

Blood

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What is blood?

Blood is a mixture of a specialized body fluid (plasma) and cells that float in it. Blood is essential for life. There is no substitute for blood and it cannot be manufactured. An average person has 4-6 liters of blood. The heart pumps the blood through the blood vessels to all the parts of the body. Blood supplies essential substances and nutrients to the cells of the body and carries waste away from the cells.

What are the components of blood?

- **Plasma** – is a yellowish fluid that is mostly made up of water. It also contains blood cells, carbon dioxide, glucose, hormones, salts and proteins. It transports water and nutrients to the cells of the body. It also carries away waste chemicals that the cells do not want any more.
- **Red blood cells (RBCs)** – are also called erythrocytes. They are concave disc shaped like donuts without the hole. They are flexible, sleek, and circulate easily through all of the body's organs. Hemoglobin is an iron-rich protein found on red blood cells. It carries oxygen throughout the body. It also carries carbon dioxide from the body to the lungs, where it is exhaled. RBCs are 40-45% of blood volume. The normal lifespan of red blood cells is 120 days.
- **White blood cells (WBCs)** – are also called leukocytes. They are part of the immune system and defend the body against infections and foreign bodies. They can move in and out of

the bloodstream to reach affected cells. A kind of WBC makes antibodies to help fight infection. They also fight abnormal cells, like cancer cells. WBCs make up 1% of blood volume.

- **Platelets** – are also called thrombocytes. They are tiny round cells involved in the clotting of blood. When bleeding occurs, platelets exposed to air break down and release fibrinogen, which sets off a chain of reactions and platelets clump together and with clotting factors forms a clot to stop the bleeding.

What are the functions of blood?

- Supply oxygen to cells and tissues
- Supply essential nutrients to cells e.g. amino acids, fatty acids, and glucose
- Remove carbon dioxide, urea and lactic acid (waste products)
- White blood cells and antibodies defend us from infection and foreign bodies
- Platelets help the blood to clot (coagulate) when we are bleeding
- Transport hormones - chemicals released by a cell in one part of the body that sends out messages that affect cells elsewhere in the body
- Regulate our acidity (pH) levels
- Regulate our body temperature

Where are the blood cells produced?

The blood cells are produced in the bone marrow, a jellylike substance that fills the cavities of bones. The main sites that form blood cells are the vertebrae, ribs, sternum, skull and hips.

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What are blood groups?

RBCs have markers (antigens) on their surface. Based on these markers, blood is grouped. The two main blood group systems are ABO system and Rh(D) type.

The main blood types are:

- **A positive** – A antigen present on RBCs, Anti-B antibodies in plasma, Rh(D) factor present
- **A negative** – A antigen present on RBCs, Anti-B antibodies in plasma, Rh(D) factor absent
- **B positive** – B antigen present on RBCs, Anti-A antibodies in plasma, Rh(D) factor present
- **B negative** – B antigen present on RBCs, Anti-A antibodies in plasma, Rh(D) factor present
- **O positive** – No antigen present on RBCs, Anti-A and Anti-B antibodies in plasma, Rh(D) factor present
- **O negative** – No antigen present on RBCs, Anti-A and Anti-B antibodies in plasma, Rh(D) factor absent
- **AB positive** – A antigen and B antigen present on RBCs, no antibodies in plasma, Rh(D) factor present
- **AB negative** – A antigen and B antigen present on RBCs, no antibodies in plasma, Rh(D) factor absent