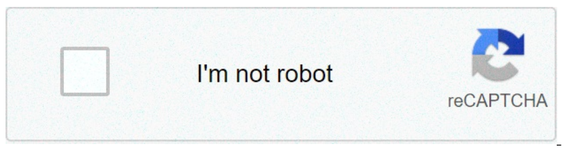

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White blood cell mitochondria

White blood cells, also known as leukocytes, are the part of the serum that forms the immune system and protects against disease and foreign invaders. There are five types of white blood cells: neutrophils, lymphocytes, eosinophils, monocytes, and basophils. Each type of white blood cell has a unique function. For example, neutrophils help rid the body of bacteria and fungi, while basophils combat inflammation. A normal white blood cell count for an adult ranges between 3,500 and 10,500 blood cells per microliter (mcL) of blood. 1. 1. Symptoms of Abnormal White Blood Cell Count Symptoms of a low white blood cell count include general fatigue, body aches, fever, chills, and headaches. With a low white blood cell count, cuts and bruises may not heal as quickly and are more likely to become infected. Conversely, high white blood cell levels are generally asymptomatic. cgtoolbox / Getty Images It is not uncommon for urine tests to reveal white blood cells or leukocytes. Usually, they signal nothing more concerning than a urinary tract infection, which is quite easily treated. Doctors can detect leukocytes in urine with routine urine tests. 1. What Are Leukocytes and What Do They Do? Germs are always trying to enter the body. If they succeed, illness can follow. Fortunately, our immune systems are ready and waiting to fight off germs and keep us healthy. At the front line of defense is an army of leukocytes or white blood cells. When a potentially harmful bacteria or virus breaches the skin barrier, leukocytes spring into action to neutralize the danger. They fend off germs in a variety of ways: some produce antibodies to fight the bug, while others completely engulf the threatening agent. Rick_Jo / Getty Images Say: wite blud sels White blood cells are part of the germ-fighting immune system. They are like little warriors floating around in your blood waiting to attack invaders, like viruses and bacteria. You have several types of white blood cells and each has its own special role in fighting off the different kinds of germs that make people sick. Say: wite blud sels White blood cells are part of the germ-fighting immune system. They are like little warriors floating around in your blood waiting to attack invaders, like viruses and bacteria. You have several types of white blood cells and each has its own special role in fighting off the different kinds of germs that make people sick. Ryan Etter/Ikon Images/Getty Images The main function of white blood cells is to help protect the human body from infection as well as other foreign materials. White blood cells are also known as leukocytes, and they develop in bone marrow from stem cells. There are five different types of white blood cells, including neutrophils, lymphocytes, monocytes, eosinophils and basophils. The lack of white blood cells, or the incidence of too many can cause serious disorders in the body. Disorders are more common regarding neutrophils and lymphocytes. A common disorder from a lack of white blood cells is called leukopenia. The presence of leukopenia can make a person much more susceptible to infections and contagious diseases. Mitochondria generate the energy that a cell needs to function properly. They are often described as the powerhouse of the cell. They are also involved in signaling, cellular differentiation, cell death, maintenance of cell growth and control of the cell cycle. Mitochondria create chemical energy in the form of a chemical called adenosine triphosphate through a machinery known as the electron transport chain. The chain is created by four complexes created of groups of proteins and a fifth complex that is responsible for the final step of energy generation. In order for the process to occur, electrons must be passed between the complexes of the chain. The first complex accepts the electrons. Electrons are then moved to the third complex while protons cross the inner mitochondrial wall. In the third complex the electrons are joined with others donated from the second complex. Complex three then passes the electrons to complex four as more protons move across the inner mitochondrial membrane. In the fourth complex, electrons are joined to oxygen which creates water, and protons cross the membrane once again. A gradient is created as a result of the movement of so many protons. This gradient is used to rotate the fifth complex, creating an adenosine triphosphate with every rotation. A person with more white blood cells than red blood cells may be suffering from a condition referred to as pediatric blood cell disorder. In this condition, the bone marrow produces many or less white blood cells. When the while blood cell count range is above the normal, the condition is referred to as leukocytosis, as stated by Mayo Clinic. An elevated amount of white blood cells in the blood indicates that a person has leukemia or other conditions, such as whooping cough and measles, as noted by Healthline. Causes of leukocytosis include tissue damage, immune reactions, bone marrow problems, certain medications and emotional stress. A person may experience different symptoms, including bruising, fever, pain, breathing difficulties, dizziness, weakness and loss of appetite. A doctor will look at the medical history and medication records of a patient when diagnosing the condition to understand the cause.Fortunately, the condition can get better on its own without treatment, as stated by Drugs . The doctor will determine the main cause of leukocytosis in the body. The patient will need to take intravenous fluids to increase fluids in their body. Medication may be provided to treat the condition that is causing the condition. A person may also undergo leukapheresis, a procedure to reduce the count of white blood cells, as stated by Drugs . This photomicrograph of a blood smear reveals the presence of a few white blood cells. Dr. Candler Ballard / CDC White blood cells are blood components that protect the body from infectious agents. Also called leukocytes, white blood cells play an important role in the immune system by identifying, destroying, and removing pathogens, damaged cells, cancer cells, and foreign matter from the body. Leukocytes originate from bone marrow stem cells and circulate in blood and lymph fluid. Leukocytes are able to leave blood vessels to migrate to body tissues. White blood cells are categorized by the apparent presence or absence of granules (sacs containing digestive enzymes or other chemical substances) in their cytoplasm. If they have granules, they are considered granulocytes. If they do not, they are agranulocytes. The primary purpose of white blood cells is to protect the body from infection. White blood cells are produced by bone marrow and their levels of production are regulated by organs such as the spleen, liver, and kidneys. Granulocytes and agranulocytes are the two types of white blood cells or leukocytes. Granulocytes contain granules or sacs in their cytoplasm and agranulocytes do not. Each type of granulocyte and agranulocyte plays a slightly different role in fighting infection and disease. The three types of granulocytes are neutrophils, eosinophils, and basophils. The two types of agranulocytes are lymphocytes and monocytes. White blood cells are produced within bones by bone marrow and some then mature in the lymph nodes, spleen, or thymus gland. Blood cell production is often regulated by body structures such as the lymph nodes, spleen, liver, and kidneys. The life span of mature leukocytes can be anywhere from a few hours to several days. During times of infection or injury, more white blood cells are produced and sent into the blood. A blood test known as a white blood cell count or WBC is used to measure the number of white blood cells present in the blood. There are between 4,300-10,800 white blood cells present per microliter of blood in the average healthy person. A low WBC count may be due to disease, radiation exposure, or bone marrow deficiency. A high WBC count may indicate the presence of an infectious or inflammatory disease, anemia, leukemia, stress, or tissue damage. There are three types of granulocytes: neutrophils, eosinophils, and basophils. As seen under a microscope, the granules in these white blood cells are apparent when stained. Neutrophils: These cells have a single nucleus with multiple lobes. Neutrophils are the most abundant white blood cell in circulation. They are chemically drawn to bacteria and migrate through tissue toward infection sites. Neutrophils are phagocytic, meaning that they engulf and destroy target cells. When released, their granules act as lysosomes to digest cellular macromolecules, destroying the neutrophil in the process. Eosinophils: The nucleus of these cells is double-lobed and appears U-shaped in blood smears. Eosinophils are usually found in connective tissues of the stomach and intestines. These are also phagocytic and primarily target antigen-antibody complexes formed when antibodies bind to antigens to signal that they should be destroyed. Eosinophils are most active during parasitic infections and allergic reactions. Basophils: Basophils are the least numerous type of white blood cells. They have a multi-lobed nucleus and their granules contain immune-boosting compounds such as histamine and heparin. Basophils are responsible for the body's allergic response. Heparin thins the blood and inhibits blood clot formation while histamine dilates blood vessels to increase blood flow and the permeability of capillaries so that leukocytes may be transported to infected areas. Lymphocytes and monocytes are the two types of agranulocytes or nongranular leukocytes. These white blood cells have no obvious granules. Agranulocytes typically have a larger nucleus due to the lack of noticeable cytoplasmic granules. Lymphocytes: After neutrophils, lymphocytes are the most common type of white blood cell. These cells are spherical in shape with large nuclei and very little cytoplasm. There are three main types of lymphocytes: T cells, B cells, and natural killer cells. T cells and B cells are critical for specific immune responses and natural killer cells provide nonspecific immunity. Monocytes: These cells are the greatest in size of the white blood cells. They have a large, single nucleus that comes in a variety of shapes but is most often kidney-shaped. Monocytes migrate from blood to tissue and develop into either macrophages and dendritic cells. Macrophages are large cells present in nearly all tissues. They actively perform phagocytic functions. Dendritic cells reside most often in the tissue of areas that come into contact with external antigens. They are found in the skin, lungs, gastrointestinal tract, and inner layers of the nose. Dendritic cells function primarily to present antigenic information to lymphocytes in lymph nodes and lymph organs to aid in the development of antigen immunity. Dendritic cells are so named because they have projections that are similar in appearance to the dendrites of neurons.