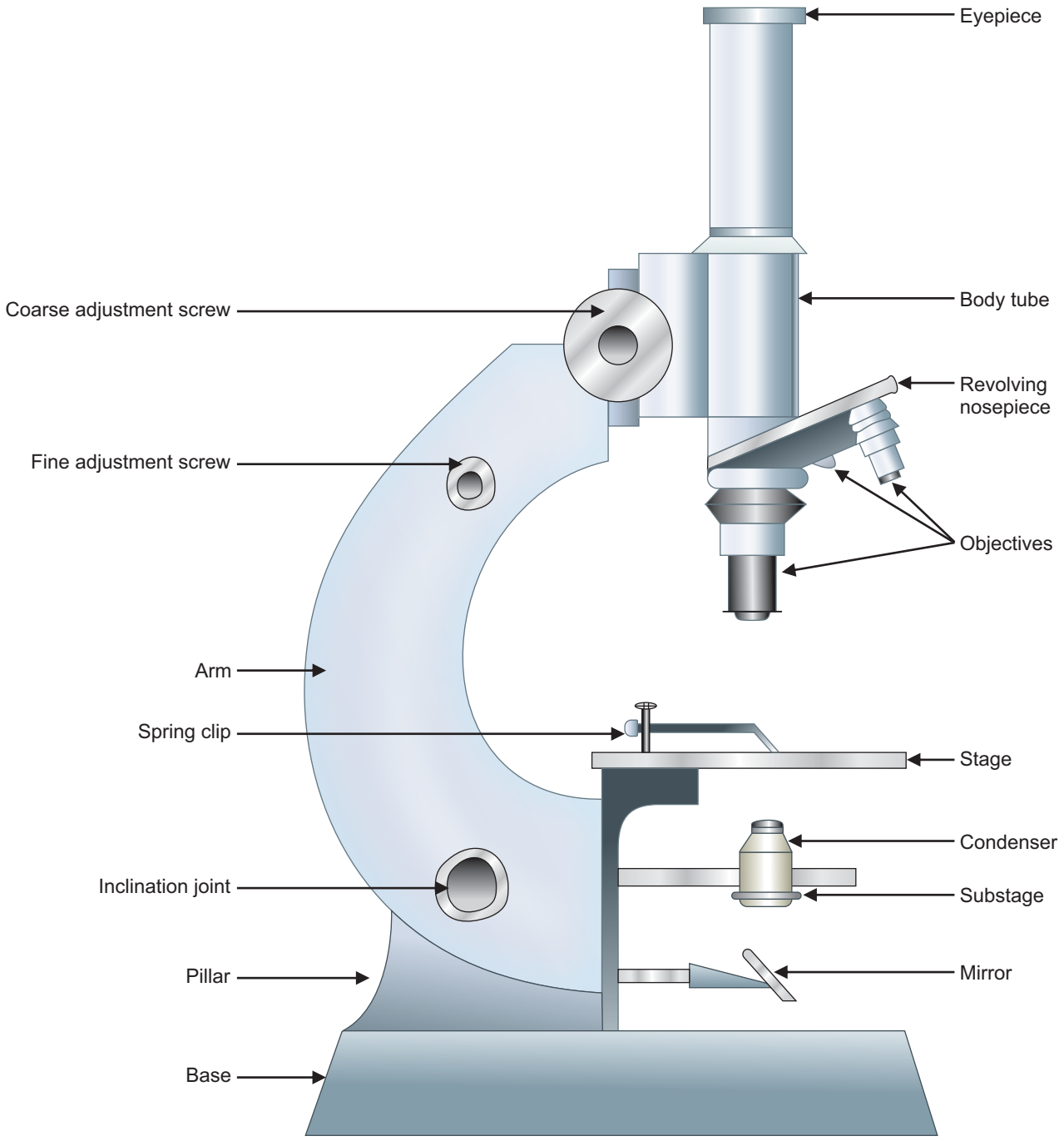
1 Microscope

LIGHT MICROSCOPE



Figures/Notes

Figures/Notes

2 Epithelial Tissue (AN 65.1, 65.2)

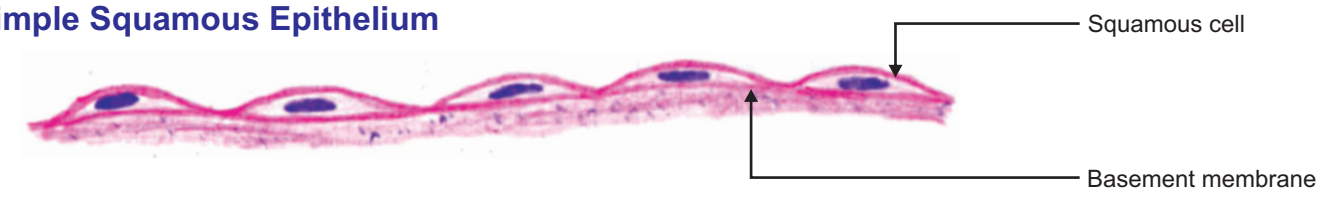
- Epithelium is one of the basic tissues of the body that covers or lines all body surfaces, cavities and tubes.
- Epithelial cells are bound to adjacent cells by various types of cell junctions and all epithelia are supported by a basement membrane.
- Basic functions of epithelia based on their location includes providing protection, acting as mechanical barrier, involved in absorption, secretion and sensory perception.
- Epithelia are classified based on layers of cells as—simple epithelium with only one layer of cells, stratified epithelium with two or more layers of cells, pseudostratified epithelium and transitional epithelium.
- Epithelia are classified based on shape of cells facing towards free surface as squamous epithelium made up of flat cells, cuboidal epithelium made up of cells with equal height and width, columnar epithelium composed of cells with more height than width.
- Pseudostratified epithelium is simple epithelium since all the cells rest on basement membrane. The nuclei of these cells are disposed at different levels thus creating the illusion of stratification.
- Apical or luminal surface of epithelial cells may incorporate three main types of specialization—cilia which are actively motile structures, microvilli—the shorter projections of plasma membrane, stereocilia are non-motile extremely long microvilli.
- Epithelium primarily involved in secretion is often arranged into structures called glands (glandular epithelia). Glands are merely invagination of epithelial surfaces into the underlying structure.
- Glands are broadly classified as exocrine glands, which release their secretions through the duct and endocrine glands, which have no duct system and release their secretions into the bloodstream.
- Exocrine glands are classified: 1. based on their duct system into simple (unbranched) glands and compound (branched) glands, 2. based on secretory component into tubular or acinar (alveolar).

Applied Aspects of Epithelial Tissue

1. Epithelial cell tumor: It is a swelling that occurs due to excessive proliferation of cells which can be benign or malignant when it is termed as carcinoma.
2. Metaplasia: It is abnormal replacement of one type of epithelium by another type of epithelium on exposure to certain factors like loss of cilia from the epithelium of trachea on exposure to cigarette smoke.

SIMPLE EPITHELIUM

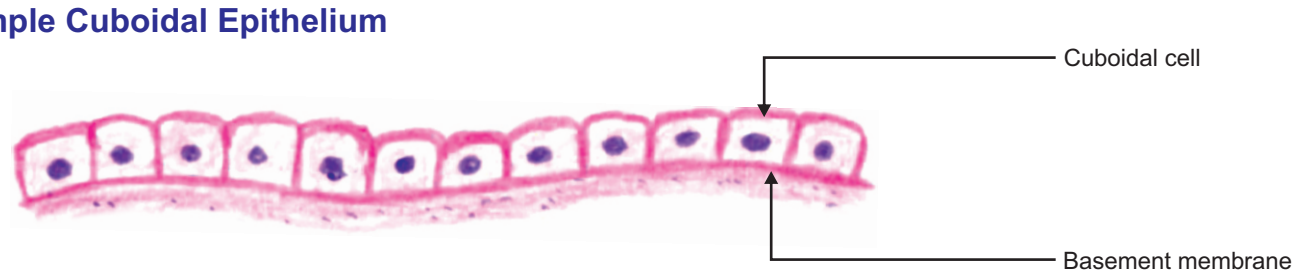
Simple Squamous Epithelium



Examples

- Alveoli of lung and endothelium of blood vessels

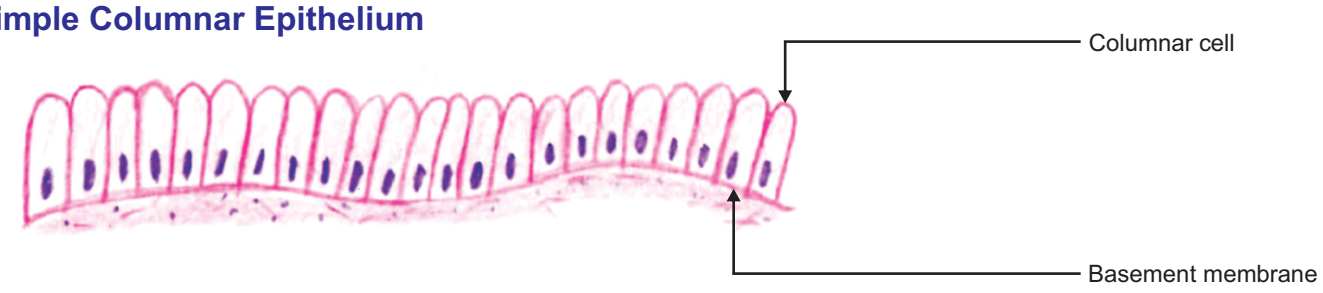
Simple Cuboidal Epithelium



Examples

- Follicles of thyroid gland
- Ducts of exocrine glands

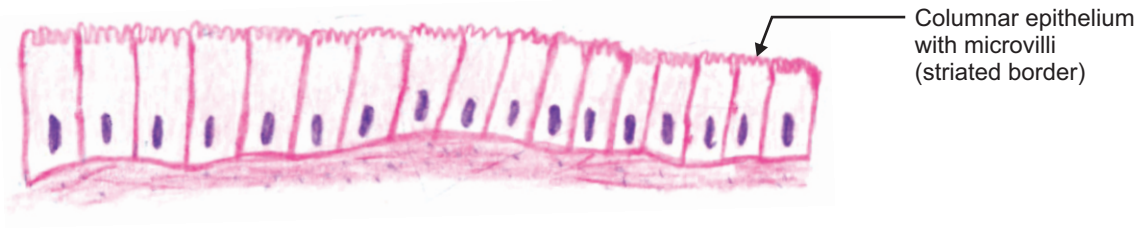
Simple Columnar Epithelium



Examples

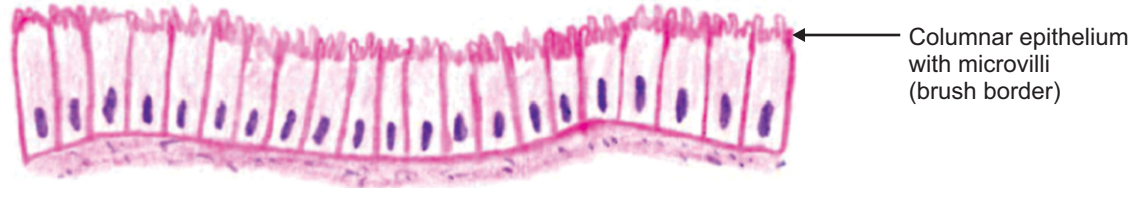
- Small intestine
- Uterus

APICAL SURFACE MODIFICATION OF COLUMNAR EPITHELIUM



Examples

- Duodenum, jejunum and ileum



Examples

- Gallbladder and PCT of kidney

Examples

- Fallopian tube and auditory tube

Pseudostratified Ciliated Columnar Epithelium

Examples

- Trachea and bronchi

Figures/Notes

STRATIFIED SQUAMOUS NON-KERATINIZED EPITHELIUM

Key Features to Identify the Slide

- Presence of multiple layers of cells
- Basal cell layer is columnar/cuboidal in nature and resting on basement membrane
- Presence of polygonal cell layers with superficial layer of squamous cells

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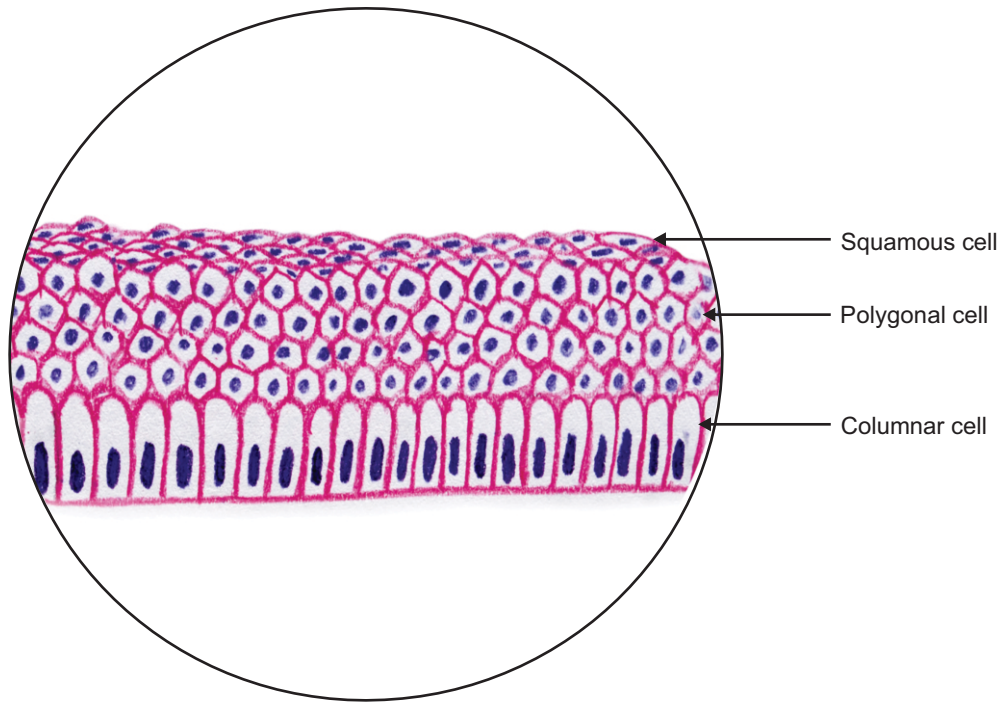
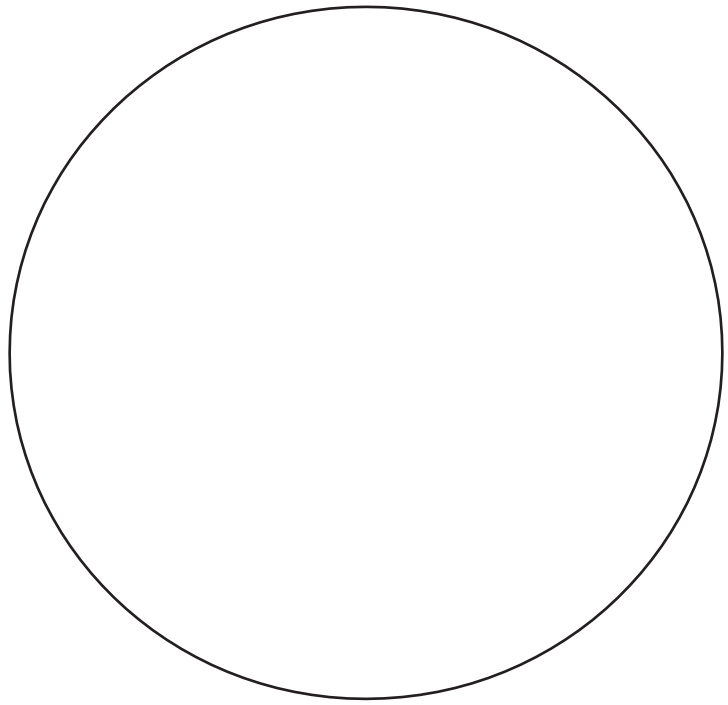
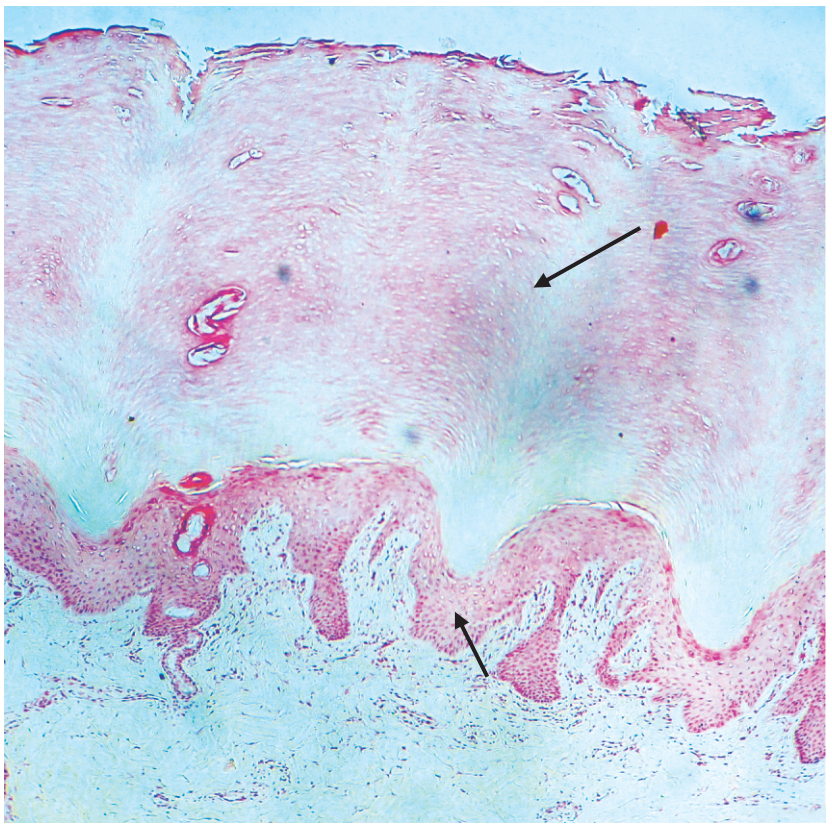
Examples

- Oesophagus
- Cornea


Squamous cell
Polygonal cell
Columnar cell



STRATIFIED SQUAMOUS KERATINIZED EPITHELIUM

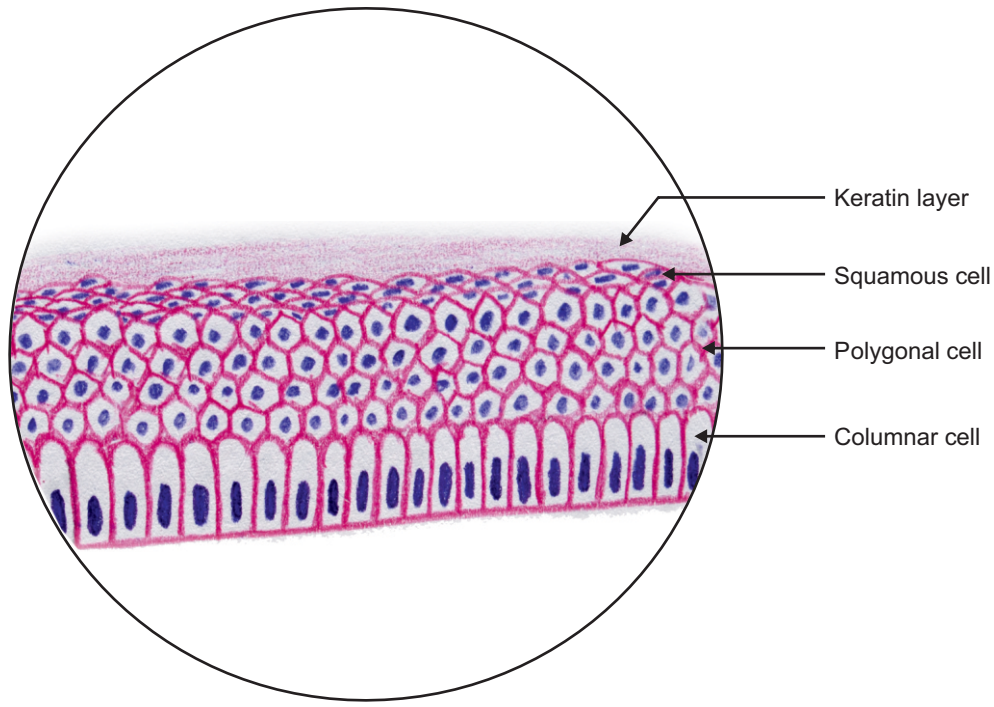


Key Features to Identify the Slide

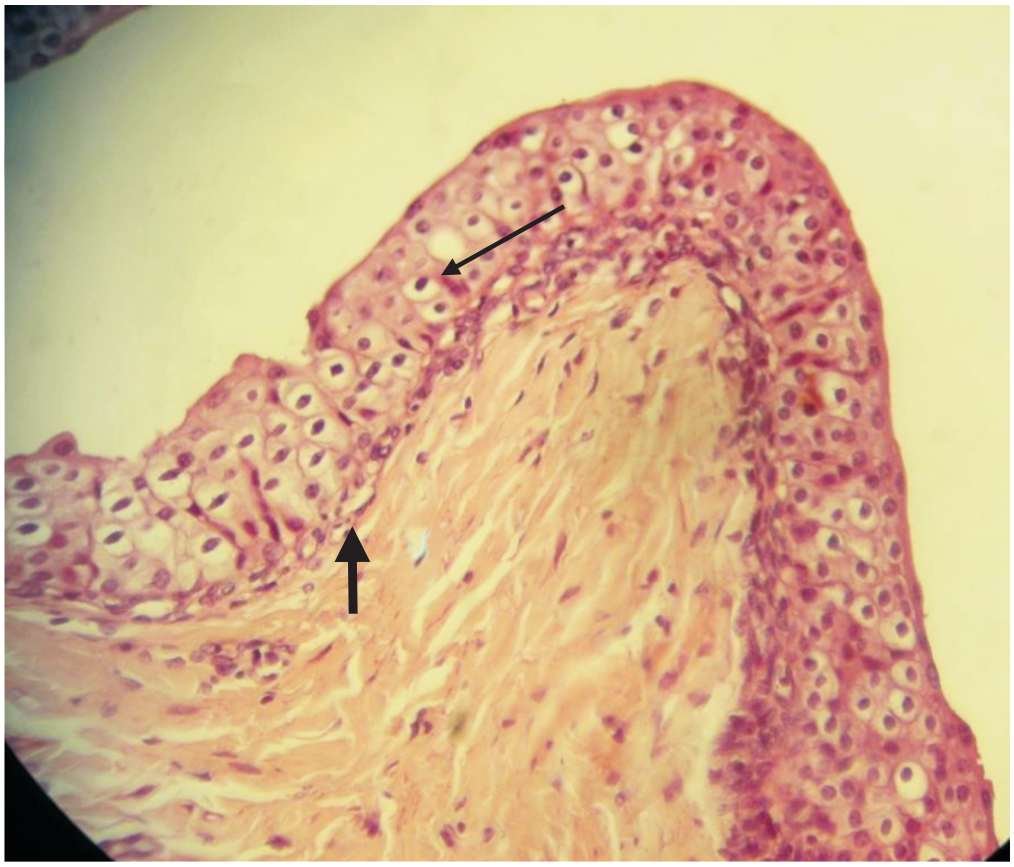
- Presence of multiple layers of cells
- Basal cell layer is columnar/cuboidal in nature and resting on basement membrane
- Presence of polygonal cell layers with superficial layer of squamous cells
- Presence of well-defined keratin layer on the surface

Examples

- Thick skin
- Thin skin


Keratin layer
Squamous cell
Polygonal cell
Columnar cell

TRANSITIONAL EPITHELIUM

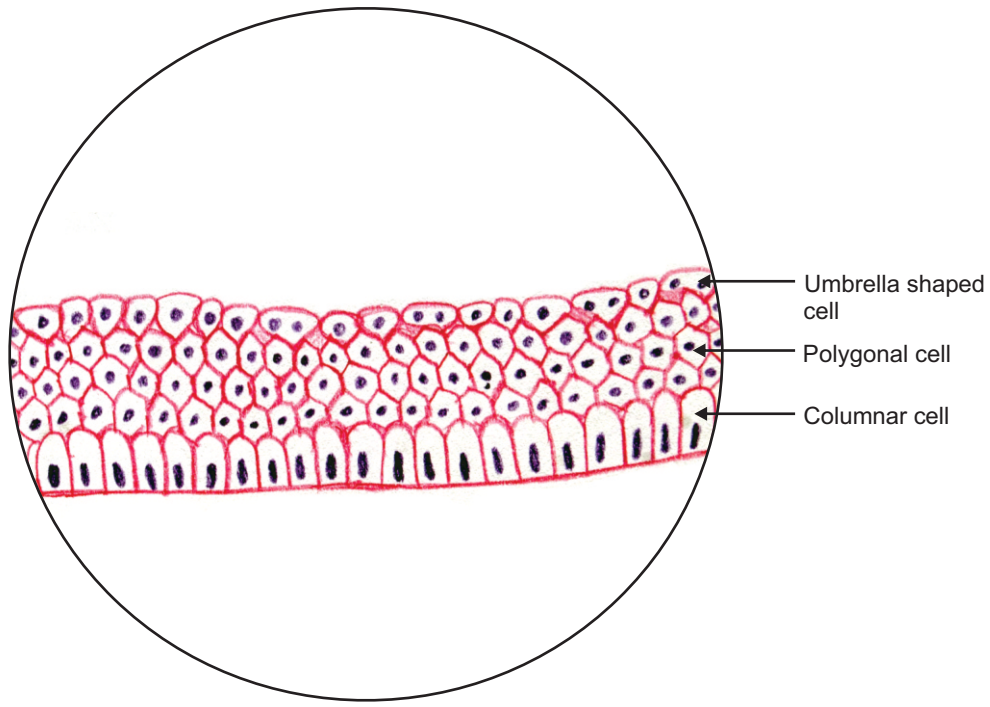


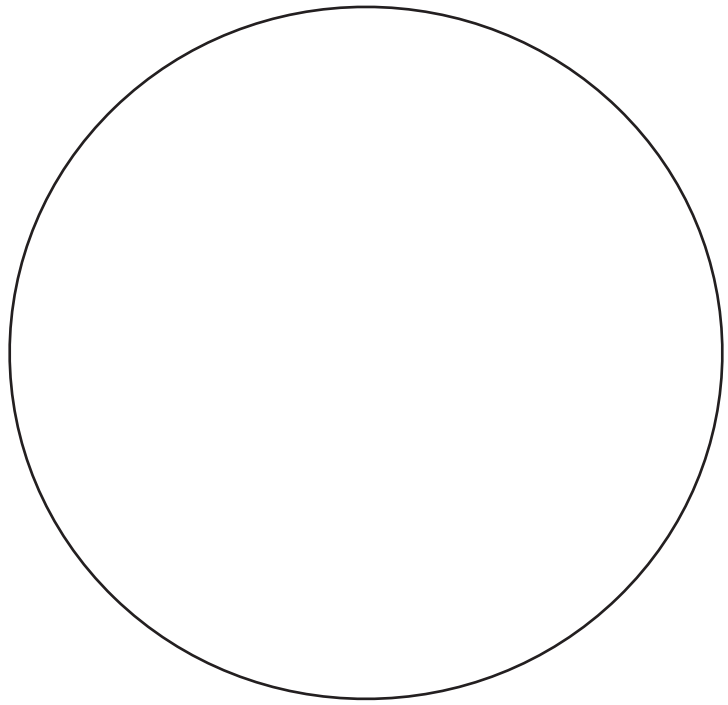
Key Features to Identify the Slide

- Presence of multiple layers of cells
- Basal cell layer is columnar/cuboidal in nature and resting on basement membrane
- Superficial layer made up of umbrella/dome-shaped cells

Examples

- Urinary bladder
- Ureter


Umbrella shaped cell
Polygonal cell
Columnar cell



QUESTIONS

1. Define epithelium. How does it receive its nutrition? 2M
2. What are the functions of epithelia? 2M
3. What are the surface modifications of epithelial cells? 2M
4. Classify epithelium with suitable diagrams and provide examples for each. 5M
5. What are the types of multicellular glands based on the shape of the secretory units? Provide examples for each type. 2M
6. Classify exocrine glands and provide examples for each. 5M
7. What are the four basic tissues in the body? 2M
8. Describe the junctional complexes. 5M

Figures/Notes