

3.1

Q3.1.1 Short Answer: What is psychopharmacology, and why do we study it?

Answer: The scientific study of the effects of drugs on the nervous system and behavior; to learn about psychotherapeutic drugs and gain a better understanding of how these things work.

Q3.1.2 Multiple Choice: Which of the following is NOT a function of psychopharmacology?

- (A) Study the effects of drugs on the nervous system
- (B) Study the effects of drugs on behavior
- (C) Study the effects of drugs on the immune system
- (D) Study the effects of drugs on neurotransmitter systems

Answer: C.

Q3.1.3 Fill in the Blank: The location at which a drug interacts with the body to produce its effects is called the _____.

Answer: Site of action.

Q3.1.4 Short Answer: What is the difference between an agonist and an antagonist?

Answer: An agonist mimics or enhances the effects of a neurotransmitter, while an antagonist blocks or inhibits the effects of a neurotransmitter.

Q3.1.5 True or False: Drugs directly create effects in the body.

Answer: False. They modulate ongoing cellular activity.

Q3.1.6 Multiple Choice: Which of the following is an example of a drug that acts as an agonist?

- (A) Naloxone
- (B) Morphine
- (C) Curare
- (D) Atropine

Answer: B.

Q3.1.7 Short Answer: What is selective action?

Answer: The ability of a drug to affect only certain types of receptors or neurotransmitter systems, minimizing side effects.

Q3.1.8 Short Answer: What is an example of how an agonistic effect can become antagonistic?

Answer: If a drug increases the release of a neurotransmitter and also blocks its re-uptake, it can lead to an excess of the neurotransmitter, which may inhibit further release.



Q3.1.9 Multiple Choice: What is a precursor?

- (A) A substance that inhibits neurotransmitter release
- (B) A substance that enhances neurotransmitter release
- (C) A substance from which another substance is formed
- (D) A substance that blocks neurotransmitter receptors

Answer: C.

Q3.1.10 Fill in the Blank: The process of creating a neurotransmitter from its precursors is called _____.

Answer: Synthesis.

Q3.1.11 Fill in the Blanks: A(n) _____ agonist binds to the same receptor as the neurotransmitter and _____ its effects, while a(n) _____ agonist binds to a different site on the receptor and _____ the effects of the neurotransmitter.

Answer: Direct, mimics, indirect, enhances.

Q3.1.12 Fill in the Blanks: A(n) _____ antagonist binds to a different site on the receptor and _____ the effects of the neurotransmitter, while a(n) _____ antagonist binds to the same receptor as the neurotransmitter and _____ its effects.

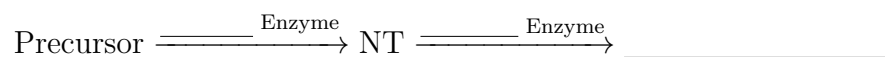
Answer: Indirect, blocks, direct, inhibits.

Q3.1.13 Multiple Choice: Drugs that cause the action potential to stay in a depolarized state are called:

- (A) Agonists
- (B) Depolarizing agents
- (C) Antagonists
- (D) Inverse agonists

Answer: B

Q3.1.14 Fill in the Blanks: In the following diagram, label the specific enzyme for each arrow, and identify the outcome:



Answer: Synthetic; Metabolic; Inactive Metabolite

Q3.1.15 Long(-ish) Answer: Describe the difference between a neurotransmitter and a neuromodulator.

Answer: A neurotransmitter is a chemical messenger that transmits signals across a synapse from one neuron to another, while a neuromodulator is a substance that modulates the activity of neurotransmitters, often affecting a larger area of the brain and influencing the overall tone of neural activity.



Q3.1.16 Matching: Match the following examples with them either being an antagonist or an agonist. (Some of these may be direct or indirect. Specify each one.)

Choices

- (a) *Curare*
- (b) *Atropine*
- (c) *Morphine*
- (d) *Naloxone*
- (e) *Botulinum Toxin*
- (f) Interfering with docking proteins
- (g) Blocking the reuptake of a neurotransmitter
- (h) *Sarin*
- (i) Interfering with vesicles
- (j) Blocking receptors
- (k) Black widow spider venom
- (l) Cobra and Krait Venom
- (m) Parathion
- (n) DFP
- (o) *Physostigmine*

- (1) Direct antagonist _____
- (2) Indirect antagonist _____
- (3) Direct agonist _____
- (4) Indirect agonist _____
- (5) Antagonist _____
- (6) Agonist _____

3.2

Q3.2.1 Multiple Choice: Which of the following neurochemicals does NOT transmit information (according to our notes)?



(A) Dopamine

(B) Glutamate

(C) GABA

(D) Glycine

Answer: A.

Q3.2.2 Fill in the Blank: Peptides are short chains of _____.

Answer: Amino acids.

Q3.2.3 Fill in the Blanks: The difference between opioids and opiates are that opioids are _____ and opiates are _____.

Answer: endogenous; exogenous.

Q3.2.4 Short Answer: What is the pain pathway for the face? What about from the neck down? (Generally speaking.)

Answer: From the face (specifically the trigeminal nerve); A-delta fibers (myelinated) fast conducting, C-fibers (unmyelinated) slow conducting fibers

Q3.2.5 Fill in the Blanks: The three types of opioid receptors are _____, _____, and _____.

Answer: Mu, Kappa, Delta.

Q3.2.6 Long Answer: What are each of the three opioid receptors responsible for, and what neurochemicals bind to each the most?

Answer: Mu: Analgesia and euphoria, Endorphins; Delta: Analgesia, Enkephalins; Kappa: Colocalized with certain catecholamines, learning and memory, emotional control, stress response, and analgesia, Dynorphins.

Q3.2.7 Multiple Choice: Prostaglandins become active during

(A) Resting-and-Digesting

(B) Crying

(C) Daydreaming

(D) Bleeding

Answer: D.

Q3.2.8 True or False: *Celecoxib (Celebrex)*, a COX-2 Inhibitor, was removed from the market because it causes heart attacks and stroke.

Answer: False; Rofecoxib (Vioxx) is the actual COX-2 inhibitor.

Q3.2.9 Fill in the Blank: *Cylooxygenase (COX)* is an enzyme that converts inactive _____ to its active state.

Answer: Prostaglandins

Q3.2.10 Long Answer: List the characteristics for the direct pain pathway and the indirect pain pathway.

Answer: Direct: Sharp and well localized pain, immediate and brief, mechanical (strong) and thermal (extreme temperature); Indirect: Slow pain, throbbing, aching and dull pain, takes longer, but lingers, chemical (inflammatory) pain,



Q3.2.11 Fill in the Blanks: Pain arrives at the _____, then travels to the _____. Once there, it is processed by several brain regions. First, the _____ contributes to arousal. Then, the _____, particularly the anterior cingulate cortex (ACC), processes the emotional aspects of pain. When the pain is overwhelming, the _____ activates and releases endogenous opioids to reduce the sensation—this allows a person, for example, to escape danger despite a severe injury. Finally, the _____ and other areas help interpret and associate the pain with context.

Answer: Brain stem reticular formation (BSRF); Thalamus; Thalamus; Limbic system (ACC); Periaqueductal gray region; Frontal lobes

Q3.2.12 Matching: Match the following drugs with their respective NSAID class.

Choices

- (a) Ibuprofen
- (b) Aspirin
- (c) Diflunisal
- (d) Naproxen
- (e) Salsalate
- (f) Ketoprofen

- (1) Propionic Acid Derivatives _____
(2) Salicylates _____

Answer: (1): a, d, f; (2): b, c, e

Q3.2.13 Long Answer: Some studies show that both the placebo effect and acupuncture can be blocked by Naloxone, an opioid antagonist. What does this suggest about the mechanism of acupuncture's pain-relieving effects? Does this prove that acupuncture is not entirely a placebo?

Answer: This suggests that acupuncture's pain-relieving effects may be mediated by the body's endogenous opioid system, similar to the placebo effect. However, this does not prove that acupuncture is entirely a placebo; it only indicates that placebo-like mechanisms (such as expectation-induced opioid release) may contribute to its effects. Other mechanisms may also be involved.

Q3.2.14 Short Answer: What are some of the functions of opioids? (List the main effects and the side effects.)

Answer: Prevents diarrhea, gives euphoria, analgesia, changes the stress response, body temperature, emotion, feeding motivation, sexual behavior, learning, drowsiness, and promotes pro-social behavior in some cases.



Q3.2.15 True or False: The term *colocalized* means two or more neurotransmitters are released from two separate neurons at the same time.

Answer: False; from the same neuron.

Q3.2.16 Short Answer: What is the definition of pain? (DO NOT say this exam!!!!!!!)

Answer: Unpleasant sensory and emotional experience associated with actual or potential tissue damage.



3.3

Q3.3.1 True or False: The amines (monoamines) are derived from amino acids.

Answer: True.

Q3.3.2 Short Answer: Name three neurotransmitters that fall under the amino acid category.

Answer: Glutamate, GABA, Glycine.

Q3.3.3 Fill in the Blank: The two indolamines are _____ and _____.

Answer: Serotonin (5-HT) and Melatonin.

Q3.3.4 Multiple Choice: What amino acid are indolamines derived from?

(A) Tryptophan (B) Tyrosine (C) Glutamate (D) Glycine

Answer: A.

Q3.3.5 Fill in the Blank: The precursor to glutamate is _____, and the enzyme that synthesizes glutamate from it is _____.

Answer: The precursor is glutamine; the enzyme is glutaminase.

Q3.3.6 Short Answer: What receptor does ketamine bind to, and what is its effect?

Answer: Ketamine binds to the NMDA receptor and acts as a dissociative anesthetic, which is being studied as a treatment for depression.

Q3.3.7 Fill in the Blank: The enzyme _____ deactivates anandamide.

Answer: Fatty acid amide hydrolase (FAAH)

Q3.3.8 True or False: The most common excitatory neurotransmitter in the brain is GABA.

Answer: False; it is glutamate.

Q3.3.9 Fill in the Blank: The drug _____ is a direct antagonist of the NMDA receptor and can cause hallucinations and dissociation.

Answer: Phencyclidine (PCP).

Q3.3.10 Short Answer: What transporters are responsible for glutamate reuptake, and why is this process important?

Answer: Excitatory amino acid transporters (EAATs); it prevents excitotoxicity, which can lead to brain damage (e.g., in stroke or ALS).



Q3.3.11 Multiple Choice: Which receptor is closely associated with glutamate and is important for synaptic plasticity and memory formation?

- (A) GABA receptor (B) NMDA receptor
(C) Serotonin receptor (D) Dopamine receptor

Answer: B.

Q3.3.12 Short Answer: What enzyme converts glutamate into GABA, and what type of neurotransmitter is GABA?

Answer: Glutamic acid decarboxylase (GAD); GABA is the most common inhibitory neurotransmitter in the brain.

Q3.3.13 Fill in the Blanks: The three catecholamine neurotransmitters are _____, _____, and _____.

Answer: Dopamine (DA), Norepinephrine (NE), Epinephrine (Adrenaline).

Q3.3.14 Multiple Choice: What do all catecholamines contain, and what amino acid are they derived from?

- (A) Catechol and are derived from tryptophan
(B) Catechol and are derived from tyrosine
(C) Indole and are derived from tryptophan
(D) Indole and are derived from tyrosine

Answer: B.

Q3.3.15 Fill in the Blank: The enzyme _____ converts tyrosine into L-DOPA.

Answer: Tyrosine hydroxylase.

Q3.3.16 Short Answer: Explain how botox interferes with emotional expression.

Answer: Botox blocks the release of ACh at the neuromuscular junction, preventing muscle contraction and thus inhibiting facial expressions associated with emotions.

Q3.3.17 Fill in the Blank: The orbicularis oculi muscle influences _____.

Answer: Happiness.

Q3.3.18 True or False: Tyrosine is the precursor for serotonin.

Answer: False; it is the precursor for catecholamines.

Q3.3.19 Short Answer: What are the names of the systems that use dopamine, norepinephrine, and epinephrine? *Answer:* Dopaminergic, Noradrenergic, and Adrenergic systems

Q3.3.20 Fill in the Blanks: Melatonin is synthesized from _____ and is involved in regulating _____.

Answer: Serotonin; sleep-wake cycles (circadian rhythms).



Q3.3.21 Short Answer: What is another name for peptides in the context of neurotransmitters, and give an example. *Answer:* Neuropeptides; example: Endogenous opioids

Q3.3.22 Multiple Choice: What is the name of the endogenous cannabinoid neurotransmitter whose name means “bliss” in Sanskrit?

- (A) Anandamide (B) Cannabidiol
(C) Tetrahydrocannabinol (THC) (D) 2-Arachidonoylglycerol (2-AG)

Answer: A.

Q3.3.23 Short Answer: How are lipid-based neurotransmitters synthesized and stored?

Answer: They are synthesized on demand and not stored in synaptic vesicles.

Q3.3.24 Fill in the Blank: The gaseous neurotransmitter that is required for an erection is _____.

Answer: Nitric Oxide (NO).

Q3.3.25 Long Answer: Describe the study that addressed the question, “Does Botox decrease emotional experience?” Describe the population, the method, and the results

Answer: The study involved participants receiving Botox injections and then received either botox or restylane (dermal filler) injected. Everyone then was shown emotion evoking movies. The results are that the Botox group reported less emotional experience than the restylane group.

Q3.3.26 Short Answer: Name one neurotransmitter that is a nucleoside. What is its function?

Answer: Adenosine; it is involved in sleep regulation and has inhibitory effects on neurotransmission.

Q3.3.27 Fill in the Blanks: Fill in the following spaces that describe the process of dopamine metabolism:

DA is broken down by _____ into _____. Then, _____ converts it into _____.

Answer: Monoamine oxidase (MAO); Dihydroxyphenylacetic acid (DOPAC); Catechol-O-methyltransferase (COMT); Homovanillic acid (HVA).

Q3.3.28 Short Answer: What are the results of the study into depression that asks “Can Botox be used as a good thing?”

Answer





3.4:

Q3.4.1 Short Answer: What does cholinergic mean?

Answer: Cholinergic refers to the neurotransmitter acetylcholine (ACh) and its receptors.

Q3.4.2 Multiple Choice: Who first discovered acetylcholine in 1921?

- | | |
|--------------------|------------------|
| (A) Otto von Loewy | (B) James Olds |
| (C) Neal Miller | (D) Peter Milner |

Answer: A.

Q3.4.3 Short Answer: What experiment led to the discovery of acetylcholine?

Answer: Otto von Loewy took a frog heart, put it in saline, stimulated the parasympathetic part of the vagus nerve which slowed the heart. When he put the saline in another frog heart, it also slowed down, showing a chemical was released.

Q3.4.4 Fill in the Blank: The original name given to acetylcholine by its discoverer was _____.

Answer: Vagusstoff.

Q3.4.5 Short Answer: What are the two types of ACh receptors?

Answer: Nicotinic and muscarinic receptors.

Q3.4.6 True or False: Acetylcholine is the only neurotransmitter used in the parasympathetic branch of the autonomic nervous system.

Answer: True.

Q3.4.7 Fill in the Blanks: In the sympathetic nervous system, ACh is used at the _____, while NE is used at the _____.

Answer: Preganglionic synapse (or paravertebral ganglion); neuromuscular junction with smooth muscles and glands.

Q3.4.8 Multiple Choice: Which of the following is NOT a function of ACh in the CNS?

- | | |
|----------------------------|---------------------|
| (A) Learning and alertness | (B) Memory |
| (C) REM sleep generation | (D) Pain modulation |

Answer: D.

Q3.4.9 Short Answer: Describe the synthesis of acetylcholine.

Answer: Acetylcoenzyme-A (Acetyl-CoA) attaches to an acetate ion, which is derived from acetic acid. Then, choline acetyltransferase (ChAT) transfers the acetate from the acetyl-CoA to choline, forming acetylcholine.

Q3.4.10 Fill in the Blanks: The precursor to acetylcholine is _____ and the enzyme that synthesizes acetylcholine is _____.

Answer: Choline; choline acetyltransferase (ChAT).



Q3.4.11 Short Answer: Explain how acetylcholine is metabolized.

Answer: ACh is broken down by the enzyme acetylcholinesterase (AChE) into acetate and choline. The choline is taken back up by active transport and reused, while acetate is broken down and eliminated.

Q3.4.12 Multiple Choice: Which type of ACh receptor is ionotropic?

- (A) Nicotinic receptors
- (B) Muscarinic receptors
- (C) Both nicotinic and muscarinic receptors
- (D) Neither nicotinic nor muscarinic receptors

Answer: A.

Q3.4.13 Short Answer: Explain what the sympathetic chain is, and where it is located.

Answer: The sympathetic chain is a series of ganglia located along the spinal cord that connects the sympathetic nervous system to the spinal nerves. It allows for the rapid transmission of signals throughout the body.

Q3.4.14 Fill in the Blank: The drug _____ is a direct antagonist of nicotinic receptors, causing paralysis.

Answer: Curare.

Q3.4.15 True or False: Atropine blocks muscarinic receptors and is derived from the plant known as belladonna alkaloids (deadly nightshade).

Answer: True.

Q3.4.16 Short Answer: How does Botulinum Toxin interfere with acetylcholine function?

Answer: It interferes with Ca^{2+} influx channels, preventing the release of ACh.

Q3.4.17 Fill in the Blanks: Black Widow Spider venom causes _____ of ACh, while Cobra venom _____ ACh receptors.

Answer: Continual release; blocks.

Q3.4.18 Multiple Choice: Which of the following is a reversible AChE blocker used to treat myasthenia gravis?

- (A) Sarin
- (B) Parathion
- (C) Neostigmine (Prostigmin)
- (D) DFP (Diisopropylfluorophosphate)

Answer: C.

Q3.4.19 True or False: *Donepezil* (**Aricept**) crosses the blood-brain barrier and is used to treat the cognitive symptoms of Alzheimer's disease.

Answer: True.



Q3.4.20 True or False: Nicotinic receptors are antagonists at low doses, but agonists at high doses.

Answer: False; they are agonists at low doses and antagonists at high doses.

Q3.4.21 Multiple Choice: In the PNS, where are nicotinic receptors predominantly located?

- (A) Brain and spinal cord
- (B) Neuromuscular junctions
- (C) Autonomic ganglia
- (D) All of the above

Answer: B.

Q3.4.22 Long Answer: Define the neuromuscular junction and the paravertebral ganglion.

Answer:

Q3.4.23 Multiple Choice: In the sympathetic nervous system, which neurotransmitter is used at the neuromuscular junction with smooth muscles and glands?

- (A) Acetylcholine
- (B) Norepinephrine
- (C) Dopamine
- (D) Serotonin

Answer: B.

Q3.4.24 True or False: In the sympathetic nervous system, acetylcholine is the neurotransmitter used at the neuromuscular junction with sweat glands.

Answer: True.

Q3.4.25 Fill in the Blanks: The _____ is a chain of ganglia that runs parallel to the spinal cord. This is why when you get anxious, _____ of your body responds at once.

Answer: Sympathetic chain; ALL

Q3.4.26 Short Answer: Compare the neurotransmitters used in the parasympathetic nervous system versus the sympathetic nervous system.

Answer:

Q3.4.27 Multiple Choice: Which of the following statements about acetylcholine in the autonomic nervous system is FALSE?

- (A) ACh is the only neurotransmitter in the parasympathetic branch
- (B) ACh is used at preganglionic synapses in both sympathetic and parasympathetic branches
- (C) ACh is used at postganglionic synapses to sweat glands in the sympathetic branch
- (D) ACh is the primary neurotransmitter at the neuromuscular junction with smooth muscles in the sympathetic branch



Answer: D.

Q3.4.28 Fill in the Blank: In the somatic nervous system, ACh _____ the neuromuscular junction.

Answer: Excites.

Q3.4.29 Short Answer: Explain the role of acetylcholine in the somatic nervous system.

Answer: ACh excites the neuromuscular junction in the somatic nervous system, making it crucial for transmitting motor messages from the nervous system to skeletal muscles, resulting in voluntary movement.

Q3.4.30 Matching: Match each brain structure with its projection target.

Choices

- (a) Nucleus Basalis
- (b) Medial Septal Nucleus and Nucleus of Diagonal Band
- (c) Pedunculopontine nucleus (PPT) and Laterodorsal Tegmental Nucleus (LDT)

- (1) Projects to the cortex _____
- (2) Projects to the hippocampus through the fornix _____
- (3) Projects to the pons and thalamus _____

Q3.4.31 Multiple Choice: Which structure in the basal forebrain that uses ACh is primarily responsible for activating the cortex and facilitating learning?

- (A) Nucleus Basalis
- (B) Medial Septal Nucleus
- (C) Nucleus of Diagonal Band
- (D) Pedunculopontine nucleus

Answer: A.

Q3.4.32 True or False: The Medial Septal Nucleus, which uses ACh, primarily modulates the amygdala.

Answer: False. It primarily modulates the hippocampus.

Q3.4.33 Long Answer: Explain the function of acetylcholine in REM sleep generation, including the specific brain structures involved.

Answer: Acetylcholine is important for REM sleep generation through the actions of the Pedunculopontine nucleus (PPT) and Laterodorsal Tegmental Nucleus (LDT). These cholinergic structures project to the pons and thalamus, activating brain regions during REM sleep that are responsible for the vivid dreaming and rapid eye movements characteristic of this sleep phase. ACh levels are highest during REM sleep, facilitating the cortical activation seen in this paradoxical sleep state.



Q3.4.34 Fill in the Blanks: The _____ and _____ are structures that use acetylcholine and project to the hippocampus through the fornix.

Answer: Medial Septal Nucleus; Nucleus of Diagonal Band.

Q3.4.35 Short Answer: What are the four main functions of acetylcholine in the central nervous system?

Answer: Learning and alertness, memory, REM sleep generation, and reward system.

Q3.4.36 True or False: When comparing the sympathetic and parasympathetic nervous systems, both use ACh at their preganglionic synapses.

Answer: True.

Q3.4.37 Multiple Choice: Which of the following correctly describes the neurotransmitter pathway in the parasympathetic nervous system?

- (A) ACh at preganglionic synapse, ACh at postganglionic synapse
- (B) ACh at preganglionic synapse, NE at postganglionic synapse
- (C) NE at preganglionic synapse, ACh at postganglionic synapse
- (D) NE at preganglionic synapse, NE at postganglionic synapse

Answer: A.

Q3.4.38 Shoet Answer: What is the connection between vikings, Koryaks and ACh?

Answer:



3.5:

Q3.5.1 Fill in the Blanks: The three catecholamines are _____, _____, and _____.

Answer: Dopamine (DA); Norepinephrine (NE); Epinephrine (Adrenaline).

Q3.5.2 Multiple Choice: What is the precursor for dopamine?

- (A) Tyrosine
- (B) L-DOPA
- (C) Tryptophan
- (D) Choline

Answer: A.

Q3.5.3 Fill in the Blank: The rate-limiting enzyme in the synthesis of catecholamines is _____.

Answer: Tyrosine Hydroxylase.

Q3.5.4 Short Answer: Describe the pathway of dopamine synthesis from its amino acid precursor.

Answer: Tyrosine is converted to L-DOPA by tyrosine hydroxylase, then L-DOPA is converted to dopamine by DOPA decarboxylase.



Q3.5.5 True or False: The word “tyrosine” is derived from a word meaning “tire.”

Answer: False; it is derived from “cheese”

Q3.5.6 Multiple Choice: Which pathway is involved in movement and motor control?

- (A) Nigrostriatal system (B) Mesocortical system
(C) Mesolimbic system (D) Tuberoinfundibular system

Answer: A.

Q3.5.7 Fill in the Blanks: The nigrostriatal pathway starts in the _____ and ends in the _____.

Answer: Substantia nigra; striatum (caudate nucleus and putamen).

Q3.5.8 Short Answer: List four symptoms of Parkinson’s disease.

Answer: Any four of: weakness, tremor at rest, muscle rigidity, problems with balance, abnormal gait, trouble learning.

Q3.5.9 Multiple Choice: What neurotoxin led to the development of an animal model for Parkinson’s disease?

- (A) MPTP (B) MPPP (C) MPP+ (D) MAO

Answer: A.

Q3.5.10 Fill in the Blank: The misfolded proteins found in the brains of people with Parkinson’s disease are called _____.

Answer: Lewy Bodies.

Q3.5.11 True or False: In Huntington’s Chorea, there is too much GABA from the Striatum to the Substantia Nigra.

Answer: False. In Huntington’s Chorea, there is too little GABA from the Striatum to the Substantia Nigra.

Q3.5.12 Long Answer: Explain how the MPTP incident in 1982 contributed to our understanding of Parkinson’s disease.

Answer:

Q3.5.13 Fill in the Blank: *Methylphenidate (Ritalin)* increases levels of _____ and _____ in the brain.

Answer: Dopamine (DA); Norepinephrine (NE).

Q3.5.14 Multiple Choice: Which system is primarily responsible for reward and reinforcement?



- (A) Nigrostriatal system (B) Mesocortical system
(C) Mesolimbic system (D) Tuberoinfundibular system

Answer: C.

Q3.5.15 Short Answer: What neuropeptide, also called orexin, is involved in the regulation of sleep and wakefulness?

Answer: Hypocretin.

Q3.5.16 Fill in the Blank: The drug _____ is an orexin receptor antagonist used to treat insomnia.

Answer: Suvorexant (Belsomra).

Q3.5.17 True or False: The mesocortical system is involved in short-term memory, planning, and problem-solving.

Answer: True.

Q3.5.18 Multiple Choice: Which researchers discovered that electrical stimulation of certain brain areas could be rewarding rather than aversive?

- (A) Otto von Loewy and Vagusstoff (B) James Olds and Peter Milner
(C) Neal Miller and Delgado (D) Lateral hypothalamus researchers

Answer: B.

Q3.5.19 Short Answer: What structure within the limbic system is considered the “pleasure center” of the brain?

Answer: Nucleus accumbens.

Q3.5.20 Fill in the Blanks: The following is a paragraph that describes dopamine synthesis: Tyrosine is converted to _____ by the enzyme _____. This converted form is then used to create dopamine by the enzyme _____.

Answer: L-DOPA; Tyrosine Hydroxylase; DOPA Decarboxylase.

Q3.5.21 Multiple Choice: Which of the following is NOT a function of dopamine in the CNS?

- (A) Movement and motor control (B) Reward and reinforcement
(C) Learning and memory (D) Sleep-wake cycles and REM sleep

Answer: D.

Q3.5.22 Short Answer: Describe the metabolism of dopamine.

Answer: Dopamine is metabolized by the enzyme monoamine oxidase (MAO) into Dihydroxyphenylacetic acid (DOPAC), which is further metabolized by catechol-O-methyltransferase (COMT) into Homovanillic acid (HVA).

Q3.5.23 Short Answer: Define choreoathetotic movements.

Answer: Choreoathetotic movements refer to excessive movement disorders.



Q3.5.24 Fill in the Blanks: The term _____ refers to slow, continuous writhing movements, while _____ (from the Greek word for "dance") refers to rapid, purposeless, involuntary movements.

Answer: Athetosis; Choreic

Q3.5.25 True or False: Both athetosis and choreic movements are characterized by too little movement.

Answer: False. Both are characterized by too much movement.

Q3.5.26 Short Answer: Where in the brain is hypocretin produced?

Answer: In the lateral hypothalamus.

Q3.5.27 Multiple Choice: Which drug increases both dopamine and norepinephrine in the brain and can be used to treat narcolepsy?

(A) Suvorexant (Belsomra)

(B) Methylphenidate (Ritalin)

(C) TAK-994

(D) Hypocretin

Answer: B.

Q3.5.28 Short Answer: Explain the difference between athetosis and choreic movements.

Answer: Athetosis involves slow, continuous writhing movements, while choreic movements are rapid, purposeless, involuntary movements (like dancing).

Q3.5.29 Fill in the Blank: _____ is a neuropeptide involved in the regulation of sleep and wakefulness that is also known as orexin.

Answer: Hypocretin

Q3.5.30 Short Answer: What is the role of adenosine in the body?

Answer: Adenosine is a nucleoside that plays a role in sleep regulation and has inhibitory effects on neurotransmission. It accumulates in the brain during wakefulness and promotes sleepiness.