

The immune system

The immune system is the body's defence mechanism, protecting against invaders like bacteria and viruses to keep us healthy.

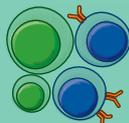
Cells are the main building blocks of our body. Our immune system relies on many different types of cells, each playing an important role. Many of these can be found in our bloodstream, especially white blood cells, which are the main component of the human immune system.

White blood cells are strategically located throughout the body, not only in the bloodstream but in the lymph nodes, spleen, lungs, intestines and skin. This allows them to deal with pathogens wherever they enter the body.

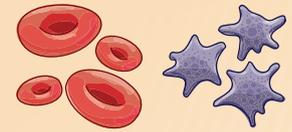
There are two main types of white blood cells:



guardian cells responsible for **innate immunity** (your body's first defence against pathogens).



lymphocytes responsible for **specific or 'adaptive' immunity** (your body's ability to remember pathogens and react quickly if re-infected).



Other blood cell types include red blood cells, which carry oxygen to our tissues, and platelets, which help our blood to clot.

INNATE IMMUNITY

The skin and the lining of the lungs and intestine are the first line of defence against infection, forming a physical barrier for protection. These tissues and the sentinal cells that live there form the innate immune system.



Some of these cells ingest pathogens or vaccine particles and use these to activate lymphocytes (part of specific immunity).

Some innate immunity cells produce chemicals capable of causing inflammation and amplifying the response of specific immunity.

The innate immune system gives a generalised response towards anything it identifies as 'foreign'. By itself, that response might not be strong enough to protect against an infection.

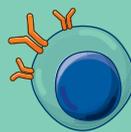
SPECIFIC IMMUNITY

After a person has an infection or is vaccinated, specific lymphocytes learn to recognise their target antigens and multiply. Some then become effector cells that can eliminate or prevent infection, while others turn into long-lived memory cells that are ready to respond more rapidly and effectively if the infection returns. They are 'specific' because they are created to target and respond only to that antigen.

There are two types of lymphocytes: T cells and B cells.



T cells respond to infections by releasing chemicals called cytokines, which trigger protective inflammation. T cells can also kill cells that have a pathogen, such as a virus, hidden inside them.



B cells, often with help from T cells, are involved in making antibodies. Antibodies are complex proteins that attach in a 'lock-and-key' fashion either to pathogens or to the toxins released by them.

When antibodies attach to a pathogen they flag it for destruction, and when they attach to a toxin they neutralise its ability to cause damage.

The immune system's responses to pathogens stops the infection in most cases, followed by repair of any damage to the body. However, serious infections can overwhelm the immune system's capacity to respond and can lead to severe disease or death. Giving a vaccine before exposure to the infection generates protective immunity in advance and avoids the serious outcomes of the disease.