Edition 3

Instructor's Guide and Answer Key to Accompany

Pharmacology Clear and Simple

A GUIDE TO DRUG CLASSIFICATIONS AND DOSAGE CALCULATIONS

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INTRODUCTION

Dear Instructor,
Having been involved in the education of students in most areas of allied health and nursing for the past 21 years, I realize that it is important to teach the very basics and then build on those elemental concepts. We should never assume that students already know a concept. All students who will be working with patients someday must master why a medication is being ordered, how to administer that medication safely, and, if unfamiliar with the medication, where to find the information they need to educate themselves and their patients about that medication. Patient safety is dependent on students learning these concepts, and we are foremost patient advocates in the allied health fields. Allow me to highlight a few approaches used in this textbook.

- I kept vocabulary fairly simple. This allows the instructor to test the student's ability to understand pharmacology rather than medical terminology. In addition, if not confronted by terminology that is too advanced, the student may not be as likely to lose heart and give up.
- I used a writing tone that creates an atmosphere of shared learning. Rather than approaching the student as the all-knowing, wise author, I selected words like "we" or "us" to help students feel that I am on a journey of discovery with them.
- I purposely tried to have 21 relatively short chapters. After instructors allow for tests, practicing injections, snow days, and so on, they may find that they can easily cover one to two chapters per class period. Most units are fairly small, at five or fewer chapters, which means that instructors can test frequently and assess comprehension before moving on to more challenging chapters.
- I describe several methods of approaching math problems. Many students are fearful of math. What I have discovered over my years in education is that students come from a variety of backgrounds. Some of them have very basic math skills, learned 20 or more years ago, whereas others have very advanced math skills. Essentially, as the saying goes, there is more than one way to skin a cat, and that applies to math as well. Strategies that work for many students do not work for others and vice versa. However, most students are able to work through this difficulty, and the "aha" moment when the light bulb goes on is very rewarding to see.
- Drugs are discovered, approved, or taken off the market almost daily, so making students memorize specific drugs is a losing battle in most instances. Instead, the exercises attempt to teach students the research methods needed to locate the most current information about drugs.
- Key terms are highlighted in bold print. To facilitate memorization, instructors can ask students to make flash cards of all bold terms, which can then be studied for tests.
- Because this book emphasizes drug research, instructors can use this book year after year. Instructors may require students to obtain a current drug handbook or go to the Internet for information on current drugs, but they will not need to adapt lesson plans to changing textbooks.
- The contents of this book match the American Association of Medical Assistants' (AAMA's) current standards for CAAHEP-accredited courses. Be sure to instruct the students to research the top 50 drugs, which are frequently on the Certified Medical Assisting Exam.
- Because the new AAMA standards include "theory of IV therapy," instructors will find that this book integrates IV therapy into chapters on supplies, routes, calculations, and administration.
- Even if your students are not currently involved in IV therapy, they may become more involved in the future to (at the very least) monitor patients receiving IV therapy. Make sure to emphasize the importance of students' checking state regulations regarding their scope of practice and IV therapy.
- The available online resources for instructors on Davis*Plus*.com include a test bank with more than 1,000 questions to help prepare the student

for national certification exams as well as PowerPoint presentations for each chapter and an image bank of illustrations from the book for use in the classroom. Printable competencies for procedures listed in the book as well as documentation exercises associated with each competency are also available.

Please feel free to contact me for any assistance in regards to this textbook at cwatkins043@gmail.com

Sincerely,

Cynthia J. Watkins RN, MSN

GENERAL IDEAS FOR TEACHING THIS COURSE

Critical Thinking

One of the key features of this book is encouraging the students to think, rather than memorize. Whenever possible, include student participation in your lesson plans to encourage them to think critically. For example, instead of teaching them about the effects of a medication, ask them to tell you what they think the effects might be. You may want to propose case studies such as "If an elderly patient with failing kidneys is put on this medication, what implications does it have on his or her care?" For lifelong learning and employability, critical thinking is absolutely necessary for the allied health professional.

Internet Research

Students will gain more from Internet research than from memorizing a table that has already been collected for them (and in many cases is already outdated). Website exercises have been placed throughout each chapter. At times, the websites many no longer be available, but you can still encourage the students to find their own trustworthy websites for researching the question. These exercises will provide students with the critical life skill of learning HOW to do research instead of just memorizing research that has been done for them. Consider assigning an Internet research project in which the students visit 10 sites and rate them for quality, ease of use, professionalism, currency, and so on. Have them share their findings with others in the class. Another idea is to create a drug scavenger hunt, in which you create a list of questions about a variety of drugs and have the students use a drug handbook, *PDR*, and the Internet to research these questions. Remember: Although many students are already computer literate, some students may be returning to school after years of being away from it and may have never learned to use a computer. You will have to be inventive to assist all students regardless of their level of comfort with computers.

Field Trips/Business Connections

One experience you can include in this course is to visit a local pharmacy and talk with the pharmacist about the role of allied health professionals as it relates to pharmacology. Be sure to interview the pharmacist beforehand to ensure that this professional will make supportive comments. You can also have a virtual field trip by asking the students to interview a pharmacist online. Another exciting adventure is to invite an emergency medical technician to visit the class to discuss medications used in an emergency; they usually bring a jump kit filled with the medications they use. You may also consider asking a pharmaceutical representative to come and discuss the rapport between the pharmaceutical representative and allied health professionals. You could assign a paper on the ethics of receiving gifts from pharmaceutical representatives, such as pens, foods, tickets to shows, and so on.

Role Play

You can order sample medication packets (including pills, enemas, transdermal patches, vials of "insulin" types, and blister packages) from medical education websites and give the students an order to complete, pointing them toward the full array of medications. Expect the students to find the correct drug, dosage, and form and role–play, giving the drug to the hypothetical patient. Make sure that the students can explain to the hypothetical patient the purpose of each medication. You can also stage an emergency and encourage the students to select the correct medication from a crash cart.

Math Issues

To reinforce the importance of dosage calculations throughout the term, introduce the topic early. After presenting the dosage calculations chapter, continue to review and reinforce it. For example, you could have a

short math quiz at the beginning of every class after Chapters 6 through 8 have been introduced. If the students fail the test on Chapters 6 through 8, you may want to allow them to retest later in the term to see whether their math skills have improved. It is also helpful to provide real-life practice and assessment, not just exercises on paper. For example, give students the ordered dosage and have them find the medication from a supply and figure out the amount to administer, as they would in a real medical setting.

Term Reports/ Assignments

A long research project is probably not necessary for this course, but suggestions for cumulative papers include the following:

- Researching 10 websites and reporting how good they are
- Picking one system or chapter to present to the rest of the class
- Creating drug cards on the top 50 drugs prescribed last year on www.rxlist.com
- Interviewing a pharmacist
- Writing a research paper on one class of drugs
- Creating a fictitious patient and developing a treatment plan, including medications, for presentation to the class

Empathy Building

Order some glasses that simulate sensory deficits or blindfold the students and ask them to try to take pills as a patient would. Ask them to pour out a tablespoon of medication and then remove the blindfold and see how accurate they were. You may also use noise-cancelling headphones and have one student try to educate the hearing-impaired student in the proper method of taking medication.

Audiovisuals

PowerPoint presentations are available for every chapter, which you can adapt to your needs. You may also want to check with your favorite audiovisual company for videos, DVDs, or other media to show how to administer medications. Many websites also provide free animations and videos.

Ancillaries

Instructors have access to competency checklists for various procedures included in the book, which are available as an instructor resource on Davis*Plus*. Each competency has associated documentation exercises so that after you assess an individual's competency in a particular procedure, you can assess their documentation skills. Have students practice the competencies first, then use the checklist to evaluate their proficiency on a certain scheduled date. You may choose to repeat the competencies later in the term, if time allows. I have included numerous competencies. Choose those that are appropriate for what is allowed in your state or expected by your accrediting body. You may also choose to use mannequins rather than humans, if that is the standard in your area.

SAMPLE SYLLABUS

Pharmacology For Health Occupations

ALHN xxx ***(course name and # at your institution)***
Instructor:
Office:
E-mail:
Fax:
Phone:
Office Hours:

COURSE DESCRIPTION

This course is designed to enable Allied Health students to acquire knowledge about pharmacology. The student will study pharmacokinetics and pharmacodynamics of the drugs by classifications, disease entity, and body system.

CREDIT HOURS:

CLASS MEETING TIME:

REQUIRED TEXTBOOK

Watkins, C:. *Pharmacology Clear and Simple, ed. 3*. Philadelphia: F.A. Davis, 2018.

INTRODUCTION

Welcome to {Insert Your Class Title Here]. This outline is intended to orient you to the course and provide information related to grading, general course expectations, and the class schedule. Please feel free to ask questions at any time. I am available to help make this a valuable learning experience for you.

COURSE OUTCOMES

Upon completion of this course, the students will attain the following outcomes:

Cognitive/Knowledge **(what a student should know from studying pharmacology)**

1. Define terminology associated with basic pharmacology.
2. Identify the regulatory bodies responsible for drug safety and reporting.
3. Compare and contrast the mechanism of action, indications for, and side effects of various selected drug agents classified by body systems and/or drug function.
4. Identify action, dose ranges, therapeutic uses, adverse effects, and drug interactions of the common classes of drugs.
5. Select the administration route for the common classes of drugs.

Behavior/Skills **(what a student should be able to do as a result of studying pharmacology)**

1. Use drug references to obtain information on unfamiliar drugs.
2. Calculate drug dosages.
3. Classify drugs according to their action and body system affected.
4. Interpret medication orders.

Values/Attitudes **(what additions or changes should the student experience in interests, appreciation, beliefs, and judgments as a result of studying pharmacology):**

1. Discuss ethical issues and professional standards related to drug prescriptions, dispensing, and administration.
2. Describe alternative health measures and lifestyle changes that promote health.

COURSE REQUIREMENTS

Success this class is contingent upon the following:

Complete all reading assignments.(**No make-up quizzes will be given.**)
Term paper — see below for details and grading criteria.
Homework assignments — see below for details and grading criteria.

COMPETENCY CHECKLISTS

Attendance

Attendance will be established by the completion of the homework assignment titled Syllabus Exercise. If this is not completed by the due date, student will be marked as "has not attended," which will affect financial aid.

Grades

Points for Course Grade	
Syllabus Assignment	5 points
Exams	350 points
Homework	30 points
Term Paper	50 points
Competencies	50 points*
Total	485
Grading Scale	
451–485	**93–100% = A**
412–450.5	**85–92% = B**
378–411.5	**78–84% = C**
339.5–377.5	**70–77% = D**
377 & below	**0–69% = F**

* Individual competencies are designed to be given a specific point value or scored as pass/fail. Therefore, these points are flexible, according to how the instructor weighs the competencies.

Homework

Students will have six homework assignments to complete over the course of the semester. **Check calendar for due dates.**

Competencies

Students must complete satisfactory competency checklists by the final exam date to pass this class. Details will be covered during the first class meeting.

Term Paper

Each student will submit a term paper covering the certain drug or class of drugs that will be assigned. **Check calendar for due date.** Early papers will be accepted. The paper must be typed, double-spaced, two to four pages long. A minimum of three references should be used to derive the content of the paper. These references can include Internet sites, *PDR,* drug inserts, and so on. ***Wikipedia is not an acceptable resource.*** The criteria for grading are listed below. You may e-mail papers to me in Word format. Microsoft Works and WordPerfect are not acceptable.

You may attach this sheet to your paper when you submit it to your instructor, but it is not necessary. Use it as a guideline.

Term Paper Grading Criteria

	Possible Points	Points Earned
Title page with title of paper, name, course, date, instructor's name	5	
Introduction of drug: description of drug, classification (may be more than one), names: generic, brand(s), chemical	5	
Pharmacodynamics: mechanism of action or how the drug works; include how the drug is absorbed, distributed, metabolized, and excreted and whether the drug is fat- or water-soluble	5	
Indications and usage: Who would use this drug, when would the drug be used (on what conditions, etc.)?	5	
Contraindications and warnings/precautions	5	
Adverse reactions/effects: Are any specifically related to the field you are in?	5	
Interactions with other drugs and foods	5	
Dosage and administration	5	
Patient education	5	
Miscellaneous comments	5	
Total	**50**	

Unit 1
Introduction to Pharmacology

Content	Textbook Reading
History of Pharmacology	Chapter 1
Basics of Pharmacology	Chapter 2
Patient Safety in Medication Administration	Chapter 3
Regulations	Chapter 4
Prescriptions and Labels	Chapter 5

OBJECTIVES

At the end of this section, the student will be able to:

- Define key terms.
- List three societies critical to the development and evolution of pharmacology.
- List four sources of drugs.
- List 10 drugs and record their sources.
- Discuss three examples of alternative medicine.
- List the four steps in the drug cycle and their effects on the body.
- Compare and contrast the usefulness of different drug resources.
- Differentiate between a side effect and an adverse reaction.
- List the seven rights of medication administration.
- Explain the various considerations of medication administration.
- Identify common abbreviations used in medicine administration.
- Outline special considerations when administering medications to the elderly and children.
- Discuss cultural effects on drug use.
- Name the actions taken with a patient, during an emergency.
- Describe the roles of OSHA, FDA, and DEA in patient safety.
- Discuss how drugs are developed.
- Distinguish between brand, generic, and trade names.
- Know the slang names for illegal drugs.
- Discuss why some drugs are controlled more strictly than others.
- Give an example of a drug from each controlled substances schedule and explain its classification.
- Discuss the role of allied health professionals in recognizing and reporting impaired patients and professionals.
- Discuss precautions to ensure patient safety.
- Identify the parts of a legal prescription.
- Differentiate between three different types of medications order.
- List which health-care providers are able to write prescriptions.
- Define abbreviations used in prescriptions.
- Interpret labels safely.
- Discuss the impact of e-prescribing on health-care consumers.

Unit 2
Calculations

Content	Textbook Reading
Basic Review of Mathematics	Chapter 6
Measurement Systems	Chapter 7
Dosage Calculations	Chapter 8

OBJECTIVES

At the end of this section, the student will be able to:

- Define all key terms.
- Discuss numerical relationships.
- Perform calculations involving whole numbers.
- Calculate problems using fractions.
- Find the lowest common denominator.
- Perform calculations involving decimals.
- Calculate percentages, ratios, and proportions.
- Solve problems for an unknown quantity.
- Compare the four systems of measurement used for drug dispensing.
- State the basic units of measurements in the metric system.

- Use conversion methods for each system of measurement correctly and accurately.
- Learn and understand the four methods for calculating drug dosages.
- Explain why certain calculations are considered special and which populations are affected.
- Explain how to reconstitute powdered medication and calculate the desired dosage.
- Discuss the factors that need to be considered when calculating the dosages of parenteral medications and the two ways intravenous medications are administered.
- Explain the calculation process for determining fluid intake.

Unit 3
Administration of Medications

Content	Textbook Reading
Enteral Medications and Administration	Chapter 9
Parenteral Medications and Administration	Chapter 10

OBJECTIVES

At the end of this section, the student will be able to:

- Define all key terms.
- List the forms in which medications are manufactured for the enteral route.
- Differentiate how the different forms of drugs affect the body.
- Describe the possible enteral routes for administering medications.
- Describe how to administer oral medications safely.
- Discuss the methods for administering medications through nasogastric or gastric tubes.
- Explain why prescribers choose certain forms and routes over others.
- Describe how to apply transdermal patches and other topical medications correctly.
- Indicate how to administer ophthalmic, otic, and nasal medications correctly.
- Describe how to insert vaginal medications safely.
- List precautions for the safe administration of inhalation therapy.
- Choose the correct needle and syringe for parenteral injections.
- Indicate how to inject IM, SC, and ID medications safely.
- Indicate how to prepare the patient for IV therapy.
- Distinguish between the solutions used in IV therapy.

Unit 4
Classification of Drugs

Content	Textbook Reading
Integumentary System Medications	Chapter 11
Musculoskeletal System Medications	Chapter 12
Nervous System Medications	Chapter 13
Eye and Ear Medications	Chapter 14
Endocrine System Medications	Chapter 15
Cardiovascular System Medications	Chapter 16
Immune System Medications	Chapter 17
Pulmonary System Medications	Chapter 18
Gastrointestinal System Medications	Chapter 19
Reproductive and Urinary System Medications	Chapter 20
Vitamins, Minerals, Herbs, and Complementary and Alternative Medicine	Chapter 21

OBJECTIVES

At the end of this section, the student will be able to:

- Define all key terms.
- Differentiate between two primary routes of medication administration in the integumentary system and identify when each route would be chosen.

- Recall at least seven conditions affecting the integumentary system and the medications used to treat them.
- Identify the key features of the musculoskeletal system.
- Discuss the importance of a healthy endocrine and nervous system to proper musculoskeletal functioning.
- Recall at least five muscular system disorders and one appropriate treatment for each.
- Discuss at least four bone or joint disorders and one appropriate treatment for each.
- Identify the two major branches of the nervous system.
- Identify four categories of medications used to treat pain and fever.
- Recall at least one category of medication used to treat anxiety, insomnia, sedation, and seizures.
- Identify at least one category of medication used to treat behavioral, emotional, or mood disorders.
- Identify one medication commonly used to stabilize mood in bipolar disorder.
- Discuss medications used to treat psychosis and identify other disorders for which these medications may be prescribed.
- Recall at least one category of drug used to treat dementia and two categories of drugs used to treat Parkinson's disease.
- Compare and contrast the actions of local and general anesthetics.
- Discuss how alcohol can influence medication use and its effect on the body.
- List five parts of the eye and the function of each structure.
- Recall three conditions related to the eye requiring treatment with medications and provide an example of an appropriate medication for each condition.
- Classify parts of the ear as belonging to the external, middle, or inner ear and discuss the function of each part.
- Recall three conditions related to the ear requiring treatment with medications and provide an example of an appropriate medication for each condition.
- Discuss six of the major endocrine glands and their functions.
- Differentiate between hypothyroidism and hyperthyroidism and identify the effects of each on the body and the medications used to treat each disorder.
- Contrast the three major disorders related to pancreatic function and discuss the medications used to treat each.
- Explain the proper way to handle, store, and administer insulin.
- Differentiate between adrenal gland insufficiency and oversecretion and discuss the medications used to treat each one.
- Discuss how the cardiovascular system functions.
- Describe 10 categories of cardiovascular medications and their uses and actions.
- Discuss five categories of anti-inflammatory medications, when they are used, and their actions in the body.
- Differentiate between the six classifications of anti-infectives and when each is used and their actions in the body.
- Compare the four different types of acquired immunity a body develops and how they each occur.
- Identify at least three different types of antineoplastic medications, when each is used, and their actions in the body.
- Discuss the toxic effects that antineoplastic medications have on patients and health-care workers, including the proper handling of both of these medications and patient secretions.
- Describe how the respiratory system functions to exchange oxygen and carbon dioxide.
- Discuss the actions of mast cell stabilizers, bronchodilators, anticholinergics, xanthines, and beta-adrenergic agonists used in the treatment of asthmas and other respiratory disorders.
- Describe two medications that may be used to treat a viral respiratory illness.
- Compare and contrast antitussive and expectorant medications and discuss when each is appropriate to use.
- Discuss tuberculosis, how it is treated, and why its occurrence has increased.
- Detail how the gastrointestinal system functions.
- Identify medications used to treat constipation.
- Identify medications used to treat diarrhea, explaining how the underlying cause should be treated.
- Identify medications used to treat nausea and vomiting.

- Compare the different types of medications used to treat GERD and gastric ulcers.
- Discuss medications used for gallstones, obesity, hemorrhoids, flatulence, stomatitis, and fungal and parasitic infections of the GI tract.
- Discuss how overdose is treated.
- Identify populations of patients needing nutritional supplements or those needing assistance digesting their food and how each of these are treated.
- List actions of the reproductive hormones: FSH, LH, and ICSH.
- Describe how contraceptives work.
- Discuss the relation of diuretics to electrolyte imbalances.
- Describe the effects of estrogens, progestins, agents for cervical ripening, oxytocin, tocolytics, ovulation stimulants, androgens, diuretics, and BPH medications.
- Discuss the body's need for vitamins and minerals.
- Compare Eastern philosophy to Western philosophy as they relate to medicine.
- Discuss why some patients prefer herbs to prescription medications.
- Discuss why insurance companies do not usually pay for herbal remedies.

Suggested Course Schedule for a 10-Week Quarter

WEEK	Reading Assignments	Evaluation
1	Introduction to course and syllabus Chapter 1: History of Pharmacology Chapter 2: Basics of Pharmacology	Midterm Homework
2	Chapter 3: Patient Safety in Medication Administration Chapter 4: Regulations Chapter 5: Prescriptions and Labels	Midterm Homework
3	Chapter 6: Basic Review of Mathematics Chapter 7: Measurement Systems	Midterm and Final Homework
4	Chapter 8: Dosage Calculations	Midterm and Final Homework
5	Chapter 9: Enteral Medications and Administration Chapter 10: Parenteral Medications and Administration	Midterm and Final Homework Competencies
6	Midterm and/or Competencies	
7	Chapter 11: Integumentary System Medications Chapter 12: Musculoskeletal System Medications Chapter 13: Nervous System Medications Chapter 14: Eye and Ear Medications	Final Exam Term Paper
8	Chapter 15: Endocrine System Medications Chapter 16: Cardiovascular System Medications Chapter 17: Immune System Medications Chapter 18: Pulmonary System Medications	Final Exam Term Paper
9	Chapter 19: Gastrointestinal System Medications Chapter 20: Reproductive and Urinary System Medications Chapter 21: Vitamins, Minerals, Herbs, and Complementary and Alternative Medicine Final Review	Final Exam Term Paper
10	Final Exam and final competencies	

Suggested Course Schedule for a 16-Week Semester

WEEK	Reading Assignments	Evaluation
1	Introduction to course and syllabus Chapter 1: History of Pharmacology	Midterm Homework
2	Chapter 2: Basics of Pharmacology Chapter 3: Patient Safety in Medication Administration	Midterm Homework
3	Chapter 4: Regulations Chapter 5: Prescriptions and Labels	Midterm Homework
4	Chapter 6: Basic Review of Mathematics Chapter 7: Measurement Systems	Midterm and Final Exams Homework
5	Chapter 8: Dosage Calculations	Midterm and Final Exams Homework
6	Midterm Exam/	
7	Chapter 9: Enteral Medications and Administration Chapter 10: Parenteral Medications and Administration	Final Exam Homework Competencies
8	Practice Competencies	
9	Competencies	
10	Chapter 11: Integumentary System Medications Chapter 12: Musculoskeletal System Medications	Final Exam Term Paper
11	Chapter 13: Nervous System Medications Chapter 14: Eye and Ear Medications	Final Exam Term paper
12	Chapter 15: Endocrine System Medications Chapter 16: Cardiovascular System Medications	Final Exam Term Paper
13	Chapter 17: Immune System Medications Chapter 18: Pulmonary System Medications	Final Exam Term Paper
14	Chapter 19: Gastrointestinal System Medications Chapter 20: Reproductive and Urinary System Medications	Final Exam Term Paper
15	Chapter 21: Vitamins, Minerals, Herbs, and Complementary and Alternative Medicine Final Review	Final Exam Term Paper
16	Final Exam Competencies (Makeups or finish)	

Unit 1

Introduction to Pharmacology

Chapter 1

History of Pharmacology

Class Activities

MEDICATION SOURCE RESEARCH

This assignment allows students to explore where the drugs that they or someone close to them routinely takes originate. Have the students pick a drug that they or someone close to them commonly takes. Have them research this drug using their textbook or any drug handbooks available to them to discover the source of this drug. If they have Internet access, they may also use this as a research tool.

Answers to Critical Thinking Exercises

1. If people rely on plants for medication, what effect does the increasing population have on the potential supply of medications?
   If we don't develop land that could be used to grow plants, we could lose our ability to make medications from these plants, which will cause them to become scarce.
2. Cows and pigs are good sources of hormones. Do you think animals may be a better hormone source than humans? Why or why not?
   Humans are the best source, because the drugs made from human sources would be compatible with other humans. In instances of things such as blood products, we only have limited supplies. If there is a way to make safe substitutes using animals, that would be a good alternative. On the other hand, we can't control what a human ingests or is exposed to as we can with animals.
3. What are some of the dangers of using toxins as medicine?
   The obvious danger would be that use of the toxin could potentially cause the patient to become very ill.
4. What are some of the ethical issues of genetically engineered drugs?
   Are we playing God by creating substances that aren't naturally occurring in nature? Are we playing God by manipulating genes and altering animal cells? Are we being cruel using animals in the synthesis of drugs?
5. Identify the following drugs as curative, prophylactic, diagnostic, palliative, replacement, or destructive.

   Synthroid—*Replacement hormone*

   Diuretic—*Curative, to reduce edema*

   Flu vaccine—*Prophylactic, preventative*

   Radiopaque dye—*Diagnostic*

   Fever reducer—*Palliative, reduces discomfort, but does not cure*

   Anticancer drugs—*Destructive, destroys cancer cells*

Answers to End-of-Chapter Activities

MULTIPLE CHOICE

1. **A.** Lanolin is derived from sheep's wool.
2. **C.** Potassium chloride is derived from minerals.
3. **B.** Digoxin (Lanoxin) is derived from a plant (foxglove).
4. **E.** Barbiturates are made synthetically.
5. **D.** Humans are the source of leukocytes (white blood cells).
6. **C.** World War II saw the mass production of penicillin.
7. **A.** Genetic engineering is used to create synthetic drugs.
8. **D.** Cows (bovine) and pigs (porcine) were the sources for insulin before synthetic production began.
9. **C.** Toxins (e.g., Botox) are used to treat skin wrinkles.
10. **B.** Premarin is derived from the urine of pregnant horses.

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SHORT ANSWERS

1. Animals may be a good source of medication, because their food sources and lifestyle can be better controlled than those of humans. They can also be continuously monitored for disease, but detection is never 100% safe, so they are a good source, but possibly not the best.
2. The rain forest and the rich plant sources are in danger of disappearing because of deforestation.
3. World War II was the catalyst for mass-production of penicillin to try to prevent the massive death toll caused by infection that occurred in previous wars.
4. Alternative medicine should (in my opinion) be used in partnership with traditional medicine, if this is the patient's choice. Patients should not be pushed toward, or steered away from, them. The exception would be if there is a known reason to avoid the alternative medicine in question, for example, massage therapy for a trauma patient when there is the potential for doing further damage.

APPLICATION EXERCISES

1. He may have porcine insulin, but it would be against his religious beliefs, unless necessary for life. The physician may choose to prescribe synthetic or bovine insulin instead.
2. Humulin insulin is manufactured using genetic engineering but does not involve the use of stem cells. It is named Humulin because it very closely resembles human insulin.
3. You would further explore aromatherapy in an attempt to discover exactly what Mr. Parker is being exposed to, and how. Document any information and make sure the physician is aware of any information that you obtain so that he or she can discuss the therapy with Mr. Parker. You SHOULD NOT tell Mr. Parker that he should avoid this type of therapy.
4. Mr. Harvey is taking a tea made from foxglove (the derivative of digoxin), which may be causing cardiac problems. You SHOULD NOT criticize him but should document the information and advise the physician. The physician may ask you to educate the patient about the effects of digoxin and digoxin toxicity, but it is the physician's role to decide the best way to handle this situation.

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