

Types of Tissues in Animals

The human body is structured into systems. The figure below illustrates the structural organization of the human body from the microscopic (cells) to the macroscopic level (organ system).

Structural Organization of the Human Body

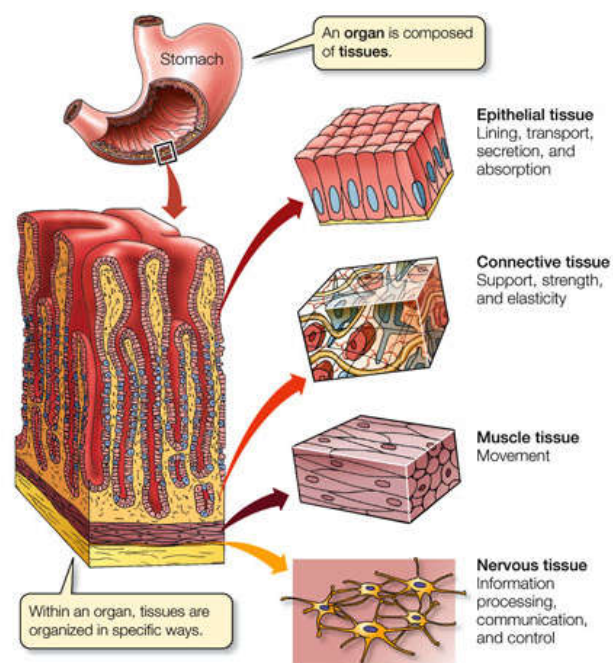
cells	tissue	organ	organ svstem
<i>nerve cells</i>	<i>nerve tissue</i>	<i>brain</i>	<i>nervous svstem</i>

The **cell** is the smallest and most basic unit of life. Although all cells have the same DNA information, they are not all alike.

Cells develop in different ways to perform particular functions in a process called cell specialization.

Every cell in your body originally came from a small group of stem cells. A stem cell is an unspecialized cell. Stem cells can be considered the precursor to tissues.

In many tissues they serve as an internal repair system, dividing essentially without limit to replenish other cells as long as the person or animal is alive. There are two types of stem cells: **embryonic stem cells** and **adult stem cells**. As the name suggests, embryonic stem cells are found in embryos. As these cells divide, further specialization occurs, leaving cells with a limited ability to create a variety of cell types. These cells are called adult stem cells.



Tissues are a group of cells that are similar in shape that work together to perform a specialized function. The human body is made up of four primary types of tissue: epithelial, connective, muscle, and nervous tissue.

Epithelial tissues are a thin covering that protects organs, lines body cavities, and covers the surface of the body.

Some examples of epithelial tissue are the outer layer of the skin, the inside of the mouth and stomach, and the tissue surrounding the body's organs.

Connective tissue provides support and holds various parts of the body together.

Some examples of connective tissue include the **inner layers of skin, tendons, ligaments, cartilage, bone, and fat tissue**. In addition to these more recognizable forms of connective tissue, **blood is also considered a form of connective tissue**.

Muscle tissues contain sheets or bundles of muscle cells that contract to produce movement,

both involuntary like the cardiac muscles (which circulates the blood throughout your body) and voluntary muscles (like your leg and calf muscles which allow you to walk). Smooth muscle is found in the walls of the digestive tract, uterus, bladder, blood vessels, and other internal organs.

There are three types of muscle tissue: **skeletal** - found in your arms and legs; **smooth** - found in blood vessels, the stomach, and other organs; and **cardiac** - found in the heart.

Nervous tissue provides communication between all body structures.

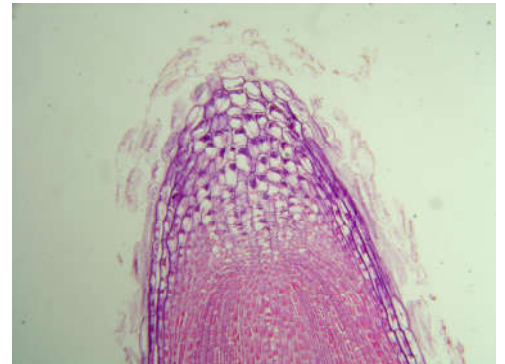
Nerve tissue has the ability to generate and conduct electrical signals in the body. These electrical messages are managed by nerve tissue in the brain and transmitted down the spinal cord to the body.

Types of Tissue in Plants

Meristematic Cells

Stem cells are also found in plants.

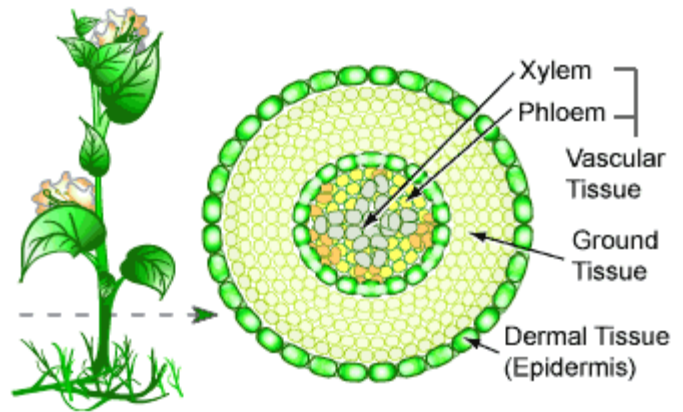
Plant stem cells are called meristematic cells. Meristem cells are responsible for the increase in number of cells; cell division occurs solely in meristematic regions usually at the tips of branches or roots.



However, like the stem cells in animals, meristem cells are not specialized and therefore not considered a tissue. However, the cells that are produced by meristem become specialized tissues of the plant body mentioned below.

Plants have only three types of tissue systems. These systems are called dermal tissue, ground tissue, and vascular tissue.

Dermal tissue system is the group of cells that covers leaves, flowers, roots, and stems. Dermal tissue is composed of epidermal cells, closely packed cells that act as a buffer between the environment and the internal plant tissues.



They have a variety of functions including the **absorption of water and minerals** primarily in the root region; in the regions of the stem and leaves, these areas are generally covered by a waxy cuticle that aids in the **prevention of water loss**. The dermal tissue can form a **barrier of resistance to bacteria and fungi**. In woody plants they provide the **exterior bark or cork**. On roots cells they have hairs that help absorb water and minerals from the soil. This tissue is considered to be the **skin of the plant**.

The ground tissue system comprises the bulk of the primary plant body. These tissues are the filler between the dermal and vascular tissues. These tissues are made up of three cell types called parenchyma, collenchyma, and sclerenchyma cells. They have a variety of functions; in green plants they **manufacture nutrients through photosynthesis**, in the roots **they store food**, and in the stem they **provide structure and support**.

The **vascular tissue system transports food, water, hormones, and minerals within the plant. Vascular tissue includes xylem and phloem.**

These two tissues transport fluid and nutrients internally. The **xylem's** main functions are to **transport water and dissolved substances**, support the physical structure of the plant, and act in food storage. The **phloem's** function is to **transport dissolved organic materials** throughout the plant. It is not surprising that their form should be similar to pipes.

Some questions to Review: Page 47: 1-8, 10-14, 17.