

Cell Growth and Division

Why do cells divide?

- large cells have difficulty transporting enough nutrients across their membranes

Cells are limited in size by their SURFACE AREA and VOLUME ratio

CELL DIVISION - Process where a cell splits into two identical daughter cells. It occurs in two main phases.

- Mitosis - division of the nucleus
- Cytokinesis - division of the cytoplasm

CHROMOSOMES

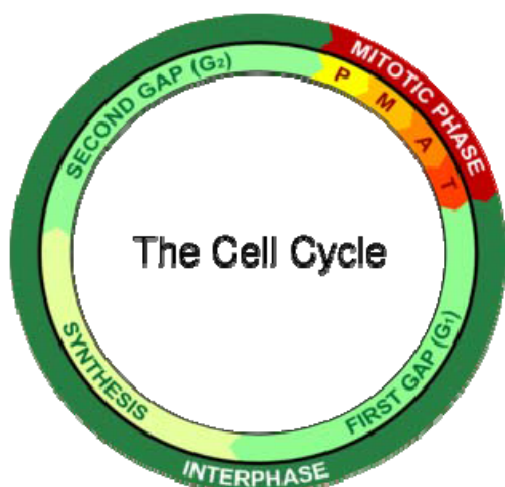
- Made of DNA, containing the cell's genetic code
- Found in Nucleus
- Each chromosome has a matching pair, homologous pair
- Number depends on organism

CELL CYCLE - events cells go through as they grow and divide

Interphase (longest phase)

- G1 - first growth (gap) phase
- Synthesis - DNA makes a copy
- G2 - second growth (gap) phase, preparing for mitosis

Mitosis - nucleus divides, ensuring each new cell has the exact number of chromosomes as parent



Mitosis

Interphase

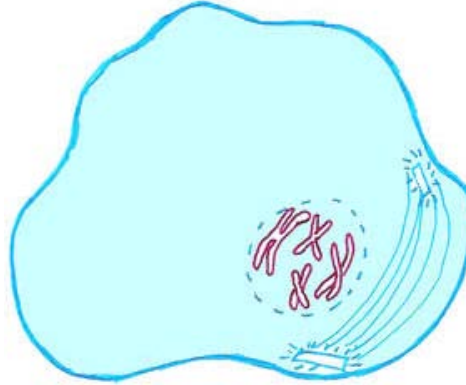
(technically not part of mitosis, but it is included in the cell cycle)

Cell is in a resting phase, performing cell functions
DNA replicates (copies)
Organelles double in number, to prepare for division



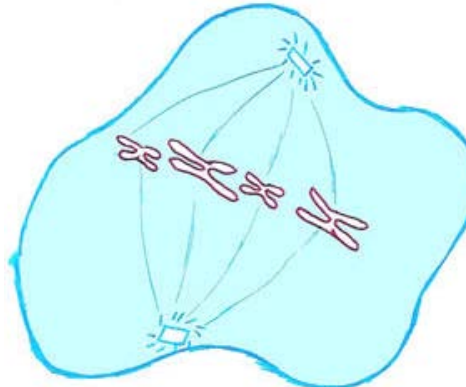
Prophase

1. chromosomes visible (chromatids)
2. centrioles migrate to the poles
3. nuclear membrane disappears
4. nucleolus disappears
5. spindle form



Metaphase

Chromosomes line up along the equator



Anaphase

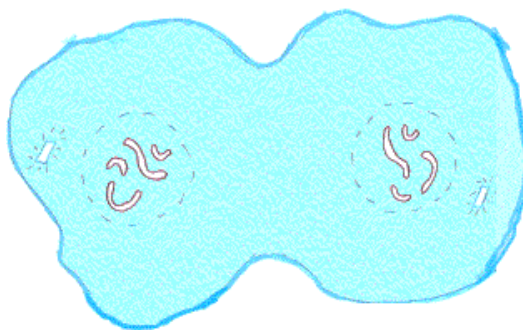
Chromatids separate and move to opposite poles



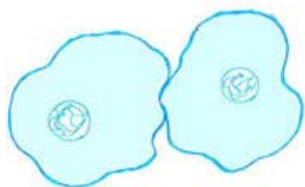
Telophase

1. chromosomes disappear (becoming chromatin)

2. nuclear membrane reforms
3. nucleoli reappears
4. spindle disappears
5. centrioles duplicate



Cytokinesis



- division of the cytoplasm to form 2 new daughter cells
- organelles are divided
- daughter cells are genetically identical
- cells return to interphase

.....cytokinesis takes two forms, depending on the cell....

Animal Cells - cell pinches inward and then splits into two

Plants - a new cell wall (called the cell plate) forms between the two new cells

