

Tissues of the human body

Epithelial tissue

Definition:

- Epithelial tissues cover body surfaces, line internal cavities, and form glands.
- They are involved in protection, secretion, absorption, and transportation.

General Structure

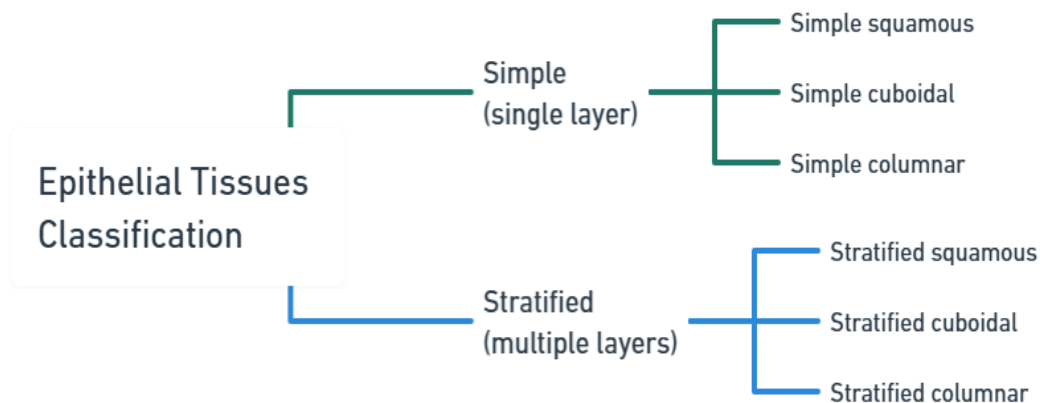
- Composed of closely packed cells with minimal extracellular matrix.
- Cells are joined by tight junctions, desmosomes, and gap junctions.
- It has two surfaces:
 - A. **Apical surface** – faces the body cavity, lumen, or external environment.
 - B. **Basal surface** – attached to the **basement membrane**, which connects to the underlying connective tissue.

Classification of Epithelial Tissue

Epithelial tissues are classified based on:

1. Number of cell layers:

- **Simple epithelium** – one cell layer.
- **Stratified epithelium** – two or more cell layers.



2. Shape of cells:

- **Squamous** – flat.
- **Cuboidal** – cube-shaped.
- **Columnar** – tall and column-like.

Special Locations

- **Surface Epithelium:** Covers **external body surfaces** (e.g., skin) and **internal cavities** (e.g., mouth, respiratory tract, GI tract).

- **Glandular Epithelium:** Forms **glands** (e.g., sweat glands, salivary glands, thyroid).

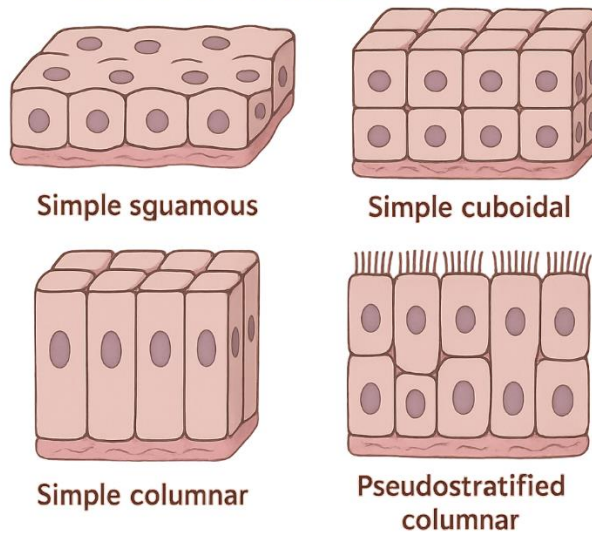
Functions of Epithelial Tissue

1. **Protection:** Shields body from injury, pathogens, and harmful substances.
2. **Secretion:** Glandular epithelium releases hormones, mucus, enzymes.
3. **Absorption:** Especially in **simple cuboidal** and **simple columnar** epithelium (e.g., kidney, intestines).
4. **Transportation:** **Ciliated epithelium** helps move mucus, particles (e.g., respiratory tract).

Simple Epithelium

All cells rest on the basement membrane. It's usually involved in absorption, secretion, and filtration.

TYPES OF SIMPLE EPITHELIUM



1. Simple Squamous Epithelium

- **Shape:** Flat and thin cells
- **Function:** Allows diffusion and filtration
- **Location:** Alveoli (lungs), lining of blood vessels (endothelium), glomeruli (kidneys)

2. Simple Cuboidal Epithelium

- **Shape:** Cube-shaped cells
- **Function:** Secretion and absorption
- **Location:** Kidney tubules, glands, ducts

3. Simple Columnar Epithelium

- **Shape:** Tall, column-like cells
- **Function:** Absorption and secretion (often mucus via goblet cells)
- **Location:** Lining of stomach, intestines, gallbladder

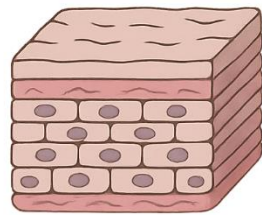
4. Pseudostratified Columnar Epithelium

- **Shape:** Appears layered but isn't (all cells touch the basement membrane)
- **Function:** Secretion and movement of mucus
- **Location:** Trachea, upper respiratory tract (usually ciliated)

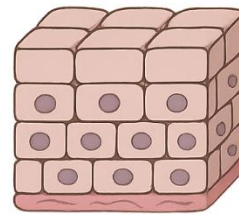
Stratified Epithelium

Mainly protective in function.

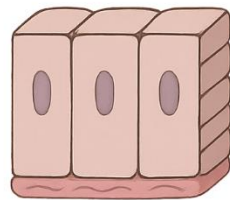
TYPES OF STRATIFIED EPITHELIUM



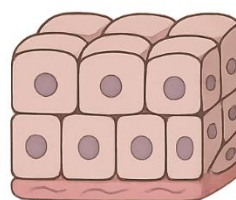
Stratified squamous



Stratified columnar



Stratified cuboidal



TRANSITIONAL

1. Stratified Squamous Epithelium

- **Shape:** Flat surface cells; deeper layers may be cuboidal or columnar
- **Function:** Protection against abrasion
- **Location:**
 - **Keratinized:** Skin (epidermis)
 - **Non-keratinized:** Mouth, esophagus, vagina

2. Stratified Cuboidal Epithelium

- **Shape:** Multiple layers of cube-shaped cells (usually 2)
- **Function:** Protection and secretion
- **Location:** Sweat gland ducts, mammary glands

3. Stratified Columnar Epithelium

- **Shape:** Top layer columnar; rare type
- **Function:** Protection and secretion
- **Location:** Male urethra, some glandular ducts

4. Transitional Epithelium

- **Shape:** Changes shape (stretchable)
- **Function:** Allows stretching
- **Location:** Urinary bladder, ureters, part of the urethra

Connective tissue

Definition:

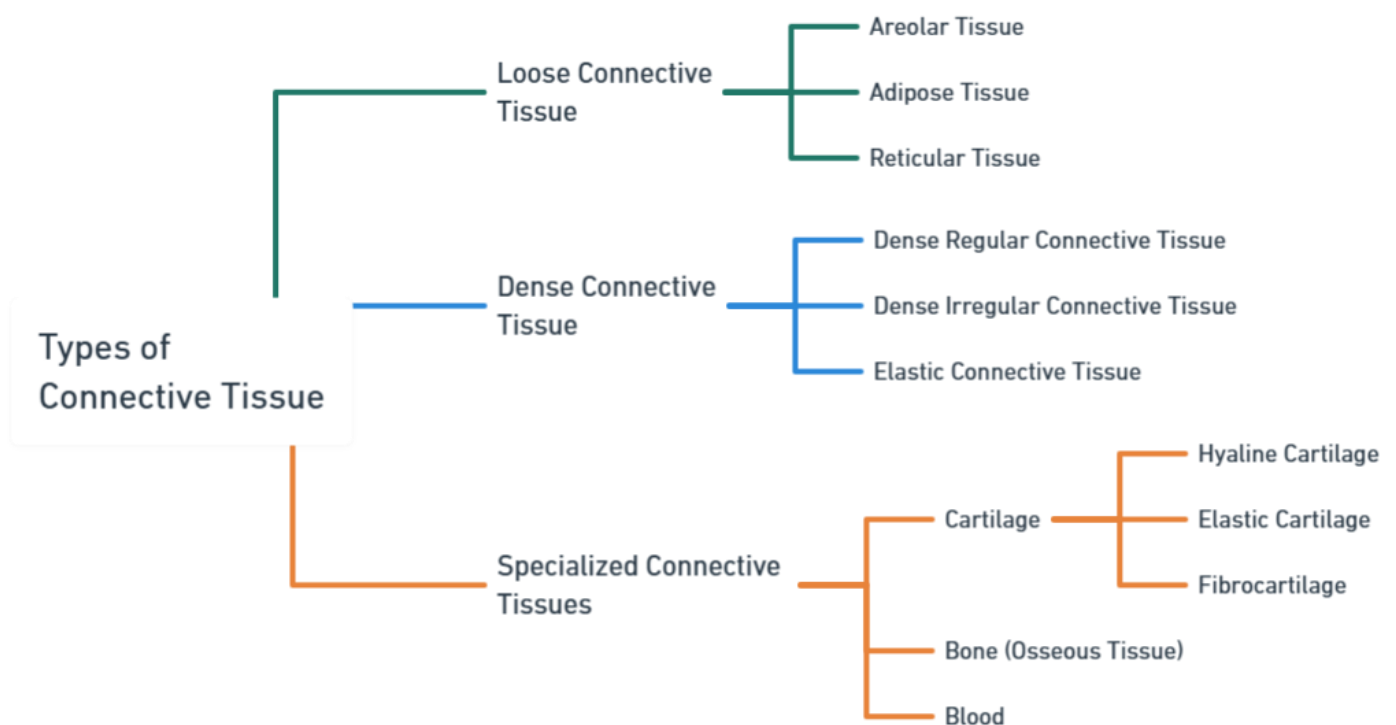
- Connective tissues provide **support, protection, insulation, and structure** to the body.
- They are characterized by having **fewer cells** and a **prominent extracellular matrix** composed of **fibers (collagen, elastic, reticular)** and **ground substance**.

General Structure

- **Fewer cells**, widely spaced.
- **Extracellular matrix** dominates:
 - **Fibers:** Collagen (strength), Elastic (flexibility), Reticular (support).
 - **Ground substance:** Gel-like material that fills space between cells and fibers.

Types of Connective Tissue

1. Loose Connective Tissue
2. Dense Connective Tissue
3. Specialized Connective Tissues



Locations of Connective Tissue

- **Connective tissue proper:** Beneath skin, around organs, tendons, ligaments, bone marrow.
- **Specialized connective tissue:** Cartilage (joints, ribs, ear), bone (skeleton).
- **Fluid connective tissue:** Blood (vessels), lymph (lymphatic system).



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