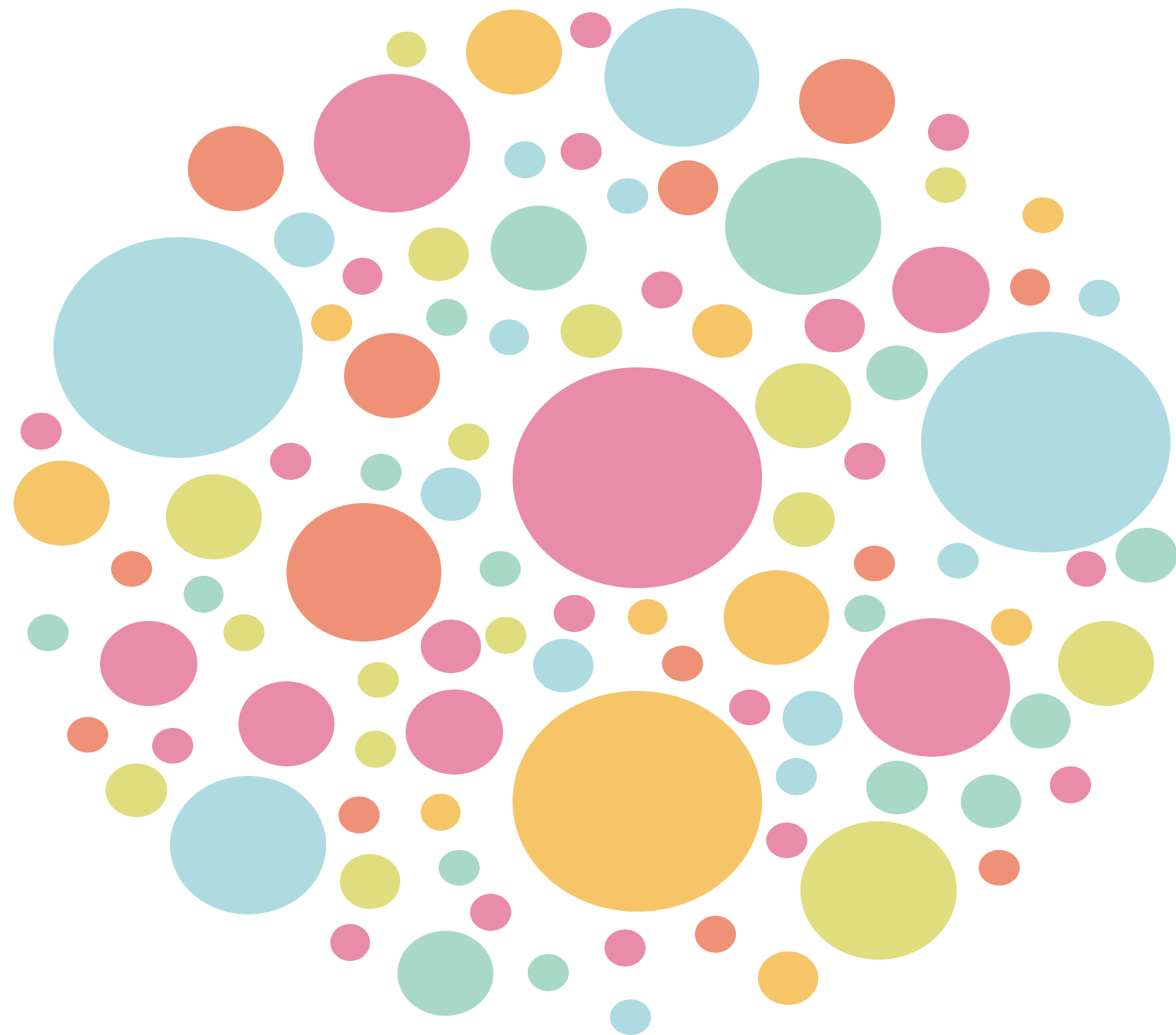


Republic of Iraq
Ministry of Higher Education And Scientific
Research
Al-Zahraa University for Women
College of Pharmacy



Human Biology
First semester/ Lab.3
Epithelial and Connective Tissues
By:
Asst. Lec. : Banaz Salih Ahmed

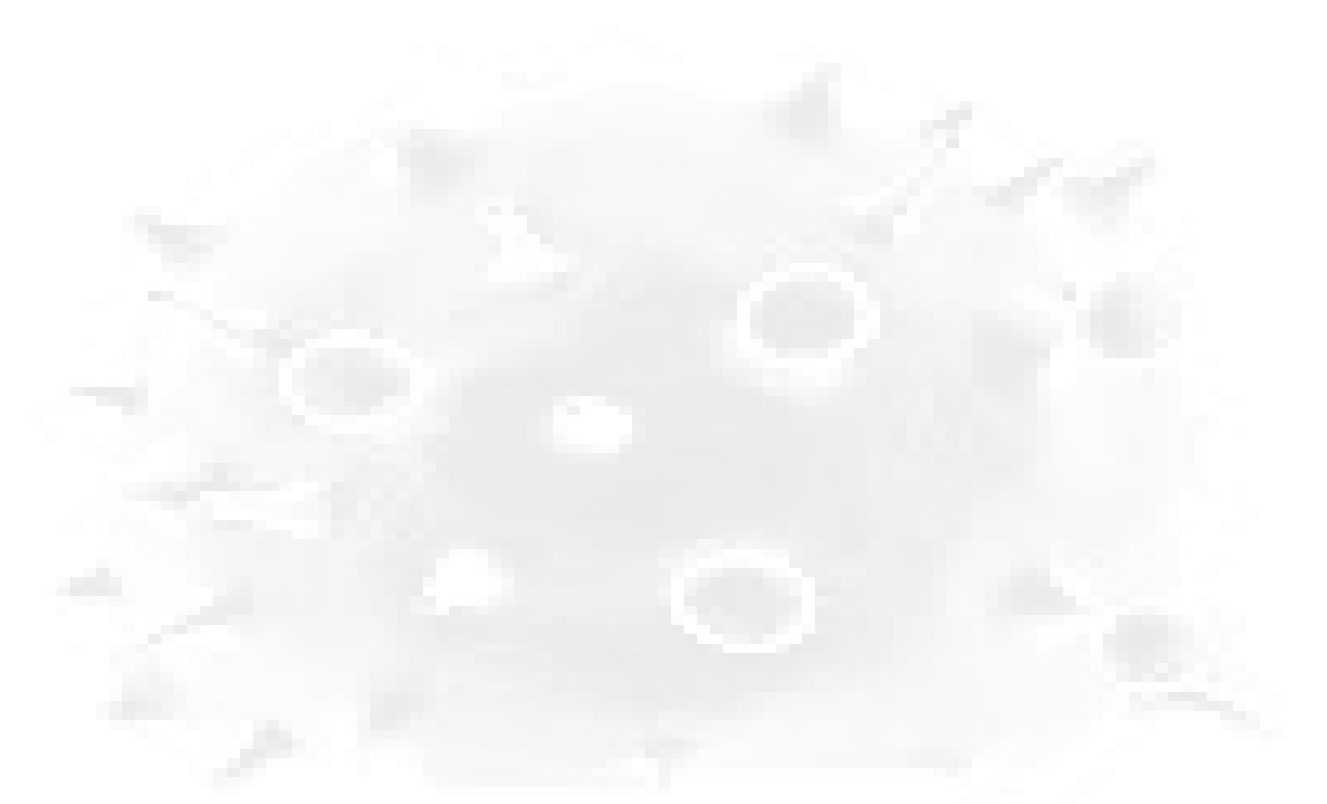
Epithelial Tissue

❖ EPITHELIAL TISSUES

The epithelial tissue, or epithelium, consists of sheets of cells that cover the external surfaces of the body, line the internal cavities, from various organs and glands, and line their ducts.

❖ Functions:

1. Protection of the underlying tissues.
2. Absorption of substances.



Epithelial Tissue

Types of epithelial tissues

The simplest classification of these tissues is based on the number of cell layers:

- 1- Simple epithelium composed of a single layer of cells.
- 2- Stratified epithelium containing two or more layers of cells.



Epithelial Tissue

❖ Epithelia can also be classified based on the shape of the cells to three types:

1. **Squamous epithelial tissue:** (Flat, scale-like cells).
 2. **Cuboidal epithelial tissue:** (cube shaped cells).
 3. **Columnar epithelial tissue:** Cells that are shaped like a column or cylinder).
- 



Epithelial Tissue

❖ Simple epithelia are classified according to the shape of their cells:

Simple epithelium are classified according to the shape of their cells:

1- **Simple Squamous epithelium** consists of a single layer of flat cells.

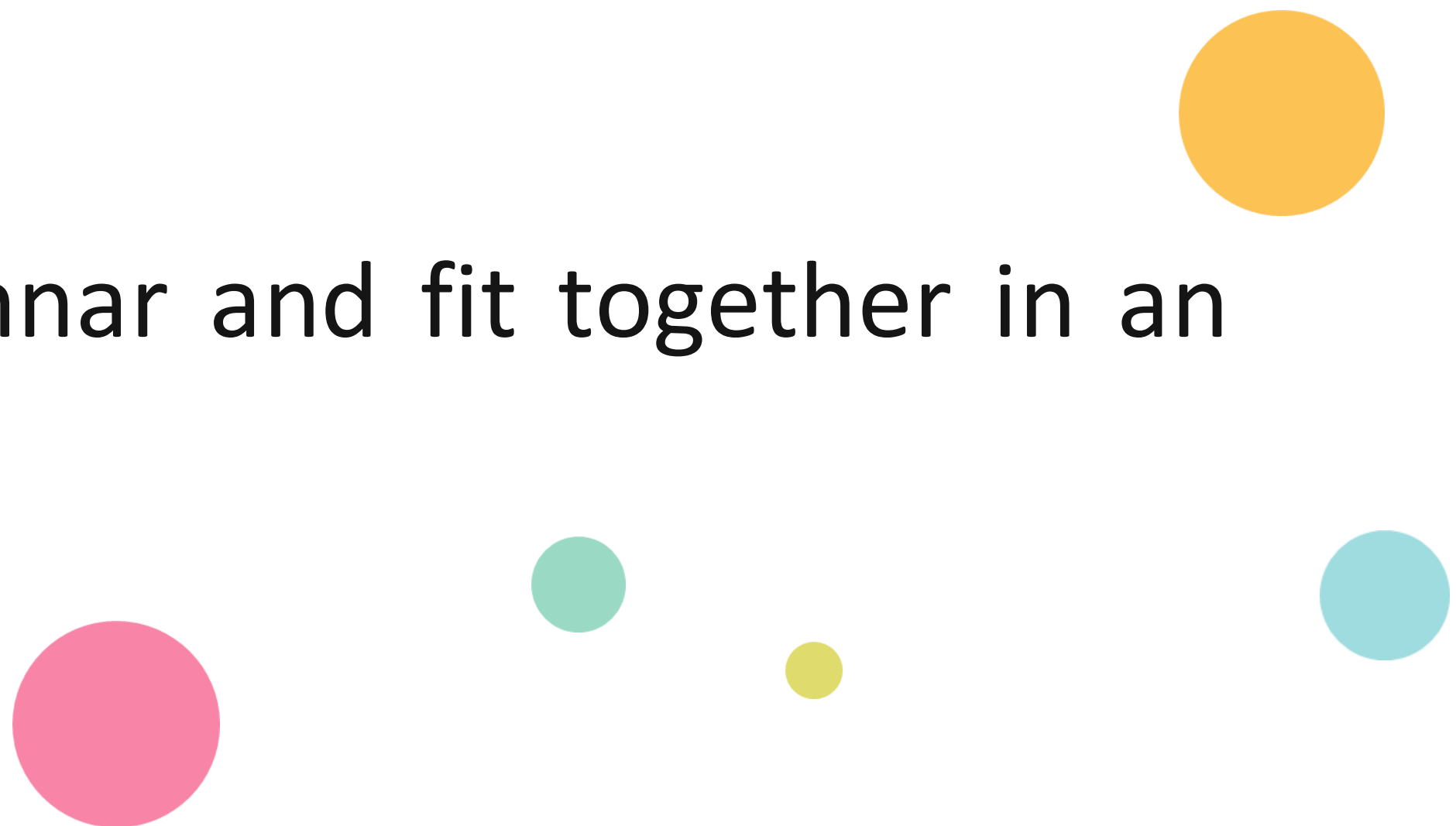
ex: blood vessels, lymphatic vessels

2- **Simple Cuboidal epithelium** single layer of cells is described as Cuboidal because in transverse section the cells appear square.

ex: Ovaries, thyroid gland

3- **Pseudostratified**. ex: trachea

4- **Simple Columnar epithelium** are all tall columnar and fit together in an essentially hexagonal pattern.



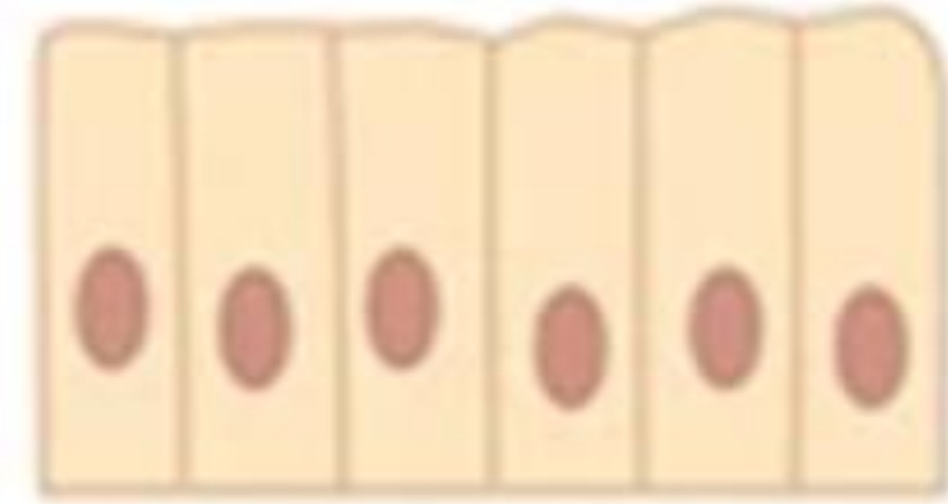
Epithelial Tissues



Simple Squamous



Simple Cuboidal



Simple Columnar



Stratified Squamous



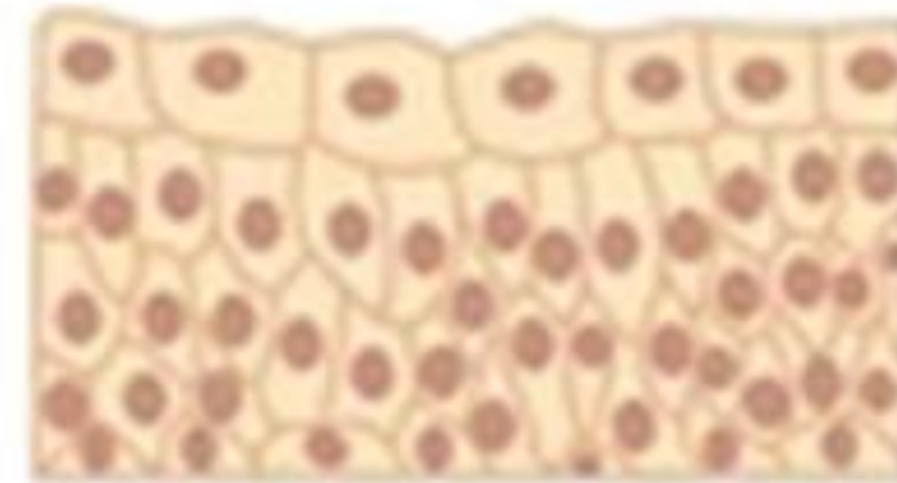
Stratified Cuboidal



Stratified Columnar



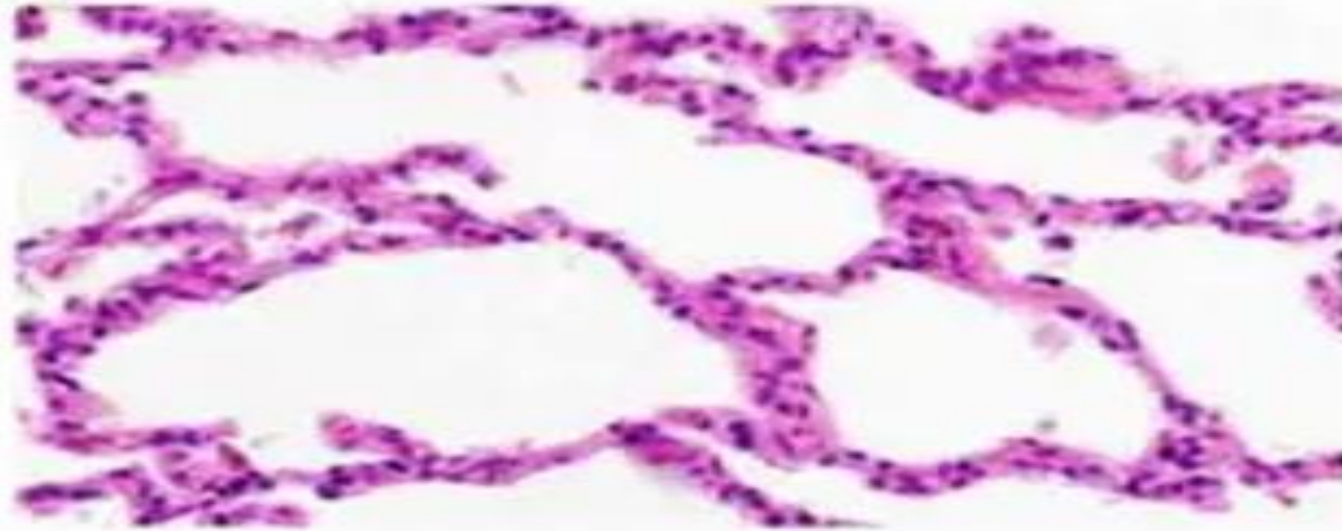
Pseudostratified Columnar



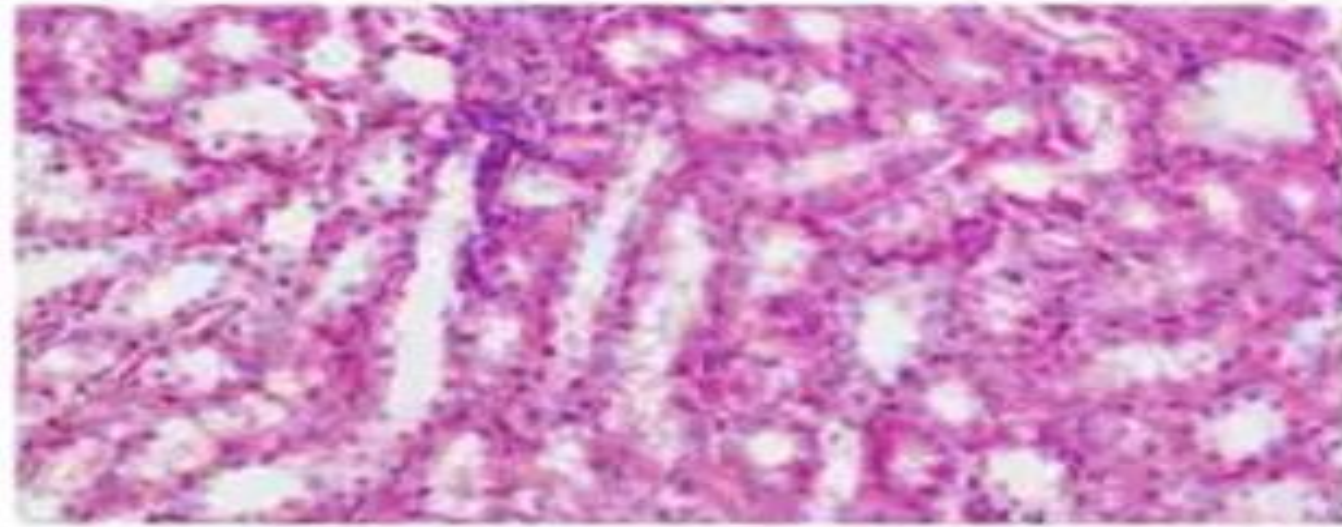
Transitional

Types of Epithelial Tissues and Examples

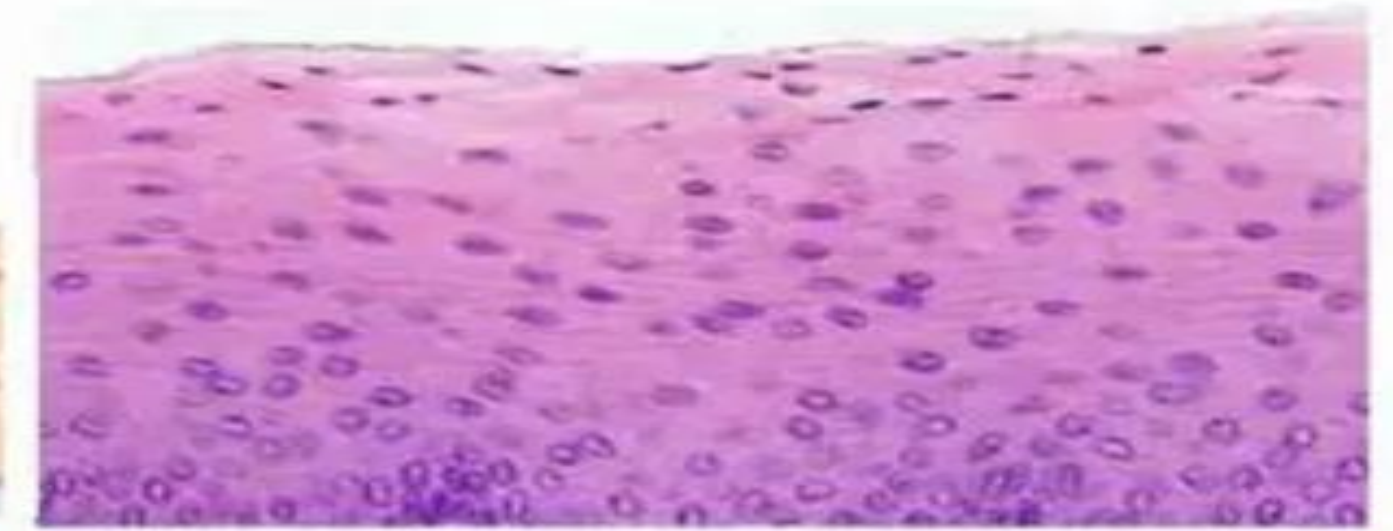
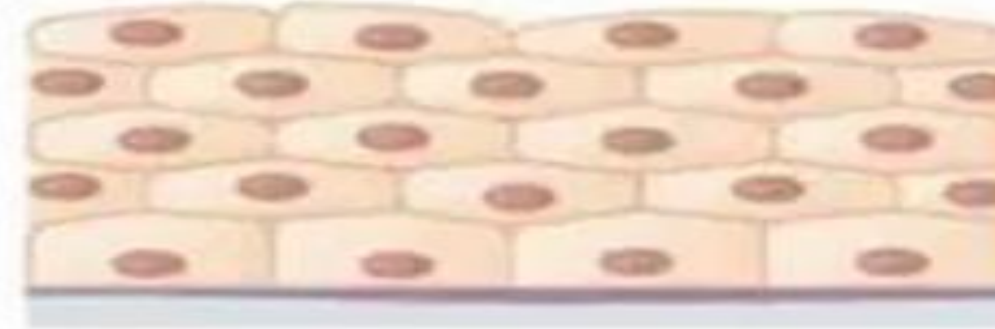
Simple Squamous
(Lung)



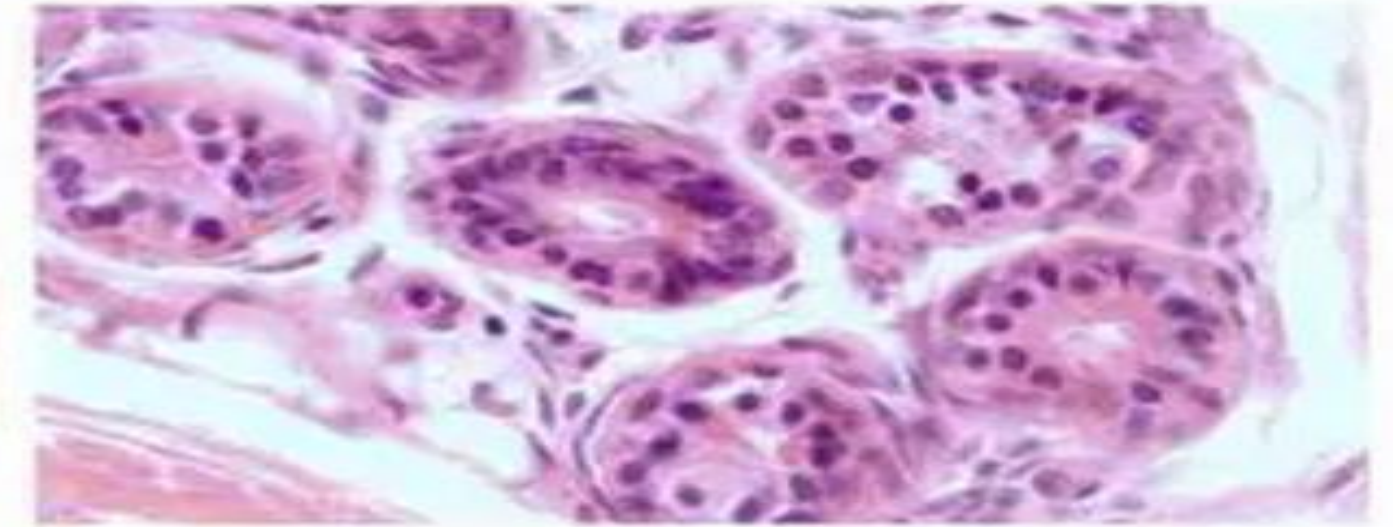
Simple Cuboidal
(Kidney)



Stratified Squamous
(Esophagus)



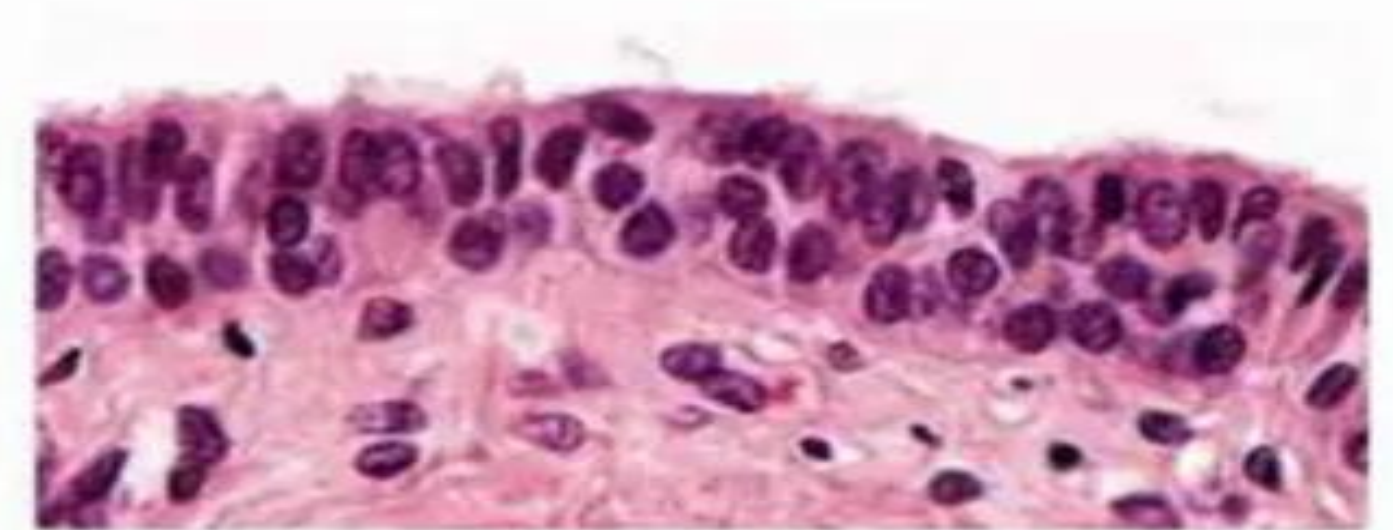
Stratified Cuboidal
(Sweat gland)



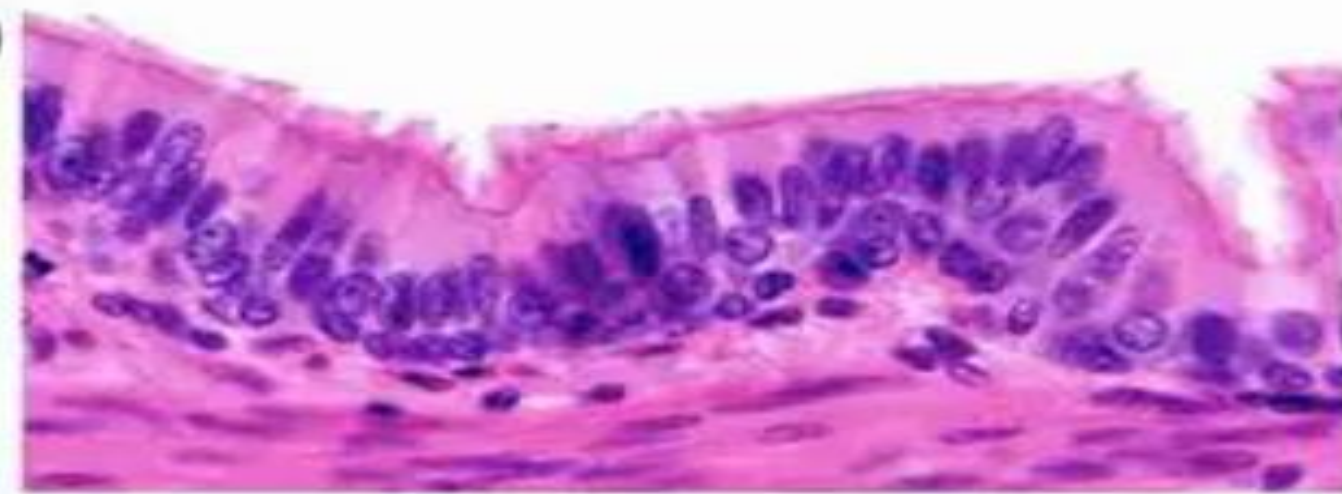
Simple Columnar
(Stomach)



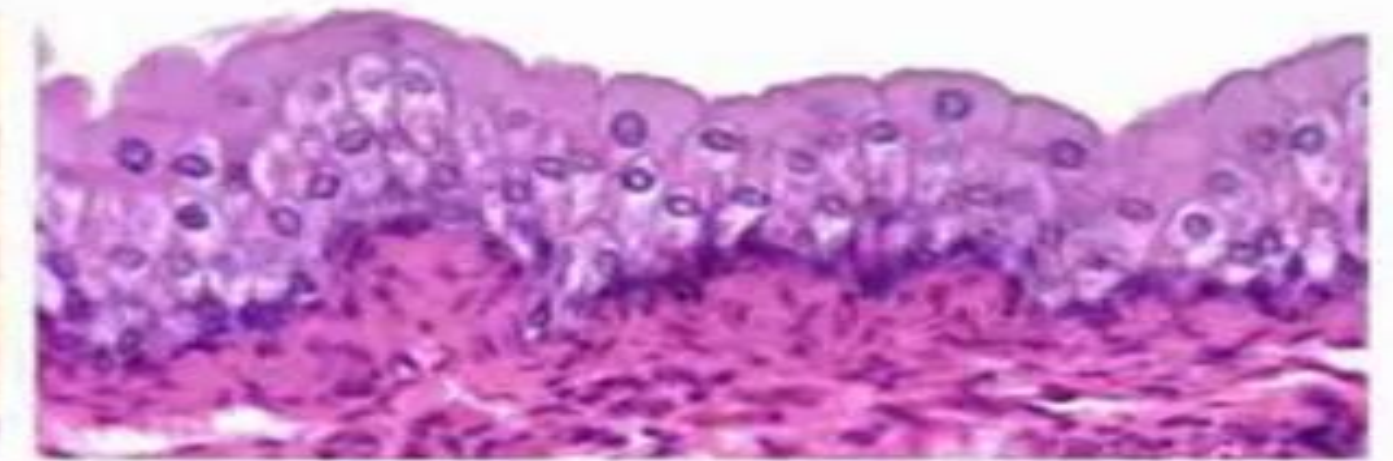
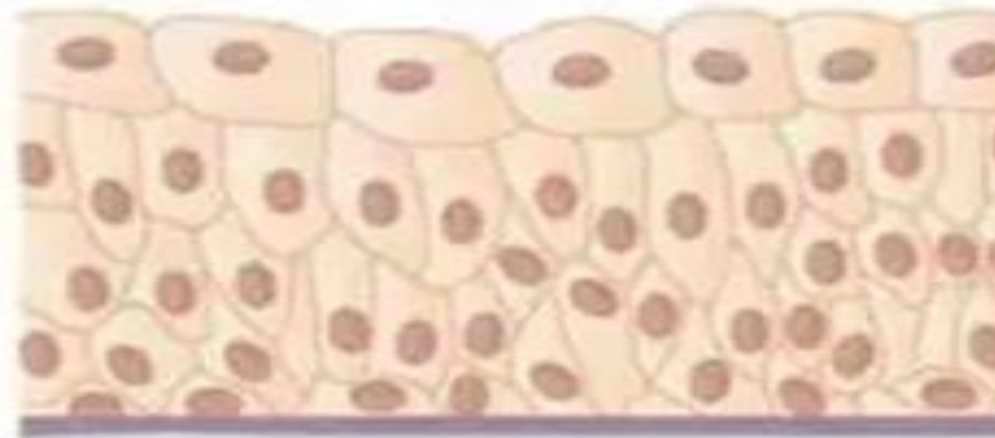
Stratified Columnar
(Salivary duct)

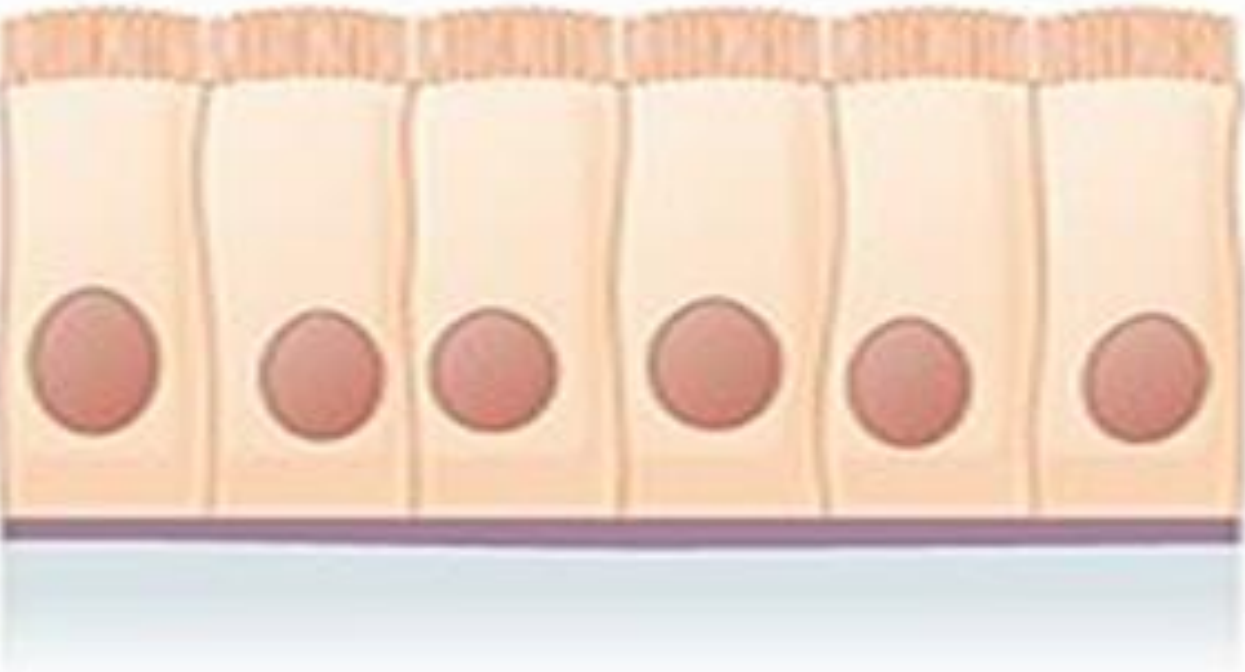
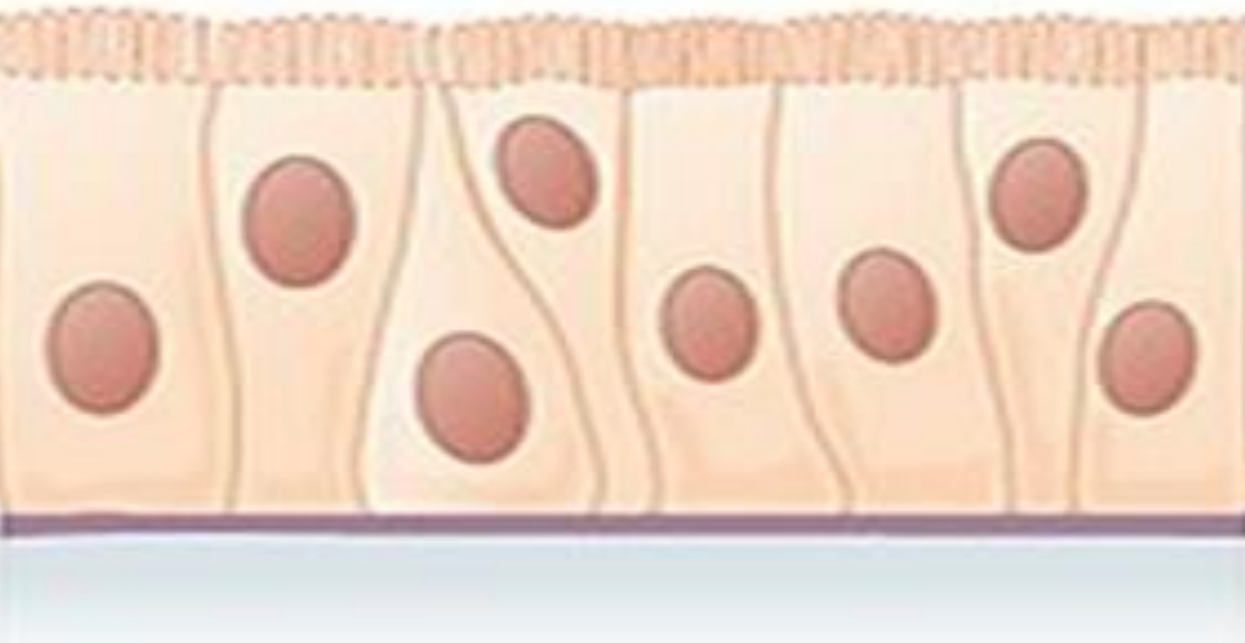


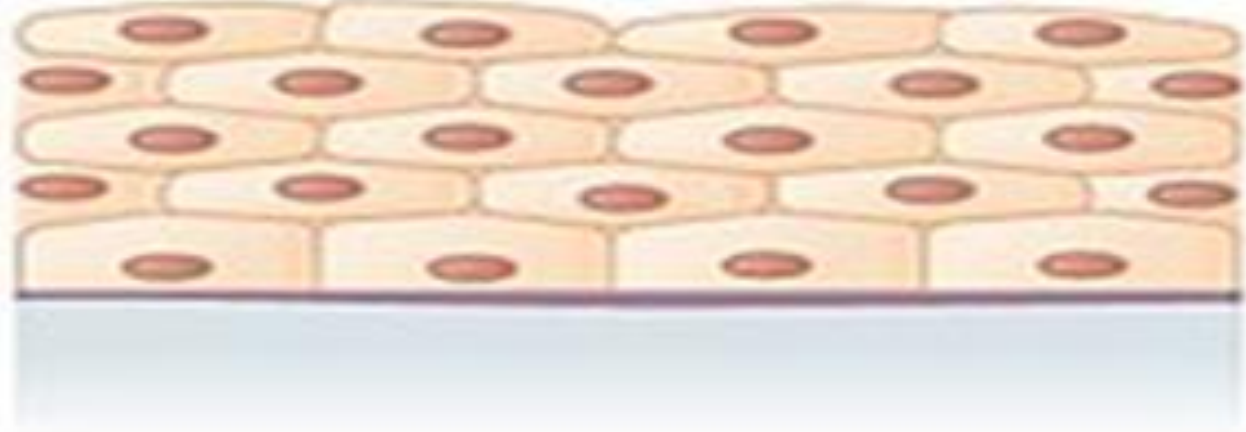
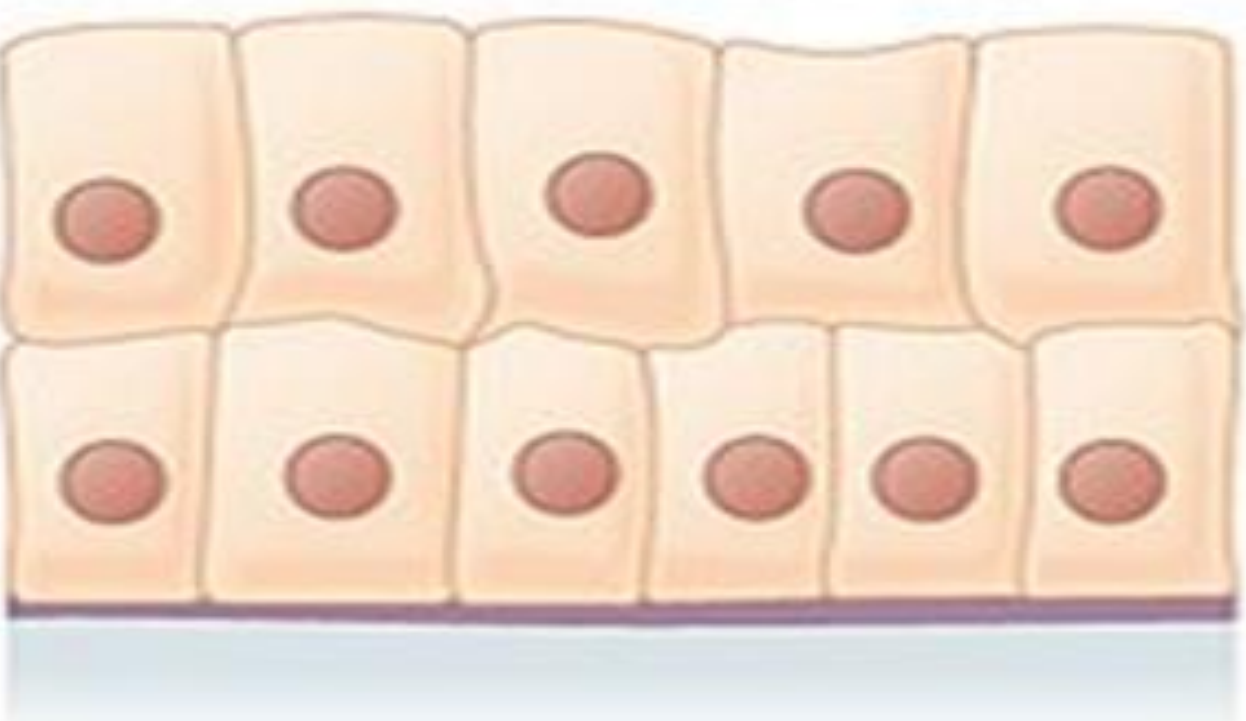
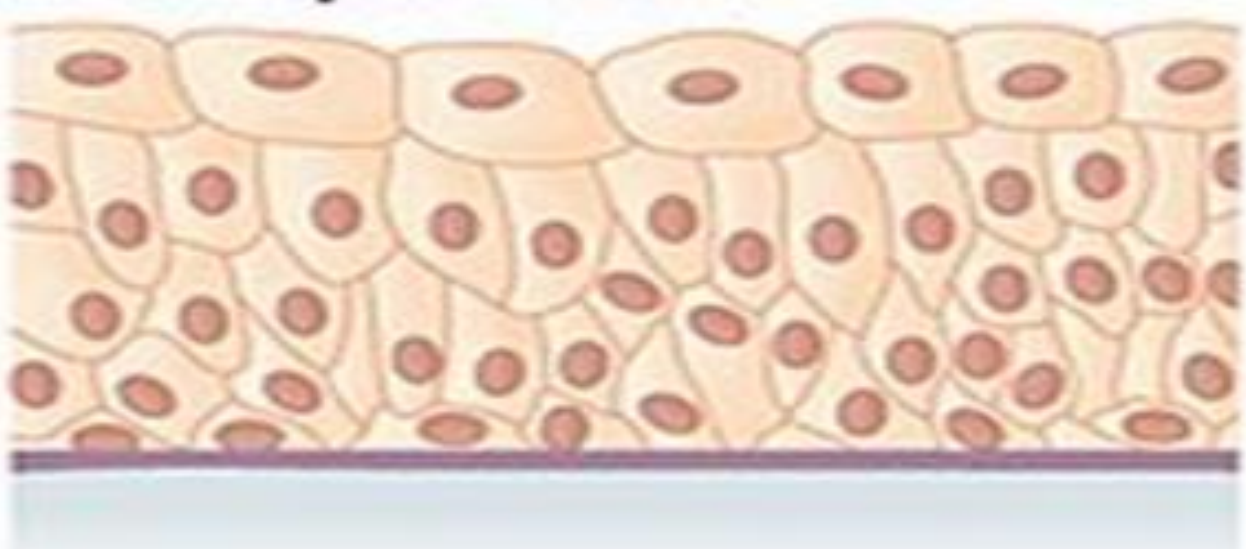
Pseudostratified Columnar
(Trachea)



Transitional (Bladder)

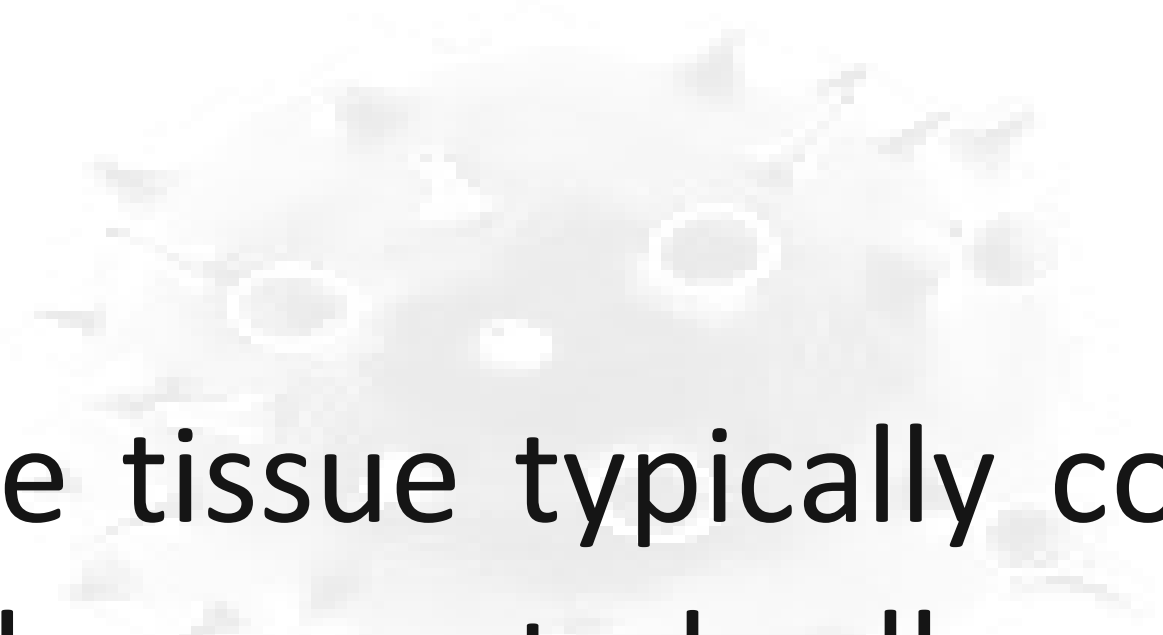


Cells	Location	Function
Simple squamous epithelium 	Air sacs of lungs and the lining of the heart, blood vessels, and lymphatic vessels	Allows materials to pass through by diffusion and filtration, and secretes lubricating substance
Simple cuboidal epithelium 	In ducts and secretory portions of small glands and in kidney tubules	Secretes and absorbs
Simple columnar epithelium 	Ciliated tissues are in bronchi, uterine tubes, and uterus; smooth (nonciliated tissues) are in the digestive tract, bladder	Absorbs; it also secretes mucous and enzymes
Pseudostratified columnar epithelium 	Ciliated tissue lines the trachea and much of the upper respiratory tract	Secretes mucus; ciliated tissue moves mucus

Stratified squamous epithelium 	Lines the esophagus, mouth, and vagina	Protects against abrasion
Stratified cuboidal epithelium 	Sweat glands, salivary glands, and the mammary glands	Protective tissue
Stratified columnar epithelium 	The male urethra and the ducts of some glands	Secretes and protects
Transitional epithelium 	Lines the bladder, urethra, and the ureters	Allows the urinary organs to expand and stretch



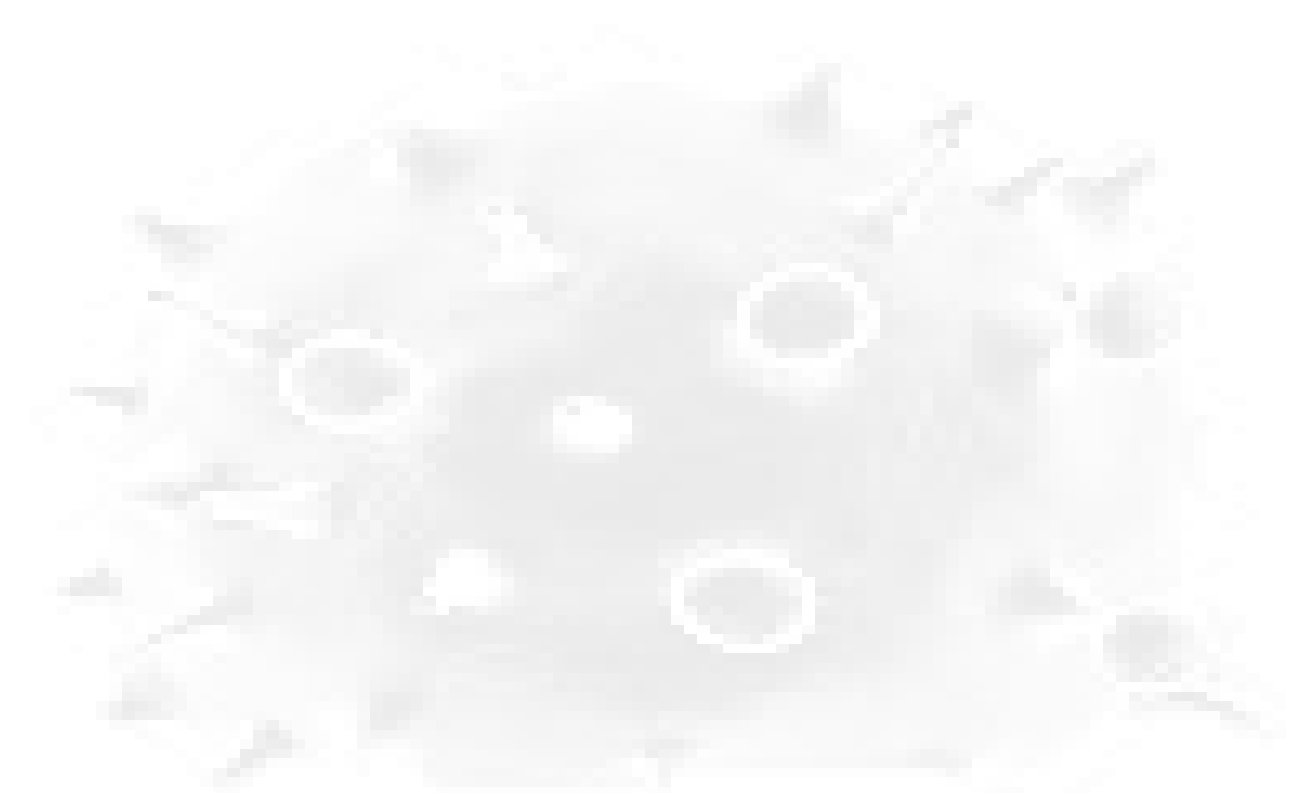
Connective tissue



Connective tissue typically consists mostly of fibers and ground substance, with widely separated cells.

The connective tissues falls into three broad categories:

1. fibrous connective tissues.
2. supportive connective tissues (cartilage and bone).
3. fluid connective tissue(blood).



A series of five colored circles (pink, teal, yellow, orange, and light blue) of varying sizes are arranged in a horizontal line at the top left of the slide.

Connective Tissue

These are some of the functions of connective tissue :

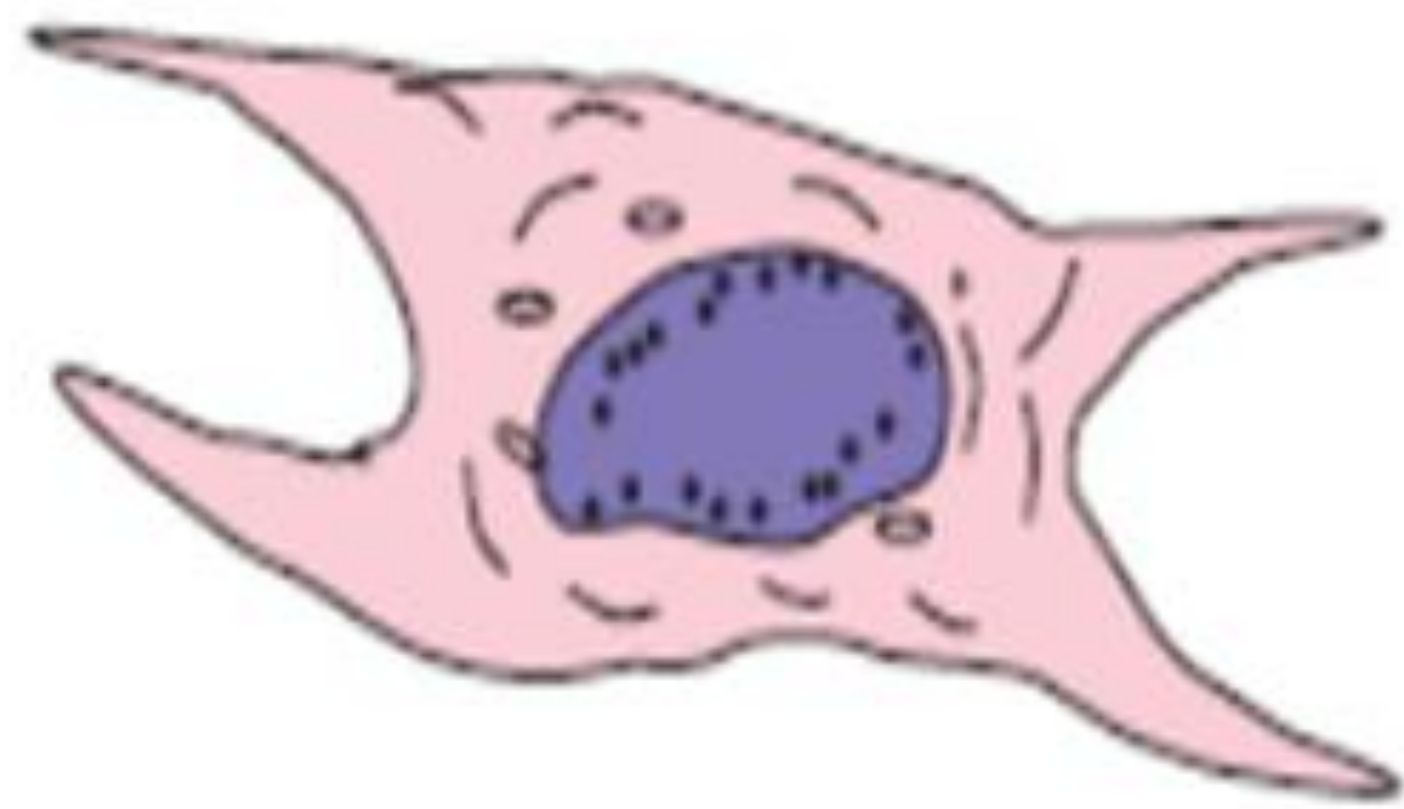
1. Binding of organs: tendons bind muscle to bone
2. Support: bones support the body
3. Immune protection: connective tissue cells attack foreign invaders.
4. Transport: blood transports gases.

A series of five colored circles (pink, teal, yellow, orange, and light blue) arranged in a horizontal line at the top left of the slide.

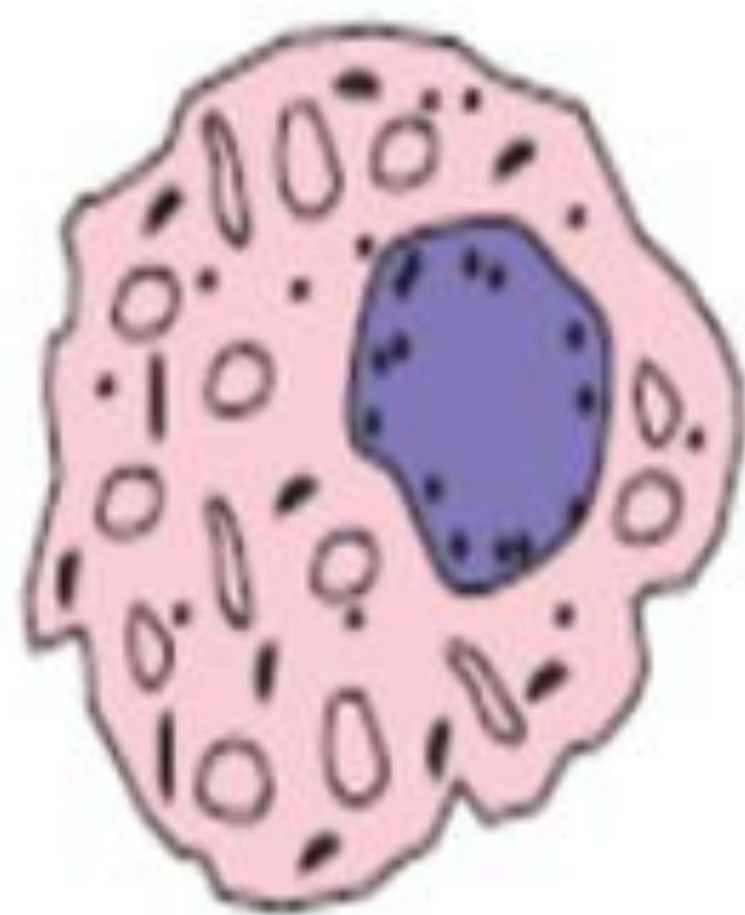
Connective Tissue

Some cells that are found in connective tissue

1. Fibroblasts: Secrete both fibers and ground substance of the matrix
2. Macrophages: Phagocytes cell that develop from Monocytes
3. Plasma Cells: Antibody secreting cells that develop from B Lymphocytes
4. Mast Cells: Produce histamine that are important in allergic reactions
5. Adipocytes: Fat cells that store triglycerides



Fibroblast



Macrophage



Adipocyte



Mast cell



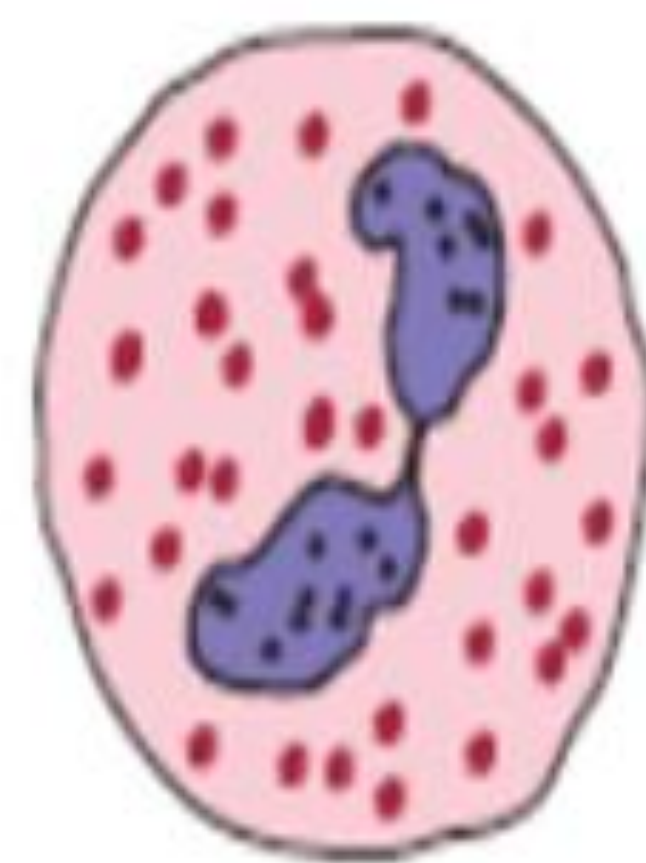
Plasma cell



B lymphocyte



Neutrophil



Eosinophil



Basophil



Connective Tissue

Three types of protein fibers are found in fibrous connective tissues:

1. Collagen Fibers: Large fibers made of the protein collagen and are typically the most abundant fibers.

Functions:

a- Promote tissue flexibility.

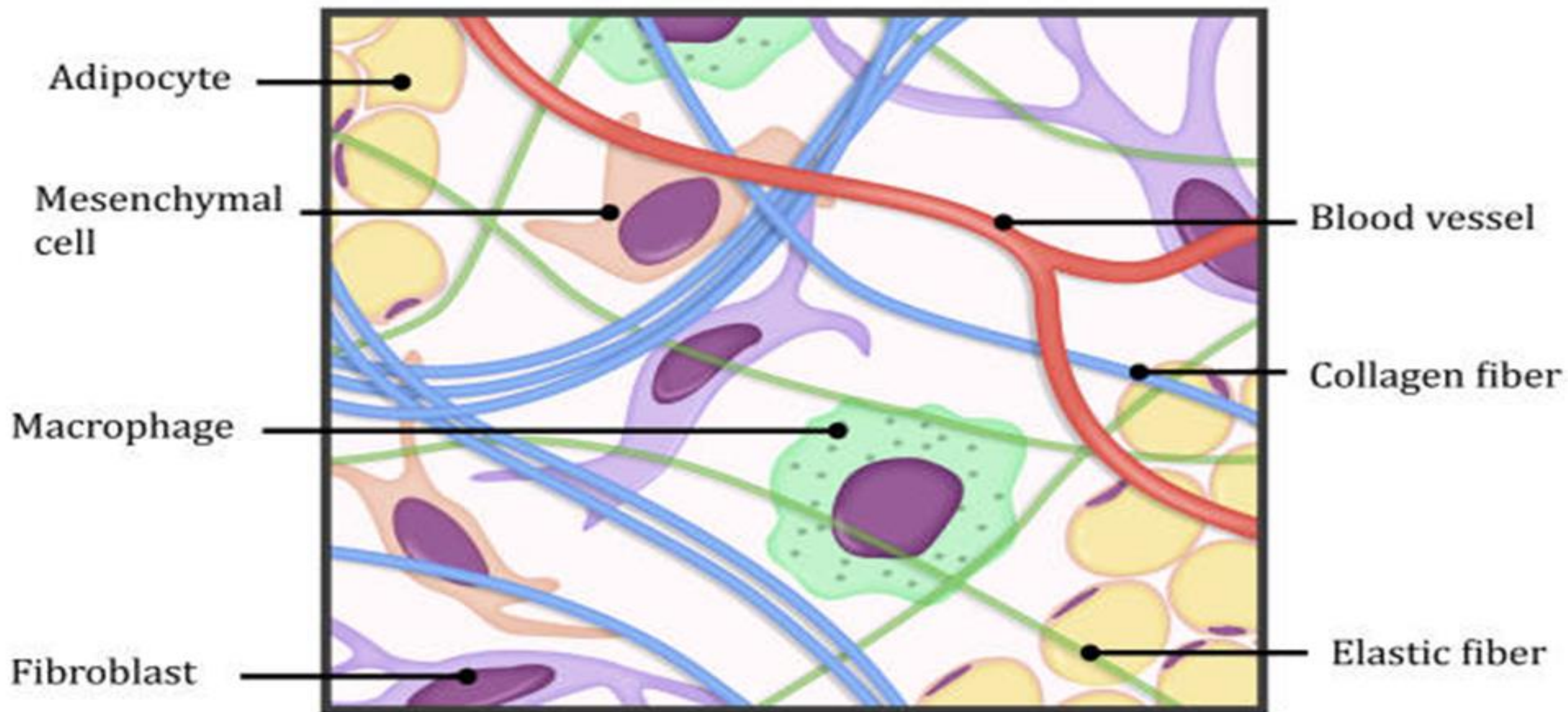
b- It keeps the muscle from tearing away from the bone.

2. Elastic Fibers: Intermediate fibers made of the protein elastin. Branching fibers that allow for stretch and recoil

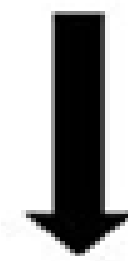
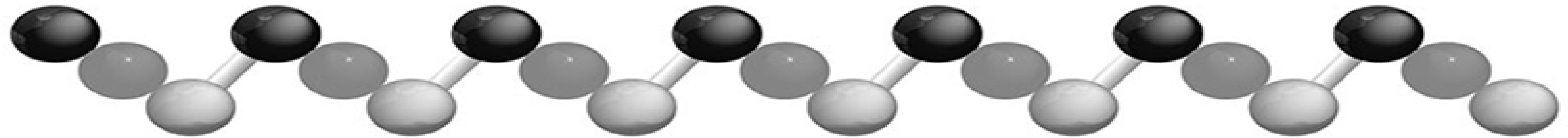
3. Reticular Fibers: Small delicate, branched fibers

Function: Forms structural framework for organs such as spleen, liver and lymph nodes.

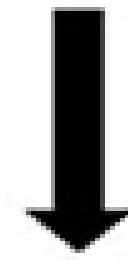
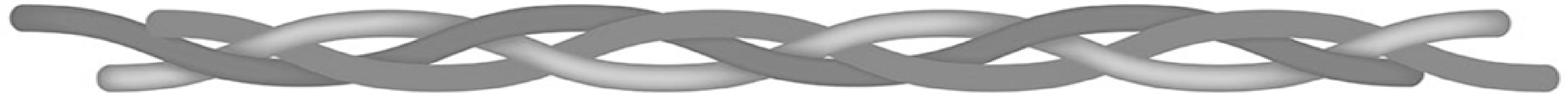
Connective tissue:



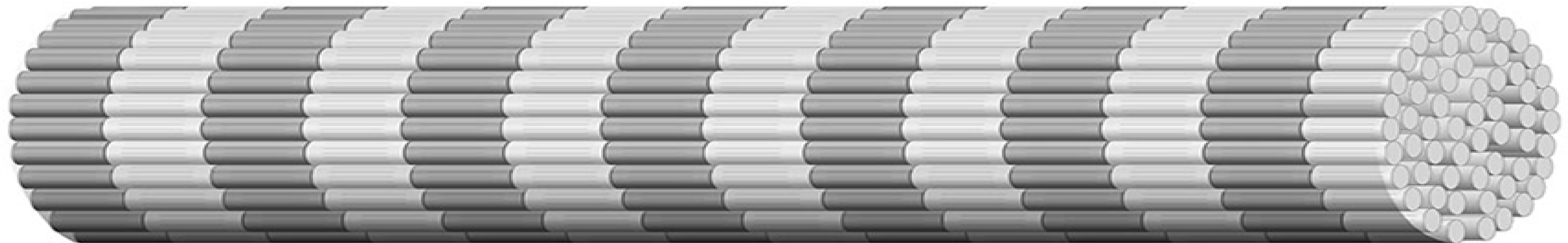
amino acid sequence

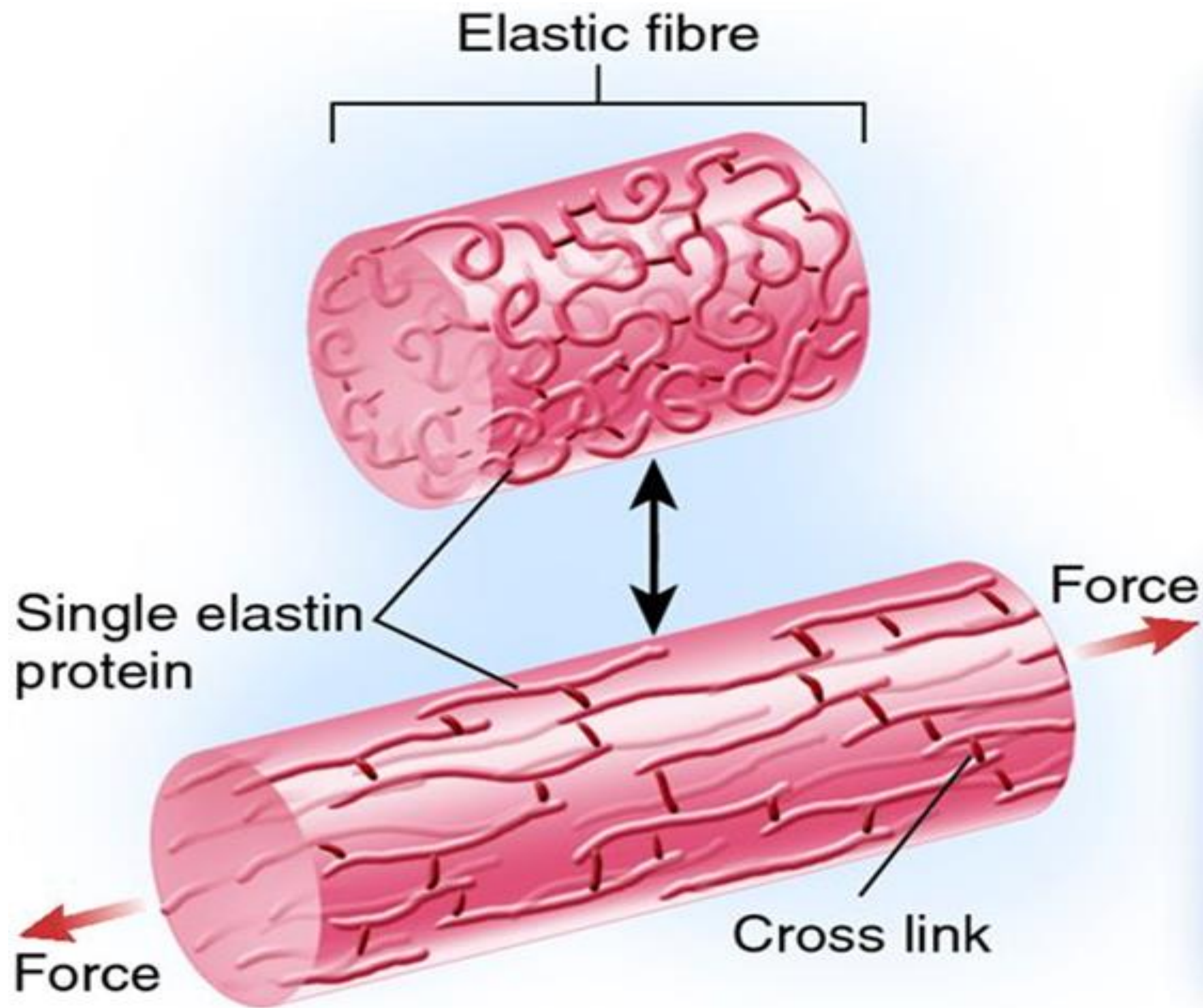


collagen molecule



collagen fiber





In the absence of a stretching force, the elastin proteins are in a compact conformation.

When subjected to a stretching force, the elastin proteins elongate but remain attached to each other via cross links.

Elastin fiber

Fibroblasts

Collagen fiber

