

LAB:1

INTRODUCTION TO THE CELL

The human body is the most complex bio-systems on the earth compared with other organisms, its consist of multi-systems

Systems: its a term refers to the group of different body organs that participate to perform complex function, ex skeletal system, respiratory system, and reproductive system. Each organ of the human organs ex: stomach, eye, and lung....etc., consist of group of different tissue

Tissuez. its a group of cells that has the same shape and function ex: muscles

cells form muscles tissue, skin cell form skin tissue, nerve cell form nervous

tissue. Each tissue consists of small structural units called the cell.

The cell is the smallest functional and structural unit in the organisms, each cell of the body are surrounded by special membrane called the cell membrane which gives the whole shape to the cell, This cellular sac is full with gel solution called cytoplasm, which is the protoplasm substances which

acts as the media submerged the nucleus and other cellular organelles ex:

Ribosome in which take place in protein synthesis, mitochondria that are energy conductor for the cell, endoplasmic reticulum, Golgi bodies, lysosome and centriole. In the center of each cell, there is a nucleus, which is

the most important cell component because it has the genetic substance or the

genome in the form of chromosomes which are the gene carrier. Each cell of

human body contains copy paste of genetic substance which is called DNA

(deoxyribonucleic acid)

TYPES OF CELLS

There are two types of the cells:

1-Animal cell

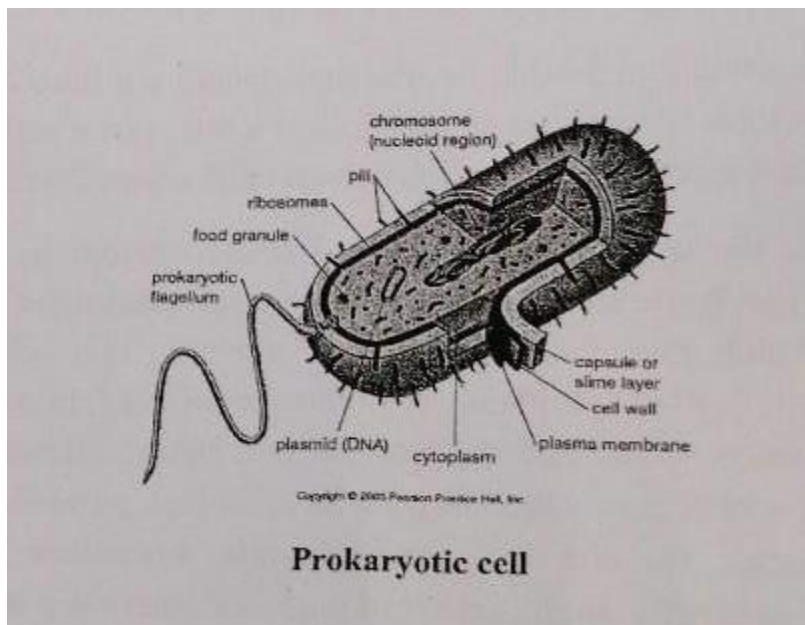
2-Plant cell (plant cell contain Cellulose wall called cellular wall that are non-flexible as cellular membrane in animal cell.

According to the cytology, the organisms can be divided into two groups

1-prokaryotes

include bacteria, blue-green algae, prokaryotes can be divided into two major groups: cytoplasm and like-nuclear or nuclear region that are surrounded by cellular membrane, and the membrane is surrounded by solid or semi-solid cellular wall that maintain on the cell and give it support.

The mean size of prokaryote is about 1-10 micrometer, the absence of the membrane that are split between genetic substance and the cytoplasm is the essential differences between Prokaryote and Eukaryote.

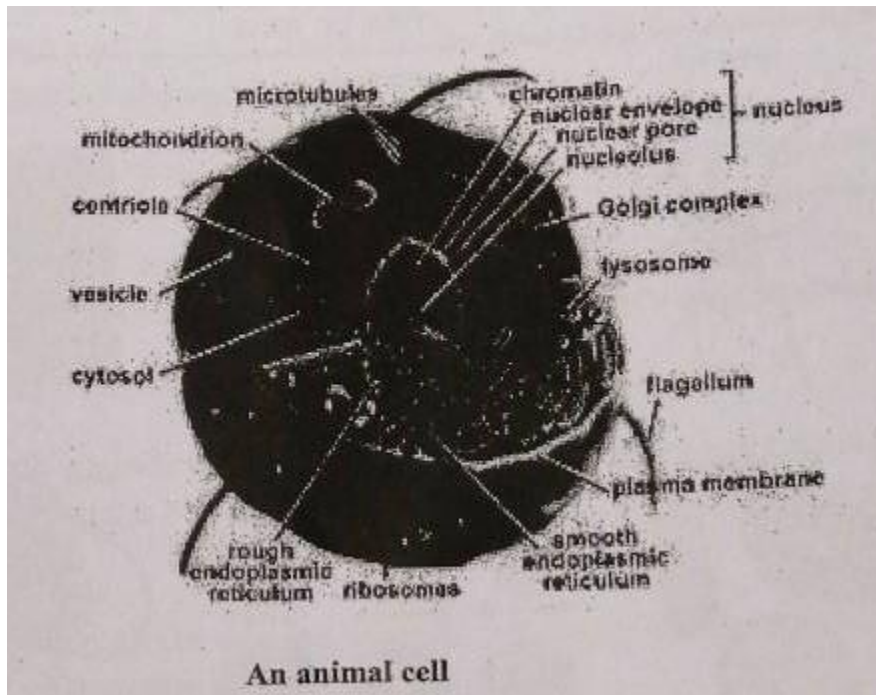


2-Eukaryote

This organisms contain the nucleus, which is one of the most important component of the animal cell. The nucleus is surrounded by double membrane called (nuclear envelope) which acts as splitter between genetic substance and the cytoplasm.

The function of nucleus is the regulating bio-chemical reaction in the cell and maintains the genetic information in genes that are present in the

chromosome.

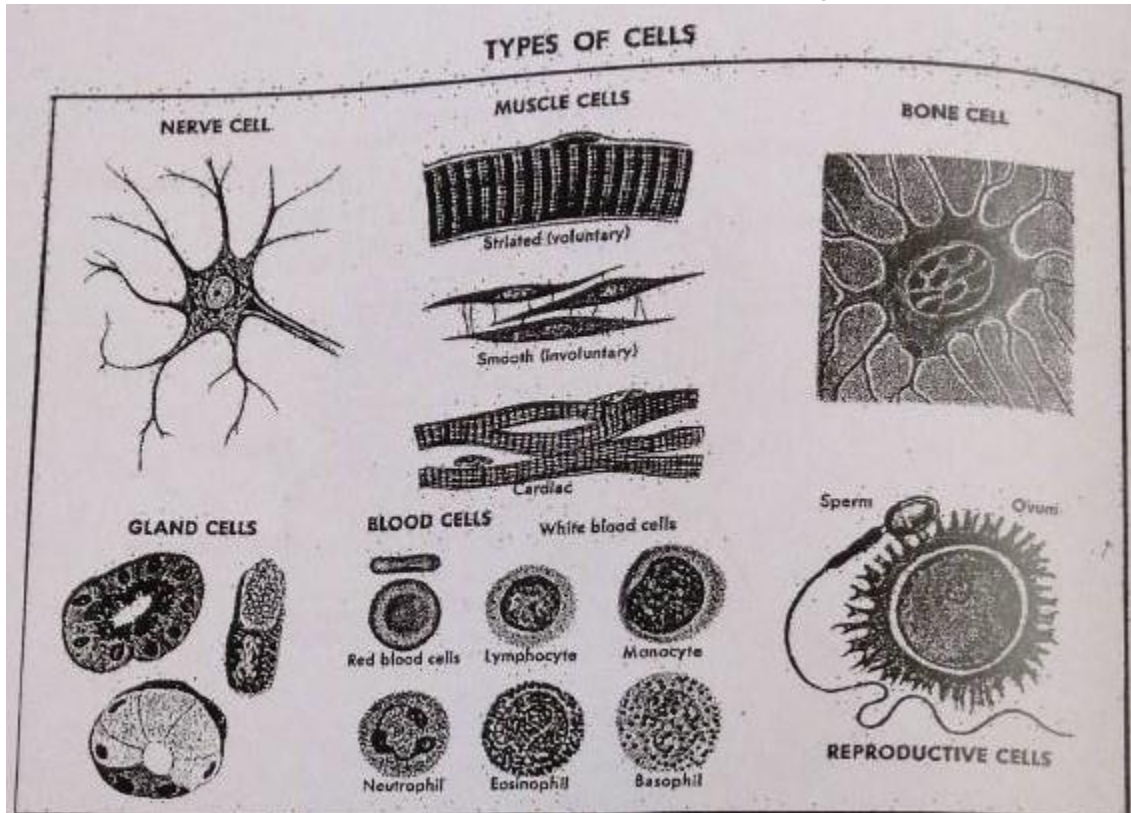


Cellular specificity:

All the cells contain organelle and essential component for their work, and all the cells perform the essential life function such as respiration, nutrition,

and growth. However, the cell is different from each other in function and special structure ex: the muscle cells have a special structure which represented by the actin and myosin filament that perform special function (muscular contraction). Also, the cells of the fatty connective tissue have a large space in the cytoplasm which permit a formation of large fat drop in it and these cells perform special function (storage fatty energy and thermal barrier) The shape of the cells are related with their function and the cells don't have define shape ex: the nervous cells have astral shape due to presence of branches which called dendrites , this dendrites have the ability to transport nervous impulses between each other's, while red blood cells have a disk shape with concave edges, and have hemoglobin molecule that attach with O₂ and CO₂ molecules, this concave edges

contribute to carry these molecules between lung and other body system.



Site of the cells:

The special functions of the cells determined by the site of the co (organs and tissue) ex: skin epitheliallls cells are found on the external surface of the body because their function is the protection and excretion (sweating tine while the same type of the cells found in the lining of the small in tes because their function is absorption of the digestive food. The cells in the multicellular organisms carried out to differential process or cellular specify. In this process, each group of the cells are specialist to build special tissues to enter in organ build, according to this, the cells modified the shape to obtain new types of the cells that have special function.

The shape of the cells can be modified according to many factors:

1-Internal factors: include all the factors that are related to age of the cells wall shape, rigidity, shape of cellular membrane, viscosity of cytoplasm and function.

2-External factors: include surface tension, viscosity of the media, and mechanical action of the cells.

The typical shape of the cells is coccid or ovoid, however, the stress of the

adjacent cells in the tissue or presence the substances between the cells enable

them to take different shapes ex: squamous, cubic, and columnar and all of these are related to their function that is performed.

What are the factors that help cells to perform different functions?

Genes: are segments of deoxyribonucleic acid (DNA) which found in separated shape along the chromosomes in the nucleus. , each gene is code for synthesis of specific protein that is participating to give these properties.

Proteins are very important to perform different function ex: enzymes, hormones and growth factors. Proteins are composed of long chain of amino acid, and there are (20) known amino acid regulate in chains with different length and arrangement to give different proteins with different function. In addition to specialist body cells, there are non-specific cells called stem cells which responsible for the regeneration of body cells.

Cells are varying in their sizes, some of them are large ex others are very small and cannot see with naked eye, ex of the cells have approximately constant size according to law and these differences due to the weight and number oant v to the volume of the cell itself , ex: hepatic cell for hur Also the age of the cells varies between one and the other ex: in human body live for four months, while the skin cells I only Size of the cells:

e large ex: bird egg, Cells the cells and nouing to const human, rat, and hod live for some da

Practical part:

A-show slides and picture of the following:

1-Nervous cell (Astocyte shape).

2- Smoothmuscles (spindle shape).

3-skeletal

muscles (cylindrical shape)

4- Cardiac muscles (cylindrical shape)

5-Human red blood cells (disk, concave)

6-forg red blood cell (ovoid shape).

B-Practical slides:

1-Smear from the lining of mout (squamous cells).

2- epidermal cells of onion plant *Allium cepa*.

3- Chloroplastids, Chromoplastids ex: living structures in the cells.

4- external cortex of onion (external cover) prismatic crystals / non-living structure.

C- Picture of blue-green algae / example of prokaryote

Picture of different shapes of bacteria / example of prokaryote.

D-Picture of Spirogera algae/ example of eukaryote.

E- Typical picture for animal cell and plant cell / to differentiate between them.