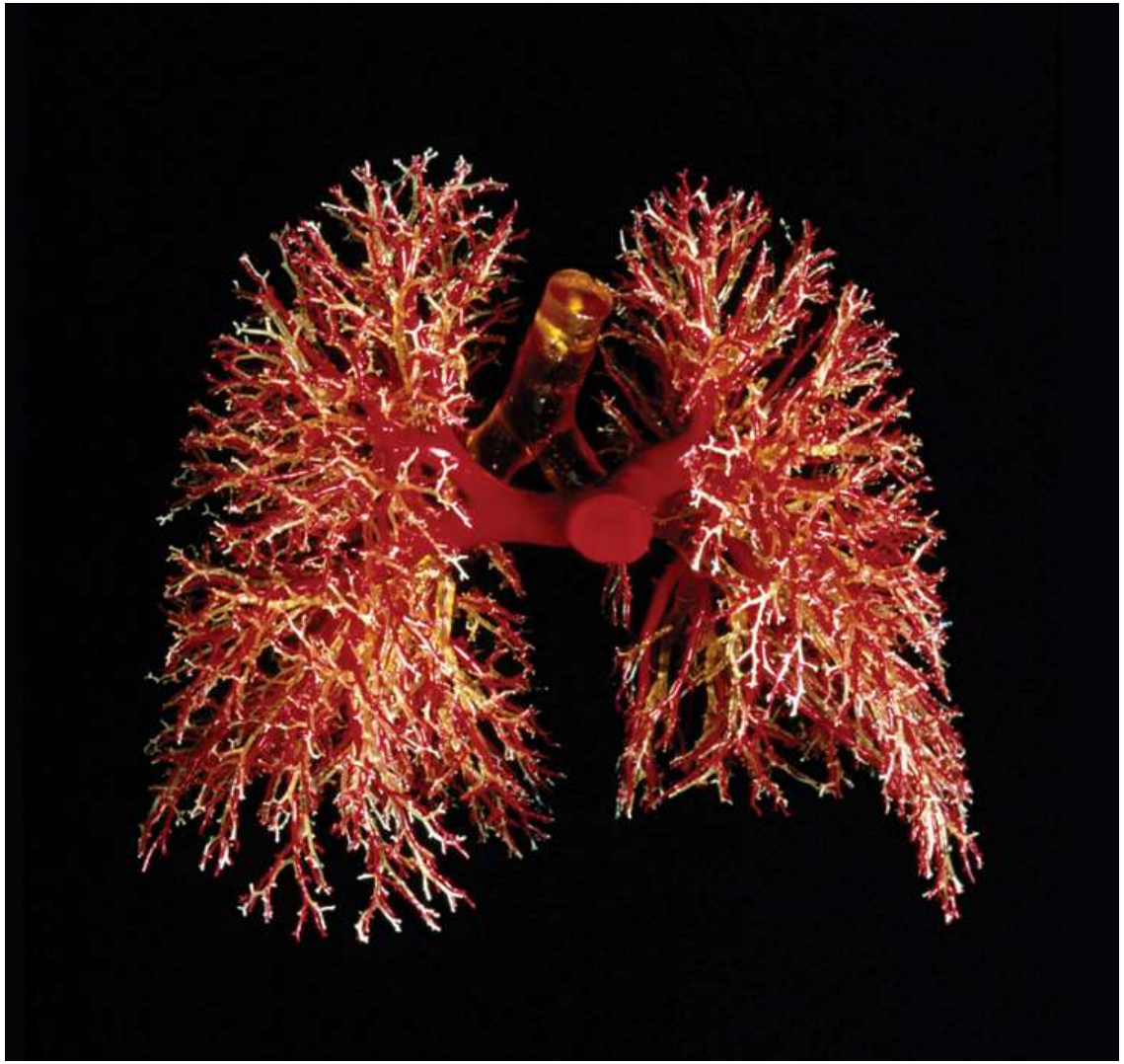
Blood

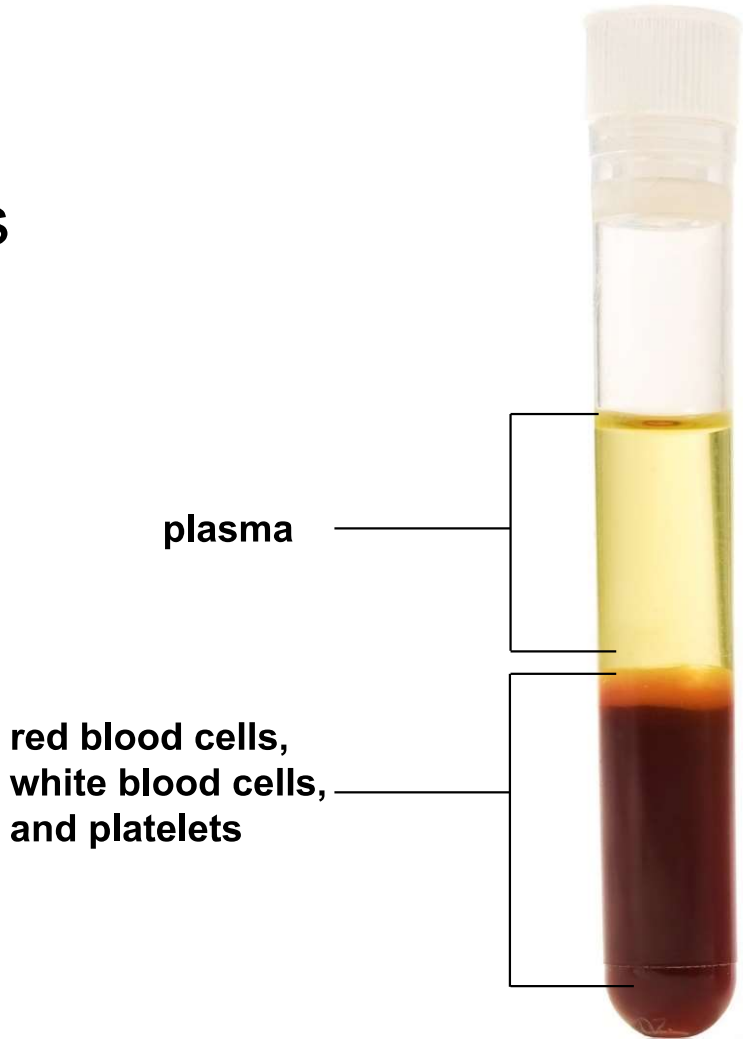
KEY CONCEPT

Blood is a complex tissue that transports materials.



Blood

- **Blood is composed mainly of cells, cell fragments, and plasma.**
  - Whole blood is made up of different materials.
    - plasma
    - red blood cells
    - white blood cells
    - platelets

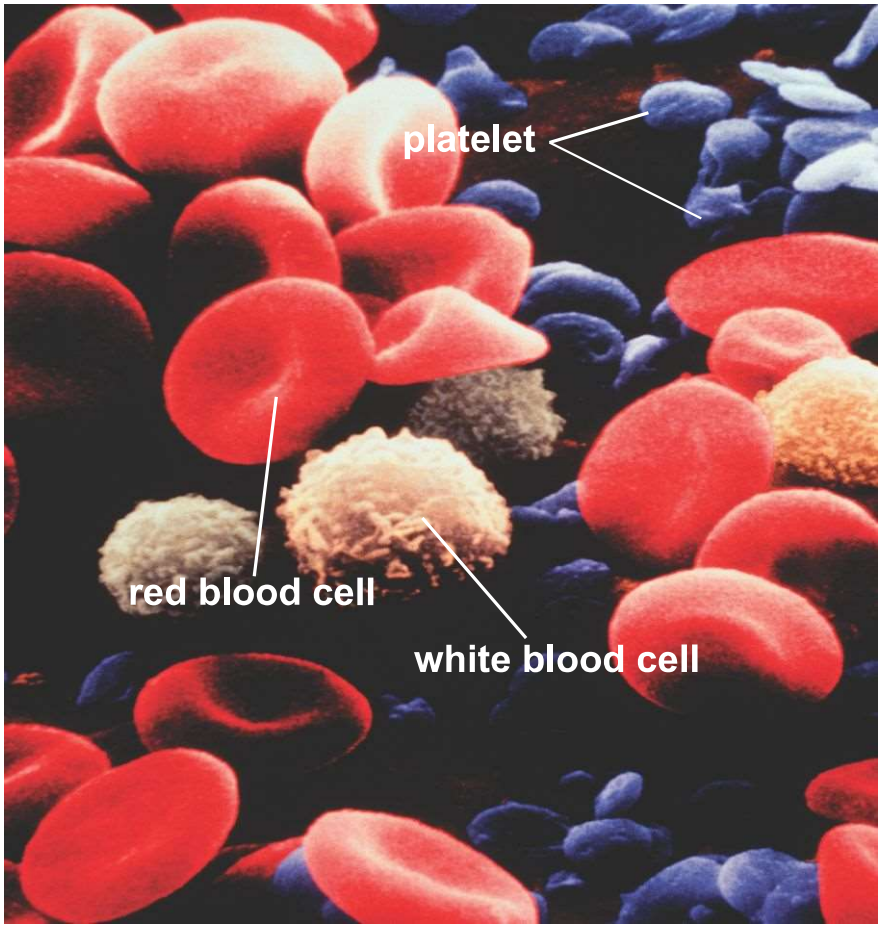


Blood

- Plasma is a key factor in maintaining homeostasis.
  - molecules diffuse into and out of plasma
  - contains proteins that stabilize blood volume
  - contains clotting factors
  - contains immune proteins

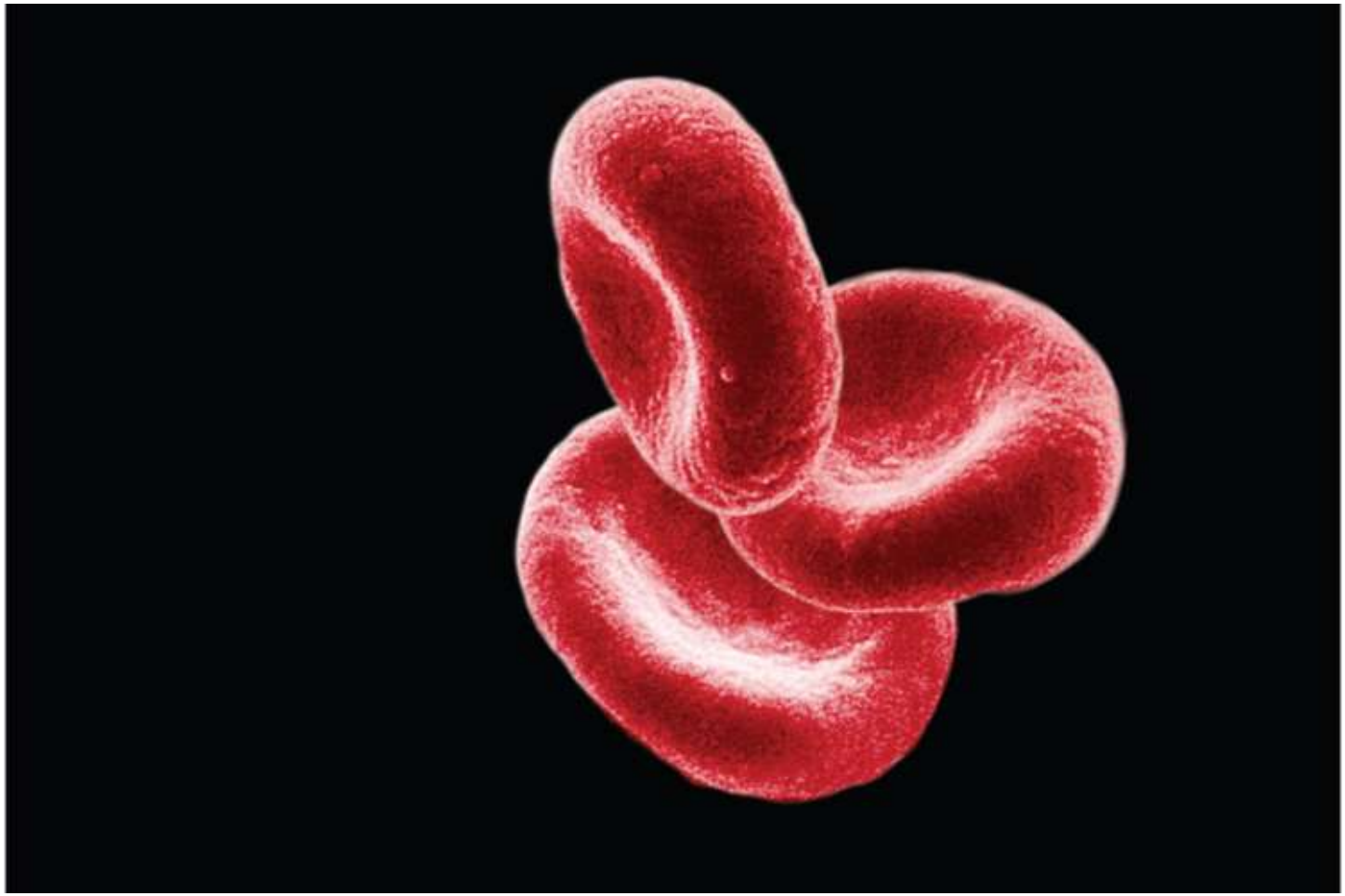
Blood

- **Platelets and different types of blood cells have different functions.**
  - The bone marrow manufactures most of the blood components.



Blood

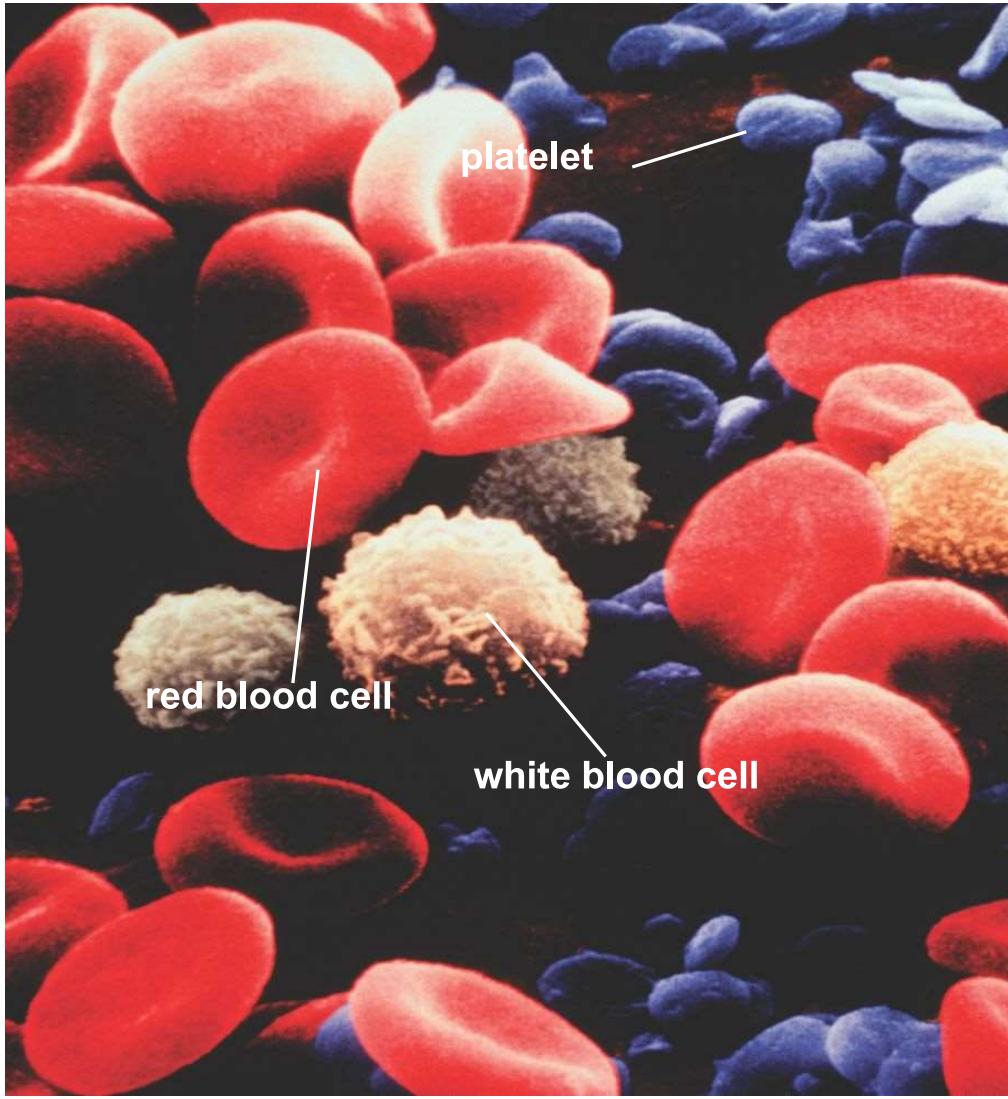
- Red blood cells make up 40-45 % of all blood cells.
  - transport oxygen to cells and carry away carbon dioxide
  - have no nuclei and contain hemoglobin



Blood

- White blood cells fight pathogens and destroy foreign matter.

- Has no hemoglobin
- Has nucleus
- Can be part of circulatory or lymphatic system
- Immune system part



Blood

- Protein markers define blood types and Rh factors.
  - ABO blood group the most common
  - Rh factor can be negative or positive
  - blood types must be compatible for transfusions

FIGURE 30.16 ABO Rh BLOOD COMBINATIONS

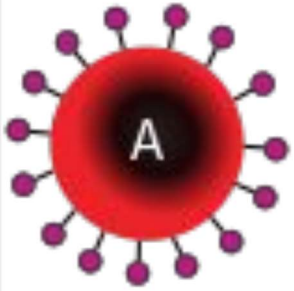
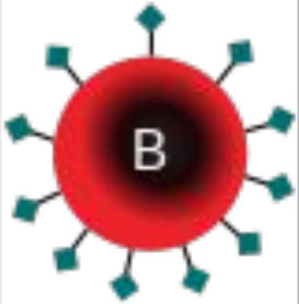
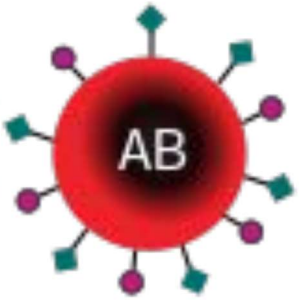
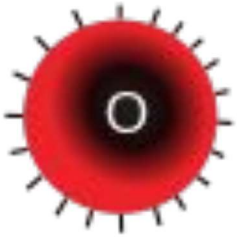
BLOOD TYPE	CAN DONATE TO	CAN RECEIVE FROM
A	A, AB	A, O
B	AB, B	B, O
AB	AB	A, B, AB, O
O	A, B, AB, O	O
Rh FACTOR	**CAN DONATE TO**	**CAN RECEIVE FROM**
Rh^+ factor	Rh^+	Rh^+, Rh^-
Rh^- factor	Rh^+, Rh^-	Rh^-

Blood

- **Rh factor**
  - Rh is a blood protein that can be present (Rh+) or absent (Rh-)
  - A blood with Rh+, can receive Rh+ or Rh- (no immune response)
  - A blood with Rh-, cannot receive Rh+, otherwise the immune system will make proteins that cause Rh+ cells to swell

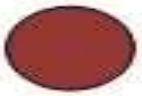
Blood

- **Blood groups:**

	Group A	Group B	Group AB	Group O
Red blood cell type				
Antibodies in plasma	 Anti-B	 Anti-A	None	 Anti-A and Anti-B
Antigens in red blood cell	 A antigen	 B antigen	 A and B antigens	None

Blood

- **Blood group determination:**

Blood group	Anti-A	Anti-B	Anti-D	Control
A+				
A-				
B+				
B-				
AB+				
AB-				
O+				
O-				
Not valid				

Blood

- Platelets help form clots that control bleeding.