

Human Tissues

Lecture 2

**1ST YEAR-BIOLOGY SUBJECT –LABORATORY SCIENCE
DEPARTMENTS**

ALZAHRAA UNIVERSITY – COLLEGE OF PHARMACY

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Learning objectives

- 1- to understand where tissue relates in the biological levels of organization
- Describe the four types of tissues and provide a general function for each

Introduction to Human Tissues

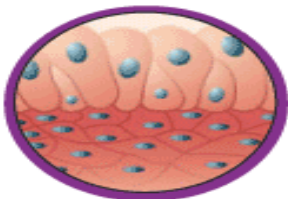
Tissues are groups of cells with similar structure and function that work together to perform specific tasks.

Importance: Tissues are the building blocks of organs and organ systems, enabling the human body to function as a coordinated whole.

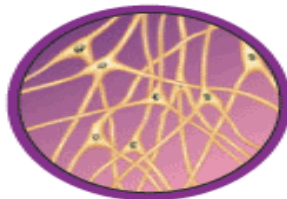
Main four types of human tissues

FOUR TYPES OF TISSUES

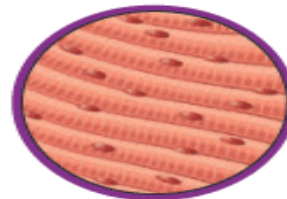
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The Learning App



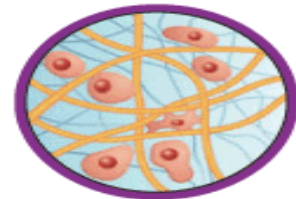
Epithelial tissue



Nervous tissue



Muscle tissue



Connective tissue

There are Four Basic Types of Tissues

1. **Epithelial Tissue:** Covers body surfaces and lines hollow organs, cavities, and ducts.
2. **Connective Tissue:** Provides support, binds tissues together, and stores energy.
3. **Muscle Tissue:** Specialized for contraction and movement.
4. **Nervous Tissue:** Responsible for transmitting signals and communication.

. Epithelial Tissue

- **Characteristics**
- Closely packed cells with minimal extracellular material.
- **Functions**
 1. **Protection:** Skin epithelium acts as a barrier.
 2. **Absorption:** Intestinal lining absorbs nutrients.
 3. **Secretion:** Glands secrete hormones and enzymes.
 4. **Filtration:** Kidney tubules filter blood.

Types of Epithelial Tissue

- **Epithelial Tissue can be classified according to number of layer & shape**
- **By layers:**
 - Simple (single layer): e.g., simple squamous in lungs
 - Compound (multiple layers)Stratified : e.g., stratified squamous in skin & transitional
- **By shape:**
 - Squamous: Flat and thin.
 - Cuboidal: Cube-shaped.
 - Columnar: Tall and cylindrical.

Types of Epithelial Tissue

Epithelial Tissue

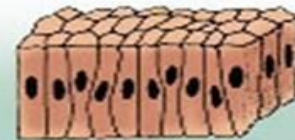
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Simple squamous



Simple cuboidal



Simple columnar

Transitional



Stratified squamous

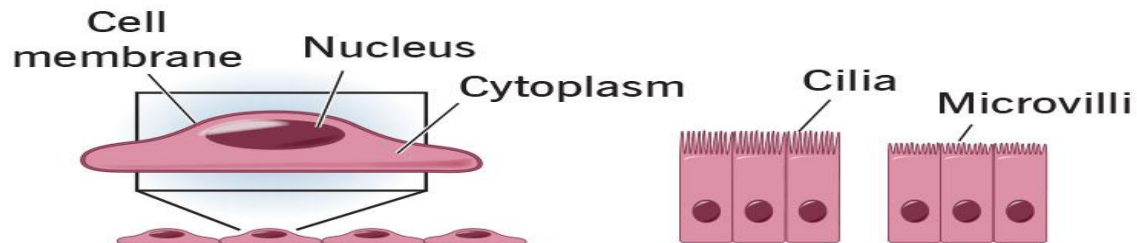


Stratified cuboidal



Pseudostratified columnar

Epithelium

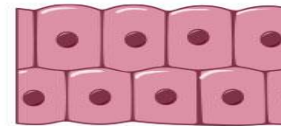


Simple squamous

Simple columnar



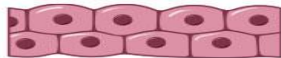
Stratified squamous



Stratified columnar

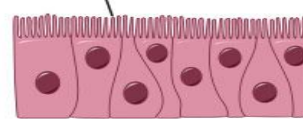


Simple cuboidal

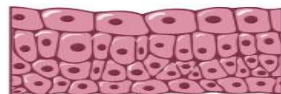


Stratified cuboidal

Stereocilia



Pseudostratified columnar



Transitional

Connective Tissue

- **Characteristics**

- Cells scattered in an extracellular matrix (ECM) made of fibers (collagen, elastin) and ground substance.

- **Functions**

1. **Structural** support: Bone forms the skeleton.
2. **Binding**: Tendons connect muscles to bones.
3. **Storage**: Adipose tissue stores energy.
4. **Transport**: Blood transports nutrients and oxygen.
5. **Immunity**: Lymph and WBCs defend against pathogens.

Types of Connective Tissue

I. Loose Connective Tissue:

II. Dense Connective Tissue:

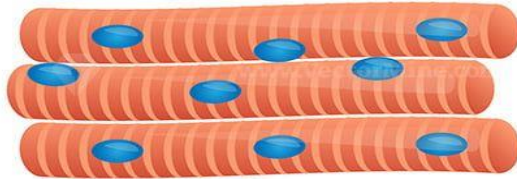
III. Specialized Connective Tissue:

- 1. Cartilage:** Hyaline (joints), elastic (ear), and fibrocartilage (intervertebral discs).
- 2. Bone:** Compact and spongy, provides structure and mineral storage.
- 3. Blood:** Liquid connective tissue for transport.

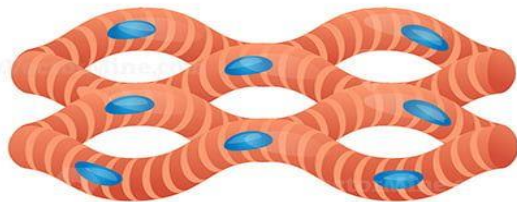
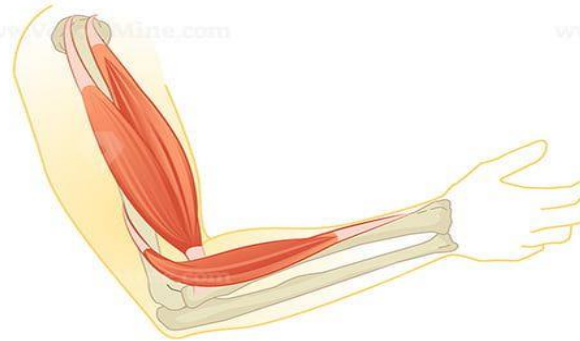
Muscle Tissue

- **Characteristics**
- Composed of elongated cells (muscle fibers) that contract in response to stimuli.
- **Functions**
- Movement: Skeletal muscles move bones.
- Stability: Maintains posture.

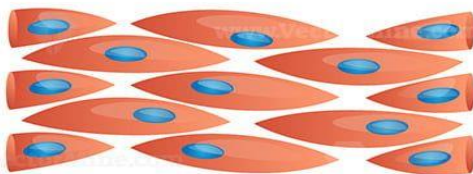
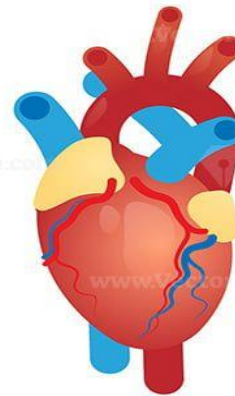
TYPES OF MUSCLE CELLS



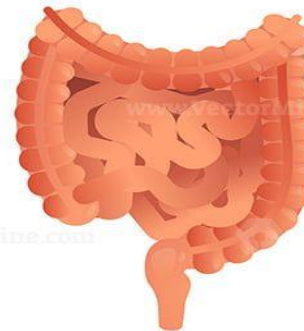
Skeletal Muscle



Cardiac Muscle



Smooth Muscle



Types of Muscle Tissue

1. **Skeletal Muscle:**

- Striated and voluntary.

2. **Cardiac Muscle:**

- Striated and involuntary.
- Found only in the heart.

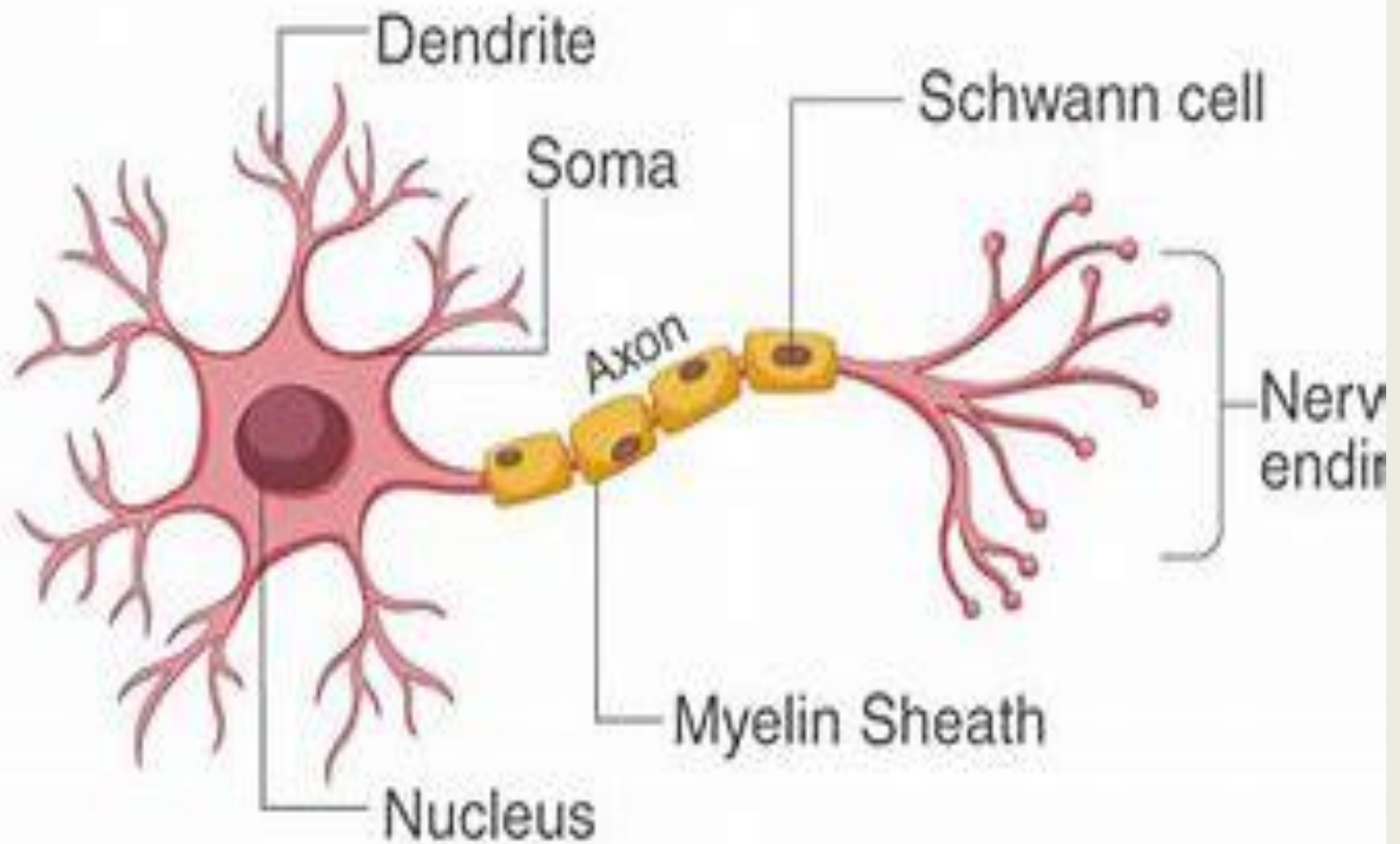
3. **Smooth Muscle:**

- Non-striated and involuntary.
- Found in walls of hollow organs (e.g., intestines, blood vessels).

. Nervous Tissue

- **Characteristics**
- Composed **of neurons (nerve cells) and neuroglia (supporting cells).**
- **Neurons have specialized structures:**
 - **Dendrites:** Receive signals.
 - **Axon:** Sends signals.
 - **Cell body:** Contains the nucleus.

STRUCTURE OF NEURON



Functions

1. **Signal transmission: Electrical impulses.**
2. **Communication: Between body parts and the brain.**
3. **Integration: Processes sensory information and determines responses.**

**Peripheral
nervous
system**

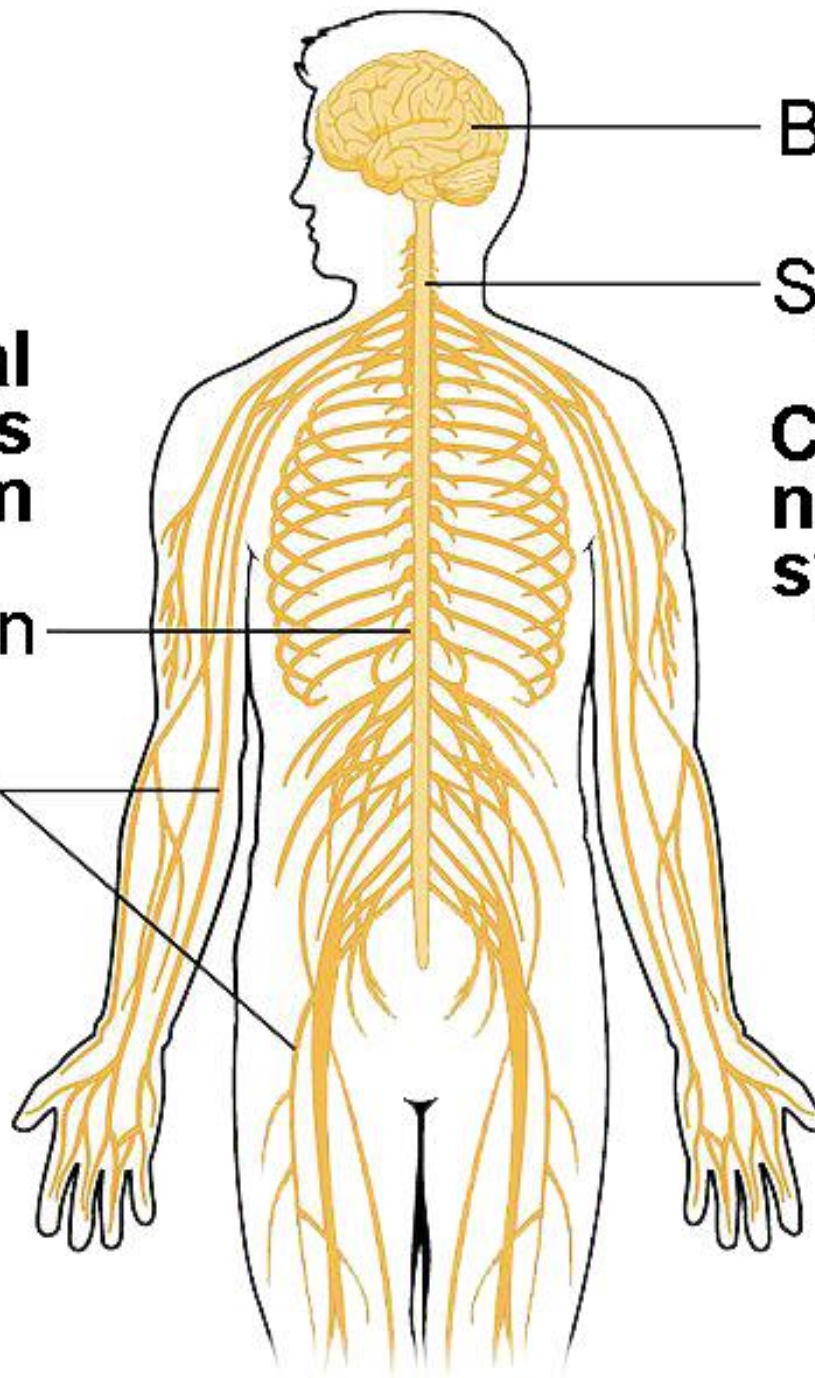
Ganglion

Nerve

Brain

Spinal cord

**Central
nervous
system**



Components of Nervous Tissue

- **Central Nervous System (CNS):**
 - Brain and spinal cord.
 - Its main function :- Processes and integrates information.
- **Peripheral Nervous System (PNS):**
 - Nerves and ganglia outside the CNS.
 - Its main function :- Transmits signals to and from the CNS

THANK

