

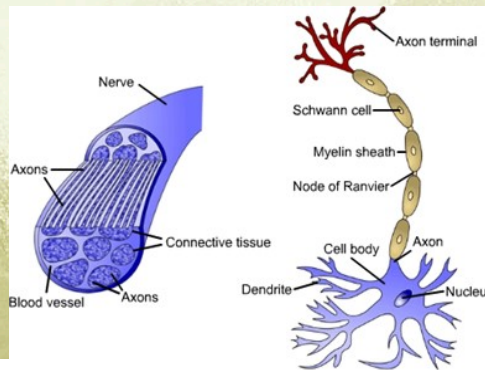
## Nerves and neurones

The basic unit of the nervous system is a cell called a **neurone (or neuron)**. A neurone consists of a **cell body**, a **dendrite** and an **axon**. There are 3 main types of neuron: **motor**, **sensory** and **connector (relay)**.

**Motor nerves** contain motor fibres which **move muscles**. **Sensory nerves** contain sensory fibres to **carry sensory impulses**.

**Mixed nerves contain both** motor and sensory fibres e.g. spinal nerves.

Some neurones are microscopic but others may have axons of over one metre in length. Bundles of neurones are collectively known and these are arranged in **bundles (tracts)** in the central nervous system. In the peripheral nervous system, they are arranged in clumps called **ganglia**.



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### The Structure of a Neurone

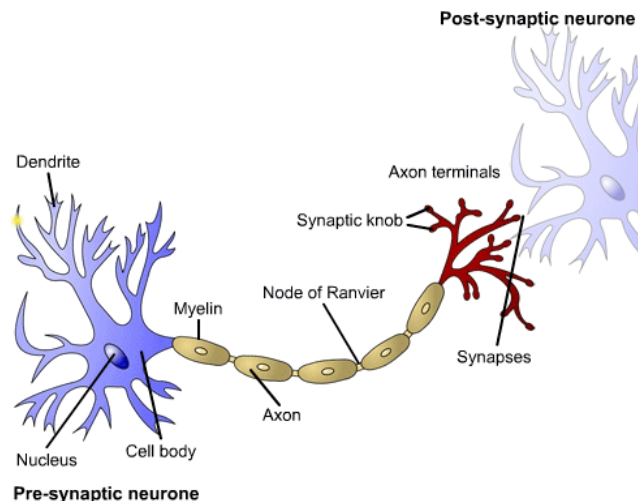
Specialized cells called **Schwann cells** form a **protein-lipid** layer around the **axon** called the **myelin sheath**. This provides **protection and insulation** for the electrical nervous impulse and increases the speed of the nervous impulse.

This layer is interrupted at intervals by narrow gaps called the **Nodes of Ranvier** where the axon membrane is exposed to the surrounding fluid (containing **sodium ions**), making **action potentials** possible only at these gaps. The action potential (**nervous impulse**) 'jumps' from node to node along the axon allowing impulses to travel along an axon very quickly. Some nerves, however, do not contain myelin and are **un-myelinated**.

Neurons are positioned end to end but do not touch – the gap in between each neurone is called a **synaptic cleft** or **synapse**. The axon terminal of one neuron lies next to the dendrite of another. The axon terminal ends in a bulbous structure called the **synaptic knob**, and contains vesicles that hold chemicals called **neurotransmitters**.

Neurotransmitters can continue the nervous impulse on to the next neurone by travelling across the synaptic cleft, through the **postsynaptic membrane** of a **dendrite** in the neighbouring neurone and stimulating an action potential along the next neurone.

Synapses are essential along the nerve fibres as they control the passage of information from one neurone to the next. Impulses move from the **pre-synaptic neurone** (before the synapse), across a **synaptic cleft** and onto the **post-synaptic neurone**.



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