جامعة الفرات الاوسط التقنية /المعهد التقني سماوة

قسم تقنيات صحة مجتمع

المحاضرة الثالثة والرابعة

اسم المادة / وظائف اعضاء 1.

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Lac 3&4

1-1 The blood

Blood is the life-maintaining fluid that circulates through the body's:- Heart. , arteries ,veins , capillaries

The blood consists of a suspension of special cells in a liquid called plasma. In an adult man, the blood is about 1/12th of the body weight and this corresponds to 5-6 liters. Blood consists of 55 % plasma, and 45 % by cells called formed elements.
The blood performs a lot of important functions. By means of the hemoglobin contained in the erythrocytes, it carries oxygen to the tissues and collects the carbon dioxide (CO_2). It also conveys nutritive substances (e.g. amino acids, sugars, mineral salts) and gathers the excreted material which will be eliminated through the renal filter. The blood also carries hormones, enzymes and vitamins. It performs the defense of the organism by mean of the phagocitic activity of the leukocytes, the bactericidal power of the serum and the immune response of which the lymphocytes are the protagonists.

2-1Functions of blood

1-Transports :-

2 - Maintains Body Temperature.

3-Control pH (The pH of blood must remain in the range 6.8 to 7.4, otherwise it begins to damage cells)

4- Removes toxins from the body

(The kidneys filter all of the blood in the body (approx. 8 pints), 36 times every 24 hours. Toxins removed from the blood by the kidneys leave the body in the urine.

5-Regulation of Body Fluid Electrolytes

Excess salt is removed from the body in urine, which may contain around 10g salt per day(such as in the cases of people on western diets containing more salt than the body requires

3-1 The plasma

The plasma is a slightly alkaline fluid, with a typical yellowish color. It consists of 90 % water and 10% dry matter. Nine parts of it are made up by organic substances, whereas one part is made up by minerals. These organic substances are composed of (glucose), lipids (cholesterol, triglycerides, phospholipids, lecithin, fats), proteins (globulins, albumins, fibrinogen), glycoproteins, hormones (gonadothropins, erythropoietin, thrombopoietin), amino acids and vitamins. The mineral substances are dissolved in ionic form, that is dissociated into positive and negative ions.

4-1 the blood cells

1- Red blood cells (erythrocytes)

The erythrocytes are the most numerous blood cells i.e. about 4-6 millions/mm^3. They are also called red cells. In man and in all mammals, erythrocytes are devoid of a nucleus and have the shape of a biconcave lens. they have a nucleus. The red cells are rich in hemoglobin, a protein able to bind in a faint manner to oxygen. In the red cells of the mammalians, the lack of nucleus allows more room for hemoglobin and the biconcave shape of these cells raises the surface and cytoplasmic volume ratio. The mean life of erythrocytes is about 120 days. When they come to the end of their life, they are retained by the spleen where they are phagocyted by macrophages.

5-1 Functions of red blood cells

The primary function of red blood cells, or erythrocytes, is to carry oxygen and carbon dioxide. Hemoglobin (Hgb) is an important protein in the red blood cells that carries oxygen from the lungs to all parts of our body.

Test –No. 1

Enumerate the functions of blood

Test – No. 2

What is the main functions of erythrocyte

1-2 White blood cells (leukocytes)

Leukocytes, or white cells, are responsible for the defense of the organism. In the blood, they are much less numerous than red cells. The density of the leukocytes in the blood is 5000-7000 /mm^3. Leukocytes divide in two categories: granulocytes and lymphoid cells or agranulocytes. The term granulocyte is due to the presence of granules in the cytoplasm of these cells. In the different types of granulocytes, the granules are different and help us to distinguish them. In fact, these granules have a different affinity towards neutral, acid or basic stains and give the cytoplasm different colors. So, granulocytes distinguish themselves in neutrophil, eosinophil (or acidophil) and basophil. The lymphoid cells, instead, distinguish themselves in lymphocytes and monocytes. As we will see later, even the shape of the nucleus helps us in the recognition of the leukocytes.

Each type of leukocyte is present in the blood in different proportions:

neutrophil 50 - 70 %
eosinophil 2 - 4 %
basophil 0,5 - 1 %
lymphocyte 20 - 40 %
monocyte 3 - 8 %

2-2 Functions of white blood cells

- The primary function of white blood cells, or leukocytes, is to fight infection. There are several types of white blood cells and each has its own role in fighting bacterial, viral, fungi, and parasitic infections. Types of white blood cells that are most important for helping protect the body from infection and foreign and Help heal wounds not only by fighting infection but also by ingesting matter such as dead cells, tissue debris and old red blood cells.
- Are our protection from foreign bodies that enter the blood stream, such as allergens.

Types of white blood cells include:

A granulocytes

- Lymphocytes.
- Monocytes.

(granulocytes).

- Eosinophils.
- Basophils.
- Neutrophils

1- Neutrophils

are very active in phagocyting bacteria and are present in large amount in the pus of wounds. Unfortunately, these cells are not able to renew the lysosomes used in digesting microbes and dead after having phagocyted a few of them.

2- Eosinophils

attack parasites and phagocyte antigen-antibody complexes

3- Basophil

secrete anti-coagulant and vasodilatory substances as histamines and serotonin. Even if they have a phagocytory capability, their main function is secreting substances which mediate the hypersensitivity reaction

Lymphocytes :- T – lymphocyte B – lymphocyte

are cells which, besides being present in the blood, populate the lymphoid tissues and organs too, as well as the lymph circulating in the lymphatic vessel. The lymphoid organs include thymus, bone marrow ,spleen, lymphoid nodules, palatine tonsils, Peyer's patches and lymphoid tissue of respiratory and gastrointestinal tracts.

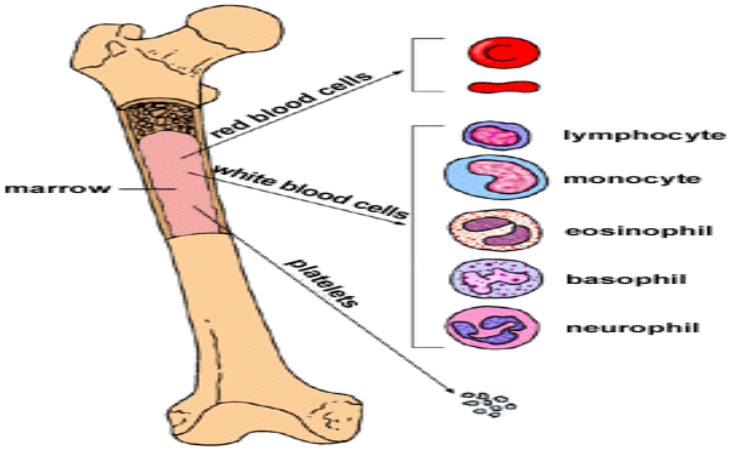
Monocytes

are the precursors of macrophages. They are larger blood cells, which after attaining maturity in the bone marrow, enter the blood circulation where they stay for 24-36 hours. Then they migrate into the connective tissue, where they become macrophages and move within the tissues. In the presence of an inflammation site, monocytes quickly migrate from the blood vessel and start an intense phagocytory activity. The role of these cells is not solely in phagocytosis because they have also have an intense secretory activity. They produce substances which have defensive functions such as lysozime, interferons and other substances which modulate the functionality of other cells. Macrophages cooperate in the immune defense. They expose molecules of digested bodies on the membrane and present them to more specialized cells, such as B and T lymphocytes

1-3 - Platelets (thrombocytes) **- help in blood clotting.**

The primary function of platelets, or thrombocytes, is blood clotting. Platelets are much smaller in size than the other blood cells. The normal platelet count is

150,000-350,000 per microliter of blood They group together to form clumps, or a plug, in the hole of a vessel to stop bleeding.



Anticoagulants

An anticoagulant is a drug that helps prevent the clotting (coagulation) of blood. These drugs tend to prevent new clots from forming or an existing clot from enlarging. They don't dissolve a blood clot. Anticoagulants are also given to certain people at risk for forming blood clots, such as those with artificial heart valves or who have atrial fibrillation

A common type of stroke is caused by a blood clot blocking blood flow to the brain. To prevent such clots, anticoagulants are often prescribed for people with conditions such as atrial fibrillation to prevent a first or recurrent stroke.

Heparin and warfarin, a derivative of coumarin, are some examples of anticoagulants