

SIMPLE EPITHELIA

There are four types of tissues in humans and these make up all of the organs and binding material in the body. **Epithelial tissue** makes up linings of the body. In many cases, where there is exposure (outside, such as the skin, or inside, such as in blood vessels), epithelium is the tissue found. It is named according to its layers (typically simple or stratified) and the shape of cells (such as cuboidal). **Simple squamous epithelium** is a single layer of flattened cells. **Simple cuboidal epithelium** is also a single layer of cells but the cells are in the shape of cubes. **Simple columnar epithelium** is a single layer of long columnar cells. Label and color these epithelial types and pay attention to the **basement membrane**, the noncellular layer that attaches the epithelium to lower layers. It should be colored red. Color the **nuclei** in purple, the **cytoplasm** blue, and label the cells.

Pseudostratified ciliated columnar epithelium is in a single layer of cells but it looks stratified on first appearance. Not all of the cells reach the surface of the tissue. All of the cells reach the basement membrane. Label and color the **nuclei**, **basement membrane**, **cell membrane** and the **cilia** in this tissue.

Top view



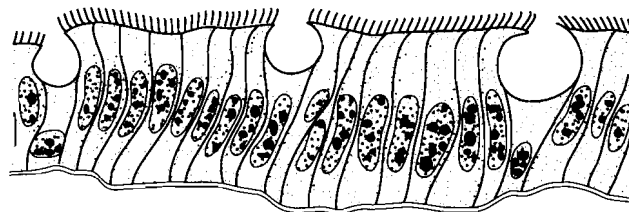
Side view



a. _____



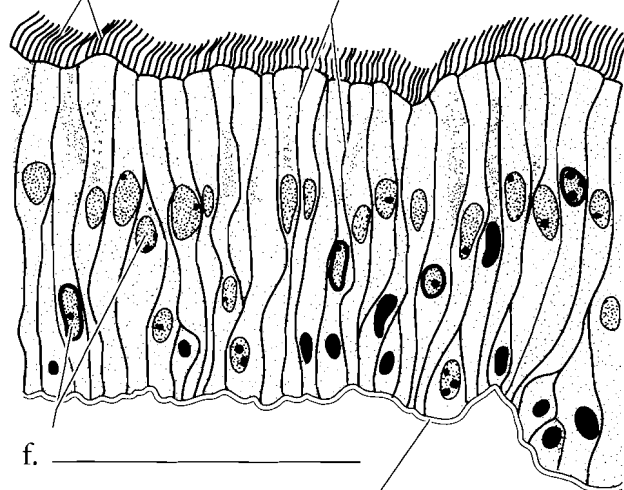
b. _____



c. _____

d. _____

e. _____



f. _____

g. _____

h. _____

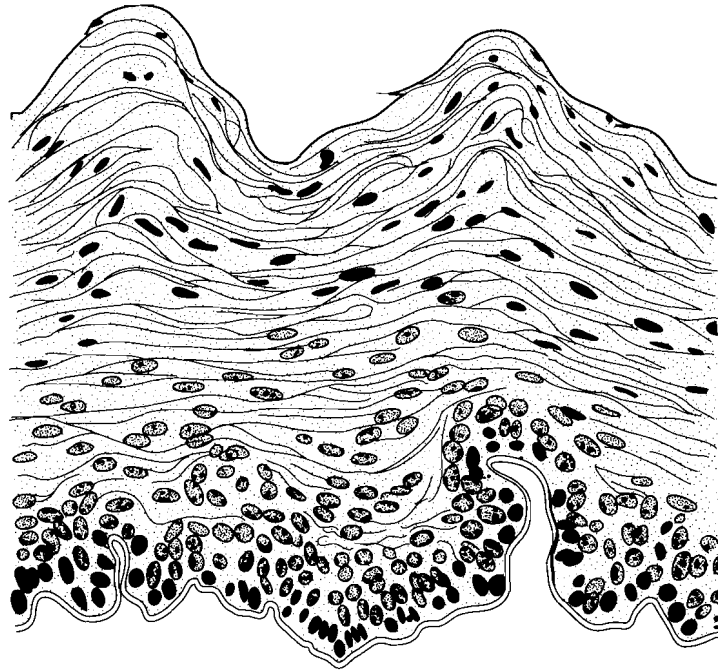
Answer Key: a. Simple squamous epithelium, b. Simple cuboidal epithelium, c. Simple columnar epithelium, d. Cilia, e. Cell membrane, f. Nuclei, g. Basement membrane, h. Pseudostratified ciliated columnar epithelium

STRATIFIED EPITHELIA

There are two common epithelial tissues that are many-layered.

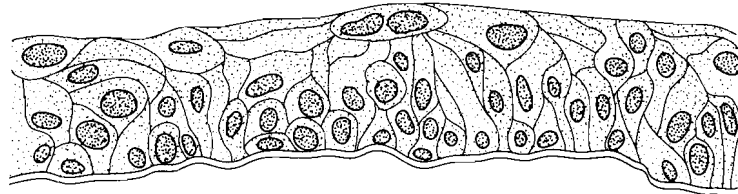
Stratified squamous epithelium is many layers of flattened cells. Label and color the basement membrane red, color the cytoplasm blue, and the nuclei purple. There are two major types of stratified squamous epithelium. Keratinized epithelium is found on the skin and is toughened by the protein keratin. Non-keratinized stratified squamous epithelium is found in the oral cavity and vagina and is a mucous membrane.

Another main type of layered epithelial tissue is **transitional epithelium**. This is tissue that lines part of the urinary tract including the bladder. When the bladder is empty, the cells bunch up on one another and the tissue is thick. When the bladder is full, the cells stretch out into a few layers. Label the cell types for each picture and color the structures in the same way as in previous illustrations.

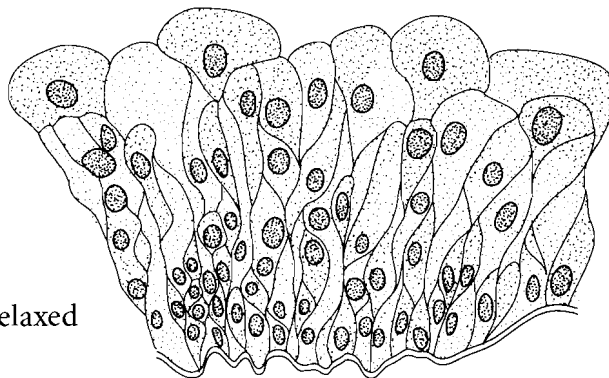


a. _____

Stretched



Relaxed

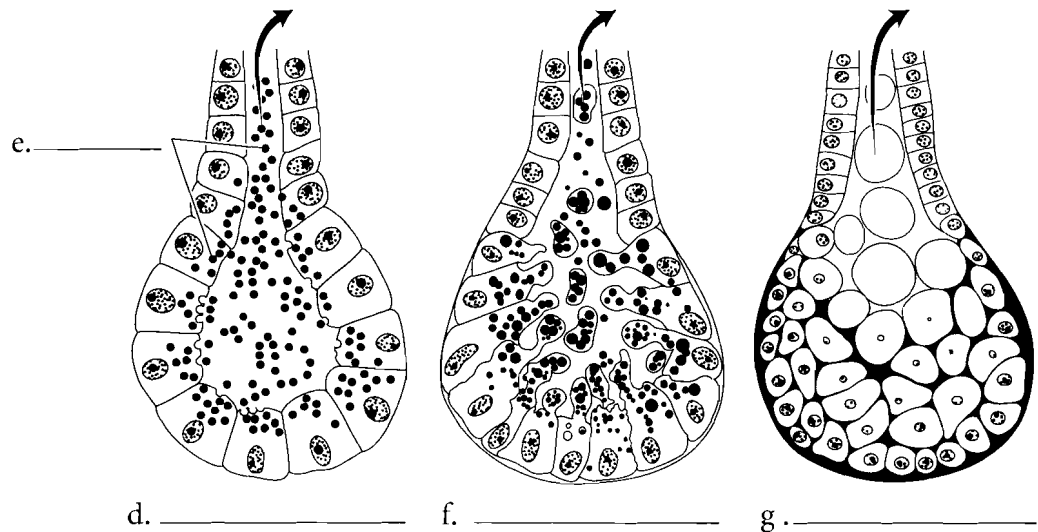
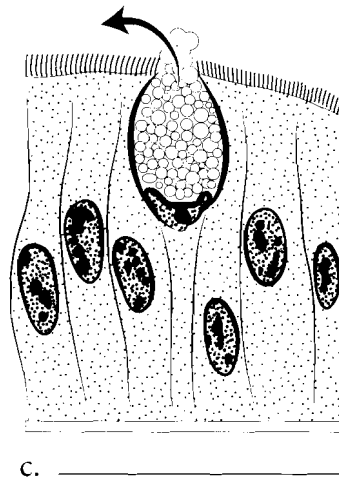
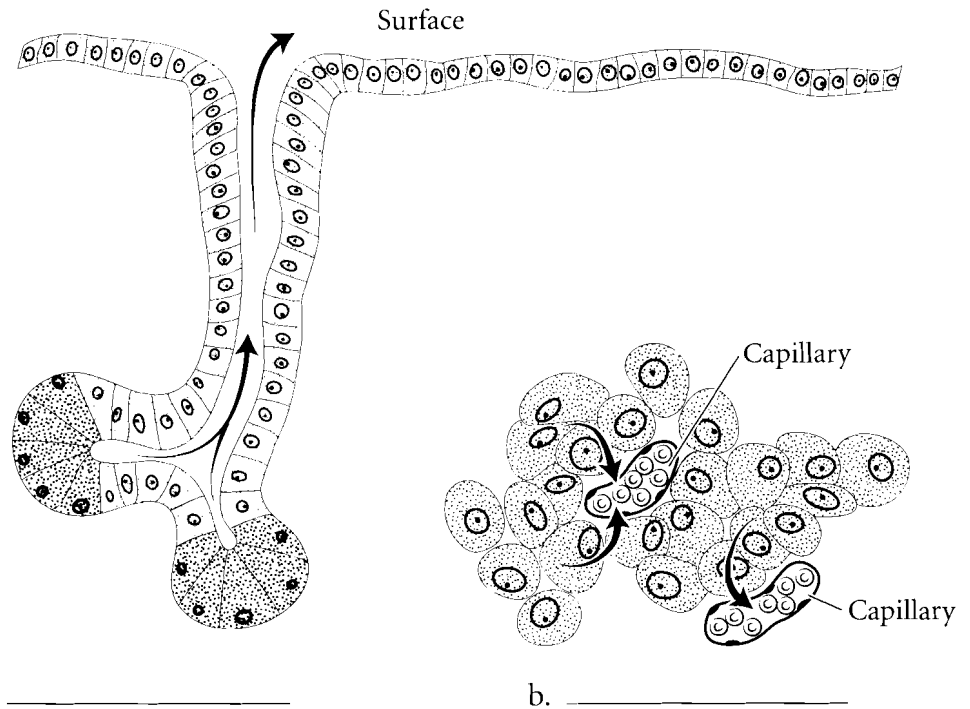


b. _____

GLANDS

There are several types of glands in the human body. Some of these glands secrete their products into tubes or ducts. These are known as **exocrine** glands. Other glands secrete their products into the spaces between cells where they are picked up by the blood or lymph system. These are the **endocrine** glands. Endocrine glands secrete hormones that have an impact on target tissues of the body.

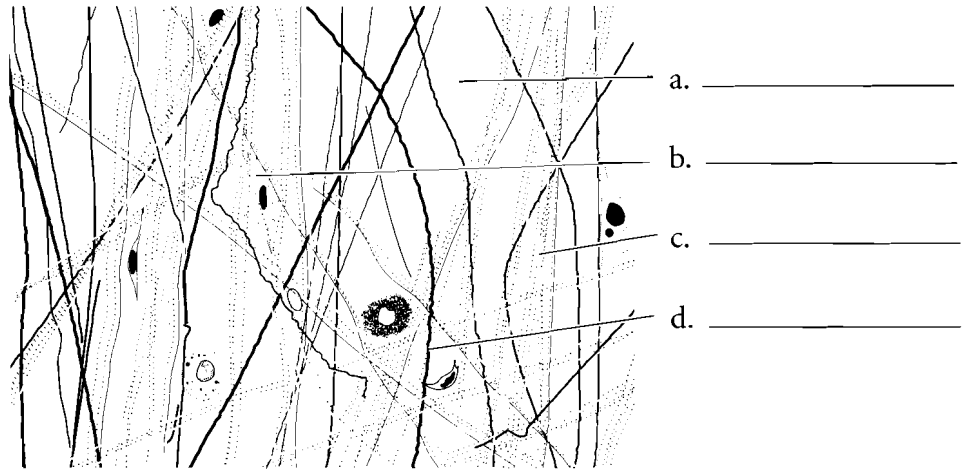
Glands can be unicellular or multicellular. Glands that consist of just one cell are called **goblet cells**. They secrete mucus, which is a lubricant. There are many types of multicellular glands. They are classified by how they secrete their products. Some glands secrete products from **vesicles** pinched off from the cell. These are called **merocrine** glands. In these glands no cellular material is lost in the secretion of material. An example of a merocrine gland is a sweat gland. Some cells squeeze parts of the cell off to secrete cellular products. These are known as **apocrine** glands. The lactiferous glands that produce milk are apocrine glands. Some secretions occur by the entire cell rupturing. These are called **holocrine** glands. Oil glands of the skin are holocrine glands. Label the glands and color them in on the figure.



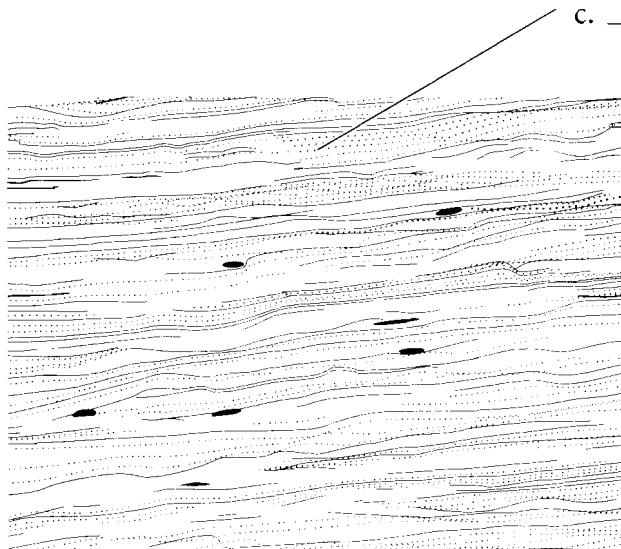
Answer Key: a. Exocrine gland,
b. Endocrine gland, c. Goblet cell,
d. Merocrine glands, e. Vesicles,
f. Apocrine glands, g. Holocrine glands

CONNECTIVE TISSUE

Connective tissue is a varied group of associated tissues, all of which are derived from an embryonic tissue known as mesenchyme. Connective tissue not only has cells, as do all of the other tissues, but it also has **fibers** and a large amount of background substance called **matrix**. There are many specific tissues that belong to connective tissue. **Loose connective tissue** is found wrapping around organs or under the epidermis and it is composed of **collagenous**, **elastic**, and **reticular fibers**, a liquid matrix and numerous cells, many of which have an immune function. **Dense regular connective tissue** has a few cells called **fibrocytes** and a small amount of matrix with most of the tissue composed of a regular arrangement of **collagenous fibers**. This specific tissue makes up tendons and ligaments. If the fibers are not in an orderly arrangement, then the tissue is called **dense irregular connective tissue**. This tissue is found in places like the white of the eye.

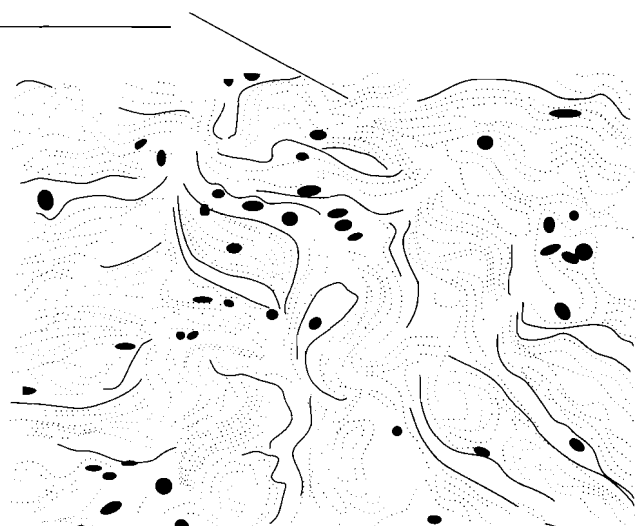


e. _____
c. _____



f. _____

c. _____



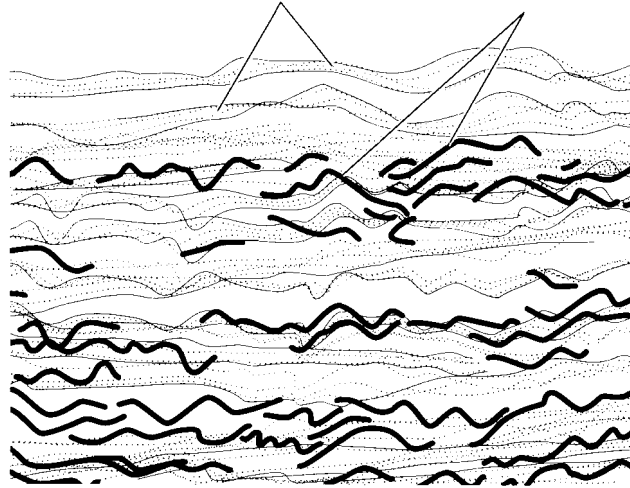
g. _____

Answer Key: a. Matrix, b. Fibrocyte,
c. Collagenous fiber, d. Elastic fiber,
e. Loose connective tissue, f. Dense
regular connective tissue, g. Dense
irregular connective tissue

CONNECTIVE TISSUE (CONTINUED)

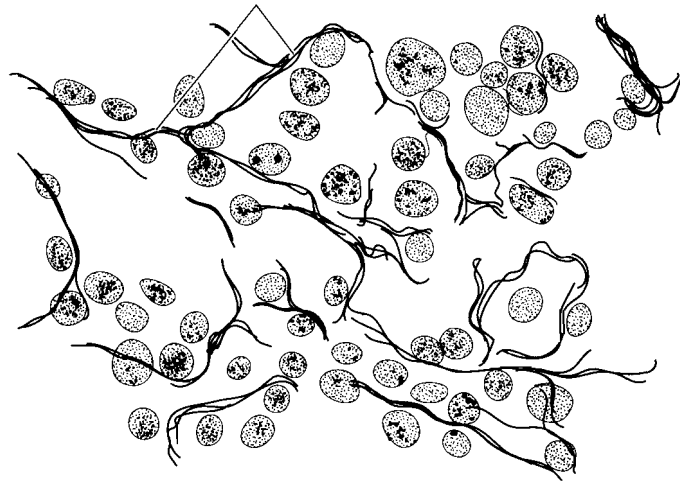
Elastic connective tissue contains **elastic fibers** and is found in areas that recoil when stretched such as in the walls of arteries. **Reticular connective tissue** consists of **reticular fibers** that form an internal support in soft organs such as the liver and spleen. **Adipose tissue** consists of specialized fat-storing cells called adipocytes. Label and color the components of these connective tissues.

a. _____ b. _____

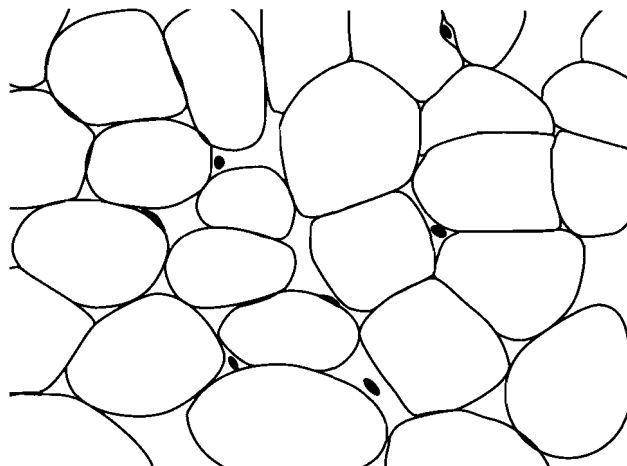


c. _____

d. _____



e. _____



f. _____

Answer Key: a. Collagenous fibers,
b. Elastic fibers, c. Elastic connective
tissue, d. Reticular fibers, e. Reticular
connective tissue, f. Adipose tissue