

# UNIT-I

## Nervous system

### (Organization of nervous system Neuron)



**Centurion**  
**UNIVERSITY**

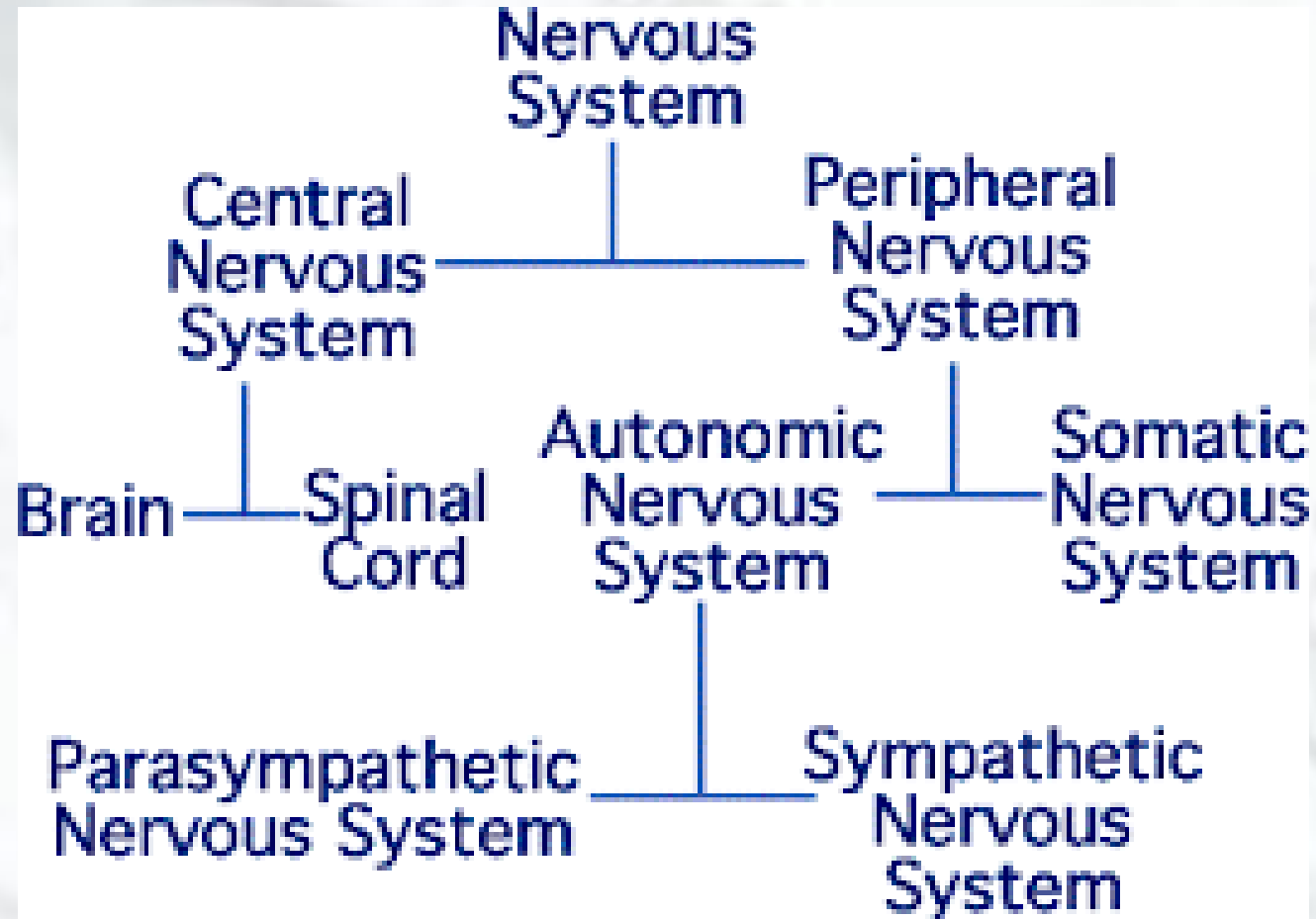
*Shaping Lives...  
Empowering Communities...*

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# NERVOUS SYSTEM

- Detects and responds to changes inside and outside the body.
- Together with the endocrine system, it controls many vital aspects of body function and maintains homeostasis.
- Nervous system provides an immediate response while endocrine activity is, in the main, slower and more prolonged
- The nervous system consists of the brain, the spinal cord and peripheral nerves.
- Response to changes in the internal environment regulates essential involuntary functions, such as respiration and blood pressure.
- Response to changes in the external environment maintains posture and other voluntary activities.

# Organization of Nervous System:

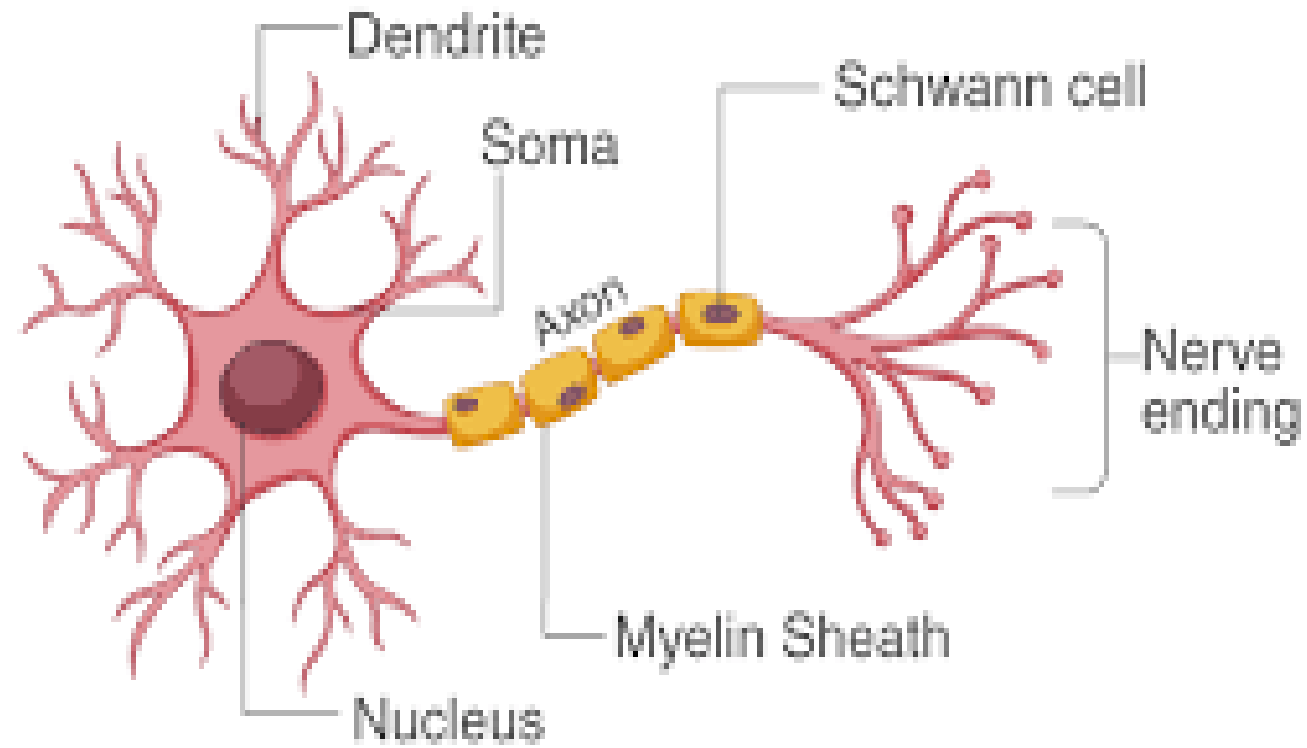


- Nervous system are grouped as follows:
- The central nervous system (CNS), consisting of the brain and the spinal cord
- The peripheral nervous system (PNS) consisting of all the nerves outside the brain and spinal cord
- The PNS comprises paired cranial and sacral nerves – some of these are sensory (afferent), some are motor (efferent) and some mixed.
- It is useful to consider two functional parts within the PNS: the sensory division the motor division
- Motor division is involved in activities that are:
- Voluntary – the somatic nervous system (movement of voluntary muscles)
- Involuntary – the autonomic nervous system (functioning of smooth and cardiac muscle and glands).
- The autonomic nervous system has two divisions: sympathetic and parasympathetic.
- The first sections of this chapter explore the structure and functions of the components of the nervous system, while the final one considers the effects of body function when normal structures do not function normally

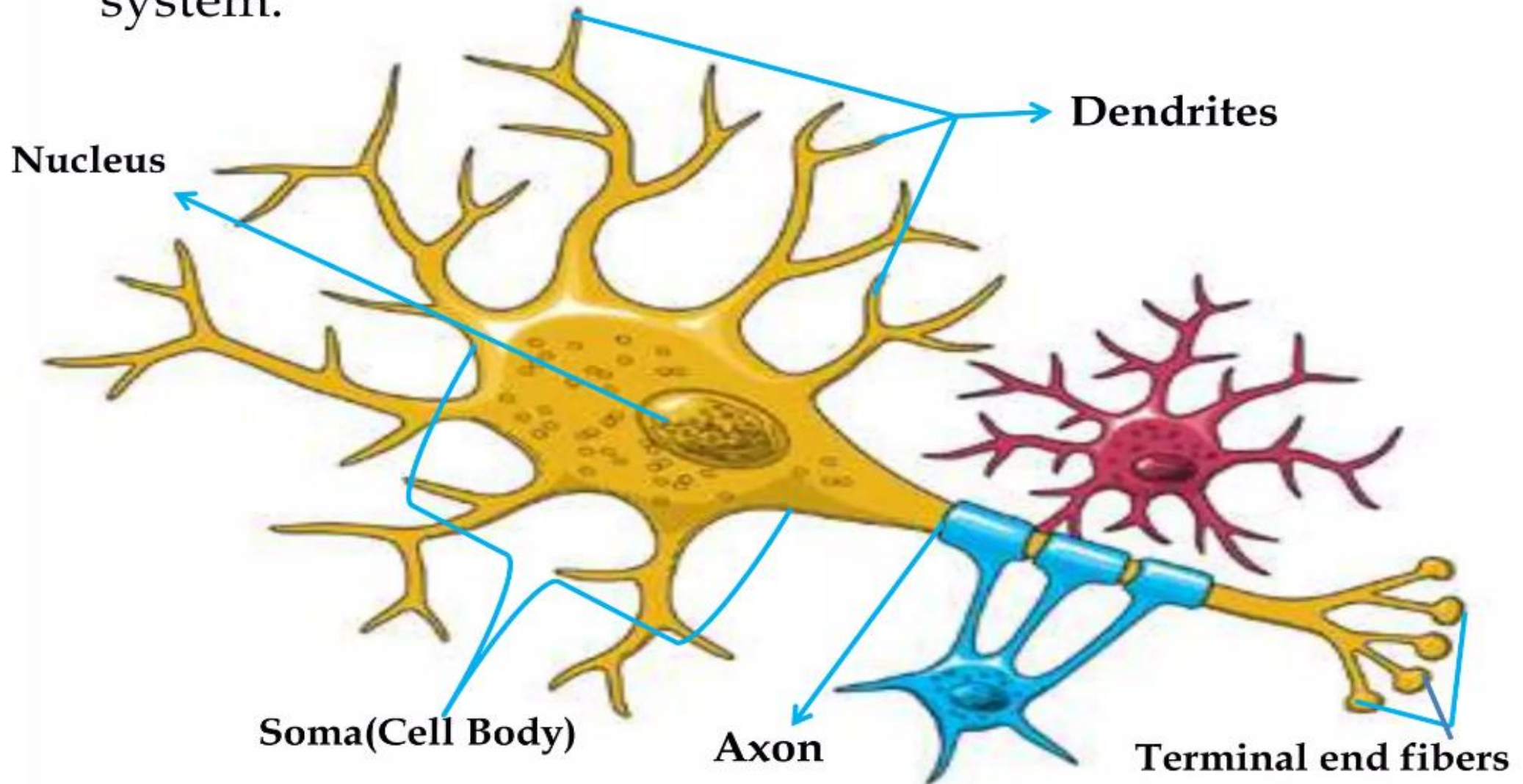
# Neurones

- The nervous system consists of neurons, which conduct nerve impulses and are supported by unique connective tissue cells known as neuroglia.
- Each neurone consists of a cell body and its processes, one axon and many dendrites. Neurones are commonly referred to simply as nerve cells
- Bundles of axons bound together are called nerves.
- Properties of neurones Neurones have the characteristics of irritability and conductivity
  - Irritability :outside the body, e.g. touch, light waves • inside the body
  - Conductivity means the ability to transmit an impulse

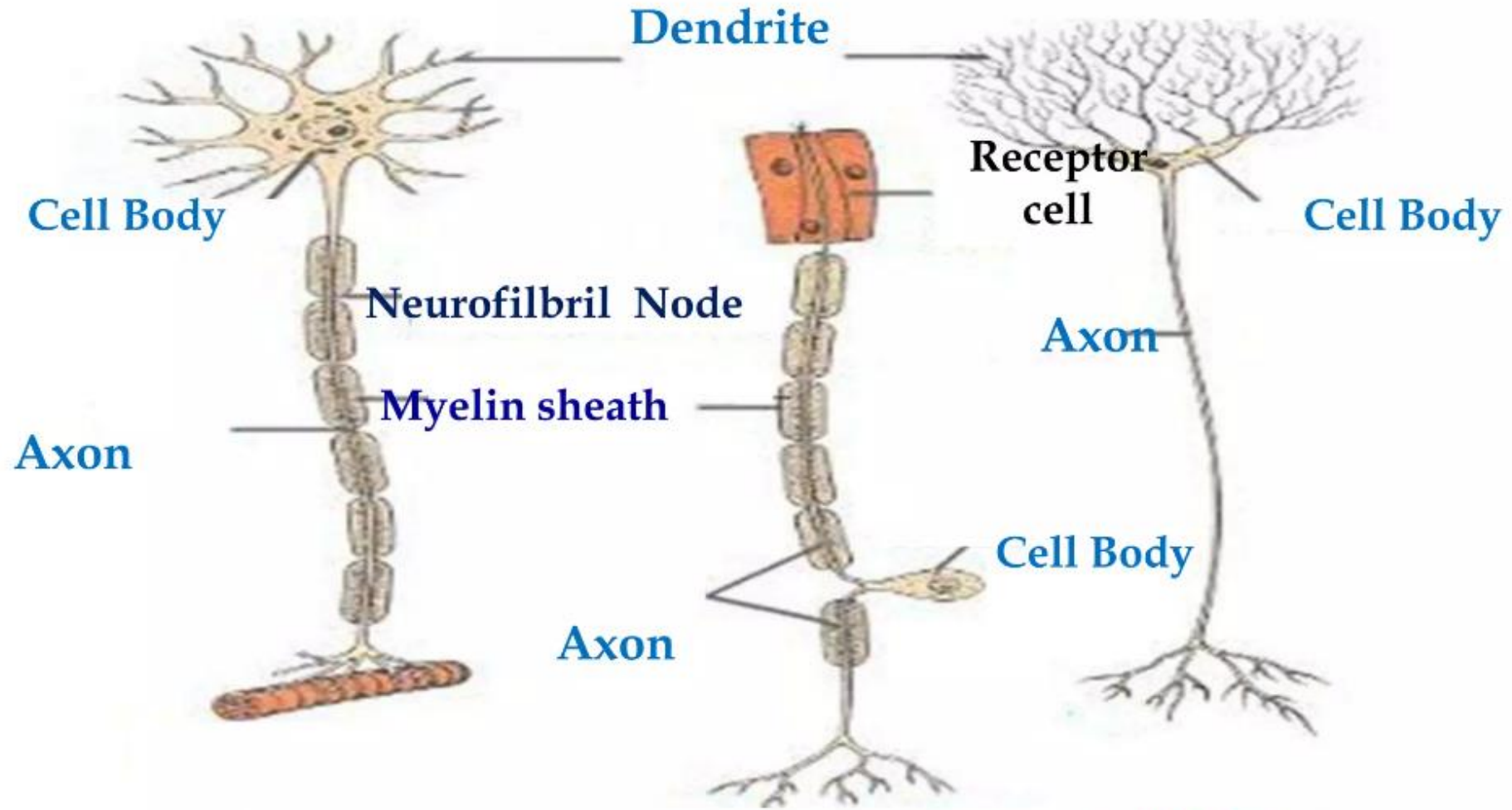
## STRUCTURE OF NEURON



**Neurons** (nerve cells) are the basic elements of the nervous system.



# TYPES OF NEURON



**(i) Efferent (motor) neuron**

**(ii) Afferent (sensory) neuron**

**(iii) Interneuron**



# Parts of Neuron:

## Cell body:

- Also known as soma
- Main processing centre of cell
- Consist of nucleus and organelles but centrioles is absent
- Produce gray matter
- Groups of cell bodies are called nuclei in the central nervous system and ganglia in the peripheral nervous system.

# Axons and dendrites

- Axons and dendrites are extensions of cell bodies and form the white matter of the nervous system.
- Axons are found deep in the brain and in groups, called tracts, at the periphery of the spinal cord.
- They are referred to as nerves or nerve fibres outside the brain and spinal cord.
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# Structure of an axon

- The membrane of the axon is called axolemma and it encloses the cytoplasmic extension of the cell body.
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- This consists of a series of Schwann cells arranged along the length of the axon.
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- Postganglionic fibres and some small fibres in the central nervous system are non-myelinated.

# Dendrites

- The dendrites are the many short processes that receive and carry incoming impulses towards cell bodies.
- They have the same structure as axons but they are usually shorter and branching. In motor neurones they form part of synapses and in sensory neurones they form the sensory receptors that respond to stimuli.

# Axon terminal

- At the end axon ends with axon terminal which is also known as synaptic nobe.
- Axon terminal conduct vesicles inside it, which contain neurotransmitter transfer information from one neuron to another.
- Tracts: bundle of nerve fibres in CNS
- Nerve : budle of nerv fibre PNS

# CLASSIFICATION OF NEURON

## ON THE BASIS OF FUNCTION

- SENSORY NEURON
- MOTOR NEURON
- ASSOCIATION  
NEURON/INTERNEURONS

## ON THE BASIS OF STRUCTURE

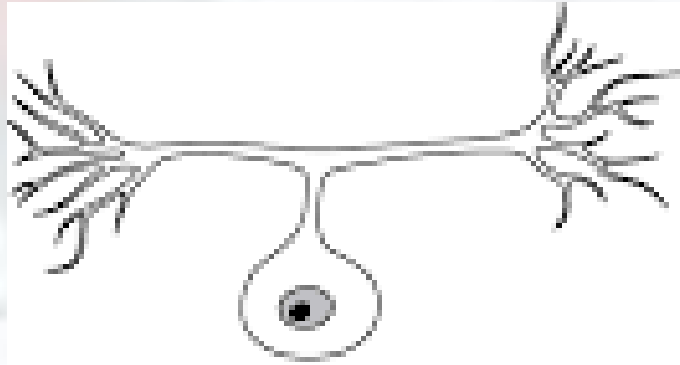
- MULTIPOLAR NEURON
- BIPOLAR NEURON
- UNIPOLAR

## On the basis of Function:

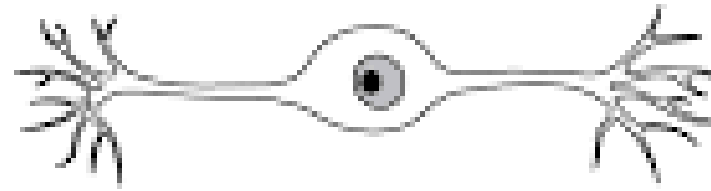
- ***Sensory or afferent nerves*** Sensory nerves carry information from the body to the spinal cord. The impulses may then pass to the brain or to connector neurones of reflex arcs in the spinal cord.
- ***Motor or efferent nerves*** Motor nerves originate in the brain, spinal cord and autonomic ganglia. They transmit impulses to the effector organs: muscles and glands.
- ***Mixed nerves*** In the spinal cord, sensory and motor nerves are arranged in separate groups, or tracts. Outside the spinal cord, when sensory and motor nerves are enclosed within the same sheath of connective tissue they are called mixed nerves.

## **On the basis of Structure:**

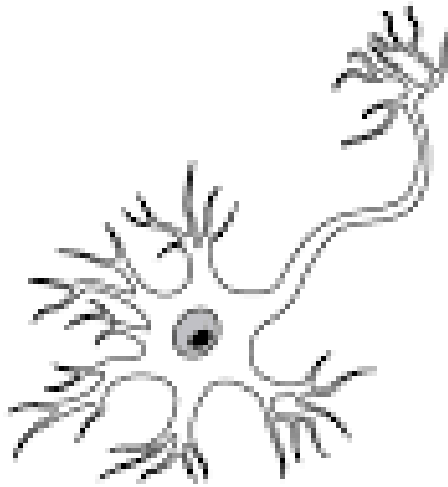
- **Multipolar Neuron:** these are those neurons in which cell body having multiple processes or extension.
- **Bipolar Neuron:** These are those neuron in which cell body having only two process or extension.
- **Unipolar Neuron:** these are those neuron in which cell body having only one process or extension.



Unipolar neuron



Bipolar Neuron



Multipolar Neuron





**Thank you**