HUMAN BODY

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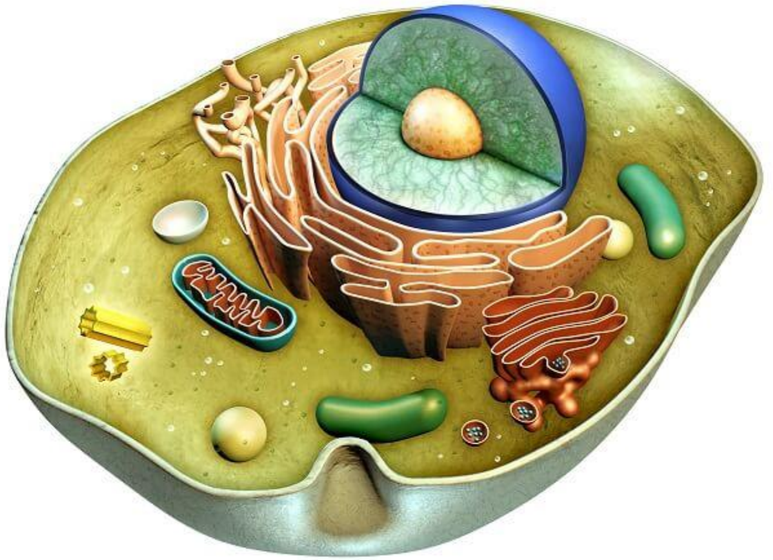

Resources

Mosby's Dictionary

By Mosby

KENHUB Website

www.kenhub.com

Mastering Medical Terminology

By Sue Walker, Maryann Wood and Jenny Nicol

Essential of Human Anatomy & Physiology

Elaine Marieb and Suzanne Keller

INTRODUCTION

- **Medical terms** that are used to describe the structures of the human body are essential knowledge in medical terminology.
- Some of these terms should be very familiar to you as they are in common English usage, but others will be new and will require learning.
- These terms will describe the **basic structure** of the body, the different **body cavities**, **regions** and **quadrants** and the **divisions** of the spinal column.
- There are also specific terms that describe **position**, **direction** and the **planes** of the body.
- The purpose of this lecture is to demonstrate the structure of the human body as a whole.

PREFIX

Prefixes

Prefix	Meaning	Medical term	Meaning of medical term
ab-	away from	abnormal	
ad-	toward	adrenal	
anti-	against	antibiotic	
bi-	two, twice, double	bilateral	
infra-	inferior to, below	infracostal	
macro-	large	macrocytic	
meta-	beyond, change	metamorphosis	
micro-	small	microcytic	
neo-	new	neoplasia	
poly-	many, much	polycystic	
uni-	one	unilateral	

SUFFIX

Suffix	Meaning	Medical term	Meaning of medical term
-blast	embryonic or developing cell	osteoblast	
-cyte	cell	lymphocyte	
-gen	producing, originating, causing	antigen	
-genesis	pertaining to formation, producing	pathogenesis	
-iasis	condition or state	hypochondriasis	
-ior	pertaining to	inferior	
-lysis	separation, destruction, breakdown, dissolution	histolysis	
-oma	tumour	haematoma	
-ose	pertaining to, full of, sugar	adipose	
-osis	abnormal condition	leucocytosis	
-pathy	disease process	myopathy	
-plasia	formation, development, growth	hypoplasia	
-plasm	growth, formation, substance	neoplasm	
-trophy	nourishment, development	hypertrophy	

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VOCABULARY

- The following list provides many of the medical terms with pronunciations.
- Check **page # 29** (*Mastering Medical Terminology*)

Term	Pronunciation
abdominopelvic	ab-DOM-in-oh-PEL-vik
anterior	an-TEER-ee-a
cell membrane	sel MEM-brayn
central nervous system	SEN-tral NER-vus sis-tem
cervical	ser-VYK-el
chromosome	KROME-oh-some
coccygeal	kok-si-GEE-al
connective tissue	kon-NEK-tiv TISH-oo
cranial	KRAY-nee-al
cytoplasm	SY-toh-plazm
distal	DIS-tel
deoxyribonucleic acid (DNA)	dee-OK-see-ry-boh-nyoo-KLEE-ik A-sid
dorsal	DAW-sal
epigastric region	ep-ee-GAS-trik REE-jen
epithelial	ep-ee-THEEL-e-al

Term	Pronunciation
spinal cord	SPY-nal kord
superficial	soo-per-FISH-al
superior	soo-PEER-ee-a
supine	SOO-pyn
tendon	TEN-don
thoracic	thaw-RAS-ik
transverse	TRANZ-vers
umbilical region	um-BIL-ee-kel REE-jen
ventral	VEN-tral
vertebra	VERT-e-bra

Term	Pronunciation
fascia	FASH-ee-a
frontal	FRUN-tal
hypochondriac region	hy-poh-KON-dree-ak REE-jen
hypogastric region	hy-poh-GAS-trik REE-jen
inferior	in-FEER-ee-a
inguinal region	IN-gwin-al REE-jen
intervertebral	in-ter-VER-te-bral
lateral	LAT-er-al
ligament	LIG-a-ment
lumbar	LUM-bah
medial	MEE-dee-al
mitochondria	my-toh-KON-dree-ah
nucleus	NYOO-klee-us
peripheral nervous system	pe-RIF-er-al NER-vus SIS-tem
pituitary gland	pit-YOO-it-ar-ee gland
posterior	pos-TEER-ee-a
prone	prohn
proximal	PROK-sim-al
quadrants	KWAD-rantz
sacral	SAK-ral
sagittal	SAJ-it-al

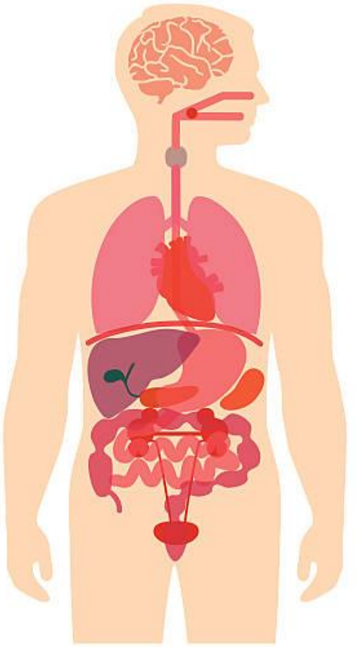
ABBREVIATION

- The following abbreviations are commonly used in the Australian healthcare environment.
- As some abbreviations can have more than one meaning it is suggested that you carefully check the context in which the abbreviation is used before assigning a meaning to it.

Abbreviation	Definition
C	Cervical — there are 7 cervical vertebrae C1–C7
L	Lumbar — there are five lumbar vertebrae L1–L5
LLQ	Left lower quadrant
LUQ	Left upper quadrant
RLQ	Right lower quadrant
RUQ	Right upper quadrant
S	Sacral — the sacrum consists of five fused vertebral bones S1–S5
T	Thoracic — there are 12 thoracic vertebrae T1–T12

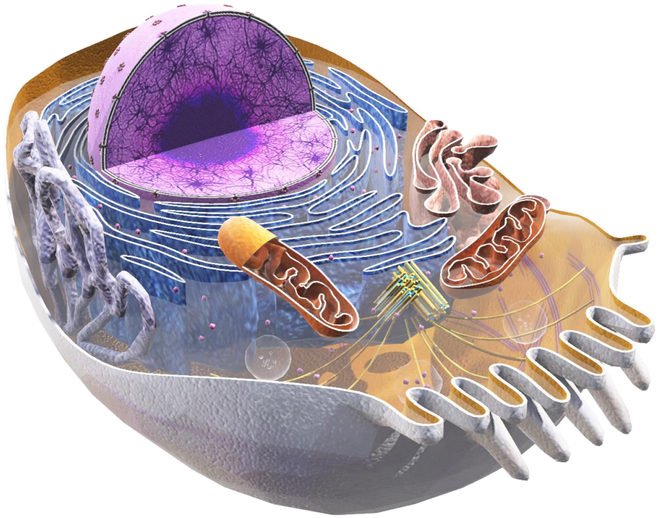
STRUCTURAL ORGANIZATION OF BODY

- The human body is made up of classes of structures, ranging from the smallest units of the body called **cells**, through to groups of cells called **tissues**, to arrangements of related tissues into **organs** and finally to groups of organs with specific functions, known as **body systems**.
- These are the body systems covered in this textbook:
  - Cardiovascular system
  - Digestive system
  - Respiratory system
  - Musculoskeletal system
  - Integumentary system
  - Endocrine system
  - Urinary system
  - Lymphatic system
  - Immune system
  - Nervous system
  - Reproductive systems (male and female).



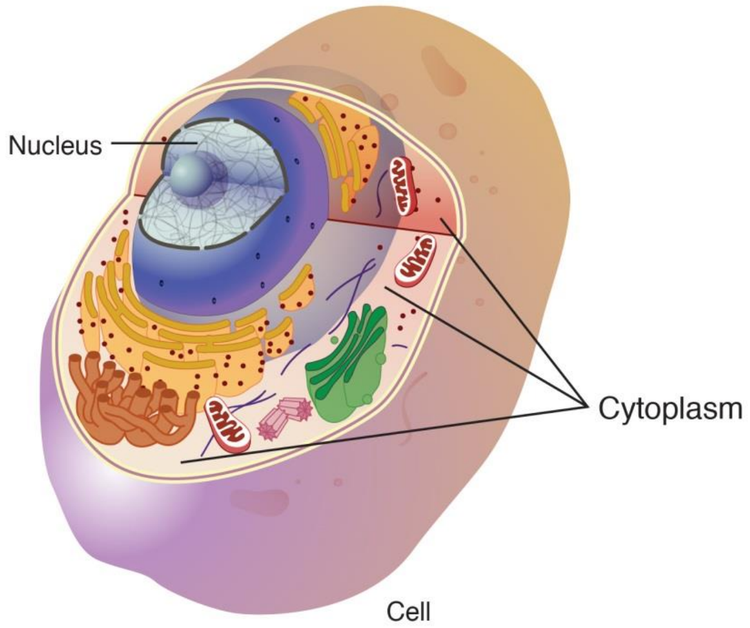
THE CELL

- **Cells** are the smallest units of the human body and constitute every part of it.
- There are around 100 trillion cells in human body, each of which is invisible to the eye.
- Although there are many types of cells, they all have much the same basic structure.
- Each cell is specialized to perform a function.
- All cells are surrounded by **cell membranes**.
- The membrane has several important functions:
  - Holds the contents of the cell together.
  - Identify the type of cell to other cells.
  - Allow substances, such as those produced by the body or drugs pass into and out of the interior of the cell.
- The two major parts of the inside of the cell are the **cytoplasm** and the **nucleus**.



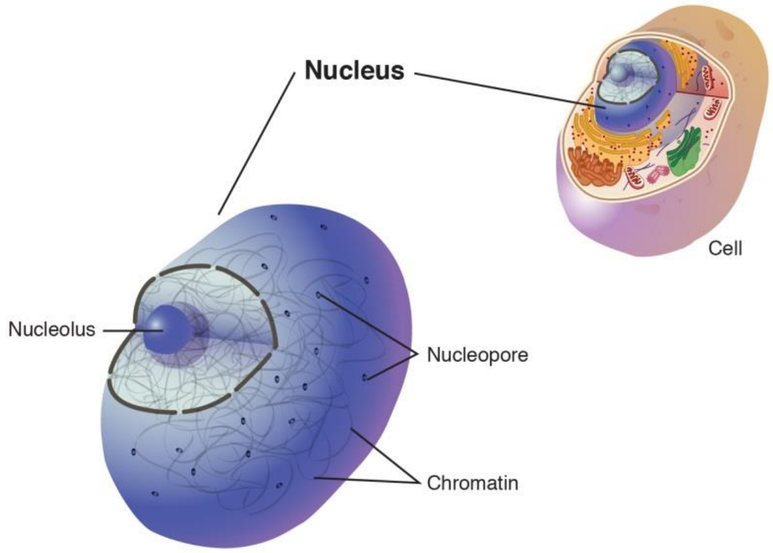
CYTOPLASM

- The cytoplasm is a clear substance with a **jelly-like** consistency.
- It consists mainly of water but also includes **enzymes**, **salts**, **organelles** such as mitochondria and ribosomes and certain **organic molecules**.
- Its principal activities are to dissolve wastes created by the cell and to move materials around inside the cell.
- It also permits the cells to carry out their specialized functions such as transmitting impulses or storing fats and is therefore vital to effective functioning of the human body.
- The maintenance of the cell is the responsibility of the various organelles contained in the cytoplasm.
- The **mitochondria** in the cytoplasm are the site of cellular respiration which generates energy to enable the cell to function.
- Within the cytoplasm are a series of channels known as the **endoplasmic reticulum**.
- The role of the endoplasmic reticulum is the synthesis, folding, alteration and transport of proteins.



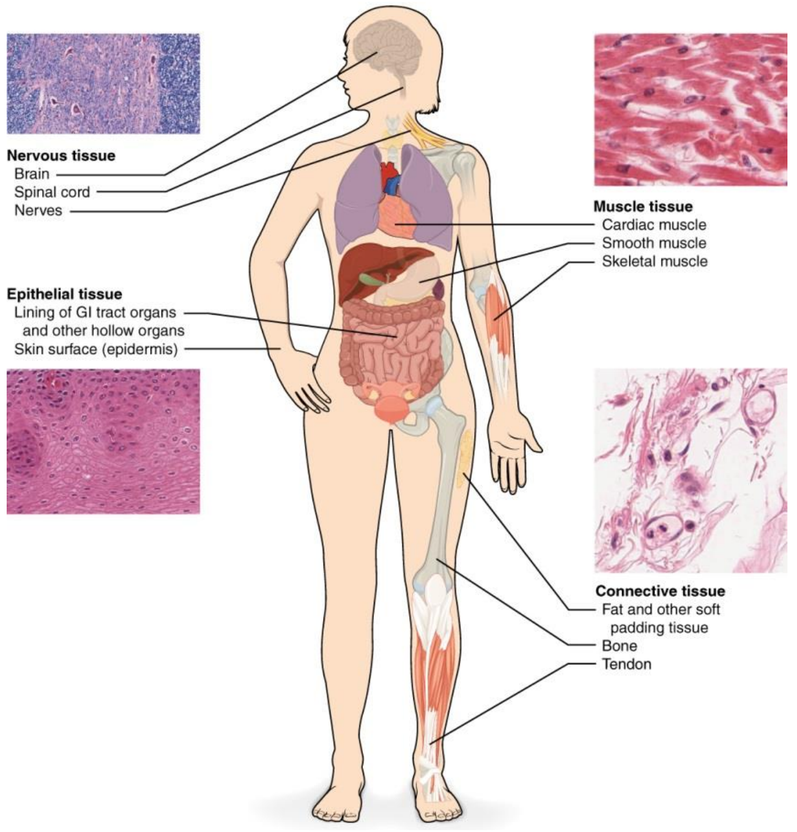
NUCLEUS

- The **nucleus** acts as the center for **administration and information** to regulates the activities of the cell.
- In **humans**, the nucleus also contains the chromosomal materials (DNA) and controls cell growth and reproduction.
- There are 46 chromosomes, consisting of 23 matched pairs, in all cells of the body except for the **egg** cells in the female and **sperm** cells in the male.
- These two types of cells have 23 chromosomes each which combine at the time of conception.
- The chromosomes contain large numbers of genes in a specific order.
- The genes contain information about the composition of particular cells in the body to instruct them to grow in a specific way.
- If something goes wrong with a gene or the way it behaves, this is known as a **mutation**.
- Some genes that have mutations are responsible for causing defects and illnesses in the body.
- Diseases can occur due to a defect in a single gene or in a set of genes.



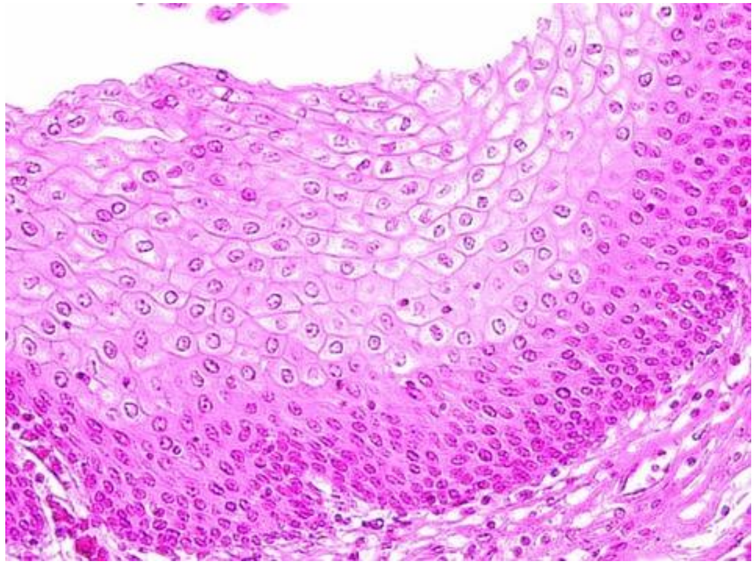
TISSUES

- A group of cells from the same origin that work together to carry out a particular function in the body is known as body tissue.
- There are four types of tissue in the human body:
  - epithelial tissue.
  - muscle tissue.
  - nervous tissue.
  - connective tissue.



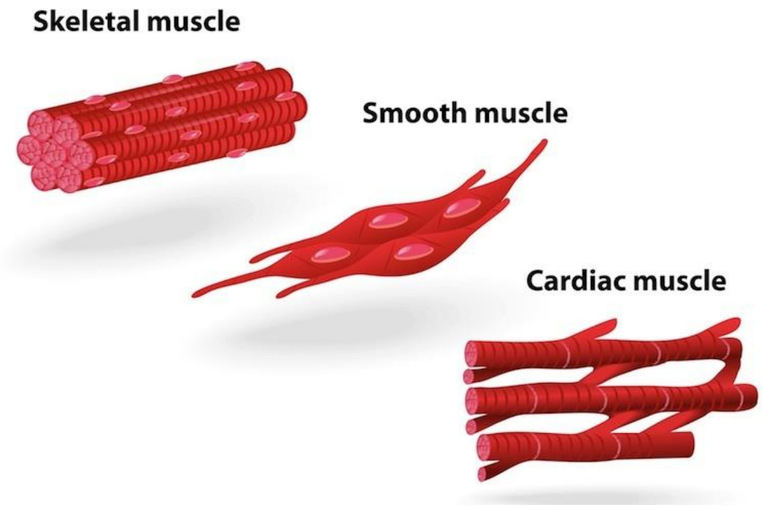
EPITHELIAL

- Epithelial tissue covers all external surfaces of the body.
- It also lines internal body cavities and organs and forms the basis for certain glands.



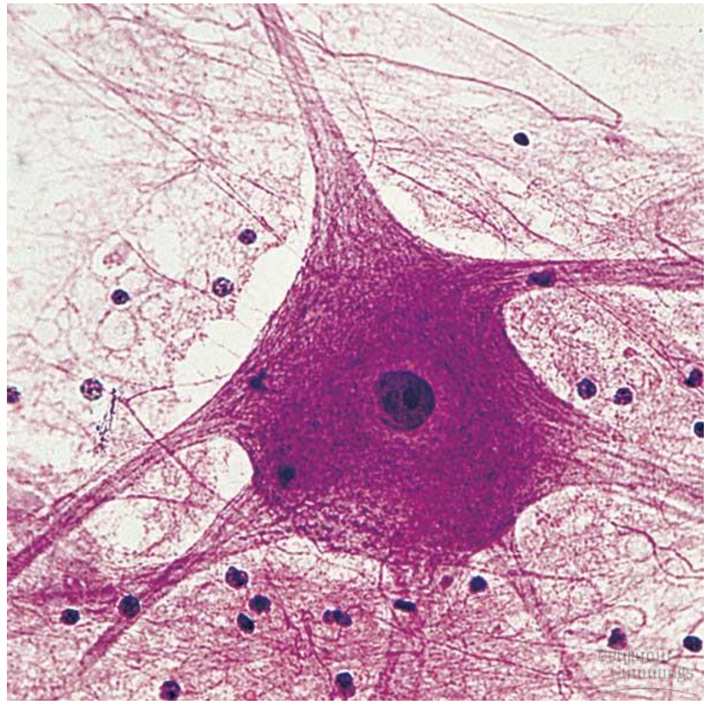
MUSCULAR TISSUE

- Muscle tissue can be classified into three types:
  - skeletal muscle.
  - smooth muscle.
  - cardiac muscle.
- The primary functions of muscle tissues are to provide motion, maintain the body's posture and produce heat.



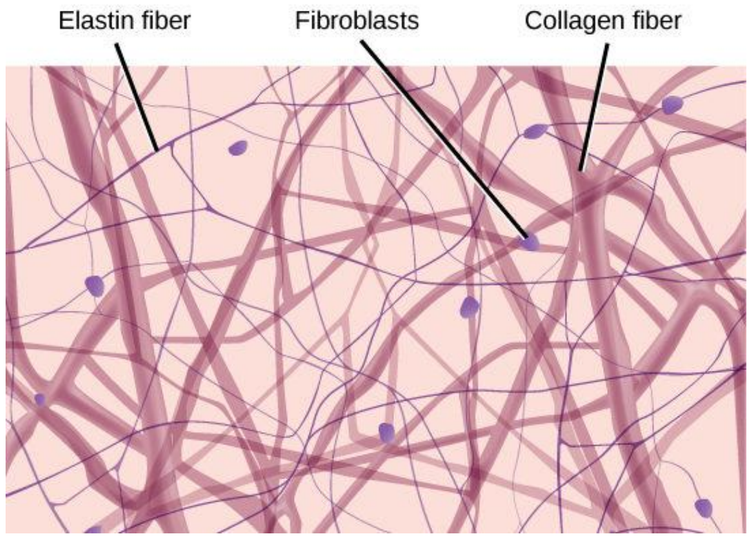
NERVOUS TISSUE

- Nervous tissue is responsible for controlling and coordinating body functions.
- Nervous tissue senses **stimuli** and sends impulses to different parts of the body to create a response.
- Nervous tissue makes up the **central nervous system**
- (CNS), which consists of the brain and spinal cord, and the **peripheral nervous system**, which covers all other nervous tissue.
- The function of the peripheral nervous system is to gather signals from all parts of the body and send them to the central nervous system, which then determines an appropriate reaction to the signal and responds back through the peripheral nervous system directing a particular action.



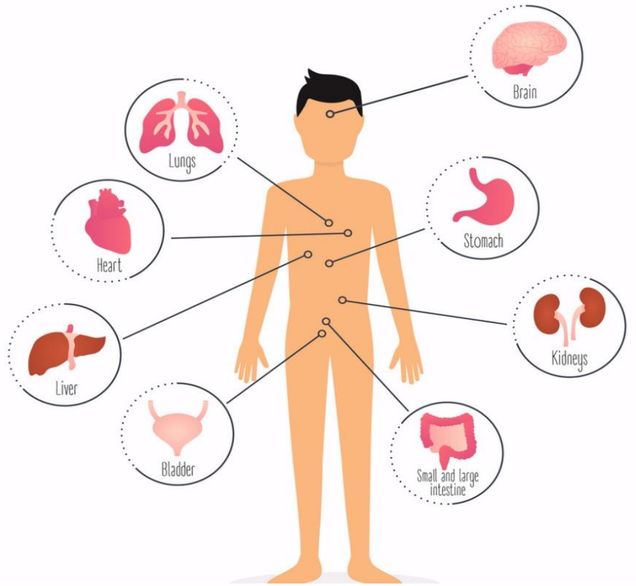
CONNECTIVE TISSUE

- Connective tissue is found between the cells, acting to connect, support, insulate and stabilize organs of the body.
- There are four types of connective tissue:
  - Loose connective tissue.
  - Dense connective tissue.
  - Cartilage.
  - Other tissue.
- *Loose connective tissue* is the most common type and has a role in connecting epithelial tissue to underlying structures, surrounding blood vessels and nerves and holding organs in fixed positions.
- *Dense connective tissue* is made up of flexible collagen fibers and is very strong.
- Tendons, ligaments and fascia are examples of dense connective tissue.
- Cartilage is made up of various percentages of chondrocytes, elastin and collagen. Its purpose is to provide structure and support to other tissues. It also provides a form of padding in the joints.
- The other category of connective tissue includes bone or osseous tissue, blood and lymphatic tissues.



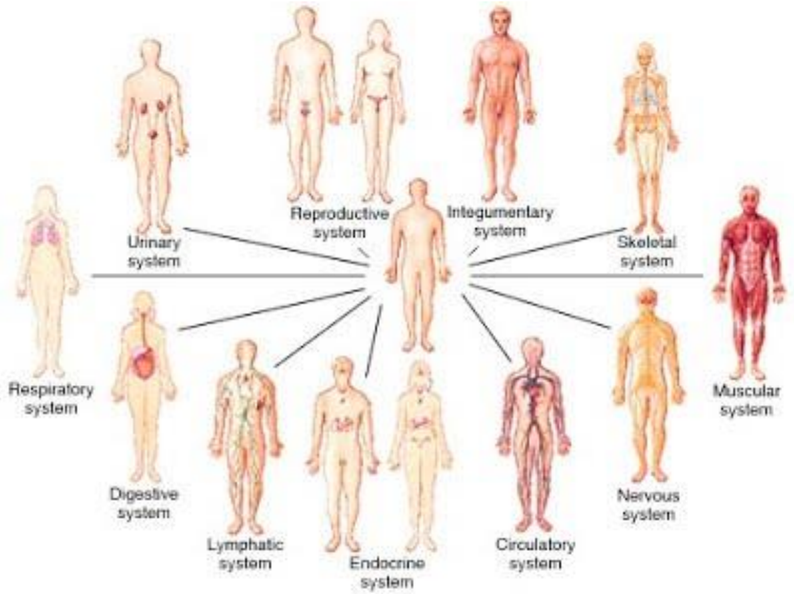
ORGANS

- **Organs** are the next level of organization in the body.
- Organs are composed of several different types of tissue and perform a special function.
- There are many organs within the body, such as the **heart**, **lungs**, **kidneys** and **skin**.



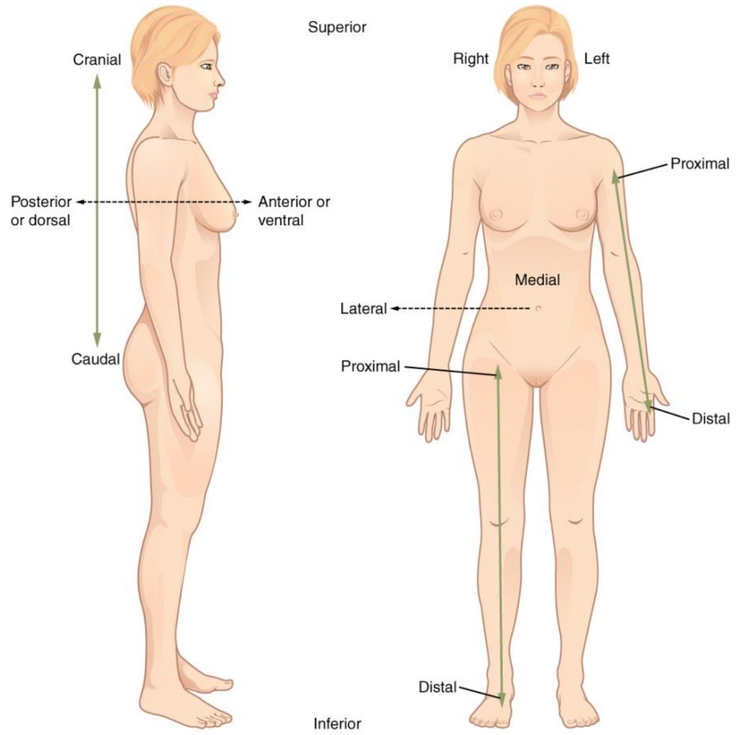
BODY SYSTEMS

- Two or more organs that perform collaboratively as a group to undertake a common function are called a **body system**.
- This is the highest level of organization in the human body and is the way that it is generally studied.
- As an example, the **digestive system** is responsible for receiving and digesting food and excreting waste.
- It consists of several organs from the mouth down to the anus, including the stomach, small and large intestines, the pancreas, liver and gallbladder.



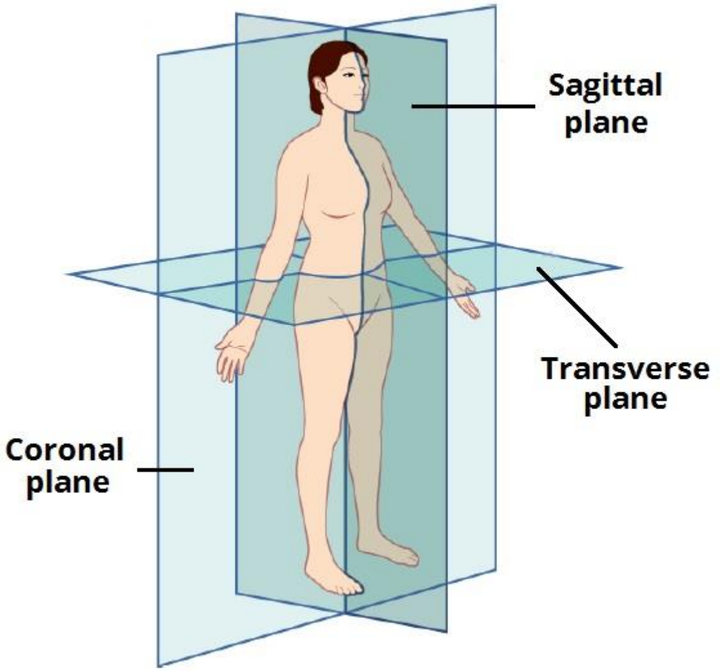
ANATOMICAL POSITION

- The anatomical position is the central concept behind all **descriptions** of location within the body.
  - A person standing upright, facing forward.
  - Arms straight and hands held by the hips, palms facing forward.
  - Feet parallel and toes pointing forward.
- When the position of an organ or body structure is described, the body is always considered as being in the anatomical position.
- When an organ is described as being on the right, it refers to the right side of the person in the anatomical position.
- Similarly, something described as being on the left refers to the left of the body when it is in the anatomical position.



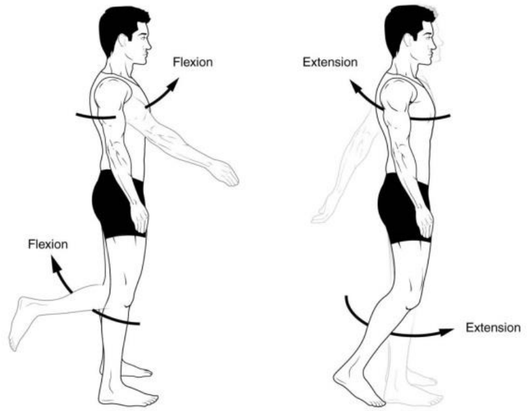
PLANES OF THE BODY

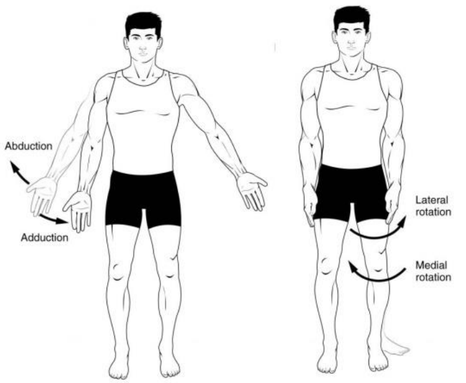
- Often sections of the body are referred to in terms of **anatomical planes**, which are imaginary lines that are drawn through a body in the anatomical position.
  - **Sagittal plane** – a vertical line which divides the body into a **left** section and a **right** section.
  - **Coronal plane** – a vertical line which divides the body into a **front** (anterior) section and **back** (posterior) section.
  - **Transverse plane** – a horizontal line which divides the body into an **upper** (superior) section and a **lower** (inferior) section.



ANATOMICAL TERMS OF MOVEMENTS

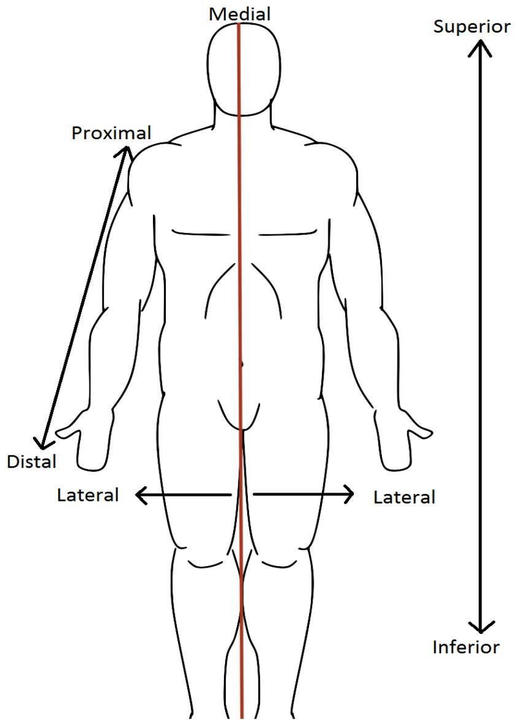
- It is used to describe the actions of muscles on the skeleton.
- Muscles contract to produce movement at joints, and the subsequent movements can be precisely described using the terminology below.
  - **Flexion** refers to a movement that decreases the angle between two body parts.
  - **Extension** refers to a movement that increases the angle between two body parts.
  - **Abduction** is a movement away from the midline.
  - **Adduction** is a movement towards the midline.
  - **Medial rotation** is a rotational movement towards the midline. It is sometimes referred to as internal rotation.
  - **Lateral rotation** is a rotating movement away from the midline. This is in the opposite direction to the movements described above.
  - **Elevation** refers to movement in a superior direction.
  - **Depression** refers to movement in an inferior direction.
  - **Dorsiflexion** refers to flexion at the ankle, so that the foot points more superiorly.
  - **Plantarflexion** refers extension at the ankle, so that the foot points inferiorly.
  - **Inversion** involves the movement of the sole towards the median plane.
  - **Eversion** involves the movement of the sole away from the median plane.





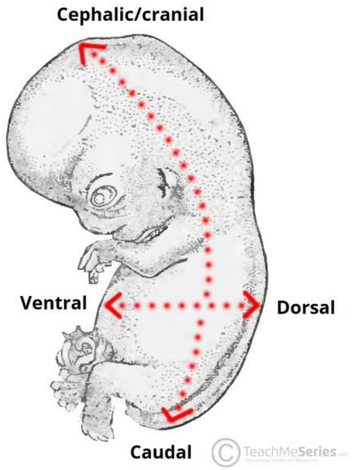
ANATOMICAL TERMS OF LOCATION

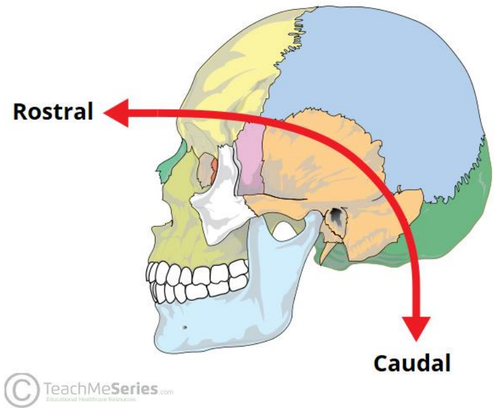
- The anatomical terms of location are important to understand anatomy.
- They help to avoid any ambiguity that can arise when describing the location of structures.
  - **Medial** means towards the midline.
  - **Lateral** means away from the midline.
  - **Anterior** (ventral) refers to the front.
  - **Posterior** (dorsal) refers to the back.
  - **Superior** means higher.
  - **Inferior** means lower.
  - **Proximal** means closer to its origin.
  - **Distal** means further away.
    - Proximal and Distal are used in structures that are considered to have a beginning and an end (such as the upper limb, lower limb). They describe the position of a structure with reference to its origin.



TERMS OF LOCATIONS IN EMBRYOLOGY

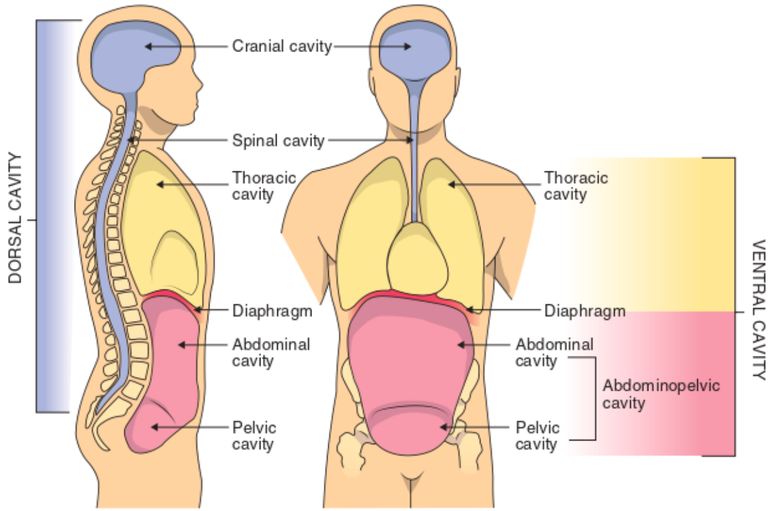
- The anatomical terms of location are important to understand anatomy.
- There are some terms that are specifically used in the description of embryology.
  - **Cephalic** refers to the head of the embryo.
  - **Caudal** refers to the tail (inferior) end.
  - **Cranial** is often used instead of cephalic when describing a location of one structure relative to another.
  - **Ventral** refers to the anterior (front) aspect of the embryo.
  - **Dorsal** refers to the posterior (back).
- Neuroembryological terms.
  - **Rostral** refers to the anterior (front) aspect of the head.
  - **Caudal** refers to the posterior (back) of the head.
  - **Ventral** refers to the inferior region of the brain.
  - **Dorsal** refers to the superior region (towards the scalp).





BODY CAVATIES

- The inside of the human body consists of **five cavities** or hollow spaces located within two main cavities, called the **dorsal** and the **ventral** cavities.
- Each of the cavities contains specific organs.
- The **dorsal cavities** are at the back of the body and are also called the posterior cavities.
- Included here are the **cranial cavity**, which contains the brain and the pituitary gland, and the **spinal cavity**, containing the nerves of the spinal cord.
- The **ventral** or anterior cavities are at the front of the body.
- The three ventral cavities are the **thoracic cavity**, the **abdominal cavity** and the **pelvic cavity**.
- The **thoracic cavity** contains the heart, lungs, esophagus, trachea, bronchi, thymus gland and the aorta.
- Within the **abdominal cavity** are the peritoneum, stomach, intestines, spleen, pancreas, liver, kidneys and gallbladder.
- The **pelvic cavity** contains small parts of the intestines, the rectum, bladder, urethra and ureters.
- In the female, the uterus and vagina also form part of the pelvic cavity.
- The abdominal and pelvic cavities are frequently considered together and are called the abdominopelvic cavity.



ABDOMINOPELVIC REGIONS AND QUADRANTS

- Because of the location of various organs within the abdominopelvic cavity, doctors often divide the cavity into **quadrants** (*quarters*), each of which contains specific organs and therefore may be affected by particular diseases.
- This assists with making a temporary diagnosis.
- The quadrants are the right upper quadrant (RUQ), right lower quadrant (RLQ), left upper quadrant (LUQ), and left lower quadrant (LLQ).
- To more specifically locate diseased organs, the **abdominopelvic region** can be further divided into a grid, with the following nine regions.

Region	Location
umbilical region	middle of the abdomen, surrounding the umbilicus
epigastric region	above (superior to) the stomach and umbilical region
hypogastric region	below (inferior to) the stomach and umbilical region
right inguinal (or right iliac) region	right side of the hypogastric region
right hypochondriac region	right of the epigastric region
left hypochondriac region	left of the epigastric region
left inguinal (or left iliac) region	left side of the hypogastric region
right lumbar region	lateral to the umbilical region on the right side
left lumbar region	lateral to the umbilical region on the left side

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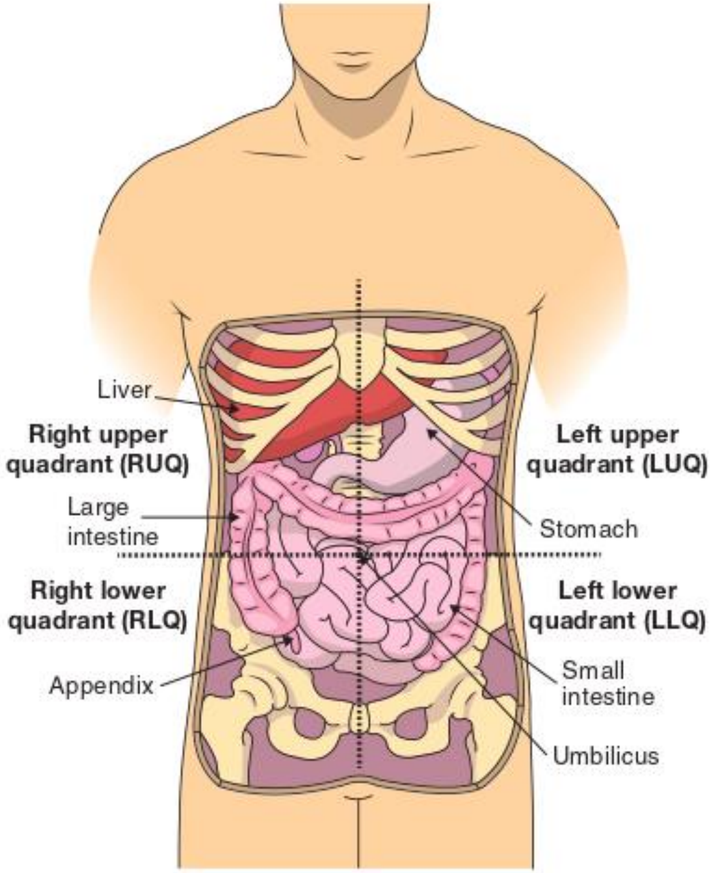
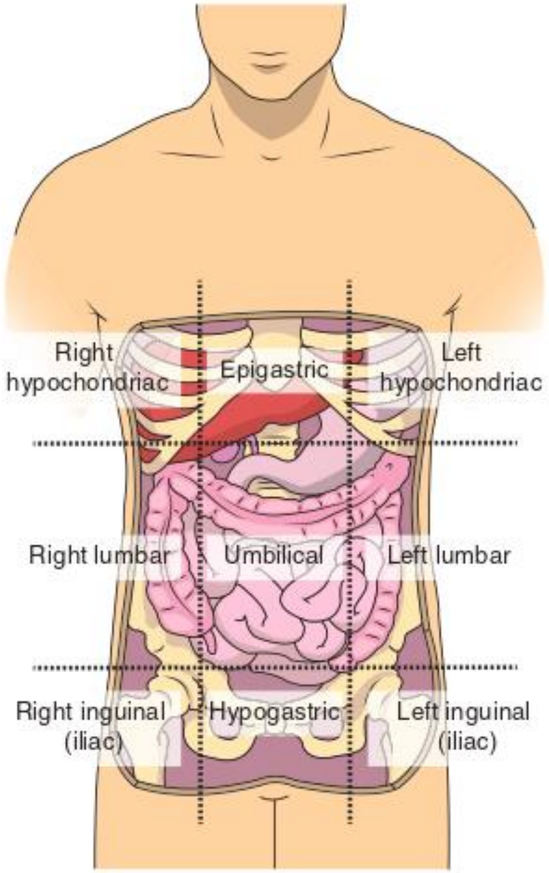
ABDOMINOPELVIC REGIONS AND QUADRANTS

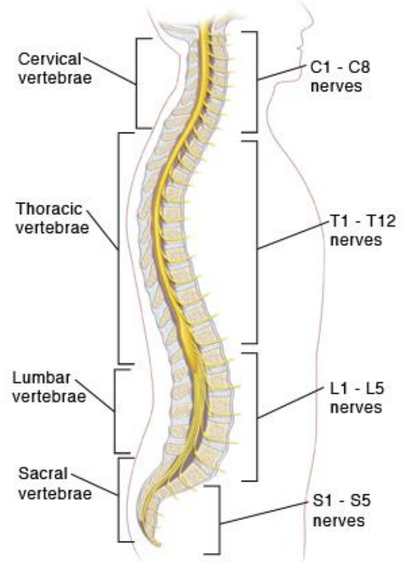




DIVISIONS OF THE SPINAL COLUMN

- The spinal column consists of **26 bones**, each of which is known as a **vertebra** (plural: vertebrae).
- The **spinal column** is generally considered to consist of five divisions. (See the chart).
- It is important to make a distinction between the **spinal column**, which is made up of bone tissue, and the **spinal cord**, which consists of nervous tissue.
- Each vertebra is separated by an **intervertebral space** which contains a small **disc** made up of water and cartilage.
- The purpose of the disc is to act as a cushioning mechanism for the vertebrae as well as a stabilizer, and to ensure continued movement of the spinal column.
- An intervertebral space is labelled or identified based on the location of the two vertebrae either side of the space.
- **For example**, intervertebral space T12/L1 is the space between the last thoracic vertebra (T12) and the first lumbar vertebra (L1).

cervical	Consists of 7 vertebrae, labelled C1–C7 and located in the neck region.
thoracic	Consists of 12 vertebrae, labelled T1–T12 and located in the chest region. Each of the 12 pairs of ribs is attached to a thoracic vertebra.
lumbar	Consists of 5 vertebrae, labelled L1–L5 and located in the flank region (the area between the ribs and the hip bone).
sacral	Consists of 5 vertebrae, labelled S1–S5. These bones are fused to form a single bone, the sacrum.
coccygeal	Consists of 4 fused bones which form the coccyx or tailbone.



POSITIONAL AND DIRECTIONAL TERMS

- Provided is a list of common terms used in medical terminology to describe the **location** of an organ or body structure in relation to another.
- Remember that when describing positions or directions the body is in the **anatomical position**.
- The terms have been paired with their opposing term to also aid in your understanding.

Position	Explanation	Example
anterior	Also known as ventral and refers to being in front of an organ or at the front of the body.	The nose is on the anterior side of the body.
posterior	Also known as dorsal and refers to behind an organ or at the back of the body.	The rectum lies posterior to the uterus.
deep	Refers to being further or well away from the surface of the body.	The knife penetrated deep into the thoracic cavity.
superficial	Refers to on or close to the surface of the body.	The patient sustained superficial cuts to the hands which did not require sutures.
proximal	Refers to locations that are close to the point of origin of a structure or attachment to the body.	The femur is proximal to the tibia and fibula.
distal	Refers to locations that are further away from the point of origin of a structure or attachment to the body.	The ulna and radius are distal to the humerus.
inferior	Refers to organs or structures that are below another.	The heart lies inferior to the head.

superior	Refers to organs or structures that are above another.	The liver lies superior to the bladder.
medial	Refers to organs or structures closer to the midline of the body.	The heart lies medial to the arms.
lateral	Refers to organs or structures that are further away from the midline of the body.	The hand lies lateral to the liver.
supine	Refers to a person lying face up.	The supine position allows for palpation of the abdomen and testing the effect of leg raising during a physical examination.
prone	Refers to a person lying face down.	The patient was placed in the prone position to allow for a better examination of the back wound.

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EXERCISES

1 _____

2 _____

3 _____

4 _____

5 _____

6 _____

7 _____

8 _____

9 _____

10 _____

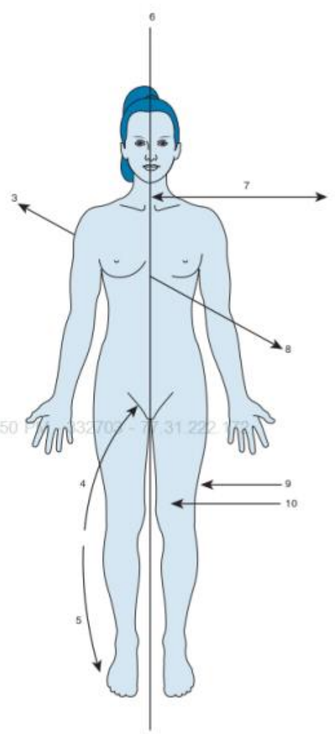

Figure 3.10

EXERCISES

Exercise 3.1: Label the Diagrams

Using the information provided in this chapter, label the anatomical parts in the figures below.

1 _____

2 _____

3 _____

4 _____

5 _____

6 _____

7 _____

8 _____

9 _____

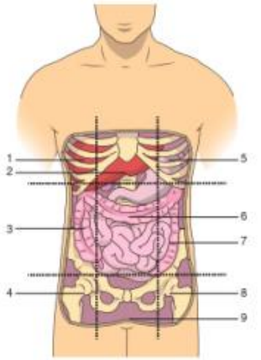

Figure 3.8

1 _____

2 _____

3 _____

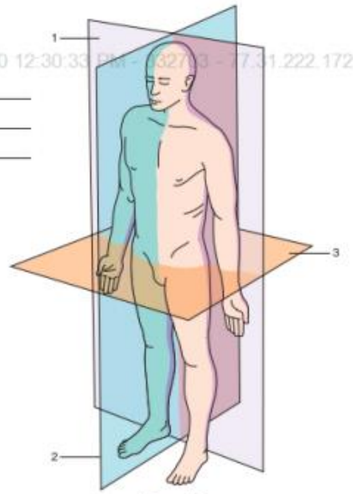

Figure 3.9

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EXERCISES

Exercise 3.2: Word Element Meanings and Word Building

Define each of the word elements, then use each element correctly in a medical term.

Word element	Meaning	Medical term
anter/o		
coccyg/o		
cervic/o		
cyt/o		
hist/o		
inguin/o		
proxim/o		
thel/o		
vertebr/o		
cata-		
hypo-		
inter-		
epi-		
-ose		
-plasm		

Exercise 3.3: Match Word Elements and Meanings

Match the prefix, suffix or word root in Column A with its meaning from Column B.

Column A	Answer	Column B
1. crani/o		A. ilium
2. meta-		B. egg
3. -eal		C. formation
4. sacr/o		D. excision
5. viscer/o		E. pertaining to
6. adip/o		F. navel
7. ili/o		G. internal organs
8. -plasia		H. nucleus
9. -ectomy		I. fat
10. umbilic/o		J. skull
11. ov/o		K. change
12. kary/o		L. sacrum

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Exercise 3.4: Word Analysis and Meaning

Break up the medical terms below into their component parts (prefixes, suffixes, word roots, combining vowels). Provide the meaning for each word element and each term as a whole.

Example:
osteosarcoma
oste / o / sarc / oma
WR CV WR S
Meaning: tumour of bones and flesh

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1. abdominopelvic
_____ / _____ / _____ / _____
Meaning:

2. posterolateral
_____ / _____ / _____ / _____
Meaning:

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3. thoracic
_____ / _____
Meaning:

4. hypogastric
_____ / _____ / _____
Meaning:

5. vertebral
_____ / _____
Meaning:

6. inguinal
_____ / _____
Meaning:

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7. pleural
_____ / _____
Meaning:

8. craniotomy
_____ / _____ / _____
Meaning:

Exercise 3.5: Vocabulary Building

Provide the medical term for each of the definitions below.

1. The plane that divides the body into anterior and posterior sections _____
2. The stomach is located in this cavity _____
3. Tissue that has fibres in it that helps the body to contract and relax _____
4. Pertaining to further away from the body or a structure _____
5. Lying on the back _____
6. The cavity above the abdomen that contains the heart and lungs _____
7. Tissue composed of fat cells _____
8. The five bones S1–S5 form the _____
9. Removal of a section of the skull _____
10. This structure controls how a cell operates _____

Exercise 3.6: Building Medical Terms

Complete the medical terms below using the correct word elements.

1. Hypo_____		refers to the left and right abdominopelvic regions.
2. _____ al cavity		contains the spinal cord.
3. Epi _____ cell		is a skin and lining cell.
4. _____ type		used to analyse chromosomes.
5. _____ al		at the front of a structure or organ.
6. _____ ior		referring to being above a structure or organ.

Exercise 3.7: Expand the Abbreviations

Expand the abbreviations to form correct medical terms.

Abbreviation	Expanded abbreviation
RUQ	
C1	
LUQ	
T12–L1	
LLQ	
DNA	
RLQ	
AP	

Exercise 3.8: Applying Medical Terminology

Referring to Figure 3.10 of the anatomical position (i.e. standing with palms facing the front) in Exercise 3.1, complete the following sentences with terms illustrating the spatial relationship of these body parts.

1. The leg is _____ to the foot.
2. A _____ plane divides the body into right and left halves.
3. The cheeks are _____ to the nose.
4. The mouth is _____ to the cheeks.
5. The chest is _____ to the abdomen.

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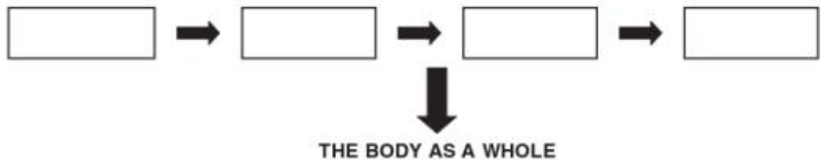
EXERCISES

6. The wrist is _____ to the elbow.
7. A _____ plane through the arm divides the hand from the shoulder.
8. A _____ plane separates the face from the rest of the head.
9. The skin is _____ to the muscles.
10. The waist is _____ to the neck.

Exercise 3.9: Applying Medical Terminology

From smallest to largest, what are the different classes of structures that make up the human body? Fill in the blanks in the boxes below.



Exercise 3.11: Crossword Puzzle

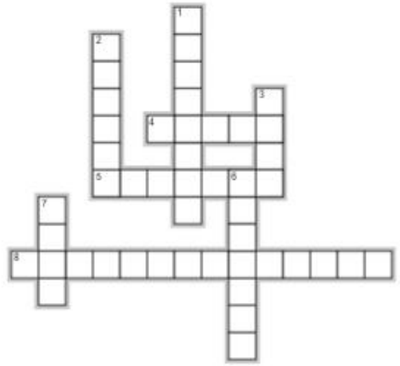
Complete the puzzle by providing the medical term for each of the clues below.

ACROSS

4. to be lying face down (5)
5. also known as frontal (7)
8. the space between two vertebrae (14)

DOWN

1. the head is said to be this to the neck (8)
2. this cavity contains the bladder (6)
3. the smallest unit of life (4)
6. the study of the structure of the body (7)
7. basic DNA molecule that determines inheritance (4)



Exercise 3.12: Anagram

Work out each medical term from the jumbled letters below. Then, using the letters in brackets, determine the medical term that matches the description given.

1. **lemdai**	__ __ __ (__) __ __	towards the midline of the body or structure
2. **tavnler**	(__) __ __ __ __ __ __	also known as anterior
3. **emeoptirnu**	__ __ __ __ (__)__ __ __ __ __	serous membrane covering the abdominal wall
4. **ylraxn**	__ __ __ (__) __ __	voice box
5. **aohdncorm**	(__) __ __ __ __ __ __ __ __	a benign tumour of the cartilage
6. **nsgora**	__ __ __ (__) __ __	structures composed of tissues and cells that perform particular functions

Rearrange the letters in brackets to form a word that means 'a hollow space within the body that contains organs'.

_ _ _ _ _ _ _


QUESTIONS?
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Life Science
for Middle School
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Earth and Space Sciences
for Middle School
Michael Carter
Physical Science
for Middle School
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Biology
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