

Organization of the human body

- Very important
- Extra information
- Terms

عن أبي هريرة أن رسول الله صلى الله عليه وسلم قال: (إذا مات الإنسان انقطع عنه عمله إلا من ثلاثة إلا من صدقة جارية أو علم ينتفع به أو ولد صالح يدعو له) صحيح مسلم

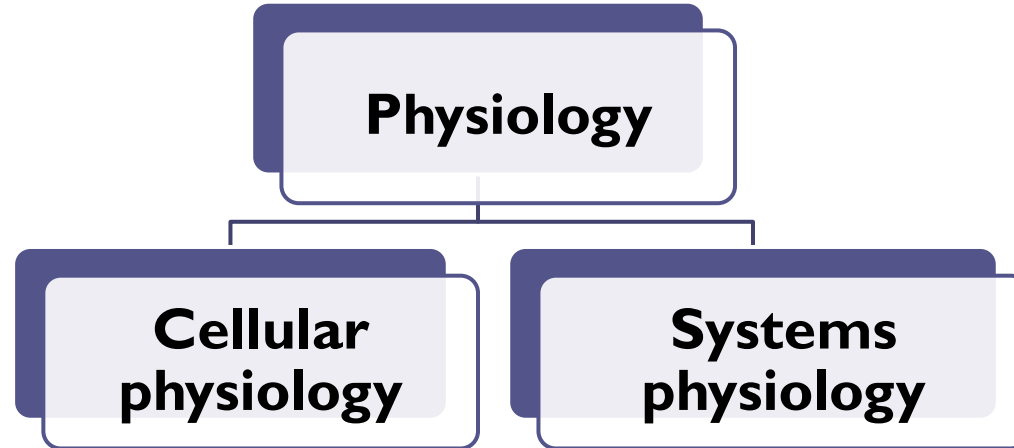
Objectives

- Understand the level of body organization.
- Distinguish the primary tissues and their subtypes.
- Recognize the regulation of extracellular fluid transport and mixing system.

What is physiology ?

- The study of the **Function** of organisms as integrated systems of molecules, cells, tissues, and organs, in health and disease.
- The study of **how the body works**, the ways in which cells, organs and the whole body functions, and how these functions are maintained in a changing environment.

What is physiology ?

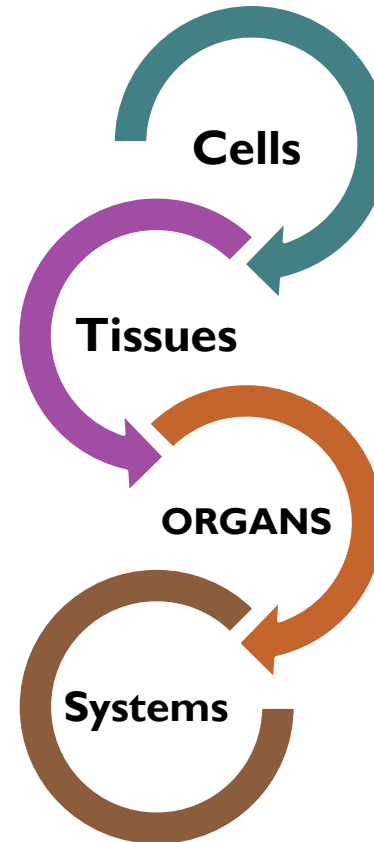


The study of the cellular components that primarily determines organ function.

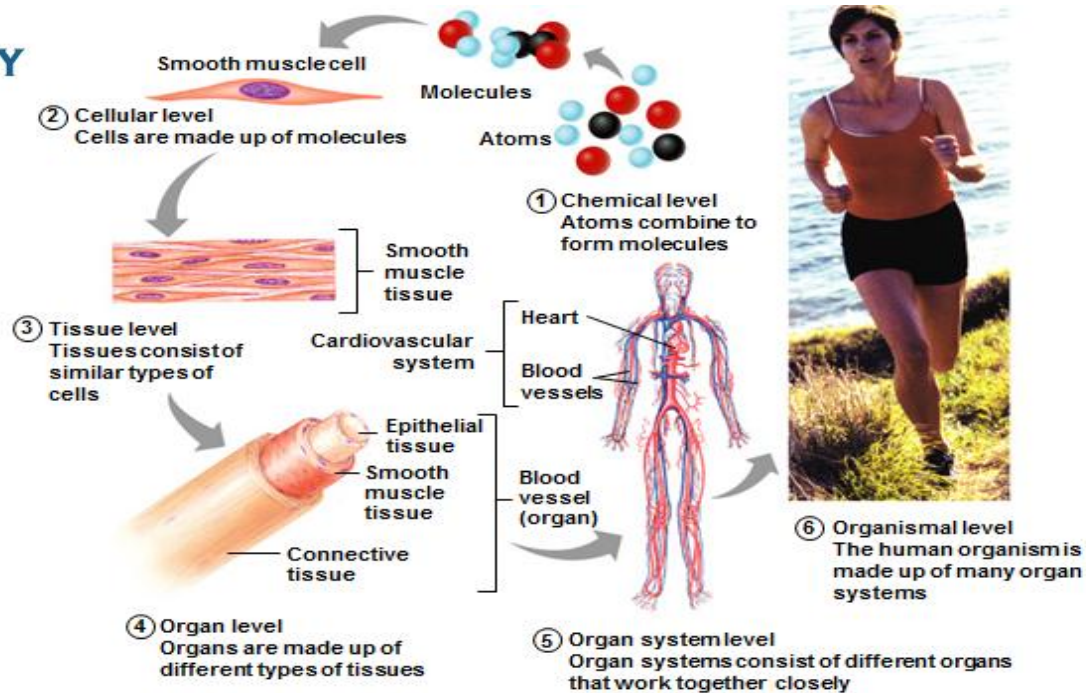
The study of the coordinated and networked processes that determine whole body function and adaptation to change.

Levels of structural organization

- **Cells:** the basic structural and functional unit.
- **Tissues:** (e.g. muscles, epithelial, nervous).
- **Organs:** (e.g. kidney, heart, liver, pancreas).
- **Organ systems:** (e.g. cardiovascular, respiratory, urinary).



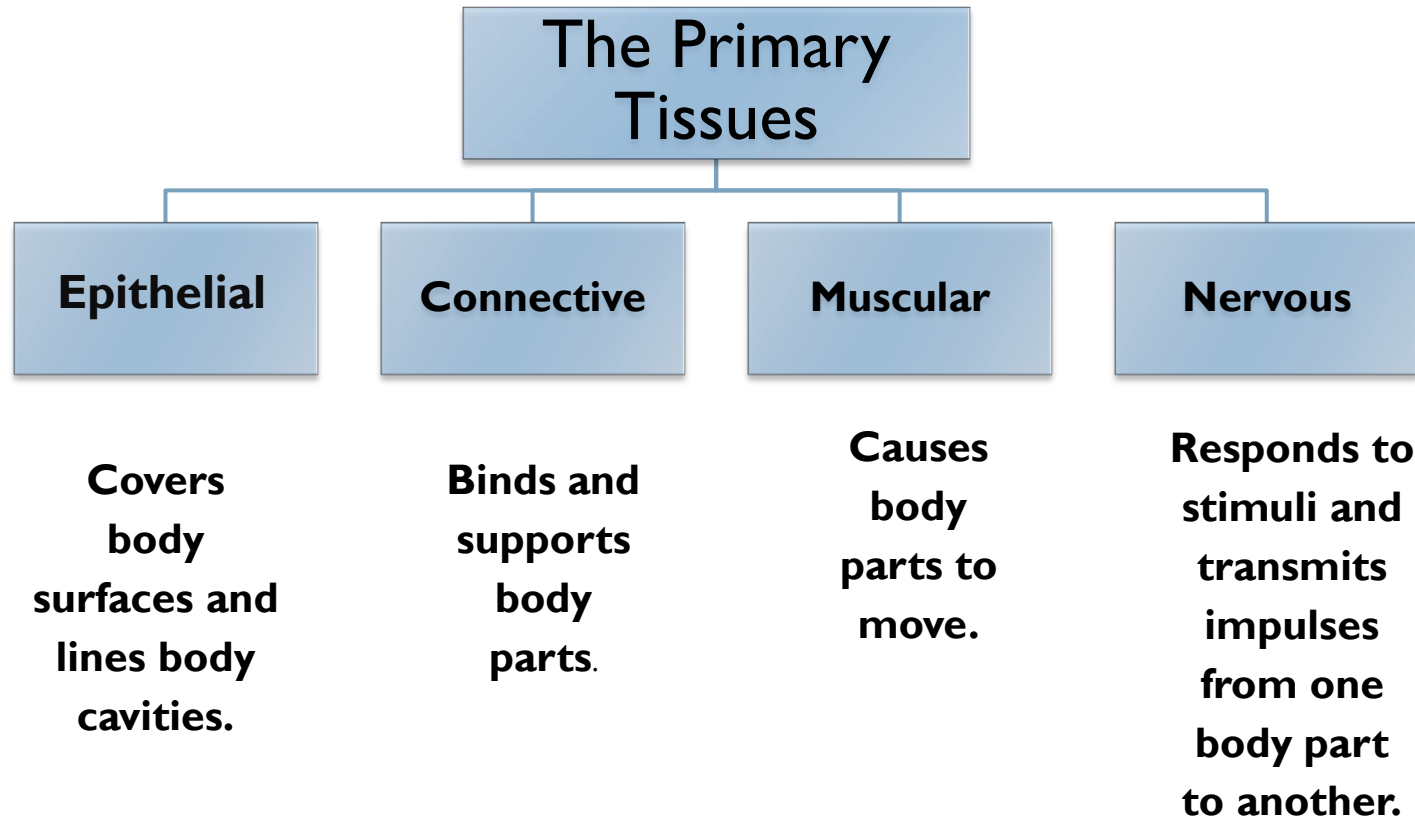
“Organs are made up of **Tissues** , Tissues are made up of **Cells** “



Chemical level → Cellular level → Tissue level →

Organ level → Organ system level → Organismal level

The Primary Tissues



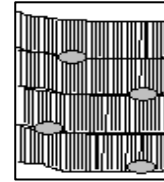
The Primary Tissues

Epithelial Tissues	Connective Tissues	Muscle Tissues	Nervous Tissues
<p>-Covers entire body surface and most of the body's inner cavities.</p> <p>Outer epidermis (skin).</p> <p>-protects from injury and drying out.</p> <p>-Inner epidermal tissue, on internal surfaces protects, secretes mucus (e.g. along digestive tract).</p>	<p>“Connects organs”</p> <p>Functions:</p> <p>-bind structures together.</p> <p>-fill up spaces.</p> <p>-provide support and protection.</p> <p>-store fat.</p>	<p>“contract for movement”</p> <p>- Skeletal muscle : Striated, voluntary.</p> <p>- Smooth muscle : Non-striated, Involuntary.</p> <p>- Cardiac muscle : Striated, Involuntary.</p>	<p>“Conduct Electrochemical Messages”</p> <p>-Specialized tissue that forms <u>nerves, brain, spinal cord</u> .</p> <p>-Conduct electrical & chemical messages along special cells called neurons.</p> <p>Composed of <u>cell body, dendrites</u> (conduct messages to cell body), <u>axon</u> (send messages away from cell body).</p>

Muscle Tissues

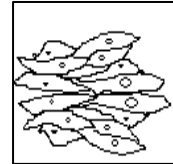
Skeletal Muscle

- striated** (alternating light and dark bands)
- attached to bones, used for movement
- voluntary control.**
- Can contract quickly and strongly but will fatigue in time.



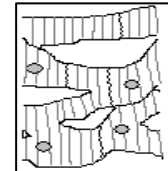
Smooth Muscle

- non-striated,**
- involuntary control,**
- found in walls of internal organs, intestine, stomach, blood vessels.
- Contracts more slowly, but can contract over a longer period of time.



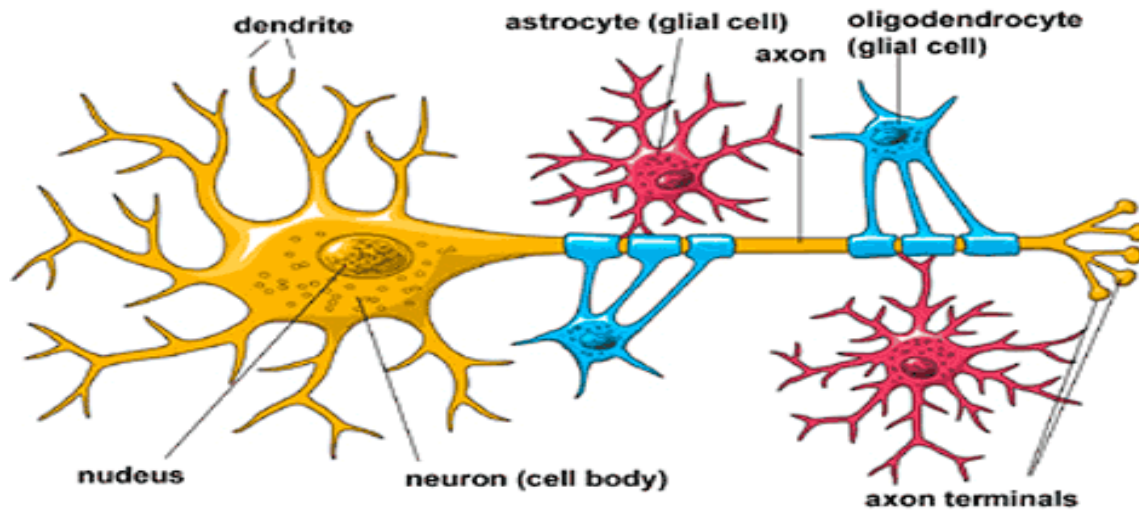
Cardiac Muscle

- striated, involuntary**
- forms heart muscle.
- Found only in the heart.
- Can contract quickly, and beats your whole life through.



What are Glial Cells ?

Glial cells are cells that surround nerve cells. They help to support, protect, and nourish nerve cells. They provide nutrients to the neurons and help keep the tissue free of debris.



What are Glands ?

Gland is a single cell, or a collection of cells that **secrete** chemicals.



secrete into **ducts**.
e.g. the gall bladder is an exocrine gland because it secretes bile in a duct. **Sweat glands are exocrine glands.**
eg : The gall bladder and sweat glands.

secrete chemicals (especially **hormones**) into **bloodstream** (e.g. pituitary gland, pancreas secretes insulin into the blood).
“Ductless”
eg : pituitary gland.

Note : The pancreas is a mixed gland because it has both endocrine and exocrine functions

ORGANS Tissues working together , made up of one or more types of tissues (usually more).

Examples of organs :

- Heart .
- Skin (the largest organ) has several tissue layers. It covers body surfaces.

Functions of skin :

gives protection from water loss and invasion by microorganisms, contains sense organs, helps to regulate body temperature.

Human Organ Systems

- Each located in specific location, with specific functions. (e.g. digestive system).
- Many internal organ systems enclosed within coelom “a cavity within the body”.
- Organ systems contribute to maintaining a “stable internal environment” (homeostasis). e.g. Temp, pH, [glucose], blood pressure.

Functions of organ systems

1. Digestive	convert food to usable nutrients
2. Circulatory	transport of necessary molecules to cells
3. Immune	defense against invading pathogens
4. Respiratory	gas exchange
5. Excretory	gets rid of metabolic wastes
6. Nervous & Sensory	regulation and control, response to stimuli, processing information
7. Muscular & Skeletal	support and movement
8. Hormonal	regulation of internal environment, development
9. Reproductive	producing offspring

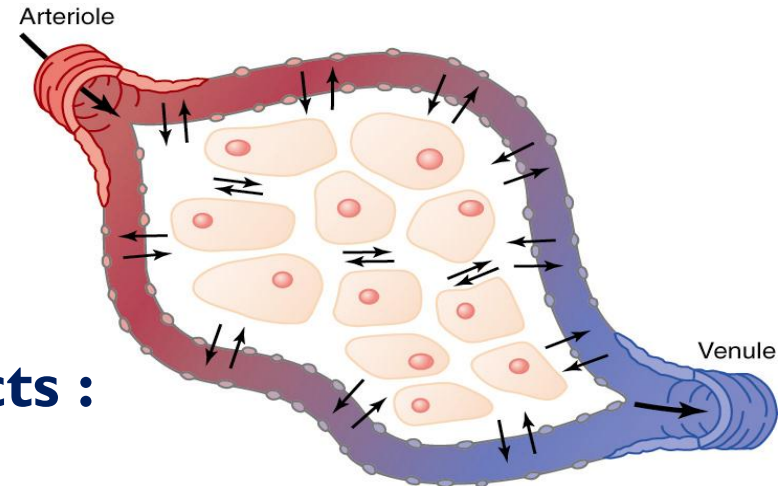
General Organization of The Circulatory System

■ Origin of nutrients in the extracellular fluid :

- Respiratory system: O_2
- Gastrointestinal tract:
 - Carbohydrates
 - Fatty acids
 - Amino acids
- Liver and other organs.
- Musculoskeletal system.

■ Removal of Metabolic End-products :

- CO_2 (by lung).
- Urea, uric acid, excess water and ions (kidneys).
- Others.



“Exchange Between the **Capillaries** and **Interstitial Fluid**”



[Click here](#) and Check your understanding !

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