

Epithelium

Functions of the epithelium are:

- 1. Protection**
- 2. Absorption**
- 3. Reabsorption**
- 4. Secretion of substances**

Protection: against mechanical, chemical, thermal factors, viruses, bacteria, parasites.

Absorption: through microvilli

Secretion: through the glands of epithelial cells, single cells like goblet cells, multicellular glands.

The glands are exocrine glands like sweat glands, endocrine glands like thyroid glands.

Glands are grouped also to produce mucus, serous (watery) or mixed.

Classification of the Epithelium:

- A. Simple epithelium**
- B. Stratified epithelium**

Simple epithelium is subdivided into many types according to the shape of cells, and the whole cells are resting on the basement membrane, the basement membrane is formed by mucopolysaccharide and reticular lamina.

- a) Simple cuboidal epithelium:** the cells are cuboidal in shape and the nuclei are spherical in shape, present in ducts of kidney for example.
- b) Simple squamous epithelium:** the cells are spindle or scale shaped, present in lining the lumens of the blood vessels.
- c) Simple columnar epithelium,** the cells are columnar in shape or tall and the nuclei are oval shaped, present in the intestine and stomach.
- d) Pseudo stratified columnar ciliated epithelium:** the cells are short and long all, these cells resting on the same basement membrane with the presence of

cilia on the surface of long cells, and the nuclei appeared in more than one row. Also there is goblet cells in between epithelial cells.

Stratified epithelia:

- a) Stratified squamous epithelium: many rows of cells resting on the basement membrane like in skin.
- b) Stratified cuboidal cells: more than one row of cuboidal cells like in ducts of sweat glands.
- c) Stratified columnar epithelium: like the ducts of mammary glands.
- d) Transitional epithelium: many rows of cells (globe-like) forming the ducts of ureter and urinary bladder. sometime this epithelium called urinary epithelium

The modification of epithelia is the glands like:

- a. Sweat glands
- b. Mammary glands
- c. Intestinal glands
- d. Sebaceous glands
- e. Salivary glands

Each gland have the glandular portion and tubular portion which convey the production either inside the body like salivary glands, intestinal glands or outside the body like mammary glands and sweat glands.

Connective Tissue C-T:

The connective tissue is responsible for connecting the structure of tissue to each other's, they are present in many forms:

1. Loose C-T
2. Adipose C-T
3. Skeletal C-T
4. Blood C-T
5. Muscular C-T
6. Nervous system

The main components of C-T are:

- A. Cells
- B. Fibers
- C. Matrix (ground substance)

The loose C-T: is formed by different types of cells such as:

- a) Fibroblasts
- b) Plasma cells
- c) Adipose (fat) cells
- d) Lymphocytes
- e) Mast cells
- f) Macrophages

The fibers are formed by:

- a. Reticular fibers (network) of fibers.
- b. Elastic fibers arranged in (single) direction .
- c. Collagen fibers arranged in (bundles), Wavy appearance with fibroblasts.

The matrix:

Is the ground substance which is formed by a jelly-like of chondroitin sulphate and the cells with fibers are embedded inside it, this type of C-T is present in the skin (subcutaneously).

The adipose C-T:

Is the fat tissue which is formed by fat cells of great size, each cell containing a cytoplasm occupied by the large drop of fat and the nucleus is small sized compressed peripherally, and this tissue have great number of blood vessels.

Skeletal C-T:

Is formed by the bones and cartilage, the bone is consisting of the following:

- A. Osteocytes cells: inside the matrix
- B. Osteoblasts cells: building cells
- C. Osteogenic cells: producing cells
- D. Osteoclasts cells: phagocytic cells

The fibers of the bone is the collagen fibers, the matrix is formed by inorganic materials such as Zink, Sulphur, Magnesium, Sodium, Calcium, Phosphorus and Iron, and also 4-6 chondroitin sulphate.

The bone is surrounded by C-T and inner layer formed by osteogenic cells.

Cartilage:

Is formed by:

- A. Cells (chondroblasts, chondrocytes, chondrogenic).
- B. Collagen fibers or elastic fibers
- C. Matrix (chondroitin sulphate)