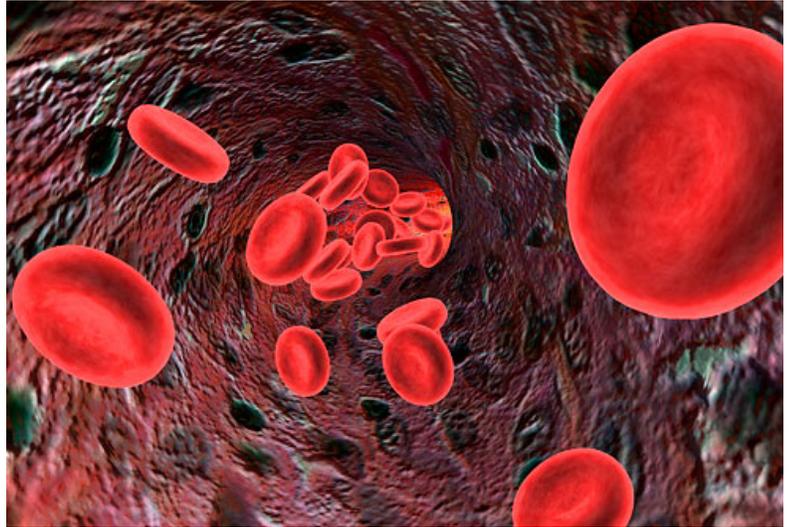


# Red Blood Cells

(Erythrocytes)

**Red blood cells**, or **erythrocytes**, are the vertebrate organism's principal means of delivering oxygen ( $O_2$ ) to the body tissues via the blood flow through the circulatory system. They take up oxygen in the lungs or gills and release it while squeezing through the body's capillaries.

These cells' cytoplasm is rich in hemoglobin, an iron-containing biomolecule that can bind oxygen and is responsible for the blood's red color.



In humans, mature red blood cells are oval and flexible biconcave disks. They lack a cell nucleus and most organelles to accommodate maximum space for hemoglobin. 2.4 million new erythrocytes are produced per second. The cells develop in the bone marrow and circulate for about 100–120 days in the body before their components are recycled by macrophages. Each circulation takes about 20 seconds. Approximately a quarter of the cells in the human body are red blood cells.

## Life cycle

Human erythrocytes are produced through a process named erythropoiesis, developing from stem cells to mature erythrocytes in about 7 days. When matured, these cells live in blood circulation for about 100 to 120 days. At the end of their lifespan, they become senescent<sup>1</sup>, and are removed from circulation.

## Erythropoiesis

Erythropoiesis is the development process by which new erythrocytes are produced; it lasts about 7 days. Through this process erythrocytes are continuously produced in the red bone marrow of large bones, at a rate of about 2 million per second in a healthy adult. (In the embryo, the liver is the main site of red blood cell production.) The production can be stimulated by the hormone erythropoietin (EPO), synthesized by the kidney. Just before and after leaving the bone marrow, the developing cells are known as reticulocytes; these comprise about 1% of circulating red blood cells.

## Functional lifetime

The functional lifetime of an erythrocyte is about 100–120 days, during which time the erythrocytes are continually moved by the blood flow.

Learn a new word:

**Senescence** (from Latin: meaning “to grow old,”) or biological aging is the endogenous and hereditary process of accumulative changes to molecular and cellular structure disrupting metabolism with the passage of time, resulting in deterioration and death. Senescence occurs both on the level of the whole organism (organismal senescence) as well as on the level of its individual cells (cellular senescence)