



Mitosis

Section 2

# Eukaryotic Cell Cycle

**Key Idea:** The life of a eukaryotic cell cycles through phases of **growth, DNA replication**, preparation for cell division, and **division of the nucleus and cytoplasm**.

- The **cell cycle** is a repeating sequence of cellular growth and division during the life of a cell.
- The **interphase** is the first three phases of the cell cycle.
- **Mitosis** is the process of dividing the nucleus into two daughter nuclei.
- **Cytokinesis** is the process of separating the organelles and the cytoplasm.

# Phases of the Cell Cycle

- **Phase G1:** Cell Growth
- **S:** DNA Synthesis
- **Phase G2:** Growth and Preparation for Mitosis
- **Mitosis:** Division of Nucleus
- **Cytokinesis:** Division of the Cytoplasm

# Eukaryotic Cell Cycle

- Interphase involves cell growth and preparation for division.
- Each new cell is identical to the original cell.

# Stages of Mitosis

**Key Idea:** Mitosis is a continuous process that can be observed in four stages: **prophase**, **metaphase**, **anaphase**, and **telophase**.

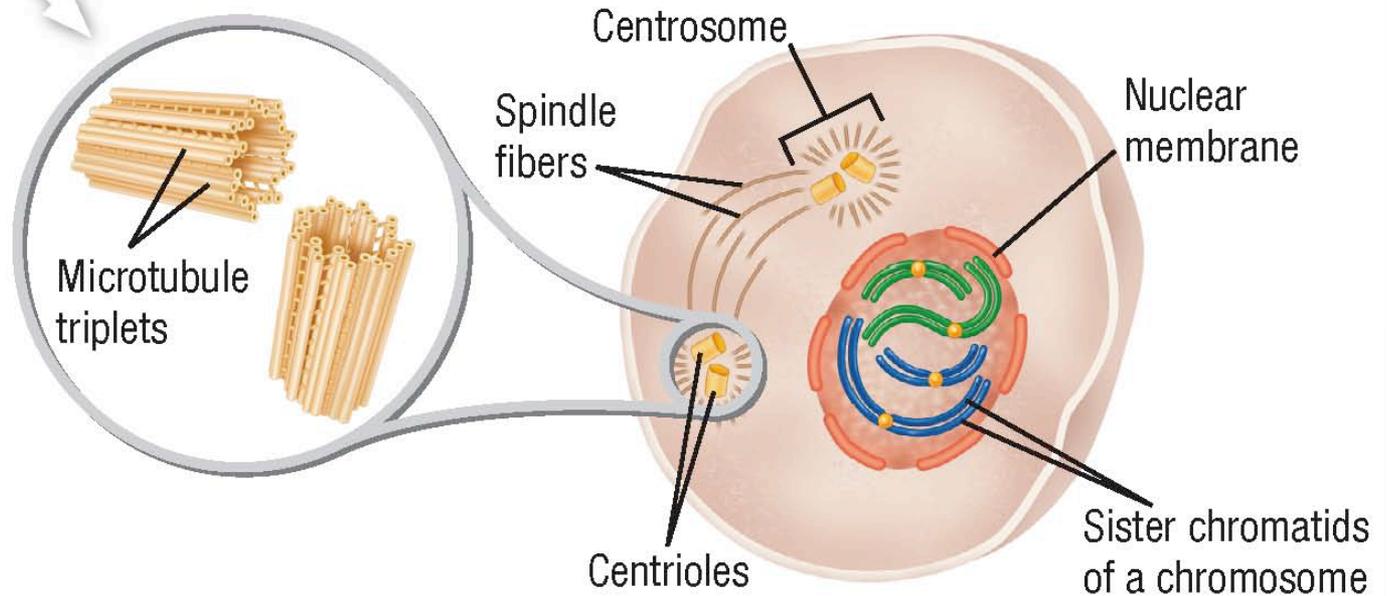
- A **spindle** is made up of several spindle fibers each is composed of an individual microtubule—a hollow tube of protein.
- A **centromere** is an organelle which helps assemble the spindle.

- **Stage 1:** Prophase - chromosomes condense, nuclear membrane dissolves.
- **Stage 2:** Metaphase - Chromosomes line up along the equator.
- **Stage 3:** Anaphase - Chromatids move to the poles
- **Stage 4:** Telophase - Nuclear envelope reforms, chromosomes uncoil

# Prophase

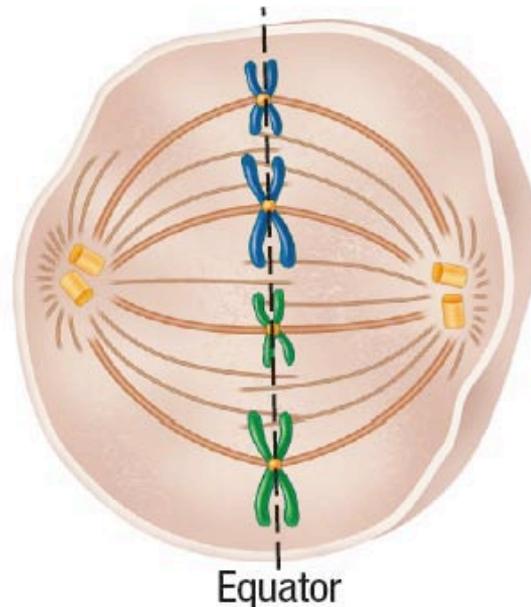
Each centriole consists of nine bundles of three microtubules each, arranged as a tube.

- 1 Prophase** Chromosomes begin to condense. The nuclear membrane dissolves. The centrosomes move to opposite poles, and the spindle forms.



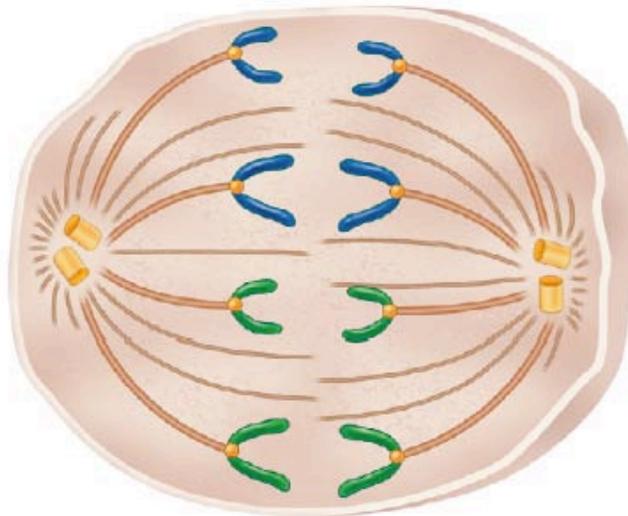
# Metaphase

- 2 Metaphase** The condensed chromosomes line up along the equator. Spindle fibers link the chromatids of each chromosome to opposite poles.



# Anaphase

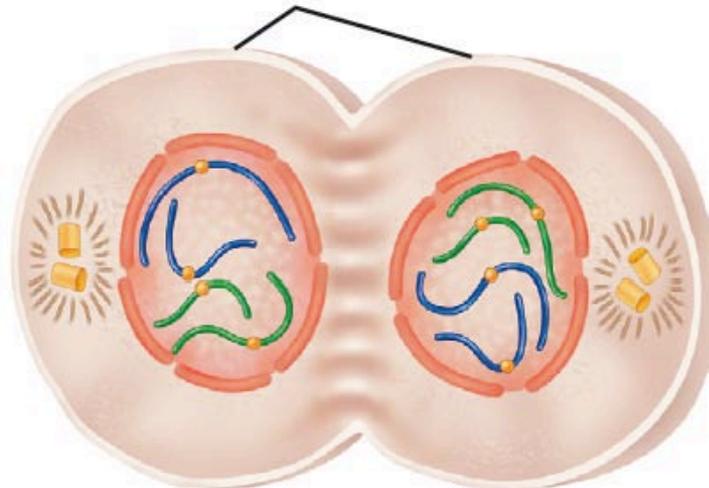
- 3 Anaphase** As the spindle fibers shorten, the chromatids are pulled toward opposite poles of the cell.



# Telophase

- 4 Telophase** A new nuclear envelope forms at each pole. The spindle dissolves, and the chromosomes uncoil. Cytokinesis begins.

Two genetically identical cells



# Mitosis

- A process of cell division that starts with a parent cell and after division ends with two identical daughter cells.

# Cytokinesis

Key Idea: During cytokinesis, the **cell membrane** grows into the center of the cell and divides it into **two daughter cells of equal size**.

- Each daughter cell has about half of the **parent's cytoplasm and organelles**.

# Cytokinesis

- In animal cells and other cells that lack cell walls, the cell is pinched in half by a belt of protein threads..