LESSON

10 How Do Cells Help Animals Live?

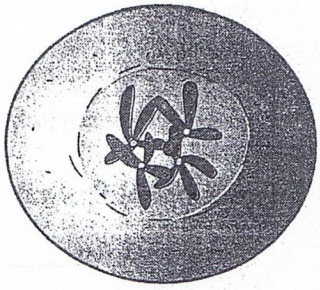
You have learned that cells specialize and cooperate to help an animal live, grow, and work. Like plant cells, animal cells depend on mitosis to make new cells for growth and to repair damaged cells. In time, all cells wear out and die. The body needs a way to remove these cells. The body also needs new cells to continue the body's work.

Look at the steps in mitosis shown in the art on this page. During mitosis, a parent cell copies its genetic material, and then divides the material between two new daughter cells. Let's use blood cells to demonstrate how important it is that genetic material is copied and divided carefully.

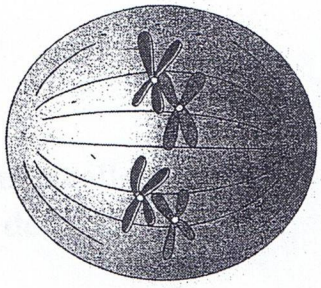
The **marrow** in the center of your bones produces red blood cells. The red blood cells deliver oxygen to every cell and then remove the waste, or carbon dioxide, from each cell. Altogether, a human body holds about 25 trillion red blood cells, but each of these cells lives only about four months. To keep your body's supply of healthy red blood cells, more than two million red blood cells are made by mitosis each second. How is this possible? Picture one parent cell dividing into two daughter cells. The daughter cells divide to make four cells. The four cells divide again to make eight cells. After twenty cell divisions, over one million cells are made. Each new blood cell must have a complete set of genetic material to do its job.

By the time you are an adult, mitosis will have taken place in your body about two trillion times every 24 hours. That's about 25 million cell divisions every second. The genetic material inside each cell tells new cells what size and shape to be, what organelles to have, and what work to do.

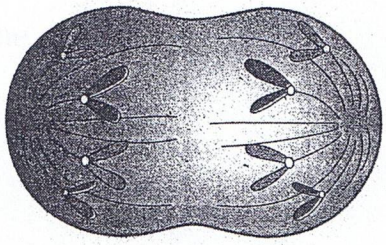
Mitosis, or Cell Division, in Animal Cells



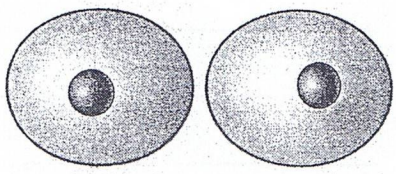
Chromosomes have copied themselves. The membrane of the nucleus breaks apart.



Chromosomes line up in the middle of the cell.



Partner chromosomes move to opposite sides, and the parent cell begins to pinch off in the middle.



Two new cells have been formed.

A.

Write the missing word or words in each sentence.

1. To replace dead and damaged cells, an animal must _____.
   (take vitamins, rest every day, make new cells)
2. In mitosis, the parent cell makes an exact copy of its _____.
   (cytoplasm, genetic material, mitochondria)
3. Daughter cells are _____ their parent cell.
   (exactly like, different from, stronger than)
4. Blood cells are made in your _____.
   (heart, bones, muscles)
5. In an adult human, mitosis happens about _____ times every day.
   (one million, two billion, two trillion)

B.

The sentences below describe the steps of mitosis in animal cells. Write 1, 2, 3, 4, and 5 to show the correct order. The first one is done for you.

_____ Partner chromosomes move to opposite sides.

_____ Cell membranes form around the two new cells.

__1__ The chromosomes copy themselves.

_____ The chromosomes line up in the middle of the cell.

_____ The membrane of the nucleus breaks apart.

C.

Write one or more sentences to answer the question.

A starfish that loses an arm grows a new arm. How do the animal's cells know how to do this?

_____

_____

_____

_____