

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.