

## White Blood Cell Protect against Infections

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### COMMENTARY

White blood cells also called leukocytes or leucocytes, are the cells of the immune system that are involved in protecting the body against both infectious disease and foreign invaders. All white blood cells are produced and derived from multipotent cells in the bone marrow known as hematopoietic stem cells. Leukocytes are found throughout the body, including the blood and lymphatic system. All white blood cells have nuclei, which distinguishes them from the other blood cells, the anucleated red blood cells and platelets. The different white blood cell types are classified in standard ways; two pairs of broadest categories classify them either by structure or by cell lineage. These broadest categories can be further divided into the five main types: neutrophils, eosinophils, basophils, lymphocytes, and monocytes. These types are distinguished by their physical and functional characteristics. Monocytes and neutrophils are phagocytic. Further subtypes can be classified; for example, among lymphocytes, there are B cells, T cells, and natural killer cells.

White blood cell, also called leukocyte or white corpuscle, a cellular component of the blood that lacks hemoglobin, has a nucleus, is capable of motility, and defends the body against infection and disease by ingesting foreign materials and cellular debris, by destroying infectious agents and cancer cells, or by producing antibodies. Fluctuations in white cell number occur during the day; lower values are obtained during rest and higher values during exercise. An abnormal increase in white cell number is known as leukocytosis, whereas an abnormal decrease in number is known as leukopenia. White cell count may increase in response to intense physical exertion, convulsions,

acute emotional reactions, pain, pregnancy, labour, and certain disease states, such as infections and intoxications. The count may decrease in response to certain types of infections or drugs or in association with certain conditions, such as chronic anemia, malnutrition, or anaphylaxis.

Although white cells are found in the circulation, most occur outside the circulation, within tissues, where they fight infections; the few in the bloodstream are in transit from one site to another. As living cells, their survival depends on their continuous production of energy. The chemical pathways utilized are more complex than those of red blood cells and are similar to those of other tissue cells. White cells, containing a nucleus and able to produce ribonucleic acid, can synthesize protein. White cells are highly differentiated for their specialized functions, and they do not undergo cell division in the bloodstream; however, some retain the capability of mitosis. On the basis of their appearance under a light microscope, white cells are grouped into three major classes' lymphocytes, granulocytes, and monocytes each of which carries out somewhat different functions.

Lymphocytes, which are further divided into B cells and T cells, are responsible for the specific recognition of foreign agents and their subsequent removal from the host. B lymphocytes secrete antibodies, which are proteins that bind to foreign microorganisms in body tissues and mediate their destruction. Typically, T cells recognize virally infected or cancerous cells and destroy them, or they serve as helper cells to assist the production of antibody by B cells. Also included in this group are natural killer (NK) cells, so named for their inherent ability to kill a variety of target cells.

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