

Mitosis and the Cell Cycle



Cell reproduction



Some Definitions

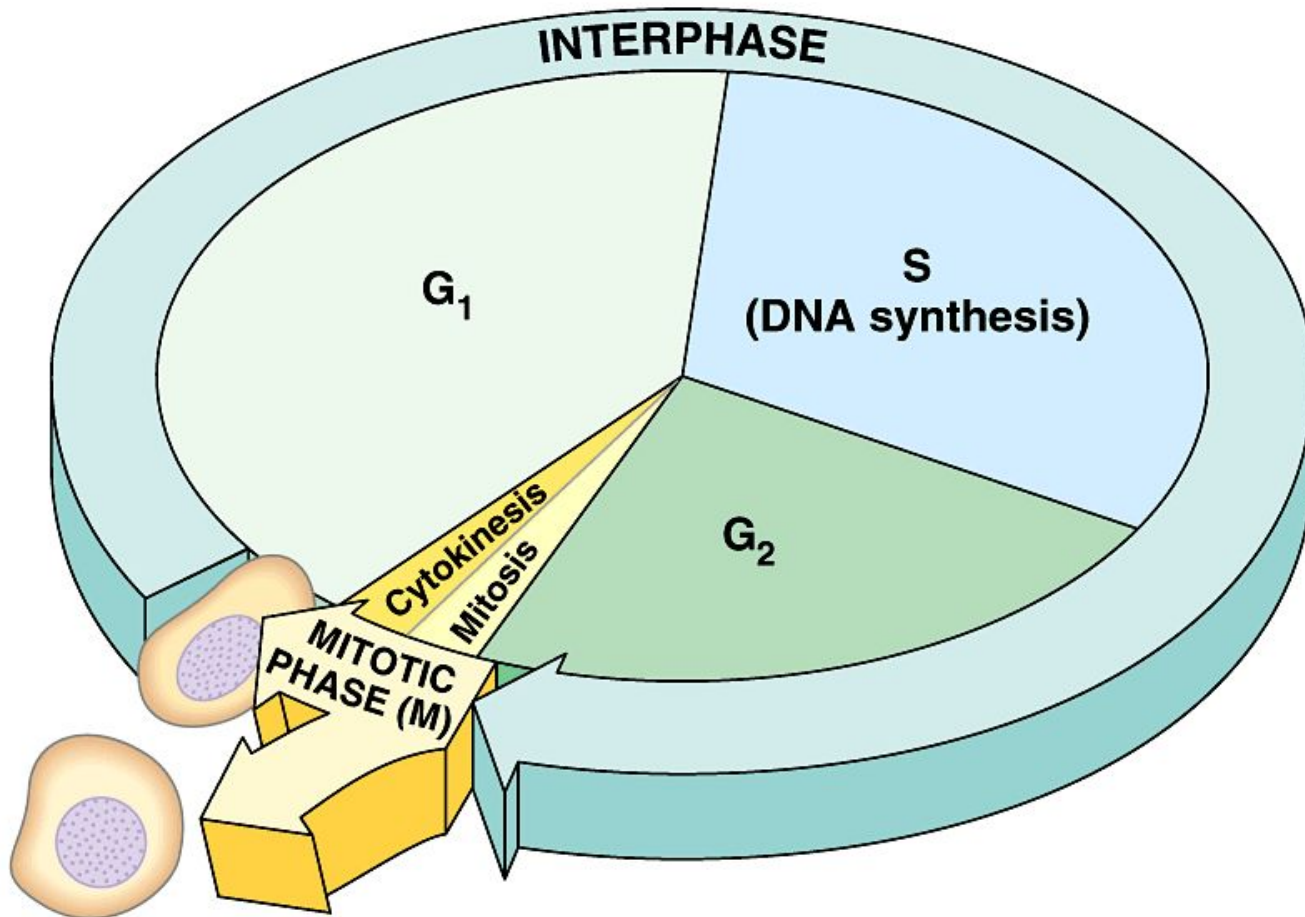
- Somatic Cells – body cells
 - Produced through mitosis
 - Has 46 chromosomes (23 pairs)
- Homolog – each member of a chromosome pair
- Diploid ($2n$) – total of 46 chromosomes in people – zygote & somatic cells
- Haploid (n) – total of 23 chromosomes in people, gametes (sperm & egg)



The Cell Cycle

- The sequence of growth and division of a cell.
- 95% of cell cycle in interphase
- 5% of cell cycle in mitosis

Cell cycle





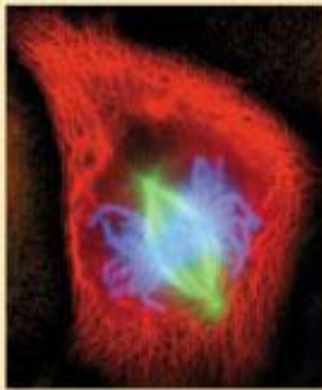
Interphase

- Growth Stage 1 (G_1) – metabolic activity of the cell
- Synthesis Stage (S) – metabolic activity of the cell, replication of DNA
- Growth Stage 2 (G_2) – metabolic activity of the cell, prepare for division

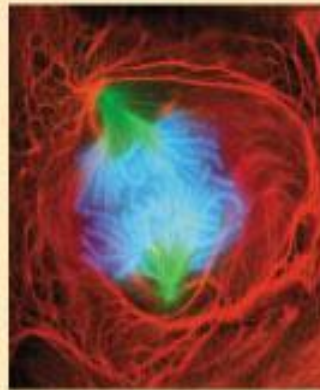


Mitosis

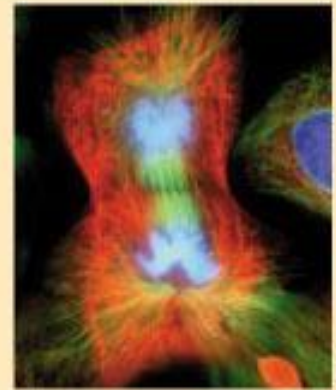
- Happens in all cells
- Cell division process
- 5 major stages



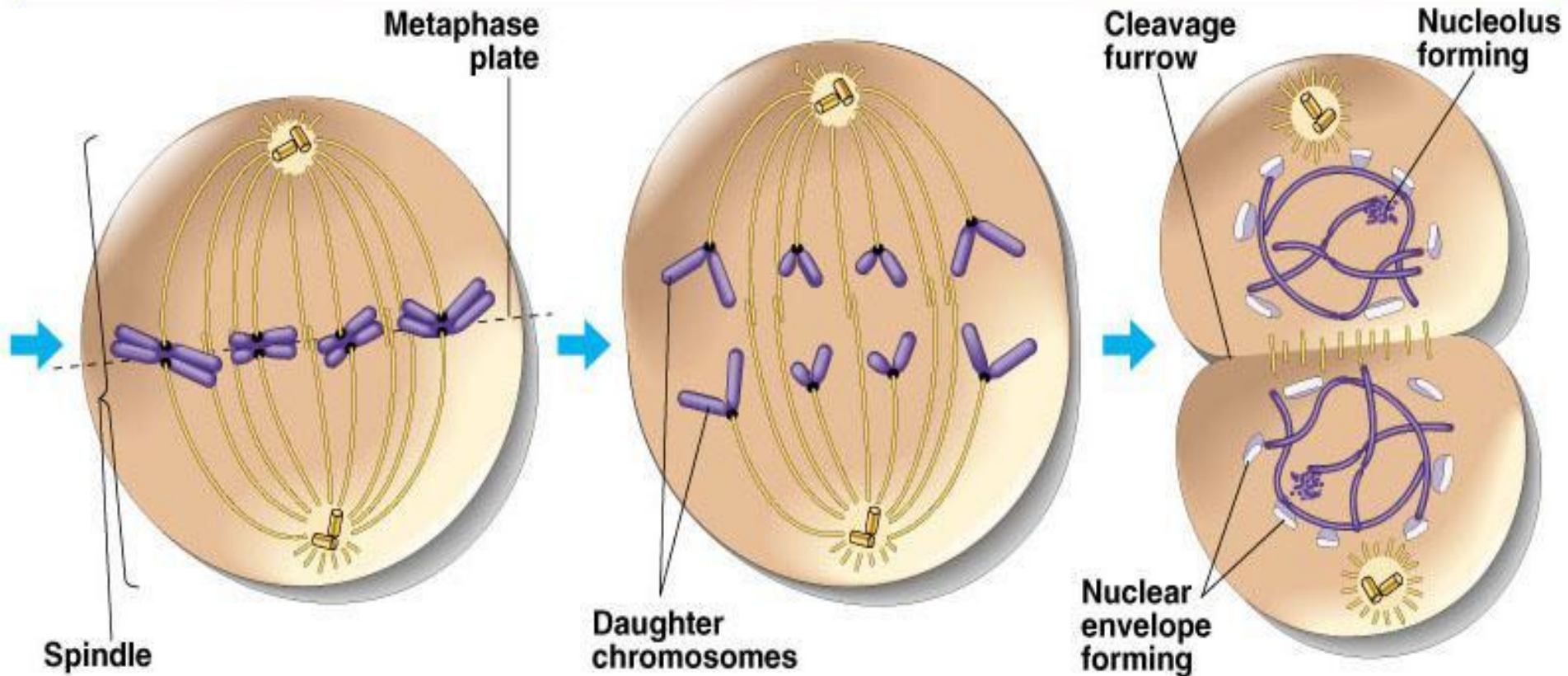
METAPHASE



ANAPHASE

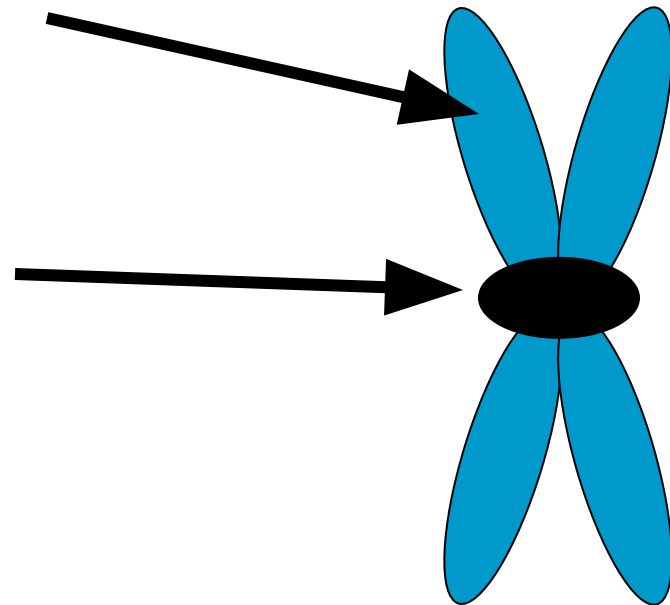


TELOPHASE AND CYTOKINESIS



Prophase

- Nuclear envelope disappears
- Chromosomes condense – can see sister chromatids
- Spindle forms



A vertical chromosome is shown on the left side of the slide. It consists of a central centromere (black) and two arms. The arms are decorated with various colored bands: blue, yellow, light blue, dark blue, and black. The chromosome is oriented vertically, with the centromere in the middle.

Metaphase

- Chromosomes move to the equator of spindle
- Each chromatid is attached to spindle with centromere



Anaphase

- Centromeres split
- Sister chromatids are pulled apart to opposite poles of the cell
- Each chromatid is now a separate chromosome



Telophase

- Nuclear envelopes (2) reform
- Chromosomes begin to uncoil



Cytokinesis

- Cytoplasm divides
- Two new daughter cells are now separate