

Advanced Addiction Science Mastery

Addiction Science · Answer Key · 18 Questions

1. Which specific subunit configuration of the nicotinic acetylcholine receptor is primarily responsible for the reinforcing effects of nicotine in the ventral tegmental area?

- A) alpha-7
- B) alpha-4-beta-2**
- C) alpha-3-beta-4
- D) alpha-5-beta-3

2. In the context of opioid dependence, which medication acts as a partial agonist at the mu-opioid receptor and has a high affinity but low intrinsic activity?

- A) Methadone
- B) Naltrexone
- C) Buprenorphine**
- D) Lofexidine

3. What is the primary mechanism of action of Disulfiram, used in the treatment of alcohol use disorder?

- A) Inhibition of aldehyde dehydrogenase**
- B) Agonism of GABA-A receptors
- C) Antagonism of NMDA receptors
- D) Inhibition of dopamine beta-hydroxylase

4. Chronic cocaine exposure is primarily associated with the downregulation of which specific dopamine receptor subtype in the striatum?

- A) D1
- B) D2**
- C) D3
- D) D4

5. Which brain structure is considered the primary site for the initiation of the 'incentive salience' process in drug addiction?

- A) Nucleus accumbens shell**
- B) Prefrontal cortex
- C) Hippocampus
- D) Thalamus

6. What is the metabolic byproduct of ethanol that leads to the acute toxic effects associated with Disulfiram therapy?

- A) Acetic acid
- B) Acetaldehyde**
- C) Methanol
- D) Acetone

7. Which neurotransmitter system is primarily implicated in the 'anti-reward' system and the negative emotional state associated with protracted drug withdrawal?

- A) Serotonergic
- B) Dopaminergic
- C) Dynorphin/Kappa-opioid**
- D) Cholinergic

8. What is the primary pharmacological action of Varenicline, a smoking cessation aid?

- A) Full agonist of alpha-4-beta-2 receptors
- B) Partial agonist of alpha-4-beta-2 receptors**
- C) Antagonist of alpha-7 receptors
- D) Reuptake inhibitor of serotonin

9. The 'opponent-process theory' of addiction, as proposed by Solomon and Corbit, suggests that addiction is maintained by:

- A) Positive reinforcement only
- B) A shift from homeostatic set-points to allostatic states**
- C) Purely social conditioning
- D) The absence of neuroplasticity

10. Which drug is classified as a non-competitive NMDA receptor antagonist and is often studied for its dissociative and addictive properties?

- A) Ketamine**
- B) Diazepam
- C) Baclofen
- D) Buspirone

11. What specific type of neuroplasticity in the nucleus accumbens is a hallmark of long-term exposure to psychostimulants?

- A) Increased spine density on medium spiny neurons**
- B) Decreased spine density
- C) Axonal pruning
- D) Glial cell death

12. Naltrexone, an opioid antagonist used for alcohol dependence, primarily exerts its effect by blocking which system?

A) Endogenous opioid system

- B) GABAergic system
- C) Serotonergic system
- D) Glutamatergic system

13. Which metabolic enzyme is responsible for the conversion of heroin into 6-monoacetylmorphine (6-MAM) in the body?

A) Cytochrome P450 2D6

B) Plasma esterases

- C) Alcohol dehydrogenase
- D) Monoamine oxidase

14. The 'incentive sensitization theory' of addiction, developed by Robinson and Berridge, distinguishes between which two psychological processes?

A) Liking and wanting

- B) Tolerance and withdrawal
- C) Reward and punishment
- D) Cognition and emotion

15. Which region of the prefrontal cortex is most consistently linked to the 'go/no-go' deficit observed in addicted individuals?

- A) Ventromedial prefrontal cortex
- B) Anterior cingulate cortex

C) Dorsolateral prefrontal cortex

D) Orbitofrontal cortex

16. What is the primary effect of chronic alcohol consumption on the NMDA receptor system?

A) Downregulation

B) Upregulation

- C) No effect
- D) Competitive antagonism

17. Which drug is a partial agonist at the glycine site of the NMDA receptor and has been investigated as a treatment for cognitive deficits in addiction?

A) D-cycloserine

- B) Memantine
- C) Acamprosate
- D) Naloxone

18. In the context of cannabis pharmacology, the 'entourage effect' refers to the interaction between cannabinoids and which other class of compounds?

A) Terpenes

B) Flavonoids

C) Alkaloids

D) Phenols