MEDICAL TERMINOLOGY: RESPIRATORY SYSTEM

Structures of the respiratory system (Figure 1)

- The **respiratory system** brings oxygen into the body for transportation to the cells. It also removes carbon dioxide and some water waste from the body. For descriptive purposes, the respiratory system is divided into upper and lower respiratory tracts.
- The **upper respiratory tract** consists of the nose, mouth, pharynx, epiglottis, larynx, and trachea.
- The **lower respiratory tract** consists of the bronchial tree and lungs. These structures are located within, and protected by, the thoracic cavity which is also known as the rib cage.

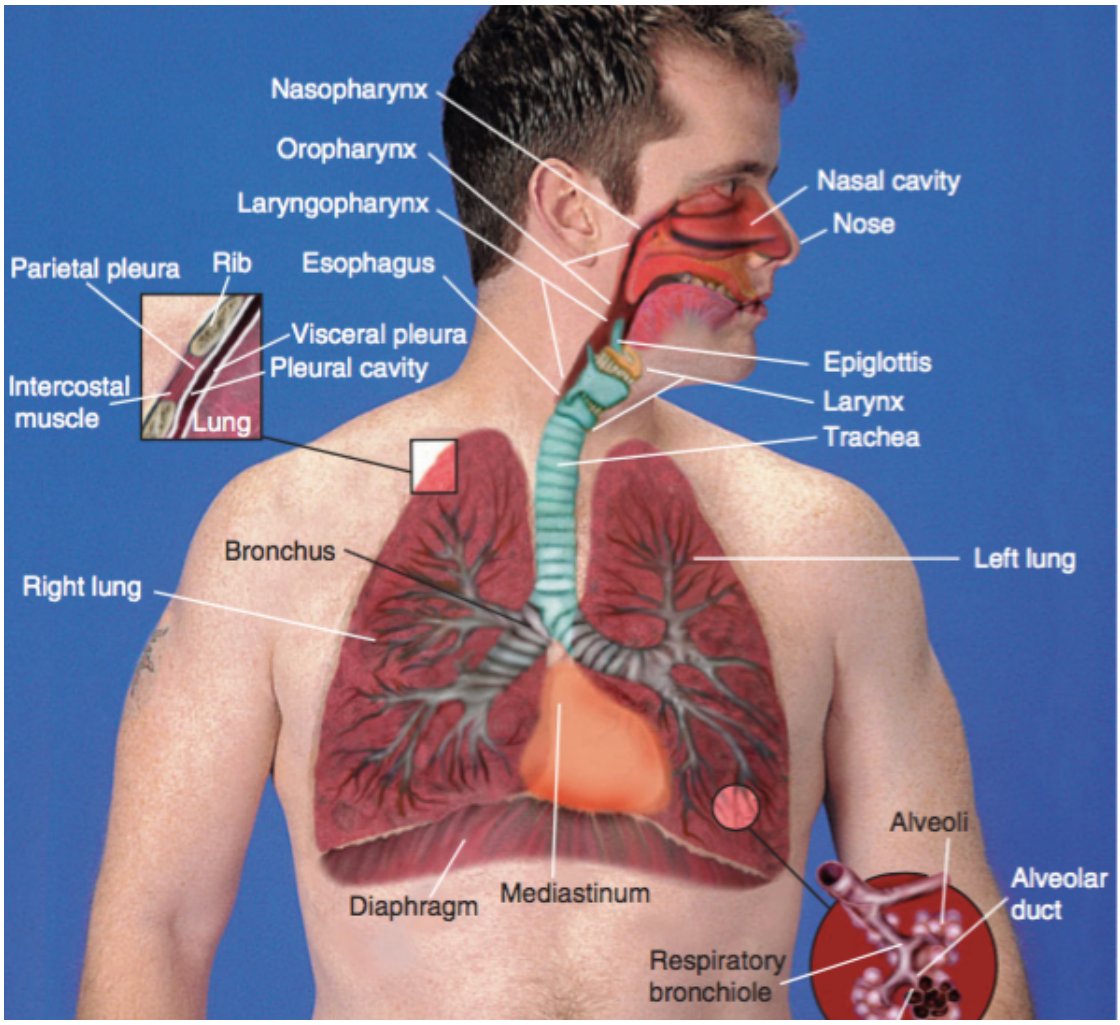

Figure 1. Respiratory system

Suffixes for Respiration

Suffix	Meaning	Example	Definition of Example
-**pnea**	breathing	orthopenia Or-THOP-nē-a	difficulty that is relieved by assuming an upright (ortho-) position
-**oxia***	level of oxygen	hypoxia hī-POK-sē-a	decreased amount of oxygen in the tissues
-**capnia***	level of carbon dioxide	hypercapnia hī-per-KAP-nē-a	increased carbon dioxide in the tissues
-**phonia**	difficulty in speaking	dysphonia dis-FŌ-nē-a	difficulty in speaking

*When referring to levels of oxygen and carbon dioxide in the blood, the suffix *-emia* is used, as in hypoxemia, hypercapnemia.

Roots for respiratory passageways

Root	Meaning	Example	Definition of Example
nas/o	nose	intranasal in-tra-NĀ--zal	within the nose
rhin/o	nose	rhinoplasty RĪ-nō-plas-tē	plastic repair of the nose
pharyng/o*	pharynx	Pharyngeal fa-RIN-jē-al	pertaining to the pharynx
laryng/o	larynx	laryngospasm la-RIN-gō-spazm	spasm (sudden contraction) of the larynx
trache/o	Trachea	Tracheotome TRĀ-kē-ō-tōm	instrument used to incise the trachea
bronch/o, **bronch**/i	Bronchus	Bronchogenic brong-kō-GEN-ik	originating in a bronchus
bronchiol	Bronchiole	Bronchiolectasis brong-kē-ō-LEK-ta-sis	dilatation of the bronchioles

*An e is added to the root before the adjective ending -al.

Roots for the Lungs and Breathing

Root	Meaning	Example	Definition of Example
phren/o	diaphragm	phrenic FREN-ik	pertaining to the diaphragm
phrenic/o	phrenic nerve	phrenicectomy fren-i-SEK-tō-mē	partial excision of the phrenic nerve
pleur/o	pleura	pleurodesis plū-ROD-e-sis	fusion of the pleura
pulm/o, **pulmon**/o	lung	extrapulmonary EKS-tra-pul-mō-ner-ē	outside the lungs
pneumon/o	lung	pneumonitis nū-mō-NĪ-tis	inflammation of the lung; pneumonia
pneum/o, **pneumat**/o	air, gas; also respiration, lung	pneumothorax nū-mō-THŌ-raks	presence of air in the thorax (pleural space)
spir/o	breathing	spirometer spī-ROM-e-ter	instrument for measuring breathing volumes

Symptoms, Conditions and Disorders

Key terms	Definition
dyspnea disp-NĒ-a	Difficult or labored breathing, sometimes with pain; “air hunger”
anoxia an-OK-sē-a	Lack or absence of oxygen in the tissues; often used incorrectly to mean hypoxia
asphyxia as-FIK-sē-a	Condition caused by inadequate intake of oxygen; suffocation (literally “lack of pulse”)
aspiration as-pi-RĀ-shun	The accidental inhalation of food or other foreign material into the lungs. Also means the withdrawal of fluid from a cavity by suction
asthma AZ-ma	A disease characterized by dyspnea and wheezing caused by spasm of the bronchial tubes or swelling of their mucous membranes
cyanosis sī-a-NŌ-sis	Bluish discoloration of the skin caused by lack of oxygen in the blood (adjective: cya- notic)
sleep apnea AP-nē-a	Intermittent periods of breathing cessation during sleep. Central sleep apnea arises from failure of the brain stem to stimulate breathing. Obstructive sleep apnea results from airway obstruction during deep sleep, as from obesity or enlarged tonsils

Symptoms, Conditions and Disorders: continue

Key terms	Definition
empyema *em-pī-Ē-ma*	Accumulation of pus in a body cavity, especially the pleural space; pyothorax
hemothorax *hē-mō-THOR-aks*	Presence of blood in the pleural space
hydrothorax *hī-drō-THOR-aks*	Presence of fluid in the pleural space
hyperventilation hī-per-ven-ti-LĀ-shun	Increased rate and depth of breathing; increase in the amount of air entering the alveoli
hypoventilation *hī-pō-ven-ti-LĀ-shun*	Decreased rate and depth of breathing; decrease in the amount of air entering the alveoli
influenza *in-flū-EN-za*	An acute, contagious respiratory infection causing fever, chills, headache, and muscle pain; "flu"
pneumonia *nū-MŌ-nē-a*	Inflammation of the lungs generally caused by infection. May involve the bronchioles and alveoli (bronchopneumonia) or one or more lobes of the lung (lobar pneumonia)

MEDICAL TERMINOLOGY: CIRCULATION SYSTEM

THE CARDIOVASCULAR SYSTEM

Blood circulates throughout the body in the **cardiovascular system**, which consists of the **heart** and the blood **vessels**. This system forms a continuous circuit that delivers oxygen and nutrients to all cells and carries away waste products. The lymphatic system also functions in circulation. Its vessels drain fluid and proteins left in the tissues and return them to the bloodstream. The lymphatic system plays a part in immunity and in the digestive process as well.

1. The Heart

The heart is located between the lungs, with its point, or **apex**, directed toward the inferior and left. The wall of the heart consists of three layers (Figure 1), all named with the root *cardi*, meaning "heart." Moving from the innermost to the outermost layer, these are the (Figure 2):

1. Endocardium—a thin membrane that lines the chambers and **valves** (the prefix *endo-* means "within").

2. Myocardium—the thick muscle layer that makes up most of the heart wall (the root *my/o* means "muscle").

3. Epicardium—a thin membrane that covers the heart (the prefix *epi-* means "on").

A fibrous sac, the **pericardium**, contains the heart and anchors it to surrounding structures, such as the sternum (breastbone) and diaphragm (the prefix *peri-* means "around").

Each of the heart's upper receiving chambers is an **atrium** (plural: atria). Each of the lower pumping chambers is a **ventricle** (plural: ventricles).

The chambers of the heart are divided by walls, each of which is called a septum. The interventricular septum separates the two ventricles; the interatrial septum divides the two atria. There is also a septum between the atrium and ventricle on each side. The heart pumps blood through two circuits. The right side pumps blood to the lungs to be oxygenated through the **pulmonary circuit**. The left side pumps to the remainder of the body through the **systemic circuit** (Figure 2).

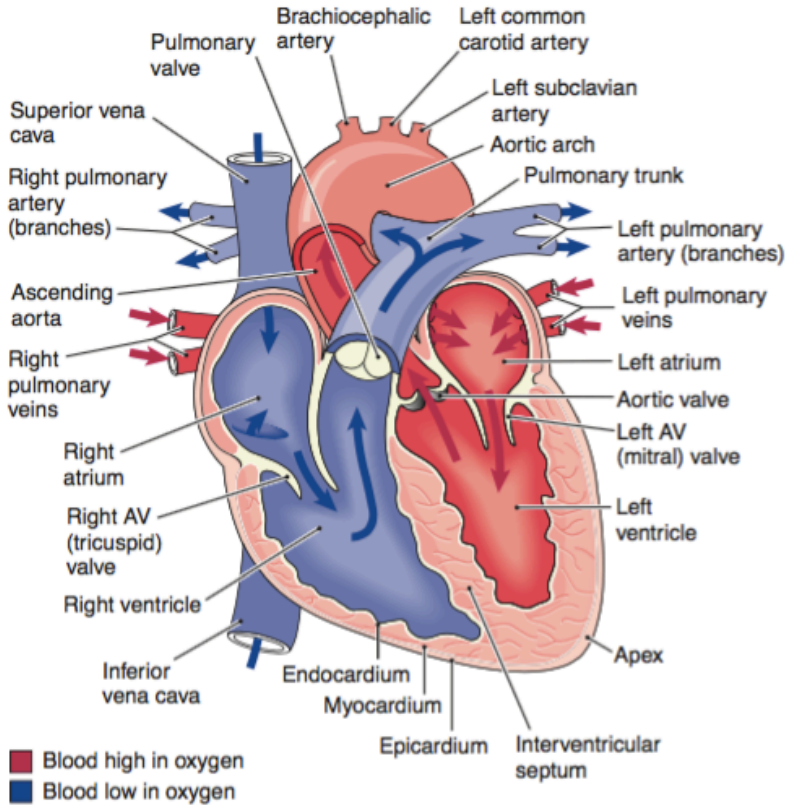

Figure 1. The heart

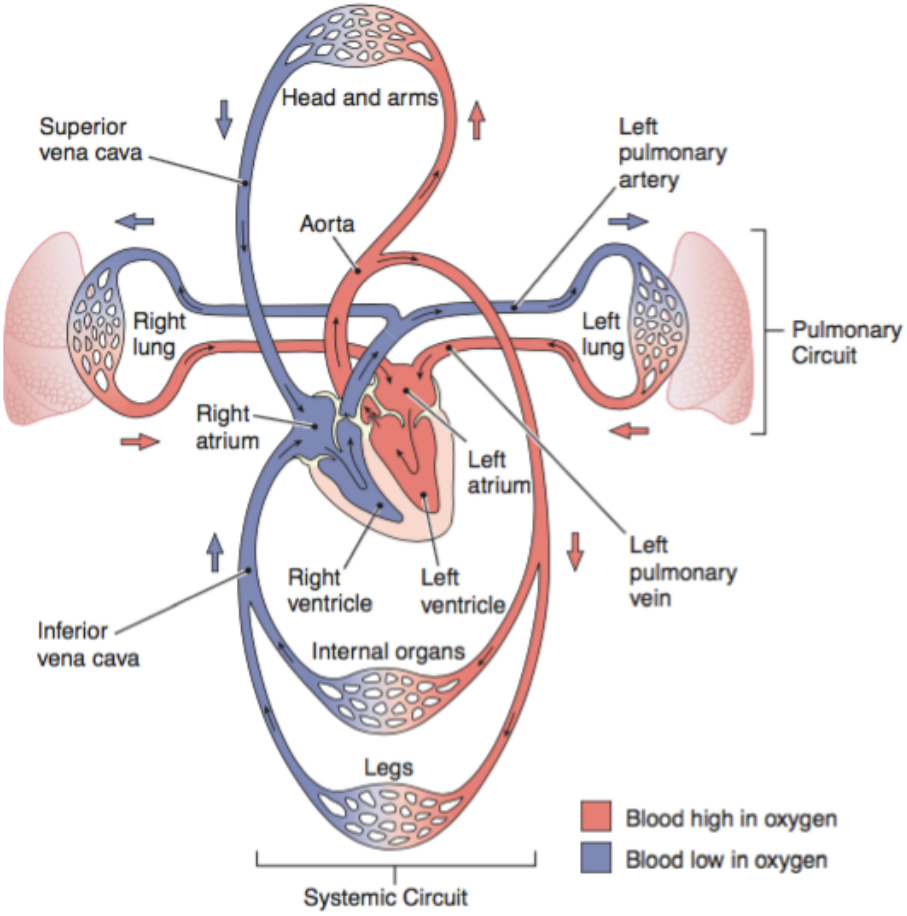

Figure 2. Circulatory system: pulmonary circuit and systemic circuit

2. The Vascular System

The vascular system consists of:

1. **Arteries** that carry blood away from the heart
2. **Arterioles,** vessels smaller than arteries that lead into the capillaries
3. **Capillaries,** the smallest vessels, through which exchanges take place between the blood and the tissues
4. **Venules**, small vessels that receive blood from the capillaries and drain into the veins
5. **Veins** that carry blood back to the heart

All arteries, except the pulmonary artery (and the umbilical artery in the fetus), carry highly oxygenated blood. They are thick-walled, elastic vessels that carry blood under high pressure. All veins, except the pulmonary vein (and the umbilical vein in the fetus), carry blood low in oxygen. Veins have thinner, less elastic walls and tend to give way under pressure. Like the heart, veins have one-way valves that keep blood flowing forward.

Root for the Heart

Root	Meaning	Example	Definition of Example
cardi/o	heart	cardiomyopathy* *kar-dē-ō-mī-OP-a-thē*	any disease of the heart muscle
oatri/o	atrium	Atriotomy *ā-trē-OT-ō-mē*	surgical incision of an atrium
ventricul/o	cavity, ventricle	Supraventricular *sū-pra-ven-TRIK-ū-lar*	above a ventricle
valv/o, valvul/o	valve	Valvulotome *VAL-vū-lō-tōm*	instrument for incising a valve

Roots for the Blood Vessels

Root	Meaning	Example	Definition of Example
angi/o	vessel	angiography *an-jē-OG-ra-fē*	x-ray imaging of a vessel
vas/o, vascul/o	vessel, duct	vasospasm *VĀ-sō-spazm*	sudden contraction of a vessel

Root	Meaning	Example	Definition of Example
arter/o, arteri/o	artery	endarterial *end-ar-TĒ-rē-al*	within an artery
arteriol/o	arteriole	arteriolar ar-tē-rē-Ō-lar	pertaining to an arteriole
aort/o	aorta	aortoptosis *ā-or-top-TŌ-sis*	downward displacement of the aorta
ven/o, ven/i	vein	venous *VĒ-nus*	pertaining to a vein
phleb/o	vein	phlebotomy *fle-BOT-ō-mē*	incision of a vein to withdraw blood

Cardiovascular Disorders

Term	Definition
arrhythmia *a-RITH-mē-a*	Any abnormality in the rate or rhythm of the heartbeat (literally "without rhythm;" note doubled r). Also called dysrhythmia
arteriosclerosis *ar-tēr-ē-ō-skler-Ō-sis*	Hardening (sclerosis) of the arteries, with loss of capacity and loss of elasticity, as from fatty deposits (plaque), deposit of calcium salts, or scar tissue formation
atherosclerosis *ath-er-ō-skler-Ō-sis*	The development of fatty, fibrous patches (plaques) in the lining of arteries, causing narrowing of the lumen and hardening of the vessel wall. The most common form of arteriosclerosis is hardening of the arteries. The root ather/o means "porridge" or "gruel"
angina pectoris *an-JĪ-na PEK-tō-ris*	A feeling of constriction around the heart or pain that may radiate to the left arm or shoulder, usually brought on by exertion; caused by insufficient blood supply to the heart
cerebrovascular accident (CVA) or stroke *ser-e-brō-VAS-kū-lar*	Sudden damage to the brain resulting from reduction of blood flow. Causes include atherosclerosis, embolism, thrombosis, or hemorrhage from a ruptured aneurysm; commonly called stroke

Term	Definition
shock	Circulatory failure resulting in an inadequate blood supply to the tissues. Cardiogenic shock is caused by heart failure; hypovolemic shock is caused by a loss of blood volume; septic shock is caused by bacterial infection
occlusion *ō-KLŪ-zhun*	A closing off or obstruction, as of a vessel
plaque *plak*	A patch. With regard to the cardiovascular system, a deposit of fatty material and other substances on a vessel wall that impedes blood flow and may block the vessel; atheromatous plaque
dyspnea *DISP-nē-a*	Difficult or labored breathing (-pnea)
embolism *EM-bō-lizm*	Obstruction of a blood vessel by a blood clot or other matter carried in the circulation
embolus *EM-bō-lus*	A mass carried in the circulation. Usually a blood clot, but also may be air, fat, bacteria, or other solid matter from within or from outside the body
edema *e-DĒ-ma*	Swelling of body tissues caused by the presence of excess fluid. Causes include cardiovascular disturbances, kidney failure, inflammation, and malnutrition
fibrillation *fi-bri-LĀ-shun*	Spontaneous, quivering, and ineffectual contraction of muscle fibers, as in the atria or the ventricles
hypertension *hī-per-TEN-shun*	A condition of higher-than-normal blood pressure. Essential (primary, idiopathic) hyper- tension has no known cause
infarct *in-FARKT*	An area of localized tissue necrosis (death) resulting from a blockage or a narrowing of the artery that supplies the area
ischemia *is-KĒ-mē-a*	Local deficiency of blood supply caused by circulatory obstruction (root: hem/o)
syanosis *sī-a-NŌ-sis*	bluish discoloration of the skin caused by lack of oxygen
phlebitis *fle-BĪ-tis*	Inflammation of a vein
Term	**Definition**

deep vein thrombosis (DVT)	Thrombophlebitis involving the deep veins
bradycardia *brad-ē-KAR-dē-a*	A slow heart rate, of less than 60 bpm
tachycardia *tak-i-KAR-dē-a*	An abnormally rapid heart rate, usually over 100 bpm
myocardial infarction (MI) *mī-ō-KAR-dē-al in-FARK-shun*	Localized necrosis (death) of cardiac muscle tissue resulting from blockage or narrowing of the coronary artery that supplies that area. Myocardial infarction is usually caused by formation of a thrombus (clot) in a vessel
rheumatic heart disease *rū-MAT-ik*	Damage to heart valves after infection with a type of Streptococcus (group A hemolytic Streptococcus). The antibodies produced in response to the infection produce valvular scarring usually involving the mitral valve
septal defect *SEP-tal*	An opening in the septum between the atria or ventricles; a common cause is persistence of the foramen ovale (for-Ā-men ō-VAL-ē), an opening between the atria that bypasses the lungs in fetal circulation
heart failure	A condition caused by the inability of the heart to maintain adequate blood circulation
angina pectoris *an-JĪ-na PEK-tō-ris*	A feeling of constriction around the heart or pain that may radiate to the left arm or shoulder, usually brought on by exertion; caused by insufficient blood supply to the heart
patent ductus arteriosus *PĀ-tent DUK-tus ar-tēr-ē-Ō-sus*	Persistence of the ductus arteriosus after birth. The ductus arteriosus is a vessel that connects the pulmonary artery to the descending aorta in the fetus to bypass the lungs

THE LYMPHATIC SYSTEM

The lymphatic system is a widely distributed system with multiple functions. **Its role in circulation is to return excess fluid and proteins from the tissues to the bloodstream**. Blind-ended lymphatic capillaries pick up these materials in the tissues and carry them into larger vessels. The fluid carried in the lymphatic system is called lymph. Lymph drains from the lower part of the body and the upper left side into the thoracic duct (left lymphatic duct),

which travels upward through the chest and empties into the left subclavian vein near the heart.

The right lymphatic duct drains the body's upper right side and empties into the right subclavian vein (Figure 1).

Lymphatic Circulation

Another major function of the lymphatic system is **to protect the body from impurities and invading microorganisms.** Along the path of the lymphatic vessels are small masses of lymphoid tissue, the lymph nodes. Their function is to filter the lymph as it passes through. They are concentrated in the cervical (neck), axillary (armpit), mediastinal (chest), and inguinal (groin) regions (Figure 2).

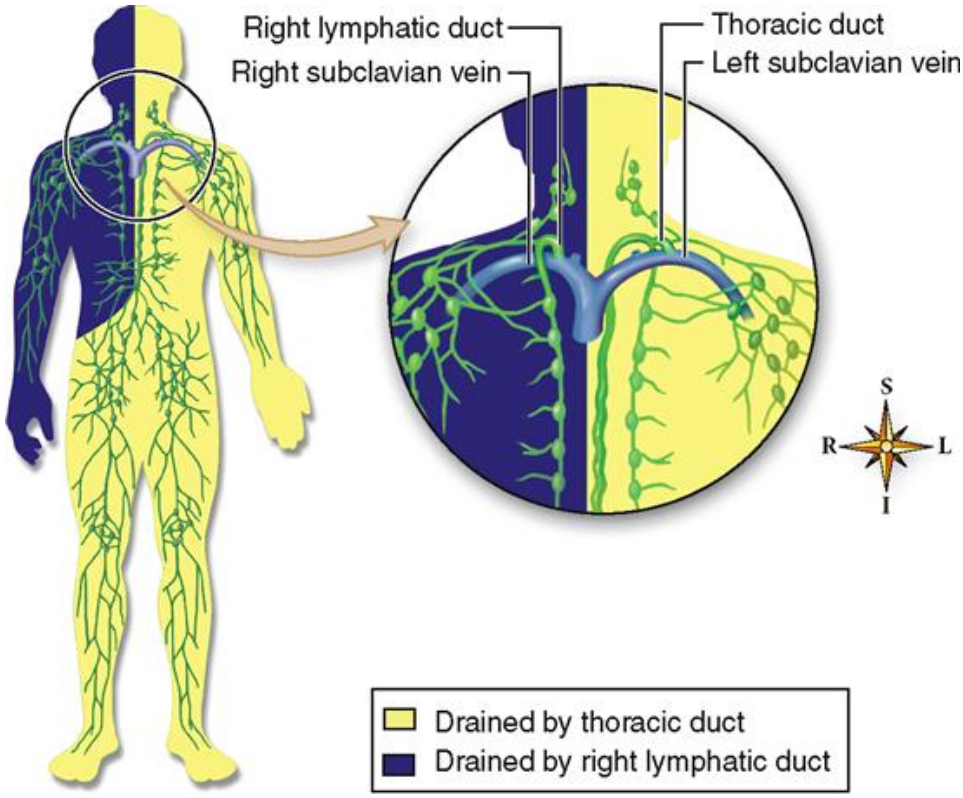

Figure 1. Lymphatic system

Other protective organs and tissues of the lymphatic system include the (Figure 3):

1. Tonsils, located in the throat (pharynx). They filter inhaled or swallowed materials and aid in immunity early in life.
2. Thymus in the chest, above the heart. It processes and stimulates lymphocytes active in immunity.
3. Spleen in the upper left region of the abdomen. It filters blood and destroys old red blood cells.
4. Appendix, attached to the large intestine. It may aid in the development of immunity.

5. Peyer patches, in the lining of the intestine. They help protect against invading microorganisms.

A final function of the lymphatic system is to **absorb digested fats from the small intestine**. These fats are then added to the blood with the lymph that drains from the thoracic duct.

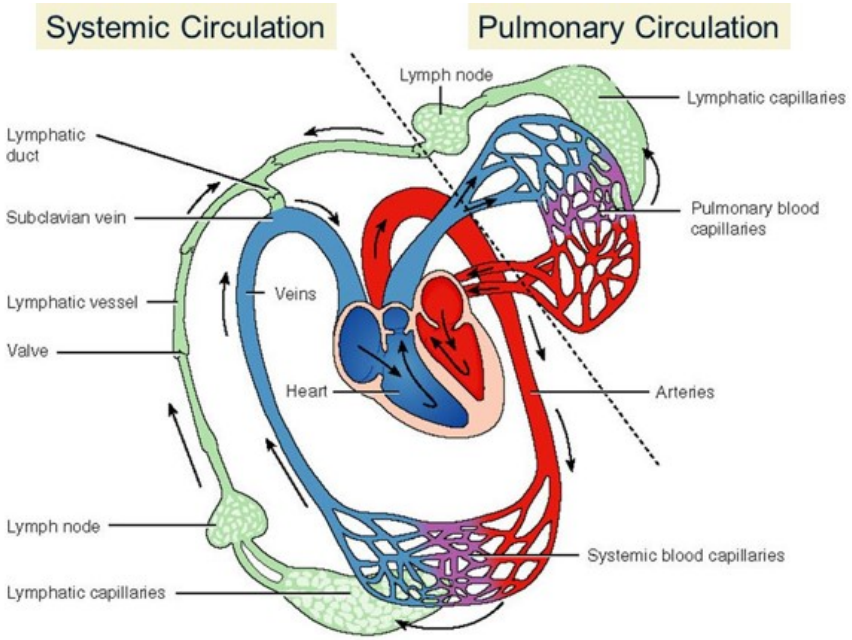

Figure 2. Lymphatic circulation: Arrows show direction of flow of lymph and blood

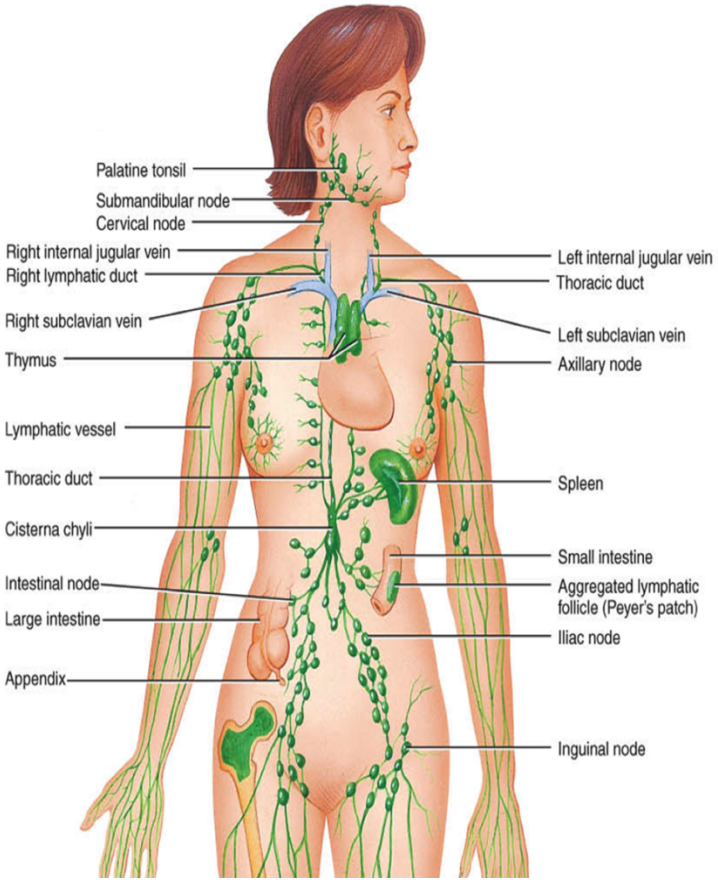

Figure 3. Protective organs and tissues of the lymphatic system

Roots for the Lymphatic System

Root	Meaning	Example	Definition of Example
lymph/o	lymph, lymphatic system	lymphoid *LIM-foyd*	resembling lymph or lymphatic tissue
lymphaden/o	lymph node	lymphadenitis *lim-fad-e-NĪ-tis*	inflammation of a lymph node
lymphangi/o	lymphatic vessel	lymphangiogram *lim-FAN-jē-ō-gram*	x-ray image of lymphatic vessels
splen/o	spleen	splenalgia *splē-NAL-jē-a*	pain in the spleen
thym/o	thymus	athymia *a-THĪ-mē-a*	absence of the thymus
tonsil/o	tonsil	tonsillar *TON-sil-ar*	pertaining to a tonsil

Key Clinical Terms

Term	Definition
lymphedema *lim-fe-DĒ-ma*	swelling of tissues with lymph caused by obstruction or excision of lymphatic vessels
lymphoma *lim-FŌ-ma*	any neoplastic disease of lymphoid tissue
Lymphangitis *lim-fan-JĪ-tis*	is inflammation of lymphatic vessels. Note the linear red streak proximal to a skin infection

MEDICAL TERMINOLOGY: NERVOUS SYSTEM

Nervous System

For study purposes, the nervous system may be divided structurally into two parts (Figure 1):

- The central nervous system (CNS), consisting of the brain and spinal cord
- The peripheral nervous system (PNS), consisting of all nervous tissue outside the brain and spinal cord

Functionally, the nervous system can be divided into the:

- Somatic nervous system, which controls skeletal muscles
- Visceral or autonomic nervous system (ANS), which controls smooth muscle, cardiac muscle, and glands. The ANS regulates responses to stress and helps to maintain homeostasis.

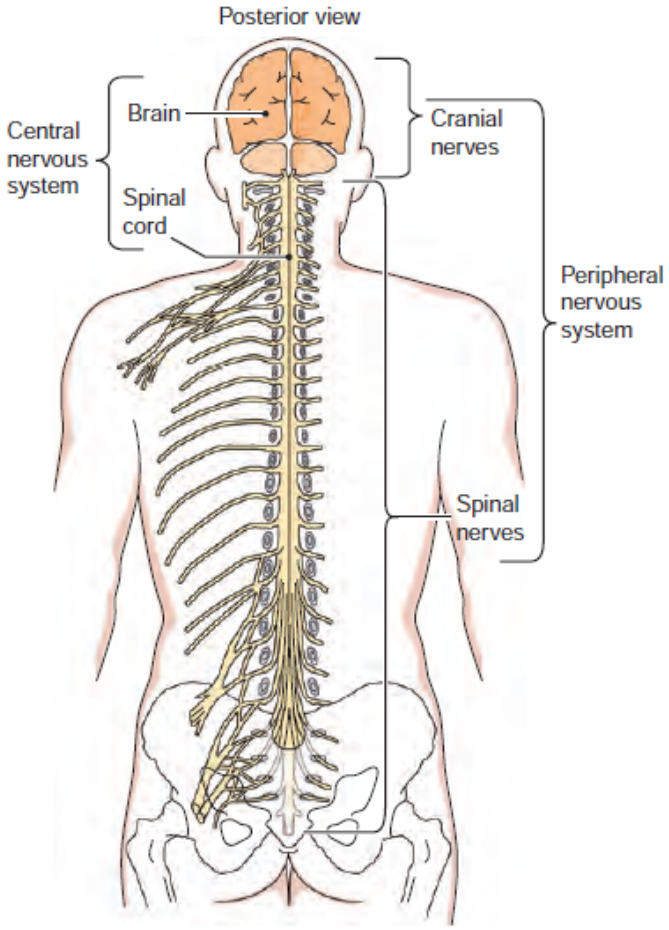

Figure 1. Anatomic divisions of the nervous system.

Neurons

Two types of cells are found in the nervous system. **Neurons**, or nerve cells, make up the conducting tissue of the nervous system. **Neuroglia** are the cells that support and protect nervous tissue. The neuron is the nervous system's basic functional unit. Each neuron has two types of fibers extending
from the cell body:

■ The **dendrite** carries impulses toward the cell body.

■ The **axon** carries impulses away from the cell body.

Some axons are covered with **myelin**, a whitish, fatty material that insulates and protects the axon and speeds electric conduction. Axons so covered are described as *myelinated*, and they make up the **white matter** of the nervous system. Unmyelinated tissue makes up the nervous system's **gray matter**.

Each neuron is part of a pathway that carries information through the nervous system. A neuron that transmits impulses toward the CNS is a **sensory**, or **afferent**, neuron; a neuron that transmits impulses away from the CNS is a **motor**, or **efferent**, neuron. There are also connecting cells within the CNS called **interneurons**.

A **synapse** is the point of contact between two neurons. At the synapse, energy is passed from one cell to another, usually by means of a neurotransmitter and sometimes by direct transfer of electric current.

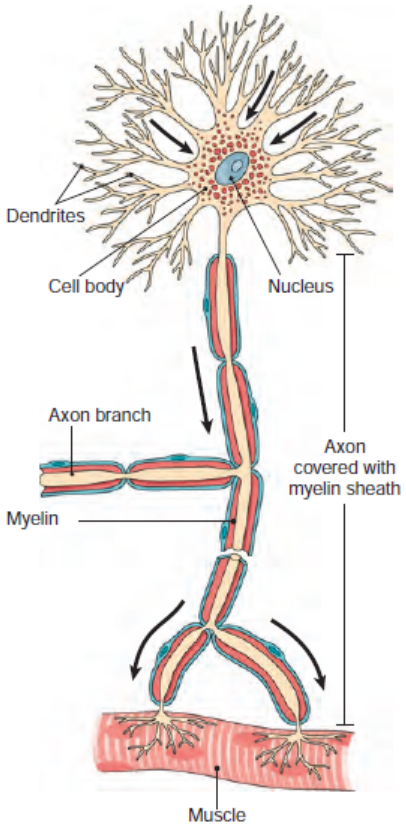

Figure 2. A motor neuron. The break in the axon denotes length. The arrows show the direction of the nerve impulse.

The Brain

The brain is nervous tissue contained within the cranium. It consists of the **cerebrum**, **diencephalon**, **brainstem**, and **cerebellum**. The cerebrum is the largest part of the brain; it is composed largely of white matter with a thin outer layer of gray matter, the **cerebral cortex**. It is within the cortex that the higher brain functions of memory, reasoning, and abstract thought occur (Figure 1).

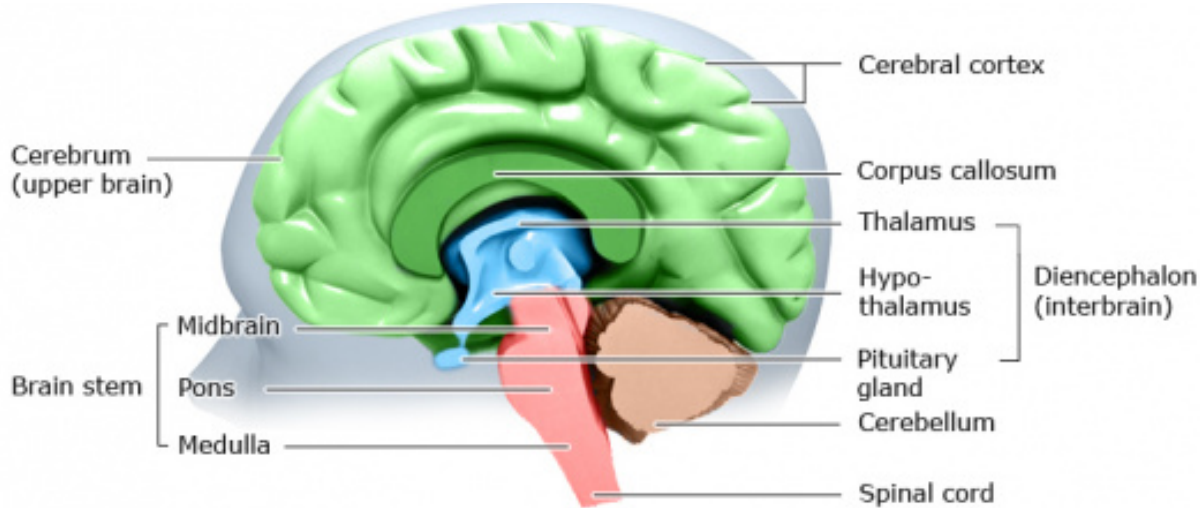

Figure 1. Brain, sagittal section. The main divisions are shown.

Protecting the Brain

Within the brain are four ventricles (cavities) in which cerebrospinal fluid (CSF) is formed. This fluid circulates around the brain and spinal cord, acting as a protective cushion for these tissues.

Covering the brain and the spinal cord are three protective layers, together called the meninges. All are named with the Latin word *mater*, meaning "mother," to indicate their protective function (Figure 2). They are the:

1. **Dura mater**, the outermost and toughest of the three. *Dura* means "hard."
2. **Arachnoid mater**, the thin, web-like middle layer. It is named for the Latin word for spider, because it resembles a spider web.
3. **Pia mater**, the thin, vascular inner layer, attached directly to the tissue of the brain and spinal cord. *Pia* means "tender."

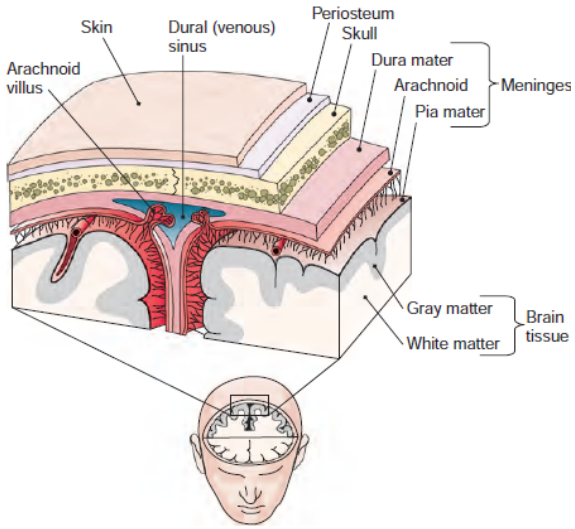

Figure 2. The meninges. The three protective layers and adjacent tissue are shown in a frontal section of the head

THE CRANIAL NERVES

Number	Name	Function
I	**olfactory** ol-FAK-tō-rē	carries impulses for the sense of smell
II	**optic** OP-tik	carries impulses for the sense of vision
III	**oculomotor** ok-ū-lō-MŌ-tor	controls movement of eye muscles
IV	**trochlear** TROK-lē-ar	controls a muscle of the eyeball
V	**Trigeminal** trī-JEM-i-nal	carries sensory impulses from the face; controls chewing muscles
VI	**abducens** ab-DŪ-sens	controls a muscle of the eyeball
VII	**Facial** FĀ-shal	controls muscles of facial expression, salivary glands, and tear glands; conducts some impulses for taste
VIII	**vestibulocochlear** **ves-tib-ū-lō-KOK-lē-ar**	conducts impulses for hearing and equilibrium; also called auditory or acoustic nerve
IX	**glossopharyngeal** **glos-ō-fa-RIN-jē-al**	conducts sensory impulses from tongue and pharynx; stimulates parotid salivary gland and partly controls swallowing
X	**vagus** **VĀ-gus**	supplies most organs of thorax and abdomen; controls digestive secretions
XI	**spinal accessory** **ak-SES-ō-rē**	controls muscles of the neck
XII	**hypoglossal** **hī-pō-GLOS-al**	controls muscles of the tongue

THE SPINAL NERVES

Thirty-one pairs of spinal nerves connect with the spinal Cord. These nerves are grouped in the segments of the cord as follows (Figure 3):

- Cervical: 8
- Thoracic: 12
- Lumbar: 5
- Sacral: 5
- Coccygeal: 1

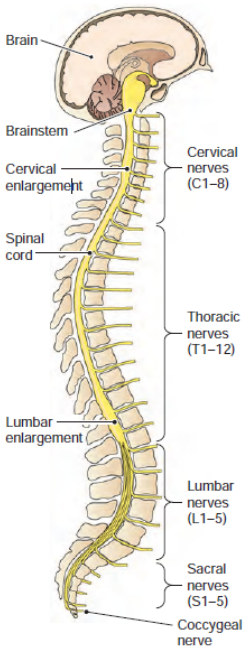

Figure 3. Spinal cord, lateral view. The divisions of the spinal nerves are shown.

Roots for the Nervous System and the Spinal Cord

Root	Meaning	Example	Definition of Example
neur/o, neur/i	nervous system, nervous tissue, nerve	Neurotrophin *nū-rō-TRŌ-fin*	factor that promotes nerve growth (*troph/o* means "nourish")
gli/o	neuroglia	glial *GLĪ-al*	pertaining to neuroglia
gangli/o, ganglion/o	ganglion	ganglioma *gang-glē-Ō-ma*	tumor of a ganglion
mening/o, meninge/o	meninges	meningocele *me-NING-gō-sēl*	hernia of the meninges
myel/o	spinal cord (also bone marrow)	hematomyelia *hē-ma-tō-mī-Ē-lē-a*	hemorrhage into the spinal cord
radicul/o	spinal nerve root	radiculopathy *ra-dik-u--LOP-a-the*	Any disease of a spinal nerve root

Roots for the Brain

Root	Meaning	Example	Definition of Example
encephal/o	brain	Anencephaly *an-en-SEF-a-le*	absence of a brain

Root	Meaning	Example	Definition of Example
cerebr/o	cerebrum (loosely, brain)	infracerebral *in-fra-SER-e-bral*	below the cerebrum
cortic/o	cerebral cortex, outer portion	*corticospinal* *kor-ti-ko--SPI--nal*	pertaining to the cerebral cortex and spinal cord
cerebell/o	cerebellum	supracerebellar su--pra-ser-e-BEL-ar	above the cerebellum
thalam/o	thalamus	thalamotomy thal-a-MOT-o—me	Incision of the thalamus
ventricul/o	cavity, ventricle	intraventricular in-tra-ven-TRIK-u--lar	within a ventricle
medull/o	medulla oblongata (also spinal cord)	medullary MED-u--lar-e	pertaining to the medulla
medull/o	medulla oblongata (also spinal cord)	medullary MED-u--lar-e	pertaining to the medulla
psych/o	mind	psychogenic sī-kō-JEN-ik	originating in the mind
narc/o	stupor, unconsciousness	narcosis nar-KŌ-sis	state of stupor induced by drugs
somn/o, somn/i	sleep	somnolence SOM-nō-lens	sleepiness

Suffixes for the Nervous System

Suffix	Meaning	Example	Definition of Example
-phasia	speech	*heterophasia* *het-er-ō-FĀ-zē-a*	uttering words that are different from those intended
-lalia	speech, babble	*coprolalia* *kop-rō-LĀ-lē-a*	compulsive use of obscene words (copro- means “feces”)
-lexia	reading	*bradylexia* *brad-ē-LEK-sē-a*	slowness in reading
-plegia	paralysis	tetraplegia tet-ra-PLE--jē-a	paralysis of all four limbs

Suffix	Meaning	Example	Definition of Example
-paresis*	partial paralysis, weakness	hemiparesis hem-i-pa-RĒ-sis	partial paralysis of one side of the body
-lepsy	seizure	narcolepsy NAR-kō-lep-sē	condition marked by sudden episodes of sleep
-phobia*	persistent, irrational fear	agoraphobia ag-o-ra-FŌ-bē-a	fear of being in a public place (from Greek agora, meaning "marketplace")
-mania*	excited state, obsession	megalomania meg-a-lō-MĀ-nē-a	exaggerated self-importance; "delusions of grandeur"

Key Terms

Term	Definition
afferent AF-er-ent	Carrying toward a given point, such as the sensory neurons and nerves that carry impulses toward the CNS (root fer means "to carry")
efferent EF-er-ent	Carrying away from a given point, such as the motor neurons and nerves that carry impulses away from the CNS (root fer means "to carry")
axon AK-son	The fiber of a neuron that conducts impulses away from the cell body
gray matter	Unmyelinated tissue of the nervous system
white matter	Myelinated tissue of the nervous system
synapse *SIN-aps*	The junction between two neurons; also the junction between a motor neuron and a muscle or gland
concussion *kon-KUSH-un*	Injury resulting from a violent blow or shock; a brain concussion usually results in loss of consciousness
confusion *kon-FŪ-zhun*	A state of reduced comprehension, coherence, and reasoning ability resulting in inappropriate responses to environmental stimuli
seizure *SĒ-zhur*	A sudden attack, as seen in epilepsy. The most common forms of seizure are tonic–clonic, or grand mal (gran mal) (from French, meaning "great illness"); absence seizure, or petit mal (pet-Ē mal), meaning "small illness;" and psychomotor seizure
epilepsy *EP-i-lep-sē*	A chronic disease involving periodic sudden bursts of electric activity from the brain, resulting in seizures

Term	Definition
convulsion *kon-VUL-shun*	A series of violent, involuntary muscle contractions. A tonic convulsion involves prolonged muscle contraction; in a clonic convulsion, there is alternation of contraction and relaxation. Both forms appear in grand mal epilepsy
encephalitis *en-sef-a-LĪ-tis*	Inflammation of the brain
dementia *dē-MEN-shē-a*	A gradual and usually irreversible loss of intellectual function
hemiplegia *hem-i-PLĒ-jē-a*	Paralysis of one side of the body
meningitis *men-in-JĪ-tis*	Inflammation of the meninges
narcolepsy *NAR-kō-lep-sē*	Brief, uncontrollable episodes of sleep during the day

Medical Terminology: Cell, Tissue, and Organs

Body organisation

All organisms are built from simple to more complex levels (Figure 1). Chemicals form the materials that make up cells, which are the body's structural and functional units. Groups of cells working together make up tissues, which in turn make up the organs, which have specialized functions.
Organs become components of the various systems, which together comprise the whole organism.

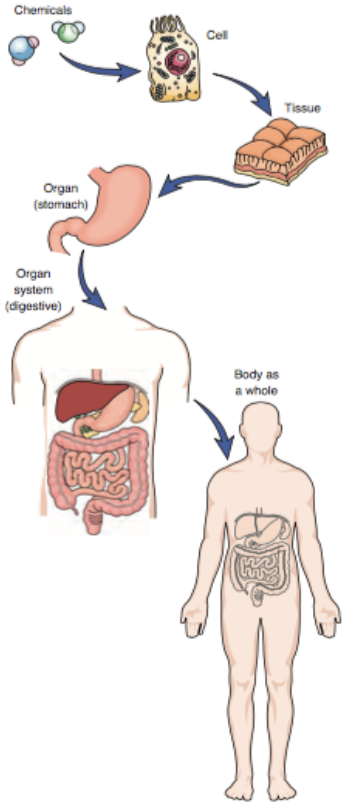

Figure 1. Levels of organization. The organ shown is the stomach, which is part of the digestive system.

The Cell

The **cell** is the basic unit of living organisms (Figure 2). Cells accomplish all the activities and produce all the components of the body. They carry out **metabolism**, the sum of all the body's physical and chemical activities. They provide the energy for metabolic reactions in the form of the chemical **ATP** (adenosine triphosphate), commonly described as the energy compound of the cell.

The main categories of organic compounds contained in cells are:

1. **Proteins**, which include the **enzymes**, some hormones, and structural materials.
2. **Carbohydrates**, which include sugars and starches. The main carbohydrate is the sugar **glucose**, which circulates in the blood to provide energy for the cells.
3. **Lipids**, which include fats. Some hormones are derived from lipids, and adipose (fat) tissue is designed to store lipids.

Within the **cytoplasm** that fills the cell are subunits called **organelles**, each with a specific function. Diseases may affect specific parts of cells. Cystic fibrosis and diabetes, for example, involve the plasma membrane. Other disorders originate with mitochondria, the endoplasmic reticulum (ER), lysosomes, or peroxisomes.

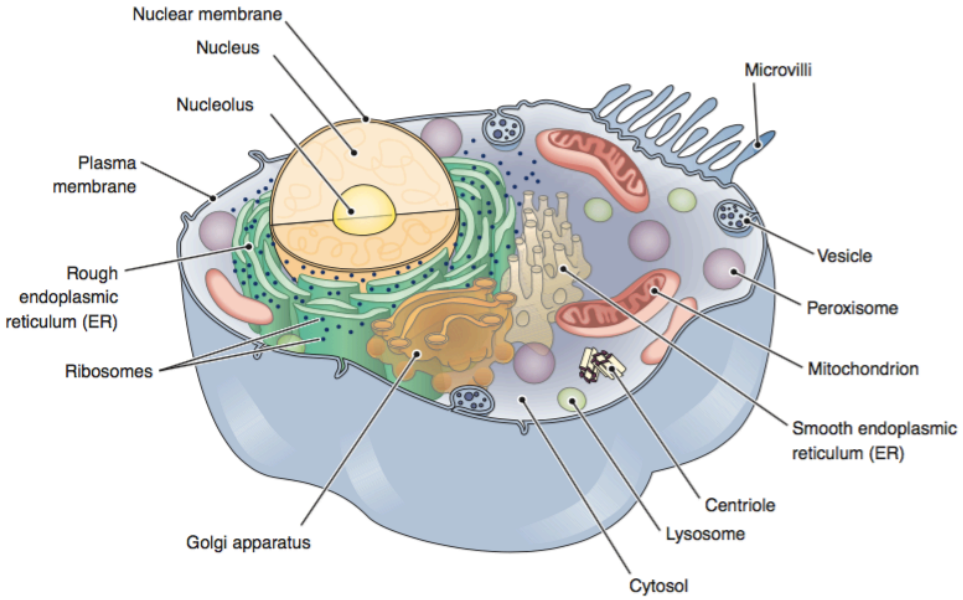

Figure 2. Generalized animal cell, sectional view. The main organelles are shown.

The **nucleus** is the control region of the cell. It contains the **chromosomes**, which carry genetic information.

Each human cell, aside from the reproductive (sex) cells, contains 46 chromosomes.

These thread-like structures are composed of a complex organic substance, **DNA (deoxyribonucleic acid)**, which is organized into separate units called **genes**.

Genes control the formation of proteins, most particularly enzymes, the catalysts needed to speed the rate of metabolic reactions. To help manufacture proteins, the cells use a compound called **RNA (ribonucleic acid)**, which is chemically related to DNA. Changes (mutations) in the genes or chromosomes are the source of hereditary diseases.

When a body cell divides by the process of **mitosis (Figure 3)**, the chromosomes are doubled and then equally distributed to the two daughter cells. When a cell is not dividing, it remains in a stage called *interphase*.

In cancer, cells multiply without control causing cellular overgrowth and tumors.

Reproductive cells (eggs and sperm) divide by a related process, meiosis, that halves the chromosomes in preparation for fertilization.

The study of cells is **cytology** (*sī-TOL-ō-jē*), based on the root *cyt/o*, meaning "cell.

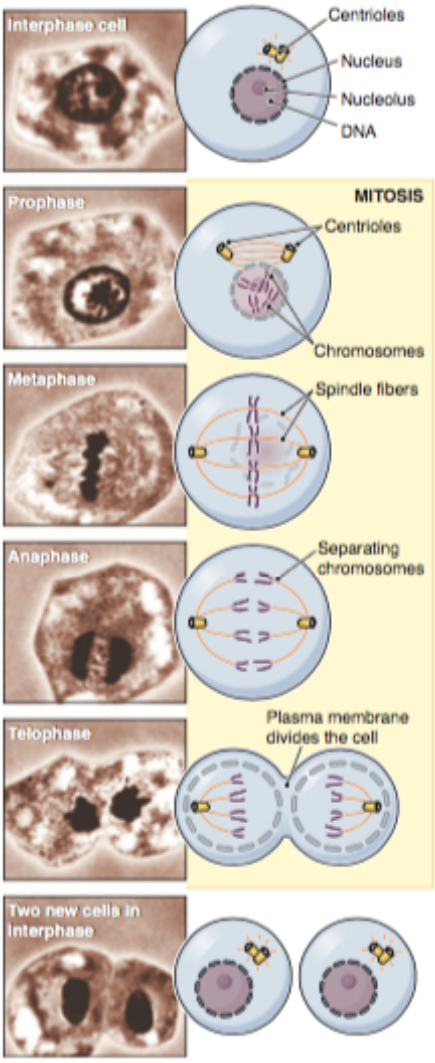

Figure 3. Mitosis, the stages in cell division

Tissues

Cells are organized into four basic types of tissues that perform specific functions (Figure 4 & 5):

1. **Epithelial** (*ep-i-THĒ-lē-al*) tissue covers and protects body structures and lines organs, vessels, and cavities. Simple epithelium, composed of cells in a single layer, functions to absorb substances from one system to another, as in the respiratory and digestive tracts. Stratified epithelium, with cells in multiple layers, protects deeper tissues, as in the mouth and vagina. Most of the active cells in glands are epithelial cells.

2. **Connective tissue** supports and binds body structures. It contains fibers and other non-living material between the cells. Included in this category are blood, adipose (fat) tissue, cartilage, and bone.

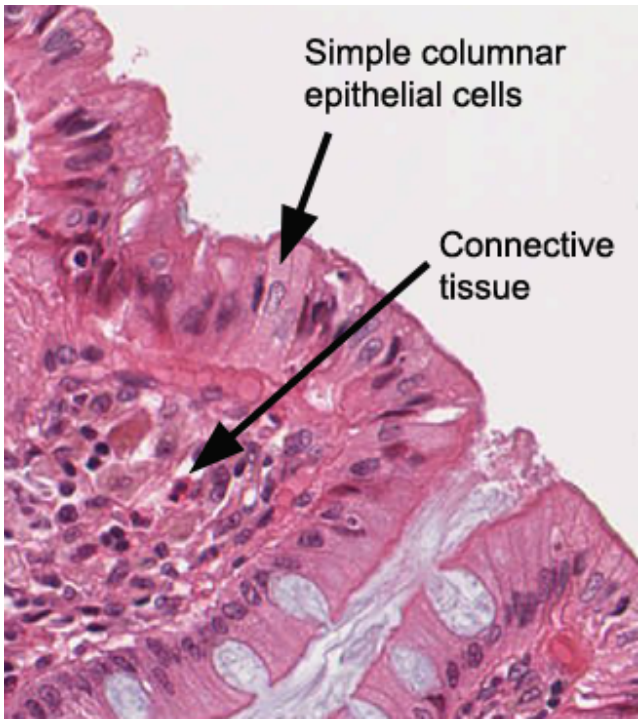

Figure 4. Epithelial tissue.

3. **Muscle tissue** (root: my/o) contracts to produce movement. There are three types of muscle tissue:

a. *Skeletal muscle* moves the skeleton. It has visible cross-bands, or striations, that are involved in contraction. Because it is under conscious control, it is also called voluntary muscle.

b. *Cardiac muscle* forms the heart. It functions without conscious control and is described as involuntary.

c. *Smooth or visceral muscle* forms the walls of the abdominal organs; it is also involuntary. The walls of ducts and blood vessels also are composed mainly of smooth muscle.

4. **Nervous tissue** (root: *neur/o*) makes up the brain, spinal cord, and nerves. It coordinates and controls body responses by the transmission of electrical impulses. The basic cell in nervous tissue is the neuron, or nerve cell.

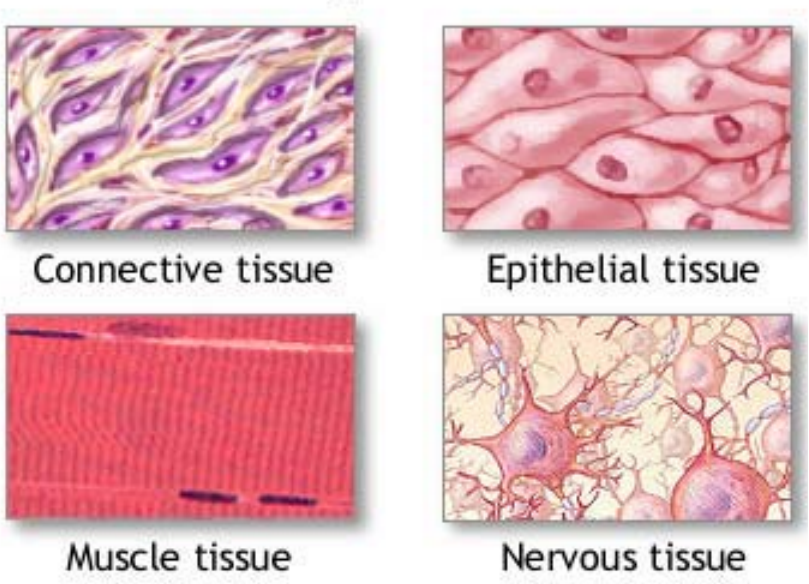

Figure 5. Types of tissue

Roots for Cells and Tissues

Root	Meaning	Example	Definition of Example
morph/o	form	polymorphous *pol-ē-MOR-fus*	having many forms
cyt/o, -cyte	cell	cytologist *sī-TOL-ō-jist*	one who studies cells
nucle/o	nucleus	nuclear *NŪ-klē-ar*	pertaining to a nucleus
kary/o	nucleus	karyotype *KAR-ē-ō-tīp*	picture of a cell's chromosomes organized according to size
hist/o, histi/o	tissue	histocompatibility *his-tō-kom-pat-i-BIL-i-tē*	tissue similarity that permits transplantation
fibr/o	fiber	fibrosis *fī-BRŌ-sis*	abnormal formation of fibrous tissue

Roots for Cells and Tissues

Root	Meaning	Example	Definition of Example
reticul/o	network	reticulum *re-TIK-ū-lum*	a network
aden/o	gland	*ad-e-NŌ-ma*	tumor (-oma) of a gland
papill/o	nipple	papilla *pa-PIL-a*	projection that resembles a nipple
myx/o	mucus	myxadenitis *miks-ad-e-NĪ-tis*	inflammation (-itis) of a mucus-secreting gland
muc/o	Mucus, mucous	mucorrhea *mū-kō-RĒ-a*	increased flow (-rhea) of mucus
somat/o, -some	Body, small body	hromosome *KRŌ-mō-sōm*	small body that takes up color (dye) (chrom/o)

Roots for Cell Activity

Root	Meaning	Example	Definition of Example
blast/o, -blast	immature cell, productive cell, embryonic cell	histioblast HIS-tē-ō-blast	a tissue-forming cell
gen	origin, formation	karyogenesis kar-ē-ō-JEN-e-sis	formation of a nucleus
phag/o	eat, ingest	Autophagy aw-TOF-a-jē	self (auto)-destruction of a cell's organelles
phil	attract, absorb	basophilic bā-sō-FIL-ik	attracting basic stain
plas	formation, molding, development	hyperplasia hī-per-PLĀ-zē-a	overdevelopment of an organ or tissue
trop	act on, affect	chronotropic kron-o-TROP-ik	affecting rate or timing (chron/o)
troph/o	feeding, growth, nourishment	atrophy A-trō-fē	tissue wasting

Suffixes for Body Chemistry

Suffix	Meaning	Example	Definition of Example
-ase	enzyme	lipase *LĪ-pa-s*	enzyme that digests fat (lipid)
-ose	sugar	lactose *LAK-to-s*	milk sugar

Roots for Body Chemistry

Root	Meaning	Example	Definition of Example
hydr/o	water, fluid	hydration *hī-DRĀ-shun*	addition of water, relative amount of water present
gluc/o	glucose	glucogenesis *glū-kō-JEN-e-sis*	production of glucose
glyc/o	sugar, glucose	normoglycemia *nor-mō-glī-SĒ-mē-a*	normal blood sugar level
sacchar/o	sugar	polysaccharide *pol-ē-SAK-a-rīd*	compound containing many simple sugars
amyl/o	starch	amyloid *AM-i-loyd*	resembling starch
lip/o	lipid, fat	lipophilic *lip-ō-FIL-ik*	attracting or absorbing lipids
adip/o	fat	adiposuria *ad-i-pō-SŪR-ē-a*	presence of fat in the urine (ur/o)
steat/o	fatty	steatorrhea *stē-a-tō-RĒ-a*	discharge (-rhea) of fatty stools
prote/o	protein	protease *PRŌ-tē-ās*	enzyme that digests protein

Supplementary Terms

Key terms	Definition
amino acids *a-MĒ-nō*	The nitrogen-containing compounds that make up proteins
anabolism *a-NAB-ō-lizm*	The type of metabolism in which body substances are made; the building phase of metabolism
catabolism *ka-TAB-ō-lizm*	The type of metabolism in which substances are broken down for energy and simple compounds
collagen *KOL-a-jen*	A fibrous protein found in connective tissue
cortex *KOR-tex*	The outer region of an organ
glycogen *GLĪ-kō-jen*	A complex sugar compound stored in liver and muscles and broken down into glucose when needed for energy
interstitial *in-ter-STISH-al*	Between parts, such as the spaces between cells in a tissue
medulla *me-DUL-la*	The inner region of an organ, marrow (root: medull/o)
parenchyma *par-EN-ki-ma*	The functional tissue of an organ
parietal *pa-RĪ-e-tal*	Pertaining to a wall, describes a membrane that lines a body cavity
soma *SŌ-ma*	The body
stem cell	An immature cell that has the capacity to develop into any of a variety of different cell types, a precursor cell
visceral *VIS-er-al*	Pertaining to the internal organs, describes a membrane on the surface of an organ

ACADEMIC WRITING

Ten Principles of Academic Writing

1. Clear Purpose. The goal of your paper is to answer the question you posed as your topic. Your question gives you a purpose. The most common purposes in academic writing are to persuade, analyse/synthesize, and inform.

- **Persuasive purpose** In persuasive academic writing, the purpose is to get your readers to adopt your answer to the question. So you will choose one answer to your question, support your answer using reason and evidence, and try to change the readers' point of view about the topic. Persuasive writing assignments include argumentative and position papers.
- **Analytical purpose** In analytical academic writing, the purpose is to explain and evaluate possible answers to your question, choosing the best answer(s) based on your own criteria. Analytical assignments often investigate causes, examine effects, evaluate effectiveness, assess ways to solve problems, find the relationships between various ideas, or analyse other people's arguments. The "synthesis" part of the purpose comes in when you put together all the parts and come up with your own answer to the question. Examples of these assignments include analysis papers and critical analyses.
- **Informative purpose** In informative academic writing, the purpose is to explain possible answers to your question, giving the readers new information about your topic. This differs from an analytical topic in that you do not push your viewpoint on the readers, but rather try to enlarge the readers' view.

2. Audience Engagement. As with all writing, academic writing is directed to a specific audience in mind. Unless your instructor says otherwise, consider your audience to be fellow students with the same level of knowledge as yourself. As students in the field, they are interested in your topic, but perhaps not so interested in reading a paper. So you will have to engage them with your ideas and catch their interest with your writing style. Imagine that they are also sceptical, so that you must use the appropriate reasoning and evidence to convince them of your ideas.

3. Clear Point of View. Academic writing, even that with an informative purpose, is not just a list of facts or summaries of sources. Although you will present other people's ideas and research, the goal of your paper is to show what you think about these things. Your paper will

have and support your own original idea about the topic. This is called the thesis statement, and it is your answer to the question.

4. Single Focus. Every paragraph (even every sentence) in your paper will support your thesis statement. There will be no unnecessary, irrelevant, unimportant, or contradictory information (Your paper will likely include contradictory or alternative points of view, but you will respond to and critique them to further strengthen your own point of view).

5. Logical Organization. Academic writing follows a standard organizational pattern. For academic essays and papers, there is an introduction, body, and conclusion. Each paragraph logically leads to the next one.

- The **introduction** catches the readers' attention, provides background information, and lets the reader know what to expect. It also has the thesis statement.
- The **body** paragraphs support the thesis statement. Each body paragraph has one main point to support the thesis, which is named in a topic sentence. Each point is then supported in the paragraph with logical reasoning and evidence. Each sentence connects to the one before and after it. The readers do not have to work to find the connection between ideas.
- The **conclusion** summarises the paper's thesis and main points and shows the reader the significance of the paper's findings.
-

6. **Strong Support.** Each body paragraph will have sufficient and relevant support for the topic sentence and thesis statement. This support will consist of facts, examples, description, personal experience, and expert opinions and quotations.

7. **Clear and Complete Explanations.** This is very important! As the writer, you need to do all the work for the reader. The reader should not have to think hard to understand your ideas, logic, or organization. English readers expect everything to be done for them; your thoughts and thought processes should be clearly and completely explained.

8. **Effective Use of Research.** Your paper should refer to a variety of current, high-quality, professional and academic sources. You will use your research to support your own ideas; therefore, it must be integrated into your writing and not presented separately. That means that source material will be introduced, analysed, explained, and then cited.

9. **Correct APA Style.** Some academic papers should follow the guidelines of the American Psychological Association as found in Research and APA Style Guide 2010,

regarding in-text citations, the reference list, and format. Follow your instructor's directions.

10. Writing Style. Because this is your work, you should use your own words whenever possible. Do not try to write like a boring, overly formal scholarly article. Use the natural conversational style that you would use in the classroom. Your writing should be clear, concise, and easy to read. It is also very important that there are no grammar, spelling, punctuation, or vocabulary mistakes in academic writing. Errors convey to the reader that you do not care.

And finally, this rule will override all the principles: **ALWAYS FOLLOW THE DIRECTIONS OF YOUR INSTRUCTOR.** Every instructor has a reason for giving you an assignment, and each instructor's requirements may differ. Follow your instructor's directions to get the most from an assignment.

ACADEMIC WRITING

Key differences between a report and an essay

1. Purpose

Reports are the presentation and analysis of findings from practical research. They begin with an aim (to investigate, to explore) and probably a hypothesis (a proposition that the research will test). Depending on the guidelines or purpose, a report may make recommendations.

Essays begin with a question and seek to answer that question based on research into existing theories and through the writer's own evaluation. An essay may include results of practical research but only in so far as it may help support the writer's conclusions.

2. Content

Reports are generally descriptive, reporting sequential events (experiments or fixed results from surveys etc). However, they involve an evaluation in either the conclusion or recommendations sections.

Essays can be descriptive, discursive, evaluative, etc. This is dependent on the process given in the essay question. Content usually involves a synthesis of knowledge gained from existing texts and from the author's own opinions and argument.

3. Format

Both essays and reports use an **introduction and conclusion format**. The main content, findings, analysis etc. come inbetween.

A report generally has a **fixed structure**. The choice of sections will depend on the purpose of your report and, while at university, the preferences of your tutor or department.

In **an essay**, the **thought process taken from the question dictates the structure** of the main body of an essay.

Parts of a Report

- Title page
- Table of contents
- Executive Summary
- Introduction
- Findings
- Conclusions
- Recommendations
- Bibliography
- Appendices

Write this first before the rest of the report

Differences between an academic Report and an Essay

	Report	**Essay**
The topic	based on reading and/or practical work May be: • a problem • a case study • an experiment	based on reading and critical thinking May be: • a question • a proposition
The purpose	to investigate, present and analyse information May be: to make recommendations	to articulate a well-argued response
The outcome	presentation of findings may recommend action or change	conclusion drawn from evaluation or argument may recommend action or change
The reader	May be: • lecturer • client • manager	lecturer
The format	• sections with headings • headings numbered	• sections may include headings • headings not numbered
The content	• must include introduction, conclusion and references • may include recommendation • choice of other sections depends on purpose	• must include introduction, conclusion and references • choice of other sections depends on structure of argument
The style	• impersonal • objective	• impersonal • can be subjective (based on evaluation)
Assessment	Success depends on: • the demonstration of good research skills • the objective presentation and analysis of relevant information	Success depends on: • how well the proposition is established • how one point relates to the next

ACADEMIC WRITING

Plagiarism

Plagiarism is taking the words, theories, creations or ideas of another person and passing them off as your own.

Plagiarism can be **deliberate** – copying a passage from a book or journal or pasting something from the internet into an assignment without referencing the original source.

You can also commit **inadvertent** plagiarism which is where you unintentionally repeat some of the information you have read in the course of your research. You must ensure you do **reference ALL material** that comes from another source so question yourself as to whether you have read the information elsewhere and go back to your sources to locate the reference.

Plagiarism can also result from **not referencing correctly**. You must ensure you know how to reference your work using the style advised by your tutor.

Plagiarism can occur in lots of different ways:

- copying a chunk of text from someone else's writing without citing the source
- paraphrasing what someone else said but not showing who said it or where the idea came from
- putting your references into your bibliography , but not indicating in the text of your paper where these sources are used
- copying anything that is created by someone else, such as images, tables, graphs, etc, into your paper and not naming the source
- copying from another student' s paper , or even from one of your own papers
- acquiring a complete essay from another source, such as buying it off the net. This **really** is academic misconduct

Imprint it on your brain – Plagiarism is always wrong; there are no times when it is acceptable. If you use someone else's words or ideas, you must always reference them.

Consequences for plagiarism

Plagiarism is a serious issue that can result in failing an assignment, failing the year or even having to leave the course.

To avoid plagiarism, make sure you include **references** within your assignment to **all** sources you use and then include full details of all the sources in a reference list at the end of your work.

Citing your source within the text

As the name suggests, the citation in the text normally includes the name(s) (surname only) of the author(s) and the date of the publication. This information is usually included in brackets at the most appropriate point in the text.

An example for citation within the text:
Heritable differences in craniofacial structures have been shown between OSA patients and controls (Agha and Johal, 2017).
Bibliography (Reference list):
Agha B, Johal A. Facial phenotype in obstructive sleep apnea-hypopnea syndrome: a systematic review and meta-analysis. J Sleep Res 2017; 26: 122–131.

When a publication has several authors, It is usual to give the surname of the first author followed by *et al.* (an abbreviation of the Latin for 'and the others') although for works with just two authors both names may be given, as shown in the above example.
Research using techniques such as ICP-OES (optical emission spectrometry in inductively coupled plasma) or ICP-MS (inductively coupled plasma mass spectrometry) may provide answers to questions related to the release of, for example, silver or zirconium ions from composites containing S–P (Sleibi et al, 2019).

References in an essay or report

At the end of your essay or report you should include a **list of references**. Such a list of references provides more details than just the name of the author and the year of publication. It's this list that allows identifying the work cited. Each work you cited in the **essay or report** is cited once, and listed in alphabetical order.

These details should include:

- surname(s) and initial(s) of the author(s);
- the date of publication;
- the title of the text;
- if it is a paper, the title of the journal and volume number;
- if it is a chapter of an edited book, the book's title and editor(s)
  the publisher and place of publication;
- the first and last page numbers if it is a journal article or a chapter in an edited book.

For particularly important points, or for parts of texts that you might wish to quote word for word, also include in your notes the specific page reference. There are different styles of using references and bibliographies.

Referencing styles

There are many different referencing conventions in common use. Each department will have its own preferred format, and every journal or book editor has a set of 'house rules'. The commonly used formats, the **'author, date'** system. The most popular styles are:

MLA style: Agha, Bahn, and Ama Johal. "Facial phenotype in obstructive sleep apnea–hypopnea syndrome: a systematic review and meta-analysis." *Journal of sleep research* 26.2 (2017): 122-131.
APA style: Agha, B., & Johal, A. (2017). Facial phenotype in obstructive sleep apnea–hypopnea syndrome: a systematic review and meta-analysis. *Journal of sleep research*, *26*(2), 122-131.
Harvard style: Agha, B. and Johal, A., 2017. Facial phenotype in obstructive sleep apnea–hypopnea syndrome: a systematic review and meta-analysis. *Journal of sleep research*, *26*(2), pp.122-131.
Vancouver style: Agha B, Johal A. Facial phenotype in obstructive sleep apnea–hypopnea syndrome: a systematic review and meta-analysis. Journal of sleep research. 2017 Apr;26(2):122-31.

Book references

The simplest format, for a book reference, includes the following:

- the surnames and forenames or initials of both the authors;
- the date of publication;
- the book title;
- the place of publication;
- the name of the publisher.

Example:
Knapper, C.K. and Cropley, A. 1991: Lifelong Learning and Higher Education. London: Croom Helm.

Lecture References

Full references to unpublished oral presentations, such as lectures, usually include the speaker's name, the date of the lecture, the name of the lecture or of the lecture series, and the location:
Agha, B. 2020 (7 July): Cell, Tissue and Organ Terminology, Lecture 4. College of Dentistry, Al-Mustansiriyah University.

Web page or website Reference

Information on the internet changes rapidly and web pages move or are sometimes inaccessible meaning it can often be difficult to validate or even find information cited from the internet. When referencing web pages it is helpful to include details that will help other people check or follow up the information.

An example:
Little, J.W. and Parker, R. 2010. How to read a scientific paper. [http://www.owlnet.rice.edu/~cainproj/courses/HowToReadSciArticle.pdf]. Accessed August 24, 2011.

*note that the "author" of a website often is an organization, a government or a university.

Sometimes the link is very long and then you may shorten the URL, but think of that you lose useful information included in the original link i.e. the name of governmental body or university responsible for the document.

Written Communications in Academia and Clinical Setting

Communications at Clinical Setting: Referral letters

A referral is essentially a request for assistance regarding a patient, from an appropriate colleague. This may be a referral from primary care (health centres) to secondary care (hospitals) or occasionally between clinicians in secondary care. Common principles apply to both.

The referring dentist may require a second opinion, or in many cases, the referral may also request that management of a patient be undertaken. Such a referral requires the transfer of information between the referring dental surgeon and, in many cases, a specialist, and may take a verbal, electronic or written form.

Often, the referral may be an elective process following discussion between the patient and clinician regarding treatment options. However, on other occasions, the referral may require the prompt attention of a specialist to deal with an urgent concern raised by the patient or clinician. In order to facilitate the efficient referral of a patient, a few simple principles should be followed and these are discussed later.

When to refer

You can work within your knowledge, professional competence and physical abilities. Refer patients for a second opinion and for further advice when it is necessary, or if the patient asks. Refer patients for further treatment when it is necessary to do so.

As such, the need for referral may be that the situation lies outside:

- the knowledge;
- the skill;
- the experience; or
- the facilities available to the referring dentist.

How to refer

Many attempts have been made to produce standard pro forma letters to simplify the process of referral. Standard letters are also considered by some to improve the information, which is provided by prompting the referrer for information.

Emergency referrals may also be made by telephone call. It is important to keep a record of the telephone conversation, and best practice is to follow this up with a letter. The letter should refer to the telephone conversation and provide the appropriate details expected in any referral. The use of electronic mail or online referral of patients has yet to become common practice, but many centres are now developing this service.

Minimum data to be included in the letter of referral

- Referring dentist's name, address and a telephone number
- The patient's name, date of birth, address and telephone number
- An indication of the urgency of the referral
- The presenting complaint
- History of the presenting complaint
- Clinical findings
- Relevant medical history
- Whether an opinion or management is sought

Reported information

Other than the essential **demographic data** required to contact the patient, the **nature of the problem** is the next most important information. This should follow the order of a simple patient assessment. Where appropriate, the patient's presenting complaint and history of the complaint should be given, along with the treatment history subsequent to presentation.

Clinical findings should be summarised as follows:

- Accurate description of site size and nature of lesion(s)
- A brief report of radiographic findings
- Results of other investigations

Referral Template

[Senders Name]
[Address line]
[Providence]

[Letter Date]

[Recipients Name]
[Address line]
[Providence]

[Subject: Normally bold, summarizes the intention of the letter]

Dear [Recipients Name],

Good day! I am Dr. Bahn Agha, an orthodontist under the consultancy Group of Al-Mustansiriyah Dental Hospital.

I would like to refer to you Samih Mohammed, a 14-year old boy who I have treat him since he was 12 years old. He is being recently suffering from dental pain in the upper left region of the upper arch. I am confident that your clinic is very able to see to the health needs of this child.

Please do accept him under your care.

Sincerely,

[Senders Name]
[Senders Title] -Optional-

[Enclosures: number] - Optional -
cc: [Name of copy recipient] - Optional -

Sample

Patient name: Medical health centre name:

Date of birth (DOB):

Address:

Telephone:

Dear Dr Agha

I am writing to refer the above named patient for assessment and subsequent treatment of a grossly carious 46, the tooth is being unrestorable. The 46 has been dressed and the patient is currently asymptomatic, as such an urgent appointment is not required.

Mr Ali had a laryngeal cancer treated in Al Amal Hospital, December 2015, managed with surgery and subsequent radiation. No other medical problems were noted, the patient currently taking no medications. Mr Ali smokes 29 cigarettes per day.

I enclose a recent periapical radiographs and would be grateful for its return on completion of treatment.

Signed:

Print name:

Communication at University: Email etiquette

How do I write an effective email?

Email is a very common mode of communication at university, in the workplace and socially. It's important to get the tone and style of your email right, as this will help you make a good impression and hopefully get the response you're looking for.

Email template

Below is a template you can follow and adjust when you want to email a lecturer, tutor, or coordinator. Each element is numbered and explained further underneath.

- ***(1)*** *Subject: [Subject code] - [question about / request for etc.]*
- ***(2)*** *Dear* ***(3)*** *[Professor / Dr etc.] [insert name],*
- ***(4)*** *I am a student in your [insert subject name] lecture.*

- ***(5)*** *I have a question regarding the lecture presented last [insert day/date] which I couldn't find the answer to.*
- *Should our essay draw only on readings listed on the syllabus or can I incorporate scholarly articles I read on my own, as long as it fits with the subject of the assignment?*
- *I look forward to hearing from you.*
- ***(6)*** *Kind regards,*
  [Your name]

The fundamental components of an effective email:

1) Use a concise and direct subject line

Subject code + Problem/Enquiry

The subject line should be simple and reflect the content of your email. Something like "Question about [Class Name] paper" or "Meeting request" is clear and appropriate.

2) Use an appropriate salutation

Start your email with a "Dear" or "Hello", these are appropriate in formal situations. "Hey" is ok when you're emailing friends, but would be too informal in this context.

3) Address the recipient appropriately (both title and name)

Double-check the spelling of your lecturer or tutor's name and their title. Try to avoid gendered addresses like 'Mr.' or 'Mrs.'

4) Introduce yourself

Tell your lecturer who you are, especially if this is the first email you've written to them. They may have hundreds of students across different subjects.

5) Keep the body short and straight to the point

Try to use one paragraph for each idea you want to address. Writing everything in one long paragraph can be confusing for the reader.

6) End with a clear closing

It's good practice to sign off at the end of an email with a set phrase such as 'Kind regards', 'Best wishes', or 'Thanks', followed by your name.