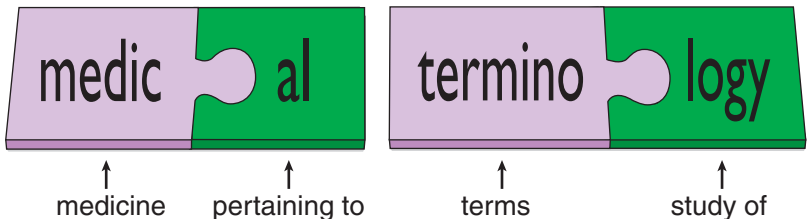
CHAPTER 1

MEDICAL TERMINOLOGY BASICS

OBJECTIVES

1. Define medical terminology.
2. Describe the origin of medical language.
3. Analyze the component parts of a medical term to determine its meaning.
4. Explain the common rules for proper medical term formation, pronunciation, and spelling.

MEET THE PATIENT Anne Stanco has been one of Dr. Spaulding's primary care patients for several years. Although she is diligent about seeing to the needs of her husband and daughter, who are also patients of Dr. Spaulding, Anne needs to take better care of herself. She claims she is "working on it," but still smokes cigarettes and is overweight, despite the history of heart problems in her family. With her 50th birthday approaching, Anne makes an appointment with Dr. Spaulding, who orders blood tests to evaluate her risks for heart disease. Indeed, Anne's lab results show that she has **hyperlipemia**. Information about Anne's condition will be explained in this chapter.



Medical terminology is the study of terms used in medicine and health care. The majority of medical terms have Greek or Latin origins that can be traced back to the founding of modern medicine by the Greeks and the influence of Latin when it was the universal language of the Western world. Other languages, such as German and French, have also influenced medical terms. Today, many new terms are derived from English, which is considered the universal language.

Once you understand the basic structure of medical terms and memorize the key 300 term components covered in this text, you can determine the meaning of most medical terms by simply defining their component parts. Those mysterious words, which are almost frightening at first glance, will soon seem commonplace. With your newfound knowledge and the help of a good medical dictionary, you will be able to analyze and understand each term you encounter.

Start Now

Take time to study the material in each self-instruction frame before starting a review segment. Flash cards for the prefixes, suffixes, and a select number of combining forms presented in this chapter are included at the back of the text and are identified by letter and number. Locate and use them for additional reinforcement.

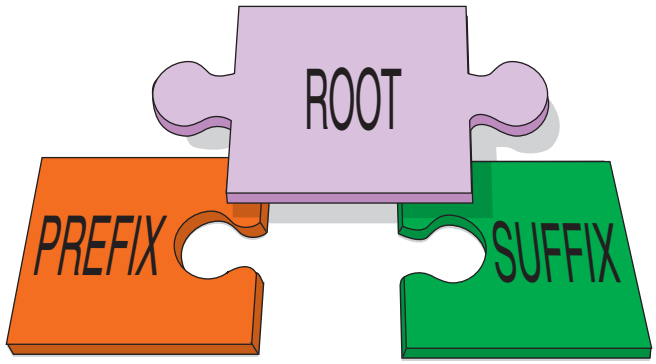
Remove the Reveal Card from the text. Place the card over the left column of the Programmed Review sections to hide the answers to the questions posed in the learning material in the right column. Slide the card down the page to reveal the answer only after you have written your response in the fill-in space on the right. Use a pencil so that you can erase any incorrect responses and replace them with the correct answers. You may mark all of the correct responses with a highlighter pen for extra reinforcement.

You can move at your own pace, given the time allotted. Between study periods, use the Reveal Card as a bookmark.

Term Components

Study the following term components to prepare for the Self-Instruction and Programmed Review segments that follow.

TERM COMPONENT	CATEGORY	MEANING	FLASH CARD ID
lip	root	fat	
lip/o	combining form	fat	CF-4
-emia	suffix	blood condition	S-7
hyper-	prefix	excessive	P-21
protein	root	protein	

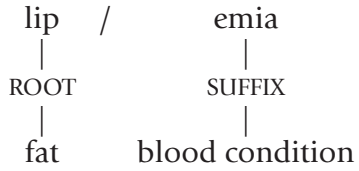


SELF-INSTRUCTION: Basic Term Components

The very first step in the study of medical language is to examine the basic structure of terms. Most medical terms have three **components:** a root, suffix, and prefix.

ROOT AND SUFFIX

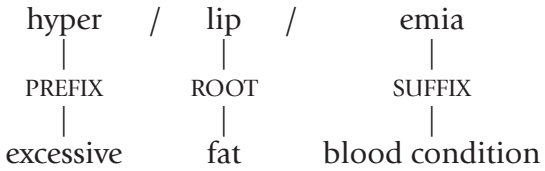
The **root** is the foundation or subject of a term. The **suffix** is the word ending that modifies and gives essential meaning to the root. Medical terms are formed by combining one or more roots to a suffix. Consider the term lipemia, for example:



Lip (meaning fat) is the root and the subject of the term. It is modified by the suffix *-emia,* meaning blood condition, to indicate a condition of fat in the blood. Note that each component is dependent on the other to express meaning.

PREFIX

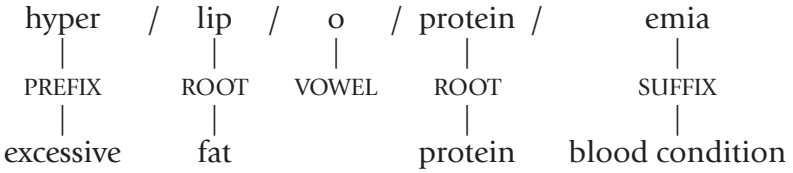
The **prefix** is a term component that is placed at the beginning of a term when needed to further modify the root or roots. Let's look at the term hyperlipemia:



The addition of the prefix *hyper-* (meaning excessive) modifies the root to denote excessive fat in the blood.

ADDITIONAL ROOTS

Often a medical term is formed around two or more roots. For example, in hyperlipoproteinemia:



In this term, the second root, *protein* (joined to *lip* by the vowel "o"), further defines the word to indicate an excessive amount of fat and protein in the blood.

COMBINING VOWELS AND COMBINING FORMS

When a medical term contains more than one root, each is joined by a vowel, usually an "o." As shown in the term hyper/lip/o/protein/emia, the "o" links the two roots and fosters easier pronunciation. This vowel is known as a **combining vowel.** Combining vowels are also used to link a root to a suffix. The letter "o" is the most common

combining vowel ("i" is the second most common). They are used so frequently that it is common to present them along with the root as a **combining form:**

lip	root
lip/o	combining form (root with combining vowel attached)

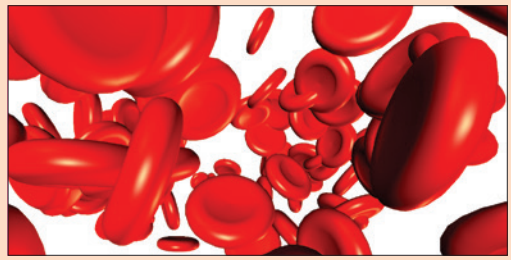
This text uses combining forms rather than roots for easier term analysis. Each is presented with a slash between the root and the combining vowel. Hyphens are placed after prefixes to indicate their placement at the beginning of a medical term, and hyphens are placed before suffixes to indicate their placement at the end of a term.

ON CLOSER INSPECTION

Hem/o, hemat/o, and *-emia* Compete for Use in Terms Referring to Blood

Stemming from the Greek word haima, *hem/o* and *hemat/o* are combining forms that both mean blood.

The root *hem* was linked to *-ia,* a simple suffix meaning condition of, to form *-emia,* the compound suffix meaning blood condition. The "h" was initially part of the reference but was dropped over time.



A cluster of erythrocytes (red blood cells).

hem/o and *hemat/o* are common subjects in medical terms related to blood, and *-emia* is used to modify terms related to blood conditions. For example:

- Hematology is the study of blood.
- Hyperlipemia is a condition of excessive fat in blood.

PROGRAMMED REVIEW: Basic Term Components

ANSWERS	REVIEW
root, suffix, prefix	**1.1** Most medical terms have three basic parts: the _____, _____, and _____.
subject or foundation	**1.2** The root is the _____ of the term.

suffix	**1.3** The _____ is the word ending that modifies and gives essential meaning to the root.
prefix	**1.4** The _____ is a term component at the beginning of a term that further modifies the root.
two	**1.5** Often a medical term is formed from _____ or more roots.
vowel o	**1.6** When a medical term has more than one root, it is joined together by a combining _____ (usually a/an ___).
root vowel	**1.7** A combining form is a/an _____ with a/an _____ attached.
fat subject or foundation blood condition fat, blood	**1.8** In the word lipemia, *lip*, meaning _____, is the root and _____ of the term. It is modified and given essential meaning by the link to the suffix *-emia*, meaning _____ _____. The term refers to a condition of _____ in the _____. Note: Lipemia is synonymous with lipidemia.
prefix beginning modify excessive	**1.9** In the term hyperlipemia, *hyper-* is a/an _____ placed at the _____ of the term to further _____ the meaning of the term to denote above or _____ fat in the blood.
root protein	**1.10** In the term hyperlipoproteinemia, the addition of the _____ protein further defines the word to indicate an excessive amount of fat and _____ in the blood.

root
combining form
o
combining vowel, i

1.11 In *lip/o, lip* is the _____ and *lip/o* is the _____ _____ (root with combining vowel attached). The vowel ___ is the most common _____ _____, and ____ is the second most common combining vowel.

Vital Statistics **HYPERLIPEMIA** (*hī′per-li-pē′mē-ă*)

Origin: *hyper-* (above or excessive) + *lip/o* (fat) + *-emia* (blood condition)

The patient you met at the beginning of this chapter, Anne Stanco, was diagnosed with hyperlipemia. What exactly is that?

Hyperlipemia is an excess of fatty substances called lipids in the blood. It is also called hyperlipoproteinemia because these fatty substances travel in the blood attached to proteins.

Hyperlipemia, along with diabetes, hypertension (high blood pressure), positive family history, and smoking, is a major risk factor for heart disease. It usually has no noticeable symptoms and tends to be discovered during routine examination or evaluation for heart disease. Diagnosis is typically based on medical history, physical examination, and blood tests.

It is necessary to first identify and treat any potential underlying medical problems, such as diabetes or hypothyroidism, that can contribute to hyperlipemia. Treatment of hyperlipemia includes dietary changes, weight reduction, and exercise. If lifestyle modifications cannot bring about optimal lipid levels, then medications may be necessary.

Term Components

The following is a list of term components that are used in this chapter to explain the rules for forming, spelling, and pronouncing medical terms. Study the flash cards for each term component to prepare for the Self-Instruction and Programmed Review segments that follow.

SUFFIX	MEANING	FLASH CARD ID
-al, -ic	pertaining to	S-1
-ectomy	excision or removal	S-6
-emia	blood condition	S-7
-itis	inflammation	S-18
-logy	study of	S-22
-spasm	involuntary contraction	S-45
-stomy	creation of an opening	S-47
-tomy	incision	S-48

PREFIX	MEANING	FLASH CARD ID
hyper-	above or excessive	P-21
hypo-	below or deficient	P-22
para-	alongside of or abnormal	P-31
peri-	around	P-33

COMBINING FORM (ROOT WITH VOWEL)	MEANING	FLASH CARD ID
angi/o, vas/o, vascul/o	vessel	CF-5
cardi/o	heart	CF-11
enter/o	small intestine	CF-23
esophag/o	esophagus	
gastr/o	stomach	CF-26
hem/o, hemat/o	blood	CF-28
lip/o	fat	CF-4
oste/o	bone	
ox/o	oxygen	

SELF-INSTRUCTION: Defining Medical Terms through Word Structure Analysis

You can usually define a term by interpreting the suffix first, then the prefix (if present), and then the succeeding root or roots. Take, for example, the term pericarditis:

peri	/	card	/	itis
PREFIX		ROOT		SUFFIX
2		3		1
around		heart		inflammation

pericarditis = inflammation around the heart

You sense the basic meaning of this term by understanding its components; however, the dictionary further clarifies the fact that pericarditis refers to inflammation of the pericardium, which is the sac that encloses the heart.

Rx for Success

Beginning students often have difficulty differentiating between prefixes and roots (or combining forms) because the root appears first in a medical term when there is no prefix. It is important to memorize the most common prefixes so that you can tell the difference. Also, keep in mind that a prefix is only used as needed to further modify the root or roots, whereas the root is the foundation or subject of the word.

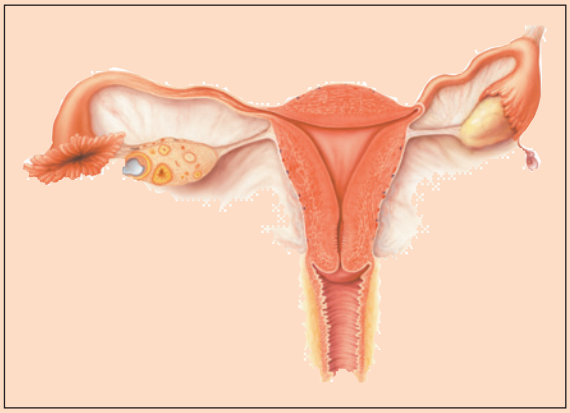
ON CLOSER INSPECTION Exceptions to the Rule

Occasionally, you will come across terms that are formed by a root alone or by a combination of roots. For example:

duct
|
ROOT
|
to lead

A duct is a tubular structure that provides for passage.

ovi / duct
| |
ROOT ROOT
| |
egg to lead



Female reproductive system: ovary, fallopian tube, uterus, and vagina.

An oviduct is the uterine tube that provides for passage of a female egg.

Other times, a term is formed by the combination of a prefix and suffix.

meta / stasis
| |
PREFIX SUFFIX
| |
beyond, after, or change stop or stand

Metastasis refers to the spread of a disease, such as cancer, from one location to another.

PROGRAMMED REVIEW: Defining Medical Terms through Word Structure Analysis

ANSWERS	REVIEW
suffix, prefix root	**1.12** You can usually define a term by interpreting the _____ first, then the _____ (if present), and then the succeeding _____ or roots.
inflammation around the heart	**1.13** Pericarditis is defined as _____ _____.
combining form prefix	**1.14** Often a root or _____ _____ appears first in a medical term when a/an _____ is not used.

SELF-INSTRUCTION: Role of the Suffix in Defining Medical Terms

The suffix is the word component that gives essential meaning to a term by forming a noun, verb, or adjective. There are two basic types of suffixes: simple and compound. **Simple suffixes** form basic terms. For example, *-ic* (meaning pertaining to) is a simple suffix; combined with the root *gastr* (stomach), it forms the term gastric (pertaining to the stomach). **Compound suffixes** are formed by a combination of basic term components. For example, the root *tom* (to cut) combined with the simple suffix *-y* (denoting a process of) forms the compound suffix *-tomy* (incision). The compound suffix *-ectomy* (excision or removal) is formed by a combination of the prefix *ec-* (out) with the root *tom* (to cut) and the simple suffix *-y* (a process of).

Rx for Success

Noting the differences between simple and compound suffixes will help you analyze medical terms. This chapter introduces two simple suffixes (-al *and* -ic*) and several compound suffixes (*-emia, -tomy, -stomy, -ectomy, *and* -logy*). These suffixes, along with others in specific categories, will be highlighted in later chapters to create terms related to anatomy, symptoms, diagnoses, tests, surgeries, and therapies.*

Suffixes in this text are divided into four categories, as outlined below:

CATEGORY	FUNCTION	EXAMPLE
Symptomatic suffix	describes the evidence of illness	-spasm
Diagnostic suffix	identifies a medical condition	-emia, -itis
Surgical (or operative) suffix	describes a surgical treatment	-tomy, -stomy, -ectomy
General suffix	has general application, such as to form an adjective or noun	-al, -ic, -logy

PROGRAMMED REVIEW: Role of the Suffix in Defining Medical Terms

ANSWERS	REVIEW
compound, simple	**1.15** There are two basic types of suffixes: simple and _____. *-al* is an example of a/an _____ suffix.
symptomatic	**1.16** Suffixes that describe the evidence of disease are called _____ suffixes.
diagnostic	**1.17** *-emia* and *-itis* are examples of _____ suffixes.
operative -ectomy	**1.18** Surgical suffixes, also known as _____ suffixes, describe a surgical treatment. *-tomy*, *-stomy*, and _____ are examples of surgical suffixes.
pertaining to	**1.19** General suffixes, such as *-al* and *-ic*, meaning _____ ____, form adjective endings of terms.

SELF-INSTRUCTION: Rules for Forming and Spelling Medical Terms

Now that you understand the basic term components, the next step is to learn the rules for how to correctly form a medical term. Memorize the following rules and use them to construct terms in the Programmed Review section that follows:

1. A combining vowel (usually an "o" or "i") is used to join a root to another root or to a suffix that begins with a consonant. Example: *gastr/**o** + enter/**o** + -stomy* is spelled gastroenterostomy.
2. A combining vowel is not used before a suffix that begins with a vowel. Example: *vas/o + -**e**ctomy* is spelled vasectomy.
3. If the root ends in a vowel and the suffix begins with the same vowel, drop the final vowel from the root and do not use a combining vowel. Example: *cardi**i**/o + -**i**tis* is spelled carditis.
4. Occasionally, when a prefix ends in a vowel and the root begins with a vowel, the final vowel is dropped from the prefix. Example: *para**-** + **e**nter/o + -al* is spelled parenteral.

Rx for Success

You will encounter exceptions to these rules for forming and spelling medical terms. Follow the basic guidelines set forth in this text, but be prepared to accept exceptions as you encounter them. Rely on your medical dictionary for additional guidance.

PROGRAMMED REVIEW: Rules for Forming and Spelling Medical Terms

ANSWERS	REVIEW
o, i root suffix, consonant	**1.20** A combining vowel (usually a/an ____ or ____) is used to join a root to another _____, or to a/an _____ that begins with a/an _____.
gastroenterostomy creation of an opening (between) the stomach and small intestine	**1.21** *gastr/o + enter/o + -stomy* is spelled _____ and means _____ _____ _____.

not vowel	**1.22** A combining vowel is _____ used before a suffix that begins with a/an _____.
vasectomy excision or removal of a vessel	**1.23** *vas/o* + *-ectomy* is spelled _____ and means _____ _____ (the vessel of the vas deferens in the male).
drop do not	**1.24** If the root ends in a vowel and the suffix begins with the same vowel, _____ the final vowel from the root and _____ _____ use a combining vowel.
carditis inflammation of the heart	**1.25** *cardi/o* + *-itis* is spelled _____ and means _____ _____.
vowel prefix	**1.26** Occasionally, when a prefix ends in a vowel and the root begins with a/an _____, the final vowel is dropped from the _____.
hypoxemia blood condition of below or deficient oxygen	**1.27** *hypo-* + *ox/o* + *-emia* is spelled _____ and means _____ _____ _____.
gastrotomy incision in stomach	**1.28** *gastr/o* + *-tomy* is spelled _____ and means _____.
angitis inflammation of a vessel	**1.29** *angi/o* + *-itis* is spelled _____ and means _____ _____.

esophagospasm involuntary contraction of the esophagus	**1.30** *esophag/o* + *-spasm* is spelled _____ and means _____ _____.
ostectomy excision or removal of bone	**1.31** *oste/o* + *-ectomy* is spelled _____ and means _____ _____.
hematology study of blood	**1.32** *hemat/o* + *-logy* is spelled _____ and means _____.
gastric pertaining to the stomach	**1.33** *gastr/o* + *-ic* is spelled _____ and means _____.
parenteral, pertaining to alongside of the small intestine	**1.34** *para-* + *enter/o* + *-al* is spelled _____ and means _____ _____ _____.
pericarditis inflammation around the heart	**1.35** *peri-* + *cardi/o* + *-itis* is spelled _____ and means _____ _____.

SELF-INSTRUCTION: Rules of Pronunciation

When you are learning to pronounce medical terms, the task can seem insurmountable. The first time you open your mouth to say a term is a tense moment for those who want to get it right! The best preparation is to study the basic rules of pronunciation, repeat the words after hearing them pronounced in the Audio Glossary on this text's online site and/or after your instructor has said them, and try to spend time with others who use medical language. There is nothing like the validation you feel when you say something "medical" for the very first time and no one laughs or snarls at you! Your confidence will build with every word you use.

Study the following shortcuts to pronunciation:

Consonant Sounds	Example
c (before a, o, u) = k	cavity, company, cure
c (before e, i) = s	cell, city
ch = k	character
g (before a, o, u) = g	gain, good, guilt
g (before e, i) = j	generic, giant
ph = f	phase
pn = n	pneumonia
ps = s	psychology
pt = t	ptosis
rh, rrh = r	rhythm, diarrhea
x (as first letter) = z	xerosis

The phonetic spelling for the pronunciation of medical terms in this text is provided in summary lists at the end of chapters; these terms are also pronounced in the Audio Glossary on this text's online site. The phonetic system described here is basic and uses only a few standard rules. The macron and breve are the two diacritical (accent) marks used.

The macron (¯) is placed over vowels that have a long sound:

ā in day
ē in bee
ī in pie
ō in no
ū in unit

The breve (˘) is placed over vowels that have a short sound:

ă in alone
ĕ in system
ĭ in pencil
ŏ in oven
ŭ in sun

The primary accent (′) is placed after the syllable that is stressed when saying the word, for example, x′ray. Monosyllables (words with only one syllable) do not have a stress mark. Other syllables are separated by hyphens.

PROGRAMMED REVIEW: Rules of Pronunciation

ANSWERS	REVIEW	
t	**1.36**	The "pt" in ptosis has a/an ____ sound.
k	**1.37**	The "ch" in the word chronic has a/an ____ sound.
s	**1.38**	The "c" in the word citizen has a/an ____ sound.
z	**1.39**	The "x" in xiphoid has a/an ___ sound.
j	**1.40**	The "g" in genital has a/an ___ sound.
n	**1.41**	The "pn" in pneumatic has a/an ___ sound.
r	**1.42**	The "rrh" in hemorrhoid has a/an ____ sound.
f	**1.43**	The "ph" in pharmacy has a/an ____ sound.
g	**1.44**	The "g" in gurney has a/an ____ sound.
s	**1.45**	The "ps" in psychic has a/an ____ sound.
k	**1.46**	The "c" in cure has a/an ____ sound.

SELF-INSTRUCTION: Singular and Plural Forms

Most often, plurals are formed by adding "s" or "es" to the end of a singular form. The following are common exceptions for forming plurals of terms of Latin and Greek derivation. Study the exceptions in preparation for a review that follows.

Singular Ending	Example	Plural Ending	Example
-a	vertebra *vĕr′ tĕ-bră*	-ae	vertebrae *vĕr′ tĕ-brā*
-is	diagnosis *dī-ag-nō′ sis*	-es	diagnoses *dī-ag-nō′ sēz*

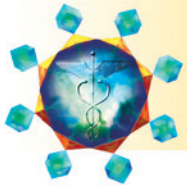
Singular Ending	Example	Plural Ending	Example
-ma	condyloma *kon-di-lō′ mă*	-mata	condylomata *kon-di-lō′ mah-tă*
-on	phenomenon *fĕ-nom′ĕ-non*	-a	phenomena *fĕ-nom′ĕ-nă*
-um	bacterium *bak-tēr′ē-yŭm*	-a	bacteria *bak-tēr′ē-ă*
-us*	fungus *fŭng′ gŭs*	-i	fungi *fŭn′ jī*
-ax	thorax *thō′ raks*	-aces	thoraces *thō-rā′ sēz*
-ex	*a*pex *ā′ peks*	-ices	apices *ap′ i-sēs*
-ix	appendix *ă-pen′ diks*	-ices	appendices *ă-pen′ di-sēz*
-y	myopathy *mī-op′ ă-thē*	-ies	myopathies *mī-op′ ă-thēz*

*The terms virus and sinus follow the usual rule of adding "s" or "es" to form the plural (viruses and sinuses) instead of using the Latin ending "i."

PROGRAMMED REVIEW: Singular and Plural Forms

ANSWERS	REVIEW
ovaries ova	**1.47** An ovum is an egg produced by an ovary. There are two _____ in the female that produce eggs, or _____.
metastases	**1.48** The spread of cancer to a distant organ is called metastasis. The spread of cancer to more than one organ is called _____.
verrucae	**1.49** A verruca is a wart. The term for several warts is _____.

condyloma	**1.50** Condylomata are genital warts. One genital wart is a/an _____.
index appendices	**1.51** Indices is a plural form of _____. More than one appendix is termed _____.
thrombi	**1.52** A thrombus is a clot. Several clots are termed _____.
bacteria	**1.53** A bacterium is a single-celled microorganism. The plural form of bacterium is _____.
viruses	**1.54** A virus is an infective agent. The term referring to more than one virus is _____.
thorax	**1.55** Thoraces is a plural form of _____.
a	**1.56** A singular term ending with *-on* is made plural by replacing these letters with a/an ____.



Examine Your Understanding

For the following terms, draw a line or lines to separate the prefixes (P), combining forms (CF), roots (R), and suffixes (S). Then, write the meaning of each component on the corresponding blank to define the term.

EXAMPLE

hyperlipemia

hyper/lip/emia

above or excessive / *fat* / *blood condition*

P R S

1. vasculitis

_____ / _____

R S

2. osteotomy

_____ / _____

CF S

3. hematology

_____ / _____

CF S

4. hypolipoproteinemia

_____ / _____ / _____ / _____

P CF R S

5. hypoxic

_____ / _____ / _____

P R S

6. enterostomy

_____ / _____

CF S

7. periosteal

_____ / _____ / _____

P R S

8. gastrectomy

_____ / _____

R S

9. vasospasm

_____ / _____

CF S

10. pericarditis

_____ / _____ / _____

P R S

Match the following examples of basic term components:

11. ____ *-emia*	a. root
12. ____ *lip/o*	b. combining vowel
13. ____ *hyper-*	c. suffix
14. ____ *protein*	d. prefix
15. ____ o	e. combining form

Circle the correct meaning for the following term components:

16. *para-*

a. around b. deficient c. alongside of d. excessive

17. *-al*

a. condition of b. study of c. alongside of d. pertaining to

18. *angi/o*

a. heart b. vessel c. small intestine d. blood

19. *hemat/o*

a. liver b. blood c. blood condition d. enlargement

20. *peri-*

a. around b. deficient c. alongside of d. excessive

21. *-ic*

a. pertaining to b. alongside of c. around d. incision

Briefly describe the difference between the following term components:

22. *peri-* vs. *para-* _____

23. *hypo-* vs. *hyper-* _____

24. *hem/o* vs. *-emia* _____

25. *-tomy* vs. *-stomy* vs. *-ectomy* _____

Circle the correct plural form for the following terms:

26. vertebra

a. vertebray b. vertebrases c. vertebrae d. vertebrus e. vertebraes

27. speculum

a. speculata b. speculumes c. specula d. speculae e. speculuma

28. fungus

a. fungi b. fungae c. funges d. funguses e. fungea

29. stoma

a. stomata b. stomatae c. stomes d. stomatus e. stomatum

30. diagnosis

a. diagnosa b. diagnoses c. diagnosses d. diagnosi e. diagnosae

31. radius

a. radii b. radiusos c. radiuses d. radia e. radiis

32. phenomenon

a. phenomenones b. phenomena c. phenomeni d. phenomenata e. phenomenae

Match the following types of suffixes:

33. ____ symptomatic a. *-ic*

34. ____ diagnostic b. *-ectomy*

35. ____ operative c. *-itis*

36. ____ general d. *-spasm*

Complete the following statements related to rules of term pronunciation:

37. The "pt" in pterygium has a/an _____ sound.

38. The "c" in the word cell has a/an _____ sound.

39. The "g" in generic has a/an _____ sound.

40. The "pn" in pneumonia has a/an _____ sound.

Combine the following components to correctly form medical terms:

41. *oste/o + -tomy* = _____

42. *vascul/o + -itis* = _____

43. *gastr/o + enter/o + -logy* = _____

44. *enter/o + -ic* = _____

45. *cardi/o + -spasm* = _____

Answers to Examine Your Understanding

1. vascul/itis
   vessel / *inflammation*
   R S
2. osteo/tomy
   bone / *incision*
   CF S
3. hemato/logy
   blood / *study of*
   CF S
4. hypo/lipo/protein/emia
   below or deficient / *fat* / *protein* / *blood condition*
   P CF R S
5. hyp/ox/ic
   below or deficient / *oxygen* / *pertaining to*
   P R S
6. entero/stomy
   small intestine / *creation of an opening*
   CF S
7. peri/oste/al
   around / *bone* / *pertaining to*
   P R S
8. gastr/ectomy
   stomach / *excision or removal*
   R S
9. vaso/spasm
   vessel / *involuntary contraction*
   CF S
10. peri/card/itis
    around / *heart* / *inflammation*
    P R S

11. c
12. e
13. d
14. a
15. b
16. c
17. d
18. b
19. b
20. a
21. a

22. *peri-* is a prefix meaning around, whereas *para-* is a prefix meaning alongside of or abnormal.
23. *hypo-* is a prefix meaning below or deficient, whereas *hyper-* is a prefix meaning above or excessive.
24. *hem/o* is a combining form meaning blood, whereas *-emia* is a suffix meaning blood condition.
25. *-tomy* is a suffix meaning incision; *-stomy* is a suffix meaning creation of an opening; and *-ectomy* is a suffix meaning excision or removal.

26. c
27. c
28. a
29. a
30. b
31. a
32. b
33. d
34. c
35. b
36. a
37. t
38. s
39. j
40. n
41. osteotomy
42. vasculitis
43. gastroenterology
44. enteric
45. cardiospasm