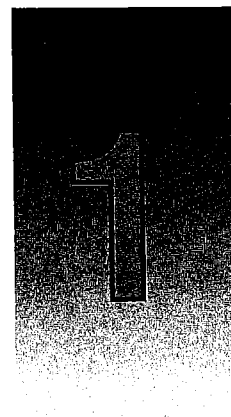


Basic Word Structure



I. Objectives in Studying the Medical Language

There are three objectives to keep in mind as you study medical terminology.

1. **Analyze words by dividing them into component parts.** Your goal is to learn the *tools* of word analysis that will make the understanding of complex terminology easier. Do not simply memorize terms; think about dividing terms into component parts. This text will show you how to separate both complicated and simple terms into understandable word elements. Medical terms are very much like individual jigsaw puzzles. They are constructed of small pieces that make each word unique, but the pieces can be used in different combinations in other words as well. As you become familiar with word parts and learn what each means, you will be able to recognize those word parts in totally new combinations in other terms.

2. **Relate the medical terms to the structure and function of the human body.** Memorization of terms, although essential to retention of the language, should not become the primary objective of your study. A major focus of this text is to *explain* terms in the context of how the body works in health and disease. Medical terms explained in their proper context will also be easier to remember. Thus, the term **hepatitis**, meaning inflammation (-itis) of the liver (**hepat**), is better understood when you know where the liver is and how it functions. No previous knowledge of biology, anatomy, or physiology is needed for this study. Explanations in the text are straightforward and basic.

3. **Be aware of spelling and pronunciation problems.** Some medical terms are pronounced alike but are spelled differently, which accounts for their different meanings. For example, **ilium** and **ileum** have identical pronunciations, but the first term, **ilium**, means a part of the pelvis (hip bone), whereas the second term, **ileum**, means a part of the small intestine. Even when terms are spelled correctly, terms can be misunderstood because of incorrect pronunciation. For example, the **urethra** (ū-RĒ-thrāh) is the tube leading from the urinary bladder to the outside of the body, whereas a **ureter** (ŪR-ĕ-tĕr) is one of two tubes leading from the kidney to the urinary bladder. Figure 1-1 illustrates the difference between the urethra and the ureters.

II. Word Analysis

Studying medical terminology is very similar to learning a new language. The words at first sound strange and complicated, although they may stand for commonly known English terms.

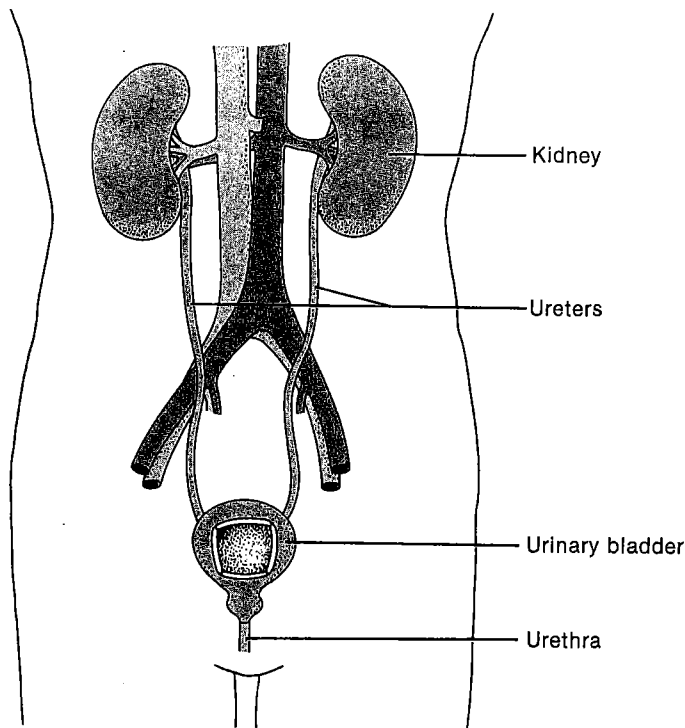
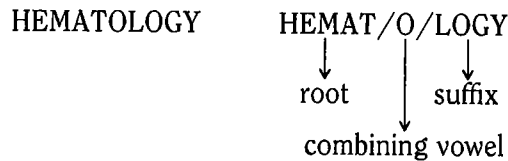


Figure 1-1

Urinary system. (From Chabner DE: *Medical Terminology: A Short Course*. Philadelphia, WB Saunders, 1990.)

The terms **gastralgia**, meaning stomach ache, and **ophthalmologist**, meaning eye doctor, are examples.

Your first job in learning the language is to understand how to divide words into their component parts. The medical language is logical in that most terms, whether complex or simple, can be broken down into basic parts and then understood. For example, consider the following term:



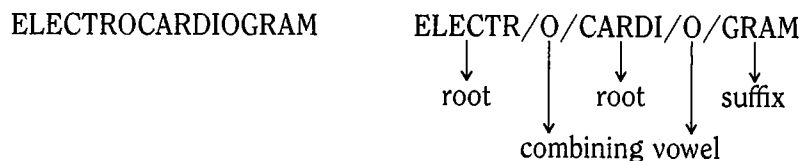
The **root** is the *foundation of the word*. All medical terms have one or more roots. The root **hemat** means **blood**.

The **suffix** is the *word ending*. All medical terms have a suffix. The suffix **-logy** means **study of**.

The **combining vowel** (usually o) *links the root to the suffix or the root to another root*. A combining vowel has no meaning of its own; it only joins one word part to another.

It is useful to read the meaning of medical terms *starting from the suffix back to the beginning of the term*. Thus, the term **hematology** means **study of blood**.

Here is another familiar medical term:



The root **electr** means **electricity**.

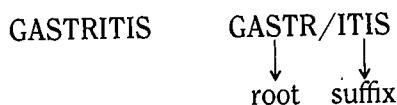
The root **cardi** means **heart**.

The suffix **-gram** means **record**.

The entire word means **record of the electricity in the heart**.

Notice that there are two combining vowels in this term. They link the two roots (**electr** and **cardi**) as well as the root (**cardi**) and suffix (**-gram**).

Try another term:

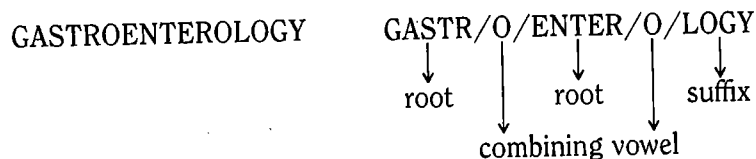


The root **gastr** means **stomach**.

The suffix **-itis** means **inflammation**.

The entire word, reading from the end of the term (suffix) to the beginning, means **inflammation of the stomach**.

Note that the combining vowel, **o**, is missing in this term. This is because the suffix, **-itis**, begins with a vowel. The combining vowel is dropped before a suffix that begins with a vowel. It is retained, however, between two roots, even if the second root begins with a vowel. Consider the following term:



The root **gastr** means **stomach**.

The root **enter** means **intestines**.

The suffix **-logy** means **study of**.

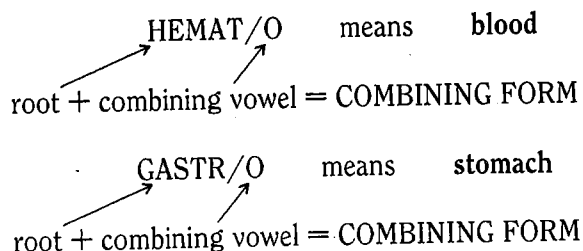
The entire term means **study of the stomach and intestines**.

Notice that the combining vowel is used between **gastr** and **enter**, even though the second root, **enter**, begins with a vowel.

In summary, remember three general rules:

1. Read the meaning of medical terms from the suffix back to the beginning of the term and across.
2. Drop the combining vowel (usually **o**) before a suffix beginning with a vowel: **gastritis** *not* **gastroitis**.
3. Keep the combining vowel between two roots: **gastroenterology** *not* **gastrenterology**.

In addition to the root, suffix, and combining vowel, there are two other word parts commonly found in medical terms. These are the **combining form** and **prefix**. The combining form is simply the root plus the combining vowel. For example, you are already familiar with the following combining forms and their meanings:



CARDI/O means heart

 root + combining vowel = COMBINING FORM

Combining forms can be used with many different suffixes, so it is useful to know the meaning of a combining form to decipher the meaning of a term.

The **prefix** is a small part that is attached to the *beginning of a term*. Not all medical terms contain prefixes, but the prefix can have an important influence on meaning. Consider the following examples:

SUB/GASTR/IC means pertaining to under the stomach

 prefix root suffix

 (under) (stomach) (pertaining to)

TRANS/GASTR/IC means pertaining to across the stomach

 prefix root suffix

 (across) (stomach) (pertaining to)

EPI/GASTR/IC means pertaining to above the stomach

 prefix root suffix

 (above) (stomach) (pertaining to)

In summary, the important elements of medical terms are:

1. **Root:** foundation of the term
2. **Suffix:** word ending
3. **Prefix:** word beginning
4. **Combining vowel:** vowel (usually o) that links the root to the suffix or the root to another root
5. **Combining form:** combination of the root and the combining vowel

III. Combining Forms, Suffixes, and Prefixes

In previous examples you have been introduced to the combining forms **gastr/o** (stomach), **hemat/o** (blood), and **cardi/o** (heart). The following list contains new combining forms, suffixes, and prefixes with examples of medical words using those word parts. Your job is to write the *meaning* of the medical term in the space provided. As you do this, you may wish to divide the term into its component parts by using slashes (for example: **aden/oma**).

If you have a question about the correct pronunciation of a term, consult the Pronunciation of Terms section at the end of the chapter. The audiotapes that accompany this text contain these terms and their meanings, so you may find it helpful as a study aid. Although most medical terms can be divided into component parts and understood, others will defy simple explanation. Additional information is provided in the text when those terms are introduced, and you may wish to consult a medical dictionary as well.

To test your understanding of word parts and terminology in this chapter, complete the exercises on pages 13 to 21 and check your answers on pages 21 to 23. Then, as a final review,

give the meanings for the combining forms, suffixes, and prefixes on the Review Sheet, pages 28 and 29.

Write the meaning of the medical terms that follow in the spaces provided.

Combining Forms			
Combining Form	Meaning	Terminology	Meaning
aden/o	gland	adenoma _____	
		<i>The suffix -oma means tumor or mass.</i>	
arthr/o	joint	adenitis _____	
		<i>The suffix -itis means inflammation.</i>	
bi/o	life	arthritis _____	
		biology _____	
carcin/o	cancerous, cancer	biopsy _____	
		<i>The suffix -opsy means process of viewing. Living tissue is removed from the body and viewed under a microscope.</i>	
cardi/o	heart	carcinoma _____	
		<i>A carcinoma is a cancerous tumor. Carcinomas grow from epithelial (surface or skin) cells that cover the outside of the body and line organs, cavities, and tubes within the body.</i>	
cephal/o	head	cardiology _____	
		cephalic _____	
cerebr/o	cerebrum (largest part of the brain)	<i>(sē-FAL-īk) The suffix -ic means pertaining to.</i>	
		cerebral _____	
cis/o	to cut	<i>The suffix -al means pertaining to. A cerebral vascular accident (CVA) occurs when damage to blood vessels (vascul/o means blood vessels) in the cerebrum causes injury to nerve cells of the brain. This condition is also called a stroke or a cerebrovascular accident.</i>	
		incision _____	
		<i>The prefix in- means into and the suffix -ion means process.</i>	
		excision _____	
		<i>The prefix ex- means out.</i>	

crin/o	secrete (to form and give off)	endocrine glands _____ <i>The prefix endo- means within; endocrine glands (for example: thyroid, pituitary, and adrenal glands) secrete hormones directly within (into) the bloodstream. Other glands, called exocrine glands, secrete chemicals (saliva, sweat, tears) through tubes (ducts) to the outside of the body.</i>
cyst/o	urinary bladder	cystoscopy _____ <i>(sīs-TŌS-kō-pē) The suffix -scopy means process of visual examination.</i>
cyt/o	cell	cytology _____
derm/o dermat/o	skin	dermatitis _____ hypodermic _____ <i>The prefix hypo- means under, below.</i>
electr/o	electricity	electrocardiogram _____ <i>The suffix -gram means record. Also called an ECG or EKG.</i>
encephal/o	brain	electroencephalogram _____ <i>Also called an EEG.</i>
enter/o	intestines (usually the small intestine)	enteritis _____ <i>The small intestine is narrower and longer than the large intestine (colon).</i>
erythr/o	red	erythrocyte _____ <i>The suffix -cyte means cell. Erythrocytes carry oxygen in the blood.</i>
gastr/o	stomach	gastrectomy _____ <i>The suffix -ectomy means excision or removal.</i> gastrotomy _____ <i>The suffix -tomy means incision or cutting into.</i>
gnos/o	knowledge	diagnosis _____ <i>The prefix dia- means complete. The suffix -sis means state of. A diagnosis is made after sufficient information has been obtained about the patient's condition.</i> prognosis _____

The prefix pro- means before. Literally, knowledge before, a prognosis is a prediction about the outcome of an illness, but it is always given after the diagnosis has been determined.

gynec/o woman, female

gynecology _____

hem/o blood
hemat/o

hematology _____

hematoma _____

In this term, -oma means a mass or collection of blood, rather than a growth of cells (tumor). A hematoma occurs when blood is lost from blood vessels and collects as clotted blood in a cavity or organ or under the skin.

hepat/o liver

hepatitis _____

iatr/o treatment

iatrogenic _____

The suffix -genic means pertaining to produced by, or producing. Iatrogenic conditions are unexpected side effects that result from treatment by a physician.

leuk/o white

leukocyte _____

This blood cell helps the body fight disease.

nephr/o kidney

nephritis _____

nephrology _____

neur/o nerve

neurology _____

onc/o tumor

oncology _____

oncologist _____

The suffix -ist means a specialist.

ophthalm/o eye

ophthalmoscope _____

The suffix -scope means an instrument for visual examination.

oste/o bone

osteitis _____

osteoarthritis _____

This condition is actually a degeneration of bones and joints that occurs as the body ages.

path/o disease

pathology _____

		pathologist _____
		<i>A pathologist examines biopsy samples microscopically and examines a dead body to determine the cause of death.</i>
ped/o	child	pediatric _____
		<i>An orthopedist (orth/o means straight) was originally a doctor who straightened children's bones and corrected deformities. Nowadays, an orthopedist specializes in disorders of bones and muscles of people of all ages.</i>
psych/o	mind	psychology _____
		psychiatrist _____
radi/o	x-rays	radiology _____
ren/o	kidney	renal _____
		<i>Ren/o (Latin) and nephro/o (Greek) both mean kidney. Ren/o is used with -al to describe the kidney, whereas nephro/o is used with other suffixes to describe abnormal conditions and operative procedures.</i>
rhin/o	nose	rhinitis _____
sarc/o	flesh	sarcoma _____
		<i>This is a cancerous (malignant) tumor. A sarcoma grows from cells of "fleshy" connective tissue such as muscle, bone, and fat, whereas a carcinoma (another type of cancerous tumor) grows from epithelial cells that line the outside of the body or the inside of organs in the body.</i>
sect/o	to cut	resection _____
		<i>The prefix re- means back. A resection is a cutting back in the sense of cutting out or removal (excision). A gastric resection is a gastrectomy, or excision of the stomach.</i>
thromb/o	clot, clotting	thrombocyte _____
		<i>These cells help clot blood and are also known as platelets. A thrombus is the actual clot that forms, and thrombosis (-osis means condition) is the condition of clot formation.</i>
ur/o	urinary tract, urine	urology _____
		<i>A urologist is a surgeon who operates on the organs of the urinary tract and the organs of the male reproductive system.</i>