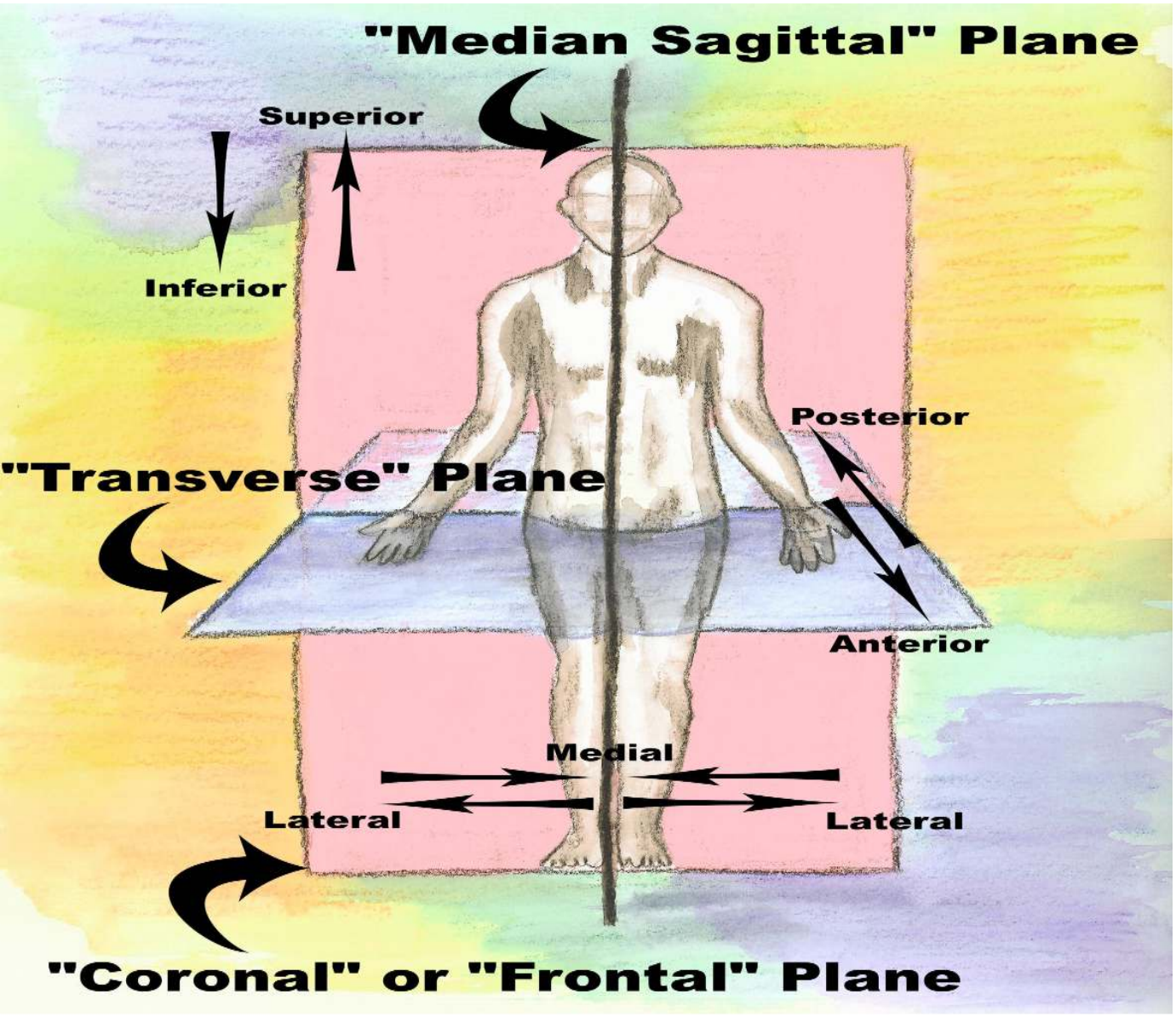


Orientation

D.HAMMOUDI, MD

ANATOMICOMEDICAL TERMINOLOGY

- Anatomical terms are descriptive terms standardized in an international reference guide, Terminologia Anatomica (TA).
- These terms, in English or Latin, are used worldwide.
- ◆ Colloquial terminology is used by—and to communicatewith—lay people.
- ◆ Eponyms are often used in clinical settings but are not recommended because they do not provide anatomical context and are not standardized.
- ◆ Anatomical directional terms are based on the body in the anatomical position.
- ◆ Four anatomical planes divide the body, and sections divide the planes into visually useful
- and descriptive parts.
- ◆ Other anatomical terms describe relationships of parts of the body, compare the positions of structures, and describe laterality and movement.

Anatomical Position

- Body erect, feet slightly apart, palms facing forward, thumbs point away from body

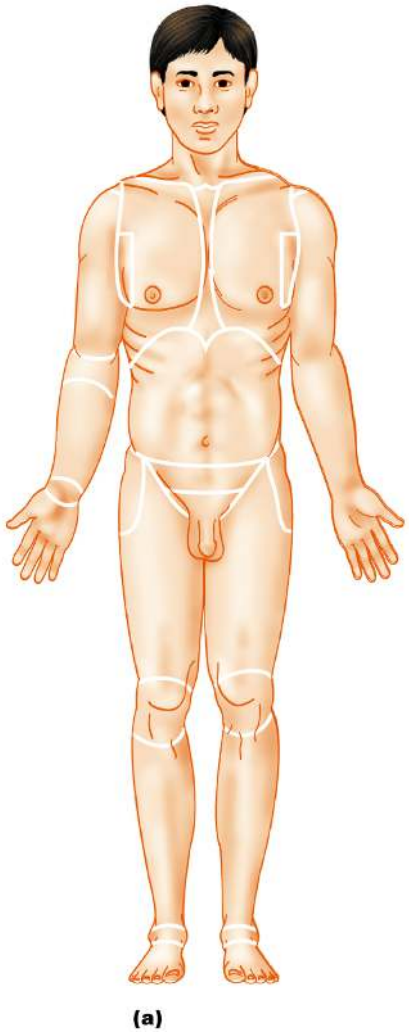


Figure 1.7a

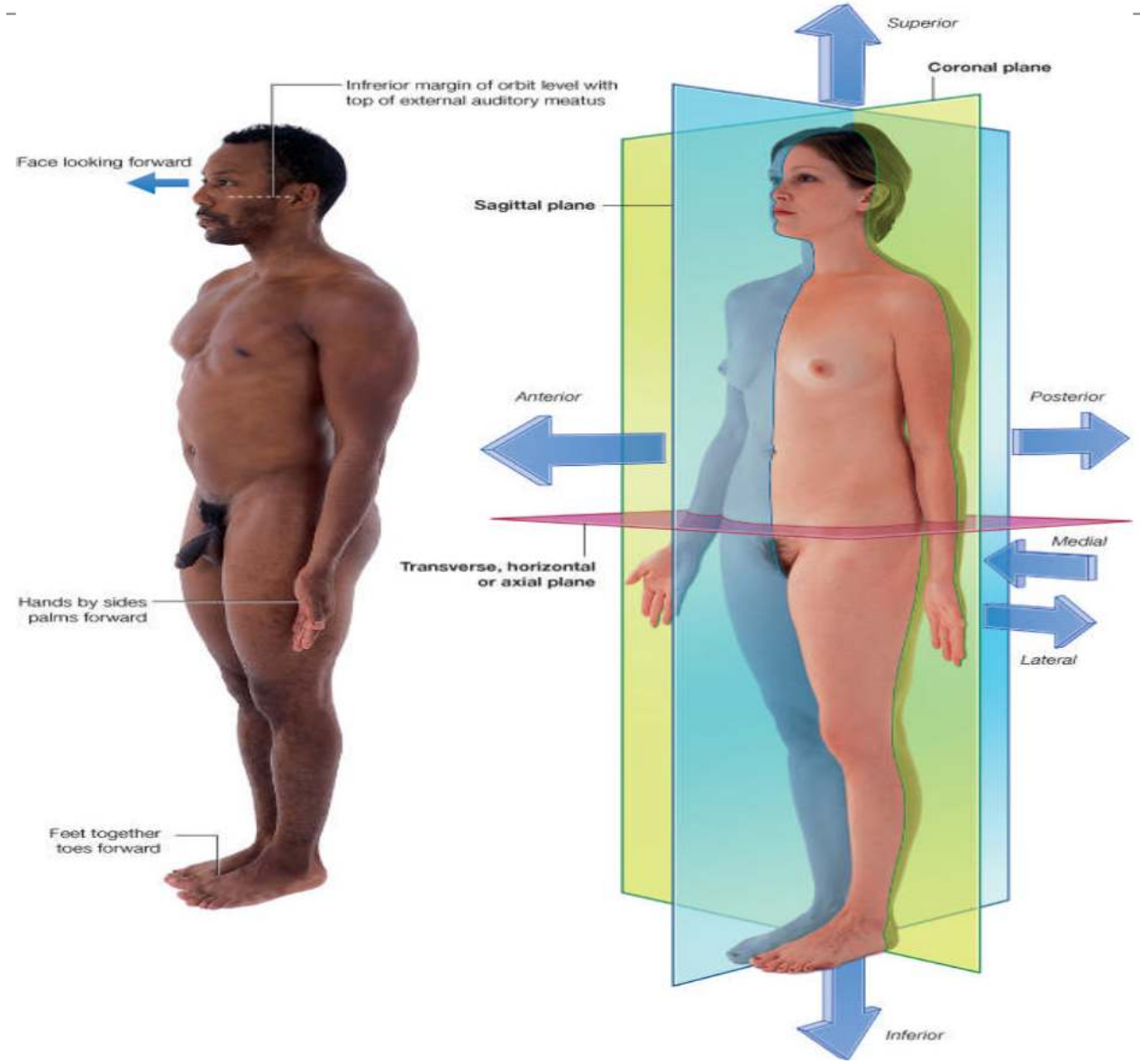
Directional Terms

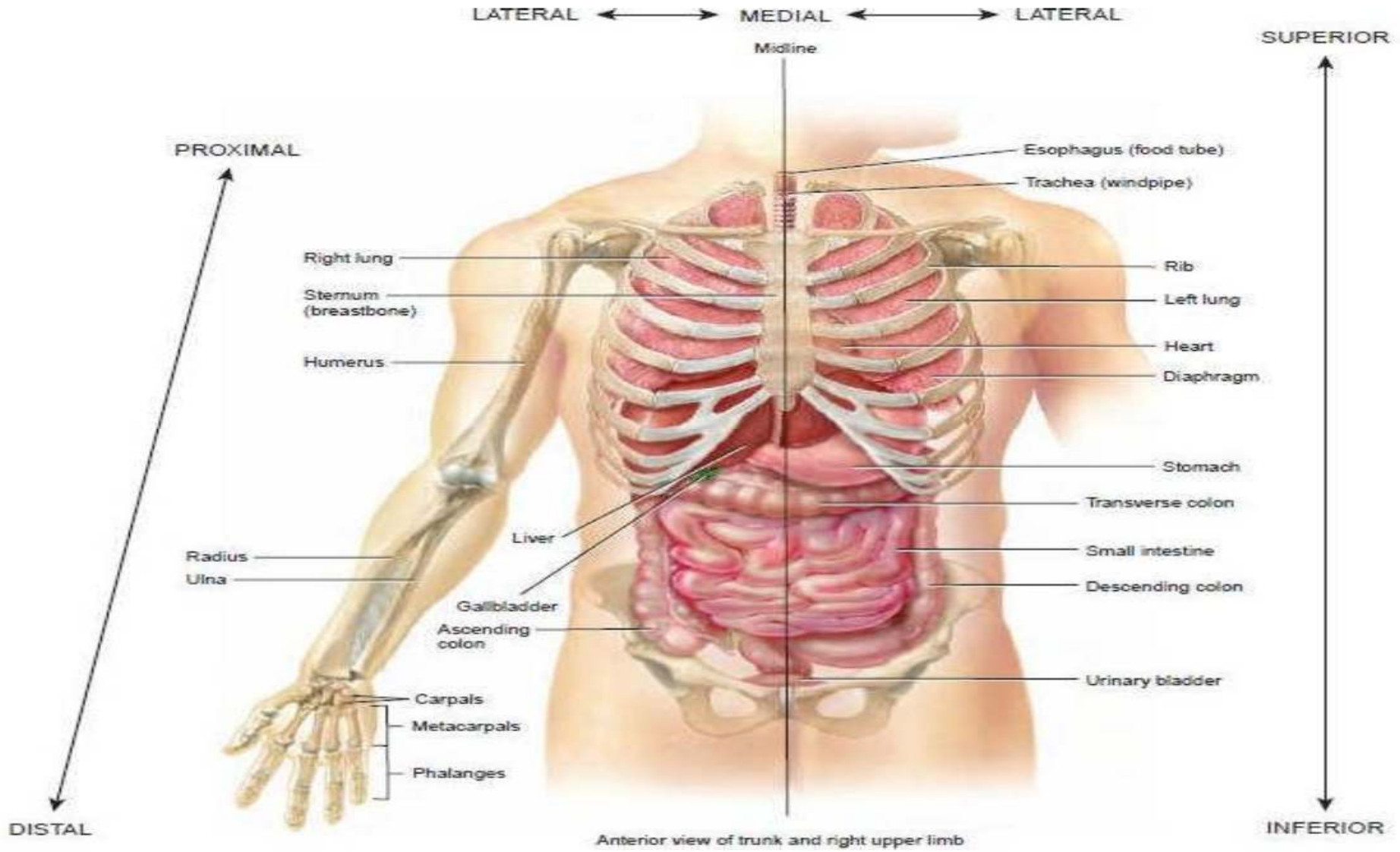
- **Superior and inferior** – toward and away from the head, respectively
- **Anterior and posterior** – toward the front and back of the body
- **Medial, lateral, and intermediate** – toward the midline, away from the midline, and between a more medial and lateral structure
  - Paired structures having right and left members (e.g., the kidneys)are bilateral, whereas those occurring on one side only (e.g., the spleen) are unilateral.
  - Designating whether you are referring specifically to the right or left member of bilateral structures can be critical, and is a good habit to begin at the outset of one's training to become a health professional.

  - Something occurring on the same side of the body as another structure is ipsilateral; the right thumb and right great (big) toe are ipsilateral, for example.
  - Contralateral means occurring on the opposite side of the body relative to another structure;
  - the right hand is contralateral to the left hand.

Directional Terms

- Proximal and distal – closer to and farther from the origin of the body part
- Superficial and deep – toward and away from the body surface





Anterior view of trunk and right upper limb

TABLE 1.1 Orientation and Directional Terms

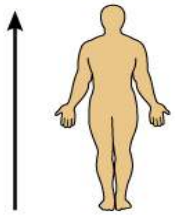
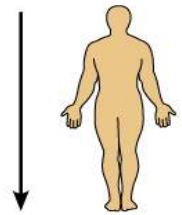
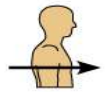
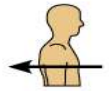
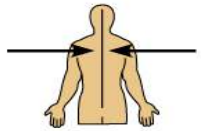
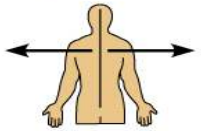
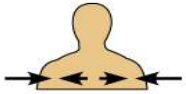
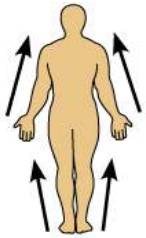
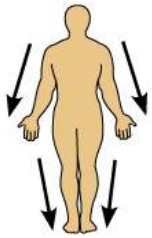
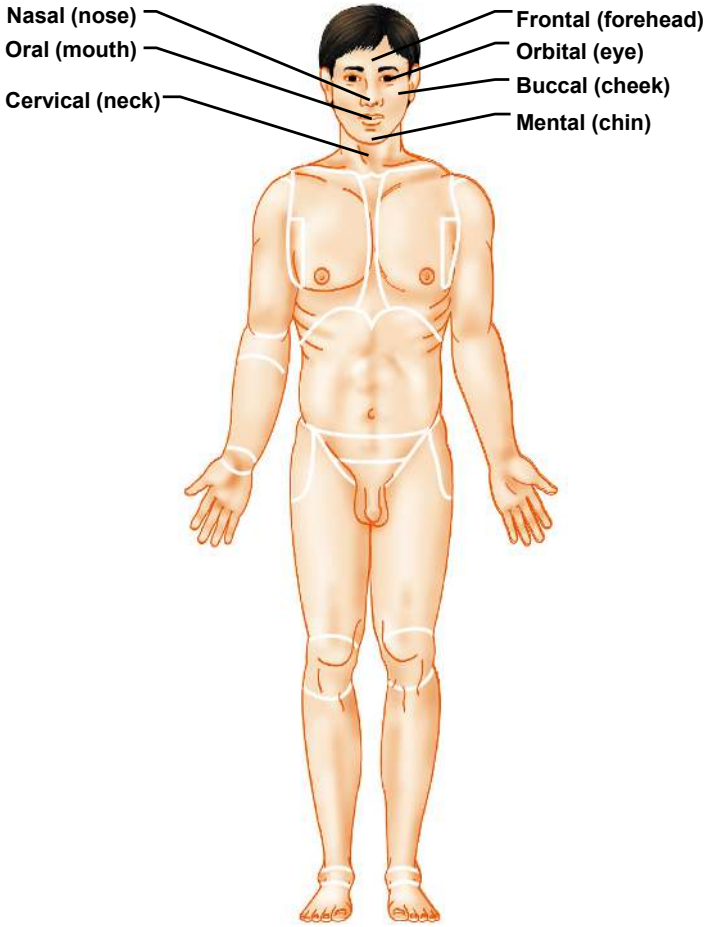
TERM	DEFINITION	EXAMPLE	
Superior (cranial)	Toward the head end or upper part of a structure or the body; above		The head is superior to the abdomen
Inferior (caudal)	Away from the head end or toward the lower part of a structure or the body; below		The navel is inferior to the chin
Ventral (anterior)*	Toward or at the front of the body; in front of		The breastbone is anterior to the spine
Dorsal (posterior)*	Toward or at the back of the body; behind		The heart is posterior to the breastbone
Medial	Toward or at the midline of the body; on the inner side of		The heart is medial to the arm
Lateral	Away from the midline of the body; on the outer side of		The arms are lateral to the chest
Intermediate	Between a more medial and a more lateral structure		The collarbone is intermediate between the breastbone and shoulder

TABLE 1.1 Orientation and Directional Terms

TERM	DEFINITION	EXAMPLE	
Proximal	Closer to the origin of the body part or the point of attachment of a limb to the body trunk		The elbow is proximal to the wrist
Distal	Farther from the origin of a body part or the point of attachment of a limb to the body trunk		The knee is distal to the thigh
Superficial (external)	Toward or at the body surface		The skin is superficial to the skeletal muscles
Deep (internal)	Away from the body surface; more internal		The lungs are deep to the skin

*The terms *ventral* and *anterior* are synonymous in humans, but this is not the case in four-legged animals. Whereas *anterior* refers to the leading portion of the body (abdominal surface in humans, head in a cat), *ventral* specifically refers to the "belly" of a vertebrate animal and thus is the inferior surface of four-legged animals. Likewise, although the dorsal and posterior surfaces are the same in humans, the term *dorsal* specifically refers to an animal's back. Thus, the dorsal surface of four-legged animals is their superior surface.

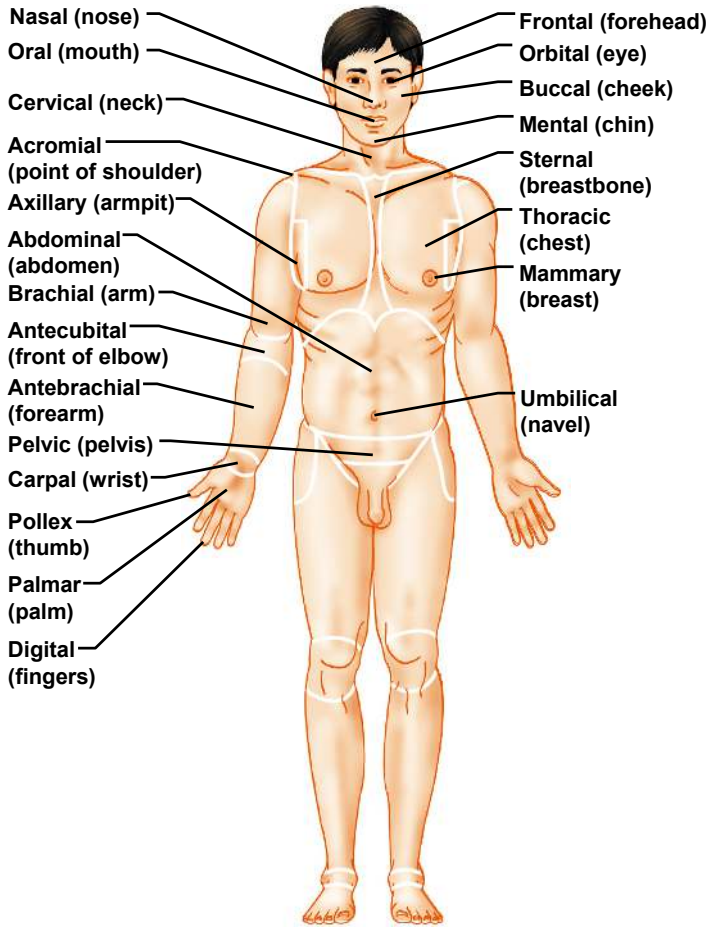
Regional Terms: Anterior View



(a) Anterior

Figure 1.7a

Regional Terms: Anterior View



(a) Anterior

Figure 1.7a

Regional Terms: Anterior View

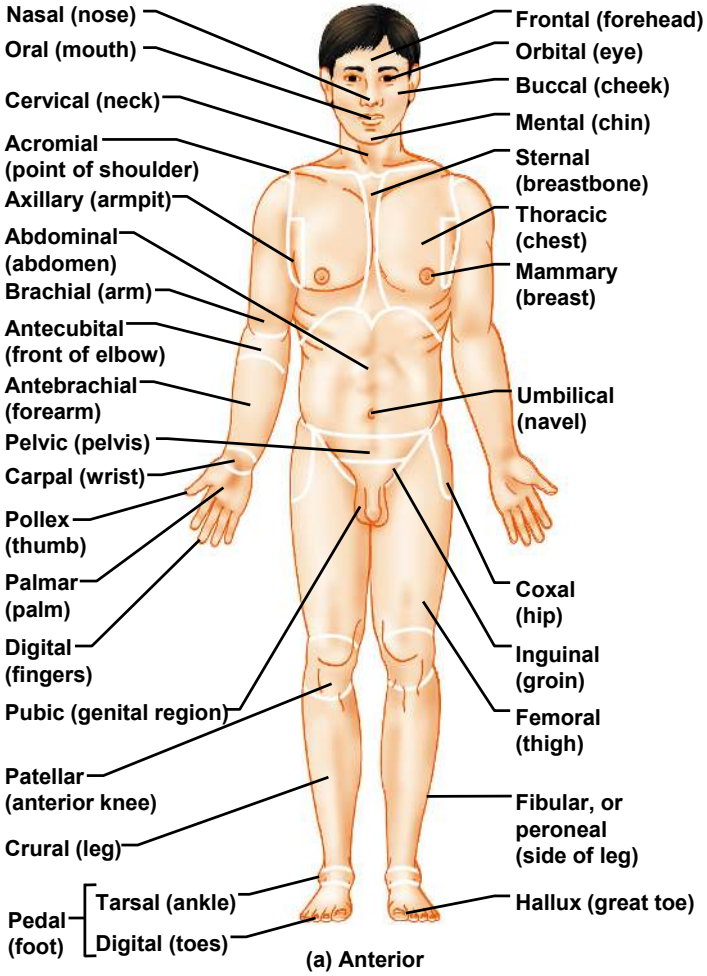
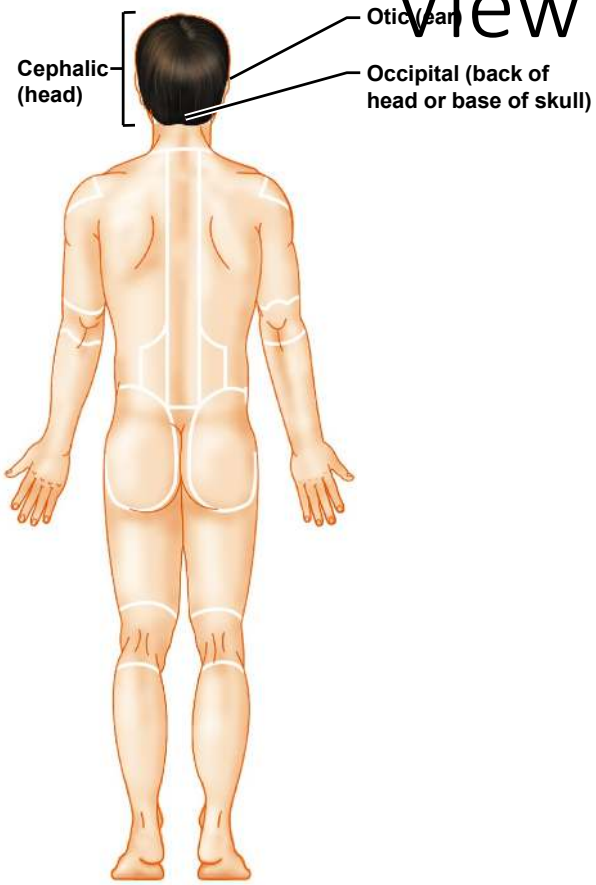


Figure 1.7a

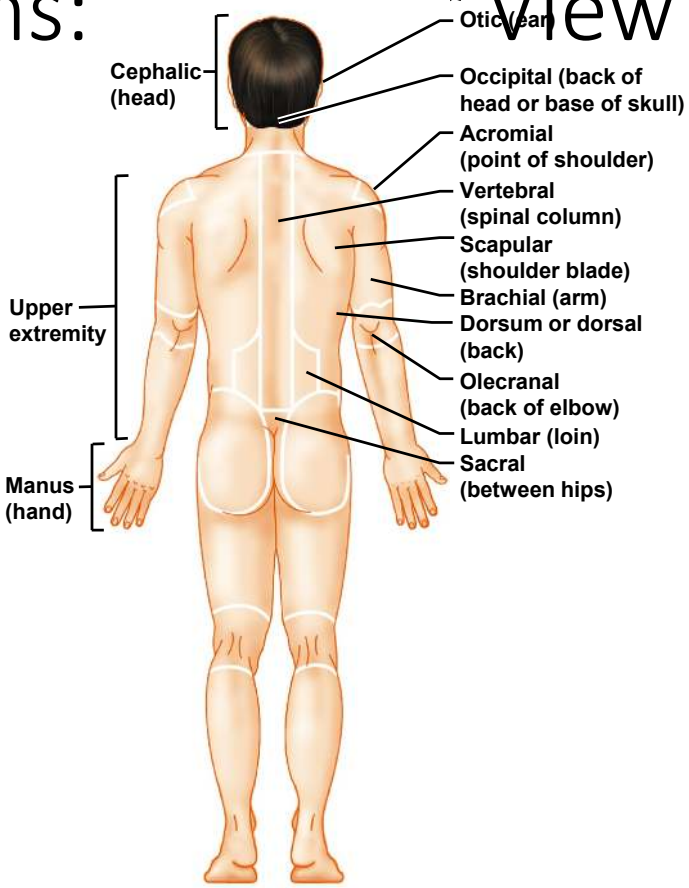
Regional Terms: Posterior View



(b) Posterior

Figure 1.7b

Regional Terms: Posterior View



(b) Posterior

Figure 1.7b

Regional Terms: Posterior View

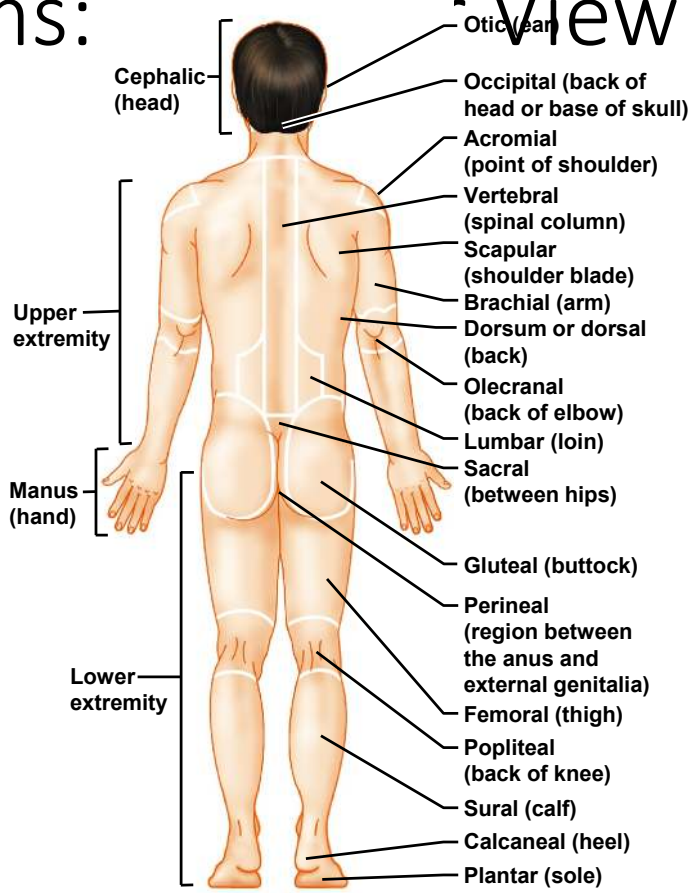
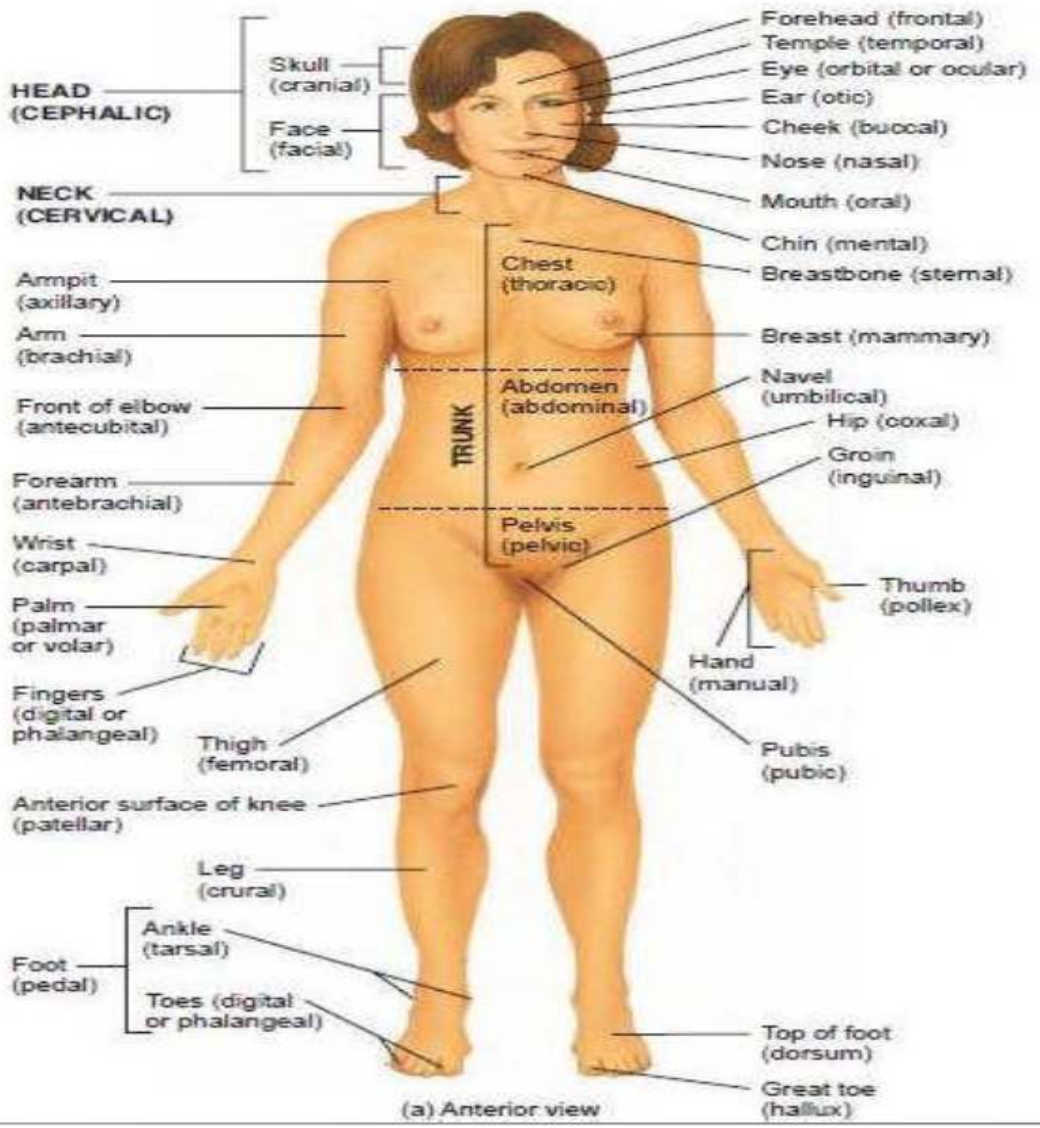
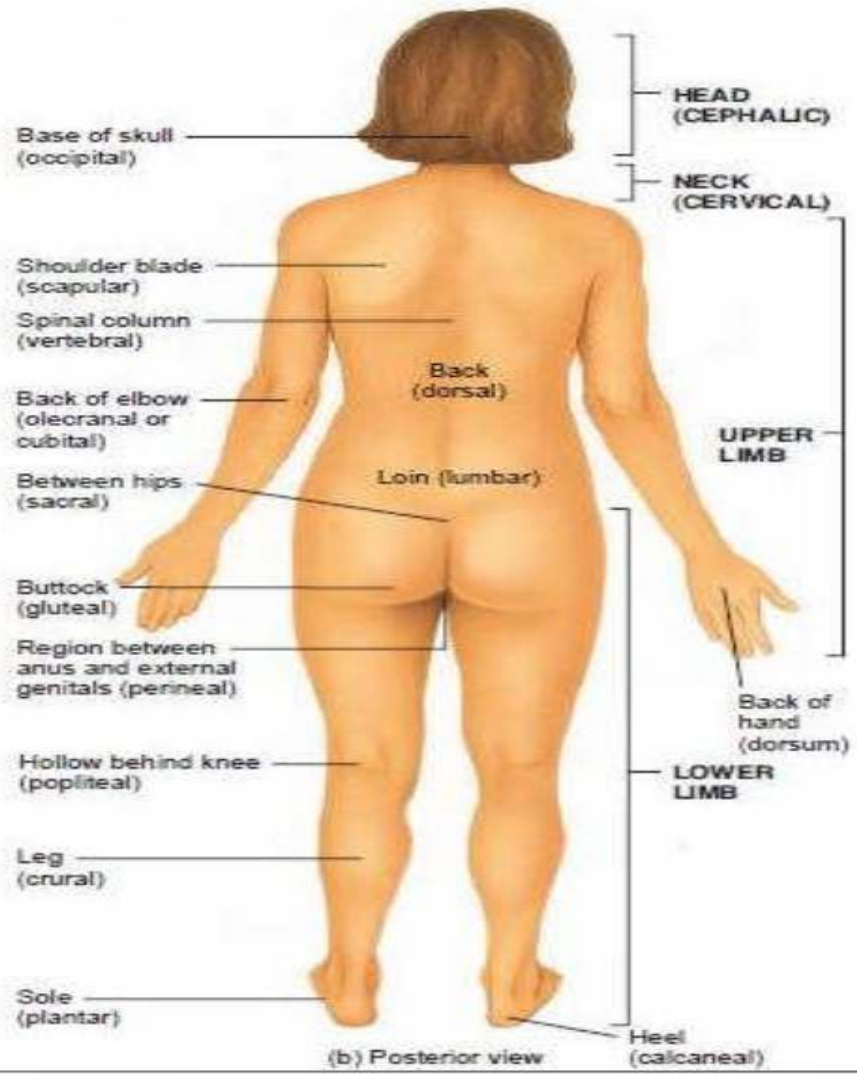


Figure 1.7b



(a) Anterior view



(b) Posterior view

Figure 1.7 Regional terms used to designate specific body areas.

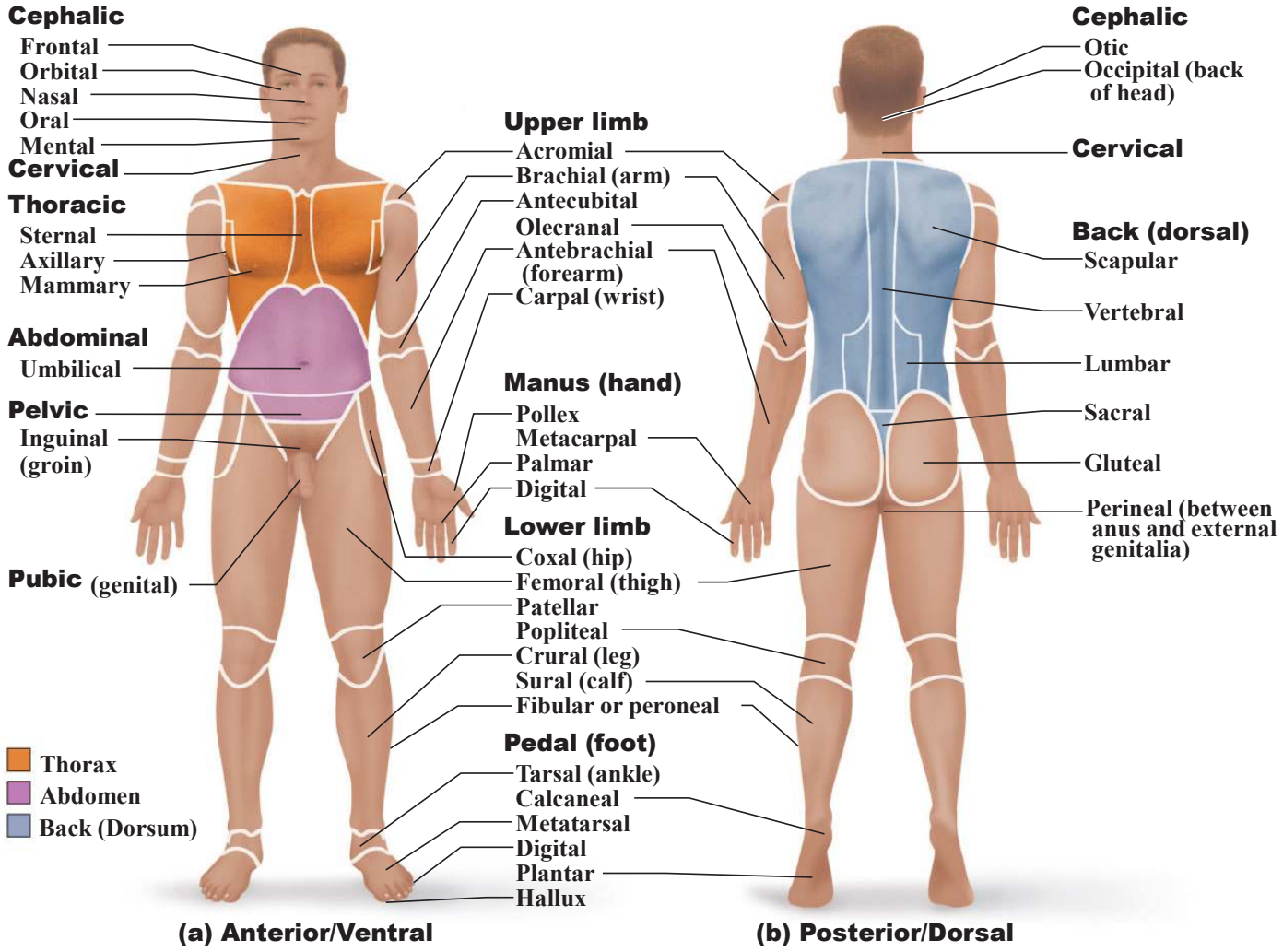


Figure 1.7a Regional terms used to designate specific body areas.

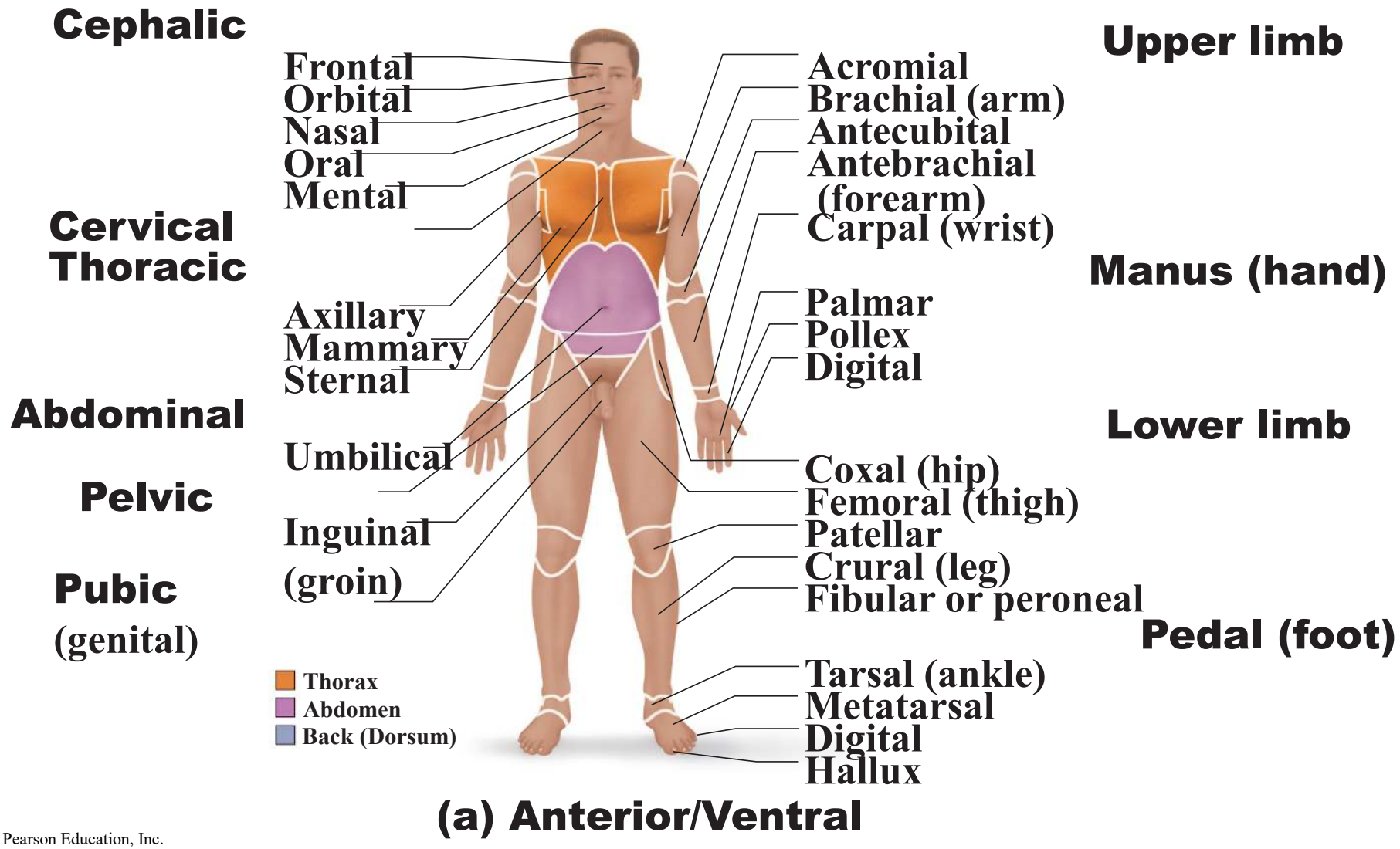
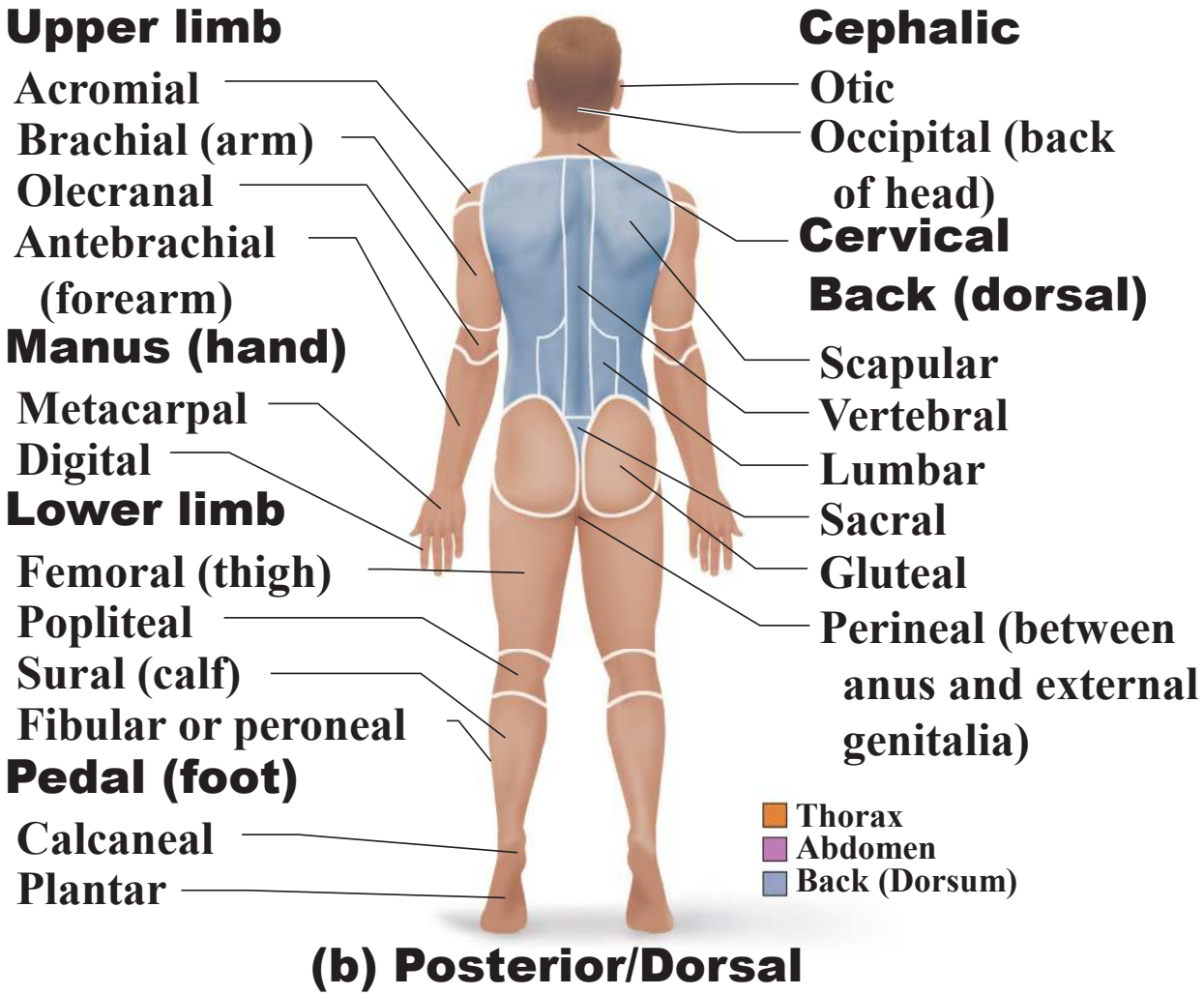


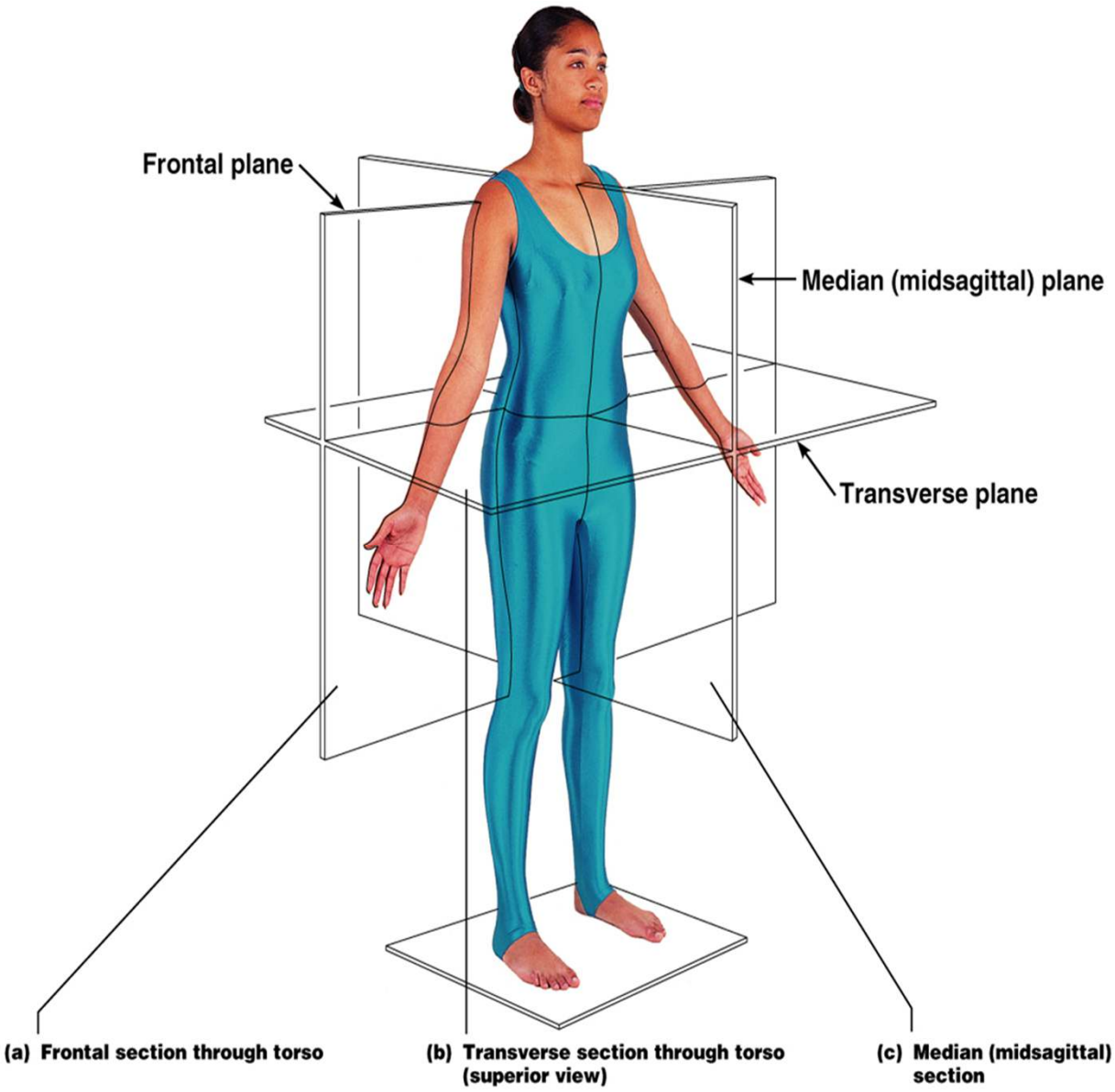
Figure 1.7b Regional terms used to designate specific body areas.



(b) Posterior/Dorsal

Body Planes

- Sagittal – divides the body into right and left parts
- Midsagittal or medial – sagittal plane that lies on the midline
- Frontal or coronal – divides the body into anterior and posterior parts
- Transverse or horizontal (cross section) – divides the body into superior and inferior parts
- Oblique section – cuts made diagonally



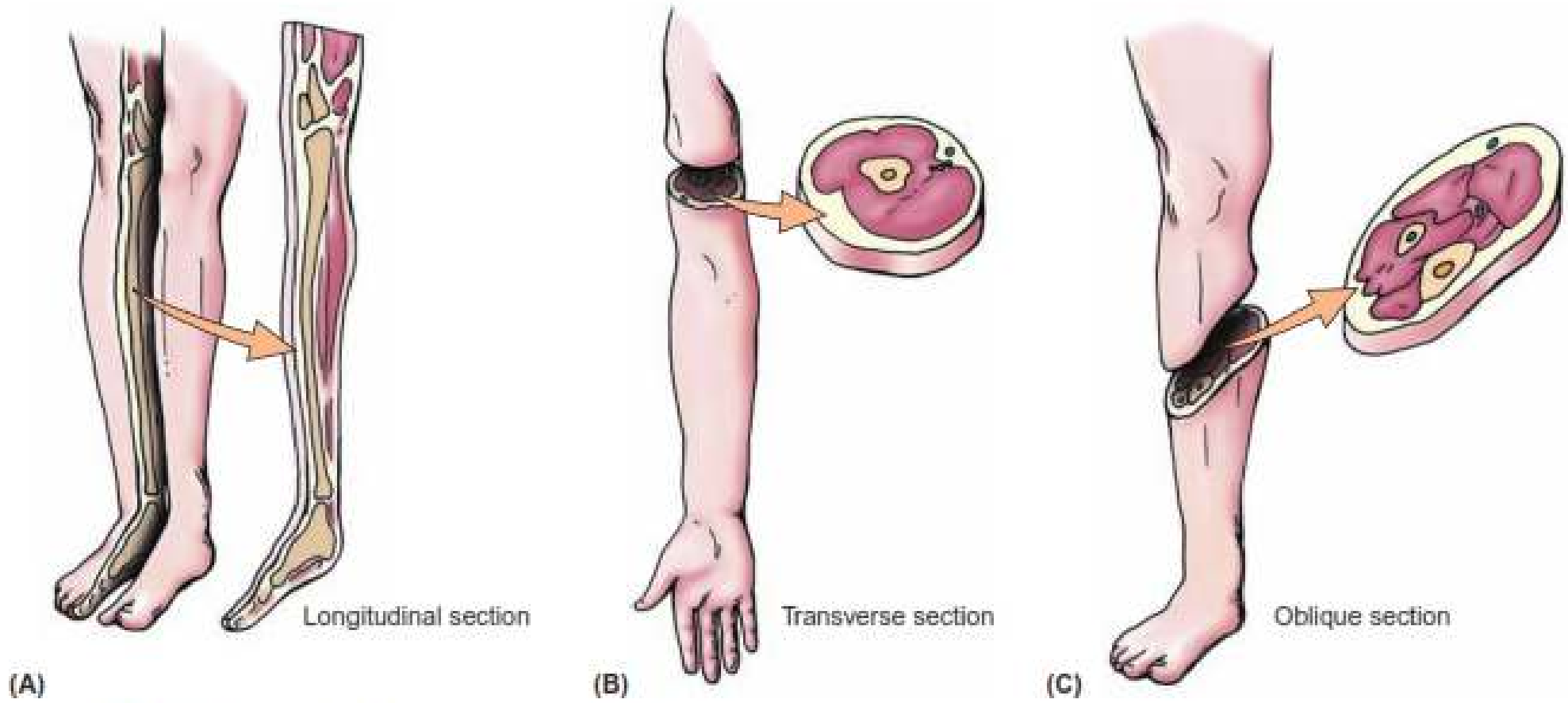
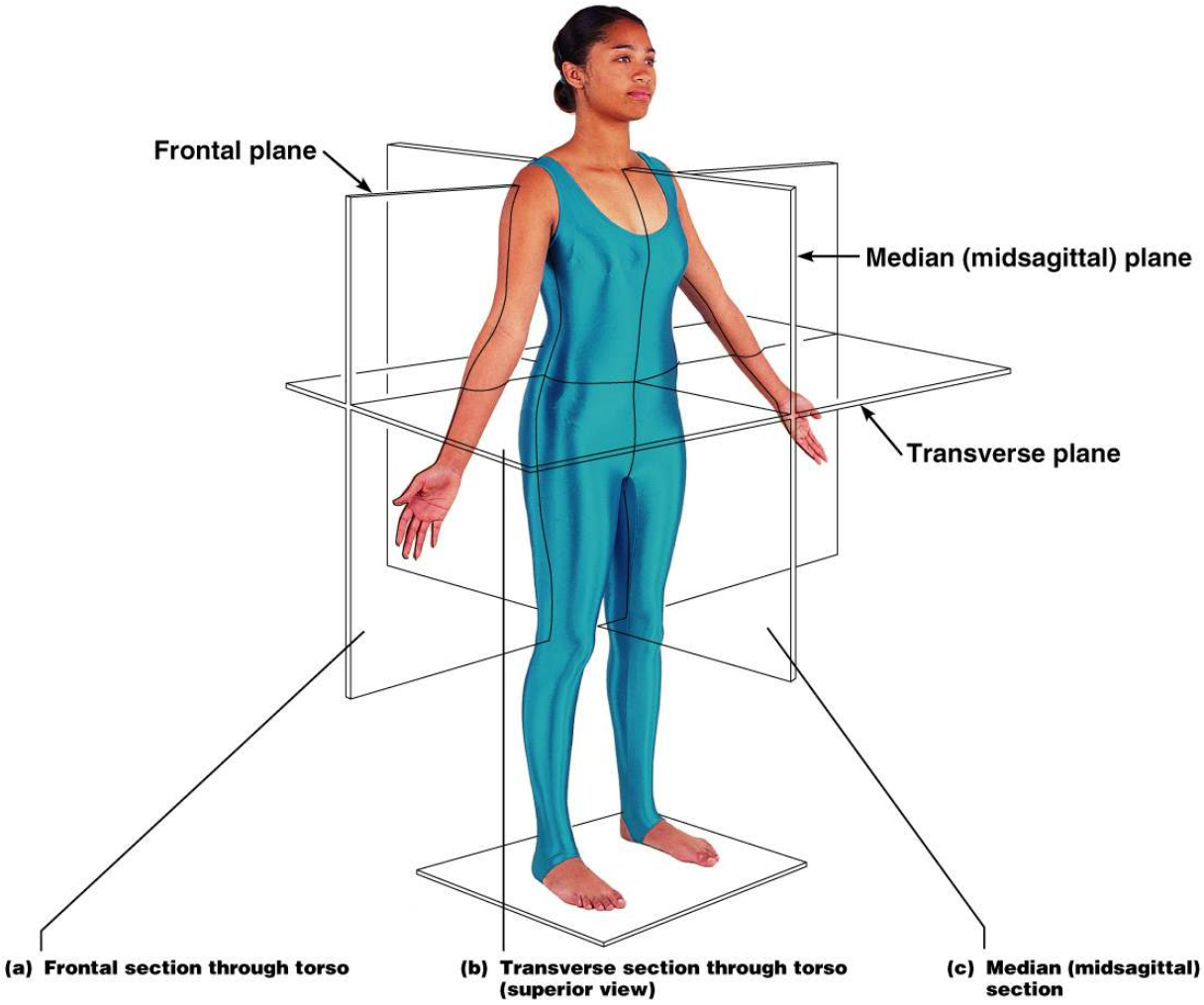
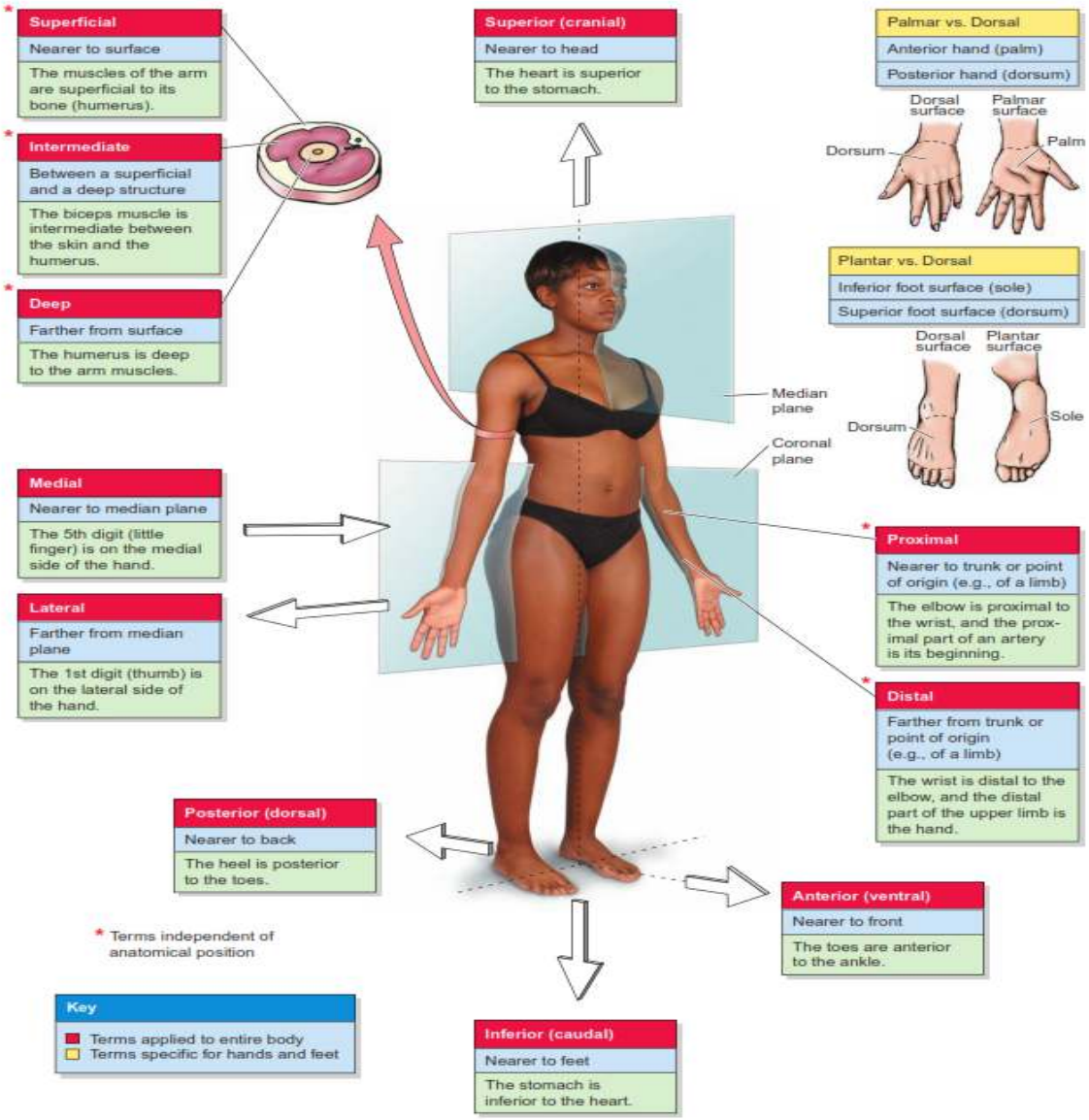


FIGURE I.3. Sections of the limbs. Sections may be obtained by anatomical sectioning or medical imaging techniques.

Body Planes

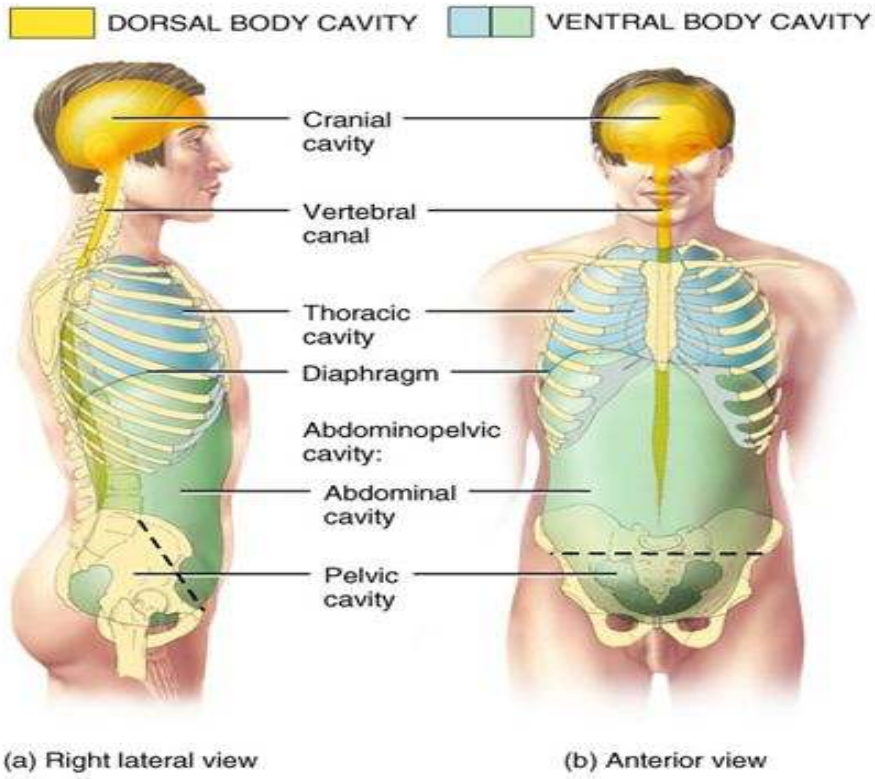

Frontal plane
Median (midsagittal) plane
Transverse plane
(a) Frontal section through torso
(b) Transverse section through torso (superior view)
(c) Median (midsagittal) section


* Superficial
Nearer to surface
The muscles of the arm are superficial to its bone (humerus).
* Intermediate
Between a superficial and a deep structure
The biceps muscle is intermediate between the skin and the humerus.
* Deep
Farther from surface
The humerus is deep to the arm muscles.
Superior (cranial)
Nearer to head
The heart is superior to the stomach.
Palmar vs. Dorsal
Anterior hand (palm)
Posterior hand (dorsum)
Dorsal surface
Palmar surface
Dorsum
Palm
Plantar vs. Dorsal
Inferior foot surface (sole)
Superior foot surface (dorsum)
Dorsal surface
Plantar surface
Dorsum
Sole
Median plane
Coronal plane
Medial
Nearer to median plane
The 5th digit (little finger) is on the medial side of the hand.
Lateral
Farther from median plane
The 1st digit (thumb) is on the lateral side of the hand.
* Proximal
Nearer to trunk or point of origin (e.g., of a limb)
The elbow is proximal to the wrist, and the proximal part of an artery is its beginning.
* Distal
Farther from trunk or point of origin (e.g., of a limb)
The wrist is distal to the elbow, and the distal part of the upper limb is the hand.
Posterior (dorsal)
Nearer to back
The heel is posterior to the toes.
Anterior (ventral)
Nearer to front
The toes are anterior to the ankle.
* Terms independent of anatomical position
Key
Terms applied to entire body
Terms specific for hands and feet
Inferior (caudal)
Nearer to feet
The stomach is inferior to the heart.

Body Cavities

- Dorsal cavity protects the nervous system, and is divided into two subdivisions
  - Cranial cavity – within the skull; encases the brain
  - Vertebral cavity – runs within the vertebral column; encases the spinal cord
- Ventral cavity houses the internal organs (viscera), and is divided into two subdivisions
  - Thoracic
  - Abdominopelvic

2. What is in the major body cavities?



(a) Right lateral view (b) Anterior view

CAVITY	COMMENTS
DORSAL CAVITY	
Cranial cavity	Formed by cranial bones and contains brain.
Vertebral cavity	Formed by vertebral column and contains spinal cord and the beginnings of spinal nerves.
VENTRAL CAVITY*	
Thoracic cavity	Chest cavity; superior portion of ventral body cavity; contains pleural and pericardial cavities and mediastinum.
Pleural cavity	Each surrounds a lung; the serous membrane of the pleural cavities is the pleura.
Pericardial cavity	Surrounds the heart; the serous membrane of the pericardial cavity is the pericardium.
Mediastinum	Central portion of thoracic cavity between the lungs; extends from sternum to vertebral column and from neck to diaphragm; contains heart, thymus, esophagus, trachea, and several large blood vessels.
Abdominopelvic cavity	Inferior portion of ventral body cavity; subdivided into abdominal and pelvic cavities.
Abdominal cavity	Contains stomach, spleen, liver, gallbladder, small intestine, and most of large intestine; the serous membrane of the abdominal cavity is the peritoneum.
Pelvic cavity	Contains urinary bladder, portions of large intestine, and internal organs of reproduction.

* See figure 1.7 for details of the thoracic cavity

Body Cavities

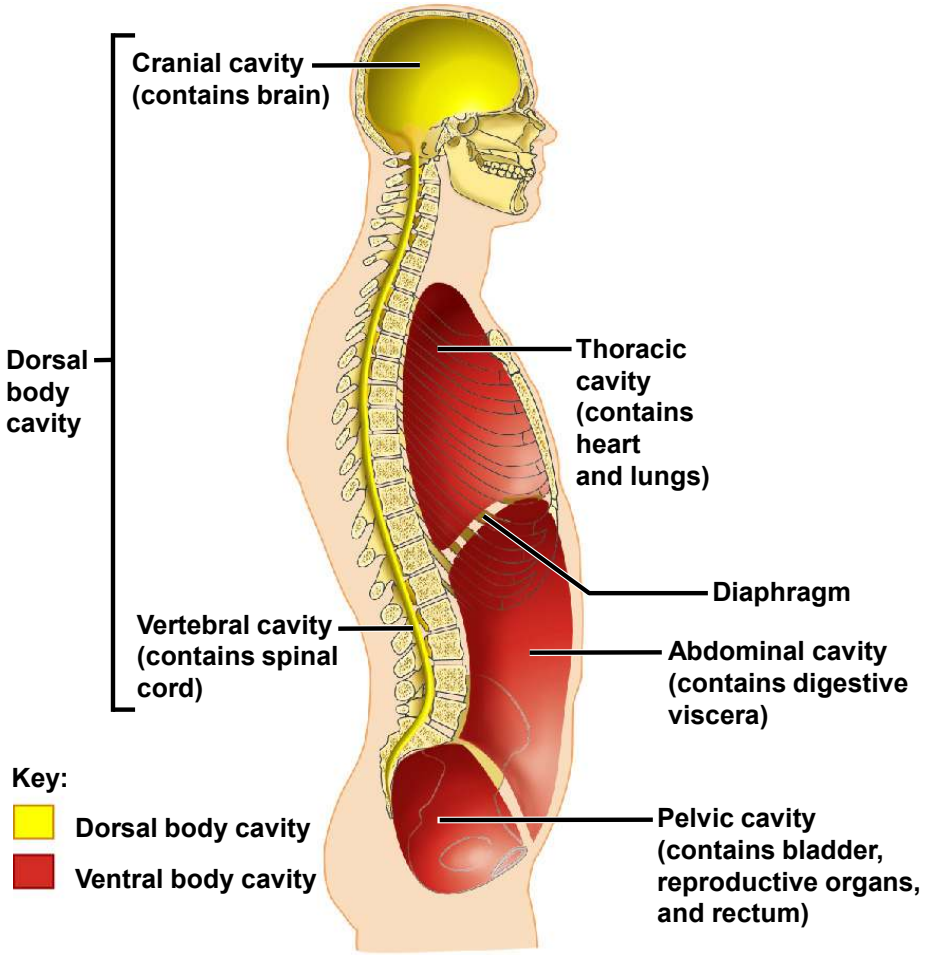
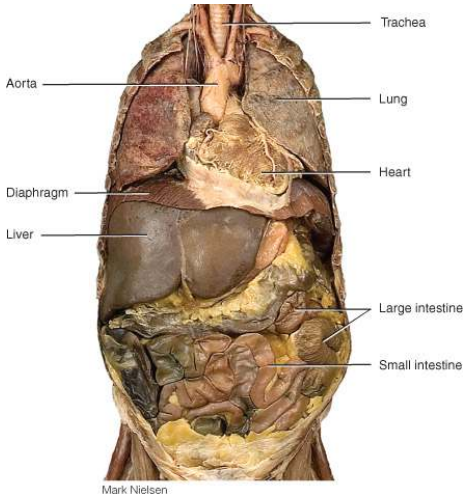
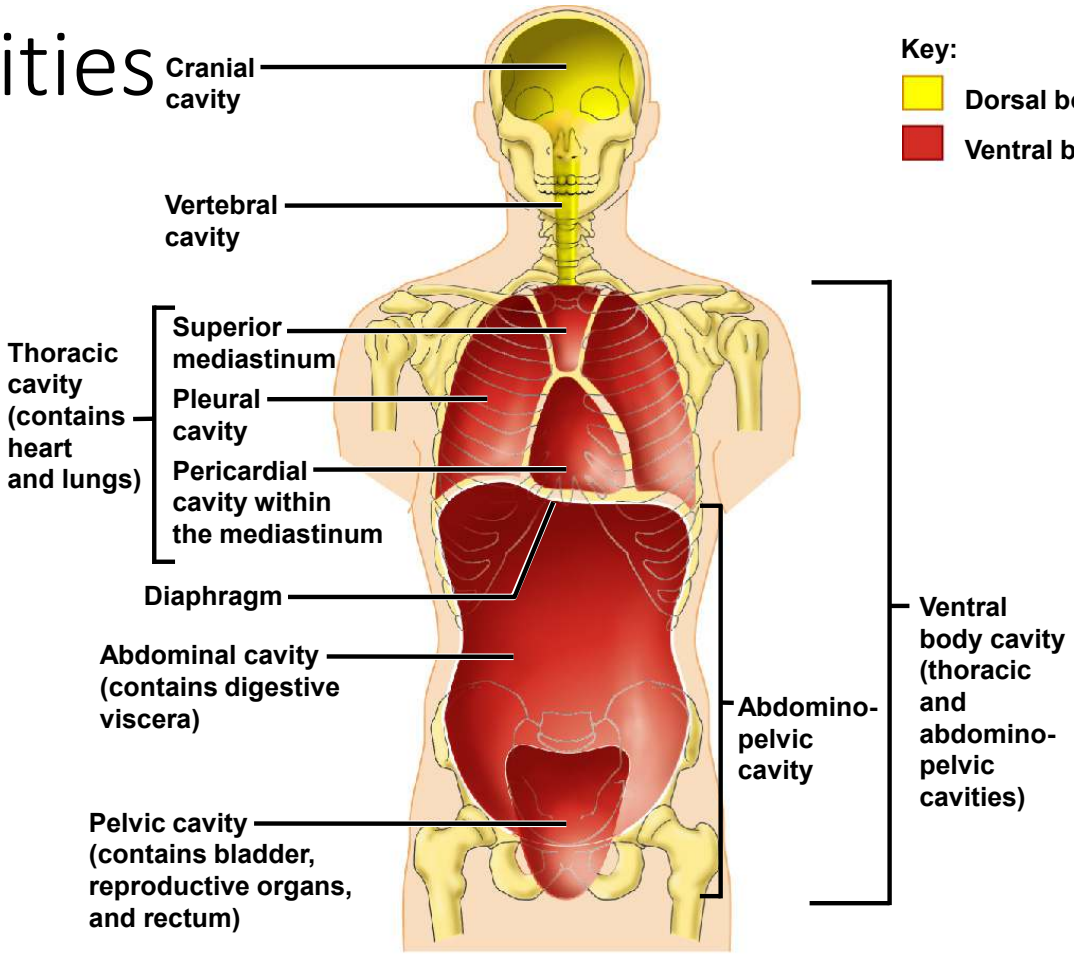


Figure 1.9a

Body Cavities



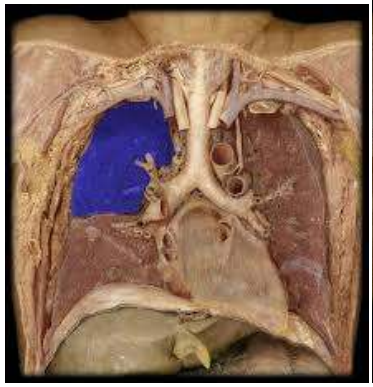
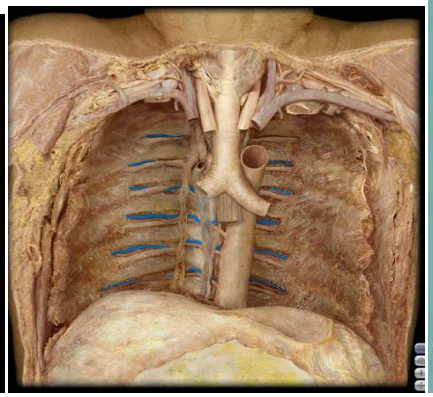
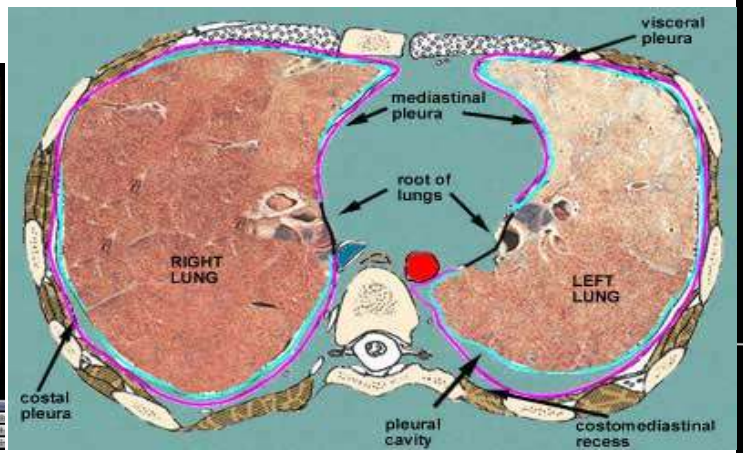


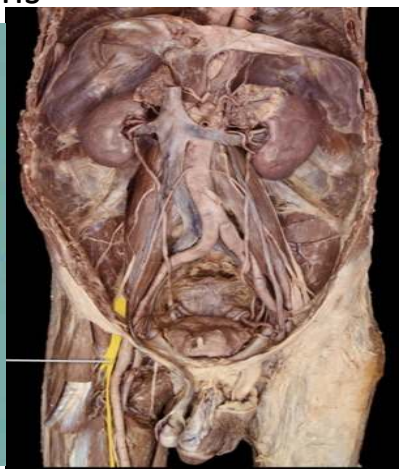
(b) Anterior view

Figure 1.9b

Body Cavities

- Thoracic cavity is subdivided into two pleural cavities, the mediastinum, and the pericardial cavity
  - Pleural cavities – each houses a lung
  - Mediastinum – contains the pericardial cavity; surrounds the remaining thoracic organs
  - Pericardial cavity – encloses the heart

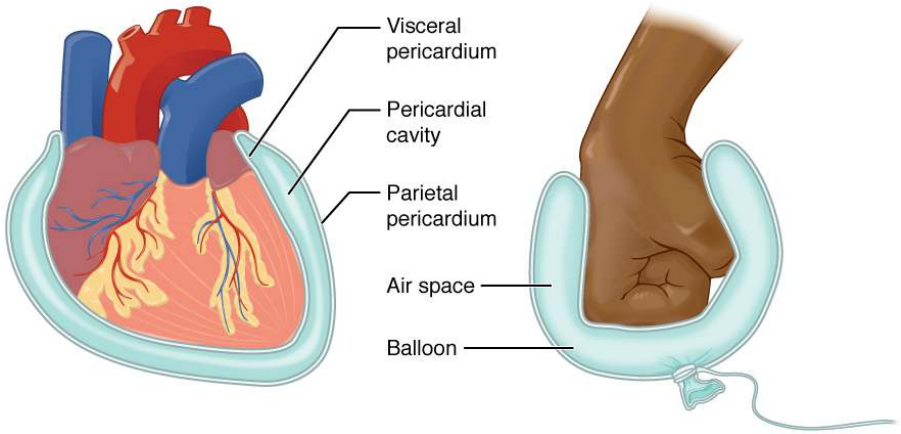




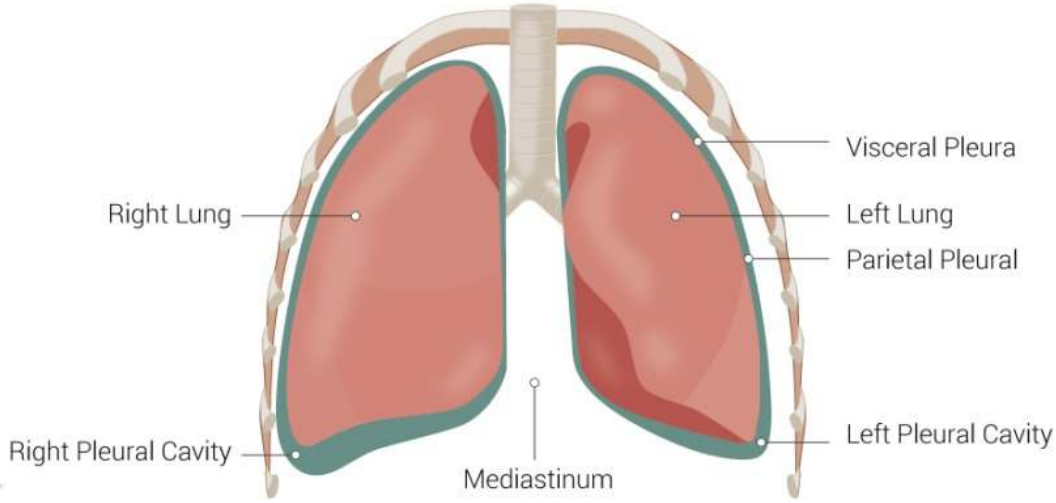


- The abdominopelvic cavity is separated from the superior thoracic cavity by the dome-shaped diaphragm
- It is composed of two subdivisions
  - Abdominal cavity – contains the stomach, intestines, spleen, liver, and other organs
  - Pelvic cavity – lies within the pelvis and contains the bladder, reproductive organs, and rectum

Ventral Body Cavity Membranes

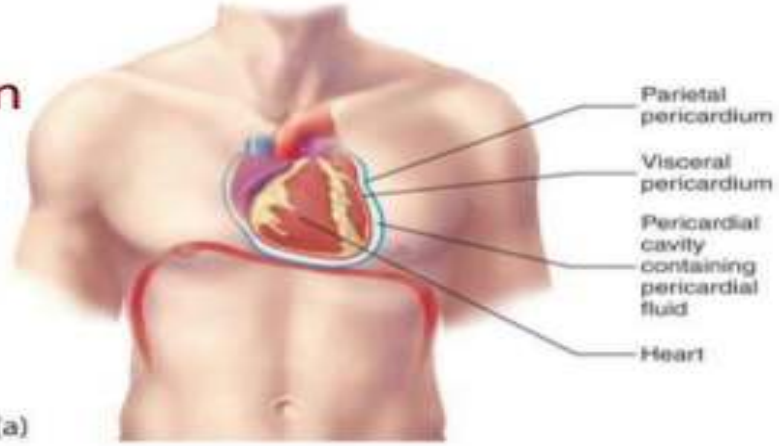
- Parietal serosa lines internal body walls
- Visceral serosa covers the internal organs
- Serous fluid separates the serosae



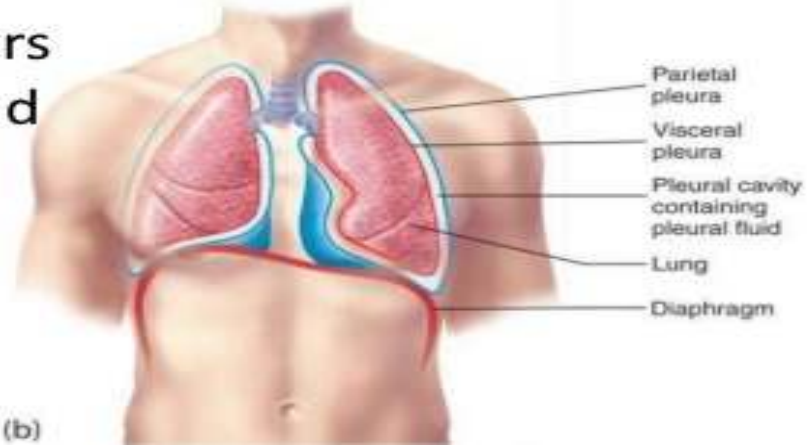


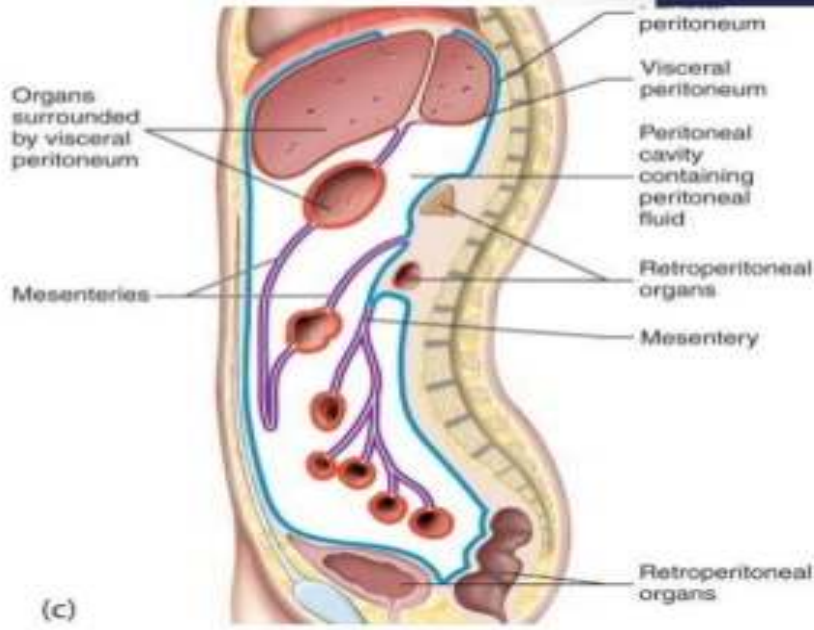
Serous Membranes: Named for Their Specific Cavities and Organs

Pericardium refers to heart.



Pleura refers to lungs and thoracic cavity





Peritoneum refers to abdominopelvic cavity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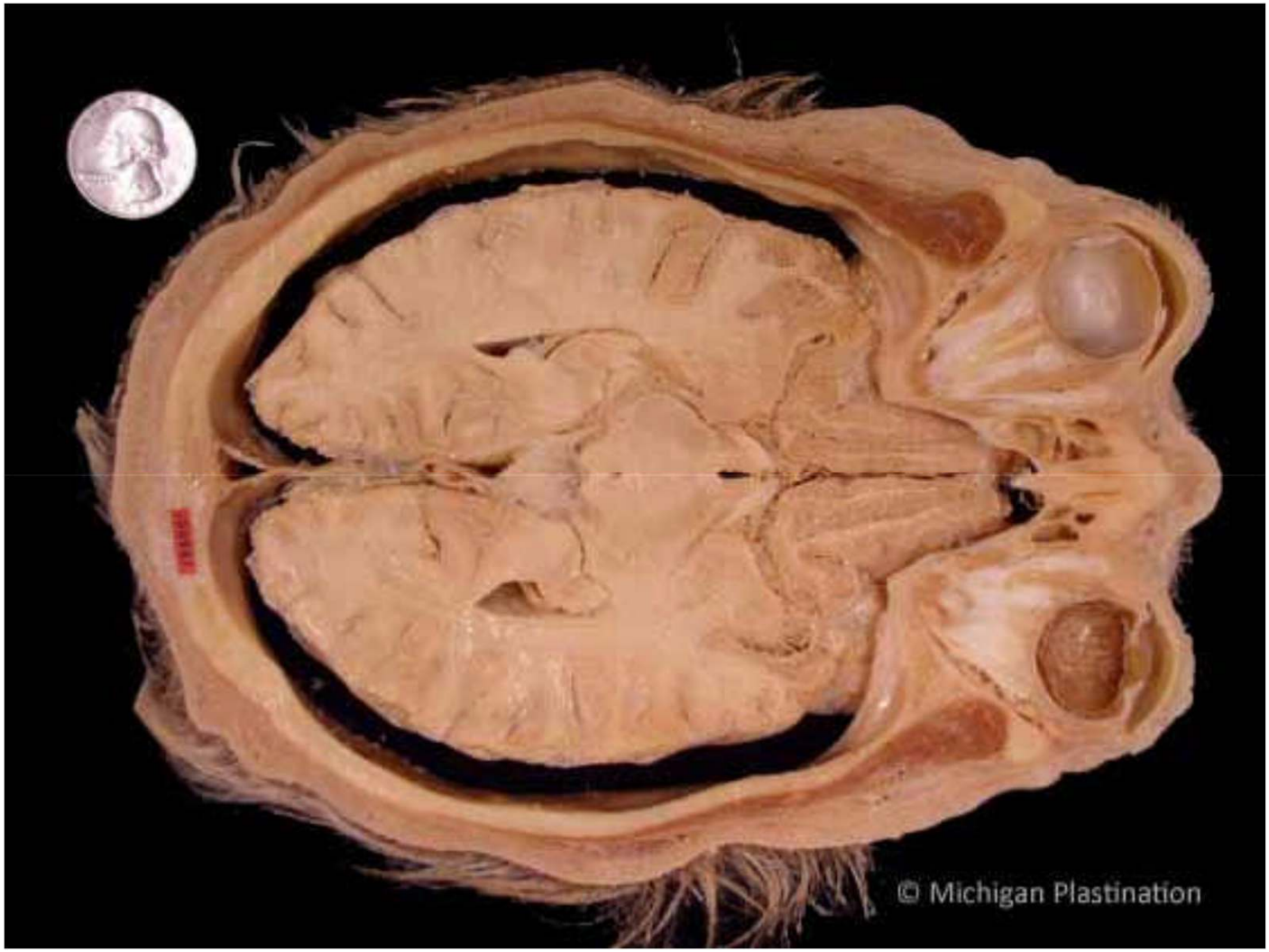
© Michigan Plastination

Body Cavities

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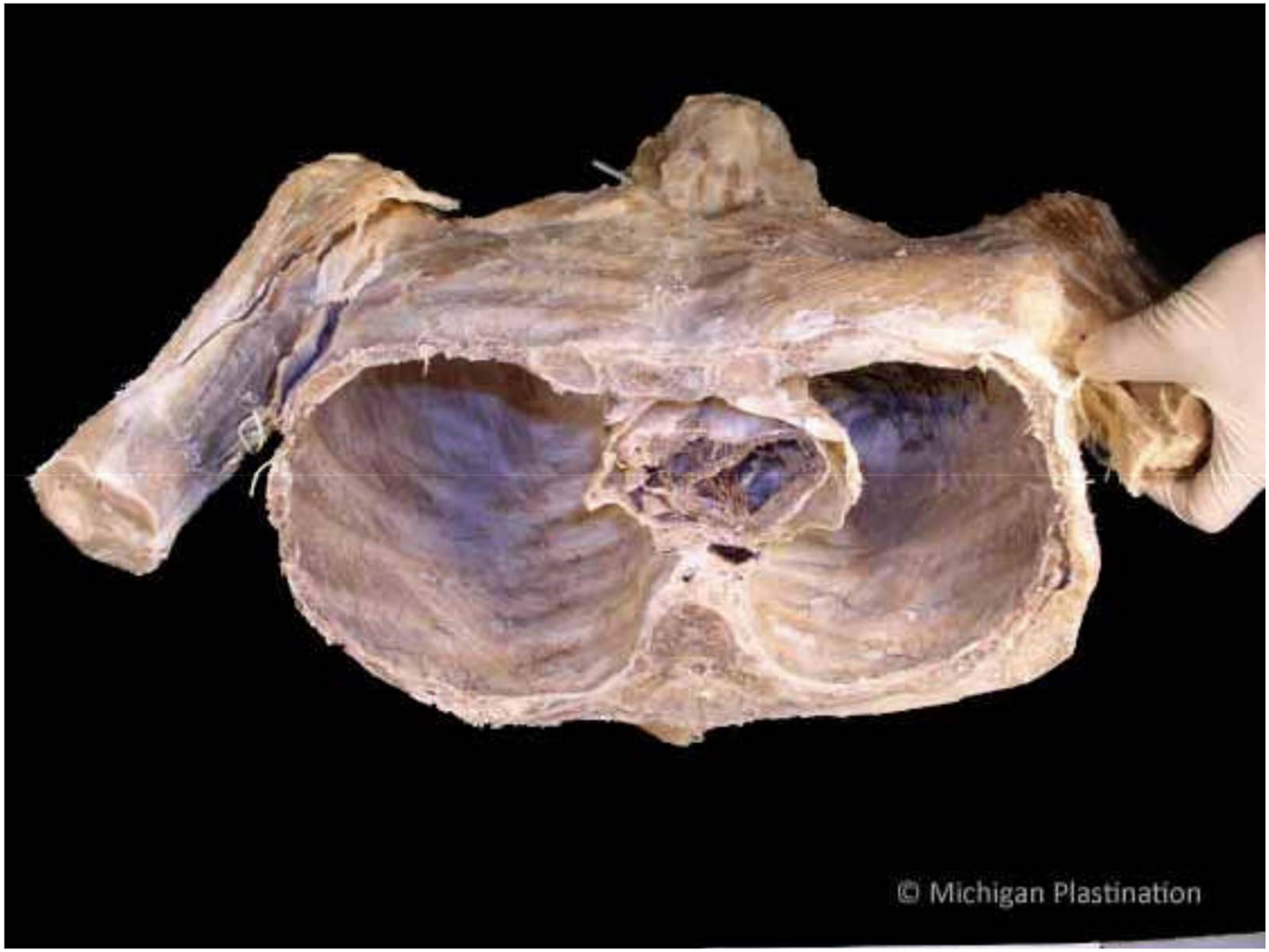
  - **Pleural cavities** – each houses a lung
  - **Mediastinum** – contains the pericardial cavity; surrounds the remaining thoracic organs
  - **Pericardial cavity** – encloses the heart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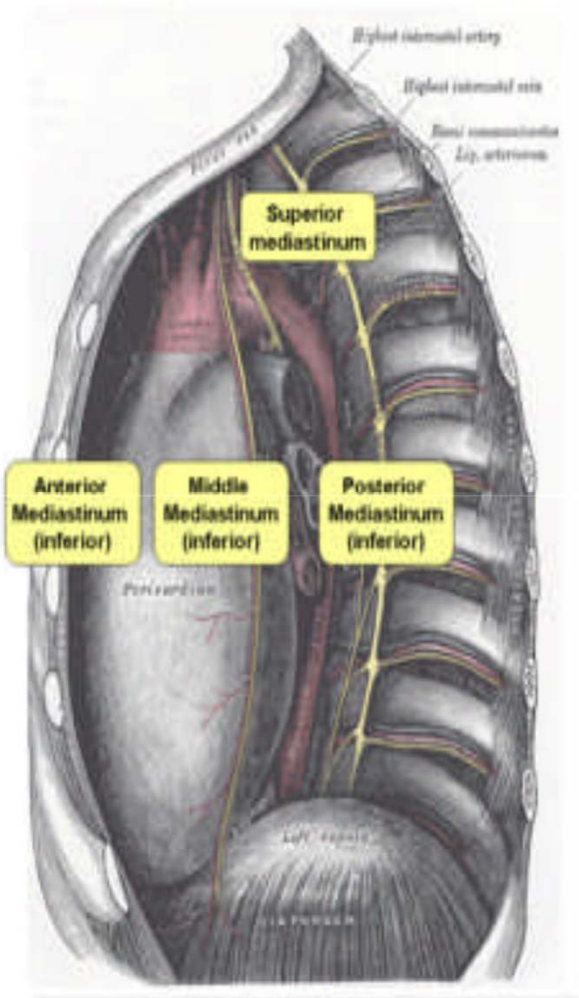
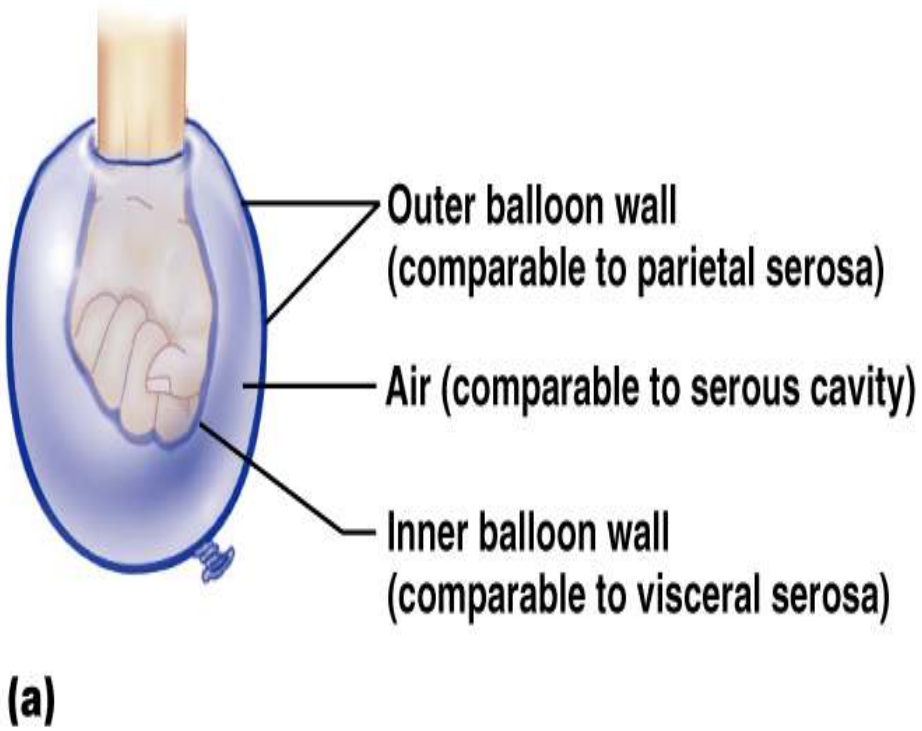
Mediastinum

- **It contains**

1. **the heart,**
2. **the great vessels of the heart,**
3. **the esophagus,**
4. **the trachea,**
5. **the phrenic nerve,**
6. **the cardiac nerve,**
7. **the thoracic duct,**
8. **the thymus,**
9. **the lymph nodes of the central chest.**



Serous Membrane Relationship



(a)

Ventral Body Cavity Membranes

- **Parietal serosa** lines internal body walls
- **Visceral serosa** covers the internal organs
- **Serous fluid** separates the serosae

Figure 1.10a

Heart Serosae

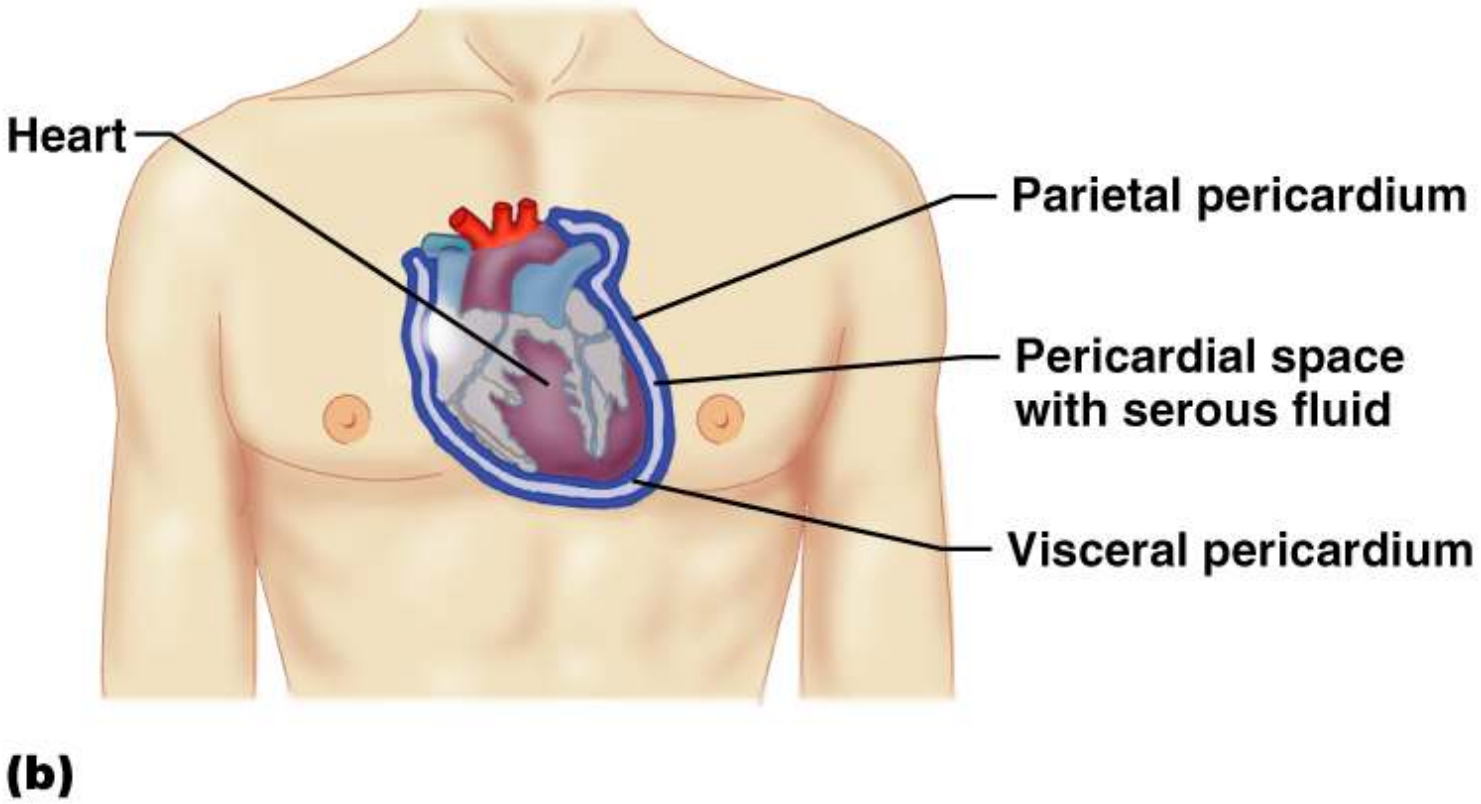


Figure 1.10b

Other Body Cavities

- Oral and digestive – mouth and cavities of the digestive organs
- Nasal –located within and posterior to the nose
- Orbital – house the eyes
- Middle ear – contains bones (ossicles) that transmit sound vibrations
- Synovial – joint cavities

Other Body Cavities

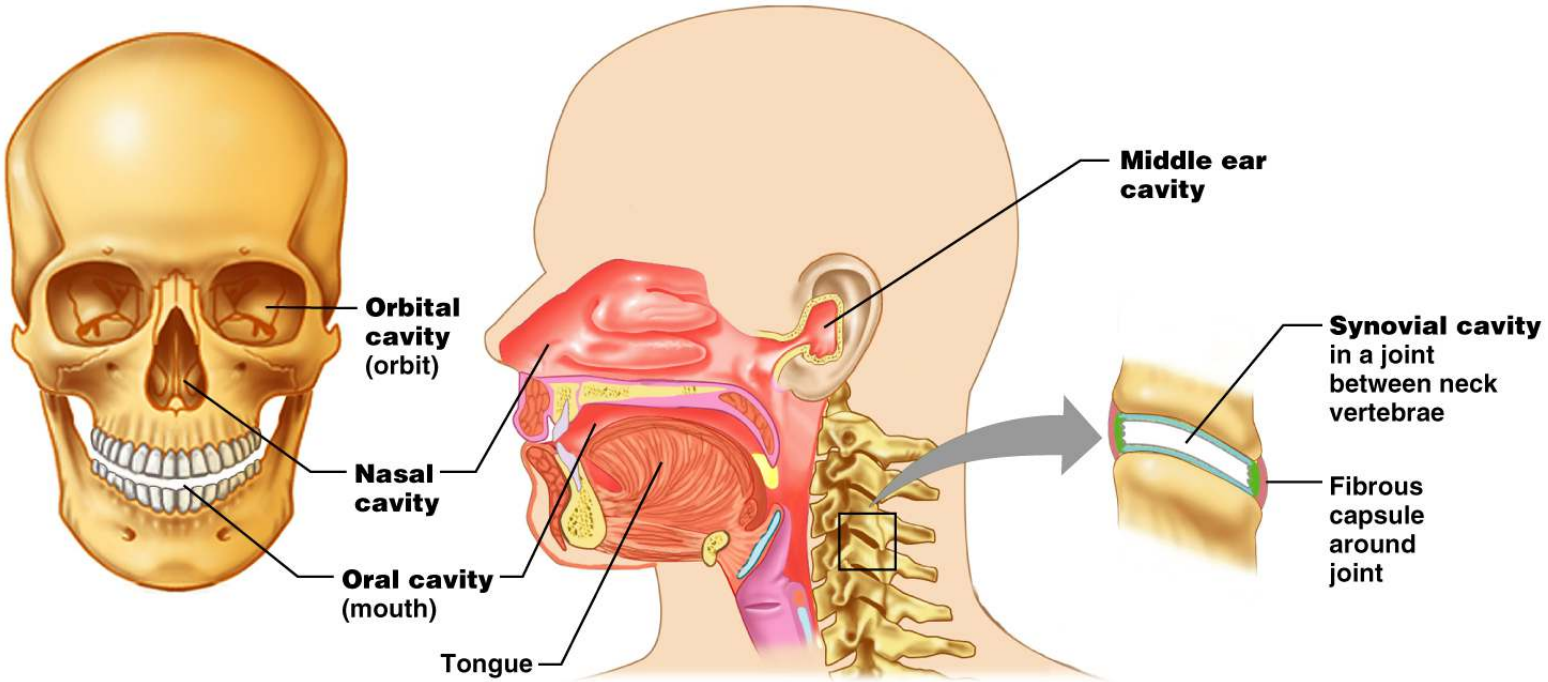
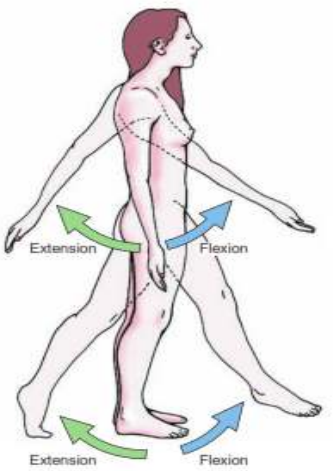
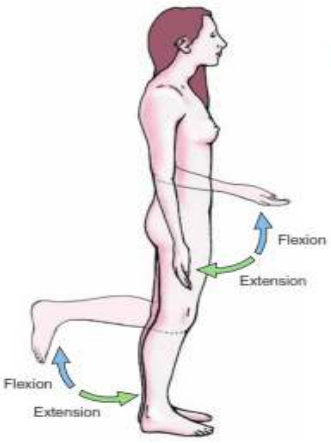


Figure 1.13

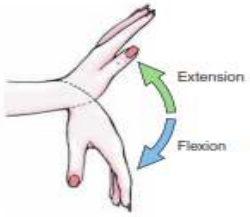


(A) Flexion and extension of upper limb at shoulder joint and lower limb at hip joint



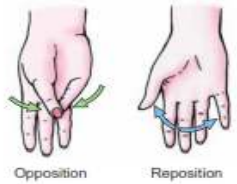
Flexion and extension of forearm at elbow joint and of leg at knee joint

Flexion and extension of vertebral column at intervertebral joints



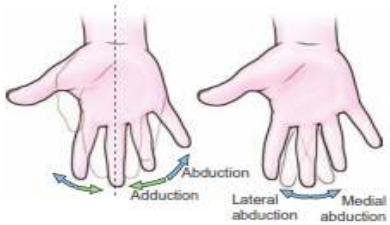
(B) Flexion and extension of hand at wrist joint

Flexion and extension of digits (fingers) at metacarpophalangeal and interphalangeal joints



(C) Opposition and reposition of the thumb at the carpometacarpal joint and little finger at the metacarpophalangeal joint

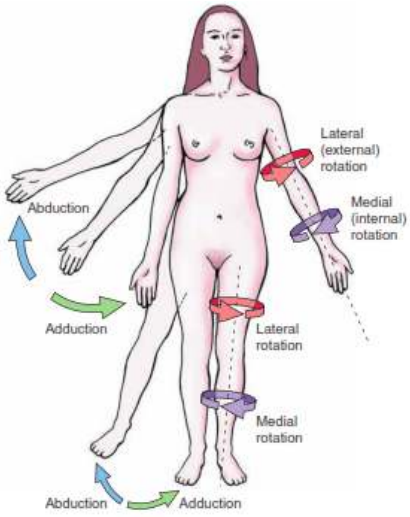
(D) Pronation and supination of forearm at radioulnar joints



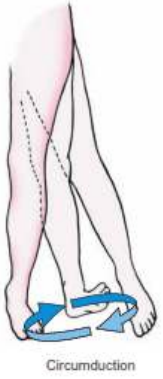
(E) Abduction and adduction of 1st, 2nd, 4th, and 5th digits at metacarpophalangeal joints

Abduction of 3rd digit at metacarpophalangeal joint

(F) The thumb is rotated 90° relative to other structures. Abduction and adduction at the metacarpophalangeal joint occurs in a frontal plane; flexion and extension at the metacarpophalangeal and interphalangeal joints occurs in sagittal planes, opposite to these movements at other joints.

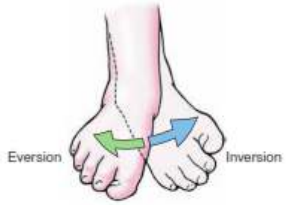


(G) Abduction and adduction of right limbs and rotation of left limbs at glenohumeral and hip joints, respectively

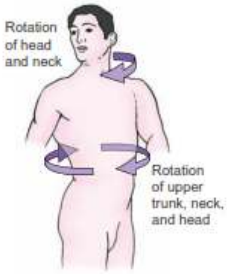


(H) Circumduction (circular movement) of lower limb at hip joint

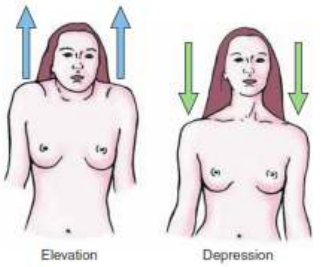
Dorsiflexion and plantarflexion of foot at ankle joint



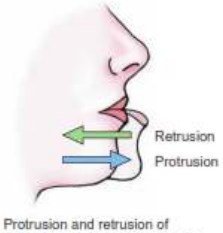
(I) Inversion and eversion of foot at subtalar and transverse tarsal joints



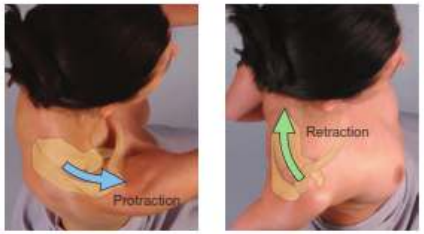
(J) Lateral bending (lateral flexion) of trunk and rotation of upper trunk, neck, and head



(K) Elevation and depression of shoulders



(L) Protrusion and retrusion of jaw at temporomandibular joints



(M) Protraction and retraction of scapula on thoracic wall