CELL TYPES

BIOLOGICAL LEVELS OF ORGANIZATION

Cell > Tissues > Organ > Organ System > Organism

Cell

- Smallest, basic unit of life that is responsible for all of life's processes.

Tissue

- A group of cells that possess a similar structure and perform a specific function
- The word tissue originates from French, which means “to weave.”

4 BASIC TYPES OF TISSUES

1. Epithelial / Epithelium
2. Connective Tissue
3. Muscle Tissue
4. Nervous Tissue

1. EPITHELIAL / EPITHELIUM

- Occurs as sheets of tightly packed cells that cover body surfaces and line internal organs and cavities.
- TYPES OF EPITHELIAL
  - **a) Simple Squamous Epithelium**
    - ✓ Cells are flat in shape and arranged in a single layer
    - ✓ This single layer is thin enough to form a membrane that compounds can move through via passive diffusion
    - ✓ This epithelial type is found in the walls of capillaries, linings of the pericardium, and the linings of the alveoli of the lungs.
  - **b) Simple Cuboidal Epithelium**
    - ✓ The important functions of the simple cuboidal epithelium are secretion and absorption.
    - ✓ This epithelial type is found in the small collecting ducts of the kidneys, pancreas, and salivary glands.
  - **c) Simple Columnar Epithelium**
    - ✓ These cells are found in areas with high secretory function (such as the wall of the stomach), or absorptive areas (as in small intestine).
  - **d) Pseudostratified Columnar**
    - ✓ Found most heavily along the respiratory tract
    - ✓ Pseudostratified ciliated columnar epithelial cells help trap and transport particles brought in through the nasal passages and lungs.
  - **e) Stratified Squamous Epithelium**
    - ✓ Found in the skin
    - ✓ It covers the external dry surface of the skin

- ✓ Serves the function of protection from wear and tear.

f) Stratified Cuboidal

- ✓ They protect areas such as ducts of sweat glands, mammary glands, and salivary glands. stratified squamous epithelium

g) Transitional Epithelium

- ✓ The primary function is to enable tissue to contract and expand.

2. CONNECTIVE TISSUE

- ➢ Bind structures together
- ➢ Form a framework and support for organs and the body as a whole
- ➢ Store fat, transport substances, protect against disease
- ➢ Help repair tissue damage.

Connective Tissues are composed of:

- ❖ **BLOOD**
  - ✓ Made up of plasma; contains water, salts, and dissolved proteins; erythrocytes that carry oxygen (RBC), leukocytes for defense (WBC), and platelets for blood clotting.
- ❖ **CONNECTIVE TISSUE PROPER [CTP]**
  - ✓ Made up of loose connective tissue that is found in the skin and fibrous connective tissue that is made up of collagenous fibers found in tendons and ligaments.
  - ✓ Adipose tissues are also examples of loose connective tissues that store fats which functions to insulate the body and store energy.
- ❖ **CARTILAGE**
  - ✓ Characterized by collagenous fibers embedded in chondroitin sulfate.
  - ✓ Chondrocytes are the cells that secrete collagen and chondroitin sulfate.
  - ✓ Cartilage functions as cushion between bones.
- ❖ **BONE**
  - ✓ Mineralized connective tissue made by bone-forming cells called osteoblasts which deposit collagen.
  - ✓ The matrix of collagen is combined with calcium, magnesium, and phosphate ions to make the bone hard.
  - ✓ Blood vessels and nerves are found at a central canal surrounded by concentric circles of osteons.

3. MUSCLE TISSUE

- ➢ Composed of cells that have the special ability to shorten or contract in order to produce movement of the body parts
- ❖ TYPES OF MUSCLE TISSUE

a) Smooth Muscle
- ✓ Is involuntary
- ✓ Found in digestive system
- ✓ Has spindle-shaped, nonstriated
- ✓ Occurs in walls of internal organs

b) Cardiac Muscle
- ✓ Is involuntary
- ✓ Has striated, branch, uninucleate fibers
- ✓ Occurs in walls of heart

c) Skeletal Muscle
- ✓ Is voluntary
- ✓ Has striated, tubular, multinucleated fibers
- ✓ Usually attached to skeleton

4. NERVOUS TISSUE

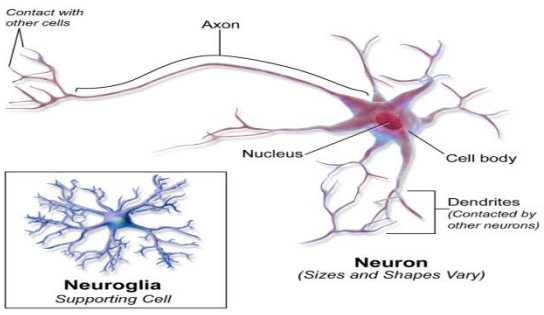
- ➢ found in the brain, spinal cord, and nerves
- ➢ It is responsible for coordinating and controlling many body activities.
- ❖ STRUCTURES OF NERVOUS TISSUE
  - ➢ It is made of nerve cells or neurons

a) Axons
- ✓ Long stem-like projections emerging out of the cell
- ✓ Responsible for communicating with other cells called the Target cells, thereby passing impulses

b) Cell body
- ✓ Contains the nucleus, cytoplasm and cell organelles
- ✓ Extensions of the cell membrane are referred to as processes.

c) Dendrite
- ✓ a highly branched processes, responsible for receiving information from other neurons and synapses (specialized point of contact).
- ✓ Information of other neurons is provided by dendrites to connect with its cell body.

➢ Information in a neuron is unidirectional as it passes through neurons from dendrites, across the cell body down the axon



Neural Tissue