Supplementary Material for: Morphological Diversity Strongly Constrains Synaptic Connectivity and Plasticity

Michael W Reimann

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This supplementary material contains information about connection probabilities and synapse numbers between all excitatory and inhibitory neuron populations in all layers in the model of neocortical connectivity of (Markram et al., 2015).

For all tables:

	postsynaptic layer: type →
presynaptic layer: type ↓	*values*

1 Connection probabilities at 50 μm

Values in %
Mean +- standard deviation of seven statistical instantiations

	L1: inh.	L23: exc.	L23: inh.	L4: exc.	L4: inh.	L5: exc.	L5: inh.	L6: exc.	L6: inh.
L1: inh.	6.4+-0.5	3.6+-0.1	2.0+-0.1	1.0+-0.0	—	3.3+-0.1	—	—	—
L23: exc.	—	6.4+-0.1	5.9+-0.2	7.8+-0.0	3.7+-0.1	9.0+-0.0	1.7+-0.0	1.4+-0.0	—
L23: inh.	2.0+-0.2	10.2+-0.1	9.0+-0.2	4.3+-0.1	2.1+-0.1	5.1+-0.1	0.8+-0.0	0.3+-0.0	0.0+-0.0
L4: exc.	—	0.5+-0.0	0.4+-0.0	7.5+-0.1	5.4+-0.2	12.2+-0.0	3.9+-0.1	2.7+-0.0	—
L4: inh.	0.4+-0.1	2.3+-0.1	1.9+-0.1	7.6+-0.2	6.8+-0.6	6.1+-0.2	2.6+-0.2	1.3+-0.0	0.2+-0.0
L5: exc.	—	—	—	1.3+-0.0	0.7+-0.0	8.8+-0.1	5.7+-0.1	4.5+-0.0	1.6+-0.0
L5: inh.	—	0.5+-0.0	0.5+-0.0	2.9+-0.0	2.8+-0.1	7.9+-0.1	5.3+-0.2	1.7+-0.0	0.5+-0.0
L6: exc.	—	—	—	—	—	1.7+-0.0	0.7+-0.0	11.3+-0.0	8.4+-0.1
L6: inh.	0.2+-0.0	0.4+-0.0	0.3+-0.0	0.8+-0.0	0.6+-0.1	2.4+-0.0	1.8+-0.1	8.1+-0.2	7.2+-0.3

2 Length constant of distance dependent connection probability

Values in μm
Mean +- standard deviation of seven statistical instantiations

	L1: inh.	L23: exc.	L23: inh.	L4: exc.	L4: inh.	L5: exc.	L5: inh.	L6: exc.	L6: inh.
L1: inh.	115+-20	177+-9	193+-13	220+-19	—	269+-20	—	—	—
L23: exc.	—	204+-6	111+-2	142+-0	100+-0	158+-0	120+-1	198+-3	—
L23: inh.	142+-10	118+-1	107+-3	125+-1	119+-2	158+-0	125+-7	211+-12	213+-48
L4: exc.	—	546+-18	253+-15	189+-2	115+-3	149+-0	95+-0	189+-1	—
L4: inh.	195+-25	158+-4	149+-7	148+-5	132+-8	153+-2	122+-6	178+-4	153+-63
L5: exc.	—	—	—	512+-15	213+-22	292+-8	155+-5	177+-1	131+-1
L5: inh.	—	529+-48	445+-89	178+-5	143+-5	219+-7	136+-6	161+-1	155+-7
L6: exc.	—	—	—	—	—	288+-6	186+-4	157+-0	103+-1
L6: inh.	97+-8	176+-13	183+-22	182+-10	168+-15	160+-2	132+-3	136+-3	136+-5

3 Number of synapses

Values in thousands of synapses
Mean +- standard deviation of seven statistical instantiations

	L1: inh.	L23: exc.	L23: inh.	L4: exc.	L4: inh.	L5: exc.	L5: inh.	L6: exc.	L6: inh.
L1: inh.	15+-1	202+-10	31+-1	26+-1	0+-0	245+-14	0+-0	1+-0	0+-0
L23: exc.	6+-0	1078+-20	287+-6	1077+-15	96+-1	2295+-26	112+-2	654+-6	19+-0
L23: inh.	23+-1	1274+-29	294+-11	514+-15	28+-1	1284+-30	17+-1	121+-5	1+-0
L4: exc.	0+-0	179+-2	47+-1	1030+-18	103+-3	2362+-31	168+-2	879+-8	30+-0
L4: inh.	2+-0	174+-9	38+-1	452+-16	39+-1	559+-29	25+-2	164+-7	2+-0
L5: exc.	0+-0	56+-1	14+-0	362+-9	43+-1	3754+-70	339+-7	2324+-35	154+-4
L5: inh.	3+-0	181+-10	43+-2	398+-9	35+-1	1429+-31	93+-2	439+-11	13+-0
L6: exc.	0+-0	30+-1	7+-0	139+-3	14+-0	1177+-14	130+-3	6231+-96	607+-15
L6: inh.	0.2+-0	54+-2	12+-0	91+-5	7+-0	600+-20	52+-2	1523+-45	128+-5

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Synapses per *presynaptic* neuron
Mean +- standard deviation of mean values of seven statistical instantiations

	L1: inh.	L23: exc.	L23: inh.	L4: exc.	L4: inh.	L5: exc.	L5: inh.	L6: exc.	L6: inh.
L1: inh.	46.5+-4.1	597.3+-30.8	93.3+-5.2	76.7+-3.6	0.5+-0.1	723.2+-44.0	0.3+-0.0	3.0+-0.4	0.0+-0.0
L23: exc.	1.2+-0.1	183.6+-3.6	49.0+-1.1	183.4+-2.6	16.4+-0.3	390.7+-4.5	19.2+-0.3	111.4+-1.2	3.3+-0.1
L23: inh.	14.3+-0.9	775.5+-17.5	179.0+-6.9	313.3+-9.4	17.4+-1.2	781.4+-18.3	10.9+-0.9	74.1+-3.4	0.9+-0.1
L4: exc.	0.0+-0.0	42.9+-0.7	11.5+-0.4	246.2+-4.6	24.6+-0.8	564.3+-7.4	40.2+-0.7	210.1+-2.0	7.3+-0.2
L4: inh.	4.5+-0.5	364.9+-20.0	80.8+-3.2	947.8+-36.0	82.5+-4.0	1172.4+-62.6	53.5+-4.2	344.2+-16.0	4.2+-0.2
L5: exc.	0.0+-0.0	11.1+-0.3	3.0+-0.1	71.9+-1.8	8.6+-0.3	744.2+-13.8	67.2+-1.4	460.8+-6.7	30.6+-0.9
L5: inh.	3.5+-0.4	170.3+-9.6	40.5+-2.2	374.2+-9.5	33.2+-1.3	1341.9+-29.1	88.1+-2.3	412.1+-10.0	12.22+-0.4
L6: exc.	0.0+-0.0	2.7+-0.2	0.7+-0.0	12.1+-0.3	1.3+-0.0	102.8+-1.2	11.4+-0.3	543.7+-8.6	53.0+-1.4
L6: inh.	0.6+-0.1	43.2+-2.0	10.3+-0.5	73.1+-4.6	6.3+-0.4	479.4+-16.5	41.6+-2.0	1216.0+-36.4	102.4+-4.2

Synapses per *post*synaptic neuron
Mean +- standard deviation of mean values of seven statistical instantiations

	L1: inh.	L23: exc.	L23: inh.	L4: exc.	L4: inh.	L5: exc.	L5: inh.	L6: exc.	L6: inh.
L1: inh.	46.5+-4.1	34.5+-1.8	19.2+-1.1	6.2+-0.3	0.4+-0.1	48.6+-2.9	0.1+-0.0	0.1+-0.0	0.0+-0.0
L23: exc.	20.0+-1.1	183.6+-3.6	175.2+-3.9	257.4+-3.6	202.6+-4.6	455.0+-5.1	106.0+-2.0	57.1+-0.6	15.3+-0.4
L23: inh.	69.5+-4.3	216.9+-5.0	179.0+-6.9	123.0+-3.7	60.0+-4.3	254.5+-6.2	16.8+-1.3	10.6+-0.5	1.2+-0.1
L4: exc.	0.3+-0.0	30.5+-0.5	29.2+-1.1	246.2+-4.6	216.3+-7.2	468.3+-6.1	158.0+-2.6	76.7+-0.8	24.4+-0.6
L4: inh.	6.3+-0.7	29.6+-1.6	23.4+-0.9	108.0+-4.0	82.5+-4.0	110.9+-6.0	23.9+-1.9	14.3+-0.7	1.6+-0.1
L5: exc.	0.7+-0.1	9.6+-0.3	9.1+-0.3	86.7+-2.2	90.8+-2.8	744.2+-13.8	318.3+-6.5	202.8+-3.1	123.4+-3.5
L5: inh.	11.1+-1.4	30.9+-1.7	26.3+-1.5	95.2+-2.4	74.2+-3.0	283.4+-6.1	88.1+-2.3	38.3+-1.0	10.4+-0.4
L6: exc.	0.2+-0.0	5.3+-0.3	4.6+-0.3	33.2+-0.7	30.2+-1.1	233.5+-2.8	122.8+-3.4	543.7+-8.6	484.8+-12.2
L6: inh.	2.2+-0.2	9.2+-0.4	7.8+-0.4	21.9+-1.4	16.5+-1.1	119.0+-4.2	48.9+-2.4	132.9+-4.0	102.4+-4.2