

Chapter 5 -Tissues

Introduction

Tissue – a group of cells performing a specialized structural or functional role.

Cells of different tissues are structured differently, which leads to their differences in function.

The tissues of the human body include four major types.

- Epithelial
- Connective
- Muscle
- Nervous

Epithelial Tissues

Classified according to their shape and the number of layers of cells

Simple – Single celled

Stratified– two or more layers of cells

Squamous – thin, flattened cells

Cuboidal – cube shaped cells

Columnar – elongated cells

General Characteristics

1. Epithelial tissue is widespread throughout the body, covers organs, and lines body surfaces.
2. Epithelial tissues are made up of tightly packed cells containing little intercellular material, generally lack blood vessels, and are replaced frequently.
3. They function in protection, secretion, absorption, excretion, and sensory reception.

Simple Squamous Epithelium

1. made up of a single layer of thin, flattened cells.
2. Because it is suited for diffusion, it functions in the exchange of gases in the lungs and lines blood and lymph vessels as well as body cavities.

Simple Cuboidal Epithelium

1. single layer of cube-shaped cells with centrally located nuclei.
2. It functions in secretion and absorption in the kidneys, and in secretion in glands.

Simple Columnar Epithelium

1. row of elongated cells whose nuclei which may be ciliated.
2. It lines the uterus, stomach, and intestines where it protects underlying tissues, secretes digestive fluids, and absorbs nutrients.

Pseudostratified Columnar Epithelium

1. These cells appear layered due to the varying positions of their nuclei within the row of cells, but are not truly layered.
2. Cilia may be present, along with mucus-secreting cells, that line and sweep debris from respiratory tubes.

Stratified Squamous Epithelium

- 1.layers of flattened cells that are designed to protect underlying layers.
- 2.It makes up the outer layer of skin, and lines the mouth, throat, vagina, and anal canal.
- 3.In the skin, outer layers of cells undergo keratinization (accumulate the protein keratin, cell hardens, and dies); however, this process does not occur where tissues remain moist in the throat, vagina, or anal canal.

Stratified Cuboidal Epithelium

- 1.two to three layers of cuboidal cells lining the mammary glands, sweat glands, salivary glands, and pancreas.

Stratified Columnar Epithelium

- 1.This tissue consists of several layers of cells and is found in the vas deferens, part of the male urethra, and parts of the pharynx.

Transitional Epithelium

- 1.Transitional epithelium is designed to distend

and return to its normal size, as it does in the lining of the urinary bladder.

2. This design provides distensibility and keeps urine from diffusing back into the internal cavity.

Glandular Epithelium

1. This tissue is made up of cells designed to produce and secrete substances into ducts or into body fluids.
2. Glands that secrete products into ducts are exocrine; those that secrete into body fluids and blood are called endocrine.

Connective Tissues

General Characteristics

1. Connective tissues bind structures, provide support and protection, serve as frameworks, fill spaces, store fat, produce blood cells, protect against infection, and repair tissue damage.
2. Unlike epithelial tissues, connective tissues

have abundant matrix, or intercellular material, throughout, and have good blood supplies (except cartilage).

Connective tissues contain major Cell Types

1. Fibroblast - the most common cell type, and is a fixed, star-shaped cell that secretes fibers and is large in size.
2. Wandering macrophages - function as scavenger cells and defend against infection.
3. Mast cells - large and are located near blood vessels where they release heparin (anticoagulant) and histamine (promotes inflammation).

Three kinds of Connective Tissue Fibers produced by the fibroblasts

1. Strong collagenous fibers (white fibers), made of the protein collagen, add strength for holding body parts together.
2. Elastic fibers (yellow fibers), made of the protein elastin, are stretchy and add

flexibility to certain types of connective tissues.

3. Reticular fibers are thin collagenous fibers that form supportive networks in a variety of tissues.

Loose Connective Tissue

1. forms delicate, thin membranes throughout the body that bind body parts together such as skin and underlying organs.
2. The majority of the cells are fibroblasts that are separated by a gel-like ground substance that contains collagenous and elastic fibers.

Adipose Tissue

1. Adipose tissue is loose connective tissue designed to store fat.
2. It is found beneath the skin, around joints, padding the kidneys and other internal organs, and in certain abdominal membranes.

Dense Connective Tissue

- 1.This tissue consists of densely packed collagenous fibers and is very strong but lacks a good blood supply.
- 2.It is found as part of tendons and ligaments.

Cartilage

- 1.Cartilage is a rigid connective tissue that provides a supportive framework for various structures. It lacks a vascular system and so heals slowly.

Types of Cartilage

- 1.hyaline cartilage (most common), is white with abundant fine collagen fibers, is found at the ends of bones, and supports respiratory passages.
- 2.Elastic cartilage, with elastic fibers, provides a framework for the external ears and parts of the larynx.
- 3.Fibrocartilage, with many collagenous fibers, is a tough tissue that provides a shock-absorbing function in intervertebral disks and

in the knees and pelvic girdle.

Bone

1. Bone is the most rigid connective tissue, with deposits of mineral salts and collagen within the matrix.
2. Bone internally supports the body, protects, forms muscle attachments and is the site for blood cell formation.
3. Bone has a good blood supply, enabling rapid recovery after an injury.

Blood

1. Blood is composed of cells (red and white) suspended in a liquid matrix called plasma.
2. It functions to transport substances throughout the body.

Muscle Tissues

General Characteristics

1. Muscle cells, or fibers, can contract and consist of three major types.

Skeletal Muscle Tissue

1. Skeletal muscle is attached to bone and can be controlled by conscious effort (voluntary).
2. The cells (muscle fibers) are long and cylindrical, striated, have many nuclei and contract from nervous impulse.

Smooth Muscle Tissue

1. Smooth muscle tissue lacks striations, is uninucleate, and consists of spindle-shaped cells.
2. This involuntary muscle is found in the walls of internal organs, and in the digestive tract, blood vessels, and urinary bladder.

Cardiac Muscle Tissue

1. Cardiac muscle tissue is found only in the heart and consists of branching fibers that
2. This involuntary muscle has a single nucleus in each cell but appears striated.

Nervous Tissues

1. Nervous tissues are found in the brain, spinal cord, and nerves.
2. Neurons, or nerve cells, conduct nervous impulses while helper cells, or neuroglia, support and nourish the neurons.