1. Which of the following statements regarding HORMONES is CORRECT?
   1. they travel through the blood stream
   2. they act quickly
   3. they have only short-term effects on the body
   4. they can bind to receptors on target cells
   5. they only affect cells that are close by
2. Neurons communicate primarily using which of the following?
   1. proteins
   2. hormones
   3. cytokines
   4. neurotransmitters
   5. liposomes
3. The endocrine system primarily communicates using which of the following?
   1. neurotransmitters
   2. hormones
   3. cytokines
   4. proteins
   5. liposomes
4. When a cell releases a signaling molecule that ACTS ON ITSELF, this is said to be \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ signaling.
   1. paracrine
   2. ligand-gated
   3. autocrine
   4. coupled
   5. endocrine
5. OSMOSIS is most accurately described as which of the following?
   1. facilitated diffusion of water
   2. the diffusion of water molecules
   3. pinocytosis or 'cell drinking'
   4. receptor-mediated endocytosis
   5. all of the above
6. A cell is placed into a solution with a lot of dissolved particles. There are more solutes outside the cell than inside the cell. Which of the following affects is likely to occur?
   1. Nothing, because it is in an isotonic environment.
   2. The cell SWELLS, because it is in a HYPOTONIC environment.
   3. The cell SHRINKS, because it is in a HYPERTONIC environment.
   4. The cell SHRINKS, because it is in a HYPOTONIC environment.
   5. The cell SWELLS, because it is in a HYPERTONIC environment.
7. Blood plasma is considered part of the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.
   1. interstitial fluid
   2. intracellular fluid
   3. cytosol
   4. extracellular fluid
   5. cytoplasm
8. Which of the following allows for diffusion to occur more QUICKLY?
   1. colder temperatures
   2. having larger molecules
   3. decreasing the surface area of the membrane
   4. increasing the permeability of the membrane
   5. all of the above
9. Ligand-gated receptors respond when which of the following occurs?
   1. When there is a change in pressure
   2. When a signaling molecule binds to it
   3. When the voltage reaches threshold
   4. When endocytosis occurs
   5. When the target voltage is reached
10. The heartbeat is coordinated by \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ which connect cardiac muscle cells through cytoplasmic bridges.
    1. tight junctions
    2. gap junctions
    3. desmosomes
    4. cell adhesion molecules
    5. potassium junctions
11. The cell membrane is composed primarily of which of the following?
    1. phospholipids
    2. cholesterol
    3. lipoproteins
    4. carbohydrates
    5. amino acids
12. Which of the following is **NOT** considered "passive transport"?
    1. endocytosis
    2. diffusion
    3. facilitated diffusion
    4. osmosis
    5. a molecule traveling down its concentration gradient
13. In a HYPOTONIC solution, which of the following is TRUE?
    1. There is MORE solute (per unit volume) outside the cell than inside the cell
    2. There are MORE water molecules (per unit volume) inside the cell than outside the cell
    3. The cell will swell due to ions rushing into the cell
    4. The cell will shrink due to ions rushing out of the cell
    5. The cell will swell due to water molecules rushing into the cell
14. Vesicles are enclosed by \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.
    1. secretory molecules
    2. white blood cells
    3. a protective coat
    4. a phospholipid bilayer
    5. hydrophobic proteins
15. White blood cells that "eat" harmful substances, do so by using which of the following methods?
    1. exocytosis
    2. pinocytosis
    3. phagocytosis
    4. facilitated diffusion
    5. osmosis
16. Which of the following is NOT one of the ACTIVE methods used to take substances INTO the cell?
    1. phagocytosis
    2. pinocytosis
    3. endocytosis
    4. facilitated osmosis
    5. receptor-mediated endocytosis
17. Lipids are formed in which of the following organelles?
    1. the nucleolus
    2. the rough ER
    3. the smooth ER
    4. the Golgi body
    5. the nucleolus
18. Gap junctions are PRIMARILY used for which of the following?
    1. limit tissue locomotion
    2. anchor cells together
    3. communication between cells
    4. create a barrier between cells
    5. limit access to white blood cells
19. Which of the following is NOT one of the muscle tissue types?
20. skeletal muscle
21. smooth muscle
22. cardiac muscle
23. contraction muscle
24. none of the above
25. Which of the following is the BEST definition of 'metabolism'?
    1. Metabolism is the breaking down of molecules into usable energy.
    2. Metabolism is ALL of the chemical reactions in the body
    3. Metabolism is the building up of smaller monomers into polymers.
    4. Metabolism is essentially the same thing as 'digestion'
    5. Metabolism is the body’s ability to create heat
26. Similar types of cells come together to form \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.
27. tissues
28. molecules
29. organ systems
30. atoms
31. organs
32. Different tissue types come together to form \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.
33. Cells
34. Molecules
35. Organs
36. Organ Systems
37. Atoms
38. Different organs will work together in the body to provide a specific function in what is called \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ .
39. collective tissues
40. an organ system
41. an organism
42. an organ party
43. Which of the following is considered "the fundamental unit of MATTER"?
44. cells
45. subatomic particles
46. the atomic nucleus
47. atoms
48. organisms
49. Which of the following is considered to be "the fundamental unit of LIFE"?
50. Cells
51. Atoms
52. Molecules
53. Organisms
54. The nucleus of an atom contains which of the following subatomic particles?
55. hydrogen
56. electrons
57. carbon
58. ions
59. protons
60. 96% of all living organisms contain only 4 elements (atoms). Which of the following is NOT one of these 4 atoms?
61. nitrogen
62. carbon
63. oxygen
64. hydrogen
65. calcium
66. There are 4 groups of molecules / macromolecules that are essential to living organisms. Which of the following is NOT one of these molecules?
67. proteins
68. hydrocarbons
69. carbohydrates
70. nucleic acids
71. lipids
72. Bonding between atoms occurs through interactions with which of the following?
73. electrons in the outermost part of the atoms
74. electrons located in the atomic nucleus
75. protons located in the outermost portion of the atom
76. protons located in the atomic nucleus
77. neutrons
78. Which of the following subatomic particles has NO electrical charge?
79. protons
80. electrons
81. neutrons
82. genones
83. metrons
84. Gap junctions are formed using \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ which can open and close.
    1. Connection Molecules
    2. Connexons
    3. Cell Adhesion Proteins
    4. Protein monomers
    5. Phospholipids
85. Most of the water in the body is \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.
    1. Blood plasma
    2. Interstitial fluid
    3. Extracellular fluid
    4. Nucleoplasm
    5. Intracellular fluid
86. Most **extracellular fluid** is in the form of which of the following?
    1. Blood plasma
    2. Cytosol
    3. Intracellular fluid
    4. Interstitial fluid
    5. Nucleoplasm
87. Most cell-to-cell communication occurs by which of the following methods?
    1. by secreting a chemical (ligand) that reversibly binds to a receptor on a target cell
    2. by secreting hormones that travel through the circulatory system
    3. by secreting neurotransmitters which travel to distant cells through the blood stream
    4. by secreting ions into the synapse which opens voltage-gated ion receptors
    5. by secreting molecules in response to physical or osmotic pressure to near-by cells
88. Communication in the nervous system is TERMINATED by which of the following?
    1. Transcommunication
    2. Apoptosis
    3. Transcytosis
    4. Reuptake mechanisms
    5. Phagocytes
89. Intracellular fluid contains a lot less \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ than extracellular fluid.
    1. K+
    2. Na+
    3. Cytosol
    4. Organelles
    5. All of the above
90. Channels that open in response to sensing a specific VOLTAGE are called \_\_\_\_\_\_\_\_\_\_\_\_\_\_.
    1. Ion receptors
    2. Voltage-gated channels
    3. Ligand-gates channels
    4. Pressure-gated channels
    5. Action potential receptors
91. A \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ is a chemical that acts on cells **in the immediate vicinity** of the cell that secreted the signal.
    1. Paracrine signal
    2. Autocrine signal
    3. Endocrine signal
    4. Neurohormonal signal
    5. Transporter signal
92. In passive diffusion, molecules are said to flow \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.
    1. Up their concentration gradient
    2. From areas of lower concentration to areas of higher concentration
    3. Down their concentration gradient
    4. Through channels using energy from ATP
    5. Using membrane vesicles as vehicles
93. Equilibrium is achieved when which of the following occurs?
    1. When the electrochemical gradient reaches its maximum
    2. When the body is sufficiently dehydrated
    3. When the concentration of a substance outside the cell is equal to the concentration inside the cell
    4. When ATP is no longer needed to move substances across the membrane
    5. When membrane vesicles stop forming
94. In the nervous system, communication between cells occurs across a tiny gap between neurons called the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.
    1. Connection
    2. Connexon
    3. Extracellular space
    4. Intermembrane cleft
    5. Synapse
95. **Lipophobic** signaling molecules bind to which of the following?
    1. Receptors located on the **inside** of the cell membrane
    2. Receptors located on the **outside** of the cell membrane
    3. Receptors located on the **inside** of the nuclear membrane
    4. Receptors located on the **outside** of the nuclear membrane
    5. All of the above
96. Which of the following types of signaling molecules causes a SLOWER response in the target cell?
    1. Lipophilic signaling molecules
    2. Lipophobic signaling molecules
    3. Both A and B
    4. None of the above
97. The cyclic AMP second messenger system is triggered by the activation of a \_\_\_\_\_\_\_\_\_\_\_\_\_\_.
    1. Ligand-gated ion channel
    2. Voltage-gated receptor
    3. Cytokine receptor
    4. Intracellular membrane receptor
    5. G-coupled protein receptor
98. In primary active transport, which of the following statements are TRUE?
    1. The energy from ATP is directly needed for this process
    2. A molecule is moved from an areas of lower concentration to higher concentration
    3. A molecule is moved UP its concentration gradient
    4. It is a form of ACTIVE membrane transport
    5. All of the above
99. All carrier-mediated transport demonstrates the following characteristics EXCEPT \_\_\_\_\_\_\_\_\_\_\_.
    1. Specificity
    2. Competition
    3. Plasmolysis
    4. Saturation
    5. None of the above
100. When a group of membrane transporters are working at their maximum rate, which of the following occurs?
     1. Specificity
     2. Competition
     3. Plasmolysis
     4. Saturation
     5. Up-regulation
101. When a molecule known as an “agonist” binds to a receptor, which of the following occurs?
     1. The agonist will mimic the effect of the signaling molecule
     2. The agonist will decrease the effect of the signaling molecule
     3. The agonist will increase the effect of the signaling molecule
     4. The agonist will irreversibly block the signaling molecule from binding
     5. The agonist will reversibly block the signaling molecule from binding
102. Phagocytosis is used to bring bacteria or foreign molecules into a cell where \_\_\_\_\_\_\_\_\_\_\_\_.
     1. It is replicated in the nucleus
     2. It gets recycled in peroxisomes
     3. It is released intact from the cell
     4. It gets permanently quarantined in the Golgi body
     5. It is destroyed in the lysosome
103. Which of the following process is also known as “cell drinking”?
     1. Phagocytosis
     2. Pinocytosis
     3. Exocytosis
     4. Endocytosis
     5. Transcytosis
104. In the epithelium, large molecules can be transported from one side of the tissue to the other side of the tissue using vesicles in a process known as \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.
     1. Phagocytosis
     2. Pinocytosis
     3. Exocytosis
     4. Endocytosis
     5. Transcytosis
105. The pericardial sac/cavity holds which of the following organs?
     1. The brain
     2. The spinal cord
     3. The thorax
     4. The lungs
     5. The heart
106. A tissue lining called the \_\_\_\_\_\_\_\_\_\_\_\_\_\_ lines the abdomen and surrounds the organs within it.
     1. Myotoneum
     2. Endometrium
     3. Peritoneum
     4. Endocardium
     5. Periserosum
107. In the cell membrane allows which of the following substances to freely cross?
     1. Glucose
     2. Water
     3. Sodium ions
     4. Potassium ions
     5. All of the above
108. Phospholipids are considered **ampiphillic** because \_\_\_\_\_\_\_\_\_\_\_\_\_\_.
     1. They are highly selective
     2. They have a hydrophilic region and a hydrophobic region
     3. They create an impenetrable barrier
     4. They allow proteins to move around the membrane
     5. They contain integral membrane proteins
109. The liquid inside of the nucleus is called the \_\_\_\_\_\_\_\_\_\_\_\_\_.
     1. Cytosol
     2. Cytoplasm
     3. Nucleosome
     4. Nucleoplasm
     5. Ground Substance
110. Membrane proteins that span the entire plasma membrane are called which of the following?
     1. Membrane transporters
     2. Glycolipids
     3. Transmembrane proteins
     4. Integral membrane proteins
     5. Phospholipids
111. Properties of living organisms include the ability to \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.
     1. Acquire, transform, store, and use energy
     2. Sense and respond to internal and external environments
     3. Maintain homeostasis through internal control systems with feedback
     4. Reproduce, develop, grow, and die
     5. All of the above
112. Which of the following is NOT one of the MAIN REGIONS of the cell?
     1. The nucleolus
     2. The plasma membrane
     3. The cytoplasm
     4. The nucleus
     5. All of the above are main regions of the cell
113. The nuclear membrane is also known as which of the following?
     1. The nuclei
     2. The nucleolus
     3. The nucleoplasm
     4. The nuclear envelope
     5. All of the above
114. Ribosomes leave the nucleus through which of the following?
     1. Exocytosis
     2. Nuclear pores
     3. The Endoplasmic Reticulum
     4. Synaptic vesicles
     5. Receptor-mediated exocytosis
115. Ribosomes that are NOT located on the rough ER are called \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.
     1. Free ribosomes
     2. Smooth ER ribosomes
     3. Liposomes
     4. Protostomes
     5. Freedom fighters
116. Ribosomes that are located in the cytosol make which of the following substances?
     1. Lipids
     2. Water-soluble proteins
     3. Lipophilic proteins
     4. Hydrophobic proteins
     5. Phospholipids
117. Which of the following is known as “the universal solvent” because it can dissolve more types of substances than anything else?
     1. Acids
     2. Bases
     3. Alcohols
     4. Organic Solvents
     5. Water
118. Water molecules are considered ‘polar’ molecules because of which of the following traits?
     1. They maintain the polar ice caps by keeping the climate stable
     2. They are able to flip over and change conformation
     3. One end is slightly positive while the other end is slightly negative
     4. They are resistance to changes in temperature
     5. They neutralize acidic solutions
119. Toxic substances are broken down in which of the following organelles?
     1. The lysosome
     2. Vesicles
     3. The Golgi body
     4. The peroxisome
     5. The nucleus
120. What happens when ATP becomes ADP?
     1. Energy is released
     2. Energy is used
     3. It becomes toxic
     4. It makes glucose
     5. It releases carbon dioxide
121. The resting membrane potential exists largely due to the work of the \_\_\_\_\_\_\_\_\_\_\_\_\_.
     1. Golgi apparatus
     2. Voltage-gated receptors
     3. Ligand-gated ion channels
     4. Sodium-potassium pump
     5. Synaptic vesicles
122. When smaller molecules are assembled in the body to make larger molecules, this process is categorized as \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.
     1. metabolism
     2. Glycolysis
     3. Oxidative Phosphorylation
     4. Catabolism
     5. Anabolism
123. Which of the following substances would be broken down in a peroxisome?
     1. Macrophages
     2. White blood cells
     3. Free radicals
     4. Protozoans
     5. Metabolites
124. The study of tissues is ***most precisely*** known as which of the following?
     1. Histology
     2. Microscopy
     3. Tisonomy
     4. Treconomy
     5. Microbiology
125. The functional categories of epithelia includes which of the following?
     1. Exchange
     2. Transporting
     3. Protective
     4. Secretory
     5. All of the above
126. Exchange epithelia functions to do which of the following?
     1. Protection
     2. Gas exchange
     3. Store nutrients
     4. Secrete cytokines
     5. Activate the immune system
127. Cilia in epithelial tissue functions to do which of the following?
     1. Absorb nutrients
     2. Moves fluid and particles across the surface of the tissue
     3. Gas exchange
     4. Protection from abrasion
     5. Translocation
128. Peptide bonds are found in which of the following?
     1. Amino acids
     2. Fatty acids
     3. Liposomes
     4. Proteins
     5. ATP
129. Secretory epithelium is found in which of the following?
     1. Gonads
     2. Sweat glands
     3. Thyroid
     4. Salivary glands
     5. All of the above
130. Goblet cells secrete which of the following substances?
     1. Hormones
     2. Oils
     3. Mucous
     4. Sweat
     5. Saliva
131. Which of the following is NOT one of the characteristics of an enzyme?
     1. They are reusable
     2. They are highly specific
     3. They have an active site
     4. They are usually proteins
     5. They become part of the products
132. Which of the following is NOT one of the 3 types of protein fibers that can be found in the ground substance of connective tissues?
     1. Keratin fibers
     2. Collagen fibers
     3. Reticular fibers
     4. Elastic fibers
     5. None of the above
133. The primary cell type of connective tissue proper is the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.
     1. Keratinocyte
     2. Melanocyte
     3. Adipocyte
     4. Fibroblasts
     5. Stem cells
134. When an enzyme gets extremely hot, which of the following is likely to occur?
     1. The enzyme undergoes apoptosis
     2. The enzyme becomes denatured
     3. The enzyme becomes necrotic
     4. The enzyme triggers the immune response
     5. The enzyme becomes irreversibly bound to receptors
135. Most enzymes in the human body function best at which of the following values of pH?
     1. 3.7
     2. 5.0
     3. 7.4
     4. 8.0
     5. 9.5
136. Which of the following types of inhibition occurs when the inhibitor binds ALLOSTERICALLY?
     1. Irreversible inhibition
     2. Reversible inhibition
     3. Competitive inhibition
     4. Non-competitive inhibition
     5. Incomplete inhibition
137. Which of the following is NOT part of cellular respiration?
     1. Oxidative phosphorylation
     2. The Citric Acid Cycle
     3. Kreb’s cycle
     4. Glycolysis
     5. Electron coupling
138. Glycolysis is the process by which \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_-.
     1. One glucose molecule is broken down into 2 pyruvate molecules
     2. ATP is created through the electron transport chain
     3. One glucose molecule become 57 ATP molecules
     4. Glucose monomers are linked together to form polysaccharides
     5. Glucose is transformed into a proton pump
139. Which of the following is a WASTE PRODUCT of cellular respiration?
     1. Free radicals
     2. Peroxide
     3. Carbon dioxide
     4. Hexane
     5. Alcohol
140. Most of the ATP generated in cellular respiration comes from which of the following steps?
     1. Anaerobic respiration
     2. Oxidative phosphorylation
     3. Fermentation
     4. Glycolysis
     5. The Kreb’s cycle
141. Which of the following is NOT one of the 4 connective tissue types?
     1. Adipose tissue
     2. Bone
     3. Blood
     4. Cartilage
     5. Connective Tissue Proper
142. HOW do enzymes speed up chemical reactions?
     1. By releasing the energy trapped in hydrocarbon bonds
     2. By turning ATP into ADP
     3. By reducing the activation energy of the reaction
     4. By releasing kinetic energy to heat up reacting molecules
     5. By denaturing competitive inhibitors
143. Which of the following types of bonds is the STRONGEST?
     1. A polar covalent bond
     2. An ionic bond
     3. Hydrogen bonding
     4. A non-polar covalent bond
     5. A non-covalent bond
144. What is the difference between a ‘saturated fat’ and an ‘unsaturated fat’?
     1. Saturated fats have no double bonds
     2. Saturated fats have less triglyceride
     3. Saturated fats carry less hydrocarbons
     4. Saturated fats have no fatty acids
     5. Saturated fats are not naturally found in nature
145. Which of the following bases are found in DNA but NOT RNA?
     1. Adenine
     2. Cytosine
     3. Thymine
     4. Guanine
     5. Uracil
146. What type of bond exists between base pairs in DNA?
     1. A polar covalent bond
     2. An ionic bond
     3. Hydrogen bonding
     4. A non-polar covalent bond
     5. A phosphodiester bond
147. The sugar molecule RIBOSE is found in which of the following substances?
     1. DNA
     2. ATP
     3. ADP
     4. Starch
     5. RNA
148. What type of bond exists in the “backbone” of both RNA and DNA?
     1. Ester bonds
     2. peptide bonds
     3. glycosidic bonds
     4. non-polar covalent bonds
     5. phosphodiester bonds
149. What is the molecule that ENTERS the Kreb’s cycle?
     1. Adenylyl cyclase
     2. Sodium-potassium ATPase
     3. Acetyl Co-A
     4. Pyruvate
     5. Glucose
150. Enzymes in the body function BEST around which of the following temperatures?
     1. 68 degrees Celsius
     2. 37 degrees Celsius
     3. 82 degrees Celsius
     4. 24 degrees Celsius
     5. 60 degrees Celsius
151. Proteins are formed by linking which of the following monomers together?
     1. Fatty acids
     2. Amino acids
     3. Nucleic acids
     4. Monosaccharides
     5. Simple sugars
152. Which of the following is an example of a polysaccharide?
     1. Starch
     2. Sucrose
     3. Glucose
     4. Maltose
     5. Galactose
153. What type of sugar molecules exists in DNA?
     1. Ribose
     2. Maltose
     3. Deoxyribose
     4. Galactose
     5. Sucrose