

General Physiology

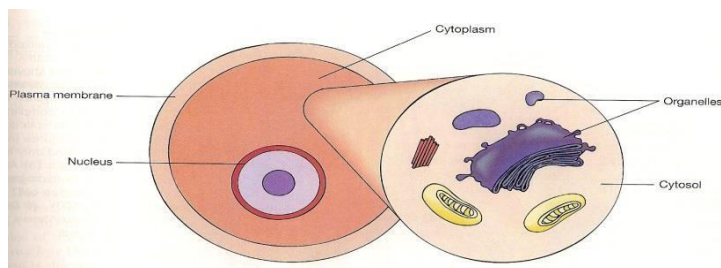
Lect. 1

Function organization of the human body

The goal of physiology is to explain the physical and chemical factors that are responsible for the origin development and progression of life. Each life from the very simple virus up to the latest tree or the complicated human being has its own functional characteristics. Therefore, the vast field of physiology can be divided into viral physiology, plant physiology, human physiology and many more subdivisions

In human physiology we attempt to explain the specific characteristics and mechanisms of the human body that make it living being.

The basic living unit of the body is the cell. All cells use oxygen as one of the major substances from which energy is divided; the oxygen combines with carbohydrates, fat or protein to release the energy required for cell function.



About 60% of the adult human body is fluid, most of this fluid is inside the cells and is called intracellular fluid, about one-third of it is in the spaces outside the cells and is called extracellular fluid. This E.C.F is in constant motion throughout the body. It is rapidly mixed by the blood and the tissue fluids, and E.C.F are the ions and nutrients needed by the cells for maintenance of cellular function. Therefore all cells live in essentially the same environment, that is the E.C.F, and for this reason is often called the internal environment of the body.

Although there is a constant change between E.C.F. and I.C.F., but there is a significant difference between the constituents of the two fluids.

The E.C.F. contains large amounts of sodium, chloride and bicarbonate ions, plus nutrients for cells, such as oxygen, glucose, fatty acids and amino acids ...etc.

The I.C.F. differs significantly from the E.C.F. particularly, it contains large amount of potassium, magnesium and phosphate ions instead of the sodium and chloride found in E.C.F.

Homeostasis:

The term of homeostasis mean maintenance of state or constant conditions in the internal environment. Essentially all of the organs and tissues of the body perform functions. That helps to maintain constant conditions.

The process of homeostasis can be understood through the followings:

1. The E.C.F. is transported through all parts of the body in two different stages. The first entails movement of blood around the circulatory system & the second , movement of fluid between the blood capillaries and the cells. All the blood in the circulation transverses the entire of the circulation in an average once each minute when the body is at rest and as six times during activity. In general , no cell is located more than 25-50 micrometers from a capillary.

2. Origin of nutrients in the E.C.F. :

a. Respiratory system: the blood passes through the body and also flows through the lungs. The blood picks up oxygen in the alveoli, thus acquiring the oxygen needed by the cells.

The membrane between the alveoli and the lumen of the pulmonary capillaries is only 0.4-2.0 micrometers in thickness.

b. Gastrointestinal track: here, different dissolved nutrients including carbohydrates, fatty acids, amino acids and others are absorbed into the E.C.F.

c. The liver changes the chemical composition of many of these to more usable forms.

d. The musculoskeletal provides motility and energy.

3. Removal of metabolic end products:

a. Removal of carbon dioxide by the lungs.

b. Kidney, regulation of blood fluid and excretion of excess substances.

4. Regulation of body functions:

a. *Nervous system:* The nervous system is composed of three major parts:

1. Sensory input portion.
2. Central nerve system.
3. Motor output portion.

b. *Hormonal system:*

Located in the body, are eight major endocrine glands that secrete chemical substances called hormones. Hormones are transported in the E.C.F. to all parts of the body to help regulate cellular function.

c. *Reproduction:*

Help to maintain static condition by generating new beings to take the phase of those that are dying.

The human body has literally thousands of control systems in it. The most important of these are genetic control systems that operate in all cells to control I.C. function as well as E.C. function.