MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

1) Lactose intolerance is the inability to 1) _____
A) digest cellulose. B) digest lactose.
C) produce lactose. D) produce milk proteins.

2) Lactose intolerance 2) _____
A) does not affect the consumption of beverages made from soy or rice.
B) is common in people of all ages, from infancy to adulthood.
C) can currently be treated by gene therapy to treat the underlying cause.
D) is most common in people of European descent.

3) Organic compounds 3) _____
A) always contain nitrogen. B) always contain carbon.
C) are synthesized only by animal cells. D) always contain oxygen.

4) Which of the following statements regarding carbon is *false*? 4) _____
A) Carbon has the ability to bond with up to six other atoms.
B) Carbon has the ability to bond together to form extensive, branched, or unbranched "carbon skeletons."
C) Carbon has the capacity to form single and double bonds.
D) Carbon has a tendency to form covalent bonds.

5) Which of the following statements about hydrocarbons is *false*? 5) _____
A) Hydrocarbons consist of atoms linked by single and double bonds.
B) Hydrocarbons can form straight, branched or ringed structures.
C) Hydrocarbons are inorganic compounds.
D) Hydrocarbons contain only carbon and hydrogen atoms.

6) Propanol and isopropanol are isomers. This means that they have 6) _____
A) different molecular formulas, but the same chemical properties.
B) the same molecular formula, but different chemical properties.
C) the same molecular formula, but represent different states of the compound.
D) the same molecular formula and the same chemical properties.

7) A hydroxyl group is 7) _____
A) characteristic of proteins. B) also called a carbonyl group.
C) characteristic of alcohols. D) basic.

8) Which of the following is a carboxyl group? 8) _____
A) –COOH B) –C=O C) –NH_2 D) –OH

9) Which of the following is an amino group? 9) _____
A) –COOH B) –NH_2 C) –CO D) –OH

10) Which of the following statements about the functional groups of organic compounds is *false*? 10) _____
A) Functional groups participate in chemical reactions.
B) All functional groups include a carbon atom.
C) Many biological molecules have two or more functional groups.
D) Functional groups help make organic compounds hydrophilic.

11) Which of the following contains a carboxyl and an amino group? 11) _____

A) sugars B) vinegar C) amino acids D) fats

12) Which of the following functional groups is capable of regulating gene expression? 12) ______
A) —CH_3 B) —CO C) —OH D) —COOH

13) Which of the following statements about the monomers and polymers found in living organisms is *false*? 13) ______
A) Cells typically make all of their macromolecules from a set of 40–50 common monomers and a few other ingredients that are rare.
B) Monomers serve as building blocks for polymers.
C) The monomers used to make polymers are essentially universal.
D) Monomers are joined together by the process of hydrolysis.

14) Which of the following statements about dehydration synthesis is *false*? 14) ______
A) Animal digestive systems utilize this process to break down food.
B) One monomer loses a hydrogen atom, and the other loses a hydroxyl group.
C) Covalent bonds are formed between the monomers.
D) H_2O is formed as the monomers are joined.

15) The results of dehydration synthesis can be reversed by 15) ______
A) polymerization. B) condensation.
C) the addition of an amino group. D) hydrolysis.

16) What is the general function of enzymes within a cell? 16) ______
A) to induce chemical reactions B) to speed up chemical reactions
C) to stop chemical reactions D) to promote the synthesis of monomers

17) The molecular formula of most monosaccharides represents a multiple of 17) ______
A) CH_3O. B) CH_2O. C) CHO_2. D) CHO.

18) A molecule with the formula $C_{55}H_{110}O_{55}$ is probably a(n) 18) ______
A) steroid. B) polysaccharide. C) oil. D) protein.

19) Many names for sugars end in the suffix 19) ______
A) -acid. B) -ase. C) -hyde. D) -ose.

20) Sucrose is formed 20) ______
A) from two glucose molecules.
B) when glucose and lactose are combined.
C) when ionic bonds link two monosaccharides.
D) from two monosaccharides through dehydration synthesis.

21) A disaccharide forms when 21) ______
A) two monosaccharides join by hydrolysis.
B) two monosaccharides join by dehydration synthesis.
C) two starches join by dehydration synthesis.
D) two starches join by hydrolysis.

22) High-fructose corn syrup is made from corn. The main carbohydrate in corn is a polysaccharide called 22) ______
A) starch. B) fructose. C) hydrocarbon. D) cellulose.

23) Which of the following lists contains *only* polysaccharides? 23) _____

A) cellulose, starch, and glycogen
B) starch, amino acids, and glycogen
C) fructose, cellulose, and glucose
D) sucrose, starch, and cellulose

24) Cellulose differs from starch in that 24) _____

A) starch is made of glucose monomers, whereas cellulose is made of fructose monomers.
B) most animals cannot break down cellulose, whereas starch is easily digested.
C) glycogen is formed by plants and cellulose by animals.
D) cellulose is highly branched, whereas starch is unbranched.

25) Foods that are high in fiber are most likely derived from 25) _____

A) red meats. B) dairy products. C) fish. D) plants.

26) Cows can derive nutrients from cellulose because 26) _____

A) their intestinal tract contains cellulose-hydrolyzing microorganisms.
B) they produce the enzymes that break down cellulose.
C) they chew their food so thoroughly that cellulose fibers are broken down.
D) they convert cellulose into starch, which is easily broken down in the intestinal tract.

27) The storage form of carbohydrates is _____ in animals and _____ in plants. 27) _____

A) glycogen . . . cellulose
B) glycogen . . . starch
C) cellulose . . . glycogen
D) starch . . . glycogen

28) Which of the following organisms contain the polysaccharide chitin? 28) _____

A) animals and plants
B) insects and plants
C) fungi and insects
D) plants and bacteria

29) An oil may be converted into a substance that is solid at room temperature by 29) _____

A) cooling it, so that double bonds form and the fats solidify.
B) removing hydrogens, increasing the number of double bonds.
C) removing water, causing a dehydration synthesis reaction to occur.
D) adding hydrogens, decreasing the number of double bonds in the molecules.

30) A diet high in animal products and hydrogenated vegetable margarine may increase the risk for atherosclerosis. This is because 30) _____

A) most animal fats are saturated and many hydrogenated vegetable margarines contain high levels of trans fats.
B) most animal fats are unsaturated and most hydrogenated vegetable margarines contain high levels of steroids.
C) most animal fats are used for energy storage and most hydrogenated vegetable margarines contain high levels of unsaturated fats.
D) most hydrogenated vegetable margarines are hydrogenated oils and most animal products contain high levels of phospholipids.

31) What feature of fats makes them hydrophobic? 31) _____

A) Fats have polar fatty acids.
B) Fats have carboxyl groups.
C) Fats include one glycerol molecule.
D) Fats have nonpolar hydrocarbon chains.

32) Fatty acids are 32) _____

A) hydrophobic.
B) composed of four linked rings.
C) composed of carbon, hydrogen, and oxygen in a 1:2:1 ratio.

D) composed of carbon, hydrogen, glycerol, and a phosphate group.

33) Which of the following statements regarding triglyceride molecules is *false*? 33) _____
A) Triglycerides consist of three fatty acids attached to a glycerol.
B) Triglycerides are a type of fat.
C) Triglycerides are hydrophilic.
D) Triglycerides play a role in energy storage.

34) Fatty acids with double bonds between some of their carbons are said to be 34) _____
A) monoglycerides. B) completely hydrogenated.
C) saturated. D) unsaturated.

35) The development of atherosclerotic disease can result from a diet high in 35) _____
A) protein. B) saturated fats. C) fiber. D) sugars.

36) If you were to add olive oil to your food as part of a diet to lower your risk of atherosclerotic disease, you would use olive oil that 36) _____
A) is hydrogenated.
B) has lard added to it.
C) is modified to be solid at room temperature.
D) is liquid at room temperature.

37) Which of the following statements about animal cell lipids is *false*? 37) _____
A) Many lipids function as enzymes.
B) Fats are a form of lipid that function to store energy.
C) Cholesterol is a type of lipid that is a component of cell membranes and steroid hormones.
D) Phospholipids are important components of cell membranes.

38) A phospholipid is composed of 38) _____
A) one fatty acid molecule linked to three glycerol molecules.
B) one glycerol molecule linked to one phosphate group and two fatty acids.
C) one fatty acid molecule linked to one glycerol molecule and two phosphate groups.
D) one glycerol molecule linked to three phosphate groups.

39) Which of the following substances is a lipid? 39) _____
A) steroids B) cellulose C) enzymes D) DNA

40) A major type of lipid found in cell membranes is 40) _____
A) waxes. B) phospholipids. C) triglycerides. D) glycerol.

41) Which of the following statements about anabolic steroids is *false*? 41) _____
A) They promote bone growth.
B) They often cause the body to reduce its normal output of sex hormones.
C) They cause a general buildup of muscle mass.
D) They can stimulate mood swings and violent behavior.

42) Amino acids can be distinguished from one another by 42) _____
A) the number of R groups found on the amino acid molecules.
B) the chemical properties of their R groups.
C) the chemical properties of their amino and carboxyl groups.
D) the type of bond between the R group and the rest of the amino acid molecule.

43) Proteins differ from one another because 43) _____
A) each protein contains its own unique sequence of sugar molecules.
B) the sequence of amino acids in the polypeptide chain differs from protein to protein.
C) the peptide bonds linking amino acids differ from protein to protein.
D) the number of nucleotides found in each protein varies from molecule to molecule.

44) Glucose molecules are to starch as _____ are to proteins. 44) _____
A) monosaccharides B) fatty acids
C) oils D) amino acids

45) Peptide bonds 45) _____
A) are formed by a hydrolysis reaction. B) link amino acids.
C) form between fatty acids. D) are used to form amino acids.

46) Which of the following statements about enzymes is *false*? 46) _____
A) They increase the rate of chemical reactions.
B) They are monomers used to build proteins.
C) They regulate virtually all chemical reactions in a cell.
D) They function as chemical catalysts.

47) Which one of the following would be correctly classified as a protein? 47) _____
A) starch B) cholesterol C) enzymes D) cellulose

48) Structural proteins 48) _____
A) are found in hair and tendons.
B) include ovalbumin, a protein found in egg white.
C) include hemoglobin.
D) include receptor molecules.

49) A scientist suspects that the food in an ecosystem may have been contaminated with radioactive nitrogen over a period of months. Which of the following substances could be examined for radioactivity to test the hypothesis? 49) _____
A) the hair produced by humans living in the ecosystem
B) the cell walls of plants growing in the ecosystem
C) the cholesterol in the cell membranes of organisms living in the ecosystem
D) the sugars produced during photosynthesis by plants growing in the ecosystem

50) Which of the following characteristics of protein will remain intact if the protein is denatured? 50) _____
A) the binding properties of the protein B) the function of the protein
C) the shape of the protein D) the number of amino acids in the protein

51) Proteins cannot be denatured by 51) _____
A) changes in salt concentration. B) changes in pH.
C) freezing. D) heat.

52) The primary structure of a protein is 52) _____
A) an α helix or a pleated sheet.
B) maintained by hydrogen bonds.
C) composed of two or more polypeptide chains.
D) the amino acid sequence of the polypeptide chain.

53) Which of the following is an example of secondary structure in a protein? 53) _____

A) a particular amino acid sequence
B) an alpha helix
C) the joining of two polypeptide chains
D) a globular shape

54) The tertiary structure of a polypeptide refers to 54) _____
A) the overall three-dimensional structure.
B) its size.
C) the amino acids of which it is made.
D) the presence of pleated sheets.

55) A protein containing more than one polypeptide chain exhibits the _____ level of protein structure. 55) _____
A) primary B) secondary C) quaternary D) tertiary

56) Mad cow disease serves as an example of how interdependent _____ and _____ are to protein. 56) _____
A) structure . . . function
B) solubility . . . texture
C) form . . . construction
D) adaptability . . . development

57) How are genes used by cells to build proteins? 57) _____
A) The genes in DNA direct the synthesis of an RNA molecule, which is used to build a protein.
B) DNA is transcribed into an amino acid sequence.
C) The genes in RNA direct the synthesis of a DNA molecule, which is used to build a protein.
D) The genes in RNA direct the synthesis of proteins directly.

58) Which of the following statements regarding nucleotides is *false*? 58) _____
A) Nucleotides can be linked together to form nucleic acids.
B) Nucleotides contain lipids.
C) Nucleotides contain nitrogenous bases.
D) Nucleotides contain sugar molecules.

59) Which of the following options correctly pairs a polymer and its monomer? 59) _____
A) RNA, ribose
B) collagen, nucleic acids
C) cellulose, amino acids
D) DNA, nucleotides

60) DNA differs from RNA because DNA 60) _____
A) consists of a single rather than a double polynucleotide strand.
B) contains phosphate groups not found in RNA.
C) contains the sugar ribose rather than the sugar deoxyribose.
D) contains thymine in place of uracil.

61) You work for a company that manufactures food products. A new "wonder food" is being distributed by a rival company. The researchers in your company determine that the "wonder food" contains only carbon, oxygen, and hydrogen. At this point, your researchers can say with certainty that the food 61) _____
A) does not include proteins or nucleic acids.
B) could only be made of triglycerides.
C) could only be made of carbohydrates.
D) includes proteins.

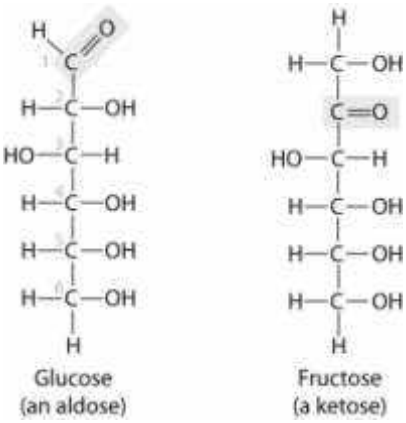
62) In what part of the world did the mutation for lactose tolerance first appear? 62) _____
A) North America
B) Eastern Asia
C) Northern Europe
D) South America

63) Why did the lactose tolerance mutation in the East African herders spread so rapidly within the pop ulation

? 63) ___
___

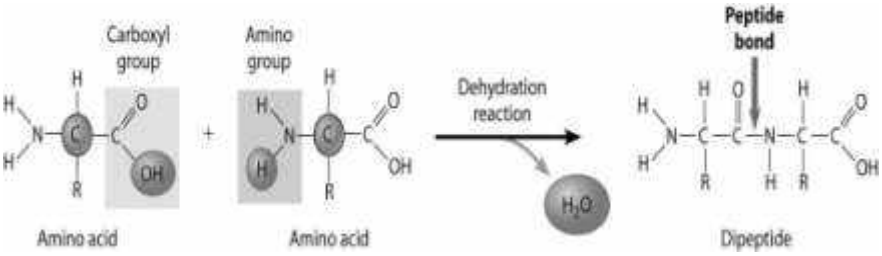
A) Milk provided calcium for strong bones.
B) It was a selective advantage for survival during droughts.
C) Milk was a good source of protein during the winter.
D) Lactose was a better source of energy than glucose.

64) These two molecules are structural isomers. What is the difference between them? 64) _____



A) the number of carbon atoms
B) Only one of them has a double bond between carbon atoms.
C) the number of hydrogen atoms
D) the location of a double-bonded oxygen atom

65) How are these two amino acids attached together? 65) _____



A) through a hydrolysis reaction
B) amino group to carboxylic acid group
C) carboxylic acid group to carboxylic acid group
D) amino group to amino group

After reading the paragraph, answer the question(s) that follow.

You're the manager of a factory that produces enzyme-washed blue jeans (the enzymes lighten the color of the denim, giving a "faded" appearance). When the most recent batch of fabric came out of the enzyme wash, however, the color wasn't light enough to meet your standards. Your quality control laboratory wants to do some tests to determine why the wash enzymes didn't perform as expected.

66) Which hypothesis is most likely to be productive for their initial investigation? 66) _____

A) The three-dimensional structure of the proteins may have been altered.
B) There may not have been enough phospholipids for the volume of fabric.
C) The nucleotide chain of the enzymes may be incorrectly formed.
D) The dye in the fabric may have hydrolyzed the fatty acids in the enzymes.

67) Based on your understanding of enzyme structure, which of the following would you recommend that they also investigate? 67) _____

A) the primary structure of the enzyme
B) how long the fabric has been in storage
C) the manufacturer of the fabric
D) the temperature of the liquid in the washing vat

68) Which of the following statements about cells is *true*? 68) _____

A) All cells are motile.
B) All cells have internal structures that move.
C) All cells are attached to other cells.
D) All cells have cell walls.

69) Light microscopes 69) _____

A) typically provide more resolution than an electron microscope.
B) are generally not used to view bacteria.
C) work by reflecting electrons off the surface of an object being studied.
D) use light and glass lenses to magnify an image.

70) One centimeter = _____ millimeters. 70) _____

A) 10 B) 100 C) 0.01 D) 0.10

71) Resolution is the 71) _____

A) size of an image.
B) ability of an optical instrument to show two close objects as separate.
C) distance between the lenses of a microscope.
D) ability of an optical instrument to magnify an image.

72) Which of the following statements about electron microscopes is *true*? 72) _____

A) Scanning electron microscopes are used to study the details of internal cell structure.
B) Electron microscopes focus electron beams to create a magnified image of an object.
C) Specimens must be sectioned to be viewed under a scanning electron microscope.
D) Transmission electron microscopes are mainly used to study cell surfaces.

73) A scientist wants to examine living cells lining the respiratory tract to determine how the cells use tiny hairs to move dirt and mucus away from the lungs. Which of the following instruments would be best, and why? 73) _____

A) a scanning electron microscope, because it can be used to observe whole cells without slicing them
B) a light microscope, because it allows observations of whole, live cells
C) a scanning electron microscope, because it can reveal structures on cell surfaces
D) a transmission electron microscope, because it has high resolution

74) The idea that all living things are composed of cells and that all cells come from other cells defines 74) _____

A) inheritance of acquired characteristics. B) organelle theory.
C) cell theory. D) the laws of inheritance.

75) A scientist wants to magnify a pollen grain 8,000 times and examine the ridges and pores on its surface. Which one of the following instruments would be best? 75) _____

A) a fluorescence confocal microscope B) a transmission electron microscope

C) a scanning electron microscope D) an inverted light microscope

76) A scanning electron microscope is used to study _____, whereas a transmission electron microscope is used to study _____. 76) _____
A) live cells . . . dead cells B) internal cell structures . . . cell surfaces
C) cell surfaces . . . internal cell structures D) dead cells . . . live cells

77) The diameter of most animal and plant cells ranges from 77) _____
A) 1.0 to 10 micrometers. B) 10 to 100 micrometers.
C) 0.1 to 1.0 micrometers. D) 100 to 1000 micrometers.

78) As cell size increases, the 78) _____
A) volume and surface area decrease.
B) surface area and volume increase at the same rate.
C) surface area increases faster than the volume.
D) volume increases faster than the surface area.

79) Which of the following cells has the greatest surface-to-volume ratio? 79) _____
A) human muscle cell B) human red blood cell
C) ostrich egg D) bacterium

80) A cell is exposed to a substance that prevents it from dividing. The cell becomes larger and larger. This situation 80) _____
A) should present no problem to the cell, because the surface area of the cell will increase as the volume of the cell increases.
B) should present no problem to the cell, since it can continue to perform all other necessary functions.
C) should be beneficial, since the cell will be able to divert the ATP normally used for cell division to other processes.
D) will eventually be problematic, since the cell's ability to absorb nutrients through its outer membrane will not keep increasing as quickly as its cytoplasmic needs.

81) Your throat is dry, and you want the last cough drop in the box to last a long time in your mouth. What should you do? 81) _____
A) Break the cough drop into little pieces and put them all in your mouth. This decreases the surface-to-volume ratio, and slows the dissolution of the cough drop.
B) It doesn't matter if the cough drop is in one piece or many pieces; the total amount of cough drop is all that matters.
C) Break the cough drop into little pieces and put them all in your mouth. Since each little piece must be dissolved separately, the drop will last longer.
D) Keep the cough drop whole. This maintains the largest surface-to-volume ratio, and slows the dissolution of the cough drop.

82) Plasma membranes are permeable to 82) _____
A) nonpolar molecules such as CO_2.
B) hydrophilic molecules such as glucose.
C) large hydrophilic molecules such as starch.
D) small ions such as Na^+.

83) In the plasma membrane, the phospholipid heads 83) _____
A) are hydrophilic and face outward towards the aqueous solution on both sides of the membrane

B) are hydrophobic and face outward towards the aqueous solution on both sides of the membrane
C) are hydrophilic and face inward, shielded from water
D) are hydrophobic and face inward, shielded from water

84) Archaea are composed of _____ cells. 84) _____
A) prokaryotic B) animal C) bacterial D) eukaryotic

85) Which of the following structures is exclusively associated with prokaryotic cells? 85) _____
A) a membrane-bound nucleus B) chromosome
C) ribosomes D) nucleoid

86) The nucleoid region of a prokaryotic cell 86) _____
A) contains the cell's nucleoli. B) is surrounded by a nucleoid membrane.
C) contains the cell's DNA. D) separates the RNA from the cytoplasm.

87) _____ cells lack a membrane-enclosed nucleus. 87) _____
A) Prokaryotic B) Plant C) Fungal D) Eukaryotic

88) A bacterial cell's DNA is found in its 88) _____
A) capsule. B) ribosomes.
C) nucleoid region. D) nucleus.

89) Which of the following structures are used by prokaryotes for attaching to surfaces? 89) _____
A) flagella B) anchoring junctions
C) capsule D) nucleoid

90) The membranous compartmentalization of a cell 90) _____
A) divides the cell into two equal-sized halves.
B) allows different chemical conditions to be maintained in different parts of the cell.
C) is common to both prokaryotes and eukaryotes.
D) requires the presence of a cell wall.

91) Which of the following statements about internal membranes in eukaryotic cells is *false*? 91) _____
A) In eukaryotic cells, internal membranes standardize the internal environment of all cellular organelles.
B) In eukaryotic cells, internal membranes form membranous compartments called organelles.
C) In eukaryotic cells, internal membranes greatly increase a cell's total membrane area.
D) In eukaryotic cells, internal membranes provide an additional area for many metabolic processes to occur.

92) You are told that the cells on a microscope slide are plant, animal, or bacterial. You look at them through a microscope and see cell walls and membrane-bound organelles. You conclude correctly that the cells 92) _____
A) are animal cells. B) are plant cells.
C) are bacterial cells. D) could be either plant or bacterial cells.

93) Unlike animal cells, plant cells have _____ and _____. Unlike plant cells, animal cells have _____. 93) _____
A) centrioles . . . chloroplasts . . . cell walls
B) chloroplasts . . . cell walls . . . centrioles
C) centrioles . . . cell walls . . . large central vacuoles

D) chloroplasts . . . cell walls . . . a nucleus

94) Which of the following statements about cellular metabolism is *false*? 94) _____
A) Cellular metabolism includes different processes that require different conditions.
B) Cellular metabolism often occurs on the surfaces of internal membranes.
C) Cellular metabolism can occur within organelles.
D) Cellular metabolism occurs in animal but not plant cells.

95) The nucleus of a cell 95) _____
A) is contained within the nucleolus.
B) is surrounded by a single layer of membrane.
C) contains DNA.
D) is the primary location of protein synthesis.

96) The complex of proteins and DNA in a nondividing cell is called 96) _____
A) a ribosome. B) a lysosome. C) a nucleolus. D) chromatin.

97) During cell reproduction, chromatin fibers coil up into structures called 97) _____
A) lysosomes. B) chromosomes. C) nucleoli. D) ribosomes.

98) The function of the nucleolus is 98) _____
A) to manufacture polypeptides.
B) to store chromatin.
C) intracellular digestion.
D) to manufacture ribosomal RNA.

99) Protein synthesis requires the use of mRNA, which 99) _____
A) is translated by the ribosomes into the amino acid sequences of proteins.
B) is made in the nucleolus.
C) must be made by the ribosomes.
D) carries the message to the nucleus to synthesize new DNA during cell division.

100) Which location in the cell is unlikely to contain ribosomes or ribosomal subunits? 100) _____
A) nuclear envelope
B) endoplasmic reticulum
C) plasma membrane
D) cytoplasm

101) Which of the following statements regarding the endomembrane system is *false*? 101) _____
A) The endomembrane system is involved in the synthesis, storage, and export of important molecules.
B) The endomembrane system includes the nuclear envelope.
C) The endomembrane system is a system of interrelated membranes that are all physically connected.
D) The endomembrane system includes the rough and smooth endoplasmic reticulum.

102) The endomembrane system includes all of the following organelles *except* the 102) _____
A) endoplasmic reticulum.
B) plasma membrane.
C) Golgi apparatus.
D) peroxisome.

103) An immune system cell called the plasma cell produces thousands of antibodies per second for release into the body. What type of intracellular structure would you expect to be very prominent within the cell? 103) _____
A) nucleus
B) microtubules
C) peroxisome
D) endoplasmic reticulum

104) Smooth endoplasmic reticulum 104) _____
A) helps assemble ribosomes for protein synthesis.
B) is the major site of carbohydrate synthesis in eukaryotic cells.
C) produces proteins for cell membranes.
D) stores calcium ions in muscle cells.

105) The two main functions of the rough endoplasmic reticulum are the production of 105) _____
A) membrane and proteins secreted by the cell.
B) mitochondria and proteins secreted by the cell.
C) ribosomes and steroid hormones.
D) hydrogen peroxide and steroid hormones secreted by the cell.

106) Secretory proteins are 106) _____
A) released from the cell through the plasma membrane.
B) chemically modified in the nucleus.
C) produced by the cell for internal use.
D) produced by ribosomes on the smooth endoplasmic reticulum.

107) The cells that produce hair contain a lot of _____, while the cells that produce the oils that coat the hair contain a lot of _____. 107) _____
A) smooth endoplasmic reticulum . . . rough endoplasmic reticulum
B) microbodies . . . lysosomes
C) smooth endoplasmic reticulum . . . lysosomes
D) rough endoplasmic reticulum . . . smooth endoplasmic reticulum

108) The Golgi apparatus 108) _____
A) is the site of carbohydrate breakdown.
B) strings together amino acids to produce proteins.
C) is composed of stacks of membranous vesicles that are continuous with one another.
D) stores, modifies, and packages proteins.

109) Which of the following statements regarding the Golgi apparatus is *false*? 109) _____
A) The Golgi apparatus serves as a molecular warehouse and finishing factory.
B) The Golgi apparatus decreases in size when a cell increases its protein production.
C) The Golgi apparatus works closely with the endoplasmic reticulum.
D) The Golgi apparatus modifies chemicals received from the endoplasmic reticulum.

110) Which of the following statements about lysosomes is *false*? 110) _____
A) Lysosomes synthesize proteins from the recycled amino acids.
B) Lysosomes help to digest worn-out or damaged organelles.
C) Lysosomes destroy harmful bacteria engulfed by white blood cells.
D) Lysosomes fuse with food vacuoles to expose nutrients to lysosomal enzymes.

111) When a cell is deprived of oxygen, its lysosomes tend to burst and release their contents into the cell. As a result of this, that cell will 111) _____
A) undergo cell division.
B) undergo self-digestion and die.
C) recycle damaged organelles.
D) produce replacement lysosomes.

112) Tay-Sachs disease results from the malfunction of 112) _____
A) nucleoli.
B) lysosomes.
C) mitochondria.
D) endoplasmic reticulum.

113) Tay-Sachs disease 113) _____
A) causes an accumulation of lipids in brain cells.
B) prevents the breakdown of glycogen.
C) is due to the absence of an enzyme that digests polysaccharides.
D) involves damage to liver cells.

114) Which of the following statements about the functions of a plant cell central vacuole is *false*? 114) _____
A) The central vacuole of a plant cell may store poisons.
B) The central vacuole of a plant cell may store waste products.
C) The central vacuole of a plant cell may help increase the size of cells by absorbing water.
D) The central vacuole of a plant cell may digest chemicals for recycling.

115) Contractile vacuoles 115) _____
A) prevent cells from bursting as a result of the influx of excess water.
B) help in the excretion of excess salt.
C) allow organisms to avoid dehydration by absorbing water from the environment.
D) are generally found in protists that inhabit salt water.

116) A manufacturing company dumps its wastes into a nearby pond. One of the wastes is found to paralyze the contractile vacuoles of certain protists. A biologist looking at individual samples of these organisms taken from the pond would find that they 116) _____
A) have gained water and burst.
B) have lost water and shrunk.
C) have died because wastes have built up in the cytoplasm.
D) have died of malnutrition.

117) Which organelle is involved in the catabolism of fatty acids and the detoxification of alcohol? 117) _____
A) smooth ER
B) peroxosome
C) Golgi apparatus
D) ribosomes

118) Insulin is a protein that is produced by pancreatic cells and secreted into the bloodstream. Which of the following options correctly lists the order of the structures through which insulin passes from its production to its exit from the cell? 118) _____
A) rough ER, transport vesicles, Golgi apparatus, vacuole, cell membrane
B) rough ER, Golgi apparatus, smooth ER, cell membrane
C) rough ER, lysosomes, transport vesicles, cell membrane
D) rough ER, transport vesicles, Golgi apparatus, transport vesicles, cell membrane

119) The function of mitochondria is 119) _____
A) cellular respiration.
B) intracellular digestion.
C) lipid synthesis.
D) photosynthesis.

120) Cyanide inhibits mitochondrial function; as a result, the rate of 120) _____
A) photosynthesis increases.
B) protein synthesis increases.
C) ATP synthesis decreases.
D) ATP synthesis increases.

121) The _____ of a mitochondrion is/are an adaptation that increases the surface area and enhances a mitochondrion's ability to produce ATP. 121) _____
A) stroma
B) cristae
C) matrix
D) intermembrane space

122) The function of chloroplasts is 122) _____

A) photosynthesis.
B) intracellular digestion.
C) cellular respiration.
D) lipid synthesis.

123) The stroma is the 123) _____
A) watery fluid enclosed by the inner membrane of a mitochondrion.
B) space between the inner and outer membranes of a mitochondrion.
C) thick fluid enclosed by the inner chloroplast membrane.
D) space between the inner and outer membranes of a chloroplast.

124) Mitochondria differ from chloroplasts in that mitochondria 124) _____
A) contain membrane folds called cristae, whereas chloroplasts contain disk-like vesicles in stacks called grana.
B) convert light energy from the sun to chemical energy, whereas chloroplasts convert one form of chemical energy to another.
C) are not found in plants, whereas chloroplasts are not found in animals.
D) contain three different membrane-bound compartments, whereas chloroplasts contain two.

125) The endosymbiosis hypothesis proposes that 125) _____
A) two cells were juxtaposed and one benefited from the other.
B) a small cell lived inside a larger cell to the benefit of both cells.
C) two cells merged into one cell, improving the enzyme function of the new cell.
D) a large cell engulfed and digested a smaller cell, exposing its enzymes for use by the larger cell.

126) The endosymbiosis hypothesis is supported by all of the following pieces of evidence, *except* the fact that 126) _____
A) chloroplasts reproduce through a splitting process like certain prokaryotes.
B) mitochondria use ATP like prokaryotes.
C) chloroplasts have ribosomes like prokaryotes.
D) mitochondria have circular DNA like prokaryotes.

127) Microfilaments differ from microtubules in that microfilaments 127) _____
A) are found only in plants, whereas microtubules are found in both plant and animal cells.
B) are mainly composed of actin, whereas microtubules are composed of tubulin.
C) are thicker than microtubules.
D) help to anchor organelles, whereas microtubules primarily function to help cells change shape and move.

128) Which of the following statements about the cytoskeleton is *false*? 128) _____
A) The cytoskeleton plays an important role in amoeboid motion.
B) The cytoskeleton is composed of three types of fibers: microfilaments, microtubules, and intermediate filaments.
C) Once laid down, the elements of the cytoskeleton are fixed and remain permanently in place.
D) The cytoskeleton helps to support cells.

129) Intermediate filaments 129) _____
A) guide the movements of chromosomes.
B) support the inner mitochondrial membrane.
C) surround the nucleus.
D) guide the movements of organelles.

130) A drug that interferes with microtubule formation is likely to completely disrupt 130) _____
A) contraction of muscle cells.
B) the movements of sperm cells.
C) the function of lysosomes.
D) the amoeboid motion of a cell.

131) Cilia differ from flagella in that 131) _____
A) the protein filaments of cilia are "naked," while those of flagella are wrapped in an extension of the cell membrane.
B) cilia are typically more numerous and shorter than flagella.
C) cilia are anchored only in the proteins of the cell membrane, while flagella are anchored in a special structure called the basal body.
D) cilia contain nine microtubule doublets surrounding a central pair of microtubules, while flagella contain only nine microtubule doublets.

132) A basal body is 132) _____
A) similar in structure to centrioles.
B) composed of nine microtubule triplets surrounding a central pair of microtubules.
C) composed of nine microtubule doublets surrounding a central pair of microtubules.
D) identical in structure to cilia.

133) Dynein feet 133) _____
A) are the anchoring proteins in basal bodies.
B) are present in cilia but not in flagella.
C) are found on microtubules in cilia and flagella and cause movement by grabbing and pulling at adjacent microtubule doublets.
D) are knobs of carbohydrate that are essential to the movement of cilia and flagella.

134) A woman is having trouble becoming pregnant. Examination of her partner's sperm indicates that dynein feet are missing from the flagella in his sperm cells. A physician explains that this could interfere with fertility by 134) _____
A) preventing the sperm from producing enough energy to power swimming.
B) preventing the sperm from swimming to the egg cell.
C) preventing the sperm from attaching to the egg cell.
D) interfering with the attachment of the flagella to the sperm.

135) Decreased fertility in men from developed countries may be related to 135) _____
A) increased exposure to hormone-like chemicals in the environment.
B) increased sperm motility from multiple flagella.
C) decreased metabolic levels from overexposure to UV rays.
D) decreased flagella motion due to inactivity.

136) Most animal cells are 136) _____
A) attached to each other via plasmodesmata.
B) embedded in a lipid matrix.
C) surrounded by a cell wall.
D) embedded in an extracellular matrix.

137) The extracellular matrix attached to cells via glycoproteins that then bind to _____ in the plasma membrane. 137) _____
A) dynein
B) integrins
C) polysaccharides
D) collagen

138) Which of the following would be most affected by a mutation that prevented cells from forming tight juncti

ons? 138) ____

A) attachment of cells to the surrounding matrix
B) integrity of the inner lining of the digestive tract
C) direct flow of water and small molecules from one cell to another
D) attachment of the cytoskeleton to the inside of the plasma membrane

139) Skin cells are fastened into strong sheets by 139) _____
A) basal bodies. B) tight junctions.
C) anchoring junctions. D) communicating junctions.

140) It is essential for heart muscle cells to beat in a coordinated fashion. The cell junctions that would best facilitate this are 140) _____
A) occluding junctions. B) anchoring junctions.
C) gap junctions. D) tight junctions.

141) Which of the following statements about plant cell walls is *false*? 141) _____
A) Wood is primarily composed of plant cell walls.
B) Plant cell walls protect plant cells by forming an impermeable layer around the cell.
C) Plant cell walls are multilayered structures.
D) Plant cell walls consist of cellulose fibers embedded in a matrix of polysaccharides and proteins.

142) Which of the following statements regarding plasmodesmata is *false*? 142) _____
A) Plasmodesmata penetrate plant cell walls.
B) Plasmodesmata carry chemical messages between plant cells.
C) Plasmodesmata are found in plants as well as some single-celled organisms.
D) Plasmodesmata carry nutrients between plant cells.

143) Which of the following cell structures is associated with the breakdown of harmful substances or substances that are no longer needed by the cell? 143) _____
A) chloroplasts B) peroxisomes C) mitochondria D) centrioles

144) Which of the following statements regarding cells is *false*? 144) _____
A) All cells have DNA as their genetic material.
B) All cells are enclosed in a membrane that maintains internal conditions different from the surroundings.
C) All cells have a cell wall.
D) All cells can interconvert forms of energy.

145) A child dies following a series of chronic bacterial infections. At the autopsy, the physicians are startled to see that the child's white blood cells are loaded with vacuoles containing intact bacteria. Which of the following explanations could account for this finding? 145) _____
A) A defect in the lysosomes of the white blood cells prevented the cells from destroying engulfed bacteria.
B) A defect in the rough endoplasmic reticulum prevented the synthesis of the antibodies (defensive proteins) that would have inactivated the bacteria.
C) A defect in the Golgi apparatus prevented the cells from processing and excreting the bacteria.
D) A defect in the cell walls of the white blood cells permitted bacteria to enter the cells.

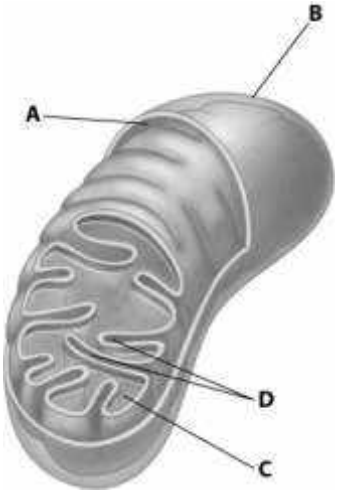
146) According to this figure, which of the following is large enough to see in the light microscope?

146) 

_____

A) viruses B) proteins C) mitochondria D) atoms

147) Which part of the mitochondrion shown enhances its ability to produce ATP by increasing the surface area of a mitochondrial membrane? 147) _____



A) structure A B) structure B C) structure C D) structure D

After reading the paragraph, answer the question(s) that follow.

The skin is the body's largest organ. It's made up of many different types of cells. Oils, produced by the sebaceous glands, prevent the skin from drying and splitting. The protein melanin, produced by melanocytes in the epidermis, protects the skin from the harmful effects of ultraviolet radiation. Sweat, released through ducts to the skin surface, helps to cool the body. The types of cells that produce these compounds have different numbers of specific organelles, depending on their function.

148) Based on their function, you would expect melanocytes in the skin to have a higher than usual number of 148) _____

A) ribosomes. B) microtubules. C) chloroplasts. D) lysosomes.

149) The oil from the sebaceous glands is produced by which of the following cell organelles? 149) _____

A) ribosomes B) smooth endoplasmic reticulum

C) cell membrane D) rough endoplasmic reticulum

1) B
2) A
3) B
4) A
5) C
6) B
7) C
8) A
9) B
10) B
11) C
12) A
13) D
14) A
15) D
16) B
17) B
18) B
19) D
20) D
21) B
22) A
23) A
24) B
25) D
26) A
27) B
28) C
29) D
30) A
31) D
32) A
33) C
34) D
35) B
36) D
37) A
38) B
39) A
40) B
41) A
42) B
43) B
44) D
45) B
46) B
47) C
48) A
49) A
50) D
51) C

52) D
53) B
54) A
55) C
56) A
57) A
58) B
59) D
60) D
61) A
62) C
63) B
64) D
65) B
66) A
67) D
68) B
69) D
70) A
71) B
72) B
73) B
74) C
75) C
76) C
77) B
78) D
79) D
80) D
81) D
82) A
83) A
84) A
85) D
86) C
87) A
88) C
89) C
90) B
91) A
92) B
93) B
94) D
95) C
96) D
97) B
98) D
99) A
100) C
101) C
102) D
103) D

104) D
105) A
106) A
107) D
108) D
109) B
110) A
111) B
112) B
113) A
114) D
115) A
116) A
117) B
118) D
119) A
120) C
121) B
122) A
123) C
124) A
125) B
126) B
127) B
128) C
129) C
130) B
131) B
132) A
133) C
134) B
135) A
136) D
137) B
138) B
139) C
140) C
141) B
142) C
143) B
144) C
145) A
146) C
147) D
148) A
149)

B