Anatomy and Physiology

Nervous System

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Neuron and Neuroglia

- Nervous system is made of Nervous tissue
- Nervous tissue contains densely packed nerve cell (neuron) which are specialized for nerve impulse conduction and supporting cells called Neuroglia.

Neuron:

- About 100 billion of neurons are present in nervous system.
- They are Specialised type of cell, they vary in shape and size, all neurons contain three principle parts- Cell Body, Dendrites and An Axon.

Cell body

- Has a large nucleus, which contain prominent nucleolus, as well as other several structures (Nissl bodies, ER, lysosome, mitochondria, neurofilament), responsible for metabolism, growth and repair of neuron
- Nissl bodies- made up of RNA, RER and free ribosome, help in protein synthesis
- Neurofilament and neurotubules are thread like protein, runs parallel to long process
- Neurofilament- semisolid structure that provide skeletal framework to axon
- Neurotubules- transport intracellular proteins between cell body and the processes

Dendrites-

- Many thread cytoplasmic extension arises from cell body called dendrites
- It conducts nerve impulse toward the cell body
- They are myelinated and have Nissl's granule and neurofibril

Axon-

- Usually one of the cytoplasmic extension is long and unbranched called axon.
- It is covered by lipid sheath called myelin sheath
- Myelin sheath is formed by specialized non-neural cell called schwann cell (neurolemmocytes) in PNS and by Oligodendrocytes in CNS. The outer sheath of these cell is known as neurolemma
- It conduct nerve impulse away from cell body
- It lacks nissl's granules

Neuroglia

Glial cells are non-conducting cells that protect and nurture as well as support cells of nervous tissue.
There are **4 types** of neuroglia cells

1. **Astrocytes**– Largest, most numerous glial cell, with long star like processes, help form the blood –brain barrier. **Function:** structural support, transport of substance between blood vessels and neurons, mop up excess ions (k) and neurotransmitters.
2. **Oligodendrocytes-** relatively small, with several branching processes, found in grey and white matter of CNS, **function**: produce myelin sheath
3. **Microglial cell**–smallest glial cell, cuboidal or columnar shaped, it is a macrophage, engulf damaged neuron.
4. **Ependymal cell-**elongated cell, arranged in single layer in inner lining of spinal cord and ventricle of brain.