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

The nervous system allows rapid, specific responses to changes in the internal and external environment.

- CNS: brain and spinal cord. PNS: all other nerves
- Sensory neurone: receptor → CNS. Relay: within CNS. Motor: CNS → effector
- Reflex arc: bypasses brain → faster response. Pathway: receptor → sensory → relay → motor → effector
- Synapse: neurotransmitters cross synaptic cleft → bind receptors on post-synaptic membrane → new impulse
- Signals only travel in ONE direction at synapse (receptors only on post-synaptic side)
- Brain regions: cerebral cortex (thought), cerebellum (coordination), medulla (automatic functions)
- ★ **HT** Myelin sheath: insulating layer — speeds up transmission (saltatory conduction)

Key Terms

Synapse	Gap between neurones — crossed by neurotransmitters
Reflex arc	Rapid automatic response pathway — bypasses brain
Cerebral cortex	Outer brain region — conscious thought, memory, language
Cerebellum	Brain region — coordination and balance

■ **Exam Tip:** Synapses ensure one-way transmission. Reflexes bypass the brain. The medulla controls automatic functions (breathing, heart rate) — damage is life-threatening.