

Chapter 12 – The Cell Cycle

The Key Roles of Cell Division

1. Explain how cell division functions in reproduction, growth, and repair.
2. Describe the structural organization of a prokaryotic and a eukaryotic genome.
3. Describe the major events of cell division that enable the genome of one cell to be passed on to two daughter cells.
4. Describe how chromosome number changes throughout the human life cycle.

The Mitotic Cell Cycle

5. List the phases of the cell cycle and describe the sequence of events that occurs during each phase.
6. List the phases of mitosis and describe the events characteristic of each phase.
7. Recognize the phases of mitosis from diagrams and micrographs.
8. Draw or describe the spindle apparatus, including centrosomes, kinetochore microtubules, nonkinetochore microtubules, asters, and centrioles (in animal cells).
9. Describe what characteristic changes occur in the spindle apparatus during each phase of mitosis.
10. Explain the current models for poleward chromosomal movement and elongation of the cell's polar axis.
11. Compare cytokinesis in animals and in plants.
12. Describe the process of binary fission in bacteria and explain how eukaryotic mitosis may have evolved from binary fission.

Regulation of the Cell Cycle

13. Describe the roles of checkpoints, cyclin, Cdk, and MPF in the cell cycle control system.
14. Describe the internal and external factors that influence the cell cycle control system.
15. Explain how the abnormal cell division of cancerous cells escapes normal cell cycle controls.
16. Distinguish among benign, malignant, and metastatic tumors.