

Mitosis

Have you ever wondered how living things grow? Living things are made of cells. To grow bigger, they need more cells. Where do the new cells come from? Each cell divides, turning into two cells. Two cells turn into four cells, and four into eight. That is how living things grow.

Cell Cycle

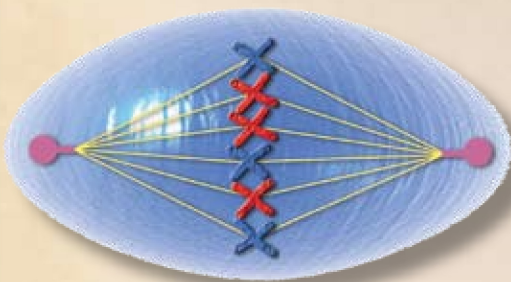
Cells cannot just split in half. They create complete copies of themselves. The copies include their DNA, the recipe for building new cells. The DNA must be copied exactly. That is the only way each cell can survive and work properly. The steps that cells go through are called the Cell Cycle. Each step is called a phase.

The Cell Cycle starts with a period of growth called interphase, which occurs in three steps. In the first step, the cell processes all the materials it needs to grow stronger. Then the DNA makes a copy of itself. These DNA copies are linked at a point called the centromere. Interphase ends as the cell checks to be sure the newly copied DNA is in order. Now the cell is ready to divide.

Five Phases

Cell division, or mitosis, occurs in five phases. They are the prophase, metaphase, anaphase, telophase, and cytokinesis. Mitosis takes about two hours to complete.

Prophase is the first phase of mitosis. The cell's nuclear membrane disappears, and the strands of DNA that paired off during interphase thicken. They become short, stubby rods called chromatids. The stubby rods look like tiny Xs. They are attached at the center by the centromere.



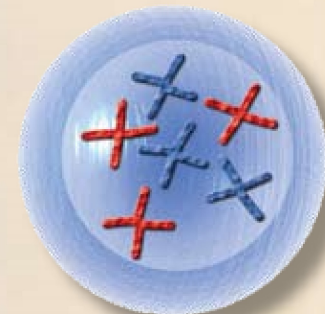
metaphase

The second phase of mitosis is metaphase. The chromosome pairs move to the center, or equator, of the cell. The pairs line up across the equator.

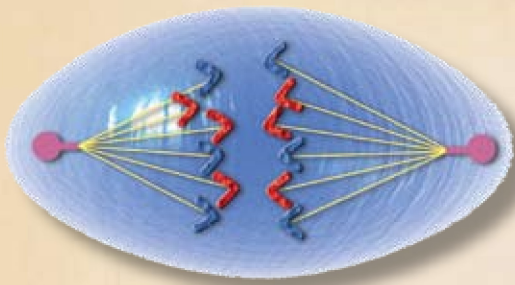
Next, the protein threads grow toward the centromeres in the chromosomes. The threads grow from the centrioles, which sit at the cell's north and south poles. The threads connect the centrioles and the centromeres. This new connection is called the spindle.



interphase

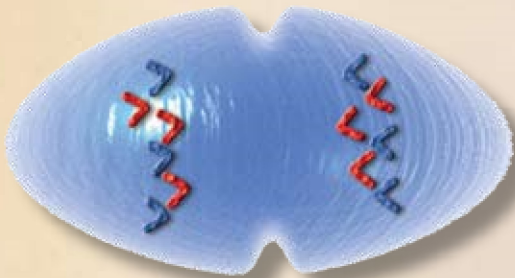


prophase



anaphase

Anaphase is the third phase of mitosis. The spindle lengthens. This makes the cell longer, too. The threads pull the chromosomes toward the poles. Identical sets of chromosomes move toward the poles. Each pole now contains a complete set of chromosomes. When the cell divides, each cell will contain a complete set of the same genetic recipe.



telophase

Mitosis is nearly complete. Telophase is the fourth phase. During telophase, the chromosomes finally arrive at the north and south poles of the cell. They begin to organize themselves into new nuclei. A membrane forms around each new nucleus. The spindle fibers disappear. A dent or furrow begins to form down the center of the cell.

Cytokinesis is the final phase of mitosis. The dent pinches the cell into two daughter cells.

Mitosis is complete. Now the cell returns to interphase. It will process materials and get ready to go through the cell cycle all over again.



cytokinesis

Comprehension Question

Describe the five phases of mitosis.