

CHAPTER 11—CELL REPRODUCTION

MULTIPLE CHOICE

- Contact inhibition _____.
 - is NOT a type of cell-to-cell communication
 - occurs when cells touch each other and stop dividing
 - is one known cause of cancer
 - causes rapid cell deathANS: B DIF: B OBJ: 11-4
- The causes of cancer may include which of the following?
 - environmental influences
 - UV radiation
 - viruses
 - all of the aboveANS: D DIF: B OBJ: 11-4
- A gene is a segment of DNA that controls the production of _____.
 - carbohydrates
 - microtubules
 - centromeres
 - proteinsANS: D DIF: B OBJ: 11-3
- Which of the following monitors a cell's progress from phase to phase during the cell cycle?
 - a series of enzymes
 - microtubules
 - lipid molecules
 - protein moleculesANS: A DIF: B OBJ: 11-3
- If the sides of a cell double in length, its volume increases by _____ times.
 - two
 - four
 - six
 - eightANS: D DIF: B OBJ: 11-1
- If the sides of a cell double in length, its surface area becomes _____ times as large.
 - two
 - four
 - six
 - eightANS: B DIF: B OBJ: 11-1

- Which of the following explains why a cell's size is limited?
 - Volume increases faster than surface area.
 - Surface area increases faster than volume.
 - Homeostasis is disrupted by a cell that is too large.
 - both a and cANS: D DIF: B OBJ: 11-1

- As a cell grows, its _____ increases more than its _____.
 - length, volume
 - width, surface area
 - volume, surface area
 - none of theseANS: C DIF: B OBJ: 11-1
- Among the following, the term that includes the others is _____.
 - interphase
 - nuclear division
 - mitosis
 - cell cycleANS: D DIF: B OBJ: 11-2
- Each of the following is a cause of some cancers except _____.
 - genetic factors
 - bacteria
 - environmental factors
 - virusesANS: B DIF: B OBJ: 11-4
- When people move from one country to another, their cancer rates follow the pattern of _____.
 - their country of origin
 - lung and colon cancer
 - the country where they live
 - breast and colon cancerANS: C DIF: B OBJ: 11-4
- A factor involved in control of the cell cycle is _____.
 - selective permeability
 - cytoplasmic density
 - contact inhibition
 - conductivityANS: C DIF: B OBJ: 11-3
- By the end of prophase, each of the following has occurred except _____.
 - tighter coiling of the chromosomes
 - breaking down of the nuclear envelope
 - disappearing of the nucleolus
 - lining up of chromosomes in the cellANS: D DIF: B OBJ: 11-2

14. Tangled strands of DNA wrapped around protein molecules make up the _____.
 a. spindle
 b. microtubules
 c. nuclear envelope
 d. chromatin
 ANS: D DIF: B OBJ: 11-2
15. Unlike plant cells, animal cells contain _____.
 a. cell walls
 b. centrioles
 c. nucleoli
 d. spindles
 ANS: B DIF: B OBJ: 11-2
16. The longest phase of the cell cycle is _____.
 a. prophase
 b. interphase
 c. metaphase
 d. mitosis
 ANS: B DIF: B OBJ: 11-2
17. As the size of a cell increases, _____.
 a. volume increases faster than surface area
 b. volume increases and surface area decreases
 c. volume and surface area increase at the same rate
 d. surface area increases faster than volume
 ANS: A DIF: B OBJ: 11-1
18. A chromatid is attached to a spindle fiber by the _____.
 a. nucleolus
 b. deep furrow
 c. centromere
 d. centriole
 ANS: C DIF: B OBJ: 11-2
- COMPLETION**
1. The structures that hold together sister chromatids are _____.
 ANS: centromeres DIF: B OBJ: 11-2
2. In a dividing cell, the football-shaped structure consisting of thin fibers is the _____.
 ANS: spindle DIF: B OBJ: 11-2

11-3

3. The process by which nuclear material is divided equally between two new cells is _____.
 ANS: mitosis DIF: B OBJ: 11-2
4. The dark-staining structures that carry the genetic material are the _____.
 ANS: chromosomes DIF: B OBJ: 11-2
5. The uncontrolled division of cells is known as _____.
 ANS: cancer DIF: B OBJ: 11-4
6. The two halves of a doubled chromosome structure are called _____.
 ANS: sister chromatids DIF: B OBJ: 11-2
7. The phase of mitosis in which chromosomes line up in the equator of the spindle is _____.
 ANS: metaphase DIF: B OBJ: 11-2
8. The segment of DNA that controls the production of a protein is a(n) _____.
 ANS: gene DIF: B OBJ: 11-2
9. The period during which chromosomes duplicate is _____.
 ANS: interphase DIF: B OBJ: 11-2
10. The sequence of growth and division of a cell makes up the _____.
 ANS: cell cycle DIF: B OBJ: 11-2
11. The phase of mitosis in which a nuclear envelope re-forms around each set of chromosomes is _____.
 ANS: telophase DIF: B OBJ: 11-2
12. The phase of mitosis in which the sister chromatids separate from each other is _____.
 ANS: anaphase DIF: B OBJ: 11-2
13. The small, dark, cylindrical structures just outside the nucleus are the _____.
 ANS: centrioles DIF: B OBJ: 11-2

11-4

SHORT ANSWER

1. Write a sentence using *telophase* and *mitosis*.

ANS: The final phase of mitosis is known as telophase.

DIF: B OBJ: 11-2

2. Write a sentence using *cell cycle* and *interphase*.

ANS: The growth period of the cell cycle is known as interphase.

DIF: B OBJ: 11-2

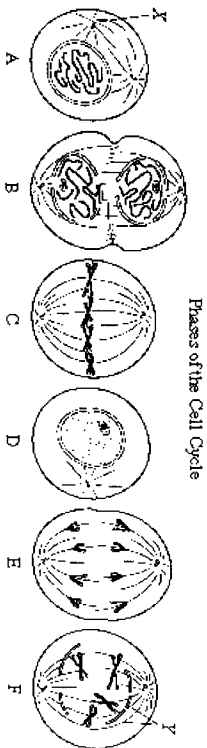


Figure 11-1

3. What are the main differences between mitosis in plant cells and in animal cells? Refer to Figure 11-1.

ANS: Plant cells lack centrioles. The cell membrane of an animal cell pinches in to form two new cells. In a plant cell, a cell plate forms across the original cell; then maternal grows around the cell plate to produce two separate cell walls for two new cells.

DIF: B OBJ: 11-2

4. Sequence the six diagrams in Figure 11-1 in order from first to last, beginning with D.

ANS: D, A, F, C, E, B

DIF: B OBJ: 11-2

5. What two main changes are taking place in cell B in Figure 11-1?

ANS: A separate nuclear envelope is forming around each set of chromosomes. The cell membrane is pushing in, and a furrow is beginning to divide one cell into two.

DIF: B OBJ: 11-2

6. Which cell of Figure 11-1 is not in a phase of mitosis?

ANS: D DIF: B OBJ: 11-2

7. In cell F of Figure 11-1, what structure is labeled Y?

ANS: spindle DIF: B OBJ: 11-2

8. In cell A of Figure 11-1, what structure is labeled X?

ANS: centriole DIF: B OBJ: 11-2

9. Cells A and F of Figure 11-1 show an early and a late stage of the same phase of mitosis. What phase is it?

ANS: prophase DIF: B OBJ: 11-2

10. Which cell of Figure 11-1 is in metaphase?

ANS: C DIF: B OBJ: 11-2

11. What enzyme changes are believed to cause cancer?

ANS: Cancer results from the failure of cells to produce certain enzymes or from overproduction or production at the wrong time of other enzymes.

DIF: A OBJ: 11-4

12. Describe the role of enzymes in the regulation of the cell cycle.

ANS: A series of enzymes monitors a cell's progress from phase to phase during the cell cycle. Some enzymes are necessary to trigger the progression of the cell cycle, whereas other enzymes function to inhibit progression.

DIF: A OBJ: 11-3

13. Describe how homeostasis is disrupted in a cell that is too large.

ANS: In a cell that is too large, the cell is unable to take in sufficient nutrients or able to dispose of the waste products it produces.

DIF: A OBJ: 11-1

14. Why do cells never grow very large?

ANS: As a cell increases in size, its volume increases faster than its surface area. It would be impossible for membranes of limited surface area to supply cells of a very large volume with sufficient nutrients or to dispose of the wastes they produce.

DIF: A OBJ: 11-1

15. In some simple eukaryotes such as yeasts and some unicellular algae, the nuclear envelope remains during mitosis and a spindle forms within the nucleus, which divides after the spindle has separated the replicated chromosomes. How does mitosis in these organisms differ from mitosis in more complex eukaryotes?

ANS: In most eukaryotes, the nuclear envelope disappears during prophase and does not reappear until telophase. The spindle forms throughout the entire cell, not just within the nucleus.

DIF: A OBJ: 11-2