

White Blood Cells Functions

These cells generally fit into one of three modes of function : -
phagocytosis, secretion, immunity.

Phagocytosis:

means that the cell ingests materials to destroy them or remove them from where they had been. Another type of phagocytosis would be to phagocytize bacteria.

Secretion :

means that some white blood cells tend to secrete chemicals to cause local (not blood-borne) signals. A white blood cell could secrete a chemical to cause inflammation in a particular tissue, or to stop inflammation. Inflammation is not a bad thing, or we wouldn't do it! Inflammations help us get blood (and white blood cells) to damaged tissues.

Immunity:

leave that for the immune system unit, but it just is a means to help us fight infection.

White blood cells functions . Here's a more specific list:

| Anatomical Type | Specific Cell Type | Function |
|-----------------|--------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Granulocyte | neutrophil | Major Function: Phagocytosis Neutrophils are very good at phagocytosing smaller chunks of material, like bacteria. They can also secrete chemicals to enhance an inflammatory response. They are also targeted to the bacteria they destroy by the immune system. |
| | eosinophil | Major Functions: Secretion of toxic materials to kill parasites and other invaders, as well as phagocytosis of bacteria. These cells are particularly good at fighting off parasitic invasions. They, like neutrophils, are also targeted to bacteria by the immune system. They also secrete chemicals in allergic reactions. |
| | basophil | Major Function: Secretion These cells secrete both histamine and heparin . Both of these chemicals promote the inflammatory response, but in different ways. Histamine draws blood into the damaged area, while heparin slows clotting so that more and more blood can still enter the damaged area. |
| Agranulocyte | monocyte | Major Function: Phagocytosis Monocytes are only found in the blood. As soon as they use diapedesis to enter tissues, they are called macrophages . These cells (that you learned about in the connective tissue chapter) crawl around and phagocytize all sorts of things-- big or small. They are the ones that pick up cellular and tissue debris. |
| | lymphocyte | Major Function: Immunity There are different types of lymphocytes. Some secrete toxic chemicals, others are more directly involved in an immune response. We will get to these in the immune system unit. |

Neutrophils :

Neutrophils are non-specific immune cells and comprise approximately **55 to 70 percent** of the total white blood cells. Neutrophils are the first line of defense against invading antigens and are first to arrive at the site of infection or injury. Chemical signals released by damaged cells attract neutrophils, which stick to blood vessel walls and engulf any foreign particles before they enter the bloodstream. Neutrophils are short lived and self-destruct after engulfing harmful antigens.

Monocytes :

Monocytes comprise **2 to 8 percent** of the total white blood cells. Monocytes originate in the bone marrow and develop into large macrophages in the bloodstream. Macrophages are the largest of the white blood cells and are responsible for engulfing cell debris, waste and harmful bacteria. Macrophages attack microbes by extending pseudopodia (feet-like extensions) around the cells and then destroy the microbe by releasing enzymes from inside the macrophage.

Eosinophils :

Sometimes referred to as acidophils, eosinophils defend the body against multicellular parasites and moderate allergic reactions. Eosinophils develop in the bone marrow before migrating out into the bloodstream. Eosinophils combat foreign parasites and particles by releasing chemical mediators in a process called degranulation. During degranulation, small granules inside the eosinophils are released to destroy the foreign invaders. These harmful chemicals are reactive proteins such as peroxides, nucleases and lipases.

Basophils :

Comprising **less than 1 percent** of the total white blood cell count, basophils play an integral role in promoting blood flow and preventing coagulation. Basophils circulate the bloodstream and release two important chemicals at the tissue site: heparin and histamine. Heparin is an anti-coagulant that prevents blood cells from clotting too quickly and histamine is a vasodilator commonly released during allergic reactions to increase blood flow. These two molecules work together to quickly increase the availability of other immune system cells at the site of infection or inflammation.

Lymphocytes :

Lymphocytes refer to a group of cells consisting of **B cells, T cell** and **natural killer (NK) cells**, which comprise **25 to 33 percent** of the total white blood cell count. B cells and T cells are the major components of the body's adaptive immunity. The B cells are primarily responsible for producing antibodies against foreign particles, which remember and specifically bind to foreign particles more quickly to be presented to and destroyed by T cells. T cells serve many functions but primarily are involved in destroying cells identified by antibodies. NK cells are not as specific as T cells but also function in destroying cells by releasing granules, like eosinophils. All three cells work together too quickly and efficiently rid the body of harmful, invading particles but are also implicated in autoimmune disorders in which the immune cells attack cells of the human body.