

The physiology :

Is the science that concerned with functions of the body systems . The goal of physiology is to explain the physical and chemical factors that are responsible for the origin, development, and progression of life.

System → Organs → Tissues → cells

The cell :

Is the structural & functional unit of various tissues & organs . Example of the cells :

1. Squamous cells in skin .
2. Cubical cells .
3. Columnar cell in digestive system .
4. Round cells as leukocytes .
5. Star cells as nerve cells .

All cells of the body are surrounded by cell membranes enclosing a mass of protoplasm (cytoplasm + nucleus) .

The cytoplasm contain the following organelles :

1. Endoplasmic reticulum
2. Golgi apparatus
3. Mitochondria
4. Lysosomes
5. Centrosomes & centrioles
6. Microtubules

The cytoplasm also contain certain inclusions as :

1. Protein deposits
2. Glycogen deposits
3. Lipid droplets
4. Secretory granules
5. Other substances → pigments as : melanin

The cytoplasmic membrane (The cell membrane) :

Is a very thin elastic semipermeable membrane surrounding the cell , allow H₂O , food materials & O₂ to enter the cell . Also permits H₂O , secretory products & wastes to leave the cell .

The nucleus :

It is control both cell reproduction & chemical reactions that occur in the cytoplasm . The nucleus is surrounded by nuclear membrane . The main contents of the nucleus are chromosomes & one or more nucleolus . The chromosomes are structures that carry the individual characteristics of the organisms & their number is fixed for each species of animal . Each chromosome is made up of a giant molecule of deoxyribonucleic acid ((DNA)) covered with protein (chromatin) & it contain unit of heredity known as the genes

- The somatic cell : contain 23 pairs of chromosomes (diploid number) arranged as :
 1. 22 pairs of autosomes
 2. 1 pair of sex chromosomes : 2 X chromosomes (XX) in female and X + Y chromosomes in male

- The germ cell (sperm & ova) : contain 11 pairs of chromosomes (haploid number) + 1 sex chromosome either X chromosome in ovum and X or Y chromosome in sperm .

The nucleolus consists of dense granules rich in ribonucleic acid ((RNA)) which is responsible for synthesis of proteins in the cell

The endoplasmic reticulum :

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There are two types :

- a. *Granular (rough) endoplasmic reticulum (R.E.R)* : which is contain ribosomes attached to it's membrane . These ribosomes are sites of protein synthesis that secreted by the cell as hormones .
- b. *A granular (smooth) endoplasmic reticulum (S.E.R)* : without ribosomes . It is site of :
 - Steroid synthesis in steroid secreting cells
 - Detoxification in other cells

Free ribosomes :

Also found in the cytoplasm which is responsible for synthesis of cytoplasmic proteins as globin of hemoglobin .

Golgi complex :

It is a collection of membranous tubules & vesicles located near the nucleus ,it is prominent in actively secreting gland cells . *Act as :*

- a. Packages of proteins (hormones & enzymes) as secretory granules .
- b. Site of lysosomes formation .
- c. It adds certain carbohydrates to proteins to form glycoproteins .

Mitochondria :

They are power generating unit of the cell by extraction of the significant amount of energy from oxidation of nutrient (CHO , proteins & fat) to form CO₂ & H₂O via citric acid cycle . the liberated energy is used to form high energy substances called adenosine triphosphate ((ATP))

Lysosomes :

Act as digestive system of the cell , can be engulf & destroy any foreign or dead substances within the cells using digestive enzymes .

The tissue :

Is group of similar cells specialized in a common direction for performance of a common function .The primary tissues of the body are :

1. Epithelial tissue
2. Connective tissue
3. Muscular tissue
4. Nervous tissue

The body systems :

Each body system is consist of different organs , as digestive system is consist of :

- Mouth with salivary glands
- Pharynx
- Esophagus
- Stomach
- Small intestine
- Large intestine
- Liver
- Pancreas

The body systems are :

1. Cardiovascular system :distribute the food , O₂ & products of metabolism .
 2. Respiratory system : take up O₂ & eliminate CO₂ .
 3. Digestive system : digest & absorb the food .
 4. Urinary system : remove wastes .
 5. Reproductive system : perpetuate the species
 6. Nervous system :
 7. Endocrine system :
- act together to coordinate & integrate the functions of other systems .

