

Difference Between Glial Cells and Neurons

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Key Difference – Glial Cells vs Neurons

The nervous system of the body is of two components: [central nervous system \(CNS\)](#) and [peripheral nervous system \(PNS\)](#). The CNS is composed of the brain and spinal cord. [Motor neurons](#), [autonomic nervous system](#), and enteric nervous system are present in the PNS. The nervous system involves the transmission of signals, both electrical and chemical, in order to regulate different voluntary and involuntary actions of the body. The nervous system is composed of two different cell types: neurons and glial cells. Neurons are the basic structural units of the nervous system. **Neurons are involved in the transmission of electrical and chemical signals along the body to control voluntary and involuntary actions whilst glial cells perform a role in regulating [homeostasis](#) of the nervous system which provides adequate protection and support in the functioning of the nervous system.** This is the key difference between glial cells and neurons.

What are Glial Cells?

Glial cells, also known as **neuroglia**, are a type of supportive cells in the central nervous system. They are non-neural cells involved in regulating homeostasis in CNS and PNS and provide support and protection to the functioning of the nervous system.

Glial cells are of two types: microglia and macroglia. Microglia is considered as special [macrophages](#) that have the ability to perform [phagocytosis](#) and destroy [pathogens](#). Macroglia help in the synthesis of myelin and provide adequate nutrition support to the nervous system. Microglia cells include [oligodendrocytes](#), astrocytes, ependymal cells, [Schwann cells](#) and satellite cells. Glial cells are the most abundant cell type present in the CNS. Astrocytes are the most numerous type of glial cell in the brain.

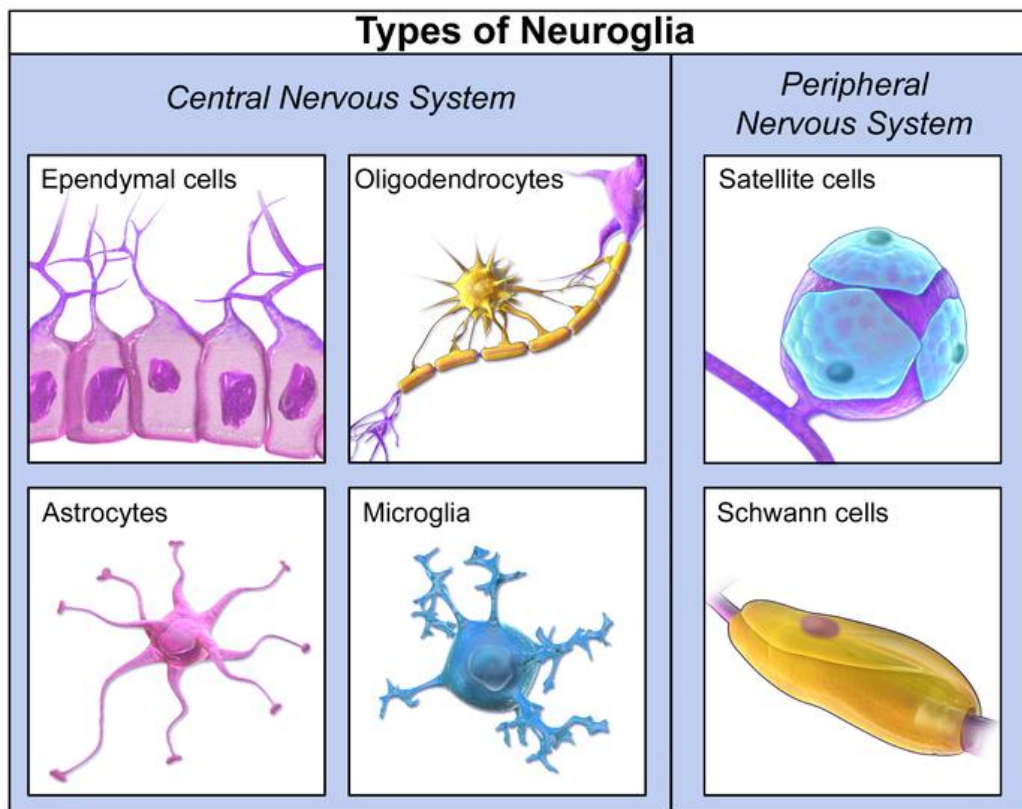


Figure 01: Types of Glial Cells

Glial cells have different functions in both CNS and PNS. They surround neurons and hold neurons in place and provide adequate nutrients and oxygen to them. Neuroglia also insulates neurons by forming insulating layers around the axons, destroying potential pathogens and removing dead neurons from the nervous system.

What are Neurons?

A neuron is the structural unit of the nervous system. It has the ability to conduct both electrical and chemical impulses throughout the body in order to control voluntary and involuntary actions. The exchange of signals between neurons is accomplished by the presence of special structures called synapses, connecting with each other to form a network of neurons. A typical neuron consists of a cell body known as 'soma,' dendrites and an axon which can be myelinated with Schwann cells or unmyelinated. The neuron is an important structure of the CNS and autonomic nervous system of PNS. Neurons are of many types according to the function they perform. **Sensory neurons** conduct nerve impulses by the stimuli received on sensory organs and transmit into the brain. **Motor neurons** conduct signals from the brain to the relevant muscle,

organ or gland. **Intermediate neurons** connect other neurons together inside the brain and the spinal cord.

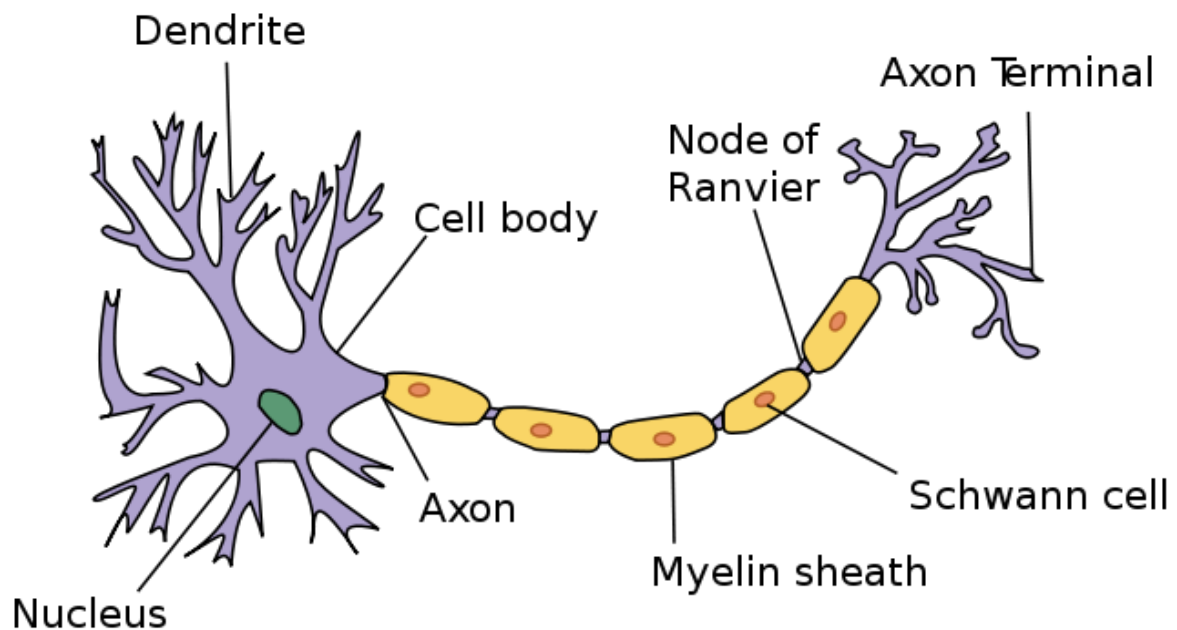


Figure 02: Structure of a Typical Neuron

What are the similarities between Glial Cells and Neurons?

- Both neurons and glial cells are a part of the nervous system.
- Glial cells and neurons have a resting potential.

What is the difference between Glial Cells and Neurons?

Glial Cells vs Neurons	
Glial cells are secondary supporting cells which are involved in the regulation of homeostasis of the nervous system and protection.	Neurons are the basic structural units of the nervous system which are involved in the transmission of impulses throughout the body during coordination of voluntary and involuntary actions.
Transmission of Impulses	
Glial cells do not conduct electrical impulses.	Neurons transmit both electrical and chemical impulses.
Components	

In glial cells, axons and nissl granules are absent.	In neurons, axons and nissl granules are present.
Cell Division	
Glial cells have the ability to undergo cell division with age.	Neurons are non-renewable. They lack the ability of regeneration and keep to their original form till death.
Function	
The glial cells surround neurons and regulate homeostasis of the nervous system, support and protect it.	Neurons transmit nerve impulses to coordinate voluntary and involuntary actions.

Summary – Glial Cells vs Neurons

The nervous system is composed of two components: the CNS and the PNS. Neurons are the basic structural units of the nervous system and are involved in the transmission of nerve impulses throughout the body. Glial cells perform a supporting role in the functioning of the nervous system by regulating homeostasis. Neurons are of three types: motor neurons, sensory neurons, and intermediate neurons. Glial cells are different types; oligodendrocytes, astrocytes, ependymal cells, Schwann cells, microglia, and satellite cells. Glial cells do not transmit nerve impulses, but neurons transmit both chemical and electrical signals throughout the body. This is the difference between glial cells and neurons.

References:

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1. "Blausen 0870 TypesofNeuroglia" By Blausen.com staff (2014). "Medical gallery of Blausen Medical 2014". WikiJournal of Medicine 1 (2). DOI:10.15347/wjm/2014.010. ISSN 2002-4436. – Own work ([CC BY 3.0](#)) via [Commons Wikimedia](#)
2. "Neuron" ([CC BY-SA 3.0](#)) via [Commons Wikimedia](#)

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