

**Description**

Epithelial tissues line internal cavities and passageways and cover external body surfaces. They are composed mostly of cells that rest on a thin basement membrane. No blood vessels are present. One method of classifying epithelial tissues is by the number of layers of cells. *Simple* epithelia have a single layer of cells, and *stratified* epithelia have multiple layers of cells. Classification is also based on the following cell shapes: *squamous* (thin, flat), *cuboidal* (cube-shaped), and *columnar* (column-shaped).

Simple cuboidal epithelium is a single row of cube-shaped cells.

**Analogy**

Each simple cuboidal cell is shaped like an ice cube.

**Location**

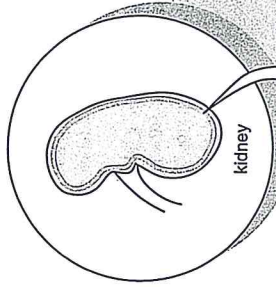
Ducts of glands, parts of kidney tubules; follicles of thyroid gland

**Function**

Secretion; absorption

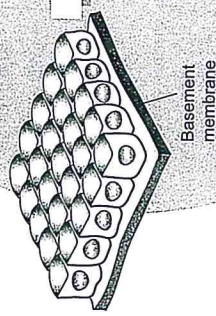


**Location**



**Fun Fact:** On average, an adult's kidneys process about 165 liters of filtered blood plasma every day, but only 1% is excreted as urine.

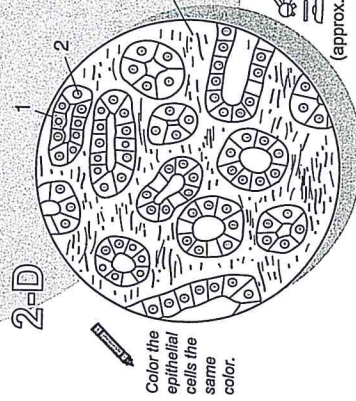
3-D



One simple cuboidal epithelial cell

Each cell is shaped like an ice cube.

2-D



(approx. 275x)

Color the epithelial cells the same color.

1. \_\_\_\_\_
2. \_\_\_\_\_
3. \_\_\_\_\_

**Key to Illustration**

1. Simple cuboidal epithelial cell
2. Nucleus of simple cuboidal epithelial cell
3. Connective tissue

My drawing of simple cuboidal epithelium

**Description**

Connective tissues primarily give structural support to other tissues and organs in the body. Though there are a wide variety of types, all are composed of cells, fibers, and ground substance. The most common cell type, called a fibroblast, manufactures fibers and other extracellular material. The two most common types of protein fibers produced are collagen and elastin. Collagen is for strength and elastin is for elasticity. The cells and the fibers are both embedded in a gel-like material called the ground substance. The ground substance varies in its consistency from being gelatin-like to a much more rigid material.

Loose connective tissues have fewer fibers than other connective tissues and serve as a protective padding in the body. There are three tissues classified as loose connective tissues: *areolar connective tissue*, *adipose connective tissue*, and *reticular connective tissue*.

**Adipose connective tissue** is fat tissue. It is composed almost entirely of fat cells called *adipocytes* along with some blood vessels. These cells have a large vacuole to store lipids (*fat*). Though adipocytes are not able to divide, they do change in size by expanding or shrinking depending on the amount of lipid that is stored inside their vacuoles. For example, as a person loses weight, the amount of lipid in the adipocyte's vacuole decreases, causing the cell to shrink in size. Unfortunately, if a person regains that weight, the cells are able to expand back to their original size.

**Location**

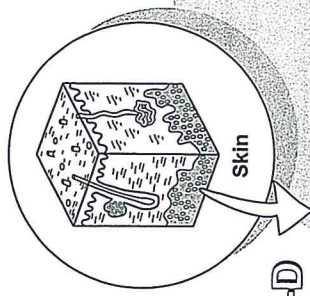
Under all skin but especially in abdomen, buttocks, and breasts; around some organs such as eyeballs and kidneys.

**Function**

Protects certain organs and other structures; insulates against heat loss through the skin; stores energy as a reserve fuel.

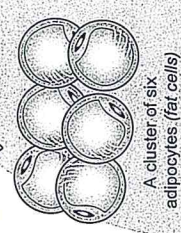


**Location**

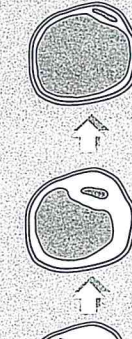


**Fun Fact:** Excess adipose tissue can be removed by a surgical procedure called liposuction, but it does have some risks.

3-D

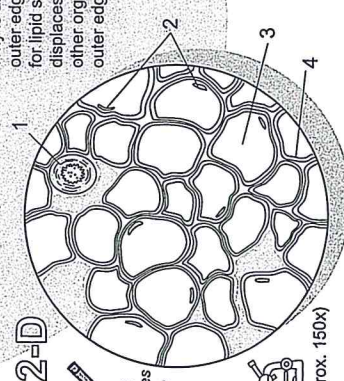


One adipocyte (fat cell)



Why is an adipocyte's nucleus located at the outer edge of the cell? Because the vacuole for lipid storage expands as it fills, and displaces the nucleus and other organelles to the outer edge of the cell.

2-D



Color the adipocytes the same color.

**Key to Illustration**

- 1. Blood vessel
- 2. Nuclei of adipocytes (fat cells)
- 3. Vacuole for lipid storage
- 4. Plasma membrane of adipocyte (fat cell)

1. \_\_\_\_\_
2. \_\_\_\_\_
3. \_\_\_\_\_
4. \_\_\_\_\_

My drawing of adipose connective tissue