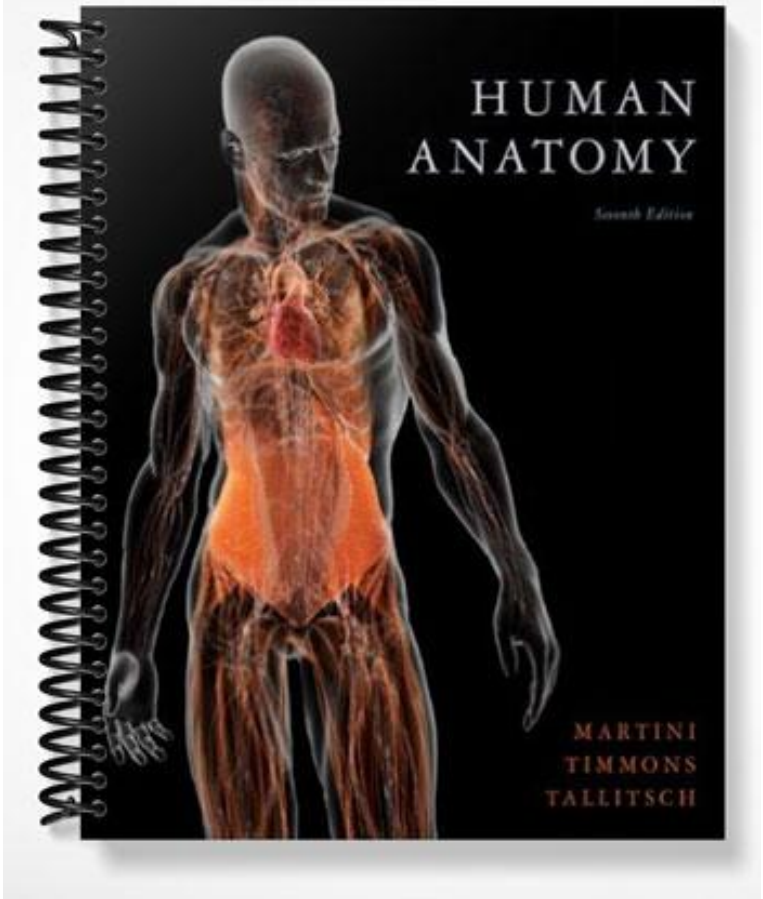
TEST BANK



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

1) The study of the structure and function of cells is 1) _____
A) gross anatomy.
B) biochemistry.
C) cytology.
D) phrenology.
E) electron microscopy.

2) Which of the following shows the fine structure of a plasmalemma (cell membrane) and the details of intracellular structures? 2) _____
A) ultrasound
B) light microscopy
C) transmission electron microscopy
D) scanning electron microscopy
E) magnetic resonance imaging

3) Cells float in a watery medium called 3) _____
A) cellular fluid.
B) extracellular fluid.
C) cytoplasm.
D) cytosol.
E) None of the answers are correct.

4) Which of the following describes phospholipids in the plasmalemma? 4) _____
A) The lipid tails are hydrophobic.
B) The lipid tails are hydrophilic.
C) The heads are on the inside.
D) The tails are at the surface.
E) The phosphate heads are hydrophobic.

5) The viscous, superficial coating on the outer surface of the plasmalemma is called the 5) _____
A) cytosol.
B) glycocalyx.
C) inclusions.
D) pseudopodia.
E) tubulin.

6) How do peripheral proteins contribute to the structure of the plasmalemma? 6) _____
A) Some may function as catalysts or receptor sites to signal through the plasmalemma.
B) They form a structural element by being embedded in the plasmalemma.
C) They are attached to only one side of the membrane.
D) Some form channels to permit passage of water molecules, ions, and small water-soluble compounds into and out of the cell.
E) None of the answers are correct.

7) Substances that enter the cell usually do so through the 7) _____
A) peripheral proteins.
B) integral proteins.
C) glycocalyx.
D) glycolipids.
E) cholesterol.

8) The general functions of the plasmalemma include 8) _____
A) structural support of the cell.
B) physical isolation of the cell contents from the extracellular fluid.
C) regulation of exchange of materials with the environment.
D) sensitivity to changes in the extracellular fluid.
E) All of the answers are correct.

9) Which statement describes how the plasmalemma is used in communication and sensitivity? 9) _____
A) It provides for specialized connections between neighboring cells.
B) It effectively isolates the cytoplasm from the surrounding fluid environment.
C) It serves as a storage site for large amounts of proteins for future use by the cell.
D) It acts as a site for the attachment of glycoproteins and glycolipids, which act as receptors for molecules present in the extracellular fluid.
E) It contains gated channels that can be opened or closed to regulate the passage of materials.

10) Because the plasmalemma blocks some substances and allows others through, it is referred to as being 10) _____
A) impermeable.
B) selectively permeable.
C) freely permeable.
D) structurally rigid.
E) both structurally rigid and selectively permeable.

11) Which of the following is a passive process for material movement across a plasmalemma? 11) _____
A) bulk flow
B) endocytosis
C) facilitated diffusion
D) exocytosis
E) active transport

12) An active process for transporting liquid across a plasmalemma is 12) _____
A) bulk flow.
B) phagocytosis.
C) exchange pumps.
D) pinocytosis.
E) None of the answers are correct.

13) Iron ions and cholesterol are brought into the cell by the process of 13) _____
A) pinocytosis.
B) receptor-mediated pinocytosis.
C) bulk transport.
D) phagocytosis.
E) None of the answers are correct.

14) How does oxygen pass through the plasmalemma? 14) _____
A) always by passive processes
B) always by active transport
C) through membrane channels
D) across the membrane's lipid portion
E) both through membrane channels and always by passive processes

15) Processes involved in the movement of substances across a membrane at the expense of ATP are classified as 15) _____
A) facilitated diffusion.
B) diffusion.
C) osmosis.
D) active transport.
E) filtration.

16) What is the term for water movement across a membrane from high concentration to low concentration? 16) _____
A) osmosis
B) active transport
C) filtration
D) facilitated diffusion
E) None of the answers are correct.

17) The two major cations in the body are 17) _____
A) calcium and sodium.
B) sodium and chloride.
C) chloride and bicarbonate.
D) magnesium and chloride.
E) sodium and potassium.

18) The extracellular fluid contains high amounts of 18) _____
A) amino acids.
B) dissolved and suspended proteins.
C) lipids.
D) sodium ions.
E) potassium ions.

19) Which of the following statements describes cytosol? 19) _____
A) It contains large amounts of carbohydrates.
B) The term encompasses all material inside the cell.
C) It contains much less protein than the extracellular fluid.
D) It includes the intracellular structures known as organelles.
E) The fluid content of the cell.

20) _____ are common inclusions in the cytosol of fat cells. 20) _____
A) Dissolved proteins
B) Lipid droplets
C) Suspended proteins
D) Glycogen granules
E) Metabolic enzymes

21) Which of the following is another name for cytosol? 21) _____
A) gelatin
B) cytoplasm
C) extracellular fluid
D) intracellular fluid
E) interstitial fluid

22) Protein producing organelles are the 22) _____

A) ribosomes.
B) nucleus.
C) Golgi apparatus.
D) lysosomes.
E) mitochondria.

23) Which of the following is a nonmembranous organelle? 23) _____
A) centriole
B) microvilli
C) Golgi apparatus
D) nucleolus
E) All of the answers are correct.

24) The functions of microtubules include 24) _____
A) changing the shape of the cell.
B) moving organelles around the cell.
C) forming small, finger-shaped projections from the plasmalemma.
D) holding open gated channels in the plasmalemma.
E) changing the shape of the cell and moving organelles around the cell.

25) Which of the following is a function of microtubules? 25) _____
A) provide strength to the cell
B) stabilize position of organelles
C) being part of the spindle apparatus
D) assist in DNA replication
E) attaches the plasmolemma to the underlying cytoplasm

26) Which of the following is located in the cytoplasm? 26) _____
A) chromatin B) centriole C) envelope D) DNA E) nucleolus

27) What is the major function of ribosomes? 27) _____
A) manufacture proteins
B) produce ATP
C) reproduce themselves
D) move through the extracellular fluid
E) package proteins

28) Thick filaments 28) _____
A) are called neurofilaments in neurons.
B) interact with actin to produce contractions.
C) are stable structures that do not change once formed.
D) form the spindle apparatus during cell division.
E) form intermediate filaments to stabilize organelle position.

29) If a cell lacked centrioles, it would be unable to 29) _____
A) move fluids or solutes across the plasmalemma.
B) move through the surrounding fluid.
C) direct the movement of chromosomes during cell division.
D) replicate its own DNA.
E) manufacture proteins.

30) Which statement describes cytoplasmic vesicles? 30) _____

A) Contents are toxic to the cell.
B) They are formed by all types of endocytosis.
C) They never contain extracellular fluids.
D) They have a membrane that is very different from the plasmalemma.
E) They only contain solids.

31) Which cellular operation occurs in the smooth endoplasmic reticulum? 31) _____
A) synthesis of RNA
B) regulation of protein synthesis
C) DNA replication leading to cell division
D) synthesis of ribosomes via nucleoli
E) manufacture of carbohydrates and lipids

32) The nucleus of a cell 32) _____
A) is surrounded by a double membrane.
B) is completely enclosed with no way in or out.
C) contains only the DNA.
D) it contains large proteins that form chromosomes and are the genetic material for the cell.
E) has all of the above attributes.

33) Which of the following is a vesicle? 33) _____
A) lysosome
B) tight junction
C) hyaluronan
D) communicating junction
E) anchoring junction

34) Manufactured proteins from the rough endoplasmic reticulum are delivered to the Golgi apparatus by 34) _____
A) bulk transport.
B) transport vesicles.
C) ribosomal RNA.
D) cisternae.
E) None of the answers are correct.

35) Recycling and changing the plasmalemma is the major function of which organelle? 35) _____
A) mitochondria
B) lysosomes
C) peroxisomes
D) Golgi apparatus
E) cytoskeleton

36) Which organelle determines the structural and functional characteristics of the cell by controlling RNA and protein synthesis? 36) _____
A) ribosomes
B) nucleus
C) mitochondria
D) Golgi apparatus
E) endoplasmic reticulum

37) Which of the following allows the nucleus to produce ribosomes? 37) _____
A) nuclear pore

B) nucleoplasm
C) nucleolus
D) nucleosome
E) nuclear envelope

38) Communicating junctions are found in high quantities in the 38) _____
A) bones. B) heart. C) lungs. D) eyes. E) brain.

39) In correct order from beginning to end, cells undergoing mitosis pass through 39) _____
A) telophase, anaphase, metaphase, and prophase.
B) interphase, telophase, metaphase, and prophase.
C) prophase, metaphase, anaphase, and telophase.
D) metaphase, prophase, telophase, and anaphase.
E) anaphase, prophase, interphase, and telophase.

40) Cytokinesis 40) _____
A) usually begins after telophase.
B) completes the process of mitosis.
C) separates the daughter cells after mitosis.
D) is the last phase of mitosis.
E) All of the answers are correct.

41) Which of the following events occur during metaphase? 41) _____
A) Centrioles move apart.
B) Daughter chromosomes move toward the opposite ends of the cell.
C) Microtubules form the spindle apparatus.
D) Chromosomes align at the equator of the cell.
E) All of the answers are correct.

42) Which of the following processes occurs during interphase? 42) _____
A) DNA replicates.
B) Chromatin condenses into chromosomes.
C) The mitotic spindle forms.
D) A cleavage furrow forms.
E) Chromatid pairs separate.

43) Which of the following is true of cell division? 43) _____
A) Protein synthesis in preparation for division occurs during the S phase of interphase.
B) It requires accurate duplication (replication) of the genetic material.
C) It requires mitosis only to produce two daughter cells.
D) Its importance diminishes after an individual grows to maturity.
E) Each dividing cell produces four cells at a time.

44) Which sequence correctly traces the steps of DNA replication? 44) _____
(1) Weak bonds between nitrogenous bases of the DNA are disrupted.
(2) DNA strands unwind.
(3) DNA polymerase binds to exposed nitrogenous bases.
(4) Ligases link together short complementary chains of nucleotides.
(5) Nitrogenous bases of the DNA strand attract complementary nucleotides.
A) 1, 2, 3, 5, 4 B) 5, 4, 3, 2, 1 C) 1, 3, 5, 2, 4 D) 1, 2, 3, 4, 5 E) 4, 2, 3, 1, 5

SHORT ANSWER. Write the word or phrase that best completes each statement or answers the question.

45) The fundamental units of all plant and animal tissues are _____. 45) _____

46) A plasmalemma separates the cell contents, or _____, from the extracellular fluid. 46) _____

47) Peripheral proteins are attached to the surface of the plasmalemma, while _____ proteins are embedded within the membrane. 47) _____

48) The membrane of a cell is composed of a _____ bilayer. 48) _____

49) A phospholipid has two functionally different areas: hydrophilic heads and _____ tails. 49) _____

50) "Little organs" inside a cell that have specialized functions are called _____. 50) _____

51) The main components of the plasmalemma include phospholipids, glycolipids, proteins, and _____. 51) _____

52) The glycocalyx is made of mostly glycoproteins and _____. 52) _____

53) Some integral proteins form _____ that let water molecules, ions, and small water-soluble compounds cross the membrane. 53) _____

54) Channels in the plasmalemma that can open or close to regulate the passage of water, small ions, and water-soluble molecules are called _____ channels. 54) _____

55) Substances that are able to pass directly through the phospholipid bilayer are lipids, lipid-soluble molecules, and _____, such as O_2 and CO_2. 55) _____

56) The term used to describe the property of being able to pass through the membrane is _____. 56) _____

57) Because the plasmalemma is relatively permeable to water, the process of _____ keeps water concentration in the extracellular and intracellular fluids equal. 57) _____

58) Moving a solute or solvent across a membrane against a concentration gradient is a(n) _____ process that requires an expenditure of ATP. 58) _____

59) A passive process that involves movement of substances from an area of higher concentration to an area of lower concentration is called _____. 59) _____

60) An active transport process that produces cytoplasmic vesicles filled with extracellular fluid is called _____. 60) _____

61) The process of engulfing solid objects that may be as large as the cell itself is called _____. 61) _____

62) Compared with extracellular fluid, a sample of _____ has a relatively high concentration of both potassium ions and dissolved or suspended proteins, but little carbohydrate. 62) _____

63) The cytosol contains a high concentration of potassium ions, while the extracellular fluid usually contains a high concentration of _____ ions. 63) _____

64) Microfilaments are slender protein strands, usually composed of the protein _____. 64) _____

65) Microtubules, intermediate filaments, and microfilaments are all part of the cell's _____. 65) _____

66) _____ filaments provide strength, stabilize the position of organelles, and transport materials within the cytoplasm; they are defined by their size rather than composition, which varies from cell to cell. (Note: Be sure the first letter of your answer is capitalized). 66) _____

67) Interaction between the _____ causes a waving or bending that results in the stiffening of microvilli and the cytoskeleton to which they are anchored. 67) _____

68) New membrane is being added continually by the _____, resulting in membrane turnover at the surface of the cell. 68) _____

69) Chemical communication between the nucleus and the cytosol occurs through _____. 69) _____

70) At intervals, DNA coiled around histones forms complexes called _____; these complexes may also coil around other histones. 70) _____

71) The _____ of the cell packages materials for exportation. 71) _____

72) The nucleus is separated from the cytosol by the _____. 72) _____

73) The continual movement and exchange of vesicles to and from the plasmalemma is called _____. 73) _____

74) In the nucleus, DNA strands form large complex structures known as _____. 74) _____

75) The _____ serves as the control center for cellular functions. 75) _____

76) The nucleus contains all the information needed for the synthesis of about 100,000 _____. 76) _____

77) Proteins called _____ are channel proteins that allow the passage of metabolites between neighboring cells. 77) _____

78) When skin cells are shed a few at a time, rather than in the usual large sheets, it can be hypothesized that the _____ junctions that hold them together might have broken down. 78) _____

79) Large areas of opposing plasmalemma may be interconnected by transmembrane proteins called _____ or CAMs. 79) _____

80) A _____ is a cell junction that binds the cell membranes of neighboring cells tightly to one another preventing the passage of material between the cells. 80) _____

81) The process that involves the phases prophase, metaphase, anaphase, and telophase is called _____. 81) _____

82) During _____, chromatid pairs separate and the daughter chromosomes move toward opposite

ends of the cell. 82) ___ ___ ___ ___ _

83) Somatic cells spend the majority of their functional lives in the phase called _____. 83) _____

84) In cells preparing for division, the phase of the life cycle that is most variable in length is _____ of interphase. 84) _____

TRUE/FALSE. Write 'T' if the statement is true and 'F' if the statement is false.

85) A passive process that allows passage of small inorganic ions and lipid-soluble materials in all cell types is called diffusion. 85) _____

86) A passive process that involves the movement of water (solvent) molecules toward solute concentrations across a membrane is called facilitated diffusion. 86) _____

87) A passive process wherein carrier molecules transport materials down concentration gradients across a membrane is called osmosis. 87) _____

88) Endocytosis is an energy-requiring process where vesicles containing fluid or solid materials from the extracellular environment are formed. 88) _____

89) Active transport is an energy-requiring process whereby ions and possibly other materials are moved across a membrane by carrier molecules, which work regardless of any concentration gradients. 89) _____

90) Vesicles that contain oxidases and catalase are called peroxisomes. 90) _____

91) Structures responsible for essential cleanup and recycling functions inside the cell are called lysosomes. 91) _____

92) Organelles that produce most of the ATP required by the cell are called ribosomes. 92) _____

93) The endoplasmic reticulum is the organelle responsible for the synthesis of organic products and provides for intracellular storage and transport. 93) _____

94) The smooth endoplasmic reticulum is the organelle that packages secretory products and renews and modifies plasmalemmae. 94) _____

95) Small packages that move materials between cisternae in the Golgi apparatus are called lysosomes. 95) _____

96) The mitochondrion is enclosed by a double membrane with numerous folds, or cristae, in the inner membrane; the fluid matrix of these organelles contains important metabolic enzymes. 96) _____

ESSAY. Write your answer in the space provided or on a separate sheet of paper.

97) Why is it potentially harmful to give a patient intravenous fluid that is pure water?

98) Solutions A and B are separated by a selectively permeable barrier. Over time, the level of fluid on side A increases. Which solution initially had the higher concentration of solute?

99) Explain why an animal cell without centrioles cannot divide.

100) Predict the consequences of non-functional cilia in the respiratory airways.

101) What is the role of the Golgi apparatus in cellular metabolism?

102) How does the plasmalemma change either over time or in response to modifications in the extracellular fluid?

103) Distinguish between primary and secondary lysosomes; how do they function?

104) How do peroxisomes differ from lysosomes?

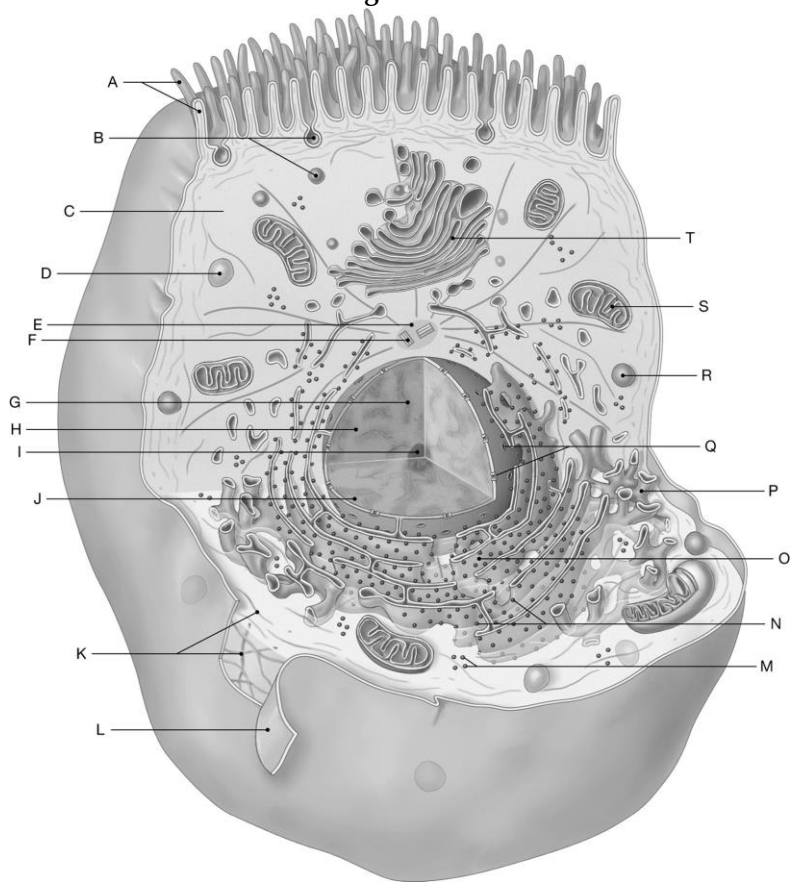
105) How does the structure of a tight junction differ from that of an anchoring junction?

106) What is cytokinesis? What is its role in the cell cycle?

107) Explain why adult animals and plants replace many of their cells throughout their lifetimes.

SHORT ANSWER. Write the word or phrase that best completes each statement or answers the question.

Figure 2.1



Using the figure above, identify the labeled part.

108) Label A: _____ 108) _____

109) Label B: _____ 109) _____

110) Label C: _____ 110) _____

111) Label D: _____ 111) _____

112) Label E: _____ 112) _____

113) Label F: _____ 113) _____

114) Label G: _____ 114) _____

115) Label H: _____ 115) _____

116) Label I: _____ 116) _____

117) Label J: _____ 117) _____

118) Label K: _____ 118) _____

119) Label L: _____ 119) _____

120) Label M: _____ 120) _____

121) Label N: _____ 121) _____

122) Label O: _____ 122) _____

123) Label P: _____ 123) _____

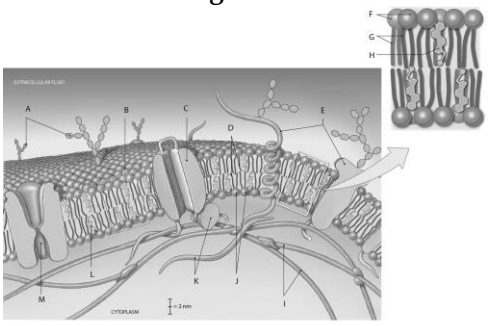
124) Label Q: _____ 124) _____

125) Label R: _____ 125) _____

126) Label S: _____ 126) _____

127) Label T: _____ 127) _____

Figure 2.2



Using the figure above, identify the labeled parts.

128) Label A: _____ 128) _____

129) Label B: _____ 129) _____

130) Label C: _____ 130) _____

131) Label D: _____ 131) _____

132) Label E: _____ 132) _____

133) Label F: _____ 133) _____

134) Label G: _____ 134) _____

135) Label H: _____ 135) _____

136) Label I: _____ 136) _____

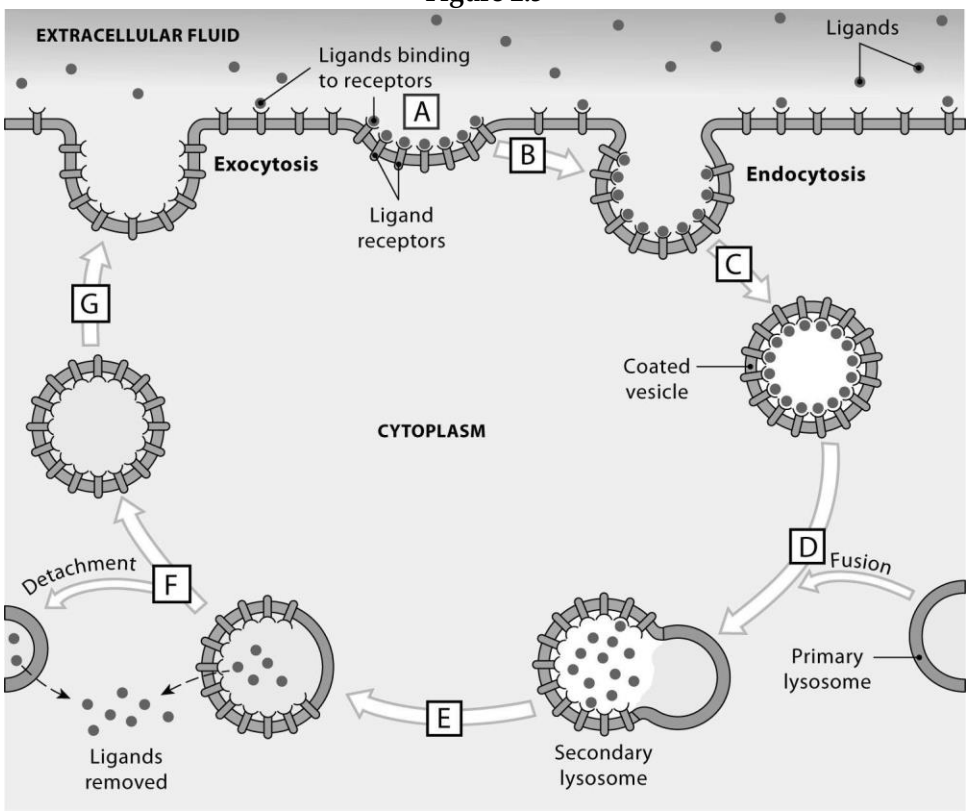
137) Label J: _____ 137) _____

138) Label K: _____ 138) _____

139) Label L: _____ 139) _____

140) Label M: _____ 140) _____

Figure 2.3



Using the figure above, identify the location where each process occurs.

141) Pockets pinch off, forming endosomes known as coated vesicles. 141) _____

142) Coated vesicles fuse with primary lysosomes to form secondary lysosomes. 142) _____

143) Target molecules (ligands) bind to receptors in plasmalemma. 143) _____

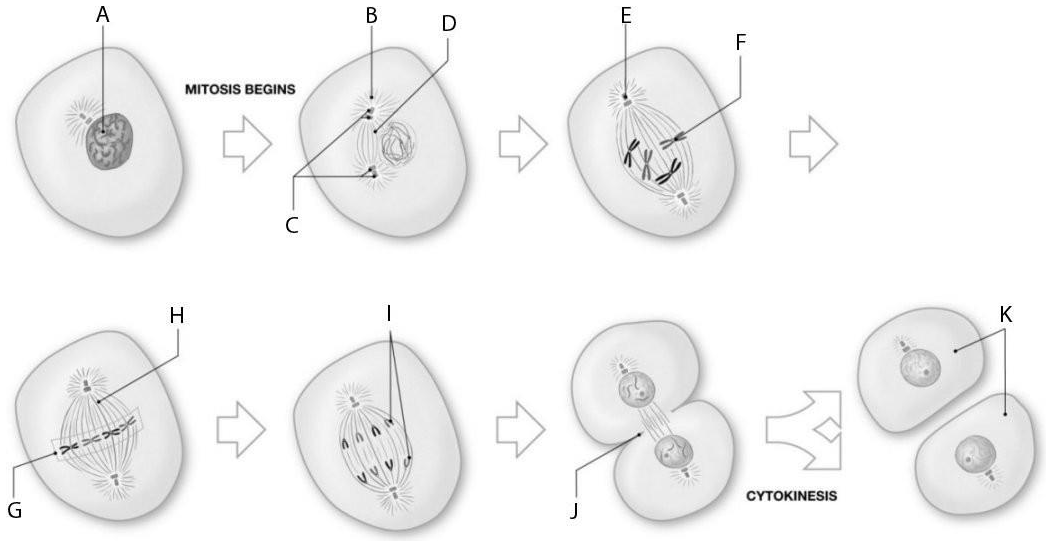
144) The endosome fuses with the plasmalemma, and the receptors are again available for ligand binding. 144) _____

145) The lysosomal and endosomal membranes separate. 145) _____

146) Areas coated with ligands form deep pockets in plasmalemma surface. 146) _____

147) Ligands are removed and absorbed into the cytoplasm. 147) _____

Figure 2.4



Using the figure above, identify the labeled part.

148) Label A: _____ 148) _____

149) Label B: _____ 149) _____

150) Label C: _____ 150) _____

151) Label D: _____ 151) _____

152) Label E: _____ 152) _____

153) Label F: _____ 153) _____

154) Label G: _____ 154) _____

155) Label H: _____ 155) _____

156) Label I: _____ 156) _____

157) Label J: _____ 157) _____

158) Label K: _____ 158) _____

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

52) glycolipids
53) channels
54) gated
55) soluble gases
56) permeability
57) osmosis
58) active
59) diffusion
60) pinocytosis
61) phagocytosis
62) cytosol or intracellular fluid
63) sodium
64) actin
65) cytoskeleton
66) Intermediate
67) microfilaments
68) Golgi apparatus
69) nuclear pores
70) nucleosomes
71) Golgi apparatus
72) nuclear envelope
73) membrane flow
74) chromosomes
75) nucleus
76) proteins
77) communicating junctions
78) anchoring
79) cell adhesion molecules
80) tight junction or occluding junction
81) mitosis
82) anaphase
83) interphase
84) G_1
85) TRUE
86) FALSE
87) FALSE
88) TRUE
89) TRUE
90) TRUE
91) TRUE
92) FALSE
93) TRUE
94) FALSE
95) FALSE
96) TRUE
97) Body fluids are not pure water, they are a mixture of water and solutes. The addition of water without solutes causes an imbalance in the body between the amount of water compared to solute, which dilutes the body fluids.
98) Side A had the higher solute concentration, as osmosis is drawing water to it and out of solution B.
99) Centrioles are a structure used during mitosis of cell division. During metaphase and anaphase the centrioles direct the movement of chromosomes to opposite ends of the cell so that cytokinesis will result in two daughter cells, each containing its own set of chromosomes.
100) Cilia lining the respiratory tract beat in a synchronized manner to move sticky mucus and trapped dust particles

towa rd the throat and away from delicate respiratory surfaces. This cleansing action is lost if the cilia are damaged or immobilized by heavy smoking or some metabolic problem, and the irritants will no longer be removed. As a result, chronic respiratory infections develop.

101) The Golgi apparatus contains enzymes that store, modify, and package the proteins and glycoproteins arriving from the RER via transport vesicles.
102) Membrane turnover is effected by the Golgi apparatus, which continually adds new membrane to the cell surface and can alter the membrane properties as required. In an actively secreting cell, the entire surface area of the plasmalemma may be replaced in as little as an hour.
103) Primary lysosomes contain inactive enzymes; activation of these enzymes occurs when the lysosome fuses with the membrane of damaged organelles. This forms a secondary lysosome, which contains activated enzymes that act to break down the engulfed contents. These contents then either reenter the cytosol (if nutrients) or are eliminated by exocytosis (if toxins or wastes).
104) Peroxisomes are smaller than lysosomes, and they carry different groups of enzymes. Peroxisomes probably originate at the RER, whereas the Golgi apparatus packages enzymes into lysosomes. Peroxisomes absorb and break down fatty acids and other organic compounds; lysosomes perform essential intracellular cleanup, recycling, and defense, all by activating and/or releasing their digestive enzymes under appropriate circumstances.
105) At a tight junction the lipid portions of the opposing plasmalemmas are tightly bound together by interlocking membrane proteins, providing the strongest of intercellular connections; at a anchoring junction, the two plasmalemmas remain distinct but are powerfully attached by CAMs (cell adhesion molecules) and a layer of proteoglycans (intercellular cement), with a dense area of layered proteins inside each plasmalemma reinforcing the junction and binding it to the cell's cytoskeleton.
106) Cytokinesis is the process by which daughter cells complete their physical separation at the end of mitosis. The completion of cytokinesis marks the end of cell division and the beginning of a new cell cycle.
107) Cells can be damaged by physical wear and tear, toxic chemicals, temperature changes, or other environmental hazards. Cells are also lost due to aging and must be replaced.
108) Microvilli
109) Secretory vesicles
110) Cytosol
111) Lysosome
112) Centrosome
113) Centriole
114) Chromatin
115) Nucleoplasm
116) Nucleolus
117) Nuclear envelope surrounding nucleus
118) Cytoskeleton
119) Plasmalemma
120) Free ribosomes
121) Fixed ribosomes
122) Rough endoplasmic reticulum
123) Smooth endoplasmic reticulum
124) Nuclear pores
125) Peroxisome
126) Mitochondrion
127) Golgi apparatus
128) Glycolipids of glycocalyx
129) Phospholipid bilayer
130) Integral protein with channel
131) Hydrophobic tails
132) Integral glycoproteins
133) Hydrophilic heads
134) Hydrophobic tails

135) Cholesterol
136) Cytoskeleton (microfilaments)
137) Hydrophilic heads
138) Peripheral proteins
139) Cholesterol
140) Gated channel
141) C
142) D
143) A
144) G
145) F
146) B
147) E
148) Nucleus
149) Astral rays
150) Centrioles (two pairs)
151) Spindle fibers
152) Centriole
153) Chromosome with two sister chromatids
154) Metaphase plate
155) Chromosomal microtubules
156) Daughter chromosomes
157) Cleavage furrow
158) Daughter cells