

Circulation ▪ *Section Summary*

Blood and Lymph

Guide for Reading

- What are the components of blood?
- What determines the type of blood that a person can receive in a transfusion?
- What are the structures and functions of the lymphatic system?

Blood is made up of four components: plasma, red blood cells, white blood cells, and platelets.

Plasma is the liquid part of blood. Plasma is mostly water, but 10 percent is made of dissolved materials. Plasma carries nutrients, such as glucose, fats, vitamins, and minerals.

Red blood cells carry oxygen from the lungs to the body cells. A red blood cell is made mostly of **hemoglobin**. Hemoglobin is an iron-containing protein that binds chemically to oxygen molecules. Red blood cells are produced in the bone marrow and have no nuclei.

White blood cells are the body's disease fighters. They are bigger than red blood cells and have nuclei. Some white blood cells alert the body when disease-causing organisms invade. Others produce chemicals to fight the invaders. Some surround and kill the disease-causing organisms.

Platelets are cell fragments that help form blood clots. They collect and stick to any site where a blood vessel is cut. Platelets then release chemicals that cause the production of the chemical fibrin. Fibrin weaves a net of fibers across the wound. The net traps blood cells and a clot is formed.

There are four major types of blood. Each type has different marker molecules. Blood type A has the A marker and blood type B has the B marker. Blood type AB has both the A and B markers. Blood type O has no markers. Your plasma contains clumping agents that makes cells with foreign markers clump together. **The marker molecules on your red blood cells determine your blood type and the type of blood that you can safely receive in transfusions.** People with type A blood can receive transfusions of blood that does not have a B marker: type A or O blood. People with type B blood can receive transfusions of blood that does not have an A marker: type B or O. People with type AB blood have no clumping proteins. They can receive all blood types. People with type O blood have both anti-A and anti-B clumping proteins. They can only receive type O blood.

Red blood cells also contain another marker, called the Rh factor. A person's blood type can either be Rh negative or rh positive.

In the capillaries, some fluid moves out of the cardiovascular system and into the surrounding tissues. The fluid moves into the body's drainage system, called the **lymphatic system**. **The lymphatic system is a network of veinlike vessels that returns the fluid to the bloodstream.** When the fluid enters the lymphatic system, it is called **lymph**. **Lymph nodes** are small knobs of tissue that filter the lymph as it passes through.

Circulation ▪ *Review and Reinforce*

Blood and Lymph

Understanding Main Ideas

Complete the table. Then answer the questions.

Blood Component	Description	Function
Plasma		
Red Blood Cell		
White Blood Cell		
Platelet		

1. If a person with type B blood needs a transfusion, which types of blood can he or she safely receive? Explain your answer.

2. How does fluid in the blood become lymph? How is it returned to your blood?

Building Vocabulary

From the list below, choose the term that best completes each sentence.

- | | |
|------------|------------------|
| plasma | lymph node |
| hemoglobin | lymphatic system |

3. A small knob of tissue that filters lymph is called a(n) _____.
4. _____ is the liquid part of the blood.
5. _____ is an iron-containing protein that binds to oxygen molecules.
6. The _____ is the network of vessels that returns fluid to the bloodstream.

