ISHIK UNIVERSITY

FACULTY OF EDUCATION Department of BIOLOGY EDUCATION

Lecture series in Histology for undergraduate students

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Tissues of the Body

Key Concept :

Tissues are collections <u>of cells</u> and <u>cell products</u> that perform specific functions. These tissues are of four types forming all structures of human body, they are :

- 1-Epithelial tissue
- 2-Connective tissue
- 3-Muscle tissue
- 4-Nervous tissue

1- Epithelial Tissues:

Learning Objectives

To describe the primary functions, locations and characteristics of Epithelial Tissue.

General outline

Epithelial tissue is composed of cells laid together in sheets with the cells tightly connected to one another forming a membranous tissue composed of one or more layers of cells that form the covering of most internal and external surfaces of the body and its organs.

Key Points A-Epithelial tissue general features

- a- closely packed cells with little extracellular material b-many cell junctions , why ?
- c-cells sit on a connective tissue; basement membrane (b m)
- d- are <u>avascular</u> and supported by connective tissue. Why?
- e- good nerve supply
- f- rapid cell division . Why?



2-Functions :

h.

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- a. Protection (esophagus, skin)
- b. Secretion (glands)
- c. Digestion (stomach, intestine)
- d. Excretion (kidney)
- e. Absorption(intestine)
- f. Sensory reception(in the ear, nose, mouth...)



g. Transportation(For a substance to cross the **epithelium**, it must be **transported** across the cell's plasma membranes by membrane transporters).

CELL SHAPES





Cuboidal



(Simple squamous)

SIMPLE



(Simple cuboidal)



Cilia Basement ۲ membrane 0 Connective tissue

(Pseudostratified)

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STRATIFIED



(Transitional, relaxed)



(Transitional, stretched)



Basement membrane



C-Classification of Epithelial Tissue :

1- according to function:

<u>**a-Membranous Epithelia**</u> form a sheet of cells covering and or lining of body and internal organs(skin epidermis, lining digestive tube, urinary and respiratory passages......etc

<u>**b-Glandular Epithelia**</u> their classification is based on how their secretions are released i.e if the secretion is distributed by tube like structures(ducts) they are called EXOCRINE glands, but if the glands have no ducts and their secretions are distributed by blood, then are called ENDOCRINE glands.

C-Classification of Epithelial Tissue :

2-according to the cell shape. Squamous(flat), Cuboidal, and columnar.



pseudostratified

3- by the number of cell layers. Simple(one layer),Stratified(many layers)



1- Simple(one layer)epithelia, usually located in areas where there is lots of absorption& filtration

a-simple squamous-flat- epithelium:

Function : exchange , transport , absorption& filtration Location: lining heart and blood vessels and lymph vessels(endothelium), kidney, lung alveoli, also pleural , pericardial and abdominal cavities(mesothelium).





b- simple cuboidal epithelium , has a rounded nucleus .
Function: secretion and absorption.
Location: most glands, also covering ovary.





c- simple columnar epithelium .Single layer of tall cells that are tightly packed together. Cilia or Microvilli also present.

Function: absorption and secretion. Location: lining stomach, intestine. gall bladder **d-pseudostratified epithelium:** Some columnar and some cuboidal Lining of trachea, bronchi, nasal cavity. Protection, secretion; cilia-mediated transport of particles trapped in mucus.











2- Stratified: more than one layer

a-squamous :Surface layer squamous keratinized (dry) Epidermis of Skin. Function: Protection; prevents water loss.

b-Surface layer squamous nonkeratinized (moist) Location :Mouth, esophagus, larynx, vagina, anal canal. Function :Protection, secretion; prevents water loss.



Str.squamous keratinized(skin)

Str.squamous nonkeratinized(esophagus)

2- Stratified: more than one layer

c-Str.cuboidal (mainly two or more layers of cuboidal cells) .Location: Sweat glands, developing ovarian follicles. Protection, secretion.



Simple cuboidal



str.cuboidal

2- Stratified: more than one layer

str.transitional

d-Str.Columnar, Location Conjunctiva and ducts of some glands. Function: Protection. **e-Str.Transitional**: domelike to flattened, depending on the functional state of the organ Location: Bladder, ureters, renal calyces. Function: Protection, distension ability.



str.transitional

str.columnar

3- Glandular Epithelia

- **Glandular Epithelium**. A gland is one or more cells that produce and secrete a specific product (the product is referred to as secretion).
- There are two types : exocrine and endocrine glands.
- Most exocrine glands are glands with ducts. The secretions are released into ducts or onto surface ,example the sweat glands of the skin , pancreas, salivary glands & goblet cells . All endocrine glands are ductless , their secretions released into interstitial fluid or blood circulation to reach <u>target organs</u>, e.g thyroid , pituitary and adrenal glands.





goblet cells

Summary of key points

- **1- Characteristic features of epithelia.**
- **2-** Functions of epithelia.
- **3- Classification of epithelia**
- 4- Types of epithelia .
- 5- Location in the body of different types of epithelia.

THE END

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