

- Anaphase: sister chromatids separate and move to opposite ends of the cell
- Telophase: nuclear membrane reforms around separated chromosomes
- Cytokinesis: cytoplasm divides equally to form two separate cells

Regulation of Cell Cycle

- Cell cycle is regulated by checkpoints, including G1/S checkpoint
- Tumor suppressor genes and proto-oncogenes play a role in regulation
- Regulation ensures proper DNA replication and cell division

Importance of Cell Cycle and Mitosis

- Cell cycle and mitosis are essential for growth, development, and tissue repair
- Proper regulation of cell cycle and mitosis prevents uncontrolled cell growth, such as cancer
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Phases of Cell Division

- In the S phase, DNA is replicated
- The nuclear envelope will dissolve to allow for separation of chromosomes
- The microtubule organization center (MTOC) will form and connect to the chromosomes to help separate them

Phases of Mitosis

- **Prophase:** chromatin is condensed, the nuclear envelope begins to dissolve, and the MTOC forms
- **Metaphase:** the nuclear envelope is dissolved, and the MTOC takes up residence in the opposite ends of the cell

Components of the MTOC

- The MTOC is formed by centrioles or centrosomes
- From the MTOC, polar and astral microtubules form and connect to the chromosomes

Process of Dissolving the Nuclear Envelope

- Special types of cyclin dependent kinases and enzymes phosphorylate different proteins of the nuclear envelope
- Phosphorylation activates proteases to break down the proteins of the nuclear envelope

Functions of Chromatin

- Chromatin is the structure in which DNA is organized and stored in the nucleus
- Chromatin condenses and becomes chromosomes during cell division to ensure proper separation of genetic material

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