*This is the **Higher Separate** version — includes all Higher Tier content (marked ★) and all Separate Science content.*

The nervous system allows rapid communication throughout the body, enabling it to respond to changes in the internal and external environment.

- CNS (central nervous system): brain and spinal cord — processes information and coordinates responses.
- PNS (peripheral nervous system): all other nerves — sensory nerves bring information to CNS; motor nerves carry instructions from CNS to effectors.
- Three types of neurone: sensory (receptor → CNS), relay (within CNS), motor (CNS → effector).
- Effectors: muscles (respond by contracting) or glands (respond by secreting hormones/enzymes).
- Stimulus → receptor → sensory neurone → CNS → motor neurone → effector → response.
- ★ **HT** Myelin sheath: fatty insulating layer around neurone axon. Speeds up electrical signal transmission. Formed by Schwann cells.
- ★ **HT** Nodes of Ranvier: gaps in the myelin sheath. Electrical signal jumps between nodes (saltatory conduction) — much faster than unmyelinated conduction.
- ★ **HT** Multiple sclerosis (MS): autoimmune disease that destroys the myelin sheath → nerve signals slowed or stopped.

### Key Terms

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|---|---|
| **Sensory neurone** | Carries electrical impulses from receptors to the CNS |
| **Relay neurone** | Carries impulses within the CNS between sensory and motor neurones |
| **Motor neurone** | Carries electrical impulses from CNS to effectors (muscles and glands) |
| **Myelin sheath** | Fatty insulating layer around axons — speeds up nerve impulse transmission |
| **Effector** | A muscle or gland that carries out the body's response to a stimulus |

■ **Exam Tip:** Know the three neurone types in order: SENSORY → RELAY → MOTOR (think: SRM). Always state where each one is found and what it connects.