

Types of Neuron

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Types of Neuron

1. Types of Neurons Based on Function

1. Sensory Neurons (Afferent Neurons)

Sensory neurons carry information from the sensory receptors of the body to the central nervous system (CNS), which includes the Brain and Spinal Cord.

These neurons detect stimuli such as:

- Light (vision)
- Sound (hearing)
- Temperature
- Pain
- Touch
- Taste and smell

For example, when you touch a hot object, sensory neurons transmit signals from your skin to the brain, allowing you to perceive pain and withdraw your hand.

Importance in psychology:

Sensory neurons are crucial for perception, sensation, and the study of sensory processes in fields like cognitive and experimental psychology.

2. Motor Neurons (Efferent Neurons)

Motor neurons carry information from the CNS (brain and spinal cord) to muscles and glands. They are responsible for movement and action.

For example:

- Moving your hand
- Speaking
- Writing
- Facial expressions

Motor neurons enable voluntary and involuntary actions. They play an important role in behavior, coordination, and response to stimuli.

Importance in psychology:

Motor neurons are involved in behavioral responses, learning of motor skills, and emotional expression.

3. Interneurons (Association Neurons)

Interneurons connect sensory neurons and motor neurons within the CNS. They are found mostly in the brain and spinal cord.

Functions:

- Processing information
- Decision-making
- Reflex actions
- Higher mental functions like thinking and reasoning

Interneurons are the most numerous type of neurons and are essential for complex psychological processes such as memory, learning, intelligence, and problem-solving.

Importance in psychology:

They form neural circuits responsible for cognition, emotion regulation, and consciousness.

2. Types of Neurons Based on Structure

1. Unipolar Neurons

Unipolar neurons have a single process extending from the cell body. They are mostly sensory neurons and are commonly found in the peripheral nervous system.

They are involved in transmitting sensory information quickly.

2. Bipolar Neurons

Bipolar neurons have two extensions:

- One axon
- One dendrite

They are found in sensory organs such as the retina of the eye and are involved in special senses like vision and hearing.

3. Multipolar Neurons

Multipolar neurons have:

- One axon
- Multiple dendrites

They are the most common type of neuron in the nervous system and are mainly found in the brain and spinal cord.

Motor neurons and many interneurons are multipolar.

Importance:

Multipolar neurons allow integration of information from multiple sources, which is essential for complex psychological functioning.

3. Types of Neurons Based on Neurotransmitters

Neurons can also be classified according to the chemical messenger (neurotransmitter) they release.

1. Cholinergic Neurons

These neurons release acetylcholine.

They are involved in memory, learning, and muscle movement.

Damage to cholinergic neurons is associated with Alzheimer's disease.

2. Dopaminergic Neurons

These neurons release dopamine.

They are involved in motivation, reward, pleasure, and movement.

Dysfunction of dopaminergic neurons is linked to:

- Parkinson's disease
- Schizophrenia

3. Serotonergic Neurons

These neurons release serotonin.

They regulate mood, sleep, appetite, and emotion.

Low serotonin levels are associated with Depression.

4. GABAergic Neurons

These neurons release GABA (Gamma-aminobutyric acid).

GABA is an inhibitory neurotransmitter that reduces neural activity.

They help in anxiety control and relaxation.

5. Glutamatergic Neurons

These neurons release glutamate.

Glutamate is the main excitatory neurotransmitter in the brain and is important for learning and memory.

4. Special Types of Neurons

1. Mirror Neurons

Mirror neurons activate both when a person performs an action and when they observe someone else performing the same action.

They are important for:

- Empathy
- Social learning
- Imitation

Mirror neurons are studied in relation to autism and social cognition.

2. Pyramidal Neurons

These are large multipolar neurons found in the cerebral cortex. They play a role in cognition, memory, and voluntary movement.

Conclusion

Neurons are fundamental to psychological processes because they form the biological foundation of behavior and mental functions. They can be classified based on function (sensory, motor, interneurons), structure (unipolar, bipolar, multipolar), and neurotransmitters (dopaminergic, serotonergic, etc.).