Chapter 2, Basic Concepts and Processes

1. Which cellular structure stores hormones and other substances?
   A. Golgi apparatus
   B. Endoplasmic reticulum
   C. Mitochondria
   D. Lysosome

   ANS: A
   Rationale: The Golgi apparatus stores hormones and other substances. The endoplasmic reticulum contains ribosomes, which synthesize proteins, including enzymes that synthesize glycogen, triglycerides, and steroids and those that metabolize drugs and other chemicals. The mitochondria generate energy for cellular activities and require oxygen. Lysosomes are membrane-enclosed vesicles that contain enzymes capable of digesting nutrients (proteins, carbohydrates, fats), damaged cellular structures, foreign substances (bacteria), and the cell itself.

   PTS: 1 REF: p. 17, Cell Structures and Functions
   OBJ: 1
   NAT: Client Needs: Physiological Integrity: Pharmacological and Parenteral Therapies
   TOP: Chapter: 2: Basic Concepts and Processes
   KEY: Integrated Process: Nursing Process
   BLM: Cognitive Level: Remember NOT: Multiple Choice

2. A client is experiencing a cough associated with an upper respiratory infection. Which oral medication will likely produce the quickest therapeutic effect?
   A. A tablet
   B. A liquid
   C. A topical spray
   D. A timed-release tablet

   ANS: B
   Rationale: Liquid medications are absorbed faster than tablets or capsules. A tablet is an oral medication that has a slower onset of action than a liquid medication. A topical spray can be sprayed to the back of the throat and provides only a local effect. A timed-release tablet is an oral medication that has a slower onset and longer duration of action.

   PTS: 1 REF: p. 19, Absorption OBJ: 3
   NAT: Client Needs: Physiological Integrity: Pharmacological and Parenteral Therapies
   TOP: Chapter: 2: Basic Concepts and Processes
   KEY: Integrated Process: Nursing Process
   BLM: Cognitive Level: Apply NOT: Multiple Choice

3. A client is administered an oral contraceptive. What is the process that occurs between the time the drug enters the body and the time it enters the bloodstream?
   A. Absorption
   B. Distribution
   C. Metabolism
   D. Excretion

ANS: A
Rationale: Absorption is the process that occurs from the time the drug enters the body to the time it enters the bloodstream to be circulated. Distribution involves the transport of drug molecules within the body. Metabolism is the method by which drugs are inactivated or biotransformed by the body. Excretion refers to elimination of a drug from the body.

PTS: 1 REF: p. 19, Distribution OBJ: 3
NAT: Client Needs: Physiological Integrity: Pharmacological and Parenteral Therapies
TOP: Chapter: 2: Basic Concepts and Processes
KEY: Integrated Process: Nursing Process
BLM: Cognitive Level: Understand NOT: Multiple Choice

4. Which site of drug absorption is considered to have the largest surface area?
   A. Rectum
   B. Vagina
   C. Eye
   D. Lungs

   ANS: D
   Rationale: The lungs have the largest surface area for absorption of anesthetic gases and a few other drugs. The rectum absorbs the medication through the mucous membranes and has a smaller surface area than the lungs. The vagina absorbs the medication through the mucous membranes and has a smaller surface area than the lungs. The eye also has a smaller surface area than the lungs and absorbs the medication through the mucous membranes.

   PTS: 1 REF: p. 19, Absorption OBJ: 3
   NAT: Client Needs: Physiological Integrity: Pharmacological and Parenteral Therapies
   TOP: Chapter: 2: Basic Concepts and Processes
   KEY: Integrated Process: Nursing Process
   BLM: Cognitive Level: Understand NOT: Multiple Choice

5. An older adult client has an elevated serum creatinine level. This client is at **greatest** risk for which medication-related effect?
   A. Toxicity
   B. Increased absorption
   C. Delayed gastric emptying
   D. Idiosyncratic effects

   ANS: A
   Rationale: An elevated creatinine level is indicative of diminished kidney function, which will result in serum drug toxicity. The creatinine level is unrelated to absorption and gastric emptying. Idiosyncratic effects are reactions that occur rarely and unpredictably among the population.

   PTS: 1 REF: p. 20, Excretion OBJ: 3
   NAT: Client Needs: Physiological Integrity: Pharmacological and Parenteral Therapies
   TOP: Chapter: 2: Basic Concepts and Processes
   KEY: Integrated Process: Nursing Process
   BLM: Cognitive Level: Apply NOT: Multiple Choice

6. What is the primary role of protein binding on drug action?
   A. Increasing the medication's speed of action
   B. Decreasing the medication's speed of action
   C. Increasing the rate of the medication's excretion
   D. Averting the risk of adverse effects posed by the medication

   ANS: B
   Rationale: Protein binding allows part of a drug to be stored and released as needed. Drugs that are highly bound to plasma proteins or stored extensively in other tissues have a long duration of action. Protein binding does not increase the speed of action or increase metabolism. Protein binding does decrease the speed of action by storing the drug to be released when needed. Protein binding does not prevent adverse reactions.

   PTS: 1 REF: p. 19, Distribution OBJ: 3
   NAT: Client Needs: Physiological Integrity: Pharmacological and Parenteral Therapies
   TOP: Chapter: 2: Basic Concepts and Processes
   KEY: Integrated Process: Nursing Process
   BLM: Cognitive Level: Understand NOT: Multiple Choice

7. A client is taking a medication that is metabolized by the CYP enzymes. Which medication inhibits several of the CYP enzymes?
   A. Cisplatin
   B. Acebutolol hydrochloride
   C. Cimetidine
   D. Dicloxacillin sodium

   ANS: C
   Rationale: Cimetidine is a gastric acid suppressor that inhibits several CYP enzymes and can greatly decrease drug metabolism. Cisplatin prevents DNA, RNA, and protein synthesis. Acebutolol hydrochloride is a $beta_1$-selective adrenergic blocking agent. Dicloxacillin sodium inhibits the final stage of bacterial cell wall synthesis.

   PTS: 1 REF: p. 20, Metabolism OBJ: 3
   NAT: Client Needs: Physiological Integrity: Pharmacological and Parenteral Therapies
   TOP: Chapter: 2: Basic Concepts and Processes
   KEY: Integrated Process: Nursing Process
   BLM: Cognitive Level: Understand NOT: Multiple Choice

8. Which phrase accurately describes the concept of a medication's serum half-life?
   A. The time required for IV medications to penetrate the brain tissue
   B. The time needed for the serum level to fall by 50%
   C. The safest margin to prevent toxicity
   D. The dose adjustment that reduces the risk of adverse effects by one half

   ANS: B
   Rationale: Serum half-life is the time required for the serum concentration of a drug to decrease by 50%. Although many IV medications penetrate the brain tissue, this action does not describe the half-life. The safest margin to prevent toxicity depends on the rate of metabolism and excretion. Half-life does not describe a strategy for mitigating adverse effects.

PTS: 1 REF: p. 22, Serum Half-Life OBJ: 5
NAT: Client Needs: Physiological Integrity: Pharmacological and Parenteral Therapies
TOP: Chapter: 2: Basic Concepts and Processes
KEY: Integrated Process: Nursing Process
BLM: Cognitive Level: Understand NOT: Multiple Choice

9. A client has increased intracranial pressure and is prescribed a diuretic. Which diuretic would be the **most** appropriate for this client?
   A. Furosemide
   B. Hydrochlorothiazide
   C. Spironolactone
   D. Mannitol

   ANS: D
   Rationale: Mannitol is an osmotic diuretic that increases the osmolarity of plasma and pulls water out of the tissues into the bloodstream. It does not act on receptor sites. Furosemide is a loop diuretic that inhibits the reabsorption of sodium and chloride in the loop of Henle. Hydrochlorothiazide is associated with drug interference with absorption of sodium ions across the distal renal tubule. Spironolactone acts by competing with aldosterone for cellular receptor sites.

   PTS: 1 REF: p. 22, Nonreceptor Drug Actions OBJ: 6
   NAT: Client Needs: Physiological Integrity: Pharmacological and Parenteral Therapies
   TOP: Chapter: 2: Basic Concepts and Processes
   KEY: Integrated Process: Nursing Process
   BLM: Cognitive Level: Apply NOT: Multiple Choice

10. Which factor accounts for the increased risk for drug reactions among clients aged 65 years and older?
    A. Drugs more readily crossing the blood–brain barrier in older people
    B. Physiologic changes affecting all pharmacokinetic processes
    C. Increased drug-metabolizing enzymes in older people
    D. Diminished immune response

    ANS: B
    Rationale: In older adults, physiologic changes may alter all pharmacokinetic processes, which can increase the risk for drug interactions. Drugs cross the blood–brain barrier easily in infants due to the barrier's immaturity; the barrier is fully developed in older adults. Older adults experience a decrease, not an increase, in drug-metabolizing enzymes. Older adults exhibit a diminished immune response; however, while this makes them more susceptible to illness, it does not increase the risk for interactions.

    PTS: 1 REF: p. 25, Age OBJ: 4
    NAT: Client Needs: Health Promotion and Maintenance
    TOP: Chapter: 2: Basic Concepts and Processes
    KEY: Integrated Process: Nursing Process
    BLM: Cognitive Level: Analyze NOT: Multiple Choice

11. When considering the dosage requirement for a 6-feet (1.8-m) tall client who weighs 280 pounds (127 kg), which statement is accurate?
    A. The dose will be higher than that required of a client who weighs 180 pounds (82 kg).
    B. The dose will be lower than that required of a client who weighs 180 pounds (82 kg).
    C. The dose will be similar to that required of a client who weighs 180 pounds (82 kg).
    D. The dose will be more effective if given parenterally.

    ANS: A
    Rationale: In general, people heavier than average may need larger doses, provided their renal, hepatic, and cardiovascular functions are adequate. In this situation, route is not relevant.

    PTS: 1 REF: p. 25, Body Weight OBJ: 4
    NAT: Client Needs: Physiological Integrity: Pharmacological and Parenteral Therapies
    TOP: Chapter: 2: Basic Concepts and Processes
    KEY: Integrated Process: Nursing Process
    BLM: Cognitive Level: Apply NOT: Multiple Choice

12. Which drug is formulated to be absorbed through the skin? Select all that apply.
    A. Lidocaine
    B. Clonidine
    C. Propranolol
    D. Nitroglycerin
    E. Fentanyl

    ANS: A, B, D, E
    Rationale: Some drugs are formulated in adhesive skin patches for absorption through the skin. Clonidine, fentanyl, and nitroglycerin are examples of drugs that are formulated in adhesive skin patch form to be absorbed through the skin. Lidocaine can be administered intravenously, subcutaneously, or topically. Propranolol is administered orally.

    PTS: 1 REF: p. 19, Absorption OBJ: 3
    NAT: Client Needs: Physiological Integrity: Pharmacological and Parenteral Therapies
    TOP: Chapter: 2: Basic Concepts and Processes
    KEY: Integrated Process: Nursing Process
    BLM: Cognitive Level: Understand NOT: Multiple Select

13. What is the mechanism that allows mannitol to produce diuresis?
    A. Competes with aldosterone for cellular receptor sites
    B. Inhibits the reabsorption of sodium and chloride in the loop of Henle
    C. Interferes with absorption of sodium ions across the distal renal tubule
    D. Increases the osmolarity of plasma and pulls water out of the tissues into the bloodstream

    ANS: D

Rationale: Mannitol is an osmotic diuretic that increases the osmolarity of plasma and pulls water out of the tissues into the bloodstream. It does not act on receptor sites. Furosemide is a loop diuretic that inhibits the reabsorption of sodium and chloride in the loop of Henle. Hydrochlorothiazide is associated with drug interference with absorption of sodium ions across the distal renal tubule. Spironolactone acts by competing with aldosterone for cellular receptor sites.

PTS: 1 REF: p. 22, Nonreceptor Drug Actions OBJ: 6
NAT: Client Needs: Physiological Integrity: Pharmacological and Parenteral Therapies
TOP: Chapter: 2: Basic Concepts and Processes
KEY: Integrated Process: Nursing Process
BLM: Cognitive Level: Apply NOT: Multiple Choice

14. What is the characteristic action of an agonist?
    A. Agonists alter the normal processes of distribution and metabolism.
    B. Agonists counteract the action of specific neurotransmitters.
    C. Agonists block the action of specific neurotransmitters.
    D. Agonists bind to receptors and cause a physiologic effect.

    ANS: D
    Rationale: Agonists are drugs that produce effects similar to those produced by naturally occurring hormones, neurotransmitters, and other substances by activating (not blocking or counteracting) a receptor. Classification of a drug as an agonist does not denote a change to metabolism and distribution.

    PTS: 1
    REF: p. 23, Additional Elements of the Receptor Theory of Drug Action
    OBJ: 7
    NAT: Client Needs: Physiological Integrity: Pharmacological and Parenteral Therapies
    TOP: Chapter: 2: Basic Concepts and Processes
    KEY: Integrated Process: Nursing Process
    BLM: Cognitive Level: Understand NOT: Multiple Choice

15. What is the expected therapeutic outcome of the simultaneous administration of two medications?
    A. The adverse effects of one of the drugs are nullified by the other drug.
    B. The combined effects are greater than the effects of either one of the drugs alone.
    C. One of the drugs enhances metabolism, while the other drug enhances either distribution or absorption.
    D. Both drugs are toxic in isolation but therapeutic when administered together.

    ANS: B
    Rationale: Synergism occurs when two drugs with different sites or mechanisms of action produce greater effects when taken together. This does not mean that potential toxicity or adverse effects are “canceled out.” The two drugs would not individually affect different aspects of pharmacokinetics.

    PTS: 1 REF: p. 24, Drug–Drug Interactions OBJ: 9
    NAT: Client Needs: Physiological Integrity: Pharmacological and Parenteral Therapies
    TOP: Chapter: 2: Basic Concepts and Processes

KEY: Integrated Process: Nursing Process
BLM: Cognitive Level: Understand NOT: Multiple Choice

16. When considering the half-life of naloxone, what are the implications for this medication therapy?
    A. Repeated doses of naloxone will likely be necessary.
    B. An increase in the dosage of naloxone will most likely be required.
    C. A different antidote will be required as the serum level of naloxone decreases.
    D. The antidote is unlikely to have a therapeutic effect on the client's symptoms.

    ANS: A
    Rationale: When an antidote is used, its half-life relative to the toxin's half-life must be considered. For example, the half-life of naloxone, a narcotic antagonist, is relatively short compared with the half-life of the longer-acting opioids such as methadone, and repeated doses may be needed to prevent recurrence of the toxic state. None of the remaining options present accurate information regarding the significance of naloxone's half-life.

    PTS: 1 REF: p. 30, Enteral Management of Toxicity
    OBJ: 11
    NAT: Client Needs: Physiological Integrity: Pharmacological and Parenteral Therapies
    TOP: Chapter: 2: Basic Concepts and Processes
    KEY: Integrated Process: Nursing Process
    BLM: Cognitive Level: Apply NOT: Multiple Choice

17. A client tells the nurse, "I took my sleeping pill yesterday evening, but it didn't seem to work for me like it usually does." The nurse should consider which variable that can affect drug absorption? Select all that apply.
    A. GI function
    B. Blood flow to the site of administration
    C. The presence of other drugs
    D. Route of administration
    E. The presence of receptor agonists

    ANS: A, B, C, D
    Rationale: Numerous factors affect the rate and extent of drug absorption, including dosage form, route of administration, blood flow to the site of administration, GI function, the presence of food or other drugs, and other variables. Agonist activity is a relevant variable, but this is not an aspect of absorption.

    PTS: 1 REF: p. 19, Absorption OBJ: 3
    NAT: Client Needs: Physiological Integrity: Pharmacological and Parenteral Therapies
    TOP: Chapter: 2: Basic Concepts and Processes
    KEY: Integrated Process: Nursing Process
    BLM: Cognitive Level: Apply NOT: Multiple Select

18. A client with a diagnosis of bipolar disorder has begun lithium therapy. What is the **primary** rationale for the nurse's instructions regarding the need for regular monitoring of the client's serum drug levels?
    A. It is necessary to regularly test for blood–drug incompatibilities that may develop during treatment.

B. It is necessary to ensure that the client's drug levels are therapeutic but not toxic.
C. It is needed to determine if additional medications will be needed to potentiate the effects of lithium.
D. It is needed in order to confirm the client's adherence to the drug regimen.

ANS: B
Rationale: Measuring serum drug levels is useful when drugs with a narrow margin of safety are given, because their therapeutic doses are close to their toxic doses. This is the case during lithium therapy. Serum levels are not commonly taken to monitor adherence to treatment. Blood–drug incompatibilities are not a relevant consideration.

PTS: 1 REF: p. 21, Serum Drug Levels OBJ: 5
NAT: Client Needs: Physiological Integrity: Pharmacological and Parenteral Therapies
TOP: Chapter: 2: Basic Concepts and Processes
KEY: Integrated Process: Nursing Process
BLM: Cognitive Level: Analyze NOT: Multiple Choice

19. A client in cardiovascular collapse requires pharmacologic interventions. What route of administration is **most** likely appropriate?
A. Intravenous
B. Oral
C. Rectal
D. Topical

ANS: A
Rationale: For rapid drug action and response, the IV route is most effective because the drug is injected directly into the bloodstream. None of the other options deliver the medication directly into the bloodstream; thus, all other routes require additional steps to deliver the medication to the vascular system that is already compromised.

PTS: 1 REF: p. 23, Route of Administration OBJ: 8
NAT: Client Needs: Physiological Integrity: Pharmacological and Parenteral Therapies
TOP: Chapter: 2: Basic Concepts and Processes
KEY: Integrated Process: Nursing Process
BLM: Cognitive Level: Apply NOT: Multiple Choice

20. A client with cancer is taking the prescribed dose of morphine sulfate, and a family member informs the nurse that the client is extremely sedated. What finding by the nurse would indicate the causative factor for the increased sedation experienced by the client?
A. The client is taking St. John's wort for depression.
B. The client has a glass of ginger ale by the bedside.
C. A family member has a naloxone pen by the bedside.
D. The client is taking metoprolol for hypertension.

ANS: A

Rationale: Herbs such as St. John's wort, which is used as an over-the-counter antidepressant, can enhance the sedation effects of the morphine and so should not be used with the drug.. Ginger ale does not have an effect on the CNS and would not enhance the sedation effect. Naloxone would reverse respiratory depression related to the use of opioid analgesia and would not be a factor in the increased sedation. Metoprolol does not increase the sedative effects of morphine.

PTS: 1 REF: p. 24, Drug–Drug Interactions OBJ: 9
NAT: Client Needs: Physiological Integrity: Physiological Adaptation
TOP: Chapter: 2: Basic Concepts and Processes
KEY: Integrated Process: Nursing Process
BLM: Cognitive Level: Analyze NOT: Multiple Choice

21. What is the effect of a significant first-pass effect on the metabolism of a medication?
    A. The medication must pass through the client's bloodstream several times in order to generate a therapeutic effect.
    B. The medication must pass through the renal tubules and is excreted in large amounts.
    C. The medication's effectiveness increases with each subsequent dose.
    D. The medication is biotransformed extensively in the client's liver.

    ANS: D
    Rationale: Some drugs are extensively metabolized in the liver, with only part of a drug dose reaching the systemic circulation for distribution to sites of action. This is called the first-pass effect or presystemic metabolism. The first-pass effect is not related to renal function or the need to pass through the bloodstream multiple times.

    PTS: 1 REF: p. 19, Absorption OBJ: 3
    NAT: Client Needs: Physiological Integrity: Pharmacological and Parenteral Therapies
    TOP: Chapter: 2: Basic Concepts and Processes
    KEY: Integrated Process: Nursing Process
    BLM: Cognitive Level: Apply NOT: Multiple Choice

22. A nurse has administered a dose of a drug that is known to be highly protein bound. What are the implications of this characteristic?
    A. The client must consume adequate protein in order to achieve a therapeutic effect.
    B. The molecules of the drug that are bound to protein are inactive and do not affect body cells.
    C. Increased levels of serum protein will increase the effect of the drug.
    D. Each molecule of the drug must bind to a protein molecule to become effective.

    ANS: B
    Rationale: Drug molecules bound to plasma proteins are pharmacologically inactive because the large size of the complex prevents their leaving the bloodstream through the small openings in capillary walls and reaching their sites of action, metabolism, and excretion. Only the free or unbound portion of a drug acts on body cells. The client's protein intake or levels of protein are not normally relevant.

    PTS: 1 REF: p. 19, Distribution OBJ: 3
    NAT: Client Needs: Physiological Integrity: Pharmacological and Parenteral Therapies

TOP: Chapter: 2: Basic Concepts and Processes
KEY: Integrated Process: Nursing Process
BLM: Cognitive Level: Apply NOT: Multiple Choice