PHYSIOLOGY

- Females & Males Slides
- Only Found in Males' slides
- Only Found in Females' slides
- Very Important Notes
- Notes
- Extra Information

Organisation of the Human Body

Objectives

:At the end of this session, the students should be able to

- Define physiology
- Provide an orientation to the subject of human physiology.
- Understand the level of body organization
- The cell is the basic unit of life.
- Describe briefly the basic structure of the cell and state the function of the different cellular organelles.
- Distinguish the primary tissues and their subtypes
- Recognize the regulation of extracellular fluid transport and mixing system
- Discuss briefly the different levels of organization starting from the cell to body systems giving examples at each level.

:Study source for this lecture

(Guyton & Hall Textbook of Medical Physiology, 13th ed, Chapter 4)

?-What is Physiology - definitions

Physiology is the Science of the Normal Functions and .Phenomena of Living Things

Oxford English Dictionary

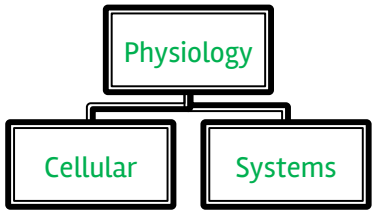
Physiology

Trunk of the tree of biomedical and life sciences

Study of eleven different body systems . ((e.g. Reproductive system

- The discipline of Physiology investigates how the systems operate at different levels:
  - System
  - Organ
  - Tissue
  - Cell
  - Molecule
- How do these systems integrate to form a fully functional human body?

- = Physio- + -logy
  - ***Physio-***: nature
  - ***-logy***: science or study of
- It is a cornerstone to medicine.



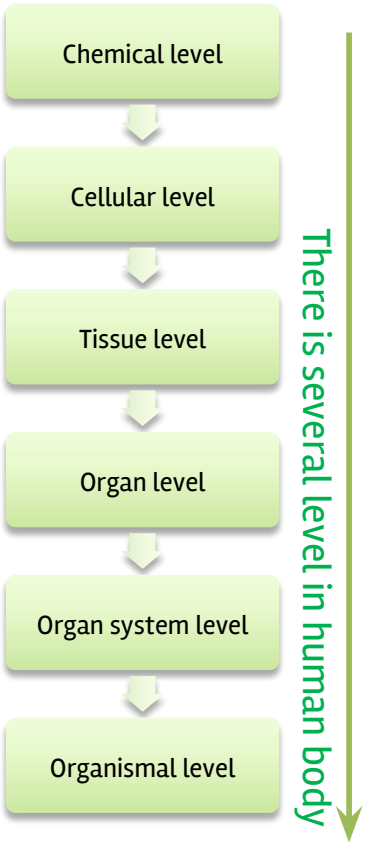
There are 2 types of Physiology

- **Cells:** the basic structural and functional unit (100 trillion cell in human body)
- **Tissues:** (e.g. muscles, epithelial, nervous)
- **Organs:The combination of two or more types of tissues forms an organ.**

(e.g. kidneys, heart, liver, pancreas)

- **Organ systems: Several organs come together and are organised into a system.**

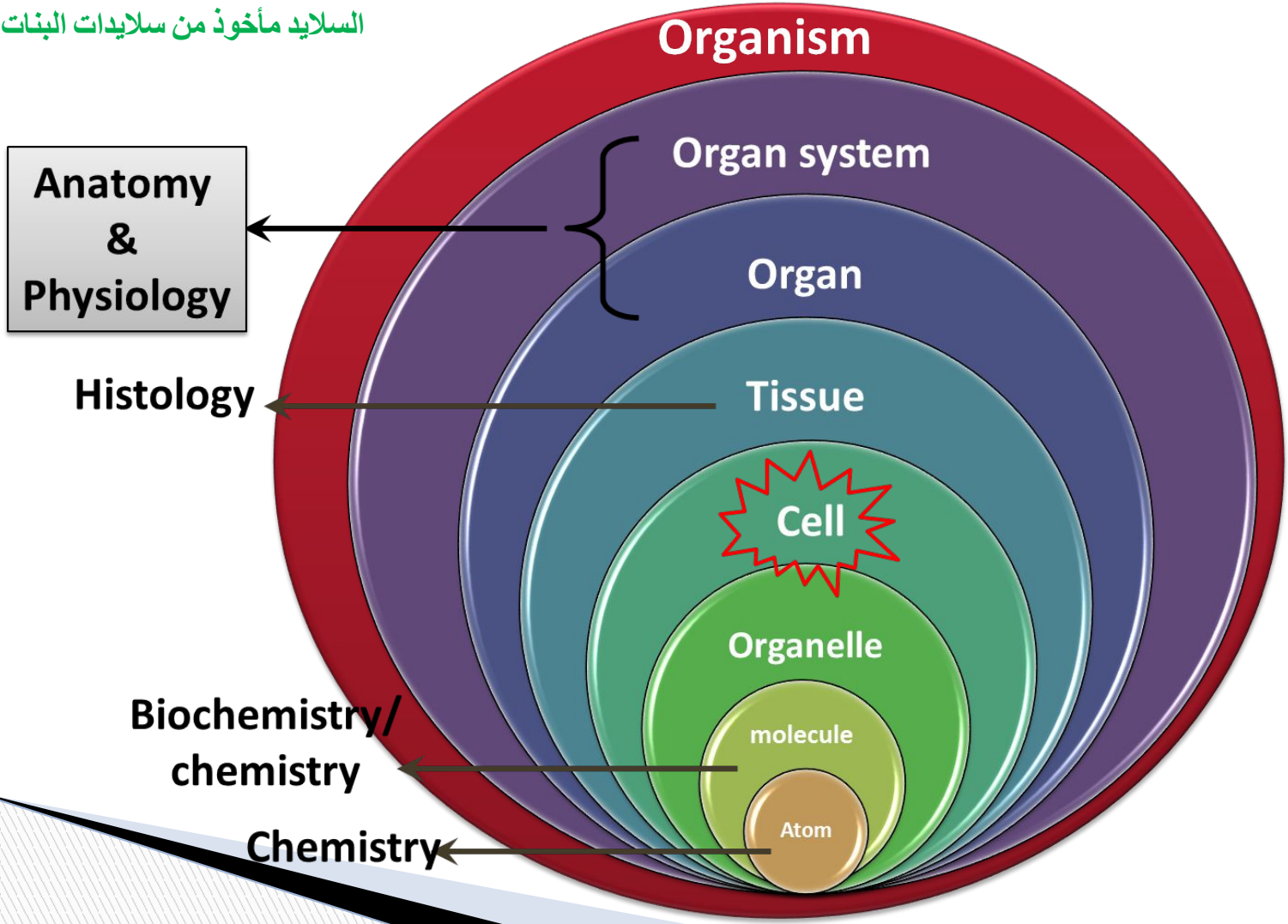
(e.g. cardiovascular, respiratory, urinary)



- Many disease states can be viewed as physiology "gone wrong" i.e. ***Pathophysiology***.
- An understanding of physiology is essential for the study and practice of medicine.

Levels of Organisation

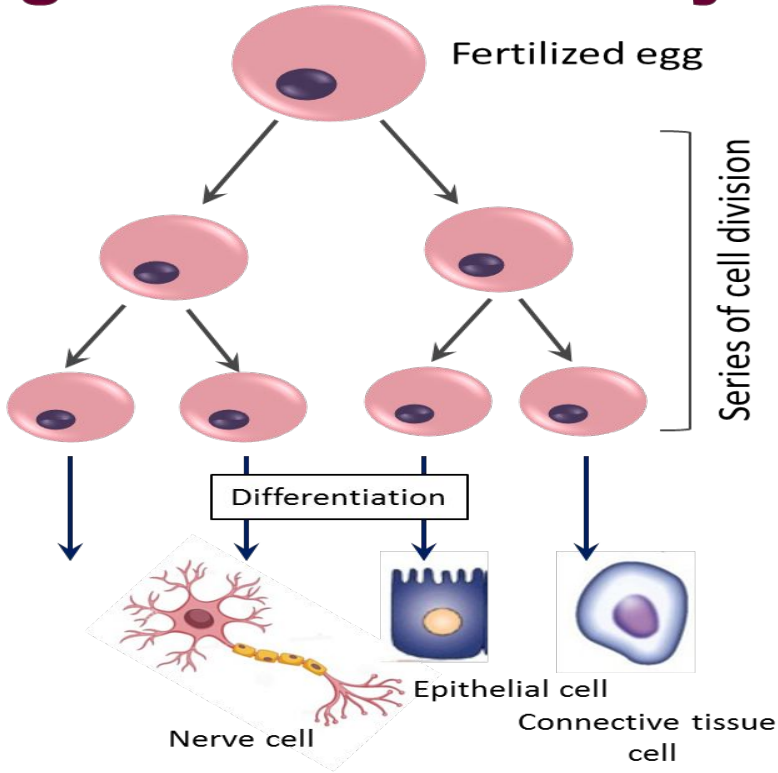
السلايد مأخوذ من سلايدات البنات



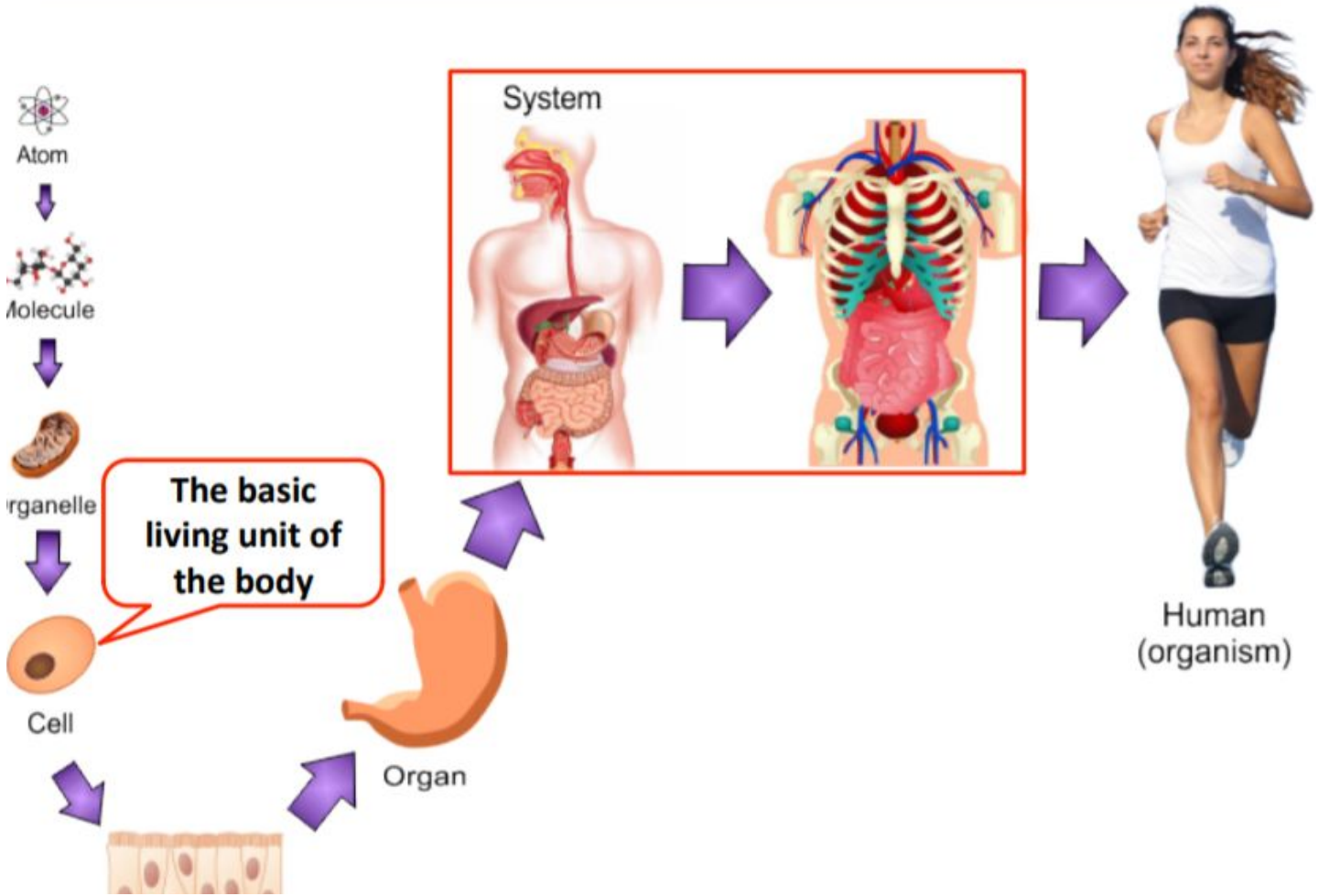
"The Cell"

The Basic Living Unit of the Body

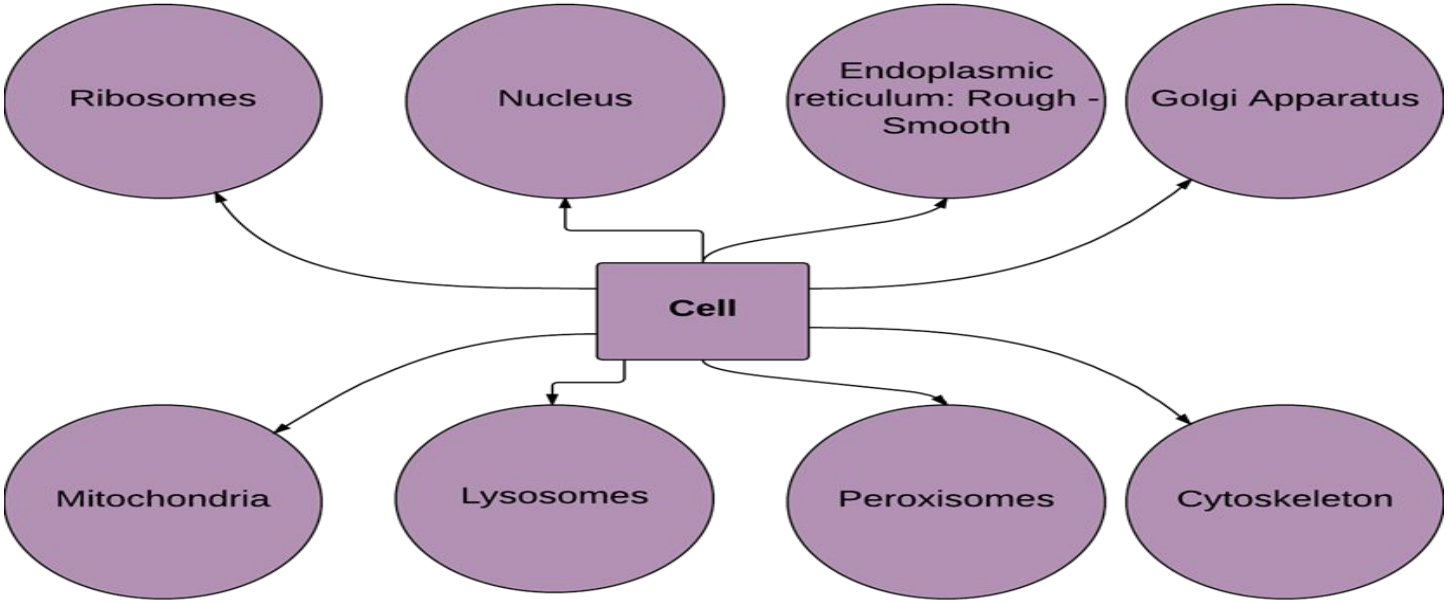
- Each human being begins as a single cell (i.e. fertilized egg).
- The number of cells increase by cellular division.
- The process of transforming an unspecialized cell into a specialized cell is known as ***differentiation***.



ملاحظة : السلايد مأخوذ من سلايدات البنات بالكامل


Atom
Molecule
rganelle
Cell
The basic living unit of the body
Organ
System
Human (organism)

Cell Structure



Cell membrane <Will be discussed in future lectures

Lysosomes and Peroxisomes both digest molecules. Peroxisomes produce Hydrogen peroxide, a poisonous compound.

The Primary Tissues

- FOUR MAJOR TYPES OF TISSUES IN THE HUMAN BODY:

Epithelial (can be found "oesophagus , skin")

- **Covers body surfaces and lines body cavities (Stomach)**

Connective

- **Binds and supports body parts**

Muscular

- **Causes body parts to move**

Nervous

- **Responds to stimuli and transmits impulses from one body part to another**

Epithelial Tissues

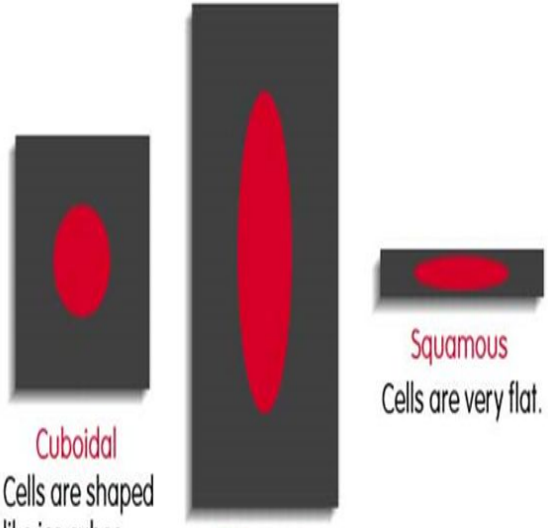
- Covers entire body surface and most of the body's inner cavities.
- Outer epidermis (skin) **protects from injury** and **drying out**
- Inner epidermal tissue, on internal surfaces protects, secretes mucus (e.g. along digestive tract)

There are many shapes of epithelial cells according to the function they need to .perform

.Thus, there are many types of epithelial tissue

:There are shared properties
.It lines surfaces
May be involved in secretion and absorption of ions & organic molecules

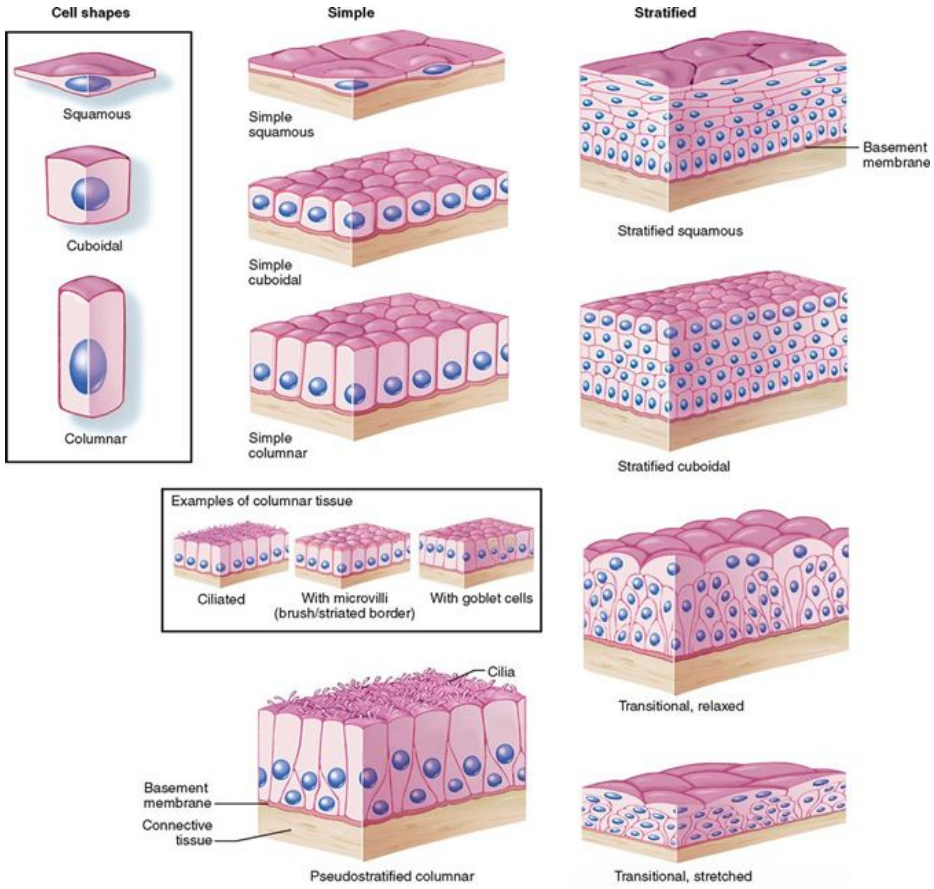
Epithelial Tissue



Cuboidal
Cells are shaped like ice cubes.

Columnar
Cells are shaped like columns.

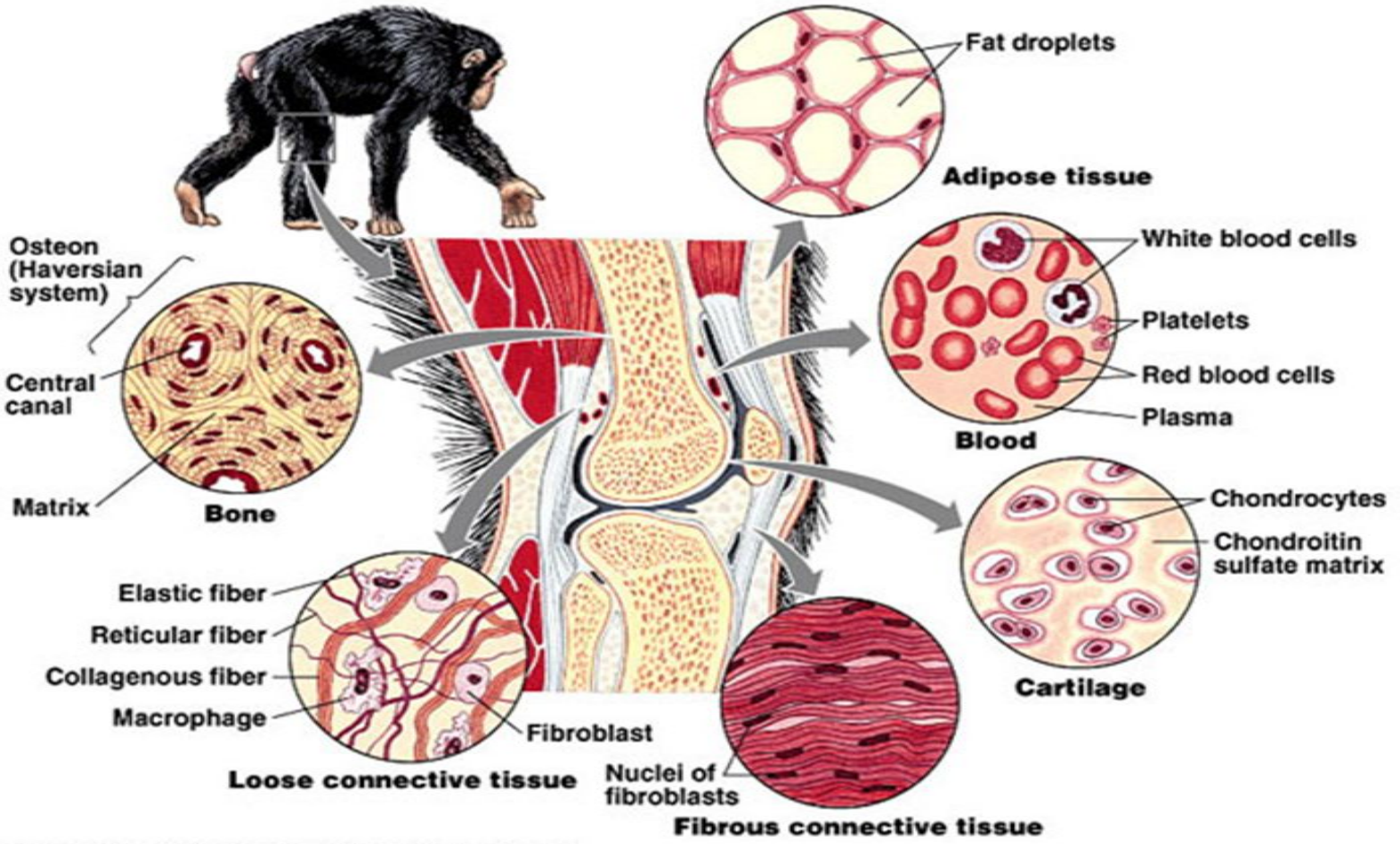
Squamous
Cells are very flat.



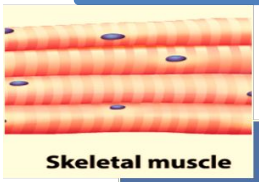
Connective Tissues

- **Connects organs**
- **Functions**:
  - binds structures together
  - fills up spaces
  - provides support and protection
  - stores fat

- It connects, anchors and support the structures of the body.
- It consist of many and diverse cell and tissue types, each with its specific function.



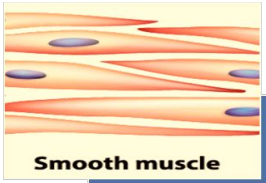
Muscle Tissues: Contract for Movement



Skeletal

- Striated
- Voluntary

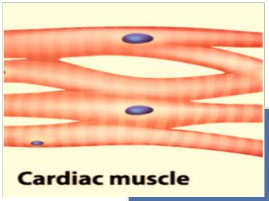
Ex: Skeletal muscle of the Arm



Smooth

- Non-striated
- Involuntary

Ex: Walls of stomach



Cardiac

- Striated
- Involuntary

EX: Walls of the heart

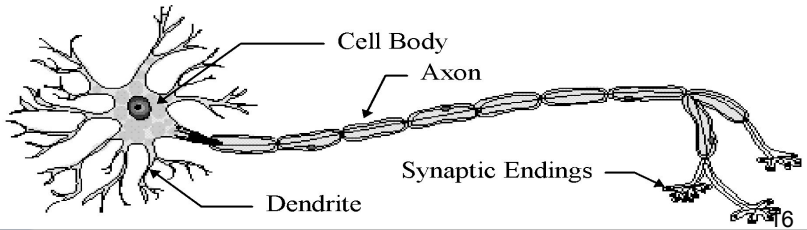
Skeletal muscle is move the bones and support the skeleton and there are 640 skeletal muscle and almost all are found in pairs

Nervous Tissues: Conduct Electrochemical Messages

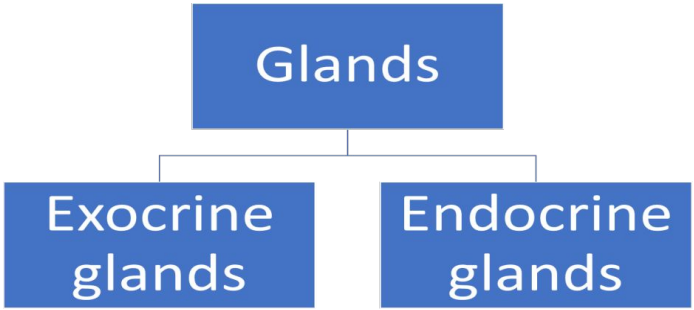
- Specialized tissue that forms **nerves**, **brain**, **spinal cord**
- Conduct electrical & chemical messages along special cells called **neurons**. Composed of **cell body**, **dendrites** (conduct messages ***to*** cell body), **axon** (send messages **away** from cell body).

- Is specialized to initiate, integrate, and conduct electrical signals to other cells.

- These signals may;
  - Initiate new electrical signals in other neurons.
  - Stimulate a gland to secrete hormones.
  - Stimulate muscle contraction.



?What are Glands



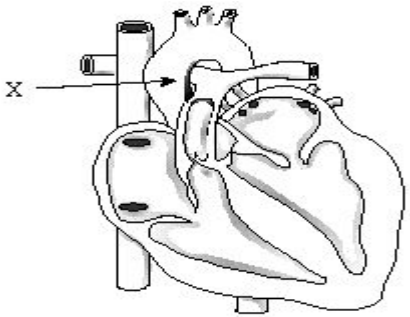
Gland : a single cell, or a collection of cells that **secrete** chemicals. There are 2 types of Glands :

- **1. Exocrine glands**: secrete into **ducts**. e.g. the gall bladder is an exocrine gland because it secretes bile in a duct. Sweat glands are exocrine glands.
- **2. Endocrine glands**: secrete chemicals (especially **hormones**) into **bloodstream** (e.g. pituitary gland, pancreas secretes insulin into the blood).

Glands: Exocrine → secrete into ducts
Endocrine → secrete into the blood

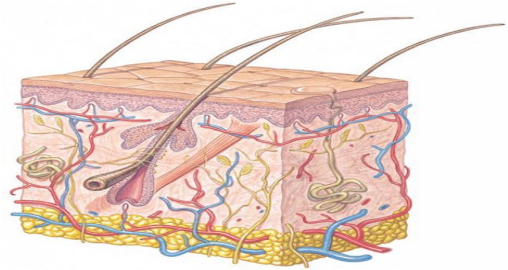
ORGANS: Tissues working together

Organs (e.g. the heart) are made up of **one or more types of tissues** (usually more)



SKIN is also an example of an organ. It is the largest organ, and has several tissue layers.

Skin **covers** body surfaces, gives **protection** from water loss and invasion by microorganisms, contains **sense organs**, helps to regulate body temperature

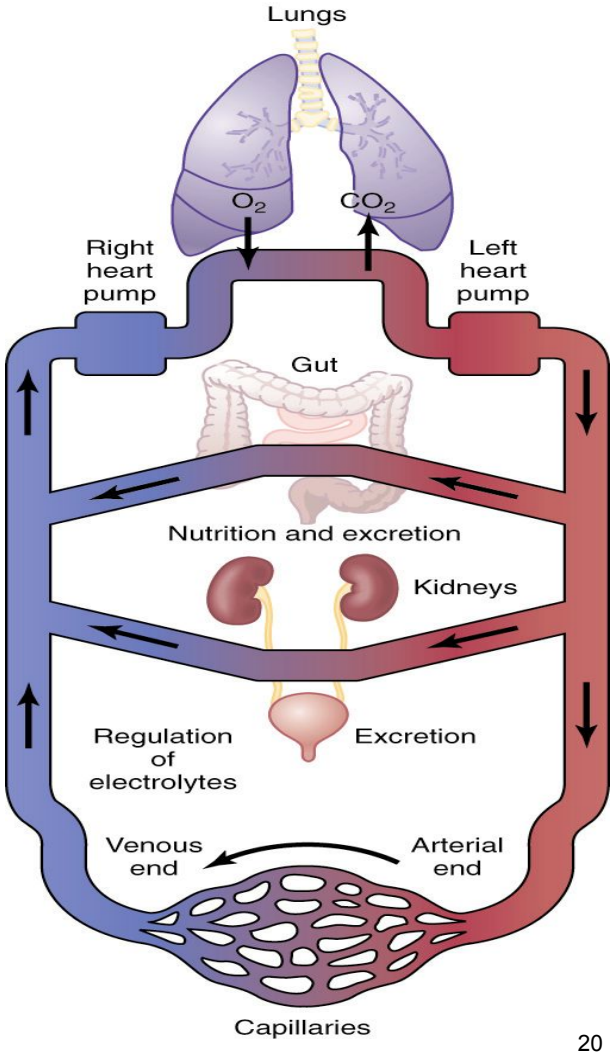


Human Organ Systems

- Each located in specific location, with specific functions. (e.g. digestive system).
- Organ systems contribute to maintaining a stable internal environment (**homeostasis**). e.g. Temp, pH, glucose, blood pressure.

System	Major Organs	Primary Functions
Integumentary	Skin, hair, nails	Protection, thermoregulation
Nervous	Brain, spinal cord, nerves	Regulation of other body systems
Endocrine	Hormone-secreting glands, such as the pituitary, thyroid, and adrenals	Secretion of regulatory molecules called hormones
Skeletal	Bones, cartilages	Movement and support
Muscular	Skeletal muscles	Movements of the skeleton
Circulatory	Heart, blood vessels, lymphatic vessels	Movement of blood and lymph
Immune	Bone marrow, lymphoid organs	Defense of the body against invading pathogens
Respiratory	Lungs, airways	Gas exchange
Urinary	Kidneys, ureters, urethra	Regulation of blood volume and composition
Digestive	Mouth, stomach, intestine, liver, gallbladder, pancreas	Breakdown of food into molecules that enter the body
Reproductive	Gonads,external genitalia, associated glands and ducts	Continuation of the human species

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

Questions

What is the basic structural and functional unit of the .1 ?human body

Tissues d) Organs c) a) Cells b) Molecules

Which one of the four major types of tissues is responsible .2 ?for binding and supporting body parts

a) Epithelial b) Connective c) Muscular d) Nervous

: Sweat glands are an example of .3 ▸

glands a) Exocrine glands b) Endocrine glands c) Nervous
d) Outer glands

: Organs are only made of one type of tissues .4

a) True b) False

: The brain is the largest organ in the human body .5

a) True b) False

Answers

Answer	Question
a	1
b	2
a	3
b	4
b	5

Thank you & good luck

- Girls team members:
- مها العمري
- هديل عورتاني
- ريما العنزي
- روتانا خطيب
- لجين عزيز الرحمن
- العنود المفرج
- ريم القرني
- عهد
- مها النهدي
- بلقيس الراجحي
- سارة البليهد
- ميعاد النفيعي
- نورة البسام
- عبير العبدالجبار
- وجدان الشامري
- الجوهرة الشنيفي

- Boys team members:
- هشام الشايع
- سعود الاحمري
- عبدالرحمن آل الشيخ
- فايز الدرسوني
- محمد الحسن
- محمد الصويغ
- محمد المنجومي
- معاذ الحمود
- منصور العبرة
- احمد الصبي
- خالد العقيلي
- عبدالجبار اليماني
- عمر الفوزان

Team Leaders:

مها بركة – طارق العميم