NEURAL CONTROL AND COORDINATION

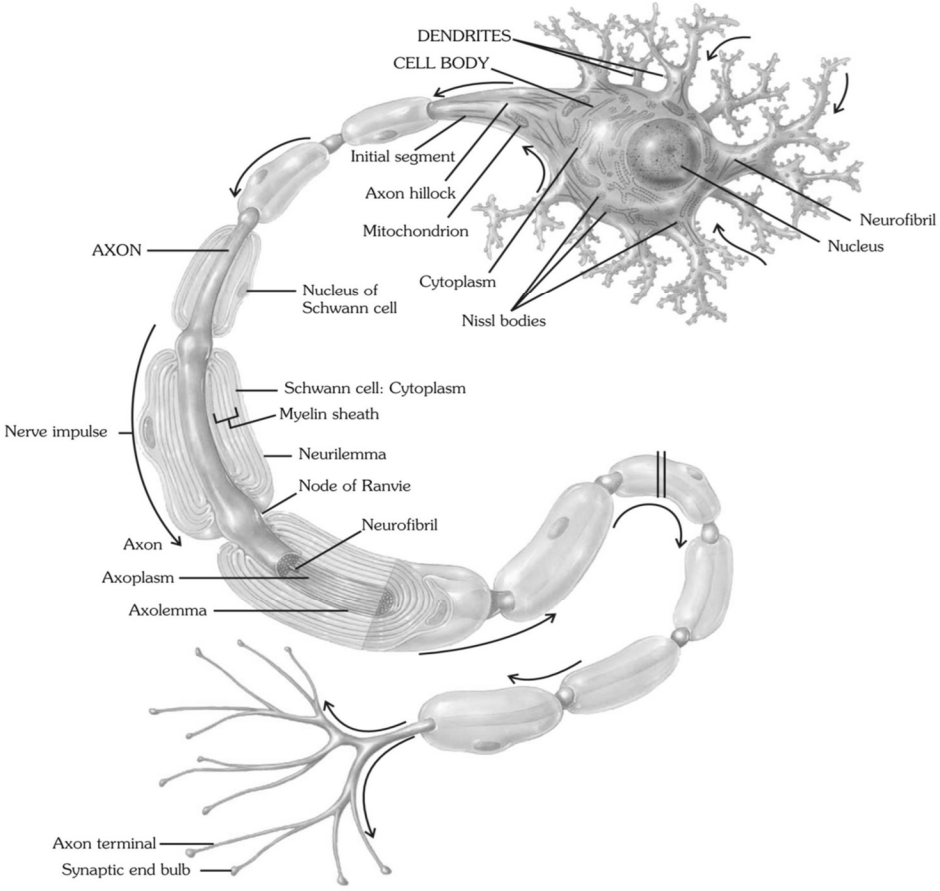
NEURON AS STRUCTURAL AND FUNCTIONAL UNIT OF NEURAL SYSTEM

Neuron as Structural and Functional Unit of Neural System

Neurons, commonly known as nerve cells, serve as both the structural and functional units within the neural system. The human brain, on average, consists of over 100 billion (10^{10}) neurons, and similar numerical abundance characterizes other components of the neural system, whether in the central nervous system (CNS) or the peripheral nervous system (PNS). Neurons form intricate connections with each other or with other cells in the body, establishing complex neural networks for the exchange of information. Recognized as the functional units of the neural system, neurons play a pivotal role in executing various functions associated with neural systems.

Structure Of a Neuron

A nerve cell is made up of cell body & cell processes like dendron and axon:



A nerve cell is made up of cell body & cell process: (Dendron and Axon = Neurites)

(A) Cell body or Cyton or soma or perikaryon:

- It contains uninucleate cytoplasm.
- Except centriole, all cell organelles are found in cytoplasm.
- Centriole is absent in the nerve cell thus cell division is absent.
- Some other cell organelles like Nissl's granule and neurofibril are also found in nerve cell.

(i) Nissl's granules:

- Endoplasmic reticulum & ribosome form granules like Structure called a Nissl's granules or Tigroid body.
- These are the centre of protein synthesis.
- Site- Cyton dendron

(ii) Many small fibrils are found in the cytoplasm called neurofibrils, these help in internal conduction in the Cyton.

(B) Cell processes:

(i) Dendron:

It is small cell process. Its fine branches are called dendrites. Some receptors are found on the dendrites, so dendron receive the stimuli & produce centripetal (towards the cell body) conduction.

(ii) Axon (Long process = Axon = Nervefibre):

- It is longest cell process of Cyton, its diameter is uniform.
- Axon is covered by Axolemma. Part of Cyton where axon arises called Axon hillock.
- Cytoplasm which contains in axon is axoplasm.
- Nissl's granules are absent in the axoplasm.
- Axoplasm of axon contains only neurofibrils and initochondria.
- The axon hillock is the neuron's trigger zone, because it is the site where action potential are triggered.
- The terminal end of axon is Telodendria and button shape structure are called as Synaptic knob, which possess synaptic vesicles containing chemicals called neurotransmitters. The axons transmit nerve impulses away from the cell body to a synapse or to a neuro-muscular junction.
- More mitochondria are found in the telodendria which synthesize neurotransmitters like Acetylcholine (Ach) with the help of Acetyl-choline transferase enzyme.
- Axon is the functional part of nerve cell; therefore, term nerve fibres usually refer to Axon.

Differences between Axon & Dendron

Axon	Dendron
1. It is always single in a neuron. 2. It has no Nissl's granules. 3. It is long.	1. One or more. 2. Nissl's granules present. 3. Short.

4. Nerve impulse travels away from the cell body. (Centripetal)	4. Nerve impulse travels towards the cell body. (Centripetal)