

8

Epithelial Tissues

MATERIALS NEEDED

Textbook
 Compound light microscope
 Prepared slides of the following epithelial tissues:
 Simple squamous epithelium (lung)
 Simple cuboidal epithelium (kidney)
 Simple columnar epithelium (small intestine)
 Pseudostratified (ciliated) columnar epithelium (trachea)
 Stratified squamous epithelium (esophagus)
 Transitional epithelium (urinary bladder)
 Colored pencils

PURPOSE OF THE EXERCISE

To review the characteristics of epithelial tissues and to observe examples.

LEARNING OUTCOMES **AP|R**

After completing this exercise, you should be able to

- 1 Differentiate the special characteristics of each type of epithelial tissue.
- 2 Sketch and label the characteristics of epithelial tissues that you were able to observe.
- 3 Indicate a location and function of each type of epithelial tissue.
- 4 Identify the major types of epithelial tissues on microscope slides.

A tissue is composed of a layer or group of cells similar in size, shape, and function. A study of tissues is called *histology*. Within the human body, there are four major types of tissues: (1) *epithelial*, which cover the body's external and internal surfaces and compose most glands; (2) *connective*, which bind and support parts; (3) *muscle*, which make movement possible; and (4) *nervous*, which conduct impulses from

one part of the body to another and help to control and coordinate body activities.

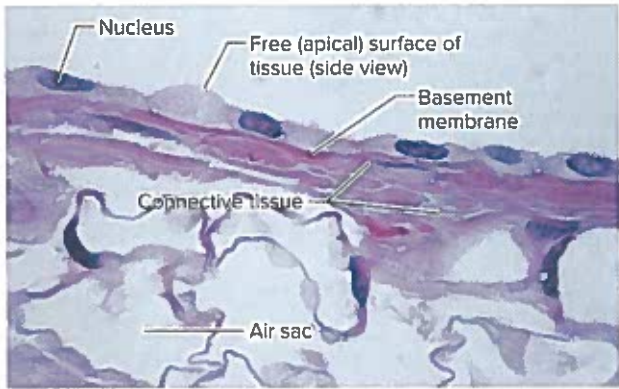
Epithelial tissues are tightly packed single (simple) to multiple (stratified) layers of cells that provide protective barriers. The underside of this tissue contains an acellular basement membrane layer composed of adhesive cellular secretions and collagen through which the epithelial cells anchor to underlying connective tissue. The cells readily divide and lack blood vessels. Epithelial cells always have a free (apical) surface exposed to the outside or to an open space internally and a basal surface that attaches to the basement membrane. The functions of epithelial cells include protection, filtration, secretion, and absorption. Many epithelial cell shapes are used to name and identify the variations. Many of the prepared slides contain more than the tissue to be studied, so be certain that your view matches the correct tissue. Also be aware that stained colors of all tissues might vary.



PRACTICE

PROCEDURE—Epithelial Tissues **AP|R**

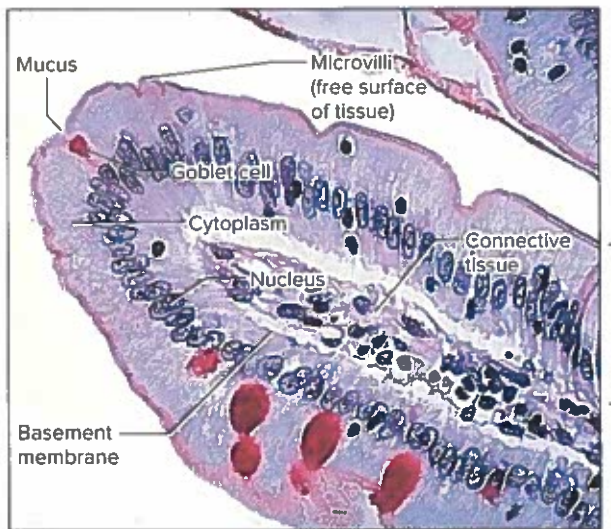
1. Review the section entitled “Epithelial Tissues” in chapter 5 of the textbook.
2. Complete Part A of Laboratory Report 8.
3. Use the microscope to observe the prepared slides of types of epithelial tissues. As you observe each tissue, look for its special distinguishing features as described in the textbook, such as cell size, shape, and arrangement. Compare your prepared slides of epithelial tissues to the micrographs in figure 8.1. As you observe each type of epithelial tissue, prepare a labeled sketch of a representative portion of the tissue in Part B of the laboratory report.
4. Complete Part B of the laboratory report.
5. Test your ability to recognize each type of epithelial tissue. To do this, have a laboratory partner select one of the prepared slides, cover its label, and focus the microscope on the tissue. Then see if you can correctly identify the tissue. **A**



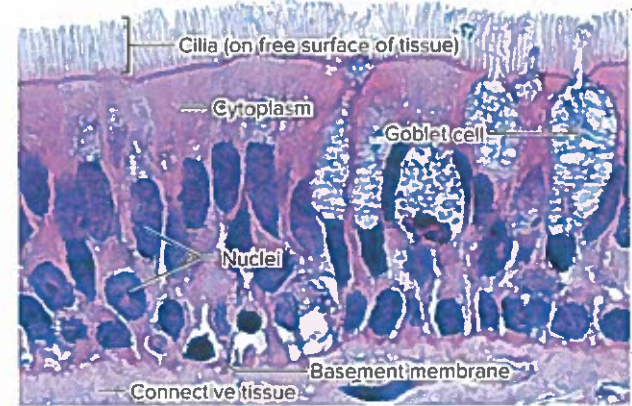
(a) Simple squamous epithelium (side view) (from lung) (250x)



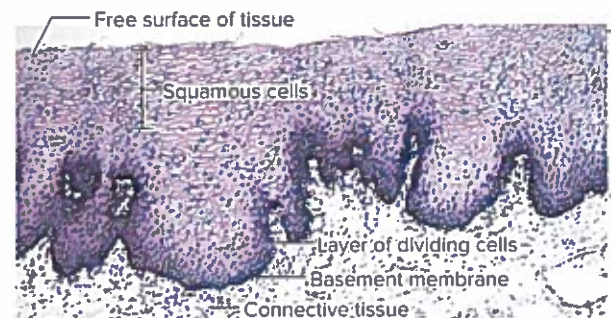
(b) Simple cuboidal epithelium (from kidney) (165x)



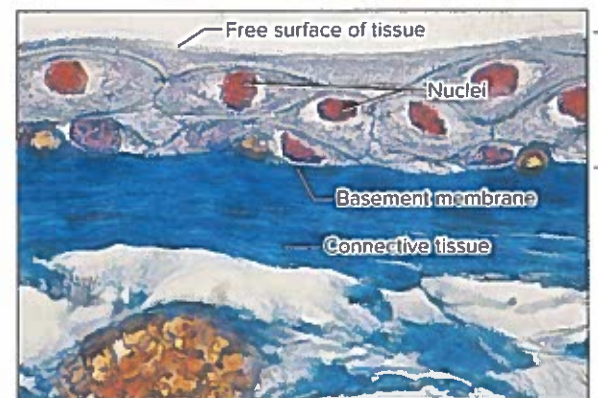
(c) Simple columnar epithelium (nonciliated) (from intestine) (400x)



(d) Pseudostratified columnar epithelium with cilia (from trachea) (1,000x)



(e) Stratified squamous epithelium (nonkeratinized) (from esophagus) (100x)



(f) Transitional epithelium (stretched) (from urinary bladder) (675x)

FIGURE 8.1 Micrographs of epithelial tissues (a–f). Note: A bracket to the right of a micrograph indicates the tissue layer.

APIFI ((a,d,e,f) ©Ed Reschke; (b,c) ©Victor P Eroschenko)

Name _____

Date _____

Section _____

The **A** corresponds to the indicated Learning Outcome(s) found at the beginning of the laboratory exercise.

Epithelial Tissues



PART A ASSESSMENTS

Match the tissues in column A with the characteristics in column B. Place the letter of your choice in the space provided. (Some answers may be used more than once.) **A A**

Column A

- a. Simple columnar epithelium
- b. Simple cuboidal epithelium
- c. Simple squamous epithelium
- d. Pseudostratified columnar epithelium
- e. Stratified squamous epithelium
- f. Transitional epithelium

Column B

- _____ 1. Consists of several layers of cells, allowing an expandable lining
- _____ 2. Commonly possesses cilia that move dust and mucus out of the respiratory airways
- _____ 3. Single layer of flattened cells
- _____ 4. Nuclei located at different levels within a single row of aligned cells
- _____ 5. Forms walls of capillaries and air sacs of lungs
- _____ 6. Appear layered (stratified) but are a single layer of cells (simple)
- _____ 7. Deeper cells cuboidal, or columnar; older cells flattened nearest the free surface
- _____ 8. Forms inner lining of urinary bladder
- _____ 9. Lines kidney tubules and ducts of salivary glands
- _____ 10. Forms lining of stomach and intestines
- _____ 11. Elongated cells with elongated nuclei located near basement membrane
- _____ 12. Forms lining of oral cavity, esophagus, anal canal, and vagina



PART B ASSESSMENTS

In the space that follows, sketch a few cells of each type of epithelium you observed. For each sketch, label the major characteristics, indicate the magnification used, write an example of a location in the body, and provide a function.



<p style="text-align: center;">Simple squamous epithelium (____x)</p> <p>Location: _____ Function: _____</p>	<p style="text-align: center;">Simple cuboidal epithelium (____x)</p> <p>Location: _____ Function: _____</p>
<p style="text-align: center;">Simple columnar epithelium (____x)</p> <p>Location: _____ Function: _____</p>	<p style="text-align: center;">Pseudostratified columnar epithelium with cilia (____x)</p> <p>Location: _____ Function: _____</p>
<p style="text-align: center;">Stratified squamous epithelium (____x)</p> <p>Location: _____ Function: _____</p>	<p style="text-align: center;">Transitional epithelium (____x)</p> <p>Location: _____ Function: _____</p>



ASSESS

CRITICAL THINKING

As a result of your observations of epithelial tissues, which one(s) provide(s) the best protection? Explain your answer.



LEARN: ACTIVITY

Use colored pencils to differentiate various cellular structures in Part B. Select a different color for a nucleus, cytoplasm, cell membrane, basement membrane, goblet cell, and cilia whenever visible.