

AP Biology Chapter 11 Reading Quiz

- 1) In yeast signal transduction, the yeast cells
 - A) must physically and directly interact.
 - B) produce signal molecules that change themselves so they can interact with one another.
 - C) produce response molecules that diffuse to other yeast cells.
 - D) secrete molecules that result in response by other yeast cells.
 - E) mate, after which the new cells secrete hybrid signals.

- 2) In which of the following ways do plant hormones differ from hormones in animals?
 - A) Plant hormones interact primarily with intracellular receptors.
 - B) Plant hormones may travel in air or through vascular systems.
 - C) Animal hormones are found in much greater concentration.
 - D) Plant hormones are synthesized from two or more distinct molecules.
 - E) Animal hormones are primarily for mating and embryonic development.

- 3) Which of the following is true for the signaling system in an animal cell that lacks the ability to produce GTP?
 - A) It would not be able to activate and inactivate the G protein on the cytoplasmic side of the plasma membrane.
 - B) It could activate only the epinephrine system.
 - C) It would be able to carry out reception and transduction but would not be able to respond to a signal.
 - D) It would use ATP instead of GTP to activate and inactivate the G protein on the cytoplasmic side of the plasma membrane.
 - E) It would employ a transduction pathway directly from an external messenger.

- 4) Testosterone functions inside a cell by
 - A) acting as a signal receptor that activates tyrosine kinases.
 - B) binding with a receptor protein that enters the nucleus and activates specific genes.
 - C) acting as a steroid signal receptor that activates ion channel proteins.
 - D) becoming a second messenger that inhibits adenylyl cyclase.
 - E) coordinating a phosphorylation cascade that increases spermatogenesis.

- 5) Which of the following is true of transcription factors?
 - A) They regulate the synthesis of DNA in response to a signal.
 - B) They transcribe ATP into cAMP.
 - C) They initiate the epinephrine response in animal cells.
 - D) They control gene expression.
 - E) They regulate the synthesis of lipids in the cytoplasm.

- 6) Because most receptors are membrane proteins, which of the following is usually true?
 - A) They lead to changes in intracellular ion concentration.
 - B) They open and close in response to protein signals.
 - C) They are only attached to one membrane surface: exterior or interior.
 - D) They preferentially bind with lipid or glycolipid signal molecules.
 - E) They change their conformation after binding with signal polypeptides.

- 7) Since steroid receptors are located intracellularly, which of the following is true?
 - A) The receptor molecules are themselves lipids or glycolipids.
 - B) The steroid/receptor complex can cross the nuclear membrane.
 - C) The unbound steroid receptors are quickly recycled by lysosomes.
 - D) The concentration of steroid receptors must be relatively high in most cells.
 - E) The receptor molecules are free to move in and out of most organelles.

- 8) The receptors for a group of signaling molecules known as growth factors are often
- A) ligand-gated ion channels.
 - B) G protein-coupled receptors.
 - C) cyclic AMP.
 - D) receptor tyrosine kinases.
 - E) neurotransmitters.
- 9) Which of the following most likely would be an immediate result of growth factor binding to its receptor?
- A) protein kinase activity
 - B) adenylyl cyclase activity
 - C) GTPase activity
 - D) protein phosphatase activity
 - E) phosphorylase activity
- 10) Which of the following is a correct association?
- A) kinase activity and the addition of a tyrosine
 - B) phosphodiesterase activity and the removal of phosphate groups
 - C) GTPase activity and hydrolysis of GTP to GDP
 - D) phosphorylase activity and the catabolism of glucose
 - E) adenylyl cyclase activity and the conversion of cAMP to AMP
- 11) Which of the following amino acids are most frequently phosphorylated by protein kinases in the cytoplasm during signal transduction?
- A) tyrosines
 - B) glycine and histidine
 - C) serine and threonine
 - D) glycine and glutamic acid
 - E) Any of the 20 amino acids are equally phosphorylated.
- 12) Why has *C. elegans* proven to be a useful model for understanding apoptosis?
- A) The animal has as many genes as complex organisms, but finding those responsible is easier than in a more complex organism.
 - B) The nematode undergoes a fixed and easy-to-visualize number of apoptotic events during its normal development.
 - C) This plant has a long-studied aging mechanism that has made understanding its death just a last stage.
 - D) While the organism ages, its cells die progressively until the whole organism is dead.
 - E) All of its genes are constantly being expressed so all of its proteins are available from each cell.
- 13) Which of the following describes the events of apoptosis?
- A) The cell dies, it is lysed, its organelles are phagocytized, and its contents are recycled.
 - B) Its DNA and organelles become fragmented, it dies, and it is phagocytized.
 - C) The cell dies and the presence of its fragmented contents stimulates nearby cells to divide.
 - D) Its DNA and organelles are fragmented, the cell shrinks and forms blebs, and the cell self-digests.
 - E) Its nucleus and organelles are lysed, then the cell enlarges and bursts.
- 14) Phosphorylation cascades involving a series of protein kinases are useful for cellular signal transduction because
- A) they are species specific.
 - B) they always lead to the same cellular response.
 - C) they amplify the original signal manyfold.
 - D) they counter the harmful effects of phosphatases.
 - E) the number of molecules used is small and fixed.

The following questions are based on the figure below:

15) Which of the following types of signaling is represented in the figure?

- A) autocrine
- B) paracrine
- C) hormonal
- D) synaptic
- E) long distance

16) In the figure, the dots in the space between the two structures represent which of the following?

- A) receptor molecules
- B) signal transducers
- C) neurotransmitters
- D) hormones
- E) pheromones



17) Lipid-soluble signaling molecules, such as testosterone, cross the membranes of all cells but affect only target cells because

- A) only target cells retain the appropriate DNA segments.
- B) intracellular receptors are present only in target cells.
- C) most cells lack the Y chromosome required.
- D) only target cells possess the cytosolic enzymes that transduce the testosterone.
- E) only in target cells is testosterone able to initiate the phosphorylation cascade leading to activated transcription factor.

18) Consider this pathway: epinephrine → G protein-coupled receptor → G protein → adenylyl cyclase → cAMP. Identify the second messenger.

- A) cAMP
- B) G protein
- C) GTP
- D) adenylyl cyclase
- E) G protein-coupled receptor

19) Apoptosis involves all but which of the following?

- A) fragmentation of the DNA
- B) cell-signaling pathways
- C) activation of cellular enzymes
- D) lysis of the cell
- E) digestion of cellular contents by scavenger cells