Contents at a Glance

In this part . . .

- An overview of the basic building blocks of learning terminology
- A background dossier on terminology and its history
- An introduction to root words
- A trip through the world of multiples and plurals
- Tips and tricks on pronunciation and usage

Your sensory system is all the "fun stuff" in your building. The windows, amenities, sound system, and dining facility all bring aesthetic delight to the building's inhabitants, and your senses work in a similar fashion.

It may be hard to imagine that words can describe all the amazing things your anatomy can do, but believe us when we say that it's all possible through terminology. And who knows? Perhaps there's a word out there that hasn't been created yet — until you came along.

All Systems Go

Once you get those basic working parts ingrained in your brain, you will move on to the physiology terminology. Physiology deals with the remaining body systems that help your fabulous body do its day-to-day work.

First up is the thing that keeps your blood pumping and your life moving forward each day: your heart. More specifically, the cardiovascular system. Your heart does not work in a vacuum. It has supporting players, namely your blood cells and vessels. These parts all work together to supply your body with fresh, clean, oxygenated blood.

Then there is the separate but complementary lymphatic system that works to flush your body of impurities. Most directly associated with immunity, the lymphatic system works in the same context as the cardiovascular system due to the similar makeup of the system and the fact that, once cleaned by the lymph nodes, lymphatic fluid is released directly into the bloodstream. Lymph vessels are arranged in a similar pattern as the blood vessels.

Speaking of oxygenating your blood, think about how that oxygen finds its way into your body. You may not consciously think about it every day, but breathing makes it all possible. The body's trillions of cells need oxygen and must get rid of carbon monoxide, and this exchange of gases is accomplished by the respiratory system. External respiration is the repetitive, unconscious exchange of air between the lungs and the external environment.

You have to breathe, but you also have to eat, and eating is way more fun. Your good buddy the gastrointestinal system helps turn those tasty meals and treats into usable energy for your body. Also called the alimentary or digestive tract, this system provides a tubelike passage through a maze of organs and body cavities, beginning at the mouth, the food entrance into the body, and ending at the anus, where solid waste material exits the body and your delicious Chinese takeout magically turns into . . . well, you know.

Moving on, the complicated endocrine system maintains the chemical balance of the body. It does this by sending chemical messengers called hormones throughout the body via the bloodstream. Hormones regulate and

Sprechen Sie terminology?

Medical terminology is like a foreign language to most people. In fact, it operates exactly like a foreign language if you have never encountered it before. Just as with practicing German (or any language, for that matter), you get the meaning of medical terms by breaking down each word into different parts:

- **Prefix:** Appears at the beginning of a word and tells the how, why, where, when, how much, how many, position, direction, time, or status.
- **Root word:** Specifies the body part to which the term refers.
- **Suffix:** Appears at the end of a word and indicates a procedure, condition, or disease.

Those are the bare bones, basic parts of every medical term. Each prefix, root, and suffix has its own meaning, so it's your job to remember them and put the three meanings together into one greater word meaning. It can be tricky, though, so proceed carefully until you are confident of individual part meanings.

As with languages, things aren't always what they seem. For example, if we use tonsillitis and appendectomy, we see that the suffix *-itis* always means "inflammation," no matter what root word precedes it. Similarly, the suffix *-ectomy* always means "surgical removal of." So when switching suffixes, *appendicitis* means "inflammation of the appendix," and *tonsillectomy* means "surgical removal of the tonsils."

For example, consider two terms commonly known to most people. *Tonsillitis* is a one-word medical term to describe "inflammation of the tonsils," and *appendectomy* is a one-word medical term to describe "surgical removal of the appendix." It's much easier to use one word than a long, drawn-out phrase to describe these conditions, don't you think?

Medical Terminology in the Real World

The need or desire to learn medical terminology is not limited to the health-care professionals. For example, a firefighter has to relay information to paramedics, such as the condition of a burn victim being placed in an ambulance. A police officer must complete a written report after delivering a baby in the back seat of a car. Or closer to home, think about trying to understand when a doctor tells you that your child needs surgery, or why an aging parent needs to be placed in a long-term care facility. Medical terminology allows you to convey the greatest quantity of information, with the least confusion and most precision, to anyone in the world. For example, saying someone has a badly broken wrist doesn't convey as much as saying someone has a Salter-Harris II fracture of the right distal radius with moderate lateral displacement and 28 degrees of anterior angulation. Now who's the coolest kid in the clinic?

In this book we outline roots, suffixes, and prefixes and include the anatomy for each body system to help you to understand how everything fits together. When in doubt, look at the table of contents and check a specific body system's chapter.

Changes in Medical Terminology

Medical language is an entity unto itself and followed a historical development. Common medical vocabulary used today includes terms built from Greek and Latin word parts, some of which were used by Hippocrates and Aristotle more than 2,000 years ago.

One type of medical term is the *eponym*, a term named after someone. An example would be Parkinson's disease, named after the English physician Dr. James Parkinson.

With the great advancements in medicine throughout the 20th century, medical language changed with the times and continues to do so today. Some words are discarded or considered obsolete, whereas others are changed, and new words are continually added.

Building on guidance from the Greek and Latin origins, medical terms began to be professionalized in the mid-1800s. *Dorland's Illustrated Medical Dictionary* was first published in 1890 as the *American Illustrated Medical Dictionary,* consisting of 770 pages, over 50 years after the first edition of *Webster's American Dictionary of the English Language.* Dr. William Alexander Dorland was the editor, and when he died in 1956 the dictionaries were renamed to include his name, thus they are known today as *Dorland's Illustrated Medical Dictionary.* Electronic medical publishing took off during the 1980s thanks to advancements in database publishing and electronic storage. In the mid-1990s, medical dictionaries — most notably from Dorland's, Stedman's, and Taber's — became available in electronic form with many various editions and publications available on disk, CD-ROM, and via Internet downloading. Check out Chapter 24 for a list of great resources.

It's Greek and Latin to Me

You can thank the two founding fathers of medical terminology for getting the ball rolling: Hippocrates and Aristotle. Hippocrates, considered the father of medicine, was a student, teacher, and great physician. Aristotle was a Greek philosopher and a physical scientist. He stressed observation and induction. His major studies were of comparative anatomy and physiology.

- Joint replacements and other surgical procedures
- Laparoscopic surgeries
- MRIs
- Organ transplants
- Stem-cell research

Today medical terminology is used and needed in any occupation that is remotely related to medicine and the normal functioning of the body. Here are a few careers involving the need for medical terminology:

- Athletic therapy
- Audiology
- Biomedical engineer
- Cytotechnology
- Dentistry and dental hygiene
- Emergency medical services
- Health records and health information technicians
- Massage therapy
- Medical statistics
- Medical transcription
- Nursing Home administrator
- Nutrition
- Occupational therapy
- Personal training
- Pharmacy
- Physical therapy
- Radiology technicians
- Speech language
- Veterinary medicine

All these applications exist in addition to the obvious groups of healthcare professionals who use terminology in their day-to-day activities, including associates, the medical secretary in a doctor's office, the insurance claims adjuster, even the compensation board adjudicator.

Table 3-1 ***(continued)***

Exterior Root	*What It Means*
Papill/o	Nipple
Pelv/o, pelv/i	Pelvis
Phall/o	Penis
Pil/o	Hair
Pod/o	Foot
Rhin/o	Nose
Somat/o	Body
Steth/o	Chest
Stomat/o	Mouth
Tal/o	Ankle
Tars/o	Foot
Thorac/o	Chest / Thorax
Trachel/o	Neck or necklike
Trich/o	Hair or hairlike
Ventr/i, ventr/o	Front of body

Copycats and opposites

Some prefixes might look very different but have the same meaning. Here are some examples:

- *Anti-* and *contra-* mean against.
- *Dys-* and *mal-* mean bad or painful.
- *Hyper-*, *supra-*, and *epi-* all mean above.
- *Hypo-*, *sub-*, and *infra-* all mean below.
- *Intra-* and *endo-* mean within.

However, other, more troublesome prefixes mean the opposite of each other even though they look or sound similar. These are contentious prefixes:

- *Ab-* means away from (abduct), but *ad-* means toward.
- *Ante-*, *pre-*, and *pro-* mean before, but *post-* means after.
- *Hyper-*, *supra-*, and *epi-* mean above, but *hypo-*, *infra-*, and *sub-* mean below.
- *Macro-* means large, while *micro-* means small.
- *Tachy-* means fast, but *brady-* means slow.
- *Hyper-* also means excessive, yet *hypo-* also means deficient.

Deriving a Plural the Medical Way

As you read earlier in this chapter, medical plurals are a bit different from the standard, everyday English variety. Read on to familiarize yourself with the nuances of medical plural building.

Medical rules for forming plurals

Some rules for pluralizing medical terms are as follows, with examples of the rule and exceptions to the rule.

Medical Rule 1: Change the a ending to ae

In other words, *vertebra* becomes *vertebrae*.

By adding the e to the plural, the "aah" sound ending pronunciation becomes "eh."

- Axilla, axillae
- Bursa, bursae
- Conjunctiva, conjunctivae
- Scapula, scapulae
- Sclera, sclerae

Medical Rule 2: Change the um ending to a

The *a* at the end is pronounced "aah."

- Acetabulum, acetabula
- Antrum, antra
- Atrium, atria
- Bacterium, bacteria
- Diverticulum, diverticula
- Labium, labia
- Medium, media

Medical Rule 3: Change the us ending to i

The *i* at the end is pronounced "eye."

- Alveolus, alveoli
- Bronchus, bronchi

Medical Rule 6: When a term ends in yx, ax, or ix, change the x to c and add es

- Appendix, appendices
- Calyx, calyces
- Calix, calices (Strange but true, both are correct)
- Thorax, thoraces

Medical Rule 7: When a term ends in nx, change the x to g and add es

- Larynx, larynges
- Phalanx, phalanges

Medical Rule 8: For Latin medical terms that consist of a noun and adjective, pluralize both terms

- Condyloma acuminatum, condylomata acuminata
- Placenta previa, placentae previae
- Verruca vulgaris, verrucae vulgares

There are (of course!) some exceptions to all these rules:

- Cornu, cornua
- Pons, pontes
- Vas, vasa

English rules of forming plurals

Many medical terms apply basic English rules for forming plurals. Thank goodness! You will no doubt recognize many of these common English language plural rules.

English Rule 1: Add an s

- Bronchoscope, bronchoscopes
- Disease, diseases
- Endoscope, endoscopes
- Finger, fingers
- Vein, veins

Table 4-3 *(continued)*

Word	*What It Means*
Anuresis	Retention of urine in the bladder
Enuresis	Bed-wetting
Apparent	Clear, obvious
Aberrant	Off course, abnormal
Aural	Pertains to the ear
Oral	Pertains to the mouth
Callous	Hard like a callus, hardened thinking
Callus	Hardened area of skin
Carotid	Artery
Parotid	Gland
Cecal	Pertains to the cecum
Fecal	Pertains to feces
CNS	Central nervous system (abbreviation)
C&S	Culture and sensitivity (lab test)
Discreet	Reserved or private
Discrete	Separate
Dysphagia	Difficulty eating or swallowing
Dysphasia	Difficulty speaking
Effusion	Escape of fluid into tissue
Infusion	To introduce fluid into vein or tissue
Eczema	A type of dermatitis
Exemia	Loss of fluid from blood vessels

Chapter 5

Say What? Pronunciation and Usage

In This Chapter

- Simplifying your pronunciation methods
- Distinguishing prefix sounds from suffix sounds
- Applying pronunciation tips to everyday usage and word building

If you read Chapter 4, you now have a better idea of how medical terms are formed. But unless you work on the set of a silent medical movie, you're going to have to learn how to pronounce these words. Even the Hollywood hotshots who rush around the sets of *Grey's Anatomy* and *Nurse Jackie* have to learn how to say medical terms, and are paid well to do it convincingly. Though you may not net seven figures for shouting, "Get an MRI of this man's duodenum and jejunum, stat!" you will fit right in with your medical counterparts by knowing the correct way to pronounce medical terms.

Hooked on Phonics

With medical terminology, sounds are not always pronounced the same as in your everyday English pronunciation, and there are not even steadfast rules that a combination of specific letters will always be pronounced in the same way. One thing that helps in both the standard English and medical worlds, though, is to learn how to pronounce *phonetically* — by breaking up word sounds into smaller parts.

The variety of possible letters and sound combinations can make — or at least can seem to make — medical terms difficult to pronounce, especially if you've never seen or heard the term before. What may seem familiar to you from everyday English might take on a whole new sound in a med term.

Terms ending in *ae* (again often plurals) are pronounced "ay" (or sometimes "eh")

Example:

Vertebra, vertebrae: (VERT-e-bray)

In terms ending in *es* (you guessed it — often plurals), the *es* is pronounced as if it were a separate syllable.

Examples:

Naris, nares: (nar-EEZ)

Testis, testes: (test-EEZ)

Pronouncing Common Combinations

Now that you have established a few pronunciation rules, consider what happens to the pronunciation of a term when you combine a prefix with a root word or combining form, together with a suffix, and often a combining vowel. The combinations are endless.

Keep a few simple explanations in mind before you start combining word parts. To review:

- **Prefix:** Always at the beginning of a term. Modifies the word root that it precedes. It almost always indicates a location, number, time or period of time, or status.
- **Word root/combining form:** Usually indicates a body part, such as *cardi/o* for heart, *gastr/o* for stomach, and *neur/o* for nerve.
- **Suffix:** Appears at the end of a medical term. Usually, though not always, indicates a condition, procedure, disorder, or disease.

A *combining vowel* can be used to change the spelling of a term, making the pronunciation easier. A combining vowel is *not* used when the suffix begins with a vowel because this would make pronunciation difficult. A combining vowel is only used when the suffix begins with a consonant. For example, *gastr/o* pertains to the stomach. Adding the suffix *-itis,* meaning inflammation, results in the term *gastritis* (GAS-TRY-tis). If the combining vowel *o* were not removed, the result would be *gastroitis* creating a double vowel and a word more difficult to pronounce (GAS-TRO-it-is).

Terminology treasure hunting in the dictionary

It is important to remember that not every medical term you see or hear may appear in a medical dictionary as it is commonly spelled or pronounced. With so many root words, prefixes, and suffixes, the possible combinations would be endless, and the medical dictionary would become a set of encyclopedias. So when trying to find a term in a medical dictionary, you might have to look under the root word first and the prefix and suffix separately. Most commonly used terms are now listed alphabetically, but just because you can't find a term in the dictionary right away doesn't mean it doesn't exist. It just means you might have to piece together your own definition.

Even the more grounded basis of a word, the root or combining form, can change the way you say and see words. The combining vowel in particular, can change the meaning and pronunciation.

- **Arthritis (ar-THRI-tis):** Inflammation of a joint (arthr/o)
- **Arthropathy (ar-THROP-a-thee):** A condition of a joint
- **Arthroplasty (AR-thro-plas-tee):** Surgical repair of a joint
- **Neuritis (noo-RYE-tis):** Inflammation of a nerve (neur/o)
- **Neuropathy (noo-ROP-a-thee):** A condition of a nerve
- **Neuroplasty (NOOR-o-plas-tee):** Surgical repair of a nerve

What Condition Your Condition Is In

Pronouncing terms for conditions can be easy if you familiarize yourself first with the root word of the condition, and then with the suffix. Let's use the simple, everyday stomach ailment as an example. By first pronouncing the root word, then adding different suffixes, you can up your vocabulary by a few points:

- **Gastro (GAS-troh):** Stomach
- **Gastritis (gas-TRY-tis):** Inflammation of the stomach (-itis)
- **Gastrodynia (gas-troh-DYNE-ee-ah):** A pain in the stomach (-dynia)
- **Gastropathy (gas-TROP-a-thee):** A stomach condition (-pathy)

- My**algia:** Muscle pain
- Nephr**osis:** Kidney condition
- Ortho**pnea:** Inability to breathe properly except in an upright position
- Osteo**penia:** Deficiency in bone mass
- Photo**phobia:** Visual intolerance of light
- Quadri**plegia:** Paralysis of all four quadrants of the body
- Spleno**megaly:** Enlargement of the spleen
- Trache**ostomy:** Artificial opening into the trachea; follows a tracheotomy

In the doctor's office and hospital

- Abdomino**plasty:** Plastic surgery on the abdomen
- Amnio**centesis:** Procedure to withdraw fluid from amniotic sac during pregnancy
- Appendec**tomy:** Surgical removal of appendix
- Broncho**scope:** Instrument used to perform a bronchoscopy
- Cardio**gram:** Hard copy record of cardiography
- Cardio**graph:** Machine used to perform a cardiography
- Cardio**graphy:** Process of recording activity of the heart
- Hernio**rrhaphy:** Surgical fixation or repair of a hernia
- Hysterec**tomy:** Surgical removal of uterus
- Laparo**scope:** Instrument used to perform a laparoscopy
- Lapar**otomy:** Cutting into the abdomen
- Mammo**graphy:** Process of examination of breast tissue
- Myo**rrhaphy:** Suture or fixation of a muscle
- Myo**rrhexis:** Suturing of a ruptured muscle
- Naso**plasty:** Repair of deviated nasal septum
- Oste**otomy:** Cutting into bone
- Psych**ologist:** Person who studies psychology
- Rhino**plasty:** Nose job
- Trache**otomy:** Cutting into the trachea
- Urethro**pexy:** Surgical fixation of the urethra

Chapter 8

Hey, I Know You: Word Recognition

In This Chapter

- Appreciating Greek and Latin origins
- Surveying terms describing the body's interior
- Checking out terms covering the body's exterior
- Looking at pathological terms

Getting the hang of medical prefixes, roots, and suffixes is just the beginning of reaching your goal of becoming a terminology expert. Once you do that, you can move on to general word recognition.

Root words remain the basic component of word building, and you can look directly to them to recognize all sorts of words that associate with specific body parts and regions. Because you have spent so much time going over these individual building blocks, you can now begin to use what you know to piece together the larger puzzle of knowing whole words.

Blame it on Aristotle and Hippocrates. Approximately 75 percent of all medical terms are based on Latin or Greek terms.

The Inside Story: Terms for Your Interior

Inside all these cavities, of course, lies a bounty of body part-related medical terms. All the root words and combining forms from Chapter 3 (and Chapters 6 and 7) can morph into all kinds of different words that explain everything from everyday common conditions and procedures to pathology and pharmacology.

Remember that you can take any root word or combining form and create several different medical terms.

Table 8-1 lists many examples of where these root words can take you on your medical terminology journey.

Table 8-1 Interior Affairs

Root Word	*What It Means*	*Example(s)*
Abdomin/o	Abdomen	Abdominoplasty: Surgical repair or reconstruction of the abdomen
Angi/o	Vessel	Angioplasty: Surgical repair or reconstruction of a vessel
Arteri/o	Artery	Arterioplasty: Surgical repair or reconstruction of an artery
Arthr/o	Joint	Arthritis: Inflammation of a joint Arthroplasty: Surgical repair or reconstruction of a joint
Audi/o	Hearing	Audiometry: Measurement of hearing using an audiometer
Bio	Life	Biology: The study of life and living organisms
Bronch/i, bronch/o	Bronchus/lung	Bronchitis: Inflammation of the bronchi Bronchoscopy: Visual examination of the bronchi
Cardi/o	Heart	Cardiomegaly: Enlargement of the heart Cardiac: Pertaining to the heart Carditis: Inflammation of the heart
Cholecyst/o	Gallbladder	Cholecystectomy: Removal of the gallbladder Cholecystitis: Inflammation of the gallbladder
Chondr/i, chondr/o	Cartilage	Chondromalacia: Softening of cartilage
Col/o	Colon	Colonoscopy: Visual examination of the colon Colonoscope: Instrument used in colonoscopy
Cry/o	Cold	Cryobiology: Branch of biology dealing with effects of low temperatures

Table 8-1 ***(continued)***

Root Word	*What It Means*	*Example(s)*
Hepat/o, hepatic/o	Liver	Hepatitis: Inflammation of the liver
Heter/o	Other, different	Heterosexual: Sexually attracted to the opposite sex
Hist/o, histi/o	Tissue	Histology: Study and function of tissue
Hom/o, home/o	Same, alike	Homosexual: Sexually attracted to the same sex
Hydr/o	Water, wet	Hydromassage: Massage by means of moving water
Hyster/o	Uterus	Hysterectomy: Surgical removal of the uterus
Ile/o	Ileum (intestine)	Ileostomy: Artificial opening into the ileum Ileitis: Inflammation of the ileum
Ili/o	Ilium (pelvic bone)	Ilioinguinal: Pertaining to the ilium and inguinal regions
Jejun/o	Jejunum	Jejunitis: Inflammation of the jejunum Jejunostomy: Artificial opening into the jejunum
Lacrima	Tears	Lacrimatory: Causing a flow of tears
Laryng/o	Larynx	Laryngitis: Inflammation of the larynx Laryngectomy: Surgical removal of the larynx
Leuk/o	White	Leukocyte: White blood cell
Lith/o	Stone or calculus	Lithotripsy: Crushing of a stone or calculus
Men/o	Menstruation	Menorrhea: Menstrual flow Menorrhagia: Excessive or heavy menstrual flow
Myel/o	Bone marrow/ spinal cord	Myelogram: Recording of the spinal cord
My/o	Muscle	Myositis: Inflammation of a muscle Myalgia: Pain in a muscle or painful muscle

Table 8-2 ***(continued)***

Root Word	*What It Means*	*Example(s)*
Odont/o	Teeth	Odontalgia: Toothache
Onych/o	Nails	Onychophagia: Habit of biting the nails
		Onychomalacia: Softening of the nails
Ophthalm/o, ocul/o	Eyes	Ophthalmologist: Physician studying eyes and treatment of eye disease
Optic/o, opt/o	Seeing, sight	Optician: One who fills the ophthalmologist's prescription for corrective eyeglasses
Or/o	Mouth	Oral: Pertaining to the mouth and tongue
Ot/o	Ear	Otitis media: Inflammation of the middle ear
		Otodynia: Earache
Pelv/o	Pelvis	Pelvimetry: Measurement of dimensions and capacity of the pelvis
Pod/o	Foot	Podarthritis: Inflammation of the joints of the foot
Rhin/o	Nose	Rhinoplasty: Nose job
		Rhinorrhea: Discharge of mucus from the nose (runny nose)
Stomat/o	Mouth	Stomatitis: Inflammation of the oral mucosa or lining of the mouth
Thorac/o	Chest	Thoracentesis: Surgical puncture into the chest cavity
		Thoracotomy: Surgical incision into the chest cavity

Pathological Conditions

Any medical term can be used in everyday settings like the doctor's office or hospital. Some, such as those in Table 8-3, specifically detail the different kinds of pathological conditions associated with root words.

form of heart disease. *Neurology,* then, is the study of nerves or the nervous system, and the *neurologist* is the physician who specializes in neurology. Any disease of the nervous system or the nerves is *neuropathy.*

Going Deeper into Suffixes

Check out some more suffix examples. Suffixes related to procedures include *-centesis,* referring to surgical puncture to remove fluid for diagnostic purposes or to remove excess fluid. That means *abdominocentesis* is surgical puncture of the abdominal cavity.

Want to talk about removing something? The suffix *-ectomy* means "surgical removal of." When you see *-ectomy* at the end of any term, no matter how long or how difficult or confusing the first part of the word is, it means surgical removal of something. Another term we all know that ends in *-ectomy* is *appendectomy,* surgical removal of the appendix.

But sadly, it's not always that easy. Take a look at a more complicated word and then break it down. How about the word *salpingo-oophorectomy?* The *-ectomy* we know indicates the surgical removal of something. But what? *Salpingo* is the root word referring to the fallopian tube; *oophoro* is the root word for ovary. Therefore, *salpingo-oophorectomy* is surgical removal of a fallopian tube and ovary. Surgical removal of an ovary only would be *oophorectomy.* Surgical removal of a fallopian tube only would be *salpingectomy.*

The eagle eyes among you may have noticed this: There is a hyphen in salpingo-oophorectomy. This is there mainly to aid with pronunciation and to avoid a triple "o" vowel with the combining of the two roots. The word can also be expressed as *oophorosalpingectomy,* which means the same thing.

Another suffix related to procedures is *-graphy,* meaning the process of recording a picture or a record. *Radiography* is the process of recording a picture by radiograph or an x-ray. Suffixes *-gram* and *-graph* are used to describe the finished product, the recording or picture. An *arteriography* is the process of recording the picture of arteries. The *arteriogram* or *arteriograph* is the film that is produced by the arteriography. The suffix *-ostomy* means to surgically create an artificial opening or *stoma.* A *colostomy* is a surgical creation of an opening between the colon and the body surface. The root word *colo* means colon. The suffix *-otomy* means "surgical cutting into," or a surgical incision. In order, then, to perform a *tracheostomy* (the surgical creation of an opening in the trachea), a *tracheotomy* (the surgical incision into the trachea) must be performed.

It is important to know the difference between "ostomy" and "otomy" — there is only one letter difference, but a big difference in the meaning.

When referring to the front of the body, the terms *anterior* and *ventral* are used. When referring to the back of the body, it's *posterior* and *dorsal.* With the waistline of the anatomical position as a guideline, above the waistline is referred to as *cephalad* ("head" or "upward") or *superior* ("above"). Below the waistline is referred to as *caudal* ("tail" or "downward") or *inferior* ("below"). Superior and inferior are also used to describe body parts in relation to one another in general.

The sides of the body are referred to as *lateral,* and the middle referred to as *medial.* The term *distal* refers to "away from the point of origin" (think of distance). *Proximal* refers to "nearest the point of origin" (close proximity). Distal and proximal are two directional terms that seem to pose problems. View the torso of the body as the point of origin. Using the arm as an example, the proximal portion of the arm is where the arm joins the shoulder. The distal, or away-from, portion of the arm would be the hand. In the leg, the upper thigh would be the proximal portion of the leg, and the foot would be the distal portion of the leg.

Directional terms can be joined together to provide a combined form. *Ipsilateral* pertains to one side, whereas *mediolateral* is a directional term meaning pertaining to the middle and one side (such as right mediolateral pain). It is often used in medical exams and surgical procedures. Here's one use of mediolateral: A right mediolateral abdominal incision would be an incision beginning at the middle of the abdomen and going toward the right side. A similar term is *lateromedial.* A lateromedial incision would be the same as a mediolateral one, but beginning from the side and going toward the middle.

Table 10-3 lists some root words that pertain to directional terms.

Table 10-3 Directional Roots

Root Word	*What It Means*
Anter/o	Front
Caud/o	Tail or downward
Cephal/o	Head or upward
Dist/o	Away from (distant) the point of origin
Dors/o	Back
Infer/o	Below
Later/o	Side
Medi/o	Middle
Poster/o	Back or behind
Proxim/o	Near to (proximity) the point of origin
Super/o	Above
Ventr/o	Front or belly

The anatomical divisions of the abdomen are referenced in anatomy textbooks to specify where certain organs are found.

The clinical regions of the abdomen are used to describe the abdomen when a patient is being examined. The clinical regions of the abdomen divide the abdominal area, as above, into four equal quadrants:

- **The right upper quadrant (RUQ)** contains the right lobe of the liver, gallbladder, and parts of the small and large intestines.
- **The left upper quadrant (LUQ)** contains the left lobe of the liver, stomach, pancreas, spleen, and parts of the small and large intestines.
- **The right lower quadrant (RLQ)** contains parts of the small and large intestines, appendix, right ureter, right ovary, and fallopian tube.
- **The left lower quadrant (LLQ)** contains parts of the small and large intestines, left ureter, left ovary, and fallopian tube.

Table 10-4 provides a quick look at some of the smaller body regions, beginning at the head and moving downward.

Table 10-4 Small But Mighty Body Regions

Region	*Where It Is*
Auricular region	Around the ears
Axillary	Axillae (armpits)
Buccal	Cheeks of the face
Carpal	Wrist
Cervical	Neck
Clavicular	On each side of the suprastemal notch (small dip at top of the sternum)
Infraorbital	Below the eyes
Infrascapular	On each side of the chest, down to the last rib
Interscapular	On the back, between *scapulae* (shoulder blades)
Lumbar	Below the infrascapular area
Mammary	Breast area
Mental	Region of the chin
Nasal	Nose
Occipital	Lower posterior head

(continued)

You've got connections

The *hypopharynx* is a common passageway for both food and air to travel to their final destinations. Air taken through the nose to the larynx produces the voice. The *trachea* (windpipe) connects the larynx to a right and left *bronchus,* just above the lungs. The bronchi break down into smaller branches called *bronchioles* that lead into small clusters resembling grapes. These grapelike sacs are called *alveoli,* of which there are approximately 300 million in healthy lungs, surrounded in *capillaries*. Oxygen moves from alveoli into the lung capillaries surrounding them to be exchanged via the bloodstream throughout the body. Carbon dioxide moves from the capillaries into the alveoli to be expelled by the lungs.

Ventilation (breathing) is a process that again is looked after automatically by the nervous system. You don't have to consciously think about breathing. When you breathe in *(inspiration),* all passageways are opened to allow the air entry. The *diaphragm,* a large muscle separating the chest cavity from the abdominal cavity, pushes down and the ribs move up to give the lungs lots of room to expand. Air pressure within the lungs decreases and air comes in. When you breathe out *(expiration),* the diaphragm moves up, the rib cage comes down, lung pressure increases, and air is pushed out.

The lungs are contained in the *thoracic cavity* that divides into the pleural and mediastinum cavities. The *pleural cavity* surrounds the lungs, and the *mediastinal cavity* between the lungs holds the heart, trachea, and esophagus. The right lung consists of three *lobes,* and the left lung two lobes. The cavities are the *pleural* and *mediastinum,* but when referring to the area in general you should say *mediastinal cavity,* even though the area is referred to as the mediastinum.

The gastrointestinal system

The *gastrointestinal system* (also called the *digestive system* or *alimentary tract*) has three functions: to digest food, absorb nutrients, and carry waste materials to be eliminated. Except for the processes of swallowing food and having a bowel movement, this system pretty much looks after itself for everything that happens in between.

We chew food, which we swallow, that goes into the esophagus and then into the stomach. The stomach partially digests the food before it moves on to the *small intestine* (also called small bowel) for further digestion and absorption. The residual food moves into the *large intestine* (large bowel) where it is doomed to be eliminated as solid waste. Except for the pharynx (throat) and esophagus, all gastrointestinal organs are in the abdominal cavity, often referred to as the *gut* or *belly.*

The *thyroid gland* secretes two hormones that are necessary for the body to maintain a normal rate of metabolism. The *parathyroid glands* secrete a hormone that moves the storage of calcium from bone into the blood (to maintain adequate levels of calcium in the bloodstream).

The *adrenal glands* are made up of the cortex and medulla. The *cortex* secretes *steroids* and mineral *corticoids,* which are essential to life because they regulate the levels of mineral salts, or *electrolytes.* In fact, all adrenal hormones secreted by the cortex are steroids. These include mineralocorticoids, which regulate potassium, sodium and chloride (electrolytes) and glucocorticoids (which includes cortisol) that aids in metabolism of carbohydrates, fat and proteins (tissues release glucose to raise blood sugar levels when needed).

The *adrenal medulla* secretes catecholamines only, such as epinephrine (adrenaline) and norepinephrine (noradrenaline), which aid the body in stressful situations.

The pancreas has specialized cells called the *islets of Langerhans.* They produce insulin and *glucagon,* which stimulates *gluconeogenesis,* or sugar production, in the liver. *Insulin* is necessary in the blood so sugar can pass from the blood into cells. The *pineal gland* secretes melatonin, thought to affect the brain, help regulate sleep patterns, and influence the rate of gonad maturation.

The endocrine glands all play a part in this large orchestra to maintain the harmonious music of the body. The hypothalamus and pituitary are the orchestra leaders of this complex system, which needs to function properly to maintain good health.

The three little systems

The *central nervous system* includes the brain and spinal cord. The *peripheral nervous system* consists of *cranial* and *spinal nerves,* or all the nerves that branch out from the brain and spinal cord. Impulses are sent to and from the brain via a vast network of nerves. The peripheral system consists of nerves that operate automatically, sending impulses from the central nervous system to glands, the heart, and blood vessels as well as the involuntary muscles in the digestive and urinary systems. This autonomic system also contains sympathetic nerves that stimulate the body when under stress or in a crisis, to increase blood pressure and heart rate.

Table 12-4 ***(continued)***

Word	*What It Means*
Red bone marrow	Found in cancellous bone, the site of hematopoiesis
Scoliosis	Abnormal lateral curvature of the spine
Subcostal	Below the ribs
Tendinitis or tendonitis	Inflammation of a tendon
Tendon	Connective tissue binding muscles to bones
Tenodynia	Pain in a tendon
Tenosynovitis	Inflammation of the tendon and synovial membrane
Trabeculae	Supporting bundles of bony fibers in cancellous or sponge bone
Trochanter	Large process behind the neck of the femur
Tubercle	Small rounded process on a bone
Tuberosity	Large rounded process on a bone
Yellow bone marrow	The fatty tissue found in the diaphyses of long bones

Common Skeletal Conditions

Breaks, sprains, and bunions are no fun. Many of the most common maladies associated with the skeletal system involve the application of casts or other corrective devices. Good, old-fashioned *fractures* (a sudden break of the bone) top the list of skeletal conditions. Whether a result of an auto accident or just plain clumsiness (come on, like you didn't see that curb jump out at you!), any bone in your body is a potential break waiting to happen.

You are probably familiar with many common bone conditions because you've likely experienced one of them.

- **Bunion** is an abnormal prominence with bursal swelling at the metatarsophalangeal joint near the base of the big toe.
- **Bursitis** is an inflammation of a bursa. Tennis elbow is an example of bursitis of the olecranon bursa.
- **Dislocation** is a displacement of a bone from its joint. Dislocations may be reduced or restored to their normal condition and the joint immobilized with sling or strapping for healing of torn ligaments and tendons.
- **Sprain,** everyone's favorite, is trauma or injury to a joint with pain, swelling, and injury to ligaments.

Chapter 13

Getting Ripped: The Muscular System

In This Chapter

- Finding out how your muscular system works
- Determining root words, prefixes, and suffixes appropriate to this system
- Using terminology of the muscular system to discuss common conditions and diseases
- Finding the right terms to use when diagnosing problems

Think about this the next time you hit the gym: Your body is the proud owner of more than 600 muscles! Luckily, you don't have to pump a different weight machine to work every single one. The beauty of the muscular system is that it is, in fact, a system in which different major muscle groups work together at the same time.

So relax and don't stress too much about that rowing machine. You're using muscles right now reading this book.

How the Muscular System Works

The *musculoskeletal* system is made up of muscles and joints. The muscles — all 600 of them and more — are responsible for movement. The skeleton provides attachment points and support for muscles, but it's the muscle tissue's ability to extend and contract that makes movement happen. So, for every climb of the elliptical machine, you can thank muscular tissue for making it possible.

Muscles make up the major part of fleshy portions of the body and account for one half of body weight. Muscles vary in proportion to body size, and the shape of the body is determined by muscles covering bones.

Testing, Testing: Muscular Radiology and Diagnostic Tests

Though the list of muscular conditions and diseases is quite long, there are some simple diagnostic tests doctors can perform to diagnose most muscular ailments.

- **Electromyogram (EMG)** is a record of electric activity in a muscle. This procedure is done to diagnose carpal tunnel syndrome. *Electromyography* is an electrical recording of activity in a muscle.
- **Isokinetic dynamometry:** A test to measuring the degree of muscular power using an instrument called a dynamometer.
- **MRI (magnetic resonance imaging):** The gold standard for making pictures of soft tissues such as fascia, tendons, ligaments, and muscle.
- **X-ray:** Picture of the bones.

Paging Dr. Terminology: Muscular Surgeries and Procedures

Now that your muscles have been poked, prodded, tested, and diagnosed, it's time to fix what's broken. Most of these procedures are surgical in nature.

Many surgeries are performed arthroscopically, through a scope inserted into or near a joint space, with one lone endoscope, *Palmar uniportal endoscopic carpal tunnel release.* This is also called a *Mirza technique,* an endoscopic method for release of carpal tunnel, previously accomplished by open surgery.

The surgical players are

- **Fasciectomy:** Excision of fascia (fibrous band or membrane of tissue surrounding muscle)
- **Fasciodesis:** Surgical fusion or binding of muscle fascia
- **Fasciotomy:** Surgical cutting into muscle fascia
- **Myolysis:** Surgical breaking down or separation of a muscle
- **Myoplasty:** Surgical repair of a muscle
- **Myorrhaphy:** Suturing of a muscle
- **Tenodesis:** Surgical fixation of a tendon

Glands, Both Sebaceous and Sudoriferous

The skin has two types of glands that, as accessory organs, produce important secretions. These glands under the skin's surface are called the sebaceous (oil) glands and the sudoriferous (sweat) glands.

The *sebaceous* glands produce an oily secretion called *sebum,* whereas the *sudoriferous* glands produce a watery secretion called *sweat.* Sebum and sweat are carried to the outer edges of the skin by ducts and excreted through openings in the skin called *pores.* Sebum helps lubricate the skin. Sebaceous glands are closely associated with hair follicles, and their ducts open into the hair follicle through which the sebum is released.

Sebaceous glands are influenced by sex hormones. This causes them to be overactive at puberty and underactive in old age. This explains the excess oil production of the skin at puberty and gradual drying of the skin as we age.

Sudoriferous (sweat) glands are tiny coiled glands found on almost all body surfaces. You have about 2 million of them in your body. There are many more in the palms of the hands and you'd find approximately 3,000 glands per square inch on the sole of your foot. The tiny openings on the surface are called *pores.* Sweat helps cool the body as it evaporates from the skin surface. Nerve fibers under the skin detect pain, temperature, pressure, and touch. The adjustment of the body to its environment depends on the sensory messages relayed to the brain and spinal cord by the sensitive nerve endings in the skin.

Diaphoresis comes from the Greek *dia,* meaning "through," and *phoreo,* meaning "I carry." Translated, it means "the carrying through of perspiration."

Stinking it up: Your sweat glands

Sweat gets a bad rap for being smelly when, in fact, it's not your fault. Your body's smell is caused by bacteria. Sweat or perspiration is almost pure water, with dissolved materials such as salt making up less than 1 percent of its total composition. Sweat is actually colorless and odorless. The odor produced when sweat accumulates is due to the action of bacteria on it.

Certain sweat glands, active only from puberty onward and larger than ordinary sweat glands, are concentrated near the reproductive organs and in the *axillae* (armpits). These glands secrete an odorless sweat that contains substances that are easily broken down by skin bacteria. The breakdown products are responsible for the characteristic "human body odor." So the next time someone tells you your sweat stinks, you can say, "I beg to differ. My bacteria are the culprits."

The *ceruminous glands* are classified as modified sweat glands and are found in the ear canal. These glands produce a yellow waxy substance called *cerumen* (ear wax).

Root Word	*What It Means*
Papill/o	Nipplelike
Pil/o	Hair
Py/o	Pus
Rhytid/o	Wrinkle
Sclera/o	Hardening
Seb/o	Sebum (fat)
Squam/o	Scale
Steat/o	Fat, sebum
Trich/o	Hair
Xer/o	Dry
Xanth/o	Yellow

Herpes comes from the Greek word *herpo*, meaning "to creep along." It is descriptive of the course and type of skin lesion as with herpes zoster (shingles).

Table 14-2 lists prefixes and suffixes pertaining to your hair, nails, skin, and glands.

Table 14-2 Common Integumentary Prefixes and Suffixes

Prefix	*What It Means*
Epi-	On, over, upon
Para-	Beside, beyond, around
Per	Through
Sub-	Under, below
Suffix	***What It Means***
-itis	Inflammation
-malacia	Softening
-opsy	View of, viewing
-orrhea	Flow, excessive discharge
-phagia	Eating or swallowing
-plasty	Surgical repair

Chapter 15

It Depends on Your Perception: The Sensory Systems

In This Chapter

- Seeing how your sensory system works
- Ferreting out root words, prefixes, and suffixes appropriate to this system
- Using terminology of the sensory system to discuss common conditions and diseases
- Sensing the right terms to use when diagnosing problems

You can thank your sensory systems for all the fun you get to have in life. While your other, also very important, systems handle the background work that keeps you running, the senses let your body have a little fun. What you see, hear, smell, touch, and taste makes life the enjoyable experience it is. So the next time you're smelling some truly fantastic barbecue or watching a dazzling fireworks display, be grateful for your senses.

The Eye

For humans, the eye is the most important sense organ — the Big Kahuna of the senses. Sight provides the most information for us, for what we see, of course, but that includes what we can read. The eye is located in the *orbit* (the bony protective cavity of the skull). The eye lets light in, focuses it, transforms it into nerve impulses, and sends these impulses to the brain.

Here's how: Light rays enter the eye via an adjustable opening, the dark center of the eye, called the *pupil,* which regulates the amount of light allowed in. Behind the pupil is the *lens,* which focuses the light. The lens is not rigid and it can adjust its shape in order to adapt to near and far objects. The light is focused by the lens into the back of the eye, where it strikes the *retina.* The retina transforms the focused image into nerve impulses that travel along the optic nerve to the *occipital lobe* of the brain for processing.

Figure 15-1 gives you a peek inside the eye.

Figure 15-2 shows the different parts of the ear.

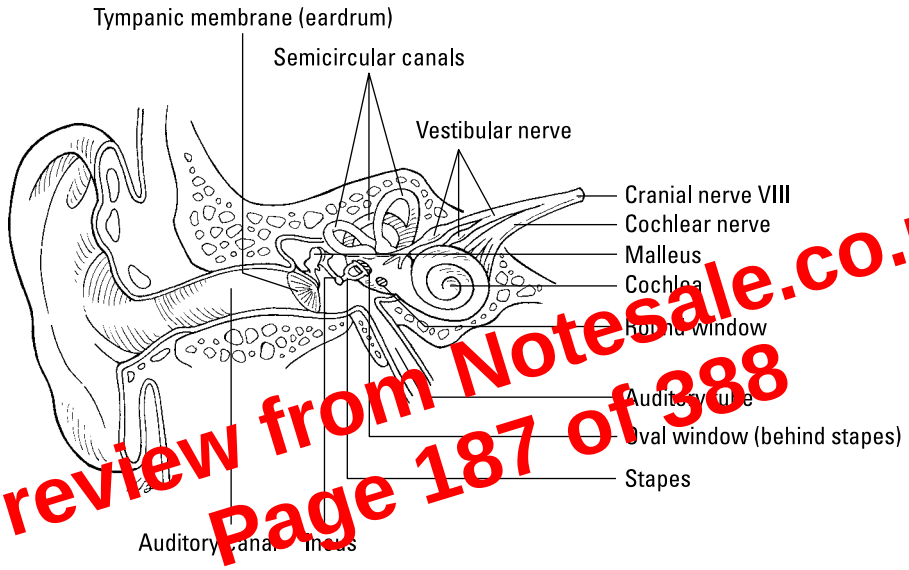

Figure 15-2: Anatomy of the ear.

Illustration by Kathryn Born

The ear is divided into three separate regions: the outer, middle, and inner ear. The outer and middle ears look after the conduction of sound waves through the ear. The inner ear contains the structures that carry the waves to the brain.

Outer ear

Sound waves are encouraged toward the ear canal by the *auricle,* or *pinna,* the visible outer ear, the hard, arching cartilage that forms the outer ear curve, the *tragus,* that hard little flap of cartilage that sticks out in front of the ear canal, and the earlobe.

From the pinna, the *external auditory meatus* is lined with numerous glands that secrete a yellowish waxy substance called *cerumen.* Cerumen (earwax) lubricates and protects the ear. Sound waves travel through the auditory canal and strike the *tympanic membrane* or *eardrum,* located between the outer and middle ear.

See, that wasn't so hard! Now that you have your feet wet (or nose, as it may be), you can move on to the eye, which has about a gazillion (okay, maybe that's an exaggeration) root words and combining forms. Check it out in Table 15-2.

Table 15-2 Visual Roots

Root Word	*What It Means*
Aque/o	Water
Blephar/o	Eyelid
Conjunctiv/o	Conjunctiva (membrane lining eyelids)
Core/o, cor/o	Pupil
Corne/o	Cornea
Dacry/o	Tear, tear duct
Dipl/o	Double
Dynam/o	In due measure
Glauc/o	Gray
Ir/o, irid/o	Iris (colored portion of the eye)
Is/o	Equal
Kerat/o	Cornea
Lacrim/o	Tear, tear duct
Mi/o	Smaller, les
Mydri/o	Wide
Ocul/o	Eye
Ophthalm/o	Eye (ophthalmologist, specialist in eye disorders)
Opt/o	Eye, vision
Phac/o, phak/o	Crystalline lens
Phot/o	Light
Presby/o	Old age
Pupill/o	Pupil
Retin/o	Retina
Scler/o	Sclera (white of the eye)
Uve/o	Iris, ciliary body, and choroids
Vitre/o	Glassy
Xer/o	Dry

no-longer-useful folks out at the end of the show. None of these components can work alone. They are a merry band of players who must share the spotlight.

The main organ of the circulatory (another name for cardiovascular) system is the *heart,* of course, and its main job is making the blood flow freely through your veins. By pumping, the heart creates pressure that forces the blood to move throughout the body via a channel system of *arteries* and *veins.* That system reaches from the center of your chest out to the nether regions of your appendages and back again, insuring that life-giving and sustaining blood cells are carried through your entire body.

The lymphatic system works to complement the actions of the cardiovascular system by carrying *lymph fluid* through the body via a system similar to veins. The lymph fluid flows forward through a grouping of *vessels, ducts,* and *nodes* that filter the fluid before it reenters the bloodstream. In this chapter, you find out more about the individual components of these two powerful systems and get to know the specific terminology associated with both.

An adult human's normal heart rate is 70–80 beats per minute. A child's is 100–120, an elephant's is about 25, a mouse's 700, and a canary's heart beats about 1,000 times per minute. Your heart beats around 100,000 times a day, pumping 2½ ounces with each contraction. That's 5 quarts a minute, 75 gallons per hour, 1,800 gallons a day, and 657,000 gallons per year.

Greek plays a role in the roots of the word for heart, *cardium.* This word, which you'll get to know quite well in this chapter, is taken from the Greek word *kardia. Cardium* takes on other identities in the commonly known forms of *cardi* and *cardio.* But make no mistake, it's all the same root.

Now, meet the individual players responsible for the pumping of the red stuff that keeps you going every day. Each has its own special function and terminology to go along with it. If watching ER is your only entrée into the world of medical terminology, fear not and consider this section your crash course in all things cardiovascular.

The heart

To take a tour of the heart, consider three components: layers, chambers, and valves. Together, these elements form the most powerful muscle in the body. Located to the left of the midline of your chest's center, this muscle, about the size of your fist, pumps a continuous stream of life-giving blood through your blood vessels.

The four heart chambers are separated by membranes called *septa* (plural of *septum*).

- **Interatrial septum** separates the two atria.
- **Interventricular septum** separates the two ventricle chambers.

Valves are the gatekeepers of the heart, making sure the blood flows in the correct direction. They let a specific amount of blood into each chamber and don't allow it to flow backwards. The beauty of valve terminology is that the name of each valve gives you a clue to its make-up.

- **Bicuspid valve (also called mitral):** The *bi-* prefix shows you that this valve has two flaps.
- **Pulmonary semilunar valve and aortic semilunar valve:** Both have a half-moon shape, thus being named from *semi* (part) and *lunar* (moon).
- **Tricuspid valve:** *Tri-* indicates this valve has three flaps, keeping blood moving forward.

Blood vessels

The vast network of blood vessels (made up of arteries and arterioles, veins and venules, and capillaries) begins at the heart and spans out through the entire body to the far reaches of the fingertips and toes. Together, these different types of vessels work to carry blood pumped by the heart through the body.

Arteries take care of clean, oxygenated blood. *Veins* handle the movement of deoxygenated blood. Your little friends, the *capillaries,* serve as mini bridges between the two types of vessels.

Arterial system

The *arterial system* is composed of arteries and *arterioles* (smaller arteries). The Greek *aer* is the basis for the word *artery,* meaning "air." Combined with *terein,* meaning "to keep," you get the word *artery.* Starting with the largest artery, the *aorta,* the arteries carry oxygenated blood away from the heart to the arterioles, and then on to the capillaries, where the exchange of gases (oxygen and carbon dioxide) takes place.

The *pulmonary artery,* with its two branches, is the exception of the arterial world. Instead of carrying oxygen-filled blood to other parts of the body, its branches carry oxygen-deprived blood to the right and left lungs.

Table 16-3 Cardiovascular and Lymphatic Vocabulary Words

Word	*What It Means*
Anticoagulant	Agent or drug that slows the clotting process
Aorta	Largest artery in the body
Atrium, Atria	Upper chambers of the heart
Auscultation	Hearing sounds in the body through a stethoscope
Blood pressure	Pressure exerted by blood against the vessel walls
Capillary	Smallest blood vessel
Cardiac	Pertaining to the heart
Cardiologist	Physician who studies and treats diseases of the heart
Cardiology	Study of the heart and its diseases
Cardiopulmonary resuscitation:	(CPR) Emergency procedure consisting of artificial ventilation and external cardiac massage
Coronary arteries:	The blood vessels that branch from the aorta to carry oxygen-rich blood to the heart muscle
Diastole	The relaxation phase of the heart beat
Endocardium	Inner lining of the heart
Erythrocyte	Red blood cell
Hematologist	Physician who studies and treats diseases of the blood
Hematology	Study of the blood
Hemolysis	Breakdown of blood
Hemostasis	Stoppage of bleeding
Immunoglobulins	Antibodies secreted by plasma cells
Leukocyte	White blood cell
Manometer	Instrument used to measure pressure of fluid
Mitral valve	Valve between the left atrium and left ventricle
Myelogenous	Produced by the bone marrow
Occlude	To be closed tightly
Percussion	Tapping of the body surface with fingers to determine density of the part beneath
Peyer's patches	Lymphatic filters located in the small intestine
Pulmonary arteries	Arteries carrying oxygen-poor blood from the heart to lungs
Pulmonary circulation	Flow of blood from the heart to the lungs and back to the heart

- **Chronic lymphocytic leukemia (CLL):** Occurs late in life and follows a slow, progressive course
- **Chronic myelogenous leukemia (CML):** Slowly progressive

All types of leukemia are treated with chemotherapy, using drugs that prevent cell division and selectively injure rapidly dividing cells. Effective treatment can lead to *remission,* or disappearance of signs of the disease. *Relapse* occurs when leukemia cells reappear in the blood and bone marrow, necessitating further treatment. Watch out for leukemia's nasty cousin, *multiple myeloma.* This is a malignant tumor of bone marrow in which malignant cells invade bone marrow and destroy bony structures.

Keep these two blood-clotting health issues in mind

- **Hemophilia** is excessive bleeding caused by a congenital lack of coagulation factor necessary for blood clotting.
- **Purpura** is a symptom caused by low platelets, involving multiple pinpoint hemorrhages and accumulation of blood under the skin.

We couldn't leave our good friends in the lymphatic system out of the pathology discussion. Who knew that such small things like lymph nodes could be so prone to disease?

The lymph nodes themselves are the sites of many a showdown between good health and an extended hospital stay. *Hodgkin's disease* is a malignant tumor arising in lymphatic tissue such as lymph nodes and spleen. *Lymphosarcoma (lymphoma)* is a malignant tumor of lymph nodes that resembles Hodgkin's disease. Often referred to as *non-Hodgkin's lymphoma,* it affects lymph nodes, spleen, bone marrow, and other organs. *Burkitt's lymphoma* is a malignant tumor of lymph nodes usually affecting children and most common in central Africa.

Inflammation is another common trait of lymphatic system pathology. Sometimes those pesky lymph nodes just get too big for their britches in diseases like the following:

- **Lymphadenitis:** Inflammation of lymph nodes usually due to infection
- **Mononucleosis:** Acute infectious disease with enlarged lymph nodes and spleen due to increased numbers of lymphocytes and monocytes
- **Sarcoidosis:** Inflammatory disease in which small nodules form in lymph nodes and other organs

and triglyceride deposits in arteries. Having high levels of *high-density lipoprotein* (HDL), containing less lipids, is a positive factor in keeping the heart healthy.

Remember *HDL* is the "happy" cholesterol in the blood. So, just remember *H* for "happy." *LDL* is the "bad" cholesterol. Remember *L* for "lousy."

Other laboratory blood tests include the following:

- **Antiglobulin test (Coombs' test)** determines whether erythrocytes are coated with antibody and useful in determining the presence of antibodies in infants of Rh-negative mothers. (Rh-negative is a blood type in which all Rh factors are lacking.)
- **Bleeding time** is measurement of the time it takes for a small puncture wound to stop bleeding; normal time is 8 minutes or less.
- **Coagulation time** is the time required for blood to clot in a test tube; normal time is less than 15 minutes.
- **ESR (erythrocyte sedimentation rate)** measures the speed at which erythrocytes settle out of plasma. The rate is altered in disease conditions such as infection, joint inflammation, and tumor.
- **Hemoglobin test** is the measurement of the amount of hemoglobin in a blood sample.
- **Platelet count** is the number of platelets per cubic millimeter of blood. Platelets normally average between 200,000–500,000 per cubic millimeter.

  

  A common diagnostic test counts the red blood cells and/or the white blood cells. To remember the normal range for each, remember *RBC (really big count)* for RBC (red blood cells). The normal number is about 5 million per cubic millimeter. The *WBC (white blood cell count)* is much smaller, averaging between 5,000–10,000 per cubic millimeter.
- **Prothrombin time (PT)** measures the ability of the blood to clot, used to follow patients taking blood thinners or anticoagulant drugs such as Coumadin.
- **White blood cell differential count** determines the number of different types of leukocytes, mature and immature, that are present in a blood sample.

Zen and the art of ticker maintenance

Sometimes surgeons have to get down and dirty to fix a heart condition. This typically involves major surgery, a Skilsaw, and lots of time. Though it may be hard to believe that these surgeries are standard issue, remember that heart surgeons perform them every day with great success.

Angioplasty is the surgical repair of a vessel. An *endarterectomy* is an excision within an artery of a thickened interior, usually named for the artery that is being "cleaned out." More vein work includes *phlebotomy,* an incision into a vein to remove or give blood. This is also called *venipuncture.* These procedures can be done in a doctor's office but are commonly performed in an outpatient lab.

The big fun happens when surgeons get more involved with the heart. In *cardiac pacemaker insertion,* a battery-powered or nuclear-powered apparatus is implanted under the skin to regulate the heart rate.

Think bypasses are only for major cities with traffic issues? Not so. The *coronary artery bypass graft (CABG)* is a surgical technique to bring a new blood supply to heart muscles by detouring around blocked arteries, whereas a *femoropopliteal bypass* is surgery to establish an alternate route from the femoral artery to the popliteal artery in the leg, to bypass obstruction.

Bypass surgery can now be performed using MIDCAB (minimally invasive direct coronary artery bypass graft) and TECAB (totally endoscopic coronary artery bypass graft) with the help of the world's most advanced surgical robot, da Vinci Si. This robot has three arms and a 3D high-definition camera, and miniaturized surgical instruments are mounted on the arms. With the surgeon's guidance, the procedure that once required a 10- to 12-inch sternal incision can now be accomplished through small portals, allowing less trauma to the body, minimal scarring, and faster recovery time.

Terminology Rx: Cardiovascular and Lymphatic Pharmacology

Your friendly neighborhood pharmacist will know all the details of what to use for cardio and lymph-related ailments. In the meantime, you have us. This section lists the most common types of drugs used to correct cardiovascular and lymphatic conditions and diseases.

Antiarrhythmics correct cardiac arrhythmias (irregular heartbeat). Examples include digoxin (Lanoxin) and propranolol hydrochloride (Inderal).

Anticoagulants slow blood clotting. Examples include heparin calcium (Calcilean) and warfarin sodium (Coumadin).

of infected droplets, always causes a commotion when reported to health officials. So much so, in fact, that before antibiotics, hospitals built solely for the treatment of TB were quite common. TB is a bit more under control today and is treated with a specific antibiotic regime, usually over a long-term (6-month) period. There are still many cases reported, though, particularly in the Global South.

Diphtheria is another infectious disease of the upper respiratory tract, affecting the throat. *Influenza,* that pesky *flu,* is a highly infectious respiratory disease that is viral in origin. Though for most people nowadays it involves some time off work and chicken soup, the flu can be deadly if not treated, or in high-risk groups like small children and the elderly. *Legionnaires' disease* is a form of *lobar pneumonia* caused by the bacterium Legionella pneumophilia.

Legionnaires' disease gained notoriety after a highly publicized epidemic of it occurred at the American Legion convention in 1976.

Tired yet? Hang in there. There are a few more respiratory diseases you should know. Here's the lowdown:

- **Adult respiratory distress syndrome (ARDS)** is respiratory failure in an adult as a result of disease or injury.
- **Bronchogenic carcinoma** is a cancerous tumor arising from the bronchus. This tumor can *metastasize* (spread) to brain, liver, and other organs.
- **Chronic obstructive pulmonary disease (COPD)** refers to any persistent lung disease that obstructs the bronchial airflow. Examples include asthma, chronic bronchitis, and emphysema.
- **Cor pulmonale** is a serious cardiac disease associated with chronic lung disorders such as emphysema.
- **OSA,** or obstructive sleep apnea, occurs when the pharynx collapses during sleep leading to absence of breathing.
- **Pulmonary edema** means fluid accumulation in the alveoli and bronchioles.
- **Pulmonary embolism** is a blood clot, fat clot, or air carried in blood circulation to pulmonary artery where it blocks the artery.
- **URI** is upper respiratory tract infection of pharynx, larynx, and trachea. LRI (lower respiratory infection) usually refers to an infection of everything that's left — bronchi and lungs. It's hard to have a LRI without the URI, but you can have the URI by itself.

Terminology RX: Respiratory Pharmacology

Several kinds of medicines are used to treat the respiratory system. Many are used for other systems as well, but they are worth repeating so you will know what is safe to use with direct relation to the lungs. *Bronchodilators* are used to treat asthma, COPD, and exercise-induced bronchospasm. They relax muscles around the bronchi, increasing air flow. They are usually given orally, intravenously, or by nebulizer or aerochamber (inhaler) administered in puffs. *Corticosteroids* are used to control inflammatory responses. *Diuretics* (water pills) are used to treat pulmonary edema.

When you are feeling the effects of a cold or bronchial infection, you probably take one of these next four drug types: *Decongestants* help reduce swelling in mucous membranes of the nose to relieve stuffiness and allow secretions to drain. *Antihistamines* help dry up secretions. They are effective in treating allergic reactions, but not effective against the common cold. *Antitussives* decrease coughing by suppressing the cough center in the brain. *Expectorants* reduce the thickness of sputum so it can be coughed up more easily. If over-the-counter meds just won't cut it, a prescription may be in order. *Antibiotics* are used to treat respiratory infections, tuberculosis, and pneumonias. *Silver nitrate* can be used to cauterize superficial blood vessels that cause nosebleeds.

Some endoscopic procedures include the following:

- **Colonoscopy:** Visual examination of the colon using an instrument called a *colonoscope*
- **EGD (esophagogastroduodenoscopy):** Visual examination of esophagus, stomach, and duodenum
- **ERCP:** Also known as an *endoscopic retrograde cholangiopancreatography,* this involves an x-ray of bile and pancreatic ducts using contrast medium (like dye) and endoscopy
- **Gastroscopy:** Visual examination of the stomach using an instrument called a gastroscope
- **Laparoscopy:** Visual examination of any internal organ or cavity using an instrument called a *laparoscope*
- **Proctoscopy:** Visual examination of the rectum using an instrument called a *proctoscope*
- **Sigmoidoscopy:** Visual examination of the sigmoid colon using an instrument called a *sigmoidoscope*

Here a few more procedures that are now done without the need for the endoscope:

- **Capsule endoscopy:** A capsule containing a camera is swallowed by the patient to take pictures along portions of the digestive tract not reachable by other procedures (the capsule passes normally with stool). How cool is that?!?
- **MRCP (Magnetic resonance cholangiopancreatography):** Uses MRI technique to obtain images of the bile and pancreatic ducts.
- **Virtual colonoscopy:** Computer takes CT images of the colon and reconstructs a 3D model of the colon, to evaluate abnormalities.

Paging Dr. Terminology: Gastrointestinal Surgeries and Procedures

Luckily, many parts of the gastrointestinal system can be repaired using surgical methods such as surgical excision, repair, and suturing. You will likely be familiar with many of these terms, such as *appendectomy,* but some will be brand-spanking new to you. Let's start by taking a look at surgical excisions, or removals. Here are some of the most common:

Table 19-1 Coming and Going: Endocrine Prefixes and Suffixes

Prefix	*What It Means*
Eu-	Normal
Ex-, exo-	Outside, outward
Hyper -	Excessive, above normal
Hypo-	Below normal
Pan-	All
Suffix	***What It Means***
-drome	Run, running
-emia	Blood condition
-genesis	Production
-ism	Condition
-tropin	Stimulating the function of

Next, in Table 19-2, we present the nitty-gritty of endocrine terminology. As always, the root words and combining forms let you know more about the condition or location involved with each term.

Table 19-2 Maintaining Balance: Endocrine Root Words

Suffix	*What It Means*
Acr/o	Extremities, height
Aden/o	Gland
Adren/o	Adrenal glands
Andr/o	Male
Calc/o	Calcium
Cortic/o	Cortex
Crin/o	To secrete
Dips/o	Thirst
Estr/o	Female
Galact/o	Milk
Gluc/o, glyc/o	Sugar
Gonad/o	Sex glands

- **Glucagon:** Hormone produced by pancreas in islets of Langerhans that stimulates the release of sugar
- **Growth hormones (GH and hGH):** Secreted hormones stimulating the growth of long bones; also called somatotropin
- **Hydrocortisone:** Cortisol
- **Insulin:** Hormone secreted by islets of Langerhans; essential for the proper uptake and metabolism of sugar in cells
- **Islets of Langerhans:** Endocrine cells of the pancreas
- **Melatonin:** Hormone secreted by pineal gland
- **Oxytocin:** Hormone secreted to stimulate uterus to contract during labor
- **Renin:** Hormone secreted by kidneys to raise blood pressure
- **Somatotropin:** Growth hormone
- **Steroids:** Complex substance derived from cholesterol of which many hormones are made
- **Target tissue:** Cells toward which the effects of the hormone are directed
- **TSH:** Hormone secretion that stimulates the thyroid gland to produce thyroxine (T3) and triiodothyronine (T4)
- **Vasopressin:** Antidiuretic hormone ADH

Next, take a look at some of the other substances associated with the endocrine system. Though not hormones, these are vital products of this system, and help keep the body functioning properly.

- **Calcium:** Mineral substance necessary for proper functioning of body tissues and bones
- **Electrolytes:** Mineral salt found in blood and tissues; necessary for proper functioning of body cells; potassium, sodium, and calcium are examples of necessary electrolytes
- **Glucose:** Simple sugar
- **Glycogen:** Starch, a storage form of sugar
- **Iodine:** Chemical element composing a large part of thyroxine, produced by the thyroid gland

Protein comes from the Greek *protos,* meaning "first."

- **Gynecomastia:** Excessive breast development in a male
- **Hypergonadism:** Excessive secretion of hormones by sex glands
- **Hypogonadism:** Deficient secretion of hormones by sex glands

Now, it's time for the potpourri of conditions. Many of these occur as a result of a more serious pathological disease, and some involve too much or too little of a specific substance in your body. It's an endocrine grab bag!

- **Diabetes insipidus:** Insufficient secretion of the antidiuretic hormone vasopressin; causes the kidney *tubules* to fail to reabsorb needed water and salt
- **Diabetic nephropathy:** Destruction of kidneys, causing renal insufficiency requiring hemodialysis or renal transplantation
- **Homeostasis:** Tendency in an organism to return to equilibrium or constant stable state
- **Hyperkalemia:** Excessive amounts of potassium in blood
- **Hyponatremia:** Deficient amount of sodium in the blood
- **Hyperparathyroidism:** A condition of excess parathyroid hormone secretion, whether from tumor, genetic condition, or medication
- **Ketoacidosis:** A primary complication of diabetes mellitus; fats are improperly burned leading to an accumulation of ketones in the body
- **Polyuria:** Excessive urination
- **Polydipsia:** Excessive thirst

Finding the Culprit: Endocrine Diseases and Pathology

While, admittedly, no condition of the endocrine system is simple or without side effects, the diseases we talk about in this section have especially serious consequences. One of the most common of these diseases is diabetes, which affects millions of people of all ages. Not only does diabetes affect the function of the body, it greatly affects a person's everyday habits. To manage the disease, one typically has to alter the diet and often take medications or insulin injections. Basically, the patient must learn a whole new lifestyle. Read on to find out more about this and other serious endocrine diseases.

The official name of diabetes is *Diabetes mellitus,* which means there is a lack of insulin secretion from the pancreas.

Paging Dr. Terminology: Nervous Surgeries and Procedures

Most surgeries of this system involve removal of tumors in the brain itself, whether malignant or benign. Tumors of the spinal cord can also be removed surgically. Surgery on the brain and the spinal cord is, as you might imagine, *very* involved and detailed, due to the complexity of nerves and the tissue involved. So, again, think reputable institution and not Craniotomy Mart.

But, we digress. Let's start getting inside your head, literally:

- **Craniotomy:** Surgical cutting into and opening the skull to gain access to the brain tissue for surgery
- **Decompression craniectomy:** A portion of the cranium (skull) is removed to relieve brain swelling following traumatic brain injury or a stroke
- **Hypophysectomy:** Removal of the pituitary gland to treat tumors, specifically craniopharyngiomas
- **Laminectomy:** Excision of the posterior arch of a vertebra
- **Neurectomy:** Excision of a nerve
- **Neuroplasty:** Surgical repair of a nerve

Terminology RX: Nervous Pharmacology

Now it's time to treat yourself to some drugs. Here are some common types of medications used to treat disorders and conditions of the nervous system:

- **Anticonvulsants, hypnotics, and sedatives** are used to treat various types of seizures.
- **CNS stimulants** are used to treat attention deficit disorders.
- **Cognition adjuvant therapy** is given to treat Alzheimer's disease.
- **Hypnotics** are used to treat sleeping disorders; examples include barbiturates and nonbarbiturates.

The Greek root of *hyponotics, hypnos,* means "to sleep."

Ureters

You have two *ureters* (right and left). They are muscular tubes about 15–18 inches long, lined with mucous membrane, extending from the renal pelvis down to the bladder. The left ureter is longer because the left kidney sits higher in position. The urine enters the bladder in spurts via each ureter every 10–30 seconds.

At the bladder entrance is a *ureteral orifice* (opening) that opens to allow urine into the bladder from each ureter. The orifice works in sequence with the *peristaltic* (wavelike) action that propels the urine through the ureter. This action prevents urine from flowing back into the ureter when the bladder contracts.

Urinary bladder

The *urinary bladder* is a hollow, very elastic muscular sac in the pelvic cavity. It acts as a temporary reservoir or "holding tank" for urine. It has two openings to receive the urine coming from each ureter. Another opening, the urethra, provides an exit route for the urine out of the body. The *trigone* is a triangular space at the base of the bladder where the ureters enter the bladder.

An average bladder holds more than 250 ml of urine before producing the desire to urinate.

Contraction of the bladder and *internal sphincter* is an involuntary action, whereas the action of the *external sphincter* is controlled by you. The act of preventing or concluding *voiding* (urination) is learned and voluntary in a healthy body.

Urethra

The *urethra* is a membranous tube that carries urine from the bladder to the exterior of the body. The process of expelling or voiding urine is technically called *micturition.* The external opening of the urethra is the *urethral meatus* or *urinary meatus.* The female urethra is about 1½ inches long, and its only function is urination. In the male, it is approximately 8 inches long. It extends from the bladder neck through the prostate and through the penis. The male urethra carries both urine and reproductive organ secretions (see Chapter 22). Thanks to Mother Nature, the urethra can't mix sperm and urine, so it's difficult to pee with an erection. That sure prevents unwanted embarrassment during those tender moments.

Root Word	*What It Means*
Glyc/o	Sugar
Hydr/o	Water
Lith/o	Stone
Meat/o	Meatus
Medull/o	Medulla inner section of the kidney
Nephr/o	Kidney
Noct/i	Night
Olig/o	Scanty
Pyel/o	Renal pelvis
Py/o	Pus
Ren/o	Kidney
Trigon/o	Trigone
Ur/o, urin/o	Urine, urea, urinary tract
Ureter/o	Ureter (you have two)
Urethr/o	Urethra (you have one)

To keep your urethra and ureters straight, remember that ureter has two *e*'s, and urethra has one *e*. You have two ureters and one urethra.

Common Urinary Conditions

Ah, your urinary system. So few parts, yet so many possible things that can go wrong. Who hasn't enjoyed a few days on the cranberry juice diet thanks to an inconvenient and painful bladder infection? And who could forget the joys of passing a good, old-fashioned kidney stone? Good times — not so much.

When you are dealing with common conditions, remember that inflammation is the arch nemesis of the urinary system. When your urinary parts are inflamed, bacteria have a perfect place to grow amidst a system transporting waste material. This results in infection and a great deal of discomfort. Here are some of the usual suspects:

- **Cystitis:** Inflammation of the bladder
- **Ureteritis:** Inflammation of a ureter
- **Urethritis:** Inflammation of the urethra
- **Urinary tract infection (UTI):** Infection of one or more organs of the urinary tract

Diuretics, often taken for hypertension, make the kidneys work overtime. A potassium (K) supplement is often given to maintain therapeutic potassium levels in the blood. A diuretic increases the excretion of urine, putting the entire urinary system into overdrive, which is not good for the kidneys or for sodium and potassium levels. This is why great caution is exercised when prescribing these drugs, and all drugs in this family are by prescription only. There are some common, everyday items that have diuretic effects, such as the caffeine in your coffee or soda.

Urethra

Semen is a combination of fluid and spermatozoa, ejected from the body through the *urethra.* In the male, the *genital orifice* (opening) combines with the urinary urethral opening. The male urethra is part of the urinary system as well as the reproductive system because it aids in the output of both urine and semen.

Cowper's glands, or bulbourethral glands, are just below the prostate gland and also secrete fluid into the urethra. The urethra passes through the penis to exit the body.

Prostate

At the region where the vas deferens enters the urethra, and almost encircling the upper end of the urethra, is the *prostate gland.* This gland secretes a thick alkaline fluid which, as part of the seminal fluid, aids in the motility of the sperm. This gland is also supplied with muscular tissue that aids in the expulsion of sperm during ejaculation. The alkaline also protects the sperm from acid present in the male urethra and the vagina of the female.

Prostate comes from the Greek *pro* meaning "before." *Statis* means "standing"; by anatomy, it is the gland standing slightly before and below the bladder.

Penis

The penis is composed of three rounded masses of erectile tissue and at its tip expands to form a soft, sensitive region called the *glans penis.* The glans penis is covered with a retractable double fold of skin called the *prepuce* (foreskin). The penis contains the urethra that carries both seminal fluid and urine. It is the organ by means of which sperm is ejected into the female vagina.

Male Reproductive Root Words

To really stretch a metaphor, as the human race needs both male and female reproductive systems in order to survive by creating new life, the medical terms associated with the male reproductive system need both prefixes and suffixes to create new words.

Table 22-1 lists some prefixes and suffixes to know when it comes to male reproductive terminology.

Venereal is derived from Venus, the goddess of love. A venereal disease was thought in ancient times to be one of the misfortunes of love.

Testing, Testing: Male Reproductive Radiology and Diagnostic Tests

It's time to test those testes! Okay, bad pun, but you get the drift. Though there aren't tons of laboratory tests and diagnostic procedures used for this system, they remain important methods for helping men of all ages find peace when it comes to issues of concern related to sexual health.

One very common test is *semen analysis*. This test is performed as part of fertility studies and also to establish current fertility status. Sometimes the test is performed to determine sperm viability for couples having difficulty conceiving. It can also be performed following a vasectomy to assure that the procedure was successful. In this case, semen is collected in a sterile container and examined microscopically; sperm cells are counted and examined for motility and shape. Analysis is also done at six weeks following vasectomy and again at three months, to establish aspermia.

Another common test for men is the *GC/Chlamydia test,* performed by inserting a small cotton swab into the opening of the urethra to obtain a sample, which is then tested for gonorrhea and Chlamydia.

A general *viral culture* tests for herpes and HIV, and is performed simply by swabbing an open sore.

In *VDRL,* also known as the *Venereal Disease Research Laboratory test,* the blood is tested to diagnose syphilis. Because the syphilis antigen stays in the blood for a lifetime, it can have far-reaching effects.

The *PSA (prostate specific antigen test)* is a prescreening test that can be performed yearly on males over 50. This is a prescreening mechanism for precancerous conditions of the prostate gland. Any rise or elevation of PSA level is followed up by other investigations.

Prostate carcinoma is both serious and scary. Any time a disease, particularly cancer, is associated with a reproductive system, it can cause more than just physical symptoms. It can be emotionally and mentally devastating, because we associate our sexual identities with our sexual systems. Much as a woman feels devastated by breast cancer, a man can feel equally devastated by a cancer affecting his sexual health. Prostate cancer is one of the most common cancers associated with the male reproductive system.

Vagina

The *vagina* is a muscular tube approximately 6 inches long and lined with mucous membrane. The entrance to the vagina is called the *introitus.*

The *clitoris* is situated in front of the vaginal opening and the *urethral meatus.* The clitoris is similar in structure to the penis in the male, being an organ made up of sensitive, erectile tissue.

Bartholin's glands are two small glands on each side of the vaginal opening. They produce a mucous secretion that lubricates the vagina.

Bartholin's gland is named after Caspar Thomeson Bartholin, a Danish anatomist (1655–1738).

The region between the vaginal opening and the anus is called the *perineum.* This may be torn during the process of childbirth in a vaginal delivery. To avoid a perineal tear, the perineum may be cut prior to delivery. This incision is called a(n) *episiotomy.*

The external genitalia (organs of reproduction) of the female are together called the *vulva.* The *labia majora* are the outer lips of the vagina, and the *labia minora* are the smaller inner lips. The *hymen* is a mucous membrane partially covering the entrance to the vagina. The clitoris and Bartholin's glands are also part of the vulva.

Time to accessorize!

The *breasts* are considered accessory organs of the reproduction system. They are *mammary,* or milk-producing glands, composed of fatty tissue, *lactiferous* or *milk-carrying ducts,* and sinus cavities, which carry milk to the opening or nipple. The breast nipple is called the *mammary papilla,* and the dark pigmented area around the nipple is the *areola.*

During a pregnancy, hormones from the ovaries and placenta stimulate gland tissue in the breasts to their full development. After *parturition* (giving birth), hormones from the pituitary gland stimulate milk production in a process known as *lactation.*

There are two hormones involved in milk production: *oxytocin* and *prolactin.* These hormones also work to assist during labor, delivery, and the recovery of the mother. Oxytocin stimulates the uterus to contract, inducing parturition. Following delivery, oxytocin helps contract the uterus back to its normal size. It also reacts on the breasts to stimulate the release of milk. Prolactin stimulates breast development and the formation of milk in the postpartum period. The act of sucking promotes prolactin production, which in turn, promotes further milk production.

- **Vaginal hysterectomy:** Uterus and cervix surgically removed via vagina
- **Vaginoplasty:** Surgical repair of the vagina
- **Vulvectomy:** Surgical removal of the vulva

The surgical robot can be used in procedures involving cervical and endometrial cancers, ovarian tumors, uterine fibroids, and pelvic prolapse. Robotics are used to perform laparoscopic-assisted vaginal hysterectomies, and total hysterectomies. The da Vinci robot can perform a robotic myomectomy, allowing a future pregnancy to follow the surgery.

Of course, because creating life and giving birth are two huge jobs of this system, you would be remiss to miss these obstetrical terms:

- **Amniotomy:** Incision into the amnion to induce labor. It is also referred to as *artificial rupture of membranes.*
- **Amniocentesis:** This involves surgical puncture to aspirate amniotic fluid via insertion of needle through the abdominal and uterine walls using ultrasound guidance. Fluid is used for the assessment of fetal health and maturity. This procedure is used to aid in diagnosis of fetal abnormalities. It is performed early in pregnancy at 16 weeks to determine fetal abnormalities such as *Down syndrome, spina bifida,* or to determine the sex of the fetus. It is done late in the pregnancy to determine lung maturity of the fetus.
- **Cesarean section:** This is surgical removal of the fetus through the abdominal and uterine walls. A *C-section* may be performed for a *breech* presentation (baby's head is not in downward position), multiple births, *placenta previa (*placenta develops in the lower uterine wall and may cover the cervix, blocking the birth canal), *abruptio placentae* (premature separation of placenta from uterine wall), *cephalopelvic disproportion* (when a baby's head or body is too large to fit through the mother's pelvis), failure to progress in labor, or any sign that the fetus is in distress.
- **Episiotomy:** Refers to incision of vulva or perineum. This is done during delivery to prevent tearing of the perineum.
- **Obstetrical ultrasound:** Ultrasound of the abdomen and pelvis determine fetal development, growth rate, and estimate fetal age, weight, and maturity.
- **Pelvimetry:** The measurement of the mother's pelvic to determine ability of fetus to pass through.
- **Salpingectomy:** Removal of a fallopian tube in order to remove an ectopic pregnancy.

In this part . . .

- Checking out ten essential medical terminology references
- Memorizing stuff with ten or so useful mnemonic devices
- Twisting your tongue with ten tough diseases

Radial Nerve

The muscles supplied by the radial nerve are the BEST! Remember:

Brachioradialis

Extensors

Supinator

Triceps

That's the BEST way to remember these muscles!

Face Nerves

You can recall what the major face muscles do by matching the action to the name. Think *M* and *Facial*. The *mandibular* nerve is in charge of *mastication*. The *facial* nerve is in charge of *facial expression*.

Perineal versus Peroneal

Can't keep these two words straight? Just remember that perINeal is *in between* the legs. PerONeal is *on* the legs.

Sperm Path through Male Reproductive Tract

Poor Steve. He gets a tough break here, but he's the best candidate for remembering the path sperm takes to exit the male body. Meet Steve:

Seminiferous **T**ubules

Epididymis

Vas deferens

Ejaculatory duct

simply indicates an instrument used to measure something, just as it does in English (like *odometer*). *Geography,* a term feared by many fifth graders the world over, ends with *-graphy* and means, more or less, "picturing lands."

-algia	Pain
-apheresis	Removal
-ar, -ary	Pertaining to
-ase	Enzyme
-blast	Immature
-capnia	Carbon dioxide
-centesis	Surgical puncture with needle to aspirate fluid
-chalasis	Relaxation
-continence	To stop
-cusis	Hearing
-cyesis	Pregnancy
-cytosis	Condition of cells
-desis	Surgical fixation
-drome	Run, running
-ectasis	Stretching or expansion
-ectomy	Surgical removal or excision
-emia	A blood condition
-flux	Flow
-gen	Producing
-genesis	Production
-globin	Protein
-globulin	Protein
-gram	Picture or finished record
-graph	Instrument used to record
-graphy	Process of recording
-iasis	Abnormal condition
-ician	One who
-ism	State of or condition
-itis	Inflammation
-lithiasis	Calculus or stone
-lysis	Loosening, separating
-lytic	Destruction or breakdown
-malacia	Softening
-megaly	Enlargement
-metrist	Specialist in the measurement of
-metry	Process of measuring
-ology	Study of
-oma	Tumor or mass

-opia	Vision (condition)
-opsy	View of, viewing
-optosis	Sagging
-orrhaphy	Surgical fixation or suturing
-orrhea	Flow, excessive discharge
-ory	Pertaining to
-oscopy	Visual examination of internal cavity using a scope
-ostomy	Creation of an artificial opening
-otomy	Process of cutting into
-oxia	Oxygen
-para	To bear, live birth
-paresis	Slight paralysis
-pathy	Disease
-pepsia	Digestion
-pexy	Surgical fixation
-phagia	Eating or swallowing
-phonia	Sound
-physis	Carrying, transmission
-plasty	Surgical repair or reconstruction
-plegia	Paralysis
-pnea	Breathing
-poiesis	Formation
-prandial	Meal
-ptosis	Drooping, sagging, prolapse
-rrhagia	Burst forth, excessive flow
-rrhaphy	Suture repair
-rrhea	Discharge or flow
-salpinx	Fallopian tube
-schisis	Cleft or splitting
-scope	Instrument used to visually examine
-scopy	Visual examination
-stasis	Stop or control
-stenosis	Narrowing or constricting
-thenia	Lack of strength
-thorax	Chest
-tocia	Labor
-tresia	Opening
-tripsy	Surgical crushing
-tropia	To turn
-uria	Urination, urine
-us	Condition

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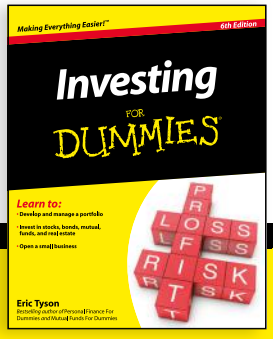

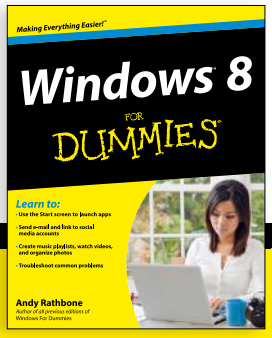

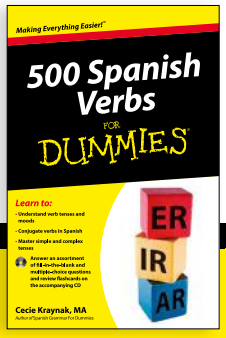

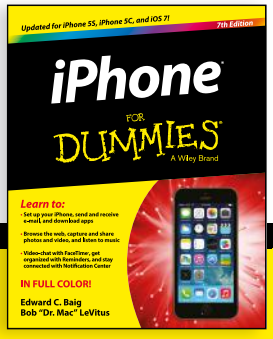

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