

Chapter 03 Test Bank

Student: _____

1. Which is a major function of the plasma membrane?

- A. storing calcium ions
- B. storing organic chemicals for metabolism
- C. providing genetic information
- D. generating ATP
- E. regulating the passage of molecules into and out of the cell

2. Which is NOT a feature of the fluid-mosaic model of plasma membranes.

A.

Integral membrane proteins are embedded in the membrane.

- B. Phospholipids form a bilayer.
- C. Cholesterol associates with phospholipid molecules.
- D. Carbohydrates are linked to lipids and proteins on the interior surface, forming a glycocalyx layer.
- E. Peripheral membrane proteins associate with polar regions of integral membrane proteins.

3. The cell membrane is composed mainly of:

- A. cytosol.
- B. phospholipids and proteins.
- C. phospholipids and nucleic acids.
- D. water.
- E. proteins and glycocalyx.

4. What feature of phospholipids allows them to interact with aqueous cytosol and extracellular fluid, while still presenting a barrier to hydrophilic substances?

- A. They are polar molecules.
- B.

They are nonpolar molecules.

- C. They are lipids.
- D. They are extremely rigid molecules.
- E. They are amphipathic molecules.

5. What is the main function of cellular tight junctions?

- A. They resist forces that tend to pull cells apart.
- B. They form barriers that restrict the passage of materials through the extracellular space between cells.
- C. They are protein channels that allow the movement of ions between the cytosol of adjacent cells.

- D. They are spaces that allow movement of substances between the interior of the nucleus and the cytosol.
- E. They hold the genetic material in a tightly coiled conformation.

6. What are desmosomes?

- A. low-resistance channel-like passages that let ions travel between the interiors of adjacent cells
- B. cell organelles that contain enzymes for digesting cellular debris and foreign microbes
- C. cellular organelles that transcribe RNA into DNA
- D. membrane-bound vesicles that pinch off from the plasma membrane and enter the cell
- E. dense plaques of proteins that maintain firm attachments between adjacent cells

7. Protein channels that link the cytosol of adjacent cells are called _____ junctions.

- A. cadherin
- B. tight
- C. gap
- D. conjunction
- E. nexus

8. What cellular structures are most closely associated with vaults?

- A. nuclear pores
- B. peroxisomes
- C. lysosomes
- D. mitochondria
- E. gap junctions

9. Which best describes functions of the agranular (smooth) endoplasmic reticulum?

- A. transcription of DNA into RNA
- B. generation of ATP
- C. digestion of engulfed bacteria and cellular debris
- D. synthesis and packaging of proteins for secretion from the cell or export to other organelles
- E. synthesis of lipids and intracellular storage of calcium ions

10. The organelles that digest engulfed bacteria and cell debris are the:

- A. peroxisomes.
- B. endosomes.
- C. lysosomes.
- D. ribosomes.
- E. mitochondria.

11. Which organelles would you expect to be especially numerous in cells that utilize oxygen to generate a great deal of energy in the form of ATP?

- A. peroxisomes
- B. endosomes
- C. lysosomes

- D. ribosomes
- E. mitochondria

12. Which of these are functions of the Golgi apparatus?

- A. modifying proteins synthesized on free ribosomes and storing calcium ions
- B. digestion of engulfed bacteria and using oxygen to generate ATP
- C. synthesizing lipids and intracellular storage of calcium ions
- D. modifying proteins synthesized on free ribosomes and allowing the distribution of modified proteins throughout the cell in vesicles
- E. modifying proteins synthesized on ribosomes associated with granular endoplasmic reticulum and allowing the distribution of modified proteins throughout the cell in vesicles

13. Which of the following is *not* true of the cytoskeleton?

- A. It refers to the cellular components of bone.
- B. It refers to a network of cytoplasmic filaments.
- C. It is important for cellular movement.
- D. It helps to determine a cell's shape.
- E. It includes actin filaments.

14. Cell A is a gland cell that makes and secretes proteins. Cell B is another type of cell that synthesizes and secretes steroids. If you were to look at electron micrographs of the two cells, what differences would you expect to see?

- A. Cell A would have more granular endoplasmic reticulum than cell B.
- B. Cell A would have fewer secretion granules than cell B.
- C. Cell A would have more agranular endoplasmic reticulum than cell B.
- D. Cell B would have more granular endoplasmic than cell A.
- E. The two cells would most likely look identical.

15. Neurons have a very prominent nucleolus which indicates that they are actively performing what function?

- A. making ATP
- B. synthesizing lipids
- C. manufacturing ribosomes
- D. breaking down carbohydrates
- E. dividing by mitosis

16. In Tay Sach's disease, lysosomes do not function normally. Predict which condition would be a symptom of Tay Sach's disease.

- A. There is excessive accumulation of damaged organelles in a cell.
- B. Cells are unable to synthesize proteins.
- C. Cells can only make ATP by glycolysis.
- D. Proteins cannot be secreted by exocytosis.
- E. Steroid hormones can't be produced.

17. In which organelle are carbohydrate chains added to glycoproteins?

- A. golgi apparatus
- B. smooth endoplasmic reticulum
- C. nucleus
- D. lysosome
- E. mitochondrion

18. Which is true about the structure and function of a gene?

- A. It is an uncoiled protein that contains information necessary for the synthesis of other proteins.
- B. It is a sequence of nucleotides in DNA that acts as an enzyme to digest proteins.
- C. It is composed of many molecules of DNA and contains information needed to make RNA.
- D. It is a sequence of nucleotides in DNA that contains information necessary for the synthesis of proteins.

19. What is a *genome*?

- A. a cluster of genes that are all regulated in the same manner
- B. a measure of the genetic variability in a population
- C. a region of DNA that codes for a single protein
- D. all of the protein in a cell at a given point in time
- E. the total genetic information in a typical cell of an organism

20. What is a codon?

- A. a triplet of deoxyribonucleotides
- B. a triplet of ribonucleotides
- C. a sequence of ribonucleotides on tRNA
- D. a very small gene
- E. a very small genome

21. What codon corresponds to the DNA sequence G-T-A?

- A. G-T-A
- B. A-T-G
- C. C-A-T
- D. C-A-U
- E. T-A-C

22. RNA synthesis from a DNA template:

- A. is called translation of the message.
- B. requires DNA polymerase.
- C. is called transcription.
- D.

occurs in the nucleolus.

E.

occurs in the cytoplasm.

23. What is the term for the segments of primary RNA that are cleaved and discarded by spliceosomes?

- A. codons
- B. introns
- C. exons
- D. anticodons
- E. genes

24. Which is a function of transfer RNA (tRNA)?

- A. transport smRNA out of the nucleus
- B. binding specifically to mRNA and nonspecifically to amino acids
- C. binding specifically to amino acids and nonspecifically to mRNA
- D. binding specifically to both mRNA and to amino acids

25. How does the synthesis of proteins that are destined to be secreted differ from that of proteins with functions inside the cell?

- A. Proteins destined to be secreted have a signal sequence.
- B. Proteins destined to be secreted are synthesized on free ribosomes.
- C. Proteins destined to be secreted are packaged into secretory vesicles in the granular endoplasmic reticulum.
- D. Only proteins destined for secretion need transfer RNA to be synthesized.
- E. Genes for proteins with functions inside the cell are located in the cytoplasm.

26. Which is NOT a function of the Golgi apparatus?

- A. sorting of proteins destined for various locations in the cell
- B. modifying proteins destined for secretion
- C. packaging enzymes destined for lysosomes
- D. addition of carbohydrate groups to proteins
- E. transcribing a signal sequence onto proteins destined for secretion

27. Which is the best definition of the term, ligand?

A.

a receptor composed of protein

B.

a molecule or ion that binds to a protein

C.

any molecule found in the intracellular fluid

D.

any molecule found in the extracellular fluid

E.

a carbohydrate molecule that binds weakly to membrane phospholipids

28. Which is NOT true about a binding site on a protein?

- A. It is an area of the protein with a shape complementary to that of a ligand.
- B. It is determined by the amino acid sequence of the protein.
- C. The binding of a ligand to a binding site typically changes the conformation of the protein.
- D. There can only be one binding site on a given protein.
- E. Binding of a ligand to the binding site typically activates or inactivates a protein's specific function.

29.

A certain protein receptor is capable of binding the neurotransmitter epinephrine but does not bind to the neurotransmitters dopamine, glutamate, or serotonin. This is because the receptor displays what characteristic?

- A. saturation
- B. inhibition
- C. specificity
- D. acclimatization
- E. accommodation

30. A solution containing proteins of a particular type is exposed to the same concentrations of ligands X and Y, but the percent saturation of molecule X is greater than the percent saturation of molecule Y. Which is most likely to be a true statement?

- A. The binding sites for ligand X are 100% saturated.
- B. The binding sites for ligand X have greater specificity than the binding site for ligand Y.
- C. Ligand X must be a competitive inhibitor of ligand Y.
- D. Both ligands must bind to the same binding site on the protein.
- E. The protein has a higher affinity for ligand X than for ligand Y.

31. Two receptors, A and B, can bind the same chemical signaling molecules but the concentration of those molecules required to reach 50 percent saturation is twice as great for receptor B. Therefore the receptors have the same _____, but different _____.

- A. specificity, affinity
- B. specificity, saturation
- C. affinity, specificity
- D. affinity, competition

E. competition, affinity

32. Which describes the action of a ligand's competitive antagonist?

- A. It decreases the amount of ligand required to activate the protein.
- B. It blocks the binding of the ligand to its binding site and prevents activation of the protein.
- C. It binds to a different binding site on the protein, altering the protein shape so that a ligand cannot bind.
- D. When present, it increases the binding of a ligand to its receptor.

33.

What is the defining characteristic of an allosteric protein?

- A. They contain two polypeptide chains, with each being an exact mirror image of the other.
- B. They contain only one ligand-binding site, but because the specificity is low, many different ligands can bind to it.
- C. They contain two ligand-binding sites, one that activates the protein when a ligand binds, and the other that inactivates the protein when the same ligand binds.
- D. They contain more than one ligand-binding site, and noncovalent binding of a ligand to one site alters the shape of other ligand binding sites.
- E. They contain no binding sites of their own, but act by modulating the activity of other proteins.

34. What is "allosteric modulation?"

- A. regulation of physiological functions by the sympathetic division of the autonomic nervous system
- B. modification of the functional state of a protein by temperature or pH
- C. the change in the shape and functional state of a protein that occurs when a ligand binds to a regulatory site
- D. the fact that all binding sites on a protein must be occupied to have a biological effect
- E. the ability of a single ligand-binding site to bind to molecularly similar ligands

35. Which of these covalently modifies proteins by phosphorylation?

- A. enzymes called protein phosphatases
- B. other proteins called allosteric proteins
- C. any ligand which can bind to specific binding sites
- D. enzymes called protein kinases
- E. metal ions, such as Fe²⁺

36. In skeletal muscle, when calcium binds to the regulatory protein troponin, it increases the affinity of neighboring troponin molecules for calcium. This is an example of

- A. allosteric modulation.
- B. cooperativity.
- C. covalent modulation.
- D. phosphorylation.
- E. saturation.

37. Which is NOT true about protein kinases?

- A. They add phosphate groups to proteins.
- B. They produce effects similar to allosteric modulation.
- C. They perform the opposite function as phosphatases.
- D. They use ATP to carry out their reactions.
- E. They remove phosphate groups from proteins.

38. The term "metabolism:"

- A. is synonymous with the term "catabolism."
- B. is synonymous with the term "anabolism."
- C. refers to any chemical reaction that involves the production of energy.
- D. is defined as the covalent modification and activation of a protein with binding sites for organic molecules.
- E. refers to the synthesis and breakdown of organic molecules involved in cell structure and function.

39. The probability of a reaction occurring is increased

- A. by decreasing reactant concentrations.
- B. by increasing the activation energy.
- C. by increasing the concentration of any of the products.
- D. if the reaction uses a great deal of energy.
- E. if the concentration of one of the reactants increases.

40. How does a chemical catalyst increase the rate of a reaction?

- A. by acting as one of the reactant molecules
- B. by decreasing the energy of activation
- C. by increasing the energy content of the product molecules
- D. by increasing the temperature of a solution
- E. by phosphorylating a reactant

41. With regard to reversible chemical reaction rates, which of the following statements is true?

- A. Decreasing the concentration of the reactants will increase the forward reaction rate.
- B. Increasing the temperature will increase the forward and reverse reaction rate.
- C. Increasing the activation energy will increase the forward reaction rate.
- D. Increasing the concentration of the products will increase the forward reaction rate.
- E. As a reaction progresses, the rate of the forward reaction increases as the concentration of reactants decreases.

42. When a reversible chemical reaction is at equilibrium

A.

the rate of the reaction in one direction is equal to the rate in the reverse direction.

B.

the concentration of the reactants is equal to the concentration of the products.

C.

both the forward and reverse reactions stop occurring.

D.

the supply of reactants has become exhausted, so the forward reaction ceases and the rate of the reverse reaction increases.

E.

catalysts no longer influence either the forward or reverse reaction rates.

43. Which would be true about the following reaction?



- A. Adding a catalyst would alter the final concentrations of products and reactants at equilibrium.
- B. Starting at chemical equilibrium, increasing the concentration of M will transiently increase the rate of formation of Y and Z.
- C. Starting at chemical equilibrium, decreasing the concentration of M will increase the concentration of Y and Z.
- D. Both the reaction is reversible and at chemical equilibrium, increasing the concentration of M will drive the reaction to the left are correct
- E. Because the reactants and products are different molecules, this is not a reversible reaction.

44. Consider the reaction: $H_2CO_3 \rightleftharpoons CO_2 + H_2O + 4 \text{ kcal/mol}$. Which of the following is TRUE?

- A. The reaction is anabolic and the energy content of the reactant is greater than that of the products.
- B. The reaction is catabolic and the energy content of the reactant is greater than that of the products.
- C. The reaction is anabolic and the energy content of the products is greater than that of the reactant.
- D. The reaction is catabolic and the energy content of the products is greater than that of the reactant.
- E. The reaction is catabolic and the energy content of the products are equal to that of the reactant.

45. At equilibrium, in an irreversible reaction:

- A. almost all of the reactants will have been converted to products.
- B. there will be an equal number of products and reactants.
- C. there will be very few molecules of product.
- D. small amounts of energy will have been released.
- E. large amounts of energy must have been input to reach that state.

46. What is the function of a catalyst in a chemical reaction?

- A. It lowers the activation energy of the reaction.
- B. It is split into individual molecules that are products of the reaction.
- C. It changes the energy content of the reactants.
- D. It generates heat that makes the reaction proceed.

E. It ensures that the reaction can proceed only in one direction, from reactants to products.

47. Enzymes

- A. are catalysts in chemical reactions.
- B. can be carbohydrate molecules.
- C. are broken down during chemical reactions they catalyze.
- D. have names generally ending in the suffix "-ase."
- E. are polymers of ATP that store large amounts of energy.

48. Which is NOT true about cofactors involved in enzymatic reactions?

- A. They may alter the conformation of the enzyme.
- B. They may be a metal such as iron.
- C. They may be a substrate in a catalyzed reaction.
- D. There must be equal quantities of enzyme and cofactor molecules for a reaction to proceed.
- E. Only a small number of cofactor molecules may be needed to maintain enzyme activity.

49. What is a coenzyme?

A.

an organic cofactor that directly participates as one of the substrates in an enzymatic reaction

B.

a metal, such as zinc, that participates in enzymatic reactions

C.

a term regarding enzymatic reactions that is synonymous with "cofactor"

D.

any ligand that binds to a specific site on a protein receptor

E.

an inorganic molecule that catalyzes enzymatic reactions

50. Which of the following is true concerning the rate-limiting step in a metabolic pathway?

- A. It is likely to be the slowest reaction in the pathway, and it is always the last step in a metabolic pathway.
- B. It is likely to be the fastest reaction in the pathway, and it is always the last step in a metabolic pathway.
- C. It is always the first step in the pathway, and may be subject to end-product inhibition.
- D. It is likely to be the slowest reaction in the pathway and it may be subject to end-product inhibition.
- E. It is likely to be the fastest reaction in the pathway and it may be subject to end-product inhibition.

51. In order to increase the overall rate of a metabolic pathway consisting of five reactions catalyzed by five different enzymes, which must occur?

- A. increasing the reaction rate of all five enzymes
- B. increasing the reaction rate of the fastest enzyme
- C. increasing the reaction rate of the slowest enzyme
- D. increasing the reaction rate of the first enzyme in the pathway
- E. increasing the reaction rate of the last enzyme in the pathway

52. ATP is

- A. formed during the hydrolysis of ADP.
- B. used by cells for the storage of energy.
- C. used to transfer energy within a cell.
- D. a protein.
- E. a molecule with less total energy content than ADP.

53. The site where most of the ATP is generated in a cell is the

- A. nucleus.
- B. plasma membrane.
- C. endoplasmic reticulum.
- D. Golgi apparatus.
- E. mitochondria.

54. ATP is

- A. a nucleotide.
- B. a lipid.
- C. an amino acid.
- D. a carbohydrate.
- E. a steroid.

55. Which is TRUE about glycolysis?

- A. It does not occur in the absence of O_2 .
- B. It does not occur in the presence of O_2 .
- C. It may result in the formation of two molecules of lactate for each molecule of glucose.
- D. It is a series of metabolic reactions that occur mainly inside the inner membrane of a mitochondrion.
- E. It is a metabolic reaction in which glucose is manufactured from large carbohydrates like glycogen.

56. Which of the following metabolic pathways can proceed in the absence of oxygen?

- A. glycolysis
- B. oxidative phosphorylation
- C.

D. the breakdown of fatty acids to CO_2 and H_2O

E.

None of the choices are correct.

57. What are the products of glycolysis under anaerobic conditions?

A. 2 molecules of NADH and 2 molecules of water

B.

2 molecules of pyruvate, 2 molecules of lactate, and 2 ATP

C. 2 molecules of pyruvate and 36 molecules of ATP

D. 2 molecules of ATP, 2 molecules of water, and 2 molecules of lactate

E. 2 molecules of pyruvate, 2 molecules of water, and 2 NADH

58. Which of the following is NOT a product of glycolysis?

A.

carbon dioxide

B. ATP

C.

pyruvate

D. NADH

59. The reactions of the Krebs cycle:

A. take place in the cytosol of human cells.

B. generate ATP directly by substrate-level phosphorylation.

C. are important for the metabolism of carbohydrates but not other molecules.

D. take place only when no oxygen is present.

E. produce pyruvate and lactate as end products.

60. Which is a series of reactions by which fatty acid catabolism occurs?

A. glycolysis

B. lipogenesis

C. beta-oxidation

D. glycogenolysis

E. phosphorylation

61. Which is NOT true about fatty acid synthesis?

A. takes place in the cytosol of cells

- B. results in molecules with an even number of carbon atoms only
- C. requires more energy than is produced by the catabolism of the same fatty acid
- D.

begins with a molecule of acetyl coenzyme A

E.

The enzymes that catalyze it are in the same location as those that mediate fatty acid catabolism.

62. Most energy in the body is stored in what form?

- A. ATP
- B. glucose
- C. fat
- D. protein
- E. DNA

63. Ammonia is

- A. a waste product of fatty acid metabolism.
- B. exhaled by the lungs into the air.
- C. processed by the liver to form urea, a less toxic compound.
- D. a waste product of fatty acid metabolism and is excreted by the kidneys into urine.
- E. a polypeptide containing many amino acids.

64. Before an amino acid can be broken down for energy:

- A. the side chain must be removed.
- B. the carboxyl group must be removed.
- C.

it must be converted to NAD^+ .

- D. the amino group must be removed.
- E. it must be phosphorylated.

65. Electrons transferred along the electron transport chain can be used to form:

- A. water.
- B. glucose.
- C. ATP.
- D. NADH.
- E. acetyl coenzyme A.

66. A light microscope can be used to view very large proteins in a cell.

True False

67. Living cells cannot be viewed under an electron microscope.

True False

68. One striking feature of plasma membrane structure is its symmetry, with the extracellular and cytoplasmic surfaces virtual mirror images of each other.

True False

69. Intracellular fluid is defined as the fluid in the cytoplasm.

True False

70. The major lipids in cellular membranes are phospholipids.

True False

71. The special functions of plasma and organelle membranes depend primarily on the specific composition of the phospholipids of those membranes.

True False

72. One function of integral membrane proteins in the plasma membrane of cells is to form channels to allow passage of nonpolar solutes into the cell.

True False

73. Peripheral membrane proteins are involved in regulating cell shape and motility.

True False

74. Desmosomes are structures that permit direct communication between cells by allowing the cells to exchange small molecules in their cytoplasm.

True False

75. Chromosomes are composed mainly of DNA.

True False

76. Free ribosomes differ from membrane-bound ribosomes in that free ribosomes specialize in synthesizing proteins for export (secretion) from the cell.

True False

77. Lysosomes are organelles specialized for breaking down intracellular debris or malfunctioning parts of cells.

True False

78. The promoter sequence of nucleotides in a gene is present on both strands of the DNA molecule, allowing transcription of both strands.

True False

79. Ribosomes transcribe DNA into RNA.

True False

80. A ribosome is composed of one molecule of RNA and several proteins.

True False

81. The nucleotide triplet in tRNA that base-pairs with a complementary triplet in mRNA is called the codon.

True False

82. There are twenty different molecules of tRNA.

True False

83. Once protein synthesis is completed, the protein that was synthesized may undergo further changes prior to its secretion or use within the cell.

True False

84. Transcription factors activate or repress the transcription of specific genes by binding to regions of DNA that interact with the promoter region of a gene.

True False

85. Proteins destined to become integral membrane proteins have a signal sequence.

True False

86. The consequences of mutations are invariably harmful.

True False

87. The deletion of a single base in a gene would alter the structure of the gene's protein more than the substitution of one base for another.

True False

88. In general, the larger the number of different ligands that can bind to a particular binding site on a protein, the less the specificity of that binding site.

True False

89. The shape of a ligand and the shape of its binding site influence both the specificity and the affinity of binding.

True False

90. Any given protein contains binding sites for only one kind of ligand.

True False

91. The greater the ligand concentration needed to achieve 50 percent saturation of a particular binding site, the higher the affinity of the binding site for that ligand.

True False

92. Allosteric modulation of a protein involves noncovalent binding of a ligand to a regulatory binding site.

True False

93. The only role of modulator molecules is to enhance the binding affinity of the functional site of an allosteric protein.

True False

94. Proteins that mediate or catalyze, reactions in which the covalent bonding of the reactant molecules changes are called substrates.

True False

95. Coenzymes are organic cofactors.

True False

96. An important function of coenzymes is to act as carriers to transport hydrogen atoms.

True False

97. The active site of an enzyme is a functional binding site.

True False

98. The enzyme carbonic anhydrase catalyzes the catabolism of H_2CO_3 to H_2O and CO_2 .

True False

99. In a metabolic pathway, the same enzyme ordinarily catalyzes several different reactions.

True False

100. The rate-limiting reaction in a metabolic pathway is one that occurs at a faster rate than the other steps in the pathway.

True False

101. Allosteric inhibition of rate-limiting enzymes is a common means of regulating anabolic pathways.

True False

102. During oxidative phosphorylation, hydrogen atoms are passed serially from a coenzyme down a chain of molecules called cytochromes.

True False

103. In the absence of oxygen, cells can derive energy to form ATP from the metabolism of fatty acids.

True False

104. The first step in glycogen synthesis is the phosphorylation of glucose.

True False

105. Glucose cannot be synthesized from fatty acids because the reaction converting pyruvic acid to acetyl coenzyme A is not reversible.

True False

106. Substrate-level phosphorylation takes place in the ribosomes of cells, whereas oxidative phosphorylation takes place in mitochondria.

True False

107. During anaerobic glycolysis, a net of two molecules of ATP are generated for each molecule of glucose broken down.

True False

108. In the Krebs cycle, an acetyl fragment is broken down to CO_2 and H ions.

True False

109. The major waste product of metabolism is H_2O .

True False

110. Most of the energy stored in the body is in the form of glycogen.

True False

111. Proteins are broken down to amino acids by enzymes called transaminases.

True False

112. Removal of the amino group from an amino acid is necessary before the amino acid can be metabolized for energy.

True False

113. Human beings can synthesize all twenty amino acids the body must have.

True False

114. An essential nutrient is one necessary for good health that may or may not be synthesized by the body.

True False

115. Glucose is not considered an essential nutrient because it is not essential for good health.

True False

116. Fat-soluble vitamins are required for health because they act as coenzymes.
True False

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- A. storing calcium ions
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- D. generating ATP
- E. regulating the passage of molecules into and out of the cell**

Bloom's: Level 1. Remember

Learning Outcome: 03.02

Section: 03.02

Topic: Cells

2. Which is NOT a feature of the fluid-mosaic model of plasma membranes.

A.

Integral membrane proteins are embedded in the membrane.

- B. Phospholipids form a bilayer.
- C. Cholesterol associates with phospholipid molecules.
- D. Carbohydrates are linked to lipids and proteins on the interior surface, forming a glycocalyx layer.**
- E. Peripheral membrane proteins associate with polar regions of integral membrane proteins.

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Topic: Cells

3. The cell membrane is composed mainly of:

- A. cytosol.
- B. phospholipids and proteins.**
- C. phospholipids and nucleic acids.
- D. water.
- E. proteins and glycocalyx.

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Learning Outcome: 03.02

Section: 03.02

Topic: Cells

4. What feature of phospholipids allows them to interact with aqueous cytosol and extracellular fluid, while still presenting a barrier to hydrophilic substances?

- A. They are polar molecules.
- B.

They are nonpolar molecules.

- C. They are lipids.
- D. They are extremely rigid molecules.
- E.** They are amphipathic molecules.

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Learning Outcome: 03.02

Section: 03.02

Topic: Cells

5. What is the main function of cellular tight junctions?

- A. They resist forces that tend to pull cells apart.
- B.** They form barriers that restrict the passage of materials through the extracellular space between cells.
- C. They are protein channels that allow the movement of ions between the cytosol of adjacent cells.
- D. They are spaces that allow movement of substances between the interior of the nucleus and the cytosol.
- E. They hold the genetic material in a tightly coiled conformation.

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Topic: Cells

6. What are desmosomes?

- A. low-resistance channel-like passages that let ions travel between the interiors of adjacent cells
- B. cell organelles that contain enzymes for digesting cellular debris and foreign microbes
- C. cellular organelles that transcribe RNA into DNA
- D. membrane-bound vesicles that pinch off from the plasma membrane and enter the cell
- E.** dense plaques of proteins that maintain firm attachments between adjacent cells

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Topic: Cells

7. Protein channels that link the cytosol of adjacent cells are called _____ junctions.

- A. cadherin
- B. tight
- C.** gap
- D. conjunction
- E. nexus

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Learning Outcome: 03.02

Section: 03.02

Topic: Cells

8. What cellular structures are most closely associated with vaults?

- A.** nuclear pores
- B. peroxisomes
- C. lysosomes
- D. mitochondria
- E. gap junctions

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Learning Outcome: 03.03

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Topic: Cells

9. Which best describes functions of the agranular (smooth) endoplasmic reticulum?

- A. transcription of DNA into RNA
- B. generation of ATP
- C. digestion of engulfed bacteria and cellular debris
- D. synthesis and packaging of proteins for secretion from the cell or export to other organelles
- E.** synthesis of lipids and intracellular storage of calcium ions

Bloom's: Level 1. Remember

Learning Outcome: 03.03

Section: 03.03

Topic: Cells

10. The organelles that digest engulfed bacteria and cell debris are the:

- A. peroxisomes.
- B. endosomes.
- C.** lysosomes.
- D. ribosomes.
- E. mitochondria.

Bloom's: Level 1. Remember

Learning Outcome: 03.03

Section: 03.03

Topic: Cells

11. Which organelles would you expect to be especially numerous in cells that utilize oxygen to generate a great deal of energy in the form of ATP?

- A. peroxisomes
- B. endosomes
- C. lysosomes
- D. ribosomes
- E.** mitochondria

Bloom's: Level 1. Remember

Learning Outcome: 03.03

12. Which of these are functions of the Golgi apparatus?
- A. modifying proteins synthesized on free ribosomes and storing calcium ions
 - B. digestion of engulfed bacteria and using oxygen to generate ATP
 - C. synthesizing lipids and intracellular storage of calcium ions
 - D. modifying proteins synthesized on free ribosomes and allowing the distribution of modified proteins throughout the cell in vesicles
 - E.** modifying proteins synthesized on ribosomes associated with granular endoplasmic reticulum and allowing the distribution of modified proteins throughout the cell in vesicles

Bloom's: Level 1. Remember
Learning Outcome: 03.03
Section: 03.03
Topic: Cells

13. Which of the following is *not* true of the cytoskeleton?
- A.** It refers to the cellular components of bone.
 - B. It refers to a network of cytoplasmic filaments.
 - C. It is important for cellular movement.
 - D. It helps to determine a cell's shape.
 - E. It includes actin filaments.

Bloom's: Level 1. Remember
Learning Outcome: 03.03
Section: 03.03
Topic: Cells

14. Cell A is a gland cell that makes and secretes proteins. Cell B is another type of cell that synthesizes and secretes steroids. If you were to look at electron micrographs of the two cells, what differences would you expect to see?
- A.** Cell A would have more granular endoplasmic reticulum than cell B.
 - B. Cell A would have fewer secretion granules than cell B.
 - C. Cell A would have more agranular endoplasmic reticulum than cell B.
 - D. Cell B would have more granular endoplasmic than cell A.
 - E. The two cells would most likely look identical.

Bloom's: Level 2. Understand
Learning Outcome: 03.03
Section: 03.03
Topic: Cells

15. Neurons have a very prominent nucleolus which indicates that they are actively performing what function?
- A. making ATP
 - B. synthesizing lipids
 - C.** manufacturing ribosomes
 - D. breaking down carbohydrates
 - E. dividing by mitosis

Bloom's: Level 1. Remember
Learning Outcome: 03.03
Section: 03.03
Topic: Cells

16. In Tay Sach's disease, lysosomes do not function normally. Predict which condition would be a symptom of Tay Sach's disease.

- A.** There is excessive accumulation of damaged organelles in a cell.
- B. Cells are unable to synthesize proteins.
- C. Cells can only make ATP by glycolysis.
- D. Proteins cannot be secreted by exocytosis.
- E. Steroid hormones can't be produced.

Bloom's: Level 2. Understand
Learning Outcome: 03.03
Section: 03.03
Topic: Cells

17. In which organelle are carbohydrate chains added to glycoproteins?

- A.** golgi apparatus
- B. smooth endoplasmic reticulum
- C. nucleus
- D. lysosome
- E. mitochondrion

Bloom's: Level 1. Remember
Learning Outcome: 03.03
Section: 03.03
Topic: Cells

18. Which is true about the structure and function of a gene?

- A. It is an uncoiled protein that contains information necessary for the synthesis of other proteins.
- B. It is a sequence of nucleotides in DNA that acts as an enzyme to digest proteins.
- C. It is composed of many molecules of DNA and contains information needed to make RNA.
- D.** It is a sequence of nucleotides in DNA that contains information necessary for the synthesis of proteins.

Bloom's: Level 1. Remember
Learning Outcome: 03.04
Section: 03.04
Topic: Cells

19. What is a *genome*?

- A. a cluster of genes that are all regulated in the same manner
- B. a measure of the genetic variability in a population
- C. a region of DNA that codes for a single protein
- D. all of the protein in a cell at a given point in time
- E.** the total genetic information in a typical cell of an organism

Bloom's: Level 1. Remember

Learning Outcome: 03.04

Section: 03.04

Topic: Cells

20. What is a codon?
- A. a triplet of deoxyribonucleotides
 - B.** a triplet of ribonucleotides
 - C. a sequence of ribonucleotides on tRNA
 - D. a very small gene
 - E. a very small genome

Bloom's: Level 1. Remember

Learning Outcome: 03.05

Section: 03.05

Topic: Cells

21. What codon corresponds to the DNA sequence G-T-A?
- A. G-T-A
 - B. A-T-G
 - C. C-A-T
 - D.** C-A-U
 - E. T-A-C

Bloom's: Level 1. Remember

Learning Outcome: 03.05

Section: 03.05

Topic: Cells

22. RNA synthesis from a DNA template:
- A. is called translation of the message.
 - B. requires DNA polymerase.
 - C.** is called transcription.
 - D.

occurs in the nucleolus.

E.

occurs in the cytoplasm.

Bloom's: Level 1. Remember

Learning Outcome: 03.05

Section: 03.05

Topic: Cells

23. What is the term for the segments of primary RNA that are cleaved and discarded by spliceosomes?
- A. codons
 - B.** introns
 - C. exons
 - D. anticodons

E. genes

Bloom's: Level 1. Remember
Learning Outcome: 03.05
Section: 03.05
Topic: Cells

24. Which is a function of transfer RNA (tRNA)?
- A. transport smRNA out of the nucleus
 - B. binding specifically to mRNA and nonspecifically to amino acids
 - C. binding specifically to amino acids and nonspecifically to mRNA
 - D. binding specifically to both mRNA and to amino acids**

Bloom's: Level 1. Remember
Learning Outcome: 03.05
Section: 03.05
Topic: Cells

25. How does the synthesis of proteins that are destined to be secreted differ from that of proteins with functions inside the cell?
- A. Proteins destined to be secreted have a signal sequence.**
 - B. Proteins destined to be secreted are synthesized on free ribosomes.
 - C. Proteins destined to be secreted are packaged into secretory vesicles in the granular endoplasmic reticulum.
 - D. Only proteins destined for secretion need transfer RNA to be synthesized.
 - E. Genes for proteins with functions inside the cell are located in the cytoplasm.

Bloom's: Level 1. Remember
Learning Outcome: 03.07
Section: 03.07
Topic: Cells

26. Which is NOT a function of the Golgi apparatus?
- A. sorting of proteins destined for various locations in the cell
 - B. modifying proteins destined for secretion
 - C. packaging enzymes destined for lysosomes
 - D. addition of carbohydrate groups to proteins
 - E. transcribing a signal sequence onto proteins destined for secretion**

Bloom's: Level 1. Remember
Learning Outcome: 03.03
Learning Outcome: 03.07
Section: 03.03
Section: 03.07
Topic: Cells

27. Which is the best definition of the term, ligand?
- A.

a receptor composed of protein

B.

a molecule or ion that binds to a protein

C.

any molecule found in the intracellular fluid

D.

any molecule found in the extracellular fluid

E.

a carbohydrate molecule that binds weakly to membrane phospholipids

Bloom's: Level 1. Remember

Learning Outcome: 03.08

Section: 03.08

Topic: Cells

28. Which is NOT true about a binding site on a protein?

A. It is an area of the protein with a shape complementary to that of a ligand.

B. It is determined by the amino acid sequence of the protein.

C. The binding of a ligand to a binding site typically changes the conformation of the protein.

D. There can only be one binding site on a given protein.

E. Binding of a ligand to the binding site typically activates or inactivates a protein's specific function.

Bloom's: Level 2. Understand

Learning Outcome: 03.08

Section: 03.08

Topic: Cells

29.

A certain protein receptor is capable of binding the neurotransmitter epinephrine but does not bind to the neurotransmitters dopamine, glutamate, or serotonin. This is because the receptor displays what characteristic?

A. saturation

B. inhibition

C. specificity

D. acclimatization

E. accommodation

Bloom's: Level 2. Understand

Learning Outcome: 03.08

Section: 03.08

Topic: Cells

30. A solution containing proteins of a particular type is exposed to the same concentrations of ligands X and Y, but the percent saturation of molecule X is greater than the percent saturation of molecule Y. Which is most likely to be a true statement?

- A. The binding sites for ligand X are 100% saturated.
- B. The binding sites for ligand X have greater specificity than the binding site for ligand Y.
- C. Ligand X must be a competitive inhibitor of ligand Y.
- D. Both ligands must bind to the same binding site on the protein.
- E.** The protein has a higher affinity for ligand X than for ligand Y.

Bloom's: Level 2. Understand

Learning Outcome: 03.08

Section: 03.08

Topic: Cells

31. Two receptors, A and B, can bind the same chemical signaling molecules but the concentration of those molecules required to reach 50 percent saturation is twice as great for receptor B. Therefore the receptors have the same _____, but different _____.

- A.** specificity, affinity
- B. specificity, saturation
- C. affinity, specificity
- D. affinity, competition
- E. competition, affinity

Bloom's: Level 2. Understand

Learning Outcome: 03.08

Section: 03.08

Topic: Cells

32. Which describes the action of a ligand's competitive antagonist?

- A. It decreases the amount of ligand required to activate the protein.
- B.** It blocks the binding of the ligand to its binding site and prevents activation of the protein.
- C. It binds to a different binding site on the protein, altering the protein shape so that a ligand cannot bind.
- D. When present, it increases the binding of a ligand to its receptor.

Bloom's: Level 2. Understand

Learning Outcome: 03.08

Section: 03.08

Topic: Cells

33.

What is the defining characteristic of an allosteric protein?

- A. They contain two polypeptide chains, with each being an exact mirror image of the other.
- B. They contain only one ligand-binding site, but because the specificity is low, many different ligands can bind to it.
- C. They contain two ligand-binding sites, one that activates the protein when a ligand binds, and the other that inactivates the protein when the same ligand binds.

- D.** They contain more than one ligand-binding site, and noncovalent binding of a ligand to one site alters the shape of other ligand binding sites.
- E. They contain no binding sites of their own, but act by modulating the activity of other proteins.

Bloom's: Level 1. Remember
Learning Outcome: 03.09
Section: 03.09
Topic: Cells

34. What is "allosteric modulation?"

- A. regulation of physiological functions by the sympathetic division of the autonomic nervous system
- B. modification of the functional state of a protein by temperature or pH
- C.** the change in the shape and functional state of a protein that occurs when a ligand binds to a regulatory site
- D. the fact that all binding sites on a protein must be occupied to have a biological effect
- E. the ability of a single ligand-binding site to bind to molecularly similar ligands

Bloom's: Level 1. Remember
Learning Outcome: 03.09
Section: 03.09
Topic: Cells

35. Which of these covalently modifies proteins by phosphorylation?

- A. enzymes called protein phosphatases
- B. other proteins called allosteric proteins
- C. any ligand which can bind to specific binding sites
- D.** enzymes called protein kinases
- E. metal ions, such as Fe²⁺

Bloom's: Level 1. Remember
Learning Outcome: 03.09
Section: 03.09
Topic: Cells

36. In skeletal muscle, when calcium binds to the regulatory protein troponin, it increases the affinity of neighboring troponin molecules for calcium. This is an example of

- A. allosteric modulation.
- B.** cooperativity.
- C. covalent modulation.
- D. phosphorylation.
- E. saturation.

Bloom's: Level 2. Understand
Learning Outcome: 03.09
Section: 03.09
Topic: Cells

37. Which is NOT true about protein kinases?

- A. They add phosphate groups to proteins.
- B. They produce effects similar to allosteric modulation.
- C. They perform the opposite function as phosphatases.

- D. They use ATP to carry out their reactions.
- E.** They remove phosphate groups from proteins.

Bloom's: Level 1. Remember
Learning Outcome: 03.09
Section: 03.09
Topic: Cells

38. The term "metabolism:"
- A. is synonymous with the term "catabolism."
 - B. is synonymous with the term "anabolism."
 - C. refers to any chemical reaction that involves the production of energy.
 - D. is defined as the covalent modification and activation of a protein with binding sites for organic molecules.
 - E.** refers to the synthesis and breakdown of organic molecules involved in cell structure and function.

Bloom's: Level 1. Remember
Learning Outcome: 03.10
Section: 03.10
Topic: Cells
Topic: General principles of physiology

39. The probability of a reaction occurring is increased
- A. by decreasing reactant concentrations.
 - B. by increasing the activation energy.
 - C. by increasing the concentration of any of the products.
 - D. if the reaction uses a great deal of energy.
 - E.** if the concentration of one of the reactants increases.

Bloom's: Level 1. Remember
Learning Outcome: 03.10
Section: 03.10
Topic: Cells
Topic: General principles of physiology

40. How does a chemical catalyst increase the rate of a reaction?
- A. by acting as one of the reactant molecules
 - B.** by decreasing the energy of activation
 - C. by increasing the energy content of the product molecules
 - D. by increasing the temperature of a solution
 - E. by phosphorylating a reactant

Bloom's: Level 1. Remember
Learning Outcome: 03.10
Section: 03.10
Topic: Cells
Topic: General principles of physiology

41. With regard to reversible chemical reaction rates, which of the following statements is true?
- A. Decreasing the concentration of the reactants will increase the forward reaction rate.
 - B.** Increasing the temperature will increase the forward and reverse reaction rate.

- C. Increasing the activation energy will increase the forward reaction rate.
- D. Increasing the concentration of the products will increase the forward reaction rate.
- E. As a reaction progresses, the rate of the forward reaction increases as the concentration of reactants decreases.

Bloom's: Level 1. Remember

Learning Outcome: 03.10

Section: 03.10

Topic: Cells

Topic: General principles of physiology

42. When a reversible chemical reaction is at equilibrium

A.

the rate of the reaction in one direction is equal to the rate in the reverse direction.

B.

the concentration of the reactants is equal to the concentration of the products.

C.

both the forward and reverse reactions stop occurring.

D.

the supply of reactants has become exhausted, so the forward reaction ceases and the rate of the reverse reaction increases.

E.

catalysts no longer influence either the forward or reverse reaction rates.

Bloom's: Level 1. Remember

Learning Outcome: 03.10

Section: 03.10

Topic: Cells

Topic: General principles of physiology

43. Which would be true about the following reaction?



- A. Adding a catalyst would alter the final concentrations of products and reactants at equilibrium.
- B.** Starting at chemical equilibrium, increasing the concentration of M will transiently increase the rate of formation of Y and Z.
- C. Starting at chemical equilibrium, decreasing the concentration of M will increase the concentration of Y and Z.
- D. Both the reaction is reversible and at chemical equilibrium, increasing the concentration of M will drive the reaction to the left are correct
- E. Because the reactants and products are different molecules, this is not a reversible reaction.

Bloom's: Level 2. Understand
Learning Outcome: 03.10
Section: 03.10
Topic: Cells
Topic: General principles of physiology

44. Consider the reaction: $\text{H}_2\text{CO}_3 \rightarrow \text{CO}_2 + \text{H}_2\text{O} + 4 \text{ kcal/mol}$. Which of the following is TRUE?

- A. The reaction is anabolic and the energy content of the reactant is greater than that of the products.
- B.** The reaction is catabolic and the energy content of the reactant is greater than that of the products.
- C. The reaction is anabolic and the energy content of the products is greater than that of the reactant.
- D. The reaction is catabolic and the energy content of the products is greater than that of the reactant.
- E. The reaction is catabolic and the energy content of the products are equal to that of the reactant.

Bloom's: Level 2. Understand
Learning Outcome: 03.10
Section: 03.10
Topic: Cells
Topic: General principles of physiology

45. At equilibrium, in an irreversible reaction:

- A.** almost all of the reactants will have been converted to products.
- B. there will be an equal number of products and reactants.
- C. there will be very few molecules of product.
- D. small amounts of energy will have been released.
- E. large amounts of energy must have been input to reach that state.

Bloom's: Level 1. Remember
Learning Outcome: 03.10
Section: 03.10
Topic: Cells
Topic: General principles of physiology

46. What is the function of a catalyst in a chemical reaction?

- A.** It lowers the activation energy of the reaction.
- B. It is split into individual molecules that are products of the reaction.
- C. It changes the energy content of the reactants.
- D. It generates heat that makes the reaction proceed.
- E. It ensures that the reaction can proceed only in one direction, from reactants to products.

Bloom's: Level 1. Remember
Learning Outcome: 03.10
Section: 03.10
Topic: Cells
Topic: General principles of physiology

47. Enzymes

- A.** are catalysts in chemical reactions.
- B. can be carbohydrate molecules.
- C. are broken down during chemical reactions they catalyze.
- D. have names generally ending in the suffix "-ose."

E. are polymers of ATP that store large amounts of energy.

Bloom's: Level 1. Remember

Learning Outcome: 03.11

Section: 03.11

Topic: Cells

Topic: General principles of physiology

48. Which is NOT true about cofactors involved in enzymatic reactions?

A. They may alter the conformation of the enzyme.

B. They may be a metal such as iron.

C. They may be a substrate in a catalyzed reaction.

D. There must be equal quantities of enzyme and cofactor molecules for a reaction to proceed.

E. Only a small number of cofactor molecules may be needed to maintain enzyme activity.

Bloom's: Level 1. Remember

Learning Outcome: 03.11

Section: 03.11

Topic: Cells

Topic: General principles of physiology

49. What is a coenzyme?

A.

an organic cofactor that directly participates as one of the substrates in an enzymatic reaction

B.

a metal, such as zinc, that participates in enzymatic reactions

C.

a term regarding enzymatic reactions that is synonymous with "cofactor"

D.

any ligand that binds to a specific site on a protein receptor

E.

an inorganic molecule that catalyzes enzymatic reactions

Bloom's: Level 1. Remember

Learning Outcome: 03.11

Section: 03.11

Topic: Cells

Topic: General principles of physiology

50. Which of the following is true concerning the rate-limiting step in a metabolic pathway?

A. It is likely to be the slowest reaction in the pathway, and it is always the last step in a metabolic pathway.

- B. It is likely to be the fastest reaction in the pathway, and it is always the last step in a metabolic pathway.
- C. It is always the first step in the pathway, and may be subject to end-product inhibition.
- D.** It is likely to be the slowest reaction in the pathway and it may be subject to end-product inhibition.
- E. It is likely to be the fastest reaction in the pathway and it may be subject to end-product inhibition.

Bloom's: Level 1. Remember

Learning Outcome: 03.13

Section: 03.13

Topic: Cells

Topic: General principles of physiology

51. In order to increase the overall rate of a metabolic pathway consisting of five reactions catalyzed by five different enzymes, which must occur?
- A. increasing the reaction rate of all five enzymes
 - B. increasing the reaction rate of the fastest enzyme
 - C.** increasing the reaction rate of the slowest enzyme
 - D. increasing the reaction rate of the first enzyme in the pathway
 - E. increasing the reaction rate of the last enzyme in the pathway

Bloom's: Level 1. Remember

Learning Outcome: 03.13

Section: 03.13

Topic: Cells

Topic: General principles of physiology

52. ATP is
- A. formed during the hydrolysis of ADP.
 - B. used by cells for the storage of energy.
 - C.** used to transfer energy within a cell.
 - D. a protein.
 - E. a molecule with less total energy content than ADP.

Bloom's: Level 1. Remember

Learning Outcome: 03.14

Section: 03.14

Topic: Cells

Topic: General principles of physiology

53. The site where most of the ATP is generated in a cell is the
- A. nucleus.
 - B. plasma membrane.
 - C. endoplasmic reticulum.
 - D. Golgi apparatus.
 - E.** mitochondria.

Bloom's: Level 1. Remember

Learning Outcome: 03.03

Section: 03.03

Topic: Cells

Topic: General principles of physiology

54. ATP is
- A.** a nucleotide.
 - B. a lipid.
 - C. an amino acid.
 - D. a carbohydrate.
 - E. a steroid.

Bloom's: Level 1. Remember
Learning Outcome: 03.03
Section: 03.03
Topic: Cells
Topic: General principles of physiology

55. Which is TRUE about glycolysis?
- A. It does not occur in the absence of O_2 .
 - B. It does not occur in the presence of O_2 .
 - C.** It may result in the formation of two molecules of lactate for each molecule of glucose.
 - D. It is a series of metabolic reactions that occur mainly inside the inner membrane of a mitochondrion.
 - E. It is a metabolic reaction in which glucose is manufactured from large carbohydrates like glycogen.

Bloom's: Level 2. Understand
Learning Outcome: 03.14
Section: 03.14
Topic: Cells
Topic: General principles of physiology

56. Which of the following metabolic pathways can proceed in the absence of oxygen?
- A.** glycolysis
 - B. oxidative phosphorylation
 - C.

Krebs cycle

- D. the breakdown of fatty acids to CO_2 and H_2O
- E.

None of the choices are correct.

Bloom's: Level 1. Remember
Learning Outcome: 03.14
Section: 03.14
Topic: Cells
Topic: General principles of physiology

57. What are the products of glycolysis under anaerobic conditions?
- A. 2 molecules of NADH and 2 molecules of water
 - B.

2 molecules of pyruvate, 2 molecules of lactate, and 2 ATP

C. 2 molecules of pyruvate and 36 molecules of ATP

D. 2 molecules of ATP, 2 molecules of water, and 2 molecules of lactate

E. 2 molecules of pyruvate, 2 molecules of water, and 2 NADH

Bloom's: Level 1. Remember

Learning Outcome: 03.14

Section: 03.14

Topic: Cells

Topic: General principles of physiology

58. Which of the following is NOT a product of glycolysis?

A.

carbon dioxide

B. ATP

C.

pyruvate

D. NADH

Bloom's: Level 1. Remember

Learning Outcome: 03.14

Section: 03.14

Topic: Cells

Topic: General principles of physiology

59. The reactions of the Krebs cycle:

A. take place in the cytosol of human cells.

B. generate ATP directly by substrate-level phosphorylation.

C. are important for the metabolism of carbohydrates but not other molecules.

D. take place only when no oxygen is present.

E. produce pyruvate and lactate as end products.

Bloom's: Level 1. Remember

Learning Outcome: 03.14

Section: 03.14

Topic: Cells

Topic: General principles of physiology

60. Which is a series of reactions by which fatty acid catabolism occurs?

A. glycolysis

B. lipogenesis

C. beta-oxidation

D. glycogenolysis

E. phosphorylation

Bloom's: Level 1. Remember
Learning Outcome: 03.15
Section: 03.15
Topic: Cells
Topic: General principles of physiology

61. Which is NOT true about fatty acid synthesis?

- A. takes place in the cytosol of cells
- B. results in molecules with an even number of carbon atoms only
- C. requires more energy than is produced by the catabolism of the same fatty acid
- D.

begins with a molecule of acetyl coenzyme A

E.

The enzymes that catalyze it are in the same location as those that mediate fatty acid catabolism.

Bloom's: Level 2. Understand
Learning Outcome: 03.15
Section: 03.15
Topic: Cells
Topic: General principles of physiology

62. Most energy in the body is stored in what form?

- A. ATP
- B. glucose
- C.** fat
- D. protein
- E. DNA

Bloom's: Level 1. Remember
Learning Outcome: 03.15
Section: 03.15
Topic: Cells
Topic: General principles of physiology

63. Ammonia is

- A. a waste product of fatty acid metabolism.
- B. exhaled by the lungs into the air.
- C.** processed by the liver to form urea, a less toxic compound.
- D. a waste product of fatty acid metabolism and is excreted by the kidneys into urine.
- E. a polypeptide containing many amino acids.

Bloom's: Level 1. Remember
Learning Outcome: 03.15
Section: 03.15
Topic: Cells
Topic: General principles of physiology

64. Before an amino acid can be broken down for energy:

- A. the side chain must be removed.
- B. the carboxyl group must be removed.
- C.

it must be converted to NAD^+ .

- D.** the amino group must be removed.
- E. it must be phosphorylated.

Bloom's: Level 2. Understand
Learning Outcome: 03.15
Section: 03.15
Topic: Cells
Topic: General principles of physiology

65. Electrons transferred along the electron transport chain can be used to form:

- A.** water.
- B. glucose.
- C. ATP.
- D. NADH.
- E. acetyl coenzyme A.

Bloom's: Level 2. Understand
Learning Outcome: 03.14
Section: 03.14
Topic: Cells
Topic: General principles of physiology

66. A light microscope can be used to view very large proteins in a cell.

FALSE

Bloom's: Level 1. Remember
Learning Outcome: 03.01
Section: 03.01
Topic: Cells
Topic: General principles of physiology

67. Living cells cannot be viewed under an electron microscope.

TRUE

Bloom's: Level 1. Remember
Learning Outcome: 03.01
Section: 03.01
Topic: Cells
Topic: General principles of physiology

68. One striking feature of plasma membrane structure is its symmetry, with the extracellular and cytoplasmic surfaces virtual mirror images of each other.

FALSE

Bloom's: Level 2. Understand
Learning Outcome: 03.02
Section: 03.02
Topic: Cells

69. Intracellular fluid is defined as the fluid in the cytoplasm.

FALSE

Bloom's: Level 1. Remember
Learning Outcome: 03.01
Section: 03.01
Topic: Cells

70. The major lipids in cellular membranes are phospholipids.

TRUE

Bloom's: Level 1. Remember
Learning Outcome: 03.02
Section: 03.02
Topic: Cells

71. The special functions of plasma and organelle membranes depend primarily on the specific composition of the phospholipids of those membranes.

FALSE

Bloom's: Level 2. Understand
Learning Outcome: 03.02
Section: 03.02
Topic: Cells

72. One function of integral membrane proteins in the plasma membrane of cells is to form channels to allow passage of nonpolar solutes into the cell.

FALSE

Bloom's: Level 1. Remember
Learning Outcome: 03.02
Section: 03.02
Topic: Cells

73. Peripheral membrane proteins are involved in regulating cell shape and motility.

TRUE

Bloom's: Level 1. Remember
Learning Outcome: 03.02
Section: 03.02
Topic: Cells

74. Desmosomes are structures that permit direct communication between cells by allowing the cells to exchange small molecules in their cytoplasm.

FALSE

Bloom's: Level 1. Remember

Learning Outcome: 03.02

Section: 03.02

Topic: Cells

75. Chromosomes are composed mainly of DNA.

TRUE

Bloom's: Level 1. Remember

Learning Outcome: 03.03

Section: 03.03

Topic: Cells

76. Free ribosomes differ from membrane-bound ribosomes in that free ribosomes specialize in synthesizing proteins for export (secretion) from the cell.

FALSE

Bloom's: Level 1. Remember

Learning Outcome: 03.03

Section: 03.03

Topic: Cells

77. Lysosomes are organelles specialized for breaking down intracellular debris or malfunctioning parts of cells.

TRUE

Bloom's: Level 1. Remember

Learning Outcome: 03.03

Section: 03.03

Topic: Cells

78. The promoter sequence of nucleotides in a gene is present on both strands of the DNA molecule, allowing transcription of both strands.

FALSE

Bloom's: Level 1. Remember

Learning Outcome: 03.05

Section: 03.05

Topic: Cells

79. Ribosomes transcribe DNA into RNA.

FALSE

Bloom's: Level 1. Remember
Learning Outcome: 03.03
Learning Outcome: 03.05
Section: 03.03
Section: 03.05
Topic: Cells

80. A ribosome is composed of one molecule of RNA and several proteins.

FALSE

Bloom's: Level 1. Remember
Learning Outcome: 03.03
Section: 03.03
Topic: Cells

81. The nucleotide triplet in tRNA that base-pairs with a complementary triplet in mRNA is called the codon.

FALSE

Bloom's: Level 1. Remember
Learning Outcome: 03.05
Section: 03.05
Topic: Cells

82. There are twenty different molecules of tRNA.

FALSE

Bloom's: Level 2. Understand
Learning Outcome: 03.05
Section: 03.05
Topic: Cells

83. Once protein synthesis is completed, the protein that was synthesized may undergo further changes prior to its secretion or use within the cell.

TRUE

Bloom's: Level 2. Understand
Learning Outcome: 03.05
Section: 03.05
Topic: Cells

84. Transcription factors activate or repress the transcription of specific genes by binding to regions of DNA that interact with the promoter region of a gene.

TRUE

Bloom's: Level 1. Remember
Learning Outcome: 03.05
Section: 03.05
Topic: Cells

85. Proteins destined to become integral membrane proteins have a signal sequence.

TRUE

Bloom's: Level 1. Remember

Learning Outcome: 03.07

Section: 03.07

Topic: Cells

86. The consequences of mutations are invariably harmful.

FALSE

Bloom's: Level 1. Remember

Learning Outcome: 03.05

Section: 03.05

Topic: Cells

87. The deletion of a single base in a gene would alter the structure of the gene's protein more than the substitution of one base for another.

TRUE

Bloom's: Level 2. Understand

Learning Outcome: 03.05

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Topic: Cells

88. In general, the larger the number of different ligands that can bind to a particular binding site on a protein, the less the specificity of that binding site.

TRUE

Bloom's: Level 1. Remember

Learning Outcome: 03.08

Section: 03.08

Topic: Cells

Topic: General principles of physiology

89. The shape of a ligand and the shape of its binding site influence both the specificity and the affinity of binding.

TRUE

Bloom's: Level 1. Remember

Learning Outcome: 03.08

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Topic: Cells

Topic: General principles of physiology

90. Any given protein contains binding sites for only one kind of ligand.

FALSE

Bloom's: Level 1. Remember
Learning Outcome: 03.08
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Topic: Cells
Topic: General principles of physiology

91. The greater the ligand concentration needed to achieve 50 percent saturation of a particular binding site, the higher the affinity of the binding site for that ligand.

FALSE

Bloom's: Level 1. Remember
Learning Outcome: 03.08
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Topic: General principles of physiology

92. Allosteric modulation of a protein involves noncovalent binding of a ligand to a regulatory binding site.

TRUE

Bloom's: Level 1. Remember
Learning Outcome: 03.09
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Topic: General principles of physiology

93. The only role of modulator molecules is to enhance the binding affinity of the functional site of an allosteric protein.

FALSE

Bloom's: Level 2. Understand
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Topic: General principles of physiology

94. Proteins that mediate or catalyze, reactions in which the covalent bonding of the reactant molecules changes are called substrates.

FALSE

Bloom's: Level 1. Remember
Learning Outcome: 03.09
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Topic: General principles of physiology

95. Coenzymes are organic cofactors.

TRUE

Bloom's: Level 1. Remember
Learning Outcome: 03.11

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Topic: General principles of physiology

96. An important function of coenzymes is to act as carriers to transport hydrogen atoms.

TRUE

Bloom's: Level 1. Remember
Learning Outcome: 03.11
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Topic: General principles of physiology

97. The active site of an enzyme is a functional binding site.

TRUE

Bloom's: Level 1. Remember
Learning Outcome: 03.09
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Topic: General principles of physiology

98. The enzyme carbonic anhydrase catalyzes the catabolism of H_2CO_3 to H_2O and CO_2 .

TRUE

Bloom's: Level 1. Remember
Learning Outcome: 03.11
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Topic: General principles of physiology

99. In a metabolic pathway, the same enzyme ordinarily catalyzes several different reactions.

FALSE

Bloom's: Level 1. Remember
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100. The rate-limiting reaction in a metabolic pathway is one that occurs at a faster rate than the other steps in the pathway.

FALSE

Bloom's: Level 1. Remember
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101. Allosteric inhibition of rate-limiting enzymes is a common means of regulating anabolic pathways.

TRUE

Bloom's: Level 2. Understand
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Topic: General principles of physiology

102. During oxidative phosphorylation, hydrogen atoms are passed serially from a coenzyme down a chain of molecules called cytochromes.

FALSE

Bloom's: Level 2. Understand
Learning Outcome: 03.14
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Topic: General principles of physiology

103. In the absence of oxygen, cells can derive energy to form ATP from the metabolism of fatty acids.

FALSE

Bloom's: Level 2. Understand
Learning Outcome: 03.14
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Topic: General principles of physiology

104. The first step in glycogen synthesis is the phosphorylation of glucose.

TRUE

Bloom's: Level 1. Remember
Learning Outcome: 03.15
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Topic: General principles of physiology

105. Glucose cannot be synthesized from fatty acids because the reaction converting pyruvic acid to acetyl coenzyme A is not reversible.

TRUE

Bloom's: Level 1. Remember
Learning Outcome: 03.15
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Topic: General principles of physiology

106. Substrate-level phosphorylation takes place in the ribosomes of cells, whereas oxidative phosphorylation takes place in mitochondria.

FALSE

Bloom's: Level 2. Understand
Learning Outcome: 03.14
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Topic: General principles of physiology

107. During anaerobic glycolysis, a net of two molecules of ATP are generated for each molecule of glucose broken down.

TRUE

Bloom's: Level 1. Remember

Learning Outcome: 03.14

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Topic: General principles of physiology

108. In the Krebs cycle, an acetyl fragment is broken down to CO₂ and H ions.

TRUE

Bloom's: Level 1. Remember

Learning Outcome: 03.14

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Topic: General principles of physiology

109. The major waste product of metabolism is H₂O.

FALSE

Bloom's: Level 2. Understand

Learning Outcome: 03.14

Section: 03.14

Topic: General principles of physiology

110. Most of the energy stored in the body is in the form of glycogen.

FALSE

Bloom's: Level 1. Remember

Learning Outcome: 03.15

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Topic: General principles of physiology

111. Proteins are broken down to amino acids by enzymes called transaminases.

FALSE

Bloom's: Level 1. Remember

Learning Outcome: 03.15

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Topic: General principles of physiology

112. Removal of the amino group from an amino acid is necessary before the amino acid can be metabolized for energy.

TRUE

Bloom's: Level 1. Remember
Learning Outcome: 03.15
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Topic: General principles of physiology

113. Human beings can synthesize all twenty amino acids the body must have.

FALSE

Bloom's: Level 1. Remember
Learning Outcome: 03.16
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Topic: General principles of physiology

114. An essential nutrient is one necessary for good health that may or may not be synthesized by the body.

FALSE

Bloom's: Level 1. Remember
Learning Outcome: 03.16
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Topic: General principles of physiology

115. Glucose is not considered an essential nutrient because it is not essential for good health.

FALSE

Bloom's: Level 1. Remember
Learning Outcome: 03.16
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Topic: General principles of physiology

116. Fat-soluble vitamins are required for health because they act as coenzymes.

FALSE

Bloom's: Level 1. Remember
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