

Coordination and Response

Nervous Control in Humans:

- The nervous system consists of the central nervous system (CNS) (brain and spinal cord) and the peripheral nervous system (nerves connecting the CNS to the body). Nervous impulses (electrical signals) pass through neurons to relay information.
- Sensory organs detect stimuli (e.g., skin detects touch, eyes detect light), and the brain interprets these signals, sending impulses to muscles (effectors) to respond.

Examples:

- Voluntary action: Conscious decisions, such as spitting out bad food.
- Involuntary action (Reflex arc): Immediate actions, such as withdrawing from a hot object, bypassing the brain.

Neurons:

- Sensory neurons: Carry impulses from sensory organs to the brain.
- Motor neurons: Carry impulses from the brain to effectors.
- Relay neurons: Connect sensory and motor neurons in reflex arcs.

Synapses:

Junctions between neurons where neurotransmitters help transmit impulses across a gap.

The Human Eye:

- Cornea and lens refract light onto the fovea (part of the retina), which contains rods (night vision) and cones (color vision).
- Pupil reflex controls light entry, with circular and radial muscles adjusting pupil size.

- Accommodation adjusts lens shape to focus light from near or distant objects.

Hormones:

- Hormones, like adrenalin* (fight or flight), insulin, and glucagon, regulate body functions.
- Adrenaline increases heart rate, glucose supply, and pupil dilation in emergencies.
- Hormonal transmission is slower but long-lasting compared to the nervous system.

Homeostasis:

- Maintains stable internal conditions (e.g., body temperature, blood sugar).
- Blood sugar regulation: Insulin lowers blood glucose; glucagon raises it.
- Type 1 diabetes: Caused by insufficient insulin, managed with diet and insulin injections.

Temperature Control:

- The body retains or loses heat through mechanisms like vasoconstriction (reduces heat loss) or vasodilation (increases heat loss), shivering, and sweating.

Tropic Responses in Plants:

- Auxins (plant hormones) control growth direction:
- Gravitropism: Growth towards or away from gravity (positive in roots, negative in shoots).
- Phototropism: Growth towards or away from light (positive in shoots, negative in roots).
- Synthetic auxins like 2,4-D are used as selective weedkillers.