RESEARCH OF THE MECHANISM OF BLOCKING ACTION OF THE STS-GSC-73 COMPOUND ON THE ACTIVITY OF TRONBIN FACTORS OF HUMAN BLOOD PLASMA

https://doi.org/10.5281/zenodo.7187725

Annotation: *in this article we will talk about the study of the mechanism of the blocking effect of the compound STs-gsc-73 on the activity of tronbin factors of human blood plasma, and this is divided into several types: components, plasma proteins, globulins, how much is Plasma? Training, differences with interstitial fluid, body fluids like Plasma, characteristics, blood clotting, immune response, Regulation, other important functions of plasma, importance of blood plasma in evolution*

Blood plasma it makes up the watery part of a large amount of blood. It is a connective tissue in the liquid phase that travels through small vessels, veins and arteries, both in humans and in other groups of vertebrates, during the circulation process. The function of plasma is to transport respiratory gases and various nutrients that cells need for their functioning.

In the human body, plasma is an extracellular fluid. Together with interstitial or tissue fluid (which is also called) they are found outside or in surrounding cells. But due to the fact that it is pumped by blood circulation from small vessels and microcapillars near the cell, the intercellular fluid is formed from plasma.

Plasma contains many dissolved organic and inorganic compounds, which are used by cells in the process of metabolism, and also contain many waste substances as a result of cell activity.

Components

Blood plasma, like other body fluids, consists mainly of water. This aqueous solution consists of 10% dissolved substances, of which 0.9% corresponds to inorganic salts, 2% to non-protein organic compounds and about 7% to proteins. The remaining 90% is water.

Among the inorganic salts and ions that make up the blood plasma, we find bicarbonate, chlorides, phosphates and / or sulfates as anionic compounds. And some cationic molecules such as Ca

+ , Mg2+, K+, Na+, faith+ and Cu+.

There are also many organic compounds such as urea, creatine, creatinine, bilirubin, uric acid, glucose, citric acid, lactic acid, cholesterol, cholesterol, fatty acids, amino acids, antibodies and hormones.

Plasma proteins include albumin, globulin, and fibrinogen. In addition to solid components, there are dissolved gaseous compounds such as O2, CO2 and N.

Plasma proteins

Plasma proteins are a diverse group of small and large molecules that have many functions. Currently, about 100 plasma component proteins have been described.

The most abundant protein group in plasma is albumin, which is 54-58% of the proteins found in this solution and controls the osmotic pressure between plasma and body cells.

Enzymes are also found in plasma. They arise from the process of cellular apoptosis, but they do not carry out metabolic activity in plasma, except for those involved in the coagulation process.

Globulins

Globulins make up about 35% of plasma proteins. This group of different proteins is divided into several types that, due to their electrophoretic properties, can find between 6 and 7% of A.1-globulins, 8 and 9% A2-globulins, 13 and 14% of B-globulins and 11 to 12% of B-globulins.

Fibrinogen (a-globulin) is about 5% of proteins, and in combination with prothrombin in plasma, it is responsible for blood clotting.

Ceruloplasmines transport Cu2+ and it is an oxidase enzyme. Low levels of this protein in plasma are associated with Wilson's disease, which causes neurological and liver damage due to the accumulation of Cu.2 + in these tissues.

Some lipoproteins (of the A-globulin type) transport important lipids (cholesterol) and fat-soluble vitamins. Immunoglobulins (B-globulin) or antibodies are involved in the protection against antigens.

In general, this group of globulins makes up about 35% of the total proteins, and they are also described as a high molecular weight group, like some metal-bound proteins.

How much is plasma?

The fluids present in the body, whether intracellular or not, are mainly composed of water. The human body, like other vertebrate organisms, is made up of 70% or more water per body weight.

This amount of fluid is divided into 50% of the water present in the cytoplasm of cells, 15% of the water present in intermediate locations and 5% compatible with plasma. The plasma in the human body is about 5 liters of water (more or less 5 kilograms of our body weight).

Training

Plasma accounts for about 55% of the blood. As mentioned above, 90 percent of this percentage is water, while the remaining 10 percent is dissolved solids. It is also a means of transport for the body's immune cells.

When we distinguish the amount of blood by centrifugation, we can easily see three layers, in which there is a yellowish plasma, a sub-layer composed of erythrocytes (red blood cells) and a whitish layer in the middle. platelets and white blood cells.

Most plasma is formed by the absorption of liquids, dissolved substances and organic substances into the intestine. In addition, plasma fluid is introduced, as well as several of its components through renal absorption. In this way, blood pressure is regulated by the amount of plasma present in the blood.

Another way to add materials to form plasma is with endocytosis, more precisely with pinocytosis. Many cells in the endothelium of blood vessels form large amounts of transport bubbles that release large amounts of dissolved substances and lipoproteins into the bloodstream.

Differences with interstitial fluid

Plasma and interstitial fluid have a similar composition, but there is a large amount of proteins in the blood plasma, which in most cases cannot pass from the capillaries to the intercellular fluid during blood circulation.

Body fluids like plasma

Aspects of color and concentration in primitive urine and serum are very similar to those in plasma.

However, the difference lies in the absence of proteins or substances of high molecular weight in the first case, and in the second, when coagulation factors (fibrinogen) are consumed after this occurs, it makes up the liquid part of the blood.

The different proteins that make up the plasma carry out different activities, but they all perform common functions together. Maintaining osmotic pressure and electrolyte balance is part of the most important functions of blood plasma.

They also play a major role in mobilizing biological molecules, circulating proteins in tissues, and maintaining the balance of the buffer system or blood buffer.

Blood clotting

In case of damage to a blood vessel, there is a loss of blood, the duration of which depends on the activation of the system and its response to the implementation of the mechanisms for preventing said loss, which can affect the system for a long time. Blood coagulation is a hemostatic protection that surpasses these cases.

Blood clots that cover blood flow are formed from fibrinogen as a network of fibers.

This network, called Fibrin, is formed by the enzymatic action of thrombin on fibrinogen, which breaks down peptide bonds that release fibrinopeptides that convert this protein into fibrin monomers, forming a network.

Thrombin occurs as prothrombin in an inactive form in plasma. When blood vessels burst, clotting factors such as platelets, calcium ions, and thromboplastin are quickly released into the plasma. This causes a series of reactions that carry out the conversion of prothrombin to thrombin.

Immune response

Plasma immunoglobulins or antibodies play a key role in the body's immune reactions. They are synthesized by plasma cells in response to the detection of foreign substances or antigen.

These proteins are recognized by the cells of the immune system, capable of responding to them and responding to immunity. Immunoglobulins are transported in plasma, can be used in any region where the risk of infection is detected.

There are several types of immunoglobulins, each with specific actions. Immunoglobulin M (IgM) is the first class of antibodies that appear in plasma after infection. IgG is the main antibody in plasma and can cross the placental membrane and be transferred to the fetal circulation.

IgA is an external secretion antibody (mucus, tears and saliva) that is the first way to protect against bacteria and virus antigens. IgE is responsible for allergies and interferes with anaphylactic hypersensitivity reactions and protects against parasites.

Regulation

The components of blood plasma play an important role as regulators in the system. Among the most important regulations are osmotic regulation, Ionic regulation and volume regulation.

Osmotic regulation, regardless of the amount of fluid the body consumes, tries to keep the plasma osmotic pressure stable. For example, in humans, pressure stability is maintained at about 300 mOsm (micro osmols).

Ion regulation refers to the stability of the inorganic ion concentration in plasma.

The third regulation consists in maintaining a constant volume of water in the blood plasma. These three arrangements in plasma are closely related and partly due to the presence of albumin.

Albumin is responsible for fixing water in its molecule, preventing it from escaping from the blood vessels and thus regulating osmotic pressure and water volume. On the other hand, it establishes ionic bonds that transport inorganic ions, keeping their concentration stable in plasma and in blood cells and other tissues.

Other important functions of plasma

The excretory function of the kidneys is associated with the plasma composition. In the formation of urine, the transfer of organic and inorganic molecules that are released through cells and tissues in the blood plasma occurs.

Thus, many other metabolic functions carried out in different body tissues and cells become possible only due to the transport of molecules and substrates necessary for these processes through plasma.

Importance of blood plasma in evolution

Blood plasma is basically the aqueous part of the blood that carries metabolites and waste products in the cells. What began as a simple and easily satisfied requirement for the transport of molecules has led to the evolution of several complex and important respiratory and circulatory adaptations.

For example, the solubility of oxygen in blood plasma is so low that only plasma cannot carry enough oxygen to meet metabolic requirements.

Together with the circulatory system, it seems to have developed, for example, with the evolution of special oxygen-carrying blood proteins such as hemoglobin, the oxygen permeability of the blood has increased significantly.

LITERATURE:

1. Hikman, C, P, Roberts, L. S., Kin, S. L., Larson, A., I.Anson, H. & Eisenhour, D. J. (2008). Zoologiyaning yaxlit asoslari. Nyu-York: McGraw-Hill. 14th Nashr.
2. Hill, R. W., Wyse, G. A., Anderson, M., & Anderson, M. (2012). Hayvonlar fiziologiyasi (3-jild). Sanderlend, MA: Sinauer Associates.
3. Randall, D., Burgreen, V., Frantsiya, K. (1998). Ekkerd Hayvonlarning fiziologiyasi: Mexanizmlar va moslashuvlar. Ispaniya: McGraw-Hill. 4-nashr.
4. Teijon, J. M. (2006). Strukturaviy biokimyo asoslari (1-jild). Tahririyat Tebar.
5. Teijon Rivera, J. M., Garrido Pertierra, A., Blanco Gaitan, M. D., Olmo Lopes, R. & Teijón Lopes, C. (2009). Strukturaviy biokimyo. Tushunchalar va testlar. 2-chi. Ed. Tahririyat tebi.
6. Voet, D., va Voet, J. G. (2006). Biokimyo. Panamerican Medical Ed

Djurayeva Dilshoda Imanazarovna

Karshi State University Medical Direction trainee teacher