

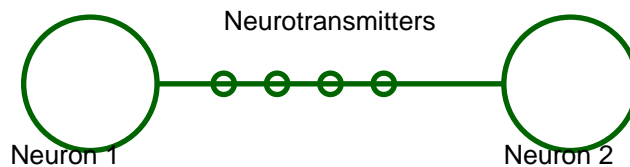
## 5.1.4 Neurotransmitters

Neurotransmitters are special chemical substances that help nerve cells communicate with each other. They are essential for transmitting messages throughout the nervous system. Without neurotransmitters, the brain and body would not be able to work together properly.

### 1. Definition of Neurotransmitters

Neurotransmitters are chemicals released by neurons to transmit signals across synapses. They carry messages from one neuron to another or from neurons to muscles and glands. These chemicals help the nervous system coordinate body functions.

**Figure 1: Neurotransmitter Transmission**



### 2. How Neurotransmitters Work

When a nerve impulse reaches the end of an axon, neurotransmitters are released into the synapse. The neurotransmitters move across the synapse and attach to receptors on the next neuron. This action allows the nerve impulse to continue traveling.

### 3. Types of Neurotransmitters

Different neurotransmitters have different functions in the body. Some important neurotransmitters include: **Dopamine:** Controls movement, emotions, and pleasure. **Serotonin:** Helps regulate mood, sleep, and appetite. **Acetylcholine:** Controls muscle movement and memory. **Adrenaline:** Prepares the body for emergency situations.

### 4. Importance of Neurotransmitters

Neurotransmitters are important because they: Help communication between neurons. Control body movement and coordination. Regulate emotions and behavior. Support learning and memory. Help the body respond to stress and danger.

### 5. Effects of Neurotransmitter Imbalance

An imbalance of neurotransmitters can affect the body and mind. For example: Low serotonin levels may cause depression. Too little dopamine may affect movement. Abnormal neurotransmitter activity can lead to stress and anxiety. Proper nutrition, sleep, and healthy living help maintain balanced neurotransmitter activity.

### 6. Examples of Neurotransmitter Activities

Feeling happy after receiving good news. Moving muscles while walking or running. Remembering important information during examinations. Reacting quickly during emergencies.

### 7. Summary

Neurotransmitters are chemicals that carry messages. They transmit signals across synapses. Dopamine, serotonin, and acetylcholine are important neurotransmitters. They help control movement, mood, memory, and body coordination. Imbalances can affect mental and physical health.

### 8. Questions and Answers

#### 1. What are neurotransmitters?

Neurotransmitters are chemicals that transmit messages between neurons.

#### 2. Where are neurotransmitters released?

They are released at the synapse.

#### 3. What is the function of dopamine?

Dopamine controls movement, emotions, and pleasure.

#### 4. What does serotonin regulate?

It regulates mood, sleep, and appetite.

#### 5. Why are neurotransmitters important?

They help communication and coordination in the body.

#### 6. What may happen if neurotransmitters become imbalanced?

It may lead to stress, anxiety, or depression.

#### 7. Which neurotransmitter controls muscle movement?

Acetylcholine controls muscle movement.

### **Conclusion**

Neurotransmitters are very important chemicals in the nervous system. They help neurons communicate and control body functions such as movement, memory, mood, and coordination. Understanding neurotransmitters helps students understand how the nervous system works effectively.