2b	($C_{35}H_{50}Br_2N_4O_4$) C,H,N 750.6	198-200	2960, 1770, 1710, 1610, 1460, 1380, 720
2c	($C_{35}H_{50}Br_2N_4O_4$) C,H,N 750.6	208-210	2940, 1760, 1710, 1610, 1360, 730
3a	($C_{34}H_{48}Br_2N_4O_4$) C,H,N 736.6	238	2970, 1765, 1700, 1370, 740
3b	($C_{36}H_{52}Br_2N_4O_4$) C,H,N 764.6	119-121	2940, 1760, 1700, 1610, 1380, 870, 740
3c	($C_{38}H_{56}Br_2N_4O_4$) C,H,N 792.7	198-200 (dec.)	2960, 1760, 1610, 1380, 1080, 740

Table: ^{1}H NMR data of the bis(ammonio)alkane compounds (δ (ppm), DMSO-d_6); s, singlet; d, doublet; t, triplet; q, quartet; m, multiplet.

no.	**1b**	**1c**	**2a**	**2b**	**2c**	**3a**	**3b**	**3c**
phth-CH_3	-	-	2.48 (s)	2.48* (s)	2.48* (s)	2.48 (s)	2.48* (s)	2.49 (s)
phth	7.83-7.91 (m)	7.84-7.94 (m)	7.64-7.86 (m)	7.64-7.78; 7.83-7.89 (m)	7.63-7.88 (m)	7.60-7.67 (m) 7.73 (d)	7.63-7.77 (m)	7.65 (d) 7.70 (s) 7.77 (d)
N-CH_2-	3.49 (m) 3.66 (t)	3.50 (m)	3.64 (m)	3.48 (m) 3.65 (t)	3.50 (m) 3.64 (t)	3.63 (t, 6.3)	3.48 (m) 3.63 (t)	3.49 (m)
N-CH_2-$\underline{CH_2}$	2.06 (m)	-	2.06 (m)	2.07 (m)	2.06 (m)	2.05 (m)	2.05 (m)	-
$C(CH_3)_2$-	1.23 (s)	1.23 (s)	-	1.22 (s)	1.23 (s)	-	1.22 (s)	1.22 (s)
CH_2-N^+	3.41 (m)	3.39 (m)	3.36 (m)	3.40 (m)	3.42 (m)	3.42 (m)	3.36 (m) 3.43 (m)	3.43 (m)
$N^+(CH_3)_2$	3.03 (s) 3.17 (s)	3.18 (s)	3.02 (s)	3.03 (s) 3.18 (s)	3.04(s) 3.18(s)	3.03 (s)	3.03 (s) 3.18 (s)	3.18 (s)
N^+-CH_2	3.27 (m) 3.35 (m)	3.27 (m)	3.27 (m)	3.30 (m) 3.33 (m)	3.28 (m)	3.27 (m)	3.28 (m) 3.29 (m)	3.29 (s)
N^+-CH_2-$\underline{CH_2}$	1.72 (m)	1.77 (m)	1.65 (m)	1.76 (m)	1.72 (m)	1.66 (m)	1.72 (m)	1.78 (m)
N^+-CH_2-CH_2-$\underline{CH_2}$-	1.32 (m)	1.29 (m)	1.29 (m)	1.32 (m)	1.32 (m)	1.30 (m)	1.32 (m)	1.35 (m)

*partially hidden by DMSO-d_6 signal

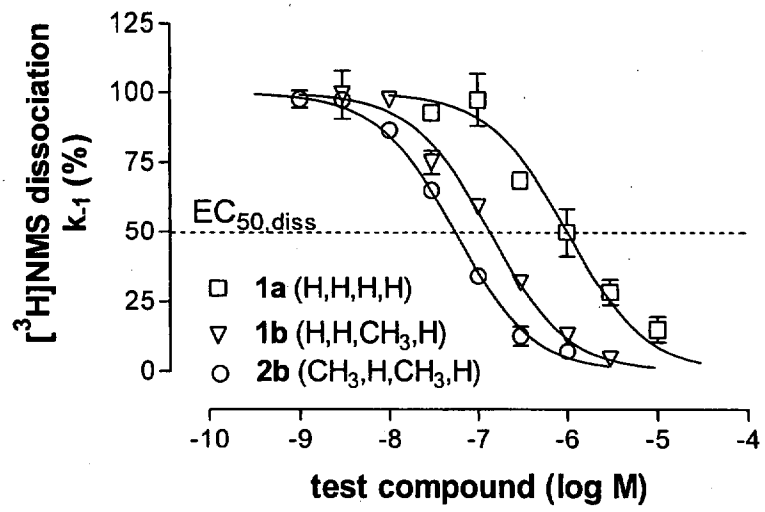

Figure: Concentration/effect-curves for the inhibition of [^{3}H]NMS dissociation by the indicated test compounds. Ordinate: apparent rate constant k_{-1} of [^{3}H]NMS dissociation from muscarinic M_2 receptors expressed as percentage of the control value. Abscissa: concentration of the test compound. Indicated are mean values ± S.E.M. of three independent experiments. Error bars are not shown when they are smaller than the symbols. Sigmoidal curve fitting. Slope factors n_H were not significantly different from unity ($P>0.05$, F-test).

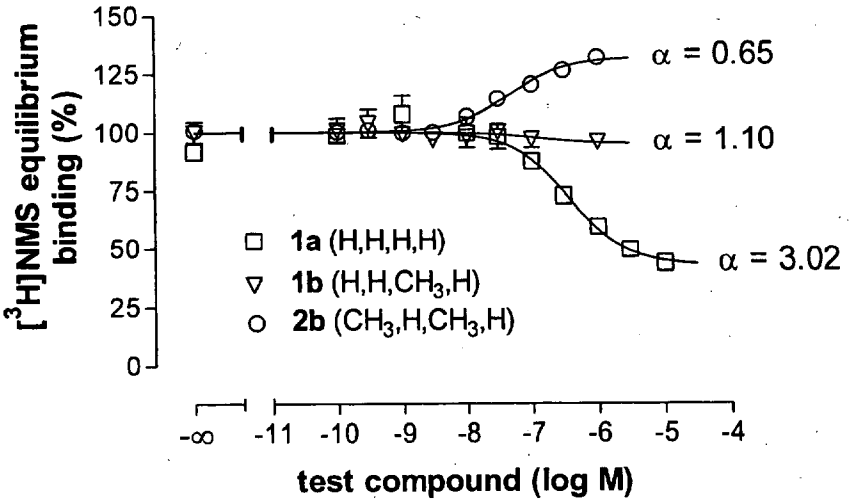

Figure: Effects of the indicated test compounds on the equilibrium binding of [^{3}H]NMS. Ordinate: specific [^{3}H]NMS binding in percent of the control value in the absence of test compound as indicated by the starting value of the binding curve. Abscissa: concentration of the test compound. Indicated are mean values ± S.E.M. of three independent experiments. Error bars are not shown when they are smaller than the symbols. Curve fitting was based on the ternary complex model of allosteric interactions. α is the factor of cooperativity between the allosteric agent and [^{3}H]NMS.