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Chapter 1 : ICD Chapter IX: Diseases of the circulatory system - Wikipedia

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The virus is an RNA-containing particle that is icosahedral. After injection by the mosquito, the virus spreads to the lymph nodes and blood, where it persists in the blood-rich organs such as the liver. Very high fever, nausea, and jaundice accompany the disease. The mortality rate is high. Two vaccines are available for preventing yellow fever. This virus has DNA and an envelope and the ability to remain latent in the B-lymphocytes. The viruses are often transmitted by saliva. Treatment usually consists of extensive bed rest, and recurrences are possible. Most often seen in Africa, the condition is related to mononucleosis because of its etiologic agent. Acquired immune deficiency syndrome AIDS. Destruction of T-lymphocytes of the immune system was associated with these infections. HIV is a very fragile virus, and for this reason, it does not survive long periods of exposure outside the body. Most cases are transmitted directly from person to person via transfer of blood or semen. The disease is associated with intravenous drug users who use contaminated needles and with individuals who perform anal intercourse, since bleeding is often associated with this practice. Heterosexual intercourse can also be a mode of transmission, especially if lesions occur on the reproductive organs. From this point, the provirus encodes new HIV particles. The human body attempts to keep up with the mass of new viral particles, but eventually, the newly emerging strains of HIV overwhelm the body defenses and the T-lymphocyte count begins to drop. Normally, the count is approximately T-lymphocytes per cubic millimeter of blood, but as the disease progresses, it drops into the low hundreds and tens. This drop may occur as soon as six months after infection or as long as 12 years or longer after infection. The patient occasionally will suffer swollen lymph nodes, mild prolonged fever, diarrhea, malaise, or other nonspecific symptoms. When a person has progressed to AIDS, an opportunistic infection is usually present. These opportunistic infections are treatable with various drugs, but the AIDS patient is constantly fighting one or the other, and it is difficult to retain the will to continue resisting. As of , close to , cases of AIDS had been recognized in the United States, and approximately , patients had died. Also as of , two types of drugs were available to inhibit the multiplication of HIV. They effectively interfere with the activity of the reverse transcriptase. The second group consists of protease inhibitors. These drugs include saquinavir and indinavir. They prevent the synthesis of the viral capsid by interfering with the last steps in preparation of the protein. These tests seek to determine the presence of antibodies produced by the body on entry of HIV. It takes approximately six weeks for the body to produce sufficient antibodies for a positive test. These tests use gene probes that unite with and signal the presence of the viral DNA if it is present in the T-lymphocytes. Counts of the T-lymphocytes are performed by a process called flow cytometry. There is question, for example, whether whole viruses or viral fragments are preferred for the vaccine. Tests are hampered however, since animal models are not available for vaccine testing, and it is difficult to find volunteers, who would then be antibody-positive and could suffer discrimination as a result. Nevertheless, candidate vaccines have been prepared not only with gp and gp41, but also with simian immunodeficiency virus SIV , which infects primates, and viruses mutated so as to have no envelopes. Many candidate vaccines are now in the testing stage, and it is hoped that one will soon be available for the general population.

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Chapter 2 : Lymphatic system: Definition, anatomy, function, and diseases

Cardiovascular and respiratory system disorders are leading causes of death in the United States. Many people have these disorders. Disorders also occur in the lymphatic system.

March Other animals While humans, as well as other vertebrates , have a closed cardiovascular system meaning that the blood never leaves the network of arteries , veins and capillaries , some invertebrate groups have an open cardiovascular system. The lymphatic system, on the other hand, is an open system providing an accessory route for excess interstitial fluid to be returned to the blood. The blood vascular system first appeared probably in an ancestor of the triploblasts over million years ago, overcoming the time-distance constraints of diffusion, while endothelium evolved in an ancestral vertebrate some 600 million years ago.

Hemolymph The open circulatory system of the grasshopper is made up of a heart, vessels and hemolymph. The hemolymph is pumped through the heart, into the aorta, dispersed into the head and throughout the hemocoel, then back through the ostia in the heart and the process repeated. In arthropods , the open circulatory system is a system in which a fluid in a cavity called the hemocoel bathes the organs directly with oxygen and nutrients and there is no distinction between blood and interstitial fluid ; this combined fluid is called hemolymph or haemolymph. When the heart relaxes, blood is drawn back toward the heart through open-ended pores ostia. Hemolymph fills all of the interior hemocoel of the body and surrounds all cells. Hemolymph is composed of water , inorganic salts mostly sodium , chlorine , potassium , magnesium , and calcium , and organic compounds mostly carbohydrates , proteins , and lipids. The primary oxygen transporter molecule is hemocyanin. There are free-floating cells, the hemocytes , within the hemolymph. They play a role in the arthropod immune system. Flatworms, such as this *Pseudoceros bifurcus* , lack specialized circulatory organs

Closed circulatory system Two-chambered heart of a fish The circulatory systems of all vertebrates , as well as of annelids for example, earthworms and cephalopods squids , octopuses and relatives are closed, just as in humans. Still, the systems of fish , amphibians , reptiles , and birds show various stages of the evolution of the circulatory system. This is known as single cycle circulation. The heart of fish is, therefore, only a single pump consisting of two chambers. In amphibians and most reptiles, a double circulatory system is used, but the heart is not always completely separated into two pumps. Amphibians have a three-chambered heart. In reptiles, the ventricular septum of the heart is incomplete and the pulmonary artery is equipped with a sphincter muscle. This allows a second possible route of blood flow. Instead of blood flowing through the pulmonary artery to the lungs, the sphincter may be contracted to divert this blood flow through the incomplete ventricular septum into the left ventricle and out through the aorta. This means the blood flows from the capillaries to the heart and back to the capillaries instead of to the lungs. This process is useful to ectothermic cold-blooded animals in the regulation of their body temperature. Birds, mammals, and crocodilians show complete separation of the heart into two pumps, for a total of four heart chambers; it is thought that the four-chambered heart of birds and crocodilians evolved independently from that of mammals. Their body cavity has no lining or enclosed fluid. Instead a muscular pharynx leads to an extensively branched digestive system that facilitates direct diffusion of nutrients to all cells. Oxygen can diffuse from the surrounding water into the cells, and carbon dioxide can diffuse out. Consequently, every cell is able to obtain nutrients, water and oxygen without the need of a transport system. Some animals, such as jellyfish , have more extensive branching from their gastrovascular cavity which functions as both a place of digestion and a form of circulation , this branching allows for bodily fluids to reach the outer layers, since the digestion begins in the inner layers.

History Human anatomical chart of blood vessels, with heart, lungs, liver and kidneys included. Other organs are numbered and arranged around it. Before cutting out the figures on this page, Vesalius suggests that readers glue the page onto parchment and gives instructions on how to assemble the pieces and paste the multilayered figure onto a base "muscle man" illustration. The earliest known writings on the circulatory system are found in the Ebers Papyrus 16th century BCE , an ancient Egyptian medical papyrus

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containing over prescriptions and remedies, both physical and spiritual. In the papyrus, it acknowledges the connection of the heart to the arteries. The Egyptians thought air came in through the mouth and into the lungs and heart. From the heart, the air travelled to every member through the arteries. Although this concept of the circulatory system is only partially correct, it represents one of the earliest accounts of scientific thought. In the 6th century BCE, the knowledge of circulation of vital fluids through the body was known to the Ayurvedic physician Sushruta in ancient India. However their function was not properly understood then. Because blood pools in the veins after death, arteries look empty. Ancient anatomists assumed they were filled with air and that they were for transport of air. The Greek physician, Herophilus, distinguished veins from arteries but thought that the pulse was a property of arteries themselves. Greek anatomist Erasistratus observed that arteries that were cut during life bleed. He ascribed the fact to the phenomenon that air escaping from an artery is replaced with blood that entered by very small vessels between veins and arteries. Thus he apparently postulated capillaries but with reversed flow of blood. Growth and energy were derived from venous blood created in the liver from chyle, while arterial blood gave vitality by containing pneuma air and originated in the heart. Blood flowed from both creating organs to all parts of the body where it was consumed and there was no return of blood to the heart or liver. In, The Canon of Medicine by the Persian physician, Avicenna, "erroneously accepted the Greek notion regarding the existence of a hole in the ventricular septum by which the blood traveled between the ventricles. The thick septum of the heart is not perforated and does not have visible pores as some people thought or invisible pores as Galen thought. The blood from the right chamber must flow through the vena arteriosa pulmonary artery to the lungs, spread through its substances, be mingled there with air, pass through the arteria venosa pulmonary vein to reach the left chamber of the heart and there form the vital spirit He stated that "there must be small communications or pores manafidh in Arabic between the pulmonary artery and vein," a prediction that preceded the discovery of the capillary system by more than years. Michael Servetus was the first European to describe the function of pulmonary circulation, although his achievement was not widely recognized at the time, for a few reasons. He firstly described it in the "Manuscript of Paris" [24] [25] near, but this work was never published. And later he published this description, but in a theological treatise, Christianismi Restitutio, not in a book on medicine. Only three copies of the book survived but these remained hidden for decades, the rest were burned shortly after its publication in because of persecution of Servetus by religious authorities. Most importantly, he argued that the beat of the heart produced a continuous circulation of blood through minute connections at the extremities of the body. However, Harvey was not able to identify the capillary system connecting arteries and veins; these were later discovered by Marcello Malpighi in Richards were awarded the Nobel Prize in Medicine "for their discoveries concerning heart catheterization and pathological changes in the circulatory system.

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Chapter 3 : Lymphatic System and Cardiovascular Disease | Interview with Dr. Bruno Chikly

Cardiovascular, Respiratory, and Lymphatic Disorders chapter 42 Key terms Congenital - to be born with (congenitus) Dysrhythmia- an abnormal (dys) heart rhythm (rhythmia).

The Lymphatic System and Cardiovascular Disease In our discussion of the connection between digestion and the lymphatic system, Dr. Chikly points me to the research of his colleague, heart surgeon Gerald Lemole, MD, a Professor of Surgery at Thomas Jefferson University and a member of the team that performed the first successful heart transplant in the United States. Lemole believes the lymphatic system plays a critical role in heart disease. Lemole began to research the link between lymphatics and cardiovascular disease when a colleague wondered if the accelerated rate of atherosclerosis in heart transplant patients was caused by the severed lymph vessels, a necessary aspect of heart transplant surgery. Further laboratory studies corroborate his findings. At least 30 percent of heart attacks may be related to the lymphatic system, a condition called lymphostatic angiopathy. In over 90 percent of coronary atherosclerosis postmortem exams, the patient shows scarring, inflammation, and blockage of the lymph. Chikly points out many natural ways to improve lymphatic flow. The first one he recommends is laughing. Chikly, strong and frequent laughing stimulates the overall lymph system through expansion and compression of the thorax and the activation of the thoracic duct the largest lymph vessel in the body. Laughing also encourages deep breathing, another important lymph remedy. Chikly stresses the importance of proper nutrition and exercise for lymphatic health, but these cures are very general. Oftentimes we need a specific and helping hand to get the lymph flowing freely again. Chikly explains, the lymphatic system is usually the last line of defense because it transports the larger and heavier molecules that no other system can transport. When substances are trapped in collagen fibers deep in the skin, as is the case with cellulite, the only course of action that can help is for the lymphatic system to drain these substances out of the skin and put them back in circulation. This is why Dr. Chikly believes, unlike with obesity, a successful cellulite treatment must be local and hands-on. *Theory and Practice of Lymph Drainage Therapy*. His book is the first comprehensive text on the lymphatic system and lymphedema in North America. Chikly is also the developer of Lymph Drainage Therapy LDT , a hands-on method of lymphatic manipulation now used by thousands of health care professional throughout the world. Learn more at www. This post is part of Real Food Wednesday hosted by Cheeseslave. Join the Cause Start healing your cellulite right now by visiting our Cellulite Treatments page. Or to make the most of your time and effort, why not first take a few minutes to get smart on cellulite theory by reading Cellulite ?

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Chapter 4 : Cardiovascular & Lymphatic System Quiz - ProProfs Quiz

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Microbial Products Bacterial Diseases of the Cardiovascular and Lymphatic Systems The infectious diseases of the cardiovascular system infect the blood, blood vessels, and heart. In many cases, the infections remain in these areas, but in others, the infections are spread to secondary organs. The diseases of the lymphatic system affect the lymph, lymph vessels, lymph nodes, and lymphoid organs, such as the spleen, tonsils, and thymus. In previous generations, this condition was known as blood poisoning. This beta-hemolytic streptococcus causes severe fever, malaise, and dropping blood pressure. Shock may accompany the infection, and antibiotic therapy with penicillin is used aggressively. Septicemia may also be caused by a number of Gram-negative rods that release endotoxins. This is usually an immune system problem caused by antigen-antibody reactions taking place at the heart valves. Heart valve replacement is sometimes required. The bacteria enter the body by contact, inhalation, ingestion of contaminated rabbit meat, and the bite of ticks and other arthropods. Patients experience a blood disorder accompanied by fever, malaise, and numerous nonspecific symptoms. Antibiotics such as gentamicin are used in therapy. Transmission by airborne droplets is possible at this time. Aggressive antibiotic therapy is necessary to prevent death. The bacteria display a safety-pin appearance due to the accumulation of dye at the poles of the cells. The bacterial agents belong to the genus *Brucella*. In animals, these bacteria cause abortion of the young, contagious abortion, and sterility of the female. They are transmitted to humans by unpasteurized milk and contaminated meat. On entering the bloodstream, the bacteria cause fever, chills, and malaise. Prolonged treatment is required with tetracycline, and vaccines are available for immunizing herds of animals. Spores from this organism are inhaled from the air, or they are acquired during contact with contaminated soil or animals such as sheep and cattle. Jaundice and rose-colored skin spots accompany the infection, which may be treated by antibiotics. It occurs at the site of the tick bite and has a red center and expands over a period of several days. After the rash fades and spirochetes enter the blood, fever and other symptoms appear. In addition, the heart is affected and irregular heartbeat may be observed. On occasion, there is paralysis of the face and meningitis. Some months later, patients display arthritis of the large joints such as hips, ankles, elbows, and knees. Lyme disease may be treated with a number of antibiotics, including penicillin and tetracycline. A vaccine is currently available for dogs. Diagnosis of the disease depends upon the observance of symptoms and awareness of exposure to ticks. Rocky Mountain spotted fever. The fever is very high, and headaches accompany the disease. Antibiotics such as tetracycline are effective for therapy. The fever is extremely high, and the death rate is significant. Tetracycline antibiotics are effective for therapy, and elimination of lice is essential to stem the spread of the epidemic. The symptoms are similar to those of epidemic typhus but are much milder, and the mortality rate is much lower. Several other rickettsiae are known to cause diseases in humans. It occurs in Pacific regions and is characterized by a fever and skin rash. Patients suffer headache and fever, but there is no skin rash associated with the disease. The diseases can be treated with tetracycline and other antibiotics.

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Chapter 5 : Circulatory system diseases | Health and medicine | Science | Khan Academy

Bacterial Diseases of the Cardiovascular and Lymphatic Systems In many cases, the infections remain in these areas, but in others, the infections are spread to secondary organs. The diseases of the lymphatic system affect the lymph, lymph vessels, lymph nodes, and lymphoid organs, such as the spleen, tonsils, and thymus.

News The lymphatic system is part of the immune system. It also maintains fluid balance and plays a role in absorbing fats and fat-soluble nutrients. The lymphatic or lymph system involves an extensive network of vessels that passes through almost all our tissues to allow for the movement of a fluid called lymph. Lymph circulates through the body in a similar way to blood. There are about lymph nodes in the body. These nodes swell in response to infection, due to a build-up of lymph fluid, bacteria, or other organisms and immune system cells. A person with a throat infection, for example, may feel that their "glands" are swollen. Swollen glands can be felt especially under the jaw, in the armpits, or in the groin area. These are, in fact, not glands but lymph nodes. They should see a doctor if swelling does not go away, if nodes are hard or rubbery and difficult to move, if there is a fever, unexplained weight-loss, or difficulty breathing or swallowing.

Fast facts about the lymphatic system The lymphatic system plays a key role in the immune system, fluid balance, and absorption of fats and fat-soluble nutrients. As lymph vessels drain fluid from body tissues, this enables foreign material to be delivered to the lymph nodes for assessment by immune system cells. The lymph nodes swell in response to infection, due to a build-up of lymph fluid, bacteria, or other organisms and immune system cells. Lymph nodes can also become infected, in a condition known as lymphadenitis. If lymph nodes remain swollen, if they are hard and rubbery, and if there are other symptoms, you should see a doctor.

Definition Lymph nodes, or "glands" may swell as the body responds to a threat. The lymphatic system has three main functions: It maintains the balance of fluid between the blood and tissues, known as fluid homeostasis. It facilitates absorption of fats and fat-soluble nutrients in the digestive system. The system has special small vessels called lacteals. These enable it to absorb fats and fat-soluble nutrients from the gut. They work with the blood capillaries in the folded surface membrane of the small intestine. The blood capillaries absorb other nutrients directly into the bloodstream.

Anatomy The lymphatic system consists of lymph vessels, ducts, nodes, and other tissues. Around 2 liters of fluid leak from the cardiovascular system into body tissues every day. The lymphatic system is a network of vessels that collect these fluids, or lymph. Lymph is a clear fluid that is derived from blood plasma. They work in a similar way to the blood vessels. The lymph vessels work with the veins to return fluid from the tissues. Unlike blood, the lymphatic fluid is not pumped but squeezed through the vessels when we use our muscles. The properties of the lymph vessel walls and the valves help control the movement of lymph. However, like veins, lymphatic vessels have valves inside them to stop fluid from flowing back in the wrong direction. Lymph is drained progressively towards larger vessels until it reaches the two main channels, the lymphatic ducts in our trunk. From there, the filtered lymph fluid returns to the blood in the veins. The vessels branch through junctions called lymph nodes. These are often referred to as glands, but they are not true glands as they do not form part of the endocrine system. In the lymph nodes, immune cells assess for foreign material, such as bacteria, viruses, or fungus. Lymph nodes are not the only lymphatic tissues in the body. The tonsils, spleen, and thymus gland are also lymphatic tissues.

What do the tonsils do? In the back of the mouth, there are tonsils. These produce lymphocytes, a type of white blood cell, and antibodies. They have a strategic position, hanging down from a ring forming the junction between the mouth and pharynx. This enables them to protect against inhaled and swallowed foreign bodies. The tonsils are the tissues affected by tonsillitis.

What is the spleen? The spleen is not connected to the lymphatic system in the same way as lymph nodes, but it is lymphoid tissue. This means it plays a role in the production of white blood cells that form part of the immune system. Its other major role is to filter the blood to remove microbes and old and damaged red blood cells and platelets.

The thymus gland The thymus gland is a lymphatic organ and an endocrine gland that is found just behind the sternum. It secretes hormones and is

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crucial in the production, maturation, and differentiation of immune T cells. It is active in developing the immune system from before birth and through childhood. The bone marrow Bone marrow is not lymphatic tissue, but it can be considered part of the lymphatic system because it is here that the B cell lymphocytes of the immune system mature. Liver of a fetus During gestation, the liver of a fetus is regarded as part of the lymphatic system as it plays a role in lymphocyte development. Below is a 3-D model of the lymphatic system, which is fully interactive. Explore the model using your mouse pad or touchscreen to understand more about the lymphatic system. Function The lymph system has three main functions. Fluid balance The lymphatic system helps maintain fluid balance. It returns excess fluid and proteins from the tissues that cannot be returned through the blood vessels. The fluid is found in tissue spaces and cavities, in the tiny spaces surrounding cells, known as the interstitial spaces. These are reached by the smallest blood and lymph capillaries. Around 90 percent of the plasma that reaches tissues from the arterial blood capillaries is returned by the venous capillaries and back along veins. The remaining 10 percent is drained back by the lymphatics. Each day, around liters is returned. This fluid includes proteins that are too large to be transported via the blood vessels. Loss of the lymphatic system would be fatal within a day. Without the lymphatic system draining excess fluid, our tissues would swell, blood volume would be lost and pressure would increase. Absorption Most of the fats absorbed from the gastrointestinal tract are taken up in a part of the gut membrane in the small intestine that is specially adapted by the lymphatic system. The lymphatic system has tiny lacteals in this part of the intestine that form part of the villi. These finger-like protruding structures are produced by the tiny folds in the absorptive surface of the gut. Lacteals absorb fats and fat-soluble vitamins to form a milky white fluid called chyle. This fluid contains lymph and emulsified fats, or free fatty acids. It delivers nutrients indirectly when it reaches the venous blood circulation. Blood capillaries take up other nutrients directly. The immune system The lymphatic system produces white blood cells, or lymphocytes that are crucial in fending off infections. The third function is to defend the body against unwanted organisms. Without it, we would die very soon from an infection. Our bodies are constantly exposed to potentially hazardous micro-organisms, such as infections. In this case, the lymphatic system enables our immune system to respond appropriately. If the immune system is not able to fight off these micro-organisms, or pathogens, they can be harmful and even fatal. A number of different immune cells and special molecules work together to fight off the unwanted pathogens. How does the lymphatic system fight infection? The lymphatic system produces white blood cells, known as lymphocytes. There are two types of lymphocyte, T cells and B cells. They both travel through the lymphatic system. As they reach the lymph nodes, they are filtered and become activated by contact with viruses, bacteria, foreign particles, and so on in the lymph fluid. From this stage, the pathogens, or invaders, are known as antigens. As the lymphocytes become activated, they form antibodies and start to defend the body. They can also produce antibodies from memory if they have already encountered the specific pathogen in the past. Collections of lymph nodes are concentrated in the neck, armpits, and groin. We become aware of these on one or both sides of the neck when we develop so-called "swollen glands" in response to an illness. It is in the lymph nodes that the lymphocytes first encounter the pathogens, communicate with each other, and set off their defensive response. Activated lymphocytes then pass further up the lymphatic system so that they can reach the bloodstream. Now, they are equipped to spread the immune response throughout the body, through the blood circulation. The lymphatic system and the action of lymphocytes, of which the body has trillions, form part of what immunologists call the "adaptive immune response. Diseases The lymphatic system can stop working properly if nodes, ducts, vessels, or lymph tissues become blocked, infected, inflamed, or cancerous. Lymphoma Cancer that starts in the lymphatic system is known as lymphoma. It is the most serious lymphatic disease. Hodgkin lymphoma affects a specific type of white blood cell known as Reed-Sternberg cells.

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Chapter 6 : The Lymphatic System and The Respiratory System by Cathleen Seaton on Prezi

Chapter 23 Diseases of the Cardiovascular and Lymphatic System Part 1 of 1 Congenital Heart Disease Unit Respiratory System Disorders - Duration.

Anatomy and Physiology of the Cardiovascular System The cardiovascular system is composed of the heart and blood vessels. The heart pumps blood through blood vessels in a closed system. Arteries carry blood from the heart to capillaries in the body tissues, whereas veins carry blood back to the heart. The heart and blood vessels function to transport oxygen, nutrients, and hormones to cells and to remove waste products and carbon dioxide from cells. The heart and blood vessels work together to pump and circulate the equivalent of quarts of blood through the heart every 24 hours. A Anterior view of the heart and major blood vessels. B Interior view of the heart. Essentials of Anatomy and Physiology, ed 5. FA Davis, Philadelphia, , p , with permission. The heart, about the size of a human fist, is made of muscle and valves. There are the four chambers—two atria and two ventricles. The walls of the heart chambers have a thick cardiac muscular tissue called the myocardium that contracts and provides the force behind the pumping action of the heart. The endocardium, a single layer of epithelium, lines the chambers of the heart and covers the heart valves. The epicardium, a thin membrane, attaches to the exterior surface of the myocardium. The atria walls are separated by the interatrial septum, and the ventricular walls are separated by the interventricular septum. Contraction of the heart is called systole, and relaxation of the heart is called diastole. When the atria contract atrial systole , the ventricles relax ventricular diastole. Then the ventricles contract ventricular systole , and the atria relax atrial diastole. There is a short interval when both atria and ventricles relax. This whole process constitutes the cardiac cycle. Pulmonary circulation circuit showing oxygen and carbon dioxide exchange to and from the lungs. The blood vessel network of the body is composed of arteries, arterioles small arteries , veins, venules small veins , and capillaries. Arteries carry blood from the heart; veins carry blood to the heart; capillaries link the arteries and the veins. Blood transports hormones, nutrients, and waste products; it defends the body against infection; and its ability to clot prevents blood loss. Blood circulation is either pulmonary or systemic. Pulmonary circulation pumps blood from the heart into the lungs; systemic circulation pumps blood from the heart to the remainder of the body. The aorta and its major branches are shown in anterior view. Systemic veins shown in anterior view. Blood is composed of plasma and blood cells. Plasma is the transportation system for the hormones, nutrients, and waste products. It also consists of important proteins. They include prothrombin and fibrinogen, important in blood clotting; albumin, which helps to keep blood from leaking out of the blood vessels; and three types of globulins that assist in the immune response. Erythrocytes, or red blood cells RBCs , carry oxygen on the protein hemoglobin. The leukocytes, or white blood cells WBCs , protect the body from infection and provide immunity against some diseases. The five types of WBCs are neutrophils, eosinophils, basophils, lymphocytes, and monocytes. The platelets or thrombocytes are pieces of cells that contribute to blood clotting and hemostasis. System of lymph vessels and major groups of lymph nodes, showing spleen and thymus glands. The lymphatic system is composed of lymph capillaries, lacteals capillaries in the villus of the small intestine , nodes, vessels, and ducts. The lymphatic system transports fluids, nutrients, and wastes exuded from tissues back to the bloodstream through connections with major veins. See Figure for the relationship between lymphatic vessels and the cardiovascular system. The lymphatic system also functions to attack toxins and cancer cells. The thymus and spleen are two important lymphatic organs whose function is similar to the lymphatic system. They serve as a filter by destroying microorganisms and abnormal cells harmful to the body through a process called phagocytosis. An increase in the size of the nodes usually indicates a high level of phagocytosis. Three pairs of lymph nodes that are relatively easy to palpate are the cervical nodes side of the neck , axillary nodes in the armpit , and inguinal nodes in the groin region. The spleen, usually considered a part of the lymphatic system, helps to store platelets and destroys platelets and old RBCs when they are no longer necessary. It also destroys some foreign microorganisms and

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produces antibodies to foreign antigens. The thymus gland produces T lymphocytes in its stem cells. These cells move to the spleen, lymph nodes, and lymph tissue where they help control cell-mediated immunity.

Chapter 7 : Circulatory system - Wikipedia

[This interview series is continued from Part III: Toxins, Lymph, and Fat Digestion] I Heart Lymph! The Lymphatic System and Cardiovascular Disease. In our discussion of the connection between digestion and the lymphatic system, Dr. Chikly points me to the research of his colleague, heart surgeon Gerald Lemole, MD, a Professor of Surgery at Thomas Jefferson University and a member of the team.

Chapter 8 : Blood and Lymph Diseases - Genes and Disease - NCBI Bookshelf

days - bull's-eye rash (hallmark of disease), disappears spontaneously Several weeks after 1st - bacteria spreads to lymph nodes, blood, organs including brain, joints, heart, liver, spleen, kidneys.

Chapter 9 : Cardiovascular, Respiratory, and Lymphatic Disorders | Nurse Key

Small lymphatic vessels empty into larger ones that ultimately drain into the central venous system via the thoracic duct or the right lymphatic duct. Most lymphatic vessels have valves, similar to those in veins, that keep lymph flowing in one direction (toward the heart).