

Chapter 1, The Cell in Health and Illness

Multiple Choice

Identify the choice that best completes the statement or answers the question.

- ____ 1. Which statement regarding the sodium–potassium pump is correct?
 - 1. The cell’s plasma membrane is more soluble to sodium ions than potassium ions.
 - 2. The concentration of sodium ions should be higher inside the cell compartment.
 - 3. The concentration of potassium ions should be higher outside the cell compartment.
 - 4. The active transport involves pumping out three sodium ions and pumping in two potassium ions.

- ____ 2. In the absence of oxygen, which cellular function creates the same amount of energy as is created in the presence of oxygen?
 - 1. Dissipation of pyruvic acid
 - 2. Initiation of the citric acid cycle
 - 3. Activation of acetyl-coenzyme A
 - 4. Creation of acidosis via lactic acid

- ____ 3. How many adenosine triphosphates (ATPs) are produced in aerobic energy metabolism?
 - 1. 2
 - 2. 3
 - 3. 34
 - 4. 53

- ____ 4. Which cell organelles differ in their number according to the cell’s energy needs?
 - 1. Ribosomes
 - 2. Mitochondria
 - 3. Ribonucleic acids
 - 4. Deoxyribonucleic acids

- ____ 5. Which option best supports the reason more energy is produced when a person is exercising?
 - 1. Exercise causes an increase in the synthesis of protein.
 - 2. There is an increase in the production of pyruvic acid in the cells.
 - 3. The conversion of pyruvic acid to lactic acid is increased by exercise.
 - 4. Muscle cells have more mitochondria to meet energy demands.

- ____ 6. When does ribosomal protein synthesis cease?
 - 1. During endoplasmic reticulum stress
 - 2. During the synthesis of adenosine triphosphate (ATP)
 - 3. During a severe hypoxic state
 - 4. During the processing of prohormone

- ____ 7. Which cellular organelles are responsible for propelling mucus and inhaled debris out of the lungs?
 - 1. Cilia
 - 2. Microfilaments
 - 3. Secretory vesicles

4. Endoplasmic reticula
- ____ 8. Which are the key proteins in the contractile units of the muscle cells?
1. Actin and myosin
 2. Prohormone and tubulin
 3. Tubulin and actin
 4. Myosin and prohormone
- ____ 9. Which deficiency causes Tay–Sachs disease?
1. Proteasome
 2. Peroxisome
 3. Macrophage
 4. Lysosomal enzymes
- ____ 10. Which is a characteristic of adrenoleukodystrophy?
1. Accumulation of ganglioside
 2. Cessation of ribosomal protein synthesis
 3. Acceleration of cellular proteasome activity
 4. Accumulation of long-chain fatty acids in the nervous system
- ____ 11. Which statement regarding endoplasmic reticulum (ER) stress is correct?
1. During ER stress, proteins are rapidly degraded.
 2. During ER stress, lipids cannot travel to their proper intracellular locations.
 3. During ER stress, long-chain fatty acids accumulate in the nervous system.
 4. During ER stress, nondegraded substances accumulate in the cells.
- ____ 12. A client is diagnosed with type 1 diabetes mellitus. At a cellular level, which function is likely to be involved?
1. Inability of ribosomes to produce a specific type of protein
 2. Incorrect processing of a protein by the Golgi apparatus
 3. Stagnation of a previously dynamic action in microtubules
 4. Obstruction of the smooth endoplasmic reticulum
- ____ 13. A newborn patient exhibits characteristics of severe physical deformities. Which cellular component is examined to determine the cause and probability of the disease being genetically transferred?
1. Transfer RNA
 2. Ribosomal RNA
 3. Double helix of DNA
 4. Mitochondrial DNA
- ____ 14. A hiker experiences muscle pain and acidosis while ascending a mountain during a long, steep climb. Which is the reason for these manifestations?
1. Cellular hypoxia
 2. Autolysis
 3. Heterolysis
 4. Cellular edema
- ____ 15. Which factor provides DNA the unique molecular ability to replicate?
1. The pairing of nitrogenous bases

2. The presence of pyrimidine bases
 3. The presence of nucleotides
 4. The nitrogenous base and phosphate bond
- ____ 16. How many nitrogenous bases compose a single codon?
1. 2
 2. 3
 3. 4
 4. 5
- ____ 17. Which components form the structure of DNA?
1. Nucleotides
 2. Amino acids
 3. Fatty acids
 4. Phosphates
- ____ 18. Which factor is essential in order for protein synthesis to occur?
1. Free-standing ribosomes within the cell
 2. Protein blueprint from the cell of the DNA
 3. Specific information from the nucleus of the cell
 4. Transfer RNA to move the protein out of the cell
- ____ 19. Tetracycline antibiotic is prescribed for an adult client with chlamydia infection. Which is the mechanism of action of the drug?
1. It prevents the replication of bacteria.
 2. It alters the configuration of bacterial cytoplasm.
 3. It interferes with the function of bacterial ribosomes.
 4. It inhibits the functions of bacterial mitochondria.
- ____ 20. Where does the conversion of a prohormone into a hormone take place?
1. In the ribosomes
 2. In the Golgi apparatus
 3. In the secretory granules
 4. In the endoplasmic reticulum
- ____ 21. Which is the cell's "master mind"?
1. Nucleus
 2. Ribosome
 3. Golgi apparatus
 4. Endoplasmic reticulum

Multiple Response

Identify one or more choices that best complete the statement or answer the question.

- ____ 22. Which statements regarding the microtubules are true? *Select all that apply.*
1. Microtubules are solid.
 2. Microtubules are flexible.
 3. Microtubules are composed of tubulin.

4. Microtubules are called actin filaments.
5. Microtubules have structures involved in cell division.

- _____ 23. Which cellular actions are carried out during the process of protein synthesis? *Select all that apply.*
1. DNA directs the cell to carry out the process.
 2. Transcription occurs in the ribosome of the cell.
 3. Protein translation takes place in the cell nucleus.
 4. RNA is single-stranded and travels outside the nucleus.
 5. In RNA, the pyrimidine base thymine is replaced with uracil.
- _____ 24. Which characteristics are specific to RNA during protein synthesis? *Select all that apply.*
1. Presence of ribose pentose sugar
 2. Presence of single-stranded helix
 3. Presence of double-stranded helix
 4. Presence of deoxyribose pentose sugar
 5. Presence of uracil and cytosine as a pyrimidine base
- _____ 25. Which are the purine bases found in DNA? *Select all that apply.*
1. Uracil
 2. Adenine
 3. Guanine
 4. Thymine
 5. Cytosine

Chapter 1, The Cell in Health and Illness

Answer Section

MULTIPLE CHOICE

1. ANS: 4

Chapter: Chapter 1, The Cell in Health and Illness

Objective: Recognize the major organelles and their function within the cell.

Page: 1

Heading: Cell Structure and Function>The Sodium Potassium Pump (Na⁺/K⁺ Pump)

Integrated Process: Nursing Process

Client Need: Physiological Integrity: Physiological Adaptation

Cognitive Level: Comprehension [Understanding]

Concept: Cellular Regulation

Difficulty: Moderate

	Feedback
1	This is incorrect. The plasma membrane of the cell is less soluble to sodium ions and more soluble to potassium ions.
2	This is incorrect. The concentration of sodium ions should be higher outside the cell compartment.
3	This is incorrect. The concentration of potassium ions should be higher inside the cell compartment.
4	This is correct. In active transport, for every three sodium ions pumped out, two potassium ions are pumped in.

PTS: 1

CON: Cellular Regulation

2. ANS: 2

Chapter: Chapter 1, The Cell in Health and Illness

Objective: Discuss the difference between aerobic and anaerobic metabolism.

Page: 3

Heading: Cell Structure and Function>Energy Metabolism

Integrated Process: Nursing Process

Client Need: Physiological Integrity: Physiological Adaptation

Cognitive Level: Analysis [Analyzing]

Concept: Cellular Regulation

Difficulty: Difficult

	Feedback
1	This is incorrect. When oxygen is not available, anaerobic metabolism produces significantly less cellular energy: a net yield of 2 ATP, as well as pyruvic acid.
2	This is correct. In the absence of oxygen, pyruvic acid is converted into acetyl-coenzyme A, which triggers a series of reactions known as the <i>Krebs cycle</i> , also called the <i>citric acid cycle</i> .
3	This is incorrect. Pyruvic acid is converted into acetyl-coenzyme A, not activated.

4	This is incorrect. In cellular hypoxia, pyruvic acid is converted to lactic acid, which is noxious to cells, causing muscle pain and biochemical alterations such as acidosis.
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PTS: 1 CON: Cellular Regulation

3. ANS: 3

Chapter: Chapter 1, The Cell in Health and Illness

Objective: Discuss the difference between aerobic and anaerobic metabolism.

Page: 3

Heading: Cell Structure and Function>Energy Metabolism

Integrated Process: Nursing Process

Client Need: Physiological Integrity: Physiological Adaptation

Cognitive Level: Knowledge [Remembering]

Concept: Cellular Regulation

Difficulty: Easy

	Feedback
1	This is incorrect. In anaerobic energy metabolism, 2 ATPs and pyruvic acid are produced.
2	This is incorrect. In active transport, 3 sodium ions are pumped out. This takes place in the plasma membrane.
3	This is correct. The process of aerobic energy requires oxygen and provides the maximum amount of energy for cellular function. The process yields 34 ATPs.
4	This is incorrect. Aerobic energy metabolism produces 34 ATPs, not 53.

PTS: 1 CON: Cellular Regulation

4. ANS: 2

Chapter: Chapter 1, The Cell in Health and Illness

Objective: Recognize the major organelles and their function within the cell.

Page: 3

Heading: Cell Structure and Function>Mitochondria

Integrated Process: Nursing Process

Client Need: Physiological Integrity: Physiological Adaptation

Cognitive Level: Comprehension [Understanding]

Concept: Cellular Regulation

Difficulty: Moderate

	Feedback
1	This is incorrect. Ribosomes are small, spherical-shaped organelles of the ribosomal ribonucleic acid.
2	This is correct. Cell types differ in their number of mitochondria according to their energy needs. For example, muscle cells have abundant mitochondria because they require a high amount of energy to function, whereas bone cells have fewer mitochondria.
3	This is incorrect. Ribonucleic acid is not affected by the cell's energy needs.
4	This is incorrect. Deoxyribonucleic acid contains double-stranded helical chains

	containing various sequences of nucleotides. Its numbers are not affected by the cell's energy needs.
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PTS: 1 CON: Cellular Regulation

5. ANS: 4

Chapter: Chapter 1, The Cell in Health and Illness

Objective: Recognize the major organelles and their function within the cell.

Page: 3

Heading: Cell Structure and Function>Mitochondria

Integrated Process: Nursing Process

Client Need: Physiological Integrity: Physiological Adaptation

Cognitive Level: Comprehension [Understanding]

Concept: Cellular Regulation

Difficulty: Moderate

	Feedback
1	This is incorrect. Protein synthesis is the function of ribosomes. An increase in the synthesis of proteins does not yield energy and is not directly related to exercise.
2	This is incorrect. In aerobic energy metabolism created by exercise, anaerobic metabolism, also referred to as <i>glycolysis</i> , occurs outside the mitochondria. In anaerobic metabolism, glucose is used to create energy.
3	This is incorrect. Conversion of pyruvic acid to lactic acid in cellular hypoxia is noxious to cells and does not create energy.
4	This is correct. Exercise stimulates mitochondria found in the muscle cells to create energy. This process is supported by the increased number of mitochondria found in muscle cells.

PTS: 1 CON: Cellular Regulation

6. ANS: 3

Chapter: Chapter 1, The Cell in Health and Illness

Objective: Recognize the major organelles and their function within the cell.

Page: 4

Heading: Cell Structure and Function>Ribosomes>Endoplasmic Reticulum

Integrated Processes: Nursing Process

Client Need: Physiological Integrity: Physiological Adaptation

Cognitive Level: Comprehension [Understanding]

Concept: Cellular Regulation

Difficulty: Moderate

	Feedback
1	This is incorrect. Ribosomal protein synthesis does not cease during endoplasmic reticulum stress.
2	This is incorrect. ATP is synthesized in the energy metabolism. It does not interfere with protein synthesis.
3	This is correct. When the cells are deprived of adequate oxygen supply, the

	ribosomal protein synthesis ceases.
4	This is incorrect. The processing of prohormones to hormones does not cease the process of protein synthesis.

PTS: 1 CON: Cellular Regulation

7. ANS: 1

Chapter: Chapter 1, The Cell in Health and Illness

Objective: Recognize the major organelles and their function within the cell.

Page: 5

Heading: Cell Structure and Function>Endoplasmic Reticulum>Microtubules and Microfilaments

Integrated Processes: Nursing Process

Client Need: Physiological Integrity: Physiological Adaptation

Cognitive Level: Knowledge [Remembering]

Concept: Cellular Regulation

Difficulty: Easy

	Feedback
1	This is correct. The cilia are responsible for propelling the mucus and inhaled debris out of the lungs using a sweeping motion.
2	This is incorrect. Microfilaments help in changing the shape of certain cells, such as macrophages, and help with contraction of muscle.
3	This is incorrect. Secretory vesicles store substances, such as hormones, that are secreted by cells before they are released into the extracellular space.
4	This is incorrect. The endoplasmic reticulum aids in the transport of the synthesized protein from the ribosomes to the Golgi apparatus.

PTS: 1 CON: Cellular Regulation

8. ANS: 1

Chapter: Chapter 1, The Cell in Health and Illness

Objective: Recognize the major organelles and their function within the cell.

Page: 5

Heading: Cell Structure and Function>Endoplasmic Reticulum>Microtubules and Microfilaments

Integrated Processes: Nursing Process

Client Need: Physiological Integrity: Physiological Adaptation

Cognitive Level: Knowledge [Remembering]

Concept: Cellular Regulation

Difficulty: Easy

	Feedback
1	This is correct. Actin and myosin are the key proteins in the contractile unit of the muscle cells.
2	This is incorrect. Prohormone and tubulin are not the key elements in the contractile units of the muscle cells. Prohormones are transferred to the Golgi apparatus to be converted into complete hormones, and tubulin is associated with microtubule formation.
3	This is incorrect. Tubulin and actin are not the key proteins in the contractile

	units of the muscle cells. Microtubules are hollow filaments composed of tubulin. So tubulin is associated with microtubule formation.
4	This is incorrect. Prohormones are not one of the key proteins in the contractile units of the muscle cells. They are transferred to the Golgi apparatus to be converted into complete hormones.

PTS: 1 CON: Cellular Regulation

9. ANS: 4

Chapter: Chapter 1, The Cell in Health and Illness

Objective: Recognize the major organelles and their function within the cell.

Page: 5

Heading: Cell Structure and Function>Lysosomes>Lack of Lysosomal Enzymes and Disease

Integrated Processes: Nursing Process

Client Need: Physiological Integrity: Physiological Adaptation

Cognitive Level: Comprehension [Understanding]

Concept: Cellular Regulation

Difficulty: Easy

	Feedback
1	This is incorrect. A deficiency of proteasome in the cell does not cause Tay–Sachs disease. Proteasome is an organelle that contains digestive enzymes similar to lysosomes. Proteasomes degrade polypeptide chains and proteins.
2	This is incorrect. A deficiency of peroxisomes in the cell does not cause Tay–Sachs disease. Peroxisomes contain digestive enzymes such as lysosomes. Peroxisomes break down the long-chain fatty acids and free radicals.
3	This is incorrect. A deficiency of macrophages in the body does not cause Tay–Sachs disease. Macrophages are the major defensive white blood cells of the body. They contain a large number of lysosomes.
4	This is correct. Lysosomes contain digestive enzymes such as lysozyme, proteases, and lipases to degrade the ingested foreign substances and cellular debris. Tay–Sachs disease is a rare genetic disorder that is caused by the deficiency of lysosomal enzymes. It results because of the buildup of lipids in the brain and spinal cord.

PTS: 1 CON: Cellular Regulation

10. ANS: 4

Chapter: Chapter 1, The Cell in Health and Illness

Objective: Recognize the major organelles and their function within the cell.

Page: 4

Heading: Cell Structure and Function>Proteasomes and Peroxisomes

Integrated Processes: Nursing Process

Client Need: Physiological Integrity: Physiological Adaptation

Cognitive Level: Comprehension [Understanding]

Concept: Cellular Regulation

Difficulty: Moderate

	Feedback
1	This is incorrect. The deficiency of lysosomal enzymes, as in Tay–Sachs disease, causes the accumulation of ganglioside in the central nervous system.
2	This is incorrect. Ribosomes are responsible for the synthesis of cellular proteins. In severe hypoxic states, ribosomal protein synthesis ceases, resulting in decreased synthesis of protein.
3	This is incorrect. Cachexia, or wasting of body mass, is associated with accelerated proteasome activity. It is often seen in conditions such as cancer.
4	This is correct. Adrenoleukodystrophy is associated with dysfunction of the peroxisomes. The disease is characterized by the accumulation of long-chain fatty acids in the nervous system. The disease causes the deterioration of the nervous system and eventually leads to death.

PTS: 1 CON: Cellular Regulation

11. ANS: 1

Chapter: Chapter 1, The Cell in Health and Illness

Objective: Recognize the major organelles and their function within the cell.

Page: 4

Heading: Cell Structure and Function>Endoplasmic Reticulum

Integrated Processes: Nursing Process

Client Need: Physiological Integrity: Physiological Adaptation

Cognitive Level: Comprehension [Understanding]

Concept: Cellular Regulation

Difficulty: Moderate

	Feedback
1	This is correct. Proteins are rapidly degraded during ER stress.
2	This is incorrect. Proteins cannot travel to their exact intracellular locations during ER stress.
3	This is incorrect. Accumulation of long-chain fatty acids in the nervous system is not associated with ER stress.
4	This is incorrect. Accumulation of nondegraded substances in the cells occurs because of the lack of lysosomal enzymes, but not as a result of ER stress.

PTS: 1 CON: Cellular Regulation

12. ANS: 1

Chapter: Chapter 1, The Cell in Health and Illness

Objective: Recognize the major organelles and their function within the cell.

Page: 5

Heading: Cell Structure and Function>Endoplasmic Reticulum>Ribosomes

Integrated Processes: Nursing Process

Client Need: Physiological Integrity: Physiological Adaptation

Cognitive Level: Application [Applying]

Concept: Cellular Regulation

Difficulty: Difficult

	Feedback
1	This is correct. Ribosomes are known as the protein factories of the cell. Different types of cells produce different types of proteins. For example, ribosomes in pancreatic beta islet cells synthesize the proteins that make up insulin. The inability results in type 1 diabetes mellitus, a condition where the body is unable to produce insulin.
2	This is incorrect. Once ribosomes complete protein synthesis, the proteins are transported via the endoplasmic reticulum to the Golgi apparatus to be processed, packaged, and secreted. Impairment of this process does not result in type 1 diabetes mellitus.
3	This is incorrect. Microtubules are hollow filaments composed of protein subunits called <i>tubulin</i> . They have a dynamic structure, meaning that they are constantly being formed, broken down, and reformed. Stagnation of the process does not occur.
4	This is incorrect. The endoplasmic reticulum is a network of tubules that act as a transport system within the cell and help in the transport of proteins. Impairment of this process does not result in type 1 diabetes mellitus.

PTS: 1 CON: Cellular Regulation

13. ANS: 3

Chapter: Chapter 1, The Cell in Health and Illness

Objective: Distinguish between the components that make up DNA versus RNA.

Page: 6

Heading: Cell Structure and Function>DNA Replication

Integrated Processes: Nursing Process

Client Need: Physiological Integrity: Physiological Adaptation

Cognitive Level: Analysis [Analyzing]

Concept: Cellular Regulation

Difficulty: Difficult

	Feedback
1	This is incorrect. Transfer RNA (tRNA) plays an important role in the assembly of proteins, but would not be examined as a source of severe deformities in a newborn.
2	This is incorrect. Proteins manufactured by ribosomes are destined to become parts of the cell, enzymes, or exported protein secretions. Different types of cells manufacture different proteins. However, ribosomal RNA is not examined for a cause of severe deformities in a newborn.
3	This is correct. In the event of severe physical deformities, the double helix of DNA will be examined for identifiable defects. The findings will identify the cause. The DNA of the parents will also be examined to aid in the identification of the condition being genetically transferred.
4	This is incorrect. It is theorized that in aging and in disorders such as diabetes, cancer, and heart failure, mitochondrial DNA undergoes mutations. Diseases that target mitochondria specifically may be caused by injury of mitochondria occurring in the cells of different organs. Mitochondrial disease causes a wide

	array of problems, including energy depletion and severe muscle weakness, but not severe deformities.
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PTS: 1 CON: Cellular Regulation

14. ANS: 1

Chapter: Chapter 1, The Cell in Health and Illness

Objective: Recognize the major organelles and their function within the cell.

Page: 3

Heading: Cell Structure and Function>Mitochondrial DNA

Integrated Processes: Nursing Process

Client Need: Physiological Integrity: Physiological Adaptation

Cognitive Level: Analysis [Analyzing]

Concept: Cellular Regulation

Difficulty: Difficult

	Feedback
1	This is correct. Muscle cramping and acidosis occur when the cells are deprived of adequate oxygen supply during energy metabolism. The oxygen level decreases slightly as the hiker climbs up the mountain into higher altitudes.
2	This is incorrect. Autolysis is the process in which lysosomes release digestive enzymes to destroy the parts of the dead cells. This process does not cause muscle cramping and acidosis in a hiker.
3	This is incorrect. Heterolysis is the process in which the lysosomes are used to digest the foreign bodies ingested by the macrophage. This process does not cause muscle cramping and acidosis in a hiker.
4	This is incorrect. When the plasma membrane configuration is altered because of diseases, excess fluids enter the cell's internal environment and cause swelling, resulting in cellular edema.

PTS: 1 CON: Cellular Regulation

15. ANS: 1

Chapter: Chapter 1, The Cell in Health and Illness

Objective: Describe the functions of the nucleus and consequences of DNA damage.

Page: 5

Heading: Cell Structure and Function>The Nucleus

Integrated Processes: Nursing Process

Client Need: Physiological Integrity: Physiological Adaptation

Cognitive Level: Comprehension [Understanding]

Concept: Cellular Regulation

Difficulty: Moderate

	Feedback
1	This is correct. The pairing of nitrogenous bases provides the DNA with the unique molecular ability to replicate. For example, adenine always binds with thymine.
2	This is incorrect. DNA nucleotides contain nitrogenous bases that are either

	purines or pyrimidines.
3	This is incorrect. DNA consists of long, double-stranded helical chains containing variable sequences of nucleotides. Nucleotides consist of a nitrogenous base and a phosphate group attached to a sugar molecule. The presence of nucleotides does not provide DNA molecules the unique ability to replicate.
4	This is incorrect. Nitrogenous bases and phosphate groups are parts of the nucleotide. The presence of nitrogenous bases and phosphate groups do not provide DNA molecules with the unique ability to replicate.

PTS: 1 CON: Cellular Regulation

16. ANS: 2

Chapter: Chapter 1, The Cell in Health and Illness

Objective: Describe the functions of the nucleus and consequences of DNA damage.

Page: 5

Heading: Cell Structure and Function>The Nucleus

Integrated Processes: Nursing Process

Client Need: Physiological Integrity: Physiological Adaptation

Cognitive Level: Knowledge [Remembering]

Concept: Cellular Regulation

Difficulty: Easy

	Feedback
1	This is incorrect. A codon contains three nitrogenous bases instead of just two.
2	This is correct. Three nitrogenous bases form a codon. Codons are interpreted by the ribosomes during protein synthesis to form specific proteins to meet the cell's need.
3	This is incorrect. A codon is made up of three nitrogenous bases instead of four.
4	This is incorrect. A codon is made up of three nitrogenous bases instead of five.

PTS: 1 CON: Cellular Regulation

17. ANS: 1

Chapter: Chapter 1, The Cell in Health and Illness

Objective: Distinguish between the components that make up DNA versus RNA.

Page: 5

Heading: Cell Structure and Function>The Nucleus

Integrated Processes: Nursing Process

Client Need: Physiological Integrity: Physiological Adaptation

Cognitive Level: Knowledge [Remembering]

Concept: Cellular Regulation

Difficulty: Easy

	Feedback
1	This is correct. DNA is a polymer of nucleotides.
2	This is incorrect. DNA is not a polymer of amino acids.
3	This is incorrect. DNA is not a polymer of fatty acids.

4	This is incorrect. DNA is not a polymer of phosphate.
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PTS: 1 CON: Cellular Regulation

18. ANS: 3

Chapter: Chapter 1, The Cell in Health and Illness

Objective: Distinguish between the components that make up DNA versus RNA.

Page: 5

Heading: Cell Structure and Function>Endoplasmic Reticulum>Ribosomes

Integrated Processes: Nursing Process

Client Need: Physiological Integrity: Physiological Adaptation

Cognitive Level: Analysis [Analyzing]

Concept: Cellular Regulation

Difficulty: Moderate

	Feedback
1	This is incorrect. Some ribosomes are freestanding within the cytoplasm, and some are attached to the rough endoplasmic reticulum; both are considered protein factories.
2	This is incorrect. In all cells, protein synthesis by the ribosomes is directed by specific information received from the nucleus but does not involve the cell's DNA.
3	This is correct. In all cells, protein synthesis by the ribosomes is directed by specific information received from the nucleus regarding the needed protein.
4	This is incorrect. Transfer RNA (tRNA) plays a key role in the assembly of proteins and does not move the proteins out of the cell.

PTS: 1 CON: Cellular Regulation

19. ANS: 3

Chapter: Chapter 1, The Cell in Health and Illness

Objective: Recognize the major organelles and their function within the cell.

Page: 5

Heading: Cell Structure and Function>Endoplasmic Reticulum>Ribosomes>Clinical Concept

Integrated Process: Nursing Process

Client Need: Physiological Integrity: Physiological Adaptation

Cognitive Level: Analysis [Analyzing]

Concept: Cellular Regulation

Difficulty: Difficult

	Feedback
1	This is incorrect. Tetracycline antibiotic does not prevent the replication of bacteria.
2	This is incorrect. Tetracycline antibiotic does not alter the configuration of bacterial cytoplasm.
3	This is correct. Tetracycline interferes with the functions of bacterial ribosomes. It inhibits bacterial protein synthesis.
4	This is incorrect. Tetracycline antibiotic does not interfere with functions of

	bacterial mitochondria.
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PTS: 1 CON: Cellular Regulation

20. ANS: 2

Chapter: Chapter 1, The Cell in Health and Illness

Objective: Recognize the major organelles and their function within the cell.

Page: 5

Heading: Cell Structure and Function>Endoplasmic Reticulum>Golgi Apparatus

Integrated Process: Nursing Process

Client Need: Physiological Integrity: Physiological Adaptation

Cognitive Level: Knowledge [Remembering]

Concept: Cellular Regulation

Difficulty: Easy

	Feedback
1	This is incorrect. The protein is initially manufactured in the ribosome. This protein is referred to as <i>preprohormone</i> , which contains a single peptide.
2	This is correct. The conversion of prohormone into hormone takes place in the Golgi apparatus. The prohormone is processed and then converted into the actual hormone. The actual hormone is secreted by the endocrine gland's cells.
3	This is incorrect. The secretory granule is present in the Golgi apparatus. The completed hormone is stored in the secretory granule.
4	This is incorrect. The preprohormone contains a single peptide, which directs its transfer to the endoplasmic reticulum. The single peptide of the pre-prohormone is removed when it is transferred from ribosome to endoplasmic reticulum.

PTS: 1 CON: Cellular Regulation

21. ANS: 1

Chapter: Chapter 1, The Cell in Health and Illness

Objective: Recognize the major organelles and their function within the cell.

Page: 5

Heading: Cell Structure and Function>The Nucleus

Integrated Process: Nursing Process

Client Need: Physiological Integrity: Physiological Adaptation

Cognitive Level: Knowledge [Remembering]

Concept: Cellular Regulation

Difficulty: Easy

	Feedback
1	This is correct. The nucleus is the master mind of a cell. It contains the body's genetic material, which regulates all cell structures and functions.
2	This is incorrect. Ribosomes are small, spherical organelles composed of ribosomal ribonucleic acid. They are called the "protein factories" of the cell.
3	This is incorrect. The synthesized proteins from ribosomes are transported to the Golgi apparatus through the endoplasmic reticulum. Proteins are processed, packaged, and secreted by the Golgi apparatus.

4	This is incorrect. The endoplasmic reticulum is a network of tubules within the cell that acts as a transport system. Lipid production takes place in the endoplasmic reticulum.
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PTS: 1

CON: Cellular Regulation

MULTIPLE RESPONSE

22. ANS: 3, 5

Chapter: Chapter 1, The Cell in Health and Illness

Objective: Recognize the major organelles and their function within the cell.

Page: 5

Heading: Cell Structure and Function>Endoplasmic Reticulum>Microtubules and Microfilaments

Integrated Process: Nursing Process

Client Need: Physiological Integrity: Physiological Adaptation

Cognitive Level: Comprehension [Understanding]

Concept: Cellular Regulation

Difficulty: Moderate

	Feedback
1.	This is incorrect. Microtubules are tubular and hollow in composition, not solid.
2.	This is incorrect. Microfilaments, not microtubules, are solid, flexible fibers, sometimes referred to as <i>actin filaments</i> .
3.	This is correct. Microtubules are composed of protein subunits called <i>tubulin</i> .
4.	This is incorrect. Microfilaments are identified as actin filaments.
5.	This is correct. Microtubules comprise cell structures involved in cell division such as centrioles and mitotic spindles.

PTS: 1

CON: Cellular Regulation

23. ANS: 1, 4, 5

Chapter: Chapter 1, The Cell in Health and Illness

Objective: Compare and contrast the processes of transcription and translation.

Page: 6

Heading: Cell Structure and Function>Transcription and Translation

Integrated Process: Nursing Process

Client Need: Physiological Integrity: Physiological Adaptation

Cognitive Level: Analysis [Analyzing]

Concept: Cellular Regulation

Difficulty: Difficult

	Feedback
1.	This is correct. Protein synthesis is a requirement for normal physiological function. DNA directs the cell to carry out protein synthesis through a two-step process.
2.	This is incorrect. DNA directs the cell to carry out protein synthesis through a two-step process known as <i>transcription</i> , which occurs in the nucleus, and <i>translation</i> , which occurs in the ribosome.

3.	This is incorrect. DNA directs the cell to carry out protein synthesis through a two-step process known as <i>transcription</i> , which occurs in the nucleus, and <i>translation</i> , which occurs in the ribosome.
4.	This is correct. RNA differs from DNA in some important ways; for example, it is single-stranded and can travel to sites outside of the nucleus.
5.	This is correct. The pentose sugar in RNA is ribose, and the pyrimidine base thymine is replaced with uracil.

PTS: 1 CON: Cellular Regulation

24. ANS: 1, 2, 5

Chapter: Chapter 1, The Cell in Health and Illness

Objective: Compare and contrast the processes of transcription and translation.

Page: 5

Heading: Cell Structure and Function>Transcription and Translation

Integrated Process: Nursing Process

Client Need: Physiological Integrity: Physiological Adaptation

Cognitive Level: Analysis [Analyzing]

Concept: Cellular Regulation

Difficulty: Difficult

	Feedback
1.	This is correct. The pentose sugar present in RNA is ribose.
2.	This is correct. RNA consists of a single-stranded helix and can travel to sites outside the nucleus.
3.	This is incorrect. Double-stranded helix is present in DNA.
4.	This is incorrect. The pentose sugar present in DNA is deoxyribose.
5.	This is correct. The pyrimidine base thymine in DNA is replaced with uracil in RNA.

PTS: 1 CON: Cellular Regulation

25. ANS: 2, 3, 4, 5

Chapter: Chapter 1, The Cell in Health and Illness

Objective: Compare and contrast the processes of transcription and translation.

Page: 5

Heading: Cell Structure and Function>The Nucleus

Integrated Process: Nursing Process

Client Need: Physiological Integrity: Physiological Adaptation

Cognitive Level: Knowledge [Remembering]

Concept: Cellular Regulation

Difficulty: Easy

	Feedback
1.	This is incorrect. Uracil is a pyrimidine base present in RNA.
2.	This is correct. Adenine is a purine base present in DNA and always binds with thymine.
3.	This is correct. Guanine is a purine base present in DNA and always binds with

	cytosine.
4.	This is correct. Thymine is a pyrimidine base present in DNA.
5.	This is correct. Cytosine is a pyrimidine base present in DNA and RNA.

PTS: 1

CON: Cellular Regulation