

University of Mosul

College of Veterinary Medicine

Department of Physiology,

Biochemistry and Pharmacology



Competitive examination/Ph.D.  
in Veterinary Pharmacology

Time: 3 Hours

Date: 9 / 7 / 2024

**Answer all the questions**

**Q1. Choose the correct answer from the following: (80 marks)**

**1- Which of the following represents a mechanism of antiviral action of remdesivir against corona viruses.**

- (A) Interference with viral cell binding (B) Interruption of virus uncoating  
(C) Inhibits the activity of the viral RNA-dependent RNA-polymerase  
(D) Inhibit bacterial cell wall synthesis

**2- Drug efficacy' refers to:**

- (A) The range of diseases in which the drug is beneficial  
(B) The maximal intensity of response that can be produced by the drug  
(C) The therapeutic dose range of the drug  
(D) The therapeutic index of the drug

**3. Which of the following statements concerning drug receptors is true?**

- (A) Drug receptors play an important role in the bioavailability of a drug.  
(B) Drugs cannot act unless they are first released from a drug receptor.  
(C) A drug can act as an antagonist even if it is bound to a drug receptor.  
(D) Drugs cannot act unless they are first bound to a receptor.

**4- Activation of which of the following G protein-coupled receptors will most likely cause an increase in Ca<sup>2+</sup> release from the endoplasmic reticulum?**

- (A) Gs (B) Gi/o (C) Gq (D) cAMP

**5- Which of the following is a correct statement regarding species variation in pharmacokinetics/pharmacodynamics?**

- (A) In the dog, glucuronidation of drugs is only present at a low rate.  
(B) Xylazine is a much more potent sedative in horses than cattle.  
(C) Horses have higher levels of plasma esterases than cattle to break down succinylcholine.  
(D) There is no species variation in pharmacological response

**6- The mechanism of action of digoxin's positive inotropic effect is:**

- (A) direct stimulation of the Na<sup>+</sup>-Ca<sup>2+</sup> exchanger.
- (B) competitive inhibition of Na<sup>+</sup>, K<sup>+</sup>-ATPase.
- (C) activation of Gs protein.
- (D) peripheral and central sympathetic stimulation.

**7- Which of the following laxatives act to reduce blood ammonia concentrations and thus is a component of hepatic encephalopathy therapy?**

- (A) Magnesium sulfate    (B) Lactulose    (C) Castor oil    (D) Bethanechol

**8- The primary reason for addition of glucose or fructose to oral rehydration solutions in treating diarrheal is**

- (A) To correct the severe hypoglycemia and weakness.
- (B) To stimulate disaccharidase activity in the mucosal brush border
- (C) To stimulate sugar-sodium coupled uptake by enterocytes.
- (D) To provide a hypertonic gradient for water absorption

**9- Chronic administration of a glucocorticoid may:**

- (A) Increase the amount of adipose tissue in the body by decreasing lipolysis.
- (B) Induce osteoporosis.    (C) Induce lymphocytosis.    (D) Inhibit osteoporosis

**10- Keratolytic agents work primarily by:**

- (A) Lysing keratinocytes by destroying sulfur bonds.
- (B) Acting as softening agents by hydrating keratinocytes.
- (C) Dissolving the keratinocytes.
- (D) stopping the production of keratin within keratinocytes.

**11- Which one of the following antitrepatodal drugs is most effective against immature Fasciola hepatica in cattle?**

- (A) Albendazole    (B) Clorsulon    (C) Praziquantel    (D) Oxamniquine

**12- A prodrug is:**

- (A) The prototype member of a class of drugs    (B) The oldest member of a class of drugs
- (C) An inactive drug that is transformed in the body to an active metabolite
- (D) A drug that is stored in body tissues and is then gradually released in the circulation

**13- Which of the following represents the mechanism of antifungal action of echinocandins?**

- (A) Inhibition of cell wall synthesis    (B) Inhibition of cell membrane synthesis
- (C) Inhibition of ergosterol synthesis    (D) Inhibition of viral replication

**14- The pharmacologic effects of Progesterone include :**

(A) Stimulate and maintain the reproductive tract and cause hyperemia, hypertrophy, and edema during estrus.

(B) Desensitize the myometrium to oxytocin (i.e., it prevents uterine contractions during pregnancy)

(C) Desensitize the myometrium to oxytocin (i.e., it induce uterine contractions during pregnancy)

(D) Abortion in animals

**15- Bromocriptine is clinically used to:**

(A) Treat pseudopregnancy (B) Treat galactorrhea (C) Treat bacterial infection

(D) Induce abortion

**16- Magnesium ion is necessary in.....**

(A) Inhibiting enzyme systems (B) Muscular relaxation (C) Nerve conduction

(D) Action potential

**17- The maximum effect (E max) achieved by a drug is a measure of:**

(A) The drug's potency. (B) The drug's efficacy (intrinsic activity).

(C) The drug's antagonistic magnitude. (D) The drug's therapeutic index.

**18- The renal clearance of a drug (weak organic base) is favored if the drug:**

(A) Has low solubility in water. (B) Has a high degree of binding to plasma protein.

(C) Is put in the ionized form by acidifying the urine.

(D) Is put in the nonionized form by alkalinizing the urine.

**19- The  $\beta$ -Blocker reduce blood pressure primarily by:**

(A) Increasing cardiac output, Decrease sympathetic outflow from central nervous system, Inhibit release of rennin from kidney

(B) Decreasing cardiac output, increase sympathetic outflow from central nervous system, Inhibit release of rennin from kidney .

(C) Decreasing cardiac output, decrease sympathetic outflow from central nervous system, Inhibit release of rennin from kidney .

(D) Decreasing cardiac output, decrease sympathetic outflow from central nervous system, induce release of rennin from kidney .

**20- Dihydropyridines class (calcium-channel blockers) particularly attractive in treating hypertension because :**

(A) Dihydropyridines have a much greater affinity for vascular calcium channels than for calcium channels in the heart.

(B) Dihydropyridines have a much greater affinity for heart calcium channels than for calcium channels in the vascular.

(C) Dihydropyridines have a much greater affinity for both calcium channels in the heart and vascular.

(D) Its effect on beta receptors

**21- Bromhexine HCl is a frequently prescribed mucolytic may increase the concentration of certain antibiotics in the alveoli by:**

- (A) Altering the permeability of the alveolar/capillary membranes  
(B) Breaks the disulfide bonds within the mucus molecules and decreases the viscosity.  
(C) Strengthens the disulfide bonds within the mucus molecules and increases the viscosity.  
(D) Increasing the blood pressure

**22- Which one of the following sentences represents the equation for the Volume of distribution (Vd):**

- (A) Amount of drug in body /Concentration of drug in body (L/k)  
(B) Concentration of drug in body /Amount of drug in body (L/k)  
(C) Concentration of drug in body /Concentration of drug in body (L/k)  
(D) The bioavailability / clearance

**23- Nicotinic receptor sites are found in all of the following locations, except:**

- (A) Parasympathetic ganglia. (B) Sympathetic ganglia. (C) Bronchial smooth muscle.  
(D) Heart

**24- An undesirable effect of a drug that occurs at therapeutic doses and can be predicted from its pharmacological actions is called.....**

- (A) Idiosyncrasy (B) Toxic effect (C) Allergic reaction (D) Side effect

**25- Which one of the following statements about the mechanism of antiparasitic action of ivermectin is accurate**

- (A) By stimulating the release of GABA causes paralysis of the parasite and eventual death  
(B) Stimulates the parasympathetic and sympathetic ganglia in susceptible parasite.  
(C) Interferes with parasite carbohydrate metabolism by blocking fumarate reduction and succinate oxidation.  
(D) Stimulate beta receptors

**26- Aspirin prolongs bleeding time by inhibiting the synthesis of .....**

- (A) Clotting factors in liver (B) Prostacyclin in vascular endothelium  
(C) Cyclic AMP in platelets (D) Thromboxane A2 in platelets

**27- Colloids used in fluid therapy is a large molecules that :**

- (A) Enhance the osmotic pressure of blood, causing fluid to move from the vascular and intracellular spaces into the interstitial space.  
(B) Enhance the osmotic pressure of blood, causing fluid to move from the interstitial and intracellular spaces into the vascular space.  
(C) Decline the osmotic pressure of blood, causing fluid to move from the interstitial and intracellular spaces into the vascular space.  
(D) Increasing the GFR

**28- Strychnine antagonizes ..... receptor in the spinal cord.**

- (A) GABA (B) Glycine (C) Aspartate (D) Glutamate

**29- Which one of the following drugs will reverse the respiratory depression and sedation caused by morphine?**

- (A) Fentanyl (B) Nalbuphine (C) Carfentanil (D) Atropine

**30- The antibacterial activity of amoxicillin may include penicillinase-producing organisms if it is combined with:**

(A) Penicillin (B) Clavulanic acid (C) Enrofloxacin (D) Ciprofloxacin

**31- The mechanism of action of tylosin through .....**

- (A) Inhibiting the bacterial cell membrane functions
- (B) Inhibiting the bacterial protein synthesis
- (C) Inhibiting the bacterial cell wall synthesis
- (D) Inhibiting the bacterial DNA gyrase

**32- The mechanism of action of Noradrenaline through.....**

- (A) Antagonist activity on adrenergic receptors (B) Agonist activity on the cholinergic receptors
- (C) Antagonist activity on the cholinergic receptors (D) Agonist activity on adrenergic receptors

**33- The mechanism of action of medetomidine through.....**

- (A) Antagonist activity on the alpha 1 receptor (B) Agonist activity on the alpha 2 receptors
- (C) Agonist activity on the Beta 1 receptor (D) Agonist activity on the Beta 2 receptors

**34- The mechanism of action of desloratadine through.....**

- (A) Antagonist activity on the H1 receptor (B) Agonist activity on the H2 receptors
- (C) Agonist activity on the H1 receptor (D) Agonist activity on the H3 receptors

**35- The mechanism of action of Bosentan through**

- (A) Antagonist activity on the endothelin A and B receptors.
- (B) Agonist activity on the endothelin A and B receptors.
- (C) Agonist activity on the endothelin B receptor only.
- (D) Antagonist activity on the endothelin B receptor only.

**36- Which expectorant, when nebulized and inhaled, breaks the disulfide bonds within the tracheal mucus molecules?**

- (A) Guaifenesin (B) N-acetylcysteine (C) Potassium iodide (D) Saline

**37- The diuretic effect of methylxanthines is due to increased.....**

- (A) The pH of ECF and urine (B) Hydrogen ions (C) Renal blood flow (D) Ca<sup>++</sup> absorption

**38- The anti-inflammatory effect of NSAIDs is due to inhibition of**

- (A) TXA2 (B) PGE2 (C) LOX (D) PGI2

**39- Methotrexate inhibits**

- (A) RNA polymerase (B) DNA topoisomerase II (C) topoisomerase II (D) dihydrofolate reductase

**40- The mechanism by which most drugs are absorbed following an intramuscular injection is:**

- (A) Pinocytosis. (B) Active transport. (C) Simple diffusion (D) Facilitated diffusion.

**41- Bioavailability of drug refers to:**

- (A) Percentage of administered dose that reaches systemic circulation in the unchanged form

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الجامعة السودانية

(B) Ratio of oral to parental dose

(C) Ratio of orally administered drug to that excreted in the feces

**42- The therapeutic index of a drug is a measure of its:**

(A) Safety (B) Potency (C) Efficacy

**43- The rate of drug absorption is greatest in :**

(A) The small intestine (B) The large intestine (C) The stomach

**44- Diphenhydramine like other antihistamines (H1 blocker) is used to:**

(A) prevent allergic reactions (B) Prevent gastric ulcer (C) Treat parasitic infection

**45- Which of the following drugs is used for treatment of inflammatory and immune-mediated disease.**

(A) Dexamethasone (B) Fentanyl (C) Ephedrine

**46- Which of the following is a phase II drug metabolizing reaction ?**

(A) Conjugation (B) Hydrolysis (C) Oxidation

**47- Which one of the following statements best describes the disinfectants?**

(A) chemical agent that reduces the microbial population on skin and other living tissues

(B) process that eliminates most of pathogenic organisms from an inanimate object

(C) Drugs used to treat parasitic infection

**48- Barbiturates potentiate the activity of.....**

(A) Muscarinic receptor (B) Nicotinic receptor (C) GABA receptor

**49- Stage-III of the general anesthesia is called:**

(A) Stage of Analgesia (B) Stage of delirium (C) Stage of surgery

**50- The brief duration of action of an ultrashort acting barbiturate (Thiopental) is due to:**

(A) Slow rate of metabolism in the liver

(B) Low lipid solubility, resulting in a minimal concentration in the brain

(C) Rapid rate of redistribution from the brain due to its high liposolubility

**51- Cyclooxygenase (COX) 1 and -2 are responsible for:**

(A) The synthesis of prostaglandins from arachidonate

(B) The synthesis of leukotrienes from arachidonate

(C) The conversion of ATP to cAMP

**52- Most diarrhea remedies contain?**

(A) Kaolin (B) Citrates (C) Benzocaine

**53- Chronic use of Gentamycin causes:**

- (A) Ototoxicity and Nephrotoxicity (B) Jaundice (C) Osteoporosis

**54- Which of the following statements regarding therapeutic window is correct ?**

- (A) The ratio of LD50 to the ED50  
(B) The dosage range between the minimum effective therapeutic concentration and the minimum toxic concentration  
(C) The ratio of therapeutic index and certain safety factor

**55. Which type of drugs penetrate CNS better?**

- (A) Lipid soluble (B) Weak acids (C) Weak bases

**56- Metronidazole is used for:**

- (A) Round worm infestation (B) Hook worm infestation  
(C) Intestinal protozoa such as Giardia, Trichomonas, and Entamoeba

**57- Which type of antimicrobial drug combination is most likely to exhibit antagonism?**

- (A) Bactericidal + Bactericidal  
(B) Bactericidal + Bacteriostatic for a highly sensitive organism  
(C) Bacteriostatic + Bacteriostatic

**58- Absorption of oral iron preparations can be facilitated by coadministering:**

- (A) Antacids (B) Tetracyclines (C) Ascorbic acid

**59- Following mediators are involved in acute inflammation except:**

- (A) Histamine (B) Leukotrienes (C) Interferons

**60- Codeine acts as a cough sedative by:**

- (A) Producing mild nausea (B) Depressing bronchiolar secretions  
(C) Depressing cough center

**61- Yohimbine is an antagonist of ..... receptors.**

- (A)  $\alpha_1$  (B)  $\alpha_2$  (C) M1

**62- Local anesthetics are drugs that produce:**

- (A) Irreversible loss of sensitivity to pain in the restricted area to which they are applied  
(B) Reversible loss of sensitivity to pain in the restricted area to which they are applied.  
(C) No loss of sensitivity to pain in the area to which they are applied

**63- General anesthetics differ from local anesthetics by producing .....**

- (A) Unconsciousness (B) Decrease pain sensation (C) diarrhea

64- Dissociative anesthesia is produced by.....

- (A) Ketamine (B) Fentanyl + droperidol (C) Propofol

65- The mechanism of action of benzodiazepines is.....

- (A) Antagonism of glycine receptors in the spinal Cord  
(B) Blockade of the action of glutamic acid  
(C) Increased GABA mediated chloride ion conductance

66- Epinephrine is often included in the administration of local anesthetics because it:

- (A) Enhances analgesic effect (B) Neutralizes irritant action  
(C) Delays diffusion of the anesthetic from the site of injection

67- Acetylcholine and atropine action on the muscarinic receptors is a classic example of :

- (A) Competitive antagonism (B) Non-competitive antagonism  
(C) Non-equilibrium antagonism

68- Following is the main inhibitory neurotransmitter in the brain:

- (A) Dopamine (B) Norepinephrine (C) GABA

69- Zero- order kinetics of the drugs is called when:

- (A) A constant fraction of the drug is removed in per unit time  
(B) A constant amount of the drug is removed in per unit time  
(C) Total amount of the drug is removed in one hour

70- Active transport of a substance across biological membrane has the following characteristics except:

- (A) It is specific (B) It is pH dependent (C) It is saturable

71- Local anesthetics work through:

- (A) Blocking potassium channels (B) Blocking sodium channels  
(C) Blocking calcium channels

72- One of the following drugs consider as uterine contractants:

- (A) Oxytocin. (B) Progesterone. (C) Estrogen.

73- One of the following drugs consider as Adrenal steroids inhibitors.

- (A) Paracetamol. (B) Mitotane. (C) Aspirin.

74- One of the pharmacological effect of sometribove.

- (A) Increase milk production. (B) Decrease milk production.  
(C) Decrease uptake of amino acid into cells.

75. Which of the following is not a pharmacological effect of yohimbine?

- (A) CNS excitation (B) Hypertension (C) CNS inhibition.

76. Which of the following muscarinic receptor subtype mediates the parasympathetic decrease in heart rate and contractility?

- (A)  $M_1$  (B)  $M_2$  (C)  $M_3$

77. Which of the drugs listed below inhibits the release of histamine?

- (A) Cromolyn sodium (B) Cimetidine (C) Dimenhydrinate

78. Which one of the following drugs is an antagonist at the  $\mu$ -,  $\kappa$ -, and  $\delta$ -receptors?

- (A) Morphine (B) Naltrexone (C) Oxymorphone

79. Which of the following is the most frequently seen adverse effect of the prostaglandin inhibitors?

- (A) Agranulocytosis (B) Gastric ulcers (C) Renal papillary necrosis

80. Meloxicam alleviates all of the following types of pain *except*:

- (A) headache (B) muscle pain joint pain (C) colic.

Q2. Answer the following by marking T (True) or F (False): (20 Marks)

- 1- Astringents precipitate protein, toughen the skin, promote healing, and dry the skin when applied topically.
- 2- Dinoprost is a prostaglandin ( $PGF_{2\alpha}$ ) is used for estrus synchronization in cattle and horses by causing luteolysis.
- 3- Laxatives and cathartics are drugs that increase the motility of bowel and change the character of the stool.
- 4- The lubricant Laxatives (Mineral Oil) act by coating the surface of the stool with a water-immiscible film and produce a lubricant action to ease passage of the stool
- 5- Prednisone must be metabolized into prednisolone by the liver so it is best to use prednisolone in case of liver disease.
- 6- Methotrexate (MTX) is a folic acid analog that irreversibly binds to and inhibits dihydrofolate reductase (DHFR), thereby inhibiting the formation of reduced folates and thymidylate synthetase.
- 7- The main adverse effect of doxorubicin and daunorubicin is cardiotoxicity.
- 8- Anastrozole inhibits the aromatase enzyme and prevents the conversion of androstenedione to estrone and testosterone to estradiol.
- 9- Alkylating agents have an electrophilic center that becomes covalently linked to the nucleophilic centers of target molecules.
- 10- antagonist activity on the alpha 2 receptor is the mechanism of action of xylazine.
- 11- agonist activity on the muscarinic receptor is the mechanism of action of pilocarpine.



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- 12- agonist activity on the nicotinic receptors is the mechanism of action of the tubocurarine.
- 13- antagonist activity on the ryanodine receptors is the mechanism of action of dantrolene.
- 14- Thiazide is a diuretic that increases calcium excretion.
- 15- Cyproheptadine is a serotonin antagonist which suppresses the satiety center in the hypothalamus.
- 16- Prokinetic drugs act to increase GI motility by stimulating smooth muscle contractions.
- 17- Cisapride enhances the release of acetylcholine at the myenteric plexus.
- 18- Steroid therapy is the most commonly used therapy for chronic hepatitis in dogs.
- 19- Prednisone must be metabolized into prednisolone by the liver so it is best to use prednisolone in case of liver disease.
- 20- Meloxicam is the NSAIDs that approved by FDA to be used in cats.

GOOD LUCK



Handwritten signature in blue ink. Below the signature, the text reads: 'الأستاذ الدكتور' (Professor Dr.), 'عبد الحليم محمد' (Abdul Halim Mohamed), 'رئيس فرع السلجة والكيمياء الحيوانية والأدوية' (Head of the Department of Pharmacology and Therapeutics).