

Lesson 13

The Many Different Jobs of Cells

Materials Needed:
sheet of poster board
markers, colored pencils or crayons

So far we have talked about cells in general. We have talked about how they get energy, what they look like, how they make products in their factory, and how they reproduce (divide). You might have gotten the idea that all cells are pretty much alike. This is not true. Cells come in many different sizes and shapes. They carry out many different jobs within the body of a **multicellular** (many-celled) **organism** like a human or a rabbit. In this lesson you will learn about how cells perform many different jobs in an organism. In order to do this, cells had to become **specialized**—able to do one job well. You will also learn about how cells are organized (**levels of organization**) within the body of an organism, such as a horse or a butterfly, into systems that work together to sustain life.

Take a look at your model of the cell as a city. Inside your city there are different parts that do different things. The nucleus has all the plans for making products in the cell. The nucleolus makes RNA to direct the activities of the ribosomes or the endoplasmic reticulum. The mitochondrion makes energy so that the ribosomes can make proteins and other chemicals. All the different parts of the cell have to work together so that the cell can survive. It is much the same for a multicellular organism. In the human body the heart has to pump so that your blood can carry food and oxygen to your cells. Your digestive system has to break up the food you eat so that it can get into your blood. The cells of your **circulatory system** (heart, blood, and

blood vessels) and your **digestive system** (stomach, intestines, and digestive organs) are specialized.

A good example of a specialized cell is a heart cell. If you isolate a heart cell in the laboratory (put it by itself) it will sit there and beat. If you put another heart cell touching the one you already have, it will beat too. They start out beating to a different rhythm, but after a few moments they get together and start to beat to the same rhythm, just as they do in a heart. This is the only thing that these cells can do. If you put them anywhere else in the body of an organism, they would just beat along as if they were in the heart. This is what it means to be specialized. Specialized cells can only do one job. They can't change their minds if they find themselves in a new environment (place). When cells specialize, they are no longer able to live on their own, but must be part of a greater whole. The more specialized cells become at one function, the more they depend on other cells to do the other functions for them.

If a cell can only do one job and is part of an organism, then there must be some organization within that larger body. An organism cannot work well if it is not organized. Imagine what it would be like if you went to the supermarket to buy several cans of dog food and the store was not organized. Normally, you would go to the pet food area and pick up what you need and leave after only a few minutes. What if the store was not organized and the cans of dog food were all over the store? You would have to go to every aisle searching for what you needed. It would probably take you a long time. You would almost certainly stop going to that store and so would the other customers. Pretty soon the store would be out of business. It would be the same for a living being. If the cells that did the same jobs were not organized together, the body would *go out of business*, that is, die.

Activity 13:1—Levels of Organization

You are going to make a chart to keep the levels of organization within a multi-cellular organism straight. Call this chart Levels of Organization. Get a piece of poster board to start making your chart. You will follow the organization of the circulatory system. The first thing to go on the chart is a heart cell. This is the lowest level of organization. You will start with the lowest level and work your way to the top. Label this Drawing #1. Your drawing of a heart cell should look something like the picture below.

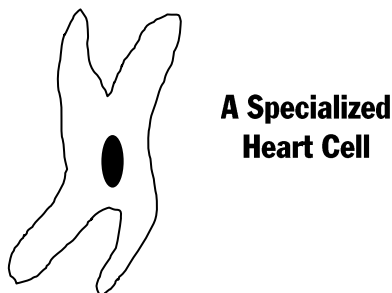


Figure 13.1

As was stated before, cells that are specialized need to be together. A group of simple cells working together to perform a certain function is called a **tissue**. A tissue is the next level of organization in a healthy body. There are actually five types of tissue that make up the human body. Add a drawing of several heart cells grouped together. Label this Drawing #2 in your Levels of Organization chart. Your drawing should look something like the drawing below.

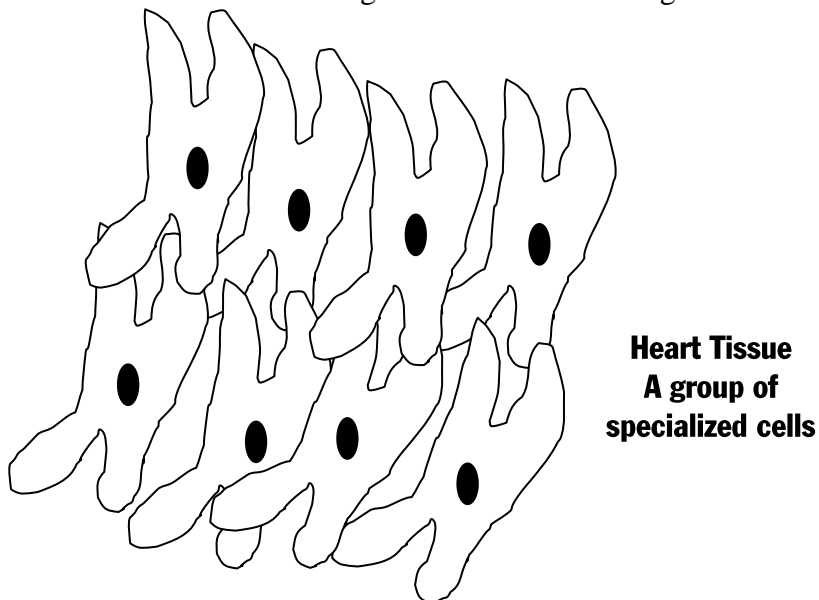


Figure 13.2

The next level up on your chart is an **organ**. An organ is a group of different tissues that work together to get one job done. In the circulatory system, the heart is the main organ. There are several different tissues within the heart. There are the cells that beat. There are the cells that make up the valves. The valves open and close when the heart beats so that blood does not travel backwards. There are the cells of the heart's blood vessels that keep the heart supplied with food and oxygen. Now you can add a picture of a heart to your chart. It is the third level of organization within a multicellular organism. You can use the picture shown here and add it to your chart or you may be artistic and want to draw one of your own.

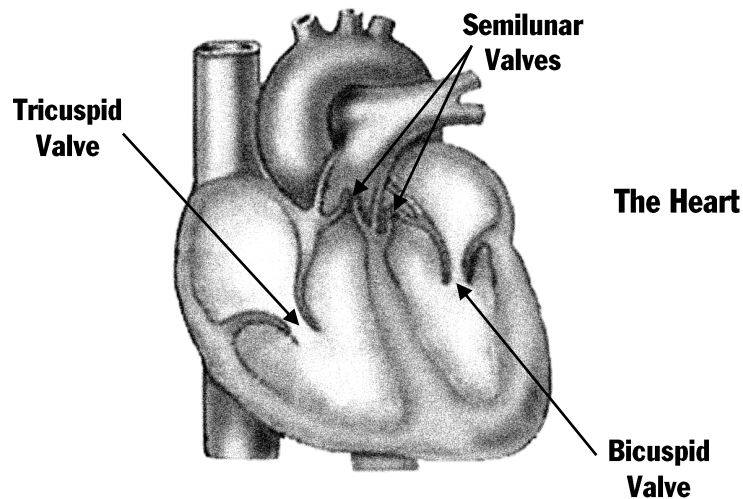


Figure 13.3

The final level of organization in the body is an **organ system**. An organ system is a group of organs that all work together to get one major job done. The circulatory system is a group of different organs that makes sure that the blood gets to every cell in the body. Add a picture of the circulatory system to your chart. You may use the picture shown here or draw a picture of your own.

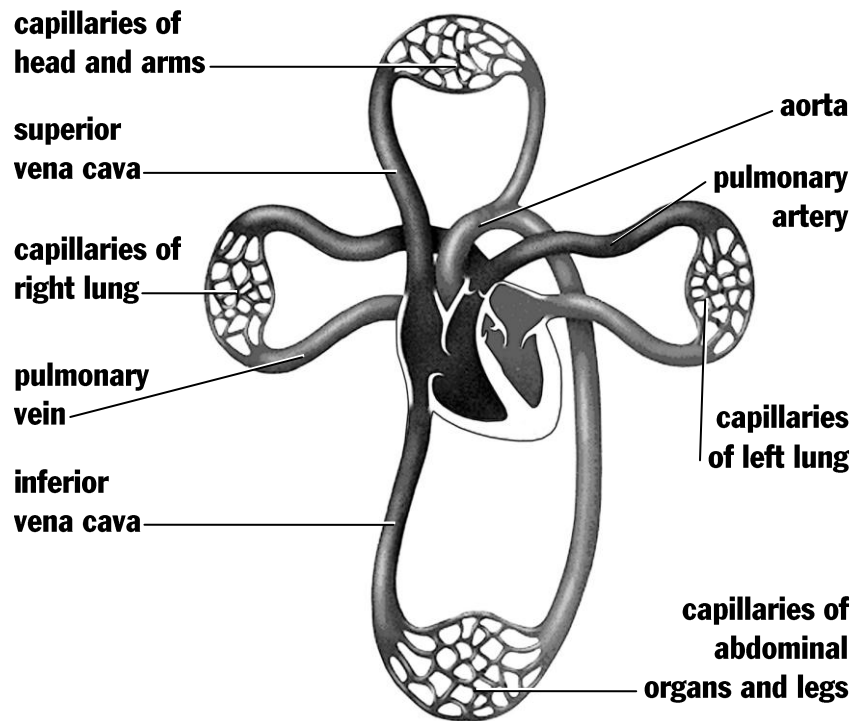


Figure 13.4: The circulatory system

Vocabulary Review

Use what you have learned in this lesson to define the following words.

multi-cellular organism

specialized cell

levels of organization

circulatory system

digestive system

tissue

organ

organ system

Analysis

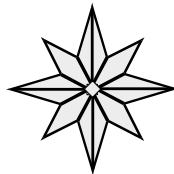
1. Are all cells alike? Give a couple of reasons that explain your answer.

2. How is a single cell that can live on its own like the body of a many-celled organism?

3. Give an example of a specialized cell and explain what its job is.

4. Why do the parts of the body of a multicellular organism need to be organized?

5. Do organs have several different types of specialized cells or only one type?



End of Lesson 13