*Biology for a Changing World 2e,* Chapter 9 Test Bank

1. If you cut yourself, the damaged cells are

1. sloughed off.
2. repaired by surrounding cells.
3. replaced by surrounding cells.
4. repaired by your immune system.
5. All the above.

Answer: C

DQ: When and how does normal cell division occur in the body?

Type: Know It

Difficulty: Easy

Important Words/Concepts: purpose of cell division

2. Which statement is FALSE?

1. Mitosis occurs during wound healing.
2. Mitosis is required for embryonic development.
3. Mitosis is part of the process used to repair damaged tissues.
4. Mitosis is required to halve the chromosome number of cells.
5. Mitosis occurs regularly in our body.

Answer: D

DQ: When and how does normal cell division occur in the body?

Type: Know It

Difficulty: Easy

Important Words/Concepts: mitosis, purpose of cell division

3. An adult has trillions of cells that all work together. Does an adult have cells that still undergo cell division? Why or why not?

*Answer:* Yes, adult cells undergo cell division both because cells die and need to be replaced and because wounds need to be healed.

DQ: When and how does normal cell division occur in the body?

Type: Know It

Difficulty: Easy

Important Words/Concepts: purpose of cell division, development, growth

4. The process of \_\_\_\_\_ is used to replace damaged or worn-out cells.

A. apoptosis

B. meiosis

C. cell twinning

D. cell division

E. cell senescence

Answer: D

DQ: When and how does normal cell division occur in the body?

Type: Know It

Difficulty: Easy

Important Words/Concepts: purpose of cell division

5. Which of the following is an example of cells undergoing mitosis and cytokinesis?

A. a new embryo growing

B. a tree producing new branches

C. dead skin cells being replaced

D. a wound healing over with a scar

E. All of the above.

Answer: E

DQ: When and how does normal cell division occur in the body?

Type: Know It

Difficulty: Hard

Important Words/Concepts: mitosis, purpose of cell division

6. Red blood cells have a tough job, circulating through our bodies rapidly to transport oxygen and carbon dioxide. Because of their job, they are worn out quickly, yet we need healthy functional red blood cells all the time. How does our body accommodate that need?

*Answer:* Red blood cells are being replaced constantly by bone marrow cells.

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DQ: When and how does normal cell division occur in the body?

Type: Use It

Difficulty: Easy

Important Words/Concepts: purpose of cell division

7. Our skin is our outermost layer, and it is exposed to all the hazards of the external environment. Thus, our skin cells are damaged on a regular basis and die. How does our body handle this frequent cell death?

*Answer:* Our skin cells are replaced as fast as they are lost. Skin tissue is frequently dividing to replace lost cells.

DQ: When and how does normal cell division occur in the body?

Type: Use It

Difficulty: Easy

Important Words/Concepts: purpose of cell division

1. What do you think might happen to the embryo if a fertilized egg could not divide normally during embryonic development?

*Answer:* The embryo would either die or be born with abnormalities.

DQ: When and how does normal cell division occur in the body?

Type: Use It

Difficulty: Easy

Important Words/Concepts: purpose of cell division, development, growth

1. Cell division is used for all of the following EXCEPT
   1. replacing skin cells separated by a paper cut.
   2. replacing blood cells that have died.
   3. production of hormones.
   4. growth of a single cell into a baby.
   5. growth of a child into an adult.

Answer: C

DQ: When and how does normal cell division occur in the body?

Type: Know It

Difficulty: Easy

Important Words/Concepts: purpose of cell division, development, growth

10. The end result of mitosis and cytokinesis is

* 1. two cells identical in size and genetic material.
  2. two cells identical in genetic material, but one is smaller than the other.
  3. three cells, one of which is twice the size of the other two.
  4. two cells, each with half the number of chromosomes as the mother cell.
  5. two cells, each with twice the number of chromosomes as the mother cell,

Answer: A

DQ: When and how does normal cell division occur in the body?

Type: Know It

Difficulty: Easy

Important Words/Concepts: cell cycle, cell division, chromosome, mitosis

11. A biologist measures the amount of DNA in cells growing in a laboratory. She should find that the amount of DNA doubles

A. during S phase.

B. at the end of G2 phase.

C. right after cytokinesis.

D. during mitosis.

E. in the middle of G1 phase.

Answer: A

DQ: When and how does normal cell division occur in the body?

Type: Know It

Difficulty: Easy

Important Words/Concepts: cell cycle, DNA replication

12. A healthy cell spends most of its lifetime in

A. cytokinesis.

B. G2 phase.

C. interphase.

D. mitosis.

E. S phase.

Answer: C

DQ: When and how does normal cell division occur in the body?

Type: Know It

Difficulty: Easy

Important Words/Concepts: cell cycle, cell division, interphase

13. Which of the following occurs during interphase?

* 1. replication of chromosomes
  2. sister chromatids line up in the middle of the cell
  3. sister chromatids migrate to opposite sides of the cell
  4. division of cytoplasm
  5. two nuclei are created

Answer: A

DQ: When and how does normal cell division occur in the body?

Type: Know It

Difficulty: Easy

Important Words/Concepts: cell cycle, cell division, chromatid, chromosome, mitosis

14. At the end of interphase each chromosome is made up of

* 1. mother-daughter chromatids.
  2. brother-sister chromatids.
  3. sister chromatids.
  4. paired chromatids.
  5. duplex chromatids.

Answer: C

DQ: When and how does normal cell division occur in the body?

Type: Know It

Difficulty: Easy

Important Words/Concepts: cell cycle, cell division, chromatid, chromosome, mitosis

15. A cell spends most of its time in

* 1. metaphase.
  2. telophase.
  3. prophase.
  4. anaphase.
  5. interphase.

Answer: E

DQ: When and how does normal cell division occur in the body?

Type: Know It

Difficulty: Easy

Important Words/Concepts: cell cycle, cell division, mitosis

16. Organelles duplicate during

A. prophase.

B. G1 phase.

C. G2 phase.

D. S phase.

E. P phase.

Answer: B

DQ: When and how does normal cell division occur in the body?

Type: Know It

Difficulty: Hard

Important Words/Concepts: cell cycle, cell division, mitosis

17. Choose the list that gives the most correct and complete order of events during the cell cycle.

1. G1, S, G2, cytokinesis, and mitosis
2. G1, S, G2, and mitosis
3. mitosis, G1, S, G2, and cytokinesis
4. G1, G2, S, cytokinesis, and mitosis
5. G1, S, G2, mitosis, and cytokinesis

Answer: E

DQ: When and how does normal cell division occur in the body?

Type: Know It

Difficulty: Easy

Important Words/Concepts: cell cycle phases and functions

18. Which phase(s) occur during interphase?

1. G1, S, and G2
2. G1, S, G2, and mitosis
3. mitosis
4. G1 and G2
5. S, G2, and mitosis

Answer: A

DQ: When and how does normal cell division occur in the body?

Type: Know It

Difficulty: Easy

Important Words/Concepts: cell cycle phases and functions

19. Sister chromatids are separated from each other during

1. interphase.
2. mitosis.
3. S phase.
4. G1.
5. cytokinesis.

Answer: B

DQ: When and how does normal cell division occur in the body?

Type: Know It

Difficulty: Easy

Important Words/Concepts: cell cycle, cell division, mitosis, chromatids

20. Sister chromatids are NOT present during

1. interphase.
2. DNA replication.
3. the cell cycle.
4. G1 stage of cell cycle.
5. S phase of cell cycle.

Answer: D

DQ: When and how does normal cell division occur in the body?

Type: Know It

Difficulty: Hard

Important Words/Concepts: cell cycle, cell division, mitosis, chromatids

21. A newly divided cell grows to mature size during

A. G1.

B. S.

C. G2.

D. mitosis.

E. cytokinesis.

Answer: A

DQ: When and how does normal cell division occur in the body?

Type: Know It

Difficulty: Easy

Important Words/Concepts: cell cycle phases and functions

22. Chromosomes are duplicated during

A. the G1 phase.

B. mitosis.

C. cytokinesis.

D. the G2 phase.

E. the S phase.

Answer: E

DQ: When and how does normal cell division occur in the body?

Type: Know It

Difficulty: Easy

Important Words/Concepts: cell cycle phases and functions

23. At the end of the S phase, cells have \_\_\_\_ set(s) of genetic material, compared to a cell at the beginning of S phase.

A. 1

B. 2

C. 3

D. 4

E. 5

Answer: B

DQ: When and how does normal cell division occur in the body?

Type: Know It

Difficulty: Easy

Important Words/Concepts: cell cycle phases and functions

24. Which of the following cell types goes through the cell cycle most frequently?

A. heart muscle cell

B. bicep muscle cell

C. brain nerve cell

D. skin cell

E. spinal nerve cell

Answer: D

DQ: When and how does normal cell division occur in the body?

Type: Know It

Difficulty: Hard

Important Words/Concepts: cell types, cell cycle

25. Put these stages of the cell cycle in order, starting with a newly formed daughter cell: G1, G2, cytokinesis, mitosis, S phase.

*Answer:* G1, S phase, G2, mitosis, cytokinesis

DQ: When and how does normal cell division occur in the body?

Type: Use It

Difficulty: Easy

Important Words/Concepts: cell cycle phases

26. Which stage of the cell cycle is the lengthiest?

1. interphase
2. mitosis
3. cytokinesis
4. All the stages are equal in duration.
5. None of the above.

Answer: A

DQ: When and how does normal cell division occur in the body?

Type: Know It

Difficulty: Easy

Important Words/Concepts: cell division, cell cycle stages

27. During interphase of the cell cycle, which of the following occurs?

1. All of the cell’s DNA is copied.
2. The cell increases in volume.
3. Organelles are produced.
4. The cell goes through stages called G1, S, and G2.
5. All of the above.

Answer: E

DQ: When and how does normal cell division occur in the body?

Type: Know It

Difficulty: Easy

Important Words/Concepts: cell cycle phases and functions

28. If the cell does not \_\_\_\_\_\_\_\_\_\_\_\_ during S phase, daughter cells may be missing some or have too many copies of certain genes.

*Answer:* accurately copy all of its DNA

DQ: When and how does normal cell division occur in the body?

Type: Know It

Difficulty: Hard

Important Words/Concepts: cell division, cell cycle, stages, S phase, interphase

29. If the cell does not \_\_\_\_\_\_\_\_\_\_\_\_ during mitosis, daughter cells may be missing some or have too many copies of certain genes.

*Answer:* accurately separate sister chromatids

DQ: When and how does normal cell division occur in the body?

Type: Know It

Difficulty: Hard

Important Words/Concepts: cell division, cell cycle, stages, mitosis

30. A cell divides before properly completing S phase. Which of the following would be a likely result?

1. two perfectly normal cells
2. one perfectly normal cell
3. two cells with extra DNA
4. two cells with some missing DNA
5. one cell with extra DNA and one with missing DNA

Answer: D

DQ: When and how does normal cell division occur in the body?

Type: Use It

Difficulty: Hard

Important Words/Concepts: cell division, cell cycle, stages, S phase, interphase, DNA replication

31. A cell divides before properly completing mitosis. Which of the following would be a likely result?

A. two perfectly normal cells

B. one perfectly normal cell

C. two smaller than normal cells

D. two cells with either extra or missing chromosomes

E. two cells with extra DNA and extra chromosomes

Answer: D

DQ: When and how does normal cell division occur in the body?

Type: Use It

Difficulty: Hard

Important Words/Concepts: cell division, cell cycle stages, mitosis

32. Colchicine is a drug that interferes with microtubule formation. Microtubules are the structures that help separate sister chromatids. Which stage of the cell cycle would colchicine affect?

1. interphase
2. mitosis
3. cytokinesis
4. S phase
5. all of the stages

Answer: B

DQ: When and how does normal cell division occur in the body?

Type: Use It

Difficulty: Hard

Important Words/Concepts: cell division, cell cycle stages, mitosis, microtubules

33. During mitosis sister chromatids are

1. held together by the centromere.
2. 50% identical to each other.
3. attached to the nuclear membrane.
4. about to duplicate to form new chromosomes.
5. ready to migrate together to one end of the cell.

Answer: A

DQ: When and how does normal cell division occur in the body?

Type: Know It

Difficulty: Hard

Important Words/Concepts: cell cycle, cell division, chromatid, chromosome, mitosis

34. When chromosomes duplicate, they form

1. daughter chromatids.
2. sister chromatids.
3. mother-daughter chromosomes.
4. bifurcated chromosomes.
5. chromateres.

Answer: B

DQ: When and how does normal cell division occur in the body?

Type: Know It

Difficulty: Easy

Important Words/Concepts: cell cycle, cell division, chromatid, chromosome, mitosis

35. When chromosomes duplicate, the copies are

1. not connected together.
2. connected together at only one end.
3. connected together at both ends but not the middle.
4. connected to each other along their entire length.
5. connected at only one point.

Answer: E

DQ: When and how does normal cell division occur in the body?

Type: Know It

Difficulty: Hard

Important Words/Concepts: cell cycle, cell division, chromatid, chromosome, mitosis

36. Sister chromatids are

1. duplicated chromosomes.
2. identical copies.
3. separated during mitosis.
4. made during the S phase.
5. All of the above.

Answer: E

DQ: When and how does normal cell division occur in the body?

Type: Know It

Difficulty: Easy

Important Words/Concepts: chromosomes and cell cycle, chromatid, chromosome, mitosis

37. Sister chromatids are held together by

1. a chromomere.
2. a chromosome fiber.
3. a centromere.
4. a centrosome.
5. a centriole.

Answer: C

DQ: When and how does normal cell division occur in the body?

Type: Know It

Difficulty: Easy

Important Words/Concepts: chromosomes and cell cycle, chromatid, chromosome, mitosis

38. Duplicated chromosomes are also known as sister

1. chromatids.
2. chromosomes.
3. chromomeres.
4. centromeres.
5. centrioles.

Answer: A

DQ: When and how does normal cell division occur in the body?

Type: Know It

Difficulty: Easy

Important Words/Concepts: chromosomes and cell cycle, chromatid, chromosome, mitosis

39. Microtubules attach to \_\_\_\_\_\_\_\_ on centromeres during mitosis.

A. kinetochore proteins

B. DNA

C. mitotic spindles

D. checkpoints

E. nuclear membranes

Answer: A

DQ: When and how does normal cell division occur in the body?

Type: Know It

Difficulty: Hard

Important Words/Concepts: mitosis, kinetochore, mitotic spindle

40. Chromosomes are most stretched out during

A. interphase.

B. prophase.

C. telophase.

D. anaphase.

E. metaphase.

Answer: A

DQ: When and how does normal cell division occur in the body?

Type: Know It

Difficulty: Easy

Important Words/Concepts: cell cycle phases and functions

41. What would be the consequences to a cell if that cell were unable to form a mitotic spindle?

*Answer:* That cell would be unable to separate the sister chromatids and thus unable to properly divide.

DQ: When and how does normal cell division occur in the body?

Type: Use It

Difficulty: Hard

Important Words/Concepts: cell cycle, cell division, chromatid, chromosome, mitosis

42. After chromosomes are duplicated, the identical copies

A. are called twin chromosomes.

B. are attached to each other by a centromere.

C. are separated and paired with their homologous chromosomes.

D. divide again before mitosis can begin.

E. are attached to each other by a cytosome.

Answer: B

DQ: When and how does normal cell division occur in the body?

Type: Know It

Difficulty: Hard

Important Words/Concepts: chromosomes, centromere, chromatids

43. In drawings of chromosomes, the “X” shape indicates that

1. the DNA has been replicated.
2. two sister chromatids exist.
3. cell division hasn’t yet occurred.
4. the cell is probably ready for mitosis.
5. All of the above.

Answer: E

DQ: When and how does normal cell division occur in the body?

Type: Know It

Difficulty: Hard

Important Words/Concepts: chromosomes, centromere, chromatids

44. Which of the following describes sister chromatids?

1. two copies of different chromosomes held together by a centromere
2. identical copies of a chromosome held together by a centromere
3. identical copies of a chromosome that are not connected
4. two copies of different chromosomes that are not connected
5. None of the above.

Answer: B

DQ: When and how does normal cell division occur in the body?

Type: Know It

Difficulty: Easy

Important Words/Concepts: chromosome, structure, cell cycle, chromatids

45. Why would a chromosome condense during mitosis?

*Answer:* Chromosomes condense to prevent them from tangling when they are separated.

DQ: When and how does normal cell division occur in the body?

Type: Know It

Difficulty: Hard

Important Words/Concepts: chromosome structure, cell cycle

46. Why would a chromosome decondense following mitosis?

*Answer:* Chromosomes decondense to allow proteins to access the DNA. Such proteins may be responsible for regulating genes and copying the DNA.

DQ: When and how does normal cell division occur in the body?

Type: Know It

Difficulty: Hard

Important Words/Concepts: chromosome structure, cell cycle

47. The correct order of phases in mitosis is

1. prophase, metaphase, anaphase, and telophase.
2. metaphase, anaphase, prophase, telophase, and cytokinesis.
3. G1, S, G2, M, and cytokinesis.
4. prophase, metaphase, anaphase, and cytokinesis.
5. cytokinesis, prophase, metaphase, anaphase, and telophase.

Answer: A

DQ: When and how does normal cell division occur in the body?

Type: Know It

Difficulty: Easy

Important Words/Concepts: stages of mitosis

48. In\_\_\_\_\_\_\_\_\_, chromosomes align in the middle of the cell, tugged there by spindle fibers.

1. prophase
2. metaphase
3. anaphase
4. telophase
5. interphase

Answer: B

DQ: When and how does normal cell division occur in the body?

Type: Know It

Difficulty: Easy

Important Words/Concepts: stages of mitosis

49. Cytokinesis occurs in animal cells when

A. the cell migrates from one location to another.

B. cell contents double in preparation for cell division.

C. the cell membrane pinches to form two separate cells.

D. when the DNA is degraded into small pieces and the cell dies.

E. a cancer-treatment therapy is designed to interrupt mitosis.

Answer: C

DQ: When and how does normal cell division occur in the body?

Type: Know It

Difficulty: Hard

Important Words/Concepts: cell cycle, cell division, mitosis, cytokinesis

50. By what stage in mitosis are sister chromatids completely separated into what will become two new daughter nuclei?

1. prophase
2. metaphase
3. anaphase
4. telophase
5. interphase

Answer: D

DQ: When and how does normal cell division occur in the body?

Type: Know It

Difficulty: Easy

Important Words/Concepts: stages of mitosis

51. The “S” phase of the cell cycle occurs during which of the following stages?

1. prophase
2. metaphase
3. anaphase
4. telophase
5. interphase

Answer: E

DQ: When and how does normal cell division occur in the body?

Type: Know It

Difficulty: Easy

Important Words/Concepts: cell cycle, stages of mitosis

52. Chromosomes pull apart because the spindle gets shorter during this stage.

A. interphase

B. prophase

C. metaphase

D. anaphase

E. telophase

Answer: D

DQ: When and how does normal cell division occur in the body?

Type: Know It

Difficulty: Easy

Important Words/Concepts: stages of mitosis

53. Chromosomes line up in the middle of the nucleus during

A. interphase.

B. prophase.

C. metaphase.

D. anaphase.

E. telophase.

Answer: C

DQ: When and how does normal cell division occur in the body?

Type: Know It

Difficulty: Easy

Important Words/Concepts: stages of mitosis

54. Chromosomes first coil up and become visible during

A. interphase.

B. prophase.

C. metaphase.

D. anaphase.

E. telophase.

Answer: B

DQ: When and how does normal cell division occur in the body?

Type: Know It

Difficulty: Easy

Important Words/Concepts: stages of mitosis

55. The nuclear envelope reforms during

A. interphase.

B. prophase.

C. metaphase.

D. anaphase.

E. telophase.

Answer: E

DQ: When and how does normal cell division occur in the body?

Type: Know It

Difficulty: Easy

Important Words/Concepts: stages of mitosis

56. DNA duplicates during

A. interphase.

B. prophase.

C. metaphase.

D. anaphase.

E. telophase.

Answer: A

DQ: When and how does normal cell division occur in the body?

Type: Know It

Difficulty: Easy

Important Words/Concepts: stages of mitosis

57. The nuclear envelope breaks up, allowing spindle fibers to attach to chromosomes during

A. interphase.

B. prophase.

C. metaphase.

D. anaphase.

E. telophase.

Answer: B

DQ: When and how does normal cell division occur in the body?

Type: Know It

Difficulty: Easy

Important Words/Concepts: stages of mitosis

58. Put the stages of cell division in the correct order.

*Answer:* interphase, prophase, metaphase, anaphase, telophase

DQ: When and how does normal cell division occur in the body?

Type: Use It

Difficulty: Easy

Important Words/Concepts: stages of mitosis

59. Which of the following is NOT a stage of mitosis?

1. prophase
2. metaphase
3. interphase
4. anaphase
5. telophase

Answer: C

DQ: When and how does normal cell division occur in the body?

Type: Know It

Difficulty: Easy

Important Words/Concepts: stages of mitosis, cell cycle

60. In which stage(s) of mitosis would sister chromatids be connected by one centromere?

1. prophase and telophase
2. metaphase and telophase
3. prophase and metaphase
4. anaphase and telophase
5. telophase

Answer: C

DQ: When and how does normal cell division occur in the body?

Type: Know It

Difficulty: Hard

Important Words/Concepts: stages of mitosis, cell cycle, chromatids

61. At what stage of mitosis do the spindle fibers shorten thereby pulling apart sister chromatids?

1. prophase
2. metaphase
3. interphase
4. anaphase
5. telophase

Answer: D

DQ: When and how does normal cell division occur in the body?

Type: Know It

Difficulty: Easy

Important Words/Concepts: stages of mitosis, cell cycle, spindle fibers

62. A cell has 46 centromeres in G1. How many will be present in prophase and in anaphase?

1. 46 in prophase and 46 in anaphase
2. 46 in prophase and 23 in anaphase
3. 46 in prophase and 92 in anaphase
4. 23 in prophase and 92 in anaphase
5. 92 in prophase and 46 in anaphase

Answer: C

DQ: When and how does normal cell division occur in the body?

Type: Know It

Difficulty: Hard

Important Words/Concepts: mitosis, cell cycle, chromosome

63. DNA replication occurs during which phase of the cell cycle?

A. metaphase

B. cytokinesis

C. interphase

D. prophase

E. anaphase

Answer: C

DQ: When and how does normal cell division occur in the body?

Type: Know It

Difficulty: Hard

Important Words/Concepts: cell cycle, cell division, chromosome, mitosis

64. Sister chromatids begin separation during which phase of the cell cycle?

A. metaphase

B. prophase

C. telophase

D. anaphase

E. interphase

Answer: D

DQ: When and how does normal cell division occur in the body?

Type: Know It

Difficulty: Hard

Important Words/Concepts: cell cycle, cell division, chromatid, chromosome, stages of mitosis

65. Which of the following places the phases of the cell cycle in the correct order?

A. metaphase, anaphase, telophase, prophase, interphase

B. interphase, prophase, metaphase, anaphase, telophase

C. interphase, metaphase, prophase, telophase, anaphase

D. prophase, metaphase, anaphase, cytokinesis, telophase

E. cytokinesis, telophase, metaphase, prophase, interphase

Answer: B

DQ: When and how does normal cell division occur in the body?

Type: Know It

Difficulty: Hard

Important Words/Concepts: cell cycle, cell division, stages of mitosis

66. A specific gene, called GRAB, prevents a cell from entering mitosis if there are any signs of DNA damage. This means that GRAB would be a type of

A. cell cycle checkpoint.

B. tumor-causing gene.

C. non-hereditary gene.

D. growth signal.

E. mutation.

Answer: A

DQ: How do normal cells and cancer cells differ with respect to cell division?

Type: Use It

Difficulty: Easy

Important Words/Concepts: cell cycle checkpoint, mitosis, cancer

67. Apoptosis

1. occurs in normal cell division.
2. contains several checkpoints.
3. is programmed cell death.
4. is a mechanism of cell repair.
5. ensures equal DNA in cytokinesis.

Answer: C

DQ: How do normal cells and cancer cells differ with respect to cell division?

Type: Know It

Difficulty: Easy

Important Words/Concepts: cell cycle checkpoints and apoptosis

68. Cell cycle checkpoints detect and control

1. DNA content.
2. signals that promote cell division.
3. DNA damage.
4. proper chromosome alignment.
5. All of the above.

Answer: E

DQ: How do normal cells and cancer cells differ with respect to cell division?

Type: Know It

Difficulty: Easy

Important Words/Concepts: cell cycle checkpoints and apoptosis

69. Cell division is usually kept under control by

1. apoptosis.
2. a single checkpoint in cytokinesis.
3. several checkpoints in the cell cycle and by apoptosis.
4. suicide checkpoints.
5. cell cycle repair mechanisms.

Answer: C

DQ: How do normal cells and cancer cells differ with respect to cell division?

Type: Know It

Difficulty: Hard

Important Words/Concepts: cell cycle checkpoints and apoptosis

70. At the G2 checkpoint, cells pause to

A. wait until there is a need for them to divide.

B. make sure that all chromosomes have been copied and are undamaged.

C. make sure that the spindle is fully formed.

D. wait until all chromosomes are lined up properly.

E. make sure that the homologous chromosomes are wrapped around each other.

Answer: B

DQ: How do normal cells and cancer cells differ with respect to cell division?

Type: Know It

Difficulty: Easy

Important Words/Concepts: cell cycle, checkpoints

71. At the G1 checkpoint, cells pause to

A. wait until there is a need for them to divide.

B. make sure that all chromosomes have been copied and are undamaged.

C. make sure that the nuclear envelope is intact.

D. make sure that all chromosomes are lined up properly.

E. make sure that the homologous chromosomes are wrapped around each other.

Answer: A

DQ: How do normal cells and cancer cells differ with respect to cell division?

Type: Know It

Difficulty: Easy

Important Words/Concepts: cell cycle, checkpoints

72. Programmed cell death is called

A. apoptosis.

B. endocytosis.

C. cytokinesis.

D. cytolysis.

E. mitosis.

Answer: A

DQ: How do normal cells and cancer cells differ with respect to cell division?

Type: Know It

Difficulty: Easy

Important Words/Concepts: apoptosis

73. Proteins scan chromosomes for damage during the

A. G1 checkpoint.

B. beginning of the synthesis phase.

C. apoptosis phase.

D. G2 checkpoint.

E. metaphase checkpoint.

Answer: D

DQ: How do normal cells and cancer cells differ with respect to cell division?

Type: Know It

Difficulty: Hard

Important Words/Concepts: apoptosis

74. There are several points during the cell cycle when the cell will check to be sure everything is progressing normally, without mistakes, and confirm that the cell should continue to the next phase of the cycle. When do these “cell cycle checkpoints” occur?

1. between G1 and S, and between G2 and mitosis
2. between G1 and G2, between G2 and mitosis, and during mitosis
3. between G1 and S, between G2 and mitosis, and during mitosis
4. between S and G2, between G2 and mitosis, and during cytokinesis
5. during S and cytokinesis

Answer: C

DQ: How do normal cells and cancer cells differ with respect to cell division?

Type: Know It

Difficulty: Hard

Important Words/Concepts: cell cycle regulation, checkpoints

75. If a cell sustains irreparable DNA damage during the S phase of the cell cycle the cell will undergo \_\_\_\_\_\_\_\_\_.

*Answer:* apoptosis

DQ: How do normal cells and cancer cells differ with respect to cell division?

Type: Know It

Difficulty: Easy

Important Words/Concepts: cell cycle, apoptosis, cell cycle regulation

76. The cell cycle checkpoints are responsible for checking that the cell is prepared to move on to the next stage in cell division. For example, the G1-to-S checkpoint ensures that the cell has all the components and signals necessary to go on to S phase and that the appropriate signals are present. The G2 checkpoint checks whether the

1. chromosomes have been separated properly.
2. DNA has been replicated properly.
3. chromosomes have aligned properly.
4. DNA has decondensed.
5. cell organelles have duplicated properly.

Answer: B

DQ: How do normal cells and cancer cells differ with respect to cell division?

Type: Use It

Difficulty: Easy

Important Words/Concepts: cell cycle regulation, checkpoints

77. What might be the result of a mutation in one of the proteins responsible for the G1 checkpoint?

1. The cell would continue to S phase without signals to divide being present.
2. The cell would divide uncontrollably.
3. The cell would move through the cell cycle more rapidly than normal.
4. Nothing; one of the other checkpoints would make up for its absence.
5. All of the above.

Answer: E

DQ: How do normal cells and cancer cells differ with respect to cell division?

Type: Use It

Difficulty: Hard

Important Words/Concepts: cell cycle regulation, checkpoints

78. Define apoptosis. Why is apoptosis important?

*Answer:* Apoptosis is programmed cell death. It serves to destroy cells that are damaged so that they do not produce more damaged cells and possibly cause cancer.

DQ: How do normal cells and cancer cells differ with respect to cell division?

Type: Know It

Difficulty: Hard

Important Words/Concepts: apoptosis, cell cycle, cell division, mitosis

79. What is the purpose of the cell cycle checkpoints? What happens when a cell no longer responds to these checkpoints?

*Answer:* Cell cycle checkpoints serve as stop-points during cell division, during which the cell checks for and corrects mistakes. If a cell no longer responds to these checkpoints, the result is usually unregulated cell growth, leading to cancer.

DQ: How do normal cells and cancer cells differ with respect to cell division?

Type: Know It

Difficulty: Easy

Important Words/Concepts: cancer, cell cycle, cell division, checkpoint, mitosis

80. If a cell is irreparably damaged, it undergoes programmed cell death, called

1. apoptosis.
2. cell division.
3. metastasis.
4. cytokinesis.
5. mitosis.

Answer: A

DQ: How do normal cells and cancer cells differ with respect to cell division?

Type: Know It

Difficulty: Easy

Important Words/Concepts: apoptosis, cell cycle, cell division, checkpoint, mitosis

81. Cancer consists of too much

A. cell division.

B. translation.

C. apoptosis.

D. toxin production.

E. DNA replication.

Answer: A

DQ: How do normal cells and cancer cells differ with respect to cell division?

Type: Know It

Difficulty: Easy

Important Words/Concepts: mitosis, cancer

82. Which of the following help(s) to prevent cancer?

A. cell cycle checkpoints

B. apoptosis

C. DNA repair enzymes

D. regulation of the cell cycle

E. All of the above.

Answer: E

DQ: How do normal cells and cancer cells differ with respect to cell division?

Type: Know It

Difficulty: Easy

Important Words/Concepts: mitosis, cancer, cancer prevention

83. Cancer is

1. an organ that becomes malignant.
2. a metastatic cell.
3. unregulated apoptosis.
4. unregulated cell division.
5. regulated cell division.

Answer: D

DQ: How do normal cells and cancer cells differ with respect to cell division?

Type: Know It

Difficulty: Easy

Important Words/Concepts: normal and cancerous cell division

84. Cancer may be caused by

1. a cell cycle checkpoint problem.
2. failure in apoptosis.
3. unregulated cell division.
4. failure in DNA repair mechanisms.
5. All of the above.

Answer: E

DQ: How do normal cells and cancer cells differ with respect to cell division?

Type: Know It

Difficulty: Easy

Important Words/Concepts: normal and cancerous cell division

85. Cell division in cancerous tumors

1. proceeds until apoptosis.
2. is regulated by the cell cycle.
3. progresses at a predicted rate.
4. is regulated by checkpoints.
5. accumulates DNA damage.

Answer: E

DQ: How do normal cells and cancer cells differ with respect to cell division?

Type: Know It

Difficulty: Hard

Important Words/Concepts: normal and cancerous cell division

86. The medical condition of cells growing out of control is called

A. cytokinesis.

B. cancer.

C. metastasis.

D. apoptosis.

E. tumorization.

Answer: B

DQ: How do normal cells and cancer cells differ with respect to cell division?

Type: Know It

Difficulty: Easy

Important Words/Concepts: cancer

87. Cells that have accumulated too much chromosomal damage can

A. lead to the formation of a tumor.

B. lead to cancer.

C. cause the cell to destroy itself (apoptosis).

D. lead to uncontrolled cell division.

E. All of the above.

Answer: E

DQ: How do normal cells and cancer cells differ with respect to cell division?

Type: Know It

Difficulty: Hard

Important Words/Concepts: chromosomal damage

88. Define metastasis. Do all cancers enter this stage?

*Answer:* Metastasis is when cancer has spread from its point of origin to other locations within the body. Not all cancers metastasize; some remain as localized tumors.

DQ: How do normal cells and cancer cells differ with respect to cell division?

Type: Use It

Difficulty: Easy

Important Words/Concepts: metastasis, tumor

89. Where do cancer cells differ in their cell cycle from normal cells?

*Answer:* Cancer cells seldom pause at the G1 checkpoint, dividing out of control. They also will continue past the G2 checkpoint, even if there is a chromosomal abnormality.

DQ: How do normal cells and cancer cells differ with respect to cell division?

Type: Use It

Difficulty: Hard

Important Words/Concepts: cancer and the cell cycle

90. How could a cancerous cell evade apoptosis?

1. The cell responds to environmental signals.
2. The cell goes through the cell cycle too quickly for apoptosis to occur.
3. The cell has a mutation in a checkpoint protein.
4. The cell is stuck in one phase of the cell cycle.
5. Cancerous cells can’t evade apoptosis.

Answer: C

DQ: How do normal cells and cancer cells differ with respect to cell division?

Type: Use It

Difficulty: Easy

Important Words/Concepts: cell division, cancer, mutation

91. Dermatologists looking for skin cancer usually don’t worry about circular moles with smooth edges, but they are concerned about moles with irregular shapes. What does the shape of the mole tell the dermatologist about what is likely going on at a cellular level?

*Answer:* Normally dividing cells are more likely to form a regular, smooth-edged circle. A mole with irregular edges, however, indicates that cell division is irregular and there is likely to be a problem with the cell cycle checkpoints.

DQ: How do normal cells and cancer cells differ with respect to cell division?

Type: Use It

Difficulty: Hard

Important Words/Concepts: cancer, cell cycle, cell division, checkpoint, mitosis

92. What causes cancer to kill people?

1. Cancer cells accumulate DNA mutations.
2. Tumors can spread to other parts of the body.
3. Cancer cells crowd out normal cells and disrupt organ functions.
4. Cancer cells have uncontrolled cell division.
5. Tumors cells contain abnormal DNA

Answer: C

DQ: How are cancer treatment decisions made for a given patient?

Type: Know It

Difficulty: Easy

Important Words/Concepts: cancer death

93. Doctors always hope to detect cancer in the early stages of tumor formation. What are the problems associated with detecting cancer in the late stages?

*Answer:* In the late stages of tumor formation, not only is the tumor large and possibly inhibiting proper organ function, but the tumor has a greater chance of having metastasized to other locations, making treatment much more difficult.

DQ: How are cancer treatment decisions made for a given patient?

Type: Use It

Difficulty: Hard

Important Words/Concepts: cancer, cell division, metastasis

94. True or False: Chemotherapy treatments only kill the cancer cells and don’t affect normal, healthy cells.

*Answer:* False. Chemotherapy is non-specific and affects all dividing cells.

DQ: How are cancer treatment decisions made for a given patient?

Type: Know It

Difficulty: Easy

Important Words/Concepts: cancer, chemotherapy

95. Chemotherapy is used in the battle against

1. breast cancer.
2. colon cancer.
3. skin cancer.
4. prostate cancer.
5. All of the above.

Answer: E

DQ: How are cancer treatment decisions made for a given patient?

Type: Know It

Difficulty: Easy

Important Words/Concepts: chemotherapy, cancer

96. Chemotherapeutics act on

1. all dividing cells.
2. cancer cells.
3. all cells.
4. apoptotic cells.
5. dividing cancer cells.

Answer: A

DQ: How are cancer treatment decisions made for a given patient?

Type: Know It

Difficulty: Easy

Important Words/Concepts: chemotherapy, cancer

97. Radiation therapy for cancer works by

1. burning the cells, thereby killing them.
2. damaging the cell’s DNA, resulting in cell death.
3. interfering with the cell’s mitotic spindle.
4. dissolving the tumor through heating.
5. freezing the cells, thereby killing them.

Answer: B

DQ: How are cancer treatment decisions made for a given patient?

Type: Know It

Difficulty: Easy

Important Words/Concepts: radiation therapy, cancer

98. Physical side-effects from chemotherapy and radiotherapy could be maximally reduced by

1. targeting specific tumor cells.
2. reducing amounts of drug or radiation.
3. reducing exposure time.
4. better detection methods.
5. using multiple drugs with radiation.

Answer: A

DQ: How are cancer treatment decisions made for a given patient?

Type: Know It

Difficulty: Hard

Important Words/Concepts: chemotherapy and radiation therapy

99. Why do cancer patients undergoing chemotherapy and radiation therapy lose their hair?

*Answer:* The treatments both attack all dividing cells, including the cells of the hair follicles. Damage to these cells results in hair loss.

DQ: How are cancer treatment decisions made for a given patient?

Type: Use It

Difficulty: Easy

Important Words/Concepts: chemotherapy, radiation therapy

100. Explain how radiation leads to apoptosis.

*Answer:* Radiation is concentrated on areas containing cancerous cells, which are cells that are rapidly dividing. It causes massive chromosomal damage in the dividing cells, which may lead to programmed cell death, apoptosis.

DQ: How are cancer treatment decisions made for a given patient?

Type: Use It

Difficulty: Easy

Important Words/Concepts: radiation therapy, apoptosis

101. Explain why radiation therapy is NOT appropriate treatment for a metastasized cancer.

*Answer:* Radiation is concentrated on areas containing cancerous cells, which are cells that are rapidly dividing, in an attempt to trigger apoptosis. However, if those cancerous cells are metastasized rather than isolated in tumors, the whole body would have to be inundated with radiation. This would lead to damage to many healthy cells and potentially cause them to become cancerous.

DQ: How are cancer treatment decisions made for a given patient?

Type: Use It

Difficulty: Hard

Important Words/Concepts: radiation therapy, apoptosis, metastasis

102. Chemotherapy and radiation target both \_\_\_\_\_\_\_\_\_\_ and \_\_\_\_\_\_\_\_\_\_\_ cells.

*Answer:* cancerous; normal

DQ: How are cancer treatment decisions made for a given patient?

Type: Know It

Difficulty: Easy

Important Words/Concepts: cancer, chemotherapy, radiation therapy

103. Side-effects of chemotherapy, such as vomiting, hair loss, and bruising occur because

1. cancerous cells release toxins that poison the rest of the body.
2. cancerous cells have overtaken normal cells, causing malfunctions.
3. chemotherapeutic drugs specifically target cancerous cells.
4. chemotherapeutic drugs kill both normal and cancerous cells.
5. the body has an immune reaction to chemotherapeutic drugs.

Answer: D

DQ: How are cancer treatment decisions made for a given patient?

Type: Know It

Difficulty: Easy

Important Words/Concepts: cancer, side-effects, chemotherapy

104. Radiation and chemotherapy typically have all of the following side-effects EXCEPT

1. blurry vision.
2. nausea.
3. diarrhea.
4. vomiting.
5. hair loss.

Answer: A

DQ: How are cancer treatment decisions made for a given patient?

Type: Know It

Difficulty: Easy

Important Words/Concepts: cancer, chemotherapy, side-effects, radiation

105. Most adults survive chemotherapy, but unborn children frequently do not. Why do you think that is? Specifically, what is the difference between an adult and an unborn child that would account for this difference?

*Answer:* Most chemotherapeutic drugs inhibit cell division. Most adult cells are not dividing rapidly; therefore, chemotherapeutic drugs do not affect those cells to a great extent. An unborn child, however, is undergoing rapid cell division in all organs, and thus chemotherapeutic drugs would likely affect all organs and could cause the death of the unborn child.

DQ: How are cancer treatment decisions made for a given patient?

Type: Use It

Difficulty: Hard

Important Words/Concepts: cancer, cell cycle, cell division, chemotherapy, conventional drugs, mitosis

106. Metastasis is

1. an effective form of treatment for cancer.
2. part of cell division, when chromosomes line up.
3. a state of rest for the cell, between divisions.
4. a state of active cell division.
5. the spread of cancer from one location in the body to another.

Answer: E

DQ: How are cancer treatment decisions made for a given patient?

Type: Know It

Difficulty: Easy

Important Words/Concepts: cancer, cell cycle, cell division, metastasis

107. When cancer has spread to many areas of the body, the most common form of treatment is

1. surgery to remove the tumors.
2. radiation directed at the tumors.
3. chemotherapy drugs injected into the bloodstream.
4. heat therapy directed at the tumors.
5. cold therapy directed at the tumors.

Answer: C

DQ: How are cancer treatment decisions made for a given patient?

Type: Know It

Difficulty: Easy

Important Words/Concepts: cancer, chemotherapy, metastasis, radiation

108. What is the name of the organization that oversees the quality control of pharmaceutical drugs produced in the United States?

A. National Institutes of Health (NIH)

B. Environmental Protection Agency (EPA)

C. Federal Drug Administration (FDA)

D. Centers for Disease Control (CDC)

E. U.S. Department of Agriculture (USDA)

Answer: C

DQ: How are new cancer drugs developed?

Type: Know It

Difficulty: Easy

Important Words/Concepts: drug development, regulations

109. Why would a drug that specifically kills rapidly dividing cells make a good chemotherapeutic agent?

1. The drug would only target cancer cells.
2. The drug would not affect normal cells.
3. Cancer cells divide more rapidly than most normal cells.
4. Unlike radiation therapy, the drug would target a specific population of cells.
5. Cancer cells are the only cells dividing in a mature human.

Answer: C

DQ: How are new cancer drugs developed?

Type: Know It

Difficulty: Easy

Important Words/Concepts: cell division, cancer, chemotherapy

110. Most chemotherapy drugs are effective because they

1. increase protein production.
2. increase the immune system response needed to fight cancer.
3. kill cancer cells only without affecting healthy cells.
4. interrupt cell division.
5. destroy the plasma membrane, thus causing cell death.

Answer: D

DQ: How are new cancer drugs developed?

Type: Know It

Difficulty: Hard

Important Words/Concepts: cancer, cell cycle, cell division, chemotherapy, conventional drugs

111. All of the following could be effective cancer treatments EXCEPT

1. a drug that enhances apoptosis.
2. a drug that increases DNA replication.
3. a drug that prevents formation of the mitotic spindle.
4. a drug that increases the immune system response.
5. a drug that makes cells more permeable to drugs.

Answer: B

DQ: How are new cancer drugs developed?

Type: Use It

Difficulty: Easy

Important Words/Concepts: apoptosis, cancer, chemotherapy, conventional drugs

112. Chemotherapy drugs interfere with

A. cell division.

B. chromosome duplication.

C. spindle formation.

D. chromosome separation during mitosis.

E. All of the above.

Answer: E

DQ: How are new cancer drugs developed?

Type: Know It

Difficulty: Easy

Important Words/Concepts: chemotherapy

113. Paclitaxel interferes with

A. chromosome separation during anaphase.

B. chromosome duplication.

C. cytokinesis.

D. nuclear envelope disintegration during mitosis.

E. centromere formation during interphase.

Answer: A

DQ: How are new cancer drugs developed?

Type: Know It

Difficulty: Hard

Important Words/Concepts: chromosome separation, activity of chemotherapy drugs

114. At what stage of mitosis would taxol interfere with cell division?

1. prophase
2. metaphase
3. interphase
4. anaphase
5. telophase

Answer: D

DQ: How are new cancer drugs developed?

Type: Know It

Difficulty: Hard

Important Words/Concepts: mitosis, cell cycle, taxol, chemotherapy

115. One promising new treatment for cancer uses “angiogenesis inhibitors” such as Avastin®. This treatment works because a growing tumor requires additional nutrients, and thus excretes substances to encourage growth of new blood vessels to “feed” the tumor. Angiogenesis inhibitors prevent that blood vessel growth. What might be one benefit of this treatment over traditional chemotherapy?

1. It would not affect most dividing cells, and so it would be more specific than traditional chemotherapy.
2. It would be able to target all tumors, and so it would be less selective than traditional chemotherapy.
3. It would starve cells in a tumor, which would kill them more gradually than traditional chemotherapy.
4. It targets only rapidly dividing cells because those are the ones that form tumors.
5. All of the above.

Answer: A

DQ: How are new cancer drugs developed?

Type: Use It

Difficulty: Hard

Important Words/Concepts: cancer, chemotherapy

116. You are trying to discover a new way to treat breast cancer that would specifically target cancerous cells and not normal cells. You notice that cancerous breast cells express a specific protein on their membranes, which normal cells do not express. Can you think of a way to use this fact to your advantage?

*Answer:* Design a drug that will target the protein expressed on the outside of the cancerous cells. The drug would then only kill cancerous cells and not normal cells.

DQ: How are new cancer drugs developed?

Type: Use It

Difficulty: Hard

Important Words/Concepts: cancer, side-effects, chemotherapy, treatment

117. If you ran a pharmaceutical company, what would be the most effective series of steps for your company to discover new drugs from plants and bring them to market?

1. Identify likely drug sources, test chemicals on cultured cells, select the most effective chemical, convert chemical into a form for delivery into humans, do clinical trials, get FDA approval for drug sales, scale up drug supply.
2. Identify likely drug sources, select the most effective chemical, convert chemical into a form for delivery into humans, test chemicals on cultured cells, do clinical trials, get FDA approval for drug sales, scale up drug supply.
3. Identify likely drug sources, select the most effective chemical, test chemicals on cultured cells, convert chemical into a form for delivery into humans, do clinical trials, scale up drug supply, get FDA approval for drug sales.
4. Get FDA approval for drug sales, identify likely drug sources, test chemicals on cultured cells, select the most effective chemical, convert chemical into a form for delivery into humans, do clinical trials, scale up drug supply.
5. Get FDA approval for drug sales, identify likely drug sources, test chemicals on cultured cells, do clinical trials, select the most effective chemical, convert chemical into a form for delivery into humans, scale up drug supply.

Answer: A

DQ: How are new cancer drugs developed?

Type: Use It

Difficulty: Hard

Important Words/Concepts: drug discovery process

118. Taxol was an important new chemotherapy drug because it

1. was present in only very low amounts in tree bark.
2. killed ovarian and breast cancer cells.
3. targeted a different step of the cell cycle compared to other drugs.
4. could be extracted from widely available trees.
5. was effective and inexpensive.

Answer: C

DQ: How are new cancer drugs developed?

Type: Know It

Difficulty: Hard

Important Words/Concepts: taxol, chemotherapy

119. When did doctors start successfully using chemotherapy to treat cancer?

1. They used taxol to treat ovarian cancer in 1988.
2. They treated most cancers with radiation prior to 1945.
3. They used synthetic organic chemicals in the early 1800s.
4. They tried mustard gas to treat cancer in 1942.
5. They tried paclitaxel to treat cancer during World War II.

Answer: D

DQ: How are new cancer drugs developed?

Type: Know It

Difficulty: Easy

Important Words/Concepts: history of chemotherapy

120. Why was taxol a controversial cancer drug when it was discovered?

1. Extraction of the drug required killing thousands of old-growth trees that grow in a limited area.
2. The rare spotted owl nested in the forests of trees from which the drug was extracted.
3. A whole tree would have to be killed to treat each person, causing environmentalists to clash with patient advocates.
4. It was difficult to obtain enough taxol to treat all the patients who needed it.
5. All of the above.

Answers: E

DQ: How are new cancer drugs developed?

Type: Know It

Difficulty: Easy

Important Words/Concepts: taxol, chemotherapy, society, environment

121. If you were going to set up a clinical trial of a new chemotherapy drug that would be used in addition to traditional treatment for prostate cancer, who would you use as the control group for your experiment?

1. patients with prostate cancer who received no treatment
2. patients with prostate cancer who received traditional treatment alone
3. patients with prostate cancer who were given the trial drug but no traditional treatment
4. patients with prostate cancer who received traditional treatment plus the trial drug
5. healthy patients with no prostate cancer

Answers: B

DQ: How are new cancer drugs developed?

Type: Use It

Difficulty: Easy

Important Words/Concepts: chemotherapy, clinical trial, experimental design