

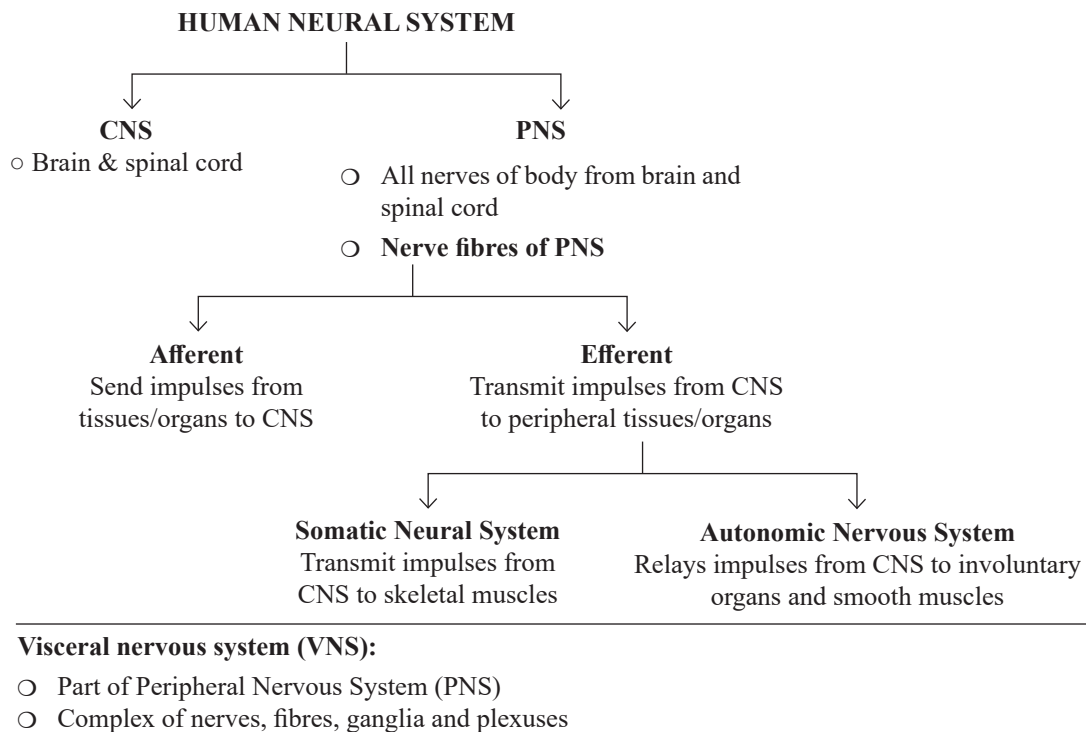
### Introduction

- ❖ The neural system and the endocrine system jointly coordinate and integrate all the activities of the organs so that they function in a synchronised manner.

### Neural System

Neurons can detect, receive & transmit stimulus

- ❖ *Hydra* – Network of neurons
- ❖ Insects – Organised neural system with brain and ganglia
- ❖ Vertebrates – Well developed neural system



### Neuron

- ❖ Neuron is the structural and functional unit of the neural system.
- ❖ Composed of a cell body, dendrites and axon.

Nissl's Granules

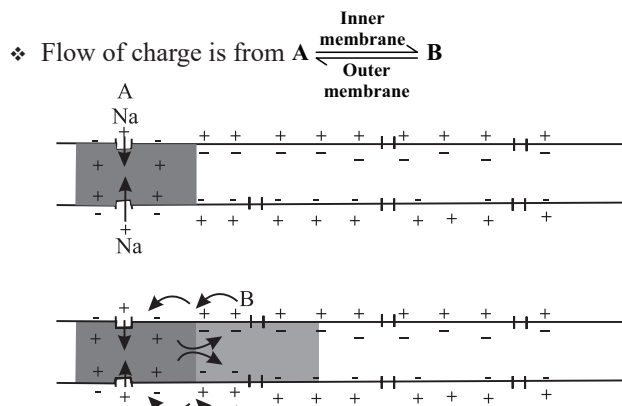
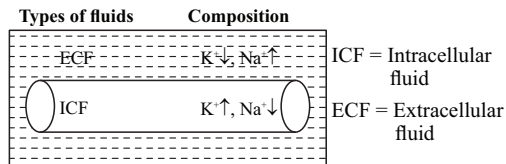
- ❖ Three types of Neurons: Multipolar, Bipolar, Unipolar.
- ❖ Cell body contains cell organelles except centriole.
- ❖ Axons can be myelinated or non-myelinated

- + CNS → oligodendrocytes → myelination
- + PNS → Schwann cells → myelination

## Generation and Conduction of Nerve Impulse

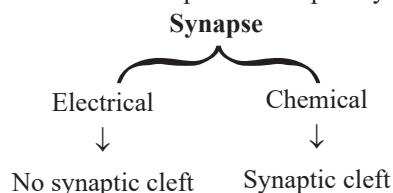
**Axon membranes (selectively permeable)** →

- More permeable for  $K^+$
- Nearly impermeable to  $Na^+$
- Impermeable to negatively charged proteins
- Sodium-potassium pump maintain ionic gradients



## Transmission of Impulse

- ❖ Done with the help of synapse.
- ❖ **Events:**
  - + Neurotransmitters released in synaptic cleft
  - ↓
  - + Bind to receptors on post synaptic neuronal membrane
  - ↓
  - + Opening of ion channels in post synaptic membrane
  - ↓
  - + Generates a new potential in post synaptic membrane



## Central Nervous System (CNS)

**Protective coverings**

- Skull
- Meninges

	Outer	Middle	Inner
<b>Name of meninx</b>	Duramater	Arachnoid (Thin)	Piamater
<b>In contact with</b>	Skull		Brain

## Brain

### Forebrain

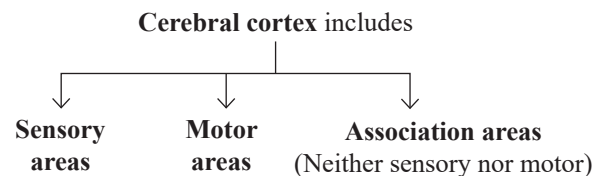
- ❖ Cerebrum → cerebral hemisphere connected by corpus callosum.
- ❖ Thalamus.
- ❖ Hypothalamus.
- ❖ Limbic system → complex structure involve amygdala, hippocampus, inner part of cerebral hemisphere and Hypothalamus.

### Midbrain

- ❖ Corpora Quadrigemina → 4 lobes on dorsal side.
- ❖ Cerebral Aqueduct → canal passes through midbrain.
- ❖ Brain stem: Midbrain, pons and medulla oblongata.

### Hindbrain

- ❖ Pons
- ❖ Cerebellum
- ❖ Medulla oblongata



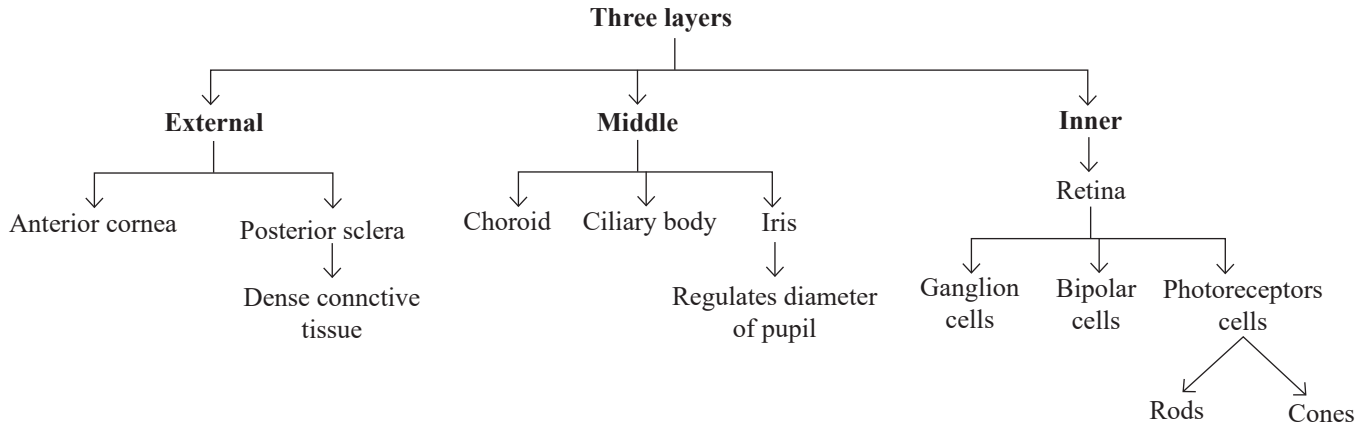
## Reflex Action and Reflex ARC

- ❖ Entire process of response to a peripheral nervous stimulation that occur involuntarily and require the involvement of a part of the CNS.

## Sense Organs

- ❖ Sensory organs senses all type of changes that takes place in the surrounding.
  - E.g. Nose → Smell → Olfactory receptors.
  - Tongue → Taste → Gustatory receptors.
  - Eye → Sight
  - Ear → Hearing

## Eye



- ❖ Macula lutea - Yellowish pigmented spot lying at the **posterior pole** of eye lateral to the blind spot with a central pit called **fovea centralis**.
- ❖ Photoreceptors contain photopigment which is an aldehyde of vitamin A/retinal and protein, opsin.

## Mechanism of Vision

- ❖ Visible light → Photosensitive → Rhodopsin (retinal + opsin) → Trans-retinal → Opsin (Change in structure) → Membrane permeability changed → Action potential generate → Ganglionic cells → Bipolar cells → Optic nerve → Visual cortex.

## Ear

