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Chapter 10

Cell Growth and Division

Section 10–1 Cell Growth (pages 241–243)

This section explains what problems growth causes for cells.

Limits to Cell Growth (pages 241–243)

1. What are two reasons why cells divide rather than continue to grow indefinitely?

a. _____

_____

b. _____

_____

2. Is the following sentence true or false? As a cell increases in size, it usually makes extra copies of its DNA. _____

3. Circle the letter of what determines the rate at which food and oxygen in a cell are used up and waste products produced.

a. The cell's organelles

b. The cell's volume

c. The cell's location

d. The cell's DNA

4. How can you obtain a cell's ratio of surface area to volume? _____

_____

5. If a cell's surface area is 6 cm^3 and its volume is 1 cm^3, then what is its ratio of surface area to volume? _____

6. Is the following sentence true or false? As a cell grows in size, its volume increases much more rapidly than its surface area.

_____

7. Circle the letter of what happens to a cell's ratio of surface area to volume as the cell's volume increases more rapidly than its surface area.

a. The ratio decreases.

b. The ratio increases.

c. The ratio remains the same.

d. The ratio disappears.

8. What is cell division? _____

_____

9. How does cell division solve the problem of increasing size? _____

_____

Section 10–2 Cell Division (pages 244–249)

This section describes the main events of the cell cycle. It also explains what happens during mitosis, when cell division occurs.

Chromosomes (page 244)

1. Is the following sentence true or false? Chromosomes are not visible in most cells except during cell division.

_____

2. When chromosomes become visible at the beginning of cell division, what does each chromosome consist of? _____

_____

3. Each pair of chromatids is attached at an area called the _____.

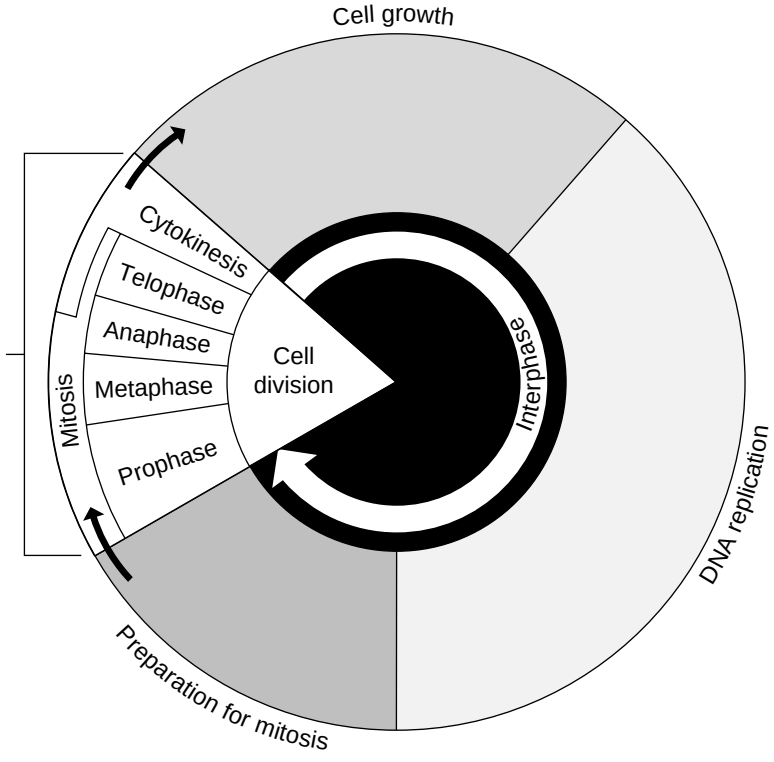
The Cell Cycle (page 245)

4. The period of growth in between cell divisions is called _____.

5. What is the cell cycle? _____

_____

6. Complete the diagram of the cell cycle by writing the names of each of the four phases.



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7. The division of the cell nucleus during the M phase of the cell cycle is called _____.

Events of the Cell Cycle (page 245)

8. Interphase is divided into what three phases?

a. _____ **b.** _____ **c.** _____

9. What happens during the G_1 phase? _____

_____

_____

10. What happens during the S phase? _____

_____

_____

11. What happens during the G_2 phase? _____

_____

_____

Mitosis (pages 246–248)

12. What are the four phases of mitosis?

a. _____ **c.** _____

b. _____ **d.** _____

13. Circle the letter of the name for the two tiny structures located in the cytoplasm near the nuclear envelope at the beginning of prophase.

a. centrioles **c.** centromeres

b. spindles **d.** chromatids

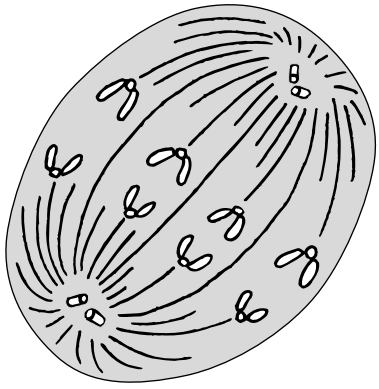
14. What is the spindle? _____

_____

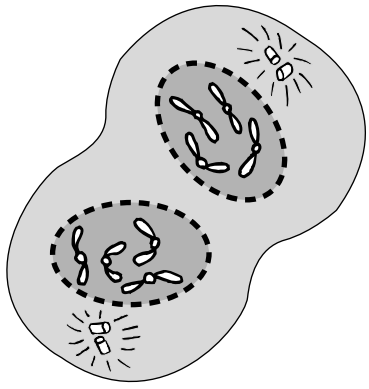
Match the description of the event with the phase of mitosis it is in. Each phase may be used more than once.

	Event	Phase
_____	**15.** The chromosomes move until they form two groups near the poles of the spindle.	**a.** Prophase
_____	**16.** The chromosomes become visible.	**b.** Metaphase
_____	**17.** A nuclear envelope re-forms around each cluster of chromosomes.	**c.** Anaphase
_____	**18.** The centrioles take up positions on opposite sides of the nucleus.	**d.** Telophase
_____	**19.** The chromosomes line up across the center of the cell.	
_____	**20.** The nucleolus becomes visible in each daughter nucleus.	

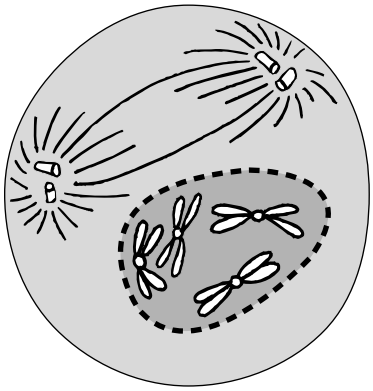
21. Identify each of the four phases of mitosis pictured below.



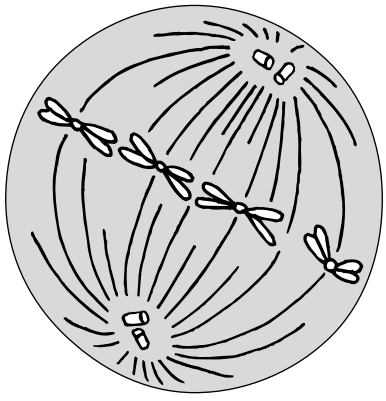
a. _____



c. _____



b. _____



d. _____

Cytokinesis (page 248)

22. What is cytokinesis? _____

23. How does cytokinesis occur in most animal cells? _____

_____

_____

24. Circle the letter of what forms midway between the divided nucleus during cytokinesis in plant cells.

a. cell nucleus
b. cytoplasm
c. cell plate
d. cytoplasmic organelles

Reading Skill Practice

You may sometimes forget the meanings of the vocabulary terms that were introduced earlier in the textbook. When this happens, you can check the meanings of the terms in the Glossary, which you can find at the end of the book just before the Index. Use the Glossary to review the meanings of all the vocabulary terms listed on page 244. Write their definitions on a separate sheet of paper.

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Section 10–3 Regulating the Cell Cycle (pages 250–252)

This section describes how the cell cycle is regulated. It also explains how cancer cells are different from other cells.

Controls on Cell Division (page 250)

1. What happens to the cells at the edges of an injury when a cut in the skin or a break in a bone occurs? _____

_____

2. What happens to the rapidly dividing cells when the healing process nears completion? _____

_____

Cell Cycle Regulators (page 251)

3. What do cyclins regulate? _____

_____

4. What are internal regulators? _____

5. Circle the letter of each sentence that is true about external regulators.

a. They direct cells to speed up or slow down the cell cycle.

b. They prevent the cell from entering anaphase until all its chromosomes are attached to the mitotic spindle.

c. They include growth factors.

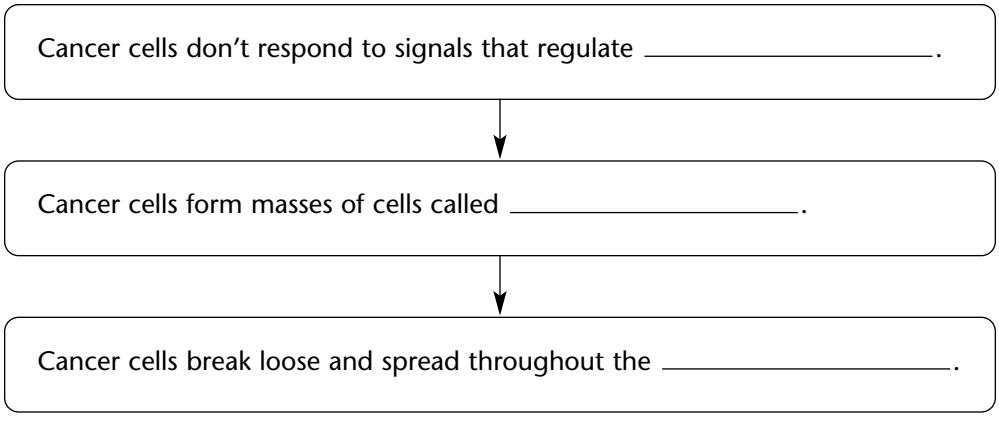
d. They prevent excessive cell growth and keep the tissues of the body from disrupting each other.

Uncontrolled Cell Growth (page 252)

6. What is cancer? _____

_____

7. Complete the flowchart about cancer.



8. Is the following sentence true or false? Cancer is a disease of the cell cycle. _____

WordWise

Complete the sentences by using one of the scrambled words below.

Word Bank

spetmeaha	sdtihcmora	eshaploet	phsaeorp	kniesscitoy	aasehpan
nilpsed	lecl yeclc	elcl voisdini	metonercer	astinhepre	sotimsi
nacecr	cinlyc	tenilorec			

1. The division of a cell's cytoplasm is called _____.
2. The final phase of mitosis is _____.
3. The phase of mitosis in which microtubules connect the centromere of each chromosome to the poles of the spindle is _____.
4. At the beginning of cell division, each chromosome consists of two sister _____.
5. The longest phase of mitosis is _____.
6. The phase of mitosis that ends when the chromosomes stop moving is _____
7. The process by which a cell divides into two new daughter cells is called _____.
8. A tiny structure located in the cytoplasm near the nuclear envelope is a(an) _____.
9. A disorder in which some of the body's cells lose the ability to control growth is called _____.
10. The area where a pair of chromotids is attached is the _____.
11. The division of the cell nucleus is called _____.
12. A protein that regulates the timing of the cell cycle in eukaryotic cells is _____.
13. The series of events that cells go through as they grow and divide is known as the _____.
14. A fanlike microtubule structure that helps separate the chromosomes is a(an) _____.
15. The time period between cell divisions is called _____.