Nervous system

NEURON

- **The *neuron* is the basic building block of the nervous system.**
- **Functional unit of nervous system.**
- **They are often grouped in bundles called *nerves*.**
- **Neuroglia- supported cells within the brain and spinal cord.**
- **Richly blood supply but lymph vessels absent in nervous tissue.**

Parts of a Neuron

1- Dendrites- **Thin, bushy-like structures that receive information from outside the neuron.**

Relays the information into the *cell body.*

***2.* Cell body-** **also known as the *perikaryon or soma, contains a nucleus surrounded by cytoplasm* that includes typical cellular organelles such as lysosomes, mitochondria, and a Golgi complex.**

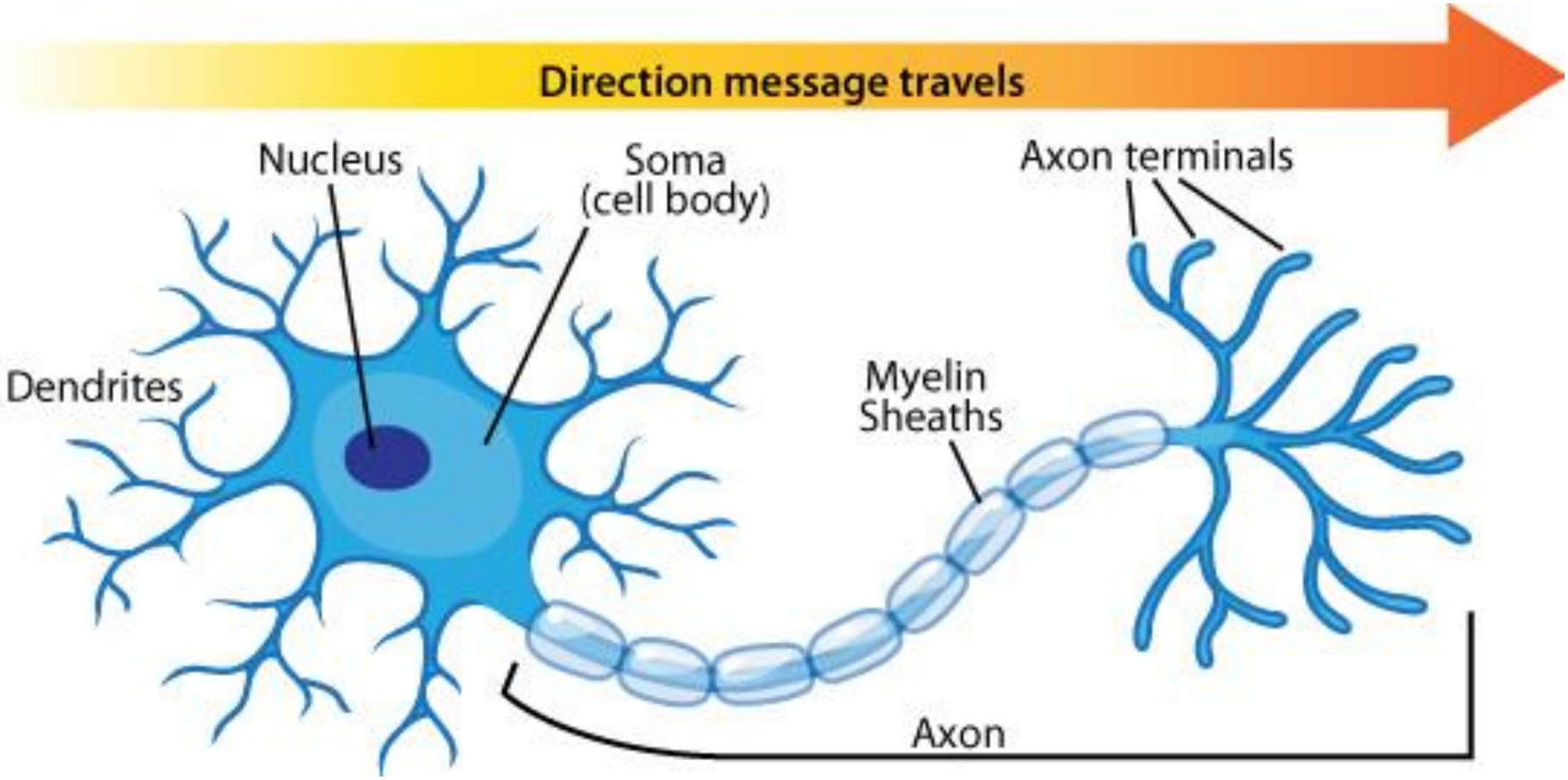
Neuronal cell bodies also contain free ribosomes and prominent clusters of rough endoplasmic reticulum termed *Nissl bodies*.

Continue….

The cell body relays the information down to the axon

***3. Axon*: A thin, long structure that transmits signals from the cell body to the *axon terminal*.**

***4. Axon Terminal:* is the last step for the relay of information inside the neuron.**


Direction message travels
Nucleus
Soma
(cell body)
Axon terminals
Dendrites
Myelin
Sheaths
Axon

- Peripheral nerves are made up of aggregations of axons.

- **Nerve fiber** is a general term for any neuronal process (extension) that emerges from the cell body of a neuron

STRUCTURE OF AXON

- **Axon hillock -** An axon often joins the cell body at a cone-shaped elevation.
- **Initial segment-** part of the axon closest to the axon hillock.
- The cytoplasm of an axon, called **axoplasm, is surrounded by a** plasma membrane known as the **axolemma .**
- **Axon collaterals -** branches **at a right angle to the axon.**
- The axon and its collaterals end by dividing into many fine processes called **axon terminals (telodendria).**

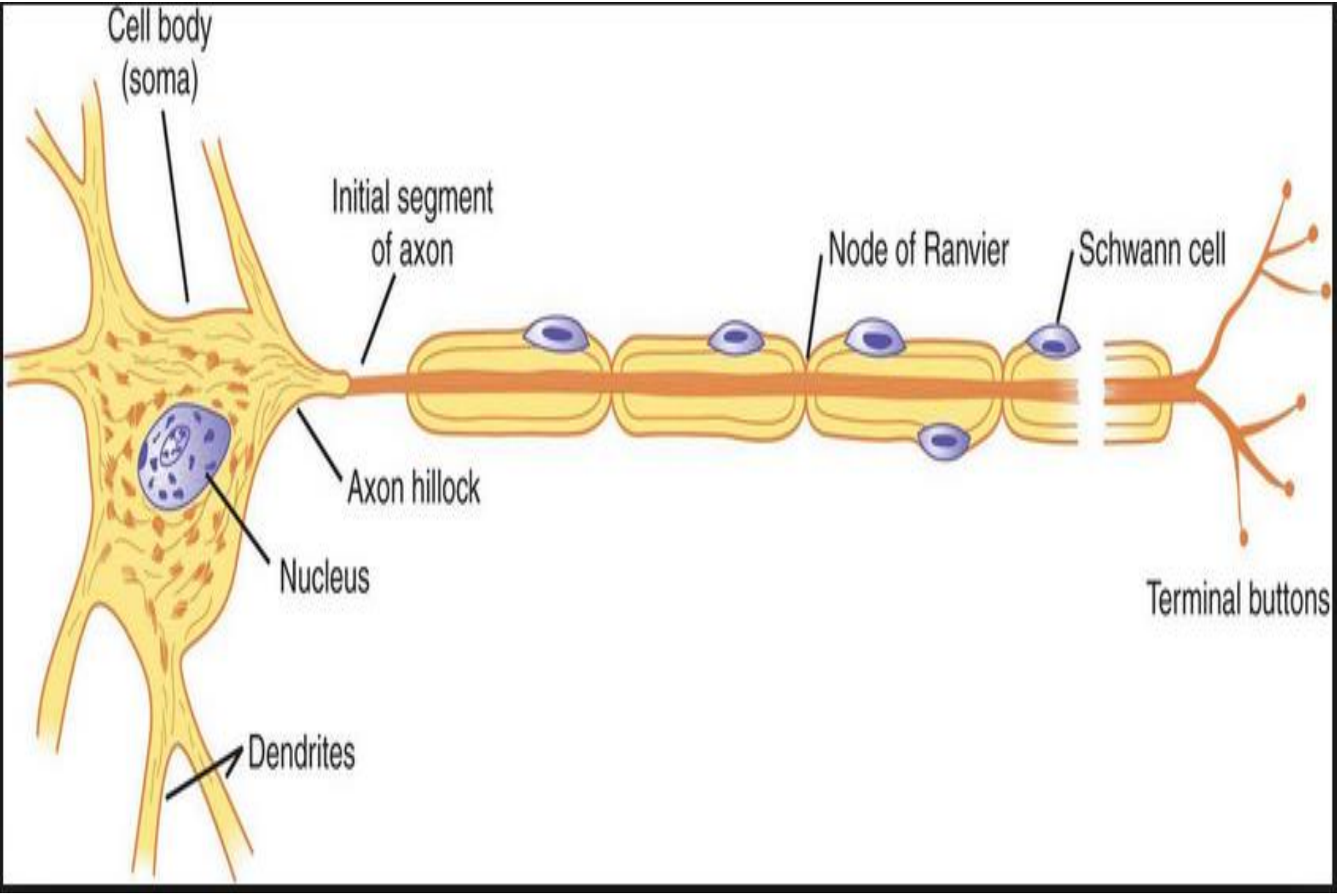
- **The site of communication between two neurons or between a neuron and an effector cell is called a synapse .**

- **The tips of some axon terminals swell into bulb-shaped structures called synaptic end bulbs.**

- In the nervous system, axons may be myelinated, or unmyelinated. This is the provision of an insulating layer, called a **myelin sheath.**
- In the peripheral nervous system axons are myelinated by glial cells known as **Schwann cells.**
- In the central nervous system the myelin sheath is provided by another type of glial cell, the **oligodendrocyte**.

- **Nodes of Ranvier (also known as *myelin sheath gaps*) are short unmyelinated segments of a myelinated axon, which are found periodically interspersed between segments of the myelin sheath.**

- **These nodes are areas where action potentials can be generated.**


Cell body
(soma)
Initial segment
of axon
Node of Ranvier
Schwann cell
Axon hillock
Nucleus
Terminal buttons
Dendrites

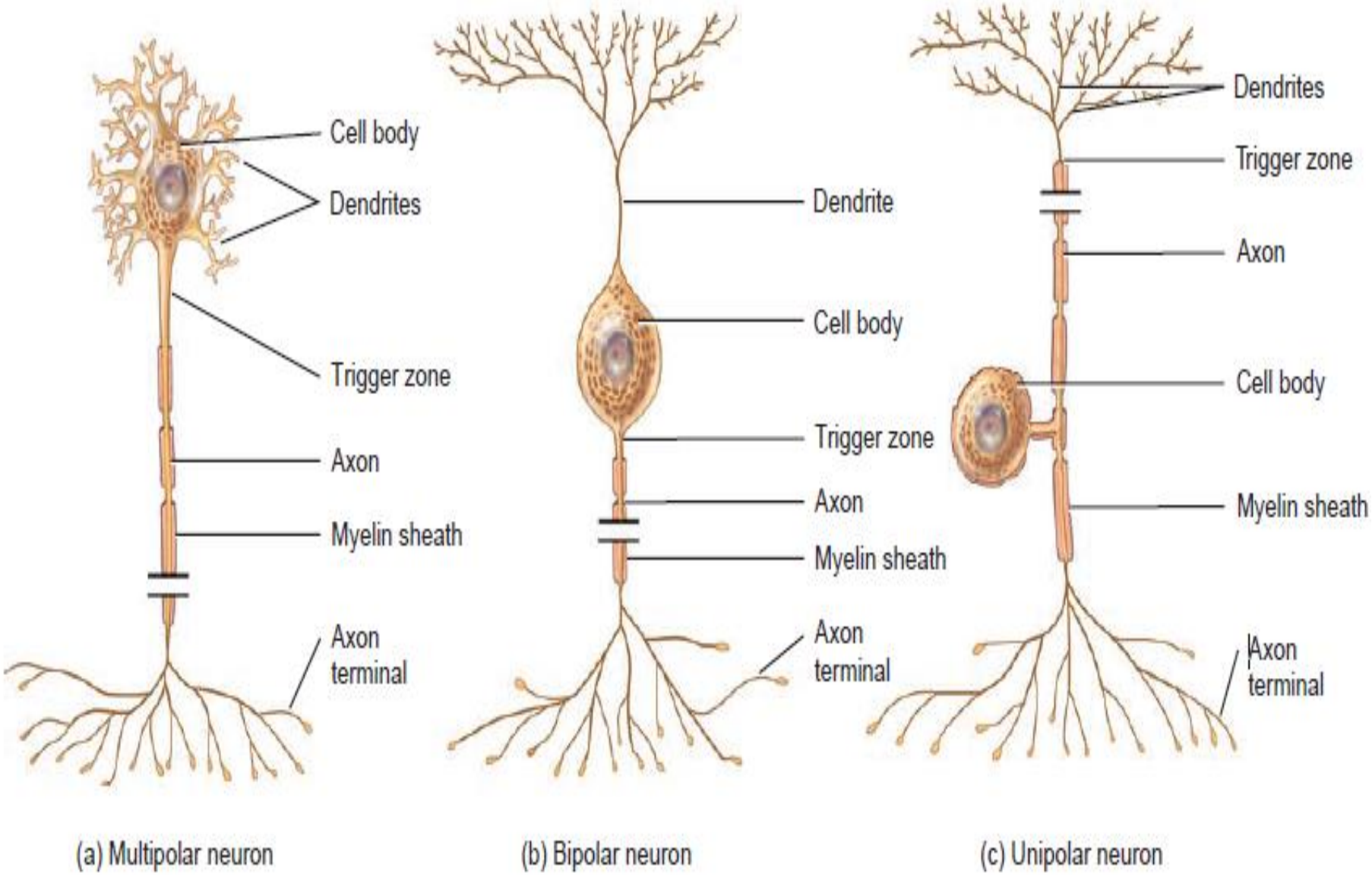
Classification of Neurons

STRUCTURAL CLASSIFICATION- according to the number of processes extending from the cell body .

1. **Multipolar- neurons usually have several dendrites and one axon . Most neurons in the brain and spinal cord are of this type.**
2. **Bipolar neurons- have one main dendrite and one axon. They are found in the retina of the eye, in the inner ear, and in the olfactory *area of the brain.***

3. **Unipolar neurons - have dendrites and one axon that are fused together to form a continuous process that emerges from the cell body.**

- **These neurons are more appropriately called pseudounipolar neurons because they begin in the embryo as bipolar neurons. During development, the dendrites and axon fuse together and become a single process.**
- **The cell bodies of most unipolar neurons are located in the ganglia of spinal and cranial nerves.**



(a) Multipolar neuron

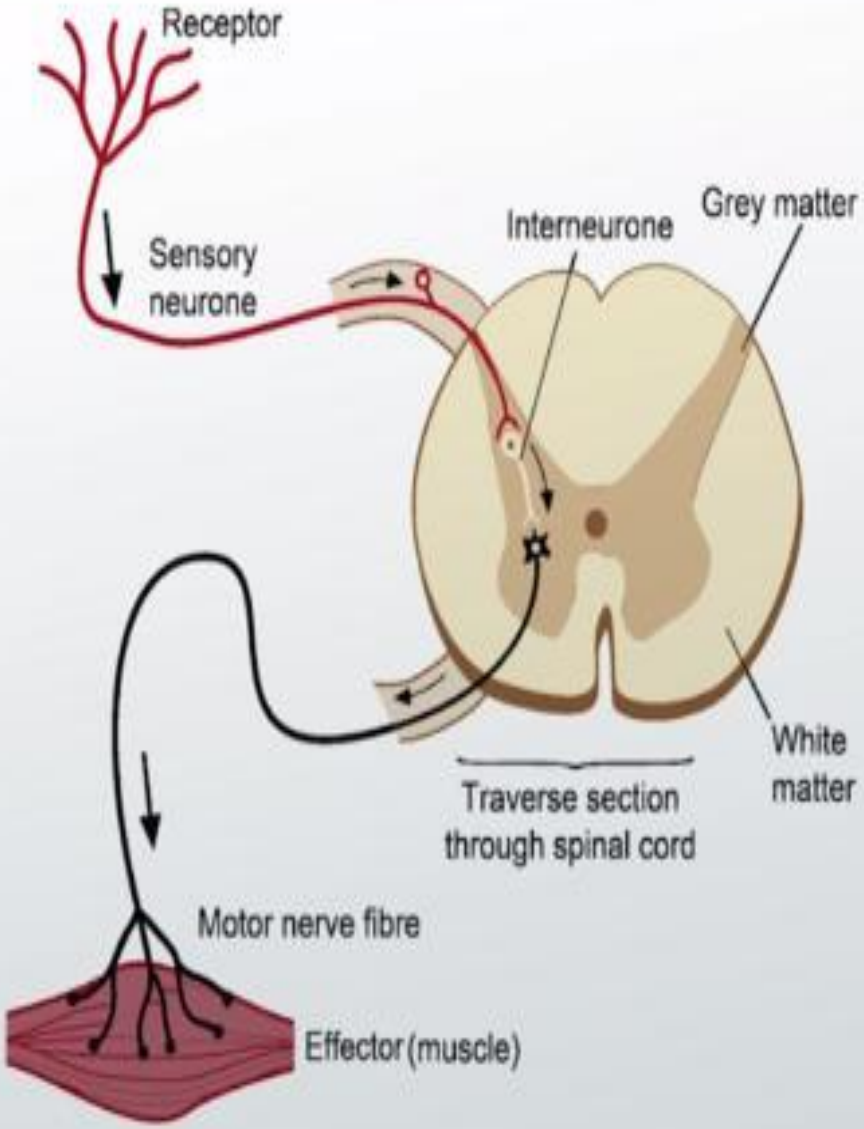
(b) Bipolar neuron

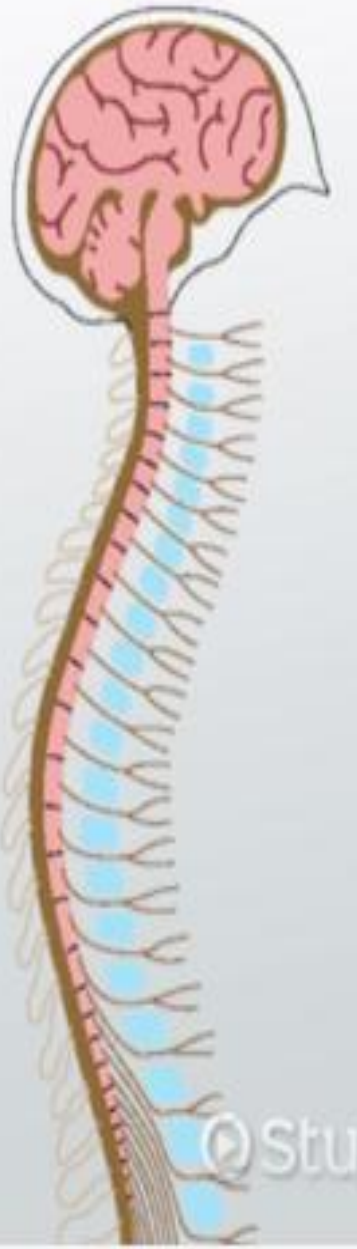
(c) Unipolar neuron

FUNCTIONAL CLASSIFICATION- **according to the direction in which the nerve impulse is conveyed with respect to the CNS.**

1. **Sensory or afferent neurons- impulse is conveyed *into the CNS through cranial or spinal nerves.***
2. **Motor or efferent neurons convey impulse *away from the CNS to effectors (*muscles and glands) in the periphery through cranial or spinal nerves .**
3. **Interneurons or association neurons are mainly located within the CNS between sensory and motor neurons.**

DEFINITION AND ROLE OF INTERNEURONS






THANKS