

HUMAN ANATOMY AND PHYSIOLOGY-I, BP-101(T)**UNIT-I (Introduction to human body)**

CLASS:9

**TOPIC – STRUCTURE, LOCATION AND FUNCTIONS OF
EPITHELIAL AND MUSCULAR TISSUES****1) Simple epithelium tissue****a) Squamous epithelium: -**

It is made up of single layer. Nature of cells: Flat polygonal in surface view centrally located nucleus.

Location :- Lungs, Bowman's capsule, Henle's loop of kidney inner wall of blood vessels, smooth inner lining of heart, blood vessels, lymphatic vessels, lymph vessels as endothelium.

Functions:- Excretion, protection, secretion, absorption, filtration.

b) Cuboidal epithelium:-

It's made up of single layer of cubical cells arranged on basement membrane.

Nature of Cells:- Cube like cells, polygonal in surface view and elongated

Nucleus.

Location: - Stomach, small intestine, large intestine, Gall bladder.

Functions: - Secretion, absorption.

c) Columnar epithelium: -

Made up of single layer of pillar shaped cells.

Nature of Cells: - Elongated cells, polygonal in surface view and elongated nucleus.

Location: - Stomach, small intestine, large intestine, Gall bladder.

Function: - Secretion, Absorption.

d) Ciliated epithelium: -

It's made up of single layer.

Nature of Cells: - The cells may be Cuboidal (or) columnar. The cells have hair like structures called cilia on its border (or) free surface area.

The wave like movement of cilia propels the contents of the tube.

Location:- a) Cuboidal ciliated- urinary tubules.

e) Glandular epithelium: -

It forms the lining of alveoli and portion of ducts in the glands.

It's made up of cubical cells (or) short columnar cells (or) sometimes polyhedral cells.

Functions: -Secretion, lubrication, dilution of irritants.

Types:

a) Exocrine gland: - It may unicellular (or) multi cellular.

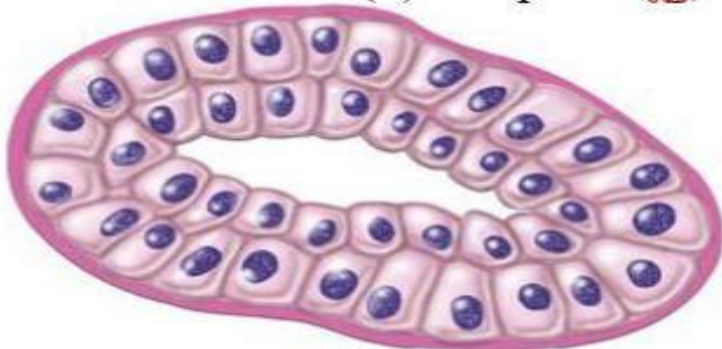
i) Unicellular eg; Goblet cells.

ii) Multi cellular eg; Tabular glands-Ileum

Secular gland – two types

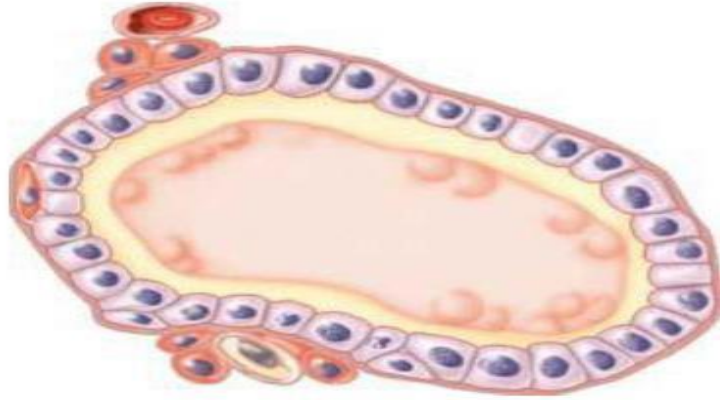
i (i) Simple eg; Sebaceous gland

ii (ii) Compound eg; salivary gland.



Endocrine gland:-

It's a ductless gland, sends secretion into blood by eg; Pituitary, pancreas, pineal etc.

**2) Pseudo stratified epithelium**

The epithelium is named because it shows two incomplete layers of columnar cells. In this tissue only one layer of cells is present; all the cells touch the basement membrane but some short cells cannot reach the surface. This feature gives the false impression of multilayered appearance.

Location: large duct of digestive glands, salivary gland and trachea.

3) Compound epithelium

It consists of more than one layer of cells. It is divided into five types.

- I) Transitional epithelium.
- II) Stratified squamous keratinized epithelium.
- III) Stratified squamous non-keratinized
- IV) Stratified columnar ciliated epithelium.

I. Transitional Epithelium:- consists of three (or) four layers of cells and thereby it occupies an intermediate position, between simple and compound epithelium.

The superficial layer is made up of large flat cells consisting of two nuclei. The second layer is made up of pyriform cells.

The next one (or) two layers are made up of polyhedral cells.

The cells are deformable without any disturbance to the function.

Location:- Pelvis of the kidney, urethra, urinary bladder upper part of the urethra.

2)Stratified Squamous Keratinized Epithelium:- It is compound of many layers of cells.

Nature of cells:-The superficial layer of cells are flat type and horny ,while deeper layer cells are polyhedral.

Functions:-Horny layers prevents the loss of water and mechanical injury.

Location:-Skin, nails,hair,palms.

3)Stratified Squamous Keratinized Epithelium:-It is made up of several layers of cells. No keratinisation.

Nature of cells:- living squamous cells.

Functions:-provides moderate protection.

Location:-buccal cavity,pharynx,oesophagus,cornea,vagina etc.

4)Stratified Columnar Epithelium:-It is made up of many layers of polyhedral cells with superficial column or type of cells.

Nature of cells:-Elongated or columnar.

Location:- Epiglottis,urethra,mammary gland,pharynx,fornix of conjunctiva.

5)Stratified Columnar Ciliated Epithelium:-The superficial layer is only columnar ciliated type of cells. The remaining layers are polyhedral cells.

MUSCULAR TISSUE:

Muscular tissue is a specialized tissue in animals which applies forces to different parts of the body by contraction. It is made up of thin and elongated cells called muscle fibers. It controls the movement of an organism.

The cytoplasm in the muscle fibers is called sarcoplasm. It contains a network of membrane called the sarcoplasmic reticulum. The membrane surrounding the muscle fibers is called sarcolemma.

Properties of Muscular Tissue

1. **Contractibility**– It is the ability of muscle cells to shorten forcefully.
2. **Extensibility**– A muscle has the ability to be stretched.

3. **Elasticity**– The muscles have the ability to recoil back to its original length after being stretched.
4. **Excitability**– The muscle tissue responds to a stimulus delivered from a motor neuron or hormone.

Structure of Muscular Tissue

The muscular tissues are bundled together and surrounded by a tough connective tissue similar to cartilage known as epimysium.

The bundle of nerve cells that run in long fibers called fascicles are surrounded by the epimysium.

The fascicles are surrounded by a protective layer known as perimysium. It allows the flow of nerves and blood to the individual fibers.

Another protective layer, the endomysium surrounds the fibers.

These layers and muscles help in the contraction of different parts of the muscles. The different bundles slide past one another as they contract.

The epimysium connects to the tendons attached to the periosteum connective tissue that surrounds the bones. This helps in the movement of the skeleton when the muscles contract.

The epimysium connects to other connective tissues to produce a force on the organs and control everything from circulation to food processing.

Types of Muscular Tissue

The muscular tissue is of three types:

- Skeletal Muscle Tissue
- Smooth Muscle Tissue
- Cardiac Muscle Tissue

Skeletal Muscle Tissue

- These muscles are attached to the skeleton and help in its movement.

- These muscles are also known as striated muscles because of the presence of alternate patterns of light and dark bands.
- These light and dark bands are sarcomeres which are highly organized structures of actin, myosin, and proteins. These add to the contractility and extensibility of the muscles.
- Skeletal muscles are voluntary muscles composed of muscle fibers.
- 40% of our body mass comprises skeletal muscles.
- Each skeletal tissue contains myofibrils.
- The cells of these tissues are multinucleated.
- These are provided with blood vessels and many elongated mitochondria and glycogen granules.
- They bring about the movement of the organs of the body.

Smooth Muscle Tissue

- These are non-striated, involuntary muscles controlled by the Autonomous Nervous System.
- It stimulates the contractility of the digestive, urinary, reproductive systems, blood vessels, and airways.
- The actin and myosin filaments are very thin and arranged randomly, hence no striations.
- The cells are spindle-shaped with a single nucleus.

Cardiac Muscle Tissue

- These are found only in the heart.
- These are involuntary muscles and the heart pumps the blood through cardiac contractions.
- The cells of the cardiac muscles known as the cardiomyocytes are striated.
- They are single-celled and uninucleated.
- The ends of the cells are joined and the junctions are called intercalated discs. The cells are attached to each other by desmosomes.

Function:

- The muscular tissues are connected to the same nerve bundles.
- The nerve impulse from the brain tells the muscles to contract.
- Each muscle cell contains the proteins actin and myosin. These proteins slide past one another when the signal is received for contraction.
- A single cell contracts up to 70% in length. The entire muscle shortens during contraction.
- Muscular tissues help in the movement of bones, squeeze different organs, or compress chambers.

IMPORTANT QUESTIONS:**2M QUESTIONS:**

1. Define Anatomy and Physiology along with its scope.
2. Define Homeostasis.
3. What is feedback system.
4. Define cell. Write the functions of mitochondria.
5. Differentiate mitosis and meiosis.
6. Differentiate Phagocytosis and Pinocytosis.
7. Define: 1. Facilitated transport 2. Osmosis transport.
8. Differentiate exocrine and endocrine signaling.
9. Define Autocrine and Juxtacrine signaling.
10. Define tissue and its types with examples.

5M QUESTIONS:

- 1) Draw a labelled diagram cell showing its cell organelles and their function.
- 2) Define tissue and its types in detail.
- 3) What is cell cycle and explain in detail.
- 4) What is cell division and explain its types.
- 5) What are different cell junctions.
- 6) Explain cell signaling and cell communication.
- 7) What is homeostasis and explain its feedback mechanism

10 M QUESTIONS

1. Define tissue and its types in detail.
2. What are different cell junctions.
3. Explain cell signaling and cell communication.