Lesson 2: Stimulus Response Model

Terminology

Olfactory - Relating to the sense of smell

Stimuli-Response Model

- A stimulus is a change in the environment that triggers a response.
    - For example, a stimulus for hearing could be a loud bang.
    - common examples include sight, smell, taste, hearing and touch.
- Receptors are specialised cells within our organs that detect the stimulus.
    - For example, receptors in your skin detect heat/pain.
    - The organs for receptors are your eyes, nose, tongue, ears, skin.

Effectors

An ***effector*** is a muscle, gland or organ that carries out a response. It produced as a result of stimulus.

Types of Stimuli

There is internal and external stimuli.

Example:

Stimulus: The Lights

Receptor: Eyes

Control Centre: Brain

Effector: Feet muscles

Response: Presses down on the break

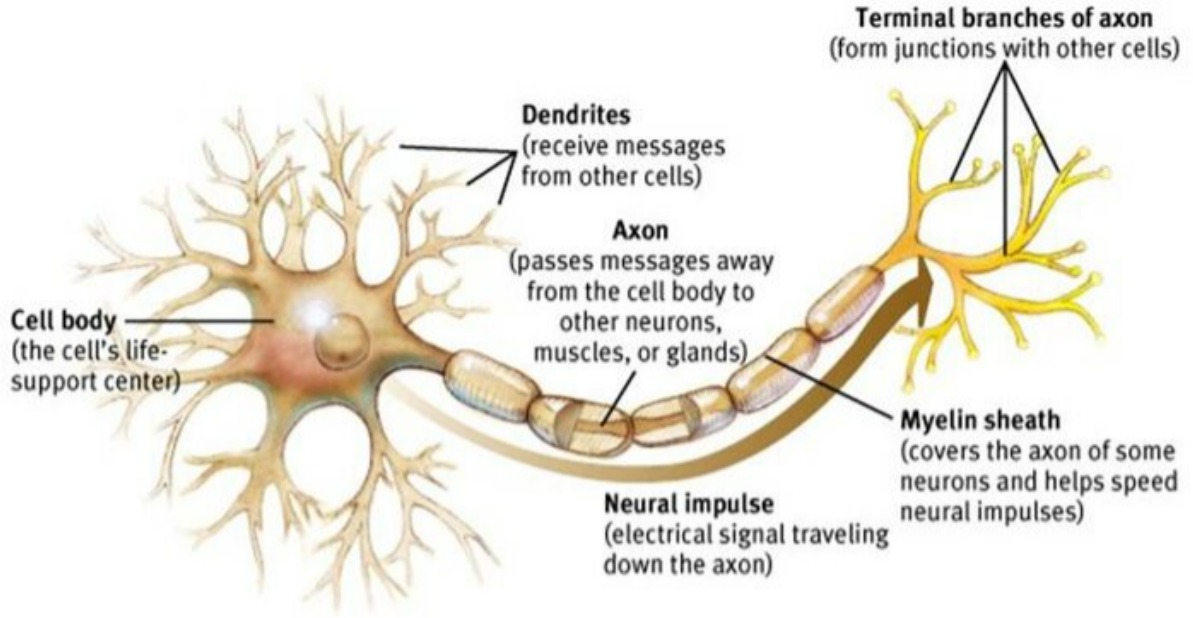
Nerves and Neurons

Nerves: Enclosed, cable-like bundle of axons and nerve fibres found in the peripheral nervous system

- Types: autonomic nerves, motor nerves, and sensory nerves

Neuron (nerve cell): Individual specialised cell which are primarily involved in transmitting information through electrical and chemical signals

- Found: brain, spinal cord and the peripheral nerves. - sensory neurons and motor neurons.
  Nervous system: Group of neurons



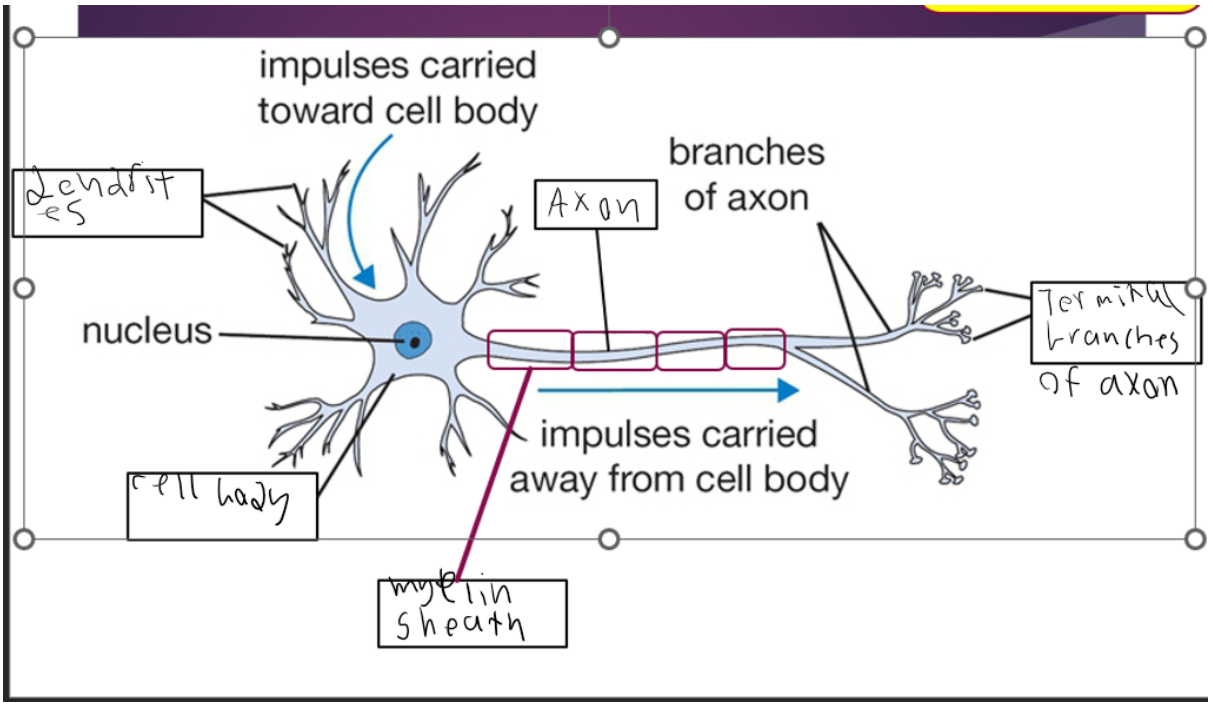
How do neural messages travel in the nervous system?

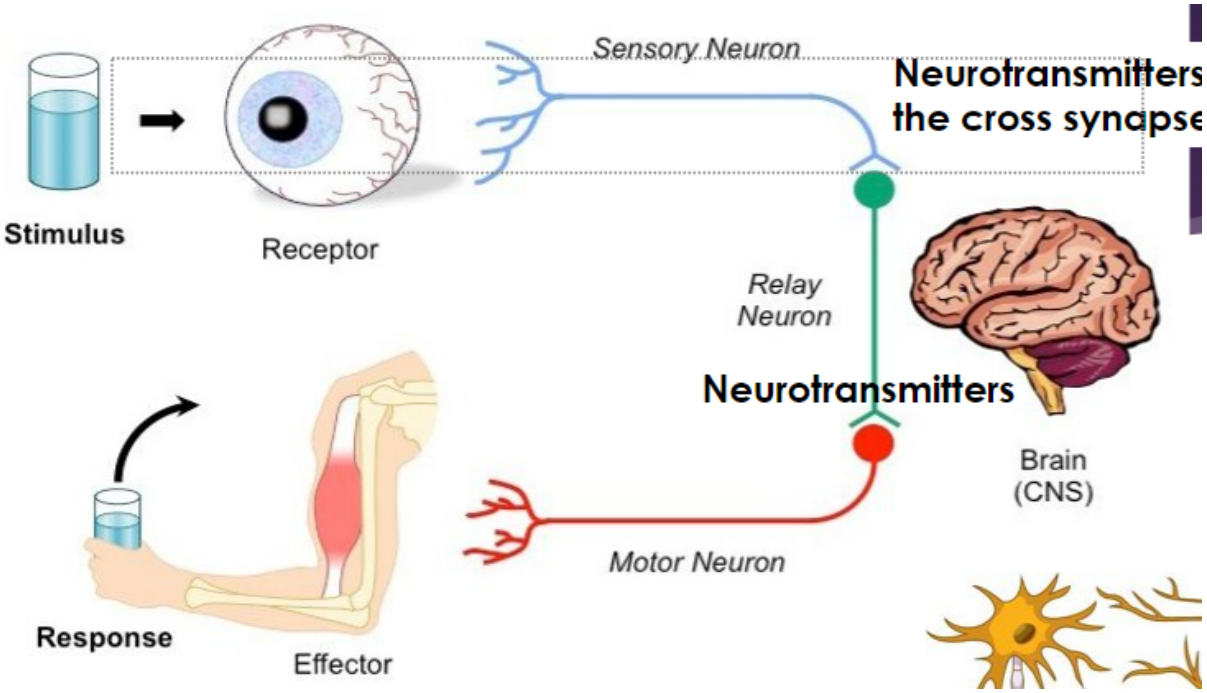
Nerves send electrical impulses and chemical messengers (neurotransmitters) between the brain and the rest of the body. these impulses help feel sensations and move muscles. They also help with eating, breathing, sweating and digesting food.

Neurotransmitters convert the impulse into a chemical message to communicate between neurons access the gap called a “synapse”.

Types of Neurons

1. Sensory Neurons - Carries Impulses from the receptors to the spinal cord.
2. Inter neuron - Carries Impulses to and from the spinal cord and the brain
3. Motor Neuron - Carries impulses from the brain to the effector





Questions from the video:

1. What is a reflex arc?
    - They are immediate built in reactions that help you in survival. It bypasses the brain.
2. What is the difference between a voluntary and an involuntary response?
    - a voluntary response is where you consciously react and was learnt individually, a involuntary response is where you instinctively respond
3. How does a reflex arc aid in survival?
    - They aid in survival as they do not require thought and are encoded into the human body to help you survive. It is due to the speed of the reaction.

Summary (Remember this)

The stimulus-response model is a theory that explains how organisms respond to changes in their environment. It states that a stimulus is a change in the environment

that triggers a response. The response is the organism's behaviour in reaction to the stimulus.

There are two types of stimuli: internal and external. Internal stimuli are changes within the body, such as hunger or thirst. External stimuli are changes outside the body, such as loud noise or bright light.

Receptors are specialised cells that detect stimuli. They are located in the eyes, nose, tongue, ears, and skin. When a receptor is stimulated, it sends a message to the central nervous system (CNS).

The CNS is made up of the brain and spinal cord. It is responsible for processing sensory information and sending motor commands to the muscles.

Effectors are muscles, glands, or organs that carry out a response. When the CNS sends a motor command to an effector, the effector performs the desired action.

Parts of the neuron:

- **Cell body (soma)**: The central part of the neuron that contains the nucleus and other organelles.
- **Dendrites:** Branching extensions that receive signals from other neurons.
- **Axon:** A long, thin extension that transmits signals to other neurons.
- **Axon terminals:** Knob-like structures at the end of the axon that release neurotransmitters.
- **Myelin Shells:** Covers the axon of some neurons and helps speed neural relays.

Questions to Reassess your learning

1. What is the stimulus-response model?
2. What are the two types of stimuli?
3. What are receptors?
4. What is the central nervous system (CNS)?
5. What are effectors?
6. How do neural messages travel in the nervous system?
7. What are the parts of a neuron?
8. What is a reflex arc?

9. What is the difference between a voluntary and an involuntary response?