Solutions Manual for Pharmacology 5th Adams

Pharmacology: Connections to Nursing Practice, 5e

Answers for Resource Website

Chapter 1

Answers to Critical Thinking Questions in Making the Patient Connection

1 A therapeutic classification describes what the drug is treating. These drugs are often identified by the prefix *anti-* such as antiseizure, anti-inflammatory, and antihypertensive. The pharmacologic classification describes how the drug acts within the body. A drug's pharmacologic classification is more specific than a therapeutic classification.

2 A barbiturate is the pharmacologic classification for a major sedative. A macrolide is the pharmacologic classification for a major type of antibiotic. Although the words *birth control pills* don't begin with *anti*, this classification describes what the drug is being used for (anti-conception). A barbiturate is the pharmacologic classification for a major sedative. A macrolide is the pharmacologic classification for a major type of antibiotic. Although the words "birth control pills" do not begin with "anti," this classification describes what the drug is being used for (anti-conception). Laxatives denotes a therapeutic classification of drugs that enhance peristalsis to cause bowel emptying. Folic acid antagonists are antimetabolites and have highly specific therapeutic uses such as the treatment of some autoimmune disorders such as rheumatoid arthritis, and in the treatment of some cancers. An antianginal agent is the therapeutic class of drugs that treat chest pain."

3 A prototype drug is a member of a category that best represents the group as a whole. A prototype is representative of a group, classification, or category. By learning about a prototype drug, students can apply this knowledge to the actions and adverse effects of other drugs in the same class.

4 The nurse is a critical member of the healthcare team and has tremendous responsibility for a patient's drug therapy. The nurse not only administers medication but also closely monitors the patient for the desired outcome and adverse effects. Nurses provide patients with essential drug-related education.

Answers to Additional Case Study

1 Although generic drugs are less expensive than their trade-name equivalent, they may vary in their bioavailability. In most cases, this difference does not affect the therapeutic effect of the drug and therefore can be safely substituted. However, in certain critical situations, the onset time of the drug may be extremely important. In such situations, such as heart attack, stroke, or shock syndromes, generic forms of a medication may not be recommended.

2 To be safe, you should advise Sarah to talk with her healthcare provider or nurse practitioner about using generics. Explain how important it is for her to inform her healthcare providers that her income status is limited. This information will assist the prescriber in determining the best and most cost-effective treatment modalities for her.

Answer to Connection Checkpoint 1.1

Exenatide (Byetta) is derived from the saliva of the Gila monster lizard. It is used to treat type 2 diabetes and is under study as a treatment for obesity. Captopril (Capoten) was developed from a peptide found in the venom of a South American viper and is used to treat hypertension. Hyaluronic acid is present naturally in body tissues such as the eyes and joints, but for medicinal uses, it is extracted from rooster combs or grown in bacterial solutions. It has a variety of uses including in skin creams, for eye surgeries and plastic surgery (e.g., lip "plumping" injections), and to treat joint conditions.

Answer to Connection Checkpoint 1.2

Anticoagulant, central nervous system agent, analgesic, and antipyretic describe therapeutic classifications. Salicylate is a pharmacologic classification.

Answer to Patient Safety Question

A potentially dangerous drug interaction may occur if paroxetine (Paxil) and St. John's wort are taken concurrently. Symptoms such as headache, sweating, confusion, and agitation may occur and may worsen, with hypertension and hyperpyrexia occurring. The patient should be taught to stop taking the St. John's wort while using paroxetine and to consult with his or her healthcare provider before taking any over-the-counter medication.

Chapter 2

Answers to Critical Thinking Questions in Making the Patient Connection

1 Many people think OTC drugs are harmless. Any drug can have dangerous properties if taken inappropriately, and adverse effects can vary from person to person. OTC drugs may produce toxic results if not used as directed. They may also prevent individuals from seeking healthcare when needed. OTC drugs should be used as a temporary measure for minor problems. Individuals who use OTC drugs for recurrent and persistent problems should see a healthcare provider.

2 OTC medications have several advantages: (1) Time; these drugs are available when the patient wants and needs them. They also do not require a visit to a healthcare provider. (2) Cost; in many cases, OTC drugs are reasonably priced. Many prescription medications are costly and may create financial hardship for individuals with limited resources. (3) Easy administration; most OTC medications are created so that the administration is fairly simple and does not require any advanced knowledge of human physiology. (4) Readily accessible; OTC medications are sold in a variety of places from grocery stores to vending machines.

The disadvantages of OTC drugs include the following: (1) Improper use; some individuals take OTC medications in improper amounts and frequencies. OTC medications should only be used as described in the directions. (2) Self-diagnosis; when patients diagnose themselves, the potential for misdiagnosis of serious and life-threatening illnesses arises. Using OTC medications is not a substitute for a physical examination and care by a healthcare provider when the health problem is persistent. (3) Delay in seeking appropriate healthcare; when health problems are persistent or intense in nature, individuals should seek medical care. Individuals with conditions such as chest pain, chronic cough, or abdominal pain who prolong seeking medical care by taking OTC medications may increase the risk of disability and mortality.

3 Gertrude can obtain correct information about OTC drugs by talking to a pharmacist or healthcare provider. Most pharmacists and healthcare providers will be happy to talk with individuals about possible drug–drug interactions, adverse effects, and contraindications for OTC medications.

Answers to Additional Case Study

1 The FDA is a federal agency whose function is to protect the public by validating the safety and efficacy of drugs, medical devices, food, and cosmetics. This organization works to provide the public with accurate and scientific-based information related to pharmaceutical products.

2 While the FDA does not require testing of herbal or dietary supplements prior to marketing, it monitors the administration of herbal products, dietary supplements, and cosmetics through the Center for Food Safety and Applied Nutrition (CFSAN).

3 In decades past, the approval of new drugs by the FDA was a long and tedious process. Since the early 1990s, the process has been expedited and now a drug can be approved approximately 1 year after research testing has been completed.

Answer to Connection Checkpoint 2.1

The term *antiemetic* denotes a therapeutic classification that describes what the drug does, and granisetron (Sustol) was approved to treat nausea and vomiting associated with chemotherapy. *Monoclonal antibody* specifies a pharmacologic classification because it describes how the drug acts, i.e., as an antibody against specific human immune cells.

Answer to Connection Checkpoint 2.2

The generic name is assigned by the United States Adopted Name Council. The trade, brand, or proprietary name is assigned by the drug manufacturer.

Chapter 3

Answers to Critical Thinking Questions in Making the Patient Connection

1 John Kessler's deteriorating condition will affect drug metabolism in several ways. First, the condition of diabetes is an alteration in metabolism and therefore the nurse must always consider that drug therapies given to a patient with diabetes may be influenced by this pathology. Additionally, John's heart disease and hepatic function are directly related to cardiovascular function. When perfusion to the liver is less than optimal, it can disturb the hepatic metabolism of drugs and nutrients. Another consideration regarding metabolism involves his lifestyle and ultimately his hepatic function with his habitual use of alcohol. Chronic alcohol abuse is destructive to the liver.

2 The patient has preexisting kidney disease and requires renal dialysis. Remember that pathologic states such as kidney disease can increase the duration and intensity of drug action when drugs are not excreted as expected. The nurse must be particularly vigilant in monitoring the patient for signs of drug toxicity.

3 Both IV and inhalation routes of administration allow the drug to be immediately absorbed and circulated to the target organs. Therapeutic responses to drugs given by these routes are frequently rapid in onset, as are toxic effects. Although these are the preferred routes of administration for this patient, the nurse must not forget that the patient has other factors that will affect both the metabolism and excretion of these drugs.

4 When it is desirable to achieve the target plasma level rapidly, a loading dose (also known as a bolus dose) is necessary. This large dose of medication is used to achieve the therapeutic range quickly. Because the patient is critically ill, there is no time to wait several days for the drug level to gradually reach a therapeutic range. He will be given maintenance doses to maintain a steady plasma level of the drug.

Answers to Additional Case Study

1 There is no way to memorize the half-lives of all drugs. However, this is important information that will guide the nurse in effectively managing the patient's drug therapy. Plasma half-life is the time it takes for half a given amount of a substance, such as a drug, to be removed from the blood plasma. Liver and kidney function may affect the half-life. Drugs with a short half-life leave the body quickly and require more frequent dosing intervals; drugs with long half-lives leave the body more slowly and present a greater risk for medication accumulation and toxicity.

2 The use of drugs with short half-lives is indicated with conditions or procedures that are brief in duration. Patients with chronic illness such as renal and hepatic disease may benefit from the use of drugs with shorter half-lives to prevent toxicities related to the existence of higher drug levels, but most need the benefits of a long half-life drug and the dosage may need to be adjusted.

3 Drugs with long half-lives are particularly useful when the maintenance of a constant and consistent level of a drug in the body is critical. Such conditions include hypertension and heart disease.

Answer to Connection Checkpoint 3.1

During a drug's period of exclusivity, competing drug companies are not allowed to market generic versions of the product. Exclusivity allows the developing pharmaceutical company sufficient time to recoup the millions of dollars in research and development costs involved in designing and testing the new drug before competing drugs are allowed on the market.

Answer to Connection Checkpoint 3.2

The Harrison Narcotics Act, passed in 1914, requires healthcare providers who dispense opium, cocaine, and related substances to keep records of the drugs they dispense and makes it illegal to possess narcotics without a prescription.

Chapter 4

Answers to Critical Thinking Questions in Making the Patient Connection

1 Potency refers to the amount of drug (usually expressed in milligrams) needed to produce an effect. Efficacy refers to the potential maximum therapeutic response that a drug can produce.

2 In most cases efficacy is more important than potency. When judging the relative merits of drugs for a patient, other factors should be considered, such as adverse effects, potential toxicity, duration of effect (which determines the number of doses needed each day), and cost.

3 Comparing drugs is not always a simple process. Generally, higher doses produce more intense adverse effects. However, when two drugs are compared, one cannot assume that the drug with the lower dose produces fewer adverse effects.

Answers to Additional Case Study

1 Most drugs work through a mechanism that is similar to a key and lock. Drugs interact with cellular receptors and bind to specific sites to produce actions. When drugs are manufactured, companies attempt to create a specific drug for a specific receptor that will produce a specific response. This is not always possible, however, because receptors are located everywhere in the body. Drugs without a specific receptor site produce more adverse effects than those with specific receptors.

2 Several factors produce variation in drug effects among people. Such factors include an individual's unique metabolism rate, age, weight, sex, and hereditary influences.

3 A drug that is an agonist is a site-specific drug that initiates activity in the cell and triggers a response. A drug classified as an antagonist acts in an opposite way to block cellular activity.

Answer to Connection Checkpoint 4.1

The pharmaceutical company must submit an Investigational New Drug (IND) application that contains all the animal testing data. Approval from the FDA is necessary before the next stage can begin.

Answer to Connection Checkpoint 4.2

By inducing CYP1A2, phenytoin would speed up the metabolism of acetaminophen and inactivate it. Thus phenytoin would be a functional antagonist of acetaminophen.

Chapter 5

Answers to Critical Thinking Questions in Making the Patient Connection

1 There are several steps a nurse can take to help Elizabeth minimize adverse drug effects. With the advent of computerized medical records, a summary list of multiple medical diagnoses and medications can be created. For institutions that still use paper documents, including clinics that

treat lower socioeconomic patients, the nurses in the clinic may consider proposing a “medical summary page” to be added to the medical record that could include medical diagnoses, hospital admissions, and prescribed drug therapies.

Secondly, Elizabeth should be advised to carry a list of her medications with her at all times. When patients are on multiple medications, it is easy to forget one or two when asked about drug therapies. Listing the purpose and dosage for each medication would also be helpful for Elizabeth and the healthcare provider. The nurse could assist Elizabeth if she is unable to do this herself or encourage her family’s participation. The nurse should review the list with her each time she comes to the clinic.

Elizabeth should be taught to report any symptoms that “just don’t feel right.” In addition, the nurse should encourage Elizabeth to become more assertive when healthcare providers suggest a new drug. Assure Elizabeth that it is acceptable to question healthcare providers when it concerns her health and her drug therapy.

Learning about all of her drugs and their potential adverse effects may be overwhelming for Elizabeth. The nurse can assist her with ongoing education related to her drug therapy at each office visit or with follow-up telephone calls.

2 Several conditions make Elizabeth more susceptible to a drug reaction. The aging process makes the metabolism and excretion of drugs less predictable. Additionally, as the number of drugs a patient takes increases, the risk of adverse drug reactions increases. Alterations in pharmacokinetics will influence the reactions expected from a given drug. The speed of absorption (specifically enteral drugs) may enhance or reduce the effect of a drug. The distribution of a drug can be altered through modification in protein binding and may produce an unpredicted reaction. Elizabeth has also experienced a stroke, suggesting that vascular changes

may be present that may affect the distribution of her medications or her hepatic and renal blood flow (thus metabolism and excretion).

3 Pharmacokinetics is the movement of drugs from the point of administration to the target cell. Drug reactions can affect each element of pharmacokinetics. Drug–drug reactions that increase or decrease gastric motility may influence the absorption time for enteral drugs. Examples include laxatives and antacids. Additionally, when drugs compete for binding ability to plasma proteins or change the pH of the plasma, drug distribution can be altered. Any drug-generated modification in hepatic enzymes has the ability to cause a drug–drug interaction. Lastly, if a drug changes the rate of renal filtration, a drug interaction may occur.

4 An additive effect occurs when two drugs from a similar therapeutic class generate a combined response. A synergistic effect is the interaction of two or more drugs so that their combined effect is greater than the sum of their individual effects. An antagonistic effect is described as the interaction of two or more drugs that produces a reduced pharmacologic response.

Answers to Additional Case Study

1 Patients are often confused when determining the difference between an adverse effect and a drug allergy. Ask the patient to describe the symptoms that occurred related to the medication. Ask how the adverse symptoms were treated because allergic reactions are sometimes treated pharmacologically. It is questionable whether the patient received sufficient drug education or that she understood the possible adverse effects associated with this medication. Adverse effects from codeine almost always include nausea and sleepiness.

2 First, the term *drug allergy* (also known as *hypersensitivity reaction*) is a reaction that occurs due to an overactive response from the immune system. In an allergic response, the drug is recognized as the antigen and the body produces antibodies as a defense mechanism. Side effects