
<Q> Pharmacodynamic refers to the division of pharmacology which deals with:

<C> Sources of drugs
<C> Concentration of the drug at different sites in the body
<C+> The effect of the drug in modifying disease sates
<C> The effect of the body on modifying the drug concentration
<C> The routes of drug administration

<Q> Pharmacokinetics is defined as the following:

<C> The science that deals with the identification and preparation of drugs of plant or animal origin
<C> A discipline covering aspects of pharmacology and pharmacognosy
<C> The preparation, compounding and dispensing of drugs
<C> The branch of pharmacology dealing with mechanisms of drug action
<C+> The branch of pharmacology dealing with the absorption, distribution, metabolism and excretion of drugs

<Q> Drugs could produce their actions by:

<C> Working on receptors on the surface membrane
<C> Replacing a nutritive element
<C> Changing pH at the site of action
<C> Working on receptors in the cytoplasm
<C+> All of the above .

<Q> When a drug works through the control of DNA transcription, the onset and duration of action is expected to be in:

<C> Milliseconds.
<C> Seconds.
<C> Minutes.
<C+> Hours.
<C> Days.

<Q> Receptors are macromolecules that:

<C> Are designed to attract drugs.
<C> Are resistant to antagonists.
<C+> Exist as targets for physiological neurotransmitters and hormones.
<C> Are only on the outer surface of cells.
<C> Are only inside of cells.

<Q> In vitro studies of drug-receptor interactions can demonstrate:

<C> The affinity of a drug for its receptor
<C> The approximate number of receptor binding sites
<C> The nature of endogenous modulators of the receptors

<C> Whether the drug is an agonist of antagonist
<C+> All of the above are true

<Q> All the following are true in upregulation of receptors; EXCEPT:
<C+> Occurs after prolonged administration of agonists
<C> Occurs after prolonged administration of antagonists
<C> Occurs in certain diseases
<C> Might be very dangerous in heart disease
<C> Associated with increased number of receptors

<Q> Concerning the efficacy of drugs:
<C> Efficacy is a measure of a drug's ability to produce a response when bound to the receptor
<C> Many tissues have "spare" receptors that need not all be activated for a maximum drug effect
<C> Partial agonists cannot produce a maximum response because of low efficacy, even when occupying 100% of the receptors
<C> Efficacy is determined from the height of the maximum response elicited by the drug
<C+> All of the above are true

<Q> A progressively increasing dose of a drug is required by the patient to produce the desired therapeutic effect. This phenomenon is called:
<C> Physiologic antagonism
<C> Insensitivity
<C+> Tolerance
<C> Pharmacologic antagonism
<C> Downregulation

<Q> All of the following about dose-response relationship are true; EXCEPT:
<C> Drug response occurs as a result of drug-receptor complex formation
<C> Each drug molecule occupies single receptor site
<C> Response to a drug is proportional to the number of receptors occupied by drugs
<C> Maximum response occurs when all receptors are occupied by drugs
<C+> The amount of drug that is bound to receptors is very large in relation to amount of drug administered

<Q> If the LD50 of a drug is 100 mg and the ED50 of the drug is 10 mg, then the therapeutic index of this drug equals to:
<C> 0.1
<C> 2
<C> 4
<C+> 10
<C> 20

<Q> Which one of the following types of antagonists produces a block that can be overcome by increasing doses of agonist ?
<C> Reversible non competitive antagonist.
<C> Irreversible non competitive antagonists.

<C+> Reversible competitive antagonist.
<c> Physiologic antagonist.
<C> Chemical antagonist.

<Q> Non competitive antagonist binds to:
<C> Same receptor site of the agonist
<C+> Site separate from the agonist's binding site.
<C> Spare receptors of the agonist.
<C> Surface of the agonist itself.
<C> Site not related to the agonist.

<Q> All the following are true about a partial agonist; EXCEPT:
<C> Has efficacy by itself
<C> Reduces the potency of the agonist
<C+> Lowers the efficacy of the agonist
<C> Activity can be prevented by the antagonist
<C> Is a partial antagonist

<Q> All the following are characteristics of intravenous administration of drugs, EXCEPT:
<C> Gives rapid responses
<C> Most suitable for irritant drugs
<C+> Suitable for oily drugs
<C> Permits close control of response
<C> Useful for patients who are unconscious

<Q> If 100 mg of a given drug is given intravenously, its bioavailability is :
<C> 10%
<C> 40%
<C> 50%
<C> 80%
<C+> 100 %

<Q> Drug absorption through membranes is enhanced by all the following; EXCEPT:
<C> High lipid solubility
<C> Small molecular size
<C+> Increased ionization
<C> Increased surface area of the site of absorption
<C> Increased contact time at the site of absorption

<Q> All the following factors can affect the rate and/ or extent of drug absorption after oral administration; EXCEPT;
<C> Gastric emptying time
<C> Intestinal motility.
<C> The presence of food.
<C> The formulation of the drug.
<C+> A generic form of the drug.

<Q> The drug with the highest rate of absorption from the stomach is:
<c> Weak basic drug
<C> Insulin hormone (protein hormone)

<C> Highly ionized drug
<C+> Weak acidic drug
<C> Highly water soluble drug.

<Q> The most common mechanism of transfer of drugs between different compartments is:
<C> Simple diffusion.
<C+> Lipid diffusion.
<C> Special carrier.
<C> Endocytosis.
<C> Exocytosis.

<Q> If the concentration of a given drug in the blood at time zero equals to 100 mg/L and the dose given equals to 500 mg then the apparent volume of distribution(AVD) equals to:
<C> 1 Liter
<C> 2 Liters
<C> 4 Liters
<C+> 5 Liters
<C> 50 Liters

<Q> All the following factors affect drug distribution in human body; <u>EXCEPT:</u>
<C> Protein binding
<C> Blood brain barrier.
<C> Physicochemical properties of the drug
<C+> The pharmaceutical form of the drug
<C> Blood perfusion rate

<Q> Which of the following CYP enzymes is associated with metabolism of the greatest number of drugs and thus most likely to be involved in drug-drug interctions?:
<C+> CYP3A4.
<C> CYP2C9.
<C> CYP2D6.
<C> CYP2E1.
<C> CYP1A2.

<Q> Pharmacological consequences of drug metabolism include:
<C> Conversion of inactive compound into active drug
<C> Conversion of an active compound to another with different activity
<C> Conversion of an active drug into active metabolite
<C> Conversion of an active drug into inactive metabolite
<C+> All of the above

<Q> Concerning the renal excretion of drugs:
<C> Drugs that are ionized in the renal tubules are more likely to undergo passive reabsorption than those that are unionized.
<C> Low molecular weight drugs are much more likely to be actively secreted

than filtered.

<C> Only drugs that are not bound to plasma proteins are filtered by the glomerulus.

<C+> Decreasing renal tubular fluid pH will increase elimination of weakly acidic drugs.

<Q> Frequently it is useful to consider the overall exposure of a person to a drug during the dosing interval. Which of the following pharmacokinetic parameters defines the exposure of a person to a drug?

<C> C_{max}

<C> T_{max}

<C+> AUC (area under the curve)

<C> Half-life

<C> Clearance

<Q> Different formulations of a drug that give equal blood and tissue concentrations of the active drug ingredient are said to be:

<C+> Equally bioavailable

<C> Chemically equivalent

<C> Physically equivalent

<C> Therapeutically equivalent

<C> None of the above

<Q> In zero order kinetics of drug elimination, the time required to reach lowest level after stopping treatment depends on:

<C> The dose of the drug

<C> The disease condition

<C+> The half life of the drug

<C> The distribution of the drug

<C> The time since stopping treatment

<Q> Which one of the following is <u>TRUE</u> for a drug whose elimination from plasma shows first - order kinetic?

<C> The T½ of the drug is proportional to the drug concentration in plasma.

<C> The amount eliminated per unit time is constant.

<C+> The rate of elimination is proportional to the plasma concentration.

<C> The rate of clearance equals Vd. x t½.

<C> The elimination rate constant equals 0.693 x t½ .

<Q> For a drug with a half life of 4 hours, practically the time required to reach the plateau phase (steady state level) after repeated administration is:

<C> 3 hours

<C> 6 hours

<C> 10 hours

<C> 13 hours

<C+> 20 hours

<Q> The route of drug administration is determined by

<C> Water solubility of the drug

<C> Lipid solubility of the drug
<C> Ionization of the drug
<C> Desirability of rapid onset of action of the drug
<C+> All of the above

<Q> All of the following about oral drug absorption is true EXCEPT
<C> The most variable route of administration
<C+> The most complicated of administration
<C> Duodenum is the major site of entry to the systemic circulation
<C> Most drugs absorbed from the gastrointestinal tract enter directly the systemic circulation
<C> First-pass metabolism by the liver limits the efficacy of many drugs.

<Q> Which one of the following statements is CORRECT
<C> Weak bases are absorbed efficiently across the epithelial cells of the stomach
<C> Coadministration of atropine speeds the absorption of a second drug
<C> Drugs showing a large V_d can be efficiently removed by dialysis of the plasma
<C+> Stressful emotions can lead to a slowing of drug absorption
<C> If the V_d for a drug is small, most of the drug is in the extraplasmic space

<Q> All of the following about passive absorption is true EXCEPT
<C> The driving force is concentration gradient
<C> Does not involve a carrier
<C+> The process is saturable
<C> the process shows a low structural specificity
<C> The process is suitable for lipid-soluble drugs

<Q> All of the following about the effect of pH on drug absorption is true EXCEPT
<C> Acidic drugs release a proton causing a charged anion
<C+> Basic drugs release a proton causing a charged cation
<C> Rate of absorption of acidic drugs is more rapid form stomach
<C> Rate of absorption of basic drugs is more rapid from small intestine
<C> pKa= the pH of the medium where of drug 50% of a drug is ionized and 50% is unionized

<Q> The following factor(s) influencing drug absorption

<C> Blood flow to the absorption site
<C> Total surface area available for absorption
<C> Contact time at the absorption surface
<C+> All of the above
<C> None of the above

<Q> Factor(s) that influence bioavailability of drugs

<C> First-pass hepatic metabolism
<C> Solubility of the drug
<C> Chemical instability in GIT
<C> Nature of the drug formulation
<C+> All of the above

<Q> A patient is treated with drug A, which has a high affinity for albumin and is administered in amounts that do not exceed the binding capacity of albumin. A second drug, B, is added to the treatment regimen. Drug B also has a high affinity for albumin, but is administered in amounts that are 100 times the binding capacity of albumin. Which of the following occurs after administration of drug B

<C+>An increase in the tissue concentrations of drug A
<C> A decrease in the tissue concentrations of drug A
<C> A decrease in the volume of distribution of drug A
<C> A decrease in the half-life of drug A
<C> Addition of more drug A singnificanlty alters the serum concentration of unbound drug B

<Q> The following factor(s) determine drug distribution

<C> Blood flow
<C> Capillary permeability
<C> Drug structure
<C> Binding of drugs to proteins
<C+> All of the above

<Q> A drug, given as a 100 mg single dose, results in a peak plasma concentration of 20 µg/ml. The apparent volume of distribution is (assume a rapid distribution and negligible elimination prior to measuring the peak plasma level)

<C> 0.5 L
<C> 1 L

<C> 2 L
<C+> 5 L
<C> 10 L

<Q> Which one of the following is TRUE for a drug whose elimination from plasma shows first-order kinetics

<C> The half-life of the drug is proportional to the drug concentration in plasma
<C> The amount eliminated per unit of time is constant
<C+> The rate of elimination is proportional to the plasma concentration
<C> Elimination involves a rate-limiting enzymic reaction operating at its maximal velocity (V_m).
<C> A plot of drug concentration versus time is a straight line

<Q> All of the following factors may increase the volume of distribution EXCEPT

<C> Pregnancy
<C> Extremely lipid soluble drugs
<C+> Blood tissue barriers
<C> Drug-drug interactions
<C> None of the above

<Q> The addition of glucuronic acid to a drug

<C> Decreases its water solubility
<C+> Usually leads to inactivation of the drug
<C> Is an example of a Phase I reaction
<C> Occurs at the same rate in adults and newborns
<C>Involves cytochrome P450

<Q> Drugs showing zero-order kinetics of elimination

<C> Are more common than those showing first-order kinetics
<C> Decrease in concentration exponentially with time
<C> Have a half-life independent of dose
<C+> Show a plot of drug concentration versus time that is non linear
<C> Show a constant fraction of the drug eliminated per unit time

<Q> A drug with a half-life of twelve hours is administered by continuous IV infusion. How long will it take for the drug to reach ninety percent of its final steady-state level

<C> 18 hours
<C> 24 hours
<C> 30 hours
<C+> 40 hours
<C> 90 hours

<Q> Which of the following results in a doubling of the steady-state concentration of a drug

<C+> Doubling the rate of infusion
<C> Maintaining the rate of infusion, but doubling the loading dose
<C> Doubling the rate of infusion and doubling the concentration of the infused drug
<C> Tripling the rate of infusion
<C> Quadruplign the rate of infusion

<Q> All of the following about plasma protein drug binding is correct EXCEPT

<C> Only the free drug can act on target sites in the tissues
<C> Only the unbound drug is available to the process of elimination
<C> The binding of drugs to albumin molecule is reversible
<C+> Albumin has the strongest affinity for cationic drugs (weak basis)
<C> Most hydrophilic drugs do not bind to albumin

<Q> All of the following about drug-drug interactions on albumin binding sites is true EXCEPT

<C> Class I drugs has low dose/capacity ratio
<C> Class II drug has high dose/capacity ratio
<C> Drug-drug interactions on plasma protein binding assumes importance when a patient whose is taking a class I drug is given a class II drug .
<C+> If the Vd is small the drug displacement from albumin is not significant
<C> None of the above

<Q> All of the following about drug metabolism is true EXCEPT

<C> Pro-drugs must be metabolized to their active forms

<C+> First-order kinetics metabolism means that a constant amount of drug is metabolized per unit of time

<C> Zero-order kinetics metabolism the enzyme is saturable

<C> Ethanol follows zero – order kinetics

<C> None of the above

<Q> All of the following about reaction of drug metabolism is correct EXCEPT

<C+> Water soluble drugs must first be metabolized in the liver

<C> Phase I reaction function to convert lipophilic molecules into lipophobic molecules

<C> Phase I reactions involved in drug metabolism catalyzed by the p450 system

<C> Drug+O_2 + NDPH----□ Drug modified+H_2O+NDP+

<C> Phase II include conjugation with endogenous substances

<Q> All of the following about renal drug elimination is true EXCEPT

<C+> All drugs (bound & free) can pass bowman's capsule capillaries into proximal convoluted tubules

<C> Acidic drugs complete with each other on active secretion rout at proximal tubules

<C> Passive reabsorption of lipid-soble drug occur at distal tubules

<C> Lipid insoluble drugs pass into urine to the bladder

<C> None of the above

Match the following about first-order drug kinetics

22.	clearance	a. The time during which the Concentration of the drug decreased from original concentration to half concentration

23.	T½	b. 4-6 elimination half-life's
24.	Time required to reach Steady-state levels in blood	c. 5 days
25.	Over 90% of administered Drug is eliminated from the Body after	d. Volume of plasma from Which all drug be removed in a given time
26.	Loading dose	e. (desired steady state plasma concentration) x volume of distribution

Choose the single correct answer in each of the following questions:

1. If a drug is displaced from plasma protein binding sites

a. The half-life will be prolonged
b. The drug will tend to achieve higher tissue concentrations
c. Renal excretion will tend to decrease
d. The peak pharmacological effect of the drug would be attenuated
e. The distribution of the drug will be decreased

2. By which of the following routes of administration would the major portion of a drug first pass through the liver before entering the general circulation?

a. Intraperitoneal
b. Sublingual
c. Oral
d. Rectal
e. a and c are correct

3. Disappearance of most drugs from the plasma follows first order kinetics, which means that:

a. The rate of disappearance is independent of the amount of drug left at any time

b. The rate of disappearance is proportional to the amount of drug left at any time
c. The disposition mechanisms are saturated
d. The drug is rapidly metabolized
e. The plasma t½ will have a high value

4. A drug with a t½ of 12 hours when given in a single dose of 1 gram produces a maximum plasma concentration of 4 mg /dL. When 1 g is given every 12 hours, the desired plasma level of 12 mg/dL will be attained in:

a. 1 day
b. 3 days
c. 6 days
d. 12 days
e. No finite time

5. If a drug is not metabolized, is bound 50% to plasma protein, and has a renal clearance of 400 mL/min in man, the mode of excretion must be:

a. Glomerular filtration
b. Filtration and reabsorption
c. Tubular secretion
d. Filtration and secretion
e. Excretion by extrarenal route

6. Each of the following statements is correct EXCEPT:

a. Tolerance is the resistance developed to the effect of a given dose of a drug
b. Idiosyncrasy is an unusual response to a drug
c. Cumulation occurs when the rate of elimination of a drug exceeds the rate of absorption
d. Potentiation occurs when the combined action of two drugs is greater than the sum of the individual actions
e. Habituation is the psychic craving for a drug

7. Each of the following statements describes the fate of drugs in the body <u>EXCEPT</u>:

a. Plasma and tissue protein binding are important in determining the duration of action of many drugs
b. Most pharmacologic agents are excreted without first being

metabolized

c. Drug absorption, distribution, and excretion are dependent upon the lipoid solubility of the drug
d. The metabolic degradation of most drugs takes place in the liver
e. The rate of tissue accumulation of some drugs is dependent upon the rate of blood flow through the tissue

Match the following:-

8.	Absorption	a.	Biochemical transformation of drugs from lipid soluble forms to water soluble drugs
9.	Metabolism	b.	Transfer of drugs from blood to peripheral tissues
10.	Distribution	c.	Depends on drug concentration a receptor sites in the peripheral tissues
11.	Excretion	d.	Irreversible elimination of drugs and their metabolites from the body
12.	Response	e.	Transport of drugs from site of administration to the blood

13. First pass effect is:

a. The amount of the drug destroyed by stomach acidity after oral administration of drugs for the first time.
b. The amount of the drug passed with stool after oral administration

c. Amount of drug lost due to hepatic metabolism during drug absorption for the first time after oral administration
d. Amount of drug that is eliminated by the liver by hepatic artery .
e. The amount of drug that bypass the cirrhosed liver after oral administration through portosystemic anastomosis

14. Bioavailability:

a. The amount of active drug that is available in the central compartment
b. Can be measured by calculating the area under the curve (AUC) of the drug plasma concentration-time curve
c. Can be influenced by drug pharmaceutical forms from different sources
d. Is less after oral administration than intravenous absorption for drugs that have high extraction ratio
e. All of the above

15. All of the following about free drugs (unbound drugs) in plasma are correct <u>EXCEPT</u>:

a. Only free drugs can distribute to peripheral tissues
b. Only free drugs can pass through glomerular filtration
c. Only free drugs become available for hepatic metabolism
d. Highly bound drugs (98% bound) have clinically significant drug-drug interactions with other drugs through displacement from binding sites on plasma protein
e. Basic drugs bind with acidic binding sites on plasma globulins while acidic drugs bind with basic binding sites on plasma albumin

16. Passive drug absorption from solid forms after oral administration depends on all of the following; <u>EXCEPT</u>:-

a. Degree of drug dissolution
b. Physico-chemical characteristics of the drug
c. Surface area of the gastro-intestinal tract
d. pH of the media inside the gastro-intestinal tract

e. The presence of carrier mechanism responsible for drug transportation from GIT to the blood

17. The following factors can influence drug absorption from GIT:

a. Stirring factors
b. Sustained release preparations
c. Food intake
d. Blood flow
e. All of the above

18. Which of the following statements is correct?

a. weak bases are absorbed efficiently across the epithelial cells of the stomach
b. coadminstration of atropine speeds the absorption of a second drug
c. drugs showing a large $\mathbf{V_d}$ can be efficiently removed by dialysis of the plasma
d. stressful emotions can can lead to a slowing of drug absorption
e. if the Vd for a drug is small, most of the drug is in the exctraplasmic space

19. All of the following about passive absorption is true Except:

a. the deriving force is the concentration gradient
b. does not involve a carrier
c. the process is saturable
d. the process shows a low structural specificity
e. the process is suitable for lipid-soluble drug

20. All of the following about the effect of pH on drug absorption is true Except:

a. acidic drug release a proton causing a charged anion
b. basic drug release a proton causing a charged cation
c. rate of absorption of acidic drugs is more rapid from stomach
d. rate of absorption of basic drugs is more rapid from small intestine
e. pKa = the pH of the medium where 50% of a drug is ionized and 50% is unionized

21. The following factor(s) determine drugs distribution

a. blood flow

b. capillary permeability
c. drug structure
d. binding of drugs to proteins
e. all of the above

22. Which one of the following is true for a drug whose elimination from plasma shows first-order kinetics?

a. the half-life of the drug is proportional to the drug concentration in plasma
b. the amount eliminated per unit of time is constant
c. the rate of elimination is proportional to the plasma concentration
d. elimination involves a rate-limiting enzymic reaction operating at its maximal velocity (**Vm**)
e. a plot of drug concentration versus time is a straight line

23. The addition of glucuronic acid to a drug:

a. decreases its water solubility
b. usually leads to inactivation of the drug
c. is an example of a Phase I reaction
d. occurs at the same rate in adults and newborns
e. involves cytochrome P450

24. Drugs showing zero-order kinetics of elimination:

a. are more common than those showing first-order kinetics
b. decrease in concentration exponentially with time
c. have a half-life independent of dose
d. show a plot of drug concentration versus time that is non-linear
e. show a constant fraction of the drug eliminated per unit time

25. Which of the following results in a doubling of the steady-state concentration of a drug?

a. doubling the rate of infusion
b. maintaining the rate of infusion, but doubling the loading dose
c. doubling the rate of infusion and doubling the concentration of the infused drug
d. tripling the rate of infusion
e. quadrupling the rate of infusion

26. All of the following about plasma protein drug binding is correct Except:

a. only the free drug can act on target sites in tissues
b. only the unbound drug is available to the process of elimination

c. the binding of drugs to albumin molecule is reversible
d. albumin has the strongest affinity for cationic drugs (weak base)
e. most hydrophilic drugs do not bind to albumin