

Table 1: Connectivity parameters for the waking state of the mean-field model of the basal ganglia-thalamo-cortical system, derived using Bayesian-genetic optimization.

	<b>Axonal range (r)</b>	<b>Damping rate (<math>\gamma</math>)</b>	<b>Synapto-dendritic Decay Rate (<math>\alpha</math>)</b>	<b>Synapto-dendritic Rise Rate (<math>\beta</math>)</b>	<b>Axonal delay (<math>\tau</math>)</b>	<b>Connection strength</b>
<b>Exc. <math>\rightarrow</math> Exc.</b>	0.12278	220.0791	85.9279	322	0.0062323	0.0018327
<b>Inh. <math>\rightarrow</math> Exc.</b>			42.555	281	0.04334	-0.0013089
<b>Relay <math>\rightarrow</math> Exc.</b>			220.8828	193	0.028104	0.00071992
<b>Exc. <math>\rightarrow</math> Inh.</b>	0.22666	232.1854	85.7514	175.0493	0.00037033	0.0011322
<b>Inh. <math>\rightarrow</math> Inh.</b>			113.6299	620	0.033074	-0.00050632
<b>Relay <math>\rightarrow</math> Inh.</b>			129.4099	555	0.025181	0.0003415
<b>GPe <math>\rightarrow</math> Inh.</b>			75.6795	205.7867	0.034081	-0.0000168
<b>Exc. <math>\rightarrow</math> TRN</b>	0.17182	73	45.089	492	0.036522	0.00029379
<b>Relay <math>\rightarrow</math> TRN</b>			187	791	0.0022316	0.0000157
<b>GPe <math>\rightarrow</math> TRN</b>			159.0547	153.6758	0.047298	-0.00032958
<b>Exc. <math>\rightarrow</math> Relay</b>	0.218	137.9915	44.8479	483.8873	0.022911	0.00048973
<b>TRN <math>\rightarrow</math> Relay</b>			182	129.5577	0.0017706	-0.00033052
<b>GPi <math>\rightarrow</math> Relay</b>			162.841	347.9839	0.0014159	-0.000024
<b>GPe <math>\rightarrow</math> Relay</b>			63.8256	914.7857	0.0090983	-0.0002165
<b>Exc. <math>\rightarrow</math> D1</b>	0.1188	23	152.7024	258	0.00069557	0.00080197
<b>Relay <math>\rightarrow</math> D1</b>			143.3016	521.6289	0.0015367	0.0000963
<b>D1 <math>\rightarrow</math> D1</b>			122	262.8843	0.002218	-0.0001518
<b>GPe <math>\rightarrow</math> D1</b>			78.6903	270.8312	0.03725	-0.0000887
<b>Exc. <math>\rightarrow</math> D2</b>	0.071609	143	125	597.8874	0.00069498	0.00071134
<b>Relay <math>\rightarrow</math> D2</b>			53.1836	390	0.002088	0.0000248
<b>D2 <math>\rightarrow</math> D2</b>			74.6389	435.8297	0.029915	-0.00024613
<b>GPe <math>\rightarrow</math> D2</b>			67.8765	294.734	0.045457	-0.00045438
<b>D1 <math>\rightarrow</math> GPi</b>			116.0711	630.4158	0.0012356	-0.0000831
<b>GPe <math>\rightarrow</math> GPi</b>			148.6143	403.3654	0.0006374	-0.0000316
<b>STN <math>\rightarrow</math> GPi</b>			51.749	255.38	0.001192	0.00018528
<b>D2 <math>\rightarrow</math> GPe</b>			23.4433	311	0.00061974	-0.00021758
<b>GPe <math>\rightarrow</math> GPe</b>			79.2077	367.7875	0.0027569	-0.00010213
<b>STN <math>\rightarrow</math> GPe</b>			127.4022	483.2848	0.00043817	0.00023124
<b>Exc. <math>\rightarrow</math> STN</b>	0.086406	95	136	730	0.00074221	0.00010993
<b>GPe <math>\rightarrow</math> STN</b>			118.5557	314	0.00059721	-0.0000276

Table 2: Population parameters for the waking state of the mean-field model of the basal ganglia-thalamo-cortical system, derived using Bayesian-genetic optimization.

	<b>Maximum firing rate (Q)</b>	<b>Firing threshold (<math>\theta</math>)</b>	<b>Firing threshold spread (<math>\sigma</math>)</b>
<b>Cortex (excitatory)</b>	228.0316	0.029706	0.0012552
<b>Cortex (inhibitory)</b>	249	0.011629	0.0045276
<b>TRN</b>	751.9918	0.0013855	0.0029211
<b>Relay</b>	466	0.0034528	0.0043363
<b>D1</b>	97.0027	0.0056627	0.0039531
<b>D2</b>	13.5585	0.0084425	0.0031499
<b>GPI</b>	222.0355	0.0036668	0.0045221
<b>GPe</b>	202.0382	0.0047459	0.0027718
<b>STN</b>	255.7239	0.011212	0.0041919

Table 3: Connectivity parameters for the anesthesia state of the mean-field model of the basal ganglia-thalamo-cortical system, derived using genetic optimization.

	<b>Axonal range (r)</b>	<b>Damping rate (<math>\gamma</math>)</b>	<b>Synapto-dendritic Decay Rate (<math>\alpha</math>)</b>	<b>Synapto-dendritic Rise Rate (<math>\beta</math>)</b>	<b>Axonal delay (<math>\tau</math>)</b>	<b>Connection strength</b>
<b>Exc. <math>\rightarrow</math> Exc.</b>	0.13371	365.323	153.1084	140.2695	0.0077477	0.001194
<b>Inh. <math>\rightarrow</math> Exc.</b>			42.555	150.1111	0.060006	-0.0015235
<b>Relay <math>\rightarrow</math> Exc.</b>			111.9569	223.3302	0.029002	0.00030845
<b>Exc. <math>\rightarrow</math> Inh.</b>	0.24992	284.4327	134.7121	175.0493	0.00037033	0.0011322
<b>Inh. <math>\rightarrow</math> Inh.</b>			115.707	901.3049	0.033074	-0.00050632
<b>Relay <math>\rightarrow</math> Inh.</b>			129.4099	512.0002	0.036616	0.00030238
<b>GPe <math>\rightarrow</math> Inh.</b>			121.6404	205.7867	0.043839	-1.68E-05
<b>Exc. <math>\rightarrow</math> TRN</b>	0.17182	73	45.8769	466.2431	0.015442	0.00015174
<b>Relay <math>\rightarrow</math> TRN</b>			41.5367	414.209	0.0012636	1.57E-05
<b>GPe <math>\rightarrow</math> TRN</b>			312.1321	1146.8432	0.037738	-0.00032958
<b>Exc. <math>\rightarrow</math> Relay</b>	0.14701	137.9915	42.8395	317.922	0.012198	0.00039605
<b>TRN <math>\rightarrow</math> Relay</b>			36.5624	363.0627	0.00085722	-0.00033052
<b>GPI <math>\rightarrow</math> Relay</b>			186.0943	158.6022	0.0014159	-2.40E-05
<b>GPe <math>\rightarrow</math> Relay</b>			162.841	347.9839	0.0090983	-0.0002165
<b>Exc. <math>\rightarrow</math> D1</b>	0.1188	17.0626	190.1072	131.2923	0.00069557	0.00078156
<b>Relay <math>\rightarrow</math> D1</b>			54.443	166.2305	0.0014043	0.00010744
<b>D1 <math>\rightarrow</math> D1</b>			66.048	773.6346	0.002218	-0.00013107
<b>GPe <math>\rightarrow</math> D1</b>			130.4614	305.148	0.03725	-6.46E-05
<b>Exc. <math>\rightarrow</math> D2</b>	0.071609	130.8712	53.4017	1381.7241	0.00069498	0.00071134
<b>Relay <math>\rightarrow</math> D2</b>			67.268	829.9581	0.0017657	2.48E-05
<b>D2 <math>\rightarrow</math> D2</b>			72.0903	390	0.029915	-0.00039284
<b>GPe <math>\rightarrow</math> D2</b>			135.9065	665.8283	0.045457	-0.00036314
<b>D1 <math>\rightarrow</math> GPI</b>			14.8752	725	0.0005457	-8.31E-05
<b>GPe <math>\rightarrow</math> GPI</b>			54.7637	630.4158	0.00080621	-2.53E-05
<b>STN <math>\rightarrow</math> GPI</b>			162.144	403.3654	0.0019464	5.48E-05
<b>D2 <math>\rightarrow</math> GPe</b>			37	710	0.00040424	-0.00028375
<b>GPe <math>\rightarrow</math> GPe</b>			23.4433	153.0925	0.0014851	-0.00022676
<b>STN <math>\rightarrow</math> GPe</b>			185.906	549.1626	0.00043817	0.00025348
<b>Exc. <math>\rightarrow</math> STN</b>	0.021519	52.1657	112.8993	659	0.0010297	0.0001557
<b>GPe <math>\rightarrow</math> STN</b>			67.564	730	0.00053249	-2.76E-05

Table 4: Population parameters for the anesthesia state of the mean-field model of the basal ganglia-thalamo-cortical system, derived using genetic optimization.

	<b>Maximum firing rate (Q)</b>	<b>Firing threshold (<math>\theta</math>)</b>	<b>Firing threshold spread (<math>\sigma</math>)</b>
<b>Cortex (excitatory)</b>	228.0316	0.054464	0.0011733
<b>Cortex (inhibitory)</b>	382.426	0.011629	0.0021614
<b>TRN</b>	1140.8187	0.0029636	0.0026014
<b>Relay</b>	466	0.0034528	0.0043363
<b>D1</b>	46.883	0.0072807	0.0063121
<b>D2</b>	13.5585	0.0084425	0.0037879
<b>GPI</b>	294.5833	0.0036668	0.0056883
<b>GPe</b>	131.961	0.0047459	0.0062872
<b>STN</b>	389.4177	0.011212	0.0041919

Table 5: Connectivity parameters for the generalized spike-and-wave seizure state of the mean-field model of the basal ganglia-thalamo-cortical system, derived using genetic optimization.

	<b>Axonal range (r)</b>	<b>Damping rate (<math>\gamma</math>)</b>	<b>Synapto-dendritic Decay Rate (<math>\alpha</math>)</b>	<b>Synapto-dendritic Rise Rate (<math>\beta</math>)</b>	<b>Axonal delay (<math>\tau</math>)</b>	<b>Connection strength</b>
<b>Exc. <math>\rightarrow</math> Exc.</b>	0.12278	220.0791	85.9279	322	0.0062323	0.0018327
<b>Inh. <math>\rightarrow</math> Exc.</b>			42.555	281	0.04334	-0.0013089
<b>Relay <math>\rightarrow</math> Exc.</b>			220.8828	193	0.028104	0.00071992
<b>Exc. <math>\rightarrow</math> Inh.</b>	0.22666	232.1854	85.7514	175.0493	0.00037033	0.0011322
<b>Inh. <math>\rightarrow</math> Inh.</b>			113.6299	620	0.033074	-0.00050632
<b>Relay <math>\rightarrow</math> Inh.</b>			129.4099	555	0.025181	0.0003415
<b>GPe <math>\rightarrow</math> Inh.</b>			75.6795	205.7867	0.034081	-0.0000168
<b>Exc. <math>\rightarrow</math> TRN</b>	0.17182	73	45.089	492	0.036522	0.00029379
<b>Relay <math>\rightarrow</math> TRN</b>			187	791	0.0022316	0.0000157
<b>GPe <math>\rightarrow</math> TRN</b>			159.0547	153.6758	0.047298	-0.00032958
<b>Exc. <math>\rightarrow</math> Relay</b>	0.218	137.9915	44.8479	483.8873	0.022911	0.00048973
<b>TRN <math>\rightarrow</math> Relay</b>			182	129.5577	0.0017706	-0.00033052
<b>GPi <math>\rightarrow</math> Relay</b>			162.841	347.9839	0.0014159	-0.000024
<b>GPe <math>\rightarrow</math> Relay</b>			63.8256	914.7857	0.0090983	-0.0002165
<b>Exc. <math>\rightarrow</math> D1</b>	0.1188	23	152.7024	258	0.00069557	0.00080197
<b>Relay <math>\rightarrow</math> D1</b>			143.3016	521.6289	0.0015367	0.0000963
<b>D1 <math>\rightarrow</math> D1</b>			122	262.8843	0.002218	-0.0001518
<b>GPe <math>\rightarrow</math> D1</b>			78.6903	270.8312	0.03725	-0.0000887
<b>Exc. <math>\rightarrow</math> D2</b>	0.071609	143	125	597.8874	0.00069498	0.00071134
<b>Relay <math>\rightarrow</math> D2</b>			53.1836	390	0.002088	0.0000248
<b>D2 <math>\rightarrow</math> D2</b>			74.6389	435.8297	0.029915	-0.00024613
<b>GPe <math>\rightarrow</math> D2</b>			67.8765	294.734	0.045457	-0.00045438
<b>D1 <math>\rightarrow</math> GPi</b>			116.0711	630.4158	0.0012356	-0.0000831
<b>GPe <math>\rightarrow</math> GPi</b>			148.6143	403.3654	0.0006374	-0.0000316
<b>STN <math>\rightarrow</math> GPi</b>			51.749	255.38	0.001192	0.00018528
<b>D2 <math>\rightarrow</math> GPe</b>			23.4433	311	0.00061974	-0.00021758
<b>GPe <math>\rightarrow</math> GPe</b>			79.2077	367.7875	0.0027569	-0.00010213
<b>STN <math>\rightarrow</math> GPe</b>			127.4022	483.2848	0.00043817	0.00023124
<b>Exc. <math>\rightarrow</math> STN</b>	0.086406	95	136	730	0.00074221	0.00010993
<b>GPe <math>\rightarrow</math> STN</b>			118.5557	314	0.00059721	-0.0000276

Table 6: Population parameters for the generalized spike-and-wave seizure state of the mean-field model of the basal ganglia-thalamo-cortical system, derived using genetic optimization.

	<b>Maximum firing rate (Q)</b>	<b>Firing threshold (<math>\theta</math>)</b>	<b>Firing threshold spread (<math>\sigma</math>)</b>
<b>Cortex (excitatory)</b>	210.4443	0.041636	0.00052695
<b>Cortex (inhibitory)</b>	341.408	0.011629	0.0045276
<b>TRN</b>	841.0487	0.0020067	0.0029211
<b>Relay</b>	829.0906	0.0033459	0.0058172
<b>D1</b>	97.0027	0.004253	0.0058384
<b>D2</b>	24.9503	0.010996	0.0044716
<b>GPI</b>	222.0355	0.0022048	0.0059299
<b>GPe</b>	202.0382	0.0042228	0.0027718
<b>STN</b>	255.7239	0.011212	0.0041919