

# Chapter Four: The Cell in Action

## Section 3: The Cell Cycle

**Cell Cycle:** the life cycle of a cell

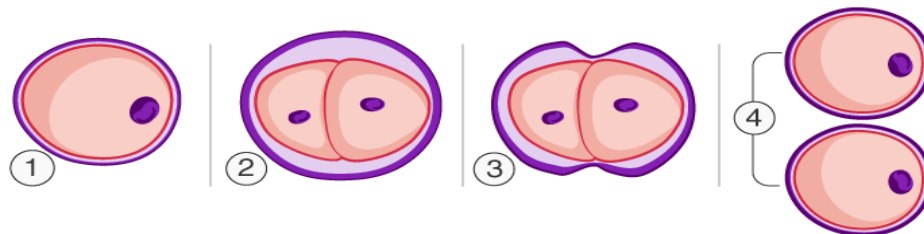
- Begins when the cell is formed
- Ends when the cell divides and forms new cells
- Before the cell divides, it makes a copy of its DNA

**Chromosomes:** in eukaryotic cells, the structures in the nucleus where the DNA of a cell is organized

- Prokaryotic cells: cell division occurs by *binary fission* which means “splitting into 2 parts”

### BINARY FISSION

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1 Parent cell | 2 DNA Duplicates | 3 Cytoplasm divides | 4 Two daughter cells

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- Eukaryotic cells: more complex and contain more DNA than prokaryotic cells
  - **Homologous chromosomes:** chromosomes that have the same sequence of genes and the same structure
    - The human body has 46 chromosomes (23 pairs of chromosomes)

Three Stages in a eukaryotic cell cycle:

1. **Interphase:** the cell grows and copies its organelles and chromosomes
  - a. **Chromatids:** the two copies after each chromosome is duplicated
  - b. **Centromere:** a region where chromatids are held together

- c. The joined chromatids twist and coil and condense into an X shape.
2. **Mitosis:** in eukaryotic cells, a process of cell division that form two new nuclei, each of which has the same number of chromosomes
  - a. **Divided into 4 phases:**
    - i. *Prophase:* the nuclear membrane dissolves and chromosomes condense into rodlike structures
    - ii. *Metaphase:* chromosomes lie up along the equator of the cell (middle of the cell)
    - iii. *Anaphase:* chromatids separate and move to opposite sides of the cell
    - iv. *Telophase:* nuclear membrane forms around each set of chromosomes...mitosis is complete
  3. **Cytokinesis:** the division of the cytoplasm of a cell
    - a. The cell begins to pinch inward and eventually pinches all the way through
      - i. The cell splits into 2 cells – these cells are identical to each other
    - b. In plants, a cell plate forms in the middle of the cell

