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# Zoology

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E101

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**Part II Zoology****( Lecture 1)****Basic tissues**

Living organisms can be classified into two organisms the unicellular and multicellular and the multicellular regarded as complex group composed of variable cells and organs collected together to form the systems with different functions and multicellular (large) organisms function more efficiently if cells become specialized for specific functions.

A tissue is composed of cells or a group of cells that function together in a specialized activity for the performance of a common function. Histology (Gr. *histo*, web or tissue, + *logos*, study) is the study of the tissues of the body and of how these tissues are arranged to constitute organs. Four fundamental tissues are recognized: epithelial tissue, connective tissue, muscular tissue, and nervous tissue.

Tissues are made of cells and extracellular matrix, two components that were formerly considered separate entities. The extracellular matrix consists of many kinds of molecules, some of which are highly organized and form complex structures, such as collagen fibrils and basement membranes. The main functions formerly attributed to the extracellular matrix were to furnish mechanical support for the cells, to transport nutrients to the cells, and to carry away catabolites and secretory products. In addition to these functions, it is now known that cells not only produce extracellular matrix components but are also influenced by them. There is thus an intense interaction between cells and matrix. Moreover, many molecules of the matrix are recognized by and attach to receptors present on cell surfaces. Most of these receptors are molecules that cross the cell membranes and connect to molecules within the cytoplasm. Thus, cells and extracellular matrix form a continuum that functions together

**There are four types of tissues found in a multicellular animal.**

**Table 4–1. Main Characteristics of the Four Basic Types of Tissues.**

| <b>Tissue</b>     | <b>Cells</b>                               | <b>Extracellular Matrix</b> | <b>Main Functions</b>                                   |
|-------------------|--|-----------------------------|---|
| <b>Nervous</b>    | Intertwining elongated processes           | None                        | Transmission of nervous impulses                        |
| <b>Epithelial</b> | Aggregated polyhedral cells                | Very small amount           | Lining of surface or body cavities, glandular secretion |
| <b>Muscle</b>     | Elongated contractile cells                | Moderate amount             | Movement  |
| <b>Connective</b> | Several types of fixed and wandering cells | Abundant amount             | Support and protection                                  |

## 1. Epithelial tissue

Forming tight covering and protecting layers below or lining the body cavities

## 2. Connective tissue (supporting tissues)

Holding other tissues together and are surrounded by lot of non living material.

## 3. Muscle tissue

Shortening and lengthening to move other tissues. there are three types of muscles skeletal, smooth and cardiac muscle.

## 4. Nervous tissue

It allows rapid flow of ions in and out to conduct signals the most conducting cells was the neurons.

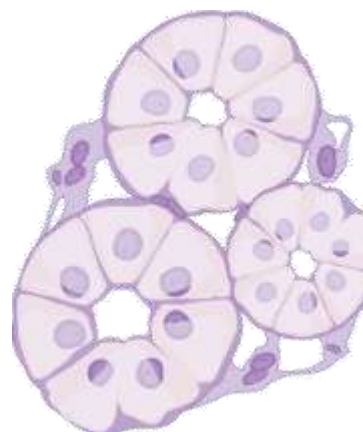
### 1. Epithelial tissues:

There are two types of epithelial tissues:

1. Covering and lining epithelium (outer layer of the skin and some organs) .
2. Glandular epithelium (constitute the secreting portion of glands) .

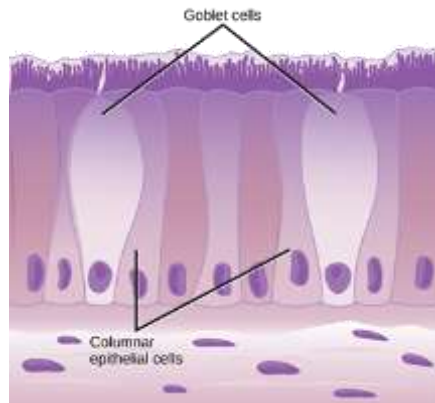
There are two types of epithelial tissues according to the number of layers:

- 1- Simple epithelial tissues and this classified according to cell shape to:







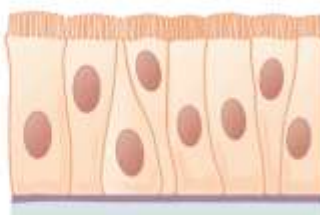


- a- Simple Squamous epithelial tissue with thin flat cells and ovoid nucleus.
- b- Simple Cuboidal epithelial tissues, cells are roughly square, spherical nucleus
- c- Simple columnar epithelial, elongated, tall cells, with elongated nucleus.

The goblet cells distribute between the columnar cells. Each cell in this tissue end with cilia on free surface.



- **Covering and lining epithelium can be divided into seven types:**
- 1- simple squamous epithelium
- 2- stratified squamous epithelium
- 3- simple cuboidal epithelium
- 4- stratified cuboidal epithelium
- 5- simple columnar epithelium
- 6- stratified columnar epithelium
- 7- Pseudostriated columnar epithelium

|                 | Simple   | Stratified  |   |
|-----------------|--|---|---|
| <b>Squamous</b> |  <p>Simple squamous epithelium</p>  |  <p>Stratified squamous epithelium</p>  |   |
| <b>Cuboidal</b> |  <p>Simple cuboidal epithelium</p>  |  <p>Stratified cuboidal epithelium</p>  |   |
| <b>Columnar</b> |  <p>Simple columnar epithelium</p> |  <p>Stratified columnar epithelium</p> | <b>Pseudostratified</b><br> <p>Pseudostratified columnar epithelium</p> |