Alayen University
Anesthesia Department

ANATOMY

Lecture Four

Body Tissues: Types and Characteristic

Definition of Tissues

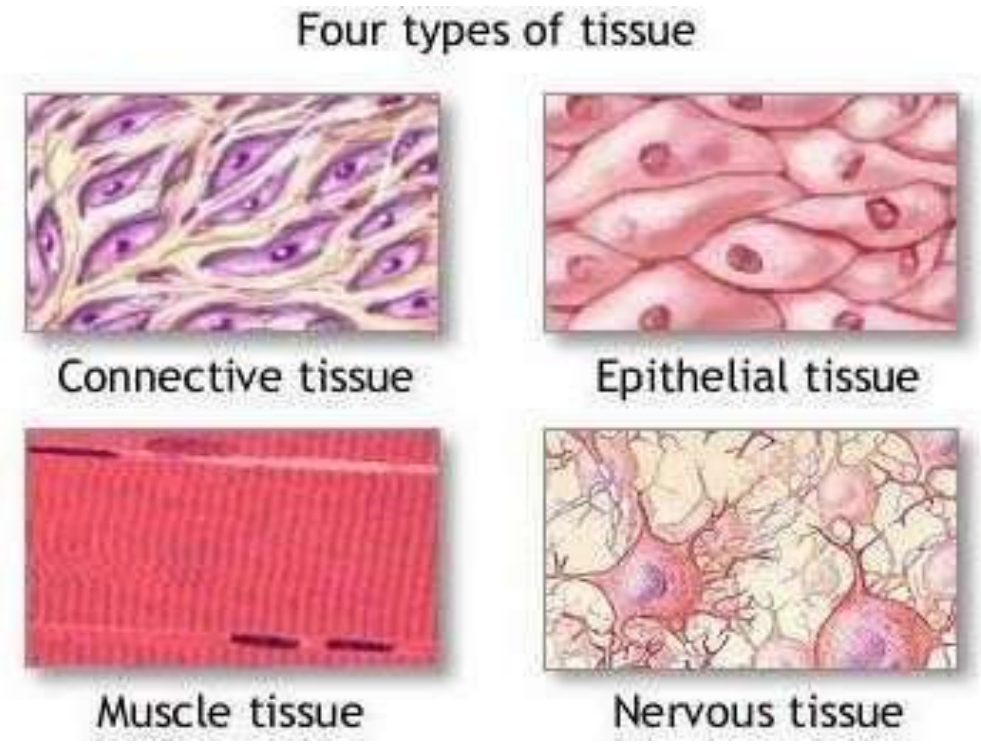
Biological tissue is a collection of interconnected cells that perform a similar function within an organism.

In other words, it is a group of cells working together mainly inside an organ.

Classification of Tissues

Human body is composed of 4 basic types of tissue:

- **Epithelial tissue**
- **Connective tissue**
- **Muscular tissue**
- **Nervous tissue**



Epithelial Tissue

Epithelial cells cover or line all body surfaces, cavities, and tubes. So, these are called covering epithelia. Epithelial cells form the functional units of secretory glands.
So, these are called *glandular epithelia*.

General Characteristic

Closely attached to each other forming a protective barrier.

Always has one free (apical) surface open to outside the body or inside (cavity) an internal organ.

Always has one fixed (basal) section attached to underlying connective tissue.

Has no blood vessels but can soak up nutrients from blood vessels in connective tissue underneath. Can have lots of nerves in it (innervated).

Very good at regenerating (fixing itself). i.e. sunburn, skinned knee**.**

Classification of Epithelia

According to thickness:

"simple" - one cell layer.
"stratified" – more than one layer of • cells (which are named according to the shape of the cells in the apical layer)

According to shape:

"squamous" – wider than tall.
"cuboidal" – as tall as wide.
"columnar" - taller than wide.

Connective Tissues

The tissues that connect the different **parts of the body together.**

General characteristic

The intercellular material is maximum whereas the cellular component is minimum.

Unlike the other tissues, (e.g. epithelium, muscle, and nerve) which are formed mainly by cells, the major constituent of connective tissue is ECM (Extra-cellular matrix).

Possess cells, fibers, and ground substances.

Basic Functions

-Support and binding of other tissues.

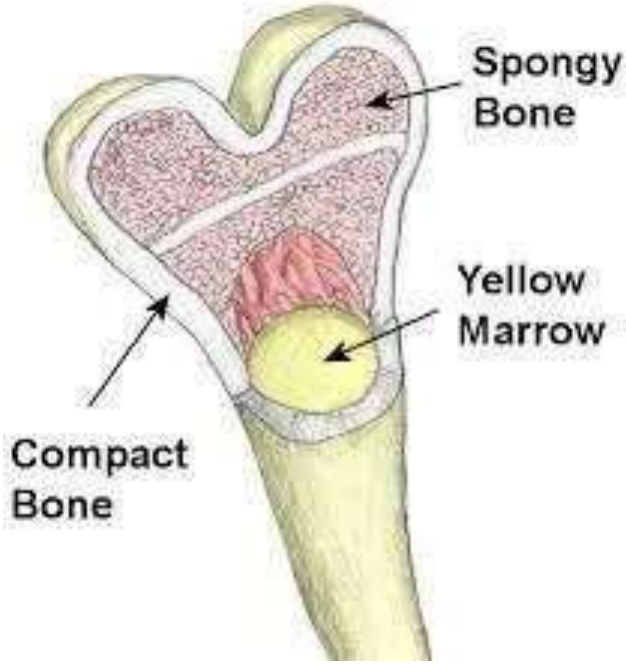
-Holding body fluids.

-Defending the body against infection macrophages, plasma cells, mast cells, WBCs.

-Storing nutrients as fat.

Bone

Description: Hard, calcified matrix containing many collagen fibers. Very well vascularized.
Function: Bone supports and protects; provides levers for the muscles to act on; stores calcium and other minerals and fat; bone marrow is the site of blood cell



Blood

Description: Liquid connective tissue, red and white blood cells in fluid matrix.
Function: Transport respiratory gases, nutrients, wastes, and other substances.
Location: In the blood vessels.

Types of Muscle Tissues:

1-Cardiac Muscle Cell
2-Skeletal Muscle Cell
3-Smooth Muscle Cell

Cardiac Muscle tissue

Description: Branching, striated cells fused at plasma membranes.

Function: Pumping of blood in the circulatory system.

Location: Wall of heart.

Skeletal Muscle Tissue

Description: Long striated cells with multiple nuclei.

Function: Contraction for voluntary movements.

Location: In skeletal muscle.

Smooth Muscle Tissue

Description: Long, spindle shaped cells, each with a single nucleus.

Function: Propulsion of substances along internal passageways.

Location: In hollow organs (e.g. Stomach)

Nervous tissue

Is responsible for transport nervous impulse (motor and sensory impulse)

Nerve cell (neurons): are responsible for reception transmission and processing of stimuli and release neurotransmitters and are consist of:

Dendrites

Cell body

Axon