

11 Psychology

Chapter 3

The Bases of Human Behaviour

❖ Evolution

- Evolution refers to the gradual and systematic biological changes, which result in a species from their pre-existing forms in response to the changes of environment.
- It occurs through the process of natural selection.
- The biological and behavioural qualities help in the meeting of objectives and increase an organism's ability to pass it on to the future generation through its genes.

❖ Biological And Cultural Evolution

- Humans have inherited their biological structure from their ancestors in the form of developed body and brain.
- Culture provides opportunities for learning by putting individuals through different situations in life.

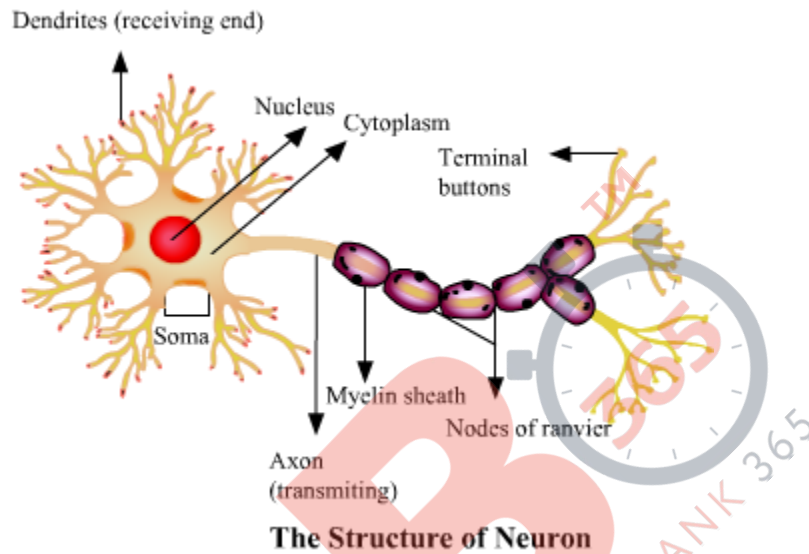
❖ Biological Bases of Behaviour

• Neurons:

- It is the basic unit of nervous system and consists of specialised cells having the property to convert various forms of stimuli into electrical impulses. Neurons help in reception, conduction and transmission of information in the form of electrochemical signals.
- The soma is the main body of nerve cell having a nucleus.
- Dendrites are the branch-like specialised structures emanating from the soma.
- The conduction of information from one place to another in the nervous system takes place through bundles of axons called nerves.
- The two types of nerves are sensory and motor.

- **Nerve Impulse**

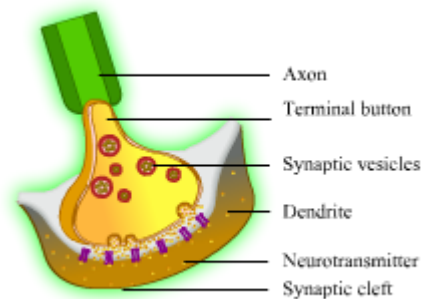
- Information travels within the nervous system through the electrochemical nerve impulse.
- The nerve fibre either responds completely to impulse or does not respond at all.



- **Synapse**

- The axon tip of a preceding neuron makes a functional connection, known as synapse, with dendrites of the other neuron to relay information.
- Synaptic cleft is the small gap between two neurons.

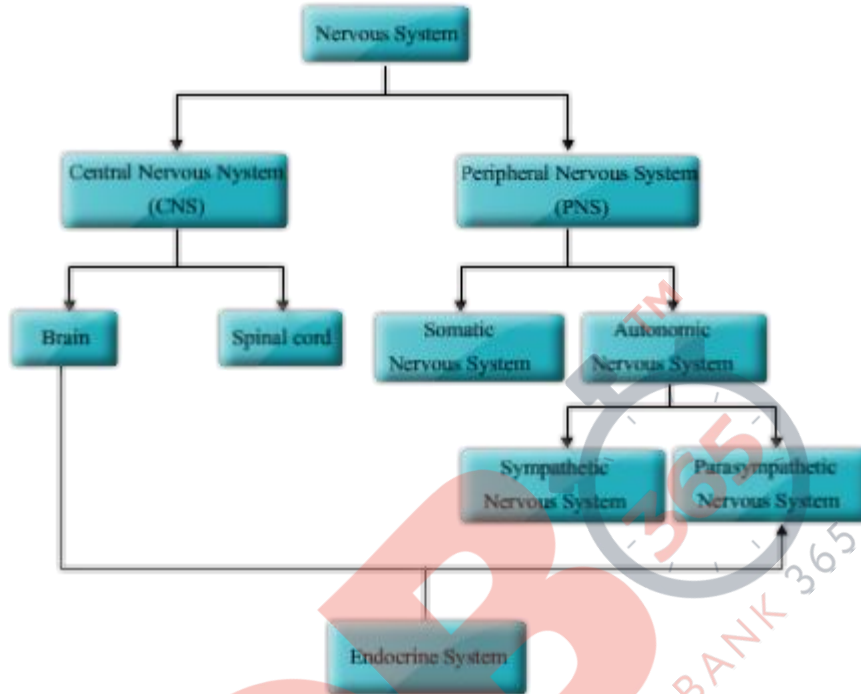
The neural impulse from one neuron is transmitted by a complex chemical synaptic



transmission process to another neuron.

❖ **Structure and Functions of Nervous System and Endocrine System – Their Relationship with Behaviour and Experience**

• **The Nervous System**



➤ **Peripheral Nervous System**

▪ **The Somatic Nervous System:**

- It consists of two types of nerves known as cranial nerves and spinal nerves.
- There are twelve sets and three types of cranial nerves: sensory, motor and mixed.
- Sensory nerves carry information from senses to the brain while motor nerves carry information from the brain to the muscles. Mixed nerves have both sensory and motor fibres.
- There are thirty one sets of spinal nerves, each having a set of sensory and motor nerves.

▪ **The Autonomic Nervous System:**

- It controls those activities which are not under direct control of the individuals such as breathing, blood circulation, salivation, emotional reactions, etc.
- It has two divisions—Sympathetic division and Parasympathetic division.
- The sympathetic division deals with emergencies while parasympathetic division conserves energy.

➤ **The Central Nervous System**

- It is the centre of all neural activity and performs cognitive activities.

• **The Brain and Behaviour**

➤ **Structure:** It is divided into three parts.

i. **Hindbrain**

- **Medulla Oblongata:** It is the lowest part of the brain attached to the spinal cord. It is called the vital centre of the brain because it includes neural centres that regulate the basic activities to support life.
- **Pons:** It is attached to medulla and midbrain. It receives signal from the ears through the nucleus.
- **Cerebellum:** It is the most developed part of the brain and coordinates the muscular movements.

ii. **Midbrain**

- It connects the hindbrain with the forebrain. The Reticular Activating System in it is responsible for arousal.

iii. **Forebrain**

- **Hypothalamus:** It is the smallest structure of brain and plays an important role in behaviour. It regulates the physiological processes and controls the internal environment of the body.
- **Thalamus:** It is an egg-shaped cluster of neurons located on the upper side of hypothalamus. It receives all the information from sense organs and sends them to cortex for processing.

- **The Limbic System:** It is a group of structures forming a part of the old mammalian brain. It helps in maintaining internal homeostasis and comprises hypothalamus, hippocampus and amygdala.
- **The Cerebrum:** It makes two-third of the total mass of the human brain and regulates all the higher level of cognitive functions. It is divided into two Cerebral Hemispheres. It is also divided into four lobes—Frontal Lobe, Parietal Lobe, Temporal Lobe and Occipital Lobe.

➤ **Spinal Cord**

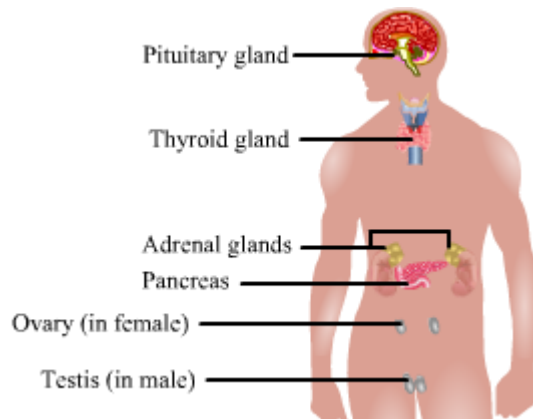
- It is a rope-like collection of nerve fibres connected to medulla at one end, and the other end is free.
- The grey mass in the shape of butterfly at the centre of the spinal cord contains association neurons.
- The white matter surrounds the grey matter, which comprises of the ascending and descending neural tracts.
- Spinal cord has two main functions:
 - i. To carry sensory impulses from the lower parts of the body to the brain, and carry the motor impulses from brain to all parts of the body.
 - ii. It performs simple reflexes without involving the brain.

➤ **Reflex Action**

- It is an involuntary action that occurs rapidly after the stimulus.
- It is inherited in the nervous system through evolutionary processes and takes place without the consciousness of brain.

• **The Endocrine System**

- It secretes hormones, which control some of the behaviour.
- The glands are also called ductless glands because of the absence of ducts.
- The whole system is also referred to as neuroendocrine system as it works with the nervous system.
- Following are the major glands of the body:



- **Pituitary Gland:** It is located within the cranium, below hypothalamus and divided into—anterior pituitary and posterior pituitary. It is also called master gland since it secretes the growth hormones which are related to the other endocrinal glands.
- **Thyroid Gland:** It is located in the neck and produces thyroxin, influencing the metabolic rate of the body.
- **Adrenal Gland:** It is located above the kidneys and has two parts—adrenal cortex and adrenal medulla. Adrenal cortex secretes corticoids and adrenal medulla secretes two hormones, namely, epinephrine and norepinephrine.
- **Pancreas:** It is situated near the stomach and helps in digestion of the food, and secretes insulin.
- **Gonads:** They form the testes in males and ovaries in females. These hormones control and regulate sexual behaviour and reproductive functions in males and females. The secretion of gonads is maintained by gonadotrophic hormone.

❖ Heredity

- **Chromosomes**

- They are the thread-like paired structures in the nucleus of each cell and are mainly composed of Deoxyribonucleic Acid.
- The number of chromosomes in each nucleus is different and remains constant.
- The gametic cells have 23 chromosomes but are not present in pairs.

- The organism at the time of conception inherits 23 chromosomes from father and mother each.
- The 23rd chromosome of the sperm cell can be either the X or Y type and determines the sex of the child.

- **Genes**

- They contain instructions for the production of specific proteins that regulate the physiological processes and the expression of phenotypic traits of the body.
- Change of a gene from one form to other is called mutation.

- ❖ **Cultural Basis of Human Behaviour**

- The behaviour of human beings is more complex than that of animals because human behaviour is regulated by their culture.
- The term 'culture' represents the man-made part of the environment.
- Human behaviour is social and involves relationships with other people.
- Culture provides meaning by creating important categories such as social practices and roles.
- Every society has a distinct culture, according to which human life is influenced.
- Culture is transmitted from one generation to another, resulting in the process of enculturation and socialisation.

- ❖ **Enculturation**

- It refers to learning that does not take place with direct or deliberate teaching but because of its availability in the socio-cultural context.

- ❖ **Socialisation**

- It is the process through which individuals acquire knowledge, skills and dispositions.
- It continues over the life-span and forms the basis of social and cultural transmission from one generation to another. Socialisation agents possess socialising power relative to an individual. These are:

- Parents
- School
- Peer groups
- Media

❖ **Acculturation**

- It refers to the cultural and psychological changes, which result from contact with other cultures.
- The four acculturation strategies are:
 - Integration
 - Assimilation
 - Separation
 - Marginalisation

❖ **Important Terms and Definitions**

- **Acculturation:** The cultural and psychological changes that result from direct or indirect contact with different people, cultures or institutions. It also denotes the re-learning of norms, values and traditions.
 - **All-or-none Principle:** It is a principle according to which the neuron would either respond or would not at all respond, regardless of the stimulus.
 - **Arousal:** A psychological state of the body that regulates and controls its internal environment.
 - **Axons:** The parts of the neuron that transmits impulses from cell body to other neurons or muscles tissues.
 - **Brain stem:** The oldest and central core structure of the brain which helps in the automatic survival functions. It begins with the swollen area of the spinal cord and enters the skull.
 - **Central nervous system:** Central to all neural activities that integrates sensory information, performs cognitive functions and provides motor commands.
- Cerebellum:** The highly developed and one of the oldest structures of brain with

wrinkled surface at the base of the skull, which organises bodily motion, posture and equilibrium. It mainly coordinates the muscular movements.

- **Cerebral cortex:** Part of the brain that regulates all higher cognitive and emotional functions like attention, learning, language and behaviour, etc.
- **Chromosomes:** Thread-like structures found in the nucleus of each cell that are responsible for the hereditary in the body. Chromosomes come in 23 pairs, one member of each pair coming from each parent, which contains DNA.
- **Cortex:** The greyish, thin covering of the cerebrum, which is the latest development of brain.
- **Culture:** It refers to the shared beliefs, values, norms and traditions that are transmitted from one generation to another.
- **Deoxyribonucleic Acid:** The genetic material of the cell which is located in the nucleus. It helps in the development and functioning of all living organisms.
- **Enculturation:** It refers to the learning, which takes place because of its availability in the socio-cultural context, instead of a direct or deliberate teaching. This process takes place through transmission of knowledge from generation to generation.
- **Endocrine glands:** The glands which secrete hormones and circulate them into the bloodstream. It works in accordance to the different parts of nervous system.
- **Environment:** It refers to the external physical, biological, social and cultural conditions that influence the functions and responses of an organism.
- **Evolution:** The theory proposed by Charles Darwin that over time organisms originate and change in response to adaptational demands of their unique environments. A theory by Charles Darwin, according to which everything has evolved through the interaction of genetic endowments and environment.
- **Genes:** The units of hereditary information, short chromosome segments composed of DNA. Genes act as blueprints for cells to reproduce themselves and manufacture the proteins that maintain life. Substance present in the DNA which helps in the inheritance of physical characteristics from parents to the young ones. **Homo**

- sapiens:** The scientific nomenclature of modern human beings. The term literary means 'wise men'.
- **Homeostasis:** The physiological tendency to maintain a stable and constant internal state of balance in terms of food, water, air, sleep, and temperature. It can either be open or a closed system.
 - **Hypothalamus:** It is the smallest brain structure that regulates physiological processes that are regulates emotional and motivational behaviour.
 - **Medulla:** It is the lowest part of brain connected to the spinal cord. Medulla is responsible for the control of heart beat, breathing, waking and sleeping.
 - **Memes:** It is an idea or behaviour, which influences every aspect of mind, behaviour and culture.
 - **Nerve impulse:** It is the information in nervous system that travels in the form of nerve sensation from one place to another, through lelectrochemical process of conduction.
 - **Neurons:** Specialised nerve cells that converts stimulus into electrical impulses. Around 12 billion neurons are found in the human nervous system.
 - **Nucleus:** A small rounded structure that is bound by a membrane, present in the cytoplasm. It controls all the activities of a cell.
 - **Reticular Activation System:** An important part of midbrain, which is responsible for arousal. It helps to regulate sensory inputs and selecting the information.
 - **Skeletal muscles:** Muscles under the control of somatic nervous system. It is attached to bones, which brings about various types of body movements like the limb movements.
 - **Socialisation:** It is the process through which the individuals acquire knowledge, skills and dispositions for an effect participation in the society. It forms the basis of social and cultural transmission and develops lifelong.

- **Soma:** It is the main body of nerve cell containing nucleus and other structures of the cell.
- **Somatic nervous system:** The part of the peripheral nervous system that controls voluntary muscles and actions. It consists of nerves that stimulate muscle contraction that includes non sensory neurons connected with skeletal muscles and skin.**Synaptic vesicles:** Structure in the synaptic knobs that store various neurotransmitters that are released at synapse.

