



JACQUELINE ROSENJACK BURCHUM
LAURA D. ROSENTHAL

Lehne's

PHARMACOLOGY

for Nursing Care ELEVENTH EDITION

TEST BANK

Chapter 01: Orientation to Pharmacology Burchum: Lehne's Pharmacology for Nursing Care, 11th Edition

MULTIPLE CHOICE

1. The nurse is teaching a patient how a medication works to treat an illness. To do this, the nurse will rely on knowledge of which topic? a. Clinical pharmacology b. Drug efficacy c. Pharmacokinetics d. Pharmacotherapeutics

ANS: D

Pharmacotherapeutics is the study of the use of drugs to diagnose, treat, and prevent conditions. Clinical pharmacology is concerned with all aspects of drug-human interactions. Drug efficacy measures the extent to which a given drug causes an intended effect. Pharmacokinetics is the study of the impact of the body on a drug.

PTS: 1

2. What is a desired outcome when a drug is described as easy to administer? a. It can be stored indefinitely without need for refrigeration. b. It does not interact significantly with other medications. c. It enhances patient adherence to the drug regimen. d. It is usually relatively inexpensive to produce.

ANS: C

A major benefit of drugs that are easy to administer is that patients taking them are more likely to comply with the drug regimen. Drugs that are easy to give may have the other attributes listed, but those properties are independent of ease of administration.

PTS: 1

3. A patient tells the nurse that an analgesic he will begin taking may cause drowsiness and will decrease pain up to 4 hours at a time. Based on this understanding of the drug's effects by the patient, the nurse will anticipate which outcome? a. Decreased chance of having a placebo effect b. Decreased motivation to take the drug c. Improved compliance with the drug regimen d. Increased likelihood of drug overdose

ANS: C

A drug is effective if it produces the intended effects, even if it also produces side effects. Patients who understand both the risks and benefits of taking a medication are more likely to comply with the drug regimen.

PTS: 1

MULTIPLE RESPONSE

1. What are considered the 'Big Three' properties of an ideal drug? (*Select all that apply.*) a. Irreversible action

- b. Effectiveness
- c. Safety
- d. Selectivity
- e. A recognizable trade name

ANS: B, C, D

The 'Big Three' properties of the ideal drug are effectiveness, safety, and selectivity.

PTS: 1

2. Before administering a medication, what does the nurse need to know to evaluate how individual patient variability might affect the patient's response to the medication? (*Select all that apply.*)
- a. Chemical stability of the medication
 - b. Ease of administration
 - c. Family medical history
 - d. Patient's age
 - e. Patient's diagnosis

ANS: C, D, E

The family medical history can indicate genetic factors that may affect a patient's response to a medication. Patients of different ages can respond differently to medications. The patient's illness can affect how drugs are metabolized. The chemical stability of the medication and the ease of administration are properties of drugs.

PTS: 1

Chapter 02: Application of Pharmacology in Nursing Practice Burchum: Lehne's Pharmacology for Nursing Care, 11th Edition

MULTIPLE CHOICE

1. A patient is using a metered-dose inhaler containing albuterol for asthma. The medication label instructs the patient to administer "2 puffs every 4 hours as needed for coughing or wheezing." The patient reports feeling jittery sometimes when taking the medication, and doesn't feel that the medication is always effective. Which action is outside the nurse's scope of practice?
- a. Asking the patient to demonstrate the use of the inhaler
 - b. Assessing the patient's exposure to tobacco smoke
 - c. Auscultating lung sounds and obtaining vital signs
 - d. Suggesting that the patient use 1 puff to reduce side effects

ANS: D

It is not within the nurse's scope of practice to change the dose of a medication without an order from a prescriber. Asking the patient to demonstrate inhaler use helps the nurse to evaluate the patient's ability to administer the medication properly and is part of the nurse's evaluation. Assessing tobacco smoke exposure helps the nurse determine whether nondrug therapies, such as smoke avoidance, can be used as an adjunct to drug therapy. Performing a physical assessment helps the nurse evaluate the patient's response to the medication.

PTS: 1

2. A postoperative patient is being discharged home with acetaminophen/hydrocodone [Norco] for pain. The patient asks the nurse about using Tylenol for fever. Which statement by the nurse is correct?
- "It is not safe to take over-the-counter drugs with prescription medications."
 - "Taking the two medications together poses a risk of drug toxicity."
 - "There are no known drug interactions, so this will be safe."
 - "Tylenol and Norco are different drugs, so there is no risk of overdose."

ANS: B

Tylenol is the trade name and acetaminophen is the generic name for the same medication. It is important to teach patients to be aware of the different names for the same drug to minimize the risk of overdose. Over-the-counter (OTC) medications and prescription medications may be taken together unless significant harmful drug interactions are possible. Even though no drug interactions are at play in this case, both drugs contain acetaminophen, which could lead to toxicity.

PTS: 1

3. The nurse is preparing to care for a patient who will be taking an antihypertensive medication. Which action by the nurse is part of the assessment step of the nursing process?
- Asking the prescriber for an order to monitor serum drug levels
 - Monitoring the patient for drug interactions after giving the medication
 - Questioning the patient about over-the-counter medications
 - Taking the patient's blood pressure throughout the course of treatment

ANS: C

The assessment part of the nursing process involves gathering information before beginning treatment, and this includes asking about other medications the patient may be taking. Monitoring serum drug levels, watching for drug interactions, and checking vital signs after giving the medication are all part of the evaluation phase.

PTS: 1

4. A postoperative patient reports pain, which the patient rates as an 8 on a scale from 1 to 10 (10 being the most extreme pain). The prescriber has ordered acetaminophen [Tylenol] 650 mg PO every 6 hours PRN pain. What will the nurse do?
- Ask the patient what medications have helped with pain in the past.
 - Contact the provider to request a different analgesic medication.
 - Give the pain medication and reposition the patient to promote comfort.
 - Request an order to administer the medication every 4 hours.

ANS: B

The nursing diagnosis for this patient is severe pain. Acetaminophen is given for mild to moderate pain, so the nurse should ask the prescriber to order a stronger analgesic medication. Asking the patient to tell the nurse what has helped in the past is part of an initial assessment and should be done preoperatively and not when the patient is having severe pain. Because the patient is having severe pain, acetaminophen combined with nondrug therapies will not be sufficient. Increasing the frequency of the dose of a medication for mild pain will not be effective.

PTS: 1

5. A patient newly diagnosed with diabetes is to be discharged from the hospital. The nurse teaching this patient about home management should begin by doing what?
- Asking the patient to demonstrate how to measure and administer insulin
 - Discussing methods of storing insulin and discarding syringes
 - Giving information about how diet and exercise affect insulin requirements
 - Teaching the patient about the long-term consequences of poor diabetes control

ANS: A

Because insulin must be given correctly to control symptoms and because an overdose can be fatal, it is most important for the patient to know how to administer it. Asking for a demonstration of technique is the best way to determine whether the patient has understood the teaching. When a patient is receiving a lot of new information, the information presented first is the most likely to be remembered. The other teaching points are important as well, but they are not as critical and can be taught later.

PTS: 1

6. The nurse receives an order to give morphine 5 mg IV every 2 hours PRN pain. Which action is *not* part of the six rights of drug administration?
- Assessing the patient's pain level 15 to 30 minutes after giving the medication
 - Checking the medication administration record to see when the last dose was administered
 - Consulting a drug manual to determine whether the amount the prescriber ordered is appropriate
 - Documenting the reason the medication was given in the patient's electronic medical record

ANS: A

Assessing the patient's pain after administering the medication is an important part of the nursing process when giving medications, but it is not part of the six rights of drug administration. Checking to see when the last dose was given helps ensure that the medication is given at the right time. Consulting a drug manual helps ensure that the medication is given in the right dose. Documenting the reason for a pain medication is an important part of the right documentation—the sixth right.

PTS: 1

7. A patient tells a nurse that a medication prescribed for recurrent migraine headaches is not working. What will the nurse do?
- Ask the patient about the number and frequency of tablets taken.
 - Assess the patient's headache pain on a scale from 1 to 10.
 - Report the patient's complaint to the prescriber.
 - Suggest biofeedback as an adjunct to drug therapy.

ANS: A

When evaluating the effectiveness of a drug, it is important to determine whether the patient is using the drug as ordered. Asking the patient to tell the nurse how many tablets are taken and how often helps the nurse determine compliance. Assessing current pain does not yield information about how well the medication is working unless the patient is currently taking it. The nurse should gather as much information about compliance, symptoms, and drug effectiveness as possible before contacting the prescriber. Biofeedback may be an effective adjunct to treatment, but it should not be recommended without complete information about drug effectiveness.

PTS: 1

8. A nurse is preparing to administer medications. Which patient would the nurse consider to have the greatest predisposition to an adverse reaction?
- A 30-year-old man with kidney disease
 - A 75-year-old woman with cystitis
 - A 50-year-old man with an upper respiratory tract infection
 - A 9-year-old boy with an ear infection

ANS: A

The individual with impaired kidney function would be at risk of having the drug accumulate to a toxic level because of potential excretion difficulties. Cystitis is an infection of the bladder and not usually the cause of excretion problems that might lead to an adverse reaction from a medication. A respiratory tract infection would not predispose a patient to an adverse reaction, because drugs are not metabolized or excreted by the lungs. A 9-year-old boy would not have the greatest predisposition to an adverse reaction simply because he is a child; nor does an ear infection put him at greater risk.

PTS: 1

9. A nurse consults a drug manual before giving a medication to an 80-year-old patient. The manual states that older adult patients are at increased risk for hepatic side effects. Which action by the nurse is correct?
- Contact the provider to discuss an order for pretreatment laboratory work.
 - Ensure that the drug is given in the correct dose at the correct time to minimize the risk of adverse effects.
 - Notify the provider that this drug is contraindicated for this patient.
 - Request an order to give the medication intravenously so that the drug does not pass through the liver.

ANS: A

The drug manual indicates that this drug should be given with caution to elderly patients. Getting information about liver function before giving the drug establishes baseline data that can be compared with post-treatment data to determine whether the drug is affecting the liver. Giving the correct dose at the correct interval helps to minimize risk, but without baseline information, the effects cannot be determined. The drug is not contraindicated.

PTS: 1

10. A patient has been receiving intravenous penicillin for pneumonia for several days and begins to complain of generalized itching. The nurse auscultates bilateral wheezing and notes a temperature of 38.5°C (101°F). Which is the correct action by the nurse?
- Administer the next dose and continue to evaluate the patient's symptoms.

- b. Ask the prescriber if an antihistamine can be given to relieve the itching.
- c. Contact the prescriber to request an order for a chest radiograph.
- d. Hold the next dose and notify the prescriber of the symptoms.

ANS: D

Pruritus and wheezing are signs of a possible allergic reaction, which can be fatal; therefore, the medication should not be given and the prescriber should be notified. When patients are having a potentially serious reaction to a medication, the nurse should not continue giving the medication. Antihistamines may help the symptoms of an allergic reaction, but the first priority is to stop the medication. Obtaining a chest radiograph is not helpful.

PTS: 1

11. A postoperative patient has orders for morphine sulfate 1 to 2 mg IV every 1 hour PRN for severe pain and acetaminophen-hydrocodone [Norco] 5 mg PO every 4 to 6 hours PRN for moderate pain. The patient reports pain at a level of 8 on a scale of 1 to 10, with 10 being the worst pain. Which action by the nurse is appropriate?
- a. Administer acetaminophen-hydrocodone 5 mg PO every 4 hours.
 - b. Administer acetaminophen-hydrocodone 5 mg PO every 6 hours and change to every 4 hours if not effective.
 - c. Administer morphine sulfate 1 mg IV every 1 hour until pain subsides.
 - d. Administer morphine sulfate 2 mg IV and evaluate the patient's pain in 15 to 30 minutes.

ANS: D

With PRN medications, the schedule is not fixed and the administration of these medications depends on the patient's condition. It is the nurse's responsibility to assess the patient's condition and then give the appropriate PRN medication. In this case, the patient has severe pain and should receive MS IV. Either 1 or 2 mg may be given, but the nurse must evaluate the effectiveness of the pain medication within 15 to 30 minutes to help determine subsequent doses. Acetaminophen-hydrocodone is not appropriate because it is ordered for moderate pain and this patient reports severe pain. Giving MS IV every hour is not appropriate for a PRN medication unless the patient's condition warrants it.

PTS: 1

12. The nurse is teaching a patient about home administration of insulin to treat diabetes mellitus. As part of the teaching, the patient and nurse identify goals to maintain specific blood glucose ranges. This represents which aspect of the nursing process? a. Assessment b. Evaluation
- c. Implementation
 - d. Planning

ANS: D

In the planning step, the nurse delineates specific interventions directed at solving or preventing problems. When creating the care plan, the nurse defines goals, sets priorities, and establishes criteria for evaluating success. The assessment step involves collecting data about the patient. The evaluation step involves evaluating the medication effectiveness. The implementation step identifies actions that are taken to administer the drug.

PTS: 1

MULTIPLE RESPONSE

1. A nurse is reviewing a patient's medical record before administering a medication. Which factors can alter the patient's physiologic response to the drug? (*Select all that apply.*)
- a. Ability to swallow pills
 - b. Age
 - c. Genetic factors
 - d. Gender
 - e. Height

ANS: B, C, D

Age, genetic factors, and gender influence an individual patient's ability to absorb, metabolize, and excrete drugs; therefore, these factors must be assessed before a medication is administered. A patient's ability to swallow pills, although it may determine the way a drug is administered, does not affect the physiologic response. Height does not affect response; weight and the distribution of adipose tissue can affect the distribution of drugs.

PTS: 1

Chapter 03: Drug Regulation, Development, Names, and Information Burchum: Lehne's Pharmacology for Nursing Care, 11th Edition

MULTIPLE CHOICE

1. A nurse educator is conducting a continuing education class on pharmacology. To evaluate the learning of the nurses in the class, the nurse educator asks, "Which drug name gives information about the drug's pharmacologic classification?" Which is the correct response?
- a. Amoxicillin
 - b. Tylenol
 - c. Cipro
 - d. Motrin
- ANS: A

Amoxicillin is the generic name, and the suffix "-cillin" indicates that it belongs to the penicillin class of antibiotics. Tylenol, Cipro, and Motrin are all trade names without segments that indicate their pharmacologic class.

PTS: 1

2. The FDA Amendments Act (FDAAA) was passed in 2007 to address which aspect of drug safety?
- a. Allowing pharmaceutical companies to identify off-label uses of medications approved for other uses
 - b. Evaluating drug safety information that emerges after a drug has been approved and is in use
 - c. Expediting the approval process of the U.S. Food and Drug Administration (FDA) so that needed drugs can get to market more quickly
 - d. Requiring manufacturers to notify patients before removing a drug from the market

ANS: B

The FDAAA was passed to enable the Food and Drug Administration to continue oversight of a drug after granting it approval so that changes in labeling could be made as necessary and postmarketing risks could be tracked and identified. A provision of the FDA Modernization Act (FDAMA), passed in 1997, allows drug companies to promote their products for off-label uses as long as they promise to conduct studies to support their claims. Regulations to permit accelerated approval of drugs for life-threatening diseases were adopted in 1992 by the FDA. The requirement that drug companies notify patients 6 months before removing a drug from the market is a provision of the FDAMA.

PTS: 1

3. A nursing student asks a nurse about pharmaceutical research and wants to know the purpose of randomization in drug trials. The nurse explains that randomization is used to do what?
- To ensure that differences in outcomes are the result of treatment and not differences in subjects
 - To compare the outcome caused by the treatment to the outcome caused by no treatment
 - To make sure that researchers are unaware of which subjects are in which group
 - To prevent subjects from knowing which group they are in and prevent preconception bias

ANS: A

Randomization helps prevent allocation bias, which can occur when researchers place subjects with desired characteristics in the study group and other subjects in the control group so that differences in outcome are actually the result of differences in subjects and not treatment. Comparing treatment outcome to no treatment outcome is the definition of a controlled study. The last two options describe the use of blinding in studies; blinding ensures that researchers or subjects (or both) are unaware of which subjects are in which group so that preconceptions about benefits and risks cannot bias the results. PTS: 1

4. Someone asks a nurse about a new drug that is in preclinical testing and wants to know why it cannot be used to treat a friend's illness. Which statement by the nurse is correct?
- "A drug at this stage of development can be used only in patients with serious disease."
 - "At this stage of drug development, the safety and usefulness of the medication is unknown."
 - "Clinical trials must be completed to make sure the drug is safe to use in humans."
 - "Until postmarketing surveillance data are available, the drug cannot be used."

ANS: B

Preclinical testing must be completed before drugs can be tested in humans. In this stage, drugs are evaluated for toxicities, pharmacokinetic properties, and potentially useful effects. Some drugs can be used in patients before completion of Phase III studies, but this is after preclinical testing is complete. Clinical trials proceed in stages, and each stage has guidelines defining how a new drug may be used and which patients may receive it. Postmarketing surveillance takes place after a drug is in general use.

PTS: 1

5. A patient asks a nurse why drugs that have been approved by the FDA still have unknown side effects. What will the nurse tell the patient?
- Testing for all side effects of a medication would be prohibitively expensive.
 - Patients in drug trials often are biased by their preconceptions of a drug's benefits.
 - Researchers tend to conduct studies that will prove the benefits of their new drugs.
 - Subjects in drug trials do not always represent the full spectrum of possible patients.

ANS: D

All drug trials are limited by a relatively small group of subjects who may not have all the characteristics of people who will be using the drug; therefore, some side effects go undetected until the drug is in use. Although drug trials are very expensive, this is only an indirect reason that they do not detect all side effects before approval. In theory, well-designed drug trials, using blinded studies, minimize or eliminate subject bias. Designing studies to prove desired results is unethical.

PTS: 1

6. A nurse is teaching nursing students about the use of nonproprietary names for drugs. The nurse tells them which fact about nonproprietary names?
- They are approved by the FDA and are easy to remember.
 - They are assigned by the U.S. Adopted Names Council.
 - They clearly identify the drug's pharmacologic classification.
 - They imply the efficacy of the drug and are less complex.

ANS: B

Nonproprietary, or generic, names are assigned by the U.S. Adopted Names Council, which ensures that each drug has only one name. Trade names, or brand names, are approved by the FDA and are easier to remember. Some nonproprietary names contain syllables that identify the classification, although not all do. Drug names are not supposed to identify the use for the drug, although some brand names do so.

PTS: 1

Chapter 04: Pharmacokinetics Burchum: Lehne's Pharmacology for Nursing Care, 11th Edition

MULTIPLE CHOICE

1. A patient tells the nurse that the oral drug that has been prescribed has caused a lot of stomach discomfort in the past. What will the nurse ask the prescriber?
- Whether a sublingual form of the medication can be given
 - Whether the medication can be given by a parenteral route instead
 - Whether an enteric-coated form of the drug is available
 - Whether the patient can receive a sustained-release preparation of the drug

ANS: C

Enteric-coated drugs are preparations that have been coated with a material that dissolves in the intestines, not the stomach. This coating is used either to protect the drug from stomach acid and pepsin or to protect the stomach from a drug that can cause gastric upset. Sublingual forms often are used for drugs that undergo rapid inactivation during the first pass through the hepatic circulation so that the drug can be absorbed directly into the systemic circulation. Parenteral routes are more costly and less safe than oral administration and should not be used unless necessary. A sustained-release preparation is used to release the drug into the body over a specific period to reduce the number of daily doses required to sustain therapeutic drug levels.

PTS: 1

2. A patient claims to get better effects with a tablet of Brand X of a drug than with a tablet of Brand Y of the same drug. Both brands contain the same amount of the active ingredient. What does the nurse know to be most likely?
- Advertising by pharmaceutical companies can enhance patient expectations of one brand over another, leading to a placebo effect.
 - Because the drug preparations are chemically equivalent, the effects of the two brands must be identical.
 - Tablets can differ in composition and can have differing rates of disintegration and dissolution, which can alter the drug's effects in the body.

d. The bioavailability of a drug is determined by the amount of the drug in each dose. ANS:

C

Even if two brands of a drug are chemically equivalent (ie, they have identical amounts of the same chemical compound), they can have different effects in the body if they differ in bioavailability. Tablets made by different manufacturers contain different binders and fillers, which disintegrate and dissolve at different rates and affect the bioavailability of the drug. Two brands may be chemically equivalent and still differ in bioavailability, which is not determined by the amount of drug in the dose.

PTS: 1

3. A patient receives a drug that has a narrow therapeutic range. The nurse administering this medication will expect to do what?
- Administer the drug at intervals longer than the drug half-life.
 - Administer this medication intravenously.
 - Monitor plasma drug levels.
 - Teach the patient that maximum drug effects will occur within a short period.

ANS: C

A drug with a narrow therapeutic range is more difficult to administer safely, because the difference between the minimum effective concentration and the toxic concentration is small. Patients taking these medications must have their plasma drug levels monitored closely to ensure that they are getting an effective dose that is not toxic. Administering medications at longer intervals only increases the time required to reach effective plasma drug levels. Drugs that have a narrow therapeutic range may be given by any route and do not differ from other medications in the amount of time it takes for them to take effect, which is a function of a drug's half-life and dosing frequency.

PTS: 1

4. A patient is given a prescription for azithromycin [Zithromax] and asks the nurse why the dose on the first day is twice the amount of the dose on the next 4 days. Which reply by the nurse is correct?
- "A large initial dose helps to get the drug to optimal levels in the body faster."
 - "The first dose is larger to minimize the first-pass effect of the liver."
 - "The four smaller doses help the body taper the amount of drug more gradually."
 - "Tubular reabsorption is faster with initial doses, so more is needed at first."

ANS: A

A large initial dose is often used as a loading dose to help get serum drug levels to plateau levels more quickly. Larger doses do not prevent first-pass effects in drugs susceptible to this type of metabolism. Tapering of doses sometimes is used to prevent rebound or withdrawal effects and is done by stepping down the amount of drug with each dose. Tubular reabsorption is a process that allows drugs to be reabsorbed from the urine into the blood.

PTS: 1

5. A nurse is giving an enteral medication. The patient asks why this method is preferable for this drug. How will the nurse reply?

- a. "This route allows more rapid absorption of the drug."
- b. "This route is safer, less expensive, and more convenient."
- c. "This route is the best way to control serum drug levels."
- d. "This route prevents inactivation of the drug by digestive enzymes."

ANS: B

Parenteral routes include the intravenous, intramuscular, and subcutaneous routes. Enteral routes include oral administration, including pills and liquid suspensions. Enteral routes are safer, cheaper, and easier to use. Parenteral routes are used when rapid absorption, precise control of plasma drug levels, and prevention of digestive inactivation are important.

PTS: 1

6. The nurse is preparing to administer penicillin G intramuscularly to a child. The child's parents ask why the drug cannot be given in an oral liquid form. What is the nurse's reply?
- a. "This drug causes severe gastric upset if given orally."
 - b. "This drug has a narrow therapeutic range, and the dose must be tightly controlled."
 - c. "This drug is absorbed much too quickly in an oral form."
 - d. "This drug would be inactivated by enzymes in the stomach."

ANS: D

Penicillin G is inactivated by digestive enzymes in the stomach and cannot be given orally. It does not have a narrow therapeutic range.

PTS: 1

7. A provider has written an order for a medication: drug 400 mg PO every 6 hours. The half-life for the drug is approximately 6 hours. The nurse is preparing to administer the first dose at 8:00 AM on Tuesday. On Wednesday, when will the serum drug level reach plateau?
- a. 2:00 AM
 - b. 8:00 AM
 - c. 2:00 PM
 - d. 8:00 PM

ANS: B

It takes four half-lives for a drug to reach plateau. Total body stores reach their peak at the beginning of the fifth dose of a drug if all doses are equal in amount; in this case, this will be at 8:00 AM the following day.

PTS: 1

8. An adult male patient is 1 day postoperative from a total hip replacement. On a pain scale of 0 to 10, with 10 being the greatest pain, the patient reports a pain level of 10. Which medication would be most appropriate for the nurse to administer to this patient?
- a. 60 mg morphine sulfate PO
 - b. 75 mg meperidine [Demerol] intramuscularly
 - c. 6 mg morphine sulfate intravenously
 - d. Fentanyl [Duragesic] patch 50 mcg transdermally

ANS: C

The intravenous route is the fastest route of absorption and the one most appropriate for a patient in extreme pain. With the oral route, the medication would take at least 45 minutes to be effective, too long for a patient in extreme pain. With the intramuscular route, the medication

would take at least 15 minutes to be effective; although faster than the oral route, this is not as fast as the intravenous route. A Duragesic patch would be the most inappropriate route because of the long drug half-life. This is a more appropriate route for long-term use.

PTS: 1

9. A nurse is explaining drug metabolism to a nursing student who asks about glucuronidation. The nurse knows that this is a process that allows drugs to be:
- excreted in hydrolyzed form in the feces to reduce drug toxicity.
 - reabsorbed from the urine into the renal circulation to minimize drug loss.
 - recycled via the enterohepatic recirculation to remain in the body longer.
 - transported across the renal tubules to be excreted in the urine.

ANS: C

Glucuronidation of some drugs in the liver allows drugs to enter the bile, pass into the duodenum, and then be hydrolyzed to release the free drug. This is a repeating cycle of enterohepatic recirculation, which allows drugs to remain in the body longer. Glucuronidated drugs that are more resistant to hydrolysis are excreted in the feces. Glucuronidation occurs in the enterohepatic circulation and not in the renal circulation.

PTS: 1

10. A patient is receiving intravenous gentamicin. A serum drug test reveals toxic levels. The dosing is correct, and this medication has been tolerated by this patient in the past. Which could be a probable cause of the test result?
- A loading dose was not given.
 - The drug was not completely dissolved in the IV solution.
 - The patient is taking another medication that binds to serum albumin.
 - The medication is being given at a frequency that is longer than its half-life.

ANS: C

Gentamicin binds to albumin, but only weakly, and in the presence of another drug that binds to albumin, it can rise to toxic levels in blood serum. A loading dose increases the initial amount of a drug and is used to bring drug levels to the desired plateau more quickly. A drug that is not completely dissolved carries a risk of causing embolism. A drug given at a frequency longer than the drug half-life will likely be at subtherapeutic levels and not at toxic levels.

PTS: 1

11. The nurse is caring for a child who has ingested a toxic amount of aspirin. The provider orders an intravenous drug that will increase pH in the blood and urine. The nurse understands that this effect is necessary to:
- decrease the gastric absorption of aspirin.
 - decrease the lipid solubility of aspirin.
 - increase the serum protein binding of aspirin.
 - increase the urinary excretion of aspirin.

ANS: D

The phenomenon of pH-dependent ionization can be used to accelerate renal excretion of drugs. When children have been exposed to toxic amounts of aspirin, they can be treated, in part, by giving an agent that elevates urinary pH, leading to less passive reabsorption of the now ionized

molecules of aspirin and, hence, more excretion. Elevating the pH of the blood and urine does not affect absorption in the stomach. Ionization of aspirin does not affect lipid solubility or protein binding.

PTS: 1

12. A patient is taking a drug that does not bind to albumin. Which aspect of renal drug excretion is affected by this characteristic? a. Active tubular secretion b. Glomerular filtration
c. Passive tubular reabsorption
d. pH-dependent ionization

ANS: B

As blood flows through the glomerular capillaries, fluids and small molecules are forced through the pores of the capillary wall. Large molecules, such as drugs bound to albumin, remain behind in the blood. Active tubular secretion requires active transport systems to pump molecules from one side of the membrane to another. Passive tubular reabsorption allows substances in high concentrations in the tubule to be reabsorbed into the blood, and lipid-soluble drugs readily cross this membrane by passive reabsorption. pH-dependent ionization affects drugs that ionize in either acid or alkaline environments.

PTS: 1

MULTIPLE RESPONSE

1. When administering medications to infants, it is important to remember which of the following? (*Select all that apply.*)
- Breast-feeding infants are more likely to develop toxicity when given lipid-soluble drugs.
 - Immaturity of renal function in infancy causes infants to excrete drugs less efficiently.
 - Infants have immature livers, which slow drug metabolism.
 - Infants are more sensitive to medications that act on the central nervous system (CNS).
 - Oral medications are contraindicated in infants, because PO administration requires a cooperative patient.

ANS: B, C, D

Immature renal function causes infants to excrete drugs more slowly, and infants are at risk for toxicity until renal function is well developed. Infants' livers are not completely developed, and they are less able to metabolize drugs efficiently. Because the blood-brain barrier is not well developed in infants, caution must be used when administering CNS drugs. Lipid-soluble drugs may be excreted in breast milk if the mother is taking them, but breast-feeding does not affect medications given directly to the infant. Oral medications may be given safely to infants as long as they are awake and can swallow the drug.

PTS: 1

Chapter 05: Pharmacodynamics Burchum: Lehne's Pharmacology for Nursing Care, 11th Edition

MULTIPLE CHOICE

1. A patient is receiving digoxin twice daily. When assessing the patient before giving a dose, the nurse counts a pulse of 60 beats/min and learns that the patient is experiencing nausea. The nurse

consults a drug manual and verifies that the ordered dose is correct. What should the nurse do? a. Contact the prescriber to report the symptoms.

- b. Delay the dose so the drug can clear from receptor sites.
- c. Give the medication as ordered, because the dose is correct.
- d. Request an anti-nausea medication from the prescriber.

ANS: A

The symptoms indicate toxicity, and even though the dose is safe and effective in most cases, an individual patient may have toxic effects with a standard dose. The nurse should contact the prescriber to discuss the next steps. Delaying a dose without a change in order is not within the scope of practice for a nurse. The nurse should not give a dose of a medication when toxicity is suspected, because additional drug will compound the symptoms. Antiemetics are useful for counteracting drug side effects, but they should not be used when the patient's symptoms indicate toxicity.

PTS: 1

2. A patient reports becoming "immune" to a medication because it no longer works to alleviate symptoms. The nurse recognizes that this decreased effectiveness is likely caused by:
- a. antagonists produced by the body that compete with the drug for receptor sites.
 - b. decreased selectivity of receptor sites, resulting in a variety of effects.
 - c. desensitization of receptor sites by continual exposure to the drug.
 - d. synthesis of more receptor sites in response to the medication.

ANS: C

Continual exposure to an agonist would cause the cell to become less responsive or desensitized. The body does not produce antagonists as a response to a medication. Receptor site selectivity is determined by physiologic factors and not by the substances that bind to them. Medications do not cause more receptors to be produced.

PTS: 1

3. A patient has been receiving an antibiotic with a small therapeutic index for 10 days. Upon assessment, the nurse notes an increase in the drug's side effects. What would be the nurse's priority action?
- a. Call the prescriber and have the antibiotic changed.
 - b. Suspect an allergic reaction and administer a PRN antihistamine.
 - c. Ask the prescriber to order a plasma drug level test.
 - d. Set up oxygen and obtain an order for an antagonist.

ANS: C

A narrow therapeutic index indicates that a drug is relatively unsafe and should be monitored closely. The nurse should have a blood level drawn to confirm suspicions of toxicity. The nurse would not have the antibiotic changed, because there is no cause at this time. The patient is unlikely to be experiencing an allergic reaction, because the antibiotic has been in the system for 10 days. The patient shows no signs of anaphylaxis, so oxygen and an antagonist are not indicated.

PTS: 1

4. A patient who is taking morphine for pain asks the nurse how a pain medication can also cause constipation. What does the nurse know about morphine? a. It binds to different types of receptors in the body.

- b. It can cause constipation in toxic doses.
- c. It causes only one type of response, and the constipation is coincidental.
- d. It is selective to receptors that regulate more than one body process.

ANS: D

Morphine is a medication that is selective to receptor type that regulates more than one process. Because it is selective to receptor type, it does not bind to different types of receptors. Constipation is a normal side effect and is not significant for toxicity.

PTS: 1

5. What occurs when a drug binds to a receptor in the body?
- a. It alters the receptor to become nonresponsive to its usual endogenous molecules.
 - b. It increases or decreases the activity of that receptor.
 - c. It gives the receptor a new function.
 - d. It prevents the action of the receptor by altering its response to chemical mediators.

ANS: B

When a drug binds to a receptor, it mimics or blocks the actions of the usual endogenous regulatory molecules, either increasing or decreasing the rate of the physiologic activity normally controlled by that receptor. It does not alter the activity of the receptor and does not give the receptor a new function.

PTS: 1

6. The nurse administers naloxone [Narcan] to a patient who has received a toxic dose of morphine sulfate. The nurse understands that the naloxone is effective because of which action?
- a. Countering the effects of morphine sulfate by agonist actions
 - b. Increasing the excretion of morphine sulfate by altering serum pH
 - c. Preventing activation of opioid receptors through antagonist actions
 - d. Regulating the sensitivity of opioid receptors by neurochemical alterations

ANS: C

Naloxone acts by blocking the action of opioids at opioid receptors. An opioid agonist would increase the effects of morphine. Naloxone does not affect serum pH or excretion of opioids. Naloxone does not alter the sensitivity of opioid receptors.

PTS: 1

MULTIPLE RESPONSE

1. Two nurses are discussing theories of drug-receptor interaction. Which statements are true regarding the affinity of a drug and its receptor? (*Select all that apply.*)
- a. Affinity and intrinsic activity are dependent properties.
 - b. Affinity refers to the strength of the attraction between a drug and its receptor.
 - c. Drugs with high affinity are strongly attracted to their receptors.
 - d. Drugs with low affinity are strongly attracted to their receptors.
 - e. The affinity of a drug for its receptors is reflected in its potency.

ANS: B, C, E

Affinity refers to the strength of the attraction between a drug and its receptor. Drugs with high affinity are strongly attracted to their receptors, and the affinity of a drug and its receptors is

reflected in its potency. Affinity and intrinsic activity are independent properties. Drugs with low affinity are weakly attracted to their receptors.

PTS: 1

2. Which drugs will *not* be affected by interpatient variability? (*Select all that apply.*)
- Antiseptics applied to the skin to slow bacterial growth
 - Antacids to help with the discomfort of heartburn
 - Broad-spectrum antibiotics that are effective against many organisms
 - Chelating agents that remove metal compounds from the body
 - Topical analgesics used to treat localized pain

ANS: A, B, D

Antiseptics, antacids, and chelating agents are all drugs that do not act through receptors, and therefore that do not depend on the body's processes for effects; these agents react with other molecules. Broad-spectrum antibiotics and topical analgesics bind with receptors to produce desired effects, and these processes can be influenced by individual patient variables.

PTS: 1

Chapter 06: Drug Interactions Burchum: Lehne's Pharmacology for Nursing Care, 11th Edition

MULTIPLE CHOICE

1. The nurse is teaching a patient about taking warfarin and asks if the patient takes aspirin. This assessment by the nurse reflects a knowledge of which type of drug interaction?
- Creation of unique effects
 - Increased therapeutic effects
 - Inhibitory effects
 - Potentiative effects

ANS: D

A potentiative effect is one in which one drug intensifies the effects of another. Both warfarin and aspirin suppress blood clotting, and the combination may increase the risk of bleeding, which is an intensified adverse effect. Creation of a unique effect is a rare occurrence in which the combination of two drugs creates a response not seen with either drug when given alone. Increased therapeutic effects are a type of potentiative effect; however, in this case the combination of two drugs would increase the desired effects. An inhibitory effect is a type of pharmacodynamic effect that occurs when an antagonist drug inhibits the action of an agonist drug at the same receptor site.

PTS: 1

2. A young adult postoperative patient is receiving morphine 2 to 4 mg IV every 2 hours PRN pain. The last dose was 3 mg given 2 hours ago. The patient is asleep, and the nurse notes a heart rate of 86 beats/min and a respiratory rate of 8 breaths per minute. Which PRN medication will the nurse give this patient?
- Diphenhydramine [Benadryl] to counter morphine side effects
 - Morphine 4 mg for increased pain, as indicated by tachycardia

- c. Naloxone [Narcan] to block the effects of the morphine
- d. Nothing at this time, because the patient is resting comfortably

ANS: C

A respiratory rate of 8 breaths per minute indicates respiratory depression, which is a significant adverse effect indicating morphine toxicity. Naloxone blocks the actions of morphine at cell receptor sites and is given to quickly reverse the effects. This patient does not have signs of an allergic response, which would include shortness of breath, a rapid respiratory rate, and wheezing. The tachycardia might be a sign of worsening pain, but the toxic effects must be treated first. Patients who are sleeping are not always pain free.

PTS: 1

3. In a discussion of drug-drug interactions, which would be the best example of a beneficial inhibitory interaction?
- a. Naloxone [Narcan] blocking morphine sulfate's actions
 - b. Antacids blocking the action of tetracycline [Sumycin]
 - c. Propranolol [Inderal] blocking the effects of albuterol
 - d. Cholestyramine blocking the actions of antihypertensive drugs

ANS: A

Naloxone is used when a narcotic overdose has occurred. As a narcotic antagonist, it provides a beneficial inhibitory interaction. An antacid blocking tetracycline's antibiotic effects would not be beneficial, but rather detrimental to the desired effects of the tetracycline. Alcohol would not block the effects of opiates, but would contribute to CNS depression. Cholestyramine and certain other adsorbent drugs, which are administered orally but do not undergo absorption, can adsorb other drugs onto themselves, thereby preventing absorption of the other drugs into the blood.

PTS: 1

4. A patient is taking drug X and receives a new prescription for drug Y, which is listed as an inducing agent. The nurse caring for this patient understands that this patient may require _____ doses of drug .
- a. lower; X
 - b. lower; Y
 - c. higher; X
 - d. higher; Y

ANS: C

An inducing agent stimulates the synthesis of CYP isoenzymes, which may increase the metabolism of other drugs as much as two- to threefold, thereby lowering the level of those drugs in the body and requiring higher doses to maintain drug effectiveness.

PTS: 1

5. A patient taking oral contraceptives thinks she may be pregnant. As part of this patient's history, what will the nurse ask the patient?
- a. "Do you drink grapefruit juice?"
 - b. "Do you take seizure medication?"
 - c. "Do you take your contraception with milk?"
 - d. "Do you use laxatives regularly?"

ANS: B

Patients taking oral contraceptives along with phenobarbital, which is used to treat seizures, will have lower levels of the contraceptive, because phenobarbital is an inducing agent, which causes an increase in the metabolism of oral contraceptives. Grapefruit juice inhibits the metabolism of some drugs, leading to toxic effects. Dairy products interfere with the absorption of tetracyclines, because the calcium binds with the drug to form an insoluble complex. Laxatives reduce the absorption of some drugs by speeding up the transit time through the gut.

PTS: 1

6. A child ingests a parent's aspirin tablets, and the prescriber orders sodium bicarbonate to block the toxic effects of the aspirin. The nurse caring for this patient knows that sodium bicarbonate is effective against the aspirin because it:
- accelerates its passage through the intestine.
 - alters urinary pH to enhance renal excretion.
 - induces CYP isoenzymes to increase drug metabolism.
 - raises the pH of the interstitial fluid to facilitate passage out of the cells.

ANS: D

Sodium bicarbonate increases the pH of interstitial fluid and plasma, allowing the acidic aspirin ions to move outside the cells and thus removing them from the site where they have toxic effects. It does not have laxative effects and does not alter the rate of passage through the gut. It is not a CYP isoenzyme inducer and therefore has no effect on drug metabolism. It does not alter renal excretion of aspirin.

PTS: 1

7. Which statement about food and drug interactions is true?
- Foods alter drug absorption and metabolism but not drug action.
 - Medications are best absorbed on an empty stomach.
 - Patient discomfort is the food and drug interaction of most concern.
 - Some foods can inhibit CYP isoenzymes and alter drug metabolism.

ANS: D

Grapefruit juice inhibits CYP3A4, which lowers the metabolism of some drugs, leading to toxic effects of drugs affected by these isoenzymes. Foods can alter all pharmacokinetic and pharmacodynamic processes. Not all medications are absorbed better on an empty stomach; some require certain foods to enhance absorption. Patient comfort is a concern, but it is not as important as more severe and possibly life-threatening food and drug interactions.

PTS: 1

8. A nurse is teaching a patient about a prescription for a monoamine oxidase (MAO) inhibitor for depression. What will the nurse teach the patient to avoid while taking this drug?
- Alcoholic beverages
 - Aged cheeses
 - Brussels sprouts and cabbage
 - Grapefruit juice

ANS: B

Aged cheeses are rich in tyramine, which interacts with MAO inhibitors to raise blood pressure to life-threatening levels. Patients taking MAO inhibitors should be taught to avoid tyramine-rich

foods. Chianti wine contains tyramine, but other alcoholic beverages do not. Brussels sprouts and cabbage are foods rich in vitamin K, which can interfere with the effects of warfarin. Grapefruit juice inhibits CYP3A4 and interferes with the metabolism of many medications.

PTS: 1

9. A nurse is teaching a patient about a drug that induces P-glycoprotein. The nurse will explain that this drug may cause which effect on other drugs?
- Decreased absorption in the intestines
 - Decreased elimination through the kidneys
 - Increased brain exposure
 - Increased fetal absorption

ANS: B

Drugs that induce PGP can increase drug export from cells of the intestinal epithelium into the intestinal lumen, thus decreasing absorption of the drug. PGP inducers also increase drug elimination and decrease brain and fetal drug exposure.

PTS: 1

MULTIPLE RESPONSE

1. The nurse is providing multiple medications to a patient whose spouse brings grapefruit juice every morning. The nurse will be concerned about which classes of drugs? (*Select all that apply.*)
- Calcium channel blockers
 - Selective serotonin reuptake inhibitors
 - Aminoglycosides
 - Beta blockers
 - Penicillins

ANS: A, B

Calcium channel blockers and selective serotonin reuptake inhibitors have been shown to reach increased and/or toxic levels when taken with grapefruit juice. Grapefruit juice is not contraindicated with aminoglycosides, beta blockers, or penicillins.

PTS: 1

2. The nurse is administering morning medications. The nurse gives a patient multiple medications, two of which compete for plasma albumin receptor sites. As a result of this concurrent administration, the nurse can anticipate that what might occur? (*Select all that apply.*)
- Binding of one or both agents will be reduced.
 - Plasma levels of free drug will rise.
 - Plasma levels of free drug will fall.
 - The increase in free drug will intensify effects.
 - The increase in bound drug will intensify effects.

ANS: A, B, D

When two drugs bind to the same site on plasma albumin, coadministration of those drugs produces competition for binding. As a result, binding of one or both agents is reduced, causing plasma levels of free drug to rise. The increase in free drug can intensify the effect, but it usually undergoes rapid elimination. The increase in plasma levels of free drug is rarely sustained.

PTS: 1

3. A nurse is caring for a patient who is taking multiple medications. To help ensure that adverse drug reactions are prevented or minimized, the nurse will do which of the following? (*Select all that apply.*)
- Ask the patient about over-the-counter medications used.
 - Contact the prescriber to request cytochrome P450 levels.
 - Limit the patient's calcium intake.
 - Obtain a thorough diet history.
 - Request orders for PRN medications to treat any anticipated symptoms of drug interactions.

ANS: A, B, D

Over-the-counter medications add to drug interactions, and a thorough history of all medications taken by the patient is essential to minimize adverse drug reactions. Cytochrome P450 levels yield important information about a patient's ability to metabolize drugs and can help predict whether drugs will reach toxic levels or be ineffective. A diet history allows providers to anticipate significant known food-drug interactions. Limiting calcium intake is necessary only if the patient is taking drugs known to interact with calcium, such as tetracycline. Asking for PRN medications to treat drug reactions may only compound the risk, because the risk of drug interactions increases with the number of medications taken.

PTS: 1

4. The prescriber has ordered an antibiotic for a patient with a bacterial infection. The nurse provides patient education at discharge and instructs the patient to take the drug on an empty stomach. When should the patient take the drug? (*Select all that apply.*)
- 1 hour or more before a meal
 - Only after an 8-hour fast
 - Only after the patient has missed a meal
 - At least 2 hours after a meal
 - Shortly before a meal

ANS: A, D

The absorption of some drugs can be significantly reduced by food; these drugs should be taken on an empty stomach, which is 1 hour or more before a meal or at least 2 hours after a meal. An 8-hour fast is not necessary; the patient does not need to miss a meal to take the medication; and it is not reasonable to have the patient on thin liquids for 12 hours.

PTS: 1

Chapter 07: Adverse Drug Reactions and Medication Errors Burchum: Lehne's Pharmacology for Nursing Care, 11th Edition

MULTIPLE CHOICE

1. A patient is given a new medication and reports nausea within an hour after taking the drug. The nurse consults the drug information manual and learns that nausea is not an expected adverse effect of this drug. When the next dose is due, what will the nurse do?
- Administer the drug and tell the patient to report further nausea.
 - Hold the drug and notify the provider of the patient's symptoms.
 - Report the symptoms of nausea to the MEDWATCH program.

d. Request an order for an antiemetic to counter this drug's effects.

ANS: A

Not all adverse drug reactions (ADRs) can be detected during clinical trials, and nurses should be alert to any effects that may result from drug administration. Because nausea is not a serious effect and because it is not yet known whether the drug is the cause of this patient's nausea, the nurse should administer the medication and observe the patient for recurrence of the symptom. It is not necessary to hold the drug, because nausea is not a serious side effect. The MEDWATCH program should be notified when there is a greater suspicion that the drug may have caused the nausea if the nausea occurs with subsequent doses. Until there is greater suspicion that the drug actually caused this patient's nausea, giving an antiemetic is not indicated.

PTS: 1

2. A patient is being discharged after surgery. During the admission history, the nurse learned that the patient normally consumes 2 or 3 glasses of wine each day. The prescriber has ordered hydrocodone with acetaminophen [Norco] for pain. What will the nurse do? a. Request an order for acetaminophen without hydrocodone for pain. b. Suggest that the patient use ibuprofen for pain. c. Tell the patient not to drink wine while taking Norco. d. Tell the patient to limit wine intake to 1 or 2 glasses per day.

ANS: C

Combining a hepatotoxic drug with certain other drugs may increase the risk of hepatotoxicity. When even therapeutic doses of acetaminophen are taken with alcohol, the acetaminophen can cause liver damage. Patients should be cautioned not to drink alcohol; even 2 drinks with acetaminophen can produce this effect. Hydrocodone does not contribute to hepatotoxicity. Ibuprofen is not indicated for postoperative pain unless the pain is mild. Limiting wine to 1 or 2 glasses per day still increases the risk of hepatotoxicity.

PTS: 1

3. A nurse is reviewing a medication administration record before administering medications. Which order will the nurse implement? a. Furosemide [Lasix] 20 mg QD PO b. Furosemide [Lasix] 20 mg qd PO c. Furosemide [Lasix] 20 mg daily d. Furosemide [Lasix] 20 mg PO daily

ANS: D

The correct answer is a complete order; it contains the medication, dose, route, and time. "qd" is no longer an accepted abbreviation; it should be written out as "daily" or "every day." The order of "20 mg daily" does not specify the route to be used.

PTS: 1

4. A patient is given a drug for the first time and develops shortness of breath. The patient's heart rate is 76 beats/min, the respiratory rate is 20 breaths per minute, and the blood pressure is 120/70 mm Hg. The nurse checks a drug administration manual to make sure the correct dose was given and learns that some patients taking the drug experience shortness of breath. The nurse will contact the provider to report what? a. An allergic reaction

- b. An idiosyncratic effect
- c. An iatrogenic response
- d. A side effect

ANS: D

A side effect is a secondary drug effect produced at therapeutic doses. This patient received the correct dose of the drug and developed shortness of breath, which, in this case, is a drug side effect. To experience an allergic reaction, a patient must have prior exposure to a drug and sensitization of the immune response. An idiosyncratic effect results from a genetic predisposition to an uncommon drug response. An iatrogenic response occurs when a drug causes symptoms of a disease.

PTS: 1

5. A nurse is preparing to give an antibiotic to a patient who reports being allergic to antibiotics. Before giving the medication, what will the nurse do first?
- a. Ask whether the patient has taken this antibiotic for other infections.
 - b. Question the patient about allergies to other medications.
 - c. Request an order for a lower dose of the antibiotic.
 - d. Request an order for an antihistamine.

ANS: A

The nurse needs to assess whether the patient is truly allergic to this drug. Allergic reactions require previous exposure to the drug, so the nurse should ask whether the patient has taken this antibiotic before. If a patient is allergic to a drug, lowering the dose will not decrease the risk of allergic reaction. Antihistamines sometimes are given when patients must take a drug to which they are allergic.

PTS: 1

6. A nurse is preparing to administer a drug. Upon reading the medication guide, the nurse notes that the drug has been linked to symptoms of Parkinson disease in some patients. What will the nurse do?
- a. Ask the patient to report these symptoms, which are known to be teratogenic effects.
 - b. Observe the patient closely for such symptoms and prepare to treat them if needed.
 - c. Request an order to evaluate the patient's genetic predisposition to this effect.
 - d. Warn the patient about these effects and provide reassurance that this is expected.

ANS: B

A drug that causes disease-like symptoms is known to be iatrogenic. Nurses should be prepared for this possibility and be prepared to withdraw the drug if necessary and treat the symptoms. Such effects are not teratogenic. Patients with a genetic predisposition to respond differently to drugs are known to have idiosyncratic effects. Iatrogenic effects, even when known, are not typically expected side effects.

PTS: 1

7. A nurse provides teaching to a patient who will begin taking a drug with a known risk of hepatotoxicity. Which statement by the patient indicates a need for further teaching? a. "I should avoid taking acetaminophen while taking this drug."
- b. "I will need periodic evaluation of aspartate aminotransferase and alanine aminotransferase levels."
 - c. "If I experience nausea, vomiting, or abdominal pain, I should call my provider."

d. "Routine testing and early detection of problems will prevent liver failure."

ANS: D

Drug-induced liver injury can progress from undetectable to advanced between routine tests; therefore, routine testing does not always prevent liver failure. Patients taking known hepatotoxic drugs should avoid other drugs, such as acetaminophen, that can cause liver damage. Aspartate aminotransferase (AST) and alanine aminotransferase (ALT) are liver enzymes that are routinely monitored when a patient is taking hepatotoxic drugs. Nausea, vomiting, and abdominal pain are signs of liver injury and should be reported.

PTS: 1

8. A patient is taking sertraline [Zoloft] for depression, and the provider orders azithromycin [Zithromax] to treat an infection. What will the nurse do?
- Contact the provider to discuss an alternative to azithromycin.
 - Request an order for a different antidepressant medication.
 - Request an order to reduce the dose of sertraline.
 - Withhold the sertraline while giving the azithromycin.

ANS: A

Both sertraline and azithromycin prolong the QT interval, and when taken together, they increase the risk of fatal dysrhythmias. Because the antibiotic is used for a short time, it is correct to consider using a different antibiotic. Reducing the dose of sertraline does not alter the combined effects of two drugs that lengthen the QT interval. Sertraline should not be stopped abruptly, so withholding it during antibiotic therapy is not indicated.

PTS: 1

9. A patient is taking a drug that has known toxic side effects. What will the nurse do?
- Discontinue the drug at the first signs of toxicity.
 - Ensure that complete blood counts are ordered periodically.
 - Monitor the function of all organs potentially affected by the drug.
 - Teach the patient how to treat the symptoms if they develop.

ANS: C

When a drug is administered that has known toxic side effects, the nurse is responsible for monitoring all organ systems potentially affected by the drug. Not all toxic side effects warrant discontinuation of the drug, and a nurse cannot discontinue a drug without an order from the provider. Complete blood counts are indicated only for drugs that affect the blood. Some drugs need to be discontinued, so teaching a patient to treat symptoms is not correct in all cases.

PTS: 1

10. A nursing student is preparing to give a medication that has a boxed warning. The student asks the nurse what this means. What will the nurse explain about boxed warnings?
- They indicate that a drug should not be given except in life-threatening circumstances.
 - They provide detailed information about the adverse effects of the drug.
 - They alert prescribers to measures to mitigate potential harm from side effects.
 - They provide information about antidotes in the event that toxicity occurs.

ANS: C

Boxed warnings (also known as black box warnings) are used to alert providers to potential side effects and to ways to prevent or reduce harm from these side effects. A boxed warning is placed

on any drug that, although useful, has serious side effects; this is a way to keep drugs on the market while protecting patients. Many of these drugs are used in situations that are not life threatening. The boxed warning provides a concise summary and not a detailed explanation of drug side effects. The boxed warning does not include antidotes to toxicity.

PTS: 1

MULTIPLE RESPONSE

1. Which actions occur in 90% of fatal medication errors? *(Select all that apply.)*

- a. Confusing drugs with similar packaging
- b. Giving a drug intravenously instead of intramuscularly
- c. Giving Nasarel instead of Nizoral
- d. Using an infusion device that malfunctions
- e. Writing a prescription illegibly

ANS: B, C, E

Ninety percent of fatal medication errors fall into three categories: human factors, communication mistakes, and name confusion. Giving a drug IV (intravenously) instead of IM (intramuscularly) is an example of a human factor; writing a prescription so that it is illegible is an example of a communication mistake; and giving a drug with a name that sounds like the name of another drug is an example of name confusion. Confusion of drugs with similar packaging and using a faulty device also can cause fatal drug errors, but these factors do not fall into the categories that account for 90% of fatal errors.

PTS: 1

2. Which are effective ways to help prevent medication errors? *(Select all that apply.)*

- a. Developing nonpunitive approaches to track errors
- b. Focusing on caregivers who make errors
- c. Helping patients to be active, informed members of the healthcare team
- d. Naming, blaming, and shaming those who make errors
- e. Using electronic medical order entry systems

ANS: A, C, E

To help prevent medication errors, it is important to create an environment for tracking errors that is nonpunitive so that caregivers can learn from mistakes and work together to change systems appropriately. Helping patients be active, informed members of the healthcare team is a useful tool in this process. Using electronic order entry helps eliminate confusion from poor handwriting and allows built-in systems to warn caregivers about possible overdoses, side effects, and drug interactions; it also helps ensure the right dose at the right time to the right patient. An approach that focuses on those who make mistakes by naming, blaming, and shaming is not productive and often results in personnel who cover up mistakes instead of working to make things better.

PTS: 1

3. Which patients are at increased risk for adverse drug events? *(Select all that apply.)*

- a. A 2-month-old infant taking a medication for gastroesophageal reflux disease
- b. A 23-year-old female taking an antibiotic for the first time

- c. A 40-year-old male who is intubated in the intensive care unit and taking antibiotics and cardiac medications
- d. A 7-year-old female receiving insulin for diabetes
- e. An 80-year-old male taking medications for COPD

ANS: A, C, E

Patients at increased risk for adverse drug events include the very young, the very old, and those who have serious illnesses. Females, children, and young adults taking single medications do not have increased risks for adverse events.

PTS: 1

Chapter 08: Individual Variation To Drug Responses Burchum: Lehne's Pharmacology for Nursing Care, 11th Edition

MULTIPLE CHOICE

1. A postoperative patient who is worried about pain control will be discharged several days after surgery. The nurse providing discharge teaching tells the patient that the prescribed Norco is not as strong as the morphine the patient was given in the immediate postoperative period. Which response is the patient likely to experience?
 - a. A decreased likelihood of filling the prescription for the drug
 - b. A negative placebo effect when taking the medication
 - c. An increased compliance with the drug regimen
 - d. Optimistic, realistic expectations about the drug

ANS: B

The full extent of placebo effects, if they truly occur, is not well documented or understood, although a decrease in pain as a placebo effect has been demonstrated to some extent. To foster a beneficial placebo effect, it is important for all members of the healthcare team to present an optimistic and realistic assessment of the effects of the drug the patient is taking. If the nurse tells an anxious patient that the medication being given is not as strong as what has been given, the patient is likely to have lowered expectations of the effectiveness of the drug, causing a negative placebo effect. Lowered expectations do not mean that the patient will give up on the drug entirely; in fact, the patient may actually fill the prescription and then take more drug than what is prescribed to get a better effect.

PTS: 1

2. A nurse administers the same medication in the same preparation in the same dose to several patients and notes that some patients have a better response to the drug than others. What is the most likely explanation for this phenomenon?
 - a. Altered bioavailability of the drug
 - b. Patient compliance with the therapeutic regimen
 - c. Pharmacogenomic differences among individuals
 - d. Placebo effects enhancing expectations of drug efficacy

ANS: C

Each patient's genetic makeup can determine how that patient responds to drugs quantitatively and qualitatively, and this is the most likely cause of individual variation when the same drug is given at the same dose. The bioavailability of a drug is determined by the drug's composition and varies across formulations of the drug. The patients in this example were given the same drug.

The nurse was administering the medication to the patients, so compliance is not an issue. Nothing in this example indicates that a placebo effect was in play.

PTS: 1

3. The U.S. Food and Drug Administration (FDA) recommends genetic testing of patients receiving certain medications. Genetic testing helps prescribers:
- better establish a drug's therapeutic index.
 - determine whether a patient is a rapid or slow metabolizer of the drug.
 - identify racial characteristics that affect psychosocial variation in drug response.
 - produce a drug that is tailored to an individual patient's genetic makeup.

ANS: B

Pharmacogenomics is the study of the ways genetic variations affect individual responses to drugs through alterations in genes that code for drug-metabolizing enzymes and drug receptors. For some drugs, the FDA requires genetic testing, and for others, this testing is recommended but not required. Genetic testing does not determine a drug's therapeutic index; this is a measure of a drug's safety based on statistics of the drug's use in the general population (see Chapter 5). Any distinct physiologic differences in drug response among various racial populations are related to genetic differences and do not affect psychosocial differences in drug responses. Genetic testing is recommended to identify how a patient will respond to a drug and not to design a drug specific to an individual. PTS: 1

4. A patient asks a nurse why a friend who is taking the same drug responds differently to that drug. The nurse knows that the most common variation in drug response is due to differences in each patient's:
- drug receptor sites.
 - hypersensitivity potential.
 - metabolism of drugs.
 - psychosocial response.

ANS: C

The most common source of genetic variation in drug response is related to alterations in drug metabolism and is determined by genetic codes for various drug-metabolizing isoenzymes. There are known genetic differences in codes for drug target sites, but these are not as numerous as those for metabolic isoenzymes. Hypersensitivity potential is also genetically determined, but variations produce differences in adverse reactions to drugs and not in drug effectiveness. Psychosocial responses vary for many less measurable reasons, such as individual personalities and variations in cultures.

PTS: 1

5. A nurse is preparing to care for a patient who is receiving digoxin. When screening for potential adverse effects from this drug, the nurse will review which of this patient's laboratory results?
- Albumin
 - Blood urea nitrogen (BUN) and creatinine
 - Hepatic enzymes
 - Serum electrolytes

ANS: D

Patients with low serum potassium are at risk for fatal cardiac dysrhythmias when taking digoxin, and it is essential to know this level before this medication is administered. Knowing a patient's albumin level would be important when giving drugs that are protein bound. The BUN and creatinine levels are indicators of renal function. Hepatic enzymes are important to know when drugs are metabolized by the liver.

PTS: 1

6. A patient has been taking narcotic analgesics for chronic pain for several months. The nurse caring for this patient notes that the prescribed dose is higher than the recommended dose. The patient has normal vital signs, is awake and alert, and reports mild pain. What does the nurse recognize about this patient?
- This patient exhibits a negative placebo effect with a reduced response to the drug.
 - This patient has developed a reaction known as *tachyphylaxis* because of repeated exposure to the drug.
 - This patient has developed pharmacodynamic tolerance, which has increased the minimal effective concentration (MEC) needed for analgesic effect.
 - This patient produces higher than normal hepatic enzymes as a result of prolonged exposure to the drug. ANS: C

Pharmacodynamic tolerance results when a patient takes a drug over a period of time. Adaptive processes occur in response to chronic receptor occupation. The result is that the body requires increased drug, or an increased MEC, to achieve the same effect. This patient is getting adequate pain relief, so there is no negative placebo effect. Tachyphylaxis is a form of tolerance that can be defined as a reduction in drug responsiveness brought on by repeated dosing over a short time; this occurs over several months. Barbiturates induce synthesis of hepatic enzymes that cause increased metabolism of the drug, but it does not increase the MEC.

PTS: 1

7. A nurse is caring for a woman with breast cancer who is receiving Tamoxifen. A review of this patient's chart reveals a deficiency of the *CYP2D6* gene. The nurse will contact the provider to suggest:
- a different medication.
 - an increased dose.
 - a reduced dose.
 - serum drug levels.

ANS: A

Women with a deficiency of the *CYP2D6* gene lack the ability to convert Tamoxifen to its active form, Endoxifen, and will not benefit from this drug. Another drug should be used to treat this patient's breast cancer. Increasing the dose, reducing the dose, or monitoring serum drug levels will not make this drug more effective in these women.

PTS: 1

8. A nurse is teaching a group of women about medications. The women want to know why so many drugs have unpredictable effects in women. The nurse will tell them that:
- drugs usually have more toxic effects in women.
 - most known drug effects are based on drug trials in men.

- c. women have varying responses to drugs during menstrual cycles.
- d. women metabolize drugs more slowly.

ANS: B

Until 1997, almost all clinical drug trials were performed in men. Women may have more toxic effects with some drugs and fewer toxic effects with others. Not all drugs are influenced by hormonal changes. Women metabolize some drugs more slowly and other drugs more quickly. Unless drug trials are performed in both women and men, the effects of drugs in women will not be clear.

PTS: 1

9. The nurse is assessing a newly admitted older patient who has recently lost 15 lb. The nurse notes that the patient is taking warfarin (Coumadin). Which laboratory tests will the nurse discuss with this patient's provider?
- a. Blood glucose and C-reactive protein
 - b. Complete blood count and hepatic function tests
 - c. Renal function tests and serum electrolytes
 - d. Serum albumin and coagulation studies

ANS: D

Older patients and those who are malnourished are at increased risk for low serum albumin. Since warfarin binds to albumin, such patients are at increased risk for elevated warfarin levels, which can cause increased bleeding. The nurse should request albumin levels and coagulation studies.

PTS: 1

MULTIPLE RESPONSE

1. Which groups of people are especially sensitive to medication effects? (*Select all that apply.*)
- a. Older adults
 - b. Caucasians
 - c. Infants
 - d. Minorities
 - e. Women

ANS: A, C

Older adults and infants are the two groups most sensitive to drugs because of differences in organs that absorb, metabolize, and excrete drugs. In the older adult, organ degeneration accounts for these differences, whereas in infants the differences are related to organ immaturity. Racial and gender differences tend to be related to genetic differences and not race and gender per se. These groups are more sensitive to drug effects in some cases and less sensitive in other cases.

PTS: 1

MULTIPLE CHOICE

1. The student is listening to a lecture on genetics and genomics. Which statement by the student indicates that teaching has been effective?
- “Genetics considers a person’s environment.”
 - “People with the same genes experience the same diseases.”
 - “Genomics takes into account a person lifestyle.”
 - “How genes are passed is examine in genomics.”

ANS: C

Genomics takes into account a person’s environment and lifestyle. Genetics is the examination of how genes are passed from one generation to the next through human genes. Individuals with the same genes can experience different diseases.

PTS: 1

2. Which statement is false regarding biomarkers?
- Biomarkers cannot be measured.
 - Biomarkers indicate the presence of specific markers.
 - Many drug labels mention biomarkers.
 - Biomarkers are used in pharmacogenomics.

ANS: A

A biomarker is a measurable substance that can indicate a specific phenomenon when found in an organism. Many drug labels mention biomarkers. They can be used in pharmacogenomics to determine reaction to drug treatment.

PTS: 1

3. The nurse is administering a drug with a narrow therapeutic index. Which does the nurse know to be true about this type of drug?
- Altered metabolism rates would have no impact on the individual.
 - Dose changes must be large to create the desired therapeutic effect.
 - Therapeutic failure occurs easily when dosages are decreased.
 - Dose changes must be monitored closely to prevent toxicity.

ANS: D

Drugs with a narrow therapeutic index must be monitored closely to prevent toxicity. Dose increases or decreases must be small and incremental. Altered metabolism of different individuals can altered the levels of drug in the body, and potentially lead to toxicity.

PTS: 1

4. A provider is preparing to treat a patient who has been diagnosed with Human Immunodeficiency Virus (HIV) and wants to use the drug Maraviroc [Selzentry]. The provider orders the required genetic testing and is reviewing the results. Which strain must be present in order for the provider to treat with this drug?
- HER2
 - CCR5
 - VKORC1
 - ADRB1