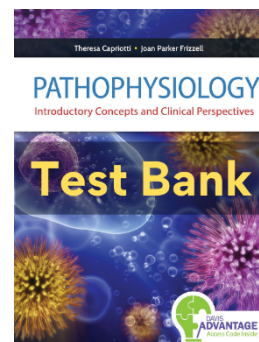


Chapter 1: The Cell in Health and Illness

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. What is the process in which glucose is used to create energy?
1. Autolysis
 2. Glycolysis
 3. Heterolysis
 4. None of the above
- _____ 3. How many adenosine triphosphates (ATPs) are produced in aerobic energy metabolism?
1. 2
 2. 3
 3. 34
 4. None of the above
- _____ 4. Which cell organelles are believed to have once been self-sustaining and independent?
1. Ribosomes
 2. Mitochondria
 3. Ribonucleic acid
 4. Deoxyribonucleic acid
- _____ 5. Why is more energy produced when a person is exercising?
1. There is an increase in the synthesis of protein.
 2. There is an increase in the production of pyruvic acid in the cells.
 3. There is an increase in the conversion of pyruvic acid to lactic acid.
 4. There is an increase in the production of mitochondria in the muscle cells.
- _____ 6. When does ribosomal protein synthesis cease?
1. During endoplasmic reticulum (ER) stress
 2. During the synthesis of ATP
 3. During severe hypoxic state
 4. During the processing of prohormone
- _____ 7. The cellular organelle responsible for propelling mucous and inhaled debris out of the lungs is
1. cilia.
 2. microfilament.
 3. secretory vesicle.
 4. endoplasmic reticulum.
- _____ 8. Which are the key proteins in the contractile units of the muscle cells?
1. Actin and myosin
 2. Myosin and tubulin
 3. Tubulin and actin



4. None of the above

_____ 9. Which deficiency causes Tay-Sach's disease?

1. Proteasome
2. Peroxisome
3. Macrophage
4. Lysosomal enzymes

_____ 10. Adrenoleukodystrophy is characterized by

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, accumulation of long chain fatty acids occurs in the nervous system.
4. During ER stress, accumulation of non-degraded substances occurs in the cells.

_____ 12. Which is referred to as the protein factory of the cell?

1. Ribosome
2. Mitochondria
3. Golgi apparatus
4. Endoplasmic reticulum

_____ 13. Which acts as a blue print for the construction of proteins?

1. Transfer RNA
2. Ribosomal RNA
3. Messenger RNA
4. Mitochondrial DNA

_____ 14. A hiker experiences muscle pain and acidosis as he or she ascends a mountain during a long, steep climb. What is the reason for these symptoms?

1. Cellular hypoxia
2. Autolysis
3. Heterolysis
4. Cellular edema

_____ 15. Which factor provides DNA the unique molecular ability to replicate?

1. The precise pairing of the nitrogenous bases
2. The presence of pyrimidines 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. None of the above

_____ 17. The DNA is a polymer of

1. Nucleotides.
2. Amino acids.
3. Fatty acids.
4. Phosphates.

- _____ 18. What is the function of ribosomal ribonucleic acid during protein synthesis?
1. It transports genetic information from the DNA for protein synthesis.
 2. It gathers and joins the amino acids for specific proteins.
 3. It is directly involved in the formation of ribosomes.
 4. None of the above.
- _____ 19. Tetracycline antibiotic was given to a 30 year old client with Chlamydia infection. What 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. Ribosome
 2. Golgi apparatus
 3. Secretory granule
 4. 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 comprise of centrioles and mitotic spindle.
- _____ 23. Which structures are found in microtubules? *Select all that apply.*
1. Cilia
 2. Centrioles
 3. Mitotic spindle
 4. Actin filaments
 5. Secretory vesicles
- _____ 24. What are the characteristics of ribonucleic acid? *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 pyrimidine base
- _____ 25. Which are the purine bases found in deoxyribonucleic acid and ribonucleic acid? *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

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Page: 4

Objective: N/A

Difficulty: Moderate

Heading: The Sodium Potassium Pump

Integrated Process: Nursing Process

Client Need: Physiological Integrity: Physiological Adaptation

Cognitive Level: Comprehension [Understanding]

Concept: Cellular Regulation

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

PTS: 1

CON: Cellular Regulation

2. ANS: 2

Chapter: Chapter 1, The Cell in Health and Illness

Page: 5

Objective: N/A

Difficulty: Easy

Heading: Mitochondria

Integrated Process: Nursing Process

Client Need: Physiological Integrity: Physiological Adaptation

Cognitive Level: Comprehension [Understanding]

Concept: Cellular Regulation

	Feedback
1	Autolysis is the process in which the lysosome releases digestive enzymes to destroy cell parts when a cell dies.
2	Glycolysis is the process in which glucose is used to create energy.
3	Heterolysis is the process in which the lysosomes digest foreign matter ingested by macrophages.
4	Glycolysis is the process in which glucose is broken down and used for energy.

PTS: 1

CON: Cellular Regulation

3. ANS: 3

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Page: 5

Objective: N/A

Difficulty: Easy

Heading: Mitochondria

Integrated Process: Nursing Process

Client Need: Physiological Integrity: Physiological Adaptation

Cognitive Level: Knowledge [Remembering]

Concept: Cellular Regulation

	Feedback
1	In anaerobic energy metabolism, two ATPs and pyruvic acid are produced.
2	In active transport, three sodium ions are pumped out. This takes place in the plasma membrane.
3	The process of aerobic energy requires oxygen and provides maximum amount of energy for cellular function. The process yields 34 ATPs.
4	The answer option none of the above is incorrect. Aerobic energy metabolism produces 34 ATPs.

PTS: 1 CON: Cellular Regulation

4. ANS: 2

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Page: 5

Objective: N/A

Difficulty: Easy

Heading: Mitochondria

Integrated Process: Nursing Process

Client Need: Physiological Integrity: Physiological Adaptation

Cognitive Level: Knowledge [Remembering]

Concept: Cellular Regulation

	Feedback
1	Ribosomes are small, spherical shaped organelles of the ribosomal ribonucleic acid. They have not likely evolved from self-sustaining or independent organisms.
2	Mitochondria are cellular organelles that have their own DNA. They are believed to have once been independent and self-sustaining but, over the course of evolution, they were incorporated into human cells.
3	Ribonucleic acid is single stranded and can travel to sites outside the nucleus, but ribonucleic acid is not likely evolved from self-sustaining or independent organisms.
4	Deoxyribonucleic acid contains double stranded helical chains containing various sequences of nucleotides. Deoxyribonucleic acid is not thought to have evolved from self-sustaining organisms.

PTS: 1 CON: Cellular Regulation

5. ANS: 4

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Page: 5

Objective: N/A

Difficulty: Moderate

Heading: Mitochondria

Integrated Process: Nursing Process

Client Need: Physiological Integrity: Physiological Adaptation

Cognitive Level: Comprehension [Understanding]

Concept: Cellular Regulation

	Feedback
1	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	In aerobic energy metabolism, two adenosine triphosphate and pyruvic acid are produced. The increase in the production of pyruvic acid does not produce more energy.
3	Conversion of pyruvic acid to lactic acid in cellular hypoxia is noxious to cells and does not create energy.
4	Exercise stimulates an increase in the number of mitochondria formed in the muscle cells. This process leads to the conversion of oxygen into energy.

PTS: 1 CON: Cellular Regulation

6. ANS: 3

Chapter: Chapter 1, The Cell in Health and Illness

Page: 6

Objective: N/A

Difficulty: Moderate

Heading: Ribosomes

Integrated Processes: Nursing Process

Client Need: Physiological Integrity: Physiological Adaptation

Cognitive Level: Comprehension [Understanding]

Concept: Cellular Regulation

	Feedback
1	Ribosomal protein synthesis does not cease during endoplasmic reticulum stress.
2	ATP is synthesized in the energy metabolism. It does not interfere with protein synthesis.
3	When the cells are deprived of adequate oxygen supply, the ribosomal protein synthesis ceases.
4	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

Page: 7

Objective: N/A

Difficulty: Easy

Heading: Microtubules and Microfilaments

Integrated Processes: Nursing Process

Client Need: Physiological Integrity: Physiological Adaptation

Cognitive Level: Knowledge [Remembering]

Concept: Cellular Regulation

	Feedback
1	The cilia are responsible for propelling the mucous and inhaled debris out of the lungs using a sweeping motion.
2	Microfilaments help in changing the shape of the certain cells, such as macrophages, and also help with contraction of muscle.
3	Secretory vesicles store substances, such as hormones, that are secreted by cells before they are released into the extracellular space.
4	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

Page: 7

Objective: N/A

Difficulty: Easy

Heading: Microtubules and Microfilaments

Integrated Processes: Nursing Process

Client Need: Physiological Integrity: Physiological Adaptation

Cognitive Level: Knowledge [Remembering]

Concept: Cellular Regulation

	Feedback
1	Actin and myosin are the key proteins in the contractile unit of the muscle cells.
2	Myosin and tubulin are not the key elements in the contractile units of the muscle cells because tubulin is associated with microtubules formation.
3	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 microtubules formation.
4	The answer option none of the above is incorrect. Actin and myosin are the key proteins in the contractile unit of the muscle cells.

PTS: 1 CON: Cellular Regulation

9. ANS: 4

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Page: 6

Objective: N/A

Difficulty: Easy

Heading: Lysosomes

Integrated Processes: Nursing Process

Client Need: Physiological Integrity: Physiological Adaptation

Cognitive Level: Comprehension [Understanding]

Concept: Cellular Regulation

	Feedback
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1	A deficiency of proteasome in the cell does not cause Tay-Sach's disease. Proteasome is an organelle, which contains digestive enzymes similar to lysosomes. Proteasomes degrade polypeptide chains and proteins.
2	A deficiency of peroxisomes in the cell does not cause Tay-Sach's disease. Peroxisomes contain digestive enzymes such as lysosomes. Peroxisomes break down the long chain fatty acids and free radicals.
3	A deficiency of macrophages in the body does not cause Tay-Sach's disease. Macrophage is the major defensive white blood cells of the body. Macrophages contain a large number of lysosomes.
4	Lysosomes contain digestive enzymes such as lysozyme, proteases, and lipases to degrade the ingested foreign substances and cellular debris. Tay-Sach's 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

Page: 6

Objective: N/A

Difficulty: Easy

Heading: Proteasomes and Peroxisomes

Integrated Processes: Nursing Process

Client Need: Physiological Integrity: Physiological Adaptation

Cognitive Level: Comprehension [Understanding]

Concept: Cellular Regulation

	Feedback
1	The deficiency of lysosomal enzymes causes the accumulation of ganglioside in the central nervous system. Tay-Sach's disease is characterized by the accumulation of ganglioside in the central nervous system.
2	Ribosomes are responsible for the synthesis of cellular proteins. In severe hypoxic states ribosomal protein synthesis ceases, resulting in decreased synthesis of protein.
3	Cachexia or wasting of body mass is associated with accelerated proteasome activity. It is often seen in conditions such as cancer.
4	Adrenoleukodystrophy is a disorder associated with the 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

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Page: 6

Objective: N/A

Difficulty: Moderate

Heading: Endoplasmic Reticulum

Integrated Processes: Nursing Process

Client Need: Physiological Integrity: Physiological Adaptation

Cognitive Level: Comprehension [Understanding]

Concept: Cellular Regulation

	Feedback
1	Proteins are rapidly degraded during ER stress.
2	Proteins cannot travel to their exact intracellular locations during ER stress.
3	Accumulation of long chain fatty acids in the nervous system is not associated with ER stress.
4	Accumulation of non-degraded 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

Page: 6

Objective: N/A

Difficulty: Easy

Heading: Ribosomes

Integrated Processes: Nursing Process

Client Need: Physiological Integrity: Physiological Adaptation

Cognitive Level: Knowledge [Remembering]

Concept: Cellular Regulation

	Feedback
1	Ribosomes are known as the protein factories of the cell. Different types of cells produce different types of proteins. For example, the ribosomes in thyroid cells manufacture proteins that build thyroxine.
2	Mitochondria are known as the power house of the cell. Mitochondria produce the energy that is required by the cell for performing various functions.
3	The Golgi apparatus is not the protein factory of the cell. The Golgi apparatus is responsible for processing and secreting the proteins once they are made in the ribosomes. Hormones are stored in Golgi apparatus until they are secreted by the glands.
4	The endoplasmic reticulum is a network of tubules that act as a transport system within the cell. For example, endoplasmic reticulum helps in the transport of proteins.

PTS: 1 CON: Cellular Regulation

13. ANS: 3

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Page: 6

Objective: N/A

Difficulty: Easy

Heading: Ribosomes

Integrated Processes: Nursing Process

Client Need: Physiological Integrity: Physiological Adaptation

Cognitive Level: Knowledge [Remembering]

Concept: Cellular Regulation

	Feedback
1	Transfer RNA (tRNA) plays an important role in the assembly of proteins.
2	Ribosomal RNA (rRNA) is associated with the assembly and function of ribosomal particle.
3	Messenger RNA (mRNA) acts as a blueprint for the construction of proteins.
4	Mitochondrial DNA enables the mitochondria to reproduce on their own within the cells when there is an increased need for ATP formation.

PTS: 1 CON: Cellular Regulation

14. ANS: 1

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Page: 5

Objective: N/A

Difficulty: Difficult

Heading: Mitochondria

Integrated Processes: Nursing Process

Client Need: Physiological Integrity: Physiological Adaptation

Cognitive Level: Analysis [Analyzing]

Concept: Cellular Regulation

	Feedback
1	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	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	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	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

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Page: 7

Objective: N/A

Difficulty: Moderate

Heading: The Nucleus

Integrated Processes: Nursing Process

Client Need: Physiological Integrity: Physiological Adaptation

Cognitive Level: Comprehension [Understanding]

Concept: Cellular Regulation

	Feedback
1	The pairing of nitrogenous bases provides the DNA with the unique molecular ability to replicate. For example, adenine always binds with thymine.