

## UNIT-2

### Structure and functions of tissues

**Structure and functions of tissues-** In humans, there are four basic types of tissue: epithelial, connective, muscular, and nervous tissue.

Tissues are groups of cells that have a similar structure and act together to perform a specific function. The word tissue comes from a form of an old French verb meaning “to weave”. There are four different types of tissues in animals: connective, muscle, nervous, and epithelial. In plants, tissues are divided into three types: vascular, ground, and epidermal. Groups of tissues make up organs in the body such as the brain and heart.

#### **Connective tissue-**

Connective tissue connects or separates groups of other tissues. It is found in between all the other tissues and organs in the body. Connective tissue is made up of cells and ground substance, which is a gel that surrounds cells. Most connective tissue, except for lymph and blood, also contains fibers, which are long, narrow proteins. Fibers can be collagenous, which bind bones to tissues; elastic, which allow organs like the lungs to move; or reticular, which provide physical support to cells. Connective tissue also allows oxygen to diffuse from blood vessels into cells.

About 1 in 10 people have a disorder involving connective tissue. Some connective tissue disorders include sarcomas, Marfan syndrome, lupus, and scurvy, which is a Vitamin C deficiency that leads to fragile connective tissue.

#### **Four types of connective tissue-**

Adipose. Type of loose connective tissue that consists of large cells that store lipids. ...

Cartilage. Hard yet flexible tissue that supported structures ex. ...

Bone cells. Hard tissue of calcium phosphate and calcium concentrate, used for support and function.

Blood.

## **Muscular tissue**

Muscle tissue comprises all the muscles in the body, and the specialized nature of the tissue is what allows muscles to contract. There are three types of muscle tissue: skeletal muscle, cardiac muscle, and smooth muscle. Skeletal muscle anchors tendons to bones and allows the body to move. Cardiac muscle is found in the heart and contracts to pump blood. Smooth muscle is found in the intestines, where it helps move food through the digestive tract, and it is also found in other organs like blood vessels, the uterus, and the bladder. Skeletal and cardiac muscles are striated; this means that they contain sarcomeres (a unit of muscle tissue) that are arranged in a uniform pattern. Smooth muscle does not have sarcomeres. Duchenne muscular dystrophy is an example of a muscle tissue disorder. It is an inherited disorder that causes muscles to atrophy over time. The muscles shorten as they atrophy, which can cause scoliosis and immobile joints. Individuals with the disorder are usually male because the gene responsible for it is found on the X chromosome (of which males have only one).

## **Nervous Tissue**

Nervous tissue is found in the brain, spinal cord, and peripheral nerves, which are all parts of the nervous system. It is made up of neurons, which are nerve cells, and neuroglia, which are cells that help nerve impulses travel. Nervous tissue is grouped into four types: gray matter and white matter in the brain, and nerves and ganglia in the peripheral nervous system. The main difference between gray and white matter is that axons of the neurons in gray matter are unmyelinated, while white matter is myelinated. Myelin is a white, fatty substance that insulates neurons and is crucial for nervous system functioning.

## **Epithelial Tissue**

Epithelial tissue, or epithelium, covers the surfaces of organs including the skin, the trachea, the reproductive tract, and the digestive tract's inner lining. It creates a barrier that helps protect organs, and it also has roles in absorbing water and nutrients, getting rid of waste, and secreting enzymes or hormones. All of the body's glands are formed from ingrowths of epithelium. Some common epithelial tissue diseases are skin diseases like eczema and psoriasis, which both cause rashes. When cancer develops from epithelial tissue, it is called a carcinoma. Epithelial cells in the airways are also responsible for asthma, which is characterized by inflammation of the airways that leads to shortness of breath.

The epithelial tissues are formed by cells that cover the organ surfaces, such as the surface of skin, the airways, the reproductive tract, and the inner lining of the digestive tract. The cells comprising an epithelial layer are linked via semi-permeable, tight junctions; hence, this tissue provides a barrier between the external environment and the organ it covers. In addition to this

protective function, epithelial tissue may also be specialized to function in secretion, excretion and absorption. Epithelial tissue helps to protect organs from microorganisms, injury, and fluid loss.

Functions of epithelial tissue:

The cells of the body's surface form the outer layer of skin.

Inside the body, epithelial cells form the lining of the mouth and alimentary canal and protect these organs.

Epithelial tissues help in absorption of water and nutrients.

Epithelial tissues help in the elimination of waste.

Epithelial tissues secrete enzymes and/or hormones in the form of glands.

Some epithelial tissue perform secretory functions. They secrete a variety of substances such as sweat, saliva (mucus), enzymes, etc.

There are many kinds of epithelium, and nomenclature is somewhat variable. Most classification schemes combine a description of the cell-shape in the upper layer of the epithelium with a word denoting the number of layers: either simple (one layer of cells) or stratified (multiple layers of cells). However, other cellular features, such as cilia may also be described in the classification system. Some common kinds of epithelium are listed below:

Simple squamous epithelium-The epithelial tissues are formed by cells that cover the organ surfaces, such as the surface of skin, the airways, the reproductive tract, and the inner lining of the digestive tract. The cells comprising an epithelial layer are linked via semi-permeable, tight junctions; hence, this tissue provides a barrier between the external environment and the organ it covers. In addition to this protective function, epithelial tissue may also be specialized to function in secretion, excretion and absorption. Epithelial tissue helps to protect organs from microorganisms, injury, and fluid loss.

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