

# 37–2 Blood and the Lymphatic System



## 37-2 Blood and the Lymphatic System

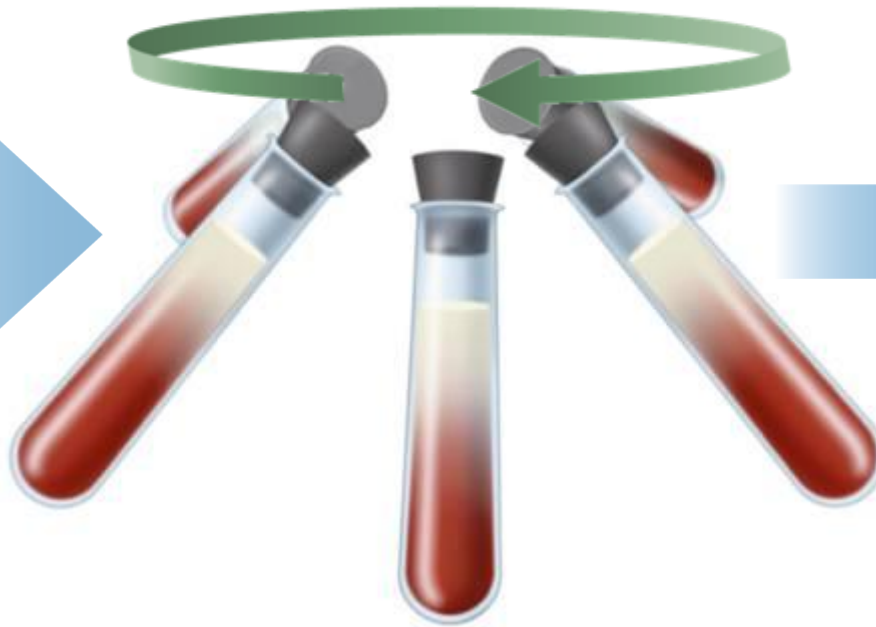
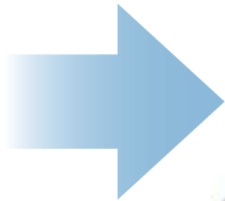
The functions of blood include:

- collecting oxygen from the lungs, nutrients from the digestive tract, and waste products from tissues.
- regulating the body's internal environment.
- helping to fight infections.
- forming clots to repair damaged blood vessels.

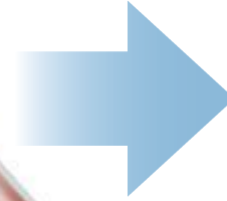
# Blood Composition



**Whole Blood Sample**



**Sample Placed in Centrifuge**



**Blood Sample That Has Been Centrifuged**

- Plasma
- Platelets
- White blood cells
- Red blood cell

Plasma proteins are divided into three groups:

- albumins
- globulins
- fibrinogen

Albumins and globulins transport substances such as fatty acids, hormones, and vitamins.

Albumins regulate osmotic pressure and blood volume.

Some globulins fight viral and bacterial infections.

Fibrinogen is the protein that clots blood.

# Blood Cells

The cellular portion of blood consists of:

- red blood cells
- white blood cells
- platelets

## Red Blood Cells



**Red blood cells transport oxygen.**

Red blood cells look like disks that are thinner in the center.

They are produced in red bone marrow.

They have no nuclei.

They live for about 120 days.





**White blood cells are the “army” of the circulatory system—they**

- **guard against infection,**
- **fight parasites,**
- **attack bacteria.**

## White Blood Cells

White blood cells do not contain hemoglobin.

They are less common than red cells.

White blood cells are produced in bone marrow.

They contain nuclei.

White blood cells may live for days, months, or years.

There are many types of white blood cells.

Phagocytes engulf and digest bacteria and other disease-causing microorganisms.

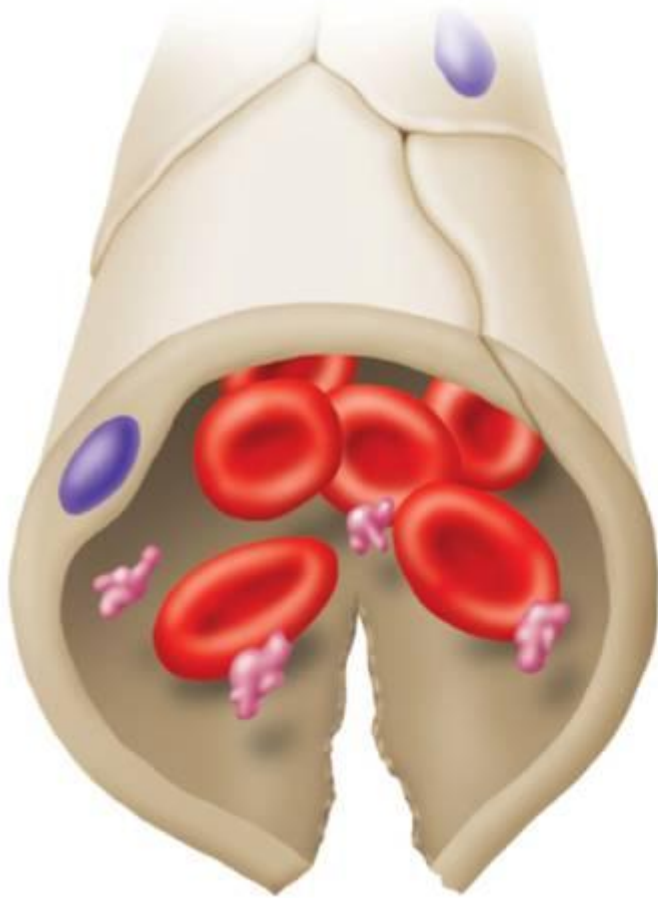
Some white blood cells release histamines.

Histamines increase blood flow into the affected area, producing redness and swelling.

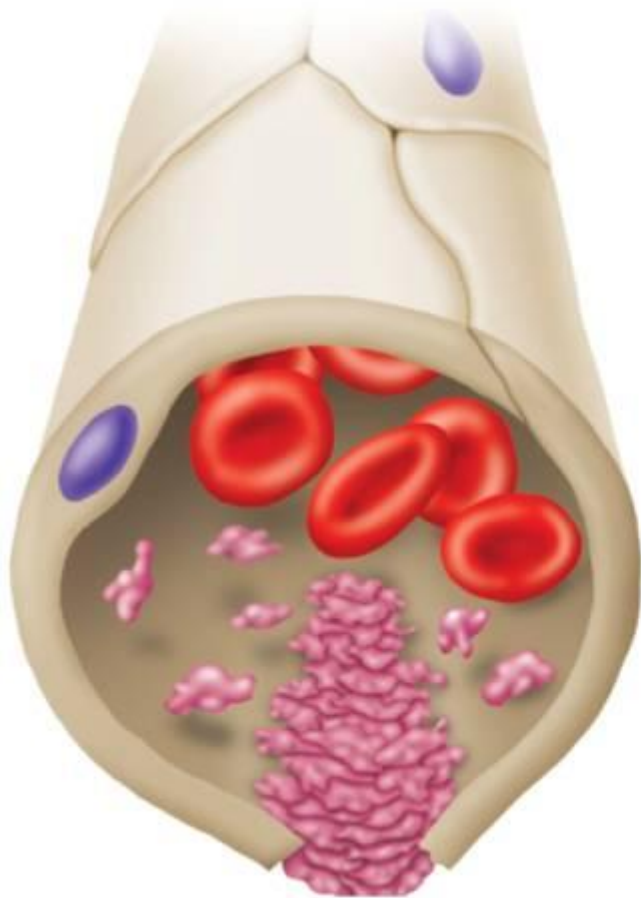
**Lymphocytes** produce antibodies.

Antibodies are essential to fighting infection and help to produce immunity to many diseases.

37-2 Blood and the Lymphatic System → Blood Cells

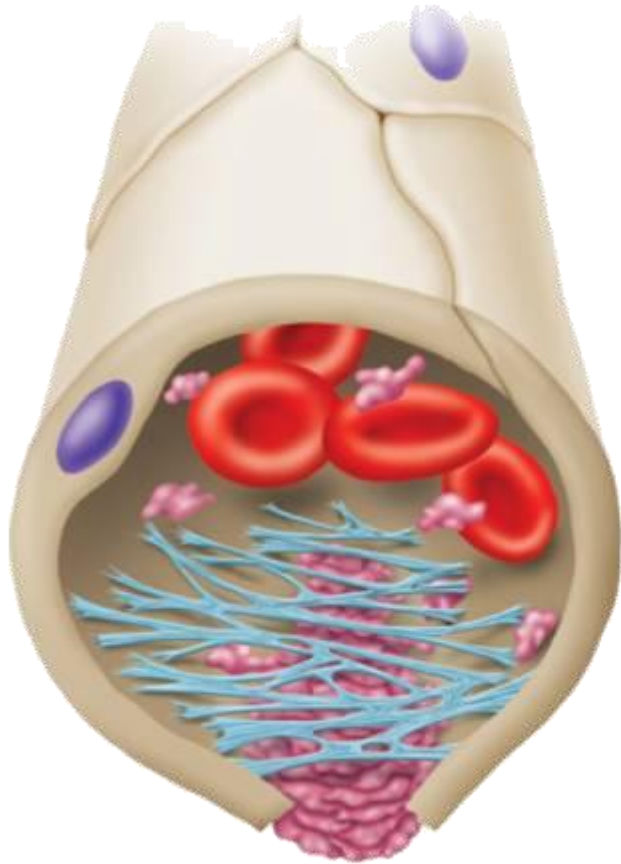


**Break in Capillary Wall**  
Blood vessels injured.



## Clumping of Platelets

Platelets clump at the site and release thromboplastin. Thromboplastin converts prothrombin into thrombin.



## Clot Forms

Thrombin converts fibrinogen into fibrin, which causes a clot. The clot prevents further loss of blood.

## Blood Clotting Problems

If one of the clotting factors is missing or defective, the clotting process does not work well.

Hemophilia is a genetic disorder that results from a defective protein in the clotting pathway.

Hemophiliacs cannot produce blood clots that are firm enough to stop even minor bleeding.





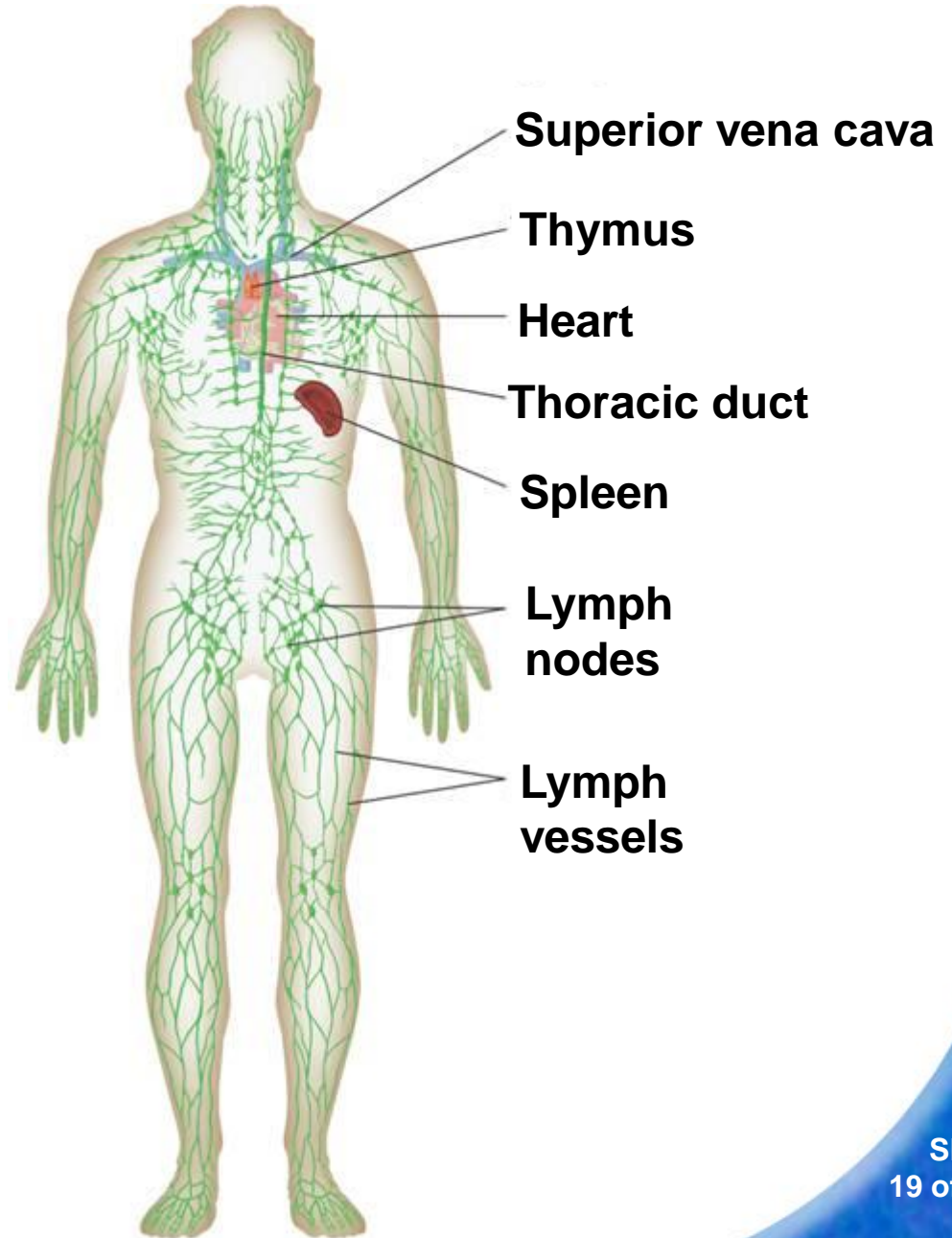
**What is the function of the lymphatic system?**



**The lymphatic system collects the fluid that is lost by the blood and returns it back to the circulatory system.**

The fluid is known as **lymph**.

# The Lymphatic System



Lymph collects in lymphatic capillaries and flows into larger lymph vessels.

Ducts collect the lymph and return it to the circulatory system through two openings in the superior vena cava.

Along lymph vessels are enlargements called lymph nodes.

Lymph nodes trap disease-causing microorganisms.

When large numbers of microorganisms are trapped in the lymph nodes, the nodes become enlarged.

## 37-2 Section QUIZ

Continue to:

**Section QUIZ**

- or -

Click to Launch:



## 37-2 Section QUIZ

**1** The plasma protein that is responsible for blood clotting is

a. albumin.

**A** b. fibrinogen.

c. globulin.

d. hemoglobin.

## 37-2 Section QUIZ

**2** White blood cells that engulf and digest foreign cells are known as

- A**
- a. phagocytes.
  - b. platelets.
  - c. antibodies.
  - d. thrombocytes.



## 37-2 Section QUIZ

**3** Blood cells that do not have nuclei and are produced by the red bone marrow are

**A** a. red blood cells.

b. lymphocytes.

c. platelets.

d. phagocytes.

## 37-2 Section QUIZ

- 4** The function of platelets is to
- a. assist red blood cells in carrying oxygen.
  - b. destroy viruses and bacteria.
  - A** c. initiate the blood clotting process.
  - d. keep capillaries open so blood can flow freely through.

## 37-2 Section QUIZ

- 5** The function of lymph nodes is to
- A**
- a. trap bacteria and viruses that cause disease.
  - b. produce antibodies.
  - c. manufacture new red and white blood cells.
  - d. store fat.

**END OF SECTION**