

## The Cell Cycle

What is the cell cycle?

When does the cell cycle begin?

What are the two phases of the cell cycle?

What happens during the M phase of the cell cycle?

What phase of the cell cycle do cells spend most of their time in?

You have observed children and animals growing up and changing. All living things have a distinct life cycle- a pattern of growth in which the organism changes over time. Just like living things, cells also go through a life cycle, called the cell cycle. A cell cycle is a repeated pattern of cellular growth, preparation for division, and division. The cell cycle begins when a cell forms. The cell cycle ends when the cell divides to produce two new cells. These two new cells then begin the cycle again.

The cell cycle consists of two phases. One phase is called the M phase. The M stands for mitosis. Mitosis is the process in which a nucleus divides to form two nuclei (from one nucleus to two nuclei). Mitosis is followed by the division of the cytoplasm, called cytokinesis. Together the divisions of the nucleus and cytoplasm make up the M phase of the cell cycle. The other phase of the cell cycle is called Interphase. Cells spend most of their time in interphase.

What is inside the cell's nucleus?

What are chromosomes made of?

What does DNA stand for?

What happens during interphase?

What happens during mitosis?

What are the steps of mitosis?

What happens during cytokinesis?

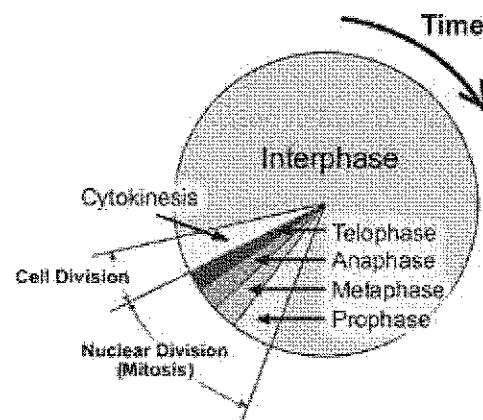
Remember that the cell's nucleus contains the genetic information. This genetic information is stored in structures called chromosomes. The chromosomes are made of deoxyribonucleic acids, DNA. Before a cell can begin mitosis, the DNA (genetic material) must first be copied. The copying of the genetic information (DNA) occurs during Interphase. Once interphase is complete, the cell is ready to begin M phase.

During mitosis, the cell's nucleus divides into two nuclei. First the chromosomes line up in the middle of the cell, each member of the chromosome pair then moves to the opposite end of the cell, and finally the nucleus divides with each nucleus having the same kind and number of chromosomes as the original cell. The last step of the M phase is called cytokinesis. During cytokinesis, the cytoplasm divides.

Look at the picture:

How does the cell spend most of its time in the cell cycle?

What are the names of the 4 steps of mitosis?



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Notice most of the cell cycle is interphase, where the genetic material is duplicated.

Mitosis is the way that most cells divide.

Interphase is the phase of the cell cycle in which the cell spends the majority of its time and performs the majority of its purposes including preparation for cell division. In preparation for cell division, it increases its size and makes a copy of its DNA. Interphase is also considered to be the 'living' phase of the cell, in which the cell obtains nutrients, grows, reads its DNA, and conducts other "normal" cell functions. The majority of eukaryotic cells spend most of their time in interphase.

Mitosis typically consists of four stages: prophase, metaphase, anaphase, and telophase. During prophase, the chromosomes are visible; little structures called centrioles move to opposite sides of the cell; and spindle fibers move across the cell. In metaphase, the duplicated chromosomes line up across the center of the cell and each centromere—the center part of each chromosome—attaches to two spindle fibers. The centromeres divide during anaphase, and identical chromosomes separate and move to opposite sides of the cell. During telophase, spindle fibers start to disappear. Chromosomes uncoil and it becomes harder to see them. Each mass of chromosomes develops its own nuclear membrane to make a new nucleus. After mitosis, the cell membrane splits and two whole new cells are formed.

What is mitosis?

What happens in a cell during interphase?

Why is Interphase called the "living phase"?

For each of the phases of mitosis, describe *in your own words* what is happening to the **chromosomes**:

Prophase-

Metaphase –

Anaphase-

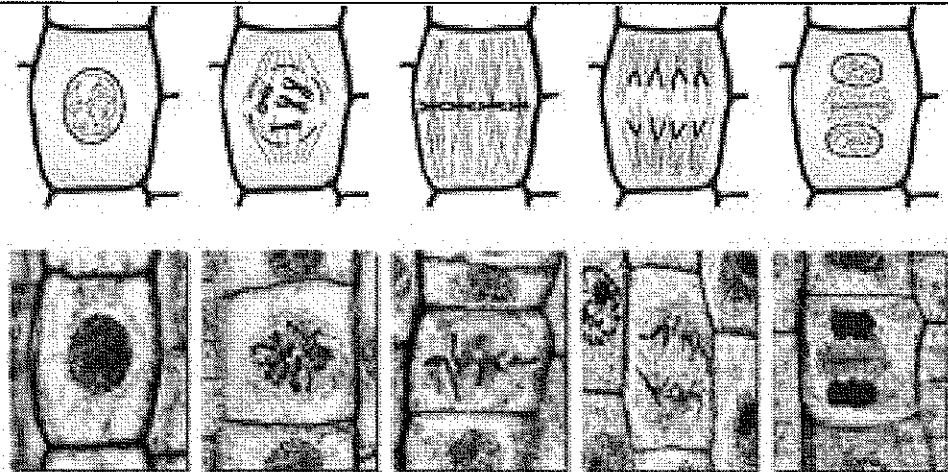
Telophase-

What is the result of mitosis?

Which phase is the longest?

In which phase does DNA replication occur?

Interphase      Prophase      Metaphase      Anaphase      Telophase



Describe what is happening in mitosis:

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