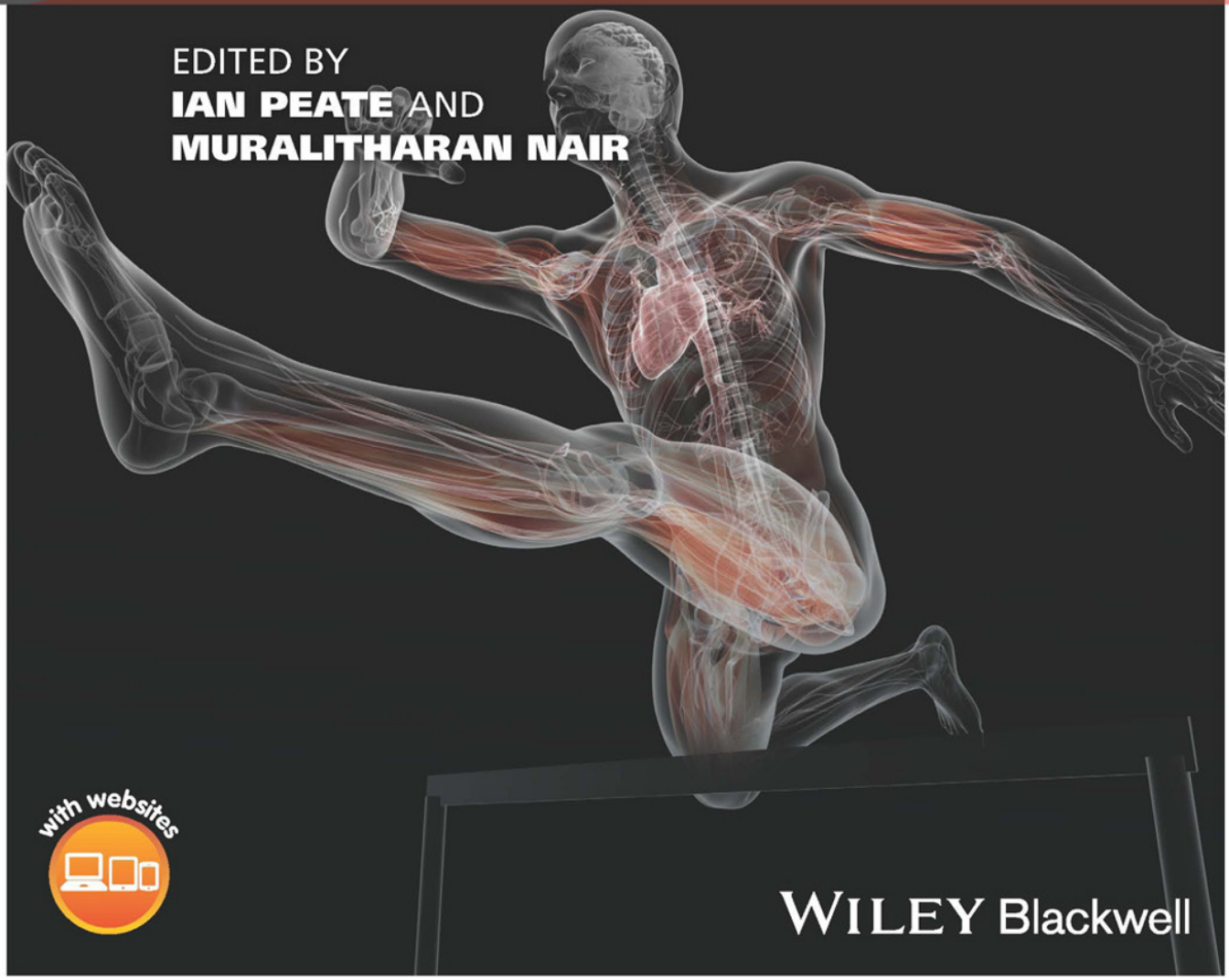
FUNDAMENTALS

SECOND EDITION

Fundamentals of Anatomy and Physiology

For Nursing and Healthcare Students

EDITED BY
IAN PEATE AND
MURALITHARAN NAIR



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Fundamentals of Anatomy and Physiology Workbook:

A Study Guide for Nurses and Healthcare Students

Ian Peate

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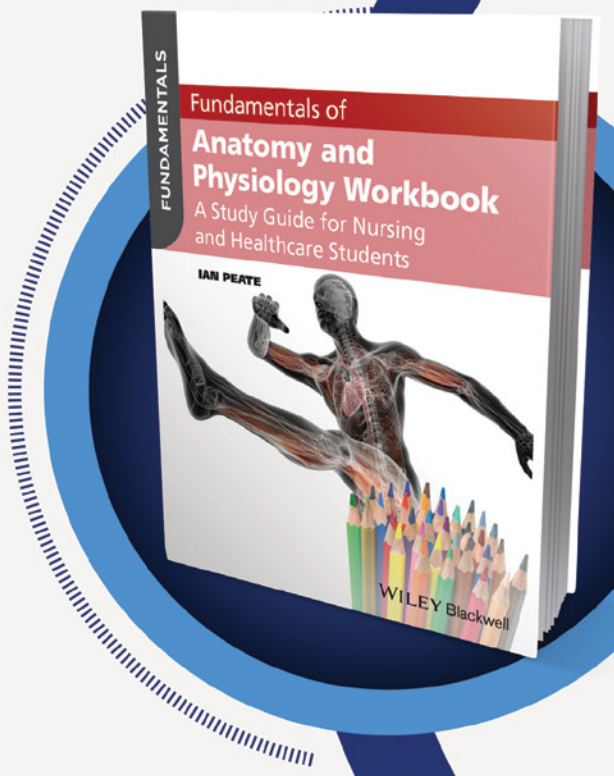

This new study guide is a companion to the bestselling textbook *Fundamentals of Anatomy and Physiology: For Nursing and Healthcare Students*, and is designed to help and support you with this subject area, by testing and consolidating your knowledge of anatomy and physiology. Jam-packed with tips, hints, activities and exercises, this workbook will guide you through the core areas of anatomy and physiology, and provide you with loads of help with your studies.

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Anatomy and Physiology

For Nursing and Healthcare Students

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Fundamentals of

Anatomy and Physiology

For Nursing and Healthcare Students

Second Edition

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Ian began his nursing career in 1981 at Central Middlesex Hospital, becoming an enrolled nurse working in an intensive care unit. He later undertook 3 years' student nurse training at Central Middlesex and Northwick Park Hospitals, becoming a staff nurse and then a charge nurse. He has worked in nurse education since 1989. His key areas of interest are nursing practice and theory, men's health, sexual health and HIV. Ian has published widely. He is Visiting Professor, Kingston University London and St George's, University of London.

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Muralitharan commenced his nursing a career in 1971 at Edgware General Hospital, becoming a staff nurse. In 1975 he commenced his mental health nurse training at Springfield Hospital and worked as a staff nurse for approximately 1 year. He worked at St Mary's Hospital Paddington and Northwick Park Hospital, returning to Edgware General Hospital to take up the post of senior staff nurse and then charge nurse. He has worked in nurse education since 1989. His key interests include physiology, diabetes, surgical nursing and nurse education. Muralitharan has published widely in journals and co-edited a number of textbooks. He has now retired from being a full-time lecturer but is working as a nursing consultant.

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Carl began his nursing a career in 1990 as a nursing auxiliary. He later undertook 3 years' student nurse training at Selly Oak Hospital (Birmingham), moving to The Royal Devon and Exeter Hospitals, then Northwick Park Hospital, and finally The Royal Brompton and Harefield NHS Trust as a Resuscitation Officer and Honorary Teaching Fellow of Imperial College (London). He has worked in nurse education since 2001. His key areas of interest are physiology, sociology, cardiac care and resuscitation. Carl has previously published work in cardiac care, resuscitation and pathophysiology.

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Janet G Migliozzi RN, BSc (Hons), MSc (Lon), PGDE, FHEA

Janet is a senior lecturer in the School of Health & Social Work, University of Hertfordshire. Janet commenced her nursing career in London and worked at a variety of hospitals across London, predominantly in vascular, orthopaedic and high-dependency surgery before specialising in infection prevention and control. Janet has worked in higher education since 1999, and her key interests include medical microbiology and microbial resistance, healthcare-associated infection, patient safety, infection prevention strategies/education of healthcare professionals at both a UK and European level and the use of clinical simulation to minimise healthcare risk. Janet has previously published work in minimising healthcare-associated risk and pathophysiology. Janet is a member of the European Nurses Association and is also the research and development lead for the East of England branch of the Infection Prevention Society.

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Following a career in teaching, Peter commenced nursing in 1980, working at the York District Hospital and the Hospitals for Sick Children, Great Ormond Street, London, becoming the Clinical Nurse Specialist in Paediatric Immunology. Following a degree in Biosciences and Health Studies, in 1999, he was awarded his doctorate following research into the long-term development of children with severe combined immunodeficiency in the UK and Germany. He worked in nurse education for several years and has written books on children's responses to early hospitalisation and on research methodology; he has also written chapters for nursing bioscience and pathophysiology books, and presented papers at international conferences. His areas of interest are immunology and immunology nursing, infectious diseases, genetics and research. Now retired, he remains active in writing and was President of INGID (the international organisation for nurses working within the field of primary immunodeficiencies) from 2012 to 2014.

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Anthony began his nursing career at Barnet College of Nursing and Midwifery. After qualification in 1995 he worked as a staff nurse and senior staff nurse in the Respiratory Directorate at the Royal Brompton and Harefield NHS Trust in London. In 2000 he started teaching on post-registration cardio-respiratory courses before moving into full-time nurse education at Thames Valley University in 2002. Anthony has a wide range of nursing interests, including cardio-respiratory nursing, anatomy and physiology, respiratory assessment, nurse education, and the application of bioscience in nursing practice. In 2006 Anthony joined the University of Hertfordshire, where he has taught on both pre- and post-registration nursing courses. He is currently an associate subject lead for adult nursing.

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Muralitharan would like to thank his wife, Evangeline, and his daughters, Samantha and Jennifer, for their continued support and patience.

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Preface

We were delighted when we were asked to write a second edition of the popular *Fundamentals of Anatomy and Physiology for Student Nurses*. The first edition has been a very popular choice not only with student nurses but also with students in other healthcare professions and this has been reflected in the title of this second edition. The second edition of *Fundamentals of Anatomy and Physiology for Nursing and Healthcare Students* retains all of the attributes in the popular first edition as well as a whole range of new features in this book and also through the companion websites.

Those contributing to the text are all dedicated to the provision of high-quality, safe and effective care. The authors are all experienced academics working in higher education, with many years of clinical experience, knowledge and skills, teaching a variety of multidisciplinary student groups at various academic levels. We are confident that after you have gained a sound understanding of anatomy and physiology you will be able to understand better the needs of the people you have the privilege to care for. High-quality, safe and effective care for all is something all of us should strive to provide; however, this will be a challenge if we do not fully appreciate the person in a holistic manner. Those who provide care have to take into consideration the anatomical and physiological elements, but they must also consider the psychosocial aspects of the person and their family, addressing the needs of the whole being, the whole person. This text has been devised in such a way as to encourage learning and understanding. We hope you enjoy reading it, and more importantly that you are hungry to learn more, that you will be tempted to delve deeper as you grow and develop into becoming a provider of healthcare that is world class, safe and effective.

The companion to this book, *Fundamentals of Applied Pathophysiology: An Essential Guide for Nursing and Healthcare Students* (Nair and Peate, 2013), also in its second edition, will help in your development and understanding. Within your programme of study which is related to the provision of care it is important that you are confident and competent with regards to pathophysiology and anatomy and physiology. It is not enough that you remember all of the facts (and there are many of these) that are linked with anatomy and physiology; you also have to relate these to those you care for. Some of those people may be vulnerable and at risk of harm, and it is your responsibility to ensure that you are knowledgeable and that you understand the complexities of care. This new edition of *Fundamentals of Anatomy and Physiology for Nursing and Healthcare Students* will help you.

It is a requirement of several programmes of study that lead to registration with a professional body that you demonstrate competence in a number of spheres, and this will include anatomy and physiology – for example, see The Standards for Pre-Registration Nursing Education (Nursing and Midwifery Council, 2010).

The human body is as beautiful on the inside as it is on the outside; when working in harmony the mind and body is an astonishing mechanism that has the capacity to perform a range of amazing things. Healthcare students practise and study in a number of healthcare settings, in the hospital and the primary-care setting and in the person's own home where they are destined to meet and care for patients with a range of altered anatomical and physiological problems. Employing a fundamental approach with a sound anatomical and physiological understanding will provide healthcare students with an essential basis on which to provide care.

Anatomy and physiology

Anatomy can be defined simply as the science related to the study of the structure of biological organisms; there are dictionaries that use such a definition. *Fundamentals of Anatomy and Physiology for Nursing and Healthcare Students* focuses on human anatomy, and the definition of anatomy for the purposes of this text is that it is a study of the structure and function of the human body. This allows for reference to function and also structure; in all biological organisms structure and function are closely interconnected. The human body can only operate through interrelated systems.

The term anatomy is Greek in origin and means 'to cut up' or 'to dissect'. The first scientifically based anatomical studies (credited to Vesalius, the 16th-century Flemish anatomist, doctor and artist) were based on observations of cadavers (dead bodies). Contemporary approaches to human anatomy differ, however, as they include other ways of observation; for example, with the aid of a microscope and other complex and technologically advanced imaging tools. Subdivisions are now associated within the broader field of anatomy, with the word anatomy often preceded with an adjective identifying the method of observation; for example, gross anatomy (the study of body parts that are visible to the naked eye, such as the heart or the bones) or microanatomy (where body parts such as cells or tissues are only visible with the use of a microscope).

Living systems can be defined from a number of perspectives:

- At the very smallest level, the chemical level, atoms, molecules and the chemical bonds connecting atoms provide the structure upon which living activity is based.
- The smallest unit of life is the cell. Specialised bodies – organelles – within the cell perform particular cellular functions. Cells may be specialised; for example, bone cells and muscle cells.
- Tissue is a group of cells that are similar and they perform a common function. Muscle tissue, for example, is made up of muscle cells.
- Organs are groups of different types of tissues working together to carry out a specific activity. The stomach, for example, is an organ made up of muscle, nerve and tissues.
- A system is two or more organs that work together to carry out a specific activity. The digestive system, for example, comprises the coordinated activities of a number of organs, including the stomach, intestines, pancreas and liver.
- Another system that possesses the characteristics of living things is an organism; this has the ability to obtain and process energy, the capacity to react to changes in the environment and the ability to reproduce.

As anatomy is associated with the function of a living organism it is almost always inseparable from physiology. Physiology can be described as the science dealing with the study of the function of cells, tissues, organs and organisms. Physiology is concerned with how an organism carries out its many activities, considering how it moves, how it is nourished, how it adapts to changing environments – human and animal, hostile and friendly. It is in essence the study of life.

Physiology is the foundation upon which we build our knowledge of what life is; it can help us to decide how to treat disease as well as help us to adapt and manage changes imposed on our bodies by new and changing surroundings – internal and external. Studying physiology will help you understand disease (pathophysiology) arising from this; physiologists working with others are able to develop new ways for treating diseases.

Just as there are a number of branches of anatomical study, so too are there a number of physiological branches that can be studied; for example, endocrinology, neurology and cardiology.

There are 17 chapters. The text is not intended to be read from cover to cover, but you may find reading chapters one to four first will help you come to terms with some of the more complex concepts; we would encourage you to dip in and out of the book. The chapters use simple and generously sized full-colour artwork in order to assist you in your understanding and appreciation of the complexities associated with the human body from an anatomical and physiological perspective. There are many features contained within each chapter that can help you to build upon and develop your knowledge base; we would encourage you to get the most out of this book.

The text takes the reader from the microscopic to macroscopic level in the study of anatomy and physiology. The contents demonstrate the movement from cells and tissues through to systems. This approach to teaching is a tried-and-tested approach, especially when helping learners understand a topic area that can sometimes be seen as complex.

This book has been written with these key principles in mind, to help inform your practice as well as your academic work. This second edition retains the features that have helped students bring to life the fascinating subject of human anatomy and physiology; there is also a range of new features provided to further enhance the student experience.

Each chapter begins with several questions that are posed to test your current knowledge; this allows you to pre-test. Learning outcomes are provided. These will cover the content within the chapter, but only you can do the learning; these outcomes are what are expected of you after reading and absorbing the information. This is a minimum of what you can learn; do not be constrained by the learning outcomes, they are only provided to guide you. Where appropriate an anatomical map is provided; this is related to the chapter you are reading, allowing you to 'situate or visualise' the anatomy being discussed.

Another feature in most of the chapters that is provided to help you consider people you care for, to help you make clinical links, is the 'Clinical considerations' box. These boxes demonstrate the application to your learning, citing specific care issues that you may come across when working with people in care settings.

A new addition is the feature called 'Medicines management'. In this feature the contributors discuss the administration of medicines, medicine management issues. This addition can help you appreciate the importance of understanding anatomy and physiology with the intention of administering medicines safely and effectively.

In most chapters there is a series of snapshots. This new addition relates the theory to practice, introducing you to the issues being discussed in a practical way.

At the end of the chapter you are provided with a bank of multiple choice questions. Some of the answers to the questions are not found in the text; in this case you are encouraged to seek out the answers and in so doing develop your learning further.

Other features provided will help you measure the learning that has taken place; for example, true or false, label the diagram, find out more, crosswords or word searches. These are meant to be fun, but they also aim to pull together the content of the chapter.

The feature 'Conditions' at the end of the chapter provides you with a list of conditions that are associated with the topics discussed in the chapter. You are encouraged to take some time to write notes about each of the conditions listed; this will help you relate theory to practice. You can make your notes taken from other textbooks or other resources – for example, the people you work with in a care area – or you may make the notes as a result of people you have cared for. It is important, however, that if you are making notes about people you have cared for you must ensure that you adhere to the rules of confidentiality.

At the end of every chapter a glossary of terms is provided. We present this to facilitate the learning of difficult words or phrases; understanding these words and phrases is important to

your success as a healthcare student. When you have mastered the words your medical vocabulary will have grown and you will be in a better position to develop it further.

We have, in this new edition, included a list of prefixes and suffixes as well a table of normal values.

A myriad of features have been compiled to help your learning with two companion websites. The features include an interactive glossary and a series of case studies with the intention of bringing alive the subject matter. The electronic resources associated with this book are designed to help enhance your learning; they are varied and informative and are visually stimulating.

The advantages of these resources are that they can be used in your own place at your own pace. The aim is to encourage further learning and to build upon what you know already. There are also links to other resources via the further reading section at the end of the chapters.

Using the electronic resources alongside the book, as well as the human resources you will meet in practice, will enhance the quality of your learning. The electronic resources available cannot replace the more conventional face-to-face learning with other students, lecturers, registered practitioners and patients; they complement it.

We have enjoyed writing this second edition and we sincerely hope you enjoy reading it. We wish you much success with your studies, whether they are in the classroom or in the many care areas that you might find yourself working.

References

Nair, M. and Peate, I. (2013) *Fundamentals of Applied Pathophysiology: An Essential Guide for Nursing and Healthcare Students*, 2nd edn. Oxford: John Wiley & Sons, Ltd.

Nursing and Midwifery Council (2010) Standards for Pre-Registration Nursing Education. http://standards.nmc-uk.org/PublishedDocuments/Standards%20for%20pre-registration%20nursing%20education%2016082010.pdf (accessed 7 November 2015).

Prefixes, suffixes

Prefix: A prefix is positioned at the beginning of a word to modify or change its meaning. Pre means 'before'. Prefixes may also indicate a location, number, or time.

Suffix: The ending part of a word that changes the meaning of the word.

Prefix or suffix	Meaning	Example(s)
a-, an-	not, without	analgesic, apathy
ab-	from; away from	abduction
abdomin(o)-	of or relating to the abdomen	abdomen
acous(io)-	of or relating to hearing	acoumeter, acoustician
acr(o)-	extremity, topmost	acrocrany, acromegaly, acroosteolysis, acroposthia
ad-	at, increase, on, toward	adduction
aden(o)-, aden(i)-	of or relating to a gland	adenocarcinoma, adenology, adenotome, adenotyphus
adip(o)-	of or relating to fat or fatty tissue	adipocyte
adren(o)-	of or relating to adrenal glands	adrenal artery
-aemia	blood condition	anaemia
aer(o)-	air, gas	aerosinusitis
-aesthesi(o)-	sensation	anaesthesia
alb-	denoting a white or pale colour	albino
-alge(si)-	pain	analgesic
-algia, -alg(i)o-	pain	myalgia
all(o-)	denoting something as different, or as an addition	alloantigen, allopathy
ambi-	denoting something as positioned on both sides	ambidextrous
amni-	pertaining to the membranous foetal sac (amnion)	amniocentesis
ana-	back, again, up	anaplasia
andr(o)-	pertaining to a man	android, andrology
angi(o)-	blood vessel	angiogram

Prefix or suffix	Meaning	Example(s)
ankyl(o)-,ancyl(o)-	denoting something as crooked or bent	ankylosis
ante-	describing something as positioned in front of another thing	antepartum
anti-	describing something as 'against' or 'opposed to' another	antibody, antipsychotic
arteri(o)-	of or pertaining to an artery	arteriole, arterial
arthr(o)-	of or pertaining to the joints, limbs	arthritis
articul(o)-	joint	articulation
-ase	enzyme	lactase
-asthenia	weakness	myasthenia gravis
ather(o)-	fatty deposit, soft gruel-like deposit	atherosclerosis
atri(o)-	an atrium (especially heart atrium)	atrioventricular
aur(i)-	of or pertaining to the ear	aural
aut(o)-	self	autoimmune
axill-	of or pertaining to the armpit (uncommon as a prefix)	axilla
bi-	twice, double	binary
bio-	life	biology
blephar(o)-	of or pertaining to the eyelid	blepharoplast
brachi(o)-	of or relating to the arm	brachium of inferior colliculus
brady-	'slow'	bradycardia
bronch(i)-	bronchus	bronchiolitis obliterans
bucc(o)-	of or pertaining to the cheek	buccolabial
burs(o)-	bursa (fluid sac between the bones)	bursitis
carcin(o)-	cancer	carcinoma
cardi(o)-	of or pertaining to the heart	cardiology
carp(o)-	of or pertaining to the wrist	carpopedal
-cele	pouching, hernia	hydrocele, varicocele
-centesis	surgical puncture for aspiration	amniocentesis
cephal(o)-	of or pertaining to the head (as a whole)	cephalalgy
cerebell(o)-	of or pertaining to the cerebellum	cerebellum
cerebr(o)-	of or pertaining to the brain	cerebrology
chem(o)-	chemistry, drug	chemotherapy

Prefix or suffix	Meaning	Example(s)
chol(e)-	of or pertaining to bile	cholecystitis
cholecyst(o)-	of or pertaining to the gallbladder	cholecystectomy
chondr(i)o-	cartilage, gristle, granule, granular	chondrocalcinosis
chrom(ato)-	colour	haemochromatosis
-cidal, -cide	killing, destroying	bacteriocidal
cili-	of or pertaining to the cilia, the eyelashes	ciliary
circum-	denoting something as 'around' another	circumcision
col(o)-, colono-	colon	colonoscopy
colp(o)-	of or pertaining to the vagina	colposcopy
contra-	against	contraindicate
coron(o)-	crown	coronary
cost(o)-	of or pertaining to the ribs	costochondral
crani(o)-	belonging or relating to the cranium	craniology
-crine, -crin(o)-	to secrete	endocrine
cry(o)-	cold	cryoablation
cutane-	skin	subcutaneous
cyan(o)-	denotes a blue colour	cyanosis
cyst(o)-, cyst(i)-	of or pertaining to the urinary bladder	cystotomy
cyt(o)-	cell	cytokine
-cyte	cell	leukocyte
-dactyl(o)-	of or pertaining to a finger, toe	dactylology, polydactyly
dent-	of or pertaining to teeth	dentist
dermat(o)-, derm(o)-	of or pertaining to the skin	dermatology
-desis	binding	arthrodesis
dextr(o)-	right, on the right side	dextrocardia
di-	two	diplopia
dia-	through, during, across	dialysis
dif-	apart, separation	different
digit-	of or pertaining to the finger (rare as a root)	digit
-dipsia	suffix meaning '(condition of) thirst'	polydipsia, hydroadipsia, oligodipsia
dors(o)-, dors(i)-	of or pertaining to the back	dorsal, dorsocephalad

Prefix or suffix	Meaning	Example(s)
duodeno-	duodenum	duodenal atresia
dynam(o)-	force, energy, power	hand strength dynamometer
-dynia	pain	vulvodynia
dys-	bad, difficult, defective, abnormal	dysphagia, dysphasia
ec-	out, away	ectopia, ectopic pregnancy
-ectasia, -ectasis	expansion, dilation	bronchiectasis, telangiectasia
ect(o)-	outer, outside	ectoblast, ectoderm
-ectomy	denotes a surgical operation or removal of a body part; resection, excision	mastectomy
-emesis	vomiting condition	haematemesis
encephal(o)-	of or pertaining to the brain; also see **cerebr(o)-**	encephalogram
endo-	denotes something as 'inside' or 'within'	endocrinology, endospore
enter(o)-	of or pertaining to the intestine	gastroenterology
eosin(o)-	red	eosinophil granulocyte
epi-	on, upon	epicardium, epidermis, epidural, episclera, epistaxis
erythr(o)-	denotes a red colour	erythrocyte
ex-	out of, away from	excision, exophthalmos
exo-	denotes something as 'outside' another	exoskeleton
extra-	outside	extradural haematoma
faci(o)-	of or pertaining to the face	facioplegic
fibr(o)	fibre	fibroblast
fore-	before or ahead	forehead
fossa	a hollow or depressed area; trench or channel	fossa ovalis
front-	of or pertaining to the forehead	frontonasal
galact(o)-	milk	galactorrhoea
gastr(o)-	of or pertaining to the stomach	gastric bypass
-genic	formative, pertaining to producing	cardiogenic shock
gingiv-	of or pertaining to the gums	gingivitis
glauc(o)-	denoting a grey or bluish-grey colour	glaucoma
gloss(o)-, glott(o)-	of or pertaining to the tongue	glossology
gluco-	sweet	glucocorticoid

Prefix or suffix	Meaning	Example(s)
glyc(o)-	sugar	glycolysis
-gnosis	knowledge	diagnosis, prognosis
gon(o)-	seed, semen; also, reproductive	gonorrhoea
-gram, -gramme	record or picture	angiogram
-graph	instrument used to record data or picture	electrocardiograph
-graphy	process of recording	angiography
gyn(aec)o-	woman	gynaecomastia
haemangi(o)-	blood vessels	haemangioma
haemat(o)-,haem-	of or pertaining to blood	haematology
halluc-	to wander in mind	hallucinosis
hemi-	one-half	cerebral hemisphere
hepat- (hepatic-)	of or pertaining to the liver	hepatology
heter(o)-	denotes something as 'the other' (of two), as an addition, or different	heterogeneous
hist(o)-, histio-	tissue	histology
home(o)-	similar	homeopathy
hom(o)-	denotes something as 'the same' as another or common	homosexuality
hydr(o)-	water	hydrophobe
hyper-	denotes something as 'extreme' or 'beyond normal'	hypertension
hyp(o)-	denotes something as 'below normal'	hypovolaemia
hyster(o)-	of or pertaining to the womb, the uterus	hysterectomy, hysteria
iatr(o)-	of or pertaining to medicine, or a physician	iatrogenic
-iatry	denotes a field in medicine of a certain body component	podiatry, psychiatry
-ics	organised knowledge, treatment	obstetrics
ileo-	ileum	ileocaecal valve
infra-	below	infrahyoid muscles
inter-	between, among	interarticular ligament
intra-	within	intramural
ipsi-	same	ipsilateral hemiparesis
ischio-	of or pertaining to the ischium, the hip joint	ischioanal fossa

Prefix or suffix	Meaning	Example(s)
-ismus	spasm, contraction	hemiballismus
iso-	denoting something as being 'equal'	isotonic
-ist	one who specialises in	pathologist
-itis	inflammation	tonsillitis
-ium	structure, tissue	pericardium
juxta- (iuxta-)	near to, alongside or next to	juxtaglomerular apparatus
karyo-	nucleus	eukaryote
kerat(o)-	cornea (eye or skin)	keratoscope
kin(e)-, kin(o)-, kinesi(o)-	movement	kinesthaesia
kyph(o)-	humped	kyphoscoliosis
labi(o)-	of or pertaining to the lip	labiodental
lacrim(o)-	tear	lacrimal canaliculi
lact(i)-, lact(o)	milk	lactation
lapar(o)-	of or pertaining to the abdomen wall, flank	laparotomy
laryng(o)-	of or pertaining to the larynx, the lower throat cavity where the voice box is	larynx
latero-	lateral	lateral pectoral nerve
-lepsis, -lepsy	attack, seizure	epilepsy, narcolepsy
lept(o)-	light, slender	leptomeningeal
leuc(o)-, leuk(o)-	denoting a white colour	leukocyte
lingu(a)-, lingu(o)-	of or pertaining to the tongue	linguistics
lip(o)-	fat	liposuction
lith(o)-	stone, calculus	lithotripsy
-logist	denotes someone who studies a certain field	oncologist, pathologist
log(o)-	speech	logopaedics
-logy	denotes the academic study or practice of a certain field	haematology, urology
lymph(o)-	lymph	lymphoedema
lys(o)-, -lytic	dissolution	lysosome
-lysis	destruction, separation	paralysis

Prefix or suffix	Meaning	Example(s)
macr(o)-	large, long	macrophage
-malacia	softening	osteomalacia
mammill(o)-	of or pertaining to the nipple	mammillitis
mamm(o)-	of or pertaining to the breast	mammogram
manu-	of or pertaining to the hand	manufacture
mast(o)-	of or pertaining to the breast	mastectomy
meg(a)-, megal(o)-, -megaly	enlargement, million	splenomegaly, megameter
melan(o)-	black colour	melanin
mening(o)-	membrane	meningitis
meta-	after, behind	metacarpus
-meter	instrument used to measure or count	sphygmomanometer
metr(o)-	pertaining to conditions of the uterus	metrorrhagia
-metry	process of measuring	optometry
micro-	denoting something as small, or relating to smallness	microscope
milli-	thousandth	millilitre
mon(o)-	single	infectious mononucleosis
morph(o)-	form, shape	morphology
muscul(o)-	muscle	musculoskeletal system
my(o)-	of or relating to muscle	myoblast
myc(o)-	fungus	onychomycosis
myel(o)-	of or relating to bone marrow or spinal cord	myeloblast
myri-	ten thousand	myriad
myring(o)-	eardrum	myringotomy
narc(o)-	numb, sleep	narcolepsy
nas(o)-	of or pertaining to the nose	nasal
necr(o)-	death	necrosis, necrotising fasciitis
neo-	new	neoplasm
nephr(o)-	of or pertaining to the kidney	nephrology
neur(i)-, neur(o)-	of or pertaining to nerves and the nervous system	neurofibromatosis