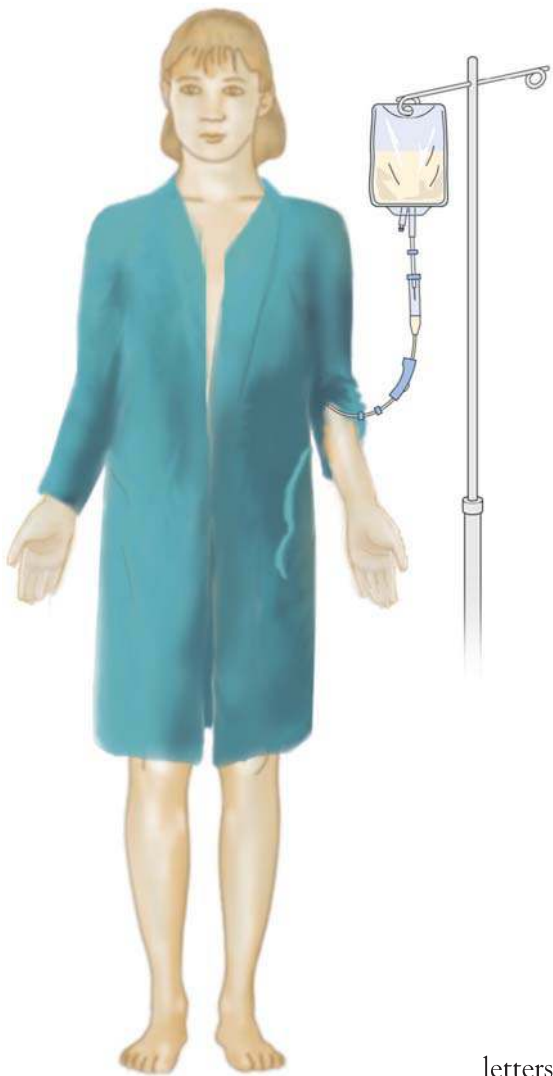


# CHAPTER

# 22

## Terms in Pharmacology

### ► PHARMACOLOGY



After studying this chapter, you will be able to:

- 22.2 Describe the source and types of drugs
- 22.3 List various generic and trade names for common drugs
- 22.4 Identify the various ways drugs are administered
- 22.5 Describe some of the ways in which drugs affect the body
- 22.6 Identify the meaning of related abbreviations

### Drug Sources, Types, Function, and Administration

**Drugs** are biological or chemical agents. They are *therapeutic* when they are used to cure, alleviate, diagnose, treat, or prevent illness. They are *addictive* or habit-forming when they are used in unregulated and excessive quantities to stimulate or depress someone's moods. Therapeutic drugs are also called **medicines** or **medications**.

Drugs come from plants, animals, or through chemical synthesis in a laboratory. **Vitamins**, organic substances found in food, are also a form of drugs. The federal *Food and Drug Administration (FDA)* regulates the testing, manufacture, content, and distribution of all drugs that are not part of or derived from food. The FDA has an approval process that is intended to exclude drugs that may cause more harm than they can cure. It evaluates data submitted by pharmaceutical companies to determine the safety or harmful effects of a drug, and to ensure the drug provides effective treatment. In recent years, there have been questions about the efficacy of the FDA's approval and monitoring processes. Congress is studying new ways to ensure the independence of the FDA. The standards for approval are set by an independent committee in publications collected and published as the *United States Pharmacopeia (U.S.P.)*. When the letters U.S.P. follow a drug name on the package, it means that the drug has met the stringent standards set by the committee.

Aside from the Pharmacopeia, doctors generally use one of two references in gathering drug information. The first, the *Hospital Formulary*, lists drugs that are approved for patient care in that particular facility. The use of formularies grew out of the need to control health care costs under managed care systems. The second, the *Physician's Desk Reference (PDR)*, is a widely

used reference for physicians. The PDR lists drugs by their drug class, and includes information such as indication for use, known side effects, appropriate dosages, and routes of administration. Figure 22-1 shows the PDR entry for aspirin.

**Pharmacology** is the science that studies, develops, and tests drugs. Some of the scientists who work in pharmacology specialize in the various subdivisions of the field. For example, *medicinal chemistry* is the study of new drugs, their structure, and how they work. **Pharmacodynamics** is the study of how drugs affect the body. **Toxicology** is the study of harmful effects of drugs on the body and of **antidotes**, substances able to cancel out unwanted effects. **Pharmacokinetics** is the study of how drugs are **absorbed, metabolized** (chemically changed so it can be used in the body), and **excreted** over time. Since the mapping of the human genome and ability to use stem cells, new drug therapies are being developed all the time. Many foresee a day when genetically developed drugs and therapies will be the preferred method for preventing and curing disease.

Some drugs are available **over-the-counter (OTC)**, sold without a doctor's **prescription**, which is an order for medication with the dosages, directions, route, and timing of administration included. Prescription drugs are dispensed by a **pharmacist** or **druggist** in a pharmacy or drug store. Drugs are also available from mail-order companies and from companies on the Internet. Drugs usually come with instructions about how and how often to take the medication and a listing of the potential side effects. Sometimes other drugs or even foods are **contraindicated** (advised against) to be taken along with the medication being given.

Drugs can have several different names. First is a chemical name that describes the chemical formula of the drug. Second is a **generic** name that is the official name of the drug and is often a shortened or simpler version of the chemical name for legal purposes. Third is a **trade, brand, or proprietary**



**FIGURE 22-1** Pharmacist filling a prescription.

The publishers of the PDR run a Web site ([www.gettingwell.com](http://www.gettingwell.com)) where it is possible to search for information about specific drugs.

## MORE ABOUT . . .

### Pain Management and Controlled Substances

In the past, many in the medical community regarded chronic pain as only a symptom. Often, practitioners told patients much of it was in their heads. In recent years, chronic pain has come to be regarded as a long-term condition in need of management both for the quality of life such management offers and for the attempt to prevent the pain from becoming debilitating. Many pain medications have been developed and are effective along with therapies, such as acupuncture, biofeedback, physical therapy, massage therapy, and others. Unfortunately, the most effective medications are also the drugs most likely to be abused or to become addictive. The federal government regards narcotics and other medications, such as Vicodin, Oxycontin, sedatives, and various strong muscle relaxants, as controlled substances. This means that patients can only receive a limited number of pills in a specified time period. Also, physicians who prescribe and pharmacists who fulfill an inordinate number of prescriptions of controlled substances often come under scrutiny. For more information on pain management, visit the WebMD section on this issue ([www.webmd.com/pain-management/default.htm](http://www.webmd.com/pain-management/default.htm)).

**name** that is given and copyrighted by the manufacturer for a specific drug. Each drug has only one chemical name and only one generic name, but it may have many trade names. For example, acetylsalicylic acid is the chemical name for *aspirin*, the generic name packaged under various trade names, such as Bayer aspirin. Table 22-1 lists some generic and trade names of drugs according to their function (what class of drug it is). Many insurance companies will only pay for generic drugs or the least expensive alternatives. Pharmacies generally check a patient's insurance before filling any prescription. Federal laws also may limit the number of pills of certain restricted drugs that may be filled at any one time. Restricted drugs, called *controlled substances*, are usually narcotics or other addictive drugs that may be easily abused.

Dosages of drugs vary depending on the age, size, severity of symptoms, and other medications in use. Some drugs are tapered; that is, they are given at a higher dose initially and then the dose is gradually reduced as the symptoms subside. Many drugs are synthesized to perform like substances in the body. For example, manufactured **hormones** (chemical substances in the body that form in one organ and have an effect on another organ or part) are widely used in hormone replacement therapy. Many drugs are derived from plant material. Many drugs have been in use for centuries, such as aloe vera for infections. Today there are many people who prefer to use plant-based remedies instead of certain drugs. For example, St. John's Wort (a plant derivative) is widely used for cases of mild depression. The use of alternative drug therapies should always be checked with a physician. Herbal remedies can have side effects and can be contraindicated in certain cases, such as drug interaction with other prescription drugs.

Drugs are classified by their use in the body. For example, **antibiotics** or **anti-infectives** stop or slow the growth of harmful microorganisms, such as bacteria, fungi, or parasites. However, when antibiotics are overused, microbes become resistant to the antibiotic and infections can become harder to treat. Some physicians are trying to limit the prescribing of antibiotics only to those people who really need them. Subclassifications of antibiotics include the more specific purposes of the drug, as an **antifungal** is an antibiotic that kills fungi. Table 22-1 lists the major drug classes, their functions, and generic and trade name examples for each class.

Drugs come in many forms—pills, liquids, semiliquids, suppositories, foams, lotions, creams, powders, transdermal patches, sprays, or gases—depending on how the drug is to be administered to the patient. Pills or tablets (usually stored in a small bottle called a **vial**) may be available as the standard solid small tablet or they may be in the form of capsules, a tablet with a gelatin covering encasing a powder or a liquid. They may also be coated (**enteric-coated** capsules dissolve slowly in the intestine so as not to irritate the stomach) or delayed- or timed-release (as with a transdermal patch), which spreads the dosage of the medicine gradually over a period of hours. Pills may also be in the form of lozenges, tablets meant to be dissolved slowly in the mouth, not swallowed. Tablets and some liquids can also be placed **sublingually**, under the tongue, or **buccally**, inside the cheek, where they are left to dissolve. **Oral administration** is the most common method for giving pills and some liquids.

Liquid and semiliquid drugs may come in various forms, such as syrups, heavy solutions of sugar, flavoring, and water added to the medication,

**TABLE 22-1 Pharmacological Agents, Their Functions, and Examples**

Drug Class	Purpose	Generic	Trade Name
analgesic	relieves pain without causing loss of consciousness	acetaminophen	Tylenol
anesthetic	produces a lack of feeling either locally or generally throughout the body	lidocaine procaine	Novacaine Xylocaine
antacid	neutralizes stomach acid	calcium carbonate and magnesia alumina, magnesia, simethicone	Roloids Mylanta
antianemic	replaces iron	ferrous sulfate erythropoietin	Feosol, Slow Fe Procrit
antianginal	dilates coronary arteries to increase blood flow and reduce angina	nitroglycerine	Nitrocot
antianxiety	relieves anxiety	alprazolam lorazepam	Xanax Ativan
antiarrhythmic	controls cardiac arrhythmias	quinidine amiodarone	Cardioquin, Quinaglute Cordarone
<b>antibiotic, anti-infective, antibacterial</b>	destroys or inhibits the growth of harmful microorganisms	ciprofloxacin levofloxacin amoxicillin penicillin	Cipro Levaquin Amoxil, Wymox various
anticholinergic	blocks certain nerve impulses and muscular reactions, as in the movements of Parkinson's disease, or in cases of nausea	atropine homatropine propantheline	Atropair Homapin Pro-Banthine
anticoagulant	prevents blood clotting	warfarin sodium heparin dipyrimadole	Coumadin various Persantine
anticonvulsant	inhibits convulsions	phenytoin clonazepam carbamazepine	Dilantin Klonopin Tegetrol
antidepressant	prevents or relieves symptoms of depression	fluoxetine sertraline paroxetine	Prozac Zoloft Paxil
antidiabetic	lowers blood sugar or increases insulin sensitivity	insulin glyburide rosiglitazone	Humulin, Novolin Diabeta, Micronase Avandia
antidiarrheal	prevents or slows diarrhea	bismuth subsalicylate loperamide	Pepto-Bismol Imodium
antiemetic	prevents or relieves nausea and vomiting	dimenhydrinate meclizine	Dramamine Bonine, Antivert

*(continued)*

**TABLE 22-1 Pharmacological Agents, Their Functions, and Examples (cont.)**

Drug Class	Purpose	Generic	Trade Name
antifungal	destroys or inhibits fungal growth	tolnaftate ketoconazole	Tinactin, Desenex Nizoral
antihistamine	slows allergic reactions by counteracting histamines	loratidine diphenhydramine fexofenadine	Claritin Benadryl Allegra
antihypertensive	controls high blood pressure	clonidine prazosin guanethidine metoprolol	Catapres Minipress Ismelin Lopressor
anti-inflammatory, nonsteroidal anti-inflammatory drug (NSAID)	counteracts inflammations	ibuprofen naprosyn valdecoxib	Advil, Motrin Aleve Bextra
antineoplastic	destroys malignant cells	cyclophosphamide vincristine doxorubicin	Cytosan Oncovin Adriamycin
antiparkinson	controls symptoms of Parkinson's disease	levodopa benztropine biperiden	Sinemet Cogentin Akineton
antipsychotic	controls symptoms of schizophrenia and some psychoses	aripiprazole risperidone olanzapine	Abilify Risperdal Zyprexa
antipyretic	reduces fever	acetylsalicylic acid (aspirin)	Bayer, Excedrin, various
antitubercular	decreases growth of microorganisms that cause tuberculosis	isoniazid ethambutol rifampin	Laniazid Myambutol Rifadin
antitussive, expectorant	prevents or relieves coughing	guaifenesin dextromethorphan	Humibid, Robitussin Vicks Formula 44
antiulcer	relieves and heals ulcers	cimetidine omeprazole ranitidine	Tagamet Prilosec Zantac
antiviral	controls the growth of viral microorganisms	didanosine zidovudine amantadine	Videx AZT, Retrovir Symmetrel
barbiturate	controls epileptic seizures	pentobarbital secobarbital	Nembutal Seconal
bronchodilator	dilates bronchial passages	albuterol ephedrine	Ventolin Bronkaid, Primatene
decongestant	reduces nasal congestion and/or swelling	pseudoephedrine	Drixoral, Sudafed
diuretic	increases excretion of urine	furosemide bumetanide	Lasix Bumex
hemostatic	controls or stops bleeding	aminocaproic acid recombinant factor VIIa	Amicar NovoSeven

**TABLE 22-1 Pharmacological Agents, Their Functions, and Examples (cont.)**

Drug Class	Purpose	Generic	Trade Name
hypnotic, sedative	produces sleep or a hypnotic state	diazepam zolpidem methaqualone	Valium Ambien Quaalude
hypoglycemic	lowers blood glucose levels	glucagon	Glucagon Diagnostic Kit
laxative	loosens stool and promotes normal bowel elimination	psyllium bisacodyl docusate	Metamucil Dulcolax, Theralax Therevac
vasodilator	decreases blood pressure by relaxing blood vessels	hydralazine enalapril benazepril	Apresoline Vasotec Lotensin

and emulsions, suspensions of oil or fat in water along with the medication. Liquids can be swallowed, sprayed (as on a wound or in an inhalant form), or injected. They may also be released directly into the body from an implantable drug pump controlled by the patient. This method is usually used to administer pain control medication to chronically ill patients. Patients with diabetes can use a pump to release amounts of insulin as needed rather than in a specific dose. Specific types of liquid and semiliquid medications are:

- *elixir*, oral liquid dissolved in alcohol
- *tincture*, topical liquid dissolved in alcohol
- *solution*, drug dissolved in liquid
- *suspension*, drug particles suspended in liquid, must shake before administration
- *emulsion*, drug particles suspended with oil or fat in water
- *lozenge*, drug in a candy-like base, dissolves slowly and coats the oral pharynx
- *syrup*, oral liquid drug in a thick solution, coats the oral pharynx

Drugs that are meant to go throughout the body are *systemic* (able to travel throughout the bloodstream to affect any part of the body); for example, aspirin tablets are taken internally for various pains. **Suppositories**, drugs mixed with a semisolid melting substance, are inserted into the

## MORE ABOUT . . .

### Drugs

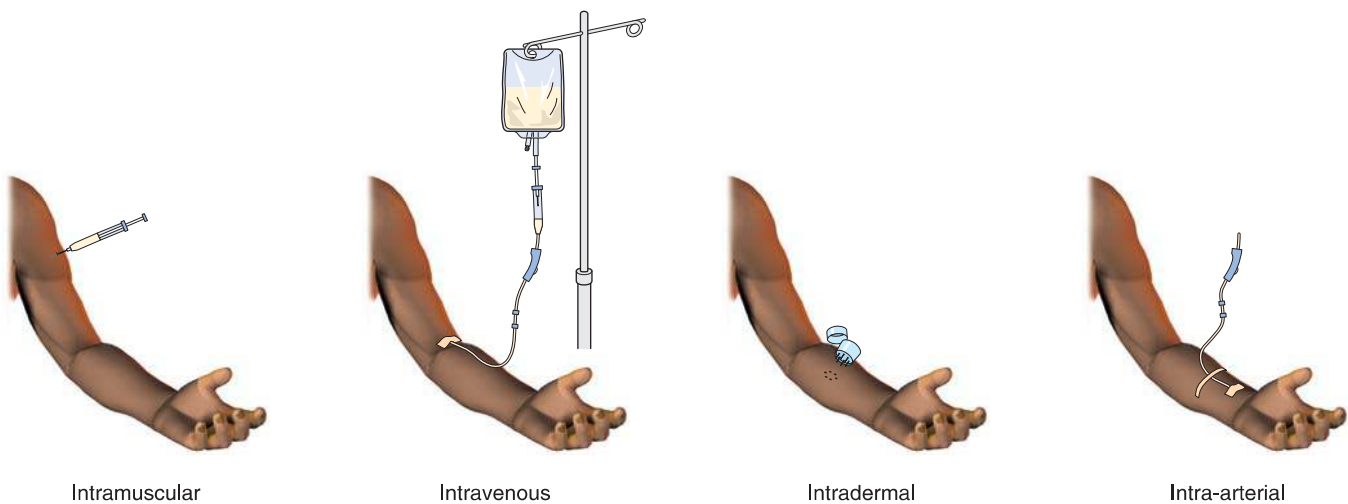
When doctors prescribe drugs, the pharmacist usually provides instructions regarding side effects and what to avoid (incompatible or contraindicated with certain other drugs, alcohol, and so on). Those instructions do not usually discuss what types of food can interact with drugs. The National Consumers League and the Food and Drug Administration have published a brochure listing potentially harmful drug-food combinations. For example, grapefruit juice taken along with certain heart drugs can be fatal. Cheeses and sausages contain the substance tyramine, which can cause extremely high blood pressure when taken along with certain antidepressants.



**FIGURE 22-2** Patient using an inhaler.

vagina, rectum, or urethra are either topical or systemic drugs. Foams are generally inserted into the vagina. Lotions and creams are applied **topically** to the surface of the skin. Topical drugs are meant to work where they are placed. Powders may be inserted into a gelatin capsule or mixed with a liquid. Liquids or gases can be administered in **inhalation** form in which tiny droplets are inhaled through an inhaler (Figure 22-2), nebulizer, or spray. Inhalants are usually given in metered doses (for example, 2 puffs q4h). Sprays can be applied topically to the skin, into the nose (*intranasal*), or into the mouth.

Injection of a drug is called **parenteral administration**. Parenteral administration may be done by health care professionals or someone trained to administer it. Parenteral administration is medication that does not go through the gastrointestinal system. Most drugs given by parenteral administration are meant for systemic use. The closer to the bloodstream, the faster the drug will work. Some parenteral administration is topical; for example, **intra-dermal** or **intra-cutaneous** administration is the injection of a needle or **syringe** just beneath the outer layer of skin to check for local reactions. **Subcutaneous** administration is injection of the substance into the fatty layer of tissue below the outer portion of the skin. **Intramuscular** administration is the injection of drugs deep into the muscles. Intravenous administration is the injection of drugs through an **intravenous (IV)** tube. Generally the liquid drugs are titrated, put into solution in a specific volume. An IV **infusion** is the slow intravenous administration of a drug so that fluid is added to the bloodstream at a slow and steady rate. IV tubes can also be put into a pump system controlled by the patient. Figure 22-3 shows the methods of parenteral administration. There are other types of parenteral injection that can only be performed by a physician. These types of injection are: **intracardiac** (directly into heart muscle), **intra-arterial** (directly into an artery), **intra-spinal** or **intra-thecal** (directly into spinal spaces as in a case of severe pain or cancer), and **intra-osseous** (directly into bone). For steroids and **anesthetics**, injections are done *intra-articularly*, or directly into a joint.



**FIGURE 22-3** Parenteral administration is the general term for administration by injection. These are only some types of parenteral administration.

## VOCABULARY REVIEW

In the previous section, you learned terms relating to pharmacology. Before going on to the exercises, review the terms below and refer to the previous section if you have any questions. Pronunciations are provided for certain terms. Sometimes information about where the word came from is included after the term. These etymologies (word histories) are for your information only. You do not need to memorize them.

Term	Definition
<b>absorb</b> [äb-SÖRB]	To take into.
<b>analgesic</b> [än-äl-JĒ-zĭk] From Greek <i>analgesia</i> , insensibility	Drug that lessens or blocks pain.
<b>anesthetic</b> [än-ēs-THĒT-ĭk]	Drug that causes temporary loss of ability to perceive sensations at a conscious level.
<b>antacid</b> [änt-ÄS-ĭd] ant-, against + acid	Drug that lessens or neutralizes acidity.
<b>antibacterial</b> [ÄN-tē-bäk-TĒR-ē-äl] anti-, against + bacterial	Drug that stops or slows bacterial growth.
<b>antibiotic</b> [ÄN-tē-bĭ-ÖT-ĭk] anti- + Greek <i>biosis</i> , life	Drug that stops or slows the growth of harmful microorganisms.
<b>antidiabetic</b> [ÄN-tē-dĭ-ä-BĒT-ĭk] anti- + diabetic	Drug that lowers blood sugar or increases insulin sensitivity.
<b>antidote</b> [ÄN-tē-dōt] Greek <i>antidotos</i> , given against	Substance able to cancel out unwanted effects of another substance.
<b>antifungal</b> [ÄN-tē-FÜNG-gäl] anti- + fungal	Drug that stops or slows the growth of fungus.
<b>antihistamine</b> [ÄN-tē-HĪS-tä-mēn] anti- + histamine	Drug that reduces the action of histamines; used in allergy treatments.
<b>anti-infective</b> [ÄN-tē-ĭn-FĒK-tĭv]	See <i>antibiotic</i> .
<b>antitubercular</b> [ÄN-tē-tū-BĒR-kyū-lär] anti- + tubercular	Drug that stops the spread of tuberculosis.
<b>antiviral</b> [ÄN-tē-VĪ-räl] anti- + viral	Drug that stops or slows the spread of a virus.
<b>brand name</b>	See <i>trade name</i> .
<b>buccally</b> [BŪK-äl-lē] Latin <i>bucca</i> , cheek	Inside the cheek.
<b>contraindicated</b> [kōn-trä-ĭn-dĭ-KÄ-tĕd] contra- + indicated	Inadvisable to use; said especially of a drug that might cause complications when used in combination with other drugs or when used on a patient with a particular set of symptoms.
<b>drug</b> [drŭg]	Biological or chemical agents that can aid or alter body functions.



Term	Definition
<b>druggist</b> [DRŮG-ĭst]	See <i>pharmacist</i> .
<b>enteric-coated</b> [ĕn-TĒR-ĭk]	Having a coating (as on a capsule) that prevents stomach irritation.
<b>excrete</b> [ĕks-KRĒT]	To separate out and expel.
<b>generic</b> [jĕ-NĀR-ĭk]	Shortened version of a chemical name; official drug name.
<b>hormone</b> [HŌR-mŏn]	Chemical substance in the body that forms in one organ and moves to another organ or part on which the substance has an effect; manufactured version of that chemical substance.
<b>infusion</b> [ĭn-FYŮ-zhŭn]	Administration of a fluid through an intravenous tube at a slow and steady rate.
<b>inhalation</b> [ĭn-hĀ-LĀ-shŭn]	Taking in of drugs in a fine spray of droplets.
<b>intra-arterial</b> [ĭN-trĀ-Ār-TĒ-rĒ-Āl]	Injected directly into an artery.
<b>intracardiac</b> [ĭN-trĀ-KĀR-dĒ-Āk] intra-, within + cardiac	Injected directly into heart muscle.
<b>intracutaneous</b> [ĭN-trĀ-kyŪ-TĀ-nĒ-ŭs] intra- + (sub)cutaneous	Injected just beneath the outer layer of skin.
<b>intra-dermal</b> [ĭN-trĀ-DĒR-mĀl] intra- + dermal	See <i>intracutaneous</i> .
<b>intramuscular</b> [ĭN-trĀ-MŪS-kyŪ-lĀr] intra- + muscular	Injected deep into muscle tissue.
<b>intraosseus</b> [ĭN-trĀ-ŌS-Ē-ŭs] intra- + Latin <i>os</i> , bone	Injected directly into bone.
<b>intraspinal</b> [ĭN-trĀ-SPĪ-nĀl] intra- + spinal	Injected directly into spinal spaces.
<b>intrathecal</b> [ĭN-trĀ-THĒ-kĀl] intra- + Greek <i>theke</i> , box	See <i>intraspinal</i> .
<b>intravenous</b> [ĭN-trĀ-VĒ-nŭs] (IV) intra- + venous	Administered through a tube into a vein.
<b>medication, medicine</b> [mĕd-ĭ-KĀ-shŭn, MĒD-ĭ-sĭn]	Drug that serves a therapeutic purpose.
<b>metabolize</b> [mĕ-TĀB-ŏ-lĭz]	To change chemically or physically so as to make useful.
<b>nonsteroidal anti-inflammatory drug (NSAID)</b>	Anti-inflammatory drug that does not include steroids.
<b>oral administration</b>	Swallowing of pills or liquids via the mouth.
<b>over-the-counter (OTC)</b>	Available for sale without a doctor's prescription.
<b>parenteral</b> [pĀ-RĒN-tĒr-Āl] <b>administration</b>	Administration of a drug by injection.
<b>pharmacist</b> [FĀR-mĀ-sĭst]	Person licensed to dispense medications.

Term	Definition
<b>pharmacodynamics</b> [FÄR-mă-kō-dī-NÄM-ïks] pharmaco-, drugs + dynamics	Study of how drugs affect the body.
<b>pharmacokinetics</b> [FÄR-mă-kō-kĭ-NĚT-ïks] pharmaco- + kinetics	Study of how the body absorbs, metabolizes, and excretes drugs.
<b>pharmacology</b> [fär-mă-KÖL-ō-jē] pharmaco- + -logy, study	Science that studies, develops, and tests new drugs.
<b>prescription</b> [prē-SKRĪP-shŭn]	Order given by a doctor for medication dosage, route, and timing of administration.
<b>proprietary</b> [prō-PRĪ-ě-tār-ē] <b>name</b>	See <i>trade name</i> .
<b>subcutaneous</b> [sŭb-kyū-TĀ-nē-ŭs] sub-, under + Latin <i>cutis</i> , skin	Injected into the fatty layer of tissue beneath the outer layer of skin.
<b>sublingually</b> [sŭb-LĪNG-gwă-lē] sub- + Latin <i>lingua</i> , tongue	Under the tongue.
<b>suppository</b> [sŭ-PÖZ-ĭ-tōr-ē] Latin <i>suppositorium</i> , placed underneath	Drug mixed with a semisolid melting substance meant for administration by insertion into the vagina, rectum, or urethra.
<b>syringe</b> [sĭ-RĪNJ] Greek <i>syrix</i> , tube	Instrument used for injection or withdrawal of fluids.
<b>topically</b> [TŌP-ĭ-căl-lē]	On the surface of the skin.
<b>toxicology</b> [tök-sĭ-KÖL-ō-jē] toxico-, poison + -logy	Study of harmful effects of drugs.
<b>trade name</b>	Name copyrighted by the manufacturer for a particular version of a drug.
<b>vial</b> [VĪ-ăl] Greek <i>phiale</i> , drinking cup	A small receptacle for holding liquid or pill medications.
<b>vitamin</b> [VĪT-ă-mĭn] Latin <i>vita</i> , life + amine	Organic substance found in food.

## DRUG SOURCES, TYPES, FUNCTION, AND ADMINISTRATION EXERCISES

### Follow the Route

Name the route of drug administration or type of drug from its description.

1. Drug is administered via a semisolid into the rectum: \_\_\_\_\_
2. Drug is administered via vapor or gas into the nose or mouth: \_\_\_\_\_
3. Drug is administered under the tongue: \_\_\_\_\_
4. Drug is applied locally on skin or mucous membrane: \_\_\_\_\_
5. Drug is injected through a syringe under the skin, into a vein, into a muscle, or into a body cavity: \_\_\_\_\_
6. Drug is given by mouth and absorbed through the stomach or intestinal wall: \_\_\_\_\_

## Find the Class

Give the class (not the name) of a drug that does the following. For example: stops diarrhea = antidiarrheal.

7. prevents/stops angina: \_\_\_\_\_
8. increases excretion of urine: \_\_\_\_\_
9. reduces blood pressure: \_\_\_\_\_
10. corrects abnormal heart rhythms: \_\_\_\_\_
11. relieves symptoms of depression: \_\_\_\_\_
12. prevents blood clotting: \_\_\_\_\_
13. promotes vomiting: \_\_\_\_\_
14. relieves pain: \_\_\_\_\_
15. neutralizes stomach acid: \_\_\_\_\_

## CASE STUDY

### Getting an Evaluation

Many elderly people go to different doctors for different ailments without being monitored by one regular physician. Some people take so many medications that it affects their health adversely. Helen Metrone is an 86-year-old woman with high blood pressure, a tendency to retain water, skin allergies, and minor heart disease. Her preferred provider organization (PPO) allows her to see different doctors. Helen likes to go to various doctors. She almost always gets new prescriptions because of her symptoms. Often, she neglects to tell each doctor what medications she is already taking. When asked to list her medications, Helen will put one or two that she can remember. Also, Helen sometimes forgets which

pills she has already taken in one day. This has led to several instances of fainting, disorientation, and dizziness. Helen's family is very concerned. They are looking into an assisted living arrangement where a nurse would give Helen her medication. They have also made an appointment with a gerontologist to review Helen's medications, outlook, and general health.

### Critical Thinking

16. Why is it important for patients to inform their physician of all medications they are taking?
17. Why is it important for Helen to understand the instructions that come with her medication?

## Combining Forms and Abbreviations

The lists below include combining forms and abbreviations that relate specifically to pharmacology. Pronunciations are provided for the examples. Many of these abbreviations are no longer used in the hospital because of the confusion they create. The Joint Commission for Hospital Accreditation has actually prohibited the use of some of them. But they are still used in many physician practices so it is a good idea to be familiar with them. See Appendix B for a further discussion of abbreviations.

COMBINING FORM	MEANING	EXAMPLE
chem(o)	chemical	<i>chemotherapy</i> [KĒ-mō-thār-ă-pē], treatment of a disease with chemical substances
pyret(o)	fever	<i>pyretogenous</i> [pī-rĕ-TŎJ-ĕ-nŭs], causing fever
tox(o), toxi, toxico	poison	<i>toxicogenic</i> [TŎK-sĭ-kō-JĔN-ĭk], caused by a poison

ABBREVIATION	MEANING	ABBREVIATION	MEANING
aa, $\overline{aa}$	of each	a.u., AU	each ear (Latin <i>auris uterque</i> )
a.c.	before meals (Latin <i>ante cibum</i> ), usually one-half hour preceding a meal	BID, b.i.d.	twice a day (Latin <i>bis in die</i> )
ad	up to	c, $\overline{c}$	with
a.d., AD	right ear (Latin <i>auris dexter</i> )	cap., caps.	capsule
ad lib	freely (Latin <i>ad libitum</i> ), as often as desired	cc., cc	cubic centimeter
AM, a.m., A	morning (Latin <i>ante meridiem</i> )	comp.	compound
a.s., AS	left ear (Latin <i>auris sinister</i> )	cx	contraindicated
DAW	dispense as written	ml	milliliter
dil.	dilute	n., noct.	night (Latin <i>nocte</i> )
disc, DC, dc	discontinue	non rep.	do not repeat
disp.	dispense	NPO	nothing by mouth
div.	divide	NPO p MN	nothing by mouth after midnight
DW	distilled water	N.S., NS	normal saline
D <sub>5</sub> W	dextrose 5% in water	NSAID	nonsteroidal anti-inflammatory drug
dx, Dx	diagnosis	N&V	nausea and vomiting
elix.	elixir	o.d., OD	right eye (Latin <i>oculus dexter</i> )
e.m.p.	as directed (Latin <i>ex modo praescripto</i> )	oint., ung.	ointment, unguent
ex aq.	in water	o.l.	left eye
ext.	extract	o.s.	left eye (Latin <i>oculus sinister</i> )
FDA	Food and Drug Administration	OTC	over the counter
fld. ext.	fluid extract	o.u.	each eye
FUO	fever of unknown origin	oz.	ounce
g, gm	gram	p	post, after
gr	grain, gram	p.c.	after meals (Latin <i>post cibum</i> ), one-half hour after a meal
gtt	drop	PDR	<i>Physician's Desk Reference</i>
H	hypodermic	PM, p.m., P	afternoon (Latin <i>post meridiem</i> )
h.	every hour (Latin <i>hora</i> )	p.o.	by mouth (Latin <i>per os</i> )
h.s.	at bedtime (Latin <i>hora somni</i> , hour of sleep)	PRN, p.r.n.	repeat as needed (Latin <i>pro re nata</i> )
IM	intramuscular	pulv., pwdr	powder
inj	injection	qam	every morning

ABBREVIATION	MEANING	ABBREVIATION	MEANING
IV	intravenous	q.d.	every day (Latin <i>quaque dies</i> )
mcg	microgram	q.h.	every hour
mEq	milliequivalent	q.i.d.	four times a day
mg	milligram	QNS	quantity not sufficient
q.o.d.	every other day	susp.	suspension
q.s.	sufficient quantity	sym, Sym, Sx	symptom
R	rectal	syr.	syrup
Rx	prescription	tab.	tablet
s, $\bar{s}$	without	tbsp.	tablespoonful
Sig.	patient directions such as route and timing of medication (Latin <i>signa</i> , inscription)	t.i.d.	three times a day
SL	sublingual	tinct., tr.	tincture
sol., soln.	solution	TPN	total parenteral nutrition
s.o.s.	if there is need	TPR	temperature, pulse, respirations
sp.	spirit	tsp.	teaspoonful
ss, $\overline{ss}$	one-half	U, u	unit
stat	immediately	u.d.	as directed
subc, subq, s.c.	subcutaneously	ung.	ointment
supp., suppos	suppository	U.S.P.	<i>United States Pharmacopeia</i>

## CASE STUDY

### Visiting a Specialist

Helen finally did go to a gerontologist—this time with her niece. Her niece brought along a list of all her medi-

cations. The doctor advised coming off several of the medications over the next few weeks. The gerontologist also asked Helen to see her in three weeks for a medication evaluation. She asked Helen to bring in the prescription vials, but her niece also had her regular nurse provide the following list of her medications.

NDC 0075-1505-43

**Nasacort**<sup>®</sup>

(*triamcinolone acetonide*) U.S. Pat. No. 4999999999

**Black's Pharmacy** #3333 ph. 879-000-0000  
36 Main St.  
Norfolk, VA 34444

Rx: **666777** Dr. Esteves, Marion D.  
St: B3456789

Use 2 sprays in each nostril once daily.

Nasacort Nasal inhaler RHO

You may refill this script 10 times before 4/26/XXXX.

Lopressor 10 mg. b.i.d.

Synthroid 50 mcg q.d.

Motrin as needed

Lasix 10 mg. b.i.d.

### Critical Thinking

- How many times a day does Helen take Synthroid?
- How many milligrams of Lopressor does Helen take daily?

## COMBINING FORMS AND ABBREVIATIONS EXERCISES

### Check Your Knowledge

Give abbreviations for the following.

20. three times a day \_\_\_\_\_
21. before meals \_\_\_\_\_
22. intramuscular \_\_\_\_\_
23. two times a day \_\_\_\_\_
24. intravenous \_\_\_\_\_
25. nothing by mouth \_\_\_\_\_
26. after meals \_\_\_\_\_
27. every hour \_\_\_\_\_
28. every morning \_\_\_\_\_
29. at bedtime \_\_\_\_\_
30. four times a day \_\_\_\_\_
31. when requested \_\_\_\_\_
32. every day \_\_\_\_\_
33. drops \_\_\_\_\_

### Find the Root

Add the combining form to complete the word.

34. Resistance to the effects of chemicals: \_\_\_\_\_ resistance
35. Treatment of fever: \_\_\_\_\_ therapy
36. Study of poisons: \_\_\_\_\_ logy

### USING THE INTERNET

Go to the FDA's Web site ([www.fda.gov/opacom/hpnews.html](http://www.fda.gov/opacom/hpnews.html)) and find information about the approval of at least one drug. Explain what the medication is for. In addition, describe at least one new procedure aimed at monitoring drug safety once the drug is on the market.

# CHAPTER REVIEW

---

The material that follows is to help you review this chapter.

## True or False

Circle T for true or F for false.

37. All medications require a prescription. T F
38. IM medications go into an IV. T F
39. Trade name and brand name are the same. T F
40. The most common method of drug administration is oral. T F
41. A tablet used sublingually is inserted under the tongue. T F
42. A parenteral administration is the injection of a medication. T F
43. A capsule is a small solid tablet. T F
44. A suppository can only be used rectally. T F
45. You should never swallow a suppository. T F

## Understanding Pharmacological Terms

Write the letter of the correct definition in the space provided.

- |                        |   |
|------------------------|---|
| 46. ___ analgesic      | a. relieves heart pain                        |
| 47. ___ antidiarrheal  | b. normalizes heart rhythm                    |
| 48. ___ antipyretic    | c. reduces fever                              |
| 49. ___ antidepressant | d. relieves nervousness and feelings of dread |
| 50. ___ antacid        | e. works on a mood disorder                   |
| 51. ___ antiarrhythmic | f. relieves pain                              |
| 52. ___ antianemic     | g. relieves indigestion                       |
| 53. ___ antianginal    | h. relieves bouts of loose bowels             |
| 54. ___ antianxiety    | i. prevents or relieves coughing              |
| 55. ___ antitussive    | j. replaces iron                              |

## Understanding Pharmacological Terms

Write the letter of the correct definition in the space provided.

- |                       |   |
|-----------------------|---|
| 56. ___ diuretic      | a. injected into the fatty layer of the skin    |
| 57. ___ hypoglycemic  | b. on the skin surface                          |
| 58. ___ laxative      | c. under the tongue                             |
| 59. ___ buccally      | d. official drug name                           |
| 60. ___ generic       | e. increase excretion of urine                  |
| 61. ___ brand name    | f. lowers blood glucose                         |
| 62. ___ intramuscular | g. loosens stool and promotes bowel elimination |

63. \_\_\_ intradermal  
 64. \_\_\_ topically  
 65. \_\_\_ subcutaneous  
 66. \_\_\_ sublingually
- h. trade name  
 i. inside the cheek  
 j. into the muscle  
 k. beneath outer layer of skin (between layers)

## Know the Abbreviations

For the following prescriptions, describe the timing and amount of the dosage.

67. Zyrtec 10 mg q d  
 68. Amoxicillin 500 mg bid for 10 days  
 69. Cymbalta 60 mg at hs  
 70. Relpax 40 mg prn for migraine

## DEFINITIONS

Define the following terms and abbreviations. Make sure you know the proper pronunciations of terms. The blue words in curly brackets are references to the Spanish glossary available online at [www.mhhe.com/medterm3e](http://www.mhhe.com/medterm3e).

### TERM

- |   |  |  |
|---|--|--|
| 71. absorb [ăb-SŎRB]                                    | 82. antitubercular [ĂN-tē-tū-BĚR-kyū-lăr]  | 98. intracutaneous [ĪN-tră-kyū-TĂ-nē-ŭs]   |
| 72. analgesic [ăn-ăl-JĚ-zĭk] {analgésico}               | 83. antiviral [ĂN-tē-VĪ-răl]               | 99. intradermal [ĪN-tră-DĚR-măl]   |
| 73. anesthetic [ăn-ēs-THĚT-ĭk] {anestésico}             | 84. brand name                             | 100. intramuscular [ĪN-tră-MŪS-kyū-lăr]  |
| 74. antacid [ănt-ĂS-ĭd] {antiácido}                     | 85. buccally [BŪK-ăl-lē]                   | 101. intraosseus [ĪN-tră-ŎS-ē-ŭs]  |
| 75. antibacterial [ĂN-tē-băk-TĚR-ē-ăl] {antibacteriano} | 86. chem(o)                                | 102. intraspinal [ĪN-tră-SPĪ-năl]  |
| 76. antibiotic [ĂN-tē-bĭ-ŎT-ĭk] {antibiótico}           | 87. contraindicated [kŏn-tră-ĭn-dĭ-KĂ-tĕd] | 103. intrathecal [ĪN-tră-THĚ-kăl]  |
| 77. antidiabetic [ĂN-tē-dĭ-ă-BĚT-ĭk] {antidiabético}    | 88. drug [drŭg] {droga}                    | 104. intravenous [ĪN-tră-VĚ-nŭs] (IV) {intravenoso (IV)}   |
| 78. antidote [ĂN-tē-dŏt] {antidote}                     | 89. druggist [DRŪG-ĭst] {boticario}        | 105. medication, medicine [mĕd-ĭ-KĂ-shŭn, MÉD-ĭ-sĭn] {medicación, medicina}                          |
| 79. antifungal [ĂN-tē-FŪNG-găl] {antifúngico}           | 90. enteric-coated [ĕn-TĚR-ĭk]             | 106. metabolize [mĕ-TĂB-ŏ-lĭz]   |
| 80. antihistamine [ĂN-tē-HĪS-tă-mĕn] {antihistamina}    | 91. excrete [ĕks-KRĚT]                     | 107. nonsteroidal anti-inflammatory drug (NSAID) {agentes de antiinflamatorios no esteroideos, AINE} |
| 81. anti-infective [ĂN-tē-ĭn-FĚK-tĭv]                   | 92. generic [jĕ-NĂR-ĭk] {genérico}         | 108. oral administration   |
|   | 93. hormone [HŎR-mŏn] {hormona}            | 109. over-the-counter (OTC)  |
|   | 94. infusion [ĭn-FYŪ-zhŭn]                 | 110. parenteral [pă-RĚN-tĕr-ăl] administration   |
|   | 95. inhalation [ĭn-hă-LĂ-shŭn]             | 111. pharmacist [FĂR-mă-sĭst]  |
|   | 96. intra-arterial [ĪN-tră-ăr-TĚ-rē-ăl]    |  |
|   | 97. intracardiac [ĪN-tră-KĂR-dĕ-ăk]        |  |



## TERM

- |  |   |  |
|--|---|--|
| 112. pharmacodynamics<br>[FĀR-mă-kō-dī-NĀM-īks]          | 116. proprietary<br>[prō-PRĪ-ě-tār-ē] name            | 121. syringe [sĭ-RĪN]] {jeringa}                   |
| 113. pharmacokinetics<br>[FĀR-mă-kō-kĭ-NĚT-īks]          | 117. pyret(o)   | 122. topically [TŎP-ĭ-căl-lē]                      |
| 114. pharmacology<br>[fār-mă-KŎL-ō-jē]<br>{farmacología} | 118. subcutaneous<br>[sŭb-kyū-TĀ-nē-ŭs]               | 123. tox(o), toxi, toxico                          |
| 115. prescription<br>[prē-SKRĪP-shŭn]<br>{prescripción}  | 119. sublingually<br>[sŭb-LĪNG-gwă-lē]                | 124. toxicology [tŏk-sĭ-KŎL-ō-jē]<br>{toxicología} |
|  | 120. suppository<br>[sŭ-PŎZ-ĭ-tŏr-ē]<br>{supositorio} | 125. trade name                                    |
|  |   | 126. vial [VĪ-ăl] {vial}                           |
|  |   | 127. vitamin [VĪT-ă-mĭn]<br>{vitamina}             |

## Abbreviations

Write the full meaning of each abbreviation

## ABBREVIATION

- |                       |                |                  |
|-----------------------|----------------|------------------|
| 128. aa, āā           | 151. e.m.p.    | 174. N.S., NS    |
| 129. a.c.             | 152. ex aq.    | 175. NSAID       |
| 130. ad               | 153. ext.      | 176. N&V         |
| 131. a.d., AD         | 154. FDA       | 177. o.d., OD    |
| 132. ad lib           | 155. fld. ext. | 178. oint., ung. |
| 133. AM, a.m., A      | 156. FUO       | 179. o.l.        |
| 134. a.s., AS         | 157. g, gm     | 180. o.s.        |
| 135. a.u., AU         | 158. gr        | 181. OTC         |
| 136. BID, b.i.d.      | 159. gtt       | 182. o.u.        |
| 137. c, c̄            | 160. H         | 183. oz.         |
| 138. cap., caps.      | 161. h.        | 184. p           |
| 139. cc., cc          | 162. h.s.      | 185. p.c.        |
| 140. comp.            | 163. IM        | 186. PDR         |
| 141. cx               | 164. inj       | 187. PM, p.m., P |
| 142. DAW              | 165. IV        | 188. p.o.        |
| 143. dil.             | 166. mcg       | 189. PRN, p.r.n. |
| 144. disc, DC, dc     | 167. mEq       | 190. pulv., pwdr |
| 145. disp.            | 168. mg        | 191. qam         |
| 146. div.             | 169. ml        | 192. q.d.        |
| 147. DW               | 170. n., noct. | 193. q.h.        |
| 148. D <sub>5</sub> W | 171. non rep.  | 194. q.i.d.      |
| 149. dx, Dx           | 172. NPO       | 195. QNS         |
| 150. elix.            | 173. NPO p MN  | 196. q.o.d.      |

## ABBREVIATION

197. q.s.	206. ss, $\overline{ss}$	215. t.i.d.
198. R	207. stat	216. tinct., tr.
199. RX	208. subc, subq, s.c.	217. TPN
200. s, $\overline{s}$	209. supp., suppos	218. TPR
201. Sig.	210. susp.	219. tsp.
202. SL	211. sym, Sym, Sx	220. U, u
203. Sol., soln.	212. syr.	221. u.d.
204. s.o.s.	213. tab.	223. ung.
205. sp.	214. tbsp.	224. U.S.P.

Name \_\_\_\_\_ Date \_\_\_\_\_

## Chapter 22: Pharmacology Test (25 questions—1 pts. each)

---

Give the full meaning of each abbreviation for these terms in pharmacology.

1. FDA \_\_\_\_\_
2. PDR \_\_\_\_\_
3. gr \_\_\_\_\_
4. disp \_\_\_\_\_
5. p.o \_\_\_\_\_
6. NPO \_\_\_\_\_
7. BID \_\_\_\_\_
8. DAW \_\_\_\_\_
9. Dx \_\_\_\_\_
10. ext \_\_\_\_\_
11. q.d \_\_\_\_\_
12. mg \_\_\_\_\_
13. IV \_\_\_\_\_
14. H \_\_\_\_\_
15. cap \_\_\_\_\_
16. comp \_\_\_\_\_
17. a.u \_\_\_\_\_
18. aa \_\_\_\_\_
19. non. Rep \_\_\_\_\_
20. qam \_\_\_\_\_
21. p.c \_\_\_\_\_
22. tab \_\_\_\_\_
23. Rx \_\_\_\_\_
24. u.d \_\_\_\_\_
25. sol \_\_\_\_\_