

HISTOLOGY VIRTUAL MICROSCOPY
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EPITHELIUM LABORATORY

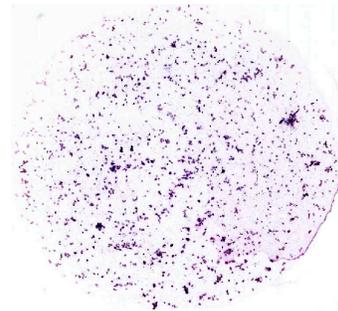
The functions of epithelium are protection, absorption, secretion, and sensory reception. Epithelium, covers free internal and external surfaces of the body, lines cavities, and forms glands. It is characterized by closely packed cells with very little intercellular substance between them. There is no vascular supply within epithelium. How do the cells receive nutrients?

Simple epithelium is composed of one layer of cells in contrast to stratified (multi-layered) epithelium. The latter are named according to the shape of the luminal or surface layer of cells. The basal cells of all epithelia, although separated by a basement membrane, are, nevertheless, contiguous with the underlying connective tissue, which carries the blood vessels. This connective tissue supports the epithelium physically and nutritionally.

Study the following slides of tissues obtained from different organs. **You should be able to identify the various types and locations of epithelium within an organ.** (Do not try to learn the organ at this time.) Note characteristics of epithelium, including surface specializations, which help to distinguish epithelium from other tissues.

1. Simple squamous epithelium

- a. Simple squamous smear (**slide Epi 1**). The specimen shows the flat face of the epithelium. The epithelial cells are shaped like thin plates.



- b. Kidney (**slide Epi 2**). Note that a large number of tubules are cut in both longitudinal and cross-sections. Scattered among the tubules are the larger, more prominent knots of blood vessels called glomeruli. Cells lining the glomerular tuft are examples of simple squamous epithelium. Examine carefully the shape of the cell nucleus and its position bulging into the lumen of the vessels. In addition, cells lining Bowman's capsule, loop of Henle and capillaries are also simple squamous epithelium.



2. Simple cuboidal epithelium

Kidney (**slide Epi 2**). Examine the longitudinal and cross sections of some of the kidney tubules for examples of simple cuboidal epithelium.

3. Simple columnar epithelium

Duodenum (**slide Epi 3**), Ileum (**slide Epi 4**). A simple columnar epithelium is found lining the intestinal lumen. A striate border (microvilli) is a specialization for absorption. Goblet cells can easily be distinguished as oval, clear cells among the columnar epithelium.)



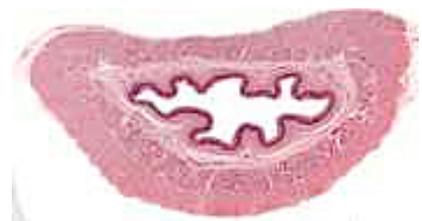
4. Pseudostratified columnar epithelium

Trachea (**slide Epi 5**). Note that the nuclei, which may be seen at different levels, are of varying densities. Those closer to the base are the most dense and rounder. Toward the surface the nuclei are more elongate. All cells actually rest on the **BASEMENT MEMBRANE**, WHICH is particularly thick in this tissue. The specialization here is the presence of **CILIA**. **GOBLET CELLS** may also be seen.



5. Stratified squamous epithelium

- Esophagus (**slide Epi 6**). The lumen is lined with non-keratinized stratified squamous epithelium. Note the position of the nuclei. The cells change in shape from cuboidal in the basal layers to squamous at the surface. The long axis of the basal cells is perpendicular to the surface while the long axis of the surface cells is parallel to the surface.
- Skin (**slide Epi 7**). This is an example of keratinized stratified squamous epithelium. Note that the flattened surface cells have lost their nuclei and are being sloughed off.
- Lip (**slide Epi 8**). Examine this slide for examples of both keratinized and non-keratinized stratified squamous epithelium.



6. Transitional epithelium

Bladder (**slide Epi 9**). This type of stratified epithelium is limited to the urinary tract. It is adapted to extensibility. Note that in the unstretched areas of the luminal surface dome-shaped "umbrella" cells overlie one or more cells. These fat "umbrella" cells flatten out when the bladder epithelium is stretched. Transitional epithelium, in contrast to stratified squamous epithelium, has viable nuclei from the base to the surface and a similarity of polarity of basal cells and surface cells.