Glencoe Science

Biology

Interactive Classroom

Click the advance arrow or press the space bar to continue

Mc Graw Hill Glencoe

34.1 Circulatory System

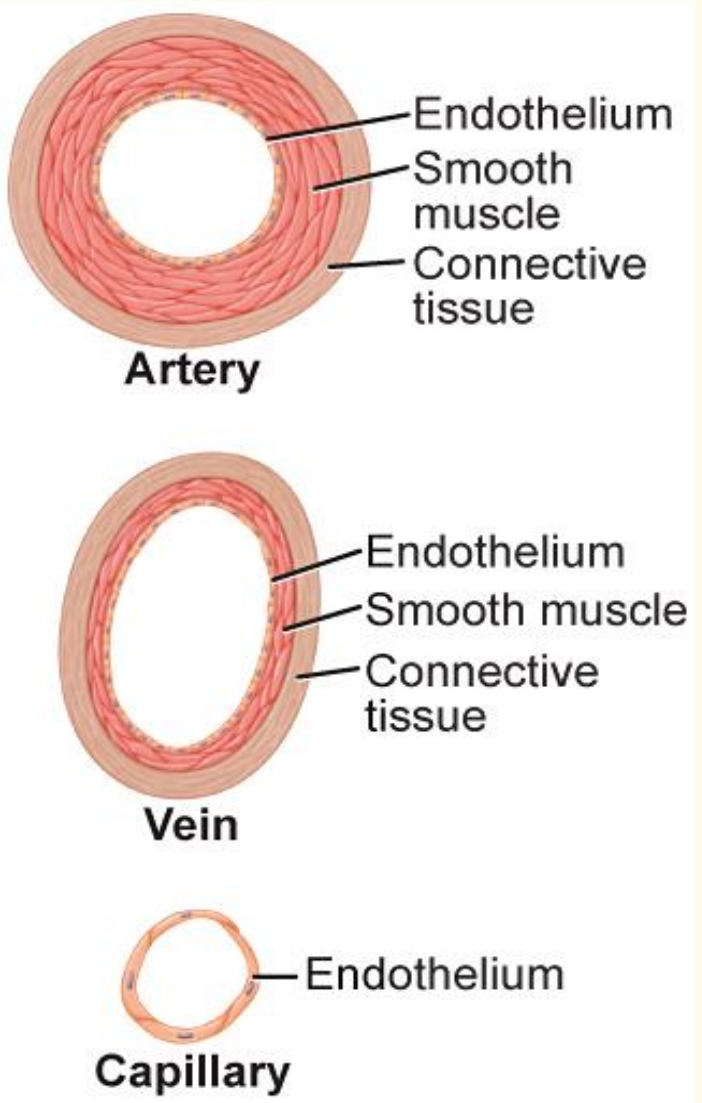
Functions of the Circulatory System

- Transports oxygen and nutrients
- Carries disease-fighting materials produced by the immune system
- Contains cell fragments and proteins for blood clotting
- Distributes heat throughout the body to help regulate body temperature

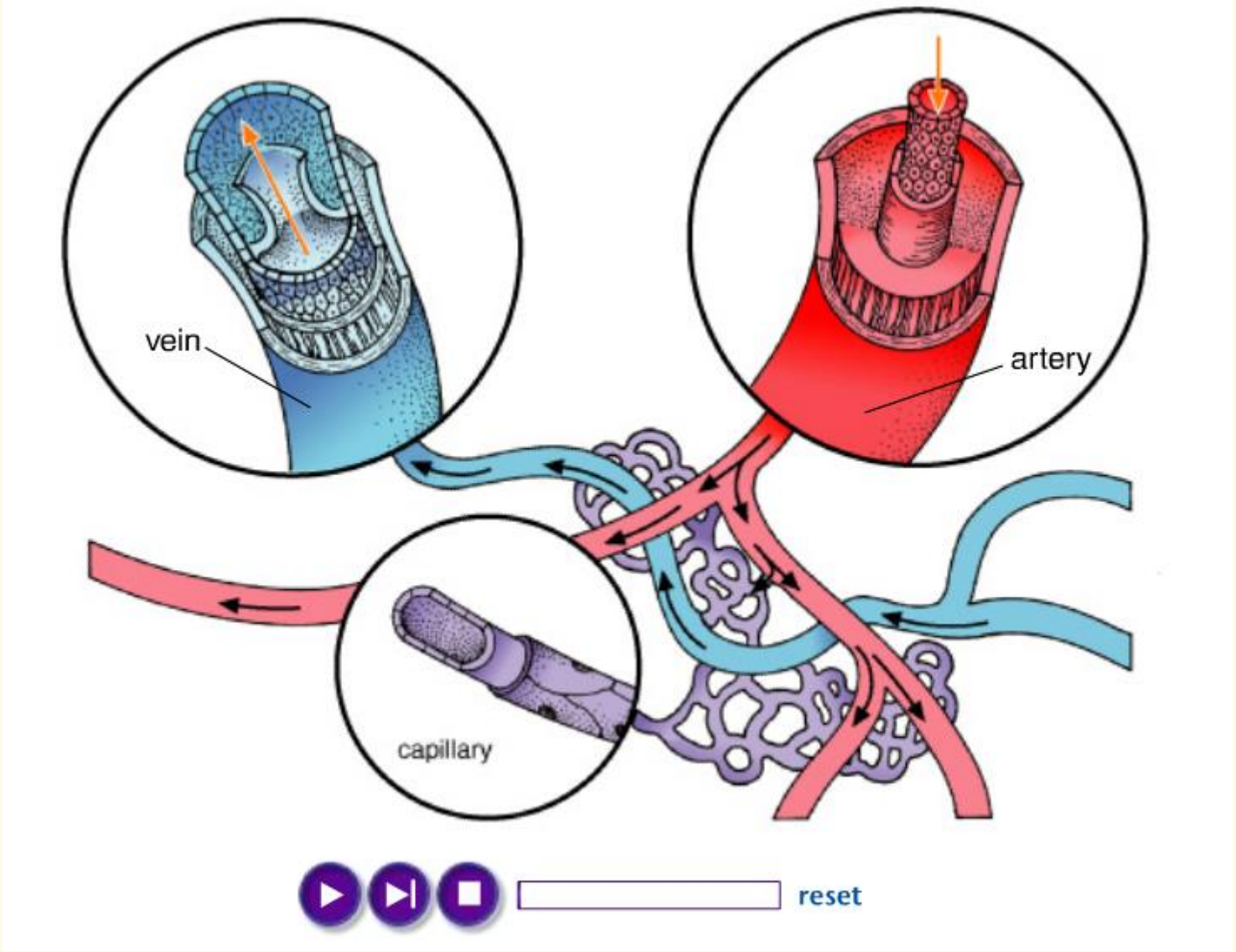
34.1 Circulatory System

Blood Vessels

- Arteries
- Capillaries
- Veins



Concepts In Motion



34.1 Circulatory System

Arteries

- Oxygen-rich blood is carried away from the heart.
- Arteries are composed of three layers:
  - Outer layer of connective tissue
  - Middle layer of smooth muscle
  - Inner layer of endothelial tissue

34.1 Circulatory System

Capillaries

- Microscopic blood vessels where the exchange of important substances and wastes occur
- The walls are only one cell thick.

34.1 Circulatory System

Veins

- Carry oxygen-poor blood back to the heart
- Contraction of skeletal muscles helps keep the blood moving.

34.1 Circulatory System

The Heart

- A hollow, muscular organ that pumps blood throughout the body
- Pumps oxygenated blood to the body
- Pumps deoxygenated blood to the lungs

34.1 Circulatory System

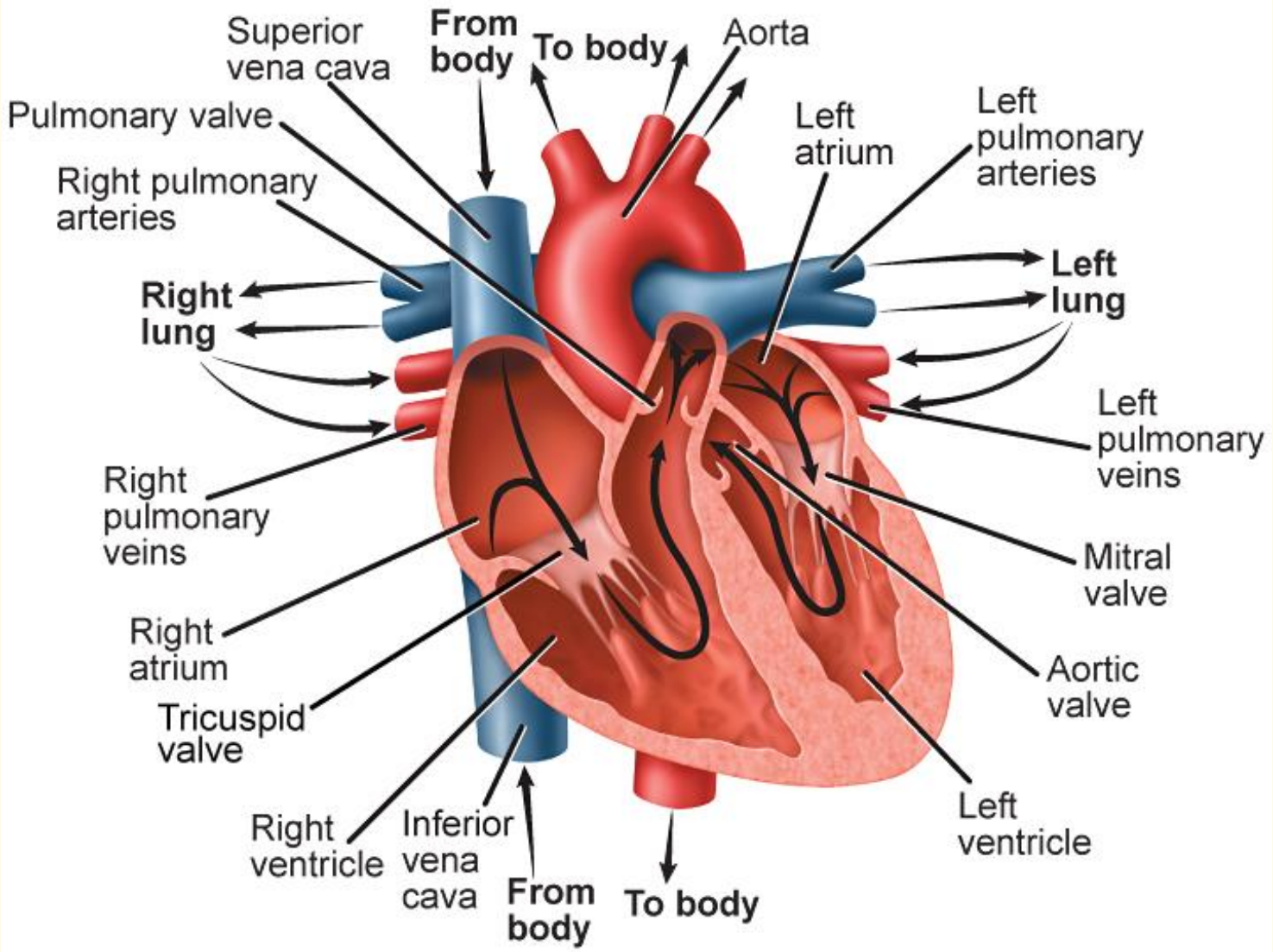
Structure of the Heart

- Divided into four compartments called chambers
- The right atrium and the left atrium receive blood returning to the heart.
- The right and left ventricles pump blood away from the heart.

34.1 Circulatory System

- A strong muscular wall separates the left side of the heart from the right side of the heart.
- Valves separate the atria from the ventricles and keep blood flowing in one direction.

34.1 Circulatory System



34.1 Circulatory System

How the Heart Beats

- The atria fill with blood.
- The atria contract, filling the ventricles with blood.
- The sinoatrial (SA) node sends out signals that cause both atria to contract.
- The signal travels to another area in the heart called the atrioventricular node, causing both ventricles to contract.

34.1 Circulatory System

Pulse

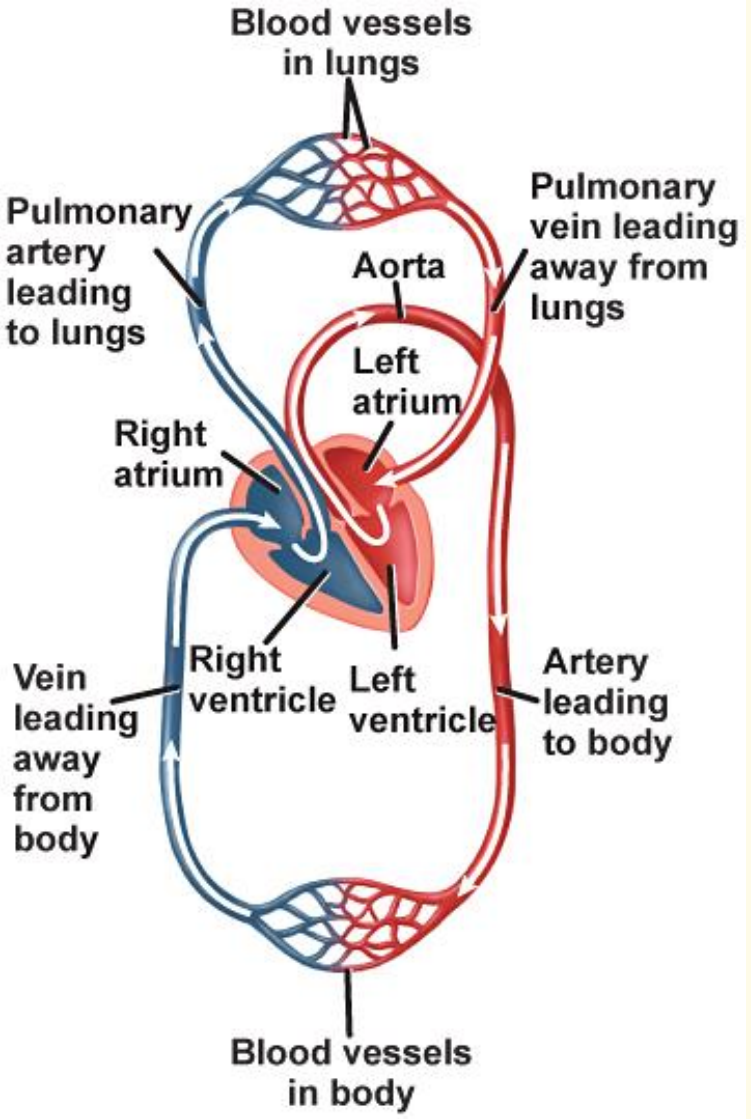
- The alternating expansion and relaxation of the artery wall caused by contraction of the left ventricle

Blood Pressure

- A measure of how much pressure is exerted against the vessel walls by the blood

34.1 Circulatory System

- Deoxygenated blood flows from the right atrium into the right ventricle and is pumped into the pulmonary arteries that lead to the lungs.
- Oxygenated blood flows from the lungs to the left atrium of the heart.



Concepts In Motion

Circulatory System

34.1 Circulatory System

- The blood moves from the left atrium into the left ventricle, which pumps the blood into the largest artery in the body, the aorta.
- Oxygen is released from the blood into the body cells by diffusion, and carbon dioxide moves from the cells to the blood by diffusion.

34.1 Circulatory System

Plasma

- Carries glucose, fats, vitamins, minerals, hormones, and waste products from the cells

34.1 Circulatory System

Red Blood Cells

- Carry oxygen to all of the body's cells
- Consist of an iron-containing protein called hemoglobin
- Hemoglobin chemically binds with oxygen molecules and carries oxygen to the body's cells.

34.1 Circulatory System

Platelets

- Collect and stick to the vessel at the site of the wound
- Release chemicals that produce a protein called fibrin
- Fibrin is a protein that weaves a network of fibers across the cut that traps blood platelets and red blood cells.

34.1 Circulatory System

White Blood Cells

- Recognize disease-causing organisms
- Produce chemicals to fight the invaders
- Surround and kill the invaders

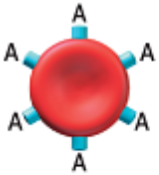
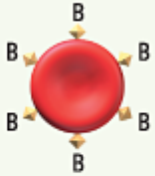
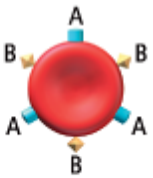
34.1 Circulatory System

Blood Types

- There are four types of blood—A, B, AB, and O.

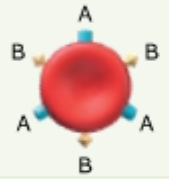
Rh Factor

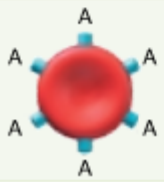
- Another marker found on the surface of red blood cells

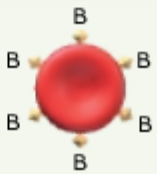
	Blood Groups			
Blood type	A	B	AB	O
Marker molecule and antibody	Marker molecule: A Antibody: anti-B	Marker molecules: B Antibody: anti-A	Marker molecules: AB Antibody: none	Marker molecules: none Antibodies: anti-A, anti-B
Example				
Can donate blood to:	A or AB	B or AB	AB	A, B, AB, or O
Can receive blood from:	A or O	B or O	A, B, AB, or O	O

Concepts In Motion

Table 34.1 Blood Groups

Blood type	Marker molecule and antibody	Example	Can donate blood to:	Can receive blood from:
A	Marker molecule: A Antibody: anti-B	Marker molecules: B Antibody: anti-A	Marker molecules: AB Antibody: none	Marker molecules: none Antibodies: anti-A, anti-B
B				
AB				A, B, AB, or O
O	A or O			





AB | O | A or AB

B or AB | B or O | A, B, AB, or O

Reset | Submit | Show me

Chapter Resource Menu

Click on a hyperlink to view the corresponding lesson.

Chapter Diagnostic Questions

CheckPoint

Identify the structures that carry blood away from the heart.

A. valves

B. veins

C. arteries

D. capillaries

Chapter Diagnostic Questions

CheckPoint

True or False

Only veins have valves to prevent backward flow of blood.

Chapter Diagnostic Questions

CheckPoint

Name the blood component that is helpful in clotting.

A. platelets

B. plasma

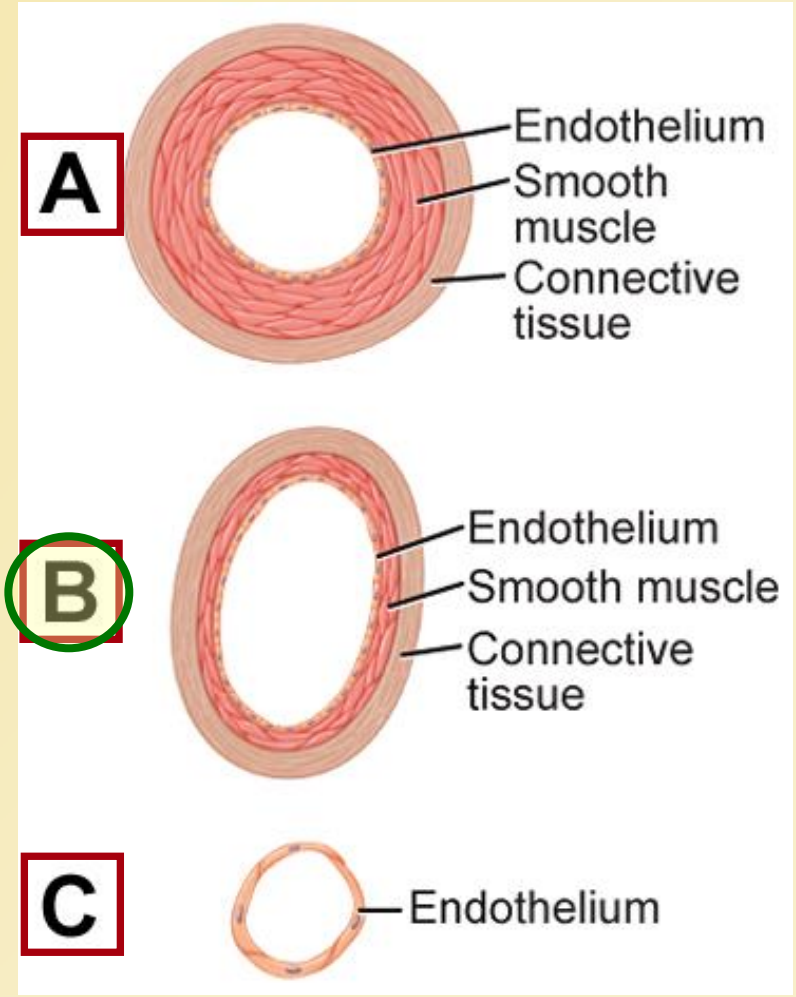
C. red blood cells

D. white blood cells

34.1 Formative Questions

CheckPoint

Which is a vein?



34.1 Formative Questions

CheckPoint

Which blood vessels have valves that prevent blood from flowing backward?

A. arteries

B. arterioles

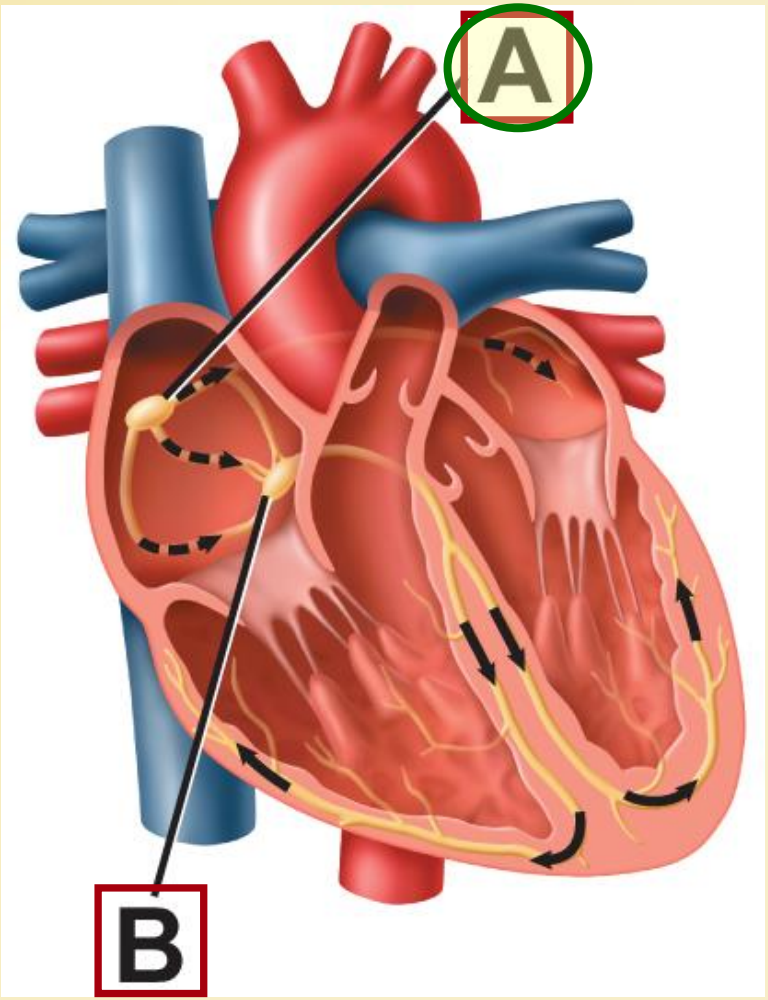
C. veins

D. venules

34.1 Formative Questions

CheckPoint

Which node is the pacemaker for the heart?



34.1 Formative Questions

CheckPoint

Which blood component carries most of the carbon dioxide produced in the body's cells?

A. hemoglobin

B. plasma

C. platelets

D. red blood cells

34.2 Formative Questions

CheckPoint

Which is *not* one of the defenses against foreign materials entering the lungs?

A. cilia

B. mucous

C. nose hairs

D. trachea

34.2 Formative Questions

CheckPoint

How is oxygen and carbon dioxide transported into and out of cells?

A. by diffusion

B. by osmosis

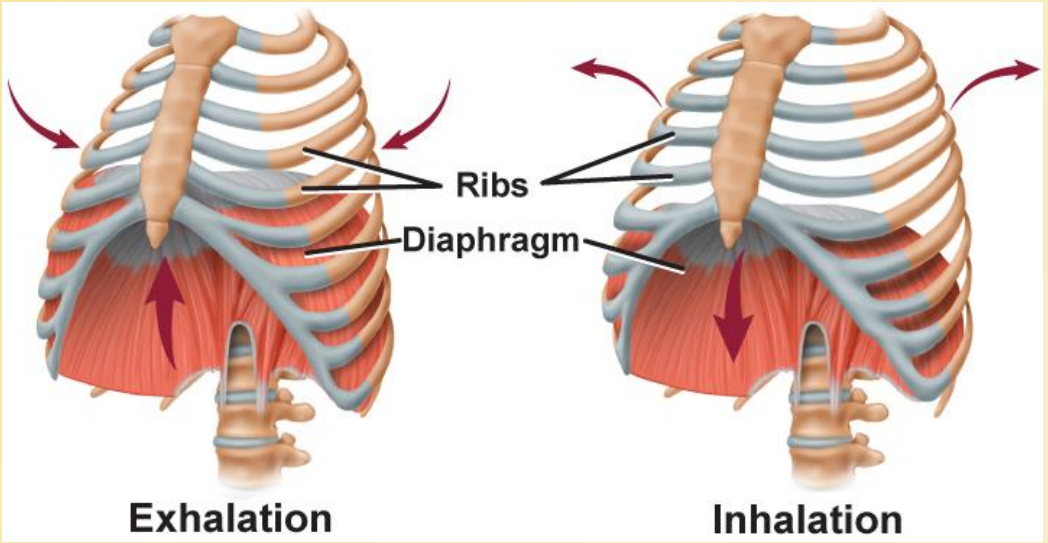
C. by active transport

D. by membrane pumps

34.2 Formative Questions

CheckPoint

What causes inhalation of air to the lungs?



A. Rib and diaphragm muscles contract.

B. Rib and diaphragm muscles relax.

34.2 Formative Questions

CheckPoint

What internal stimulus causes breathing rate to increase?

A. a high concentration of O_2 in the blood

B. a high concentration of CO_2 in the blood

C. a low concentration of O_2 in the blood

D. a low concentration of CO_2 in the blood

34.2 Formative Questions

CheckPoint

Which is an example of internal respiration?

A. Air in the lung moves into and out of alveoli.

B. Carbon dioxide is carried from body tissues to the lungs.

C. Oxygen in alveoli diffuses into red blood cells.

D. Oxygen in red blood cells diffuses into tissue cells.

34.3 Formative Questions

CheckPoint

What is the role of the skin in the excretory system?

A. It controls levels of CO_2 and other gases.

B. It excretes water and salts.

C. It regulates the pH of the blood.

D. It removes minerals and urea.

34.3 Formative Questions

CheckPoint

How do the kidneys help maintain pH homeostasis in the body?

A. by adjusting the balance of electrolytes in urine

B. by excreting hydrogen ions and reabsorbing buffers

C. by increasing or decreasing the reabsorption of water

D. by regulating the level of carbon dioxide in the blood

34.3 Formative Questions

CheckPoint

What condition results from crystallization of mineral compounds in the kidney?

A. Bowman's disorder
B. kidney stones
C. nephritis
D. polycystic disease

34.3 Formative Questions

CheckPoint

What is the immediate result of kidney failure?

A. Fluid-filled cysts grow in the kidney.

B. The body rejects the kidney.

C. The urinary tract becomes blocked.

D. Waste products build up in the blood.

Chapter Assessment Questions

CheckPoint

Sequence the flow of blood through the heart beginning with the right atrium.

Answer: Deoxygenated blood flows from the right atrium to the right ventricle, and then to the lungs and back to the left atrium and into the left ventricle which pumps oxygen-rich blood to the body and returns to the right atrium.

Chapter Assessment Questions

CheckPoint

Which is *not* true of red blood cells?

A. live for about 120 days

B. fight disease

C. develop in the marrow

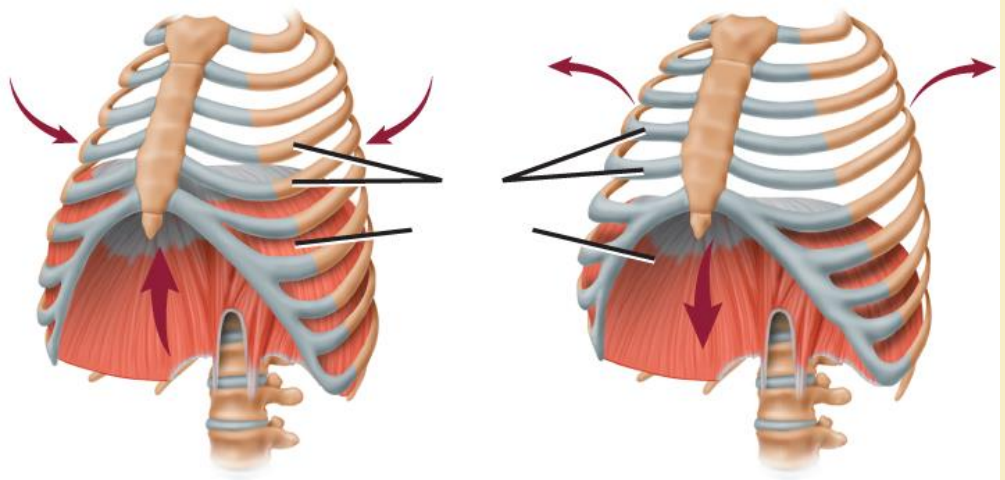
D. have no nuclei

Chapter Assessment Questions

CheckPoint

What structure contracts during inhalation?

A. bronchi
B. diaphragm
C. ribs
D. pharynx



Standardized Test Practice

CheckPoint

Which heart chamber is responsible for the pulse you can feel in your wrist?

A. left atrium

B. left ventricle

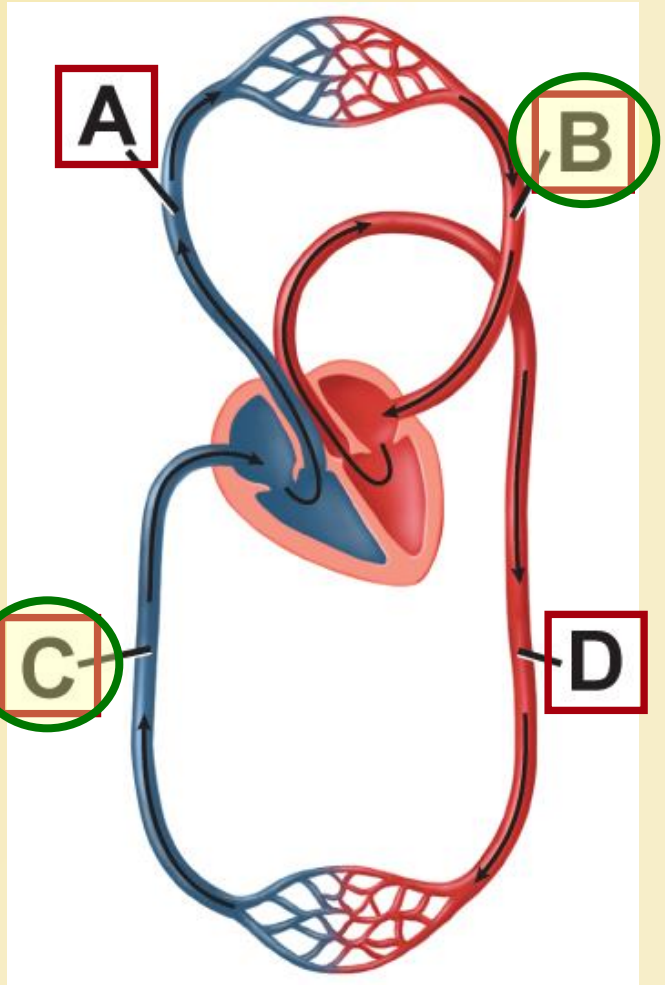
C. right atrium

D. right ventricle

Standardized Test Practice

CheckPoint

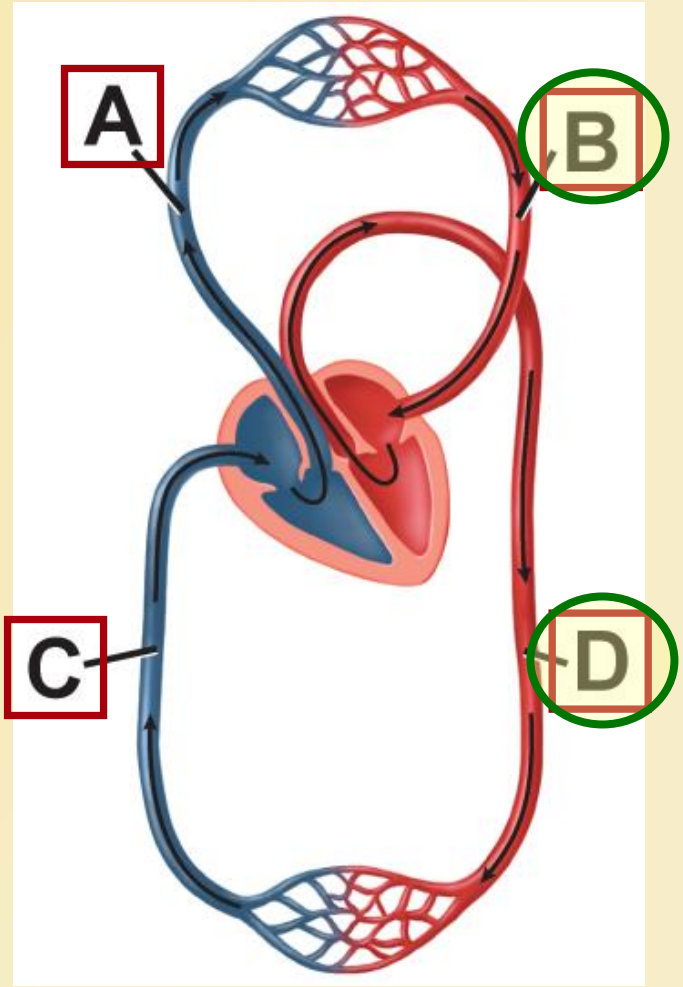
Which two blood vessels are veins? (Two answers)



Standardized Test Practice

CheckPoint

Which two blood vessels carry oxygenated blood?
(Two answers)



Standardized Test Practice

CheckPoint

Why should a girl with type A blood *not* receive a transfusion of type AB blood?

A. She has A markers on her blood cells.

B. She has A and B markers on her blood cells.

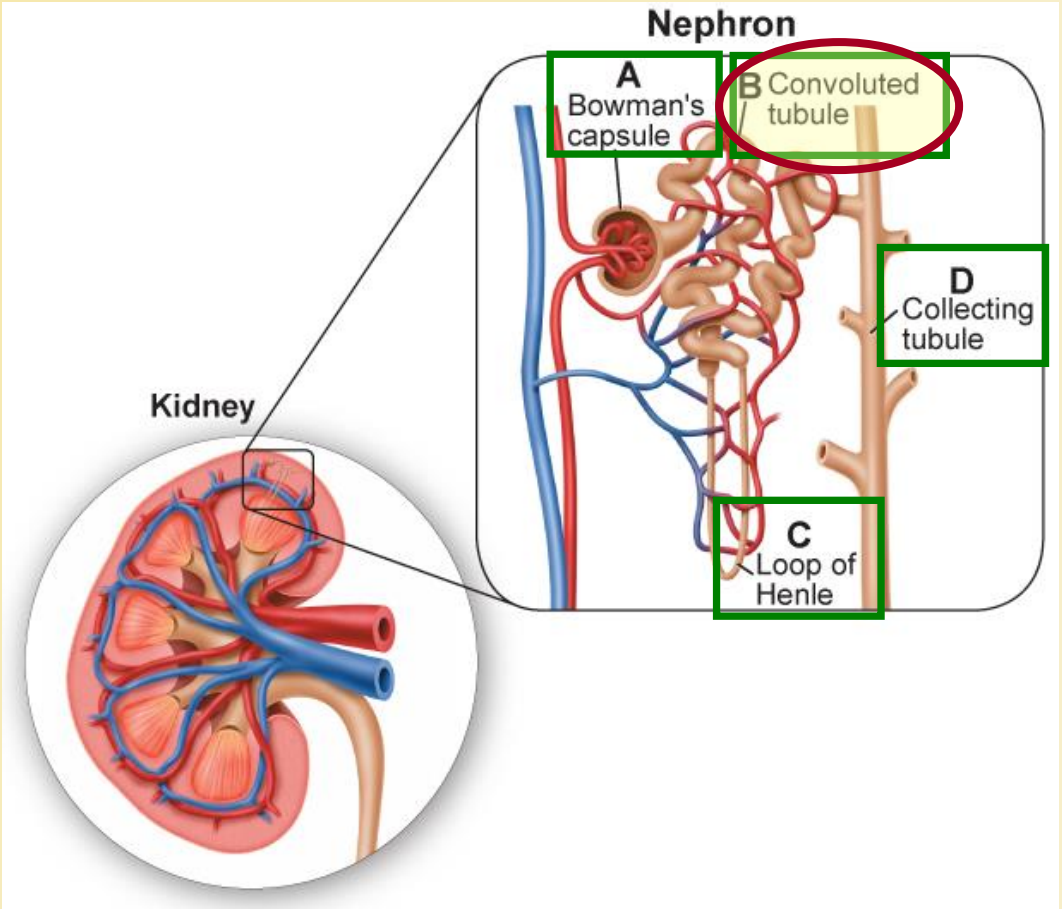
C. She has Anti-A antibodies in her blood plasma.

D. She has Anti-B antibodies in her blood plasma.

Standardized Test Practice

CheckPoint

Where is urea filtered out of the blood?



Standardized Test Practice

CheckPoint

What is the function of the convoluted tubule and the Loop of Henle?

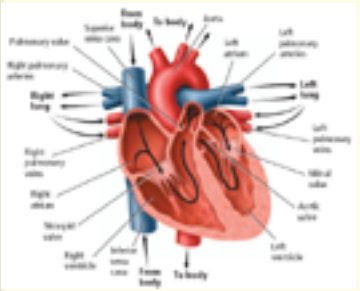
A. accumulate urea and toxins

B. filter out sugars and proteins

C. reabsorb water and glucoset

D. store salts and minerals

Glencoe Biology Transparencies



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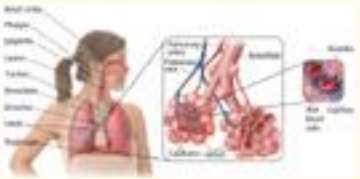


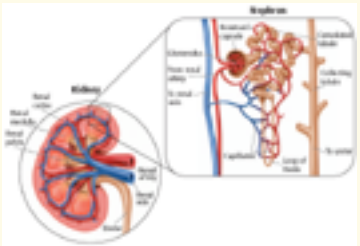
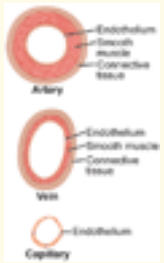
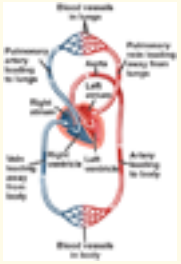
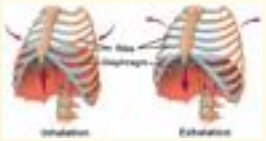


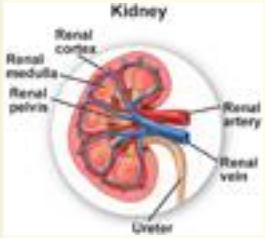
Image Bank

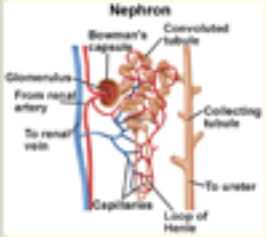

Endothelium
Smooth muscle
Connective tissue
Artery
Endothelium
Smooth muscle
Connective tissue
Vein
Endothelium
Capillary






Lungs
Skin
Kidney
Ureter
Urinary bladder
Urethra


Kidney
Renal cortex
Renal medulla
Renal pelvis
Renal artery
Renal vein
Ureter


Nephron
Bowman's capsule
Convoluted tubule
Glomerulus
From renal artery
To renal vein
Collecting tubule
To ureter
Capillaries
Loop of Henle

Vocabulary

Section 1

- artery
- capillary
- vein
- valve
- heart
- pacemaker
- plasma
- red blood cell
- platelet
- white blood cell
- atherosclerosis

Vocabulary

Section 2

- breathing
- external respiration
- internal respiration
- trachea
- bronchus
- lung
- alveolus

Vocabulary

Section 3

- kidney
- urea

Animation

Concepts In Motion

- Arteries, Capillaries, and Veins
- Circulatory System
- Visualizing Gas Exchange
- Kidney Filtration