

What is Mitosis and Cell Division?

Worksheet

Mitosis divides one cell into two identical cells through four phases: Prophase, Metaphase, Anaphase, and Telophase, followed by Cytokinesis (cytoplasm division).

Questions

1. After mitosis, daughter cells are

- A) haploid
- B) diploid
- C) polyploid
- D) aneuploid

2. Sister chromatids separate during

- A) Prophase
- B) Metaphase
- C) Anaphase
- D) Telophase

3. Chromosomes align at metaphase plate during

- A) Prophase
- B) Metaphase
- C) Anaphase
- D) Interphase

4. Cytokinesis in animal cells involves

- A) cell plate formation
- B) spindle disappearance
- C) cleavage furrow
- D) all of above (except cell plate)

5. A cell in G1 phase has 46 chromosomes. After mitosis, each daughter cell has

6. If a plant cell is 10 micrometers in diameter, what is typical during Metaphase?

7. Why is mitosis called 'equational division'?

8. Define: What is mitosis?

9. Define: Name the phases of mitosis.

10. Define: What is the spindle apparatus?

Answer Key

1. B) diploid - Mitosis produces identical copies with same chromosome number as parent (diploid).
2. C) Anaphase - Anaphase: spindle pulls sister chromatids to opposite poles.
3. B) Metaphase - Metaphase: chromosomes line up at cell equator.
4. C) cleavage furrow - Cleavage furrow pinches cytoplasm; plant cells form cell plate differently.
5. Before mitosis (G1): 46 chromosomes (diploid, $2n$). After S phase: 46 replicated chromosomes (each is 2 sister chromatids). After mitosis: 2 cells, each with 46 unreplicated chromosomes. Each daughter cell is identical to parent and to each other.
6. Metaphase: chromosomes aligned at equator. Cell still ~ 10 m, prepared for anaphase separation.
7. Unlike meiosis (reduction), mitosis maintains chromosome number. Daughter cells have same chromosome count as parent. Genetic material is equally distributed.
8. Nuclear division producing 2 identical diploid daughter cells from 1 diploid parent cell.
9. Prophase, Metaphase, Anaphase, Telophase (PMAT).
10. A network of protein fibers (microtubules) that separates chromosomes during anaphase.

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