Talk

Begin the class with a talk on what blood is and what it looks like.

Blood is liquid connective tissue. In human beings it is red in color. It is distributed throughout the body via a system of blood vessels, i.e. veins, arteries and capillaries. The movement of blood in these vessels is driven by the body's natural pump, i.e. the heart. The body of an adult human being contains approximately 5-6 liters of blood (more in men). In children, blood accounts for between approximately 1/10 and 1/9 of total body weight. Blood cells are hematocytes. Besides the functions performed by its different components (more about this during the class), blood also plays a supporting role (by exerting appropriate pressure on the walls of vessels) and carries out thermoregulatory tasks (helps maintain the body at a steady temperature).

Observing

Talk about what blood consists of, look at a model of blood (prepared by you earlier) and a model of its only liquid component – plasma.

Plasma is the liquid part of blood in which morphotic elements (i.e. blood cells and platelets) are suspended. It makes up more than half of the blood's volume. Usually it is bright yellow in color, and a change in color to, e.g., brown or green, may indicate illness or that a person is taking certain medicines. The main part of plasma is water, which acts as a conduit for proteins, fats, glucose (i.e. the most important energy producing compound for cells), gases, vitamins and metabolic waste products. Plasma also contains certain clotting factors that promote the formation of scabs. The main task of plasma is to transport everything which is in it, including the glucose that cells need to produce energy. Plasma takes food (in particular sugar and glucose) from the final section of the alimentary canal, i.e. the intestines. Blood flows through the intestines and the plasma takes sugar along with it and as it flows in the blood vessels it distributes the sugar throughout the whole body

Video/ Slide show

Watch a film about red blood cells and look at an earlier prepared model of an erythrocyte. Discuss the functions performed by this blood component.

Erythrocytes (also known as **red blood cells**) are the most numerous cells in blood. There are approximately 5 million of them in each 1 mm3 of blood. They are shaped like a biconcave disc. It is these cells that give blood its red color – they contain a red pigment called hemoglobin, which gets its color from its iron content.

The task of red blood cells is to distribute oxygen throughout the entire body. The air that a person inhales through their mouth and nose contains oxygen, which is essential for life. It only reaches as far as the lungs. It is here that blood begins to perform its function – it takes oxygen molecules (placed precisely in the indented centres of the red blood cells) from the lungs. On its return it takes carbon dioxide moleculea, a very harmful substance, from cells, which it then delivers to the lungs. From there carbon dioxide is expelled from the body during breathing. The iron contained in hemoglobin is responsible for binding gases to erythrocytes.

Video/ Slide show

Show the students the next model – this time of white blood cells. Watch a video showing how a white blood cell chases bacteria.

White blood cells
are like guards protecting our health. They hunt down and eliminate bacteria and viruses. Their role can be compared to the duties performed by the police. Just as different police officers perform different tasks – some ensure traffic laws are observed, while others try to track down criminals – so white blood cells also have specialized roles.
White blood cells account for the fewest number of blood cells. There should be 5-7,000 of them in 1 mm3. They are almost transparent, spherical-shaped and relatively large. Some have small protrusions on their surface. Unlike erythrocytes they also possess a nucleus and can move. They live for between several days and several dozen years. Their task is to protect the body from pathogens such as viruses and bacteria.

Leukocytes can be divided into several different types. The best known are lymphocytes B, which are responsible for identifying pathogens and creating antibodies, as well as macrophages, i.e. phagocytes (scavenger cells), which are responsible for absorbing structures identified as harmful to the body (e.g. viruses). Lymphocytes live longer, while macrophages gradually become poisoned by the toxins released from the microorganisms they liquidate, thanks to which they have a much shorter life span.

You can also watch a video that provides additional information about leukocytes:

Clicking play will redirect you to YouTube website.

Talk

The students look at a model of blood platelets and watch a short video explaining how blood platelets help wounds to heal.

Thrombocytes
(also known as **blood platelets**) are responsible for clotting the blood. There should be around 150–350,000 platelets per mm^3 in a human being. They are not cells but simply fragments of cytoplasm broken off from hematopoietic cells. The shape of a single blood platelet resembles that of a flattened disk with irregular protrusions ("hooks"). The main task of platelets is to initiate the clotting process by concentrating in the site of the wound. The construction initially formed by thrombocytes is further reinforced by protein threads of fibrin coming from the fibrinogen present in the plasma. Red blood cells flowing above the wound also attach to the fibrin mesh.
The scab that forms after the formation of the wound is actually a superstructure of blood platelets. The platelets themselves are yellow in color, but the blood which flows under them turns the scab a red-brown color.

Get to know more: "How a wound heals itself"

Clicking play will redirect you to YouTube website.