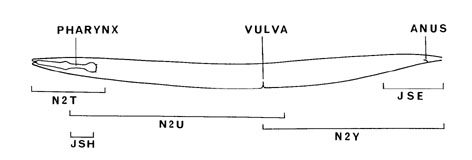
**2.2 Neuron Description (Neuron Types)**

[Neuron type-download (pdf)](https://www.wormatlas.org/images/NeuronType.pdf)  
[Neuron type-download (excel)](https://www.wormatlas.org/images/NeuronType.xls)  
  
This file contains neuron position, synapse position, and various neuron morphology designations that can be used for further analyses. Neuron position is defined by the center of the cell body projected onto the AP axis of the worm. These positions are determined from various diagrams of neuronal cell bodies in the adult worm and presented in this atlas. By dividing the worm's AP axis into three parts, head, mid-body and tail, we designate head neurons as neurons with cell bodies located at <25% along the AP axis from the anterior end of the worm, mid-body neurons with cell bodies lying between 25% and 75% of the axis, and tail neurons located at >75%.

In this file, we also note any applicable ambiguities and gaps in the wiring diagram. Due to technical constraints, wiring data in the posterior region of the worm was obtained from serial sections of 2 animals, 1 hermaphrodite ([JSE](http://wormimage.sciencewall.net/listset?title=JSE)) and 1 male ([N2Y](http://wormimage.sciencewall.net/listset?title=N2Y)) ([White et al, 1986](https://www.wormatlas.org/MoW_built0.92/MoW.html)). The difficulty in tracing neural processes across different animals contributed much of the ambiguity in this region. In the region posterior to the vulva, the scarcity of high power EM's on the dorsal side affects the reconstruction of 39 neurons. Neurons [AS11](https://www.wormatlas.org/neurons/Individual%20Neurons/ASframeset.html), [DA9](https://www.wormatlas.org/neurons/Individual%20Neurons/DAframeset.html), [DB7](https://www.wormatlas.org/neurons/Individual%20Neurons/DBframeset.html), [VD11-13](https://www.wormatlas.org/neurons/Individual%20Neurons/VDframeset.html), [RID](https://www.wormatlas.org/neurons/Individual%20Neurons/RIDframeset.html), [PDA](https://www.wormatlas.org/neurons/Individual%20Neurons/PDAframeset.html), [PDB](https://www.wormatlas.org/neurons/Individual%20Neurons/PDBframeset.html) have partial dorsal data whereas [AS7-10](https://www.wormatlas.org/neurons/Individual%20Neurons/ASframeset.html), [DA7-8](https://www.wormatlas.org/neurons/Individual%20Neurons/DAframeset.html), [DB5-6](https://www.wormatlas.org/neurons/Individual%20Neurons/DBframeset.html), [DD4-6](https://www.wormatlas.org/neurons/Individual%20Neurons/DDframeset.html), [VD7-10](https://www.wormatlas.org/neurons/Individual%20Neurons/VDframeset.html) completely lack dorsal reconstructions. All neurons with processes in the sublateral nerves have incomplete reconstructions. Unlike the ventral and dorsal cords, the sublateral cords were never examined under high power magnification and, therefore, never fully reconstructed. Despite the near completion of the wiring diagram, which maps connections between neurons, there is a lack of data specifying the location of individual synapses in the worm. For this project, synapse positions were approximated into 3 gross categories: head (< 25% along AP axis from the nose), mid-body (between 25% and 75%), and tail (>75%). Connections denoted in diagrams showing the nerve ring and anterior ventral cord in [White et al, 1986](https://www.wormatlas.org/MoW_built0.92/MoW.html) are designated to be in the head. Connections derived from the reconstruction of animal [JSE](http://wormimage.sciencewall.net/listset?title=JSE) (see [Figure 2](https://www.wormatlas.org/neuronalwiring.html#Fig2)) are designated to be in the tail. Data in this posterior region was also cross referenced with [Hall and Russell, 1991](https://www.wormatlas.org/HallRussell_1991/HallRussell1991.html). The remaining connections are assumed to be located in the mid-body. This data set of synapse positions was created by looking at individual neurons by themselves. Positions of synapses across pairs of neurons are not reconciled into these gross categories. Thus a synapse is considered to be in proximity of the cell body if both neurons fall within the same defined areas of head, mid-body, or tail. Labels are as follows:

**Neuron:** Name of neuron  
**Soma Position:**Position of cell body along the AP axis of worm body. 0=tip of nose; 1=tail tip.  
**Soma region:**Cell body position by head, mid-body, or tail region.  
**Span:** Length of neuron span. Neurons spanning <25% of worm body (e.g., motor neurons in the ventral cord, neurons with processes confined to the nerve ring and neurons confined in the mid-body) are defined to have short spans (S). All other neurons are defined to have long spans (L).  
**Ambiguity:** If applicable, code for the type of ambiguity. Codes beginning with M denote ambiguity citedin [White et al, 1986](http://www.wormatlas.org/ver1/MoW_built0.92/toc.html). Codes beginning with R denote ambiguity found in reconstructions during update of wiring diagram (MB=cell body position ambiguous, MTS=tail synapses ambiguous and/or sparse connections in the tail; MAS=anterior body ambiguous and/or sparse connections in the anterior; MD=dorsal side ambiguous; MAD=anterior and dorsal side ambiguous; MS=neurons with sublateral processes not covered by reconstructions. RDI=dorsal reconstruction incomplete; RDM=dorsal reconstruction completely missing; RVI=ventral reconstruction incomplete.)  
**TotHead:** Total number of synapses in the head including EJ and NMJ.  
**TotTail:** Total number of synapses in the tail including EJ and NMJ.  
**TotMid:** Total number of synapses in the mid-body including EJ and NMJ.  
**S\_Head:** Number of “sends” or output synapses in the head, includes send polyadic synapses ([see Figure 1](https://www.wormatlas.org/neuronalwiring.html#Fig1)) and NMJ.  
**R\_Head:** Number of “receives” or input synapses (includes polyadic synapses) in the head.  
**S\_Mid:** Number of “sends” or output synapses in the mid-body, includes polyadic synapses and NMJ.  
**R\_Mid:** Number of “receives” or input synapses (includes polyadic synapses) in the mid-body.  
**S\_Tail:** Number of “sends” or output synapses in the tail, includes polyadic synapses and NMJ.  
**R\_Tail:** Number of “receives” or input synapses (includes polyadic synapses) in the tail.  
**AY NeuronType:** Letter codes denoting ganglion group as defined by [Achacoso and Yamamoto W.S., 1991](https://www.crcpress.com/Ays-Neuroanatomy-of-C-Elegans-for-Computation/Achacoso-Yamamoto/p/book/9780849342349), where A=anterior ganglion, B=dorsal ganglion, C=lateral ganglion, D=ventral ganglion, E=retrovesicular ganglion, F=posterolateral ganglion, G=ventral cord neuron group, H=pre-anal ganglion, J=dorsorectal ganglion, K=lumbar ganglion.  
**AYNbr:** Numeric identifier given by AY for each neuron.  
Note:  Sum of S\_Head and R\_Head does not include electrical junctions (EJ), therefore, does not equal TotHead.  Similar is true for mid-body and tail.



**Fig 2:** Regions of the worm covered by different reconstructed animals. Five different animals were used in [White et al, 1986](https://www.wormatlas.org/MoW_built0.92/MoW.html) to piece together connectivity for the entire worm. The wiring data is primarily derived from animals N2U and JSE, both adult hermaphrodites. Area anterior to the nerve ring is covered with [N2T](http://wormimage.sciencewall.net/listset?title=N2T) (also an adult hermaphrodite) and the gap between[N2U](http://wormimage.sciencewall.net/listset?title=N2U) and [JSE](http://wormimage.sciencewall.net/listset?title=JSE) is covered by [N2Y](http://wormimage.sciencewall.net/listset?title=N2Y), an adult male. [JSH](http://wormimage.sciencewall.net/listset?title=JSH), an L4 hermaphrodite, was used only as a check of nerve ring connectivity.