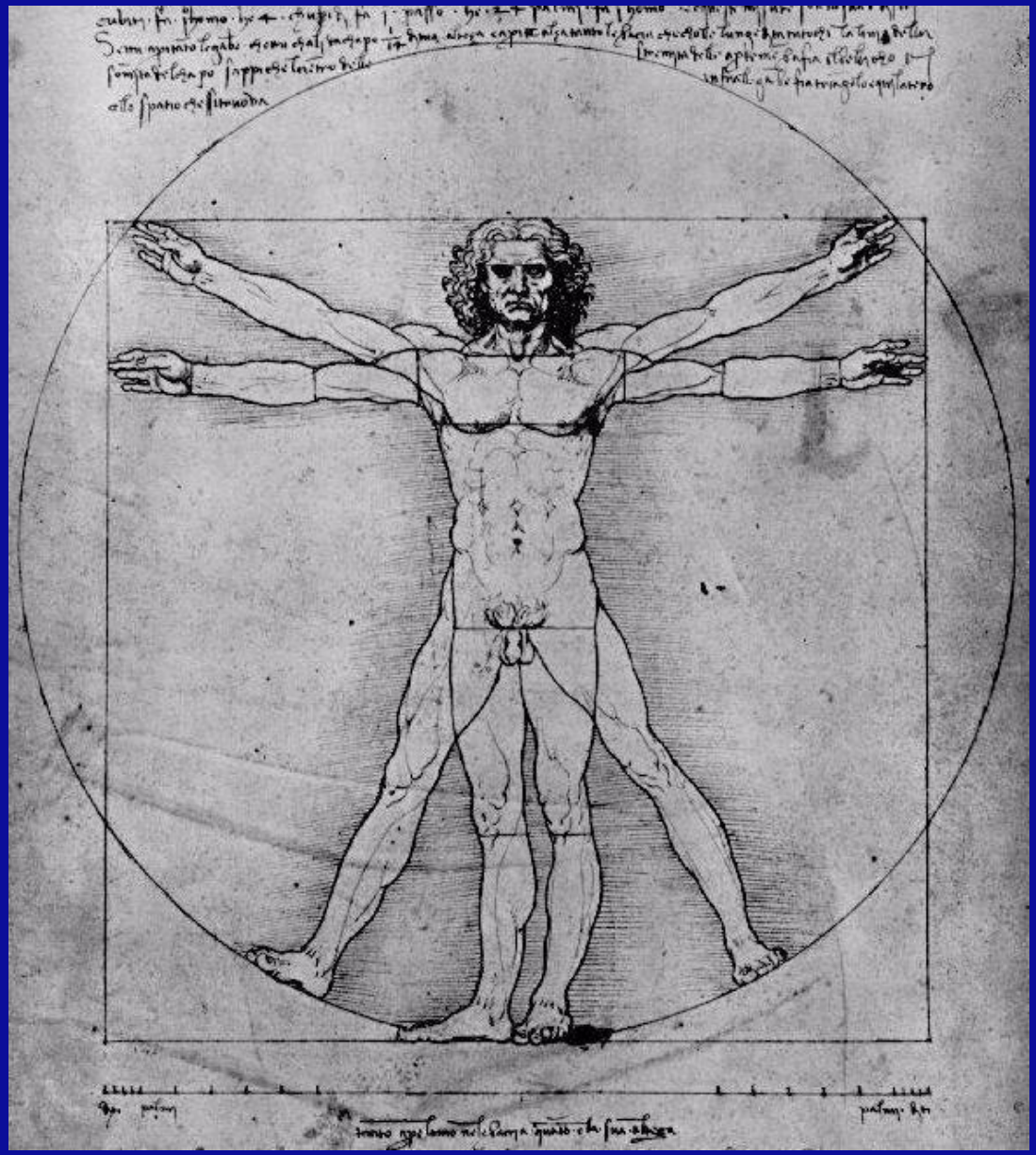


Human Anatomy & Physiology

Overview of Anatomy and Physiology

- **Anatomy** – the study of the *structure* of the body and the relationships of the various parts of the body
  - Gross/Macroscopic Anatomy (visible structures)
  - Systematic Anatomy (gross anatomy studied by system)
  - Regional Anatomy (all structures in one part of body- i.e. abdomen or leg)
  - Microanatomy (cytology, histology)

- **Physiology** – the study of the *functions* of the parts of the body and the mechanisms that operate body activities. Answers the question, How does it work?

Principle of Complementarity

- **Function** always reflects **structure**
- What a structure can do depends on its specific form

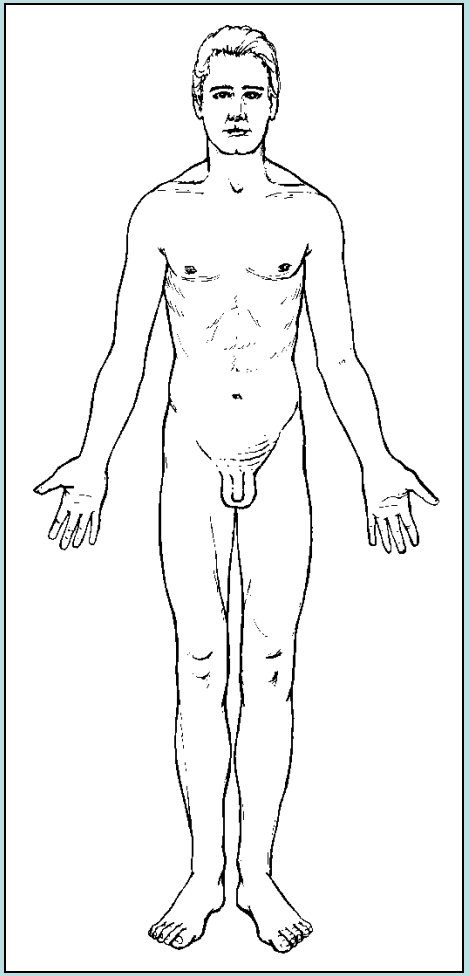
Basic Terminology

- A&P = universal language w/established set of terms
- Greek and Latin based
- Ex: myocardium → heart's muscle (cardiac)
  - Myo = muscle
  - Cardio = heart

- **Directional terms** = language that is used to describe the location of a body structure relative to another
  - ***HANDOUT:*** Table: 1-1 directional/descriptive terms, page 5

Basic Anatomical Terminology: **Reference Positions**

- ***Anatomical position***
  - most widely used & accurate for all aspects of the body
  - standing in an upright posture/body erect, facing straight ahead, feet parallel and slightly apart, & palms facing forward with thumbs pointing away from the body
  - R/L are always used in reference to the patient



Basic Anatomical Terminology: **Reference Positions**

- ***Fundamental position (reclining)***
  - is essentially same as anatomical position except arms are at the sides & facing the body
  - Face down = prone position;
  - Face up = supine position

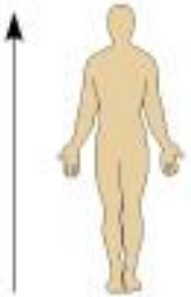
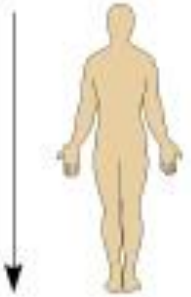
Directional/Descriptive Terms

- Superior, inferior
- Anterior, posterior
- Superficial, deep
- Medial, lateral
- Proximal, distal
- Cranial, caudal
- Ventral, dorsal
- External, internal

ALWAYS ASSUME ANATOMOICAL POSITION, regardless of the position the body happens to be in

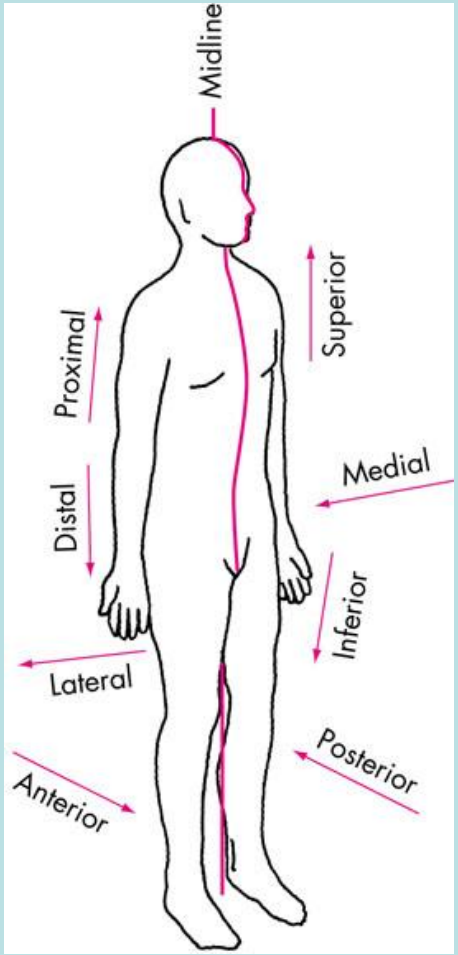
Directional Terms

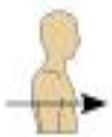
TABLE 1.1 Orientation and Directional Terms

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

Anatomical Directional Terminology

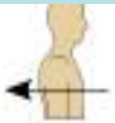
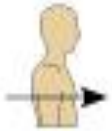
- Anterior (ventral)
  - Toward the front or belly side, in front
- Posterior (dorsal)
  - Toward the back, or in the rear



Anterior (ventral)*	Toward or at the front of the body; in front of		The breastbone is anterior to the spine

*Whereas the terms *ventral* and *anterior* are synonymous in humans, this is not the case in four-legged animals. *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.

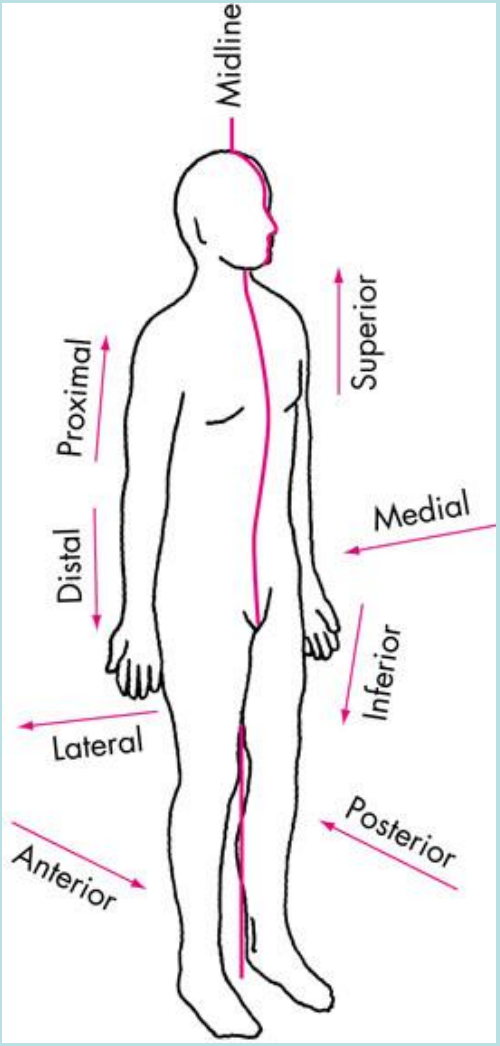
Directional Terms

Posterior (dorsal)*	Toward or at the back of the body; behind		The heart is posterior to the breastbone
Anterior (ventral)*	Toward or at the front of the body; in front of		The breastbone is anterior to the spine

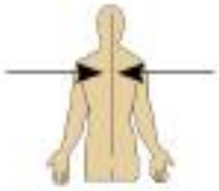
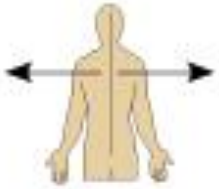
*Whereas the terms *ventral* and *anterior* are synonymous in humans, this is not the case in four-legged animals. *Ventral* specifically refers to the "belly" of a vertebrate animal and thus is the inferior surface of four-legged animals. Likewise, although the dorsal and posterior surfaces are the 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.

Anatomical Directional Terminology

- Lateral
  - on or to the side; away from the midline
- Medial
  - relating to the middle or center; nearer to the midline



Directional Terms

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

Anatomical Directional Terminology

***Used to describe relative depth or location of muscles or tissue**

***Used to describe layers within integumentary system**

- Deep
  - beneath or below the surface
- Superficial
  - near the surface

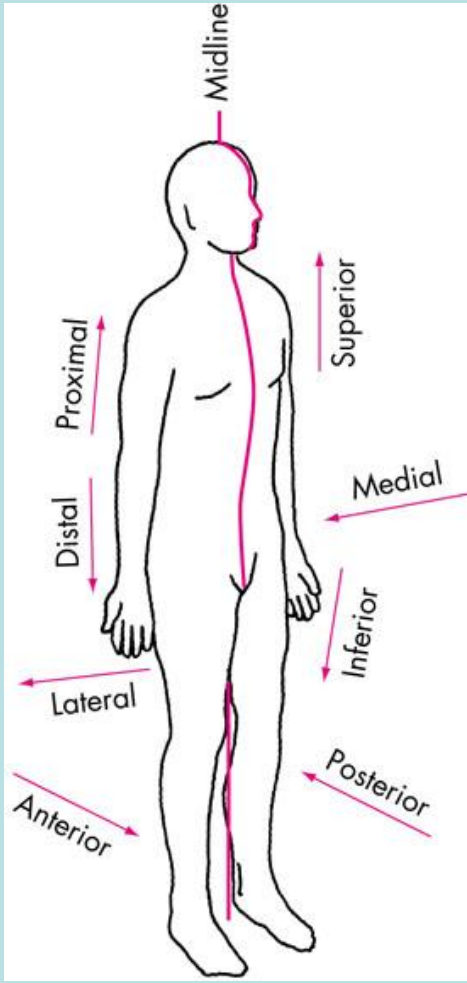
Directional Terms

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

*Whereas the terms *ventral* and *anterior* are synonymous in humans, this is not the case in four-legged animals. *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.

Anatomical Directional Terminology

- Distal
  - situated away from the center or midline of the body, or away from the point of origin
- Proximal
  - nearest the trunk or the point of origin



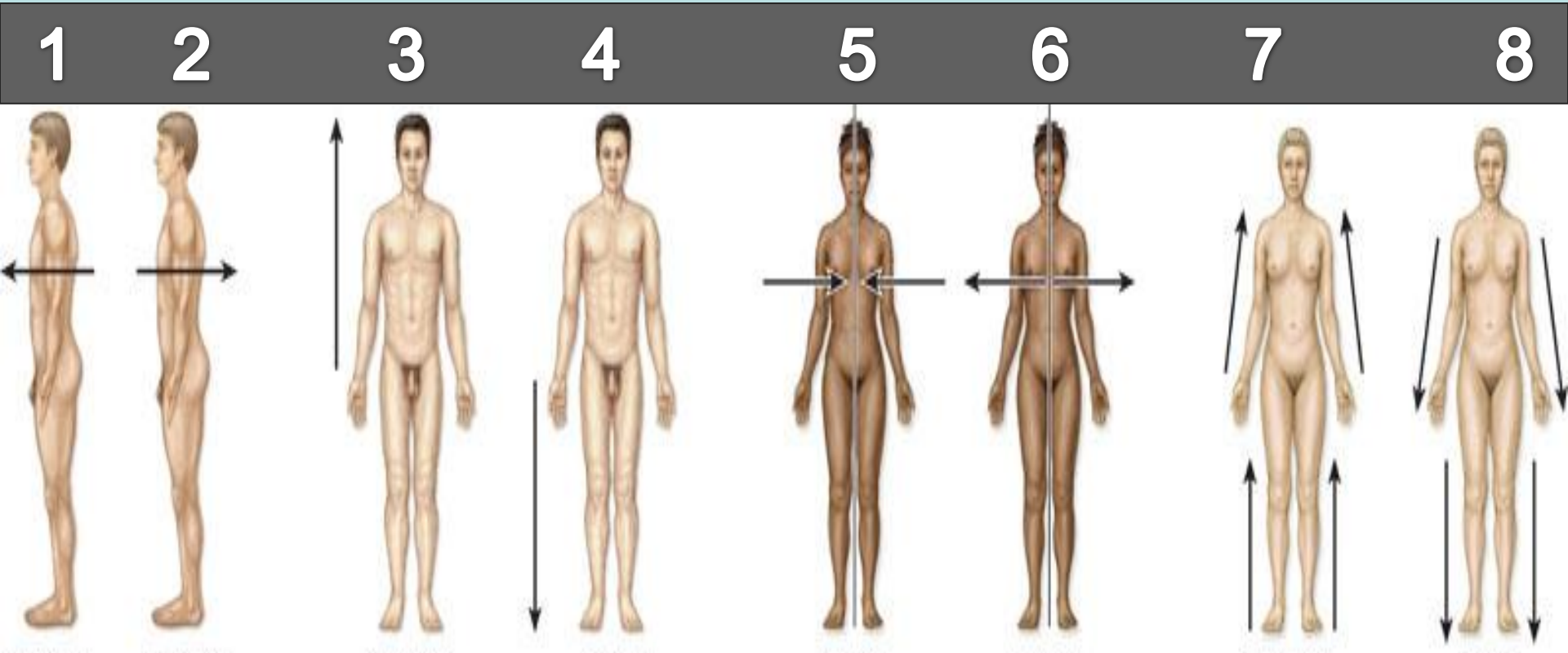
**** ONLY used on appendages ****

Directional Terms

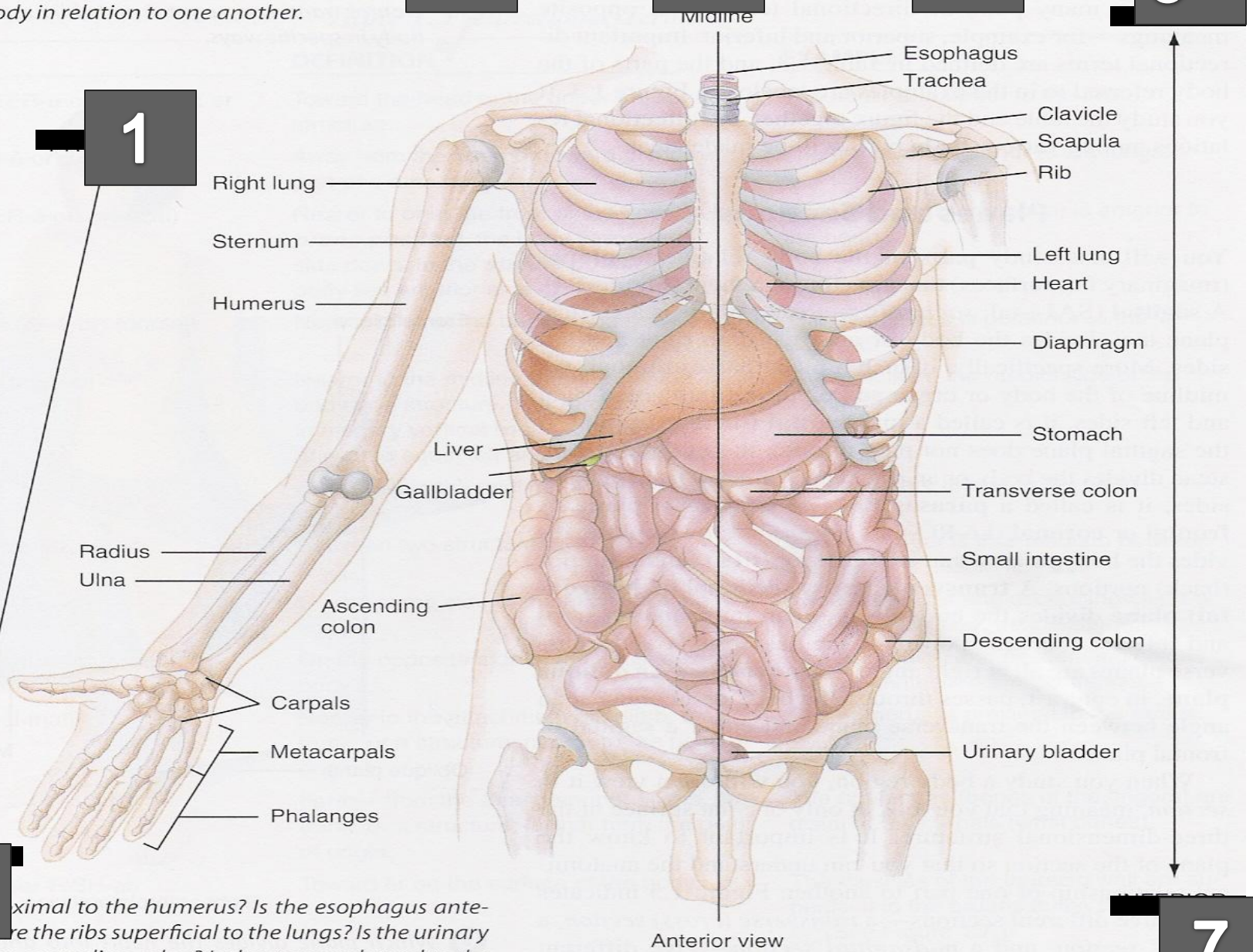
TABLE 1.1 Orientation and Directional Terms

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

Directional Terms



Directional terms precisely locate various parts of the body in relation to one another.



Is the [illegible] proximal to the humerus? Is the esophagus anterior to the [illegible] the ribs superficial to the lungs? Is the urinary bladder medial to the ascending colon? Is the sternum lateral to the descending colon?

Directional Terms

- Complete questions 12-30 in Chapter One packet

- http://www.wisc-online.com/Objects/ViewObject.aspx?ID=AP15305 (anatomical terminology)

Directional Terms

- Example:
  - The nose is _____ to the eyes
  - The wrist is _____ to elbow
  - The lateral bone in the forearm is the

- At your table, make a list of **10** examples of directional terms – put on whiteboard ; make answer key on loose leaf paper

Homework

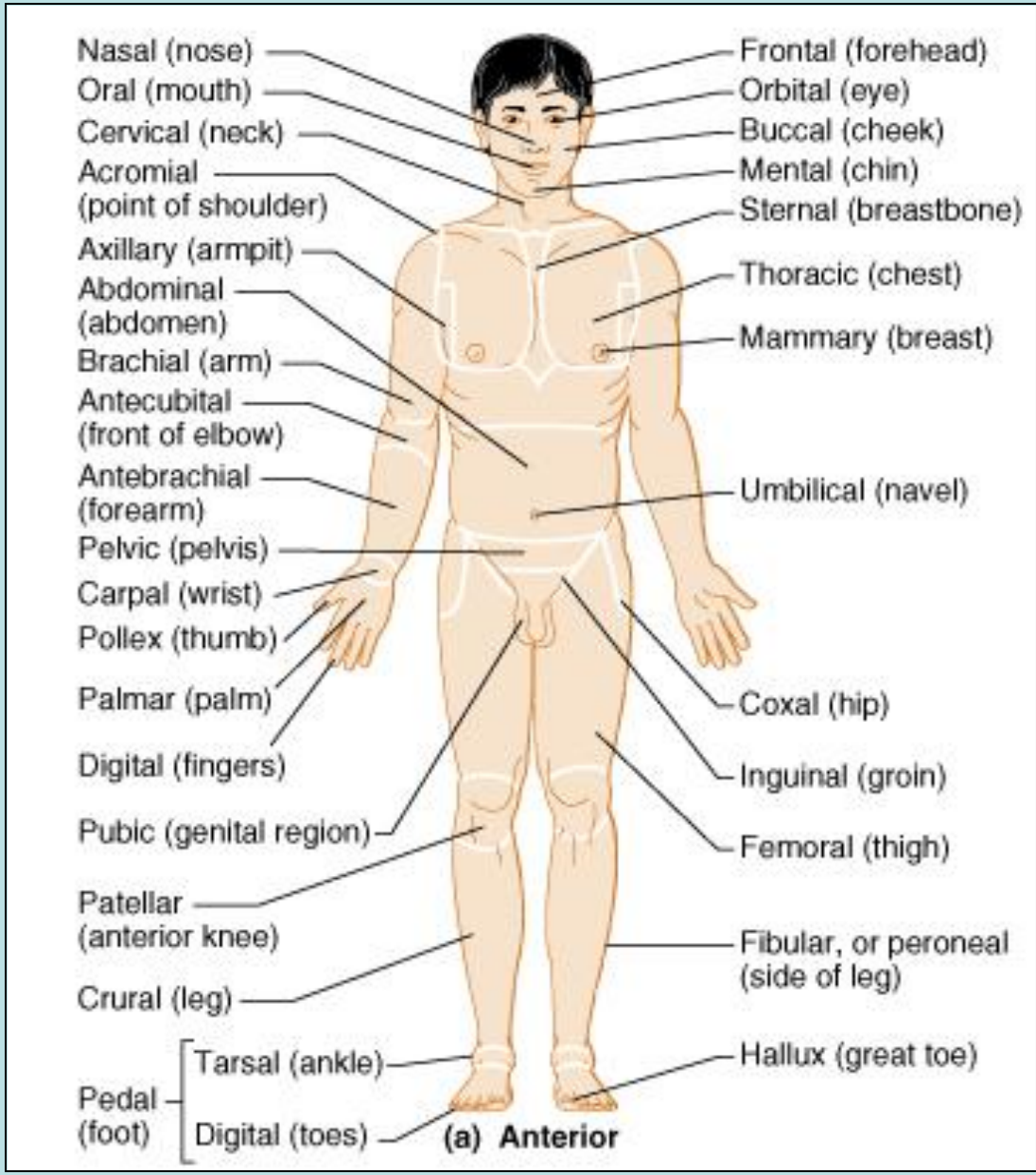
- Anatomical Terms Worksheet

Regional Terms

- Head
- Neck
- Trunk

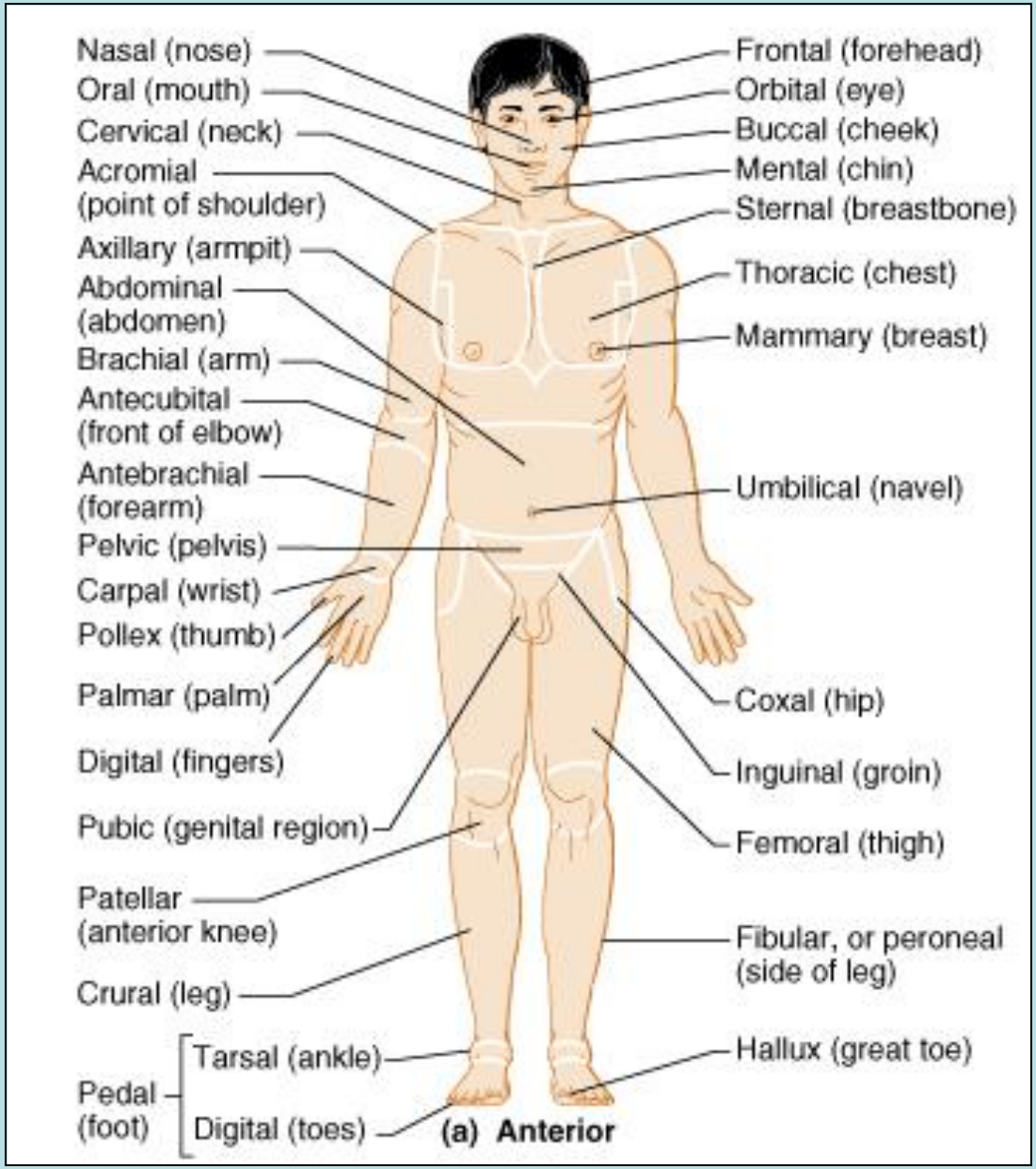
Axial

- Upper appendanges
- Lower appendages
  - Each is then subdivided further



Regional Terms

- ***Axial*** – vertical axis; Skull, vertebral column, thoracic cage, sacrum
- ***Appendicular*** – lateral to vertical axis; appendages or limbs



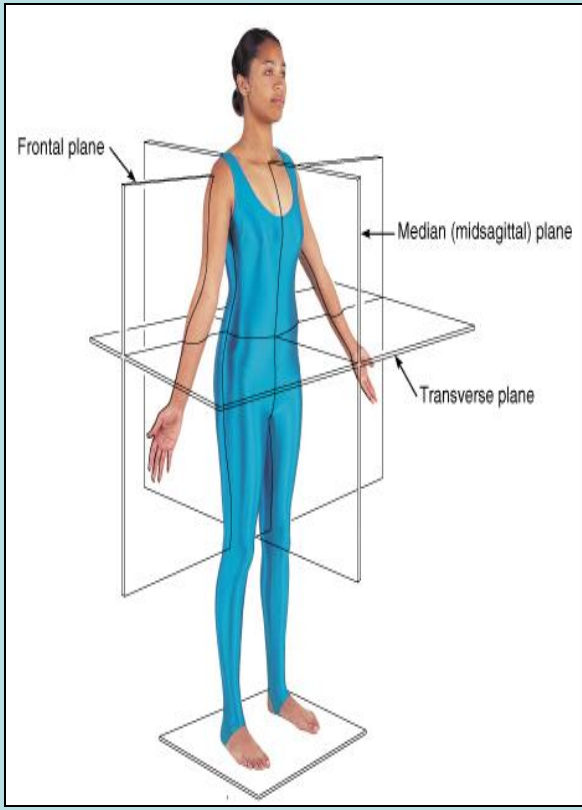
Body Planes

- ***Sagittal***– divides the body into right and left parts

  Midsagittal – sagittal plane that lies on the midline (equal halves)

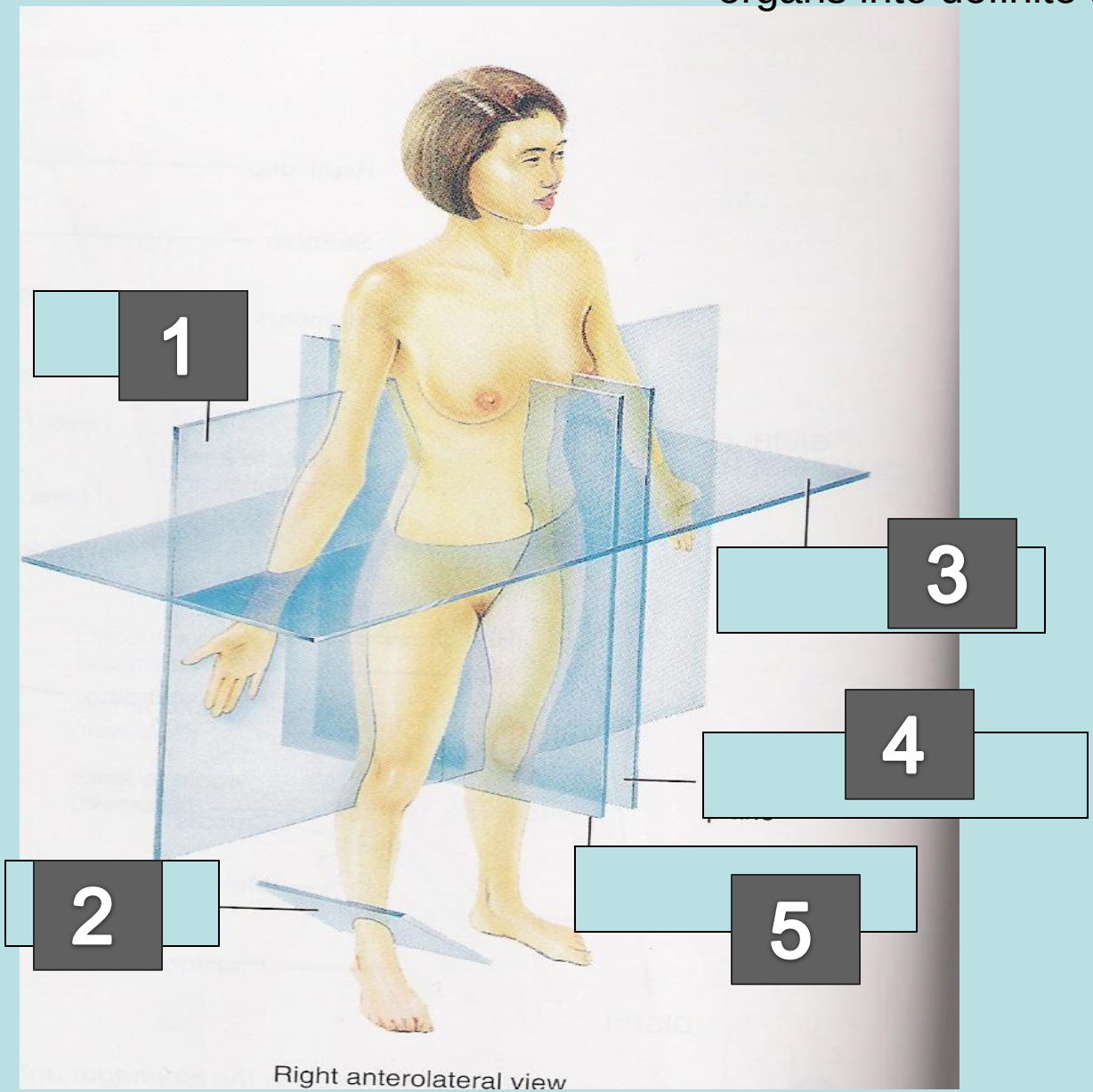
  Parasagittal - sagittal plane that divides unequally

- ***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*** – cuts made diagonally



Body Planes

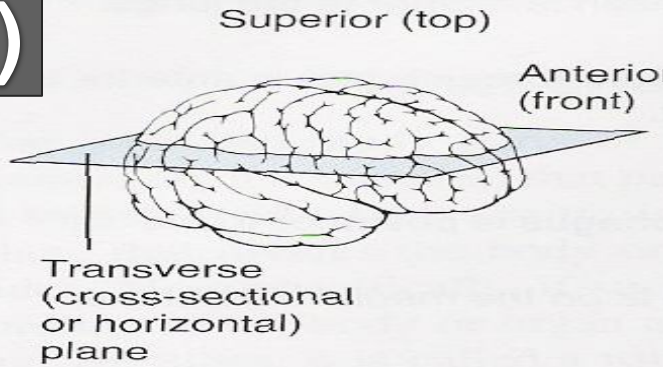
Imaginary flat surfaces that are used to divide the body or organs into definite areas



Sections

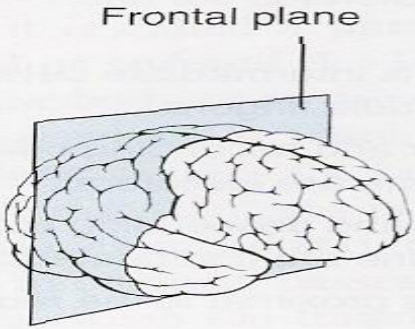
Flat surfaces resulting from cuts through body structures

A)



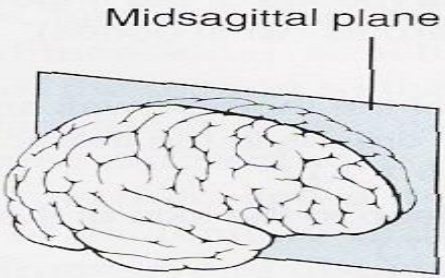
Transverse (cross) section

B)



Frontal section

C)



Midsagittal section

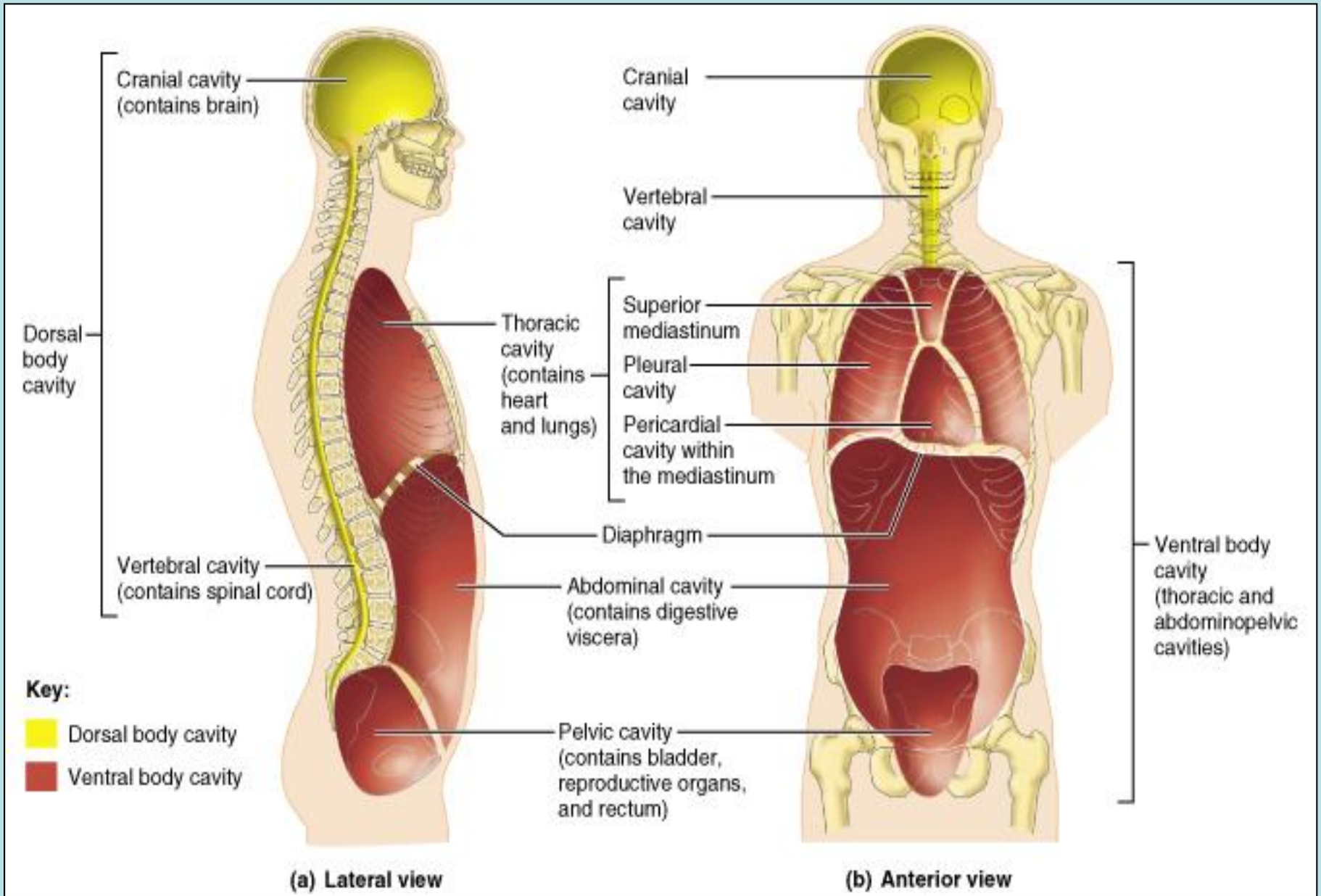
Review:

- Complete: in Chapter One Packet:
  - terminology questions 12-30
  - labels and lists questions 1-3
- Assign HOMEWORK → Terminology coloring w.s.
- Introduce lab: turning a cucumber into a frog!

Body Cavities

- Body divided internally into several spaces or “cavities”
- Hollow spaces that protect, separate, and support internal organs
- ***Dorsal cavity*** protects the **nervous** system, and is divided into two subdivisions
  - Cranial cavity is within the skull and encases the brain
  - Vertebral cavity runs within the vertebral column and encases the spinal cord
- ***Ventral cavity*** houses the internal organs (viscera), and is divided into two subdivisions
  - Thoracic contains heart and lungs
  - Abdominopelvic contains abdomen and pelvic

Body Cavities

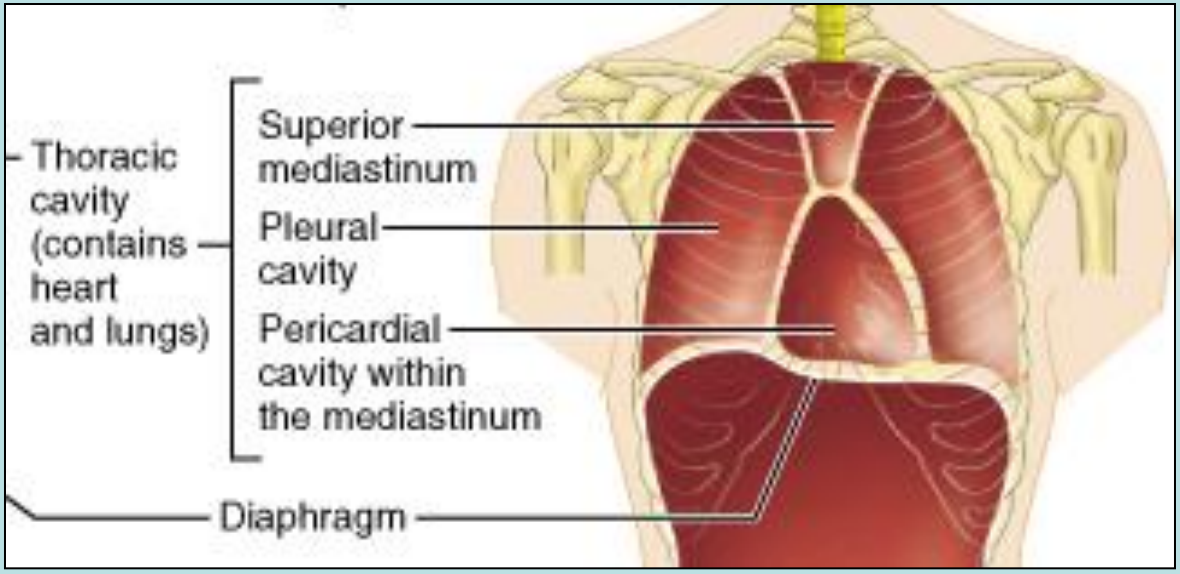


Body Cavities

- 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

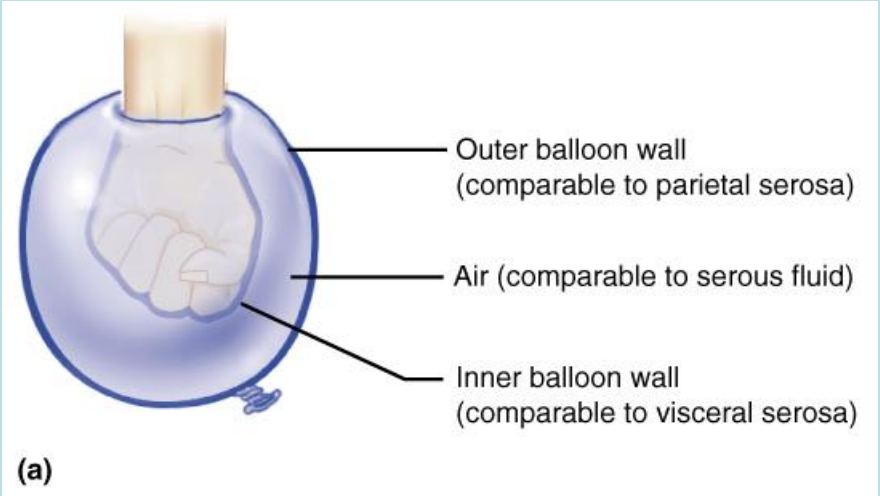
Body Cavities (w/in ventral cavity)

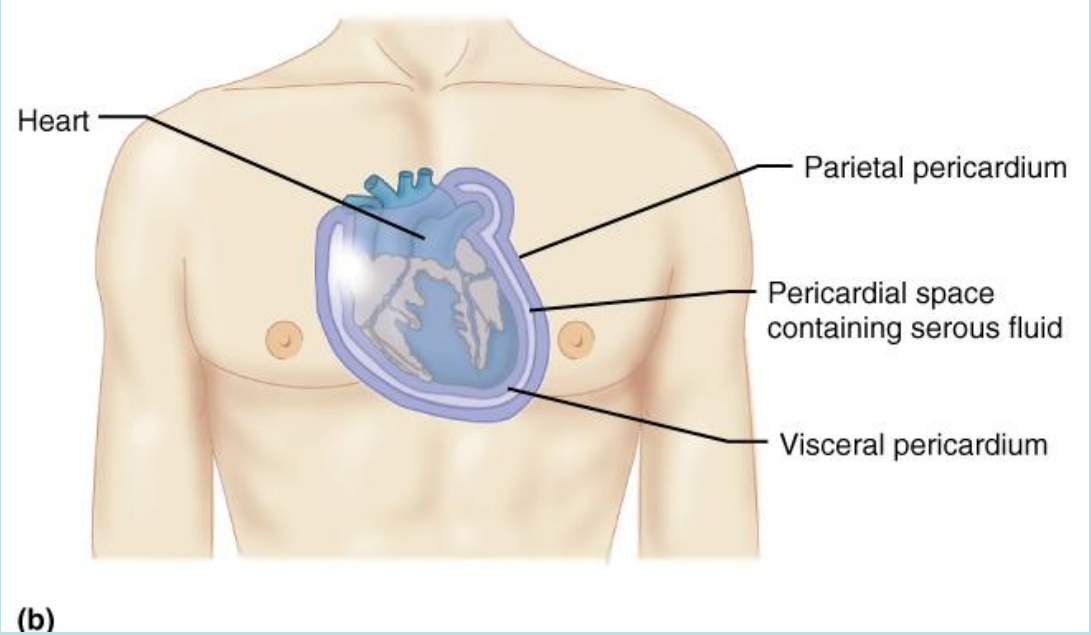
- Thoracic cavity is subdivided into pleural cavities, the mediastinum, and the pericardial cavity
  - Pleural cavities – each houses a lung
  - Mediastinum – contains the pericardial cavity, and surrounds the remaining thoracic organs
  - Pericardial – encloses the heart



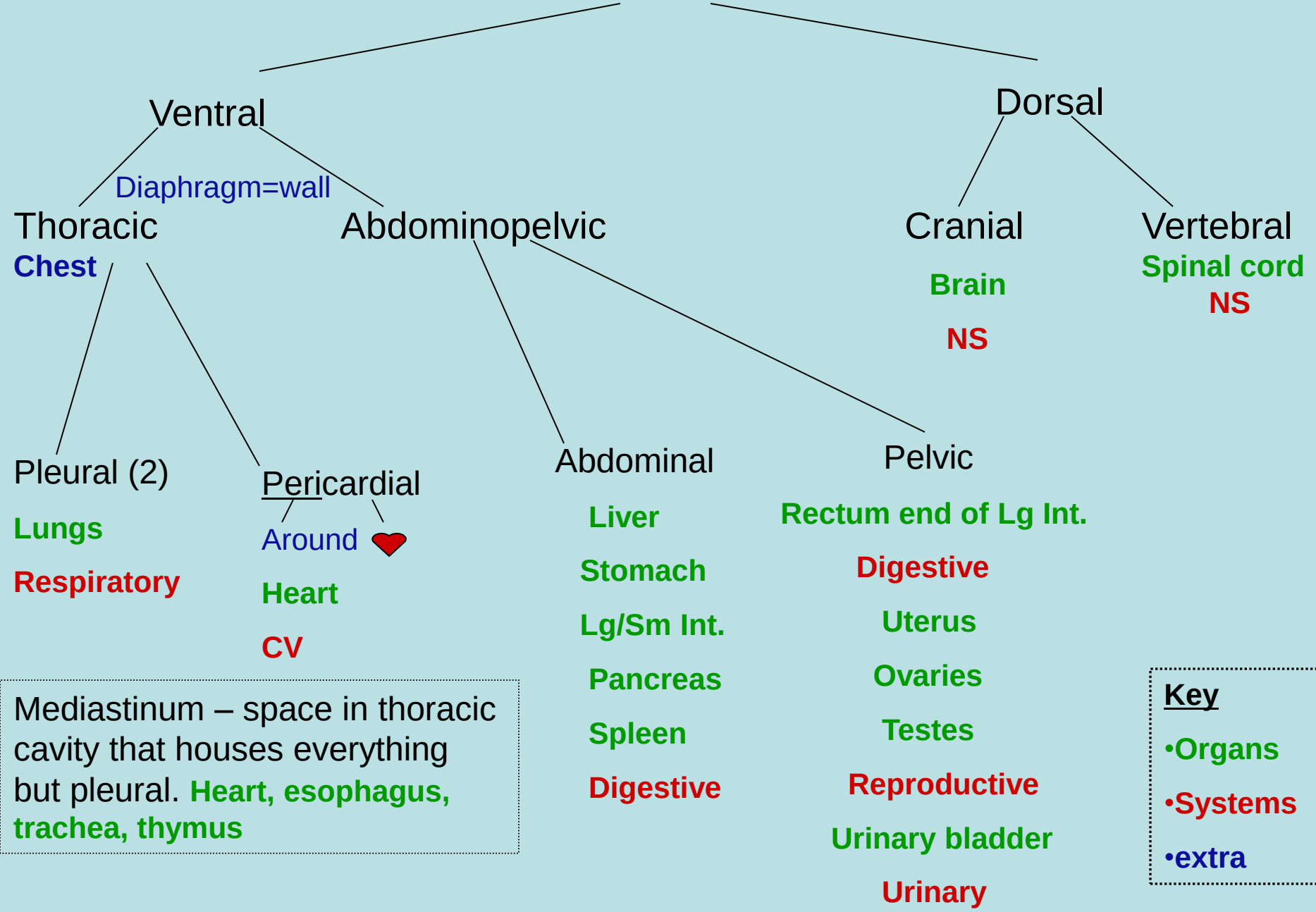
Ventral Body Cavity Membranes

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





Body Cavities



Mediastinum – space in thoracic cavity that houses everything but pleural. **Heart, esophagus, trachea, thymus**

Key

- **Organs**
- **Systems**
- **extra**

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 – contain bones (ossicles) that transmit sound vibrations
- Synovial – joint cavities

Nine Regions &

Four Quadrants

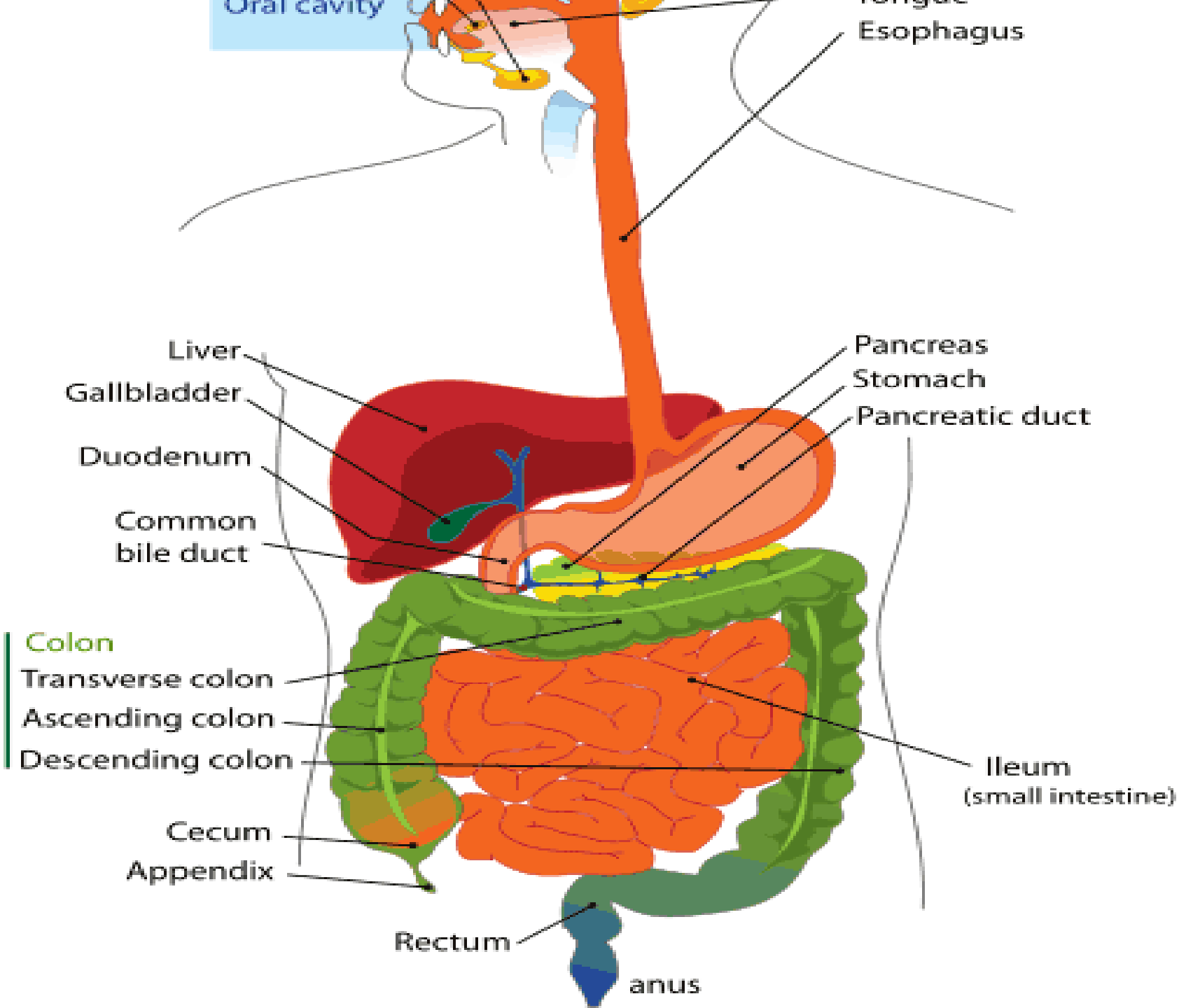
of the Abdominopelvic Cavity

Back to abdominopelvic cavity..

- Single largest cavity
- Large number of organs, therefore needs to be subdivided into “quadrants”

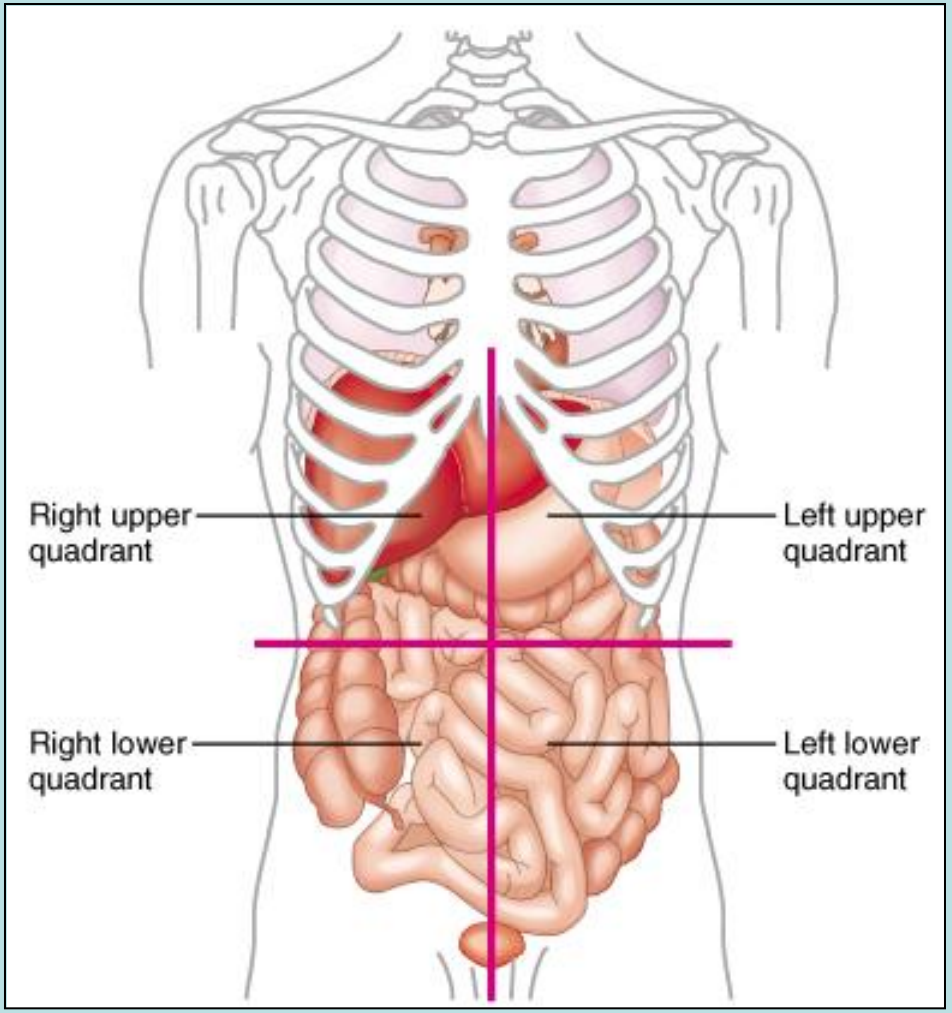
- Directions for quadrant handout:
  - Draw/label the diaphragm
  - Dot in the middle of the small intestine
    - Transverse and sagitttal cut through dot to divide
  - Shade in/label appendix
  - Label the parts of the large intestine
    - Decending
    - Transverse
    - Ascending

colon


Oral cavity
Esophagus
Liver
Gallbladder
Duodenum
Common
bile duct
Pancreas
Stomach
Pancreatic duct
Colon
Transverse colon
Ascending colon
Descending colon
Ileum
(small intestine)
Cecum
Appendix
Rectum
anus

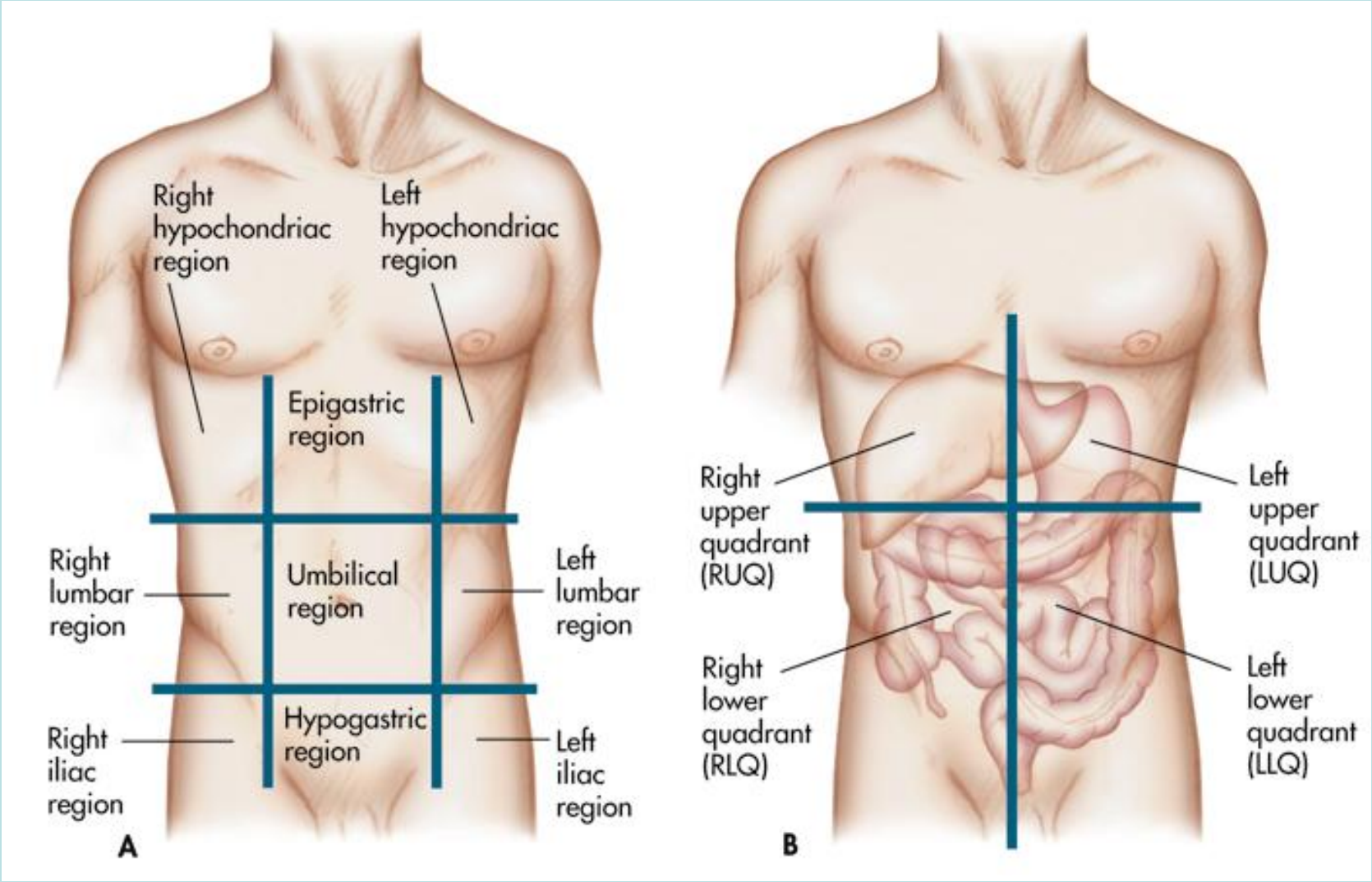
Abdomen Divided Into Quadrants

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

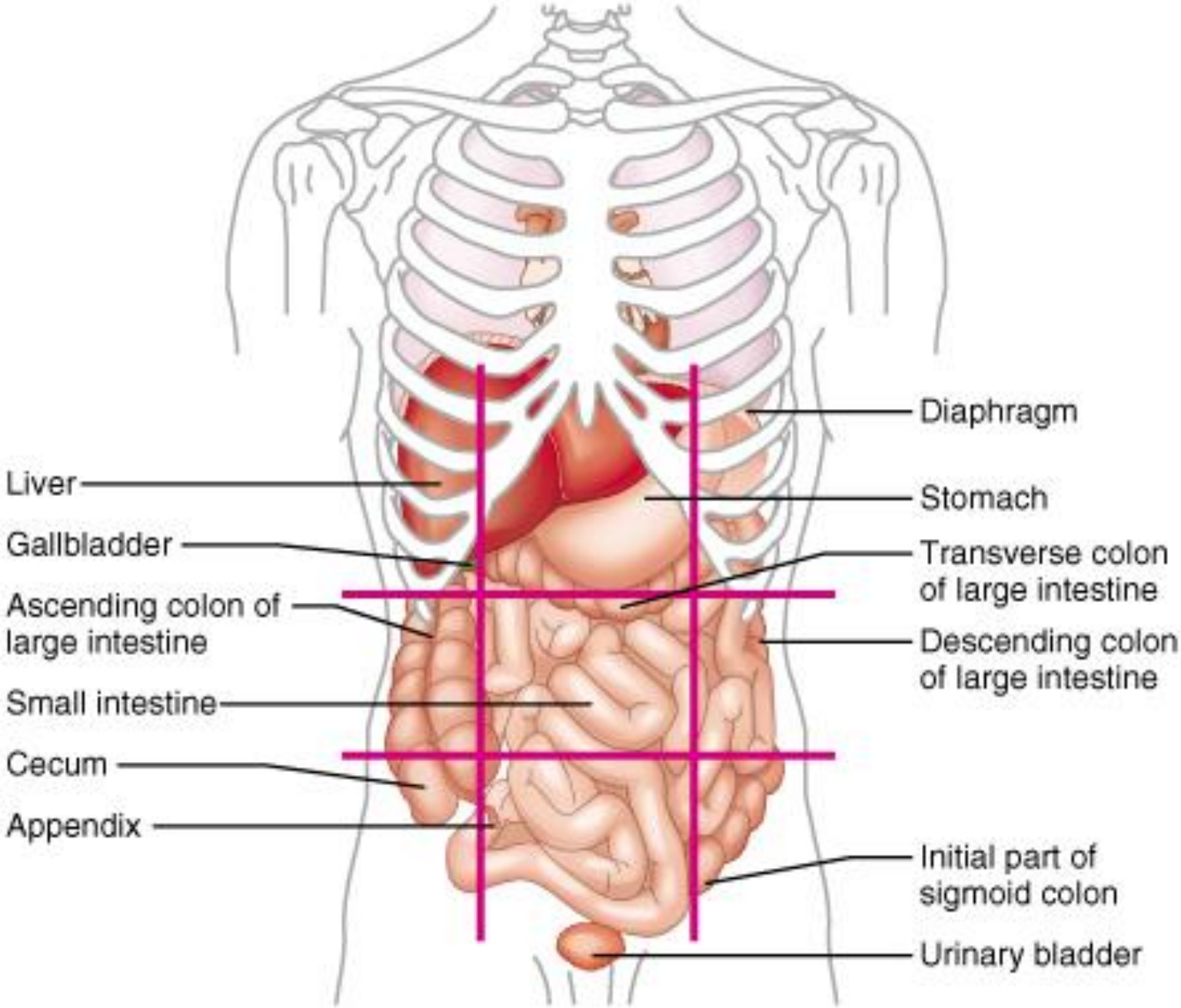


Organs - Quadrant

1. Liver
2. Stomach
3. Spleen
4. Lungs
5. Large Intestine



(A) The nine regions of the abdominopelvic cavity. (B) The four regions of the abdomen that are referred to as quadrants.


Diaphragm
Liver
Stomach
Gallbladder
Transverse colon of large intestine
Ascending colon of large intestine
Descending colon of large intestine
Small intestine
Cecum
Appendix
Initial part of sigmoid colon
Urinary bladder

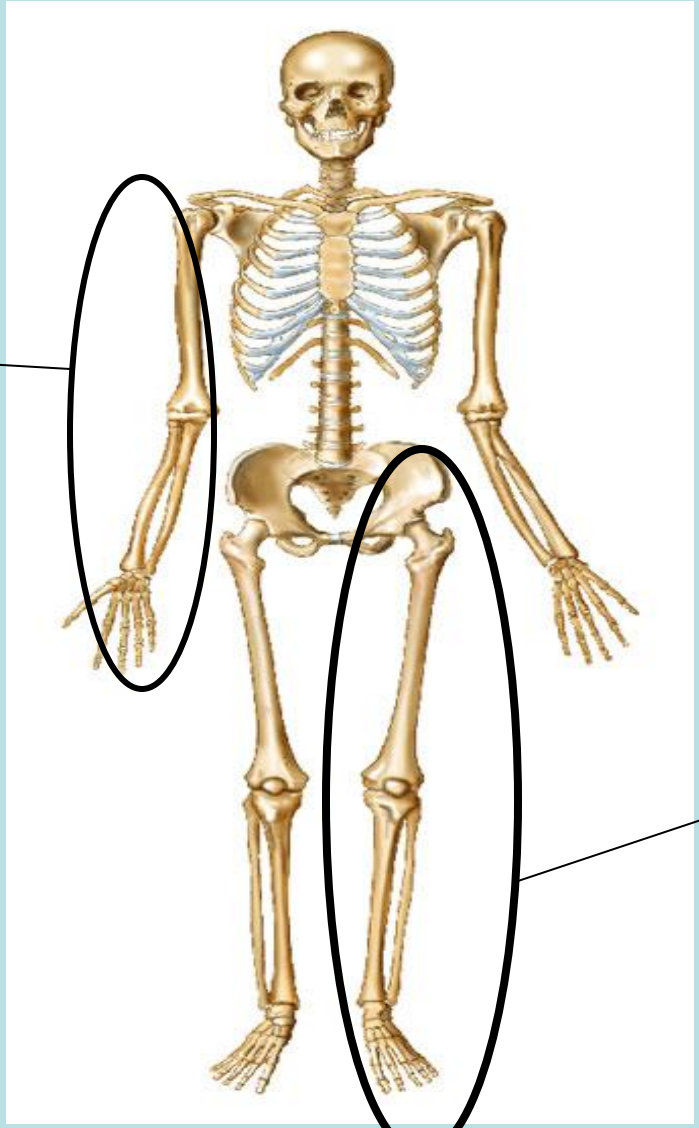
(b)

Review

- http://www.wisc-online.com/Objects/ViewObject.aspx?ID=AP15605 (planes and sections and body cavities)

Body Regions

Upper appendages



Lower appendages

Body Regions

superior

C=

T=

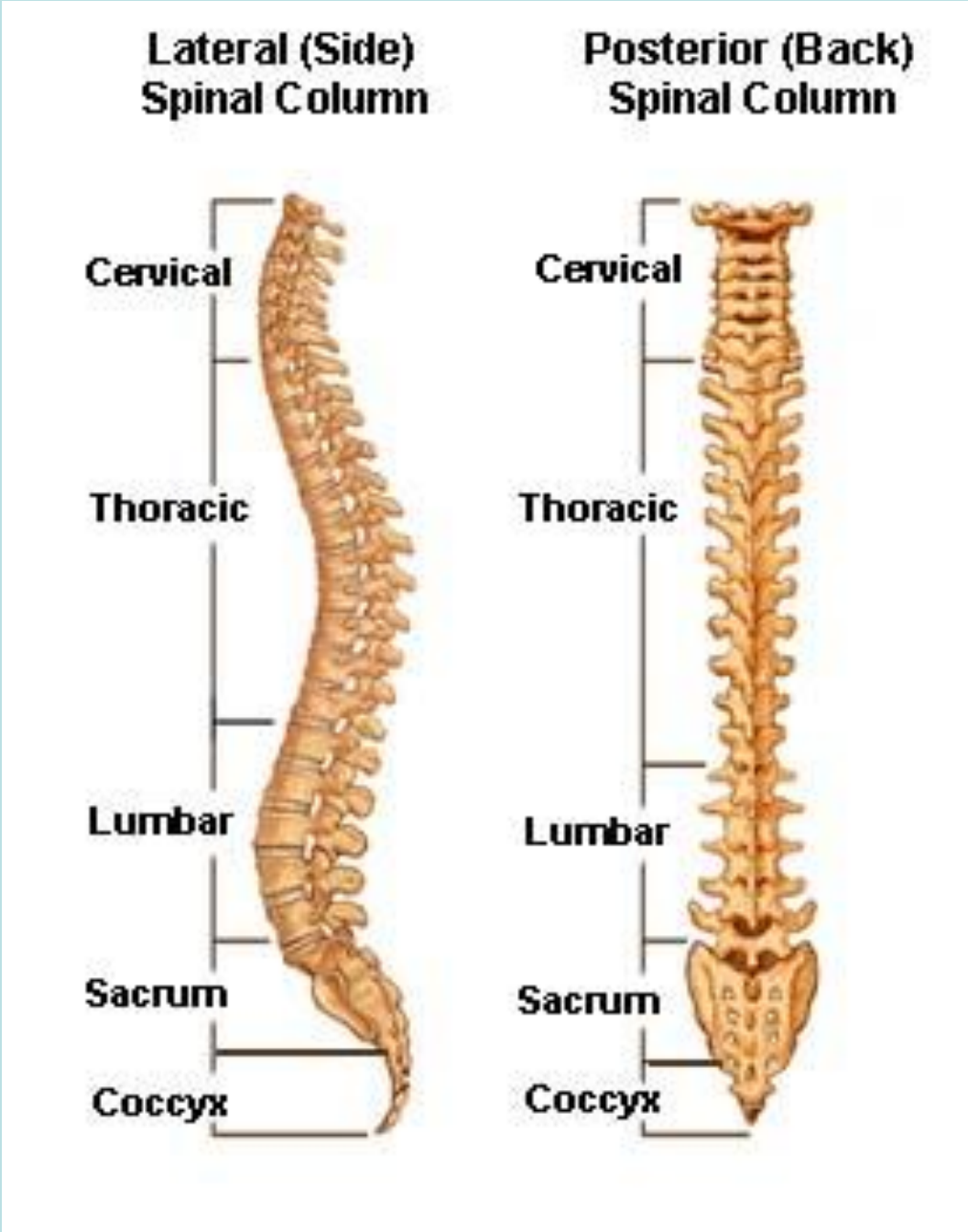
L=

S=

C=

inferior

Vertebral column
p. 168



Type of Vertebrae p. 168

- Superior

Cervical - neck 7 (breakfast; Cereal)

Thoracic - chest,ribs 12 (lunch; Turkey)

Lumbar – Low back 5 (dinner; Lasagna)

Sacral – between hips,"sacred"

Coccygeal/coccyx – tailbone

} 9 Snack of Chocolate

- Inferior