

# TISSUES

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Tissues of  
the Body



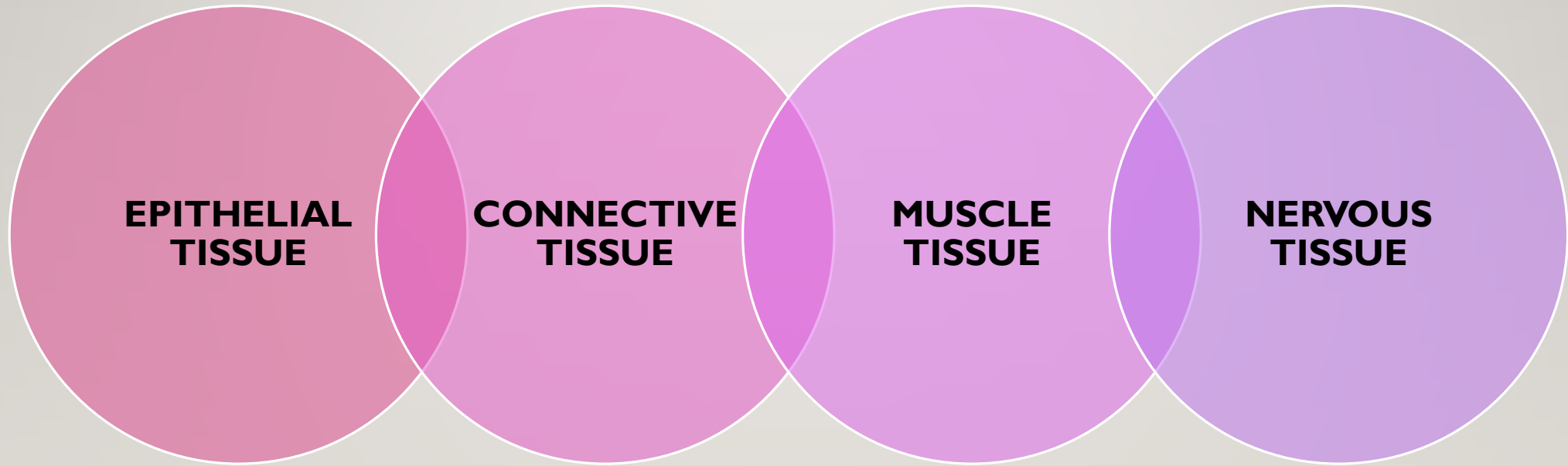
# ***DEFINITION***

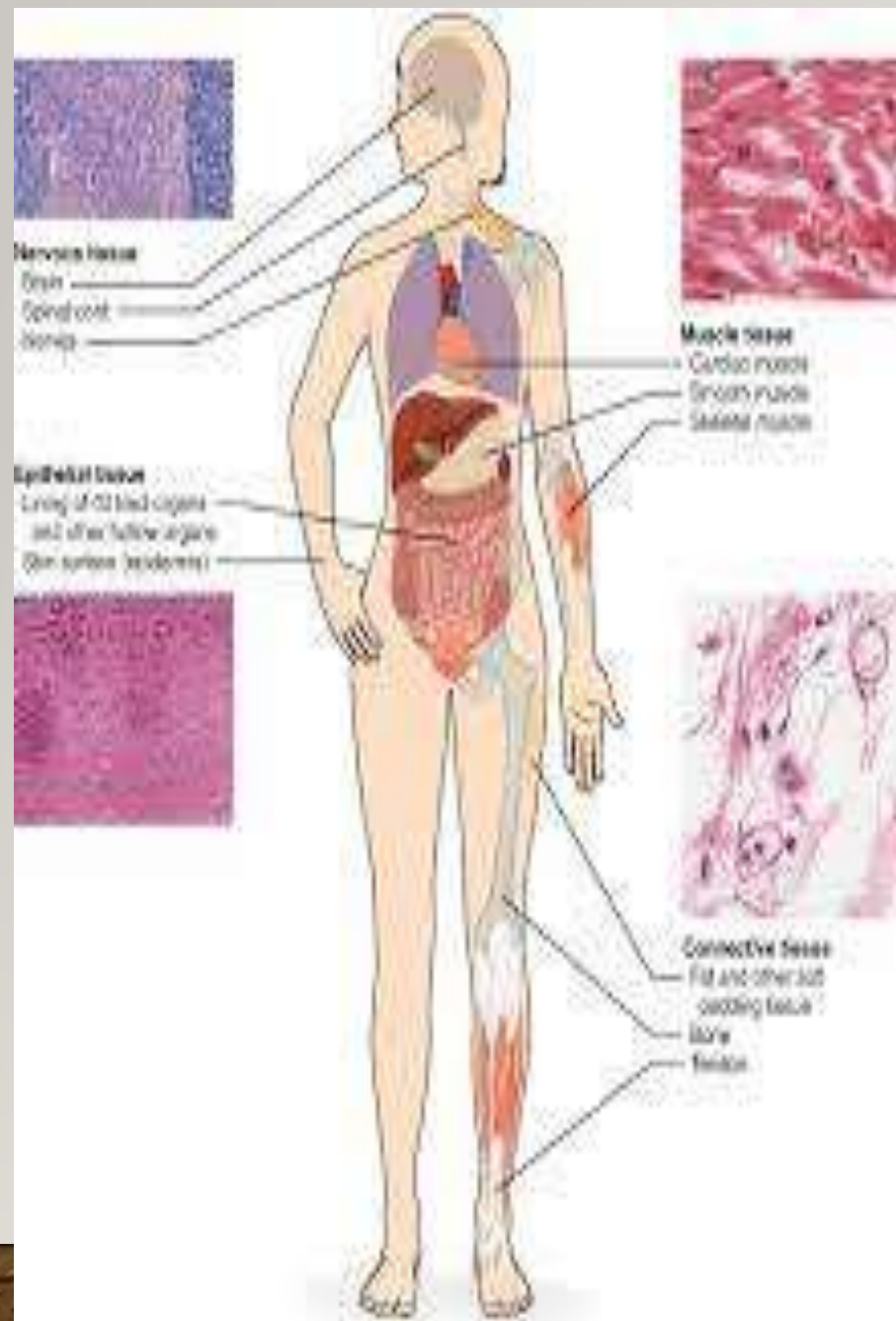
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- A grouping of cells that are similar in structure and perform a common or related function
- **Histology** – Branch of science deals with the study of tissues

# TYPES OF TISSUES

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## Four types of tissue



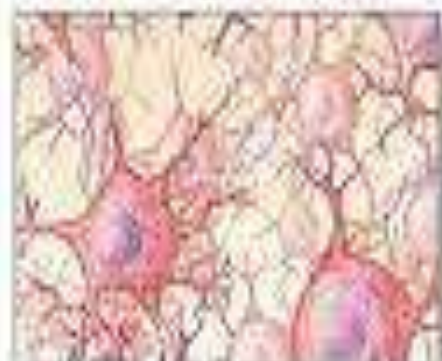
Connective tissue



Epithelial tissue



Muscle tissue



Nervous tissue



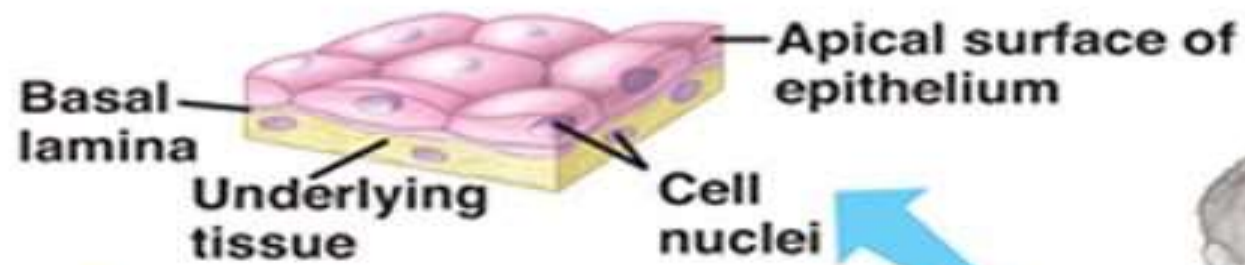
# EPITHELIAL TISSUE

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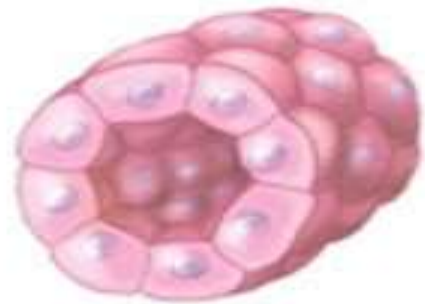
**Thin** tissues that **cover** all the **exposed surfaces of the body**

EG.,

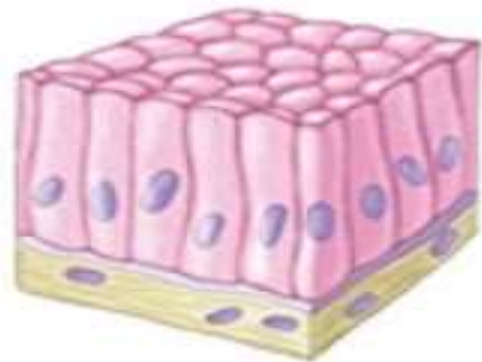
- External SKIN
- Inner lining of the mouth, digestive tract, secretory glands,
- lining of hollow parts of every organ such as the HEART, LUNGS, EYES, EARS, the urogenital tract, ventricular system of the BRAIN and central canals of the spinal cord



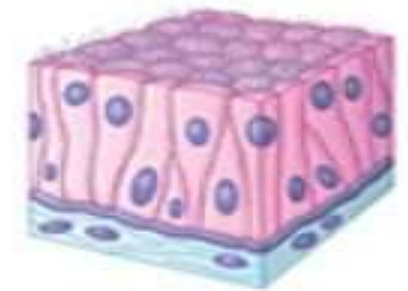
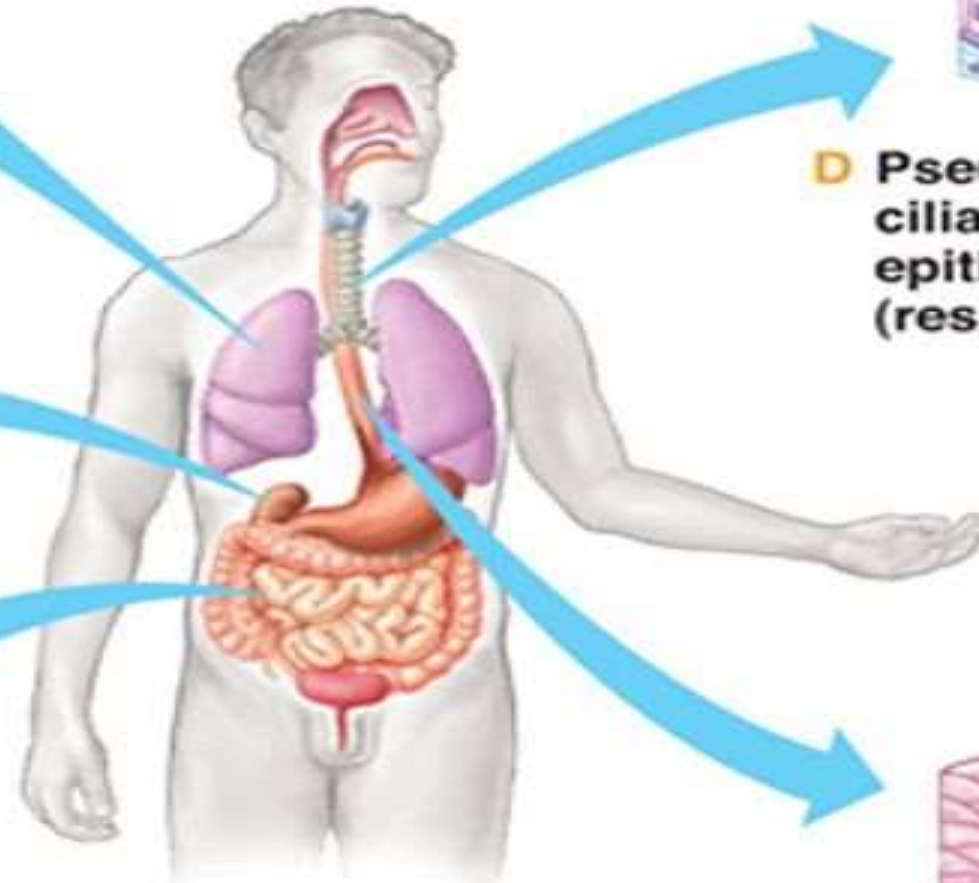
**A** Simple squamous epithelium (air sacs of the lung)



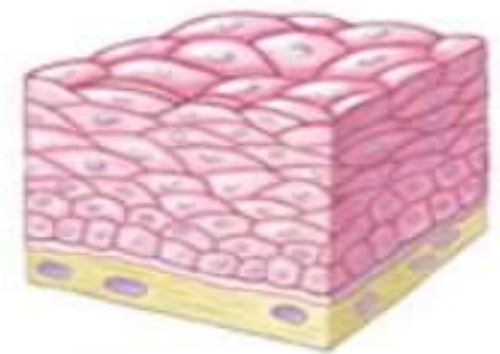
**B** Simple cuboidal epithelium (kidney)



**C** Simple columnar epithelium (intestine)



**D** Pseudostratified ciliated columnar epithelium (respiratory tract)



**E** Stratified squamous epithelium (esophagus)

# ***EPITHELIAL TISSUE - FUNCTIONS***

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- **Covering or lining Protection**
- **Permeability control**
- **Secretion**
- **Absorption**
- **Excretion**
- **Sensory Function is determined by cell type & number of cell layers.**



# CHARACTERISTICS



1. Has two surfaces

## Apical Surface

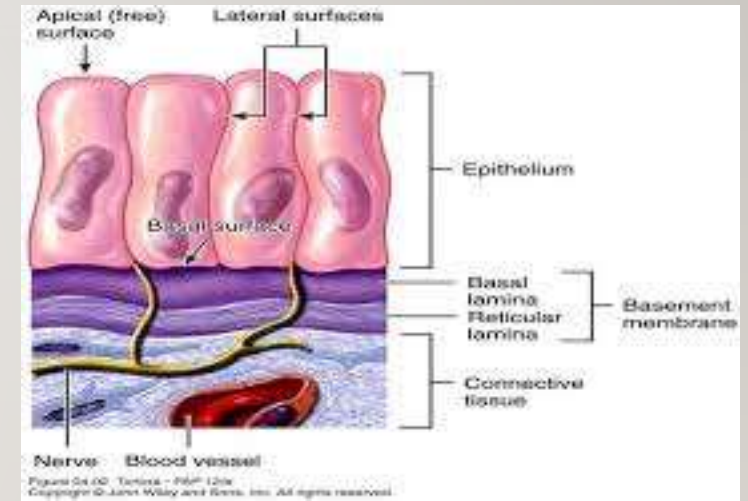
Top surface that borders an open space – known as a lumen

## Basement Membrane

Underside of all epithelial cells (anchoring them to connective tissue)

2. Avascularity (Nourished by connective tissue)

3. Regenerate & repair quickly





# CLASSIFICATION

## Based on Shape :

- (i) Squamous
- (ii) Cuboidal
- (iii) Columnar

## Based on Layers:

- (I) Simple
- (ii) Stratified



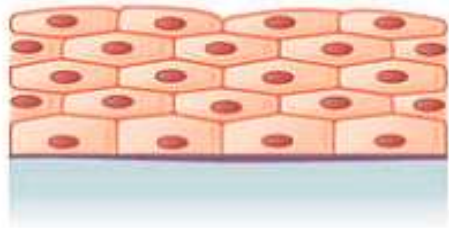
Simple squamous epithelium



Cuboidal epithelium



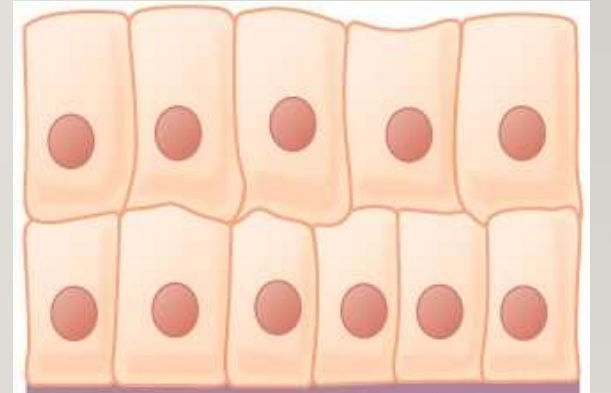
Columnar epithelium



Stratified squamous epithelium



Stratified cuboidal epithelium



Stratified columnar epithelium

# CLASSIFICATION: BASED ON THE LOCATION

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**(A) Covering and lining epithelium aka,** surface epithelium,

--> **Outer covering** skin and some internal organs

--> **Inner lining** of blood vessels, ducts, body cavities, and the inner lining of the respiratory, digestive, urinary, and reproductive systems.

**(B) Glandular epithelium**

Secreting portion of glands

e.g., Thyroid gland, Adrenal glands, Sweat glands, Digestive glands.



# Simple Squamous Epithelium

- Structure
  - Single Layer of flattened cells
- Function
  - Absorption, and filtration
  - Not effective protection – single layer of cells.
- Location
  - Walls of capillaries, air sacs in lungs
  - Form serous membranes in body cavity

# Simple Cuboidal Epithelium

- Structure
  - Single layer of cube shaped cells
- Function
  - Secretion and transportation in glands, filtration in kidneys
- Location
  - Glands and ducts (pancreas & salivary), kidney tubules, covers ovaries



# Simple Columnar Epithelium

- Structure

- Elongated layer of cells with nuclei at same level

- Function

- Absorption, Protection & Secretion
- When open to body cavities – called mucous membranes

- Special Features

- Microvilli, bumpy extension of apical surface, increase surface area and absorption rate.
- Goblet cells, single cell glands, produce protective mucus.

- Location

- Linings of entire digestive tract



# Pseudostratified Epithelium

## ■ Structure

- Irregularly shaped cells with nuclei at different levels – appear stratified, but aren't.
- All cells reach basement membrane

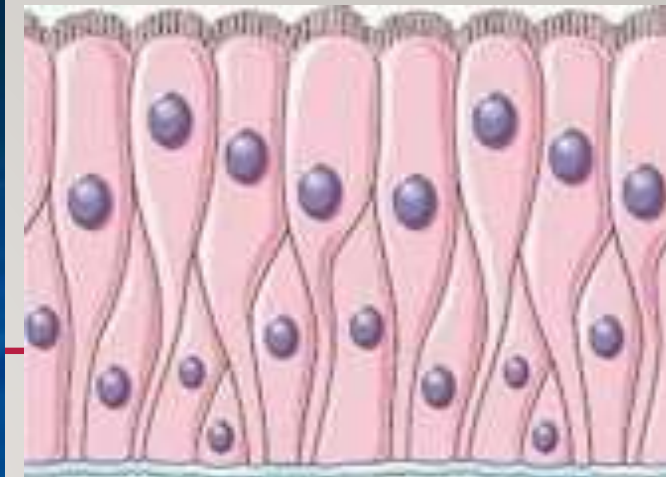
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## ■ Function

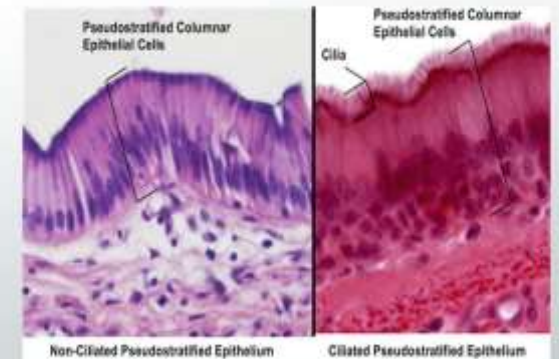
- Absorption and Secretion
- Goblet cells produce mucus
- Cilia (larger than microvilli) sweep mucus

## ■ Location

- Respiratory Linings & Reproductive tract



CILIATED VERSUS NON-CILIATED





# Stratified Squamous Epithelium

## ■ Structure

- Many layers (usually cuboidal/columnar at bottom and squamous at top)

## ■ Function

- Protection Click to add text
- Keratin (protein) is accumulated in older cells near the surface – waterproofs and toughens skin.

## ■ Location

- Skin (keratinized), mouth & throat



# Transitional Epithelium

- Structure
  - Many layers
  - Very specialized – cells at base are cuboidal or columnar, at surface will vary.
  - Change between stratified & simple as tissue is stretched out.
- Function
  - Allows stretching (change size)
- Location
  - Urinary bladder, ureters & urethra

