(I) GENERAL PRINCIPLES OF PHARMACOLOGY

PART I PHARMACOKINETICS

001. Pharmacokinetics is:
a) The study of biological and therapeutic effects of drugs
b) The study of absorption, distribution, metabolism and excretion of drugs
c) The study of mechanisms of drug action
d) The study of methods of new drug development

002. What does "pharmacokinetics" include?
a) Complications of drug therapy
b) Drug biotransformation in the organism
c) Influence of drugs on metabolism processes
d) Influence of drugs on genes

002. What does "pharmacokinetics" include?
a) Pharmacological effects of drugs
b) Unwanted effects of drugs
c) Chemical structure of a medicinal agent
d) Distribution of drugs in the organism

003. What does "pharmacokinetics" include?
a) Localization of drug action
b) Mechanisms of drug action
c) Excretion of substances
d) Interaction of substances

004. The main mechanism of most drugs absorption in GI tract is:
a) Active transport (carrier-mediated diffusion)
b) Filtration (aqueous diffusion)
c) Endocytosis and exocytosis
d) Passive diffusion (lipid diffusion)

005. What kind of substances can't permeate membranes by passive diffusion?
a) Lipid-soluble
b) Non-ionized substances
c) Hydrophobic substances
d) Hydrophilic substances

006. A hydrophilic medicinal agent has the following property:
a) Low ability to penetrate through the cell membrane lipids
b) Penetrate through membranes by means of endocytosis
c) Easy permeation through the blood-brain barrier
d) High reabsorption in renal tubules

007. What is implied by «active transport»?
a) Transport of drugs trough a membrane by means of diffusion
b) Transport without energy consumption
c) Engulf of drug by a cell membrane with a new vesicle formation
d) Transport against concentration gradient

008. What does the term "bioavailability" mean?
a) Plasma protein binding degree of substance
b) Permeability through the brain-blood barrier
c) Fraction of an uncharged drug reaching the systemic circulation following any route administration
d) Amount of a substance in urine relative to the initial doze

009. The reasons determing bioavailability are:
a) Rheological parameters of blood
b) Amount of a substance obtained orally and quantity of intakes
c) Extent of absorption and hepatic first-pass effect
d) Glomerular filtration rate

010. Pick out the appropriate alimentary route of administration when passage of drugs through liver is minimized:
a) Oral
b) Transdermal
c) Rectal
d) Intraduodenal

011. Which route of drug administration is most likely to lead to the first-pass effect?
a) Sublingual

b) Oral
c) Intravenous
d) Intramuscular

012. What is characteristic of the oral route?
a) Fast onset of effect
b) Absorption depends on GI tract secretion and motor function
c) A drug reaches the blood passing the liver
d) The sterilization of medicinal forms is obligatory

013. Tick the feature of the sublingual route:
a) Pretty fast absorption
b) A drug is exposed to gastric secretion
c) A drug is exposed more prominent liver metabolism
d) A drug can be administrated in a variety of doses

014. Pick out the parenteral route of medicinal agent administration:
a) Rectal
b) Oral
c) Sublingual
d) Inhalation

015. Parenteral administration:
a) Cannot be used with unconsciousness patients
b) Generally results in a less accurate dosage than oral administration
c) Usually produces a more rapid response than oral administration
d) Is too slow for emergency use

016. What is characteristic of the intramuscular route of drug administration?
a) Only water solutions can be injected
b) Oily solutions can be injected
c) Opportunity of hypertonic solution injections
d) The action develops slower, than at oral administration

017. Intravenous injections are more suitable for oily solutions:
a) True
b) False

018. Correct statements listing characteristics of a particular route of drug administration include all of the following EXCEPT:
a) Intravenous administration provides a rapid response
b) Intramuscular administration requires a sterile technique
c) Inhalation provides slow access to the general circulation
d) Subcutaneous administration may cause local irritation

019. Most of drugs are distributed homogeneously.
a) True
b) False

020. Biological barriers include all except:
a) Renal tubules
b) Cell membranes
c) Capillary walls
d) Placenta

021. What is the reason of complicated penetration of some drugs through brain-blood barrier?
a) High lipid solubility of a drug
b) Meningitis
c) Absence of pores in the brain capillary endothelium
d) High endocytosis degree in a brain capillary

022. The volume of distribution (Vd) relates:
a) Single to a daily dose of an administrated drug
b) An administrated dose to a body weight
c) An uncharged drug reaching the systemic circulation
d) The amount of a drug in the body to the concentration of a drug in plasma

023. For the calculation of the volume of distribution (Vd) one must take into account:
a) **Concentration of a substance in plasma**
b) Concentration of substance in urine
c) Therapeutical width of drug action
d) A daily dose of drug

024. A small amount of the volume of distribution is common for lipophylic substances easy penetrating through barriers and widely distributing in plasma, interstitial and cell fluids:

a) True
b) False

025. The term "biotransformation" includes the following:
a) Accumulation of substances in a fat tissue
b) Binding of substances with plasma proteins
c) Accumulation of substances in a tissue
d) Process of physicochemical and biochemical alteration of a drug in the body

026. Biotransformation of the drugs is to render them:
a) Less ionized
b) More pharmacologically active
c) More lipid soluble
d) Less lipid soluble

027. Tick the drug type for which microsomal oxidation is the most prominent:
a) Lipid soluble
b) Water soluble
c) Low molecular weight
d) High molecular weight

028. Pick out the right statement:
a) Microsomal oxidation always results in inactivation of a compound
b) Microsomal oxidation results in a decrease of compound toxicity
c) Microsomal oxidation results in an increase of ionization and water solubility of a drug
d) Microsomal oxidation results in an increase of lipid solubility of a drug thus its excretion from the organism is facilitated

029. Stimulation of liver microsomal enzymes can:
a) Require the dose increase of some drugs
b) Require the dose decrease of some drugs
c) Prolong the duration of the action of a drug
d) Intensify the unwanted reaction of a drug

030. Metabolic transformation (phase 1) is:
a) Acetylation and methylation of substances
b) Transformation of substances due to oxidation, reduction or hydrolysis
c) Glucuronide formation
d) Binding to plasma proteins

031. Biotransformation of a medicinal substance results in:
a) Faster urinary excretion
b) Slower urinary excretion
c) Easier distribution in organism
d) Higher binding to membranes

032. Conjugation is:
a) Process of drug reduction by special enzymes
b) Process of drug oxidation by special oxidases
c) Coupling of a drug with an endogenous substrate
d) Solubilization in lipids

033. Which of the following processes proceeds in the second phase of biotransformation?
a) Acetylation
b) Reduction
c) Oxidation
d) Hydrolysis

034. Conjugation of a drug includes the following EXCEPT:
a) Glucoronidation
b) Sulfate formation
c) Hydrolysis
d) Methylation

035. Metabolic transformation and conjugation usually results in an increase of a substance biological activity:
a) True
b) False

036. In case of liver disorders accompanied by a decline in microsomal enzyme activity the duration of action of some drugs is:
a) Decreased
b) Enlarged
c) Remained unchanged
d) Changed insignificantly

037. Half life (t ½) is the time required to:
a) Change the amount of a drug in plasma by half during elimination
b) Metabolize a half of an introduced drug into the active metabolite
c) Absorb a half of an introduced drug
d) Bind a half of an introduced drug to plasma proteins

038. Half life (t ½) doesn't depend on:
a) Biotransformation
b) Time of drug absorption
c) Concentration of a drug in plasma
d) Rate of drug elimination

039. Elimination is expressed as follows:
a) Rate of renal tubular reabsorption
b) Clearance speed of some volume of blood from substance
c) Time required to decrease the amount of drug in plasma by one-half
d) Clearance of an organism from a xenobiotic

040. Elimination rate constant (K_{elim}) is defined by the following parameter:
a) Rate of absorption
b) Maximal concentration of a substance in plasma
c) Highest single dose
d) Half life (t ½)

041. The most rapid eliminated drugs are those with high glomerular filtration rate and actively secreted but aren't passively reabsorbed:
a) True
b) False

042. Systemic clearance (CL_s) is related with:
a) Only the concentration of substances in plasma
b) Only the elimination rate constant
c) Volume of distribution, half life and elimination rate constant
d) Bioavailability and half life

PART II PHARMACODYNAMICS

001. Pharmacodynamics involves the study of following EXCEPT:
a) Biological and therapeutic effects of drugs
b) Absorption and distribution of drugs
c) Mechanisms of drug action
d) Drug interactions

002. Pharmacodynamics involves the study of following?
a) Mechanisms of drug action
b) Biotransformation of drugs in the organism
c) Distribution of drugs in the organism
d) Excretion of drug from the organism

003. Pharmacodynamics involves the following?
a) Information about main mechanisms of drug absorption
b) Information about unwanted effects
c) Information about biological barriers
d) Information about excretion of a drug from the organism

004. Pick out the answer which is the most appropriate to the term "receptor"
a) All types of ion channels modulated by a drug
b) Enzymes of oxidizing-reducing reactions activated by a drug
c) Active macromolecular components of a cell or an organism which a drug molecule has to combine with in order to elicit its specific effect
d) Carriers activated by a drug

005. What does "affinity" mean?
a) A measure of how tightly a drug binds to plasma proteins
b) A measure of how tightly a drug binds to a receptor
c) A measure of inhibiting potency of a drug
d) A measure of bioavailability of a drug

006. Target proteins which a drug molecule binds are:
a) Only receptors
b) Only ion channels
c) Only carriers

d) All of the above

007. An agonist is a substance that:
a) Interacts with the receptor without producing any effect
b) **Interacts with the receptor and initiates changes in cell function, producing various effects**
c) Increases concentration of another substance to produce effect
d) Interacts with plasma proteins and doesn't produce any effect

008. If an agonist can produce maximal effects and has high efficacy it's called:
a) Partial agonist
b) Antagonist
c) Agonist-antagonist
d) Full agonist

009. If an agonist can produce submaximal effects and has moderate efficacy it's called:
a) Partial agonist
b) Antagonist
c) Agonist-antagonist
d) Full agonist

010. An antagonist is a substance that:
a) Binds to the receptors and initiates changes in cell function, producing maximal effect
b) Binds to the receptors and initiates changes in cell function, producing submaximal effect
c) Interacts with plasma proteins and doesn't produce any effect
d) Binds to the receptors without directly altering their functions

011. A competitive antagonist is a substance that:
a) Interacts with receptors and produces submaximal effect
b) Binds to the same receptor site and progressively inhibits the agonist response
c) Binds to the nonspecific sites of tissue
d) Binds to one receptor subtype as an agonist and to another as an antagonist

012. The substance binding to one receptor subtype as an agonist and to another as an antagonist is called:
a) Competitive antagonist
b) Irreversible antagonist
c) Agonist-antagonist
d) Partial agonist

013. Irreversible interaction of an antagonist with a receptor is due to:
a) Ionic bonds
b) Hydrogen bonds
c) Covalent bonds
d) All of the above

014. Mechanisms of transmembrane signaling are the following EXCEPT:
a) Transmembrane receptors that bind and stimulate a protein tyrosine kinase
b) Gene replacement by the introduction of a therapeutic gene to correct a genetic effect
c) Ligand-gated ion channels that can be induced to open or close by binding a ligand
d) Transmembrane receptor protein that stimulates a GTP-binding signal transducer protein (G-protein) which in turn generates an intracellular second messenger

015. Tick the second messenger of G-protein-coupled (metabotropic) receptor:
a) Adenylyl cyclase
b) Sodium ions
c) Phospholipase C
d) cAMP

016. Tick the substance which changes the activity of an effector element but doesn't belong to second messengers:
a) cAMP
b) cGMP
c) G–protein
d) Calcium ions

017. The increase of second messengers' (cAMP, cGMP, Ca^{2+} etc.) concentration leads to:
a) Inhibition of intracellular protein kinases and protein phosphorylation
b) Proteinkinases activation and protein phosphorylation
c) Blocking of interaction between a receptor and an effector
d) Antagonism with endogenous ligands

018. Tick the substances whose mechanisms are based on interaction with ion channels
a) Sodium channel blockers
b) Calcium channel blockers
c) Potassium channels activators

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d) All of the above

019. All of the following statements about efficacy and potency are true EXCEPT:
a) Efficacy is usually a more important clinical consideration than potency
b) Efficacy is the maximum effect of a drug
c) Potency is a comparative measure, refers to the different doses of two drugs that are needed to produce the same effect
d) The ED_{50} is a measure of drug's efficacy

020. Give the definition for a therapeutical dose:
a) The amount of a substance to produce the minimal biological effect
b) The amount of a substance to produce effects hazardous for an organism
c) The amount of a substance to produce the required effect in most patients
d) The amount of a substance to accelerate an increase of concentration of medicine in an organism

021. Pick out the correct definition of a toxic dose:
a) The amount of substance to produce the minimal biological effect
b) The amount of substance to produce effects hazardous for an organism
c) The amount of substance to produce the necessary effect in most of patients
d) The amount of substance to fast creation of high concentration of medicine in an organism

022. Which effect may lead to toxic reactions when a drug is taken continuously or repeatedly?
a) Refractoriness
b) Cumulative effect
c) Tolerance
d) Tachyphylaxis

023. What term is used to describe a more gradual decrease in responsiveness to a drug, taking days or weeks to develop?
a) Refractoriness
b) Cumulative effect
c) Tolerance
d) Tachyphylaxis

024. What term is used to describe a decrease in responsiveness to a drug which develops in a few minutes?
a) Refractoriness
b) Cumulative effect
c) Tolerance
d) Tachyphylaxis

025. Tachyphylaxis is:
a) A drug interaction between two similar types of drugs
b) Very rapidly developing tolerance
c) A decrease in responsiveness to a drug, taking days or weeks to develop
d) None of the above

026. Drug resistance is a term used to describe the loss of effectiveness of antimicrobial or antitumour drugs. This consideration is:
a) True
b) False

027. Tolerance and drug resistance can be a consequence of:
a) Drug dependence
b) Increased metabolic degradation
c) Depressed renal drug excretion
d) Activation of a drug after hepatic first-pass

028. Tolerance and drug resistance can be a consequence of:
a) Change in receptors, loss of them or exhaustion of mediators
b) Increased receptor sensitivity
c) Decreased metabolic degradation
d) Decreased renal tubular secretion

029. Tolerance develops because of:
a) Diminished absorption
b) Rapid excretion of a drug
c) Both of the above
d) None of the above

030. Dependence is often associated with tolerance to a drug, a physical abstinence syndrome, and psychological dependence (craving). This consideration is:
a) True
b) False

031. The situation when failure to continue administering the drug results in serious psychological and somatic disturbances is called?
a) Tachyphylaxis
b) Sensibilization
c) Abstinence syndrome
d) Idiosyncrasy

032. What is the type of drug-to-drug interaction which is connected with processes of absorption, biotransformation, distribution and excretion?
a) Pharmacodynamic interaction
b) Physical and chemical interaction
c) Pharmaceutical interaction
d) Pharmacokinetic interaction

033. What is the type of drug-to-drug interaction which is the result of interaction at receptor, cell, enzyme or organ level?
a) Pharmacodynamic interaction
b) Physical and chemical interaction
c) Pharmaceutical interaction
d) Pharmacokinetic interaction

034. What phenomenon can occur in case of using a combination of drugs?
a) Tolerance
b) Tachyphylaxis
c) Accumulation
d) Synergism

035. If two drugs with the same effect, taken together, produce an effect that is equal in magnitude to the sum of the effects of the drugs given individually, it is called as:
a) Antagonism
b) Potentiation
c) Additive effect
d) None of the above

036. What does the term "potentiation" mean?
a) Cumulative ability of a drug
b) Hypersensitivity to a drug
c) Fast tolerance developing
d) Intensive increase of drug effects due to their combination

037. The types of antagonism are:
a) Summarized
b) Potentiated
c) Additive
d) Competitive

038. The term "chemical antagonism" means that:
a) two drugs combine with one another to form an inactive compound
b) two drugs combine with one another to form a more active compound
c) two drugs combine with one another to form a more water soluble compound
d) two drugs combine with one another to form a more fat soluble compound

039. A teratogenic action is:
a) Toxic action on the liver
b) Negative action on the fetus causing fetal malformation
c) Toxic action on blood system
d) Toxic action on kidneys

040. Characteristic unwanted reaction which isn't related to a dose or to a pharmacodynamic property of a drug is called:
a) Idiosyncrasy
b) Hypersensitivity
c) Tolerance
d) Teratogenic action

041. Idiosyncratic reaction of a drug is:
a) A type of hypersensitivity reaction
b) A type of drug antagonism
c) Unpredictable, inherent, qualitatively abnormal reaction to a drug
d) Quantitatively exaggerated response

042. Therapeutic index (TI) is:
a) A ratio used to evaluate the safety and usefulness of a drug for indication
b) A ratio used to evaluate the effectiveness of a drug

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 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

<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