Nervous system

The nervous system consists of all nervous tissue in the body.It is divided into the central nervous system(**CNS**) and peripheral nervous system(**PNS**).The central and peripheral nervous system are defined mainly by location. The **CNS** includes the brain and spinal cord, and **PNS** includes all other nerve tissue.

Nervous tissue of the **CNS** does not contain connective tissue other than that in the meninges and the wall of large blood vessels.The two major classes of the cells that make up the nervous tissue are nerve cells(**neurons**)and supporting cells(**glia**).

Neurons are the functional and structural units of nervous tissue,it's consists of:

1-Cell body:the cell body of neuron receive the signals from axons of other neurons through synaptic contacts on it's plasma membrane and relay them to it's axons. The nucleus is usually large and central, it has prominent nucleolus.The cytoplasm of soma contain many organelles including mitochondria,lysosomes and centrioles.The abundant free and RER associated polyribosome appear in clumps of basophilic material collectively called **Nissl bodies**.The Golgi complex is well developed,it packages neurotransmitters in neurosecretory or synaptic vesicles. (Fig.1).

2-Dendrites: These extensions of the soma increase the surface available for incoming signals.The farther they are from the soma, the thinner they highly branched, they are covered over much of their surface with synaptic contacts.

3-Axon:each neuron has one axon,a complex cell process that carries impulses away from the soma.An axson is divisible into several regions.The **axon hillock**, the part of the soma leading into the axon,differs from the rest of the perikaryon in in that it lacks **Nissl bodies**.The **initial segment** is the part of a myelinated axon between the apex of the axon hillock and beginning of the myelin sheath.The **axon proper** is the main trunk of the axon.(Fig.2)

Types of neuron:

Neuron can be classified according their function into sensory or integrative. Also they could be classified according their axon and dendrites with respect to the cell body into:

1-Multipolar neuron: most common and most are motor;numerous dendrites project from cell body.

2-Bipolar neuron: single dendrites arises opposite origin of axon.

3-Unipolar neuron: eg.spinal nucleus of trigeminal nerve.

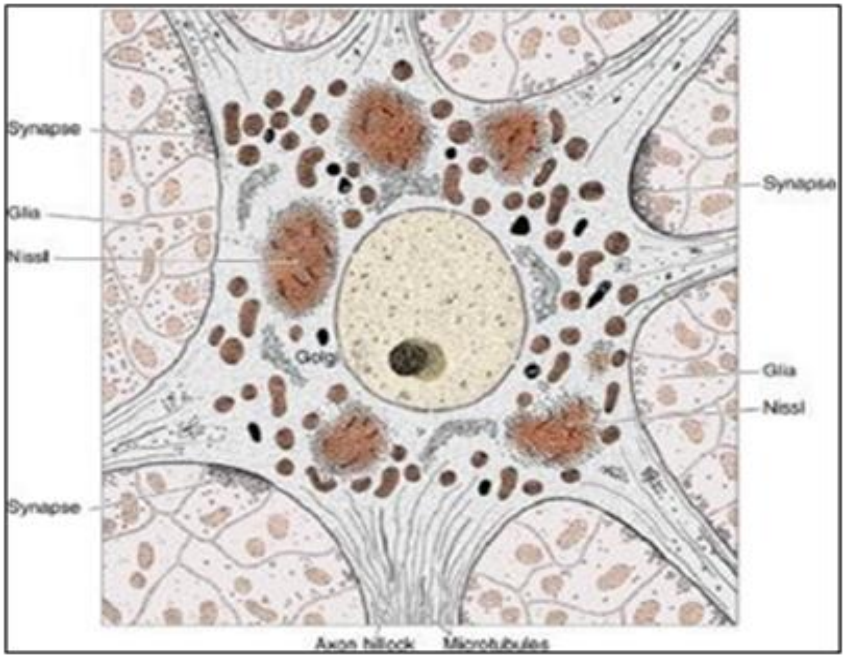
4-Pseudo-unipolar neuron: single dendrites and axon arise from common stem formed by fusion.(Fig.3).

Peripheral Nerves(PN):

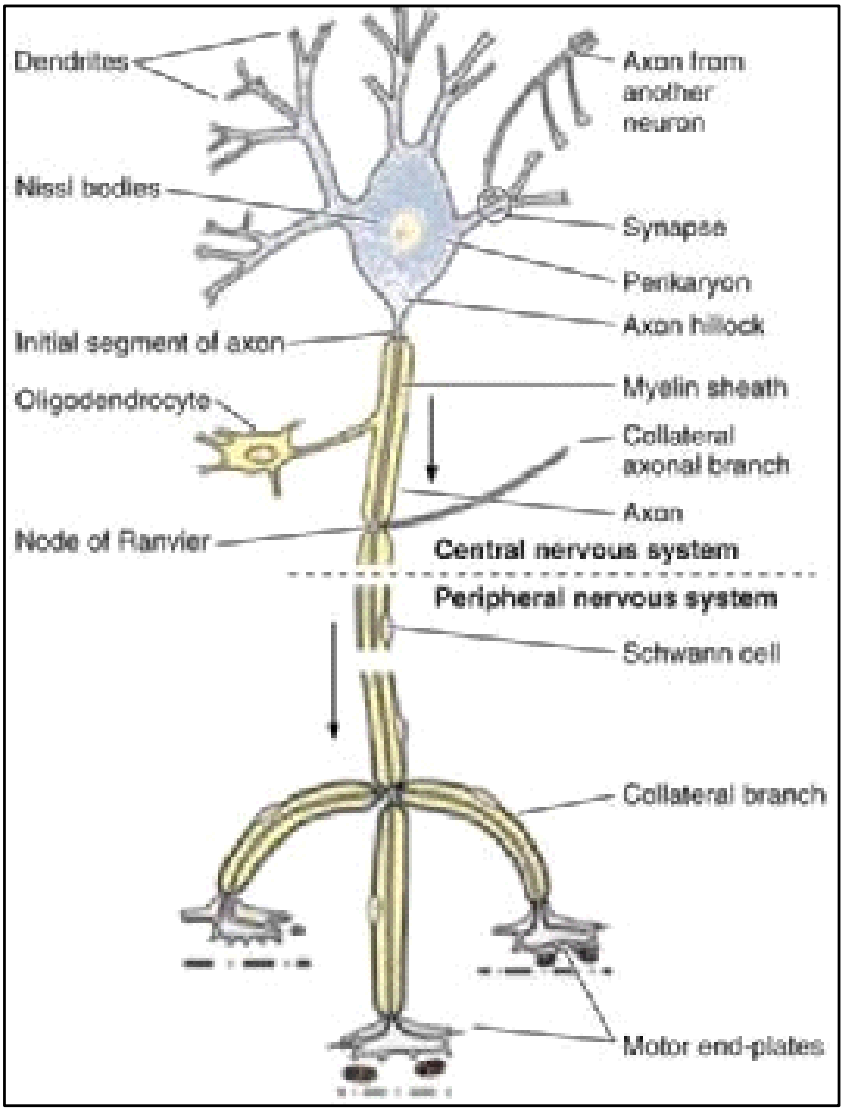
PN could be afferent, sensory fiber or efferent, motor fibers.One nerve fiber consists of an axon and it's nerve sheath.Each axon in the peripheral nerve system is surrounded by a sheath of Schwann cells.The myelin sheath formed by Schwann cell,each Schwan cell forms a myelin segment in which the cell nucleus is located, the place between two myelin segment along the course of the axon called **node of Ranvier:**(Fig.4).

Supporting cell(Neuroglia):

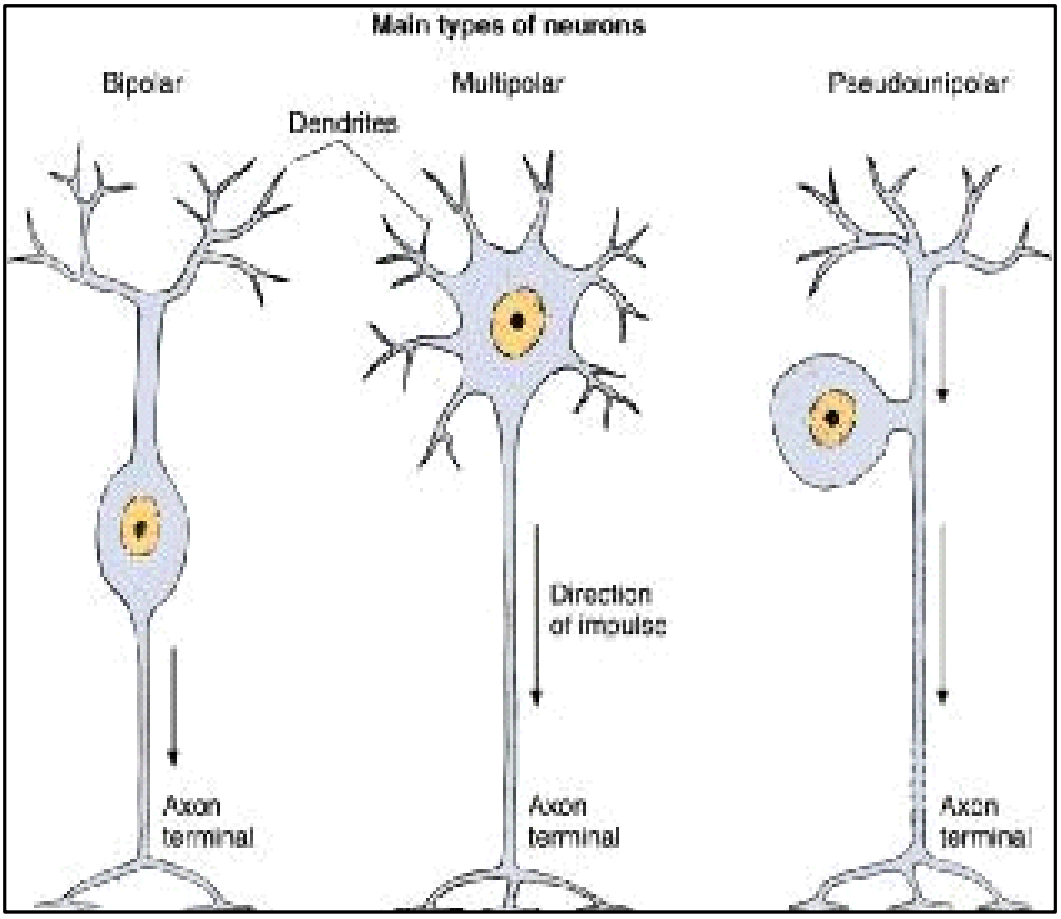
The major supporting cells in the (CNS)are the macroglia including: **Astrocytes:**they are star-shaped cells present only in the CNS. **Oligodendrocytes:**have fewer and shorter processes. **Microglia:**is small cells with complex shapes. **Ependymal cells:**they are line the internal cavities of the brain and spinal cord. They are similar in appearance to a stratified columnar epithelium.



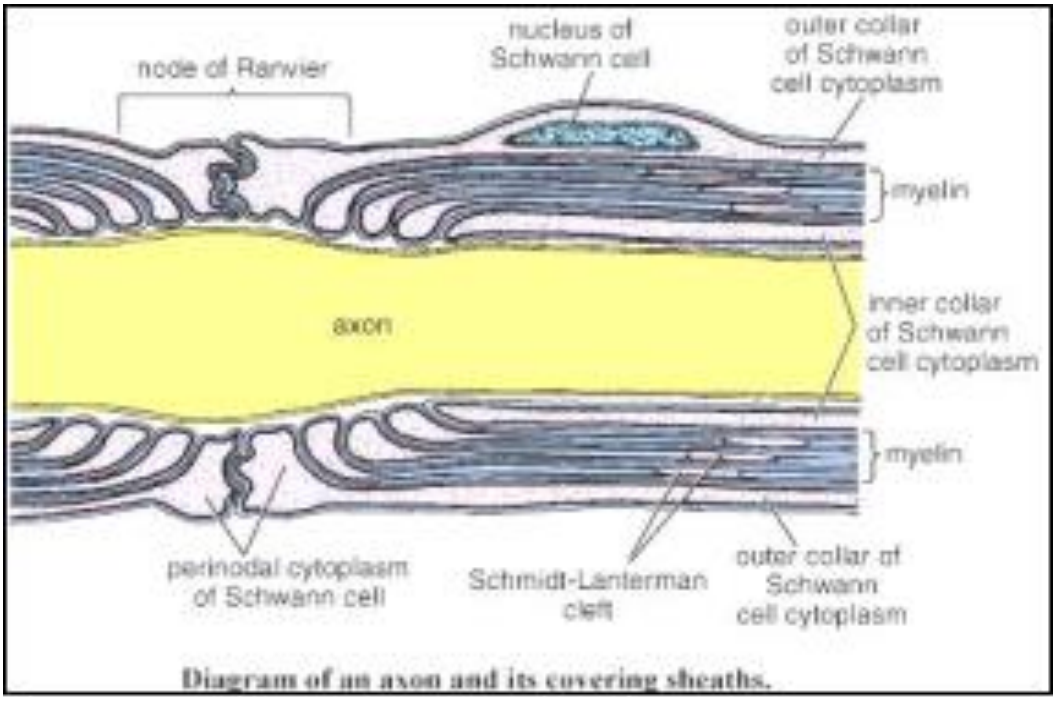
(Fig.1)Nerve cell body



(Fig.2)Nerve cell structure



(Fig.3)Types of Neurons



(F ig.4)Axon and covering sheath