

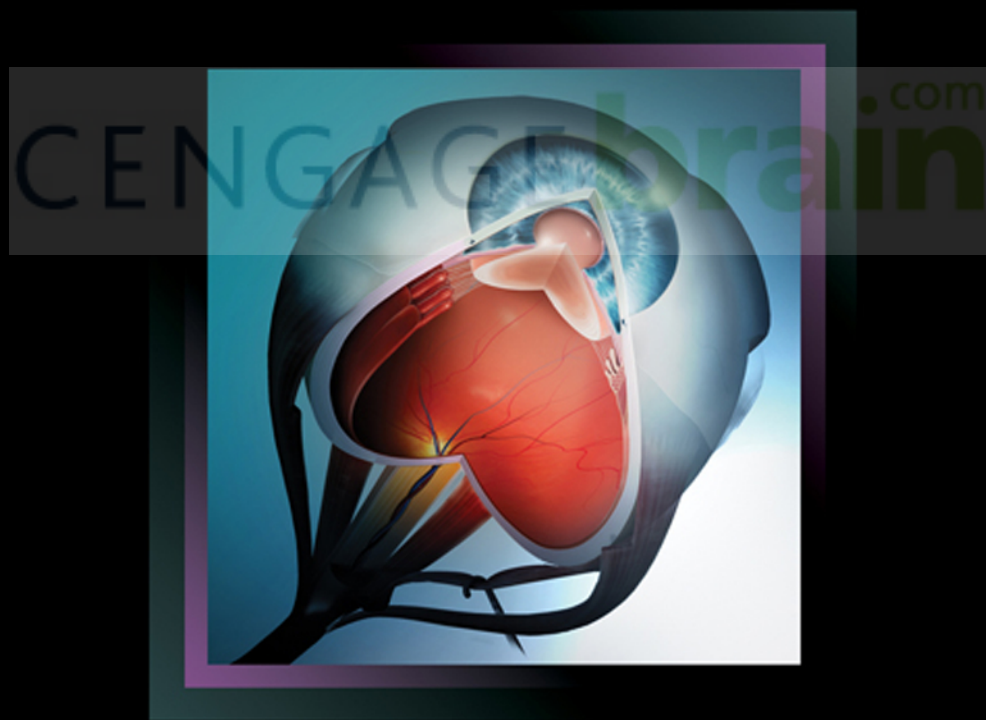
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# Comprehensive **MEDICAL** **TERMINOLOGY**

*Fourth Edition*



**Betty Davis Jones**



**Comprehensive Medical Terminology,  
Fourth Edition  
Betty Davis Jones**

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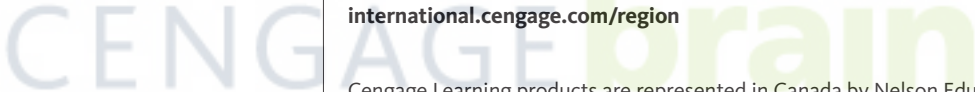
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# CHAPTER 1

# Word Building Rules

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## OBJECTIVES

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*Upon completing this chapter and the review exercises at the end of the chapter, the learner should be able to:*

1. List the three basic component parts of a word.
2. Correctly state the rule for joining prefixes and suffixes to a word root.
3. Accurately define the terms *word root*, *suffix*, *prefix*, *combining vowel*, and *combining form*.
4. Correctly state the rule for using multiple word roots in a compound word.
5. Demonstrate the ability to apply the word building rules by accurately completing the review exercises located at the end of this chapter.
6. Define an eponym and give an example.

# Overview

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Studying the language of medicine—that is, medical terminology—is very similar to learning a foreign language. There are rules that must be applied to make the “language” understandable. As a health care professional, you have chosen to learn the language, to master it, and to use it appropriately in the field of medicine. To do this, you must learn the word building rules necessary to expand your knowledge and understanding of medical terminology. Once you have accomplished this, you will possess the power to define words you never thought possible. Sounds exciting, doesn't it? It is! Let's get started.

## Word Parts, Combining Forms, and Word Building Rules

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Before you begin, remember: **It will be critical for you to learn the word parts, and the rules for combining word parts to create words, to be successful with medical terminology.** It is impossible to memorize thousands of words over the course of one or two quarters or semesters. It *is* possible, however, to memorize the word parts and the rules that will enable you to build the thousands of words you will need to function effectively as a health care professional. As you study this chapter on word building rules, understand that you will probably not master all of the rules in the beginning. This chapter will serve as a reference as you progress through the textbook. When you find that you have difficulty understanding how the words are put together, or how to pronounce certain words, return to this chapter and review the word building rules and pronunciation guidelines.

Medical words, like English words, consist of three basic component parts: word roots, prefixes, and suffixes. How you combine the component parts, or word elements, determines the meaning of the word. For example, if one part is changed, the meaning of the word also changes. Review the English word *port* and see the different words you can create by adding to it different prefixes and suffixes. Prefixes appear at the beginning of the word root, whereas suffixes appear at the end of the word root. Notice that the prefixes and the suffixes are bold to emphasize how these word elements can change the meaning of the word root *port*.

port  
report  
import  
support  
export  
transport  
porter  
portable

Let's now examine the word parts that we will be using and identifying throughout this text.

## Word Root

A **word root** is the basic foundation of a word, to which component parts are added. By adding other word elements to the root, the meaning of the word changes. A word root is also called the stem of a word or the base of a word and usually has a Greek or Latin origin. All medical words have at least one word root. Some have multiple roots that are joined by a vowel called a combining vowel.

**Example:** In the word *cardiologist*, the word root is *cardi*, which means “heart.” When you see *cardi* (or *card*) as part of a word, you know that the meaning will have something to do with the heart. Another example can be found in *dermatologist*. The root is *dermat*, which means “skin.” Anytime you see *dermat* (or *derm*) as part of a word, the meaning will have something to do with the skin.

Word roots keep their same meaning throughout. Adding prefixes and suffixes to the roots, however, changes the meaning of the word. Look at the following words (which contain either the root *cardi*, *card*, *dermat*, or *derm*) and see how the meaning changes by adding word parts. In each word, the root is in color.

Word	Meaning
<b>cardiologist</b> (car-dee-ALL-oh-jist)	<b>One who specializes in the study of diseases and disorders of the heart;</b> <i>-logist</i> (one who specializes) is a suffix; <i>o</i> is the combining vowel.
<b>cardiology</b> (car-dee-ALL-oh-gee)	<b>The study of the heart;</b> <i>-logy</i> (the study of) is a suffix; <i>o</i> is the combining vowel.
<b>carditis</b> (car-DYE-tis)	<b>Inflammation of the heart;</b> <i>-itis</i> (inflammation) is a suffix.
<b>cardiac</b> (CAR-dee-ak)	<b>Pertaining to the heart;</b> <i>-ac</i> (pertaining to) is a suffix.
<b>dermatologist</b> (der-mah-TALL-oh-jist)	<b>One who specializes in the study of diseases and disorders of the skin;</b> <i>-logist</i> (one who specializes) is a suffix; <i>o</i> is the combining vowel.
<b>dermatology</b> (der-mah-TALL-oh-gee)	<b>The study of the skin;</b> <i>-logy</i> (the study of) is a suffix; <i>o</i> is the combining vowel.
<b>dermatitis</b> (der-mah-TYE-tis)	<b>Inflammation of the skin;</b> <i>-itis</i> (inflammation) is a suffix.
<b>dermatosis</b> (der-mah-TOH-sis)	<b>Any condition of the skin;</b> <i>-osis</i> (condition) is a suffix.
<b>acrodermatitis</b> (ack-roh-der-mah-TYE-tis)	<b>Inflammation of the skin of the extremities;</b> <i>-itis</i> (inflammation) is a suffix; <i>dermat</i> is a word root; <i>acr</i> (extremities) is a word root; <i>o</i> is the combining vowel.
<b>hypodermic</b> (high-poh-DER-mik)	<b>Pertaining to under the skin;</b> <i>-ic</i> (pertaining to) is a suffix; <i>hypo</i> (under) is a prefix.

## Combining Form

A **combining form is created when a word root is combined with a vowel**. This vowel, known as a combining vowel, is usually an *o*, but occasionally it is an *i*. The combining vowel is used to join the word parts appropriately when creating words. It also helps in pronunciation by allowing the word to flow as opposed to being choppy without the aid of the vowel.

**Rule:** *Generally, when using more than one word root (as in a compound word), a combining vowel is needed to separate the different word roots regardless of whether the second or third word root begins with a vowel. (There are exceptions to the rule!)*

**Example 1:** In the word *cardiomyopathy*, which means “any disease that affects the structure and function of the heart (i.e., the heart muscle),” there are two word roots: *cardi* (meaning “heart”) and *my* (meaning “muscle”). These are followed by the suffix *-pathy*, which means “disease.” The best way to determine the number of word roots in a compound word is to look for the combining vowels and divide, or separate, the word into elements. Let’s divide the word *cardiomyopathy* to illustrate.

<i>cardi</i>	/	<i>o</i>	/	<i>my</i>	/	<i>o</i>	/	<i>-pathy</i>
↑		↑		↑		↑		↑
root	+	vowel	+	root	+	vowel	+	suffix

**Example 2:** In the word *myoelectric*, which means “pertaining to the electrical properties of the muscle,” there are two word roots: *my* (meaning “muscle”) and *electr* (meaning “electric”). These are followed by the suffix *-ic*, which means “pertaining to.” The combining vowel is used even though the word root *electr* begins with a vowel.

<i>my</i>	/	<i>o</i>	/	<i>electr</i>	/	<i>-ic</i>
↑		↑		↑		↑
root	+	vowel	+	root	+	suffix

**Example 3:** Now comes an exception to the rule. In the word *lymphadenopathy*, which literally means “any disease of the lymph nodes” (but refers to enlargement of the lymph nodes, by dictionary definition), there are two roots: *lymph* (meaning “lymph”) and *aden* (meaning “gland”). These are followed by the suffix *-pathy*, which means “disease.” The combining vowel is not used in this word to separate the two roots, as it is in the others. There is not always a clear-cut explanation as to why the vowel is used in combining some roots and not in others, but the rule of using the vowel to separate the word roots in compound words applies more often than not. One might speculate that it is easier to pronounce *lymphadenopathy* without using the *o* than it would be if using the *o* to separate the two roots in this compound word.

*lymph* / *aden* / *o* / *-pathy*  
 ↑            ↑            ↑            ↑  
 root + root + vowel + suffix

**Rule:** A word cannot end with a combining form (word root + vowel). A suffix is added at the end of the word. A combining vowel will be used if the suffix begins with a consonant. A combining vowel is generally not used if the suffix begins with a vowel. (There are some exceptions to this rule.)

**Example:** One word that means “enlargement of the heart” is *megalocardia* (megal/o/card/ia).

*megal* / *o* / *card* / *-ia*  
 ↑            ↑            ↑            ↑  
 root + vowel + root + suffix  
 └──────────┘  
 combining form = *megal/o*

Note that the word root *megal* (enlargement or enlarged) becomes a combining form by adding the vowel *o*. The word root *card* cannot be used as a combining form to end the word because this would create *megalocardo*, which is not a word. These words must use a suffix as an ending. Because the suffix begins with a vowel, the *o* is not used after *card*, and the suffix *-ia* is added to complete the word.

## Suffix

A suffix is a word element attached at the end of the word root. Adding a suffix to a word changes the meaning of the word, just as adding different prefixes changes the meaning of the word. Are you beginning to see a pattern here? Just think, a change at the beginning, a change at the end, and you have increased your word building power significantly! All medical words have an ending, or suffix, unless the root is a word itself.

**Example:** In the word *cardiomegaly*, the suffix is *-megaly* (enlargement or enlarged). When you see the suffix *-megaly* as part of a word, it is referring to something being enlarged.

**Note:** *-megaly* and *megal/o* are both acceptable word elements; *-megaly* is a suffix and *megal/o* is a combining form. As you continue learning medical terms, you will find other word elements that work as either a suffix or a combining form. Each suffix carries its same meaning regardless of the root to which it is attached.

As you look at the following words using the word root *cardi*, notice how the different suffixes allow you to make several words—all with different meanings but all referring to the heart. The suffix is in color in each word.

Word	Meaning
<i>cardialgia</i> (car-dee-AL-jee-ah)	<b>Pain in the heart, heart pain;</b> <i>-algia</i> (pain) is a suffix. Note that a combining vowel was not used with this word because the suffix begins with a vowel.

Word	Meaning
<b>cardiocentesis</b> (car-dee-oh-sen- <b>TEE</b> -sis)	<b>Surgical puncture of the heart;</b> <i>-centesis</i> (surgical puncture) is a suffix. The combining vowel was needed with this word because the suffix begins with a consonant.
<b>cardiomegaly</b> (car-dee-oh- <b>MEG</b> -ah-lee)	<b>Enlargement of the heart;</b> <i>o</i> is the combining vowel, which is needed because the suffix begins with a consonant; <i>-megaly</i> (enlargement) is a suffix.

Now that we have explored how changing the suffix also changes the meaning of the word, let's see how a particular suffix dictates whether you use a combining vowel.

**Rule:** *If the suffix begins with a vowel, the root will attach directly to it. If, however, the suffix begins with a consonant (anything other than a, e, i, o, u, y) the root will need a combining vowel before attaching to the suffix.*

**Example:** In the word *cardiogram* (cardi/o/gram), which means “a record of the heart’s activity,” the word root *cardi* (heart) is joined to the suffix *-gram* (record) by the combining vowel *o* because the suffix begins with a consonant.

Now you try the next one! Look at the word **cardialgia**. Identify the word root and the suffix. Was a combining form necessary? Why or why not?

Check your answers in the box immediately following the exercise.

Word root: \_\_\_\_\_

Suffix: \_\_\_\_\_

Combining vowel used? \_\_\_\_\_

If yes, why? \_\_\_\_\_

If no, why? \_\_\_\_\_

**Answers**

Word root: cardi \_\_\_\_\_

Suffix: -algia \_\_\_\_\_

Combining vowel used? No \_\_\_\_\_

If yes, why? \_\_\_\_\_

If no, why? The suffix -algia begins with a vowel, so the combining vowel is not needed.  
 \_\_\_\_\_

How about another one for good measure! Look at the word **carditis**. Identify the word root and the suffix. Was a combining form necessary? Why or why not?

Word root: \_\_\_\_\_

Suffix: \_\_\_\_\_

Combining vowel used? \_\_\_\_\_

If yes, why? \_\_\_\_\_

If no, why? \_\_\_\_\_



## Answers

Word root: *card* \_\_\_\_\_Suffix: *-itis* \_\_\_\_\_Combining vowel used? No \_\_\_\_\_

If yes, why? \_\_\_\_\_

If no, why? The suffix *-itis* begins with a vowel, so the combining vowel is not needed.  
\_\_\_\_\_

Before we continue with word building rules pertaining to prefixes, it is important to note that Chapters 2 and 3 are devoted to the discussion of prefixes and suffixes, respectively. Word roots, however, are addressed in each “system” chapter throughout the text. Each word, when possible, is separated into its word elements followed by a definition of the element. This appears in the left-hand column next to the medical term.

## Prefix

**A prefix is a word element added at the beginning of the word.** When a prefix is used with a root, it changes (or alters) the meaning of the word. Prefixes are not a part of all medical words.

**Rule:** *Prefixes are attached directly to the beginning of the word.*

**Example:** In the word *endocardium*, the prefix is *endo-* (which means “within or inner”). You will always be discussing the inner part, or within, when using the prefix *endo-*. Prefixes keep the same meaning whenever they are attached to a word. What does this mean? If the root doesn’t change, and the prefix doesn’t change, how does the word change? The same root can change its meaning in a word each time a new prefix is added to it, as we have already seen in the previous example with the word root *port*.

Look at the following words that contain the root *cardi* or *card* and see how using different prefixes makes several words, all with different meanings, but all referring to the heart. In each word, the prefix is in color.

Word	Meaning
<b>endocardium</b> (en-doh-CAR-dee-um)	<b>Within the heart, the inner lining of the heart;</b> <i>endo-</i> (within) is a prefix; <i>-um</i> (structure, tissue, or thing) is a noun suffix.
<b>intracardiac</b> (in-trah-CAR-dee-ak)	<b>Pertaining to within the heart (i.e., pertaining to the interior of the heart chambers);</b> <i>intra-</i> (within) is a prefix; <i>-ac</i> (pertaining to) is an adjective suffix.

Word	Meaning
<b>pericardial</b> (pair-ih-CAR-dee-ul)	<b>Pertaining to around the heart (i.e., pertaining to the pericardium, which is the sac that surrounds the heart);</b> <i>peri-</i> (around) is a prefix; <i>-al</i> (pertaining to) is an adjective suffix. When you first begin to build medical terms, it is important to define each word part (i.e., pertaining to around the heart). Once you become more comfortable, you may give a briefer definition with some of the word endings being understood without actually saying them (i.e., around the heart, instead of pertaining to around the heart).

Now, look at the following words containing the word root *men* (which means “menstruation”) to see how the different prefixes in these words change the meaning while continuing to refer to menstruation. Again, the prefix is in color in each word.

<b>amenorrhea</b> (ah-men-oh-REE-ah)	<b>Absence of menstruation;</b> <i>a-</i> (without or absence of) is a prefix; <i>-rrhea</i> (drainage or flow) is a suffix. The <i>o</i> is used to combine the word root with the suffix that begins with a consonant.
<b>dysmenorrhea</b> ( <b>dis</b> -men-oh-REE-ah)	<b>Painful menstrual flow;</b> <i>dys-</i> (bad, difficult, painful, disordered) is a prefix; <i>-rrhea</i> (drainage or flow) is a suffix. The <i>o</i> is used to combine the word root with the suffix that begins with a consonant.

## Word Structure

Generally, words are built using a root and a suffix (or a prefix, word root, and a suffix). As indicated earlier in this chapter, there are exceptions to the rule. You will notice that sometimes a medical term is constructed with only a prefix and a suffix. An example of this is *apnea*, which is composed of the prefix *a-* (without) and the suffix *-pnea* (breathing). One could dissect this word and say that it does have a prefix (*a-*), a root (*pne/o*), and a suffix (*-a*). However, the accepted word element in this word is *-pnea*, which is a suffix. Another example is *analgesia*, which is composed of the prefix *an-* (without) and the suffix *-algisia* (sensitivity to pain).

In the previous pages, we have identified the word elements (word roots, combining forms, prefixes, and suffixes). Now, let’s see how they fit together to build medical words. There is a logical order to building medical words.

**Rule:** *A prefix is placed at the beginning of the word. (Applies: always)*

**Rule:** *A suffix is placed at the end of the word root. (Applies: always)*

**Rule:** *The use of more than one word root in a word creates the need for combining vowels to connect the roots. This, in turn, creates combining forms used in compound words. (Applies: words that have several components)*

**Rule:** *Compound words are usually composed in the following order: combining form + word root + suffix.*

**Example:**

leuk/o	+	cyt	+	-osis	= leukocytosis
word + vowel		word		suffix	
root		root			
combining form					

When several combining forms are used, the order is as follows: combining form + combining form + word root + suffix.

**Example:** *dermat/o + fibr/o + sarc + -oma = dermatofibrosarcoma*

*leuk/o + erythr/o + blast + -osis = leukoerythroblastosis*

When defining a medical word, there is also a logical approach.

**Rule:** *The definition of a medical word usually begins with defining the suffix (the word ending) first and continuing to “read” backward through the word as you define it.*

**Example:** For the word **carditis**, the definition is: inflammation (*-itis*) of the heart (*card*).

For the word **cardiomegaly**, the definition is: enlargement (*-megaly*) of the heart (*cardi*). The *o* is a combining vowel.

For the word **cyanosis**, the definition is: condition (*-osis*) of blueness (*cyan*). A combining vowel is not necessary.

**Rule:** *When a medical word has a prefix, the definition of the word usually begins with defining the suffix first, the prefix second, and the root(s) last.*

**Example:** For the word **intracardiac**, the definition is: pertaining to (*-ac*) within (*intra-*) the heart (*cardi*).

For the word **pericardial**, the definition is: pertaining to (*-al*) around (*peri-*) the heart (*cardi*).

For the word **hypoglycemia**, the definition is: blood condition (*-emia*) of low or less than normal (*hypo-*) sugar (*glyc*).

For the word **hyperhidrosis**, the definition is: condition (*-osis*) of excessive (*hyper-*) sweating (*hidr*).

**Rule:** *When a medical word identifies body systems or parts, the definition of the word usually begins with defining the suffix first, then defining the organs in the order in which they are studied in the particular body system.*

**Example:** In the word **cardiopulmonary**, the definition is: pertaining to (*-ary*) the heart (*cardi*) and lungs (*pulmon*). The *o* is a combining vowel for the two word roots.

In the word **cardioarterial**, the definition is: pertaining to (*-al*) the heart (*cardi*) and the arteries (*arteri*). The *o* is a combining vowel for the two word roots.

In the word **hysterosalpingectomy**, the definition is: removal of (*-ectomy*) the uterus (*hyster*) and fallopian tubes (*salping*). The *o* is a combining vowel for the two word roots.

In the word **nasopharyngitis**, the definition is: inflammation (*-itis*) of the nose (*nas*) and throat (*pharyng*). The *o* is a combining vowel for the two word roots.

## Guidelines for Pronunciation

As you continue your study of medical terminology and the word building rules, you must also incorporate a few pronunciation rules or guidelines to help you pronounce the words correctly. Sometimes a medical word is spelled exactly like it sounds; other times

it is spelled with a letter, or letters, that produces the same phonetic sound. Let's look at some example words and guidelines for looking up the words in a dictionary.

**Note:** In the pronunciation of the example words, the part of the word that receives the strongest accent is written in bold uppercase letters. For your convenience, the rules have been simplified in Tables 1-1 and 1-2. These tables can be used as references when a particular word stumps you.

**Guidelines for words beginning with the “f” sound:** Notice if the word begins with **f** or with **ph**.

1. If the word begins with *f*, it will have the “f” sound—as in the word *febrile*, which is pronounced “**FEE**-brill.”
2. If the word begins with *ph*, it will also have the “f” sound—as in the word *physiology*, which is pronounced “fizz-ee-**ALL**-oh-gee.”

**Guidelines for words beginning with the “j” sound:** Notice if the word begins with **j** or with **g**.

1. If the word begins with *j*, it will have the “j” sound—as in the word *jejenum*, which is pronounced “jee-**JOO**-num.”

**Table 1-1** Pronunciation Guideline Chart

“Sounds Like”	Observation	Example Word	Pronunciation
Words beginning with the “f” sound	Notice if the word begins with <i>f</i> . Notice if the word begins with <i>ph</i> .	febrile physiology	“ <b>FEE</b> -brill” “fizz-ee- <b>ALL</b> -oh-gee”
Words beginning with the “j” sound	Notice if the word begins with <i>j</i> . Notice if the word begins with <i>g</i> and is followed by an <i>e</i> . Notice if the word begins with <i>g</i> and is followed by an <i>i</i> . Notice if the word begins with <i>g</i> and is followed by a <i>y</i> .	jejenum genesis  gingivitis  gyrus	“jee- <b>JOO</b> -num” “ <b>JEN</b> -ee-sis”  “jin-jih- <b>VYE</b> -tis”  “ <b>JYE</b> -russ”
Words beginning with the “k” sound	Notice if the word begins with <i>k</i> . Notice if the word begins with <i>c</i> . Notice if the word begins with <i>ch</i> . Notice if the word begins with <i>qu</i> .	kyphosis cornea chorion quadruplet	“ki- <b>FOH</b> -sis” “ <b>KOR</b> -nee-ah” “ <b>KOR</b> -ree-on” “kwah- <b>DROOP</b> -let”
Words beginning with the “n” sound	Notice if the word begins with <i>n</i> . Notice if the word begins with <i>pn</i> . Notice if the word begins with <i>kn</i> .	neonatal pneumonia knee	“nee-oh- <b>NAY</b> -tl” “new- <b>MOH</b> -nee-ah” “ <b>NEE</b> ”
Words beginning with the “s” sound	Notice if the word begins with <i>s</i> . Notice if the word begins with <i>c</i> . Notice if the word begins with <i>ps</i> .	sarcoma cervix psychology	“sar- <b>KOM</b> -ah” “ <b>SIR</b> -viks” “sigh- <b>KALL</b> -oh-jee”
Words beginning with the “sk” sound	Notice if the word begins with <i>sk</i> . Notice if the word begins with <i>sc</i> . Notice if the word begins with <i>sch</i> .	skeleton sclera schizophrenia	“ <b>SKELL</b> -eh-ton” “ <b>SKLAIR</b> -ah” “skiz-oh- <b>FREN</b> -ee-ah”
Words beginning with the “z” sound	Notice if the word begins with <i>z</i> . Notice if the word begins with <i>x</i>	zygomatic xanthoma	“zeye-go- <b>MAT</b> -ik” “zan- <b>THOH</b> -mah”

**Table 1-2** Additional Rules for Variations in Pronunciations

Beginning/Ending	Rule	Pronunciation	Example Word
Word begins with <b>c</b>	If the <b>c</b> is followed by <b>e</b>	Pronounced as a soft “c” and has a “ss” sound	cervix (“SIR-viks”)
	If the <b>c</b> is followed by <b>i</b>	Pronounced as a soft “c” and has a “ss” sound	circumduction (“sir-kum-DUCK-shun”)
	If the <b>c</b> is followed by <b>y</b>	Pronounced as a soft “c” and has a “ss” sound	cyst (“SIST”)
	If the <b>c</b> is followed by <b>a</b>	Pronounced as a hard “c” and has a “k” sound	cancer (“KAN-ser”)
	If the <b>c</b> is followed by <b>o</b>	Pronounced as a hard “c” and has a “k” sound	collagen (“KOL-ah-jen”)
	If the <b>c</b> is followed by <b>u</b>	Pronounced as a hard “c” and has a “k” sound	cuticle (“KEW-tikl”)
	If the <b>c</b> is followed by a consonant	Pronounced as a hard “c” and has a “k” sound	cheiloplasty (“KYE-loh-plas-tee”)
Word root ends with <b>g</b>	If the <b>g</b> is followed by <b>e</b>	Pronounced as a soft “g” and has a “j” sound	laryngectomy (“lah-rin-JEK-toh-me”)
	If the <b>g</b> is followed by <b>i</b>	Pronounced as a soft “g” and has a “j” sound	pharyngitis (“fair-rin-JYE-tiss”)
	If the <b>g</b> is followed by <b>a</b>	Pronounced as a hard “g” and has a “guh” sound	laryngalgia (“lah-rin-GAL-jee-ah”)
	If the <b>g</b> is followed by <b>o</b>	Pronounced as a hard “g” and has a “guh” sound	meningocele (“men-IN-goh-seel”)
	If the <b>g</b> is followed by a consonant	Pronounced as a hard “g” and has a “guh” sound	glossal (“GLOSS-al”)

2. If the word begins with **g** and is followed by the letter **e**, **i**, or **y**, it will have a “j” sound:

- ◆ If the **g** is followed by **e**—as in the word *genesis*, which is pronounced “JEN-ee-sis.”
- ◆ If the **g** is followed by **i**—as in the word *gingivitis*, which is pronounced “jin-jih-VYE-tis.”
- ◆ If the **g** is followed by the **y**—as in the word *gyrus*, which is pronounced “JYE-russ.”

**Guidelines for words beginning with the “k” sound:** Notice if the word begins with **k**, **c**, **ch**, or **qu**.

1. If the word begins with **k**, it may have the “k” sound—as in the word *kyphosis*, which is pronounced “ki-FOH-sis.” However, some words that begin with the letter **k** (as in *knee*) do not have the “k” sound. This variation is discussed in another pronunciation guideline.
2. Some words that begin with the letter **c** will have the “k” sound—as in the word *cornea*, which is pronounced “COR-nee-ah.”
3. Some words that begin with the letters **ch** will have the “k” sound—as in the word *chorion*, which is pronounced “KOR-ree-on.”
4. Words that begin with the letters **qu** will have the “k” sound—as in the word *quadruplet*, which is pronounced “kwah-DROOP-let.”

**Guidelines for words having the “n” sound: Notice if the word begins with n, pn, or kn.**

1. If the word begins with *n*, it will have the “n” sound—as in the word *neonatal*, which is pronounced “nee-oh-NAY-tl.”
2. Some words that have the “n” sound begin with *pn*—as in the word *pneumonia*, which is pronounced “new-MOH-nee-ah.”
3. Some words that have the “n” sound begin with *kn*—as in the word *knee*, which is pronounced “NEE.”

**Guidelines for words beginning with the “s” sound: Notice if the word begins with s, c, or ps.**

1. If the word begins with *s*, it will have the “s” sound—as in the word *sarcoma*, which is pronounced “sar-KOM-ah.”
2. Some words that begin with *c* will have the “s” sound—as in the word *cervix*, which is pronounced “SIR-viks.”
3. Words that begin with *ps* will have the “s” sound because the *p* will be silent—as in the word *psychology*, which is pronounced “sigh-KALL-oh-jee.”

**Guidelines for words beginning with the “sk” sound: Notice if the word begins with sk, sc, or sch.**

1. Words that begin with *sk* will have the “sk” sound—as in the word *skeleton*, which is pronounced “SKELL-eh-ton.”
2. Some words that begin with *sc* will have the “sk” sound—as in the word *sclera*, which is pronounced “SKLAIR-ah.”
3. Some words that begin with *sch* will have the “sk” sound—as in the word *schizophrenia*, which is pronounced “skiz-oh-FREN-ee-ah.”

**Guidelines for words having the “z” sound: Notice if the word begins with z or x.**

1. If the word begins with *z*, it will have the “z” sound—as in the word *zygomatic*, which is pronounced “zeye-go-MAT-ik.”
2. Some words that begin with *x* will have the “z” sound—as in the word *xanthoma*, which is pronounced “zan-THOH-mah.”

Let’s take a look at some additional words and explore the rules for variations in pronunciations.

**Rule:** *When a word begins with the letter c, the rule is as follows: If the c is followed by e, i, or y, the c is pronounced as a soft “c” and has an “s” sound.*

**Example:** In the word *cervix*, the *c* is followed by *e* and the *c* is pronounced as a soft “c.” The word is pronounced “SIR-viks.”

In the word *circumduction*, the *c* is followed by *i* and the *c* is pronounced as a soft “c.” The word is pronounced “sir-kum-DUCK-shun.”

In the word *cyst*, the *c* is followed by *y* and the *c* is pronounced as a soft “c.” The word is pronounced “SIST.”

**Rule:** *When a word begins with the letter c, the rule is as follows: If the c is followed by a, o, u, or a consonant, the c is pronounced as a hard “c” and has a “k” sound.*

**Example:** In the word *cancer*, the *c* is followed by *a* and the *c* is pronounced as a hard “c.” The word is pronounced “KAN-ser.”

In the word *collagen*, the *c* is followed by *o* and the *c* is pronounced as a hard “c.” The word is pronounced “KOL-ah-jen.”

In the word *cuticle*, the *c* is followed by *u* and the *c* is pronounced as a hard “c.” The word is pronounced “KEW-tikl.”

In the word *cheiloplasty*, the *c* is followed by a consonant and the *c* is pronounced as a hard “c.” The word is pronounced “KYE-loh-plas-tee.”

**Rule:** *When building words with word elements that end in g (such as laryng, pharyng, and mening), the rule is as follows: If the g is followed by e or i, the g is pronounced as a soft “g” and has a “j” sound.*

**Example:** In the word *laryngectomy*, the *g* is followed by *e* and the *g* is pronounced as a soft “g.” The word is pronounced “lah-rin-JEK-toh-me.”

In the word *pharyngitis*, the *g* is followed by *i* and the *g* is pronounced as a soft “g.” The word is pronounced “fair-rin-JYE-tiss.”

**Rule:** *When building words with word elements that end in g (such as laryng, pharyng, and mening), the rule is as follows: If the g is followed by a or o, the g is pronounced as a hard “g” and has a “guh” sound.*

**Example:** In the word *laryngalgia*, the *g* is followed by *a* and the *g* is pronounced as a hard “g.” The word is pronounced “lah-rin-GAL-jee-ah.”

In the word *meningocele*, the *g* is followed by *o* and the *g* is pronounced as a hard “g.” The word is pronounced “men-IN-goh-seel.”

**Rule:** *When building words with word elements that end in g, the rule is as follows: If the g is followed by a consonant, the g is pronounced as a hard “g” and has a “guh” sound.*

**Example:** In the word *glossal*, the *g* is followed by a consonant and the *g* is pronounced as a hard “g.” The word is pronounced “GLOSS-al.”

## Guidelines for Use of Possessive Forms (Eponyms)

As you begin your study of pathological conditions in this textbook, you will note that some diseases are named after individuals and are pronounced and written in the possessive form. These terms are known as eponyms. An eponym (EP-oh-nim) is a name for a disease, organ, procedure, or body function that is derived from the name of a person. Three examples of eponyms are: Parkinson’s disease, named after James *Parkinson*, a British physician; Cushing’s syndrome, named after Harvey Williams *Cushing*; and Hodgkin’s disease, named after Thomas *Hodgkin*, a British physician.

The decision to express the name of the disease in the possessive form remains an acceptable alternative if dictated and/or if indicated as the preference by the employer or client. Medical journals, dictionaries, and style guides remain divided on this issue—although many have acknowledged the trend away from the possessive form. The learner will notice in this textbook that the author’s preference is to use the possessive form of disease names.

### Feature Walk-Through

Every term on the **Written and Audio Terminology Review** list is pronounced on the Audio CDs. Each time you see the term in the chapter, it will be shown in **purple**. Study the written phonetic pronunciation in the list, and then listen to the term pronounced on the Audio CD. Practice saying the term after it is pronounced. When you feel comfortable saying the term, check the box in the list. Now write the definition in the space provided. Check your definition with the one listed in the glossary. When you have written definitions for all terms, challenge yourself further by covering up the term and pronunciation column with your hand or a piece of paper and then state the term for each definition.

The correct spelling of each term is equally important as proper pronunciation. Study the spelling of each term in the list and then test yourself by playing the Spelling Bee game on the accompanying StudyWARE™ CD-ROM to beat the clock by spelling selected terms correctly before time runs out.

# WRITTEN AND AUDIO TERMINOLOGY REVIEW

Term	Pronunciation	Definition
acrodermatitis	<input type="checkbox"/> ack-roh-der-mah-TYE-tis	_____
amenorrhea	<input type="checkbox"/> ah-men-oh-REE-ah	_____
cardiac	<input type="checkbox"/> CAR-dee-ak	_____
cardialgia	<input type="checkbox"/> car-dee-AL-jee-ah	_____
cardiocentesis	<input type="checkbox"/> car-dee-oh-sen-TEE-sis	_____
cardiologist	<input type="checkbox"/> car-dee-ALL-oh-jist	_____
cardiology	<input type="checkbox"/> car-dee-ALL-oh-gee	_____
cardiomegaly	<input type="checkbox"/> car-dee-oh-MEG-ah-lee	_____
carditis	<input type="checkbox"/> car-DYE-tis	_____
dermatitis	<input type="checkbox"/> der-mah-TYE-tis	_____
dermatologist	<input type="checkbox"/> der-mah-TALL-oh-jist	_____
dermatology	<input type="checkbox"/> der-mah-TALL-oh-gee	_____
dermatosis	<input type="checkbox"/> der-mah-TOH-sis	_____
dysmenorrhea	<input type="checkbox"/> dis-men-oh-REE-ah	_____
endocardium	<input type="checkbox"/> en-doh-CAR-dee-um	_____
hypodermic	<input type="checkbox"/> high-poh-DER-mik	_____
intracardiac	<input type="checkbox"/> in-trah-CAR-dee-ak	_____
pericardial	<input type="checkbox"/> pair-ih-CAR-dee-ul	_____
polyuria	<input type="checkbox"/> pol-ee-YOU-ree-ah	_____



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## REVIEW CHECKPOINT

Apply what you have learned in this chapter by completing the exercises in your workbook.

### Feature Walk-Through

The **Chapter Review Exercises** provide a general review of the chapter material. Your goal in these exercises is to achieve 80% or higher accuracy on each exercise. Ask your instructor for the answers and then grade each exercise. A space has been provided for your score at the end of each review section.

## Chapter Review Exercises

### A. Matching

Match the term or definition on the left with the correct definition or term on the right. Each correct answer is worth 10 points. Record your score in the space provided at the end of the exercise.

- |  |   |
|--|---|
| _____ 1. word root   | a. prefix   |
| _____ 2. prefix  | b. word ending  |
| _____ 3. suffix  | c. word root + suffix                                   |
| _____ 4. combining vowel   | d. combining form                                       |
| _____ 5. combining form  | e. usually an <i>o</i> , sometimes an <i>i</i>          |
| _____ 6. compound word   | f. attached directly to the beginning of a word         |
| _____ 7. does not need a vowel for attachment to root                              | g. basic foundation of a word                           |
| _____ 8. requires a combining vowel for attachment when it begins with a consonant | h. word root + vowel                                    |
| _____ 9. a word cannot end with this word element                                  | i. combining form + word root + suffix                  |
| _____ 10. component parts of words   | j. suffix   |
|  | k. word roots, prefixes, suffixes, and combining vowels |
|  | l. <i>dermatitis</i>                                    |
|  | m. prefix + vowel                                       |

**Number correct** \_\_\_\_\_ × **10 points/correct answer:** **Your score** \_\_\_\_\_ %

### B. Identify the Word Roots

Identify the word root(s) in each word by separating them with slash marks (/). Remember the word building rules concerning the attachment of suffixes to word roots. **The suffix, when used, appears in bold print in the first four (4) words. After that, you will have to identify the word root without the help of a bold suffix.** All answers appear within this chapter. Each correct answer is worth 10 points. Record your score in the space provided at the end of the exercise.

- Definition:      Enlargement of the heart.

Root:              cardi (the *o* is needed because the suffix *-megaly* begins with a consonant)

Word:              *cardiomegaly*

2. Definition: Condition in which there is a decrease in the number of white blood cells.  
 Root: cyt (the *o* is needed because the suffix *-penia* begins with a consonant)  
 Root + vowel: leuk/o (this becomes a combining form due to the compound word)  
 Word: leukocytopenia
3. Definition: Inflammation of the skin of the extremities.  
 Root: dermat (the *o* is not needed because the suffix *-itis* begins with a vowel)  
 Root + vowel: acr/o (this becomes a combining form due to the compound word)  
 Word: acrodermatitis
4. Definition: One who specializes in the study of diseases and disorders of the heart.  
 Root: cardi (the *o* is needed because the suffix *-logist* begins with a consonant) (This one may appear to be wrong because *cardi* ends with a vowel. However, remember that it is the beginning of the suffix that determines whether to use the vowel.)  
 Word: cardiologist
5. Definition: Any condition of the skin.  
 Root: \_\_\_\_\_  
 Word: dermatosis
6. Definition: Painful urination.  
 Root: \_\_\_\_\_  
 Word: dysuria
7. Definition: Pain in the heart.  
 Root: \_\_\_\_\_  
 Word: cardialgia
8. Definition: One who specializes in the study of diseases and disorders of the skin.  
 Root: \_\_\_\_\_  
 Word: dermatologist
9. Definition: Condition of blueness.  
 Root: \_\_\_\_\_  
 Word: cyanosis
10. Definition: Inflammation of the heart.  
 Root: \_\_\_\_\_  
 Word: carditis

**Number correct** \_\_\_\_\_  $\times$  **10 points/correct answer:** **Your score** \_\_\_\_\_ %

## C. What Is Wrong with This Word?

Each of the following words has been created incorrectly according to the word building rules. Review each word carefully and circle the mistake. Rewrite the word correctly in the space provided, and state your rationale for the change. You may need to refer to the word building rules in the chapter for help. Each correct answer is worth 10 points. Record your score in the space provided at the end of the exercise.

### Example:

Wrong: a m e n r r h e a  
 Correct: a m e n o r r h e a  
 Rationale: The suffix begins with a consonant. Therefore, a combining vowel is needed.

- 1. Wrong: megaly cardio  
Correct: \_\_\_\_\_  
Rationale: \_\_\_\_\_
  
- 2. Wrong: penia leuko cyto  
Correct: \_\_\_\_\_  
Rationale: \_\_\_\_\_
  
- 3. Wrong: dermato itis acro  
Correct: \_\_\_\_\_  
Rationale: \_\_\_\_\_
  
- 4. Wrong: megaly gastro  
Correct: \_\_\_\_\_  
Rationale: \_\_\_\_\_
  
- 5. Wrong: osis dermato  
Correct: \_\_\_\_\_  
Rationale: \_\_\_\_\_
  
- 6. Wrong: dys men rrhea  
Correct: \_\_\_\_\_  
Rationale: \_\_\_\_\_
  
- 7. Wrong: cardio algia  
Correct: \_\_\_\_\_  
Rationale: \_\_\_\_\_
  
- 8. Wrong: logist dermato  
Correct: \_\_\_\_\_  
Rationale: \_\_\_\_\_
  
- 9. Wrong: osis cyano  
Correct: \_\_\_\_\_  
Rationale: \_\_\_\_\_
  
- 10. Wrong: itis cardo  
Correct: \_\_\_\_\_  
Rationale: \_\_\_\_\_

**Number correct** \_\_\_\_\_ **× 10 points/correct answer: Your score** \_\_\_\_\_ %

## D. Completion

Read the following statements about word elements and complete the statement with the correct answer. The spaces provided indicate the number of words in the answer. Each correct answer is worth 10 points. Record your score in the space provided at the end of the exercise.

- When building a medical word, remember that a word cannot end as a \_\_\_\_\_. You must drop the vowel and add a \_\_\_\_\_.
- The basic foundation of a word is known as the \_\_\_\_\_.
- Word roots, prefixes, suffixes, and combining vowels are known as \_\_\_\_\_.
- The word element attached directly to the beginning of a word is known as a \_\_\_\_\_.
- The word element that requires a combining vowel for attachment when it begins with a consonant is known as a \_\_\_\_\_.
- The component part of a word that is usually an *o* but sometimes an *i* is called the \_\_\_\_\_.
- The word ending is called a \_\_\_\_\_.
- A word root + a vowel is known as a \_\_\_\_\_.
- The word element that attaches to the beginning of a word and does not need a vowel for attachment to the root is a \_\_\_\_\_.
- A medical word that is made up of a combining form + a word root + a suffix is known as a \_\_\_\_\_.

**Number correct** \_\_\_\_\_  $\times$  **10 points/correct answer: Your score** \_\_\_\_\_ %

## E. Review the Rules

Read each statement carefully and select the correct answer from the options listed. Each correct answer is worth 10 points. Record your score in the space provided at the end of the exercise.

- When using more than one word root, as in a compound word, a \_\_\_\_\_ is needed to separate the different word roots. This is done regardless of the second or third word root beginning with a vowel.
  - prefix
  - suffix
  - combining vowel
  - hyphen
- If a suffix begins with a vowel, the \_\_\_\_\_ will attach directly to it.
  - word root
  - prefix
  - combining form
  - hyphen
- If a suffix begins with a consonant (anything other than *a*, *e*, *i*, *o*, *u*, *y*), the root will need a(n) \_\_\_\_\_ before attaching to the suffix.
  - prefix
  - hyphen
  - combining vowel
  - extra word root

4. A word element added at the beginning of the word is a:
  - a. prefix
  - b. suffix
  - c. combining vowel
  - d. hyphen
5. Compound words are usually composed in the following order:
  - a. combining form + word root + suffix
  - b. combining form + suffix
  - c. word root + suffix
  - d. prefix + word root
6. The definition of a medical word usually begins with defining the \_\_\_\_\_ first and continuing to “read” backward through the word as you define it.
  - a. prefix
  - b. combining form
  - c. word root
  - d. suffix
7. When a medical word has a prefix, the definition of the word usually begins with defining the suffix first, the prefix \_\_\_\_\_, and the root(s) last.
  - a. third
  - b. second
  - c. fourth
  - d. after the root
8. When a medical word identifies body systems or parts, the definition of the word usually begins with defining the suffix first and then defining the organs \_\_\_\_\_ in the particular body system.
  - a. in the order in which they are studied
  - b. in alphabetical order
  - c. in reverse order
  - d. in any order desired
9. In the medical word *cardiocentesis* (*cardi* + *o* + *centesis*), the word element *-centesis* is a suffix. The combining vowel *o* is used in building this word because:
  - a. the suffix always has to have a combining vowel.
  - b. the suffix begins with a consonant.
  - c. the root *cardi* ends in a vowel.
  - d. the vowel is not needed (this word is misspelled).
10. In the medical word *cardialgia* (*cardi* + *algia*), the word element *-algia* is a suffix. The combining vowel *o* is not used in building this word because:
  - a. the suffix *-algia* begins with a vowel and a combining vowel is not necessary.
  - b. the vowel is needed (this word is misspelled).
  - c. the root *cardi* ends in a vowel.
  - d. a suffix never needs a combining vowel.

**Number correct** \_\_\_\_\_  $\times$  **10 points/correct answer: Your score** \_\_\_\_\_ %