Cell Division Encyclopedia Article

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Cell Division

Cell division is the process where a single living cell splits to become two or more distinct new cells. All cells divide at some point in their lives. Cell division occurs in single-celled organisms like **bacteria**, in which it is the major form of reproduction called binary fission, or in multicellular organisms like plants, animals, and fungi. Many cells continually divide, such as the cells that line the human digestive tract or the cells that make up human skin. Other cells divide only once.

There are two major ways in which biologists categorize cell division. The first, **mitosis**, is simple cell division that creates two daughter cells that are genetically identical to the original parent cell. Mitosis begins with **replication** of the **DNA** within the cell to form two copies of each **chromosome**. Once two copies are present, the cell splits to become two new cells by cytokinesis, or formation of a fissure. Mitosis occurs in most cells and is the major form of cell division. The second process, called **meiosis** is the production of daughter cells having half the amount of genetic material as the original parent cell. Such daughter cells are said to be **haploid**. Meiosis occurs in human sperm and egg production in which four haploid sex cells are produced from a single parent precursor cell. In both mitosis and meiosis of nucleated cells, shuffling of chromosomes creates **genetic variation** in the new daughter cells. These important shuffling processes are known as independent assortment and random segregation of chromosomes.

The control of cell division is a complex process and is a topic of much scientific research. Cell division is stimulated by certain kinds of chemical compounds. Molecules called cytokines are secreted by some cells to stimulate others to begin cell division. Also, contact with adjacent cells can control cell division. The phenomenon of contact inhibition is a process where the physical contact between neighboring cells prevents cell division from occurring. When contact is interrupted, however, cell division is stimulated to close the gap between cells. Cell division is a major mechanism by which organisms grow, tissues and organs maintain themselves, and wound healing occurs. **Cancer** is a form of uncontrolled cell division.