Physiology Test Bank

Pain receptors in the skin are typically classified as which of the following?

A) Encapsulated nerve endings

B) A single class of morphologically specialized receptors

C) The same type of receptor that detects position sense

D) Free nerve endings

Answer:D

Which of the following best describes an expanded tip tactile receptor found in the dermis of hairy skin that is specialized to detect continuously applied touch sensation?

A) Free nerve endings

B) Merkel disc

C) Pacinian corpuscle

D) Ruffini endings

Answer:B

The release of neurotransmitter at a chemical synapse in the central nervous system is dependent upon which of the following?

A) Synthesis of acetylcholinesterase

B) Hyperpolarization of the synaptic terminal

C) Opening of ligand-gated ion calcium channels

D) Influx of calcium into the presynaptic terminal

Answer:D

Which of the following is best described as an elongated, encapsulated receptor found in the dermal pegs of glabrous skin that is especially abundant on lips and

fingertips?

A) Merkel disc

B) Free nerve endings

C) Meissner corpuscle

D) Ruffini endings

Answer:C

Which of the following best describes the concept of

specificity in sensory nerve fibers that transmit only

one modality of sensation?

A) Frequency coding principle

B) Concept of specific nerve energy

C) Singularity principle

D) Labeled line principle

Answer:D

Which of the following is an encapsulated receptor

found deep in the skin throughout the body, as well as

in fascial layers, where it detects indentation of the skin (pressure) and movement across the surface (vibration)?

A) Pacinian corpuscle

B) Meissner's corpuscle

C) Free nerve endings

D) Ruffini endings

Answer:A

The excitatory or inhibitory action of a neurotransmitter is determined by which of the following?

A) The function of its postsynaptic receptor

B) Its molecular composition

C) The shape of the synaptic vesicle in which it is contained

D) The distance between the pre- and postsynaptic membranes

Answer:A

Which statement concerning sensory neurons or their functional properties is true?

A) All sensory fibers are unmyelinated

B) In spatial summation, increasing signal strength is transmitted by using progressively greater numbers of sensory fibers

C) Increased stimulus intensity is signaled by a progressive decrease in the receptor potential

D) Continuous subthreshold stimulation of a pool of

sensory neurons results in disfacilitation of those

neurons

E) Temporal summation involves signaling of increased stimulus strength by decreasing the frequency of action potentials in the sensory fibers

Answer:B

An input neuron to a diverging circuit causes the membrane potential of a target neuron to change from −65

millivolts to −55 millivolts. Which of the following best

describes this change in membrane potential (in millivolts)?

A) Excitatory postsynaptic potential = +10

B) Excitatory postsynaptic potential = −10

C) Inhibitory postsynaptic potential = +10

D) Inhibitory postsynaptic potential = −10

Answer:A

Prolonged changes in neuronal activity are usually

achieved through the activation of which of the following?

A) Voltage-gated chloride channels

B) Transmitter-gated sodium channels

C) G-protein–coupled channels

D) Voltage-gated potassium channels

Answer:C

Which statement concerning the generation of an action potential is correct?

A) When the membrane potential in the soma/axon hillock dips below “threshold,” an action potential is initiated

B) The action potential is initiated in synaptic boutons

C) The least number of voltage-gated sodium channels in an axon is found near the node of Ranvier

D) Once an action potential is initiated, it will always run its course to completion

Answer:D

As the axons of motor neurons leave the spinal cord and course peripherally to skeletal muscle, they must pass through which structure?

A) Posterior column

B) Posterior root

C) Ventral white commissure

D) Posterior horn

E) Anterior root

Answer:E

Which spinal cord level contains the entire population

of preganglionic sympathetic neurons?

A) C5-T1

B) C3-C5

C) S2-S4

D) T1-L3

E) T6-L1

Answer:D

Preganglionic sympathetic axons pass through which

of the following structures?

A) Dorsal root

B) Dorsal primary rami

C) White rami

D) Gray rami

E) Ventral primary rami

Answer:C

Cells of the adrenal medulla receive synaptic input from which type of neuron?

A) Preganglionic sympathetic

B) Postganglionic sympathetic

C) Preganglionic parasympathetic

D) Postsynaptic parasympathetic

E) Presynaptic parasympathetic

Answer:A

In which type of receptor, phasic or tonic, does the receptor potential fall below threshold, even as the stimulus continues?

Answer: Phasic

Adrenergic neurons synthesize which of the following: norepinephrine, epinephrine, ACh, dopamine, L-dopa, serotonin?

Answer: L-dopa, dopamine, norepinephrine

Preganglionic parasympathetic neurons that contribute to the innervation of the descending colon and rectum are found in which structure?

A) Superior cervical ganglion

B) Dorsal motor nucleus of the vagus

C) Superior mesenteric ganglion

D) Ciliary ganglion

E) Spinal cord levels S2 and S3

Answer:E

The sweat glands are innervated by which type of fibers?

A) Cholinergic postganglionic parasympathetic

B) Cholinergic postganglionic sympathetic

C) Adrenergic preganglionic parasympathetic

D) Adrenergic postganglionic sympathetic

E) Adrenergic preganglionic sympathetic

Answer:B

Which of the following actions is/are mediated by β2 receptors: increased heart rate, contraction of gastrointestinal sphincters, contraction of vascular smooth muscle, dilation of airways, relaxation of bladder wall?

Dilation of airways; relaxation of bladder wall

A woman who is taking atropine for a gastrointestinal disorder notices that her pupils are dilated. This has occurred because atropine blocks _____ receptors

Answer: Muscarinic

Which type of cholinergic receptor is found at synapses

between preganglionic and postganglionic neurons of

the sympathetic system?

A) Muscarinic

B) Nicotinic

C) Alpha

D) Beta-1

E) Beta-2

Answer:B

The excitatory or inhibitory effect of a postganglionic

sympathetic fiber is determined by which feature or

structure?

A) Function of the postsynaptic receptor to which it

binds

B) Specific organ innervated

C) Ganglion where the postganglionic fiber originates

D) Ganglion containing the preganglionic fiber

E) Emotional state of the individual

Answer:A

Which of the following is/are characteristic of the parasympathetic nervous system but not of the sympathetic nervous system: ganglia in or near target tissues, nicotinic receptors on postganglionic neurons, muscarinic receptors on some target tissues, β1 receptors on some target tissues, cholinergic preganglionic neurons?

Answer: Ganglia in or near target tissues

Which substance activates adrenergic alpha and beta

receptors equally well?

A) Acetylcholine

B) Norepinephrine

C) Epinephrine

D) Serotonin

E) Dopamine

Answer:C

Nasal, lacrimal, salivary, and gastrointestinal glands are

stimulated by which substance?

A) Acetylcholine

B) Norepinephrine

C) Epinephrine

D) Serotonin

E) Dopamine

Answer:A

The function of which organ or system is dominated by

the sympathetic nervous system?

A) Systemic blood vessels

B) Heart

C) Gastrointestinal gland secretion

D) Salivary glands

E) Gastrointestinal motility

Answer:A

A wide variety of neurotransmitters have been identified

in the cell bodies and afferent synaptic terminals in the

basal ganglia. A deficiency of which transmitter is typically associated with Parkinson's disease?

A) Norepinephrine

B) Dopamine

C) Serotonin

D) GABA

E) Substance P

Answer:B

Some cells secrete chemicals into the extracellular fluid

that act on cells in the same tissue. Which of the following refers to this type of regulation?

A) Neural

B) Endocrine

C) Neuroendocrine

D) Paracrine

E) Autocrine

Answer:D

All of the following describes muscarinic poisoning except:

-**Dilation of pupil**

-sweating

-hyper-salivation

-vomiting and diarrhea

-decreased heart rate

At which phase the conductance of k is at highest?

Relative refractory period

A 10 years old girl has diabetes and here free ending receptors are not appropriate. Which of the following will have high threshold (abnormal)?

Pain and heat

Which of the following causes hyponatremia with over hydration?

Increase ADH

The EPSP and receptors potential share all the following except:

They both open voltage gated channels

Which of the following has the highest velocity of conduction?

-**Aβ**

-Aδ

-C

-III

-IV

What causes depolarization of receptors membrane is?

Receptors potential

What decides if the Neurotransmitter is excitatory or inhibitory?

Receptor

One of the following is correct:

Microtubule transport vesicles

28) Which of the following receptors do not exhibit adaptation:

A. pain receptors

B.pressure receptors

C.touch receptors

D.smell receptors

Answer>> a

Strength of a stimulus determine the amplitude of:

A. action potentials

B. receptor potentials

Answer>>b

A girl has diabetes V that affect free nerve endings, according to this diagnosis, she suffer

problems in:

A. temperature

B. pressure

C. smell

D. pain

Answer>> b (I am not sure)

Larger area of the cortical region (cerebral cortex) has:

A.smaller receptive field

B.smaller number of receptors

Answer>> a

Synaptic fatigue, what is wrong:

A. maintains muscle contraction

Answer >>> a (synaptic fatigue stops muscle contraction)

About sympathetic effect on heart:

Answer>> epinephrine increase permeability to Na+

Another question about sympathetic effect on heart:

Answer>>> increases the slope of depolarization

About SA node:

Answer>> its cell are naturally permeable to Na+ ions

Increase of what of the following pressures increase lymph flow:

Answer>>> interstitial fluid colloid osmotic pressure

True about small neurotransmitters:

Answer>>> their vesicles are recycled

The properties of..... determine whether a transmitter is excitatory or inhibitory:

A. the receptor

B.transmitter itself

Answer>> a

Increase in lymph flow leads to:

Answer>> lower compliance

About nerve impulse on myelinated fiber, what is the wrong?

A. slower than unmyelinated fiber

B. is a saltatory conduction between Schwan cells

C. a+b

Answer>>> c

The predominant ions inside axon of nerve fiber (at resting membrane potential) are:

a. K+ ions

b. Na+ ions

c. Ca+2 ions

Answer>> a

True about receptor potential:

Answer>> local graded change in membrane potential

The three stages of cell signalling are:-

A) paracrine, local, and synaptic

B) reception, transduction, and response

C) transcription, translation, and folding

D) alpha, beta, and gamma

Answer:- B

Each of the following numbered processes are involved in signal transduction pathways:

I. Response

II. Amplification

III. Reception

IV. Transduction

Which of the following represents the sequence of events in a typical signal transduction pathway?

A) I, II, III, IV

B) III, I, IV, II

C) II, IV, I, III

D) III, IV, II, I

Answer:- D

A signal molecule that binds to a plasma-membrane protein is a

A) ligand

B) second messenger

C) protein kinase

D) receptor protein

Answer:- A

What determines whether a signal molecule binds on the surface or enters the cell?

A) size

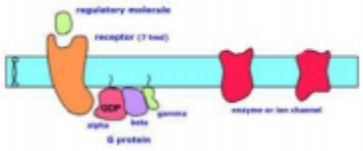
B) polarity

C) ability to cross the membrane

D) all of these are correct

Answer:- D

What type of transmembrane receptor is being shown?



A) G-protein receptor

B) tyrosine kinase receptor

C) gated ion channel

Answer:- A

Protein kinases activate other relay proteins by adding a(n) ____ to them.

A) phosphate

B) ATP molecule

C) cAMP

D) GTP

Answer:- A

Adenylyl cyclase is used in a G-protein pathway to

A) cause ATP to form cAMP

B) add a phosphate to a kinase

C) remove a phosphate from a kinase

D) attract a ligand

Answer:- A

cAMP and calcium are examples of

A) hormones

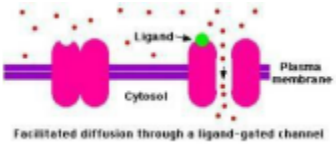
B) ligands

C) enzymes

D) secondary messengers

Answer:- D

What type of transmembrane receptor is being shown?



A) G-protein receptor

B) tyrosine kinase receptor

C) gated ion channel

Answer:- C

Consider this pathway: epinephrine --> receptor --> cAMP --> protein kinase --> transcription factors.

Identify the secondary messenger.

A) epinephrine

B) G protein-coupled receptor

C) adenylyl cyclase

D) cAMP

Answer:- D

What is an organic compound that is made by glands in the body (pituitary, thyroid, etc) that is used in long distance

communication between cells?

A) Hormones

B) Neurotransmitters

C) Synapse

D) Carbohydrates

Answer:- A

Which of the following can activate a protein by transferring a phosphate group to it?

A) cAMP

B) G Protein

C) protein kinase

D) protein phosphatase

Answer:- C

What do second messengers do?

A) transport a signal through the lipid bilayer

B) relay a signal from the outside to the inside of the cell

C) relay message from the inside of the mebrane throughout the cytoplasm

D) dampen the message

Answer:- C

A signal molecule that binds to a plasma-membrane protein is:

A) ligand

B) second messenger

C) protein kinase

D) receptor protein

Answer :- A

What determines whether a cell is a target cell for a particular signal molecule?

A) phosphorylation cascade

B) cAMP

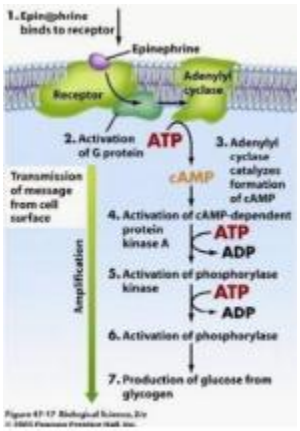
C) signal receptors

D) phosphatase

Answer:- C

Epinephrine (also known as adrenaline or adrenalin) is a hormone and a neurotransmitter. The model for the action of Epinephrine is shown below.

Which of the following molecules act as a second messenger in the cascade by which epinephrine stimulates the activation of the enzyme glycogen phosphorylase?



•A) Adenosine

A) Adenosine

B) Adenylyl cyclase

C) Citric acid

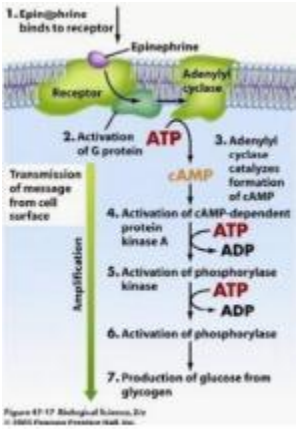
D) Cyclic AMP

Answer:- D

Epinephrine (also known as adrenaline or adrenalin) is a

hormone and a neurotransmitter. The model for the action of Epinephrine is shown below.

Which of the following best describes a benefit of the many steps involved in a protein kinase cascade?



•A) Adenosine

A) It allows for the activation or inhibition of many enzymes.

B) It allows for the amplification of the signal.

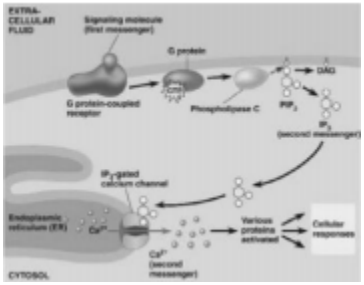
C) It allows for the distribution of the signal throughout the inside of the cell.

D) All of the above.

Answer:- D

G proteins are a family of proteins involved in transmitting chemical signals originating from outside a cell into the inside of the cell. G proteins function as molecular switches.

Which of the following best describes the role in which the G protein is most intimately involved in the process shown above?



A) Production of the ligand molecule.

B) Reception of the signal.

C) Transduction of the signal.

D) Production of response to signal.

Answer:- C

Signal amplification is most often achieved by

A) an enzyme cascade

B) binding of multiple signals

C) branching pathways

D) action of adenylyl cyclase

Answer:- A

What activates adenylyl cyclase?

A) epinephrine binding to it

B) an activated G protein

C) cAMP

D) a protein kinase

Answer:- B

الآن راع تناسق رقم السؤال مع رقم الإجابة:

1)we don't need all the receptors to be bound to their signals to have a high physiological response.
A)true
B)false.

2-Which of the following plasma membrane receptors activate signaling pathways usually by forming molecular dimers that result in protein phosphorylation reactions upon binding of their specific ligand?
a) Steroid hormone receptors
b) Receptor tyrosine kinases
c) Ligand-gated ion channels
d) G protein-coupled receptors

3-Serine, threonine and tyrosine residues are all subjected to phosphorylation in various signal transduction pathways.
a) True
b) False

5-Testosterone functions inside a cell by
A) acting as a signal receptor that activates ion-channel proteins.
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 glycogen metabolism.

6-The most significant difference between a paracrine and an autocrine is
A) the cell that releases it.
B) the cell that responds to it.
C) the method of transport.
D) the route of transport.
E) There are no differences-they are the same.

7-Receptor molecules on the surface of a cell
A) determine that cells response.
B) may allow a particular ligand to bind.
C) bind to all ligands.
D) determine that cell's response and may allow a particular ligand to bind.
E) determine that cell's response and bind to all ligands.

8-Receptor molecules are located
A) only in the outer cell membrane.
B) only in the cytosol.
C) only in the nucleus.
D) only on the cell surface.
E) in all of these places.

9-Inositol triphosphate
A) is a water-insoluble messenger molecule.
B) binds to the calcium channel of the endoplasmic reticulum.
C) is involved in the release of calcium into the cytosol.
D) is a second messenger that is involved in the release of calcium into the cytosol.
E) uses all of the mechanisms.

10-Second messenger molecules directly
A) change the regulation of ion channels.
B) increase intracellular calcium concentration.
C) change enzyme activity.
D) change regulation of gene expression.
E) All of the answers are correct.

11-In chemical communication between cells, a _____ cell secretes a chemical messenger that
binds to _____ on the _____ cell.
A) gap : connexons : secretory
B) secretory : connexons : gap
C) secretory : connexons : target
D) target : receptors : secretory
E) secretory : receptors : target

12-Which type of chemical messenger, when released, binds to receptors on the cell that released the chemical messenger?
A) neurohormone
B) autocrine
C) hormone
D) cytokine
E) neurotransmitter

13-Which type of chemical messenger is released into the bloodstream by an endocrine gland where it can affect target cells throughout the body?
A) paracrine
B) autocrine
C) hormone

D) cytokine
E) neurotransmitter

14-Which of the following chemical messengers is lipophilic?
A) glutamate
B) histamine
C) norepinephrine
D) prostaglandin
E) gamma-aminobutyric acid

15-Which of the following chemical messengers is lipophilic and is therefore able to cross the cell membrane?
A) amino acids
B) amines (excluding thyroid hormone)
C) peptides
D) eicosanoids
E) proteins

16-Which of the following chemical messengers is NOT derived from an amino acid?
A) epinephrine
B) testosterone
C) histamine
D) thyroid hormones
E) serotonin

17-Thyroid hormones are synthesized from what amino acid?
A) glutamate
B) tryptophan
C) tyrosine
D) histidine
E) glycine

18-Once a steroid hormone is synthesized, it is _____.
A) immediately capable of diffusing across the membrane
B) stored in a vesicle until released
C) bound to albumin until released from the cell
D) stored in a unique protein structure that maintains steroids in the cell
E) bound to the mitochondria until released

19-Lipophilic chemical messengers are poorly soluble in water. However, many of these lipophilic messengers are transported throughout the body. Their transport in blood (water) is facilitated by_____.
A) chylomicrons
B) lipoproteins
C) carrier proteins
D) red blood cells
E) white blood cells

20-Which of the following will NOT affect the magnitude of a cell's response to a specific hydrophilic ligand?
A) ligand concentration

B) number of receptors
C) receptor upregulation
D) affinity of the receptor for the ligand
E) lipid solubility of the ligand

21-Lipophilic hormones are transported in blood _____ and bind to receptors located _____.
A) dissolved in the plasma: on the plasma membrane of the target cell
B) dissolved in the plasma: inside the target cell
C) bound to carrier proteins: on the plasma membrane of the target cell
D) bound to carrier proteins: inside the target cell
E) inside red blood cells: inside the target cell

22-The affinity of a receptor for its ligand is a measure of _____.
A) the strength of binding between ligand and receptor
B) the number of binding sites available for the ligand
C) the ability of the ligand to permeate the plasma membrane and reach its receptor
D) the response produced in the target cell when the ligand binds to the receptor
E) the percent of receptors on a specific target cell with bound ligand

23-Differences in the rate of activity between fast and slow ligand-gated channels is caused by_____.
A) ligand selectivity
B) G protein activity gating the fast channel
C) ligands gating both channels to the closed state
D) G protein activity gating the slow channel
E) ligand affinity

24-Which of the following ions can act as a second messenger?
A) sodium only
B) potassium only
C) calcium only
D) both sodium and potassium
E) both sodium and calcium

25-Which of the following statements best describes the function of tyrosine kinase?
A) It catalyzes the formation of dopamine from L-dopa.
B) It catalyzes the formation of norepinephrine from dopamine.
C) It catalyzes the phosphorylation of a protein inside a cell.
D) It catalyzes the phosphorylation of a protein in the extracellular fluid.
E) It sequesters calcium in the cytosol.

26-The function of a second messenger system is to _____.
A) buffer a cells response to a ligand
B) isolate the response to the inside of a cell
C) keep calcium involved in these responses
D) amplify the response of the first messenger
E) facilitate the process of covalent modification of a protein

27-When the alpha subunit of the G protein is activated, it can stimulate ion channels to do what?
A) either open or close
B) open only
C) close only
D) alter the ion that travels through the channel
E) degrade

28-The enzyme that catalyzes synthesis of cAMP is called _____ and is activated by _____.
A) adenylate cyclase : a Gs protein
B) adenylate cyclase : a Gi protein
C) phosphodiesterase : a Gs protein
D) phosphodiesterase : a Gi protein
E) phosphoprotein phosphatase : a Gi protein

29-What enzyme is activated by cAMP?
A) phosphodiesterase
B) adenylate cyclase
C) tyrosine kinase
D) protein kinase A
E) protein kinase C

30-In order to terminate a cAMP-mediated response, the enzyme _____ can be activated to degrade cAMP.
A) cAMP decarboxylase
B) cAMP hydrolase
C) cAMP hydrogenase
D) cAMP phosphodiesterase
E) cAMP protein kinase

31-Which of the following second messengers, when released by phospholipase C, will directly activate the enzyme protein kinase C?
A) inositol triphosphate
B) inositol biphosphate
C) diacylglycerol
D) phosphatidylinositol biphosphate
E) cGMP

32-What molecule, whose synthesis is catalyzed by phospholipase C, triggers the release of calcium from the endoplasmic reticulum?
A) Inositol triphosphate
B) Inositol biphosphate
C) Diacylglycerol
D) Phosphatidylinositol biphosphate
E) cGMP
33-Which of the following proteins is directly activated by a G protein?
A) phospholipase A2
B) adenylate cyclase
C) tyrosine kinase

D) calmodulin
E) protein kinase G

34-Which of the following is a second messenger?
A) cAMP only
B) calcium only
C) inositol triphosphate only
D) both cAMP and inositol triphosphate
E) cAMP, calcium, and inositol triphosphate

True -false

35-Lipophobic chemical messengers communicate a message to the target cell by binding to receptors on that cell's membrane.

36-Tyrosine is one of four amino acids that function directly as chemical messengers.

37-A single cell can have receptors for different messengers.

38-Receptors for lipophilic chemical messengers are only located on the surface of a cell's membrane.

39-Thyroid hormones alter the transcription of mRNA in the target cell.

40-In its active form, a G protein has a GDP bound to its alpha unit.

41-Lipid soluble molecules are not only hydrophobic, but are also _____.

42-Catecholamines, such as dopamine, norepinephrine, and epinephrine, are derived from the amino acid _____.

43-Steroid messengers are derived from what precursor molecule?

44-As free hormones bind to their receptors and no more hormone is released from their cell of origin, the concentration of hormone bound to carrier proteins will (increase / decrease).

45-As the concentration of receptors on the cell membrane decreases, the response of the target cell will (increase / decrease).

46-An enzyme-linked receptor called _____ catalyzes the conversion of GTP to cGMP.

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47-One of the following is false about intracellular receptors
1-Bind with hormone responsive element
2-Act their function as dimmers
3-Take place in gene expression
4-The have extracellular part

5-Have binding site for lipid-soluble hormones

48-One of the following has a X receptor on the cell membrane:
1-NO gas
2-Vitamin D
3-Thyroid
4-Insulin
5-Cortisol
49-G-proteins become active when:
1-GDP-GTP exchange
2-ATP-ADP exchange
3-Alpha subunit is replaced with Beta/Gamma
4-Protein kinase becomes active
5-CAMP concentration increase

50-The following are involved in Epinephrine signal transduction Except
1-Tyrosine kinase linked receptors
2-Beta-adrenergic receptor
3-Alpha-adrenergic receptor
4-CAMP
5-Ca 2 calmodulin

51-The function of IP3 (Inositol triphosphate) is
1-Activates protein kinase C to phosphorylated proteins
2-Convert CGMP to GTP
3-Stimulate G-protein
4-Activates Phospholipase C
5- Binds to a receptor on ER to release Ca

52-Drug Y has been designed to stimulate signal transduction of a G protein coupled receptor (GPCR) and increase CAMP levels, which of the following describe the mechanism
1-Causes irreversible binding of GTP to ai subunit
2-Stimulates Beta-arrestin binding to GPCR
3-Activates protein phosphatases
4-Stimulates activity of phosphodiesterase
5-Causes irreversible binding of GTP to as subunit

53-Which of the following hormones activates Tyrosine kinase linked receptors (TRK)
1-ACTH
2-Parathyroid hormone (PTH)
3-ADH
4-Aldosterone
5-Epidermal growth factor EGF

54-Leptin hormone induces the following signal transduction pathway
1-GPCR-as/ CAMP
2-TRK/JAK/STAT
3-GPCR-aq/ CAMP
4-Ca 2 /calmodulin
5-GPCR-ai/ CAMP

55-The affinity of a receptor for its ligand is a measure of _____.
A) the strength of binding between ligand and receptor
B) the number of binding sites available for the ligand
C) the ability of the ligand to permeate the plasma membrane and reach its receptor
D) the response produced in the target cell when the ligand binds to the receptor
E) the percent of receptors on a specific target cell with bound ligand

56-Slow gated channels are identified as such because, once the receptor is bound by the ligand,the receptor must first activate a(n) _____ prior to the channel opening or closing.
A) G protein
B) ion channel
C) enzyme
D) RNA polymerase
E) hormone response element

57-Differences in the rate of activity between fast and slow ligand-gated channels is caused by_____.
A) ligand selectivity
B) G protein activity gating the fast channel
C) ligands gating both channels to the closed state
D) G protein activity gating the slow channel
E) ligand affinity
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C) calcium only
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E) both sodium and calcium

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A) It catalyzes the formation of dopamine from L-dopa.
B) It catalyzes the formation of norepinephrine from dopamine.
C) It catalyzes the phosphorylation of a protein inside a cell.
D) It catalyzes the phosphorylation of a protein in the extracellular fluid.
E) It sequesters calcium in the cytosol.

60-The function of a second messenger system is to _____.
A) buffer a cells response to a ligand
B) isolate the response to the inside of a cell
C) keep calcium involved in these responses
D) amplify the response of the first messenger
E) facilitate the process of covalent modification of a protein
61-When the alpha subunit of the G protein is activated, it can stimulate ion channels to do what?
A) either open or close
B) open only
C) close only
D) alter the ion that travels through the channel
E) degrade

62-The enzyme that catalyzes synthesis of cAMP is called _____ and is activated by _____.
A) adenylate cyclase : a Gs protein
B) adenylate cyclase : a Gi protein
C) phosphodiesterase : a Gs protein
D) phosphodiesterase : a Gi protein
E) phosphoprotein phosphatase : a Gi protein

63-What enzyme is activated by cAMP?
A) phosphodiesterase
B) adenylate cyclase
C) tyrosine kinase
D) protein kinase A
E) protein kinase C

64-In order to terminate a cAMP-mediated response, the enzyme _____ can be activated to degrade cAMP.
A) cAMP decarboxylase
B) cAMP hydrolase
C) cAMP hydrogenase
D) cAMP phosphodiesterase
E) cAMP protein kinase

65-Which of the following second messengers, when released by phospholipase C, will directly activate the enzyme protein kinase C?
A) inositol triphosphate
B) inositol biphosphate
C) diacylglycerol
D) phosphatidylinositol biphosphate
E) cGMP

66-What molecule, whose synthesis is catalyzed by phospholipase C, triggers the release of calcium from the endoplasmic reticulum?
A) Inositol triphosphate
B) Inositol biphosphate
C) Diacylglycerol
D) Phosphatidylinositol biphosphate
E) cGMP

67-Which of the following proteins is directly activated by a G protein?
A) phospholipase A2
B) adenylate cyclase
C) tyrosine kinase
D) calmodulin
E) protein kinase G

68-Which of the following describes the signal transduction mechanism for estrogen, a steroid hormone?
A) opening of fast ligand-gated channels
B) activation of enzyme-linked receptor
C) activation of cAMP second messenger system

D) opening or closing of fast ligand-gated channels
E) altering transcription of mRNA

69-Which of the following is a second messenger?
A) cAMP only
B) calcium only
C) inositol triphosphate only
D) both cAMP and inositol triphosphate
E) cAMP, calcium, and inositol triphosphate

70-Match the chemical messenger with its correct description.
1) Diffuses to neighboring cells to exert an effect.
2) Released from endocrine glands into the bloodstream.
3) Released by a presynaptic
A) neurotransmitter
B) paracrine
C) hormone

71-Match the chemical property to the messenger.
1- Catecholamines
2-Peptides/proteins.
3-Steroids
4-Thyroid hormones.
5- Eicosanoids
A) lipophobic
B) lipophilic
72-A (paracrine / hormone) is transported in the bloodstream.

73-Histamine is an example of a (paracrine / hormone).

74-Lipid soluble molecules are not only hydrophobic, but are also _____.

75-Catecholamines, such as dopamine, norepinephrine, and epinephrine, are derived from the amino acid _____.

76-Steroids are released from the secretory cell by (diffusion / exocytosis).

77-As free hormones bind to their receptors and no more hormone is released from their cell of origin, the concentration of hormone bound to carrier proteins will (increase / decrease).

78-The strength with which a ligand (chemical messenger) will bind with a receptor is referred to as its _____.

79-As the concentration of a ligand (chemical messenger) increases, the magnitude of a cell's response to that ligand will _____ until receptors are saturated.

80-As the concentration of receptors on the cell membrane decreases, the response of the target cell will (increase / decrease).

The answers:

1-A
2-B
3-A
4-A
5-B
6-B
7-D
8-E
9-D
10-E
11-E
12-B
13-C
14-D
15-D
16-B
17-C
18-A
19-C
20-E
21-D
22-A
23-D
24-C
25-C
26-D
27-A
28-A
29-D
30-D
31-C
32-A
33-B
34-E

35-T
36-F
37-T
38-F
39-T
40-F

41-lipophilic
42-tyrosine
43-cholesterol
44-decrease
45-decrease
46-guanylate cyclase

47-(4)
48-(4)
49-(1)
50-(1)
51-(5)
52-(5)
53-(5)
54-(2)

55-A
56-A
57-D
58-C
59-C
60-D

61-A
62-A
63-D
64-D
65-C
66-A
67-B
68-E
69-E

70-1/B 2/C 3/A
71-1/A 2/A 3/B 4/B 5/B

72-hormone
73-paracrine
74-hipophilic
75-tyrosine
76-diffusion
77-decrease
78-affinity
79-increase
80-decrease