

Connectivity name	Convergence	Divergence	Total connections	Synaptic parameters	References
MF-GrC (AMPA)	4.5	1640.6	3426561	$g_{\text{AMPA}} = 900 \text{ pS}$, other parameters are the same as [1]	[2,3,1]
MF-GrC (NMDA)	4.5	1640.6	3426561	$g_{\text{NMDA}} = 12690 \text{ pS}$, $R_{\text{desensitize}} = 1.2 \text{ s}^{-1}$, other parameters are the same as [1]	[2,3,1]
MF-GoC (AMPA)	13.65	12.5	26161	$\tau_{\text{rise}} = 0.13 \text{ ms}$, $\tau_{\text{decay}} = 1.1 \text{ ms}$, $g_{\text{max}} = 300 \text{ pS}$	[4,5]
GoC-GrC (GABA)	8.4	3364.65	6712206	$\tau_{\text{rise}} = 3 \text{ ms}$, $\tau_{\text{decay1}} = 5 \text{ ms}$, $\tau_{\text{decay2}} = 35 \text{ ms}$, $g_{\text{max}} = 100 \text{ pS}$	[6,7]
GrC-GoC (AA-AMPA)	554	1.36	1089460	$\tau_{\text{rise}} = 0.06 \text{ ms}$, $\tau_{\text{decay}} = 0.5 \text{ ms}$, $g_{\text{max}} = 200 \text{ pS}$	[5]
GrC-GoC (PF-AMPA)	4759	11.34	9172885	$\tau_{\text{rise}} = 0.06 \text{ ms}$, $\tau_{\text{decay}} = 0.6 \text{ ms}$, $g_{\text{max}} = 200 \text{ pS}$	[5,8,9]
GoC-GoC (GJs)	13.7	13.7	13132	$g_{\text{max}} = 1.66 \text{ nS}$	[10,11]
GoC-GoC (GABA)	2.2	2.2	4320	$\tau_{\text{rise}} = 1.9 \text{ ms}$, $\tau_{\text{decay}} = 14.1 \text{ ms}$, $g_{\text{max}} = 330 \text{ pS}$	[12]

GrC- granule neuron, GoC-Golgi neuron, GJs-gap junctions, AA-ascending axons, PF-parallel fibers, MF-mossy fibers.

References

1. Solinas S, Nieuwenhuis T, D'Angelo E. A realistic large-scale model of the cerebellum granular layer predicts circuit spatio-temporal filtering properties. *Front Cell Neurosci.* 2010;4: 12. doi:10.3389/fncel.2010.00012
2. Palkovits M, Magyar P, Szentágothai J. Quantitative histological analysis of the cerebellar cortex in the cat. IV. Mossy fiber-Purkinje cell numerical transfer. *Brain Res.* 1972;45: 15–29. doi:10.1016/0006-8993(72)90213-2
3. Nieuwenhuis T, Sola E, Mapelli J, Saftenku E, Rossi P, D'Angelo E. LTP regulates burst initiation and frequency at mossy fiber-granule cell synapses of rat cerebellum: experimental observations and theoretical predictions. *J Neurophysiol.* 2006;95: 686–699. doi:10.1152/jn.00696.2005
4. Kanichay RT, Silver RA. Synaptic and cellular properties of the feedforward inhibitory circuit within the input layer of the cerebellar cortex. *J Neurosci.* 2008;28: 8955–8967. doi:10.1523/JNEUROSCI.5469-07.2008
5. Cesana E, Pietrajtis K, Bidoret C, Isope P, D'Angelo E, Dieudonne S, et al. Granule Cell Ascending Axon Excitatory Synapses onto Golgi Cells Implement a Potent Feedback Circuit in the Cerebellar Granular Layer. *J*

- Neurosci. 2013;33: 12430–12446. doi:10.1523/JNEUROSCI.4897-11.2013
6. Mapelli L, Rossi P, Nieuws T, D'Angelo E. Tonic activation of GABAB receptors reduces release probability at inhibitory connections in the cerebellar glomerulus. *J Neurophysiol.* 2009;101: 3089–3099. doi:10.1152/jn.91190.2008
 7. Simões de Souza FM, De Schutter E. Robustness effect of gap junctions between Golgi cells on cerebellar cortex oscillations. *Neural Syst Circuits.* BioMed Central Ltd; 2011;1: 7. doi:10.1186/2042-1001-1-7
 8. Napper RM, Harvey RJ. Number of parallel fiber synapses on an individual Purkinje cell in the cerebellum of the rat. *J Comp Neurol.* 1988;274: 168–177. doi:10.1002/cne.902740204
 9. Pichitpornchai C, Rawson J a, Rees S. Morphology of parallel fibres in the cerebellar cortex of the rat: an experimental light and electron microscopic study with biocytin. *J Comp Neurol.* 1994;342: 206–20. doi:10.1002/cne.903420205
 10. Dugue GP, Brunel N, Hakim V, Schwartz E, Chat M, Levesque M, et al. Electrical Coupling Mediates Tunable Low-Frequency Oscillations and Resonance in the Cerebellar Golgi Cell Network. *Neuron.* 2009;61: 126–139. doi:10.1016/j.neuron.2008.11.028
 11. Vervaeke K, LÖrincz A, Gleeson P, Farinella M, Nusser Z, Silver RA. Rapid Desynchronization of an Electrically Coupled Interneuron Network with Sparse Excitatory Synaptic Input. *Neuron.* 2010;67: 435–451. doi:10.1016/j.neuron.2010.06.028
 12. Hull C, Regehr WG. Identification of an Inhibitory Circuit that Regulates Cerebellar Golgi Cell Activity. *Neuron.* Elsevier Inc.; 2012;73: 149–158. doi:10.1016/j.neuron.2011.10.030