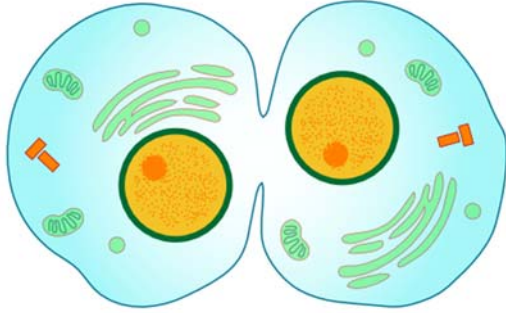


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The Marvelous World of Mitosis



Mitosis is a fascinating process that takes place inside the cells of our bodies. It plays a crucial role in the cell cycle, ensuring that our bodies can grow, repair, and replace damaged or old cells. In this reading passage, we will explore what mitosis is and delve into its primary purpose in the cell cycle.

What is Mitosis?

Mitosis is a complex and highly regulated process that occurs in the nucleus of eukaryotic cells, such as the cells in our bodies. Eukaryotic cells have a nucleus that houses genetic material, which is organized into structures called chromosomes. Each species has a specific number of chromosomes, and in humans, there are 46 chromosomes grouped into 23 pairs.

The Stages of Mitosis

Mitosis consists of several stages, each with a specific purpose. These stages are:

- **Interphase:** Before mitosis begins, the cell goes through a phase called interphase. During interphase, the cell grows, duplicates its DNA, and prepares for cell division. This is the longest phase of the cell cycle.
- **Prophase:** In this stage, the DNA condenses into visible chromosomes, and the nuclear envelope begins to break down. Mitotic spindles, tiny structures made of protein, start forming and extending from opposite ends of the cell.
- **Metaphase:** During metaphase, the chromosomes line up along the cell's equator, also known as the metaphase plate. The mitotic spindles attach to the centromere of each chromosome, ensuring they are evenly distributed to the daughter cells.
- **Anaphase:** In anaphase, the sister chromatids, which are two identical copies of each chromosome, are pulled apart towards opposite ends of the cell. This ensures that each daughter cell receives an identical set of chromosomes.
- **Telophase:** During telophase, the separated chromatids arrive at opposite poles of the cell. A new nuclear envelope forms around each set of chromosomes, creating two distinct nuclei within the cell.

Name _____

- **Cytokinesis:** Cytokinesis is the final stage, which is often included with mitosis. During this stage, the cell membrane pinches inwards, dividing the cell into two daughter cells, each with its own nucleus and identical genetic material.

The Purpose of Mitosis in the Cell Cycle

Now that we know the stages of mitosis, let's explore its primary purpose in the cell cycle.

The cell cycle is the series of events that a cell goes through as it grows and divides. Mitosis is a crucial part of this cycle, serving several important purposes:

- **Growth:** One of the primary reasons for mitosis is to help an organism grow. As an organism grows, its cells multiply through mitosis, allowing it to become larger and more complex.
- **Tissue Repair:** When you get a cut or scrape, your body needs to replace the damaged cells to heal the wound. Mitosis helps in this process by producing new cells to replace the damaged ones.
- **Cell Replacement:** Our bodies are continually replacing old or worn-out cells. For example, the lining of our digestive tract is replaced every few days. Mitosis ensures that these cells are replaced efficiently, maintaining the health and function of our organs.
- **Asexual Reproduction:** Some organisms, like single-celled organisms and certain plants, reproduce through a process called asexual reproduction. Mitosis plays a vital role in generating offspring with the same genetic makeup as the parent organism.

In summary, mitosis is a remarkable process that enables cells to divide and multiply, supporting growth, tissue repair, and cell replacement. It plays a vital role in the cell cycle, ensuring the proper functioning and maintenance of our bodies.

