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## Chapter 02: Pharmacological Principles

### Lilley: Pharmacology for Canadian Health Care Practice, 3rd Canadian Edition

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#### MULTIPLE CHOICE

1. A patient is receiving two different drugs, which, at their current dose forms and dosages, are both absorbed into the circulation in identical amounts. Which term best denotes that the drugs have the same absorption rates?
  - a. Equivalent
  - b. Synergistic
  - c. Compatible
  - d. Bioequivalent

ANS: D

Two drugs absorbed into the circulation at the same amount (in specific dosage forms) have the same bioavailability; thus, they are bioequivalent. —Equivalent is incorrect because the term -bioavailability is used to express the extent of drug absorption. -Synergistic is incorrect because this term refers to two drugs given together whose resulting effect is greater than the sum of the effects of each drug given alone. -Compatible is incorrect because this term is a general term used to indicate that two substances do not have a chemical reaction when mixed (or given, in the case of drugs) together.

DIF: Cognitive Level: Comprehension REF: p. 26

2. A patient is receiving medication via intravenous injection. Which information should the nurse provide for patient education?
  - a. The medication will cause fewer adverse effects when given intravenously.
  - b. The medication will be absorbed slowly into the tissues over time.
  - c. The medication's action will begin faster when given intravenously.
  - d. Most of the drug is inactivated by the liver before it reaches the target area.

ANS: C

Intravenous injections are the fastest route of absorption. The intravenous route does not affect the number of adverse effects, the intravenous route is not a slow route of absorption, and the intravenous route does not cause inactivation of the drug by the liver before it reaches the target area.

DIF: Cognitive Level: Comprehension REF: p. 32

3. Which is *true* regarding parenteral drugs?
  - a. They bypass the first-pass effect.
  - b. They decrease blood flow to the stomach.
  - c. They are altered by the presence of food in the stomach.
  - d. They exert their effects while circulating in the bloodstream.

ANS: A

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Drugs given by the parenteral route bypass the first-pass effect, but they still must be absorbed into cells and tissues before they can exert their effects. Enteral drugs (drugs taken orally), not parenteral drugs, decrease blood flow to the stomach and are altered by the presence of food in the stomach. Parenteral drugs must be absorbed into cells and tissues from the circulation before they can exert their effects; they do not exert their effects while circulating in the bloodstream.

DIF: Cognitive Level: Analysis

REF: p. 32

4. A drug's half-life is best defined as
- The time it takes for the drug to elicit half its therapeutic response.
  - The time it takes one-half of the original amount of a drug to reach the target cells.
  - The time it takes one-half of the original amount of a drug to be removed from the body.
  - The time it takes one-half of the original amount of a drug to be absorbed into the circulation.

ANS: C

A drug's half-life is the time it takes for one-half of the original amount of a drug to be removed from the body. It is a measure of the rate at which drugs are removed from the body. Answers A, B, and D are not correct definitions of a drug's half-life.

DIF: Cognitive Level: Comprehension

REF: p. 36

5. The term –duration of action is best defined as
- The time it takes for the drug to elicit a therapeutic response.
  - The time it takes a drug to reach its maximum therapeutic response.
  - The length of time it takes to remove a drug from circulation.
  - The time during which drug concentration is sufficient to elicit a therapeutic response.

ANS: D

Duration of action is the time during which drug concentration is sufficient to elicit a therapeutic response. The time it takes for a drug to elicit a therapeutic response is the drug's –onset of action. The time it takes a drug to reach its maximum therapeutic response is a drug's –peak effect. –The length of time it takes to remove a drug from circulation defines a drug's elimination and does not correctly define a drug's duration of action.

DIF: Cognitive Level: Comprehension

REF: p. 37

6. A drug interacts with enzymes by
- altering cell membrane permeability.
  - fooling a receptor on the cell wall.
  - enhancing the drug's effectiveness within the cells.
  - fooling the enzyme into binding with it instead of its normal target cell.

ANS: D

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When drugs interact with enzymes, they inhibit the action of a specific enzyme by –fooling the enzyme into binding to it instead of to its normal target cell. Thus, the target cells are protected from the action of the enzymes to result in a drug effect. The alteration of cell membrane permeability, the –fooling of a receptor on the cell wall, and the enhancement of the effectiveness of drugs within cells do not occur with selective enzyme interactions.

DIF: Cognitive Level: Comprehension REF: p. 39

7. When administering a new medication to a patient, the nurse reads that it is highly protein bound. Which consequence will result from this protein binding?
- Renal excretion will take longer.
  - The drug will be metabolized quickly.
  - The duration of action of the medication will be longer.
  - The duration of action of the medication will be shorter.

ANS: C

Drugs that are bound to plasma proteins are characterized by a longer duration of action. Protein binding does not make renal excretion longer and does not increase metabolism of the drug. Protein binding of a drug means that the duration of action is longer, not shorter.

DIF: Cognitive Level: Application REF: p. 33

8. When monitoring a patient on an insulin drip to reduce blood glucose levels, the nurse notes that the patient's glucose level is extremely low, and the patient is lethargic and difficult to awaken. Which adverse drug reaction is the nurse observing?
- An adverse effect
  - An allergic reaction N R I G B . C M
  - An idiosyncratic reaction U S N T O
  - A pharmacological reaction

ANS: D

A pharmacological reaction is an extension of the drug's normal effects in the body. In this case, the insulin lowered the patient's blood glucose levels too much. An adverse effect is a predictable, well-known adverse drug reaction that results in minor or no changes in patient management. An allergic reaction (also known as a *hypersensitivity reaction*) involves the patient's immune system. An idiosyncratic reaction is unexpected and is defined as a genetically determined abnormal response to normal dosages of a drug.

DIF: Cognitive Level: Comprehension REF: p. 42

9. A patient is experiencing chest pain and needs to take a sublingual form of nitroglycerin. Where should the nurse tell the patient to place the tablet?
- Under the tongue
  - In the space between the cheek and gum
  - At the back of the throat, for easy swallowing
  - On a non-hairy area on the chest

ANS: A

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Drugs taken by the sublingual route are placed under the tongue. Placing the tablet in the space between the cheek and gum is done for the buccal route; placing the tablet at the back of the throat (for easy swallowing) is done in the oral route; and placing the tablet on a non-hairy area on the chest is done in the topical or transdermal route.

DIF: Cognitive Level: Comprehension REF: p. 28

10. The nurse is administering medications to a patient who is in liver failure due to end-stage cirrhosis. The nurse is aware that patients with liver failure are most likely to have problems with which pharmacokinetic phase?
- Absorption
  - Distribution
  - Metabolism
  - Excretion

ANS: C

The liver is the organ that is most responsible for drug metabolism. Decreased liver function will most affect a drug's metabolism. The absorption of a drug is not affected by liver function, and distribution is not affected by liver function. Excretion is affected only because decreased liver function may not transform drugs into water-soluble substances for elimination via the kidneys, but this is not the best answer to this question.

DIF: Cognitive Level: Application REF: p. 34

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## Chapter 03: Legal and Ethical Considerations

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#### MULTIPLE CHOICE

1. In the development of a new drug by a pharmaceutical company, the researcher must ensure that the participants in experimental drug studies do not have unrealistic expectations of the new drug's usefulness. What will the researcher include in the design of the study to prevent bias that may occur?
  - a. A placebo
  - b. Health Canada approval
  - c. Informed consent
  - d. Efficacy information

ANS: A

To prevent bias that may occur as a result of unrealistic expectations of an investigational new drug, a placebo will be incorporated into the study. Health Canada approval, if given, does not be obtained until after phase III of the study. Informed consent is required in all drug studies. Efficacy information is not determined until the study is under way.

DIF: Cognitive Level: Comprehension REF: pp. 52-53

2. A member of an investigational drug study team is working with healthy volunteers whose participation will help determine the optimal dosage range and pharmacokinetics of the drug. In what type of study is the team member participating?
  - a. Phase I
  - b. Phase II
  - c. Phase III
  - d. Phase IV

ANS: A

Phase I studies involve small numbers of healthy volunteers to determine the optimal dosage range and the pharmacokinetics of the drug. Phases II, III, and IV involve progressively larger numbers of volunteers who have the disease or ailment that the drug is designed to diagnose or treat.

DIF: Cognitive Level: Application REF: pp. 52-53

3. A patient has a prescription for a drug classified as Schedule F. What important information should the nurse give this patient about obtaining refills for this medication?
  - a. No prescription refills are permitted.
  - b. Refills may be obtained via telephone order.
  - c. Refills are indicated by the prescriber.
  - d. The patient may have no more than six refills in a 12-month period.

ANS: C

Schedule F contains a list of drugs that can be sold and refilled only on prescription; prescriptions can be refilled as often as indicated by the prescriber.

DIF: Cognitive Level: Analysis REF: p. 49

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4. A patient has been chosen to be a recipient of an investigational drug for heart failure and has given informed consent. Which is indicated by the patient's informed consent?
- The patient has been informed of the possible benefits of the new therapy.
  - The patient will be informed of the details of the study as the research continues.
  - The patient will not be assured of receiving the actual drug during the experiment.
  - The patient has received an explanation of the study's purpose, procedures, and the benefits and risks involved.

ANS: D

Informed consent involves the careful explanation of the purpose of the study, procedures to be used, and the possible benefits and risks involved. Being informed of the possible benefits of the new therapy, being informed of the study details as research continues, and being assured of receiving the actual drug during the experiment do not describe informed consent.

DIF: Cognitive Level: Comprehension REF: p. 52

5. Which is the most significant part of legislation in regard to professional nursing practice?
- Canada Health Act*
  - Nursing Practice Act*
  - Controlled Drugs and Substances Act*
  - Personal Information Protection and Electronic Documents Act*

ANS: B

Nurse practice acts (NPAs) are regulatory laws that are instrumental in defining the scope of nursing practice and that protect public health, safety, and welfare. Nursing practice in Canada is regulated by separate acts in each of the 10 provinces and 3 territories. These acts grant self-governance to the nursing profession, direct entry into nursing practice, define the scopes of practice, and identify disciplinary actions. NPAs are the most significant part of legislation in regard to professional nursing practice.

DIF: Cognitive Level: Comprehension REF: p. 54

6. What potential failure is identified when a patient with a documented penicillin allergy receives 1.2 g of benzylpenicillin IV?
- Failure to assess
  - Failure to evaluate
  - Failure to ensure safety
  - Failure to identify the patient

ANS: C

Failure to ensure safety includes lack of adequate monitoring, failure to identify patient allergies and other risk factors related to medication therapy, inappropriate drug administration technique, and failure to implement appropriate nursing actions because of improper assessment of the patient's condition. Whereas failure to assess or evaluate includes failure to see significant changes in the patient's condition after taking a medication, failure to report these changes, failure to take a complete medication history and nursing assessment/history, and failure to monitor the patient after medication administration. Failure to identify the patient's identity is a medication error.

DIF: Cognitive Level: Application REF: p. 55

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7. Which statement correctly describes drugs in Part G, Part II of the *Food and Drugs Act*?
- They are drugs with high potential for misuse that have an accepted medical use.
  - They are drugs with high potential for misuse that do not have an accepted medical use.
  - They are medically accepted drugs that may cause mild physical or psychological dependence.
  - They are medically accepted drugs with very limited potential for causing mild physical or psychological dependence.

ANS: A

Part G, Part II drugs are those with high potential for misuse that have an accepted medical use (e.g., barbiturates).

DIF: Cognitive Level: Comprehension REF: p. 50

8. Which contributes to drug polymorphism?
- The number of drugs ordered by the physician
  - The patient's drug history
  - The patient's age, sex, and body composition
  - Different dosage forms of the same drug

ANS: C

A patient's age, sex, size, and body composition are some of the factors that contribute to drug polymorphism, which is the effect of such variables on how an individual absorbs or metabolizes specific drugs. The number of drugs ordered by the physician, the patient's drug history, and different dosage forms of the same drug are not factors that contribute to drug polymorphism.

DIF: Cognitive Level: Comprehension REF: p. 48

9. Which best describes drug polymorphism?
- Cultural and genetic effects on drug metabolism and excretion
  - Gender and cultural effects on drug absorption and distribution
  - Age or body composition effects on drug absorption or metabolism
  - Multidrug use resulting in impaired excretion

ANS: C

Drug polymorphism is the variation in response to a drug because of a patient's age, sex, size, and body composition.

DIF: Cognitive Level: Comprehension REF: p. 48

#### **MULTIPLE RESPONSE**

1. Which are elements of ethical principles in nursing and health care according to the Canadian Nurses Association (CNA) Code of Ethics? (*Select all that apply.*)
- Promoting justice
  - Maintaining anonymity
  - Demonstrating responsibility
  - Preserving dignity

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e. Promoting health and well-being

ANS: A, D, E

Elements of ethical principles in nursing and health care according to the CNA Code of Ethics include providing safe, compassionate, competent, and ethical nursing care; maintaining privacy and confidentiality; promoting justice, being accountable, preserving dignity, and promoting and respecting informed decision making; and promoting health and well-being.

DIF: Cognitive Level: Critical Thinking REF: p. 56



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**Chapter 04: Patient Focused Considerations**  
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**MULTIPLE CHOICE**

1. During the last trimester of pregnancy, drug transfer to the fetus is more likely to occur. Which is a reason for this possibility?
- Fetal size
  - Decreased surface area
  - Enhanced placental blood flow
  - Increased amount of bound drug in maternal circulation

ANS: C

Drug transfer to the fetus is more likely during the last trimester, as a result of enhanced placental blood flow, increased fetal surface area, and an increased amount of free drug in the mother's circulation. Increased, not decreased, fetal surface area affects drug transfer to the fetus. The placenta's surface area does not increase during this time. Drug transfer is increased due to an increased amount of free drug, not protein-bound drug, in the mother's circulation. -Fetal size is incorrect because the first trimester of pregnancy is the period of greatest danger of drug-induced developmental defects. During this period, the fetus undergoes rapid cell proliferation. Gestational age is more important than fetal size.

DIF: Cognitive Level: Comprehension REF: p. 60

2. A 22-year-old patient is in the twenty-sixth week of pregnancy and has developed gestational diabetes and pneumonia. She is given medications that pose a possible fetal risk, but the potential benefits may warrant the use of the medications in her situation. Which is the Food and Drug Administration (FDA) pregnancy safety category for this medication?
- Category B
  - Category C
  - Category D
  - Category X

ANS: C

Category D fits the description given in the example. Category B indicates no risk to an animal fetus; information for humans is not available. Category C indicates adverse effects reported in animal fetuses; information for humans is not available. Category X drugs should not be used in pregnant women due to reports of fetal abnormalities and positive evidence of fetal risk in humans.

DIF: Cognitive Level: Application REF: p. 61

3. Which type of dosage calculation is used most commonly when calculating drug dosages for children?
- Fried's rule
  - Clark's rule
  - Young's rule
  - The mg/kg formula

ANS: D

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The body weight method, using the mg/kg formula, is the most common and reliable method for calculating doses for young patients. Fried's rule, Clark's rule, and Young's rule are not methods used for calculating drug dosages for young patients.

DIF: Cognitive Level: Knowledge REF: p. 63

4. While assessing an 82-year-old woman, the nurse determines that the patient is experiencing polypharmacy. What is this experience most likely to indicate?
- The patient has a lower risk of drug interactions.
  - The patient takes medications for one illness several times a day.
  - The patient risks problems only if she also takes over-the-counter medications.
  - The patient takes multiple medications for several different illnesses.

ANS: D

Polypharmacy usually occurs when a patient has several illnesses and takes medications for each of them, medications possibly prescribed by different specialists who may be unaware of the patient's other treatments. This situation puts the patient at increased risk of drug interactions and adverse reactions. Polypharmacy means that the patient has a higher, not lower, risk of drug interactions, and that the patient is taking several different medications, not just one. Polypharmacy can include prescription drugs, over-the-counter medications, and natural health products.

DIF: Cognitive Level: Application REF: p. 66

5. Which statement is true in regard to children?
- Their levels of microsomal enzymes are decreased compared to those of adults.
  - Their total body water content is much less than that of adults.
  - Their first-pass elimination is increased because of higher portal circulation.
  - Gastric emptying is more rapid than that of adults because of increased peristaltic activity.

ANS: A

In children, the levels of microsomal enzymes are decreased. A child's gastric emptying is slowed because of slow or irregular peristalsis. Total body water content is greater in children than in adults, and first-pass elimination by the liver is reduced because of immaturity of the liver and reduced levels of microsomal enzymes.

DIF: Cognitive Level: Comprehension REF: p. 62

6. For accurate medication administration to young patients, the nurse must take into account which information?
- Weight, height, age, and organ maturity
  - Age, glomerular filtration rate, and weight
  - Weight, height, body temperature, and age
  - Weight, height, and total body water content

ANS: A

To accurately administer medications to young patients, their weight, height, age, physical condition, metabolism and organ maturity must be taken into account. Glomerular filtration rate, body temperature, and total body water content are not considerations when administering medications to young patients.