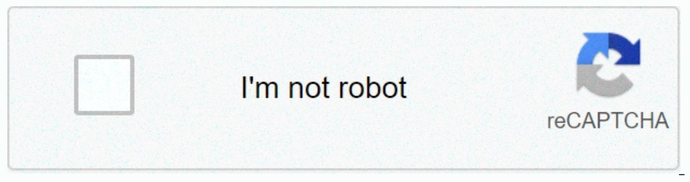

Continue

Functions of plasma proteins include

Understanding:• The endoplasmic reticulum and the golgi apparatus in hepatocytes produce plasma proteins Plasma proteins are proteins present in the blood plasma and are produced by the liver (with the exception of immunoglobulins)Proteins are produced by raw ER in hepatocytes and exported to the blood through the golgiCi complex are different types of plasma proteins, each serves several specific functions:Albumins regulate osmotic blood pressure (and thus moderate osmotic pressure of bodily fluids)Globulins participate in the immune system (i.e. immunoglobulins) and also act as transport proteinsFibrinogens are involved in the clotting process (the soluble fibrinogen can form an insoluble fibrin clot)Low levels of other plasma proteins have various functions (e.g. α-1-antitrypsin neutralizes digestive tripside)Overview of plasma proteins Proteins present in blood serum Blood proteins , they are also dete plasma proteins, they are proteins present in the blood plasma. Many different functions are needed, including the transport of lipids, hormones, vitamins and minerals in the activity and functioning of the immune system. Other blood proteins act as enzymes, complement components, protease inhibitors or kinase precursors. Contrary to popular belief, hemoglobin is not a blood protein, as it is transported inside red blood cells, rather than in blood serum. Siere albumin accounts for 55% of blood proteins,[1] is one of the main contributors to maintaining oncotic plasma pressure and helps, as a vector, in the transport of lipids and steroid hormones. Globulins eat 38% of blood proteins and carry ions, hormones and lipids that help in immune function. Fibrinogen includes 7% of blood proteins; the conversion of fibrinogen into insoluble fibrin is essential for blood clotting. The rest of the plasma proteins (1%) are regulatory proteins, such as enzymes, proentms and hormones. All blood proteins are synthesized in the liver except gamma globulins. [1] Blood protein families Blood proteins Normal level % Albumin function 3.5-5.0 g/dl 55% create and maintain osmotic pressure; carry insoluble molecules Globulin 2.0-2.5 g/dl 38% participate in the immune system Fibrinogen 0.2-0.45 g/dl 7% Blood clotting Regulatory proteins <1% Regulation of gene expression Factors Coagulation <1% Conversion of fibrinogen into fibrin Specific blood protein examples: Prealbumin (transtiretin) Alpha 1 antitrypsin (neutralizes tripsiderin that has escaped from the digestive system) Glycoprotein Alpha-1-acid alpha2-macroglobulin Gamma globulin Beta-2 microglobulin Haptoglobin Complement component 3 Complement component 4 C-reactive protein (CRP) Lipoproteins (kilomycrons, VLDL, LDL, HDL) Transferrin Prothrombin MBL or MBP Clinical significance Separating serum proteins for electrophoresis is a valid diagnostic as well as a way to monitor clinical progress. Current research on blood plasma proteins focuses on performing proteomic serum/plasma analyses in the search for biomarkers. These efforts began with two-dimensional gel electrophoresis[2] in the 1970s, and more recently this research was carried out using MS LC-tandem-based proteomics. The normal laboratory value of the total serum protein is about 7 g/dL. References ^ to b Smith, Graham S.; Gail L. Walter; Walker, Robin M. (2013-01-01), Haschek, Wanda M.; Colin G. Rousseaux; Wallig, Matthew A. (edited by), Chapter 18 - Clinical Pathology in Non-Clinical Toxicology Testing, Haschek and Rousseaux's Handbook of Toxicologic Pathology (Third Edition), Boston: Academic Press, pp. 565–594, doi:10.1016/b978-0-12-415759-0.00018-2, ISBN 978-0-12-415759-0, recovered 2020-11-16 ^ Anderson NL, Anderson NG (1977). High-resolution two-dimensional electrophoresis of human plasma proteins. Proceedings of the National Academy of Sciences. 74 (12): 5421–5425. 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Recovered from By the end of this section, you will be able to: Identify the primary functions of blood, its fluid and cellular components and its characteristics Identify the primary functions of blood in the transport, defense and maintenance of homeostasis Identify primary proteins and other solutes present in blood plasma Name the fluid component of the blood and the three main types of elements formed and identify their relative proportions in a blood sample Remember that blood is a connective tissue. Like all connective tissues, it is composed of cellular elements and an extracellular matrix. Cellular elements, called formed elements, red blood cells (RBC), white blood cells (WBC) and cell fragments called platelets. The extracellular matrix, called call makes blood unique between connective tissues because it is fluid. This fluid, which is mostly water, suspends the formed elements and allows them to circulate throughout the body within the cardiovascular system. The primary function of blood is to provide oxygen and nutrients to the cells of the body and remove them; but this is just the beginning of the story. Specific functions of blood also include defense, heat distribution and maintenance of homeostasis. Nutrients of the foods you eat are absorbed into the digestive tract. Most of these travel into the bloodstream directly to the liver, where they are processed and released back into the bloodstream for calving to the body's cells. Oxygen from the air you breathe spreads into the blood, which moves from the lungs to the heart, which then pumps it to the rest of the body. In addition, endocrine glands scattered throughout the body release hormones into the bloodstream, which transports them to distant target cells. Blood also collects cellular waste and by-products and transports it to various organs for removal. For example, blood moves carbon dioxide into the lungs for exhalation from the body, and various waste products are transported to the kidneys and liver for excretion from the body in the form of urine or bile. Many types of WBC protect the body from external threats, such as bacteria that cause diseases that have entered the bloodstream in a wound. Other BCCs seek and destroy internal threats, such as cells with mutated DNA that could multiply to become cancerous, or body cells infected with viruses. When damage to the vessels causes bleeding, blood plates and some proteins dissolved in the plasma, they interact to create clots that block the areas of rupture of the blood vessels involved. This protects the body from further blood loss. Remember that body temperature is adjusted through a negative feedback loop. If you train on a hot day, the body temperature of the rising nucleus would trigger several homeostatic mechanisms, including an increase in blood transport from the nucleus to the periphery of the body, which is typically colder. As blood passes through the skin vessels, the heat would dissipate in the environment, and the blood returning to the core of the body would be cooler. On the contrary, on a cold day, blood is diverted from the skin to maintain a warmer body nucleus. In extreme cases, this can cause frostbite. Blood also helps maintain the chemical balance of the body. Proteins and other compounds in the blood act as swabs, which help regulate the pH of body tissues. Blood also helps regulate the water content of the body's cells. If you did the blood test, it was probably taken a superficial vein in the arm, which was then sent to a laboratory for analysis. Some of the most common blood tests, such as those that measure lipid or glucose levels in plasma, determine substances are present inside the blood and in what quantities. Other blood tests control the composition of the blood itself, including the quantities and types of elements formed. One of these tests examines hematocrit, which measures the percentage of RBC (erythemocytes) in a blood sample. It is performed by rotating the blood sample in a specialized centrifuge, a process that causes the heavier elements suspended inside the blood sample to separate from the light and liquid plasma (Figure 18.1.1). Since the heaviest elements in the blood are eriocytes, they settle on the bottom of the hematocrit tube. Located above the hetrocytes is a pale and thin layer composed of the remaining blood-formed elements. These are WBC (leukocytes) and platelets (thrombocytes). This layer is referred to as the buffy mantle, and normally makes up less than 1% of a blood sample. Above the buffy mantle is blood plasma, normally a straw-colored pale liquid, which makes up the rest of the sample. The volume of hetrocytes after centrifugation is also commonly referred to as the volume of packed cells. Typically, blood contains about 45% eriocytes, however, samples can vary significantly from about 36-50%. Normal blood cells for females range from 37% to 47%, with an average value of 41%; for males, hematocrit ranges from 42 to 52%, with an average of 47%. The percentage of other formed elements, WBC and platelets, is extremely small, so it is not normally considered with hematocrit. Therefore, the average plasma percentage is the percentage of blood that is not erythrocytes: for females, about 59% (or 100 minus 41), and for males, about 53% (or 100 minus 47). Figure 18.1.1. Blood Composition: Cell elements of the blood include a large number of erocytes and relatively less leukocytes and platelets. Plasma is the fluid in which the formed elements are suspended. A sample of blood spun into a centrifuge reveals that plasma is the lightest component. It floats at the top of the tube separated from the heavier elements, the eriocytes, by a buffy layer of leukocytes and platelets. Hematocrit is the percentage of the total sample composed of ethytrocytes. Depressed and high blood haematocrit levels are shown for comparison. When you think about blood, the first feature that probably comes to mind is its color. The blood that just took oxygen in the lungs is bright red, and the blood that released oxygen into the tissues is a darker red. This is because hemoglobin is a pigment that changes color, depending on the degree of oxygen saturation. Blood is viscous, with a viscosity about five times greater than water. Viscosity is a measure of thickness or strength flow of a fluid, and is affected by the presence of plasma proteins and elements formed within the blood. Blood. viscosity of the blood has a dramatic impact on blood pressure and flow. Consider the difference in flow between water and honey. More viscous honey would show greater flow resistance than less viscous water. The same principle applies to blood. The normal blood temperature is slightly higher than normal body temperature - about 38 ° C (or 100.4 ° F), compared to 37 ° C (or 98.6 ° F) for an internal reading of body temperature. Although, the surface of blood vessels is relatively smooth, blood experiences friction and endurance as it flows. This produces heat, representing the slightly higher temperature of the blood. The pH of the blood is on average about 7.4; however, it can range from 7.35 to 7.45 in a healthy person. Blood is therefore a little more basic (alkaline) on a chemical scale than pure water, which has a pH of 7.0. Blood contains numerous swabs that help regulate pH. Blood makes up about 8% of adult body weight. Adult males typically have an average of about 5-6 liters of blood, and females on average 4-5 liters. Plasma is 92% water. Dissolved or suspended inside this water is a mixture of substances, most of which are proteins. There are hundreds of substances dissolved in plasma, although many of them are found only in very small quantities. Visit this site for a list of normal levels set for many of the substances found in a blood sample. The serum, one of the sample types included, refers to a plasma sample after the clotting factors have been removed. What types of measurements are administered for blood glucose levels? About 7% of the plasma that is not water is made of proteins. These include several plasma proteins (proteins that are unique to plasma), plus a much smaller number of regulatory proteins, including enzymes and hormones. The main components of plasma are summarized in Figure 18.1.2. The three main groups of plasma proteins are the following: albumin is the most abundant of plasma proteins. Produced by the liver, albumin molecules act as binding proteins: they carry vehicles for fatty acids and steroid hormones. Remember that lipids are hydrophobic; however, the association with albumin allows their transport in aquatic plasma. Albumin is also the most significant contribution to osmotic blood pressure; that is, its presence retains water inside blood vessels and draws water from the tissues, through the walls of blood vessels and into the bloodstream. This in turn helps to maintain both blood volume and blood pressure. Albumin normally accounts for about 54% of the total plasma protein content, or 3.5-5.0 g/dL of blood. The latter most common plasma are globulins. A heterogeneous group, there are three main subgroups known as alpha, beta and gamma globulins. Alpha and beta globulins carry iron, lipids and A, D, E and K to cells; like albumin, also contribute to osmotic pressure. Gamma globulins are proteins involved in immunity and are better known as antibodies or immunoglobulins. Unlike alpha and beta globulins, which are produced in the liver, immunoglobulins are produced by specialized leukocytes known as plasma cells. Couo globulins account for about 38% of the total volume of plasma proteins, or 1.0-1.5 g/dL of blood. The least abundant plasma protein is fibrinogen. Like albumin and alpha and beta globulins, fibrinogen is produced by the liver. It is essential for blood clotting, a process described later in this chapter. Fibrinogen accounts for about 7% of the total volume of plasma proteins, or 0.2-0.45 g/dL of blood. In addition to proteins, plasma contains a wide variety of other substances. These include various electrolytes, such as sodium, potassium, and calcium ions; dissolved gases, such as oxygen, carbon dioxide and nitrogen; various organic nutrients, such as vitamins, lipids, glucose and amino acids; and metabolic waste. All these combined non-protein solutes contribute about 1% to the total plasma volume. Figure 18.1.2 The main phlebotomists of blood components are professionals trained to take blood (drip- = blood vessel; -tomia = cut). When more than a few drops of blood are needed, phlebotomists perform a venipuncture, typically of a superficial vein in the arm. They perform a capillary stick on a

finger, an eo lobe or a child's heel when only a small amount of blood is required. An arterial stick is collected from an artery and used to analyze blood gases. After collection, blood can be analyzed by medical laboratories or perhaps used for transfusions, donations or research. While many allied health professionals practice phlebotomy, the American Society of Phlebotomy Technicians issues certificates to people passing a national exam, and some large labs and hospitals hire individuals expressly for their phlebotomy skills. Medical or clinical laboratories employ a variety of individuals in technical positions: medical technologists (MT), also known as clinical laboratory technologists (CLT), typically have a degree and certification from an accredited training program. They perform a wide variety of tests on various bodily fluids, including blood. The information they provide is essential for primary care providers in determining a diagnosis and monitoring the course of a disease and the response to treatment. Medical laboratory technicians (MTTs) typically have an associated degree, but can perform tasks similar to those of an MT. Clinical training is required, but a might not not essential to get a position. Blood is a fluid connective tissue fundamental for the transport of nutrients, gases and waste throughout the body; to defend the body from infections and other threats; and homeostatic regulation of pH, temperature and other internal conditions. Blood is composed of formed elements - erythrocytes, leukocytes and cell fragments called platelets - and a fluid extracellular matrix called plasma. More than 90% of plasma is water. The rest are mainly plasma proteins - mainly albumin, globulin and fibrinogen - and other dissolved solutes such as glucose, lipids, electrolytes and dissolved gases. Due to the formed elements and plasma proteins and other solutes, the blood is more viscous than water. It is also slightly alkaline and its temperature is slightly above normal body temperature. albumin more abundant plasma protein, which represents most of the osmotic pressure of plasma antibodies (also immunoglobulins or gamma globulins) antigen proteins produced by specialized B lymphocytes that protect the body by binding to foreign objects such as bacteria and liquid blood connective tissue virus composed of formed elements - ethytrocytes, leukocytes and platelets - and a fluid extracellular matrix called plasma; component of the buffy cardiovascular system cover a thin, pale layer of leukocytes and platelets that separates eriocytes from plasma in a sample of fibrinogen plasma protein of centrifuged blood produced in the liver and involved in blood clotting formed cellular components of the blood; that is, erythrocytes, leukocytes and platelets globulin heterogeneous group of plasma proteins that includes transport proteins, coagulation factors, immune proteins and other haematocrits (also, packed cell volume) percentage of ethytrocyte volume in a sample of centrifugal blood immunoglobulins (also antibodies or gamma globulins) antigen-specific proteins produced by specialized B lymphocytes that protect the body by binding to foreign objects such as bacteria and cell volume packed viruses (PCV) (also (hematocrit) percentage by volume of erythrocytes present in a sample of blood plasma centrifuged in the blood, the liquid extracellular matrix composed mainly of water that circulates the formed elements and dissolved materials throughout the cardiovascular system platelets (also thrombocytes) one of the elements formed of blood that consists of cell fragments broken by the megakaryocytes red blood cells (RBC) (also, erythrocytes) one of the elements formed of blood that carries white oxygen blood cells (WBC) (also , leukocytes) one of the elements formed of blood that provides defense against agents of disease and foreign materials

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