

Roots, Combining Forms, Prefixes and Suffixes

Many terms used in the biological sciences are compound words; that is, words made up of one or more word roots and appropriate prefixes and/or suffixes. Less than 400 roots, prefixes, and suffixes make up more than 90% of the medical vocabulary. These combining forms are most often derived from the ancient Latin or Greek. Prefixes are placed before the root term and suffixes are added after. The following list includes the most common forms used in anatomy, physiology and medicine and an example for each. This list, and the word origin information found throughout your physiology text book, is intended to facilitate the learning of this important vocabulary. The provided list is a learning tool and the entries are intentionally made brief. If you know these you will find your progress in learning physiology to be **swift**, **steady**, and **strong** (the three “s’es” of success).

Some terms use plural forms. To form a plural in English, we often simply add –s or –es to a word. As in English, some Latin-based forms are the same whether they are used as singular or plural. For example, the term meatus (a tube-like opening) is both singular and plural. This brief list will help you distinguish between many plural and singular forms:

Singular	Plural	Example
-a	-ae	ampula, ampullae
-ax	-aces	thorax, thoraces
-en	-ena	lumen, lumena
-en	-ina	foramen, foramina
-ex	-ices	cortex, cortices
-is	-es	neurosis, neuroses
-ix	-ices	appendix, appendices
-ma	-mata	lymphoma, lymphomata
-on	-a	mitochondrion, mitochondria
-um	-a	datum, data
-ur	-ora	femur, femora
-us	-i	villus, villi
-yx	-yces	calyx, calyces

Word part	Meaning	Example (meaning)
a-	without, lack of	Asymptomatic (absence of symptoms)
ab-	away from	abstinence (to hold back from)

acou-	hearing	acoustics (science of sound)
-ac, -al	pertaining to	cardiac (the heart), myocardial (heart muscle)
ad-	to, toward, near to	adduction (move toward the midline)
aden-, adeno-	gland	adenoma (tumor of a gland)
af-	toward	afferent (moving toward)
albi-	white	albinuria (passing of pale or white urine)
-algia	painful condition	myalgia (muscle pain)
an-	without, lack of	anesthesia (absence of pain)
andro-	male	androgens (male hormones)
angi-, angio-	vessel	angiopathy (disease of blood vessels)
ante-	before	antepartum (before birth)
anti-	against	anticoagulant (prevents blood clotting)
apo-	separated from, off	apodia (congenital absence of feet)
-arche	beginning, origin	menarche (first menstruation)
arthr-, arthro-	joint	arthritis (inflammation of a joint)
-ary	associated with	urinary (associated with urine)
-ase	signifies an enzyme	lipase (enzyme that acts on lipids)
-asis, -asia	condition or state of	homeostasis (state of metabolic balance)
audio-	hearing	auditory (belonging to the hearing sense)
auri-	ear	auricle (ear-shaped structure)
auto-	self	autolysis (self breakdown)
baro-	weight, pressure	baroreceptor (receptor for pressure changes)
bi-	twice, double	bicuspid (two cusps)
bili-	bile	bilirubin (orange-yellow bile pigment)
-blast	germ, bud	chondroblast (cartilage-producing cell)
brachi-	arm	brachial (pertaining to the arm)
brady-	slow	bradycardia (slow heart rate)
bronch-	air passage	bronchitis (inflammation of the bronchi)

bucc-	cheek	buccal cavity (inside cheek region)
carcin-	cancer	carcinogenic (causing cancer)
cardio-	heart	cardiology (study of the heart)
caud-	tail	caudal (by the tail)
-centesis	a piercing	amniocentesis (piercing the amniotic sac)
cephal-	head	cephalic (by the head)
cerebro-	brain	cerebrospinal (of the brain and spinal cord)
cerv-	neck	cervical (pertaining to the neck)
chondro-	cartilage	chondrocyte (cartilage cell)
-cide	to kill	spermicide (agent that kills sperm)
circum-	around	circumduction (movement forming a circle)
-clast	break	osteoclast (cell that breaks down bone)
co-, com-	with, together	cooperate, gray commissure (connects rt/lt horns)
contra-	against, opposite	contralateral (opposite side)
cortico-	pertaining to the cortex	corticosteroid (steroid secreted by adrenal cortex)
cost-	rib	intercostals (between the ribs)
crani-	skull	cranial cavity (where the brain is located)
-crine	release, secrete	endocrine (secrete within)
cune-	wedge	cuneiform (wedge shaped)
cuti-	skin	subcutaneous (under the skin)
cyan-	blue color	cyanosis (bluish discoloration of skin)
cysti-, cysto-	sac, bladder	cystoscope (instrument for examining inside of bladder)
-cyte, cyto-	cell	erythrocyte (red blood cell), cytology (study of cells)
demi-	half	costal demifacet (half-moon facet on vertebra for rib articulation)
di, diplo-	two	diploid (two sets of chromosomes)
duct-, -duct	lead, draw	ovarian duct, adduct (toward midline of body)

dur-	hard	dura mater (tough meninx of CNS)
dys-	painful, difficult, bad	dysuria (painful urination)
e-, ec-, ef-, ex-	out, from	efferent (carries away from), excretion (eliminate)
ecto-	outside, outer	ectocardia (displacement of heart)
-ectomy	to cut out	appendectomy (removal of appendix)
ede-, -edem	swelling	myoedema (muscle swelling)
-el, -elle	small	organelle (tiny structure that performs cell function)
endo-	within	endocardium (lining within heart chambers)
entero-	intestine	enteritis (inflammation of intestines)
epi-	above, on	epicardium (membrane covering heart)
ex-, exo	outside	exhale (breathe out); exocrine (gland that secretes to the outside)
extra-	outside	extracellular (outside the cell)
-ferent	carry	afferent (carries toward)
-form	resembling, shape of	fusiform (spindle-shaped)
gastr-, gastro-	stomach	gastric ulcer (stomach ulcer)
-genesis, -genic	produce, origin	gluconeogenesis (glucose from another molecule), carcinogenic (causes cancer)
gloss-, glosso-	tongue	hypoglossal (under the tongue)
glyco-	sugar, sweet	glycolysis
gyn-	female, woman	gynecology (treatment of female reproductive organs)
haplo-	single	haploid (single set of chromosomes)
hem-, hemato-	blood	hematology (study of blood)
hepato-	liver	hepatitis (inflammation of the liver)
hetero-	different	heterosexual (involving different sexes)
hist-, histo-	tissue	histology (study of tissues)
homo-, homeo-	same	homeostasis (constancy of body parameters)
hydro-	water	hydroadipsia (absence of thirst for water)

hyper-	above, over	hypertrophy (overgrowth of cells or part)
hypo-	under, below	hypoglycemia (low blood sugar)
idio-	self, distinct	idiopathic (disease of unknown cause)
infra-	below	infraspinatus (below the spine of scapula)
inter-	between	interosseous (between two bones)
intra-	within	intracellular (within the cell)
-issimus	greatest	latissimus (widest)
iso-	equal, same	isotonic (same concentration)
-itis	inflammation	neuritis (inflammation of nerve)
juxta-	near	juxtaglomerular (near the glomerulus)
labi-	lip	labia major (thickened folds of skin in female external genitalia)
lacto-	milk	lactose (milk sugar)
leuko-	white	leukocyte (white blood cell)
lip-	fat	liposuction (removal of fat from an area)
-ology	study of	urology (study of urinary system)
-lysis	breaking up, dissolve	hemolysis (breaking up erythrocytes)
macro-	large	macrophage (certain large leukocyte)
mamm-, mast-	breast	mammary glands, mastectomy (breast removal)
medi-	middle	medial (towards the midline)
melano-	black	melanocyte (dark pigment-producing cell)
-mers, -meres	parts	polymers (larger molecules made of monomers)
meta-	after, beyond	metastasis (beyond the original position)
micro-	small	microorganism (very small organism)
mono-	single, one	monomer (a single part); monosaccharide (a simple or single sugar)
morph-	form, shape	morphology (study of shape)

myo-	muscle	myometrium (muscular wall of uterus)
necro-	dead	necrotic (dead tissue)
neo-	new	neonatal (newborn)
nephro-	kidney	nephrology (study of kidneys)
neuro-	nerve	neurilemma (nerve cell membrane)
oculo-, ophthalm-	eye	oculomotor (movement of eye), ophthalmology (study of the eye)
odonto-	tooth	odontoid (shaped like a tooth)
-ole	little	arteriole (small artery-like vessel)
oligo-	few, little, deficient	oliguria (little urine output)
-oma	tumor	carcinoma (cancerous tumor), osteoma (benign bone tumor)
oo-	egg	oocyte (egg cell)
-osis	condition of	osteoporosis (having bones that are porous)
osse-, osteo	bone	osteoblast (bone-forming cell)
oto-	ear	otogenic (originating within the ear)
para-	near, beside	paranasal (by the nose)
-pathy	disease	neuropathy (nerve disease)
pelv-	basin	renal pelvis (collection area in kidney)
-penia	deficiency	leucopenia (deficiency of leukocytes)
peri-	around	periosteum (membrane covering bones)
phag-	eat	phagocytosis (cellular eating)
phil-	have an affinity for	lipophilic (associates with fat)
-plegia	paralyze, stroke	paraplegia (paralysis of lower extremities)
pneumo-	air, gas, lungs	pneumothorax (air in the pleural cavity)
-poiesis	make, formation of	erythropoietin (hormone that stimulates erythrocyte production)
poly-	many	polycythemia (excess erythrocytes)

post-	after	postnatal (after birth)
pre-	before in time, place	prenatal (before birth)
pro-	before in time, place	prosect (to cut for demonstration)
pseudo-	false	pseudostratified (not truly layered)
quad-	fourfold	quadriceps femoris (4-headed muscle of anterior thigh)
rami-	branch	ramus (primary division of a nerve)
rect-	straight	rectus abdominis (straight muscle of abdomen)
reno-	kidney	renal (of the kidney)
retro-	backward, behind	retroperitoneal (posterior to the peritoneum)
sclera-	hard	arteriosclerosis (hardening of the arteries)
semi-	half	semilunar (half-moon shaped)
serrate-	saw-edged	serratus anterior (muscle of thorax)
somato-	body	somatotropin (growth hormone)
steno-	narrow	stenosis (narrowing of opening)
sterno-	breast, chest	sternum (bone over heart and medial to ribs)
stria-	stripe	striated (showing stripes or lines)
sub-	under	subcutaneous (under the skin)
super-, supra-	above, upper	supercilia (upper brows), suprarenal (superior to the kidney)
sym-, syn-	together, with	symphysis (growing together, synapse (where neurons, or neuron and muscle fiber, meet))
tachy-	fast	tachycardia (rapid heart rate)
therm-	heat	thermometer (tool to measure temperature)
thorac-	chest	thoracic cavity (body cavity containing heart, lungs)
thrombo-	blood clot	thrombocyte (platelet)
-tomy	cut, incise	appendectomy (removal of appendix)
topo-	place, position	ectopic (being out of position)
trans-	across	transdermal (across the skin)

tri-	three	triceps brachii (three-headed muscle)
-tropic	influencing	gonadotropic (effecting the gonads)
tunica-	layer, coat	tunica interna (inner part of blood vessel)
ultra-	beyond, excess	ultradian (more than every 24 hours)
uni-	one	unicellular (single cell)
-uria	urine	polyuria (excess urine)
vas-	vessel	vasodilation (widening of lumen of blood vessel)
vertebra-	spine	vertebrae (bones of the spine)
villo-	hair	microvilli (minute projections of cell membrane)
viscer-	internal organ	visceral (of the internal organs)
zyg-	yoked, paired, union	azygos (unpaired anatomical structure)