

Advanced Pharmacology Concepts

Pharmacology · Answer Key · 19 Questions

1. Which class of anti-hypertensive drugs primarily acts by blocking the conversion of angiotensin I to angiotensin II, a potent vasoconstrictor?

- A) Angiotensin II Receptor Blockers (ARBs)
- B) Beta-blockers
- C) Calcium Channel Blockers
- D) Angiotensin-Converting Enzyme (ACE) Inhibitors**

2. The therapeutic effect of statins, used to lower cholesterol, is primarily achieved by inhibiting which enzyme in the cholesterol synthesis pathway?

- A) Acyl-CoA:cholesterol acyltransferase (ACAT)
- B) HMG-CoA reductase**
- C) Cholesterol esterase
- D) Lecithin-cholesterol acyltransferase (LCAT)

3. Opioid analgesics exert their pain-relieving effects mainly by binding to and activating which type of receptor in the central nervous system?

- A) Dopamine receptors
- B) Serotonin receptors
- C) Mu-opioid receptors**
- D) Adrenergic receptors

4. Which class of antibiotics works by inhibiting bacterial protein synthesis through binding to the 30S ribosomal subunit?

- A) Penicillins
- B) Cephalosporins
- C) Tetracyclines**
- D) Macrolides

5. Warfarin, an anticoagulant, exerts its effect by inhibiting the synthesis of which vitamin-dependent clotting factors?

- A) Factors II, VII, IX, and X**
- B) Factors V and VIII
- C) Factor I (fibrinogen)
- D) Platelet aggregation factors

6. The mechanism of action of proton pump inhibitors (PPIs) like omeprazole involves irreversibly blocking which enzyme system in gastric parietal cells?

- A) Carbonic anhydrase
- B) Na⁺/K⁺-ATPase
- C) H⁺/K⁺-ATPase**
- D) Gastrin receptors

7. Which neurotransmitter is the primary target for selective serotonin reuptake inhibitors (SSRIs) used to treat depression?

- A) Dopamine
- B) Norepinephrine
- C) Serotonin**
- D) GABA

8. Antihistamines primarily function by blocking which type of receptor, thereby preventing the action of histamine?

- A) Muscarinic receptors
- B) Histamine H1 receptors**
- C) Histamine H2 receptors
- D) Adrenergic receptors

9. The 'first-pass effect' in pharmacology refers to the significant metabolism of orally administered drugs by which organ before they reach systemic circulation?

- A) Kidneys
- B) Lungs
- C) Heart
- D) Liver**

10. Which class of bronchodilators mimics the action of endogenous catecholamines by activating beta-2 adrenergic receptors in the airways?

- A) Anticholinergics
- B) Corticosteroids
- C) Beta-2 agonists**
- D) Leukotriene modifiers

11. The therapeutic action of metformin, a common treatment for type 2 diabetes, is primarily through reducing hepatic glucose production and increasing peripheral glucose uptake, independent of insulin secretion from the pancreas. Which class does it belong to?

- A) Sulfonylureas
- B) Thiazolidinediones
- C) Biguanides**
- D) DPP-4 inhibitors

12. Which enzyme is inhibited by non-steroidal anti-inflammatory drugs (NSAIDs) like ibuprofen, leading to reduced prostaglandin synthesis and subsequent anti-inflammatory, analgesic, and antipyretic effects?

- A) Phospholipase A2
- B) Cyclooxygenase (COX)**
- C) Lipoxygenase (LOX)
- D) Histidine decarboxylase

13. A drug's affinity for a receptor describes its ability to do what?

- A) Produce a biological response
- B) Bind to the receptor**
- C) Block other ligands
- D) Be metabolized

14. Which pharmacodynamic principle describes the maximum effect a drug can produce, regardless of dose?

- A) Potency
- B) Efficacy**
- C) Therapeutic index
- D) Selectivity

15. The development of tolerance to a drug, where higher doses are needed to achieve the same effect, is most commonly associated with chronic activation of which type of receptor system?

- A) Ion channels
- B) Enzymes
- C) G protein-coupled receptors (GPCRs)**
- D) Nuclear receptors

16. Which pharmacokinetic parameter quantifies the extent to which a drug reaches systemic circulation unchanged after administration?

- A) Half-life
- B) Volume of distribution
- C) Clearance

D) Bioavailability

17. The 'narrow therapeutic index' of a drug implies that the range between the minimum effective dose and the minimum toxic dose is:

- A) Very wide
- B) Very narrow**
- C) Non-existent
- D) Highly variable

18. Which of the following is an example of a prodrug, a pharmacologically inactive compound that is converted to an active drug in the body?

- A) Morphine
- B) Aspirin (acetylsalicylic acid)

C) Codeine

- D) Ibuprofen

19. The mechanism of action for beta-lactam antibiotics, such as penicillins and cephalosporins, involves interfering with the synthesis of which essential bacterial component?

- A) Cell membrane lipids
- B) Bacterial DNA

C) Peptidoglycan

- D) Bacterial ribosomes