

Glia are the cells that support neurons, both within the CNS (the neuroglia) and within the PNS. Glial cells far outnumber the neurons in the nervous system. They form the myelination of new axons and contribute to most of the postnatal growth seen in the CNS. Functionally, glia:

- Provide structural isolation of neurons and their synapses
- Sequester ions in the extracellular compartment
- Provide trophic support to the neurons and their processes
- Support growth and secrete growth factors
- Support some of the signaling functions of neurons
- Myelinate axons
- Phagocytize debris and participate in inflammatory responses
- Participate in the formation of the blood-brain barrier

The different types of glial cells include the:

- **Astrocytes:** the most numerous of the glial cells, they provide physical and metabolic support for CNS neurons, and contribute to the formation of the blood-brain barrier
- **Oligodendrocytes:** smaller glial cells that are responsible for the formation and maintenance of myelin in the CNS
- **Microglia:** smallest and most rare of the CNS glia (still more numerous than neurons in the CNS!), they are phagocytic cells and participate in inflammatory reactions
- **Ependymal cells:** line the ventricles of the brain and the central canal of the spinal cord that contain cerebrospinal fluid (CSF)
- **Schwann cells:** glial cells of the PNS, they surround all axons, myelinating many of them, and provide trophic support, facilitate regrowth of PNS axons, and clean away cellular debris

While ependymal cells line the brain's ventricles, the surface of the brain and spinal cord is lined by the pia mater.

COLOR each of the different types of CNS glia, using a different color for each glial cell:

- 1. Astrocytes
- 2. Oligodendrocyte (with myelinating processes)
- 3. Microglial cell
- 4. Ependymal cells

Clinical Note:

Multiple sclerosis, or MS, is a demyelination disease of the CNS where the myelin is progressively destroyed, leading to inflammation and axonal damage. MS is an autoimmune disease that can also destroy the oligodendrocytes that synthesize and maintain myelin. Common symptoms include:

- Visual impairment
- Loss of sensation over the skin
- Problems with balance and motor coordination
- Loss of bladder and bowel control

