Exam

Name_____

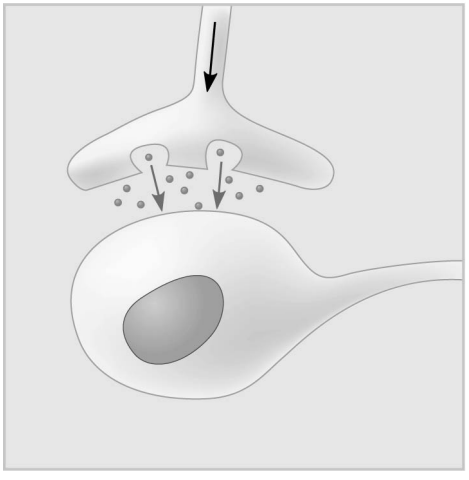
MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

1) Which of the following is a type of local signaling in which a cell secretes a signal molecule that affects neighboring cells? 1) _____
   A) autocrine signaling
   B) hormonal signaling
   C) synaptic signaling
   D) paracrine signaling

2) Hormones are chemical substances produced in one organ that are released into the bloodstream and affect the function of a target organ. For the target organ to respond to a particular hormone, it must _____. 2) _____
   A) have receptors that recognize and bind the hormone molecule
   B) experience an imbalance that disrupts its normal function
   C) be from the same cell type as the organ that produced the hormone
   D) modify its plasma membrane to alter the hormone entering the cytoplasm

3) When a neuron responds to a particular neurotransmitter by opening gated ion channels, the neurotransmitter is serving as which part of the signal pathway? 3) _____
   A) signal molecule
   B) transducer
   C) response molecule
   D) relay molecule

The following questions are based on the accompanying figure.



4) Which of the following types of signaling is represented in the figure? 4) _____
   A) hormonal
   B) autocrine
   C) paracrine
   D) synaptic

5) In the figure, the dots in the space between the two structures represent which of the following? 5) _____
   A) neurotransmitters
   B) receptor molecules
   C) signal transducers
   D) hormones

6) A G-protein receptor with GTP bound to it _____. 6) _____
A) is in its active state
B) signals a protein to maintain its shape and conformation
C) directly affects gene expression
D) will use cGMP as a second messenger

7) One of the major categories of receptors in the plasma membrane reacts by forming dimers, adding phosphate groups, and then activating relay proteins. Which type does this? 7) _____
A) ligand-gated ion channels
B) G protein-coupled receptors
C) steroid receptors
D) receptor tyrosine kinases

8) If an animal cell suddenly lost the ability to produce GTP, what might happen to its signaling system? 8) _____
A) It would be able to carry out reception and transduction but would not be able to respond to a signal.
B) It would employ a transduction pathway directly from an external messenger.
C) It would not be able to activate and inactivate the G protein on the cytoplasmic side of the plasma membrane.
D) It would use ATP instead of GTP to activate and inactivate the G protein on the cytoplasmic side of the plasma membrane.

9) The receptors for steroid hormones are located inside the cell instead of on the membrane surface like most other signal receptors. This is not a problem for steroids because _____. 9) _____
A) steroids must first bond to a steroid activator, forming a complex that then binds to the cell surface
B) the receptors can be readily stimulated to exit and relocate on the membrane surface
C) steroid hormones are lipid soluble, so they can readily diffuse through the lipid bilayer of the cell membrane
D) steroids do not directly affect cells but instead alter the chemistry of blood plasma

10) Which of the following is the best explanation for the inability of a specific animal cell to reduce the Ca^{2+} concentration in its cytosol compared with the extracellular fluid? 10) _____
A) insufficient ATP levels in the cytosol
B) loss of transcription factors
C) low levels of protein kinase in the cell
D) blockage of the synaptic signal

11) Protein kinase is an enzyme that _____. 11) _____
A) functions as a second messenger molecule
B) produces second messenger molecules
C) activates or inactivates other proteins by adding a phosphate group to them
D) serves as a receptor for various signal molecules

12) Which of the following is a correct association? 12) _____
A) GTPase activity and hydrolysis of GTP to GDP
B) adenylyl cyclase activity and the conversion of cAMP to AMP
C) kinase activity and the addition of a tyrosine
D) phosphodiesterase activity and the removal of phosphate groups

13) Put the steps of the process of signal transduction in the order they occur: 13) _____

1. A conformational change in the signal-receptor complex activates an enzyme.
2. Protein kinases are activated.
3. A signal molecule binds to a receptor.
4. Target proteins are phosphorylated.
5. Second messenger molecules are released.

A) 3, 1, 5, 2, 4 B) 3, 1, 2, 4, 5 C) 1, 2, 3, 4, 5 D) 1, 2, 5, 3, 4

14) Transcription factors _____. 14) _____

A) regulate the synthesis of lipids in the cytoplasm
B) transcribe ATP into cAMP
C) control gene expression
D) regulate the synthesis of DNA in response to a signal

15) At puberty, an adolescent female body changes in both structure and function of several organ systems, primarily under the influence of changing concentrations of estrogens and other steroid hormones. How can one hormone, such as estrogen, mediate so many effects? 15) _____

A) Estrogen binds to specific receptors inside many kinds of cells, each with different responses.
B) Each cell responds in the same way when steroids bind to the cell surface.
C) Estrogen is produced in very large concentration by nearly every tissue of the body.
D) Estrogen is kept away from the surface of any cells not able to bind it at the surface.

16) Cells that are infected, damaged, or have reached the end of their functional life span often undergo "programmed cell death." This controlled cell suicide is called apoptosis. Select the appropriate description of this event on a cell's life cycle. 16) _____

A) Each cell organelle has protein signals that initiate the breakdown of the organelle's components which leads to cell death.
B) Apoptosis is regulated by cell surface receptors that signal when a cell has reached its density-dependent limits.
C) During apoptosis, dying cells leak out their contents including digestive enzymes that also destroy healthy cells.
D) During apoptosis, cellular agents chop up the DNA and fragment the organelles and other cytoplasmic components of a cell.

Answer Key
Testname: CH_11_PRACTICE

1) D
2) A
3) A
4) D
5) A
6) A
7) D
8) C
9) C
10) A
11) C
12) A
13) A
14) C
15) A
16) D