

# Biological Basis of Behaviour

UG Semester II – Psychology

## 1. Introduction

Behaviour is influenced by biological structures, neurochemicals, and genetics.

The nervous system and endocrine system work together to regulate behaviour, emotions, and cognition.

## 2. Neuron: Structure and Function

Dendrites: Receive incoming signals from other neurons.

Cell Body (Soma): Contains nucleus; maintains cell life.

Axon: Transmits nerve impulses away from the cell body.

Myelin Sheath: Fatty covering that increases speed of impulse conduction.

Axon Terminals: Release neurotransmitters.

### Types of Neurons

Sensory neurons (afferent): Carry information to the CNS.

Motor neurons (efferent): Carry commands from CNS to muscles and glands.

Interneurons: Connect neurons within the CNS.

## 3. Synapse and Neurotransmitters

A synapse is the junction between two neurons.

Communication occurs chemically through neurotransmitters.

### Major Neurotransmitters

Acetylcholine: Muscle movement and memory.

Dopamine: Reward, motivation, movement.

Serotonin: Mood, sleep, appetite.

Norepinephrine: Alertness and arousal.

GABA: Major inhibitory neurotransmitter.

Glutamate: Major excitatory neurotransmitter.

Endorphins: Pain relief and pleasure.

## 4. Nervous System

Central Nervous System (CNS): Brain and spinal cord.

Peripheral Nervous System (PNS): Nerves outside the CNS.

### Autonomic Nervous System

Sympathetic system: Fight or flight response.

Parasympathetic system: Rest and digest response.

## 5. Brain Structures

Cerebrum: Thinking, memory, voluntary action.

Thalamus: Sensory relay station.

Hypothalamus: Hunger, thirst, temperature regulation.

Limbic system: Emotion and memory.

Cerebellum: Balance and coordination.

Medulla: Vital functions like breathing and heartbeat.

## 6. Lobes of the Cerebrum

Frontal lobe: Planning, reasoning, personality.

Parietal lobe: Sensory processing.

Temporal lobe: Hearing and memory.

Occipital lobe: Vision.

## 7. Endocrine System

Pituitary gland: Master gland controlling others.

Thyroid gland: Metabolism regulation.

Adrenal glands: Stress hormones.

Pancreas: Blood sugar regulation.

Gonads: Sex hormones and reproduction.

## 8. Genetics and Behaviour

Genotype: Genetic makeup.

Phenotype: Observable characteristics.

Behaviour is influenced by interaction of heredity and environment.

## 9. Biological Basis of Behaviour

Emotion involves limbic system and autonomic nervous system.

Learning and memory involve changes in neural connections.

Motivation is regulated by the hypothalamus.

## 10. Applications

Understanding mental disorders.

Basis of drug treatment in psychology.

Helpful in rehabilitation and brain injury studies.