

**Table 1: Main connections in the locomotion circuit ( based on Haspel and O'Donovan 2011)**

| <b>Nerve cord motoneurons</b> | <b>Neuromuscular junction</b>               | <b>Major connectivity among motoneurons</b>  | <b>Major input from interneurons</b>  |
|-------------------------------|---|--|---|
| <b>AS</b>                     | Cholinergic to dorsal muscles               | Synapse to VD that inhibits opposing muscles on ventral side (strongest connection).<br>A gap junction with VA, which excites ventral muscle two muscle lengths posterior. A gap junction with DA.             | Synaptic input from AVA, AVB, AVD and AVE (also PVC for AS1 and AS2)<br>Gap junctions with AVA. |
| <b>DA</b>                     | Cholinergic to dorsal muscles               | Synapse to two VDs that inhibit opposing muscles on ventral side (strongest connection). Gap junctions with AS and VA.   | Synaptic input from AVA, AVD and AVE.<br>Gap junctions with AVA.                                |
| <b>DB</b>                     | Cholinergic to dorsal muscles               | Gap junctions with neighboring DBs.<br>Synapse to two VDs that inhibit opposing muscles on ventral side (strongest connection). Synapse to AS and DD.  | Synaptic input from PVC, PVR and DVA.<br>Gap junctions with AVB.                                |
| <b>DD</b>                     | GABAergic to dorsal muscles                 | Gap junctions with neighboring DDs.<br>Chemical synapses to VD.  | Synaptic inputs from VA, VB and VC motoneurons and RID.   |
| <b>VA</b>                     | Cholinergic to ventral muscles              | Synapse to DD that inhibits opposing muscles on dorsal side (strongest connection).<br>A gap junction with VA.   | Synaptic input from AVA, AVD and AVE.<br>Gap junctions with AVA and SABD.                       |
| <b>VB</b>                     | Cholinergic to ventral muscles              | Synapse to DD that inhibits opposing muscles on dorsal side (strongest connection). Some synapses to VD and VA.<br>Gap junctions with neighboring VBs.   | Synaptic input from PVC. Gap junctions with AVB.  |
| <b>VC (1-3)</b>               | Very sparse cholinergic to ventral muscles. | Many gap junctions and synaptic connections among VCs. Many synapses to VD and DD throughout the anterior portion (VC1-3)  |   |
| <b>VD</b>                     | GABAergic to ventral muscles                | Synapses to VA and VB that innervate the same muscle. Gap junctions with neighboring VDs, less to DD and VA.   | Synapses from VCs.<br>Some synapses from AVE and PVN.   |
| <b>Ventral BWM</b>            | From VA, VB, VC and VD                      | High conductance (300 pS) gap junctions on muscle cell body with muscle in the other row of the same quadrant. Low conductance (75 pS) gap junctions on muscle arms with muscle in the contralateral quadrant. |   |
| <b>Dorsal BWM</b>             | From DA, DB, DD and AS                      | Similar organization of gap junctions although not tested experimentally.  |   |