

A synapse is a junction between two neurones or the junction between a neurone and an effector. Impulses are transmitted from the axon terminal of one neurone to the dendron of another neurone. Nerve impulses are transmitted by chemicals (neurotransmitters) from the neurones and are broken down by enzymes. Neurotransmitters cross the synaptic cleft and bind to a specific receptor on the receiving neurone or effector. Neurotransmitters are broken down through enzymes.

A nerve is a bundle of nerve fibres enclosed in a sheath of connective tissue. Nerves emerge from the central nervous system. They contain sensory fibres, motor nerve fibres or a mix of both.

The spinal cord passes through the vertebral column which protects it. Spinal nerves branch out along the spinal cord and branches to supply nerve fibres to various parts of the body.

Parts of the Spinal Cord/Brain

- Grey Matter- Consists of the cell bodies of neurones and forms the outer layers of the brain and the central part of the spinal cord.
- White matter- Consists of the nerve fibres and forms the central layers of the brain and the outer parts of the spinal cord.
- Central Canal- Contains a fluid called cerebrospinal fluid that brings nutrients to the spinal cord.
- Dorsal Root- The dorsal root joins the dorsal part of the spinal cord. It contains only the nerve fibres of sensory neurones that transmit impulses to the spinal cord.
 - Dorsal Root Ganglion- A small swelling in the dorsal root that contains the cell bodies of the sensory neurones.
- Ventral Root- The ventral root joins the ventral part of the spinal cord. It contains the nerve fibres of the motor neurones that transmit impulses from the spinal cord.
- Spinal nerve- The dorsal root and ventral root join to form the spinal nerve. The spinal nerve contains both sensory and motor neurones. Hence, it is a mixed neurone.

Types of Actions

- Sensation- Unconscious action. Receptor in skin > Sensory neurone > Relay neurone in spinal cord > Forebrain.
- Voluntary- Deliberate action that is produced by the forebrain and is transmitted by a relay neurone from the forebrain, down the white matter of the spinal cord and then into the grey matter. In the grey matter, impulses are transmitted to the motor neurone which transmits the impulses to the effector muscles. Forebrain > Relay neurone in spinal cord > Motor neurone > Effector
- Reflex (Involuntary) – Simplest form of response in humans and occurs immediately without any conscious effort. The spinal cord and the brain are reflex centres. Reflex actions may be cranial reflexes that are controlled by the brain and usually occur in the head or spinal reflexes which are controlled by the spinal cord and happen in the body.