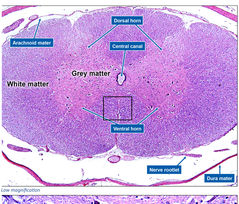
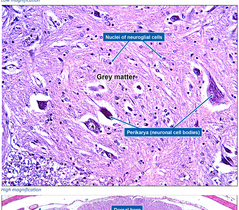
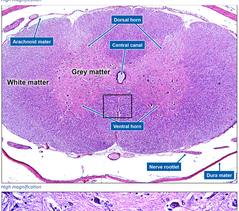
SPINAL CORD

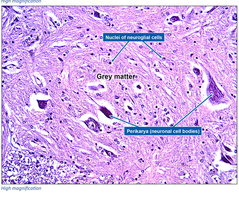
Nervous System

The grey and white matter are seen on the cross-sectional view of the Spinal cord. The spinal cord is surrounded by three meningeal layers: Dura, Arachnoid, and Pia mater.









- **Dura Mater:** outer most layer of meninges, made of dense, fibro-elastic connective tissue. Dura means tough.
- **Skull:** Dura mater is adherent to the periosteum. Intracranially, dura mater has two layers: Outer endosteal layer: continuous via the skull sutures and foramina with the periosteum. Inner meningeal layer: continuous inferiorly with the theca of the spinal cord. Extra-dural (Epidural) Haemorrhage: Blood accumulates between these two layers of Dura; this is an absolute emergency. Epidural space in the skull is a potential space.
- **Vertebrae**: A real Epidural space exists between dura mater and periosteum, consisting of plexus of veins and loose areolar connective tissue. This is the site of "epidural" anaesthesia used to reduce labour pain in a lady giving birth.
- **Arachnoid Mater**: middle meningeal layer.
- A connective tissue sheet exists between dura mater and pia mater.
- Pia mater (innermost layer) is connected with a loosely distributed trabeculae of collagen and fibroblasts to the underlying brain parenchyma.
- Arachnoid mater protects brain & spinal cord from sudden impacts.
- CSF circulates in the subarachnoid space.
- Blood vessels float in the subarachnoid space.
- Subarachnoid haemorrhage: Bleeding into subarachnoid space. Medical emergency. CSF contaminated with blood.
- **Grey Matter:** Consists of a large concentration of neuronal cell bodies and astrocytes, which gives it a grey colour.
- It constitutes the brains outermost layer.
- Grey matter of the spinal cord is arranged in a butterfly-shape.
- **Dorsal horn**: site where somatosensory fibres terminate, via the dorsal root of the spinal nerves.
- **Dorsal Root Ganglion (DRG)**: Herpes zoster virus may stay dormant for decades in the DRG.
- Central Canal extends through the entire length of the spinal cord from conus medullaris in the lumbar spine to the caudal angle of the fourth ventricle.
- Lined by ependymal cells.
- Embryologically remnant of primordial neural tube lumen.
- Ventral Horn - contains cell bodies of lower motor neurons.
- Lower motor neuron starts from ventral horn until it innervates muscle fibres.
- Blood-brain barrier (BBB) is a highly selective semipermeable border of endothelial cells that regulates the transfer of solutes and chemicals between the circulatory system and the central nervous system, thus protecting the brain from harmful or unwanted substances in the blood.
- The BBB is formed by "**endothelial**" cells of the capillary wall, "**astrocyte**" foot process, and pericytes embedded in the capillary basement membrane.
- Lateral horn is present only in the thoracic and upper lumbar regions (T1 to L2). Preganglionic Sympathetic fibres arise from the lateral horn of T1 to L2.
- Lateral horn is also present in the sacral segment of the spinal cord (S1 to S3). Preganglionic **Para**sympathetic fibres arise from the lateral horn of S1 to S3.
- Glia (neuroglia) are NON-neuronal cells in central nervous system (CNS) (brain & spinal cord) and peripheral nervous system (PNS) that do NOT produce action potentials.
- Neuroglia makes up more than half the volume of neural tissue.
- They maintain homeostasis, form myelin in the PNS, and provide support and protection for neurons.