

Human Physiology, 15e (Fox)

Chapter 2 Chemical Composition of the Body

- 1) Water makes up _____ of the total body weight of an average adult.
 - A) 50–60%
 - B) 55–65%
 - C) 60–70%
 - D) 65–75%

- 2) Most of the water found in the body is in the _____.
 - A) blood
 - B) intracellular fluid compartment
 - C) extracellular fluid compartment
 - D) blood and extracellular fluid compartment

- 3) Neutrons are uncharged particles found in the nucleus of an atom.

- 4) An element with 5 protons, 5 neutrons, and 5 electrons would have an atomic number of 15.

- 5) The atomic nucleus does NOT contain _____, which are negatively charged subatomic particles.
 - A) protons
 - B) electrons
 - C) neutrons

- 6) An element with 11 neutrons, 11 protons, and 11 electrons would have a mass number of _____.
 - A) 11
 - B) 33
 - C) 22
 - D) 21

- 7) The _____ is the physical space that an electron occupies in an atom.
 - A) nucleus
 - B) orbital
 - C) energy level
 - D) Both orbital and energy level are correct.

- 8) The _____ electrons are the outermost electrons of an atom.
 - A) kernel
 - B) valence
 - C) atomic
 - D) anion

- 9) Isotopes have the same _____ number, but a different _____ number.
A) mass; atomic
B) neutron; mass
C) atomic; mass
D) atomic; proton
- 10) Which of the following is NOT true of isotopes of a given atom?
A) They have the same number of neutrons.
B) They have the same number of protons.
C) They have different atomic masses.
D) All are not true regarding isotopes of a given atom.
- 11) The term "chemical element" refers to the most common isotope of that element.
- 12) Which of the following subatomic particles have negligible mass?
A) Electrons
B) Neutrons
C) Protons
D) Both neutrons and protons are correct.
- 13) Negatively charged ions will migrate towards the anode in an electrical field.
- 14) Hydrogen bonds form between the partially charged atoms of two polar molecules, such as the slightly positively charged hydrogen atom of one water molecule and the slightly negatively charged oxygen atom of another.
- 15) Atoms sharing a pair of electrons form covalent bonds.
- 16) When an atom loses one or more electrons, it _____.
A) becomes positively charged
B) becomes negatively charged
C) is called an anion
D) has no change in its charge
- 17) When an atom gains one or more electrons, it _____.
A) becomes positively charged
B) has no change in its charge
C) is called an anion
D) is called a cation
- 18) An atom with 5 protons, 5 neutrons, and 6 electrons would have a net charge of _____.
A) -1
B) -2
C) +1
D) +2

- 19) The type of bond formed when atoms share electrons unequally is termed _____.
- A) nonpolar covalent
 - B) ionic
 - C) polar covalent
 - D) van der Waals
- 20) Hydration spheres can be formed by compounds which contain _____ bonds.
- A) nonpolar covalent
 - B) polar covalent
 - C) ionic
 - D) Both polar covalent and ionic are correct.
- 21) If a molecule containing primarily ionic bonds is placed in an aqueous solution, it is more likely to retain its structure than a molecule composed primarily of polar covalent bonds.
- 22) Hydrophobic molecules would contain _____ bonds.
- A) nonpolar covalent
 - B) polar covalent
 - C) hydrogen
 - D) ionic
- 23) Surface tension between water molecules occurs because adjacent water molecules form _____ bonds with each other.
- A) nonpolar covalent
 - B) polar covalent
 - C) hydrogen
 - D) ionic
- 24) Bonds that are formed between oxygen and hydrogen atoms within water molecules are called _____.
- A) hydrogen bonds
 - B) ionic bonds
 - C) nonpolar covalent bonds
 - D) polar covalent bonds
- 25) The type of bond found in sodium chloride is _____.
- A) an ionic bond
 - B) a polar covalent bond
 - C) a hydrogen bond
 - D) a nonpolar covalent bond
- 26) What type of bond is formed between potassium and iodine?
- A) Polar covalent bond
 - B) Ionic bond
 - C) Nonpolar covalent bond
 - D) Hydrogen bond

- 27) Which of the following would be most easily broken?
A) A hydrogen bond
B) A nonpolar covalent bond
C) An ionic bond
D) A polar covalent bond
- 28) The pH of a solution is directly proportional to the hydrogen ion concentration of the solution.
- 29) If a substance with a pH of 4 is added to a solution, the pH of that solution will decrease in proportion to the amount of hydrogen ions released into the solution.
- 30) Water molecules form _____ ions when they associate with a hydrogen ion.
A) hydroxide
B) bicarbonate
C) hydronium
D) water
- 31) A solution of a pH above 7 is called _____.
A) acidic
B) neutral
C) basic
D) isotonic
- 32) Bases will _____ protons in a solution.
A) accept
B) donate
C) ignore
D) repel
- 33) The primary buffer in the blood is the _____ buffer.
A) hydronium
B) ammonia
C) phosphate
D) bicarbonate
- 34) If an acid with a pH of 3 is added to a solution, yet the pH of the solution remains relatively stable, the solution must have contained bicarbonate.
- 35) The pH of a solution increases as the _____ ion concentration decreases.
A) hydrogen
B) hydroxide
C) bicarbonate
D) sodium

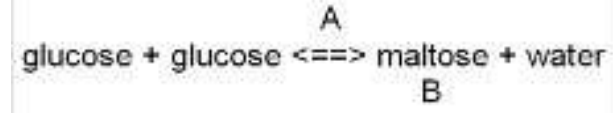
- 36) In an acidic solution, _____.
- A) the OH^- ion concentration is greater than the H^+ ion concentration
 - B) the OH^- ion concentration is less than the H^+ ion concentration
 - C) the H^+ ion concentration is equal to the OH^- ion concentration
 - D) the H^+ ion concentration is less than the OH^- ion concentration only if the solution is buffered
- 37) A blood pH of 7.6 _____.
- A) is indicative of acidosis
 - B) is indicative of alkalosis
 - C) is in the normal physiological range
 - D) indicates effective buffering by the bicarbonate/carbonic acid system
- 38) Regarding acids and bases, _____.
- A) acids will increase the pH of a solution
 - B) bases will decrease the pH of a solution
 - C) acids will accept hydrogen ions in a solution
 - D) bases will accept hydrogen ions in a solution
- 39) Ammonia usually _____.
- A) acts as a base
 - B) acts as an acid
 - C) acts as a buffer
 - D) ionizes to form a hydroxyl ion
- 40) Molecules that contain carbon and hydrogen atoms are _____.
- A) ionic
 - B) inorganic
 - C) organic
 - D) carbonic
- 41) Lactate is an example of an organic acid that has been ionized.
- 42) How many single bonds can a carbon atom form if it is double-bonded to an oxygen atom?
- A) 1
 - B) 2
 - C) 3
 - D) 4
- 43) A six-sided organic molecule with alternating double bonds is termed a(n) _____.
- A) aromatic compound
 - B) ketone
 - C) alcohol
 - D) organic acid

- 44) Ketones contain a(n) _____ group within the carbon chain.
A) hydroxyl
B) carbonyl
C) carboxyl
D) aromatic
- 45) Organic acids will contain _____.
A) a carboxyl group
B) a carbonyl group
C) an amino group
D) a hydroxyl group
- 46) An example of an aromatic substance is _____.
A) hexane
B) cyclohexane
C) fructose
D) benzene
- 47) Molecules with the same atoms, in the same sequence, but arranged differently in space are called _____.
A) structural isomers
B) stereoisomers
C) functional groups
D) aromatic molecules
- 48) Molecules that are mirror images of each other are _____.
A) enantiomers
B) geometric isomers
C) cis/trans isomers
D) structural isomers
- 49) Fatty acids and glucose are the two primary, and preferred sources of energy to create ATP.
- 50) Glucose and lactose are structural isomers that can be used immediately by cells to create ATP.
- 51) Molecules with the same ratio of atoms, but different arrangements of atoms, are known as _____.
A) isotopes
B) structural isomers
C) stereoisomers
D) radioactive isotopes
- 52) Covalent bonds are formed between monosaccharides through dehydration synthesis.

53) The addition of water with the proper enzymes to a molecule is called _____.

- A) dehydration synthesis
- B) condensation
- C) hydrolysis
- D) combustion

54) Which reaction represents a dehydration synthesis reaction?



- A) Reaction A
- B) Reaction B
- C) Both Reaction A and Reaction B are correct.
- D) Neither Reaction A nor Reaction B is correct.

55) Sucrose is a disaccharide that is composed of _____ and _____.

- A) glucose; glucose
- B) glucose; galactose
- C) glucose; fructose
- D) fructose; galactose

56) Which statement regarding glycogen is correct?

- A) Glycogen contains more potential energy for humans than the carbohydrates found in starch.
- B) Glycogen contains more potential energy for humans than cellulose.
- C) Glycogen, but not cellulose, is a polysaccharide eaten and digested by humans.
- D) Glycogen can be comprised of any monosaccharides.

57) An example of a monosaccharide is _____.

- A) maltose
- B) sucrose
- C) glucose
- D) glycogen

58) Despite being a more immediate source of energy for a cell, glucose must be stored as glycogen in order to prevent excess intracellular fluid from accumulating.

59) Which of the following is NOT a disaccharide?

- A) Fructose
- B) Sucrose
- C) Maltose
- D) Lactose

- 60) Which of the following molecules cannot be used as a source of energy for humans?
- A) Glycogen
 - B) Cellulose
 - C) Triglycerides
 - D) Amino acids
- 61) Unsaturated fatty acids contain more hydrogen atoms than saturated fatty acids of the same length.
- 62) If triglycerides are rapidly hydrolyzed in sufficient amounts, blood pH may increase as acidic ketone bodies are formed.
- 63) Steroids are derived from cholesterol.
- 64) In order to maintain proper health, total dietary fat intake should not exceed _____ calories for a 2000 calorie diet.
- A) 100
 - B) 800
 - C) 600
 - D) 400
- 65) Which of the following is NOT a type of lipid?
- A) Prostaglandins
 - B) Triglycerides
 - C) Cholesterol
 - D) Glycogen
- 66) Lipids containing glycerol would include _____ and _____.
- A) triglycerides; steroids
 - B) prostaglandins; phospholipids
 - C) triglycerides; phospholipids
 - D) steroids; prostaglandins
- 67) What molecules are liver-synthesized derivatives of free fatty acids that can be used as an immediate source of energy by many organs?
- A) Glycerols
 - B) Ketone bodies
 - C) Steroids
 - D) Cholesterols
- 68) Prostaglandins are a class of _____ that are involved in _____.
- A) triglyceride; inflammation
 - B) carbohydrate; blood clotting
 - C) fatty acid; cell membrane integrity
 - D) fatty acid; blood clotting

- 69) A molecule that is part polar and part nonpolar is called _____.
- A) an enantiomer
 - B) a ketone body
 - C) unsaturated
 - D) amphipathic
- 70) This group of organic compounds acts as surfactants.
- A) Carbohydrates
 - B) Phospholipids
 - C) Nucleic acids
 - D) Prostaglandins
- 71) In the formation of triglycerides, _____.
- A) hydroxyl and carbonyl groups interact
 - B) amino and carbonyl groups interact
 - C) carboxyl and amino groups interact
 - D) carboxyl and hydroxyl groups interact
- 72) Which of the following is false regarding unsaturated fatty acids?
- A) They contain one or more double bonds.
 - B) They are found in cooking oil rather than a stick of butter.
 - C) All of their hydrogen ions are occupied in double bonds.
 - D) They can be formed from nuts and other plants.
- 73) Which of the following is NOT true of phospholipids?
- A) They are glycolipids originally isolated from the prostate gland.
 - B) They are major components of the cell membrane.
 - C) They have a polar head and a nonpolar tail.
 - D) They are amphipathic molecules.
- 74) Ketosis _____.
- A) occurs when stored fats are rapidly degraded by the body
 - B) stimulates an increased blood pH
 - C) may lead to alkalosis
 - D) occurs as the concentration of ketones in the urine decreases
- 75) Which of the following describes a trans-fat?
- A) Has carbon-carbon single bonds
 - B) Has carbon-carbon double bonds with hydrogens on opposite sides of the bonds
 - C) Has carbon-carbon double bonds with hydrogens on the same side of the bonds
 - D) The fatty acids form a bent chain

- 76) Which of the following is false regarding steroids?
- A) They have three 6-carbon rings joined to one 5-carbon ring.
 - B) They contain a variety of functional groups.
 - C) They are derived from palmitate.
 - D) They differ in the position of the double covalent bonds between the carbon atoms in the rings.
- 77) Which of the following is NOT a derivative of cholesterol?
- A) Corticosteroids
 - B) Vitamin D₃
 - C) Aldosterone
 - D) Insulin
- 78) Phospholipid molecules will form aggregates called _____ when placed in water.
- A) surfactants
 - B) ketone bodies
 - C) prostaglandins
 - D) micelles
- 79) What characteristic of phospholipids allows them to form the double layer seen in cell membranes?
- A) They are amphipathic.
 - B) They are totally nonpolar.
 - C) They are soluble in water.
 - D) They are totally hydrophobic.
- 80) All amino acids contain carboxyl and amino groups.
- 81) The specific sequence of amino acids in a polypeptide is known as the primary protein structure.
- 82) _____ is a structural protein found in tendons and ligaments.
- A) Collagen
 - B) Keratin
 - C) Myosin
 - D) Fibrin
- 83) Peptide bonds are formed by the process of _____.
- A) ketosis
 - B) hydrolysis
 - C) dehydration synthesis
 - D) aromatization

- 84) The secondary structure of proteins is _____.
- A) the linear arrangement of amino acids in the molecule
 - B) alpha helix coils and beta-pleated sheet folds of a protein strand
 - C) due to the interaction between protein subunits
 - D) stabilized when a protein is denatured
- 85) The primary structure of proteins is _____.
- A) the linear arrangement of amino acids in the molecule
 - B) alpha helix coils and beta-pleated sheet folds of a protein strand
 - C) due to the interaction between protein subunits
 - D) stabilized when a protein is denatured
- 86) The subunit of protein is the _____.
- A) fatty acid
 - B) nucleic acid
 - C) amino acid
 - D) carboxylic acid
- 87) What holds a protein in its tertiary structure?
- A) Hydrogen bonds between nearby amino acids
 - B) Weak chemical bonds between widely spaced amino acids
 - C) Disulfide bonds between sulfur groups on cysteines
 - D) Both weak chemical bonds between widely spaced amino acids and disulfide bonds between sulfur groups on cysteines are correct.
- 88) How many amino acids are present for a polypeptide chain to be called a protein?
- A) 3
 - B) 30
 - C) 50
 - D) 100
- 89) The specific shape of a protein determines its function.
- 90) A protein that is combined with another type of molecule, such as a carbohydrate, becomes _____.
- A) conjugated
 - B) denatured
 - C) hydrolyzed
 - D) complemented
- 91) Which of the following is NOT a function of proteins in the body?
- A) Carriers for membrane transport
 - B) Enzymes
 - C) Compose genes
 - D) Receptors for regulator molecules

- 92) Keratin and collagen are considered _____ proteins.
A) functional
B) structural
C) fibrous
D) Both structural and fibrous are correct.
- 93) In DNA, cytosine forms a complementary base pair with adenine.
- 94) The nitrogenous base adenine is a _____.
A) purine
B) pyrimidine
C) steroid
D) prostaglandin
- 95) Which of the following is NOT a component of DNA?
A) Phosphate
B) Deoxyribose sugar
C) Guanine
D) Uracil
- 96) The "spiral staircase" structure of DNA is referred to as the _____.
A) tertiary structure
B) spiral structure
C) double helix
D) twist of life
- 97) Which of the following is NOT one of the three types of RNA?
A) dRNA
B) tRNA
C) rRNA
D) mRNA
- 98) The base that is NOT found in RNA is _____.
A) thymine
B) guanine
C) cytosine
D) uracil
- 99) Which of the following is NOT a difference between DNA and RNA?
A) They have different sugars.
B) RNA is a single strand, while DNA is a double strand.
C) DNA has thymine, while RNA has uracil.
D) They both can leave the nucleus to perform their functions.

100) The backbone of a DNA molecule is a chain of _____.

- A) alternating deoxyribose sugar and phosphate
- B) alternating phosphate and nitrogen
- C) alternating nitrogenous bases
- D) alternating deoxyribose and ribose sugars

101) Which of the following is NOT a function of a purine-containing nucleotide?

- A) Neurotransmitter
- B) Hormone
- C) Energy carrier
- D) Coenzymes