

1. Peripheral nerve

> Peripheral nerves are collections of nerve fibres (axons). These may be myelinated or unmyelinated.

> Efferent fibres are axons of neurons (the cell bodies of which are) located in the grey matter of the spinal cord or of the brainstem. Afferent nerve fibres are processes of neurons that are located in sensory ganglia

> In the peripheral nerves each nerve fibre with its Schwann cell and basal lamina is surrounded by a layer of connective tissue called the **endoneurium**. The endoneurium contains collagen, fibroblasts, Schwann cells, endothelial cells and macrophages.

> The Schwann cells are responsible to producing myelin sheath in peripheral nerves,

Note: In the peripheral nerve section, 90% of nuclei are of Schwann cells and only 10% belong to connective tissue cells.

> Endoneurium holds adjoining nerve fibres together and facilitates their aggregation to form **fasciculi**.

> Each fasciculus is surrounded by a thicker layer of connective tissue called the **perineurium**. The perineurium is made up of layers of flattened perineural cells separated by layers of collagen fibres.

> The fasciculi are held together by a fairly dense layer of connective tissue that surrounds the

entire nerve and is called the **epineurium**

> H&E staining: Axons, endoneurium, perineurium, and epineurium is stained. Myelin gives empty appearance.

> Special stain is used to visualise myelin sheath - **osmium tetroxide stains myelin sheath black**.

> Blood vessels (vasa nervorum) are present only in epineurium and perineurium.

Endoneurium does

not have blood vessels. Nerve fibers receive nutrition by diffusion through endoneurium.

> The blood-nerve barrier (BNB) is a physiological boundary that prevents substances from entering nerve fibers from the blood plasma. It's similar to the blood-brain barrier (BBB) and is considered the second most restrictive vascular system in the body. The BNB is made up of epineurium, perineurium and endoneurium. BNB regulates the internal microenvironment of the peripheral nerve, which is essential for effective axonal signal transduction.