

Name: _____
Blk: _____ Date: _____

Science 9

Notes on 5.1 The Cell Cycle and Mitosis

Due to the loss and death of cells, the body must replace them. A good example of this is human skin cells - each day millions are shed.

The life of a cell is divided into **three stages** known as the cell cycle:

1. **Interphase:** cell carries out normal functions.
2. **Mitosis:** nucleus divides into two equal parts.
3. **Cytokinesis:** separation of two nuclei and cell contents into two daughter cells.

Interphase:

The longest cell cycle stage a cell performs normal functions and grows

Late Interphase:

DNA must be copied!

If the cell is going to divide, the DNA must first make copies of itself during interphase (DNA replication).

Replication steps:

1. The DNA molecule **unwinds**
2. **New bases** pair with the bases on the original DNA.
3. Two new identical **DNA molecules** are produced.

Duplicated sister chromatids held together by a **centromere**

Mitosis:

Mitosis is the shortest stage of the cell cycle where the nuclear contents divide, and two daughter nuclei are formed.

It occurs in **4 stages:**

1. **Prophase**
2. **Metaphase**
3. **Anaphase**
4. **Telophase**

As the nucleus prepares to divide, replicated DNA in interphase joins to form sister chromatids, joined by a centromere.

Stages of Mitosis:

Early Prophase - nucleolus disappears and spindle fibres form

Late Prophase - spindle fibres attach to centromeres of chromosomes

Metaphase - chromosomes align on equator of cell

Anaphase - spindle fibres pull sister chromatids to opposite poles

Telophase - in this final stage, spindle fibres disappear and a nuclear membrane forms around each separated set of chromosomes.

Mitosis Under the Microscope:

Cytokinesis in an Animal Cell

Example: Frog cell dividing into 2 daughter cells

Cytokinesis in a Plant Cell

Example: A cell plate forms between the 2 new daughter cells

Cell Cycle Problems:

Mutations in genes involving checkpoints can result in an out-of-control cell cycle. The result can be uncontrolled cell division: **cancer**

- Cancer cells have large, abnormal **nuclei**
- Cancer cells are not specialized, so they serve **no function**
- Cancer cells attract blood vessels and grow into **tumours**.
- Cells from tumours can break away to other areas of the body known as **metastasize**

Mitosis Gone Mad: Cancer

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Mitosis Gone Mad: _____