

Chapter 02 - Cells

**Chapter 02**  
**Cells**

**Multiple Choice Questions**

1. The cellular basis of muscular dystrophy is that some of a child's muscle cells

A. have combined into a structure that cannot contract.

B. lack DNA.

C.

lack a protein that enables them to withstand the force of contraction.

D.

have too much of a contractile protein and become weak.

*Bloom's Level: 02. Understand*

*Learning Outcome: 02.01 Explain why it is important to know the cellular basis of a disease.*

*Section: 02.01*

*Topic: Cell parts*

2. A researcher identifies an abnormality in a protein that causes a particular inherited illness.

To develop a treatment, it would be most helpful to know

A. which cells are affected and how to replace the protein's function in them.

B. the sequence of the gene that encodes the protein.

C. the other types of molecules that cause or contribute to the disease.

D. the type of mutation that affects the protein.

*Bloom's Level: 03. Apply*

*Learning Outcome: 02.01 Explain why it is important to know the cellular basis of a disease.*

*Section: 02.01*

*Topic: Cell parts*

3. Which of the following statements is true?

- A. Somatic cells are diploid, meaning that they have two copies of the human genome.
- B. Somatic cells are haploid, meaning that they have one copy of the human genome.
- C. Sperm and egg cells are diploid, meaning that they have two copies of the human genome.
- D. Stem cells are haploid, meaning that they have one copy of the human genome.

*Bloom's Level: 02. Understand*

*Learning Outcome: 02.02 Define differentiated cell.*

*Section: 02.01*

*Topic: Cell parts*

4. Which of the following types of components aggregate and interact to form the epithelial, connective, muscle, and nerve tissues in the human body?

A.

Prokaryotic cell

B.

Secondary meristems

C.

Differentiated cell

D.

Stem cell

*Bloom's Level: 01. Remember*

*Learning Outcome: 02.02 Define differentiated cell.*

*Section: 02.01*

*Topic: Differentiation*

## Chapter 02 - Cells

5.

Humans belong to domain \_\_\_\_\_, which is distinguished by cells that have \_\_\_\_\_.

- A. Prokarya; organelles
- B. Archaea; ancient organelles
- C. Eukarya; organelles**
- D. Prokarya; proteins

*Bloom's Level: 02. Understand*

*Learning Outcome: 02.04 Describe how organelles interact.*

*Section: 02.02*

*Topic: Cell parts*

6.

Ribosomes are in the cells of

- A. eukaryotes only.
- B. animals only.
- C. vertebrates only.
- D. all organisms.**

*Bloom's Level: 01. Remember*

*Learning Outcome: 02.04 Describe how organelles interact.*

*Section: 02.02*

*Topic: Cell parts*

7. The major macromolecules that make up cells are

- A. vitamins and minerals.
- B. carbon, hydrogen, nitrogen, oxygen, and phosphorus.
- C. carbohydrates, proteins, lipids, and nucleic acids.**
- D. eukaryotes, prokaryotes, and archaea.

*Bloom's Level: 01. Remember*

*Learning Outcome: 02.03 List the four major chemicals in cells.*

*Section: 02.02*

*Topic: Cell parts*

## Chapter 02 - Cells

8.

About \_\_\_\_\_ average-sized bacteria could fit into a human cell.

- A. 10
- B. 100
- C. 1,000**
- D. 10,000

*Bloom's Level: 01. Remember*  
*Learning Outcome: 02.04 Describe how organelles interact.*  
*Section: 02.02*  
*Topic: Cell parts*

9. Organelles protect a cell by

**A.**

sequestering biochemicals that could dismantle other cellular structures.

- B. forming a thick outer barrier.
- C. containing powerful enzymes that kill any bacteria that enter.
- D.

placing flag-like molecules on a cell's surface, which identify that cell as belonging to a particular person.

*Bloom's Level: 02. Understand*  
*Learning Outcome: 02.04 Describe how organelles interact.*  
*Section: 02.02*  
*Topic: Cell parts*

10. The nuclear lamina is

- A. the sac that holds the genetic material.
- B. part of the nucleus that holds RNA.
- C. a fibrous layer that lines the inner face of the nuclear membrane.**
- D. the site of protein synthesis.

*Bloom's Level: 02. Understand*  
*Learning Outcome: 02.04 Describe how organelles interact.*  
*Section: 02.02*  
*Topic: Cell parts*

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11. In a human cell, the genetic material is in the

- A. lysosome.
- B. ribosome.
- C. nucleus.**
- D. cytoplasm.

*Bloom's Level: 01. Remember*

*Learning Outcome: 02.03 List the four major chemicals in cells.*

*Section: 02.02*

*Topic: Cell parts*

12.

Which of the following acts as a quality control center for cells?

A.

Lysosome

B.

Plasma membrane

**C.**

Endoplasmic reticulum

D.

Nuclear lamina

*Bloom's Level: 02. Understand*

*Learning Outcome: 02.04 Describe how organelles interact.*

*Section: 02.02*

*Topic: Cell parts*

13. What is the sequence of events involved in the production of proteins that is secreted?

- A.** A hormone signals the gene that encodes the protein to be transcribed into mRNA in the nucleus. The mRNA is translated into protein on the ER, then processed and folded in the Golgi apparatus, and then sent out of the cell in a vesicle.
- B. A hormone signals a protein-filled vesicle to move from the plasma membrane into the cell and into the nucleus, where it stimulates transcription of the appropriate gene into mRNA. The mRNA exits the nucleus and is translated into protein on the ER and processed and folded in the Golgi apparatus. Finally, the protein is transported out of the cell in a vesicle.
- C. A hormone binds to the plasma membrane, signaling proteins near the membrane to fall apart into amino acids. These enter the nucleus and stimulate replication of the gene encoding the protein.
- D. The protein is produced as a linear molecule in the nucleus, then exits through nuclear pores. On the ER the protein folds into its active form and at the Golgi apparatus is packed into a vesicle, which carries it across the plasma membrane and out of the cell.

*Bloom's Level: 01. Remember*

*Learning Outcome: 02.04 Describe how organelles interact.*

*Section: 02.02*

*Topic: Cell parts*

14. The organelle that consists of a stack of flat, membrane-enclosed sacs is the

- A. mitochondrion.
- B. nucleolus.
- C.** Golgi apparatus.
- D. nucleus.

*Bloom's Level: 02. Understand*

*Learning Outcome: 02.04 Describe how organelles interact.*

*Section: 02.02*

*Topic: Cell parts*

15. The organelle that is the equivalent of a cellular garbage disposal system is the

- A. nucleus.
- B.** lysosome.
- C. mitochondrion.
- D. glucosome.

*Bloom's Level: 02. Understand*

*Learning Outcome: 02.04 Describe how organelles interact.*

*Section: 02.02*

*Topic: Cell parts*

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16.

A type of vesicle that ferries molecules, such as cholesterol, to lysosomes is an

- A. endosome.
- B. episome.
- C. oprahsome.
- D. ectosome.

*Bloom's Level: 02. Understand*

*Learning Outcome: 02.04 Describe how organelles interact.*

*Section: 02.02*

*Topic: Cell parts*

17. In mitochondria,

- A. energy from nutrients is converted into a form that a cell can use.
- B. all of a cell's DNA is replicated.
- C. fats and carbohydrates are degraded.
- D. sugars are added to proteins.

*Bloom's Level: 01. Remember*

*Learning Outcome: 02.04 Describe how organelles interact.*

*Section: 02.02*

*Topic: Cell parts*

18. The cell type with the most mitochondria is

- A. muscle.
- B. nerve.
- C. fat.
- D. sperm.

*Bloom's Level: 02. Understand*

*Learning Outcome: 02.04 Describe how organelles interact.*

*Section: 02.02*

*Topic: Cell parts*

19. Cristae are

- A. types of genes.
- B. types of insects.
- C. membranous structures that are parts of mitochondria.
- D. bits of sugars in the Golgi apparatus.

*Bloom's Level: 01. Remember*

*Learning Outcome: 02.04 Describe how organelles interact.*

*Section: 02.02*

*Topic: Cell parts*

20. In a DNA molecule, the sugar-phosphate backbone is the same in everyone, but the base sequence is different in everyone. A plasma membrane is similar conceptually to DNA in that A. the lipid bilayer is the same in everyone, but the nature and pattern of the molecules embedded in it differ.

- B. the pattern of embedded proteins in the plasma membrane is the same in everyone, but the lipid bilayer differs.
- C. the lipid bilayer and pattern of embedded proteins differ in everyone.
- D. the lipid bilayer is the same in everyone, but some people have the embedded proteins sticking out of the outer face of the membrane, and others have the proteins extending inward.

*Bloom's Level: 04. Analyze*

*Learning Outcome: 02.05 Describe the structure and function of a biological membrane.*

*Section: 02.02*

*Topic: Cell parts*

21. Which sequence of events illustrates the steps of signal transduction?

- A. First messenger to receptor molecules to second messenger to cellular response
- B. Receptor molecules to first messenger to second messenger to cellular response
- C. First messenger to second messenger to receptor molecules to cellular response
- D. First messenger to second messenger to cellular responses to receptor

*Bloom's Level: 04. Analyze*

*Learning Outcome: 02.05 Describe the structure and function of a biological membrane.*

*Section: 02.02*

*Topic: Cell parts*



## Chapter 02 - Cells

22.

A molecule that binds a cell surface receptor is called a

A.

peroxisome.

B. nucleic acid.

**C. ligand.**

D. nuclear pore.

*Bloom's Level: 01. Remember*

*Learning Outcome: 02.05 Describe the structure and function of a biological membrane.*

*Section: 02.02*

*Topic: Cell parts*

23. The internal scaffolding of a cell consists of

**A. microtubules and microfilaments.**

B. cilia and flagella.

C. chitin and chlorophyll.

D. lipid bilayers.

*Bloom's Level: 01. Remember*

*Learning Outcome: 02.06 List the components of the cytoskeleton.*

*Section: 02.02*

*Topic: Cell parts*

24. Cilia are built of

A. microorganisms.

B. microfilaments.

C. micronutrients.

**D. microtubules.**

*Bloom's Level: 01. Remember*

*Learning Outcome: 02.06 List the components of the cytoskeleton.*

*Section: 02.02*

*Topic: Cell parts*

## Chapter 02 - Cells

25.

The cytoskeletal component that consists of different protein types is:

A.

a microtubule.

**B.** an intermediate filament.

C. a microfilament.

D. a fibrous filament.

*Bloom's Level: 02. Understand*

*Learning Outcome: 02.04 Describe how organelles interact.*

*Section: 02.02*

*Topic: Cell parts*

26.

People with giant axons lose the ability to move and see because

A.

apoptosis in their body rapidly and neatly dismantles cells into membrane-enclosed pieces that a phagocyte can mop up.

**B.**

they lack a protein, called gigaxonin, which normally breaks down intermediate filaments and recycles their components.

C.

they have an excess of CFTR proteins, which entrap salt inside cells.

D.

their hemoglobin leaks out of the cells of the body.

*Bloom's Level: 02. Understand*

*Learning Outcome: 02.06 List the components of the cytoskeleton.*

*Section: 02.02*

*Topic: Cell parts*

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27. The approximate percentage of our cells that are replaced daily is

A. 0.1%.

B. 1%.

C.

10%.

**D.**

27%

*Bloom's Level: 01. Remember*

*Learning Outcome: 02.08 Describe the events and control of the cell cycle.*

*Section: 02.03*

*Topic: Cell division and death*

28.

The two major stages of the cell cycle are

A. interphase and prophase.

**B.** interphase and mitosis.

C. mitosis and meiosis.

D. mitosis and apoptosis.

*Bloom's Level: 01. Remember*

*Learning Outcome: 02.08 Describe the events and control of the cell cycle.*

*Section: 02.03*

*Topic: Cell division and death*

29. The cell cycle is a series of events a cell undergoes as it prepares to

**A.** divide.

B. die.

C. adhere to another cell.

D. pass along a signal.

*Bloom's Level: 01. Remember*

*Learning Outcome: 02.08 Describe the events and control of the cell cycle.*

*Section: 02.03*

*Topic: Cell division and death*

## Chapter 02 - Cells

30.

DNA replicates during the \_\_\_\_\_ phase of the cell cycle.

- A. G<sub>1</sub>
- B. G<sub>2</sub>
- C. G<sub>3</sub>
- D. S**

*Bloom's Level: 02. Understand*

*Learning Outcome: 02.08 Describe the events and control of the cell cycle.*

*Section: 02.03*

*Topic: Cell division and death*

31. The order of events in the cell cycle is

- A. S to G<sub>1</sub> to G<sub>2</sub> to mitosis.
- B. Mitosis to G<sub>1</sub> to G<sub>2</sub> to S.
- C. G<sub>1</sub> to G<sub>2</sub> to S to mitosis.
- D. G<sub>1</sub> to S to G<sub>2</sub> to mitosis.**

*Bloom's Level: 04. Analyze*

*Learning Outcome: 02.08 Describe the events and control of the cell cycle.*

*Section: 02.03*

*Topic: Cell division and death*

32. At the point in the cell cycle when mitosis begins

- A. DNA replication begins.
- B. each chromosome consists of two identical chromatids joined at the centromere.**
- C.

the number of chromosome is reduced to half.

D. the cell enters a dormant phase.

*Bloom's Level: 02. Understand*

*Learning Outcome: 02.08 Describe the events and control of the cell cycle.*

*Section: 02.03*

*Topic: Cell division and death*

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33.

Chromosomes coil tightly around chromosomal proteins and condense during

- A. prophase.
- B. metaphase.
- C. anaphase.
- D. telophase.

*Bloom's Level: 01. Remember*

*Learning Outcome: 02.08 Describe the events and control of the cell cycle.*

*Section: 02.03*

*Topic: Cell division and death*

34.

Cells contain twice the normal number of chromosomes briefly during

- A. prophase.
- B. metaphase.
- C. anaphase.
- D. telophase.

*Bloom's Level: 01. Remember*

*Learning Outcome: 02.08 Describe the events and control of the cell cycle.*

*Section: 02.03*

*Topic: Cell division and death*

35. During S phase, replicated chromosomes are joined at their

- A. centrosomes.
- B. centromeres.
- C. middlemeres.
- D. telomeres.

*Bloom's Level: 02. Understand*

*Learning Outcome: 02.08 Describe the events and control of the cell cycle.*

*Section: 02.03*

*Topic: Cell parts*

36. The part of a chromosome that shortens with each cell division, functioning as a "clock," is the

- A. centromere.
- B. centrosome.
- C. centriole.
- D. telomere.**

*Bloom's Level: 01. Remember*

*Learning Outcome: 02.08 Describe the events and control of the cell cycle.*

*Section: 02.03*

*Topic: Cell division and death*

37. Factors that control how often a cell divides include

- A. telomere lengths, hormonal signals, crowding, and growth factors.**
- B. which chromosomes are active and which are not.
- C. the activity level of the person, diet, and environmental exposures.
- D. where chromosomes are located within the nucleus.

*Bloom's Level: 02. Understand*

*Learning Outcome: 02.08 Describe the events and control of the cell cycle.*

*Section: 02.03*

*Topic: Cell division and death*

38. During apoptosis, caspases

- A. activate enzymes that cut DNA into same-sized pieces.**
- B. cause mitochondria to replicate their DNA.
- C. alter the cell surface so that viruses can more easily enter.
- D. remove introns from DNA.

*Bloom's Level: 02. Understand*

*Learning Outcome: 02.07 Distinguish between mitosis and apoptosis.*

*Section: 02.03*

*Topic: Cell division and death*

39. Apoptosis is a form of

- A. programmed cell death that is a normal part of development.
- B. programmed cell division that is a normal part of development.
- C.

cellular duplication.

D. cellular adhesion.

*Bloom's Level: 01. Remember*

*Learning Outcome: 02.07 Distinguish between mitosis and apoptosis.*

*Section: 02.03*

*Topic: Cell division and death*

40. The defining characteristic of a stem cell is

- A. self-repair.
- B. self-renewal.
- C. the ability to turn into a cancer cell.
- D.

its origin from a progenitor cell.

*Bloom's Level: 01. Remember*

*Learning Outcome: 02.09 List the characteristics of a stem cell.*

*Section: 02.04*

*Topic: Stem cells*

41. A difference between a stem cell and a progenitor cell is that

- A. a progenitor cell cannot self-renew and a stem cell can.
- B. a stem cell cannot self-renew and a progenitor cell can.
- C. progenitor cells are rare but stem cells are abundant.
- D. progenitor cells are not present in embryos but stem cells are.

*Bloom's Level: 02. Understand*

*Learning Outcome: 02.10 Define stem and progenitor cell.*

*Section: 02.04*

*Topic: Stem cells*

42. A cell that can divide to give rise to any cell type, including those of membranes that support the developing embryo, is

- A. multipotent.
- B. a progenitor cell.
- C. a differentiated cell.
- D.** totipotent.

*Bloom's Level: 02. Understand*

*Learning Outcome: 02.09 List the characteristics of a stem cell.*

*Section: 02.04*

*Topic: Stem cells*

43. An experimental treatment for amyotrophic lateral sclerosis (Lou Gehrig's disease), which causes gradual loss of the ability to move, sends four genes into cells sampled from a patient's skin. This procedure reprograms the cells, which are then exposed to molecules and genes that stimulate them to develop as healthy versions of the cells affected in the disease. These cells are implanted into the patient. They are

- A. embryonic stem cells.
- B. adult connective tissue stem cells.
- C.** induced pluripotent stem cells.
- D. apoptotic cells.

*Bloom's Level: 04. Analyze*

*Learning Outcome: 02.10 Define stem and progenitor cell.*

*Section: 02.04*

*Topic: Stem cells*

44. Human embryonic stem cells that are used in research are

- A. cultured in the bodies of human embryos from outer cell mass cells.
- B.** cultured in laboratory dishes from inner cell mass cells taken from a 5-day embryo.
- C. taken from aborted human fetuses between 10 and 12 weeks of gestation.
- D. taken from stillbirths that do not have genetic diseases.

*Bloom's Level: 02. Understand*

*Learning Outcome: 02.09 List the characteristics of a stem cell.*

*Section: 02.04*

*Topic: Stem cells*



45.

"Adult" stem cells are more accurately called tissue-specific or somatic stem cells because

- A. they are also present at prenatal stages of development.
- B. some adults do not have them.
- C. whether they are present or not in an adult depends upon the individual's level of maturity.
- D. an adult body also contains embryonic stem cells.

*Bloom's Level: 02. Understand*

*Learning Outcome: 02.09 List the characteristics of a stem cell.*

*Section: 02.04*

*Topic: Stem cells*

46. Human stem cells are valuable in drug development because they can be used to

- A. create experimental organisms, such as rats and mice.
- B. replace experimental animals such as rats and mice.
- C. grow human embryos in culture, on which drugs can be tested.
- D. study the latest stages of the disease that would have unfolded if the person hadn't died.

*Bloom's Level: 02. Understand*

*Learning Outcome: 02.09 List the characteristics of a stem cell.*

*Section: 02.04*

*Topic: Stem cells*

## Chapter 02 - Cells

47.

The cells within and on us that are not actually of us constitute the

**A.**

human microbiome.

B.

parasite family.

C.

prokaryotic cells.

D.

cytoskeleton.

*Bloom's Level: 01. Remember*

*Learning Outcome: 02.11 How can the bacteria that live in and on our bodies affect our health?*

*Section: 02.05*

*Topic: The human microbiome*

48. Which of the following is a cure for people with recurrent infection from *Clostridium difficile*?

A.

Renal transplantation

B.

Genetic restructuring

C.

Grafting

**D.**

Fecal transplantation

*Bloom's Level: 02. Understand*

*Learning Outcome: 02.11 How can the bacteria that live in and on our bodies affect our health?*

*Section: 02.05*

*Topic: The human microbiome*

49. Which of the following is true of the human microbiome?

A.

High blood sugar following weight-loss surgery is partly due to a changed gut microbiome.

**B.**

An altered microbiome hastens starvation in malnourished children.

C.

Antibiotics do not alter the gut microbiome.

D.

The microbiome consists primarily of cells that belong to the human body.

*Bloom's Level: 02. Understand*

*Learning Outcome: 02.11 How can the bacteria that live in and on our bodies affect our health?*

*Section: 02.05*

*Topic: The human microbiome*

Chapter 02 - Cells

50.

Which of the following bacteria benefits humans?

A.

EnteritisSalmonella

**B.**

Probiotics

C.

Streptococcus Pyogenes

D.

Salmonella Typhi

*Bloom's Level: 02. Understand*

*Learning Outcome: 02.11 How can the bacteria that live in and on our bodies affect our health?*

*Section: 02.05*

*Topic: The human microbiome*