

# Medical Biology

# Nervous system

The nervous system is responsible for communication between different regions of the body, it is divided into:

**CNS (central nervous system) = brain + spinal cord**

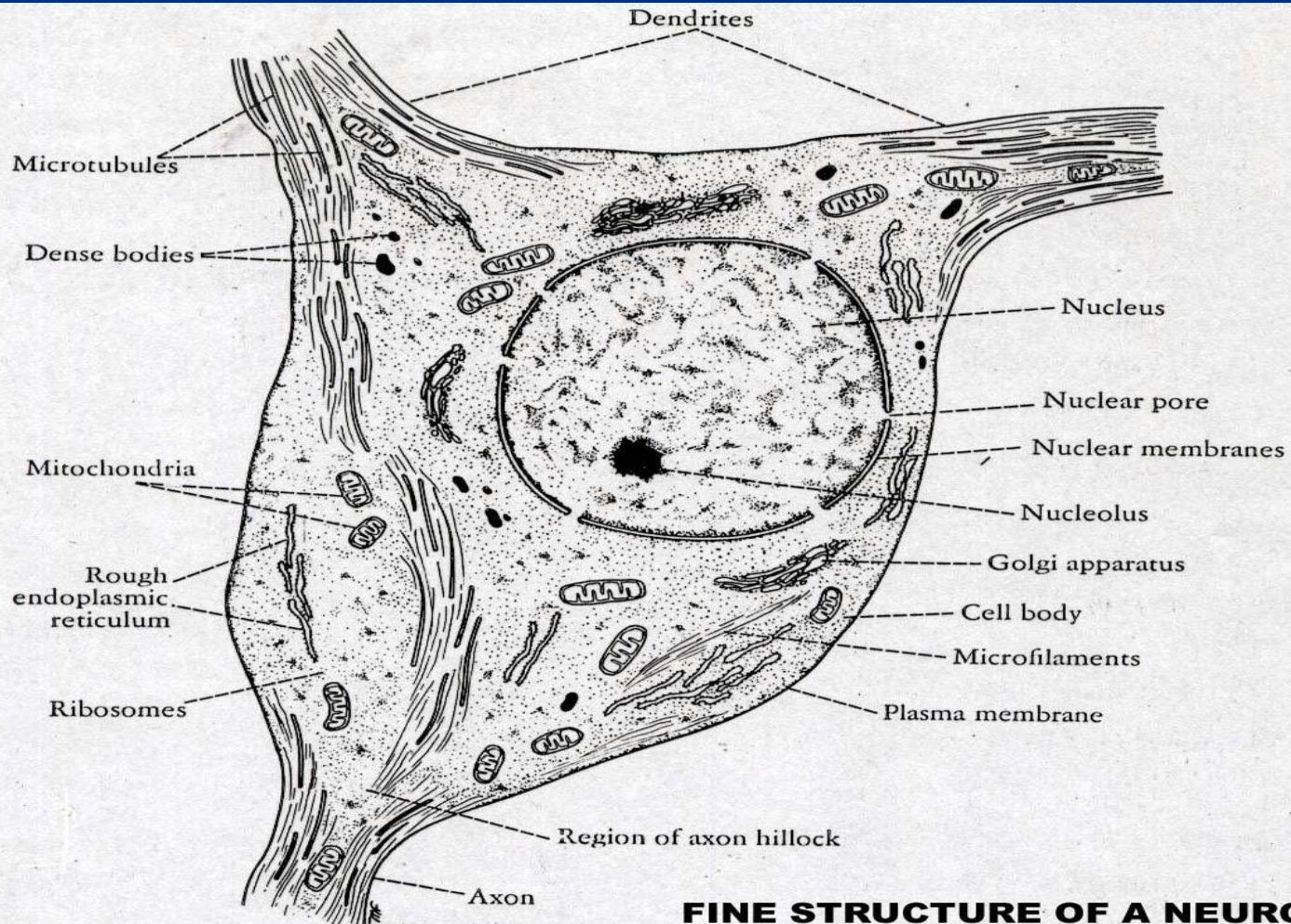
**PNS (peripheral nervous system) = nerves running between the CNS & other tissues.**

Nervous tissue consists of two major cell types:  
neurons and neuroglia.

# The Neuron:

Is the main functional unit of the nervous system , it consists of :

## 1. Cell body (perikaryon)



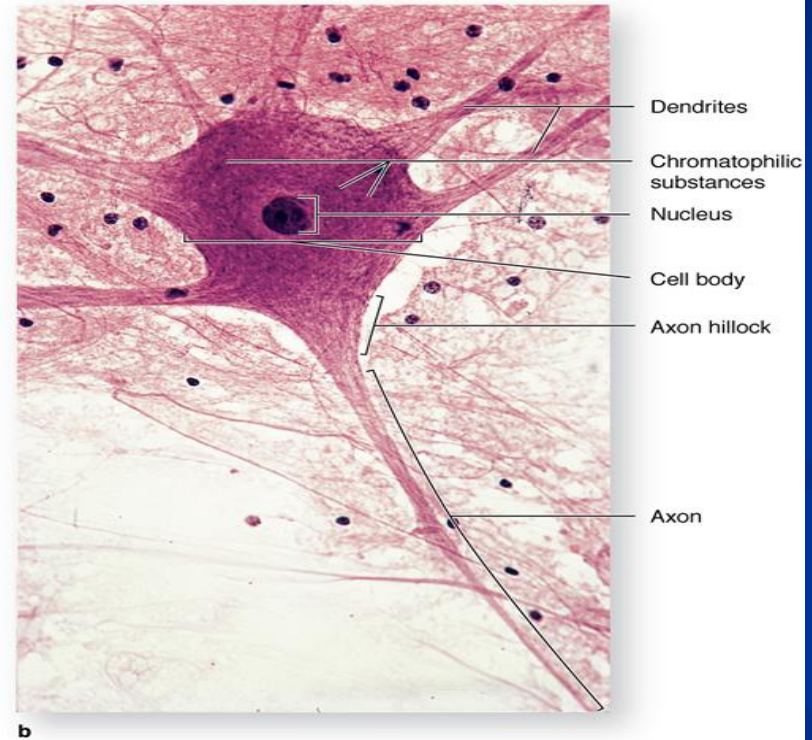
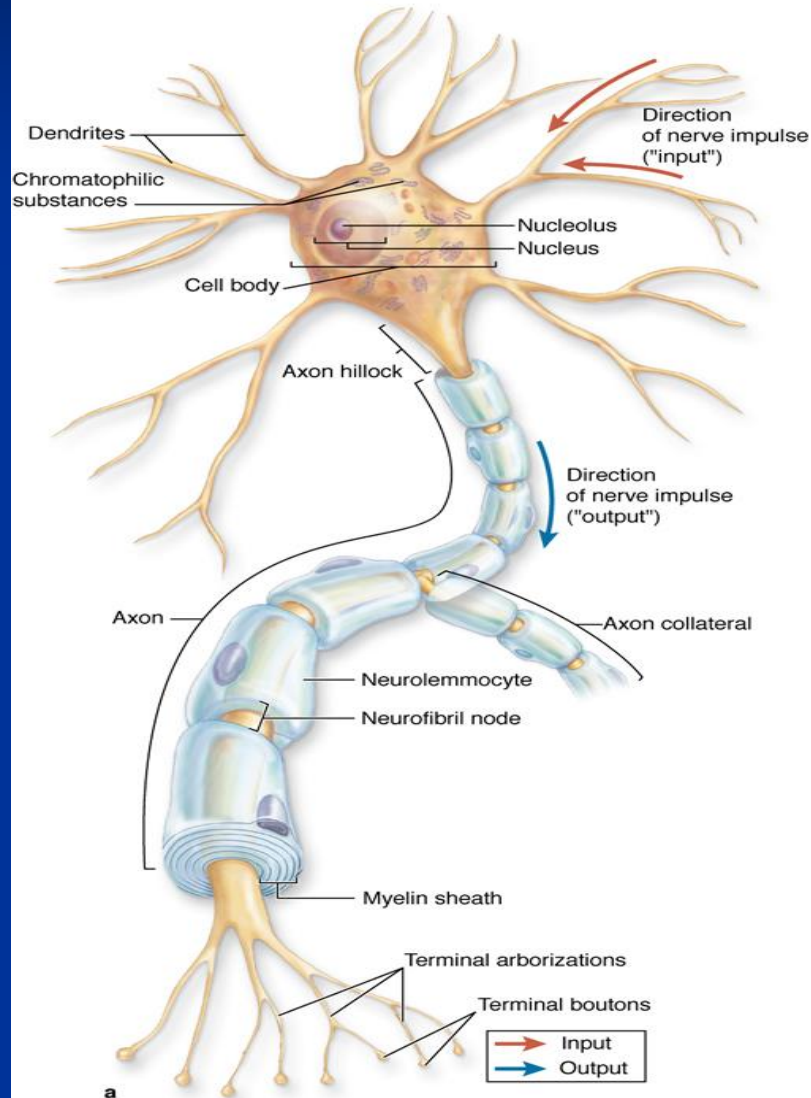
**FINE STRUCTURE OF A NEURON**



## 2. Axon

## 3. Dendrites

## 4. Terminal button

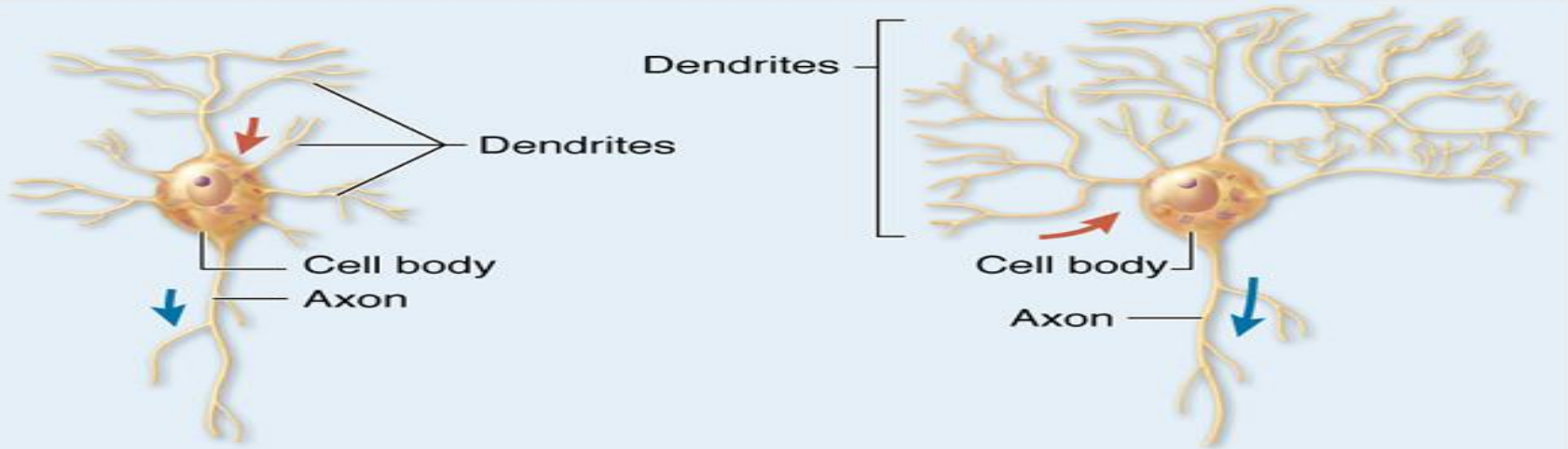


## **Types of the Neurons: According to shape**

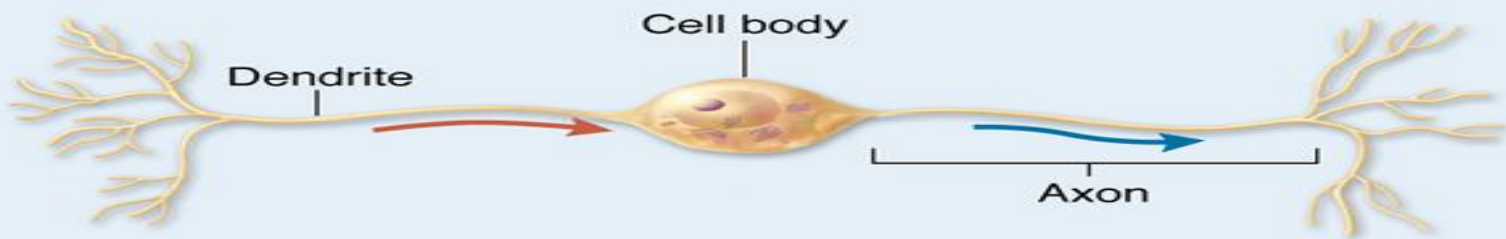
**Multipolar (motor) neurons** : have large cell body + large axon + many dendritic processes.

**Unipolar (pseudounipolar) (sensory)** : cell body + one large process divided into 2 branches, one is axon & other is dendrite.

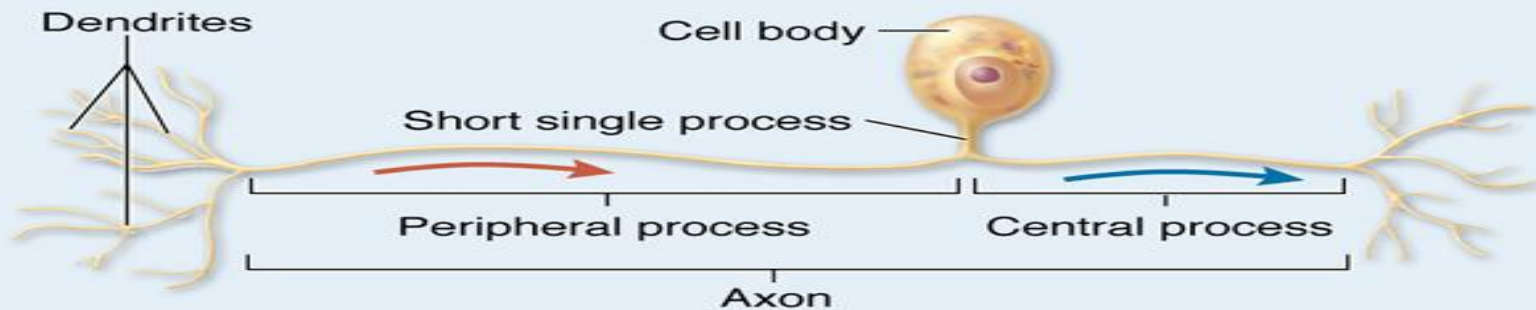
**Bipolar** : simple cells provide local communications within the CNS having 2 main processes of equal size one axon & other dendrite.



**a** Multipolar neurons



**b** Bipolar neuron



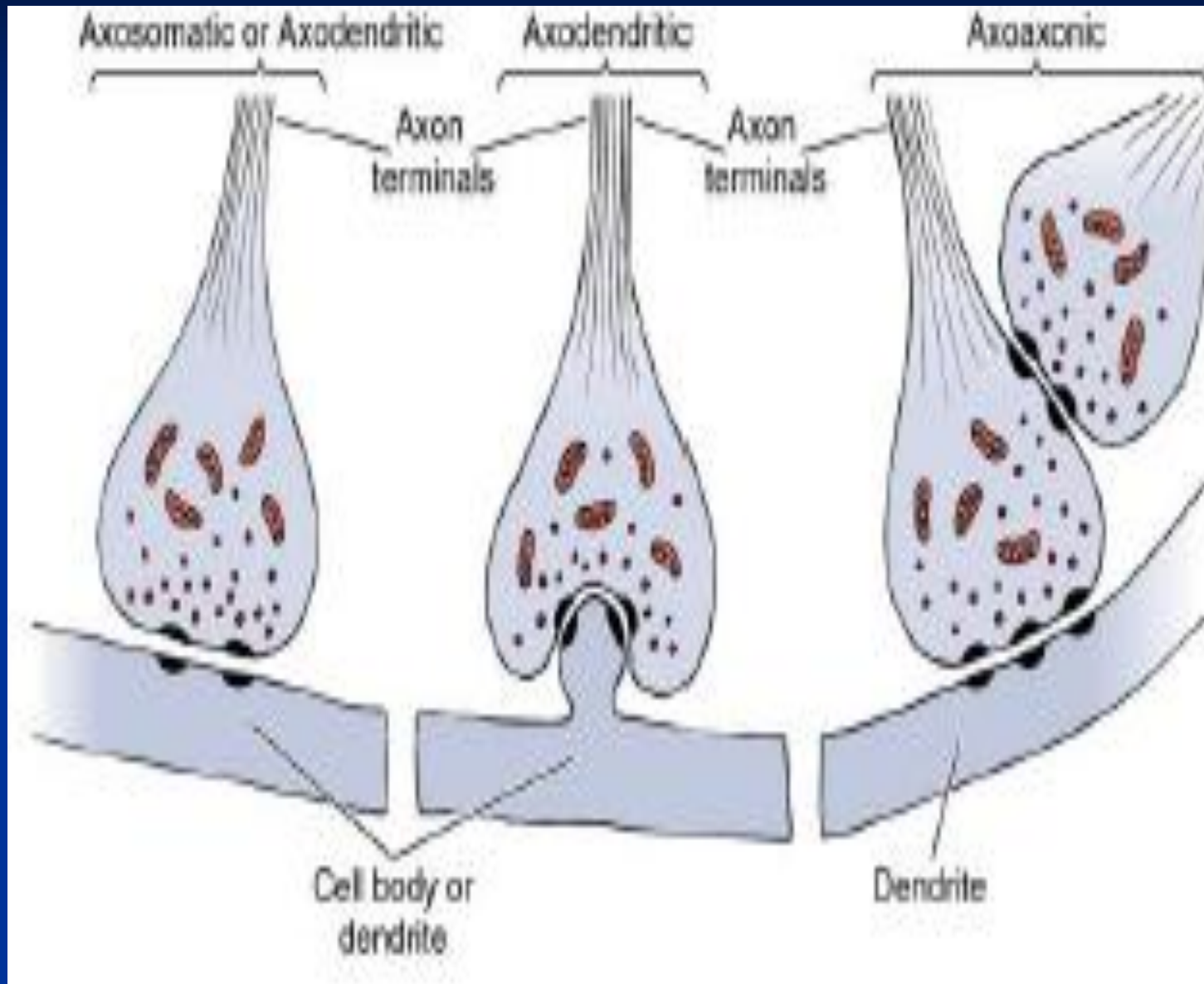
**c** Unipolar neuron



# Neurons are of 3 types:

- Sensory (afferent) somatic (p<sub>ptt</sub>) visceral (p)
- Motor (efferent) somatic & visceral
- Interneuron

# Synapses:

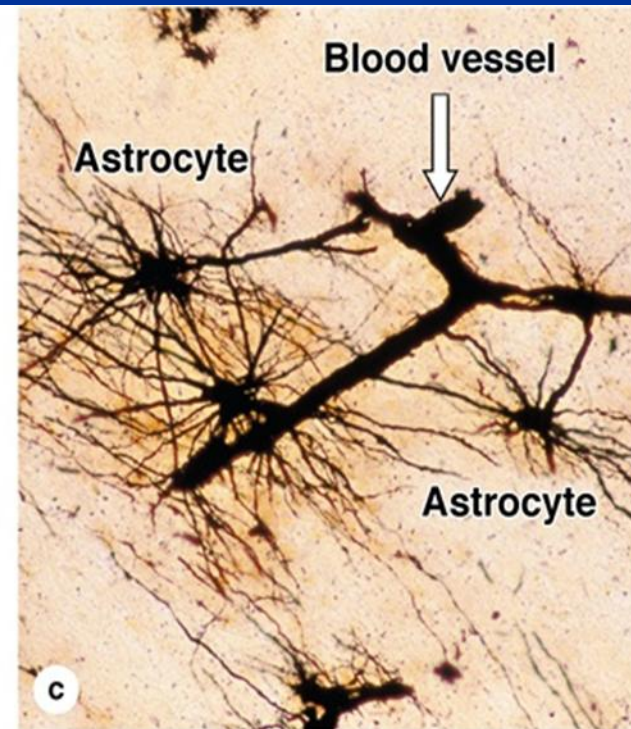
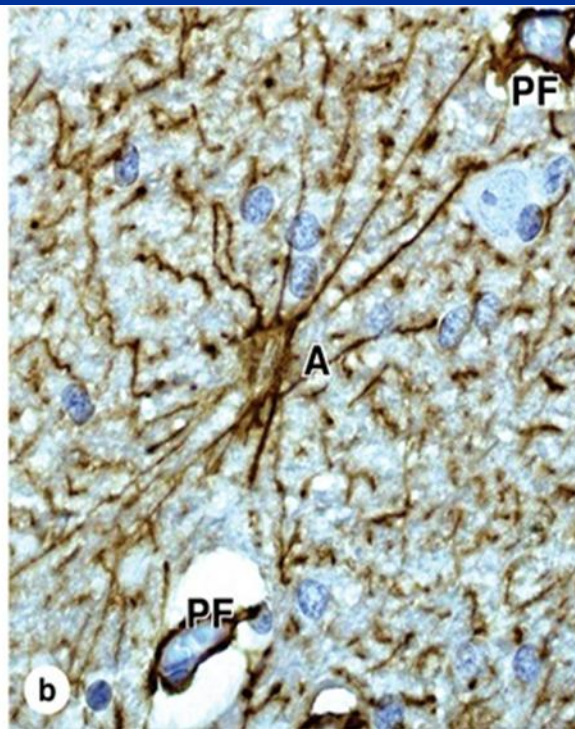
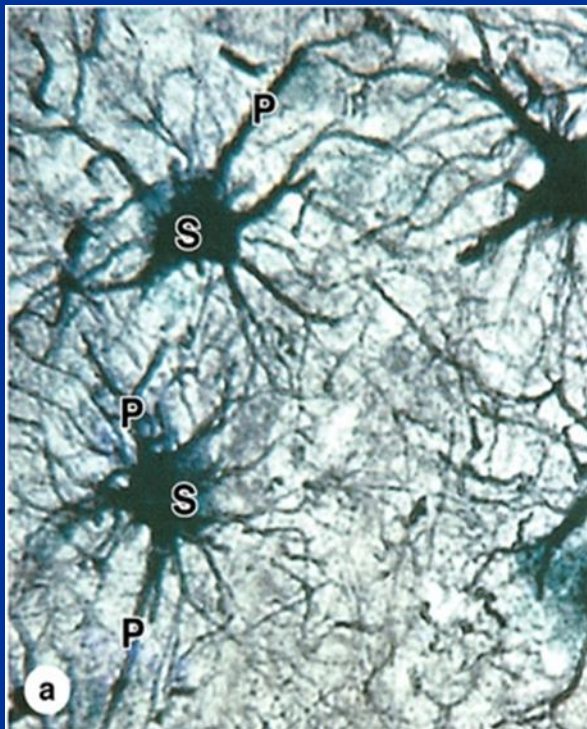




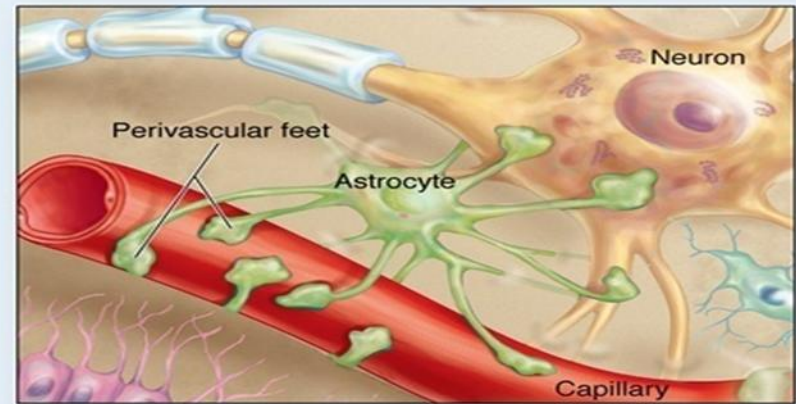
# Neuroglia:

- They outnumber neurons by about 10 to 1 in the brain . More than half the volume of the human nervous system is composed of supporting neuroglial cells.

- In the CNS (brain & the spinal cord) there are 4 types of supporting cells:
- **1. Astrocytes:** stellate-shaped cells with fine processes radiating in all directions.



- Astrocyte roles:
- 1. nutritional support
- 2. supporting and scavenging
- 3. blood-brain barrier ----- end feet



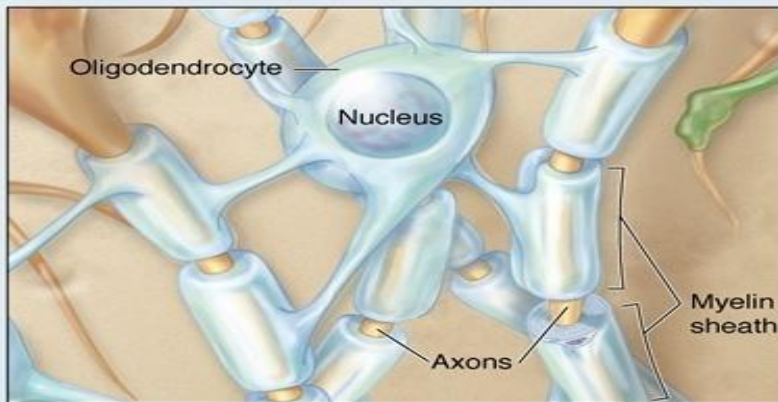
**b** Astrocyte

- Astrocytes are of 2 types:
- a. fibrous astrocytes found in the white matter of brain.
- b. protoplasmic astrocyte found in the gray matter of brain.

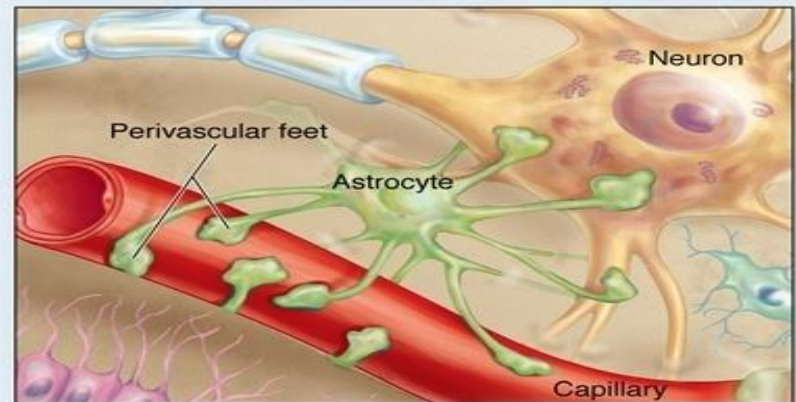


- 2. Oligodendrocytes:
- 3. Ependymal cells:
- 4. Microglia cells:

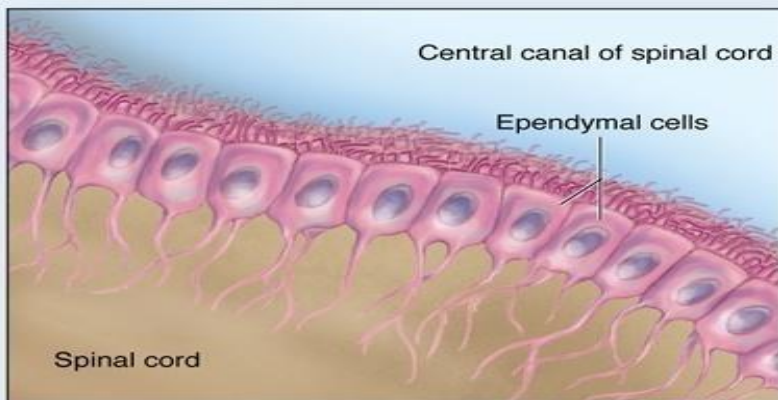
#### CNS Glial Cells



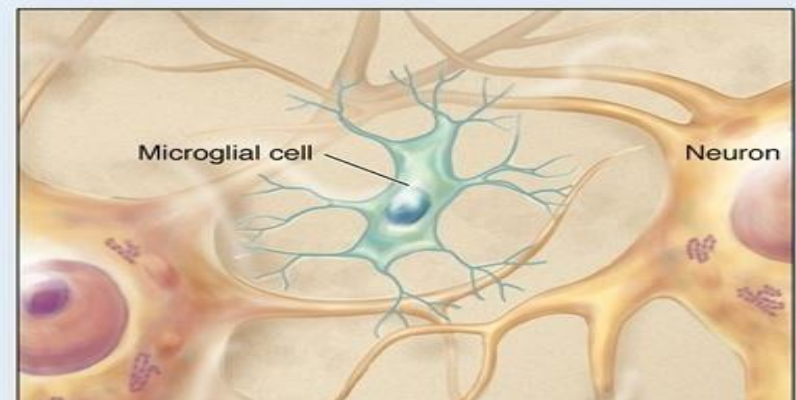
**a** Oligodendrocyte



**b** Astrocyte



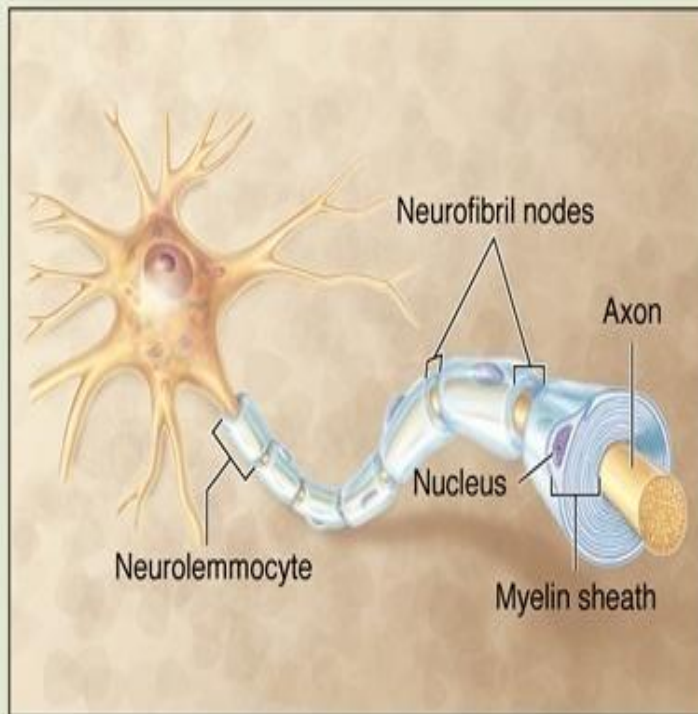
**c** Ependymal cells



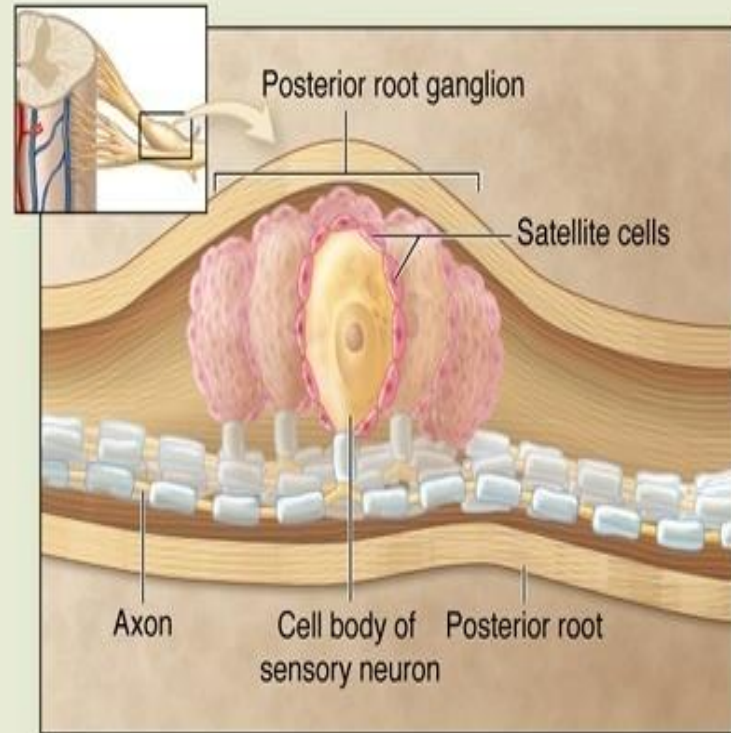
**d** Microglial cell

- In PNS:
- 5. Schwann cell (neurolemmocytes):
- 6. Satellite cells of ganglia:

#### PNS Glial Cells



e Neurolemmocytes



f Satellite cells

# Clinical Notes

- astrocytoma derived from fibrous astrocyte.



*Thank you*