

I. INTRODUCTION

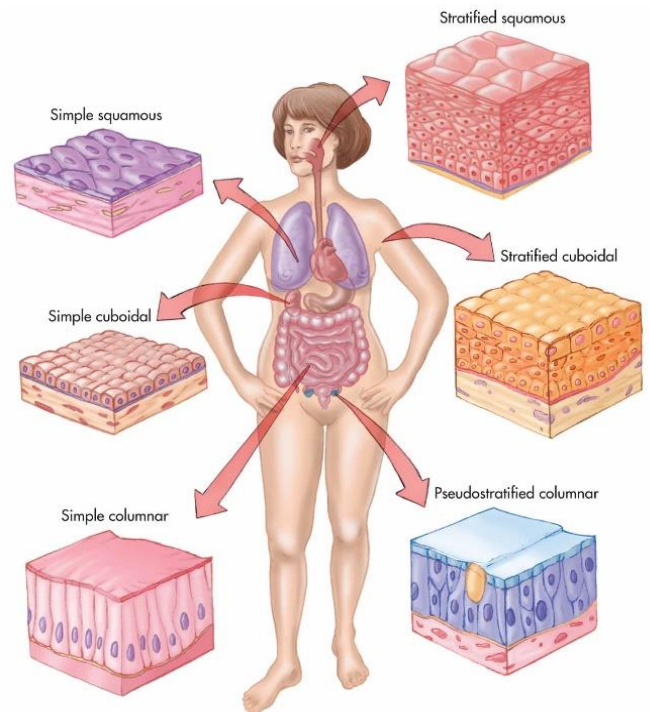
- A. Cells are the basic building blocks of our bodies.
- B. Tissues are collections of cells united to perform a function.
- C. Organs are collections of tissues designed to perform particular functions.
- D. Organs that work together to perform major specific activities, often with the help of accessory structures, form what we call a system.

II. TISSUES – FOUR MAIN TYPES

A. Epithelial Tissue

- 1. Covers and lines
- 2. Tightly packed cells forming a sheet
- 3. No blood vessels
- 4. Well innervated
- 5. Has obvious top and bottom
- 6. Classified by shape

	Epithelial Tissue	Description
a	Squamous	Flat or scale like cells
b	Cuboidal	Cube shaped
c	Columnar	Column-like
d	Transitional	Stretchy and variably shaped
e	Simple	Single layer
f	Stratified	Multiple layers



7. Membranes

- a. Membranes are sheet like structures found throughout the body that perform special functions
- b. Epithelial membrane possess a layer of epithelial tissue and a bottom layer of a specialized connective tissue

B. Connective Tissue

- 1. The most common of the tissues, found scattered throughout the body more than any other form.
- 2. Functions
 - a. **Mechanical Support**
 - b. Nutrient Storage
 - c. **Fluid Storage**
 - d. Defense
- 3. Has extensive extracellular matrix that is nonliving
- 4. Classification based on types of cells and type of matrix
 - a. Connective tissue proper
 - i. Loose—Soft, web like tissue
 - ii. Dense—Tightly packed fibers in matrix

- b. **Cartilage** – Cells in holes in gel-like matrix
- c. **Blood** – Cells in liquid matrix
- d. **Bone** – Cells in holes in calcium matrix

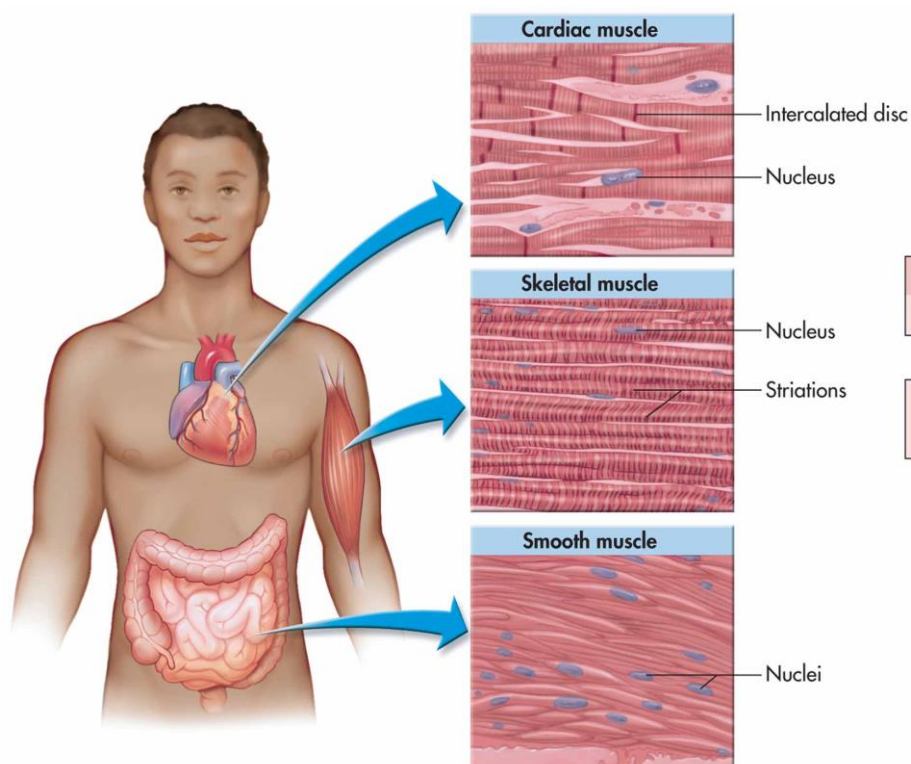
5. Synovial Membrane

- a. In joints
- b. Secretes lubrication fluid

C. Muscle Tissue

1. Provides the means for movement by and in the body
2. Has the ability to shorten itself (contractility)
3. There are three types of muscle tissue:

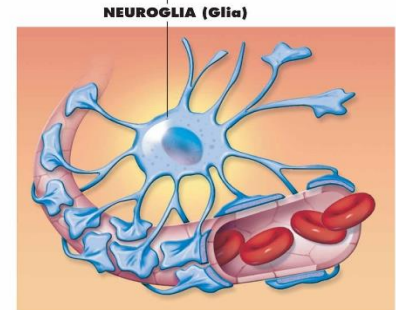
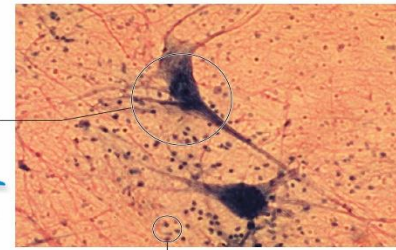
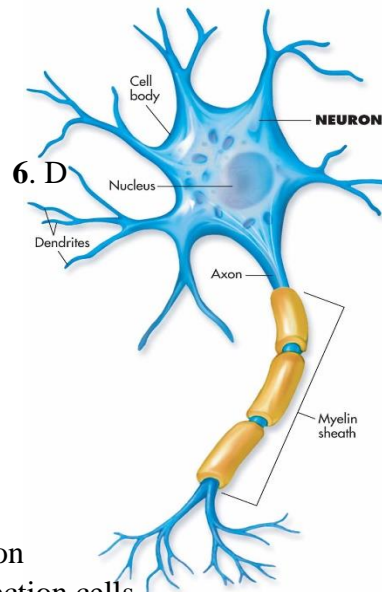
	Muscle Tissue	Description
a	Skeletal	<ul style="list-style-type: none"> i. Attached to bones; voluntary movement ii. Striated—has striped appearance iii. Cylindrical fibers (cells) with many nuclei iv. Voluntary
b	Cardiac	<ul style="list-style-type: none"> i. Walls of the heart ii. Striated iii. Branched, interlocking, uninucleate cells iv. Involuntary
c	Smooth	<ul style="list-style-type: none"> i. Walls of tubes and hollow organs ii. Not striated (smooth) iii. Uninucleate cells, shorter and wider than skeletal muscle fibers iv. Involuntary



Test Your Knowledge

Multiple Choice:

1. C 2. B 3. A 4. C 5. B



D. Nervous Tissue

1. Control system
2. There are two types of nerve cells:
 - a. **Neurons** – The conductors of information
 - b. **Glia** (or neuroglia) – Support and connection cells
3. The membranes that cover the brain and spinal cord are called **meninges**.
4. Many nerves have an insulating layer called **myelin sheath**.

III. TISSUE REPAIR

- A. Multistep process
 1. **Inflammation** – Redness, heat swelling, pain
 2. Clotting and Scab Formation
 3. Organization
 - a. Fibroblasts lay down collagen
 - b. Blood vessels form
 - c. Granulation tissue
 4. Result
 - a. Regeneration – Replacement with original tissue
 - b. Scarring – Replacement with scar tissue
- B. Regeneration ability depends on tissue type
 1. Excellent – **Bone, Blood, Epithelium**
 2. Fair – Cartilage, Skeletal muscle, Dense connective tissue
 3. Terrible – **Nervous, Cardiac muscle**

IV. ORGANS

- A. An organ is the result of two or more types of tissue organizing in such a way as to accomplish something that the tissues cannot do on their own.
- B. The body cannot survive without organs known as **vital** organs.
- C. Organs work as part of a system.

IV. SYSTEMS

A. Definition

-- An organ is the result of two or more types of tissue organizing in such a way as to accomplish something that the tissues cannot do on their own.

B. Interrelated

-- Each system is interrelated, often depending on each other for the proper functioning of the body.

C. Skeletal System

1. Functions of the skeletal system
 - a. Provides support and structure to the body
 - b. Protects organs
 - c. Provides movement
 - d. Stores a variety of minerals
 - e. Produces blood cells
2. The main components of the system are **bones**, joints, ligaments, and **cartilage**.

D. Muscular System

1. **Voluntary** Muscles
 - a. Movement created by conscious thought, like scratching your nose
 - b. Skeletal muscles attached to your bones
2. **Involuntary** muscles
 - a. Perform without conscious thought
 - b. Classified as smooth muscle or cardiac muscle
 - c. Found in blood vessels, airways, and organs

Test Your Knowledge

Multiple Choice:

1. B 2. B 3. A 4. D 5. B 6. C

E. Integumentary System

1. The body's first line of protection is the **skin**.
2. Skin is one part of the integumentary system.
3. Functions
 - a. **Temperature** regulation
 - b. Sense of touch
 - c. Glands in the skin help to lubricate and waterproof your skin and inhibit the growth of unwanted bacteria
 - d. Production of vitamin D when exposed to sunlight
4. The main components include skin, hair, sweat glands, sebaceous glands, and nails.

F. Nervous System

1. The main parts of the nervous system include the spinal cord, brain, peripheral nerves, and nerve cells.
2. The three main functions of the nervous system are:
 - a. **Receiving** messages (sensory input)
 - b. **Processing** and **interpreting** messages
 - c. Acting on messages (motor output)

G. Endocrine System

1. The endocrine system acts as a **control center** for virtually all the body's organs.
2. Endocrine glands release chemicals called hormones that are circulated via the cardiovascular system, regulating the metabolic processes and utilizing metabolites for growth and reproduction.
3. The main components of the endocrine system are the hypothalamus, pineal, pituitary, thyroid, parathyroid, thymus, adrenal glands, pancreas, and gonads, plus a large variety of hormones

H. The Cardiovascular System

1. Also called the **circulatory** system, this is the main transportation system to each cell of our body.
2. The main components are the **heart, arteries, veins, capillaries, and blood**.

I. The Respiratory System

1. Functions
 - a. Supplies the cells with **oxygen** and removes **carbon dioxide**
 - b. Filters, warms, and moistens the air we breathe
 - c. Mucous lining of the airway helps trap foreign particles and germs
 - d. Maintains the proper acid–base balance
2. The main parts of this system include the pharynx, larynx, trachea, bronchial tubes, lungs, and alveoli.

J. The Lymphatic System

1. Functions
 - a. Responsible for helping to maintain proper fluid balance and protect from **infection**
 - b. Special structures, called **lymph** nodes, act as filters to capture unwanted infectious agents.
 - c. Specialized white blood cells, called lymphocytes, fight infection.
2. Major parts of this system include lymph vessels, lymph ducts, lymph nodes, thymus gland, tonsils, and spleen.

K. The Digestive System

1. Often called the **gastrointestinal** (GI) system, the digestive system mechanically and chemically breaks down raw material (food) into usable substances, which are absorbed and transported to cells
2. Functions
 - a. **Ingestion**
 - b. Digestion (breakdown)
 - c. **Absorption** of nutrients
 - d. Solid **waste** removal
3. The main parts of this system include the mouth, pharynx, esophagus, stomach, intestines, and accessory organs.

L. Urinary System

1. Functions
 - a. Elimination of **waste** products, electrolytes, drugs, and other toxins
 - b. Fluid regulation
 - c. Blood pressure regulation
 - d. Regulation of red blood cells
 - e. Electrolyte balance

f. pH balance

2. The **kidneys**, ureters, urinary bladder, and urethra are all important parts of this system.

M. Reproductive System

1. Reproductive system is often combined with the urinary system to make the genitourinary system, or GU system.
2. The purpose of this system is **reproduction**.
3. The main female parts of this system include the: ovaries, uterus, fallopian tubes, vagina, and vulva.
4. For men, the main parts are the testes, epididymis, penis, urethra, and several accessory glands.

Test Your Knowledge 5-3

List the Correct System:

1. Respiratory
2. Urinary
3. Skeletal
4. Nervous and sensory
5. Immune and lymphatic
6. Cardiovascular
7. GI or digestive
8. Integumentary

Review Questions:

Multiple Choice:

- 1. A 2. B 3. C 4. B 5. D 6. B 7. C**

Fill in the Blanks

1. Nervous
2. Muscular or Skeletal
3. Connective
4. Visceral
5. Endocrine
6. Skeletal

Short Answer

1. Cells, tissues, organs, systems.
2. Epithelium has no blood vessels, has a distinct top and bottom, and has no extracellular matrix. Connective tissue is often well vascularized, usually has no distinct top or bottom, and has an abundant extracellular matrix.

3. Synovial membranes are connective tissue membranes that line joint cavities and lubricate them. Cutaneous membranes are epithelial membranes with a layer of connective tissue that covers the body. Serous membranes are double-layered epithelial membranes that line body cavities and cover organs. There is a potential space between the layers. Mucous membranes are epithelial membranes that line body spaces that are exposed to the environment. These membranes secrete mucus.
4. The three types of muscle tissue are skeletal, cardiac, and smooth. Skeletal muscle is striated, voluntary muscle found attached to bones. Cardiac muscle is involuntary, striated muscle found in the wall of the heart. Smooth muscle is involuntary, unstriated muscle found in the walls of hollow organs.
5. Arthritis-skeletal; Hepatitis-digestive; Pneumonia-respiratory; Osteoporosis-skeletal; Urinary tract infection-urinary.