

## Chapter 002 Pharmacokinetics and Factors of Individual Variation

### Multiple Choice Questions

1. Identify the term used for the process by which a drug enters the bloodstream from its site of administration.
  - A. Drug absorption
  - B. Drug excretion
  - C. Drug distribution
  - D. Drug metabolism
  
2. Identify the most common drug available as a transdermal patch system.
  - A. Nitroglycerin
  - B. Clonidine
  - C. Estrogen
  - D. All of these are correct.
  
3. Identify the dosage form that contains dried and finely ground drugs or drug extract.
  - A. Powders
  - B. Tablets
  - C. Troches
  - D. Capsules
  
4. Match the dosage form commonly known as a "troche" to the medical condition it is used to treat.
  - A. Asthma
  - B. Tonsillitis
  - C. Sore throat
  - D. Toothache

## Chapter 002 Pharmacokinetics and Factors of Individual Variation

5. Among the factors that affect drug distribution, the factor that plays the biggest role in how much drug penetrates the brain is:

- A. Lipid solubility
- B. Plasma protein binding
- C. Blood circulation
- D. GI absorption rate

6. Match the proper preparation name to a solution that is described as containing water and sugar and added drug.

- A. Elixir
- B. Tincture
- C. Syrup
- D. Fluid extract

7. Compare the processes of drug absorption, drug distribution, drug metabolism, and drug excretion. These are all components of the study known as:

- A. Half-life
- B. Pharmacokinetics
- C. Bioavailability
- D. Enzyme induction

8. Match the correct alcohol concentration range to the dosage form that is referred to as an alcoholic preparation and that includes the elixirs, spirits, tinctures, and fluid extracts.

- A. 5 to 10 percent
- B. 10 to 15 percent
- C. 10 to 25 percent
- D. 5 to 20 percent

## Chapter 002 Pharmacokinetics and Factors of Individual Variation

9. The fact that adipose tissue receives a relatively poor blood supply can be interpreted as indicating that adipose tissue:

- A. Accumulates large amounts of drug
- B. Does not accumulate large amounts of drug
- C. Does not metabolize large amounts of drug
- D. Metabolizes large amounts of drug

10. Use the term *drug tolerance*, *drug dependence*, or *drug addiction* to document the reason why a patient's dose of an analgesic agent he uses for chronic pain has been increased two times over the last 12 months.

- A. The drug's effect decreases due to repeated administration of the product.
- B. Reliance on the administration of the drug leads to a psychological and or physical condition for the patient.
- C. Compulsive dependence on a drug dominates all other activities in the patient's life.
- D. None of these are correct.

11. Use a half-life of 8 hours to determine how much drug is left in the body at 4 p.m. after a 500-mg dose was taken at 8 am.

- A. 250 mg
- B. 125 mg
- C. 375 mg
- D. None of these are correct.

12. Use a half-life of 4 hours to determine how much drug is left in the body at 2 p.m. after a 200-mg dose was given by the intravenous route of administration at 6 a.m.

- A. 25 mg
- B. 12.5 mg
- C. 50 mg
- D. None of these are correct.

## Chapter 002 Pharmacokinetics and Factors of Individual Variation

13. Implementing a patient education program should include educating patients to take their drug products properly. Patients should be instructed to take enteric-coated products:

- A. On an empty stomach
- B. One hour before meals
- C. Two hours after meals
- D. All of these are correct.

14. Compare the routes of administration based on the parameters of patient safety and ease of drug use in order to select the correct route of administration for a patient with a busy lifestyle and a hectic schedule.

- A. Parenteral administration
- B. Oral administration
- C. Topical administration
- D. Inhalation administration

15. Use onset of action to determine which of the following routes of administration will lead to the slowest therapeutic response.

- A. Inhalation
- B. Transdermal
- C. Intramuscular
- D. Sublingual

16. Use onset of action to determine which of the following routes of administration will lead to the quickest therapeutic response.

- A. Inhalation
- B. Transdermal
- C. Intramuscular
- D. Sublingual

## Chapter 002 Pharmacokinetics and Factors of Individual Variation

17. Using the factors of individual variation, select the statement that best describes the placebo effect.

- A. Excitement can lead to perceived symptom improvement.
- B. Positive attitude can lead to perceived symptom improvement.
- C. Less body fat can lead to perceived symptom improvement.
- D. None of these are correct.

18. Differentiate between the routes of drug administration in order to select the route that is restricted to use in the hospital setting due to immediate onset of action and high percentage of drug bioavailability.

- A. IM injection method
- B. IV injection method
- C. Topical application method
- D. Suppository insertion method

19. Differentiate between the transport mechanisms to determine how cells allow drugs to pass through the cell membrane.

- A. Filtration
- B. Passive transport
- C. Active transport
- D. All of these are correct.

20. Select the basic principle in passive transport by which most drug molecules diffuse through the cell membrane.

- A. Drug passes from an area of high concentration to an area of low concentration.
- B. Drug passes from an area of low concentration to an area of high concentration.
- C. Drug passes from an area of high concentration to an area of high concentration.
- D. Drug passes from an area of low concentration to an area of low concentration.

## Chapter 002 Pharmacokinetics and Factors of Individual Variation

21. Differentiate between tolerance, antagonism, and synergism in order to select the drug interaction that occurs during antagonism.

- A. The combined effect of two drugs, by the same mechanism of action, is equal to the sum of their individual effects.
- B. The combined effect of two drugs, by a different mechanism of action, is equal to the sum of their individual effects.
- C. The combined effect of two drugs is less than the sum of their individual effects.
- D. The combined effect of two drugs is larger than the sum of their individual effects.

22. Differentiate between the FDA pregnancy categories to determine the proper category for a drug for which studies on animals have not demonstrated fetal risk and no studies have been performed in pregnant women.

- A. Pregnancy Category A
- B. Pregnancy Category B
- C. Pregnancy Category D
- D. None of these are correct.

23. When differentiating between enzyme induction and enzyme inhibition, enzyme induction can be interpreted as resulting in a(an):

- A. Increase in the rate of drug metabolism in the liver, leading to a decreased duration of action
- B. Decrease in the rate of drug metabolism in the liver, leading to a decreased duration of action
- C. Unchanged rate of drug metabolism in the liver, leading to an increased duration of action
- D. None of these are correct.

24. When differentiating between free drug molecules and drug molecules that have bound to plasma proteins, the main focus is:

- A. Only unbound or free drug molecules can exert a pharmacological effect.
- B. Only drug molecules that have bound to plasma can exert a pharmacological effect.
- C. Free drug molecules exert the same level of pharmacological effect as drug molecules that are bound to plasma.
- D. None of these are correct

## Chapter 002 Pharmacokinetics and Factors of Individual Variation

25. You have been asked to explain to a patient the possibility that he will experience drug interactions while taking his newly prescribed medications. Select the appropriate statement you will use when explaining "synergism" to the patient.
- A. Drugs may increase each other's effect equal to the sum of their individual effects.
  - B. Drugs may increase each other's effect greater than the sum of their individual effects.
  - C. Drugs may cancel each other's effect or lead to a response that is less than the sum of their individual effects.
  - D. None of these are correct.
26. Select the proper method by which you can conclude that there will be 100 percent bioavailability in the circulatory system immediately after administration of the drug product.
- A. Subcutaneous injection method
  - B. Inhalation method
  - C. Transdermal patch method
  - D. Intravenous injection method
27. Select the most appropriate reason why a patient with cirrhosis of the liver does not get the therapeutic response expected from the medications that she is taking.
- A. The patient's ability to absorb drug is impaired.
  - B. The patient's ability to distribute drug throughout the body is impaired.
  - C. The patient's ability to metabolize drug is impaired.
  - D. The patient's ability to excrete unused drug from the body is impaired.
28. A patient has an order in the chart that reads, "Take two tablets by mouth today; then take one tablet by mouth daily for the next 4 days." Select the term that represents the part of the order that reads, "Take two tablets by mouth today."
- A. Maintenance dose
  - B. Therapeutic dose
  - C. Loading dose
  - D. None of these are correct.

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29. Select the most likely reason why a patient who has been diagnosed with end-stage renal disease must have routine blood work drawn to check his blood levels of a prescribed drug.
- A. Due to the renal disease, the patient is unable to effectively eliminate the drug, causing accumulation of the drug in the plasma.
  - B. Due to the renal disease, the patient is unable to effectively metabolize the drug, causing low levels of the drug in the plasma.
  - C. Due to the renal disease, the patient is unable to effectively absorb the drug, causing low levels of the drug in the plasma.
  - D. None of these are correct.



### Multiple Choice Questions

1. (p. 20) Identify the term used for the process by which a drug enters the bloodstream from its site of administration.

- A.** Drug absorption
- B. Drug excretion
- C. Drug distribution
- D. Drug metabolism

Drug absorption refers to the entrance of a drug into the bloodstream.

*ABHES Competency: 2. Anatomy and Physiology b. Identify and apply the knowledge of all body systems; their structure and functions; and their common diseases, symptoms, and etiologies. 6. Pharmacology b. Properly utilize PDR, drug handbook, and other drug references to identify a drug's classification, usual dosage, usual side effects, and contraindications.*

*Bloom's: Remembering*

*CAAHEP Competency: I. Anatomy & Physiology 11. Identify the classifications of medications, including desired effect, side effects, and adverse reactions.*

*Difficulty: Easy*

*Learning Outcome: 2.2 Understand the pharmacokinetic factors that determine the absorption, distribution, metabolism, and excretion of drugs.*

2. (p. 19) Identify the most common drug available as a transdermal patch system.

- A. Nitroglycerin
- B. Clonidine
- C. Estrogen
- D.** All of these are correct.

Transdermal products are administered through a bandage or patch. Nitroglycerin, estrogen, and clonidine are drugs available in this form.

*ABHES Competency: 6. Pharmacology b. Properly utilize PDR, drug handbook, and other drug references to identify a drug's classification, usual dosage, usual side effects, and contraindications.*

*Bloom's: Remembering*

*CAAHEP Competency: I. Anatomy & Physiology 12. Describe the relationship between anatomy and physiology of all body systems and medications used for treatment in each.*

*Difficulty: Easy*

*Learning Outcome: 2.1 List different forms of drug products and the routes by which they are administered.*

## Chapter 002 Pharmacokinetics and Factors of Individual Variation **Key**

3. (p. 18) Identify the dosage form that contains dried and finely ground drugs or drug extract.

- A. Powders
- B. Tablets
- C. Troches
- D. Capsules

Powders are drugs or drug extracts that are dried and ground into fine particles.

*ABHES Competency: 6. Pharmacology b. Properly utilize PDR, drug handbook, and other drug references to identify a drug's classification, usual dosage, usual side effects, and contraindications.*

*Bloom's: Remembering*

*CAAHEP Competency: I. Anatomy & Physiology 11. Identify the classifications of medications, including desired effect, side effects, and adverse reactions.*

*Difficulty: Easy*

*Learning Outcome: 2.1 List different forms of drug products and the routes by which they are administered.*

4. (p. 18) Match the dosage form commonly known as a "troche" to the medical condition it is used to treat.

- A. Asthma
- B. Tonsillitis
- C. Sore throat
- D. Toothache

Troches are flattened tablets that are allowed to dissolve in the mouth. They are commonly used for colds and sore throats.

*ABHES Competency: 2. Anatomy and Physiology b. Identify and apply the knowledge of all body systems; their structure and functions; and their common diseases, symptoms, and etiologies. 6. Pharmacology b. Properly utilize PDR, drug handbook, and other drug references to identify a drug's classification, usual dosage, usual side effects, and contraindications.*

*Bloom's: Understanding*

*CAAHEP Competency: I. Anatomy & Physiology 11. Identify the classifications of medications, including desired effect, side effects, and adverse reactions.*

*Difficulty: Easy*

*Learning Outcome: 2.1 List different forms of drug products and the routes by which they are administered.*

## Chapter 002 Pharmacokinetics and Factors of Individual Variation **Key**

5. (p. 22) Among the factors that affect drug distribution, the factor that plays the biggest role in how much drug penetrates the brain is:

- A.** Lipid solubility
- B. Plasma protein binding
- C. Blood circulation
- D. GI absorption rate

Since the brain is composed of a large amount of lipid (nerve membranes and myelin), lipid-soluble drugs pass readily into the brain. As a general rule, then, a drug must have a certain degree of lipid solubility if it is to penetrate this barrier and gain access to the brain.

*ABHES Competency: 2. Anatomy and Physiology b. Identify and apply the knowledge of all body systems; their structure and functions; and their common diseases, symptoms, and etiologies. 6. Pharmacology b. Properly utilize PDR, drug handbook, and other drug references to identify a drug's classification, usual dosage, usual side effects, and contraindications.*

*Bloom's: Understanding*

*CAAHEP Competency: 1. Anatomy & Physiology 12. Describe the relationship between anatomy and physiology of all body systems and medications used for treatment in each.*

*Difficulty: Easy*

*Learning Outcome: 2.3 Identify how half-life, blood drug level, and bioavailability relate to drug response.*

6. (p. 18) Match the proper preparation name to a solution that is described as containing water and sugar and added drug.

- A. Elixir
- B. Tincture
- C.** Syrup
- D. Fluid extract

A syrup is a solution of water and sugar to which a drug is added.

*ABHES Competency: 6. Pharmacology b. Properly utilize PDR, drug handbook, and other drug references to identify a drug's classification, usual dosage, usual side effects, and contraindications.*

*Bloom's: Understanding*

*CAAHEP Competency: 1. Anatomy & Physiology 11. Identify the classifications of medications, including desired effect, side effects, and adverse reactions.*

*Difficulty: Easy*

*Learning Outcome: 2.1 List different forms of drug products and the routes by which they are administered.*

## Chapter 002 Pharmacokinetics and Factors of Individual Variation **Key**

7. (p. 18) Compare the processes of drug absorption, drug distribution, drug metabolism, and drug excretion. These are all components of the study known as:

- A. Half-life
- B.** Pharmacokinetics
- C. Bioavailability
- D. Enzyme induction

Pharmacokinetics is a study of the factors that determine drug absorption, drug distribution, drug metabolism, and drug excretion.

*ABHES Competency: 2. Anatomy and Physiology b. Identify and apply the knowledge of all body systems; their structure and functions; and their common diseases, symptoms, and etiologies.*

*Bloom's: Understanding*

*CAAHEP Competency: I. Anatomy & Physiology 11. Identify the classifications of medications, including desired effect, side effects, and adverse reactions.*

*Difficulty: Easy*

*Learning Outcome: 2.2 Understand the pharmacokinetic factors that determine the absorption, distribution, metabolism, and excretion of drugs.*

8. (p. 18) Match the correct alcohol concentration range to the dosage form that is referred to as an alcoholic preparation and that includes the elixirs, spirits, tinctures, and fluid extracts.

- A. 5 to 10 percent
- B. 10 to 15 percent
- C. 10 to 25 percent
- D.** 5 to 20 percent

Elixirs, spirits, tinctures, and fluid extracts are drugs dissolved in various concentrations of alcohol, usually in the range of 5 to 20 percent.

*ABHES Competency: 6. Pharmacology b. Properly utilize PDR, drug handbook, and other drug references to identify a drug's classification, usual dosage, usual side effects, and contraindications.*

*Bloom's: Understanding*

*CAAHEP Competency: I. Anatomy & Physiology 11. Identify the classifications of medications, including desired effect, side effects, and adverse reactions.*

*Difficulty: Easy*

*Learning Outcome: 2.1 List different forms of drug products and the routes by which they are administered.*

## Chapter 002 Pharmacokinetics and Factors of Individual Variation **Key**

9. (p. 22) The fact that adipose tissue receives a relatively poor blood supply can be interpreted as indicating that adipose tissue:

- A. Accumulates large amounts of drug
- B. Does not accumulate large amounts of drug**
- C. Does not metabolize large amounts of drug
- D. Metabolizes large amounts of drug

Some tissues, such as adipose tissue, receive a relatively poor blood supply and, as a result, do not accumulate large amounts of drug.

*ABHES Competency: 2. Anatomy and Physiology b. Identify and apply the knowledge of all body systems; their structure and functions; and their common diseases, symptoms, and etiologies.*

*Bloom's: Understanding*

*CAAHEP Competency: I. Anatomy & Physiology 12. Describe the relationship between anatomy and physiology of all body systems and medications used for treatment in each.*

*Difficulty: Easy*

*Learning Outcome: 2.2 Understand the pharmacokinetic factors that determine the absorption, distribution, metabolism, and excretion of drugs.*

10. (p. 28–29) Use the term *drug tolerance*, *drug dependence*, or *drug addiction* to document the reason why a patient's dose of an analgesic agent he uses for chronic pain has been increased two times over the last 12 months.

- A. The drug's effect decreases due to repeated administration of the product.**
- B. Reliance on the administration of the drug leads to a psychological and or physical condition for the patient.
- C. Compulsive dependence on a drug dominates all other activities in the patient's life.
- D. None of these are correct.

Drug tolerance is defined as a decreased drug effect that occurs after repeated administration. In order to attain the previous drug effect, the dosage must be increased.

*ABHES Competency: 2. Anatomy and Physiology b. Identify and apply the knowledge of all body systems; their structure and functions; and their common diseases, symptoms, and etiologies. 6. Pharmacology b. Properly utilize PDR, drug handbook, and other drug references to identify a drug's classification, usual dosage, usual side effects, and contraindications.*

*Bloom's: Applying*

*CAAHEP Competency: I. Anatomy & Physiology 11. Identify the classifications of medications, including desired effect, side effects, and adverse reactions.*

*Difficulty: Medium*

*Learning Outcome: 2.7 Explain the basic terminology of chronic drug administration and drug dependence.*

## Chapter 002 Pharmacokinetics and Factors of Individual Variation **Key**

11. (p. 23) Use a half-life of 8 hours to determine how much drug is left in the body at 4 p.m. after a 500-mg dose was taken at 8 am.

- A. 250 mg
- B. 125 mg
- C. 375 mg
- D. None of these are correct.

The half-life of a drug is the time required for the blood or plasma concentration of the drug to fall to half of its original level.

*ABHES Competency: 6. Pharmacology a. Demonstrate accurate occupational math and metric conversions for proper medication administration. b. Properly utilize PDR, drug handbook, and other drug references to identify a drug's classification, usual dosage, usual side effects, and contraindications.*

*Bloom's: Applying*

*CAAHEP Competency: I. Anatomy & Physiology 11. Identify the classifications of medications, including desired effect, side effects, and adverse reactions.*

*Difficulty: Medium*

*Learning Outcome: 2.3 Identify how half-life, blood drug level, and bioavailability relate to drug response.*

12. (p. 23) Use a half-life of 4 hours to determine how much drug is left in the body at 2 p.m. after a 200-mg dose was given by the intravenous route of administration at 6 a.m.

- A. 25 mg
- B. 12.5 mg
- C. 50 mg
- D. None of these are correct.

The half-life of a drug is the time required for the blood or plasma concentration of the drug to fall to half of its original level.

*ABHES Competency: 6. Pharmacology a. Demonstrate accurate occupational math and metric conversions for proper medication administration. b. Properly utilize PDR, drug handbook, and other drug references to identify a drug's classification, usual dosage, usual side effects, and contraindications.*

*Bloom's: Applying*

*CAAHEP Competency: I. Anatomy & Physiology 11. Identify the classifications of medications, including desired effect, side effects, and adverse reactions.*

*Difficulty: Medium*

*Learning Outcome: 2.3 Identify how half-life, blood drug level, and bioavailability relate to drug response.*

## Chapter 002 Pharmacokinetics and Factors of Individual Variation **Key**

13. (p. 19) Implementing a patient education program should include educating patients to take their drug products properly. Patients should be instructed to take enteric-coated products:

- A. On an empty stomach
- B. One hour before meals
- C. Two hours after meals
- D.** All of these are correct.

Enteric-coated products should be taken on an empty stomach with water, either 1 hour before or 2 hours after meals.

*ABHES Competency: 6. Pharmacology b. Properly utilize PDR, drug handbook, and other drug references to identify a drug's classification, usual dosage, usual side effects, and contraindications. 9. Medical Office Clinical Procedures d. Recognize and understand various treatment protocols.*

*Bloom's: Applying*

*CAAHEP Competency: I. Anatomy & Physiology 11. Identify the classifications of medications, including desired effect, side effects, and adverse reactions.*

*Difficulty: Medium*

*Learning Outcome: 2.1 List different forms of drug products and the routes by which they are administered.*

14. (p. 19) Compare the routes of administration based on the parameters of patient safety and ease of drug use in order to select the correct route of administration for a patient with a busy lifestyle and a hectic schedule.

- A. Parenteral administration
- B.** Oral administration
- C. Topical administration
- D. Inhalation administration

The oral administration route is the safest and the most convenient method.

*ABHES Competency: 6. Pharmacology b. Properly utilize PDR, drug handbook, and other drug references to identify a drug's classification, usual dosage, usual side effects, and contraindications. 9. Medical Office Clinical Procedures d. Recognize and understand various treatment protocols.*

*Bloom's: Applying*

*CAAHEP Competency: I. Anatomy & Physiology 11. Identify the classifications of medications, including desired effect, side effects, and adverse reactions.*

*Difficulty: Medium*

*Learning Outcome: 2.1 List different forms of drug products and the routes by which they are administered.*

## Chapter 002 Pharmacokinetics and Factors of Individual Variation **Key**

15. (p. 20) Use onset of action to determine which of the following routes of administration will lead to the slowest therapeutic response.

- A. Inhalation
- B.** Transdermal
- C. Intramuscular
- D. Sublingual

The transdermal route of administration has an onset of action of approximately 30 to 60 minutes.

*ABHES Competency: 6. Pharmacology b. Properly utilize PDR, drug handbook, and other drug references to identify a drug's classification, usual dosage, usual side effects, and contraindications. 9. Medical Office Clinical Procedures d. Recognize and understand various treatment protocols.*

*Bloom's: Applying*

*CAAHEP Competency: I. Anatomy & Physiology 11. Identify the classifications of medications, including desired effect, side effects, and adverse reactions.*

*Difficulty: Medium*

*Learning Outcome: 2.1 List different forms of drug products and the routes by which they are administered.*

16. (p. 20) Use onset of action to determine which of the following routes of administration will lead to the quickest therapeutic response.

- A.** Inhalation
- B. Transdermal
- C. Intramuscular
- D. Sublingual

The inhalation route of administration has an onset of action within one minute of administration.

*ABHES Competency: 6. Pharmacology b. Properly utilize PDR, drug handbook, and other drug references to identify a drug's classification, usual dosage, usual side effects, and contraindications. 9. Medical Office Clinical Procedures d. Recognize and understand various treatment protocols.*

*Bloom's: Applying*

*CAAHEP Competency: I. Anatomy & Physiology 11. Identify the classifications of medications, including desired effect, side effects, and adverse reactions.*

*Difficulty: Medium*

*Learning Outcome: 2.1 List different forms of drug products and the routes by which they are administered.*



## Chapter 002 Pharmacokinetics and Factors of Individual Variation **Key**

17. (p. 25) Using the factors of individual variation, select the statement that best describes the placebo effect.

- A. Excitement can lead to perceived symptom improvement.
- B. Positive attitude can lead to perceived symptom improvement.**
- C. Less body fat can lead to perceived symptom improvement.
- D. None of these are correct.

It has been observed that if patients have a positive attitude and think that the drug or treatment will help, chances are the patients claim an improvement whether there actually is one or not.

*ABHES Competency: 6. Pharmacology b. Properly utilize PDR, drug handbook, and other drug references to identify a drug's classification, usual dosage, usual side effects, and contraindications. 9. Medical Office Clinical Procedures d. Recognize and understand various treatment protocols.*

*Bloom's: Applying*

*CAAHEP Competency: I. Anatomy & Physiology 11. Identify the classifications of medications, including desired effect, side effects, and adverse reactions.*

*Difficulty: Medium*

*Learning Outcome: 2.4 List several factors of individual variation that can alter drug response.*

18. (p. 19) Differentiate between the routes of drug administration in order to select the route that is restricted to use in the hospital setting due to immediate onset of action and high percentage of drug bioavailability.

- A. IM injection method
- B. IV injection method**
- C. Topical application method
- D. Suppository insertion method

Intravenous (IV) injection is usually restricted to use in the hospital. IV injection offers the fastest means of drug absorption because the drug is delivered directly into the circulation; therefore, the onset of drug action is almost immediate.

*ABHES Competency: 6. Pharmacology b. Properly utilize PDR, drug handbook, and other drug references to identify a drug's classification, usual dosage, usual side effects, and contraindications. 9. Medical Office Clinical Procedures d. Recognize and understand various treatment protocols.*

*Bloom's: Analyzing*

*CAAHEP Competency: I. Anatomy & Physiology 11. Identify the classifications of medications, including desired effect, side effects, and adverse reactions.*

*Difficulty: Hard*

*Learning Outcome: 2.1 List different forms of drug products and the routes by which they are administered.*

## Chapter 002 Pharmacokinetics and Factors of Individual Variation **Key**

19. (p. 20) Differentiate between the transport mechanisms to determine how cells allow drugs to pass through the cell membrane.

- A. Filtration
- B. Passive transport
- C. Active transport
- D. All of these are correct.**

Cells have special transport mechanisms that allow various substances (including drugs) to pass through the cell membrane. These mechanisms include filtration, passive transport, and active transport.

*ABHES Competency: 2. Anatomy and Physiology b. Identify and apply the knowledge of all body systems; their structure and functions; and their common diseases, symptoms, and etiologies.*

*Bloom's: Analyzing*

*CAAHEP Competency: I. Anatomy & Physiology 12. Describe the relationship between anatomy and physiology of all body systems and medications used for treatment in each.*

*Difficulty: Hard*

*Learning Outcome: 2.2 Understand the pharmacokinetic factors that determine the absorption, distribution, metabolism, and excretion of drugs.*

20. (p. 20–21) Select the basic principle in passive transport by which most drug molecules diffuse through the cell membrane.

- A. Drug passes from an area of high concentration to an area of low concentration.**
- B. Drug passes from an area of low concentration to an area of high concentration.
- C. Drug passes from an area of high concentration to an area of high concentration.
- D. Drug passes from an area of low concentration to an area of low concentration.

Most drugs pass through membranes by passive transport. An important principle in passive transport is that the concentration of drug on each side of the membrane differs. In passive transport, drug molecules diffuse from an area of high concentration to an area of low concentration (law of diffusion).

*ABHES Competency: 2. Anatomy and Physiology b. Identify and apply the knowledge of all body systems; their structure and functions; and their common diseases, symptoms, and etiologies. 6. Pharmacology b. Properly utilize PDR, drug handbook, and other drug references to identify a drug's classification, usual dosage, usual side effects, and contraindications.*

*Bloom's: Analyzing*

*CAAHEP Competency: I. Anatomy & Physiology 12. Describe the relationship between anatomy and physiology of all body systems and medications used for treatment in each.*

*Difficulty: Hard*

*Learning Outcome: 2.2 Understand the pharmacokinetic factors that determine the absorption, distribution, metabolism, and excretion of drugs.*

## Chapter 002 Pharmacokinetics and Factors of Individual Variation **Key**

21. (p. 29) Differentiate between tolerance, antagonism, and synergism in order to select the drug interaction that occurs during antagonism.

A. The combined effect of two drugs, by the same mechanism of action, is equal to the sum of their individual effects.

B. The combined effect of two drugs, by a different mechanism of action, is equal to the sum of their individual effects.

**C.** The combined effect of two drugs is less than the sum of their individual effects.

D. The combined effect of two drugs is larger than the sum of their individual effects.

Antagonism occurs when the combined effect of two drugs is less than the sum of their individual effects.

*ABHES Competency: 6. Pharmacology b. Properly utilize PDR, drug handbook, and other drug references to identify a drug's classification, usual dosage, usual side effects, and contraindications.*

*Bloom's: Analyzing*

*CAAHEP Competency: I. Anatomy & Physiology 11. Identify the classifications of medications, including desired effect, side effects, and adverse reactions.*

*Difficulty: Hard*

*Learning Outcome: 2.6 Define the different types of drug interaction.*

22. (p. 26) Differentiate between the FDA pregnancy categories to determine the proper category for a drug for which studies on animals have not demonstrated fetal risk and no studies have been performed in pregnant women.

A. Pregnancy Category A

**B.** Pregnancy Category B

C. Pregnancy Category D

D. None of these are correct.

Pregnancy Category B: Drug studies have not been performed in pregnant women and animal studies have not demonstrated fetal risk.

*ABHES Competency: 2. Anatomy and Physiology b. Identify and apply the knowledge of all body systems; their structure and functions; and their common diseases, symptoms, and etiologies. 6. Pharmacology b. Properly utilize PDR, drug handbook, and other drug references to identify a drug's classification, usual dosage, usual side effects, and contraindications.*

*Bloom's: Analyzing*

*CAAHEP Competency: I. Anatomy & Physiology 11. Identify the classifications of medications, including desired effect, side effects, and adverse reactions.*

*Difficulty: Hard*

*Learning Outcome: 2.5 Understand the drug factors that relate to pediatric drug administration.*

## Chapter 002 Pharmacokinetics and Factors of Individual Variation **Key**

23. (p. 22) When differentiating between enzyme induction and enzyme inhibition, enzyme induction can be interpreted as resulting in a(an):
- A.** Increase in the rate of drug metabolism in the liver, leading to a decreased duration of action
  - B. Decrease in the rate of drug metabolism in the liver, leading to a decreased duration of action
  - C. Unchanged rate of drug metabolism in the liver, leading to an increased duration of action
  - D. None of these are correct.

By stimulating the microsomal metabolizing system, the drugs actually increase the amount of enzymes (cytochrome P450's) in the system; this process is referred to as enzyme induction. With an increase in the amount of enzymes, there is a faster rate of drug metabolism. Consequently, the duration of drug action is decreased for all drugs metabolized.

*ABHES Competency: 2. Anatomy and Physiology b. Identify and apply the knowledge of all body systems; their structure and functions; and their common diseases, symptoms, and etiologies. 6. Pharmacology b. Properly utilize PDR, drug handbook, and other drug references to identify a drug's classification, usual dosage, usual side effects, and contraindications.*

*Bloom's: Analyzing*

*CAAHEP Competency: 1. Anatomy & Physiology 12. Describe the relationship between anatomy and physiology of all body systems and medications used for treatment in each.*

*Difficulty: Hard*

*Learning Outcome: 2.2 Understand the pharmacokinetic factors that determine the absorption, distribution, metabolism, and excretion of drugs.*

24. (p. 22) When differentiating between free drug molecules and drug molecules that have bound to plasma proteins, the main focus is:
- A.** Only unbound or free drug molecules can exert a pharmacological effect.
  - B. Only drug molecules that have bound to plasma can exert a pharmacological effect.
  - C. Free drug molecules exert the same level of pharmacological effect as drug molecules that are bound to plasma.
  - D. None of these are correct

Only unbound or free drug molecules can exert a pharmacological effect.

*ABHES Competency: 2. Anatomy and Physiology b. Identify and apply the knowledge of all body systems; their structure and functions; and their common diseases, symptoms, and etiologies. 6. Pharmacology b. Properly utilize PDR, drug handbook, and other drug references to identify a drug's classification, usual dosage, usual side effects, and contraindications.*

*Bloom's: Analyzing*

*CAAHEP Competency: 1. Anatomy & Physiology 12. Describe the relationship between anatomy and physiology of all body systems and medications used for treatment in each.*

*Difficulty: Hard*

*Learning Outcome: 2.2 Understand the pharmacokinetic factors that determine the absorption, distribution, metabolism, and excretion of drugs.*

## Chapter 002 Pharmacokinetics and Factors of Individual Variation **Key**

25. (p. 29) You have been asked to explain to a patient the possibility that he will experience drug interactions while taking his newly prescribed medications. Select the appropriate statement you will use when explaining "synergism" to the patient.
- A. Drugs may increase each other's effect equal to the sum of their individual effects.
  - B.** Drugs may increase each other's effect greater than the sum of their individual effects.
  - C. Drugs may cancel each other's effect or lead to a response that is less than the sum of their individual effects.
  - D. None of these are correct.

Synergism occurs when the combined effect of two drugs is greater than the sum of their individual effects.

*ABHES Competency: 6. Pharmacology b. Properly utilize PDR, drug handbook, and other drug references to identify a drug's classification, usual dosage, usual side effects, and contraindications.*

*Bloom's: Analyzing*

*CAAHEP Competency: I. Anatomy & Physiology 11. Identify the classifications of medications, including desired effect, side effects, and adverse reactions.*

*Difficulty: Hard*

*Learning Outcome: 2.6 Define the different types of drug interaction.*

26. (p. 24) Select the proper method by which you can conclude that there will be 100 percent bioavailability in the circulatory system immediately after administration of the drug product.
- A. Subcutaneous injection method
  - B. Inhalation method
  - C. Transdermal patch method
  - D.** Intravenous injection method

Bioavailability is the percentage of the dose of a drug that is actually absorbed into the bloodstream. Differences in drug formulation, route of administration, and factors that affect GI absorption can influence bioavailability.

*ABHES Competency: 6. Pharmacology b. Properly utilize PDR, drug handbook, and other drug references to identify a drug's classification, usual dosage, usual side effects, and contraindications.*

*Bloom's: Analyzing*

*CAAHEP Competency: I. Anatomy & Physiology 11. Identify the classifications of medications, including desired effect, side effects, and adverse reactions.*

*Difficulty: Hard*

*Learning Outcome: 2.3 Identify how half-life, blood drug level, and bioavailability relate to drug response.*

## Chapter 002 Pharmacokinetics and Factors of Individual Variation **Key**

27. (p. 22) Select the most appropriate reason why a patient with cirrhosis of the liver does not get the therapeutic response expected from the medications that she is taking.

- A. The patient's ability to absorb drug is impaired.
- B. The patient's ability to distribute drug throughout the body is impaired.
- C. The patient's ability to metabolize drug is impaired.**
- D. The patient's ability to excrete unused drug from the body is impaired.

Drug metabolism, also referred to as biotransformation, is the chemical alteration of drugs and foreign compounds in the body. The liver is the main organ involved in drug metabolism.

*ABHES Competency: 6. Pharmacology b. Properly utilize PDR, drug handbook, and other drug references to identify a drug's classification, usual dosage, usual side effects, and contraindications.*

*ABHES Competency: 1. Anatomy & Physiology 11. Identify the classifications of medications, including desired effect, side effects, and adverse reactions.*

*Bloom's: Analyzing*

*CAAHEP Competency: 1. Anatomy & Physiology 12. Describe the relationship between anatomy and physiology of all body systems and medications used for treatment in each.*

*Difficulty: Hard*

*Learning Outcome: 2.2 Understand the pharmacokinetic factors that determine the absorption, distribution, metabolism, and excretion of drugs.*

28. (p. 24) A patient has an order in the chart that reads, "Take two tablets by mouth today; then take one tablet by mouth daily for the next 4 days." Select the term that represents the part of the order that reads, "Take two tablets by mouth today."

- A. Maintenance dose
- B. Therapeutic dose
- C. Loading dose**
- D. None of these are correct.

A loading dose is usually an initial higher dose of drug, often administered IV, to rapidly attain the therapeutic drug level and drug effects. Loading doses are usually followed by maintenance doses that are smaller and calculated to maintain the drug level within the therapeutic range.

*ABHES Competency: 6. Pharmacology b. Properly utilize PDR, drug handbook, and other drug references to identify a drug's classification, usual dosage, usual side effects, and contraindications. c. Identify and define common abbreviations that are accepted in prescription writing.*

*Bloom's: Analyzing*

*CAAHEP Competency: 1. Anatomy & Physiology 11. Identify the classifications of medications, including desired effect, side effects, and adverse reactions.*

*Difficulty: Hard*

*Learning Outcome: 2.3 Identify how half-life, blood drug level, and bioavailability relate to drug response.*

## Chapter 002 Pharmacokinetics and Factors of Individual Variation **Key**

29. (p. 26) Select the most likely reason why a patient who has been diagnosed with end-stage renal disease must have routine blood work drawn to check his blood levels of a prescribed drug.

- A.** Due to the renal disease, the patient is unable to effectively eliminate the drug, causing accumulation of the drug in the plasma.
- B. Due to the renal disease, the patient is unable to effectively metabolize the drug, causing low levels of the drug in the plasma.
- C. Due to the renal disease, the patient is unable to effectively absorb the drug, causing low levels of the drug in the plasma.
- D. None of these are correct.

Patients with hepatic or renal disease suffer a greater incidence of adverse drug effects because they are unable to eliminate the drug and its metabolites effectively. Consequently, plasma drug levels are much higher in these patients due to accumulation of the drug in the plasma.

*ABHES Competency: 2. Anatomy and Physiology b. Identify and apply the knowledge of all body systems; their structure and functions; and their common diseases, symptoms, and etiologies. 6. Pharmacology b. Properly utilize PDR, drug handbook, and other drug references to identify a drug's classification, usual dosage, usual side effects, and contraindications.*

*Bloom's: Analyzing*

*CAAHEP Competency: I. Anatomy & Physiology 12. Describe the relationship between anatomy and physiology of all body systems and medications used for treatment in each.*

*Difficulty: Hard*

*Learning Outcome: 2.3 Identify how half-life, blood drug level, and bioavailability relate to drug response.*