

EPITHELIUM

SCHOOL OF ANATOMICAL SCIENCES



An epithelium is a sheet of cells forming a covering or a lining i.e. it has a free surface. It is separated from the underlying connective tissue by a basement membrane.

This demonstration shows some examples of the following features of epithelium:

- The number of layers of cells i.e. whether the epithelium is simple or stratified.
- The shapes and sizes of the cells.
- The arrangement of the cells in relation to one another.
- The modifications of the free surface; and
- The nature of the basement membrane.

Slide 66 (1000x): Choroid plexus (H&E)

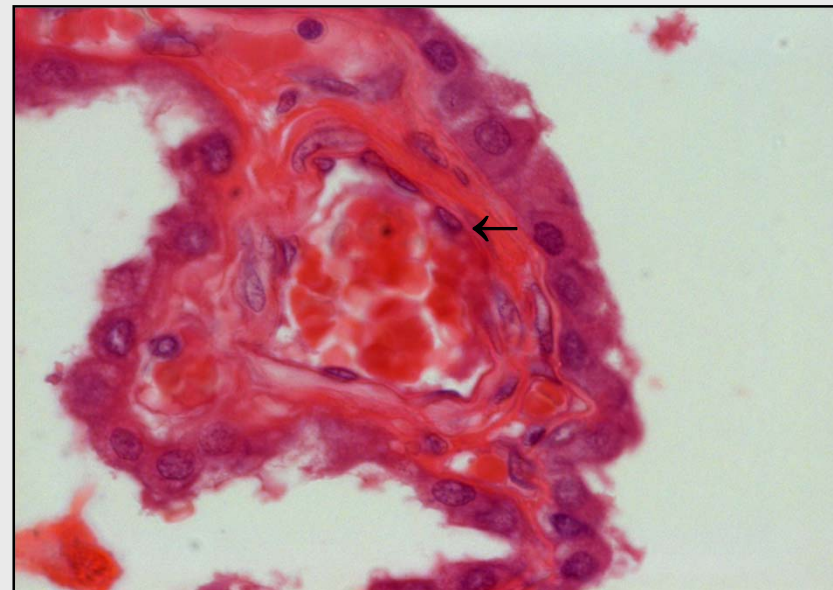
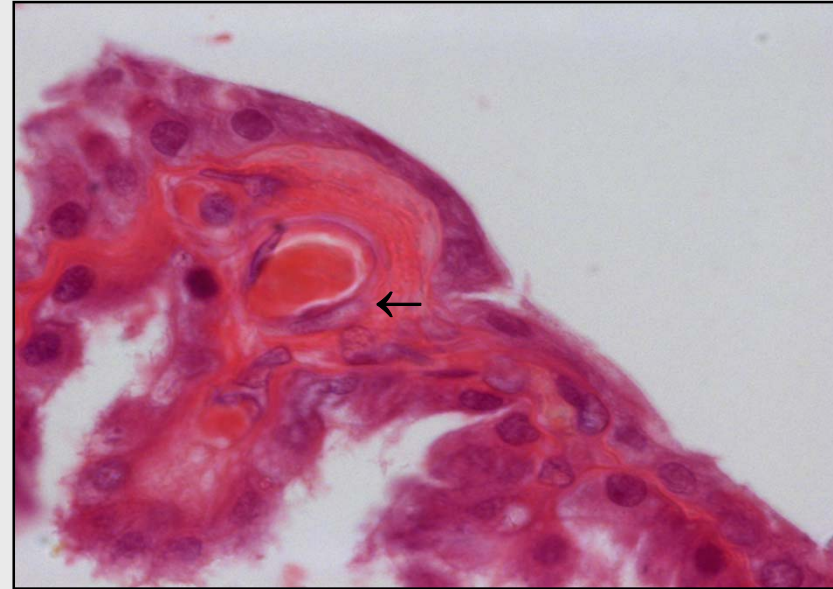
Simple Squamous Epithelium

The endothelium (arrow) lining the blood vessels is an example of simple squamous epithelium. In this section, NOTE:

- The flattened, darkly basophilic-staining nuclei of the endothelial cells.
- Little, if any, cytoplasm is visible by light microscopy.
- The boundaries of two adjacent epithelial cells cannot be determined.
- The nuclei of the squamous epithelial cells of the smaller blood vessels bulge into the lumen.

Questions

- What is the shape of the cells in this type of epithelium?
- How did you identify the blood vessel?



Slide 66 (1000x): Choroid plexus (H&E)

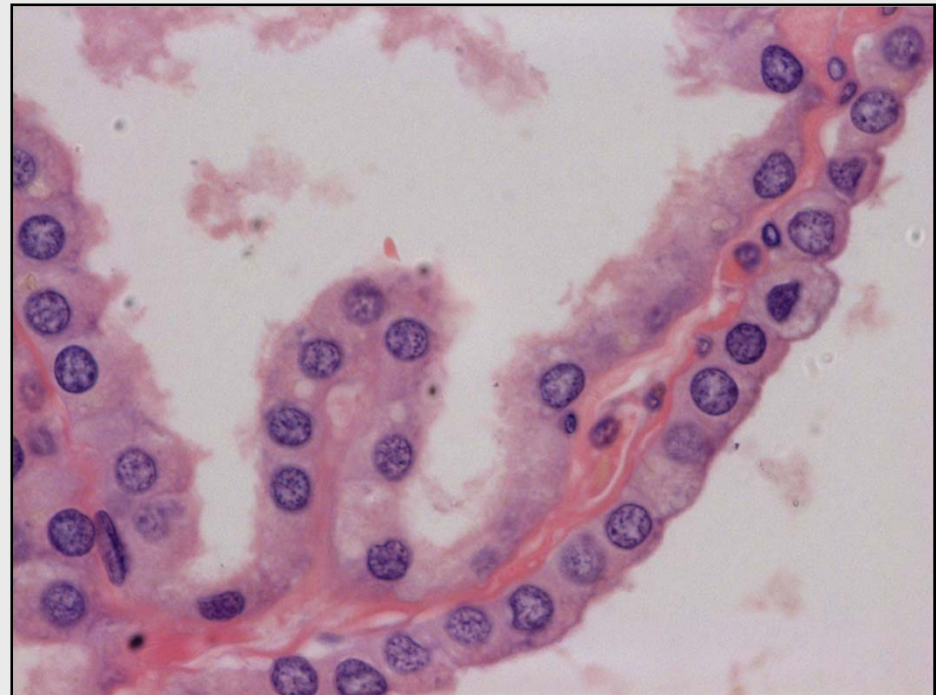
Simple Cuboidal Epithelium

A simple cuboidal epithelium is made up of one layer of cells only. In a simple epithelium, all of the cells touch the basal membrane and reach the free surface. In the simple cuboidal epithelium NOTE:

- The spherical, centrally placed nuclei are basophilic with clumps of chromatin.
- The fairly distinct cell borders and the slightly basophilic cytoplasm. The intercellular borders (lateral cell membranes) lie approximately halfway between two adjacent spherical nuclei.

Question

- Why are the nuclei basophilic? Why is the cytoplasm slightly basophilic?



Slide 85 (1000x): Jejunum (H&E)

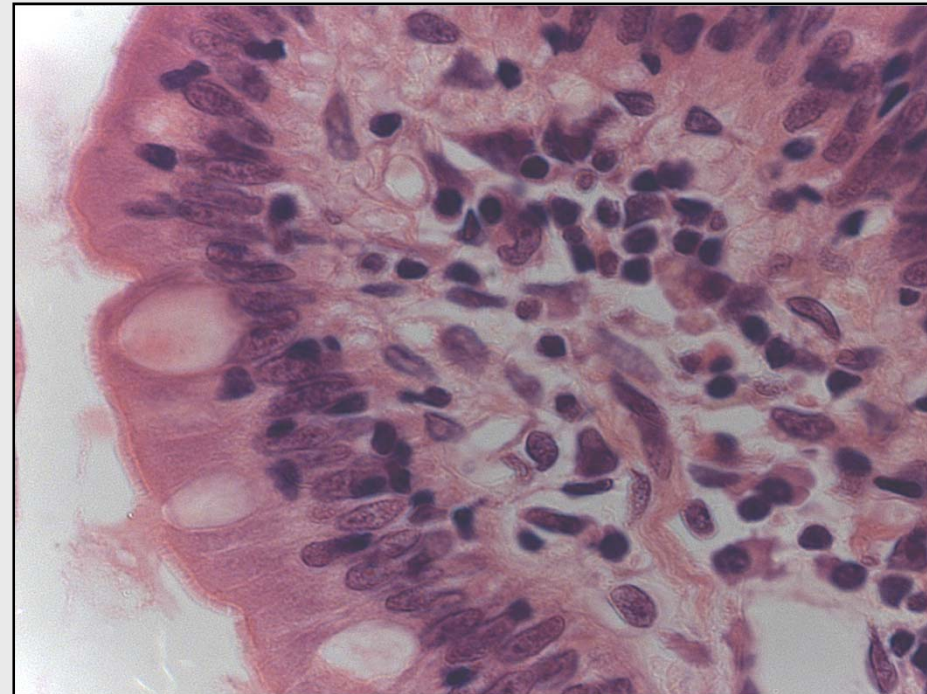
Simple Columnar Epithelium

A simple columnar epithelium with goblet cells forms the covering of the villi in the small intestine. In this section of jejunum, NOTE the cell types present in the epithelium:

- A single layer of columnar cells each with an oval nucleus and indistinct cell borders between the cells, and a striated border on the free surface.
- Goblet cells interspersed between columnar cells; and
- The intensely basophilic spherical nuclei of small lymphocytes passing through the epithelium – cells of the immune system.

Questions

- What is the function of the striated border?
- What is the function of the goblet cells?



Slide 32 (400x): Oesophagus (H&E)

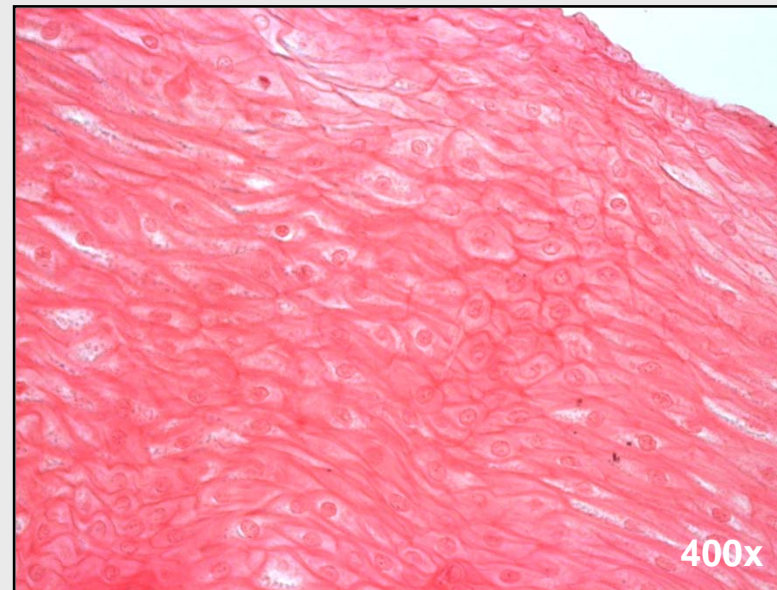
Stratified Epithelium

A stratified epithelium is made up of two or more layers of cells. In the stratified squamous non-keratinized epithelium of the oesophagus (a moist surface) NOTE:

- The many layers of cells.
- The basal layer of cuboidal cells.
- The more superficial layers of squamous (flat) cells.
- The presence of nuclei in the superficial cells, a feature of non-keratinized stratified squamous epithelium.
- The underlying connective tissue which forms papillae between the folds of the epithelium.

Question

- Where is keratinized epithelium found? How is it identified?



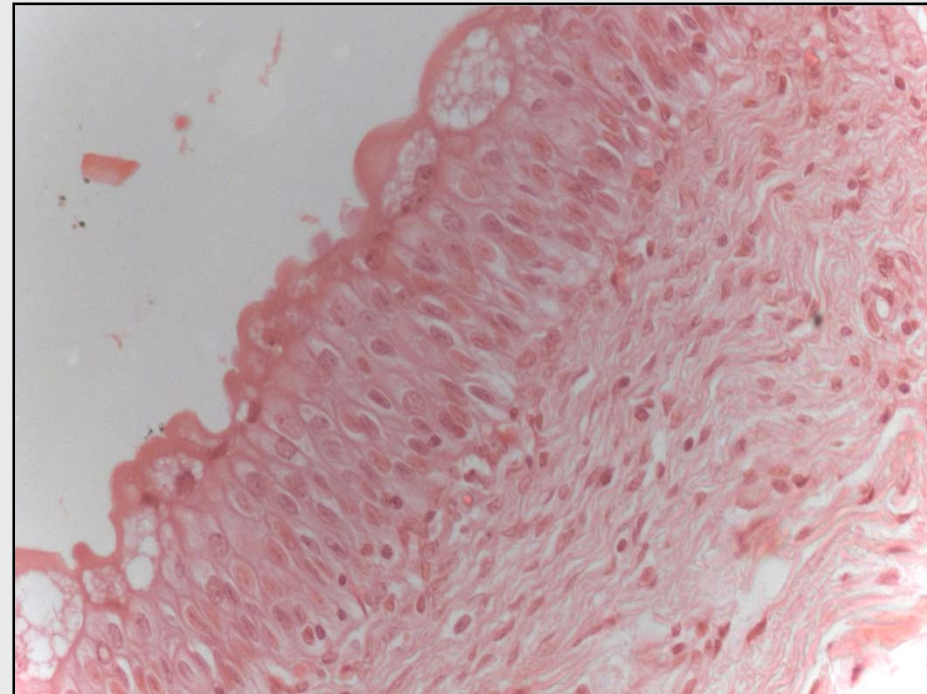
Slide 43 (400x): Urinary bladder (H&E)

Transitional Epithelium

This type of epithelium is characteristic of the excretory passages in the urinary system which are subject to distension and relaxation. NOTE the binucleate 'umbrella' cell.

Questions

- Describe the shape of the cells in a relaxed and in a distended state.
- Why do the cells appear vacuolated (empty) in a relaxed state?



Supplementary slides:

Slide 32 (400x): Trachea (H&E)

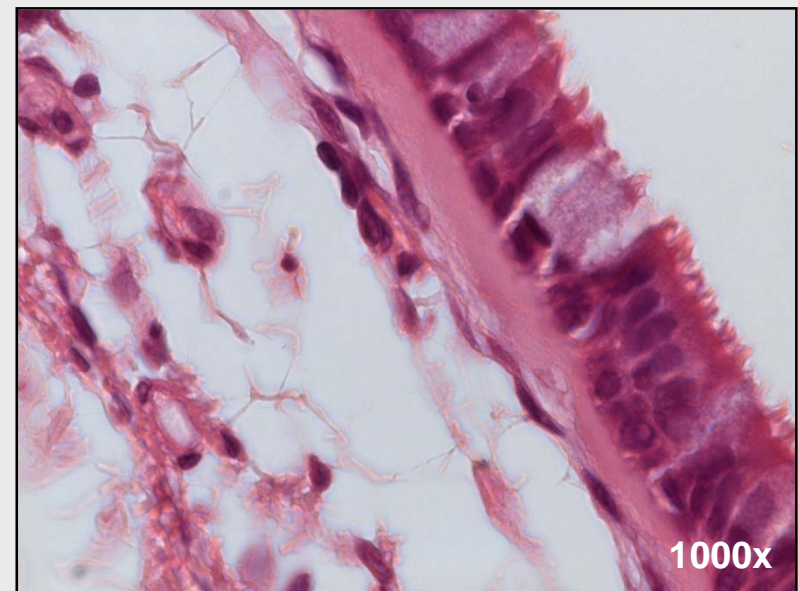
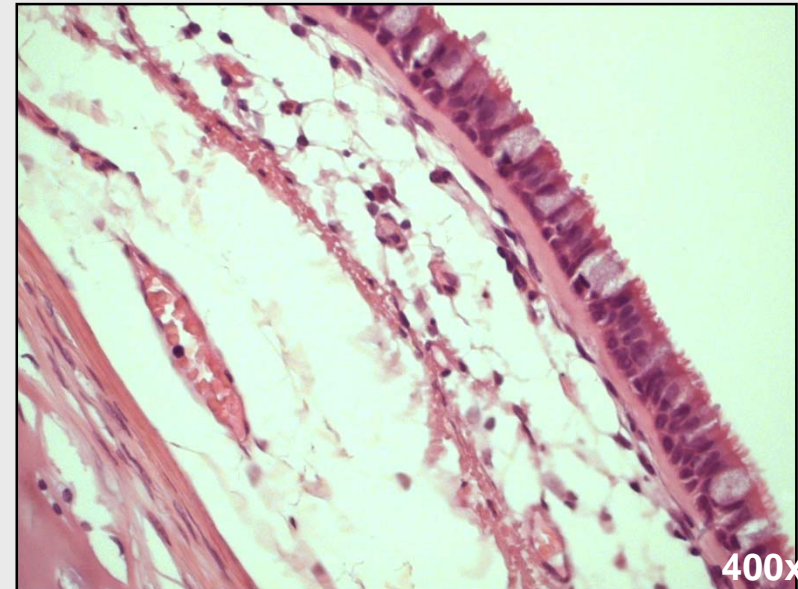
Pseudostratified Columnar Ciliated Epithelium

It appears that the epithelium of the trachea is composed of more than one layer of cells. However, these cells are closely packed and have varying heights but each cell is in contact with the basal membrane. NOTE:

- The pseudostratified ciliated columnar epithelium with numerous goblet cells (respiratory epithelium).
- The nuclei are not uniformly arranged and they occupy about three-fourths of the epithelial layer.
- The tall, ciliated cells possess large, oval nuclei.
- The thick basement membrane.

Question

- What are the functions of the goblet cells and cilia on the tall epithelial cells?



Slide 10 (400x): Baboon uterus (H&E)

Simple Epithelium with Tubular Glands

NOTE that the simple columnar epithelium of the uterine cavity is invaginated in places to form simple tubular glands, each likewise lined by a simple columnar epithelium.

Questions

- Why is the epithelium said to be simple?
- Why are the glands said to be of a simple tubular type?
- What is an invagination?
- What is a gland?
- What does the shape of the nuclei tell you about the shape of the cells in the epithelium?

