

## Grade 12 NTI Day #1 Anatomy

Assignment: Please read the excerpt below as an independent reading assignment. Then read and answer the questions below the excerpt.

# Part II: Body Tissues

## Learning Objectives

- Name the four major tissue types and their chief subcategories. Explain how the four major tissue types differ structurally and functionally.
- Give the chief locations of the various tissue types in the body.
- Describe the process of tissue repair (wound healing).

The human body, complex as it is, starts out as a single cell, the fertilized egg, which divides almost endlessly. The trillions of cells that result become specialized for particular functions. Some become muscle cells, others the transparent lens of the eye, still others skin cells, and so on. Thus, there is a division of labor in the body.

Cell specialization carries with it certain hazards. When a small group of cells is indispensable, its loss can disable or even destroy the body. For example, the action of the heart depends on a very specialized cell group in the heart muscle that controls its contractions. If those particular cells are damaged or stop functioning, the heart will no longer work properly, and the whole body will suffer or die from lack of oxygen.

Groups of cells that are similar in structure and function are called [tissues](#) and represent the next level of structural organization (look back at [Figure 1.1](#)). The four primary tissue types—*epithelial*, *connective*, *nervous*, and *muscle tissues*—interweave to form the fabric of the body. If we had to assign a single term to each primary tissue type that would best describe its overall role, the terms would most

## 3.4 Epithelial Tissue

[Epithelial tissue](#), or [epithelium](#) (ep"i-the'le-um; *epithe* = laid on, covering; plural *epithelia*), is the *lining*, *covering*, and *glandular tissue* of the body. Covering and lining epithelium covers all free body surfaces, both inside and out, and contains versatile cells. Because epithelium forms the boundaries that separate us from the outside world, nearly all substances that the body gives off or receives must pass through epithelium.

Epithelial functions include *protection*, *absorption*, *filtration*, and *secretion*. For example, the epithelium of the skin protects against bacterial and chemical damage, and the epithelium lining the respiratory tract has cilia, which sweep dust and other debris away from the lungs. Epithelium specialized to absorb substances lines some digestive system organs such as the stomach and small intestine, which absorb nutrients from food into the body. In the kidneys, epithelium both absorbs and filters.

Glandular epithelium forms various glands in the body. *Secretion* is a specialty of the glands, which produce such substances as sweat, oil, digestive enzymes, and mucus.

## 3.4a Hallmarks of Epithelium

Epithelium generally has the unique characteristics listed below:

- Except for glandular epithelium epithelial cells fit closely together to form continuous sheets. Neighboring cells are bound together at many points by specialized cell junctions, including desmosomes and tight junctions.
- The membranes always have one free (unattached) surface or edge. This [apical surface](#) is exposed to the body's exterior or to the cavity of an internal organ. The exposed surfaces of some epithelia are slick and smooth, but others exhibit cell surface modifications, such as microvilli or cilia.
- The anchored (basal) surface of epithelium rests on a [basement membrane](#), a structureless material secreted by both the epithelial cells and the connective tissue cells deep to the epithelium. Think of the basement membrane as the "glue" holding the epithelium in place.
- Epithelial tissues are [avascular](#), meaning they have no blood supply of their own and depend on diffusion from the capillaries in the underlying connective tissue for food and oxygen.
- If well nourished, epithelial cells regenerate themselves easily.

Questions:

1. **Which of the following is *not* a function of epithelial tissue?**
  - A) Protection
  - B) Absorption
  - C) Secretion
  - D) Contraction
2. **What type of epithelium forms the boundaries separating the body from the outside world?**
  - A) Glandular epithelium
  - B) Covering and lining epithelium
  - C) Connective tissue
  - D) Muscle tissue
3. **Which characteristic is *not* true about epithelial tissues?**
  - A) Epithelial cells fit closely together to form continuous sheets.
  - B) Epithelial tissues have their own blood supply.
  - C) Epithelial cells regenerate easily if well nourished.
  - D) Epithelial cells rest on a basement membrane.