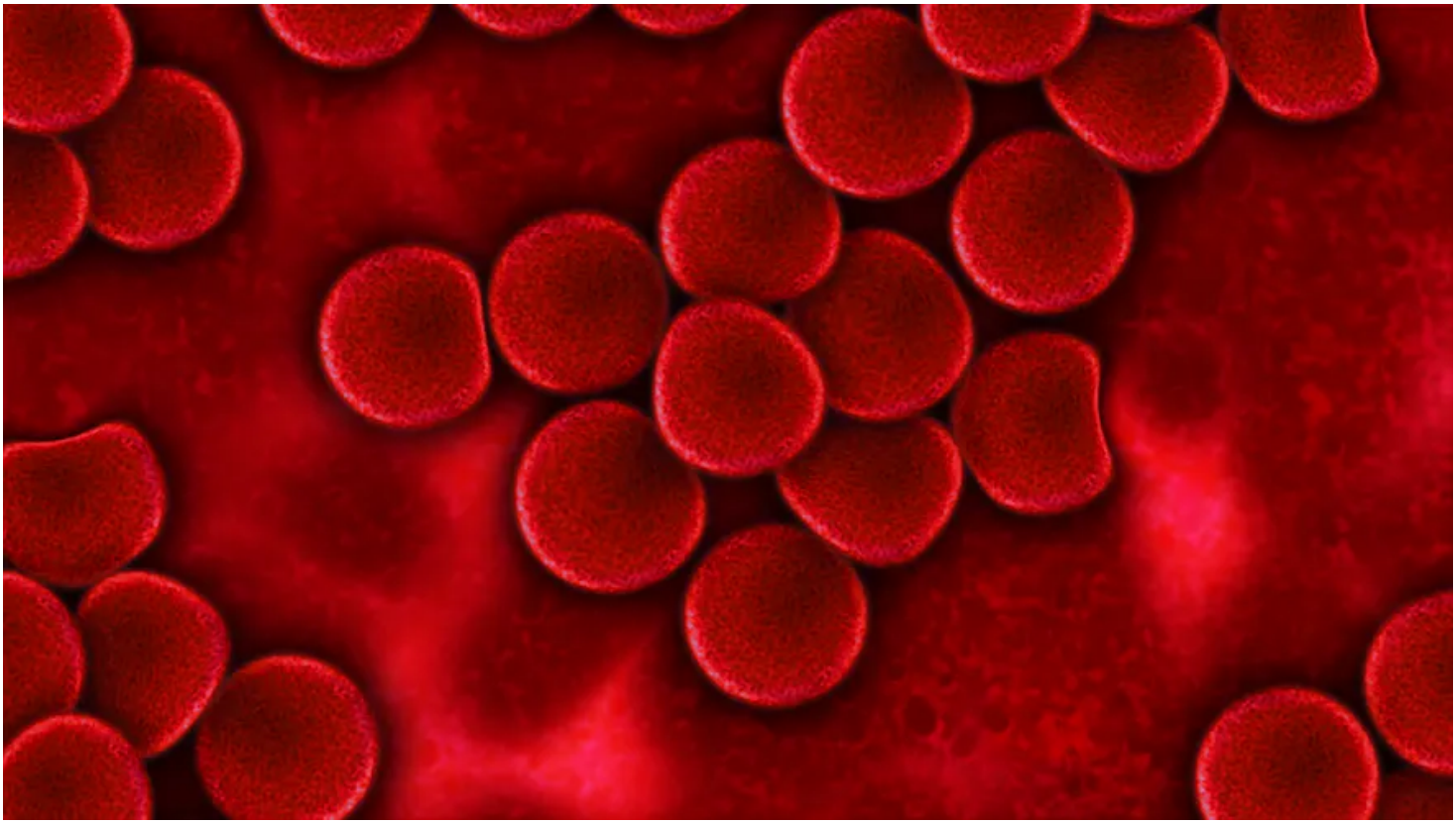
Explainer: What's actually in our blood?

By The Conversation, adapted by Newsela staff on 09.29.17
Word Count **740**
Level **1050L**



Microscopic image of red blood cells. Photo from Pixabay.

Blood is vitally important for our body. As it's pumped around our body through veins and arteries, it transports oxygen from our lungs to all of the other organs, tissues and cells that need it. Blood also removes waste products from our organs and tissues, taking them to the liver and kidneys, where they're removed from the body.

About 45 percent of our blood consists of different types of cells and the other 55 percent is plasma, a pale yellow fluid. Blood transports nutrients, hormones, proteins, vitamins and minerals around our body, suspended in the plasma. They provide energy to our cells and also signal for growth and tissue repair. The average adult has about five liters of blood.

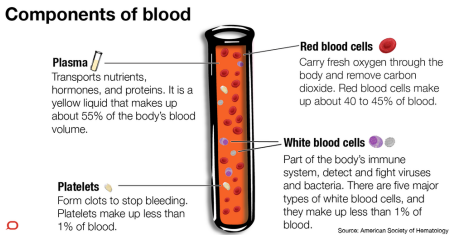


Image 1. A diagram of the blood components. Image from the Conversation. [click to enlarge]

The different types of blood cells include red blood cells, platelets and white blood cells. These are produced in the bone marrow, in the center of our bones.

Red Blood Cells

Red blood cells are essential for transporting oxygen around the body. Red cells are very small, doughnut-shaped cells with an average lifespan of 120 days within the body. They contain a protein called hemoglobin, which contains iron. It binds very strongly to oxygen, giving blood its red color.

Red cells are flexible. They can squeeze through even the tiniest of our blood vessels, called capillaries, to deliver oxygen to all of the cells in our body. When the red cells reach our organs and tissues, hemoglobin releases the oxygen.

Platelets

Platelets are even smaller than red blood cells. In fact, they are tiny fragments of another much larger type of cell, called a megakaryocyte, which is located in the bone marrow. Platelets are formed by budding off from the megakaryocyte. Platelets have an average lifespan of eight to 10 days within the body, so they are constantly being produced. When the body is cut or bruised and tissue is damaged, chemicals are released that attract platelets.

Platelets clump together and stick to the damaged tissue, which starts to form a clot to stop bleeding. Many of the proteins that help the clot to form are contained in plasma. Platelets also release growth factors that help with tissue healing.

White Blood Cells

Blood also carries white blood cells, which are an essential part of our immune system. Some white cells are able to kill micro-organisms by engulfing and ingesting them. Other types of white cells, called lymphocytes, release antibodies that help to fight infection.

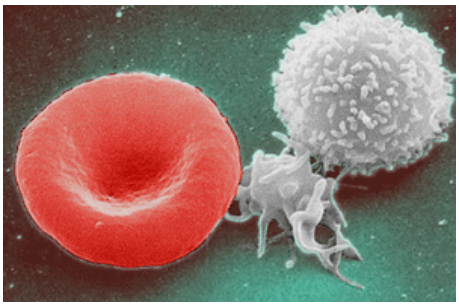


Image 2. From left to right: erythrocyte (or red blood cell? width=750&compression=85), thrombocyte, leukocyte (or white blood cell? width=750&compression=85). Photo: National Cancer Institute/Public Domain. [click to enlarge]

Blood cells don't act alone; they work together for normal body function. For example, when we cut our skin, platelets help plug the cut to stop it bleeding. Plasma delivers nutrients and clotting proteins. White cells help to prevent the cut from becoming infected, and red cells deliver oxygen to help keep the skin tissue healthy.

Blood Transfusions

Sometimes patients who are having surgery, cancer treatment or when they are seriously injured need a blood transfusion. This is usually because they have lost a lot of platelets, red cells or plasma. It could also happen because their cancer treatment has killed many of their blood cells.

In the U.S., blood is donated by voluntary blood donors at hospitals or through the Red Cross. A typical whole blood donation is just over 450 milliliters, and it takes around 10 minutes to collect. Every time a donation is made, the donor is screened for infectious diseases such as hepatitis and HIV. That way, these aren't transferred to the patient receiving the blood.

After donation, the blood is separated into its different parts: platelets, red cells and plasma, which are known as blood components. White cells are removed because they can cause problems in

patients who receive them.

Once the blood has been separated, it's stored until it's needed by hospitals. The red blood cells are stored in a refrigerator and the plasma is frozen. The red cells can be stored for six weeks, and the plasma can be stored for up to a year. Platelets can only be stored for five days. When a hospital needs blood it's packed into special blood shippers, and transported to the hospital blood bank to be transfused.

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