

The Nervous System

Year 9 Science

The Stimulus Response Model.

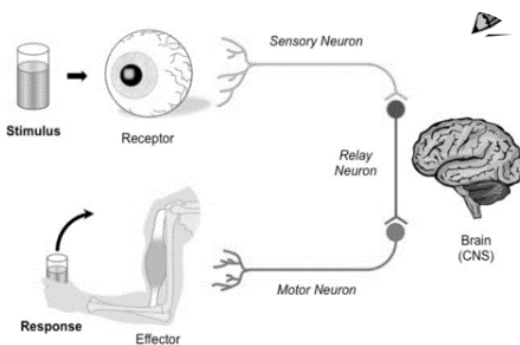
Homeostasis: the continual process of regulating a constant internal environment in any organism.

Stimulus: any event that triggers a change or response in the activity of a living organism.

Receptor: a specific cell that identifies stimuli

- **pressure and sound** = mechanoreceptor = skin/ear
- **heat** = thermoreceptor = skin
- **flavour** = tastebud
- **odour** = olfactory receptor
- **light** = photoreceptor – cones, rods, tapetum

Effector: muscle or gland that puts messages into effect (e.g. skin, tongue, nose, etc.)



Response: an organism's reaction to a stimulus that is caused by an effector.

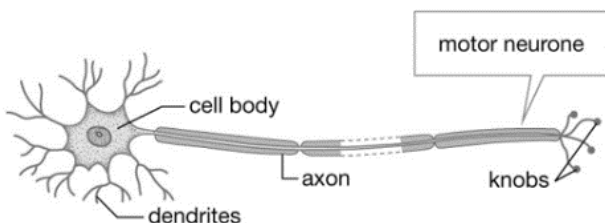
Nerve: groups of neurones used to send electrical impulses from receptors to effectors

Neurone: nerve cells that transmit and receive electrochemical impulses

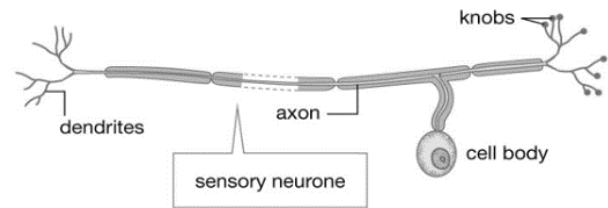
Nerve Impulse: an electrochemical message sent between nerves to achieve a response – within a neurone the message is electric but between neurones it is chemical

Types of Neurones.

Motor neurone (efferent neurone): carries messages from the CNS to effectors



Sensory neurone (afferent neurone): sensitive to various stimuli. Collects sensory information and then sends it to the CNS to be processed.



Inter-neurone (relay neurone): found between sensory and motor neurones or between other inter-neurones to make travel connections for neural messages

Features of the Neurone.

Dendrite: branches outwards to receive signals from other cells, then passes the message to the cell body

Cell body: contains cytoplasm and organelles and functions in controlling the neurone

Axon: a conducting fibre carrying nerve impulses AWAY from the cell body

Schwann cells: provide insulation for electrical impulses by creating a barrier of cell membrane layers. **Myelin sheath** is a fatty layer of insulation over the axon created by Schwann cells. It helps to accelerate nerve impulses along axons by controlling the impulse's path.

Telodendria: branches away from the cell body to divide the signal into different paths, aiming to reach other neurones

Synaptic knob: transmits signals from the telodendria to other cells

Synapse: small gap separating neurones from each other or effectors

Neurotransmitter: the collective name for chemicals released from the synaptic knobs carrying the message to other nerve cells. It is the chemical component of the nervous system and there are more than 50 neurotransmitters in the human body.

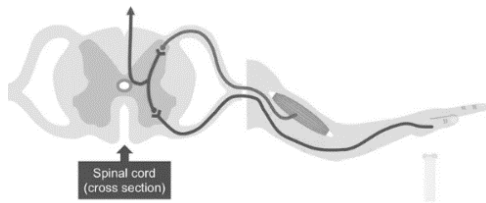
The Nervous Systems.

Central Nervous System: The brain and the spinal cord

Peripheral Nervous System: The nerves and effector cells

Reflex Action

During a reflex response, the brain is bypassed to ensure a more rapid action. Instead, the message is sent to the spinal cord as a reflex arc. The aim of this fast response is to protect the body.



Features of the Eye.

Aqueous humour: clear fluid, helps to keep the cornea's shape.

Blind spot: location where all nerves from the retina join therefore there are no photoreceptors. Together, these form the optic nerve.

Optic nerve: bundle of nerve fibres that carry information from the retina to the brain.

Retina: layer of photoreceptors at rear of eye that detect images from the lens and cornea. Connects to the brain via optic nerve.

Cornea: tough, clear covering to the iris and pupil which focuses on protecting the eye. Light bends when passing through it to make an image with the help of the lens.

Lens: clear, flexible structure that makes an image on the retina. It can change shape to focus on differently distanced objects.

Iris: muscle that controls light entering the eye, suspended between the cornea and lens.

Pupil: opening that lets light into the inner eye.

Sclera: thick, tough, white outer covering of the eyeball.

Vitreous humour: thick, clear jelly that helps to give shape to the eyeball.

