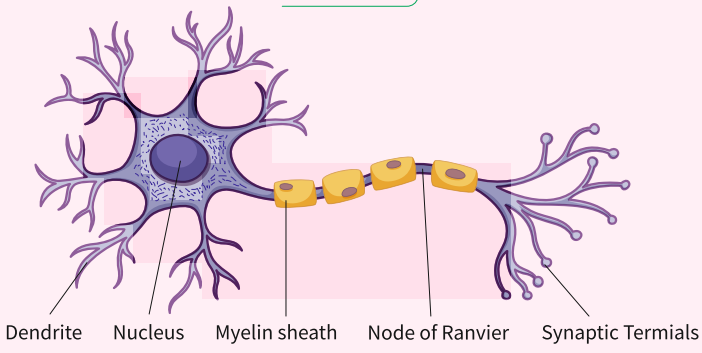
HUMAN NEURAL SYSTEM

- **CNS**
  - **BRAIN**
  - **SPINAL CORD**
- **PNS**
  - **SOMATIC NEURAL SYSTEM**
  - **AUTONOMIC NEURAL SYSTEM**
    - Sympathetic
    - Parasympathetic

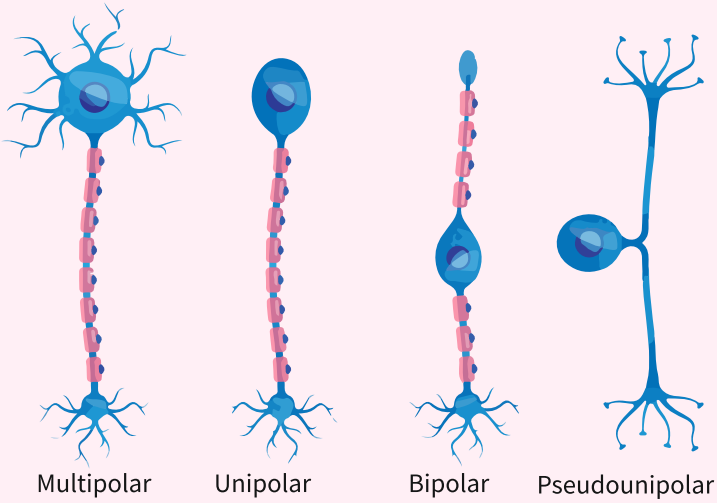
- CNS is site of information Processing & control.
- PNS comprises of nerves associated with CNS. Nerve fibers are of 2 types:- afferent fibers and efferent fibers.

- Somatic Neural system relay impulses from CNS to Skeletal Muscles.
- Autonomic Neural system transmit impulses from CNS to involuntary organs & Smooth Muscles of body.
- Neuron is the structural & functional unit of Neural system.

NEURON



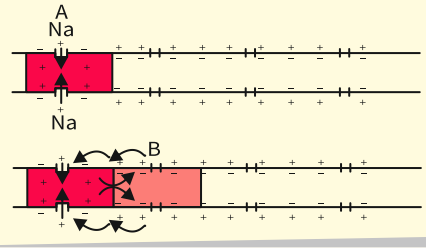
- Neuron is the microscopic structure ; 3 major parts cell body, dendrites & axon.
- Neuron can be unipolar, bipolar & multipolar ; myelinated & non-myelinated.
- Axon is long fiber for transmission of impulses. Their distal end is branched which terminates as synaptic knob (filled with synaptic vesicles possessing neurotransmitters)
- Schwann cells form the myelin sheath around the axon.
- Nodes of Ranvier is the gap between two adjacent myelin sheaths.
- Neurons are excitable cells, when neuron not conducting any impulse it is resting at this stage, its electrical potential is resting potential (outer - positive ; inner – negative).



18. NEURAL CONTROL AND COORDINATION

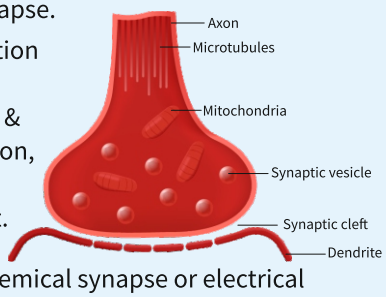
Generation and Conduction of Nerve Impulse

The electrical potential difference across the resting plasma membrane is called as the resting potential. When a stimulus is applied at a site A on the polarised membrane: becomes freely permeable to Na+ - rapid influx of Na+ site A is thus depolarised. The electrical potential difference across the plasma membrane at the site A is called the action potential, which is in fact termed as a nerve impulse.



SYNAPSE STRUCTURE

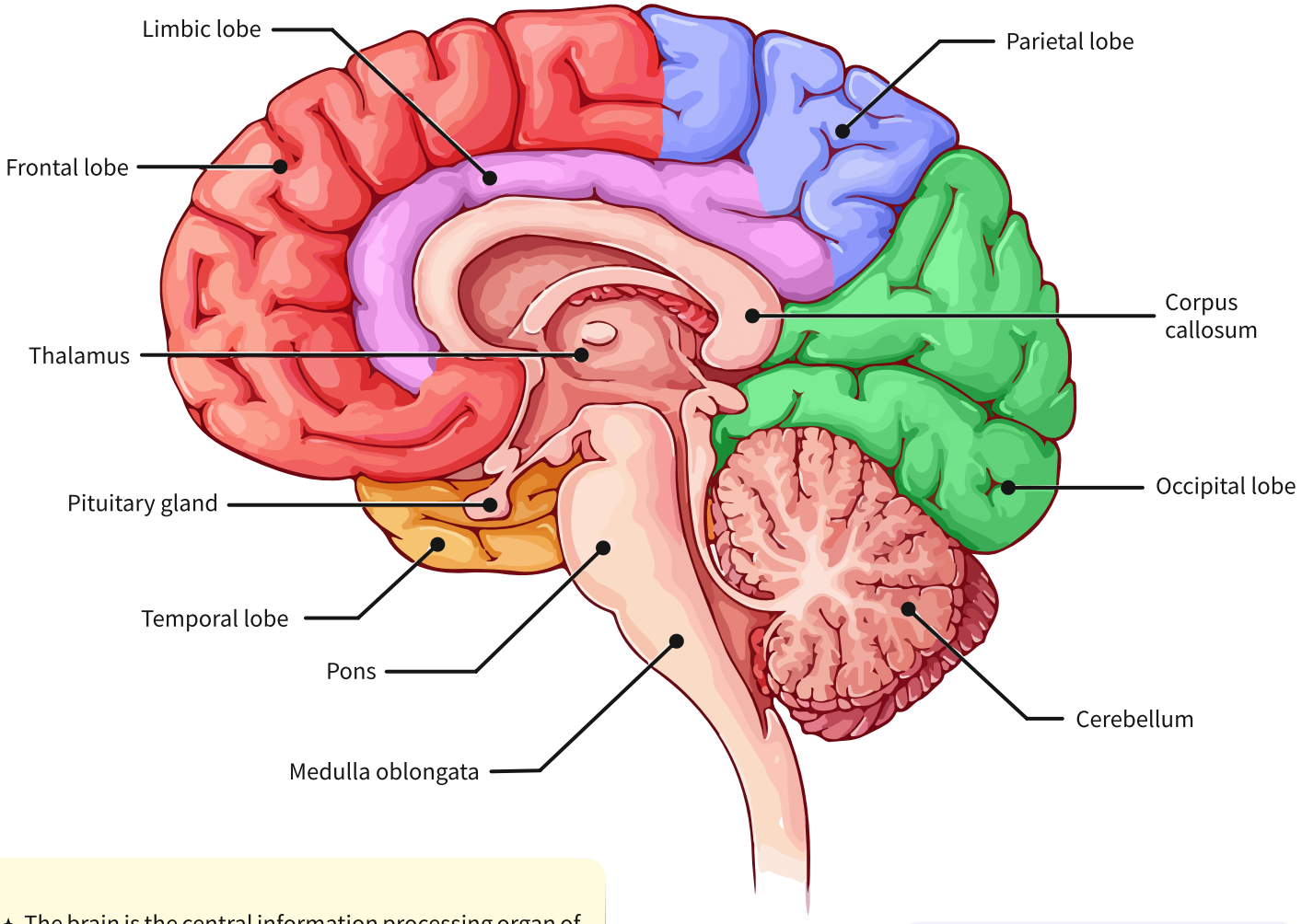
- Transmission of impulse from one neuron to another occurs through Synapse.
- Synapse is the junction of membranes of presynaptic neuron & post– synaptic neuron, separated by a gap called synaptic cleft.



- Synapses can be chemical synapse or electrical synapse.
- Chemical synapses release neurotransmitters to transmit the impulse (action potential) from one neuron to next.
- Ions are responsible for transmission of impulses from one neuron to next in electric synapses.

CENTRAL NEURAL SYSTEM

Brain acts as "command & control center" of the human body. It is central Information processing organ of body.



- The brain is the central information processing organ of our body, and acts as the 'command and control system'.
- It controls the voluntary movements, balance of the body, functioning of vital involuntary organs (e.g., lungs, heart, kidneys, etc.), thermoregulation, hunger and thirst, circadian (24-hour) rhythms of our body, activities of several endocrine glands and human behaviour.
- It is also the site for processing of vision, hearing, speech, memory, intelligence, emotions and thoughts.
- The human brain is well protected by the skull. Inside the skull, the brain is covered by cranial meninges consisting of an outer layer called dura mater, a very thin middle layer called arachnoid and an inner layer (which is in contact with the brain tissue) called pia mater.
- The brain can be divided into three major parts: (i) forebrain, (ii) midbrain, and (iii) hindbrain

BRAIN

- **Forebrain**
  - Cerebrum
  - Thalamus
  - Hypothalamus
- **Midbrain**
  - Corpora quadrigemina
- **Hindbrain**
  - Pons
  - Cerebellum
  - Medulla

BRAIN

- **Cerebrum** – Major part of human brain. It has two halves – left and right. Left and right cerebral hemispheres connected by corpus callosum.
- **Thalamus** – Major co-ordination Centre for sensory & motor signalling.
- **Hypothalamus** – Controls the desire of eating and drinking. It also controls body temperature; It also releases hypothalamic hormones that control endocrines.
- **Medulla** – Control center of respiratory, cardiovascular & gastric reflexes.