Dr Lagat Moses Kipchumba

MB.ChB., MMed (ObsGyn) [UoN].

Lecturer Clinical Medicine

HND- RH Coordinator

Who am I?

- Reproductive Health Specialist
- Group Practice Enthusiast
- Building Teams

Profile

CPA-II

Undergraduate Training

Residency program

- Resident in the Department of Obstetrics & Gynecology
- Chief Resident – Coordinate all duties of Residents 120

1. LIHM
2. Economic Evaluation of Global Health
3. Project Mx
4. Conducting Research Responsibly
5. Introduction to Epidemiology

MO-Intern
MO
Internship coordinator

- Hospital -MOIC
- NMTC-Lecturer : Microbiology
- 5 Year strategic plan
  - Internship center for clinical medicine
  - Diploma –RCO
  - Trauma Hospital
  - Service Delivery
  - Community mobilization
  - Set up satellite facility : feeder

UNHCR-Refugee Support program
MO/Medical Director

- MO
- OBGYN
  - Resident
  - Specialist

Profile Continued

- Lecturer Clinical Medicine
- HND- RH Coordinator
- Adjunct Faculty
- Assessor
  - OSCEs
  - RH

- Founder member
  - F500
  - FHCS
    - Eldoret & Bungoma
- Director Technical Services- FHC –Kahawa Sukari Brach
  - Policy implementation
  - Legal aspects of the business
  - Operations
  - Service delivery

REPUBLIC OF KENYA

MINISTRY OF HEALTH

- Member of the (TWG) Technical Working group on ageing and older persons
  - Curriculum for older persons training
    - HND-NURSING, CLINICAL MEDICINE
  - Development of the 5 Strategic plan
  - Development of CHV TOT Manual Content
- EMONC TOT
  - In partnership with LSTM /COC.
- KMPDC- Specialist Recognition .

Profile Continued

- Honorary Consultant
- OBGYN/Surgical care (2016)

Introduction to program/ Unit/

Diploma in Clinical Medicine & Surgery / ANATOMY

- Basic Sciences
- Intermediate
- Clinicals

- MWR
- Clinic
- Theatre days
- Trainings
  - CAPACITY BUILDING

The how?

- MWR
- Clinic
- Theatre days
- Trainings
  - CAPACITY BUILDING

KENYA MEDICAL TRAINING COLLEGE

FACULTY OF HEALTH SCIENCES

DEPARTMENT OF CLINICAL MEDICINE

MT KENYA REGION MARCH 2020.

HUMAN ANATOMY

Code: HAT 116

Hours: 60

SN	LECTURER	PHONE	CAMPUS	TOPIC	Hrs	Date
1.	DR. LAGAT	0721550125		Introduction to human anatomy definitions, sub-disciplines of anatomy, anatomical terminologies (body positions,; Introduction to human anatomy; regional names, directional terms) planes and sections	6	MON 28/9/2020 MON 5/10/2020 MON 12/10/2020
1.	LUCY GACHANE	0735570982	GATUNDU	Levels of structural organization; chemical (chemical elements), Levels of structural organization; cellular (cell-parts of cell, plasma membrane, cytoplasm, and organelles),	6	WED 30/9/2020 WED 7/10/2020 WED 14/10/2020
1. 1.	GEORGE NJENGA NOAH SAMBURU	0711535749 0721713836	NYAHURURU MURANG'A	Levels of structural organization tissue histology-types (epithelial, connective, muscular and nervous),	14	MON 19/10/2020 MON 26/10/2020 MON 2/11/2020 MON 9/11/2020 MON 16/11/2020 WED 18/11/2020 MON 23/11/2020
1. 1.	NANCY MUCHOKI AMOS KARANJA	0723657617 0721454783	MERU ISIOLO	Embryology structure and locations, organ systems and organisms Embryology;cell division (mitosis, meiosis), gametogenesis, fertilization Embryology; embryogenesis and organogenesis	8	WED 21/10/2020 WED 28/10/2020 WED 4/11/2020 WED 11/11/2020

Introduction to Human Anatomy

- Definitions
- sub-disciplines of anatomy,
- anatomical terminologies
  - (body positions,;
  - regional names,
  - directional terms)
  - planes &
  - sections

Introduction to Human Anatomy

- **Definitions**

- sub-disciplines of anatomy,
- anatomical terminologies
  - (body positions,;
  - regional names,
  - directional terms)
  - planes &
  - sections

What is Anatomy?

- Latin: to take apart
- Modern: the study of structures, morphology

- Study of the STRUCTURE of the Human Body

- Closely related to PHYSIOLOGY!

- **Physiology** is the study of the FUNCTION of the human body

- ANATOMY vs PHYSIOLOGY

Subcategories of anatomy:

- Gross
- Microscopic
  - Histology & Cytology
- Embryology
- Systematic
- Regional
- Surface
-
- Pathological

Divisions of Anatomy

- Gross Anatomy
  - Structures that can be seen with the eye
  - Muscles, bones, various organs

Divisions of Anatomy

- Microscopic Anatomy
  - Structures that cannot be seen with the eye
  - Need to use a microscope
  - **Cytology** = study of cells
  - **Histology** = study of tissues
  - **Light microscope vs Electron microscope**

Microscopic Anatomy

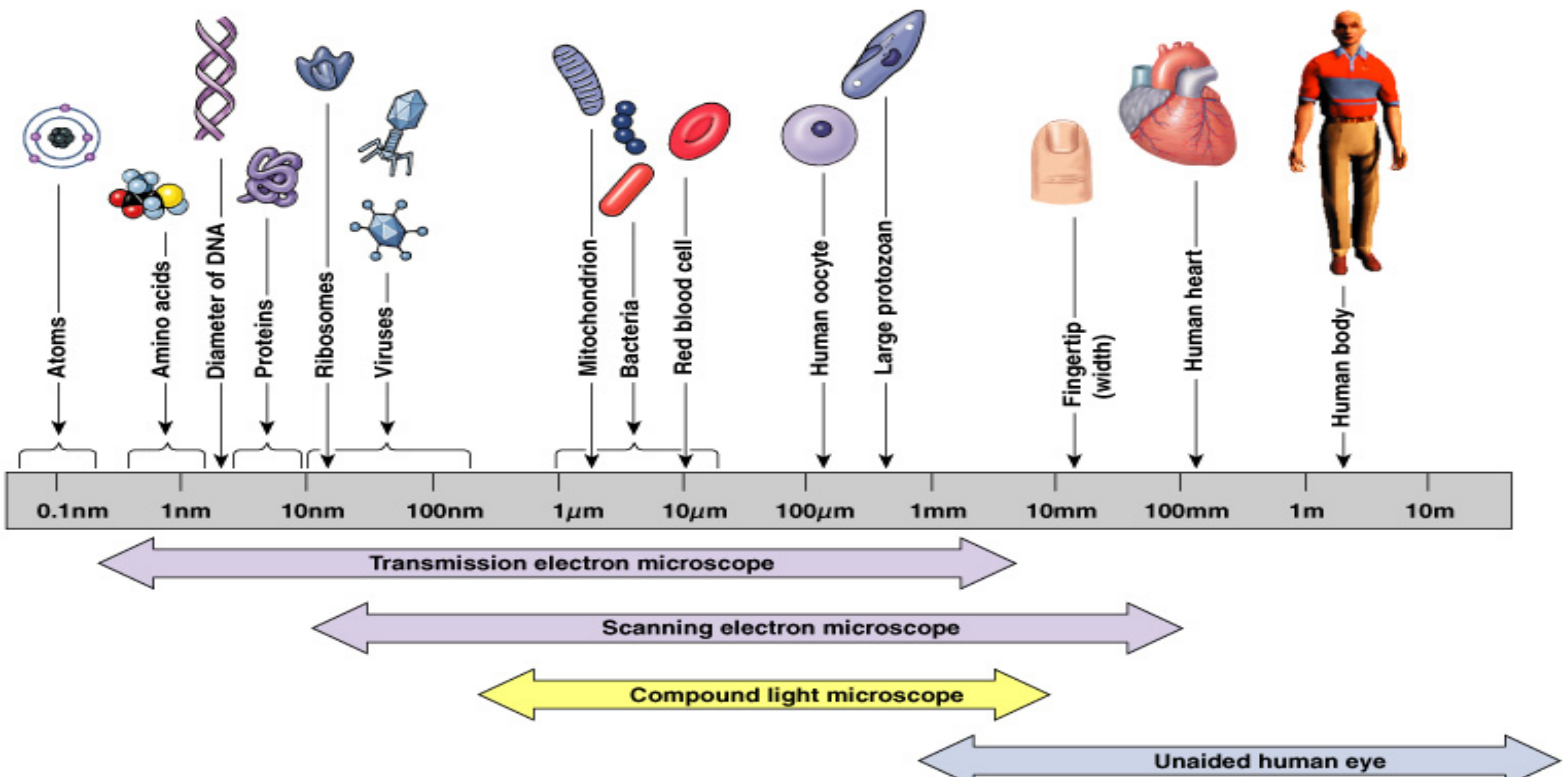


Figure 1.1 The Study of Anatomy at Different Scales

Divisions of Anatomy

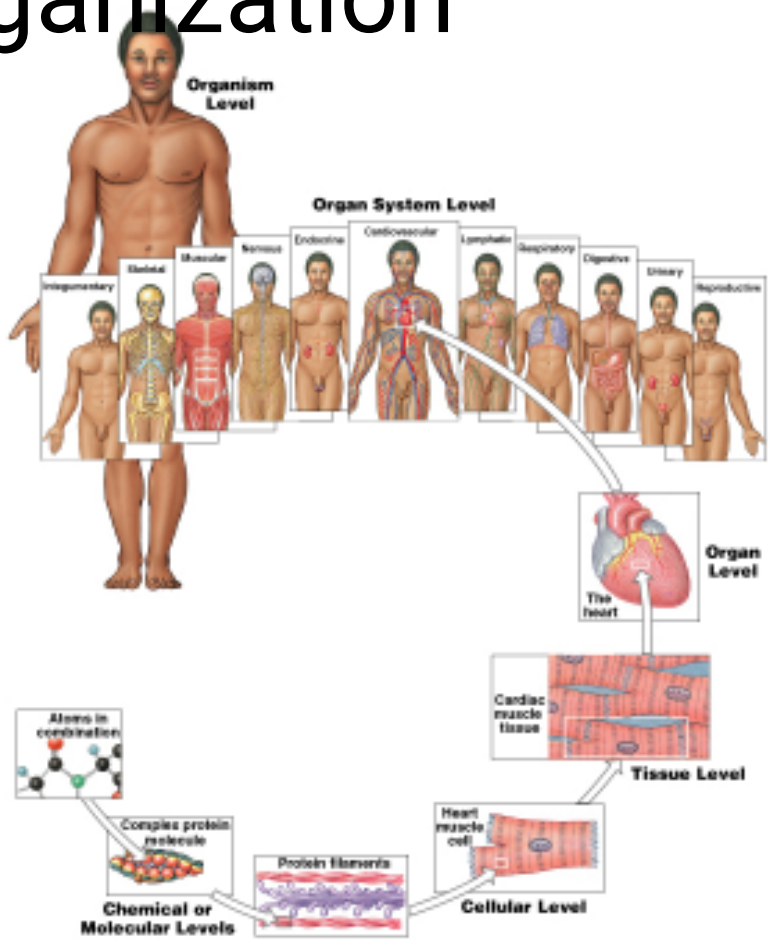
- Developmental/Embryology Anatomy
  - the science dealing with the formation, development, structure, and functional activities of embryos.
  - **Embryology** is the branch of biology that studies the prenatal development of gametes (sex cells), fertilization, and development of embryos and fetuses.

Ways to Study Anatomy

- **Regional Anatomy** – study one region of the body at a time and learn everything about the region

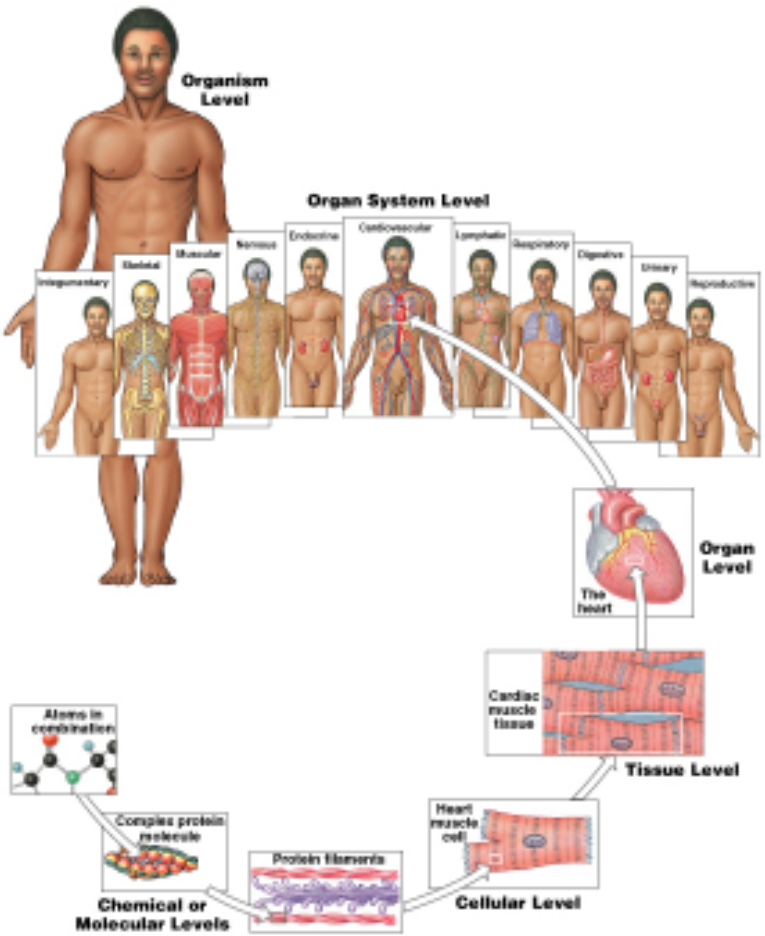
- **Systemic Anatomy** – study one body system at a time. This is the approach we will use in this course

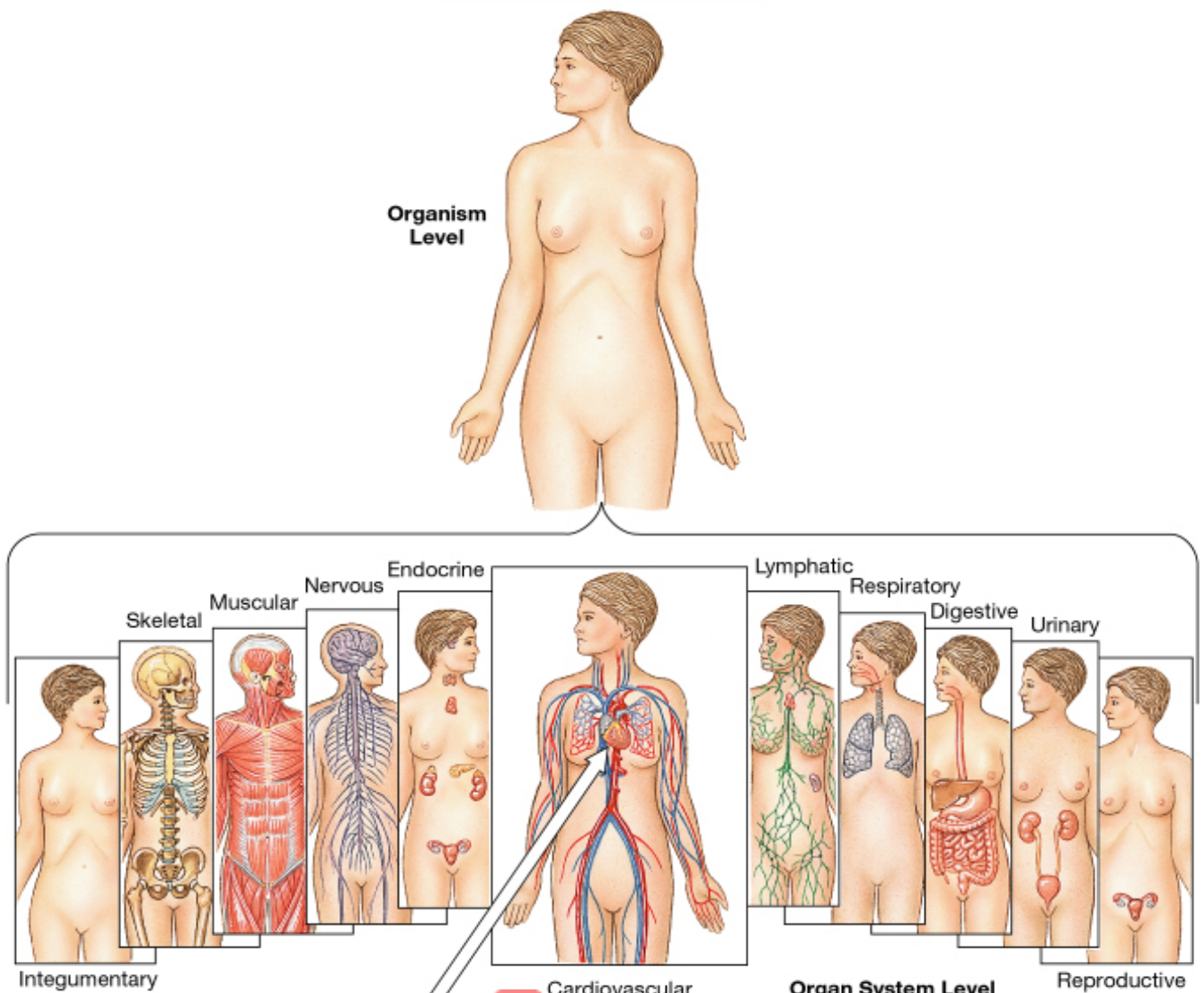
Levels of Organization



Anatomical Organization

- Cells
- Tissues
- Organs
- Organ Systems
- Organism





https://youtu.be/uBGl2BujkPQ

Body Systems

- *Know names, major components and basic functions*

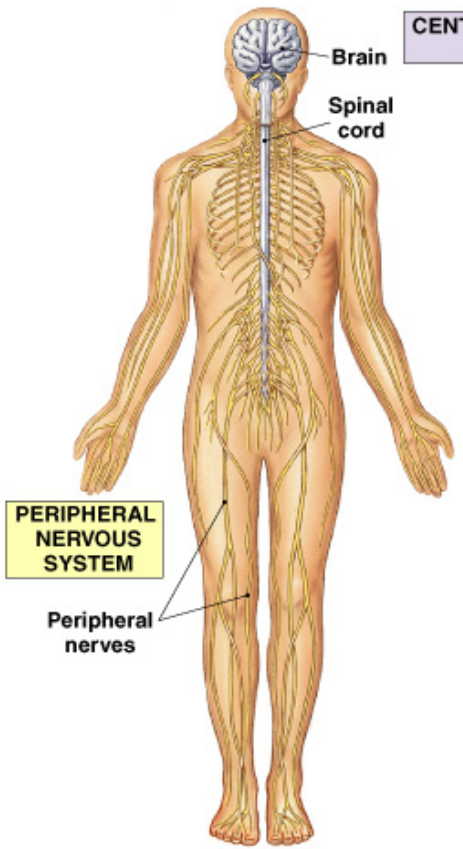
Organ Systems

- 1. Integument
- 2. Skeletal
- 3. Muscular
- 4. Nervous
- 5. Endocrine
- 6. Cardiovascular
- 7. Lymphatic
- 8. Respiratory
- 9. Digestive
- 10. Urinary
- 11. Reproductive

Organ System		*Major Functions*
	Integumentary system	Protection from environmental hazards; temperature control
	Skeletal system	Support, protection of soft tissues; mineral storage; blood formation
	Muscular system	Locomotion, support, heat production
	Nervous system	Directing immediate responses to stimuli, usually by coordinating the activities of other organ systems
	Endocrine system	Directing long-term changes in the activities of other organ systems
	Cardiovascular system	Internal transport of cells and dissolved materials, including nutrients, wastes, and gases
	Lymphatic system	Defense against infection and disease
	Respiratory system	Delivery of air to sites where gas exchange can occur between the air and circulating blood
	Digestive system	Processing of food and absorption of organic nutrients, minerals, vitamins, and water
	Urinary system	Elimination of excess water, salts, and waste products; control of pH
	Reproductive system	Production of sex cells and hormones

Body Systems: *Know names, major components and basic functions*

The Nervous System

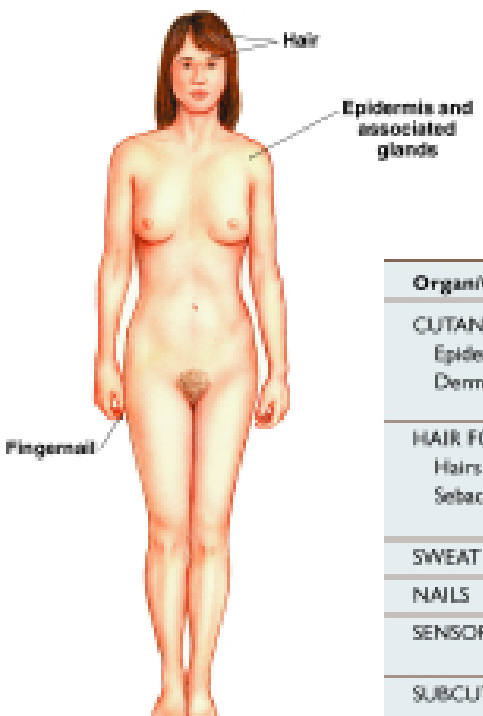


(d) The Nervous System

Organ/Component	Primary Functions
CENTRAL NERVOUS SYSTEM (CNS)	Acts as control center for nervous system: processes information; provides short-term control over activities of other systems
Brain	Performs complex integrative functions; controls both voluntary and autonomic activities
Spinal cord	Relays information to and from brain; performs less-complex integrative functions; directs many simple involuntary activities
Special senses	Provide sensory input to the brain relating to sight, hearing, smell, taste, and equilibrium
PERIPHERAL NERVOUS SYSTEM (PNS)	Links CNS with other systems and with sense organs

Figure 1.6d The Organ Systems of the Body

The Integumentary System



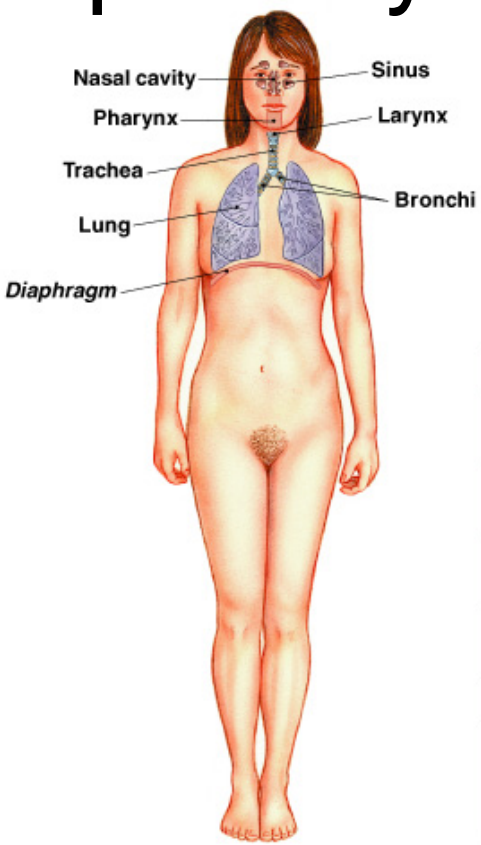
(a) The Integumentary System

Organ/Component	Primary Functions
CUTANEOUS MEMBRANE	
Epidermis	Covers surface; protects deeper tissues
Dermis	Nourishes epidermis; provides strength; contains glands
HAIR FOLLICLES	Produce hair; innervation provides sensation
Hairs	Provide some protection for head
Sebaceous Glands	Secrete lipid coating that lubricates hair shaft and epidermis
SWEAT GLANDS	Produce perspiration for evaporative cooling
NAILS	Protect and stiffen distal tips of digits
SENSORY RECEPTORS	Provide sensations of touch, pressure, temperature, pain
SUBCUTANEOUS LAYER	Stores lipids; attaches skin to deeper structures

Body Systems

- *NIRMCRUDLES*
  - *Know names, major components and basic functions*

The Respiratory System

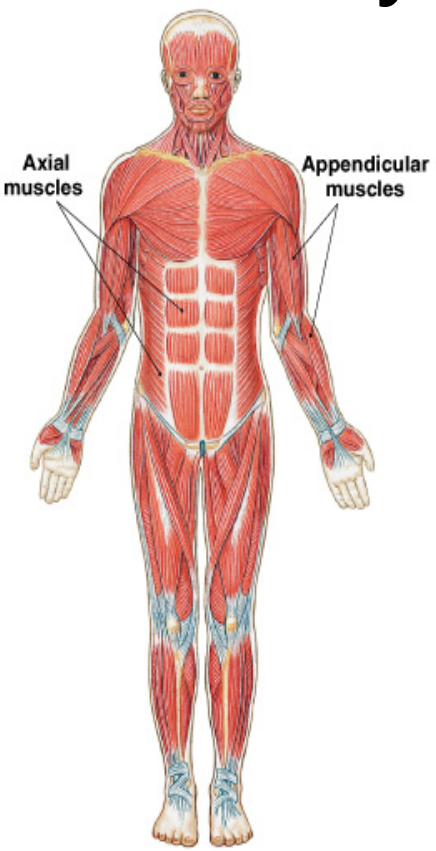


(h) The Respiratory System

Organ/Component	Primary Functions
NASAL CAVITIES, PARANASAL SINUSES	Filter, warm, humidify air; detect smells
PHARYNX	Conducts air to larynx; a chamber shared with the digestive tract (*see Figure 1.6i*)
LARYNX	Protects opening to trachea and contains vocal cords
TRACHEA	Filters air; traps particles in mucus; cartilages keep airway open
BRONCHI	(Same functions as trachea) through volume changes
LUNGS	Responsible for air movement during movements of ribs and diaphragm; include airways and alveoli
Alveoli	Act as sites of gas exchange between air and blood

Figure 1.6h The Organ Systems of the Body

The Muscular System

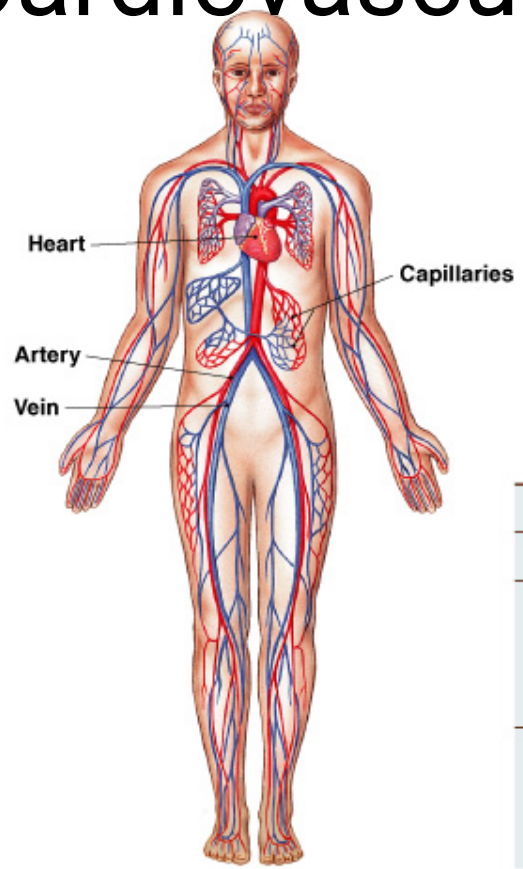


(c) The Muscular System

Organ/Component	Primary Functions
SKELETAL MUSCLES (700)	Provide skeletal movement; control entrances to digestive and respiratory tracts and exits of digestive and urinary tracts; produce heat; support skeleton; protect soft tissues
Axial muscles	Support and position axial skeleton
Appendicular muscles	Support, move, and brace limbs
TENDONS, APONEUROSES	Harness forces of contraction to perform specific tasks

Figure 1.6c The Organ Systems of the Body

The Cardiovascular System

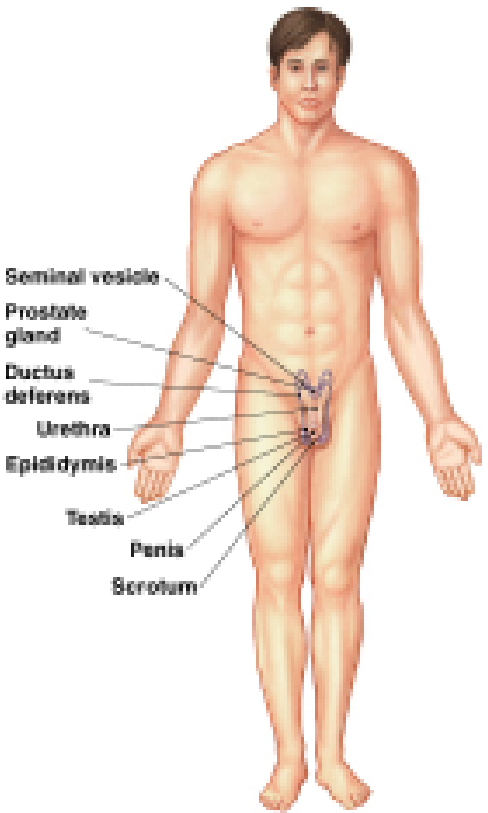


(f) The Cardiovascular System

Organ/Component	Primary Functions
HEART	Propels blood; maintains blood pressure
BLOOD VESSELS	Distribute blood around the body
Arteries	Carry blood from heart to capillaries
Capillaries	Permit diffusion between blood and interstitial fluids
Veins	Return blood from capillaries to the heart
BLOOD	Transports oxygen, carbon dioxide, and blood cells; delivers nutrients and hormones; removes waste products; assists in temperature regulation and defense against disease

Figure 1.6f The Organ Systems of the Body

The Male Reproductive System

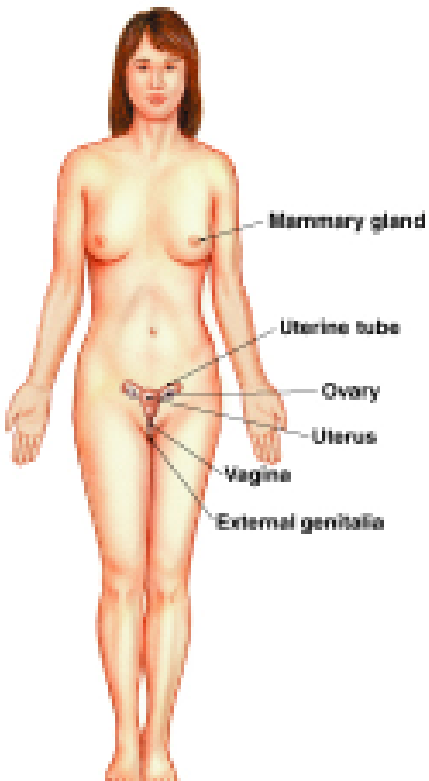


(k) The Male Reproductive System

Organ/Component	Primary Functions
TESTES	Produce sperm and hormones (see *Figure 1.6e*)
ACCESSORY ORGANS	
Epididymis	Acts as site of sperm maturation
Ductus deferens (sperm duct)	Conducts sperm from the epididymis and merges with the duct of the seminal vesicle
Seminal vesicles	Secrete fluid that makes up much of the volume of semen
Prostate gland	Secretes fluid and enzymes
Urethra	Conducts semen to exterior
EXTERNAL GENITALIA	
Penis	Contains erectile tissue; deposits sperm in vagina of female; produces pleasurable sensations during sexual activities
Scrotum	Surrounds the testes and controls their temperature

Figure 1.6k The Organ Systems of the Body

The Female Reproductive System

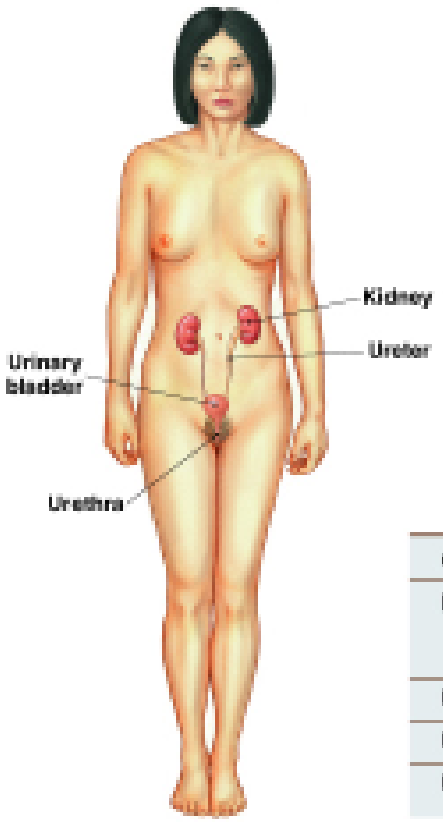


(I) The Female Reproductive System

Organ/Component	Primary Functions
OVARIES	Produce oocytes and hormones (see Figure 1.6e)
UTERINE TUBES	Deliver oocyte or embryo to uterus; normal site of fertilization
UTERUS	Site of embryonic development and exchange between maternal and embryonic bloodstreams
VAGINA	Site of sperm deposition; acts as birth canal at delivery; provides passageway for fluids during menstruation
EXTERNAL GENITALIA	
Clitoris	Contains erectile tissue; produces pleasurable sensations during sexual activities
Labia	Contain glands that lubricate entrance to vagina
MAMMARY GLANDS	Produce milk that nourishes newborn infant

Figure 1.6l The Organ Systems of the Body

The Excretory or Urinary System

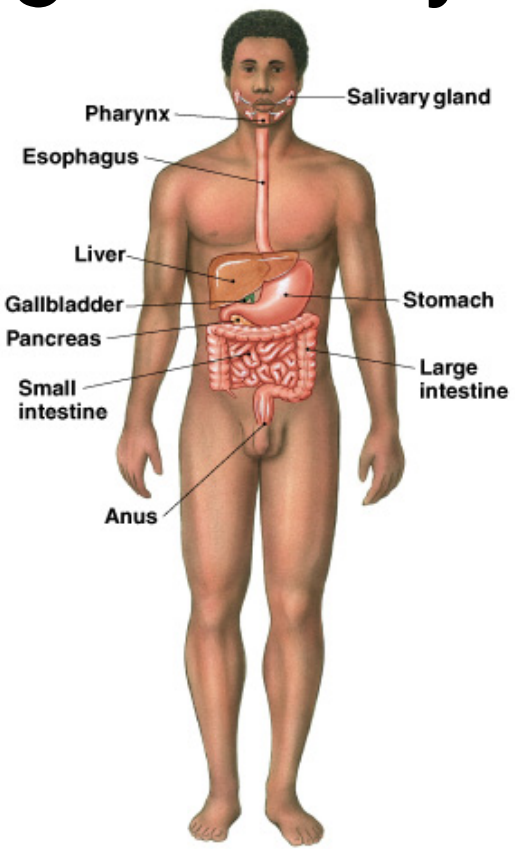


(j) The Urinary System

Organ/Component	Primary Functions
KIDNEYS	Form and concentrate urine; regulate blood pH and ion concentrations; perform endocrine functions (see Figure 1.6e)
URETERS	Conduct urine from kidneys to urinary bladder
URINARY BLADDER	Stores urine for eventual elimination
URETHRA	Conducts urine to exterior

Figure 1.6j The Organ Systems of the Body

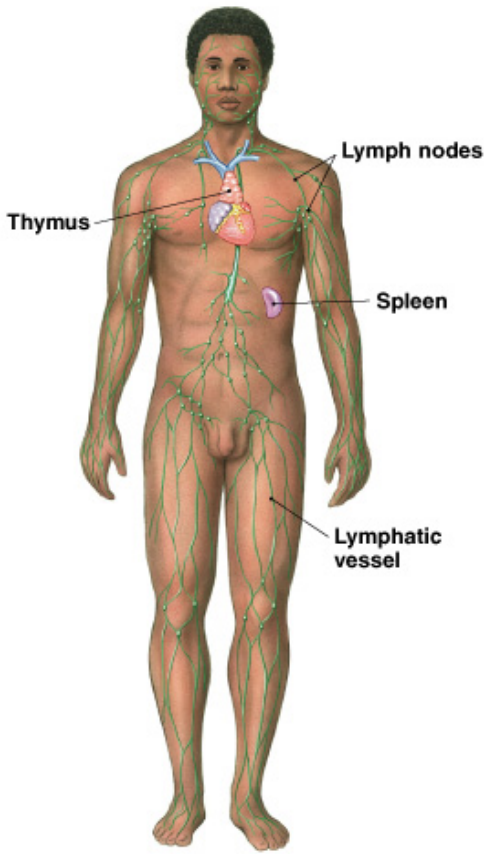
The Digestive System



(i) The Digestive System

Organ/Component	Primary Functions
MOUTH	Receptacle for food; works with associated structures (teeth, tongue) to break up food and pass food and liquids to pharynx
SALIVARY GLANDS	Provide buffers and lubrication; produce enzymes that begin digestion
PHARYNX	Conducts solid food and liquids to esophagus; chamber shared with respiratory tract (*see Figure 1.6h*)
ESOPHAGUS	Delivers food to stomach
STOMACH	Secretes acids and enzymes
SMALL INTESTINE	Secretes digestive enzymes, buffers, and hormones; absorbs nutrients
LIVER	Secretes bile; regulates nutrient composition of blood
GALLBLADDER	Stores and concentrates bile for release into small intestine
PANCREAS	Secretes digestive enzymes and buffers; contains endocrine cells (*see Figure 1.6e*)
LARGE INTESTINE	Removes water from fecal material; stores wastes

The Lymphatic System

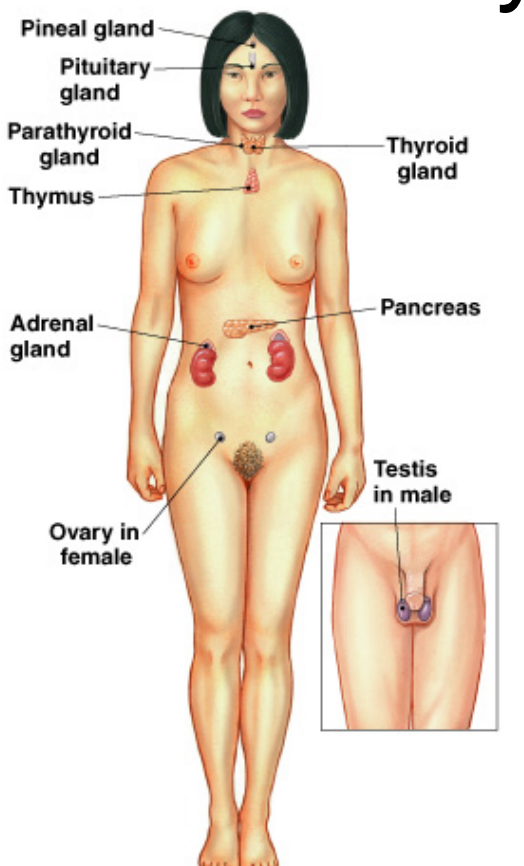


(g) The Lymphatic System

Organ/Component	Primary Functions
LYMPHATIC VESSELS	Carry lymph (water and proteins) and lymphocytes from peripheral tissues to veins of the cardiovascular system
LYMPH NODES	Monitor the composition of lymph; engulf pathogens; stimulate immune response
SPLEEN	Monitors circulating blood; engulfs pathogens and recycles red blood cells; stimulates immune response
THYMUS	Controls development and maintenance of one class of lymphocytes (T cells)

Figure 1.6g The Organ Systems of the Body

The Endocrine System

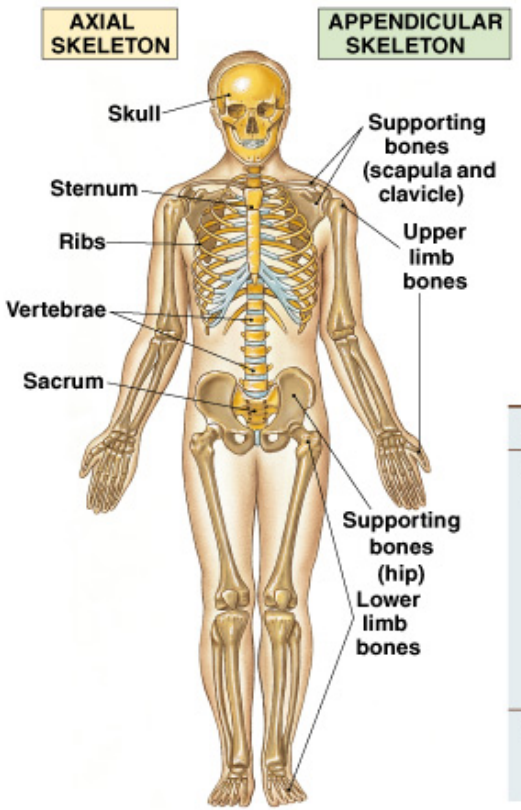


(e) The Endocrine System

Organ/Component	Primary Functions
PINEAL GLAND	May control timing of reproduction and set day–night rhythms
PITUITARY GLAND	Controls other endocrine glands; regulates growth and fluid balance
THYROID GLAND	Controls tissue metabolic rate; regulates calcium levels
PARATHYROID GLANDS	Regulate calcium levels (with thyroid)
THYMUS	Controls maturation of lymphocytes
ADRENAL GLANDS	Adjust water balance, tissue metabolism, cardiovascular and respiratory activity
KIDNEYS	Control red blood cell production and elevate blood pressure
PANCREAS	Regulates blood glucose levels
GONADS	
Testes	Support male sexual characteristics and reproductive functions (*see Figure 1.6k*)
Ovaries	Support female sexual characteristics and reproductive functions (*see Figure 1.6l*)

Figure 1.6e The Organ Systems of the Body

The Skeletal System



(b) The Skeletal System

Organ/Component	Primary Functions
BONES, CARTILAGES, AND JOINTS	Support, protect soft tissues; bones store minerals
Axial skeleton (skull, vertebrae, sacrum, coccyx, sternum, supporting cartilages and ligaments)	Protects brain, spinal cord, sense organs, and soft tissues of thoracic cavity; supports the body weight over the lower limbs
Appendicular skeleton (limbs and supporting bones and ligaments)	Provides internal support and positioning of the limbs; supports and moves axial skeleton
BONE MARROW	Primary site of blood cell production (red marrow); storage of energy reserves in fat cells (yellow marrow)

Figure 1.6b The Organ Systems of the Body

The Language of Anatomy

- Superficial anatomy: anatomical landmarks and correct directional terms help in understanding the underlying structures.
- Anatomical **landmarks**:
  - *Anatomical position* : standing upright, arms at sides, palms facing forward (little fingers by the thigh), feet flat on the floor, face straight ahead
  - *Supine:* lying down with the face up
  - *Prone:* lying down with the face down

Anatomical Directions

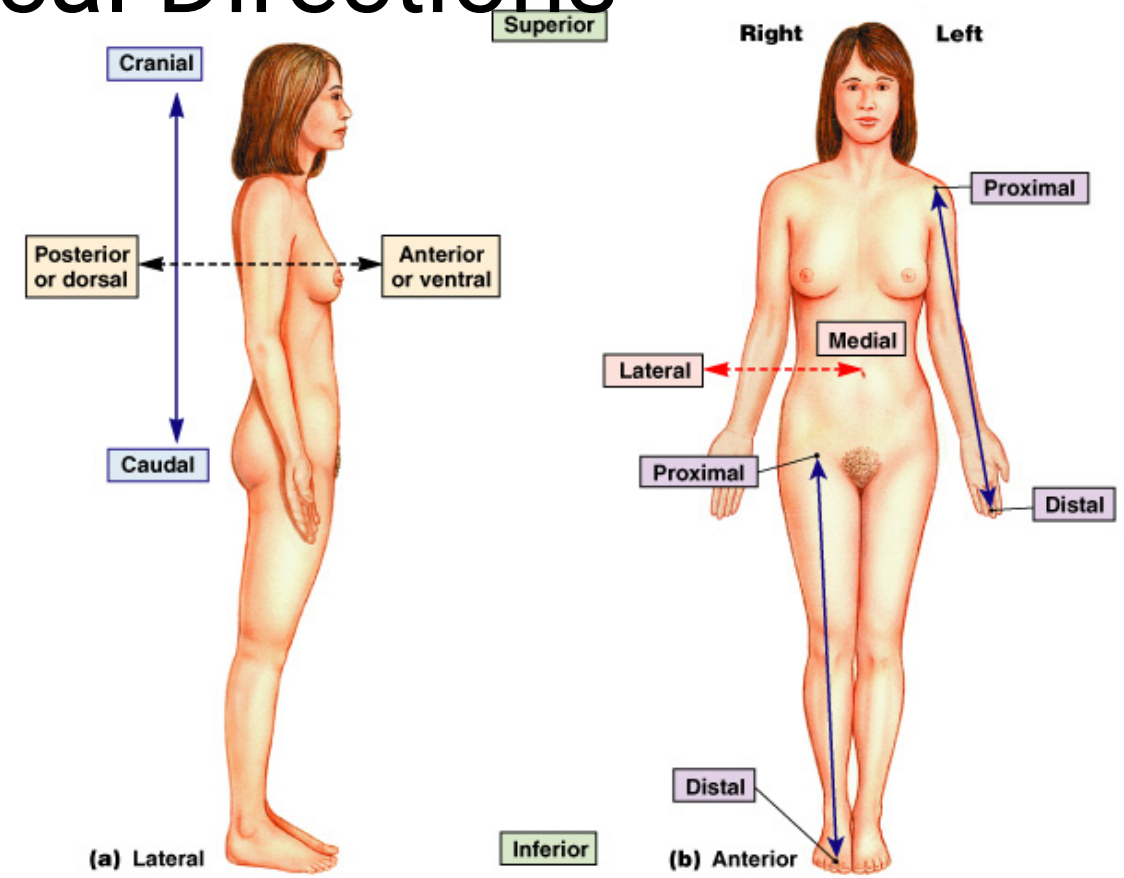


Figure 1.10 Directional References

Sectional Anatomy

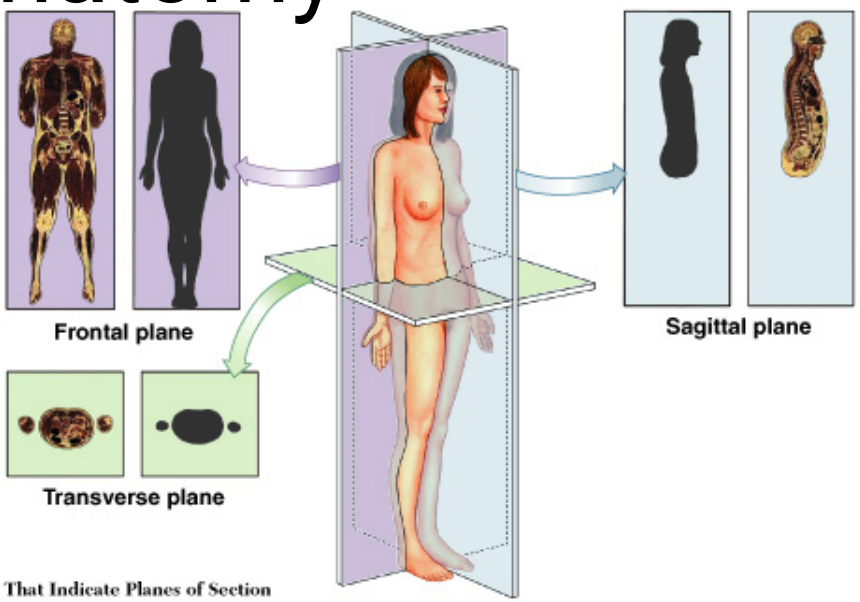


TABLE 1.3 Terms That Indicate Planes of Section

Orientation of Plane	Adjective	Directional Term	Description
Perpendicular to long axis	Transverse or horizontal or cross-sectional	Transversely or horizontally	A *transverse*, or *horizontal*, section separates superior and inferior portions of the body; sections typically pass through head and trunk regions.
Parallel to long axis	Sagittal	Sagittally	A *sagittal* section separates right and left portions. You examine a sagittal section, but you section sagittally.
	Midsagittal		In a *midsagittal* section, the plane passes through the midline, dividing the body in half and separating right and left sides.
	Parasagittal		A *parasagittal* section misses the midline, separating right and left portions of unequal size.
	Frontal or coronal	Frontally or coronally	A *frontal*, or *coronal*, section separates anterior and posterior portions of the body; coronal usually refers to sections passing through the skull.

Figure 1.11 Planes of Section

Sectional Anatomy

Sectional Anatomy was used to make this CT scan.

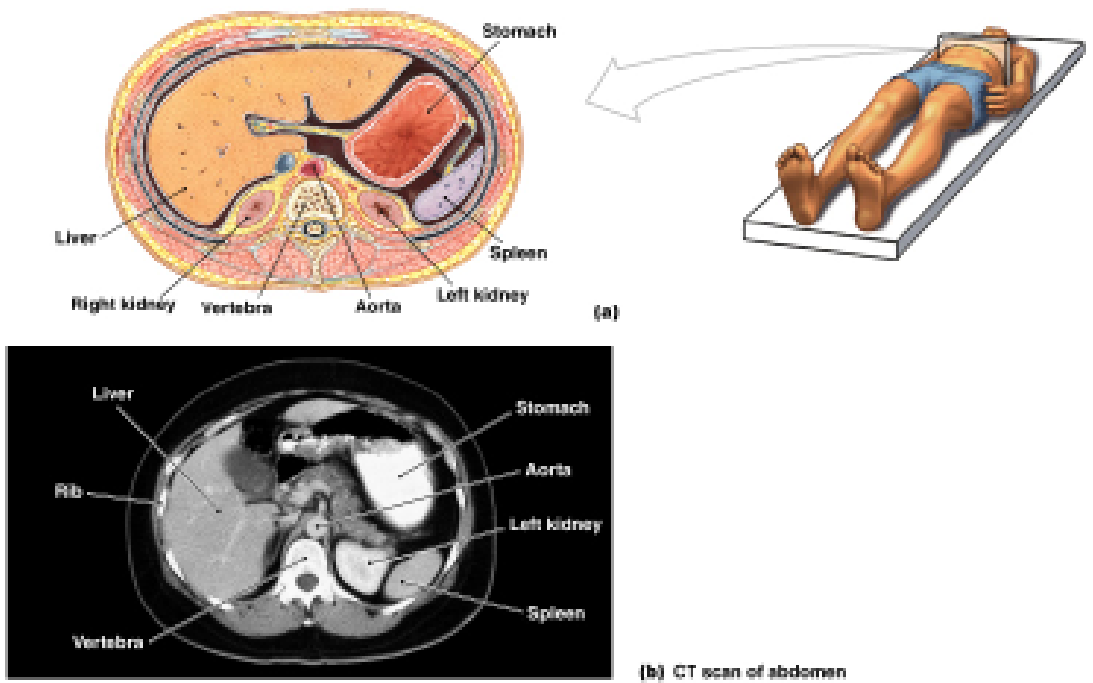


Figure 1.16a,b Scanning Techniques

Anatomical Regions and Surface Anatomy

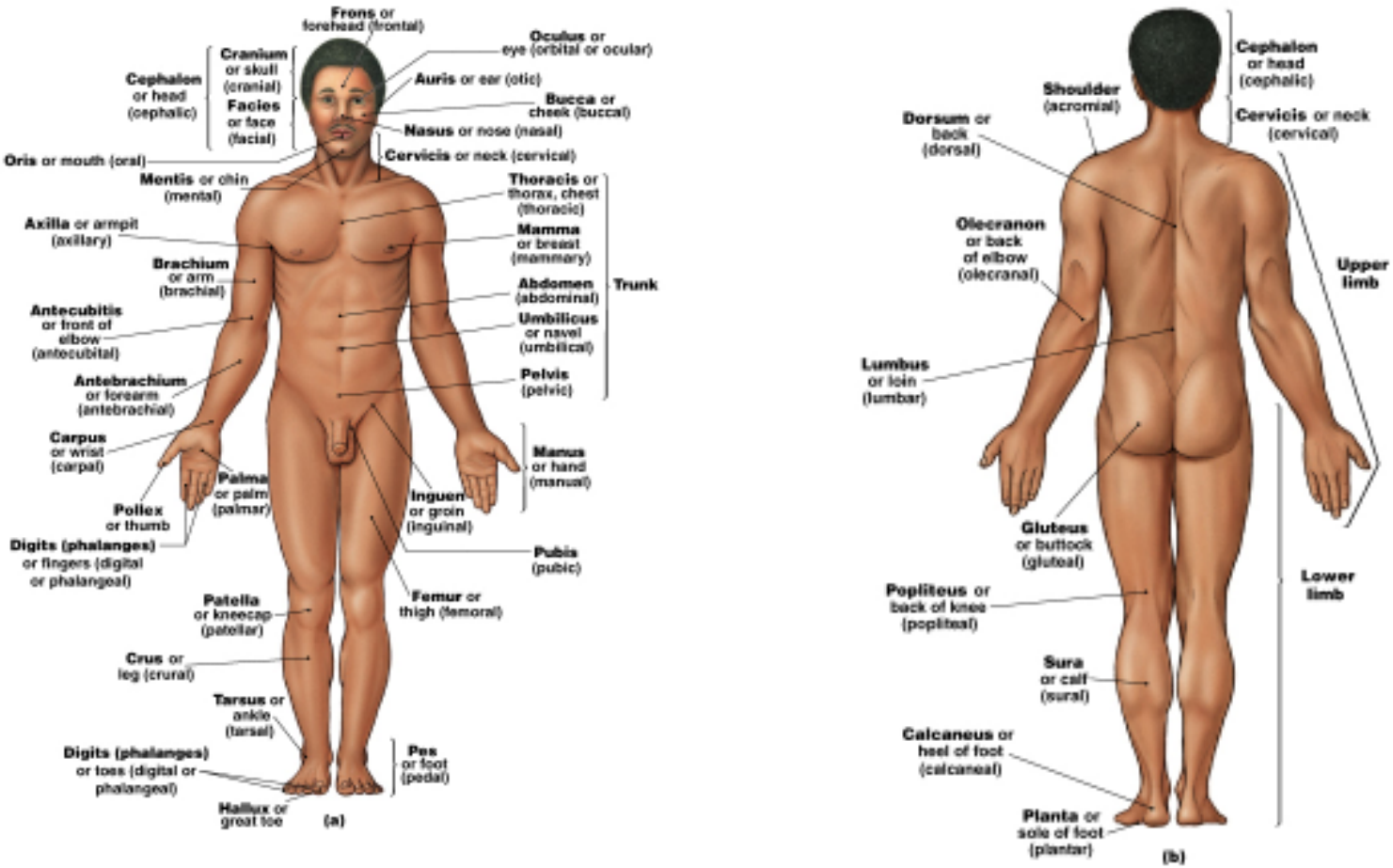
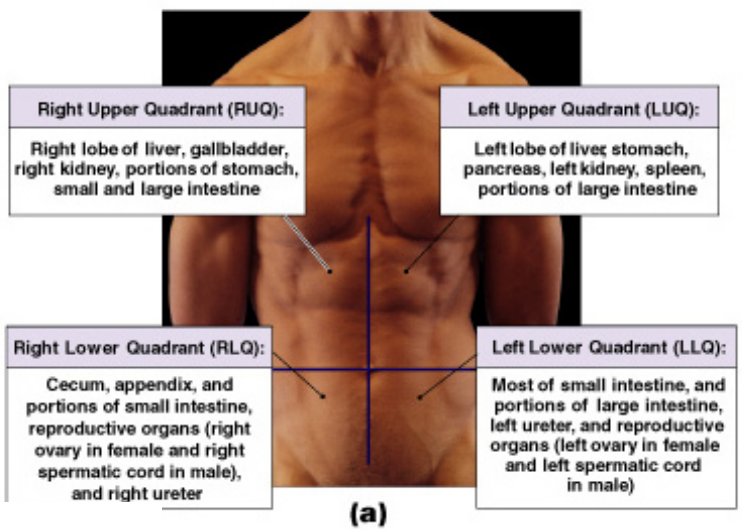


Figure 1.8 Anatomical Landmarks

Abdominopelvic Quadrants and Regions



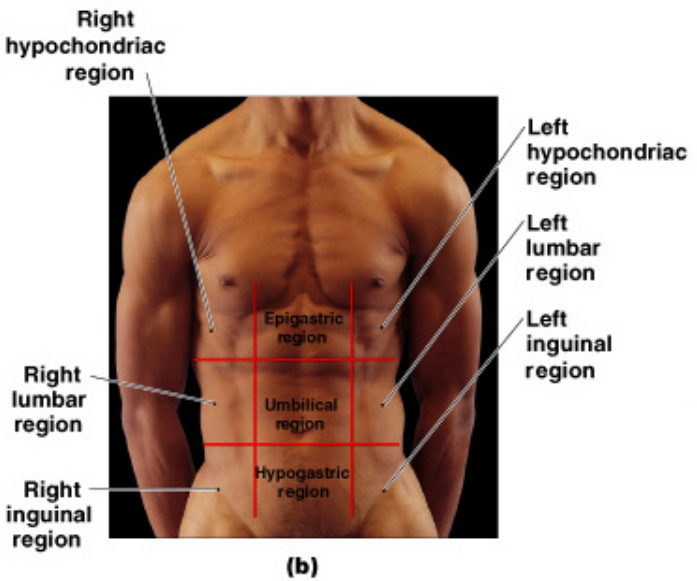


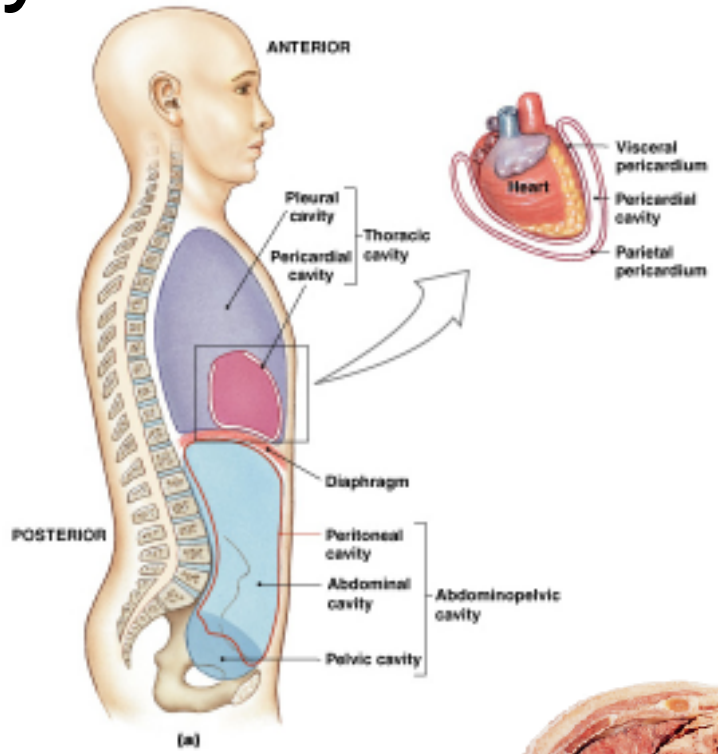
Figure 1.9a Abdominopelvic Quadrants

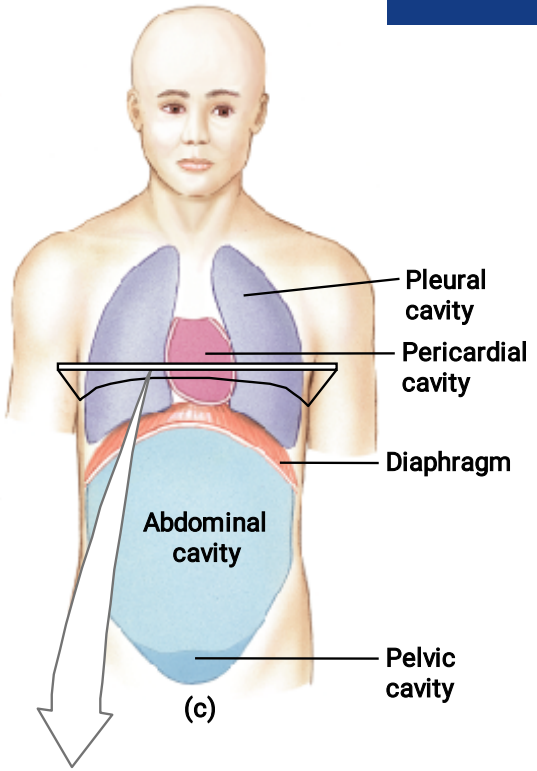
Figure 1.9b Abdominopelvic Regions

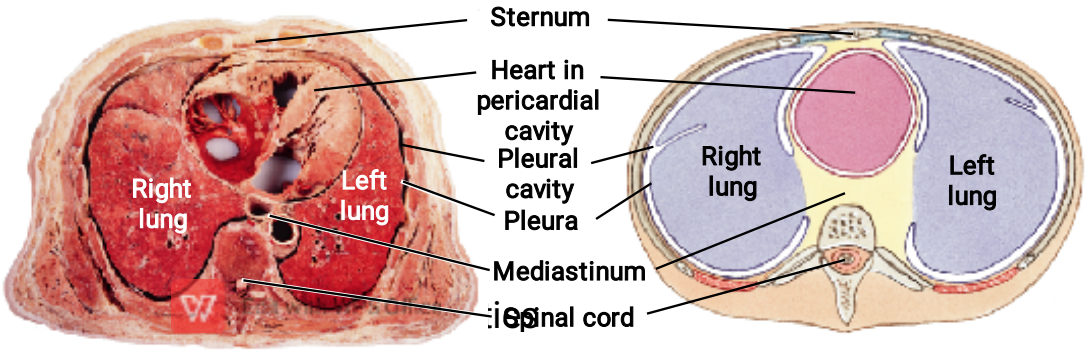
Body Cavities

- Ventral and Dorsal
  - Dorsal
    - Spinal and Cranial
  - Ventral
    - Organs of the respiratory, cardiovascular, digestive, urinary, and reproductive systems are housed in the ventral body cavity.
    - The*diaphragm* separates the ventral body cavity.
    - The ventral body cavity is protected and lubricated by a two-layer membrane system called **serous** membranes
    - Thoracic
      - Pleural
      - Pericardial
      - Mediastinum
    - Abdominal / Pelvic
  - .

Body Cavities



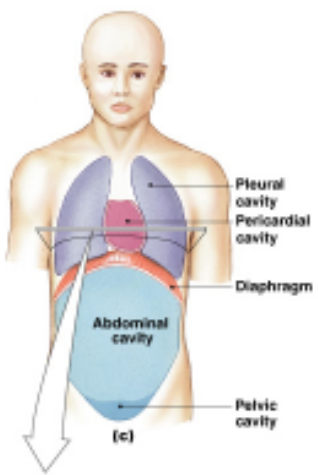




Serous Membranes

Serous membranes line body cavities and organs

- **Parietal** - on body wall
- **Visceral** - on organ
- **Pericardium** - pericardial cavity
- **Pleura** - Pleural cavity
- **Peritoneum** - Peritoneal cavity
  - **Mesentery**
  - **Omenteum** (greater and lesser



Body Cavities

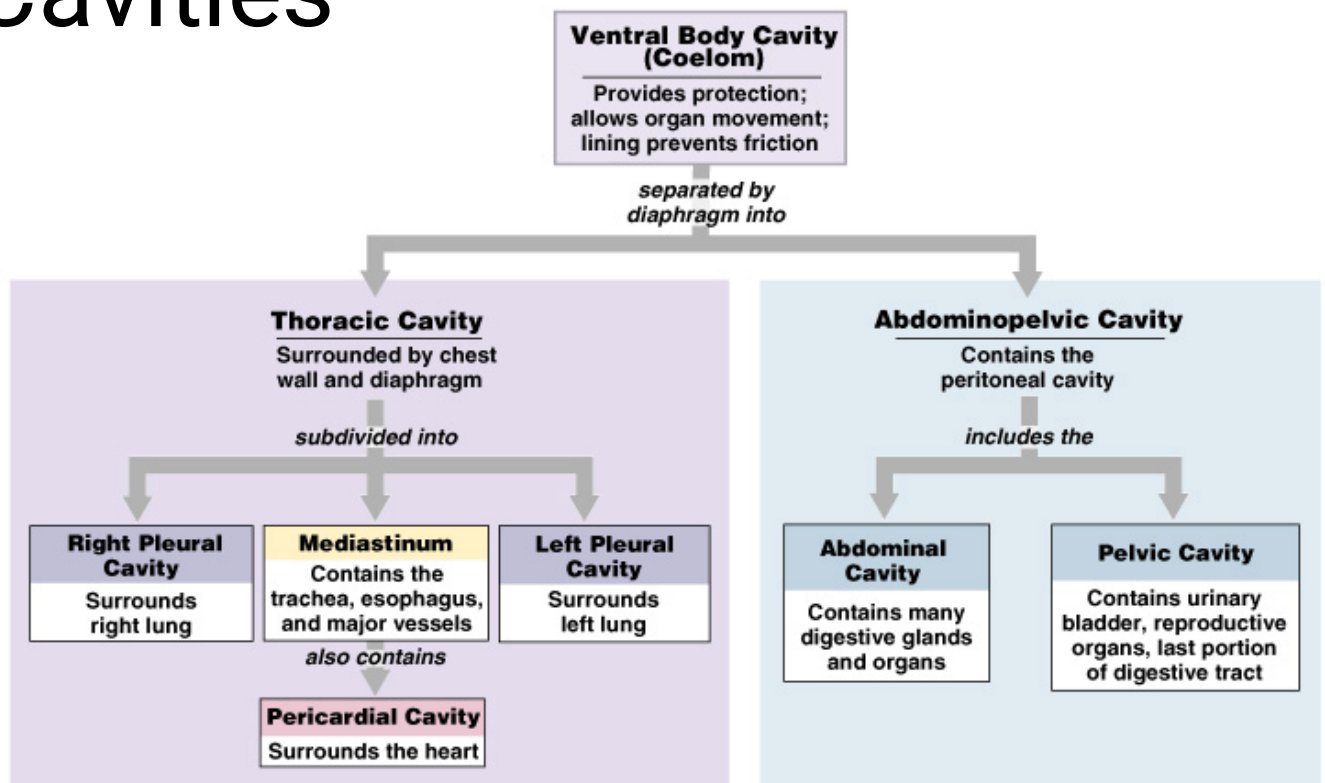
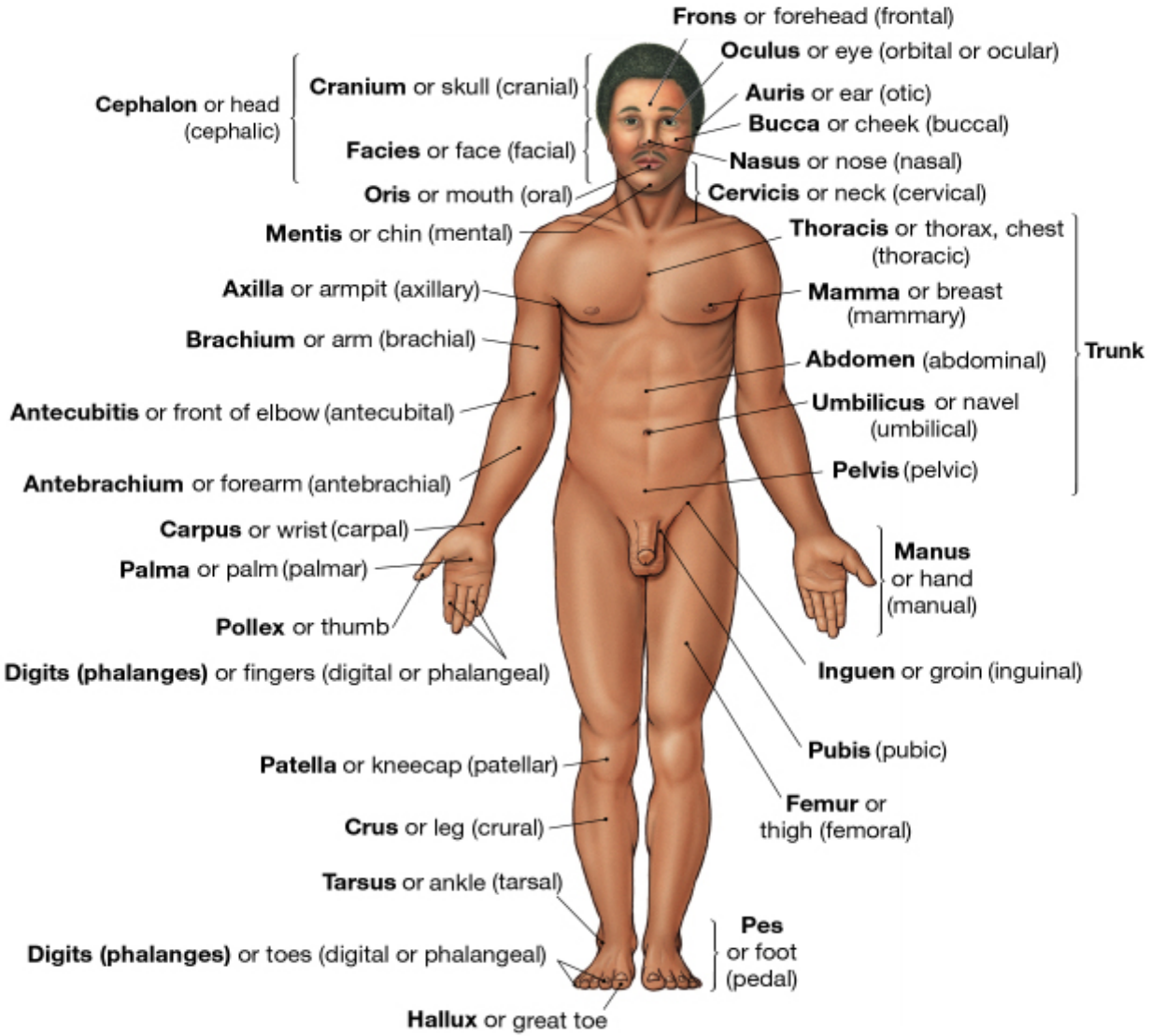
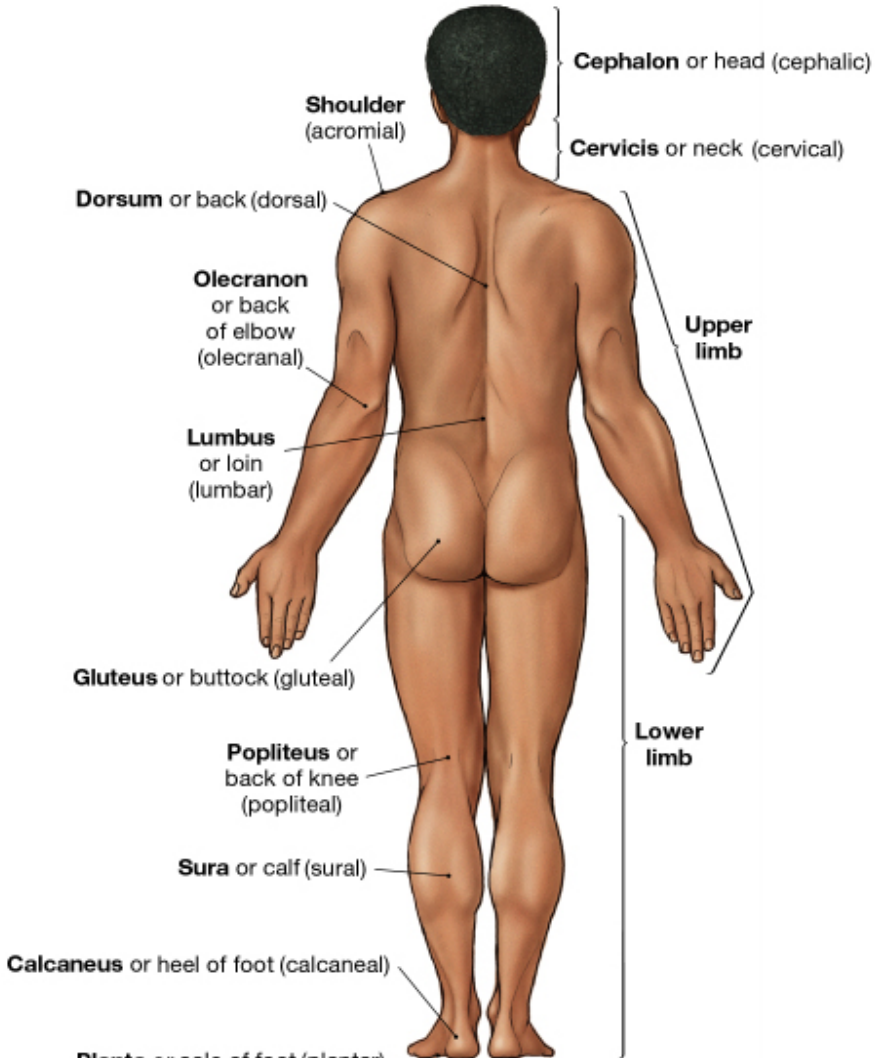
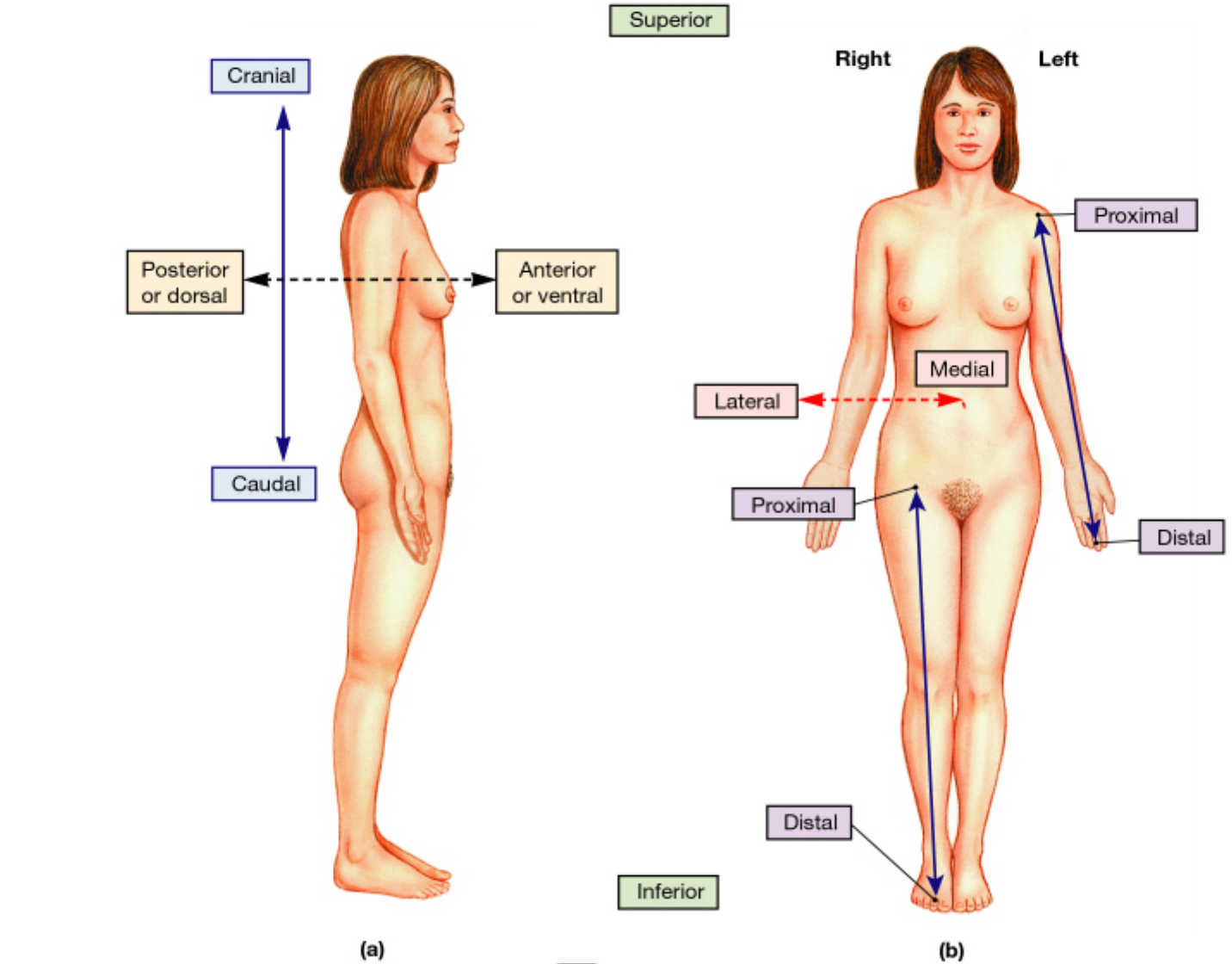


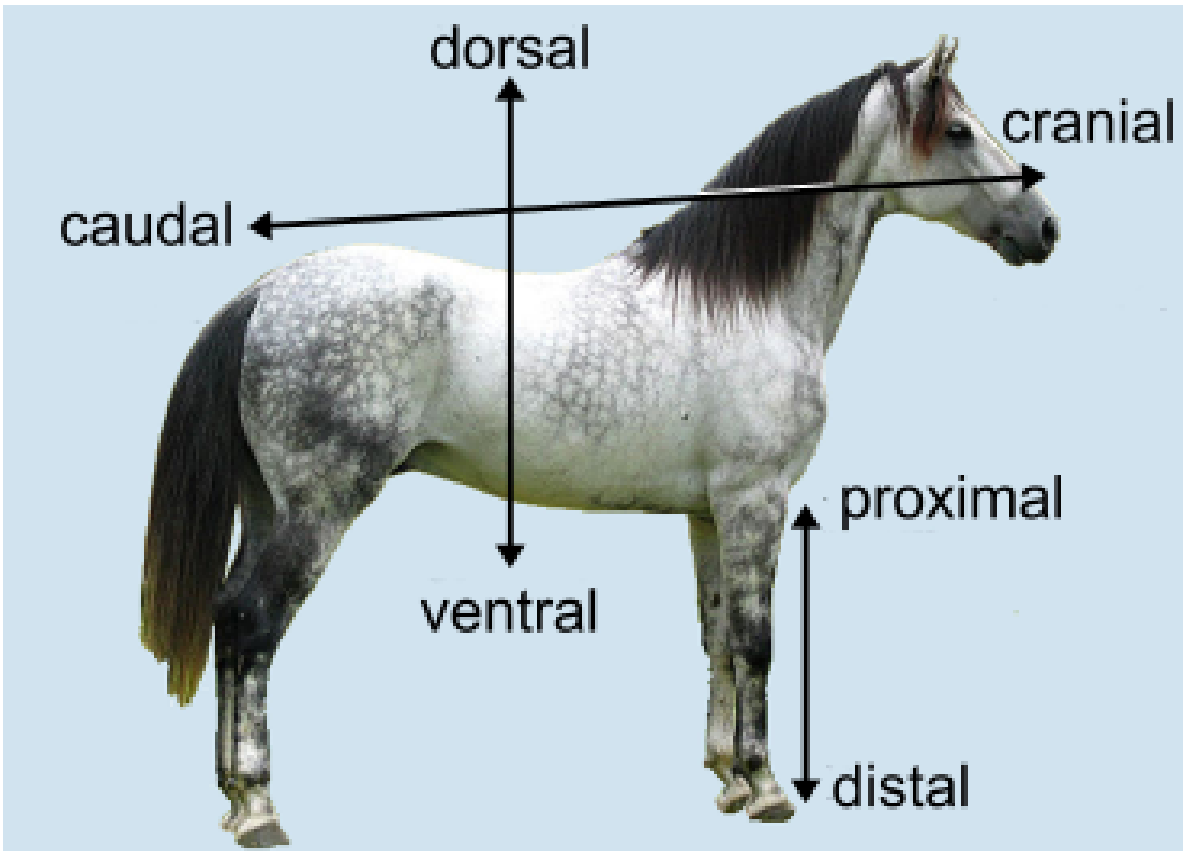
Figure 1.13 The Ventral Body Cavity







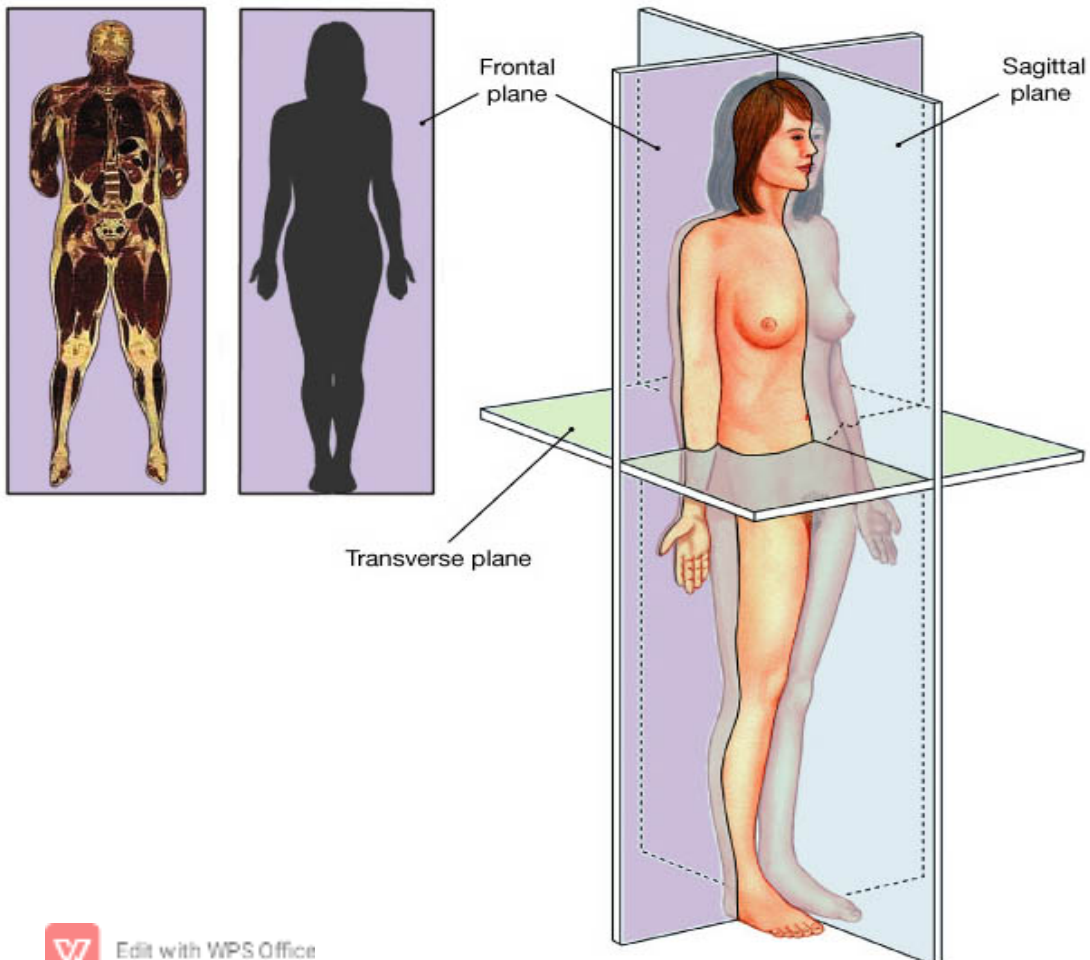
Four-footed body directions



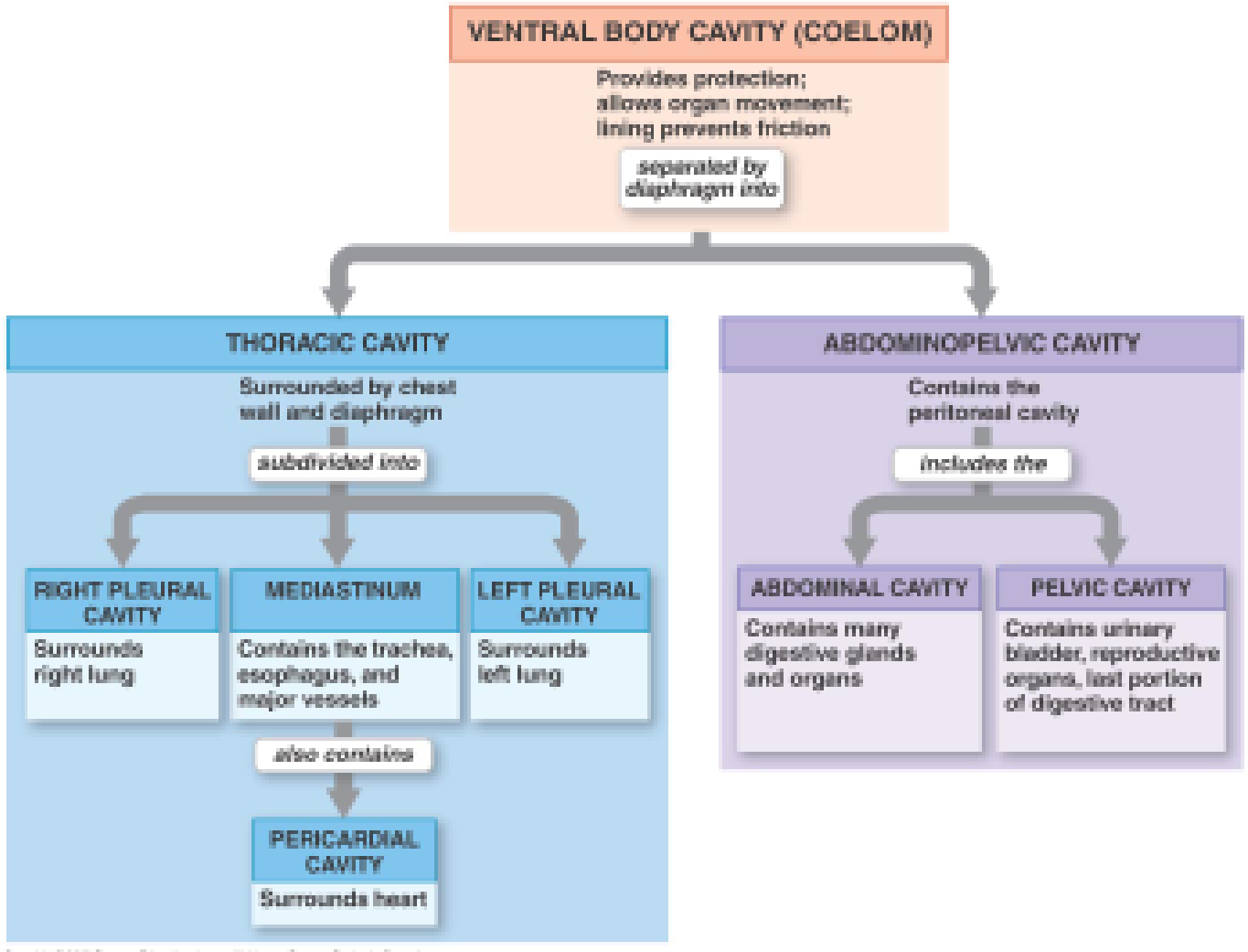
Planes & Sections

- Sagittal section – divides the body into right and left sides
  - Mid-sagittal section = straight down the center of the body
- Frontal section – divides the body into front and back sides
- Transverse (cross) section – cut straight across the body

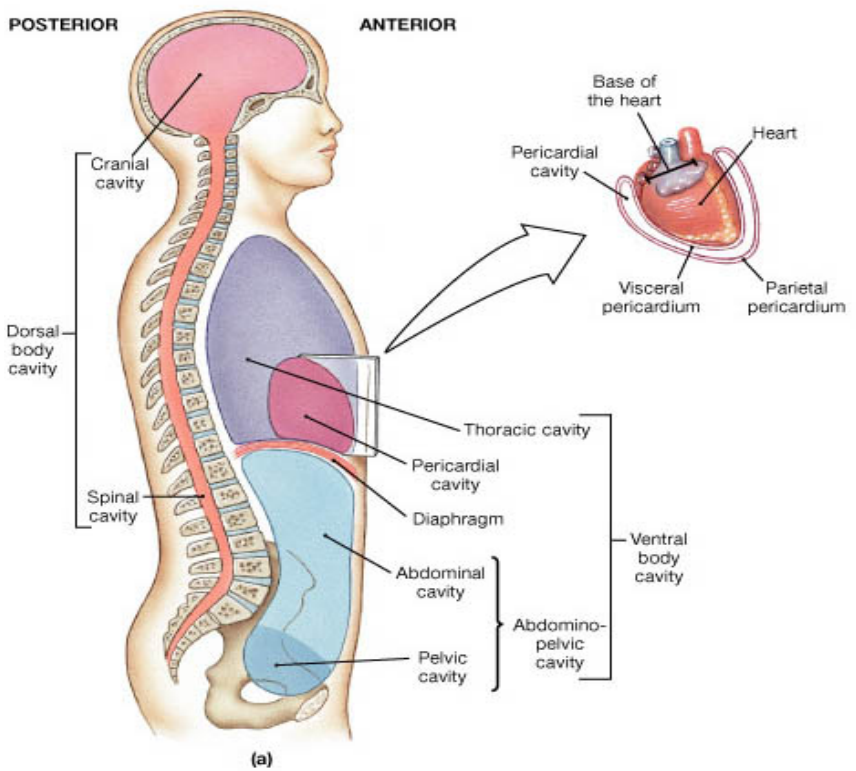
Planes & Sections

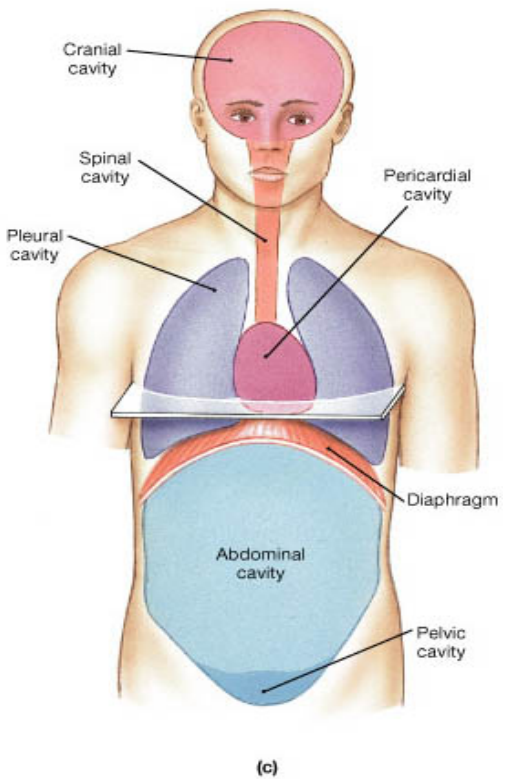


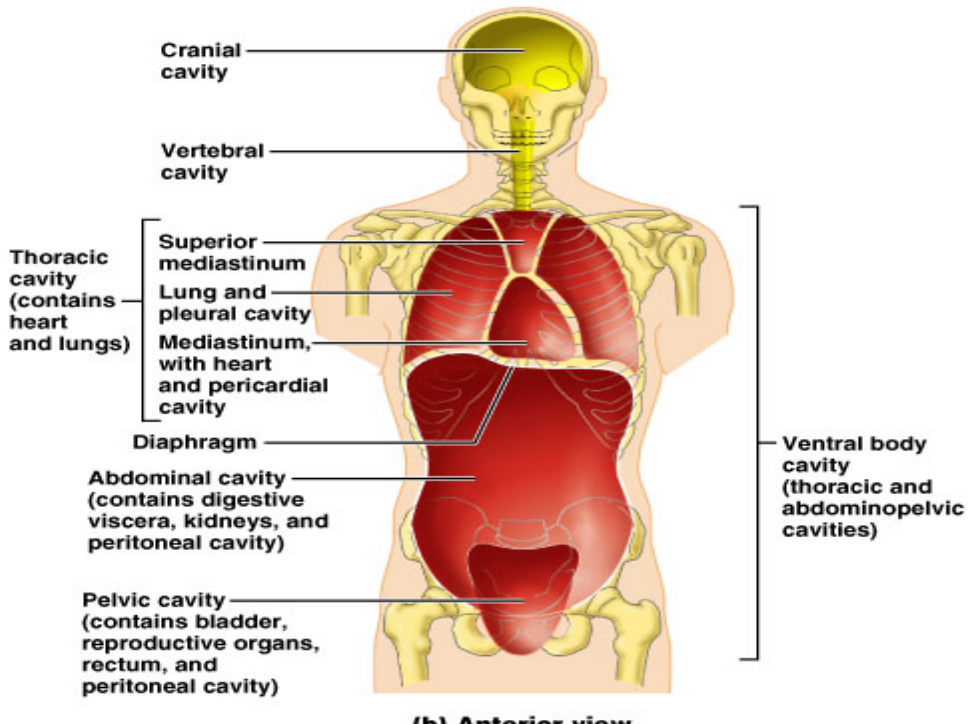
Body Cavities



Body Cavities



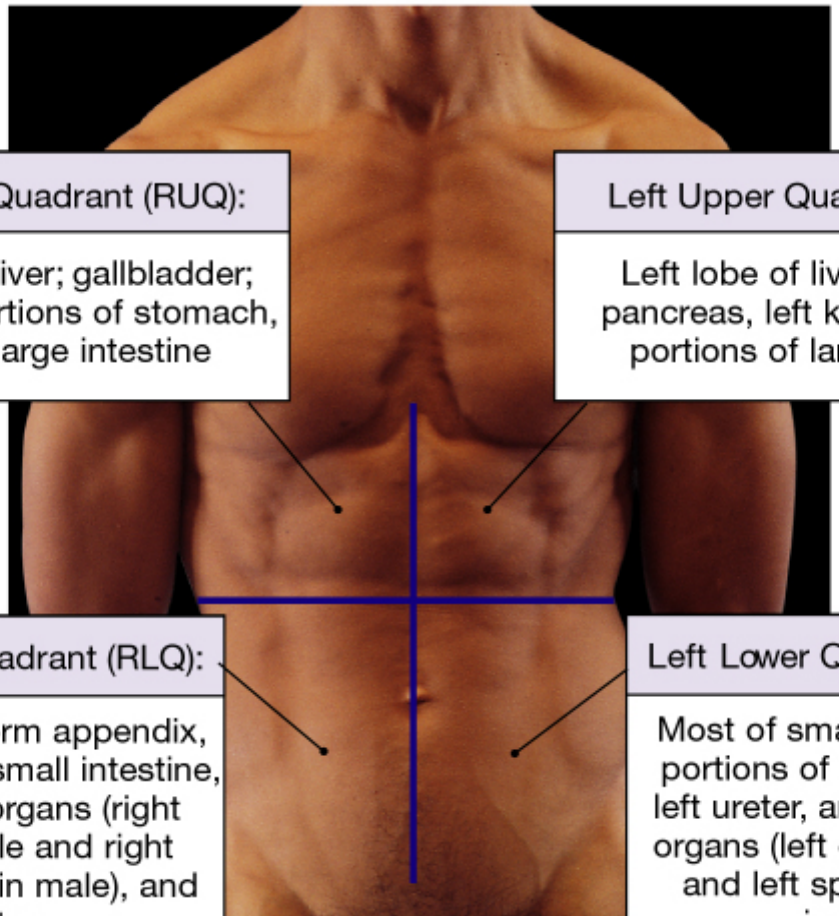




(b) Anterior view

Body Quadrants

- Right Upper Quadrant (RUQ)
- Left Upper Quadrant (LUQ)
- Right Lower Quadrant (RLQ)
- Left Lower Quadrant (LLQ)



Right Upper Quadrant (RUQ):

Right lobe of liver; gallbladder; right kidney; portions of stomach, small and large intestine

Left Upper Quadrant (LUQ):

Left lobe of liver; stomach, pancreas, left kidney, spleen; portions of large intestine

Right Lower Quadrant (RLQ):

Cecum, vermiform appendix, and portions of small intestine, reproductive organs (right ovary in female and right spermatic cord in male), and right ureter

Left Lower Quadrant (LLQ):

Most of small intestine, and portions of large intestine, left ureter, and reproductive organs (left ovary in female and left spermatic cord in male)

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