

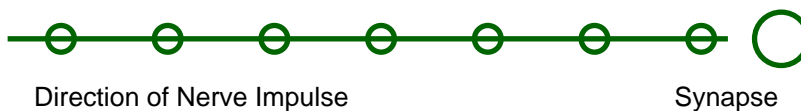
## 5.1.3 Nerve Impulse and Transmission

The nervous system communicates through electrical signals called nerve impulses. These impulses travel rapidly through neurons and allow the body to respond to changes in the environment. Nerve impulse transmission is essential for movement, sensation, reflexes, and body coordination.

### 1. What is a Nerve Impulse?

A nerve impulse is an electrical signal that travels along a neuron. It is produced when a neuron is stimulated by a change in the environment. The impulse moves from the dendrites, through the cell body, and along the axon.

**Figure 1: Movement of a Nerve Impulse**



### 2. Transmission of Nerve Impulses

Nerve impulses move from one neuron to another through a small gap called a synapse. At the synapse, chemicals called neurotransmitters carry the message across the gap. This process allows communication between neurons and body organs.

### 3. Steps of Nerve Impulse Transmission

The transmission of nerve impulses occurs in several steps: A stimulus activates the receptor. The sensory neuron carries the impulse to the central nervous system. The brain or spinal cord processes the information. A motor neuron carries the response to muscles or glands. The body reacts to the stimulus.

### 4. Role of Synapses

A synapse is the junction between two neurons. Neurotransmitters are released at the synapse to continue the impulse. Synapses ensure that impulses move in one direction only.

### 5. Importance of Nerve Impulses

Nerve impulses are important because they: Help the body respond quickly to danger. Control body movement and coordination. Allow communication between the brain and body organs. Support reflex actions and learning.

### 6. Examples of Nerve Impulse Activities

Pulling the hand away from a hot object. Blinking when bright light enters the eye. Running after hearing danger. Feeling pain after touching a sharp object.

### 7. Summary

Nerve impulses are electrical signals. They travel through neurons. Synapses connect neurons. Neurotransmitters help transmit messages. Nerve impulses are important for coordination and response.

### 8. Questions and Answers

#### 1. What is a nerve impulse?

A nerve impulse is an electrical signal that travels through a neuron.

#### 2. What is a synapse?

A synapse is a small gap between two neurons.

#### 3. What are neurotransmitters?

They are chemicals that transmit messages across synapses.

#### 4. Why are nerve impulses important?

They help the body respond and coordinate activities.

#### 5. In which direction does a nerve impulse travel?

From dendrites to the axon.

#### 6. Give one example of nerve impulse activity.

Pulling the hand away from a hot object.

#### 7. Which neurons carry impulses to muscles?

Motor neurons carry impulses to muscles.

### Conclusion

Nerve impulses are essential for communication in the nervous system. They help the body receive

information, process signals, and respond quickly. Understanding nerve impulse transmission helps students understand how the nervous system controls body activities.