CHAPTER 1
GENERAL PHARMACOLOGY

1. All of the following are general mechanisms of drug permeation Except
   (a) Aqueous diffusion
   (b) Aqueous hydrolysis
   (c) Lipid diffusion
   (d) Pinocytosis or endocytosis
   (e) Special carrier transport

2. If the plasma concentration of a drug declines with “first-order kinetics”, this means that
   (a) There is only one metabolic path for drug disposition
   (b) The half-life is the same regardless of the plasma concentration
   (c) The drug is largely metabolized in the liver after oral administration and has low bioavailability elimination
   (d) The rate of elimination is proportionate to the rate of administration at all times
   (e) The drug is not distributed outside the vascular system

3. Regarding termination of drug action
   (a) Drug must be exerted from the body to terminate their action
   (b) Metabolism of drugs always increases their water solubility
   (c) Metabolism of drugs always abolishes their pharmacologic activity
   (d) Hepatic metabolism and renal excretion are the two most important mechanisms involved
   (e) Distribution of a drug out of the bloodstream terminates the drug’s effect

4. Distribution of drugs to specific tissues
   (a) Is independent of blood flow to the organ
   (b) Is independent of the solubility of the drug in that tissue
   (c) Depends on the unbound drug concentration gradient between blood and tissue
   (d) Is increased for drugs that are strongly bound to plasma proteins
   (e) Has no effect on the half-life of the drug

5. A physical process by which a weak acid becomes less water-soluble and more lipid-soluble at low pH is
   (a) Distribution  (b) Elimination  (c) First-pass effect  (d) Permeation  (e) Protonation

6. Dose-response curves are used for drug evaluation in the animal laboratory and in the clinic. Quantal dose-response curves are often
   (a) Used for determining the therapeutic index of a drug
   (b) Used for determining the maximal efficacy of a drug
   (c) Invalid in the presence of inhibitors of the drug being studied
   (d) Obtained from the study of intact subject but not from isolated tissue preparations
(e) Used to determine the statistical variation (standard deviation) of the maximal response to the drug.

7. The following are excreted faster in basic urine
   (a) Weak acids  (b) Strong acids
   (c) Weak Bases  (d) None of the above

8. Which of the following statements about spare receptors is most correct?
   (a) Spare receptors, in the absence of drug, are sequestered in the cytoplasm
   (b) Spare receptors will be detected if the intracellular effect of drug-receptor interaction lasts longer than the drug-receptor interaction itself
   (c) Spare receptors influence the maximal efficacy of the drug-receptor system
   (d) Spare receptors activate the effector machinery of the cell without the need for a drug
   (e) Spare receptors may be detected by the finding that the EC_{50} is greater than the K_d for the agonist

9. Which of the following terms best describes an antagonist that interacts directly with the agonist and not at all or only incidentally, with the receptor?
   (a) Pharmacological antagonist
   (b) Partial agonist
   (c) Physiological antagonist
   (d) Chemical antagonist
   (e) Noncompetitive antagonist

10. Which of the following terms best describes a drug that blocks the action of epinephrine at its receptors by occupying those receptors without activating them?
    (a) Pharmacological antagonist
    (b) Partial agonist
    (c) Physiological antagonist
    (d) Chemical antagonist
    (e) Noncompetitive antagonist

11. Which of the following provides information about the variation in sensitivity of the drug within the population studied?
    (a) Maximal efficacy
    (b) Therapeutic index
    (c) Drug potency
    (d) Grade dose-response curve
    (e) Quantal dose-response curve

12. Which of the following most accurately describes the transmembrane signaling process involved in steroid hormone action?
    (a) Action on a membrane spanning tyrosine kinase
    (b) Activation of a G protein which activates or inhibits adenyl cyclase
    (c) Diffusion into the cytoplasm and binding to an intracellular receptor
    (d) Diffusion of “STAT” molecules across the membrane
    (e) Opening of transmembrane ion channels

13. Which of the following is a phase II drug-metabolizing reaction?
    (a) Acetylation
    (b) Deamination
    (c) Hydrolysis
    (d) Oxidation
    (e) Reduction

14. Which of the following drugs may inhibit the hepatic microsomal P450 responsible for warfarin metabolism?
    (a) Cimetidine
    (b) Ethanol
    (c) Phenobarbital
    (d) Procainamide
    (e) Rifampin

15. With regard to clinical trials of new drugs, which of the following is most correct?
    (a) Phase I involves the study of a small number of normal volunteers by highly trained clinical pharmacologists
    (b) Phase II involves the use of the new drug in a large number of patients (100-5000) who have the disease to be treated
    (c) Phase III involves the determination of the drug’s therapeutic index by the cautious induction of toxicity
    (d) Chemical antagonist
    (e) Phase II requires the use of a positive control (a known effective drug) and a placebo

16. Animal testing of potential new therapeutic agents
(a) Extends over a time period of at least 3 years in order to discover late toxicities
(b) Requires the use of at least two primate species, e.g. Monkey and baboon
(c) Requires the submission of histopathologic slides and specimens to the FDA for government evaluation
(d) Has good predictability for drug allergy-type reactions
(e) May be abbreviated in the case of some very toxic agents used in cancer

17. The “dominant lethal” test involves the treatment of a male adult animal with a chemical before mating; the pregnant female is later examined for fetal death and abnormalities. The dominant lethal test therefore is a test of
(a) Teratogenicity
(b) Mutagenicity
(c) Carcinogenicity
(d) All of the above
(e) None of the above

18. The Ames test is a method for detecting
(a) Carcinogenesis in rodents
(b) Carcinogenesis in primates
(c) Teratogenesis in any mammalian species
(d) Teratogenesis in primates
(e) Mutagenesis in bacteria

19. “Nicotinic” sites include all of the following except
(a) Bronchial smooth muscle
(b) Adrenal medullary cells
(c) Parasympathetic ganglia
(d) Skeletal muscle
(e) Sympathetic ganglia

20. A good example of chemical antagonism
(a) Heparin & Protamine
(b) Protamine & Zinc
(c) Heparin & Prothrombin
(d) All the above

21. Which of the following agents is a pro-drug that is much less toxic in mammals than in insects?
(a) Acetylcholine  (b) Bethanechol
(c) Physostigmine  (d) Pilocarpine
(e) Neostigmine

22. Phenylephrine causes
(a) Constriction of vessels in the nasal mucosa
(b) Increased gastric secretion and motility
(c) Increased skin temperature
(d) Miosis
(e) All of the above

23. Pretreatment with propranolol will block which one of the following?
(a) Methacholine-induced tachycardia
(b) Nicotine-induced hypertension
(c) Norepinephrine-induced bradycardia
(d) Phenylephrine-induced mydriasis

24. Most drug receptors are
(a) Small molecules with a molecular weight between 100 and 1000
(b) Lipids arranged in a bilayer configuration
(c) Proteins located on cell membranes or in the cytosol
(d) DNA molecules
(e) RNA molecules

25. With regard to distribution of a drug from the blood into tissues
(a) Blood flow to the tissue is an important determinant
(b) Solubility of the drug in the tissue is an important determinant
(c) Concentration of the drug in the blood is an important determinant
(d) Size (volume) of the tissue is an important determinant
(e) All of the above are important determinants

26. The pH value is calculated mathematically as the
(a) Log of the hydroxyl ion (OH⁻) concentration
(b) Negative log of the OH⁻ concentration
(c) Log of the hydrogen ion (H⁺) concentration
(d) Negative log of the H⁺ concentration
(e) Ratio of H⁺/OH⁻ concentration

27. Which property is classified as colligative?
(a) Solubility of a solute
(b) Osmotic pressure
28. The colligative properties of a solution are related to the
(a) pH of the solution
(b) Number of ions in the solution
(c) Total number of solute particles in the solution
(d) Number of unionized molecules in the solution
(e) pKa of the solution

29. The pH of a buffer system can be calculated with the
(a) Noyes – Whitney equation
(b) Henderson – Hasselbalch equation
(c) Michaelis – Menten equation
(d) Yong equation
(e) Stokes equation

30. Which mechanism is most often responsible for chemical degradation?
(a) Racemization
(b) Photolysis
(c) Hydrolysis
(d) Decarboxylation
(e) Oxidation

31. Which equation is used to predict the stability of a drug product at room temperature from experiments at accelerated temperature?
(a) The stokes equation
(b) The Yong equation
(c) The Arrhenius equation
(d) The Michaelis – Menten equation
(e) The Hixson – Crowell equation

32. Based on the relation between the degree of ionization and the solubility of a weak acid, the drug aspirin (pKa 3.49) will be most soluble at
(a) pH 1.0
(b) pH 2.0
(c) pH 3.0
(d) pH 4.0
(e) pH 6.0

33. The particle size of the dispersed solid in a suspension is usually greater than
(a) 0.5 µm
(b) 0.4 µm
(c) 0.3 µm
(d) 0.2 µm
(e) 0.1 µm

34. In the extemporaneous preparation of a suspension, levigation is used to
(a) Reduce the zeta potential
(b) Avoid bacterial growth
(c) Reduce particle size
(d) Enhance viscosity
(e) Reduce viscosity

35. Active transport differs from facilitated transport in following ways, except
(a) Carrier is involved
(b) It is against concentration gradient
(c) Energy is required
(d) All of the above

36. Vanishing cream is an ointment that may be classified as
(a) A water –soluble base
(b) An oleaginous base
(c) An absorption base
(d) An emulsion base
(e) An oleic base

37. Rectal suppositories intended for adult use usually weigh approximately
(a) 1g
(b) 2g
(c) 3g
(d) 4g
(e) 5g

38. In the fusion method of making cocoa butter suppositories, which substance is most likely to be used to lubricate the mold?
(a) Mineral oil
(b) Propylene glycol
(c) Cetyl alcohol
(d) Stearic acid
(e) Magnesium silicate

39. A very fine powdered chemical is defined as one that
(a) Completely passes through a # 80 sieve
(b) Completely passes through a # 120 sieve
(c) Completely passes through a # 20 sieve
(d) Passes through a # 60 sieve and not more than 40% through a # 100 sieve
(e) Passes through a # 40 sieve and not more than 60% through a # 60 sieve
40. Which technique is typically used to mill camphor?
   (a) Trituration  
   (b) Levigation  
   (c) Pulverization and intervention  
   (d) Geometric dilution  
   (e) Attrition

41. Which type of paper best protects a divided hygroscopic powder?
   (a) Waxed paper  
   (b) Glassine  
   (c) White bond  
   (d) Blue bond  
   (e) Vegetable parchment

42. Which capsule size has the smallest capacity?
   (a) 5  
   (b) 4  
   (c) 1  
   (d) 0  
   (e) 000

43. The shells of soft gelatin capsules may be made elastic or plastic-like by the addition of
   (a) Sorbitol  
   (b) Povidone  
   (c) Polyethylene glycol  
   (d) Lactose  
   (e) pKa of the solution

44. Nonionic surface-active agents used as synthetic emulsifiers include
   (a) Tragacanth  
   (b) Sodium lauryl sulphate  
   (c) Sorbitan esters(spans)

45. A ceramic mortar may be preferable to a glass mortar when
   (a) A volatile oil is added to a powder mixture  
   (b) Colored substances (dyes) are mixed into a powder  
   (c) Commination is desired in addition to mixing

46. Divided powders may be dispensed in
   (a) Individual-dose packets  
   (b) A bulk container  
   (c) A perforated, sifter-type container

47. Agents that may be used to coat enteric coated tablets include
   (a) Hydroxypropyl methyl cellulose  
   (b) Carboxymethyl cellulose  
   (c) Cellulose acetate phthalate

48. For each tablet processing problem listed below, select the most likely reason for the condition
   (a) Excessive moisture  
   (b) Entrapment of air  
   (c) Tablet friability  
   (d) Degraded drug  
   (e) Tablet hardness
   (1) Picking in the granulation  
   (2) Mottling  
   (3) Capping  
   (4) Sticking  
   (5) Table hardness

49. For each description of a comminution procedure below, select the process that it best describes
   (a) Trituration  
   (b) Spatulation  
   (c) Levigation  
   (d) Pulverization by intervention  
   (e) Tumbling
   (1) Rubbing or grinding a substance in a mortar that has a rough inner surface  
   (2) Reducing and subdividing a substance by adding an easily removable solvent  
   (3) Adding a suitable agent to form a paste and then rubbing or grinding the paste in mortar

50. Match the drug product below with the type of controlled-release dosage form that it represents
   (a) Matrix device  
   (b) Ion-exchange resin complex  
   (c) Hydrocolloid system  
   (d) Osmotic system  
   (e) Coated granules
   (1) Biphenamine Capsules  
   (2) Thorazine Spansule Capsules  
   (3) Valrelease system  
   (4) Slow - K  
   (5) Coated granules

51. The route of drug administration that gives the most rapid onset of the pharmacological effect is
   (a) Intramuscular injection  
   (b) Intravenous injection  
   (c) Intradermal injection
(d) Peroral administration
(e) Subcutaneous injection

52. **Acidic drugs mainly bind to plasma**
(a) Albumin
(b) α1 – acid glycoprotein
(c) Both (a) and (b)
(d) None of the above

53. **After peroral administration, drugs generally are absorbed best from the**
(a) Buccal cavity (b) Stomach
(c) Duodenum (d) Ileum
(e) Rectum

54. **The passage of drug molecules from a region of high drug concentration to a region of low drug concentration is known as**
(a) Active transport (b) Bioavailability
(c) Biopharmaceutics (d) Simple diffusion
(e) Pinocytosis

55. **What equation describes the rate of drug dissolution from a tablet?**
(a) Fick’s law
(b) Henderson – Hasselbach equation
(c) Law of mass action
(d) Michaelis – Menten equation
(e) Noyes Whitney equation

56. **Dose dumping is a problem in the formulation of**
(a) Compressed tablets
(b) Modified- release drug products
(c) Hard gelatin capsules
(d) Soft gelatin capsules
(e) Suppositories

57. **The rate of drug bioavailability is most rapid when the drug is formulated as a**
(a) Controlled – release product
(b) Hard gelatin capsule
(c) Compressed tablet (d) Solution
(e) Suspension

58. **Creatinine clearance is used as a measurement of**
(a) Renal excretion rate

(b) Glomerular filtration rate (GFR)
(c) Active renal secretion
(d) Passive renal absorption
(e) Drug metabolism rate

59. **The earliest evidence that a drug is stored in tissue is**
(a) An increase in plasma protein binding
(b) A large apparent volume of distribution (Vd)
(c) A decrease in the rate of formation of metabolites by the liver
(d) An increase in the number of side effects produced by the drug
(e) A decrease in the amount of free drug excreted in the urine

60. **The intensity of the pharmacologic action of a drug is most dependent on the**
(a) Concentration of the drug at the receptor site
(b) Elimination half-life (t½) of the drug
(c) Onset time of the drug after oral administration
(d) Minimum toxic concentration (MTC) of the drug in plasma
(e) Minimum effective concentration (MEC) of the drug in the body

61. **Drug that show nonlinear pharmacokinetics have which property?**
(a) A constant ratio of drug metabolites is formed as the administered dose increases
(b) The elimination half-life (t½) increases as the administered dose increases
(c) The area under the plasma drug concentration versus time curve (AUC) increases in direct proportion to an increase in the administered dose
(d) Both low and high doses follow first-order elimination kinetics
(e) The steady-state drug concentration increases in direct proportion to the dosing rate

62. **The loading dose (Dl) of a drug is usually based on the**
(a) Total body clearance (Cl) of the drug
(b) Percentage of drug bound to plasma proteins
(c) Fraction of drug excreted unchanged in the urine
d) Apparent volume of distribution \( (V_d) \) and desired drug concentration in plasma
(e) Area under the plasma drug concentration versus time curve (AUC)

63. The renal clearance of insulin is used as a measurement of
(a) Effective renal blood flow
(b) Rate of renal drug excretion
(c) Intrinsic enzyme activity
(d) Active renal secretion
(e) Glomerular filtration rate (GFR)

64. All of the following statements about plasma protein binding of a drug are true except
(a) Displacement of a drug from plasma protein binding sites results in a transient increased volume of distribution \( (V_d) \)
(b) Displacement of a drug from plasma protein binding sites makes more free drug available for glomerular filtration
(c) Displacement of a potent drug that is normally more than 95% bound may cause toxicity
(d) Albumin is the major protein involved in protein binding of drugs
(e) Drugs that are highly bound to plasma proteins generally have a greater \( V_d \) compared with drugs that are highly bound to tissue proteins

65. _______ is expressed in both the intestinal epithelium and the kidney.
(a) CYP2D6 (b) CYP1A1/2
(c) CYP3A4 (d) CYP2E1

66. The initial distribution of a drug into tissue is determined chiefly by the
(a) Rate of blood flow to tissue
(b) Glomerular filtration rate (GFR)
(c) Stomach emptying time
(d) Affinity of the drug for tissue
(e) Plasma protein binding of the drug

67. Which tissue has the greatest capacity to bio-transform drugs?
(a) Brain (b) Kidney
(c) Liver (d) Lung
(e) Skin

68. The principle of superposition in designing multiple-dose regimens assumes that
(a) Each dose affects the next subsequent dose causing nonlinear elimination
(b) Each dose of drug is eliminated by zero-order elimination
(c) Steady-state plasma drug concentration are reached at approximately 10 half-lives
(d) Early doses of drug do not affect subsequent doses
(e) The fraction of drug absorbed is equal to the fraction of drug eliminated

69. Which equation is true for a zero-order reaction rate of drug?
(a) \( \frac{dA}{dt} = - k \) (b) \( t_{1/2} = 0.693/k \)
(c) \( A = A_0 e^{-kt} \)

70. Which of the following functional groups is most susceptible to hydrolysis?
(a) \( R - CO - R \) (b) \( R - COOR \)
(c) \( R - O - R \) (d) \( R - NH - CH_3 \)
(e) \( R - COOH \)

71. Monomer units of proteins are known as
(a) Monosaccharides (b) Prosthetic groups
(c) Amino acids (d) Purines
(e) Nucleosides

72. Glucose is a carbohydrate that cannot be hydrolyzed into a simpler substance. It is best described as
(a) A sugar (b) A monosaccharide
(c) A disaccharide (d) A polysaccharide
(e) An oligosaccharide

73. All of the following carbohydrates are considered to be polysaccharides except
(a) Heparin (b) Starch
(c) Glycogen (d) Maltose
(e) Cellulose

74. Which of the following compounds are considered the building blocks of nucleic acids?
(a) Nucleotides (b) Nucleosides
(c) Monosaccharides (d) Purines
(e) Amino acids
75. Which of the following terms best describes a co-factor that is firmly bound to an apoenzyme?
(a) Holoenzyme  (b) Prosthetic group  
(c) Coenzyme  (d) Transferase  
(e) Heteropolysaccharide

76. Enzymes that uncouple peptide linkages are best classified as
(a) Hydrolases  (b) Ligases  
(c) Oxidoreductases  (d) Transferases  
(e) Isomeraes

77. The sugar that is inherent in the nucleic acids RNA and DNA is
(a) Glucose  (b) Sucrose  
(c) Ribose  (d) Digitoxose  
(e) Maltose

78. N-oxidation will be involved with the metabolism of following drugs, except
(a) Dapsone  (b) Meperidine  
(c) Phenytoin  (d) Chlorpheniramine

79. Which of the following statements describes plasmids? They
(a) Are single – stranded DNA molecules  
(b) Carry optional gene(s)  
(c) Carry genes essential for growth  
(d) Are always found in linear form

80. Bacteria that grow at temperatures as high as 55°C are known as
(a) Psychrophiles  (b) Thermophiles  
(c) Mesophiles  (d) Auxotrophs

81. Which of the following organisms can use only molecular oxygen as the final acceptor?
(a) Obligate anaerobes  
(b) Facultative anaerobes  
(c) Obligate aerobes  
(d) Strict anaerobes

82. A declining growth rate occurs during which of the following phases of bacterial cell growth?
(a) Lag phase  (b) Exponential phase  
(c) Stationary phase  (d) Death phase

83. Which class of antibody has the longest serum half-life and opsonizes antigens for phagocytosis through two different pathways?
(a) Immunoglobin G (IgG)  
(b) Immunoglobin M (IgM)  
(c) Immunoglobin A (IgA)  
(d) Immunoglobin E (IgE)

84. Urticaria that appears rapidly after the ingestion of food usually indicates which type of hypersensitivity reaction?
(a) Type I  (b) Type II  
(c) Type III  (d) Type IV

85. A patient receives long-term, high-dose therapy with a sulfonamide. After approximately 3 weeks of therapy, the patient has a low-grade fever, rash, and muscle and joint pain. Which type of hypersensitivity accounts for these symptoms?
(a) Type I  (b) Type II  
(c) Type III  (d) Type IV

86. CD4+ T cells specifically recognize antigens in which form?
(a) Bound to major histocompatibility (MHC) class I molecules on the surface of any body cell  
(b) In free, soluble form in extracellular fluids  
(c) Bound to MHC class II molecules on the surface of special antigen-presenting cells (APCs)

87. Which of the following statements concerning a drug receptor is true?
(a) It mediates the nonspecific action of volatile anesthetics  
(b) Its expression is induced only by exogenously added drugs  
(c) It can bind endogenous ligand to produce physiological activity  
(d) It mediates the cathartic activity of magnesium citrate  
(e) Down-regulation of receptor level can lead to sensitization of the target cell to the receptor agonist.
88. Which of the following acids has the highest degree of ionization in an aqueous solution?
(a) Aspirin \( pK_a = 3.5 \)
(b) Indomethacin \( pK_a = 4.5 \)
(c) Warfarin \( pK_a = 5.1 \)
(d) Ibuprofen \( pK_a = 5.2 \)
(e) Phenobarbital \( pK_a = 7.4 \)

89. Which of the following salts forms an aqueous solution that is alkaline to litmus?
(a) Sodium chloride
(b) Benzalkonium chloride
(c) Meperidine hydrochloride
(d) Cefazolin sodium
(e) Chlordiazepoxide hydrochloride

90. Hydrolysis reactions are involved with the metabolism of following drugs, except
(a) Procaine
(b) Diazepam
(c) Aspirin
(d) Lidocaine

91. Flurazepam has \( pK_a \) of 8.2. What percentage of flurazepam will be ionized at a urine \( pH \) of 5.2?
(a) 0.1%  
(b) 1%
(c) 50%  
(d) 99%
(e) 99.9%

92. Precipitation may occur when mixing aqueous solutions of meperidine hydrochloride with which of the following solutions?
(a) Sodium bicarbonate injection
(b) Atropine sulfate injection
(c) Sodium chloride injection

93. The excretion of a weakly acidic drug generally is more rapid in alkaline urine than in acidic urine. This process occurs because
(a) A weak acid in alkaline media will exist primarily in its ionized form, which cannot be reabsorbed easily
(b) A weak acid in alkaline media will exist in its lipophilic form, which cannot be reabsorbed easily.

94. Which of the following drugs is considered to be the agent of choice for anaphylactic reactions?
(a) Edrophonium  
(b) Ipratropium
(c) Ambenonium  
(d) Propantheline
(e) Homatropine

95. Which of the following drugs is considered to be the agent of choice for anaphylactic reactions?
(a) Clonidine  
(b) Isoproterenol
(c) Epinephrine  
(d) Phenylephrine
(e) Terbutaline

96. Which of the following emissions from the decay of radionuclides is most commonly used in nuclear medicine imaging?
(a) X-ray  
(b) Beta
(c) Alpha  
(d) Gamma
(e) Positron

97. Which of the following radionuclides is not commonly used in nuclear pharmacy practice?
(a) \( ^{67}\text{Ga} \)  
(b) \( ^{201}\text{Tl} \)
(c) \( ^{99m}\text{TC} \)  
(d) \( ^{123}\text{I} \)
(e) \( ^{133}\text{Xe} \)

98. Which of the following radionuclides is generator produced?
(a) \( ^{99m}\text{TC} \)  
(b) \( ^{201}\text{Tl} \)
(c) \( ^{67}\text{Ga} \)  
(d) \( ^{133}\text{Xe} \)
(e) \( ^{123}\text{I} \)

99. Abrasives, ingredients in dentifrices, are noted for which of the following actions?
(a) Providing flavor
(b) Cleansing via a foaming detergent action
(c) Removing plaque and debris
(d) Preventing dental caries
(e) Adding thickness to the product

100. The appropriate \( pH \) range for ophthalmic products is
(a) 2.0 – 3.0  
(b) 4.0 – 6.0
(c) 6.0 – 8.0  
(d) 8.0 – 10.0

(c) All drugs are excreted more rapidly in an alkaline urine.
101. Which type of contact lens can most easily be ruined by the absorption of chemicals?
   (a) Hard lenses (b) Soft lenses (c) Gas-permeable lenses

102. All of the following desensitizing agents are recommended for sensitive teeth except
   (a) 10% carbamide peroxide (b) 5% potassium nitrate (c) Dibasic sodium citrate (d) 10% strontium chloride hexahydrate

103. Carbamide peroxide appears to soften earwax by
   (a) Causing oxygen to be released, which loosens the wax (b) Stimulating fluid secretion in the ear canal (c) Actually dissolving the ear wax (d) Decreasing lipid content of the wax (e) None of the above

104. A common oral problem caused by herpes simplex type I virus (HSV-1) is
   (a) Aphthous ulcers (b) Canker sores (c) Aphthous stomatitis (d) Fever blisters (e) Thrush

105. The definition of a surfactant (an ingredient in toothpaste) can best be described by which of the following statements? Surfactivant
   (a) Prevents drying of the preparation (b) Removes debris by its detergent action and causes foaming, which is usually desired by the patient (c) Physically removes plaque and debris (d) Determines the texture, dispersiveness, and appearance of the product (e) Adds flavor to the preparation which makes it more appealing to the patient

106. Which is not a risk factor for hyperphosphatemia and death from sodium phosphate enemas when used in children?
   (a) Renal insufficiency (b) Hirschsprung’s disease (c) Anorectal malformations (d) Children between the ages of 6 and 12 years

107. Which of the following factors is associated with an increased risk of noncompliance in the elderly?
   (a) Polypharmacy (b) Hypertension (c) Male gender (d) Living with a spouse in an isolated environment (e) Expensive medications

108. The principal difference between competitive and non-competitive inhibition is
   (a) Extent of receptor site blocking (b) Whether inhibition occurs (c) Extent of enzyme inhibition (d) Degree of agonism (e) None of the above

109. Drug administrated through which of the following routes is not likely to be subjected to first-pass metabolism:
   (a) Oral (b) Sublingual (c) Subcutaneous (d) Rectal

110. Many receptors use distinct hetero_________ GTPα-binding regulatory proteins
   (a) Tetrameric (b) Trimeric (c) Dimeric (d) Monomeric

111. Alkalinization of urine hastens the excretion of
   (a) Weakly basic drugs (b) Weakly acidic drugs (c) Strong electrolytes (d) Nonpolar drugs

112. Majority of drugs cross biological membranes primarily by
   (a) Weakly basic drugs (b) Weakly acidic drugs (c) Strong electrolytes (d) Nonpolar drugs
113. The most important factor which governs diffusion of drugs across capillaries other than those in the brain is
(a) Blood flow through the capillary
(b) Lipid solubility of the drug
(c) pKa value of the drug
(d) pH of the medium

114. 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
(d) It requires metabolic energy

115. Bioavailability differences among oral formulations of a drug are most likely to occur if the drug
(a) Is freely water soluble
(b) Is completely absorbed
(c) Is incompletely absorbed
(d) Undergoes little first-pass metabolism

116. Bioavailability of drug refers to
(a) Percentage of administered dose that reaches systemic circulation in the unchanged form
(b) Ratio of oral to parental dose
(c) Ratio of orally administered drug to that excreted in the faeces
(d) Ratio of drug excreted unchanged in urine to that excreted as metabolites

117. The most important factor governing absorption of a drug from intact skin is
(a) Molecular weight of the drug
(b) Site of application
(c) Lipid solubility of the drug
(d) Nature of the base used in the formulation

118. Redistribution is a feature of
(a) Highly plasma protein bound drugs
(b) Depot preparations
(c) Poorly lipid soluble drugs
(d) Highly lipid soluble drugs

119. Weakly acidic drugs
(a) Are bound primarily to a1 acid glycoprotein in plasma
(b) Are excreted faster in alkaline urine
(c) Are highly ionized in the gastric juice
(d) Do not cross blood—brain barrier

120. High plasma protein binding
(a) Increases the volume of distribution of the drug
(b) Facilitates glomerular filtration of the drug
(c) Minimizes drug interactions
(d) Generally makes the drug long acting

121. Biotransformation of drugs is primarily directed to
(a) Activate the drug
(b) Inactivate the drug
(c) Convert lipid soluble drugs into nonlipid soluble metabolites
(d) Convert nonlipid soluble drugs into lipid soluble metabolites

122. 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

123. Which of the following cytochrome P450 isoenzymes is involved in the metabolism of a large number of drugs in human beings and has been implicated in some dangerous drug interactions:
(a) CYP 3A4  (b) CYP 2C9
(c) CYP 2E1  (d) CYP 1A2

124. The most commonly occurring conjugation reaction for drugs and their metabolites is
(a) Glucuronidation
(b) Acetylation
(c) Methylation
(d) Glutathione conjugation

125. G-protein coupled receptors span the plasma membrane as a bundle of ___ alpha helices
(a) One  (b) Three
(c) Seven  (d) Ten
126. Which of the following drug metabolizing reactions is entirely nonmicrosomal
(a) Glucuronide conjugation
(b) Acetylation
(c) Oxidation
(d) Reduction

127. Induction of drug metabolizing enzymes involves
(a) A conformational change in the enzyme protein to favor binding of substrate molecules
(b) Expression of enzyme molecules on the surface of hepatocytes
(c) Enhanced transport of substrate molecules into hepatocytes
(d) Increased synthesis of enzyme protein

128. Drugs which undergo high degree of first-pass metabolism in liver
(a) Have oral bioavailability
(b) Are excreted primarily in bile
(c) Are contraindicated in liver disease
(d) Exhibit zero order kinetics of elimination

129. Glomerular filtration of a drug is affected by its
(a) Lipid solubility
(b) Plasma protein binding
(c) Degree of ionization
(d) Rate of tubular secretion

130. If a drug undergoes net tubular secretion, its renal clearance will be
(a) More than the glomerular filtration rate
(b) Equal to the glomerular filtration rate
(c) Less than the glomerular filtration rate
(d) Equal to the rate of urine formation

131. Which of the following is not a primary/fundamental, but a derived pharmacokinetic parameter
(a) Bio-availability
(b) Volume of distribution
(c) Clearance
(d) Plasma half life

132. If a drug is eliminated by first order kinetics
(a) A constant amount of the drug will be eliminated per unit time
(b) Its clearance value will remain constant
(c) Its elimination half-life will increase with dose
(d) It will be completely eliminated from the body in 2 x half-life period

133. If a drug has a constant bio-availability and first order elimination, its maintenance dose rate will be directly proportional to its
(a) Volume of distribution
(b) Plasma protein binding
(c) Lipid solubility
(d) Total body clearance

134. The following dose of a drug is governed by its
(a) Aqueous diffusion
(b) Aqueous hydrolysis
(c) Lipid diffusion
(d) Pinocytosis or endocytosis

135. Monitoring plasma drug concentration is useful while using
(a) Antihypertensive drugs
(b) Levodopa
(c) Lithium carbonate
(d) MAO inhibitors

136. Microsomal enzyme induction has one of the following features
(a) Takes about one week to develop
(b) Results in increased affinity of the enzyme for the substrate
(c) It is irreversible
(d) Can be used to treat acute drug poisonings

137. Which of the following is a competitive type of enzyme inhibitor
(a) Acetazolamide  (b) Disulfiram
(c) Physostigmine  (d) Theophyline

138. What is true in relation to drug receptors
(a) All drugs act through specific receptors
(b) All drug receptors are located on the surface of the target cells
(c) Agonists induce a conformational change in the receptor
(d) Partial agonists have low affinity for the receptor

139. A partial agonist can antagonize the effects of a full agonist because it has
   (a) High affinity but low intrinsic activity
   (b) Low affinity but high intrinsic activity
   (c) No affinity and low intrinsic activity
   (d) High affinity but no intrinsic activity

140. Receptor agonists possess
   (a) Result in increased smooth endoplasmic reticulum
   (b) Result in increased rough endoplasmic reticulum
   (c) Result in decreased enzymes in the soluble cytoplasmic fraction
   (d) Require 3–4 months to reach completion

141. Agonists affect the receptor molecule in the following manner
   (a) Alter its amino acid sequence
   (b) Denature the receptor protein
   (c) Alter its folding or alignment of subunits
   (d) Induce covalent bond formation

142. Receptors perform the following function/functions
   (a) Ligand recognition
   (b) Signal transduction
   (c) Both ligand recognition and signal transduction
   (d) Disposal of agonists and antagonists

143. Which of the following receptor types has 7 helical membrane, spanning amino acid segments with 3 extracellular and 3 intracellular loops
   (a) Tyrosine protein kinase receptor
   (b) Gene expression regulating receptor
   (c) Intrinsic ion channel containing receptor
   (d) G protein coupled receptor

144. Which of the following is a G protein coupled receptor
   (a) Muscarinic cholinergic receptor
   (b) Nicotinic cholinergic receptor
   (c) Glucocorticoid receptor
   (d) Insulin receptor

145. Placebo effects result presumably from the
   (a) Physician-patient relationship
   (b) Mental set up imparted by the therapeutic settings
   (c) Mental set up imparted by the physician
   (d) All of the above

146. All of the following subserve as intracellular second messengers in receptor mediated signal transduction except
   (a) Cyclic AMP
   (b) Inositol trisphosphate
   (c) Diacyl glycerols
   (d) G protein

147. A receptor which itself has enzymatic property is
   (a) Insulin receptor
   (b) Progesterone receptor
   (c) Thyroxine receptor
   (d) Glucagon receptor

148. Down regulation of receptors can occur as a consequence of
   (a) Continuous use of agonists
   (b) Continuous use of antagonists
   (c) Chronic use of CNS depressants
   (d) Denervation

149. When therapeutic effects decline both below and above a narrow range of doses, a drug is said to exhibit
   (a) Ceiling effect
   (b) Desensitization
   (c) Therapeutic window phenomenon
   (d) Nonreceptor mediated action

150. ‘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
151. If the dose-response curves of a drug for producing different actions are widely separated on the dose axis, the drug is
(a) Highly potent  (b) Highly efficacious
(c) Highly toxic   (d) Highly selective

152. The therapeutic index of a drug is a measure of its
(a) Safety   (b) Potency
(c) Efficacy   (d) Dose variability

153. If the effect of combination of two drugs is equal to the sum of their individual effects, the two drugs are exhibiting
(a) Potentiation  (b) Synergism
(c) Cross tolerance  (d) Antagonism

154. The antagonism between adrenaline and histamine is called ‘Physiological antagonism’ because
(a) Both are physiologically present in the body
(b) They act on physiological receptors
(c) Both affect many physiological processes
(d) They have opposite physiological effects

155. A drug ‘R’ producing no response by itself causes the log dose-response curve of another drug ‘S’ to shift to the right in a parallel manner without decreasing the maximal response : Drug ‘R’ is a
(a) Partial agonist  (b) Inverse agonist
(c) Competitive antagonist  (d) Noncompetitive antagonist

156. A drug which does not produce any action by itself but decreases the slope of the log dose-response curve and suppresses the maximal response to another drug is a
(a) Physiological antagonist  (b) Competitive antagonist
(c) Noncompetitive antagonist  (d) Partial agonist

157. A drug which is generally administered in standard doses without the need for dose individualization is
(a) Insulin  (b) Mebendazole
(c) Prednisolone  (d) Digoxin

158. A fixed dose combination preparation meant for internal use must not contain the following class of drug
(a) Thiazide diuretic  (b) Fluoroquinolone antimicrobial
(c) Corticosteroid  (d) H₂ blocker

159. Interindividual variations in equieffective doses of a drug are most marked if it is disposed by
(a) glomerular filtration  (b) Tubular secretion
(c) Both (a) and (b)  (d) Hepatic metabolism

160. The pharmacokinetics of drugs in the neonate differs from that in adults, because their
(a) Intestinal transit is fast  (b) Glomerular filtration rate is high
(c) Tubular transport mechanisms are not well developed  (d) Drug metabolizing enzymes are overactive

161. Pharmacodynamic tolerance may involve changes in ____ of drug receptors
(a) Number  (b) Affinity
(c) Function  (d) All the above

162. Drug metabolism can be induced by the following factors except
(a) Cigarette smoking  (b) Acute alcohol ingestion
(c) Exposure to insecticides  (d) Consumption of charcoal boiled meat

163. Which of the following is true of placebos
(a) Placebo is a dummy medication  (b) Placebo is the inert material added to the drug for making tablets
(c) Placebos do not produce any effect  (d) All patients respond to placebos

164. In patients of hepatic cirrhosis
(a) The extent of change in pharmacokinetics of drugs can be predicted from the values of liver function tests
15. High doses of furosemide can be safely used. Metformin is the preferred oral hypoglycaemic. Disposition of atenolol is not significantly affected.

165. An undersirable effect of a drug that occurs at therapeutic doses and can be predicted from its pharmacological actions is called (a) Side effect (b) Toxic effect (c) Allergic reaction (d) Idiosyncrasy

166. Which of the following is a type II (unpredictable) adverse drug reaction (a) Side effect (b) Toxic effect (c) Idiosyncrasy (d) Physical dependence

167. A ‘toxic effect’ differs from a ‘side effect’ in that (a) It is not a pharmacological effect of the drug (b) It is a more intense pharmacological effect that occurs at high dose or after prolonged medication (c) It must involve drug induced cellular injury (d) It involves host defence mechanisms

168. Which of the following statements is true in relation to ‘drug toxicity’ and ‘poisoning’ (a) The two terms are synonymous (b) When a toxic effect requires specific treatment, it is called poisoning (c) A toxic effect which endangers life by markedly affecting vital functions is called poisoning (d) Toxicity is caused by drugs while poisoning is caused by other harmful chemicals

169. The most vulnerable period of pregnancy for the causation of foetal malformations due to drugs is (a) 18–55 days of gestation (b) 56–84 days of gestation (c) Second trimester (d) 36 weeks onwards

170. Which of the following is a proven human teratogen (a) Chloroquine (b) Warfarin sodium (c) Dicyclomine (d) Methyldopa

171. Select the drug which has been found to be a strong human teratogen (a) Isoniazid (b) Isotretinoin (c) Hydralazine (d) Propylthiouracil

172. Oral route (a) Yields better absorption than parenteral administration for majority of drugs (b) Should be avoided in the recumbent position (c) Has no demerit (d) Produces quick onset of action

173. Intramuscular route (a) Always produces faster absorption than oral route (b) Can be used to inject mild irritants (c) In a child is made into the gluteus maximus muscle (d) Can be used to inject a volume of 1.5 ml

174. Advantage of sublingual route include the following except (a) It has a rapid onset of action (b) Spitting out the tablet can terminate its action (c) Its usefulness is limited to treat local conditions (d) It avoids first pass hepatic metabolism

175. First pass metabolism (a) Can increase the oral bio-availability of the drug (b) Occurs only in the liver (c) Is higher on intravenous administration (d) Necessitates high oral dose for certain drugs

176. Bio-transformation (a) Renders the drug more lipid soluble (b) Can be altered by drugs (c) Is necessary for all drugs for their elimination (d) Takes place only in the liver

177. Entry of a drug in the central nervous system is enhanced if the drug is (a) Ionized (b) More lipid soluble (c) Given intravenously (d) Highly plasma protein bound
178. Kinetic processes of elimination for a large number of drugs is
(a) First order
(b) First order followed by zero order
(c) Zero order followed by first order
(d) Zero order

179. A drug is said to be potent when
(a) It produces maximal response
(b) The amount needed to produce a certain response is less
(c) It produces minimal/no side effects
(d) It has a rapid onset of action

180. Spare receptors are often found among drugs that elicit
(a) Smooth muscle contraction
(b) Smooth muscle relaxation
(c) Secretion
(d) Cardiac stimulation

181. What is the best criterion for judging the therapeutic superiority of a drug over its congeners?
(a) Potency
(b) Wide range of activity
(c) Efficacy
(d) Variability

182. pKa of a compound
(a) Is the pH of solution at which the compound is 50% ionized
(b) Is the pH of compound at which it is 50% ionized
(c) Is the time in which the compound is ionized
(d) Is the time in which total compound is ionized

183. Pharmacokinetics is
(a) The study of absorption, distribution, metabolism and excretion of drugs
(b) The study of biological and therapeutic effects of the drugs
(c) The method of development of new pharmacological agent
(d) The study of carcinogenic activity of a new drug

184. In which form the drug is absorbed more rapidly?
(a) In aqueous solution
(b) In suspension
(c) In oily solution
(d) In solid form

185. Alcohol is rapidly absorbed from the intestine because
(a) It is lipid soluble and non-electrolyte
(b) It is lipid soluble and highly ionised
(c) It is absorbed by active transport
(d) It is not absorbed quickly

186. After intramuscular injection, the drugs
(a) In oily solution are more rapidly absorbed
(b) In aqueous solution are more rapidly absorbed
(c) Suspended in various repository vehicles are more rapidly absorbed
(d) All solutions are rapidly absorbed

187. Bio-availability of a drug is
(a) The percentage of drug released from a formulation that becomes available for biological effect
(b) The percentage of drug that is ionized from a formulation
(c) The net amount of actual therapeutic agent present in the formulation
(d) The dose of a drug by which 50% animals show signs of toxicity

188. The absorption time of a drug can be reduced by
(a) Making a more soluble salt – for oral
(b) By using hyaluronidase – for injection
(c) By using vesoconstrictor substances
(d) By giving combination of drugs

189. Reduction of heavy metal toxicity by dimercaprol is an example of
(a) Chemical antagonist
(b) Physiological antagonist
(c) Pharmacokinetic antagonist
(d) Antagonism by receptor block

190. Which of the following drugs is primarily stored in the natural fat of the body
(a) Primaquine  (b) Acetyl salicylic acid
(c) Thiopentone  (d) Vitamin C
191. Bio-transformation of the drugs is to render them
   (a) Less lipid soluble
   (b) More protein bound
   (c) Less ionized
   (d) Less protein bound

192. Drug metabolism occurs chiefly in
   (a) Liver
   (b) Brain
   (c) Spleen
   (d) Kidneys

193. For renal excretion the factors important are
   (a) Extent of plasma protein binding of drugs
   (b) Glomerular filtration rate
   (c) Active renal tubular reabsorption
   (d) All of the above

194. If tubular urine is made more acid
   (a) Excretion of weak acid is reduced
   (b) Excretion of weak acid is increased
   (c) Excretion of weak base is increased
   (d) Excretion of weak base is reduced

195. Simultaneous administration of two drugs may – (select the false statement)
   (a) Show an additive effect
   (b) Produce synergism
   (c) Result in antagonism
   (d) Produce any of above phenomena

196. The advantages of bio-assay over chemical assay include – (select false statement)
   (a) It is cheaper
   (b) The active principal does not have to be known
   (c) The active principal does not have to be in a pure state
   (d) The sensitivity may be greater

197. In presence of competitive antagonist
   (a) The maximum response of agonist can never be achieved
   (b) The maximum can be achieved by increasing the concentration activity
   (c) Maximum can be achieved only if the antagonist is having intrinsic activity
   (d) None of the above

198. The receptor concept was first introduced by
   (a) J.N. Langley in 1878
   (b) Paul Ehrlich in 1926
   (c) Somonis in 1964
   (d) Wakesman in 1826

199. True tolerance develops because of
   (a) Diminution in absorption
   (b) Rapid excretion of the drug
   (c) Both of the above
   (d) None of the above

200. Two drugs binding to the same receptors is
   (a) Chemical antagonism
   (b) Pharmacokinetic antagonism
   (c) Competitive antagonism
   (d) Non-competitive antagonism

201. Tachyphylaxis is
   (a) A drug interaction between two similar types of drugs
   (b) Rapidly developing tolerance
   (c) A synergism between two types of drugs
   (d) None of the above

202. Drug A in a dose of 10 mg produces same response as with 100 mg of drug B
   (a) Drug A is 10 times more potent than drug B
   (b) Drug B is 10 times more potent than drug A
   (c) Drug A is 10 times more efficacious than drug B
   (d) Both are equally potent
   (e) Both are equally efficacious

203. Teratogenicity is
   (a) The acute reaction to drugs
   (b) Intolerance to drugs
   (c) Tumour forming action of the drugs
   (d) Malformation of the foetus

204. The chances of foetal malformation with a teratogenic drug is maximum
   (a) During first trimester of pregnancy
   (b) During second trimester of pregnancy
   (c) During third trimester of pregnancy
   (d) When given just prior to the labor
205. Phocomelia is a known teratogenic effect of
   (a) Anticancer drugs
   (b) Antiviral drugs
   (c) Antiepileptic drugs
   (d) Thalidomide

206. Which of the following drugs are known to cause toxic cataract?
   (a) Chloroquine  (b) Ergot
   (c) Phenothiazine  (d) Naphthalene
   (e) All of the above

207. The passage of drugs into the foetus from placenta
   (a) Is by active transport
   (b) Is by passive diffusion
   (c) Is by carrier mediated transport
   (d) By any of the above methods

208. Idiosyncrasy reaction of a drug is
   (a) A type of hypersensitivity reaction
   (b) A type of drug antagonism
   (c) Unpredictable, inherent, qualitatively abnormal reaction of a drug
   (d) Quantitatively exaggerated response

209. Two drugs having similar effects are termed as
   (a) Heterergic drugs
   (b) Isomer drugs
   (c) Homergic drugs
   (d) Antagonistic drugs

210. If the combined effect of two drugs acting by the same mechanism is equal to the algebraic sum of their individual effect, it is called as
   (a) Antagonism  (b) Additive effect
   (c) Potentiation  (d) None of the above

211. Antagonism between barbiturate and amphetamine is termed as
   (a) Non-competitive antagonism
   (b) Physiological antagonism
   (c) Competitive antagonism
   (d) Synergism

212. Which one of the following is an example of physical or chemical interaction?
   (a) Warfarin plus salicylates—prolongation of anticoagulant effect and bleeding tendency
   (b) Methotrexate plus sulfonamides—pancytopenia
   (c) Heparin plus protamine—reversal of heparin effect
   (d) Sulfonamides plus salicylate—sulfa toxicity

213. First 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
   (d) Total amount of the drug is removed in first passage through the kidneys

214. For the drugs which follow first order kinetics, after 4 half life the elimination will be approximately
   (a) 40%  (b) 94%
   (c) 25%  (d) 4%

215. Passive diffusion of a drug across cell membrane is low when its molecular mass is greater than
   (a) 50–100 Da  (b) 100–200 Da
   (c) 200–300 Da  (d) 300–400 Da

216. Passage of drug across most capillary endothelial membranes is dependent upon
   (a) Lipid solubility  (b) pH gradient
   (c) Blood flow  (d) All of the above

217. Following receptors are membrane proteins, except
   (a) Receptors for fast neurotransmitters, coupled directly to an ion channel
   (b) Receptors for many hormones and slow transmitters, coupled to effector system
   (c) Receptor for insulin and various growth factors, which are directly linked linked to tyrosine kinase
   (d) Receptors for steroid hormone
218. pH difference between extracellular and intracellular fluid is
   (a) Nil  (b) 0.2
   (c) 0.4  (d) 0.8

219. Which type of drugs penetrate CNS better
   (a) Lipid soluble  (b) Weak acids
   (c) Weak bases  (d) All equally

220. Acidic drugs mostly bind to plasma
   (a) Albumin  (b) Globulin
   (c) Glycoprotein  (d) None of the above

221. The number of P450 gene families identified in human being is
   (a) 4  (b) 8
   (c) 12  (d) 16

222. The majority of drug biotransformation occurs by which cytochrome family
   (a) CYP1  (b) CYP2
   (c) CYP3  (d) None of the above

223. Nonlinearity in pharmacokinetics of a drug is due to saturation of
   (a) Protein binding
   (b) Hepatic metabolism
   (c) Active renal transport
   (d) All of the above

224. Which of the following disease is due to G protein receptor malfunction
   (a) Precocious puberty
   (b) Retinitis pigmentosa
   (c) Malignant hyperthyroidism
   (d) All of the above

225. The pharmacokinetic alternations in elderly are due to
   (a) Reduction in lean body mass and total body water
   (b) Increase in percentage of body fat
   (c) Reduced cytochrome P450 enzymes
   (d) All of the above

226. The effect of enzyme induction is greatest when the drug is given
   (a) Digoxin  (b) Furosemide
   (c) Enalapril  (d) Amrinone

227. The hepatic enzyme inducer naringenin is present in
   (a) Tobacco smoke  (b) Grape juice
   (c) Alcohol  (d) Apple Juice

228. In gene tranfer which metal particle is often used
   (a) Iron  (b) Gold
   (c) Platinum  (d) Molybdenum

229. Slow reacting substance of anaphylaxis refers to
   (a) LTC4  (b) LTD4
   (c) Both of the above  (d) None of the above

230. Drugs producing allergic reaction generally act as
   (a) Complete antigens
   (b) Haptens
   (c) Antibodies
   (d) Mediators

231. An addicting drug which produces little or no physical dependence is
   (a) Amphetamine  (b) Methadone
   (c) Phenobarbitone  (d) Diazepam

232. 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) Both the above
   (d) None of the above

233. Which of the following statements regarding acid –base balance is not correct?
   (a) it is an essential balance between the amount of carbonic acid and bicarbonate in blood.
   (b) It must be kept constant so that the hydrogen ion concentration in the blood plasma is in turn kept constant
   (c) Any deviation in the balance can have a profound effect on physiological function
   (d) All the above
   (e) None of the above
234. During liver disease the metabolism and elimination of which of the following drugs is decreased
   (a) Morphine
   (b) Pentobarbitone
   (c) Propanolol
   (d) All the above
   (e) None of the above

235. In celiac disease oral absorption of which of the following drugs is decreased
   (a) Amoxycillin
   (b) Cephalexin
   (c) Cotrimoxazole
   (d) All the above
   (e) None of the above

236. Which people are said to be slowest acetylators because they metabolize isoniazid by the process of acetylation very slowly
   (a) Canadian Eskimos
   (b) Indians
   (c) Asiatic Jews
   (d) Chinese
   (e) Europeans
   (f) all the above

237. Which people are said to be fastest acetylators because they metabolize isoniazid by the process of acetylation very quickly
   (a) Canadian Eskimos
   (b) Indians
   (c) Asiatic Jews
   (d) Chinese
   (e) Europeans
   (f) all the above

238. Clearance of which of the following drugs is reduced parallel to decrease in the creatine clearance
   (a) Aminoglycosides
   (b) Digoxin
   (c) Phenobarbitone
   (d) All the above
   (e) None of the above

239. Pharmaceutical factors which can modify the effect of drug are
   (a) Formulation type
   (b) Bioavailability
   (c) Bioequivalence
   (d) Fixed Dose combination
   (e) All the above
   (f) None of the above

240. Following statement is true about receptors linked directly to ion channels
   (a) These receptors are involved mainly in fast synaptic transmission
   (b) These are monomeric proteins containing one transmembrane segment
   (c) Ligand binding and channel opening occur on a minute time-scale
   (d) All of the above

241. Route of administration suitable for emergency and permits titration of the dosage as well is
   (a) Oral
   (b) Intravenous
   (c) Intramuscular
   (d) Subcutaneous
   (e) All the above
   (f) None of the above

242. The disadvantage of oral route is
   (a) Vomiting as a result of gastrointestinal irritation
   (b) Destruction of some drugs by the digestive enzyme and non-favorable gastric pH
   (c) Irregularities in the absorption in the presence of the food and other drugs
   (d) Patient non-compliance
   (e) All the above
   (f) None of the above

243. Drugs which have a tendency to accumulate in the body fat mostly have
   (a) Extremely high lipid-water partition coefficient
   (b) Extremely low lipid-water partition coefficient
   (c) None of the above

244. Once the drug enters the blood, the rate at which it subsequently penetrates the tissues and other body fluids depends on
   (a) Capillary permeability
   (b) Extent of plasma protein and tissue binding
   (c) Transport mechanism
245. Factor which can effect the absorption of drug is
(a) Dissolution rate  (b) Particle Size
(c) Lipid Solubility  (d) All the above
(e) None of the above

246. The movement of drug molecules across the cell membrane is by
(a) Diffusion through the lipid
(b) Diffusing through aqueous pores that traverse the lipid
(c) Combination with a carrier molecule which acts as a catalyst
(d) Pinocytosis
(e) All the above
(f) None of the above

247. Which of the following responses develops to drugs due to antigen-antibody reaction?
(a) Toxic response
(b) Idiosyncratic response
(c) Allergic response
(d) None of the above

248. The microsomal oxidation of drugs is carried out through a larger or smaller extent in
(a) Liver  (b) Kidney
(c) Lung  (d) small intestine
(e) all of the above

249. The mechanism of Biotransformation of Aspirin to Salicylic acid and Acetic acid is
(a) Oxidation  (b) Reduction
(c) Hydrolysis  (d) None of the above

250. Which one of the statements regarding microsomal enzymes is not correct
(a) They lack specificity
(b) Capable of metabolizing substances of different structure
(c) Only catalyze reaction of compounds which are lipid insoluble
(d) All the above

251. Which one of the following is a Phase II - Drug metabolizing reaction
(a) Oxidation  (b) Reduction
(c) Acetylation  (d) All the above

252. The metabolic reaction which makes the metabolite of codeine more Pharmacologically potent analgesic is
(a) Dealkylation  (b) Oxidation
(c) Deamination  (d) All the above

253. Prodrug
(a) Facilitates absorption and distribution of drugs with poor lipid solubility
(b) Increases the duration of action of drugs that are rapidly eliminated
(c) Promotes Site specific delivery of drugs
(d) All the above

254. The removal of oxygen or an alteration in a drug which leads to a decrease in the proportion of oxygen in the drug compound is known as
(a) Oxidation  (b) Reduction
(c) Hydrolysis  (d) All the above

255. Excipients are
(a) Pharmacologically inert substances
(b) Used to mask an unpleasant taste
(c) Used to increase solubility or stability to the agent
(d) Employed to add bulk to the active agent used in small quantities
(e) All the above

256. Bio-assay is used to
(a) Determine the relationship between the dose administered and the magnitude of response
(b) Determine the potency of a new agent compared with that of an established drug
(c) Determine the relationship between the doses producing a desired effect and those eliciting undesirable or toxic effect
(d) All the above
(e) None of the above

257. Which of the following endogenous compounds undergo methylation?
(a) Histamine  (b) Estradiol
(c) Thyroxine  (d) All the above
(e) None of the above
258. Which one of the following statements regarding glucuronide conjugation is not correct
(a) The most frequently occurring reactions
(b) The conjugating agent is glucuronic acid, \( C_6H_{10}O_6 \)
(c) The glucuronides are rapidly eliminated in the urine
(d) The glucuronides are also secreted in the bile, but this does not always lead to their elimination in the feces
(e) All the above
(f) None of the above

259. Which of the following therapeutic systems provides continuous, unattended, controlled drug input for a long period without gastrointestinal or hepatic drug inactivation prior to systemic circulation?
(a) Parenteral
(b) Oral
(c) Transdermal
(d) All the above
(e) None of the above

260. The translocation of a solute from one side of a biologic barrier to the other side and the transferred solute appearing in the same form on both sides of the biological barrier is known as
(a) Bioavailability
(b) Biotransport
(c) Bioequivalence
(d) None of the above

261. Guanine nucleotides bind to the ______ subunit of G-proteins
(a) \( \alpha \)
(b) \( \beta \)
(c) \( \gamma \)
(d) All the above

262. Pharmacodynamics include
(a) The biological effects produced by chemicals
(b) The site/s and mechanism by which the biological effects are produced
(c) The factors that effect the safety and effectiveness of the agent
(d) All the above
(e) None of the above

263. The person who set forth the principles that drugs are effective only after reaching a responsive tissue and that there is a relationship between the structure of drugs and the effects that they produce
(a) Paracelsus
(b) William Harvey
(c) James Blake
(d) Rudolf Buccheim
(e) None of the above

264. The great scientist who explained the circulation of the blood to the world which signaled of the beginning of the scientific study of the medical sciences was
(a) Paracelsus
(b) William Harvey
(c) James Blake
(d) Rudolf Buccheim
(e) None of the above

265. All the below mentioned drugs cause enzyme inhibition in man except one
(a) Acetazolamide
(b) Allopurinol
(c) Meprobamate
(d) Disulfiram
(e) Selegiline

266. All the below mentioned drugs cause enzyme induction in man except one
(a) Phenytoin
(b) Phenobarbitone
(c) Griseofulvine
(d) Enalapril
(e) Rifampicin

267. Cimetidine potentiates the action of propranolol, theophylline, warfarin and phenytoin because
(a) It causes deficiency of G - 6–PD
(b) It blocks the H2 – histaminergic receptors
(c) It is an inhibitor of microsomal P–450
(d) None of the above

268. The incidence of adverse drug reaction rises with age in the adult, especially after 65 years because of
(a) The increasing number of drugs they need to take because they tend to have multiple diseases
(b) Poor compliance with dosing regimens
(c) Bodily changes of aging that require modification of dosage regimens
(d) All the above
(e) None of the above

269. Agranulocytosis is
(a) Virtual absence from the blood of white cells known as neutrophils
(b) It is a life-threatening conditions that results from toxic damage to the bone-marrow by some drugs
(c) Can be treated with antibiotics and sometimes transfusion of white blood cells
(d) All the above

270. Characteristically following oral administration to a man, drugs
(a) Are absorbed readily when in the unionized rather than in the ionized form
(b) Are absorbed primarily in the intestine
(c) Cross membranes mainly by simple diffusion
(d) With high lipid solubility readily penetrate into CNS
(e) All the above

271. Competitive antagonists
(a) Dissociate from receptors faster than their respective agonists
(b) Alter the shape of the log dose response curve of an agonist
(c) According to the rate theory have low dissociation rate constants
(d) Initiate the opposite cellular response to receptor occupancy to that obtained by the agonist
(e) All the above

272. A non-competitive antagonist
(a) Alters the mechanism of action of an agonist
(b) Alters the potency of an agonist
(c) Shifts the dose-response curve of an agonist to the right
(d) Decreases the maximum response to an agonist
(e) None of the above

273. Repeated administration of a drug may
(a) Increase its own metabolism
(b) Increase the metabolism of other drugs
(c) Increase the metabolism of endogenous compounds
(d) All the above
(e) None of the above

274. Plasma concentration is useful for
(a) Drugs with high safety margin
(b) Drugs with low safety margin
(c) Drugs activated in the body
(d) Hit and run drugs

275. During competitive equilibrium type of antagonism
(a) Equilibrium constant \( K_m \) is unchanged, but total number of binding sites \( V_{max} \) is reduced
(b) Equilibrium constant \( K_m \) is increased and total number of binding sites \( V_{max} \) is reduced
(c) Equilibrium constant \( K_m \) is increased and total number of binding sites \( V_{max} \) remain unchanged
(d) None of the above

276. Addition of oxygen or negatively charged radical and removal of hydrogen or positively charged radical is known as
(a) Reduction
(b) Oxidation
(c) Acetylation
(d) Hydrolysis
(e) None of the above

277. Pharmacopoeia includes list of established drugs and medicinal preparation with the description of their
(a) Physical properties
(b) Identification test
(c) Purification test
(d) Potency test
(e) All the above

278. Claude Bernard is known as
(a) Father of Medicine
(b) Father of Pharmacognosy
(c) Father of Polypharmacy
(d) Father of Pharmacology
(e) Father of Experimental Medicine

279. Oswald Schmiedeberg is known as
(a) Father of Medicine
(b) Father of Pharmacognosy
(c) Father of Polypharmacy
(d) Father of Pharmacology
(e) Father of Experimental Medicine

280. Catalytic conversion of GTP to GDP is carried out by ____ subunit of G-proteins
(a) \( \alpha \)
(b) \( \beta \)
(c) \( \gamma \)
(d) All the above
281. Theophrastus is known as
   (a) Father of Medicine
   (b) Father of Pharmacognosy
   (c) Father of Polypharmacy
   (d) Father of Pharmacology
   (e) Father of Experimental Medicine

282. Hippocrates is known as
   (a) Father of Medicine
   (b) Father of Pharmacognosy
   (c) Father of Polypharmacy
   (d) Father of Pharmacology
   (e) Father of Experimental Medicine

283. When a drug lacking effect of its own increases the effects of the second active
drug \( 0 + 1 = > 1 \); such an effect is called
   (a) Additive effect
   (b) Synergism
   (c) Potentiation

284. When two drugs with the same effect produce an effect greater than the sum
of the effects of individual drugs \( 1 + 1 > 2 \); such an effect is called
   (a) Additive effect
   (b) Synergism
   (c) Potentiation

285. Weak acids ionize more in
   (a) Alkaline pH
   (b) Acidic pH
   (c) Not dependent of pH

286. Theophylline has shorter half life in infants and children because
   (a) Renal tubular secretory mechanism is deficient
   (b) Immaturity of the nephron
   (c) Immaturity of the blood-brain barrier
   (d) Reduced plasma - protein binding
   (e) Liver size larger on a body weight basis

287. An antagonist has
   (a) Intrinsic activity and no affinity
   (b) Only intrinsic activity and no affinity
   (c) No intrinsic activity and no affinity
   (d) Affinity same as agonist and devoid of intrinsic activity
   (e) None of the above

288. Acetylcholine and atropine action on the muscarinic receptors is a classical example of
   (a) Competitive antagonism
   (b) Non-competitive antagonism
   (c) Non-equilibrium antagonism
   (d) Physiological antagonism
   (e) Chemical antagonism

289. Biological half-life of is calculated as
   (a) \( t_{1/2} = 0.693 \times CL/Vd \)
   (b) \( t_{1/2} = 0.693 \times K/\ln2 \)
   (c) \( t_{1/2} = 0.693 \times Vd/CL \)
   (d) \( t_{1/2} = 0.693 \times \ln2/K \)
   (e) None of the above

290. Following statement is true regarding therapeutic index
   (a) It is based on animal toxicity data
   (b) It reflects forms of toxicity that are important clinically
   (c) It takes into account idiosyncratic toxic reaction
   (d) All the above

291. Ocuserts are
   (a) Placed under the eyelid
   (b) Intrauterine contraceptives
   (c) Monoclonal antibodies
   (d) None of the aboves

292. Nitroglycerin is given in angina pectoris by sublingual route because:
   (a) Liver is by-passed
   (b) Can be spat after desired effect
   (c) Rapid absorption
   (d) Non irritant and lipid soluble drug
   (e) All the above

293. Volatile drug may be best administered by:
   (a) Oral route
   (b) Inhalation
   (c) Sublingual route
   (d) Intrathecal route
   (e) Rectal route

294. A desired clinical response may be delayed altered or blocked by:
   (a) A drug that does not go into solution
   (b) A drug that does not get to its site of action
295. Following compartment constitutes the largest percentage
(a) Plasma (b) Intestinal fluid
(c) Intracellular fluid (d) Fat

296. The duration of action of a drug is dependent of its
(a) Plasma and tissue binding (b) Metabolism
(c) Tubular filtration and secretion (d) All the above

297. When a drug has a low therapeutic index, that drug should be
(a) Used mostly orally (b) Used mostly intravenously
(c) Considered a potentially toxic substance (d) Given only in submilligram doses

298. A drug is being metabolized by zero-order kinetics. This indicates that
(a) A constant amount of drug is being catabolised each hour
(b) A constant fraction of drug is being catabolised each hour
(c) A drug is a water soluble substance (d) The time required to catabolise half of the drug is independent of the initial concentration of the drug

299. Drugs interact with their receptors sites by forming
(a) Ionic bonds (b) Hydrogen bonds
(c) Van der Waals bond (d) All the above

300. The main route of administration of a drug to produce a local effect is
(a) Topical (b) Oral
(c) Parenteral

301. The main routes of administration of a drug is to provide a systemic effect. Identify the wrong answer
(a) Topical (b) Oral
(c) Parenteral

302. Parenteral administration of a drug refers to the giving of a preparation, except
(a) Orally (b) Intradermally
(c) Intramuscularly (d) Intravenously

303. Pharmacokinetics considers
(a) The way in which the body affects a drug by the process of absorption, distribution, metabolism and excretion
(b) The effects of the drug on the body and the mode of drug action.
(c) The proportion of administered drug that is available to have an effect.
(d) The removal of the drug by the liver before it has become available

304. If gut motility is increased then
(a) Drug absorption is decreased (b) Drug absorption is increased
(c) Drug absorption is not effected

305. The rate of drug absorption is greatest in
(a) The small intestine (b) The large intestine
(c) The stomach

306. Drug distribution may depend on tissue perfusion
(a) Highly vascular organs rapidly acquire a drug
(b) Highly vascular organs acquire a drug slowly
(c) Levels of a drug in bone may rise quickly due to its high vascularity
(d) Levels of a drug in bone may rise slowly due to its reduced

307. Most drugs and metabolites are excreted by
(a) The kidneys (b) The bile
(c) The lungs (d) Perspiration, saliva and tears
MCQs IN PHARMACOLOGY

308. Pharmacodynamics considers:
(a) The way in which the body affects the drug
(b) The effects of the drug on the body and the mode of drug action
(c) Drug metabolism

309. A drug that binds to a cell receptor and causes a response is called an:
(a) Agonist
(b) Antagonist
(c) Receptor blocker

310. Receptors for ________ are DNA-binding proteins
(a) Steroids  (b) Vitamin D
(c) Retinoids  (d) all the above

311. Factors affecting a client's response to a drug include all the following except:
(a) A body weight i.e. the larger the individual, the larger the area for drug distribution
(b) Body fat – A loss of body fat stores means less drug available for activity
(c) Body fat – An increase in body fat means greater sequestering in body fat and less drug activity
(d) The presence of certain foods

ANSWERS

1. b  2. b  3. d  4. c  5. e  6. a  7. a  8. b  9. d  10. a  11. e  12. c  13. a  14. a  15. a  16. a  17. b  18. e  19. a  20. a  21. a  22. a  23. a  24. c  25. e  26. d  27. b  28. c  29. b  30. c  31. c  32. e  33. a  34. c  35. a  36. d  37. b  38. a  39. b  40. c  41. a  42. a  43. a  44. a  45. c  46. a  47. c

48. 1. a, 2. d, 3. b, 4. a  49. 1. a, 2. d, 3. c  50. 1. b, 2. e, 3. c, 4. a  51. b  52. b  53. c  54. d  55. d  56. b  57. d  58. b  59. b  60. a  61. b  62. d  63. e  64. e  65. c  66. a  67. c  68. d  69. a  70. b  71. c  72. b  73. d  74. a  75. b  76. a  77. c  78. c  79. b  80. b  81. c  82. d  83. a  84. a  85. c  86. c  87. c  88. a  89. d  90. b  91. e  92. a  93. a  94. b  95. c  96. d  97. c  98. a  99. c  100. c  101. b  102. a  103. a  104. d  105. b  106. d  107. a  108. c  109. a  110. b  111. b  112. a  113. a  114. b  115. c  116. a  117. c  118. d  119. b  120. d  121. c  122. c  123. a  124. a  125. c  126. b  127. d  128. a
EXPLANATIONS FOR ANSWERS

7. a because of enhanced disassociation weak acids are excreted faster in basic (not acidic) urine.

20. a Chemical antagonism does not involve any receptors. Protamine is a positively charged protein at physiological pH and thus antagonizes the effects of Heparin which is negatively charged at physiological pH.

35. a Facilitated diffusion differs from active transport in that it does not require energy source and it carries the transport in the direction of electrochemical gradient.

52. a Glycoprotein binds to basic drugs and albumin binds to many acidic drugs and a small number of basic drugs.

65. c CYP3A4 is involved in the metabolism of majority of drugs and is also expressed extrahepatically. In fact, poor bioavailability of many drugs is attributed to the drug metabolism by CYP3A4 in gastrointestinal tract.

78. c N-oxidation is involved in the metabolism of dapsone, meperidine and chloramphenicol. Metabolism of phenytoin involves oxidative N-dealkylation.

110. b Many receptors use heterotrimeric GTP-binding regulatory proteins. The subunits are designated as β, α and α and their classification is based on α subunits.

125. c G-protein coupled receptors are hydrophobic proteins and span the plasma membrane in seven α-helical segments.

145. d Placebo effect is a desired response to a therapy without drug. Placebo effect is mainly because of various psychological reasons e.g. physician-patient relationship, mental set up affected by surroundings and positive mental set up because of known and trusted physician.

161. d Pharmacodynamic tolerance involves multiple mechanism such as number, affinity and function of receptors.

180. a Spare receptors are generally found whenever a receptor acts catalytically and not stoichiometrically. Hence, they are generally found among drugs, which elicit smooth muscle contraction.

189. a Dimercaprol interacts directly with heavy metals in blood and tissue fluids and prevents binding of heavy metals to cellular constituents. Dimercaprol forms an inactive complex with heavy metals.

200. c Two drugs binding to the same receptor is an example of competitive antagonism and effect of one drug can be decreased by increasing the concentration of other drug.

217. d Receptors for steroid hormones are intracellular DNA – binding proteins, which regulate gene transcription.

240. a Receptors linked directly to ion channels are involved in the fast synaptic transmission e.g. nicotinic acetylcholine receptor. This receptor is a pentamer i.e. it is made up of five poly-peptide subunits.

261. a In G-protein coupled receptors, agonist-receptor complex enhances GTP binding to the α subunit, mainly by dissociating already bound GDP.

280. a The termination of agonist-receptor coupling in a G-protein-coupled receptor is because of conversion of GTP to GDP by a GTPase that is intrinsic to α subunit.

290. a Therapeutic index is the range between minimal and maximal concentration required to elicit desired response.

295. c Intracellular fluid comprises 35%, whereas contribution of other compartments is far less e.g. plasma – 5%; interstitial fluid – 16%; fat – 20% and transcellular fluid – 2%.

310. d Receptors for steroids, vitamin D, retinoids and also thyroid hormones are DNA-binding proteins, which regulate transcription of genes.