LEC 1

1. **What does pharmacokinetics study?**
   A) The effect of the drug on the body
   B) The processes of absorption, distribution, metabolism, and excretion
   C) The chemical structure of drugs
   D) The therapeutic effects of medications
   Answer: B
2. **Which of the following routes of administration guarantees full absorption of a drug?**
   A) Oral
   B) Intravenous (IV)
   C) Subcutaneous
   D) Inhalation
   Answer: B
3. **What is the primary site of drug metabolism in the body?**
   A) Kidneys
   B) Small intestine
   C) Liver
   D) Heart
   Answer: C
4. **What is the first step in the pharmacokinetic process?**
   A) Distribution
   B) Metabolism
   C) Absorption
   D) Excretion
   Answer: C
5. **Which factor does NOT influence drug distribution?**
   A) Plasma protein binding
   B) Tissue permeability
   C) Gastric pH
   D) Blood flow to organs
   Answer: C
6. **What is the 'first-pass effect'?**
   A) The absorption of a drug in the intestines
   B) The metabolism of a drug in the liver before it reaches systemic circulation
   C) The excretion of a drug via the kidneys
   D) The distribution of a drug to target tissues
   Answer: B
7. **Which phase of metabolism involves oxidation and reduction reactions?**
   A) Phase I
   B) Phase II
   C) First-pass effect

D) Conjugation
Answer: A

8. **Which of the following is the most common route of drug excretion?**
   A) Biliary
   B) Feces
   C) Sweat
   D) Renal (urine)
   Answer: D
9. **Why are capsules often preferred over tablets for certain medications like antibiotics?**
   A) Capsules are more stable.
   B) Capsules dissolve faster than tablets.
   C) Capsules are cheaper to produce.
   D) Capsules have a longer shelf life.
   Answer: B
10. **What does the volume of distribution (Vd) indicate?**
    A) The total amount of drug in the body
    B) The theoretical volume a drug would occupy if evenly distributed
    C) The concentration of drug in the bloodstream
    D) The rate of drug metabolism
    Answer: B
11. **Which enzyme system is primarily responsible for the metabolism of a majority of clinically used drugs, and what is its significance in pharmacokinetics?**
    A) Aldose reductase; it converts drugs to inactive forms.
    B) Cytochrome P450 enzymes; they mediate oxidative metabolism and influence drug-drug interactions.
    C) UGT enzymes; they are solely responsible for renal clearance.
    D) Esterases; they hydrolyze drugs to their active forms.
    Answer: B
12. **In the context of pharmacokinetics, which of the following statements about the 'first-pass effect' is true?**
    A) It refers to the enhanced absorption of drugs taken orally due to liver metabolism.
    B) It decreases the bioavailability of drugs administered via the intravenous route.
    C) It can lead to significant variability in drug response among individuals.
    D) It is negligible for drugs that are extensively protein-bound.
    Answer: C
13. **A drug exhibits zero-order kinetics at therapeutic concentrations. What does this imply about its pharmacokinetics?**
    A) The rate of drug elimination is constant regardless of concentration.
    B) The drug is eliminated proportionally to its concentration.
    C) The half-life of the drug is constant.

D) All of the above.
Answer: A

14. **If a drug has a high volume of distribution (Vd), which of the following is most likely true?**
    A) The drug is predominantly found in the bloodstream.
    B) The drug is highly protein-bound.
    C) The drug extensively distributes into tissues outside the vascular compartment.
    D) The drug is eliminated rapidly through renal clearance.
    Answer: C
15. **Which of the following pharmacokinetic parameters is least affected by changes in hepatic blood flow?**
    A) Clearance of drugs that undergo extensive first-pass metabolism.
    B) Clearance of drugs that are minimally metabolized by the liver.
    C) Bioavailability of orally administered drugs.
    D) Total body clearance of drugs that are highly dependent on liver function.
    Answer: B
16. **Case 1: A 45-year-old patient is prescribed a medication that is significantly affected by the first-pass effect. After taking the drug orally, the patient reports minimal therapeutic effect. What is the most likely explanation for this?**
    A) The drug is extensively metabolized by the liver before reaching systemic circulation.
    B) The drug has a high volume of distribution, leading to low blood concentration.
    C) The patient has impaired renal function, affecting drug clearance.
    D) The drug is poorly absorbed in the gastrointestinal tract.
    Answer: A
17. **Case 2: A physician is considering switching a patient from an oral medication to an intravenous (IV) form due to the patient's critical condition. What is the primary advantage of using the IV route in this situation?**
    A) It is more cost-effective than oral medication.
    B) It guarantees full absorption of the drug.
    C) It minimizes the risk of adverse effects.
    D) It enhances the drug's therapeutic index.
    Answer: B
18. **Case 3: A 60-year-old woman is started on a new medication that is highly protein-bound. During her follow-up appointment, her doctor notes that the medication is not achieving the desired effect. Which of the following factors might explain this?**
    A) Increased renal clearance of the drug
    B) Competition with other drugs for protein binding
    C) Enhanced gastric pH affecting absorption

D) Decreased hepatic metabolism
Answer: B

19. **Case 4: A patient receives a drug that has a large volume of distribution (Vd). Which clinical scenario would most likely occur in this patient?**
A) The drug will primarily remain in the bloodstream.
B) The patient will require lower doses to achieve therapeutic effects.
C) The drug will distribute widely into tissues outside the vascular compartment.
D) The patient will experience increased side effects due to rapid elimination.
Answer: C
20. **Case 5: A patient is prescribed a medication that undergoes both Phase I and Phase II metabolism. Which of the following statements is true regarding this drug's metabolism?**
A) It will only undergo oxidation and reduction reactions.
B) It can directly enter Phase II reactions without passing through Phase I.
C) Phase I metabolism generally increases the drug's toxicity.
D) Phase II metabolism involves the breakdown of the drug into its active form.
Answer: B
21. **Case 6: A 30-year-old male patient presents to the emergency department with an overdose of a drug known for its high lipophilicity. Which pharmacokinetic characteristic most likely explains the prolonged effects of this drug?**
A) High renal clearance
B) Large volume of distribution (Vd)
C) Extensive first-pass metabolism
D) Rapid hepatic elimination
Answer: B
22. **Case 7: A 50-year-old woman with chronic liver disease is started on a new medication that is primarily metabolized by the liver. What is the most significant concern regarding her drug therapy?**
A) Increased gastric pH affecting absorption
B) Reduced first-pass effect
C) Accumulation of the drug leading to toxicity
D) Increased protein binding
Answer: C
23. **Case 8: A patient receiving a medication orally has a bioavailability of only 40%. If the medication is administered intravenously, what can be expected about its bioavailability?**
A) It will be lower than 40%.
B) It will be 100%.
C) It will vary based on individual metabolism.
D) It will be equivalent to the oral form.
Answer: B

24. **Case 9: A 70-year-old male is taking multiple medications, including one that induces cytochrome P450 enzymes. What impact might this have on the pharmacokinetics of his other medications?**
    A) Decreased drug clearance and increased effect
    B) Increased drug metabolism and decreased effect
    C) Increased bioavailability of oral medications
    D) Reduced renal excretion of drugs
    Answer: B
25. **Case 10: A pharmacist receives a prescription for a drug that undergoes significant enterohepatic recirculation. What does this imply about the drug's pharmacokinetics?**
    A) The drug is rapidly eliminated through the kidneys.
    B) The drug may have prolonged action due to reabsorption.
    C) The drug is primarily excreted unchanged in urine.
    D) The drug's absorption is significantly affected by food intake.
    Answer: B
26. **Case 11: A patient on a stable dose of a medication experiences a significant increase in drug levels after starting a new antifungal agent. What is the most likely reason for this interaction?**
    A) The antifungal agent enhances renal clearance.
    B) The antifungal agent inhibits cytochrome P450 enzymes involved in the drug's metabolism.
    C) The antifungal agent increases the drug's bioavailability.
    D) The antifungal agent displaces the drug from plasma proteins.
    Answer: B
27. **Case 12: A patient requires a medication that is known to have a low therapeutic index. What should the healthcare provider be most concerned about?**
    A) The drug's high protein-binding capacity.
    B) The narrow margin between therapeutic and toxic doses.
    C) The drug's route of administration.
    D) The drug's volume of distribution.
    Answer: B

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