

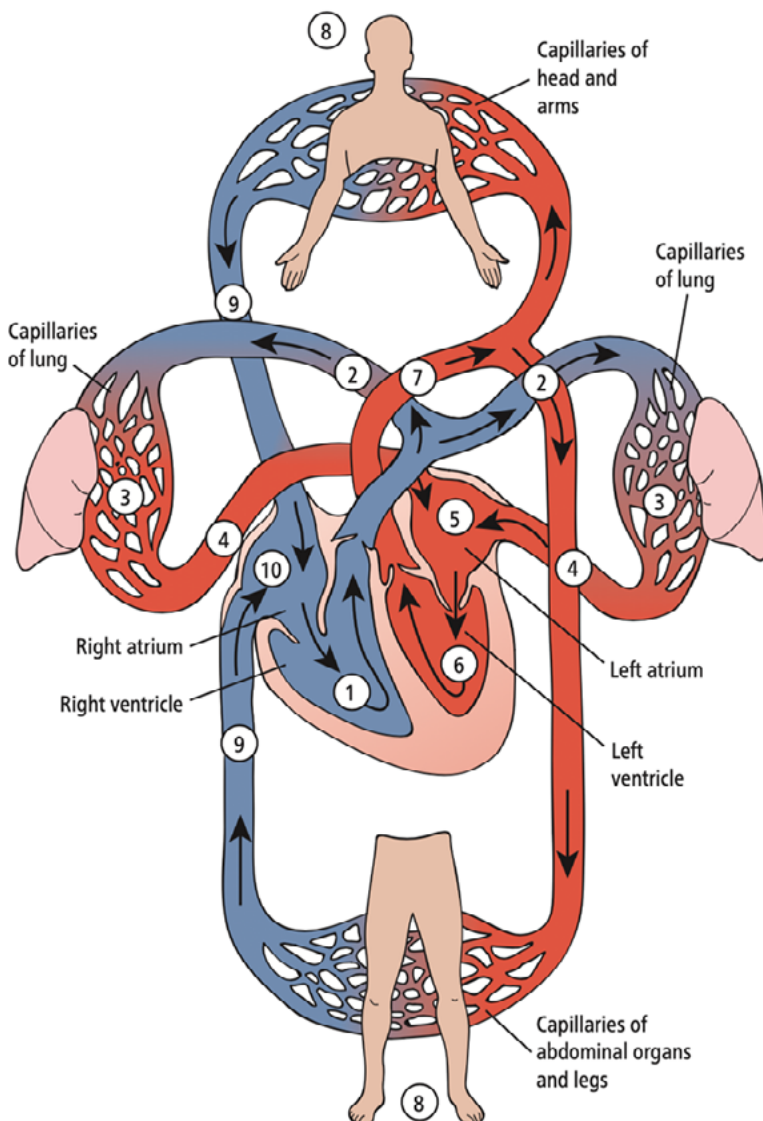
# Maintaining the Body

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## 14.2 The Path of Blood Flow

Like all good food, garbage, and mail services, the circulatory system does not move blood haphazardly around the body but follows a set route, shown in Figure 14.4. The path of blood flow through the body allows the circulatory system to efficiently carry out one of its primary tasks, delivering oxygen to tissues. How does blood flow?



**FIGURE 14.4**

This figure shows the path of blood flow around the body. Blue indicates deoxygenated blood, and red indicates oxygenated blood.

Let's start with blood returning from the body to the heart. Blood returning from the body contains low levels of oxygen—it is *deoxygenated*. This deoxygenated blood flows from veins into the right atrium of the heart. The right atrium pumps it to the right ventricle. The right ventricle pumps it out arteries that go to the lungs. There, at the lungs, blood picks up oxygen and drops off carbon dioxide. The blood is now *oxygenated*.

Oxygenated blood flows back to the heart through veins that go to the left atrium. The left atrium pumps blood to the left ventricle. The left ventricle then pumps it out arteries that go to tissues all over the body.

The oxygen in the blood diffuses into the cells of all your tissues; every one of your cells needs oxygen. After carrying oxygen to the tissues, blood becomes deoxygenated again and returns to the heart. This entire circuit takes about one minute.





**FIGURE 14.5**

A doctor checks her patient's blood pressure.

## Blood Pressure

A common procedure when visiting your doctor is having your blood pressure measured—you may remember the cuff that is placed around your arm that tightens and then relaxes again (Figure 14.5). What exactly is blood pressure, and why do doctors measure it? Pressure is defined as the force exerted over a unit of area. *Blood pressure* is a measure of the pressure your blood exerts against the walls of your arteries.

This pressure is what causes blood to flow through your blood vessels. Blood pressure is highest in the arteries near the heart. It then decreases as blood flows through the arteries to the arterioles, capillaries, venules, and veins. It is lowest just before blood returns to the heart.

When your blood pressure is measured, two separate numbers are reported. The *systolic blood pressure* is the maximum blood pressure in your arteries, which occurs when the ventricles of the heart are contracting. The *diastolic blood pressure* is the minimum blood pressure in your arteries, which occurs when the ventricles are filling with blood and your heart is resting between beats. Blood pressure is reported as the systolic pressure “over” the diastolic pressure. A normal blood pressure is anything around 120/80 mmHg or lower—that is, a systolic blood pressure that is 120 mmHg or lower, and a diastolic blood pressure that is 80 mmHg or lower. Notice that the units for blood pressure are mmHg (millimeters of mercury). This is the amount of pressure that it takes to push a column of mercury up 1 millimeter. Although mmHg is not a metric system unit, it became standard because mercury was used in the first accurate pressure gauges. This unit of measurement is still widely used in medicine.

A person with high blood pressure has a heart that is working hard. High blood pressure is associated with many health problems, including heart disease, heart attacks, heart failure, kidney disease, and strokes. Unfortunately, high blood pressure is fairly common today. Many people develop the condition with age. A variety of other factors can contribute to high blood pressure, including stress, smoking, lack of exercise, an unhealthy diet, and alcohol consumption. High blood pressure is usually treated with medication.

### READING CHECK

- 1. Which chambers of the heart contain oxygenated blood? Which chambers contain deoxygenated blood?**
- 2. Most arteries carry oxygenated blood, and most veins carry deoxygenated blood. Are there any exceptions?**
- 3. Heart failure is a condition in which the heart gradually becomes too weak to effectively pump enough blood to the body. Early symptoms include fatigue and getting out of breath easily. Why can high blood pressure contribute to heart failure?**



## CHECK YOUR ANSWERS

1. The left atrium and left ventricle contain oxygenated blood that has just returned from the lungs. The right atrium and right ventricle contain deoxygenated blood that has just returned from the body.
2. There are only a few exceptions. The arteries that carry blood from the heart to the lungs carry deoxygenated blood. The veins that carry blood from the lungs to the heart carry oxygenated blood.
3. High blood pressure means the heart is working hard to pump blood. Eventually, the heart cannot keep up with its workload and begins to fail.

You can review the path of blood around the body here:

<https://www.dummies.com/education/science/biology/the-path-of-blood-through-the-human-body/>

