SNS COLLEGE OF ALLIED HEALTH SCIENCE

Affiliated to The Tamil Nadu Dr MGR Medical University, Chennai

DEPARTMENT OF OPERATION THEATRE AND ANESTHESIA TECHNOLOGY

COURSE NAME: 1131 – BASIC SCIENCES - ANATOMY

UNIT I – BASICS OF ANATOMY

TOPIC: Tissues – EPITHELIAL TISSUES

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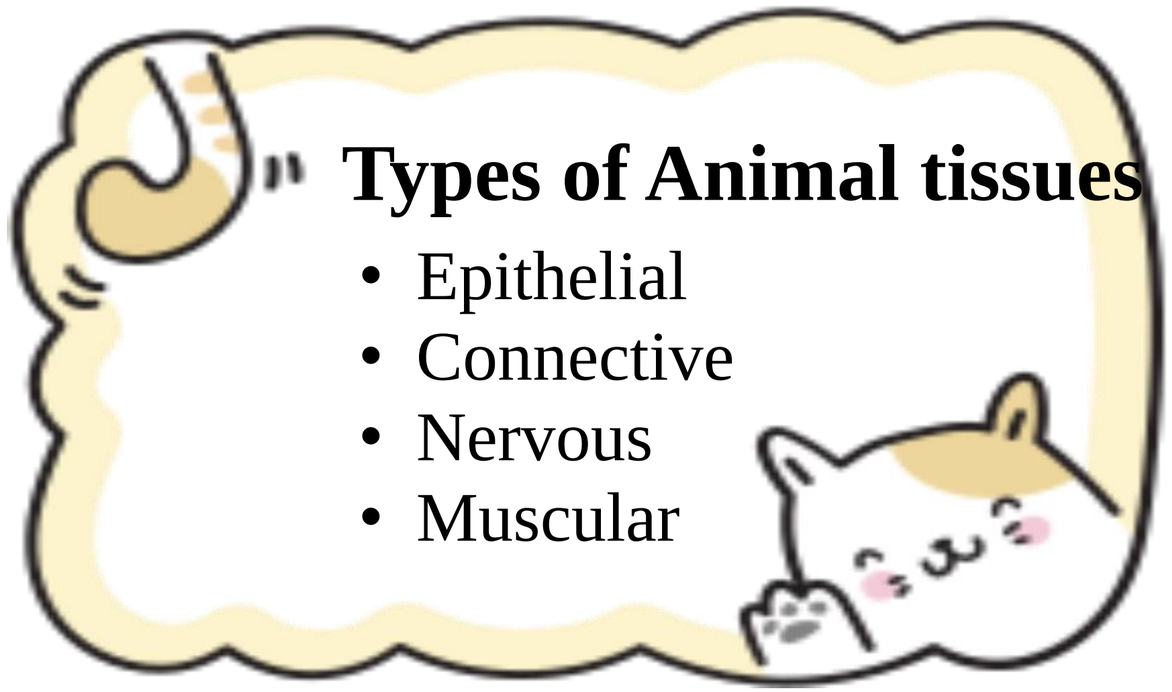
TISSUES

Histology

Study of Tissues

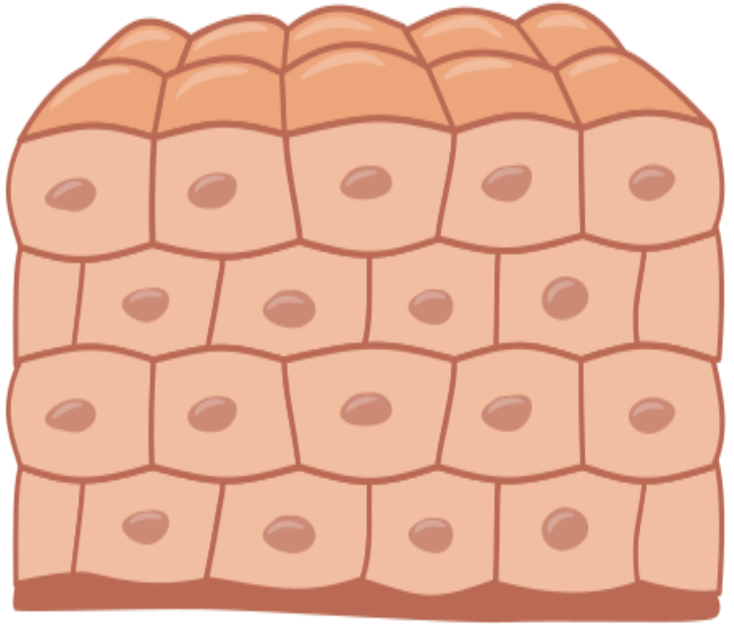
- Tissue is a group of cells similar in structures and have common origin that work together to perform a particular function



EPITHELIAL TISSUES

EPITHELIAL TISSUES

- An epithelial tissue or epithelium consists of cells arranged in continuous sheets, in either single or multiple layers.
- It covers body surfaces and lines hollow organs, body cavities, and ducts.
- It also forms glands.



Epithelial Tissue

Simple
1. Squamous
2. Cuboidal
3. Columnar
4. Ciliated

Stratified
1. Squamous
2. Cuboidal
3. Columnar
4. Transitional

Pseudo-stratified columnar epithelium

CHARACTERISTICS OF EPITHELIAL TISSUE

CELLULARITY - Tissues comprised of cells, with less Extracellular Matrix

POLAR - Always have on free surface called Apical Surface

AVASCULAR - So depends on diffusion nutrients from connective tissue

SPECIALIZED CONTACTS - Closing together to form membranes

REGENERATION - It has high regenerative, to replace itself.

FUNCTIONS OF EPITHELIAL TISSUES

PROTECTION - Protects body surface from drying or bacterial invasion

TRANSPORT - Mucous & Particulate matters are carried to epithelial surfaces

SECRETION - The cells secrete the product synthesized

EXCRETION - May excrete metabolic waste products

FUNCTIONS OF EPITHELIAL TISSUES

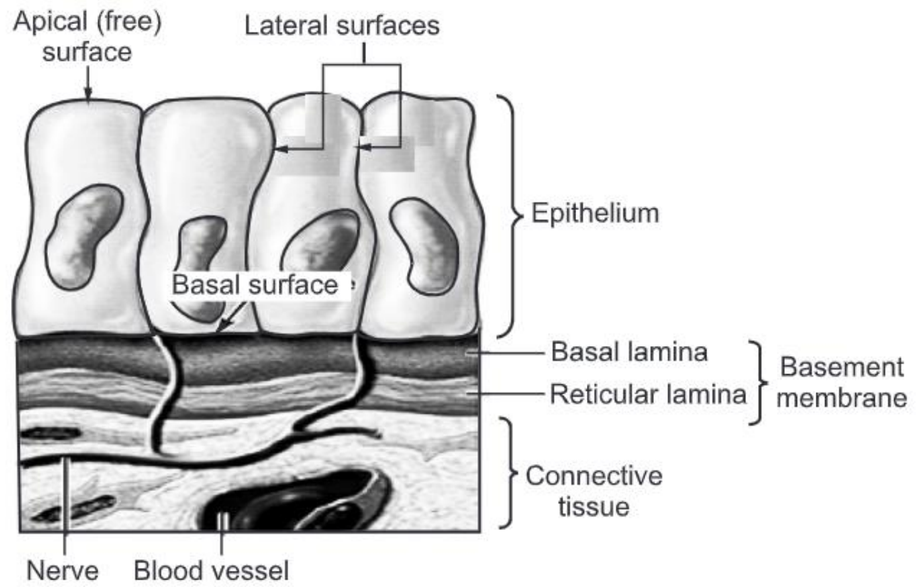
ABSORPTION - Absorbs essential substances from the lumen of GIT & Kidney tubules

LUBRICATION - Peritoneum, Pleura, Pericardial epithelium serves this function

SENSORY - In skin (touch), nasal mucosa (smell), and tongue (taste), it serves as sensory organ

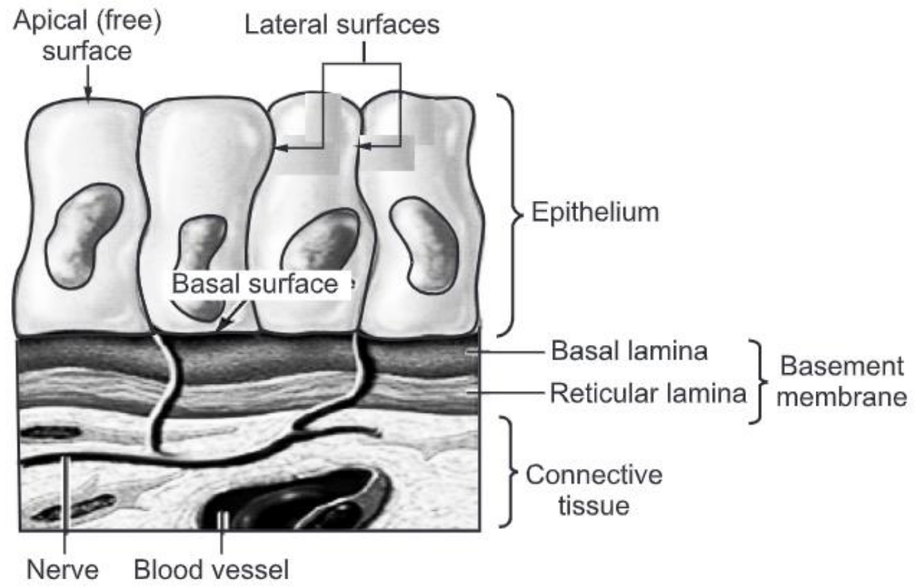
SURFACES OF EPITHELIAL TISSUES

- **Apical (free) surface:** It faces the body surface. It may contain a body cavity, the lumen of an internal organ that receives cell secretions. It may contain cilia or microvilli.
- **Lateral surface:** It faces the adjacent cells on either side. It may contain tight junctions, adherens junctions, desmosomes, and/or gap junctions.
- **Basal surface:** It is present opposite to the apical surface. In multiple layers of epithelial cells, the apical layer is the most superficial layer of cells, and the basal layer is the deepest layer of cells.



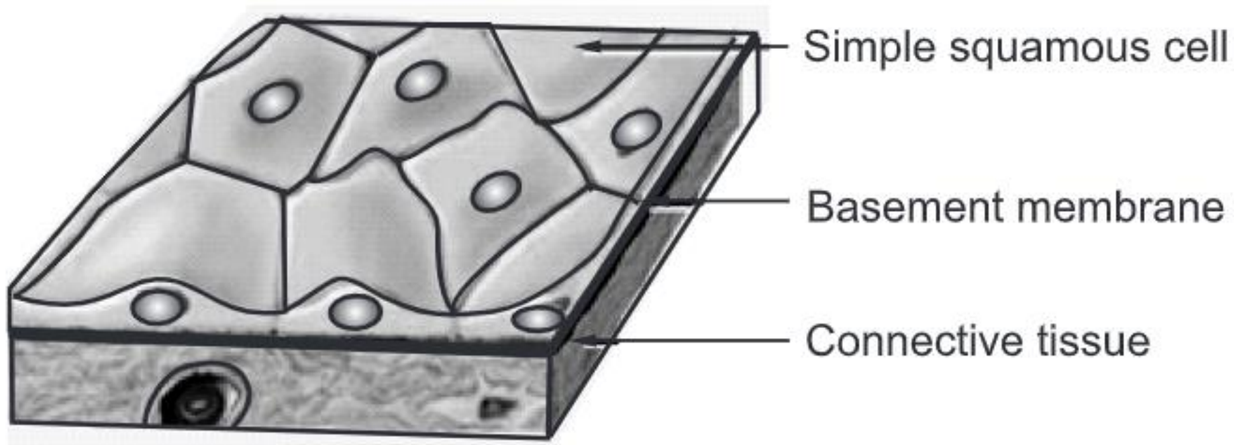
BASEMENT MEMBRANE

- It is a thin extracellular layer that consists of two layers, the basal lamina, and the reticular lamina.
- The basement membrane is a point of attachment and support for the overlying epithelial tissue.
- **Basal lamina:** It is closer to and secreted by the epithelial cells. It contains proteins (collagen, glycoproteins) and proteoglycans.
- **Reticular lamina:** It is closer to the underlying connective tissue and contains proteins such as collagen produced by connective tissue.



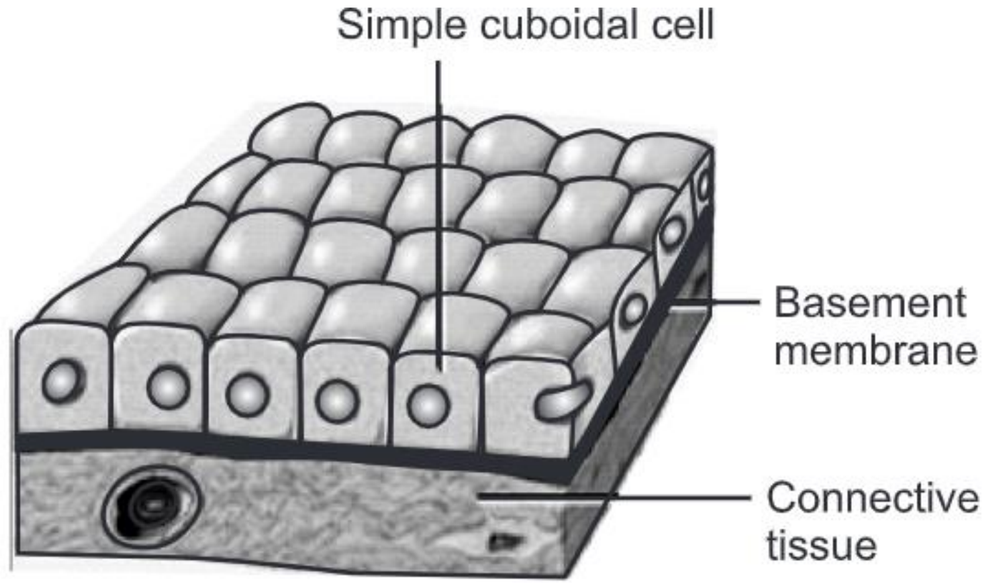
SIMPLE SQUAMOUS EPITHELIUM

- **Structure:** Single layer of flat, scale-like cells.
- **Location:** Alveoli of lungs, lining of blood vessels, body cavities.
- **Function:** Facilitates diffusion and filtration; secretes lubricating substances.



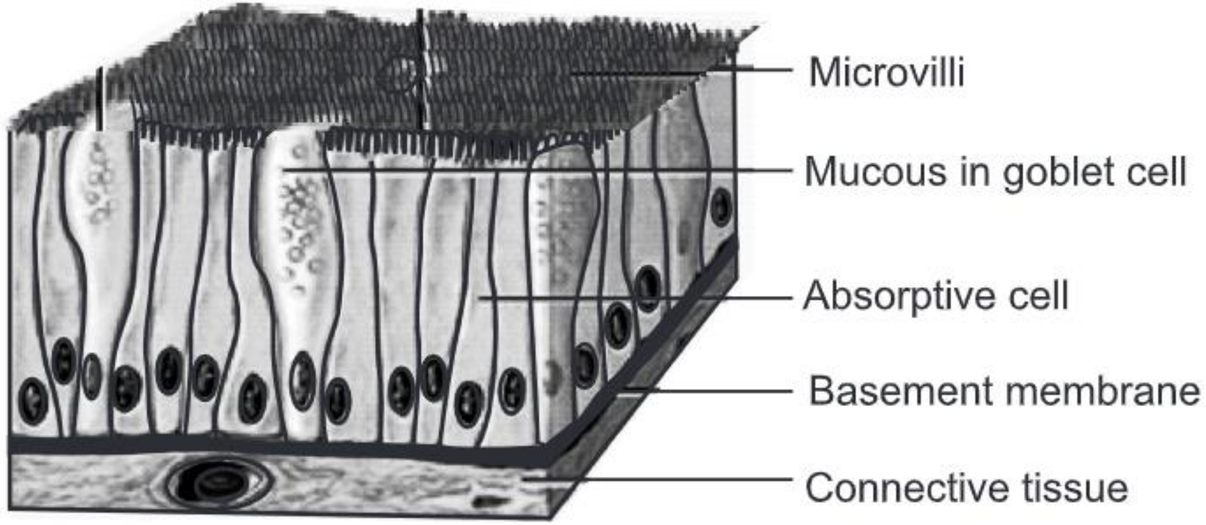
SIMPLE CUBOIDAL EPITHELIUM

- **Structure:** Single layer of cube-shaped cells.
- **Location:** Kidney tubules, ducts of glands.
- **Function:** Secretion and absorption.



SIMPLE COLUMNAR EPITHELIUM

- **Structure:** Single layer of tall, rectangular cells.
- **Location:** Lining of digestive tract, uterus.
- **Function:** Absorption and secretion of mucus and enzymes.

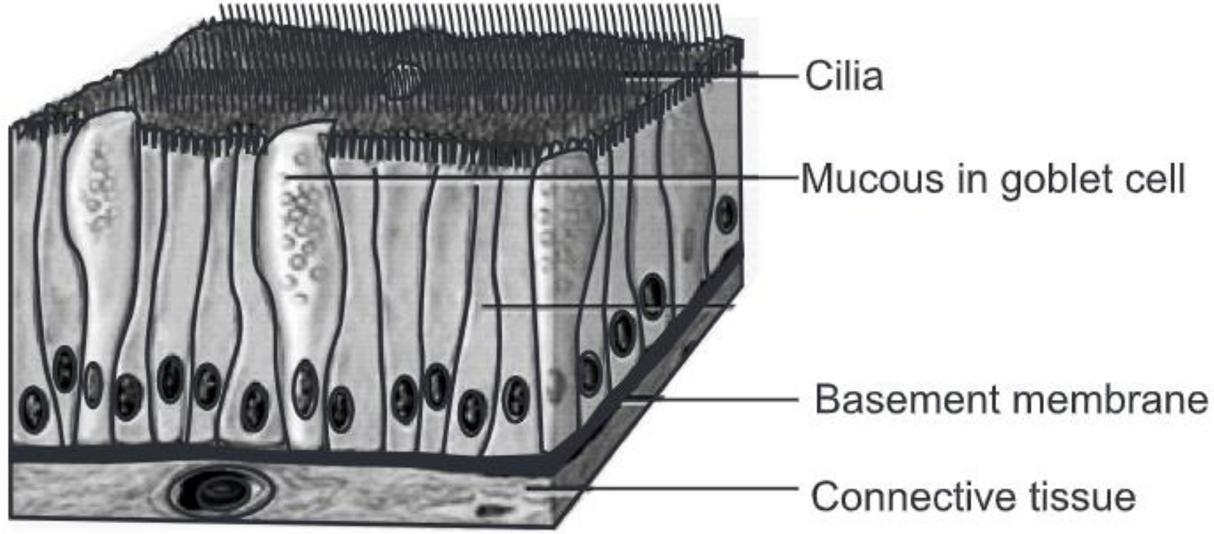


SIMPLE CILIATED EPITHELIUM

Structure: Single layer of tall cells with tiny moving hairs (cilia) on top.

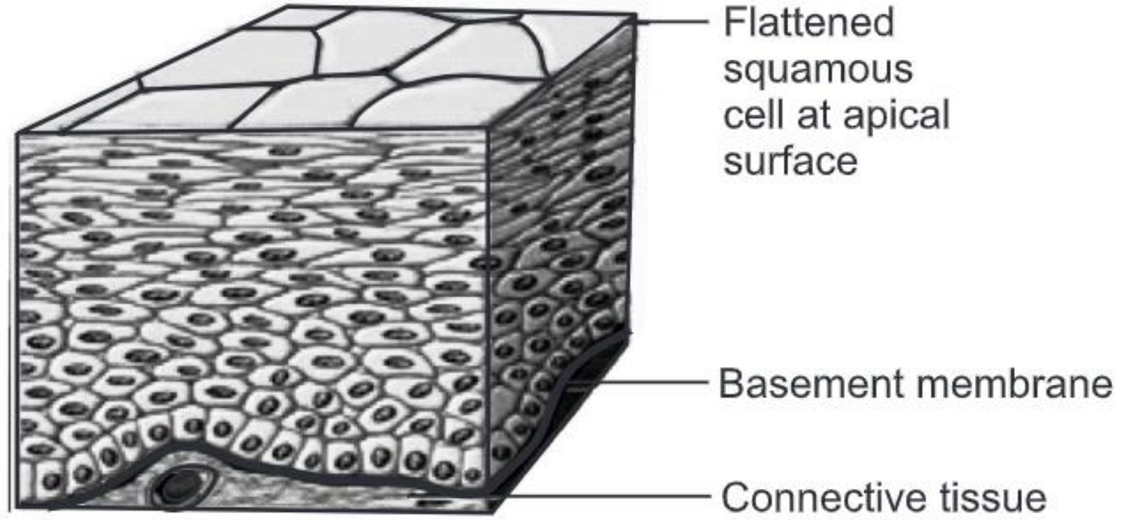
Location: Fallopian tubes, parts of airways, brain and spinal cord cavities.

Function: Moves mucus, eggs, dust, or brain fluid by beating cilia; also secretes mucus.



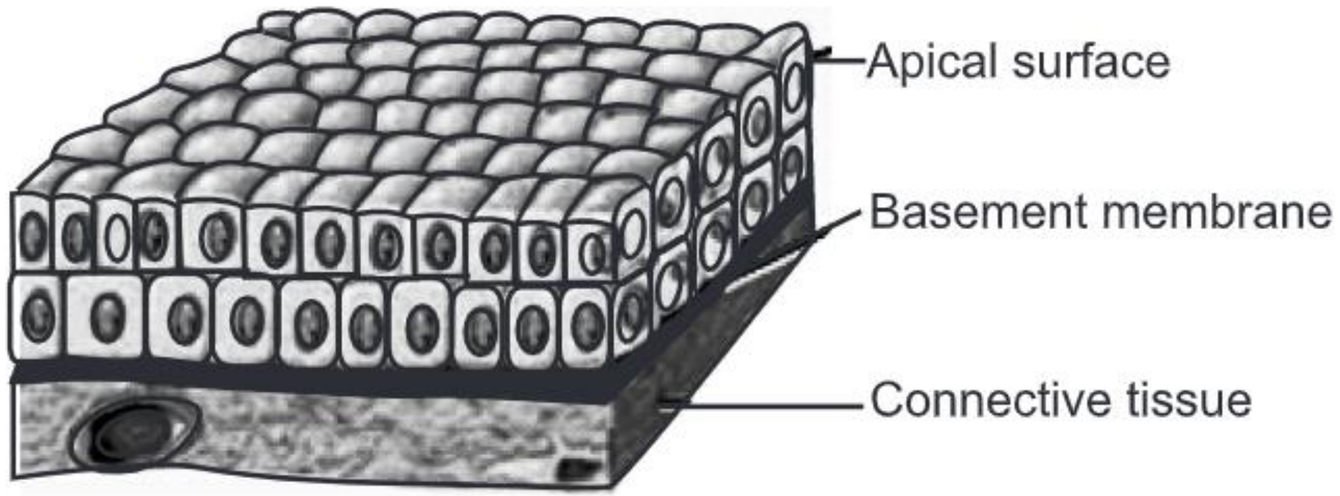
STRATIFIED SQUAMOUS EPITHELIUM

- **Structure:** Multiple layers of flat cells; surface cells are squamous.
- **Location:** Skin (keratinized), mouth, esophagus, vagina (non-keratinized).
- **Function:** Protection against abrasion and pathogens.



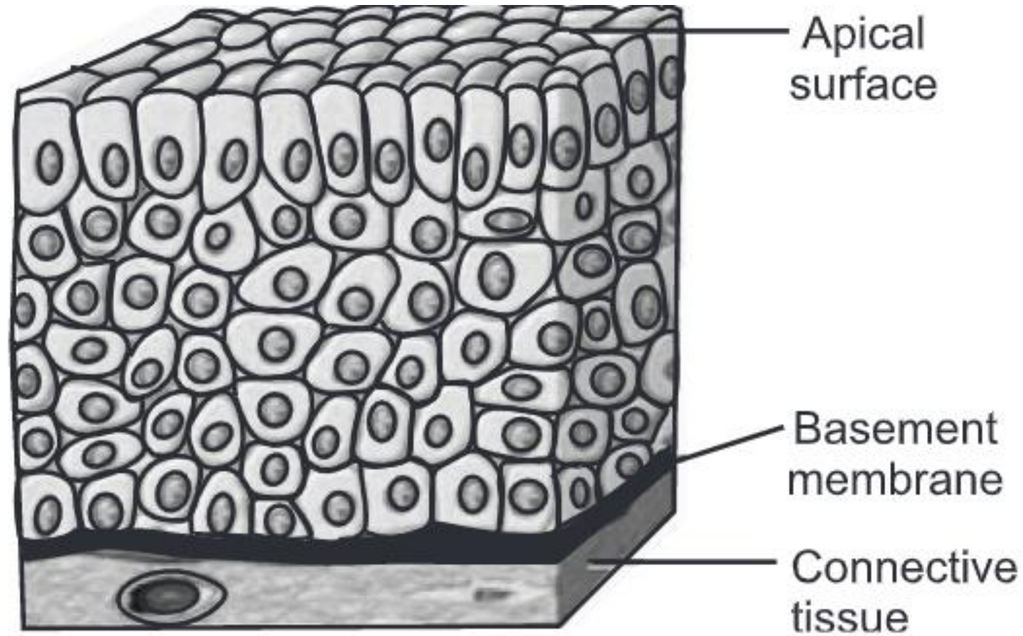
STRATIFIED CUBOIDAL EPITHELIUM

- **Structure:** Two or more layers of cube-shaped cells.
- **Location:** Sweat glands, salivary glands, mammary glands.
- **Function:** Protection and secretion.



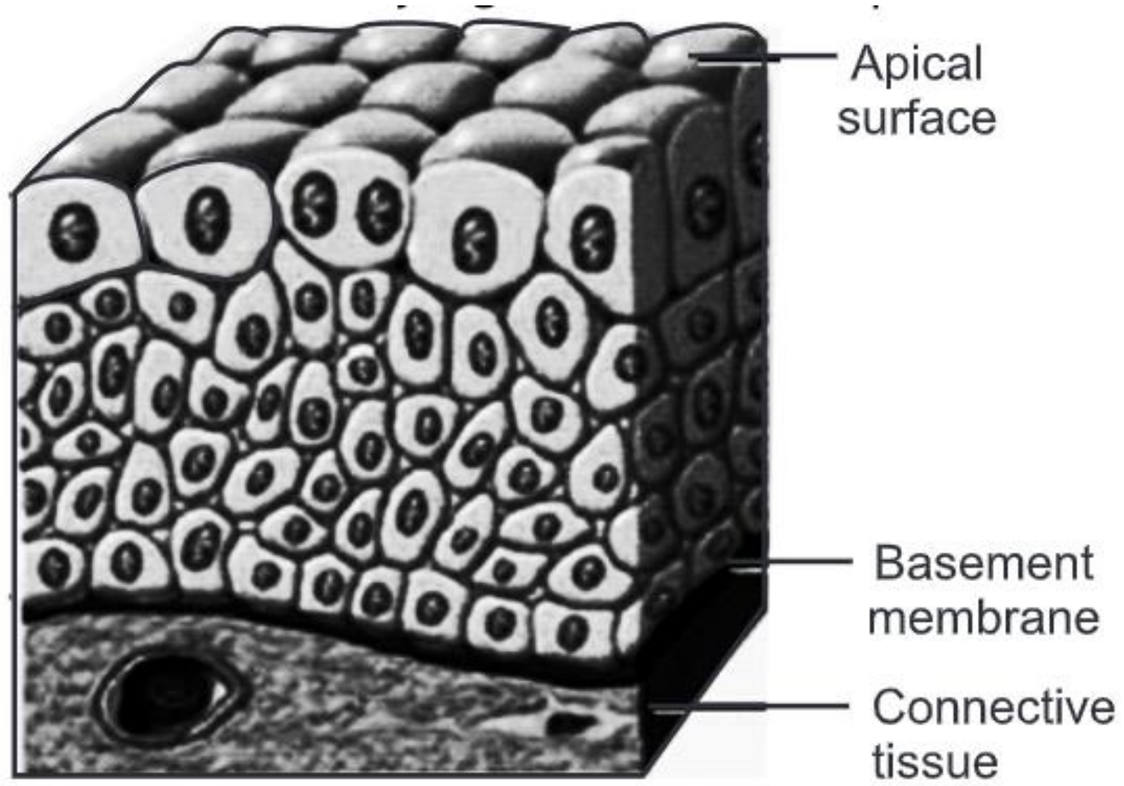
STRATIFIED COLUMNAR EPITHELIUM

- **Structure:** Multiple layers of columnar cells.
- **Location:** Male urethra, ducts of some glands.
- **Function:** Secretion and protection



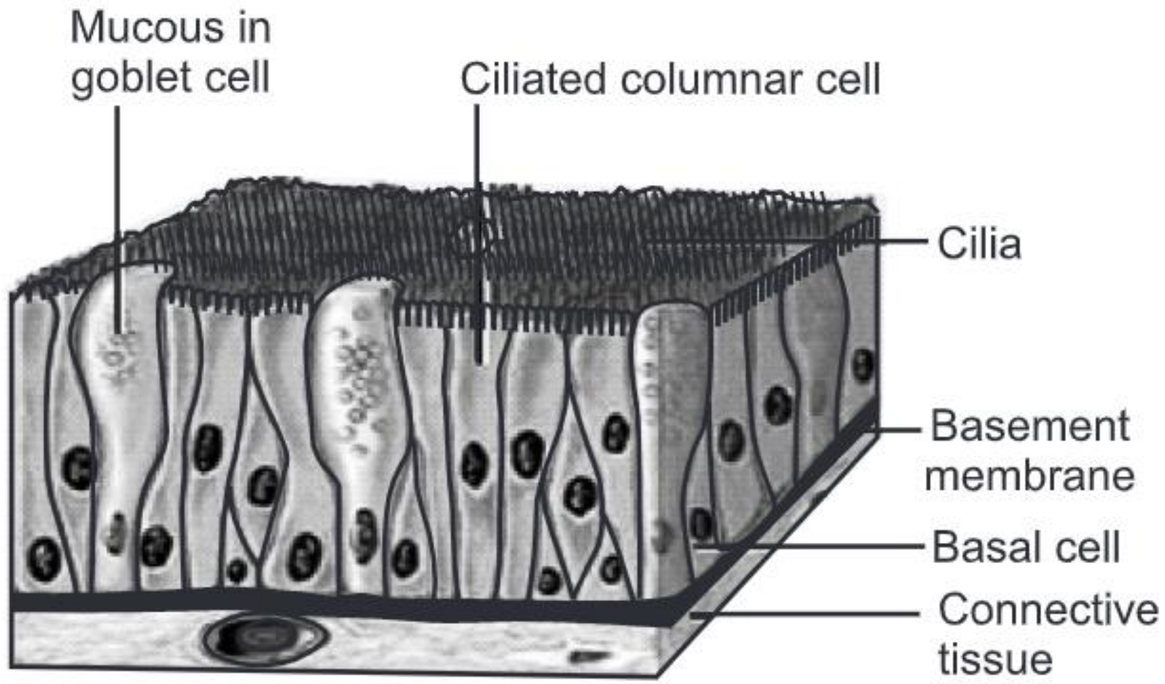
TRANSITIONAL EPITHELIUM

- **Structure:** Multiple layers of cells that can change shape (stretchable).
- **Location:** Urinary bladder, ureters, urethra.
- **Function:** Allows stretching and protection of urinary organs.

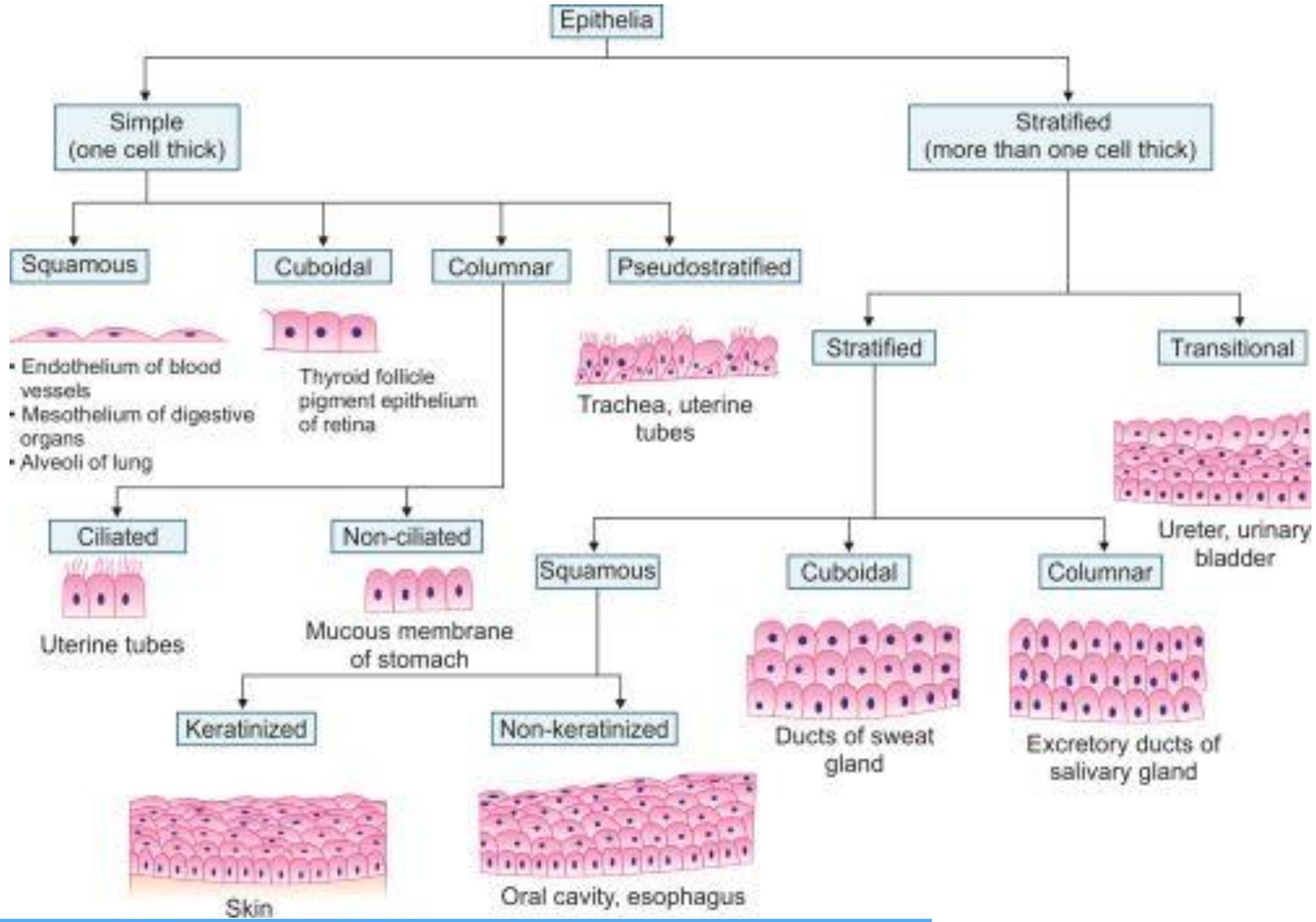


PSEUDOSTRATIFIED COLUMNAR EPITHELIUM

- **Structure:** Single layer of cells with nuclei at different heights, giving a stratified appearance.
- **Location:** Respiratory tract (trachea, bronchi).
- **Function:** Secretion of mucus; cilia move mucus and trapped particles



SUMMARY


Epithelia
Simple (one cell thick)
Stratified (more than one cell thick)
Squamous
Cuboidal
Columnar
Pseudostratified
• Endothelium of blood vessels
• Mesothelium of digestive organs
• Alveoli of lung
Thyroid follicle pigment epithelium of retina
Trachea, uterine tubes
Stratified
Transitional
Ureter, urinary bladder
Ciliated
Non-ciliated
Squamous
Cuboidal
Columnar
Uterine tubes
Mucous membrane of stomach
Keratinized
Non-keratinized
Ducts of sweat gland
Excretory ducts of salivary gland
Skin
Oral cavity, esophagus

REFERENCE

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- Madhyastha S. Manipal Manual of Anatomy. 3rd ed. New Delhi: CBS Publishers & Distributors; 2022

THANK YOU