

Module 07: Mitosis — Study Questions

Cell Cycle

1. What are the main stages of the cell cycle, and what happens during each?
2. Why do cells need to divide?
3. What occurs during the S phase of interphase?
4. About how much of the cell cycle is spent in interphase versus mitosis?
5. Why is it important for a cell to grow and prepare before dividing?

DNA Replication

1. Why must DNA be replicated before a cell divides?
2. What is the semi-conservative model of DNA replication?
3. What role does DNA polymerase play in replication?
4. Why is it important that DNA replication is highly accurate?
5. What might happen if errors in DNA replication are not corrected?

Chromosome Structure

1. What is the difference between chromatin and chromosomes?
2. After DNA replication, what holds the two copies of a chromosome together?
3. What is the difference between a chromatid and a chromosome?
4. What is a centromere, and where is it located?
5. What does "diploid" mean? How does it differ from haploid?

Mitosis Stages

1. What are the four main stages of mitosis? List them in order.
2. What happens to the nuclear envelope during prophase?
3. During which stage do chromosomes line up in the middle of the cell?
4. What happens during anaphase that ensures each daughter cell gets one copy of each chromosome?
5. How is the cell during telophase different from the cell at the start of prophase?
6. What is the mitotic spindle, and what is its function?
7. How do kinetochores connect chromosomes to the spindle fibers?

Cytokinesis

1. What is cytokinesis, and when does it occur?
2. How does cytokinesis differ between animal cells and plant cells?
3. What is a cleavage furrow? Why don't plant cells form one?

Cell Cycle Regulation

1. What are cell cycle checkpoints, and why are they important?
2. What happens at the G1 checkpoint?
3. How do cyclins and CDKs work together to regulate the cell cycle?
4. What can happen if the cell cycle is not properly regulated?
5. How is cancer related to problems with cell cycle control?