

قسم هندسة الأجهزة الطبية / المرحلة الثانية

المادة : التشريح والفسلجة / الأستاذ الدكتور خيرى عبدالله

Anatomy and Physiology / Lec. 1

Anatomy : Greek word means dissection , involves study of structures of human body .

Anatomy of human compose 650 muscle 200 bones 79 organs .

The cell : Human cell

There are two types of cells :

1 - Prokaryotic cells (bacteria) . Pro . = Primitive

Prokaryotic cells without nucleus only nuclear materials are present in the center of cell .

2 – Eukaryotic cells (Human and animals) . Eu . = truth.

Human cells Eukaryotic cells . Shape of the cells , vary in shape , circular , spindle , columnar and stellate in shape .

Ultrastructure and functions of cells :

All human cells are composed from three parts :

(1)

1 – Plasma membrane 2- Cytoplasm 3 – Nucleus

Plasma membrane :

It has two layers , chemically compose lipid molecules in which proteins molecules are embedded .

Lipid molecules have hydrophilic polar end and hydrophobic non polar end . The hydrophobic ends facing each other while the hydrophilic ends facing the aqueous medium (In and outside the cells) .

Function of plasma membrane is selective membrane for passing materials (nutrition , Oxygen , hormones , enzymes and treatment) .

Cytoplasm :

Cytoplasm is colloid fluid rich in protein (cytosol) In which organelles are suspended . These organelles are vary in number , type , and functions .

Nucleus :

1 – It is surrounded by nuclear envelope consisting two layers .

2 – Most nucleuses contain chromatin suspended in aqueous medium called nucleoplasm . (2)

3 – Dense chromatin (heterochromatin) located close to the nuclear envelope , while loosely light chromatin called euchromatin which metabolically active >

4 – It contains DNA arranged in chromosomes .

5 – It is surrounded by nuclear envelope (double layers) , outerwhich separate the nucleoplasm from cytoplasm .

6 – The outer membrane is continuous with rough endoplasmic reticulum .

7 - Nuclear pores which provide aqueous channels , transported through it some RNA molecules and some proteins .

Nucleolus :

It is densely stained membraneless knowo as nucleolus , It forms ribosomes which is coding ribosomal RNA (rRNA) .

The main roles of the nucleolus are synthesize rRNA .

Nucleolus : This organelle plays a role in the ribosomal RNA synthesis and assembly required for synthesis protein .

(3)

Mitochondria :

1 – Houses of energy because they generate energy needed by the cell in the form of ATP (adenosine tri – phosphate) from glucose and oxygen .

**2 – Mitochondria are bounded by a pair of membranes
Separated by a narrow intermediate space .**

3 – The inner membrane is usually folded forming cristae which protrude into mitochondria matrix .

4 – DNA present in mitochondria fluid .

5 – It is present mostly in skeletal muscles cells , in brain cells (neurons) and cardiac muscle cells .

Organelles :

The endoplasmic reticulum :

It is a complex system of membranes , canaliculi , cisternae and vesicles . There are two types of endoplasmic reticulum :

1 – Rough E. R.

It has granules of ribosomes plus RNA on its membrane and produce protein . It is present mostly in liver cells . (4)

2 – Smooth endoplasmic reticulum :

Its membrane smooth without granules of ribosomes .

It is present abundant in secreting cells of glands .

Golgi complex :

1- Golgi complex (Golgi apparatus) is located near nucleus .

2- Consists of parallel curved cisternae vary in length , distended at both sides with vesicles .

3- Function of Golgi complex secretion such as (hormones and enzymes) .

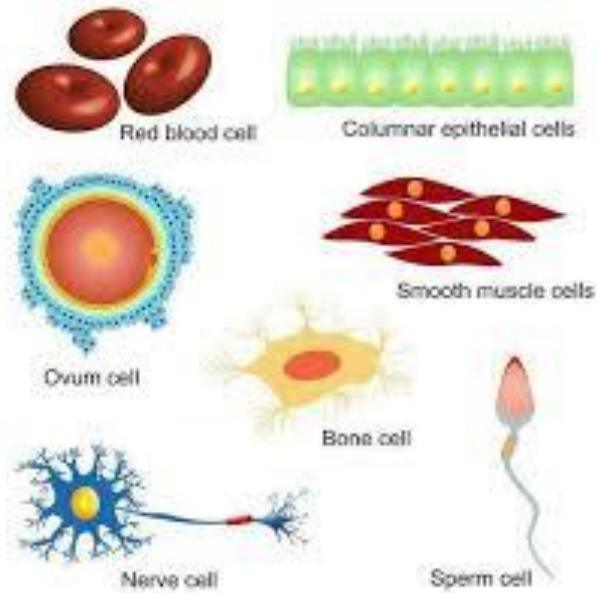
Lysosomes :

Membrane bounded organelle contain enzymes used for digestion of various intracellular macromolecules . Lysosome present in cells of digestive tract , in macrophages and neutrophils .

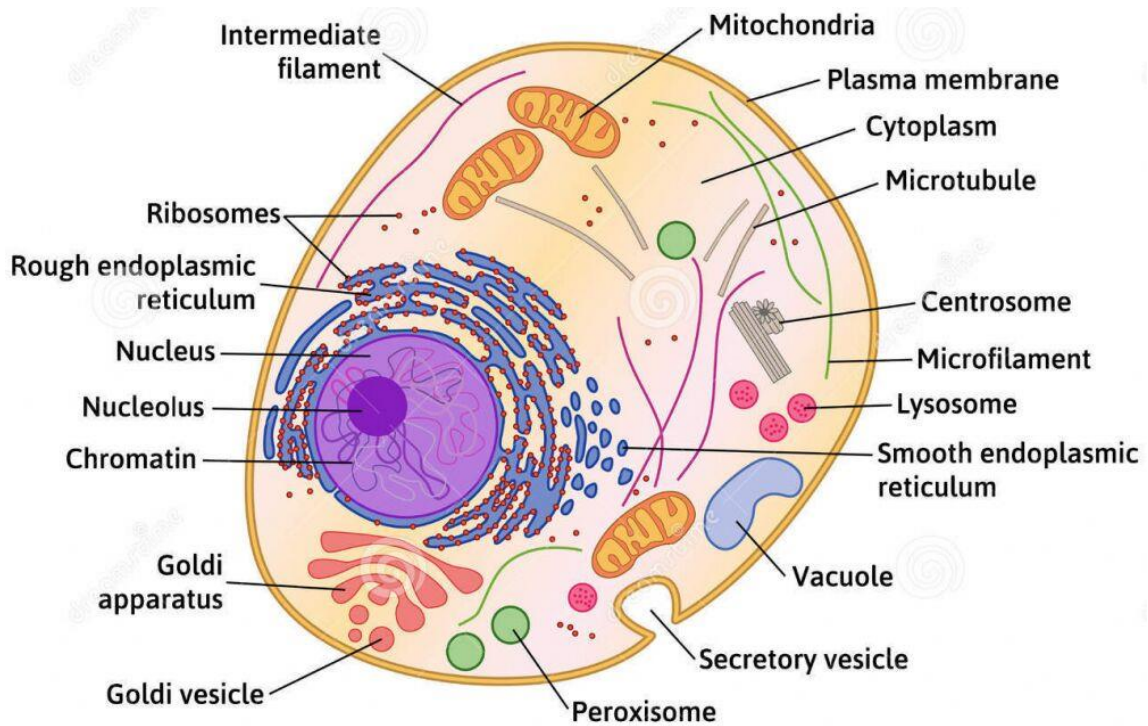
Centrioles :

Pairs structure , deeply stained , short rods , often near nucleus . They are involved with organization

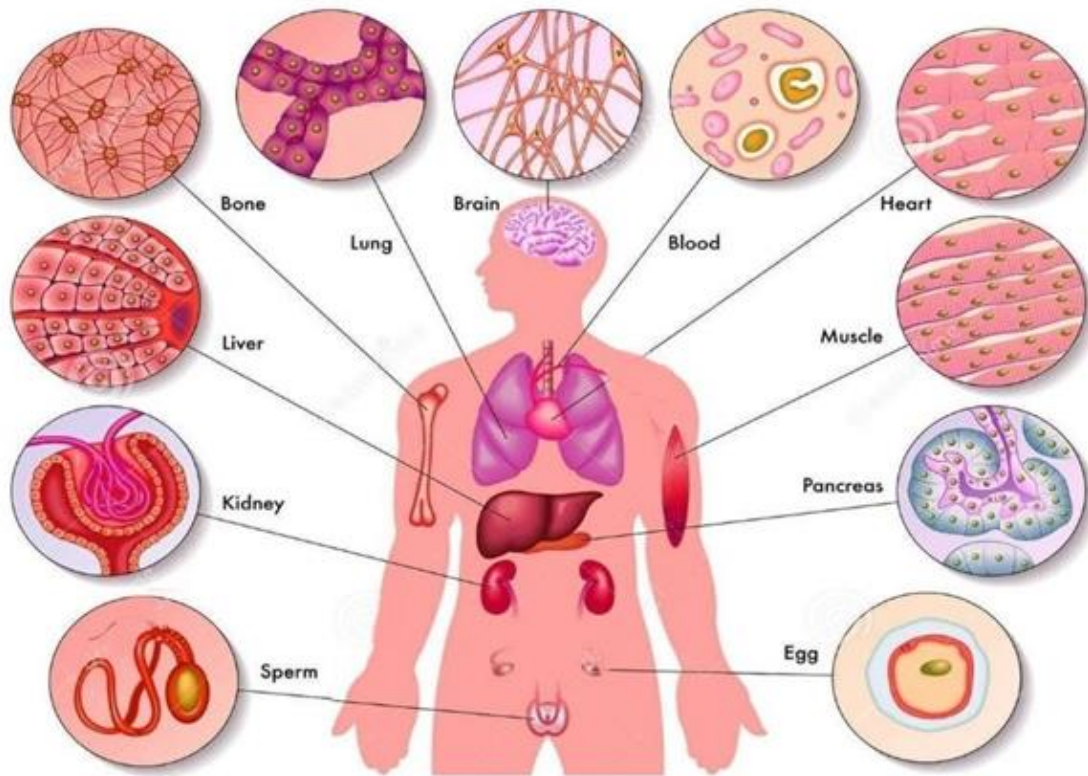
ANATOMY OF HUMAN CELLS



Shape and Size of Human cells



Human Cells



(5)

Microscope Parts

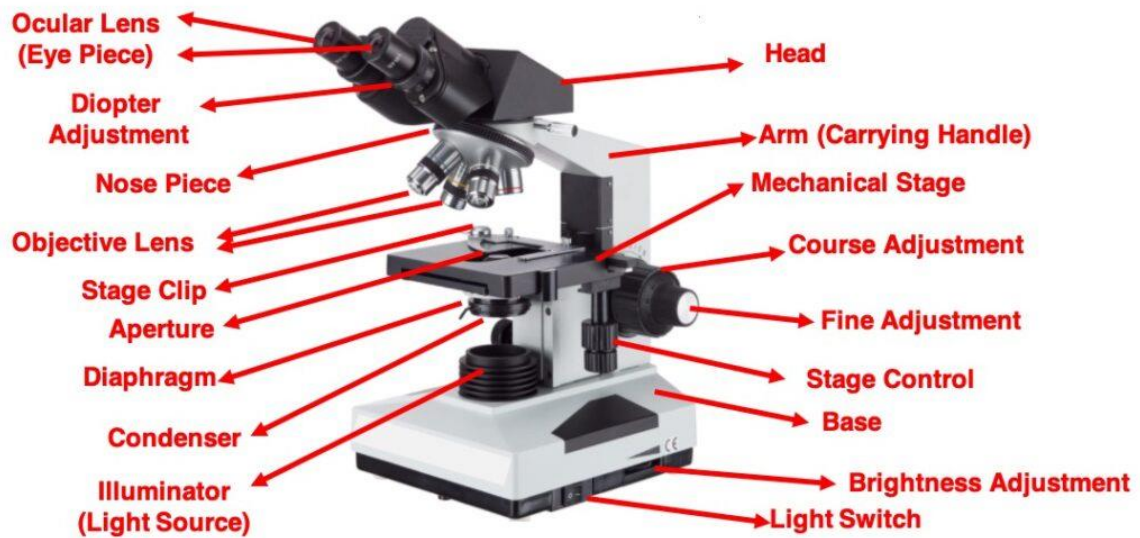


Figure: Microscope Parts

(6)