What is Mitosis?

Worksheet

Mitosis is the phase of the cell cycle in which a eukaryotic cell duplicates its chromosomes and divides its nucleus into two genetically identical daughter nuclei, following interphase (G1, S, G2).

Questions

1. During which phase does DNA replication occur?

A) G1
B) S
C) G2
D) M

2. Sister chromatids separate and move to opposite poles during

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

3. A 24-hour cell cycle spends 10% of its time in mitosis. How long is mitosis?

A) 1.2 hours
B) 2.4 hours
C) 10 hours
D) 0.24 hours

4. What is the main purpose of mitosis?

A) Produce gametes with half the chromosomes
B) Produce two genetically identical diploid cells for growth/repair
C) Shuffle genetic material via crossing over
D) Reduce the chromosome number by half

5. A cell cycle lasts 20 hours total, with mitosis (M phase) taking up 5% of that time. How long is M phase?

6. If G1, S, and G2 (interphase) together take 23 hours of a 24-hour cycle, what percent of the cycle is interphase?

7. A somatic cell with 46 chromosomes undergoes mitosis. How many chromosomes are in each daughter cell, and are they identical?

8. Define: What are the two main parts of the cell cycle?

9. Define: What happens during S phase?

10. Define: What are the four stages of mitosis?

Answer Key

1. B) S - S phase (Synthesis) is when chromosomal DNA is replicated.

2. C) Anaphase - Anaphase is when the centromeres split and chromatids are pulled apart.

3. B) 2.4 hours - 24 10/100 = 2.4 hours.

4. B) Produce two genetically identical diploid cells for growth/repair - Mitosis makes identical diploid daughter cells, unlike meiosis which produces gametes.

5. T = 20 hours, p = 5% Duration = T p/100 = 20 5/100 = 1 hour

6. Interphase = 23 hours, Total = 24 hours Percent = 23/24 100 95.8%

7. Mitosis produces 2 daughter cells from 1 parent cell Each daughter gets one full copy of the genome Each daughter cell has 46 chromosomes, genetically identical to the parent

8. Interphase (G1, S, G2) and the mitotic (M) phase.

9. DNA replication - each chromosome is copied into two sister chromatids.

10. Prophase, metaphase, anaphase, telophase.