

The Nervous System

- ▶ The human nervous system allows the body to respond to stimuli (change in environment) to survive. It consists of Receptors, Effectors, central nervous system and different types of neurons.
- ▶ Single cell organisms just respond to the stimuli whereas multicellular organisms need to communicate first and then respond to stimuli and develop nervous and hormonal communication systems.

Structure of Nervous system

The **human nervous system** detects **stimuli** from the external environment, transports the message all around the body along with **neurons** and coordinates **behavioral changes** in the body in response. Human nervous system consists of:

1. Receptors

- **Stimuli** (changes in the environment) are detected by **receptor cells**.
- Different receptors are **specialised** to detect different types of stimuli, e.g. taste receptors on the tongue, sound receptors in ear, light receptor cells on the retina of the eye.

2. Sensory neurons

- Carry **electrical impulses** from the **receptors** to the **central nervous system (CNS)**.

3. Central nervous system (CNS)

- Consists of the **brain** and **spinal cord**.
- It receives and **processes electrical impulses** from **receptor cells** and organises a **response**.
- It will then send an impulse along a **motor neuron**.

4. Motor neurons

- Carry **electrical impulses** from the **CNS** to **effectors**.

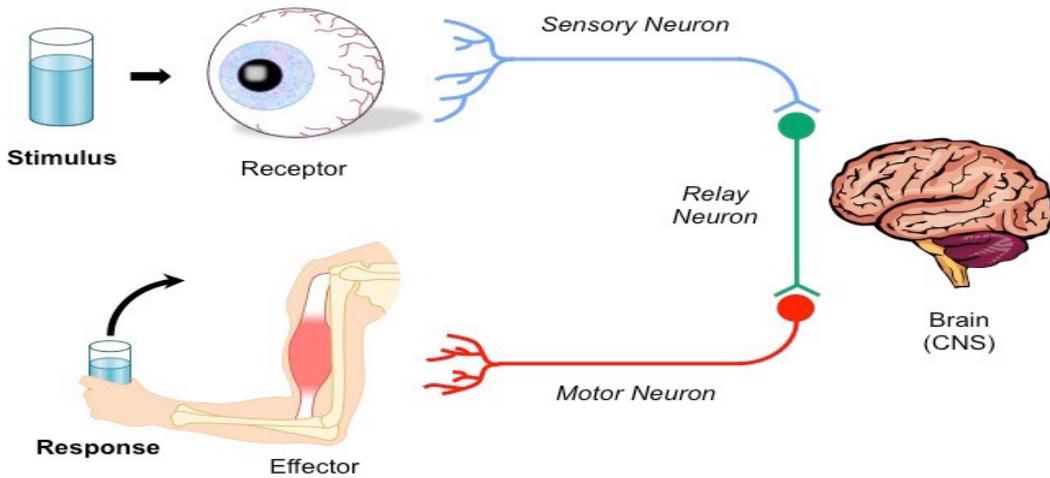
5. Effectors

B5: Homeostasis and

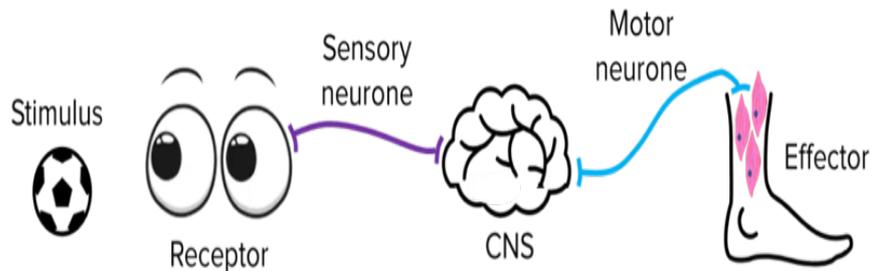
Response

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- Effectors receive **electrical impulses** from the **CNS** and respond to the **stimuli**. This could be either **contracting** a muscle or secreting a particular **hormone** from a gland.



Pathway of Central nervous System



1. Light receptors in the retina of the eye detect the ball.

2. Impulse is sent via a sensory neurone to the brain and a decision is made to kick the ball.

3. Impulse is sent via a motor neurone to the leg muscle cells (effector) which contract causing kicking motion.

Synapses

- **Synapses** are where two **neurones** join together and use **chemicals** to transfer the **electrical nerve impulses** across the gap between them.
- The connection between two neurons is called Synapses.
- **Principal of transferring signals**

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Response

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1. An **electrical impulse** travels along the first **neurons** to the end.
2. This causes the release of **chemicals** which is called **neurotransmitters** into the gap between the **neurons**.
3. **Neurotransmitter diffuses** across the gap and binds to receptors on the second **neuron**
4. This sets off a new **electrical impulse** that travels along the second **neuron**.

