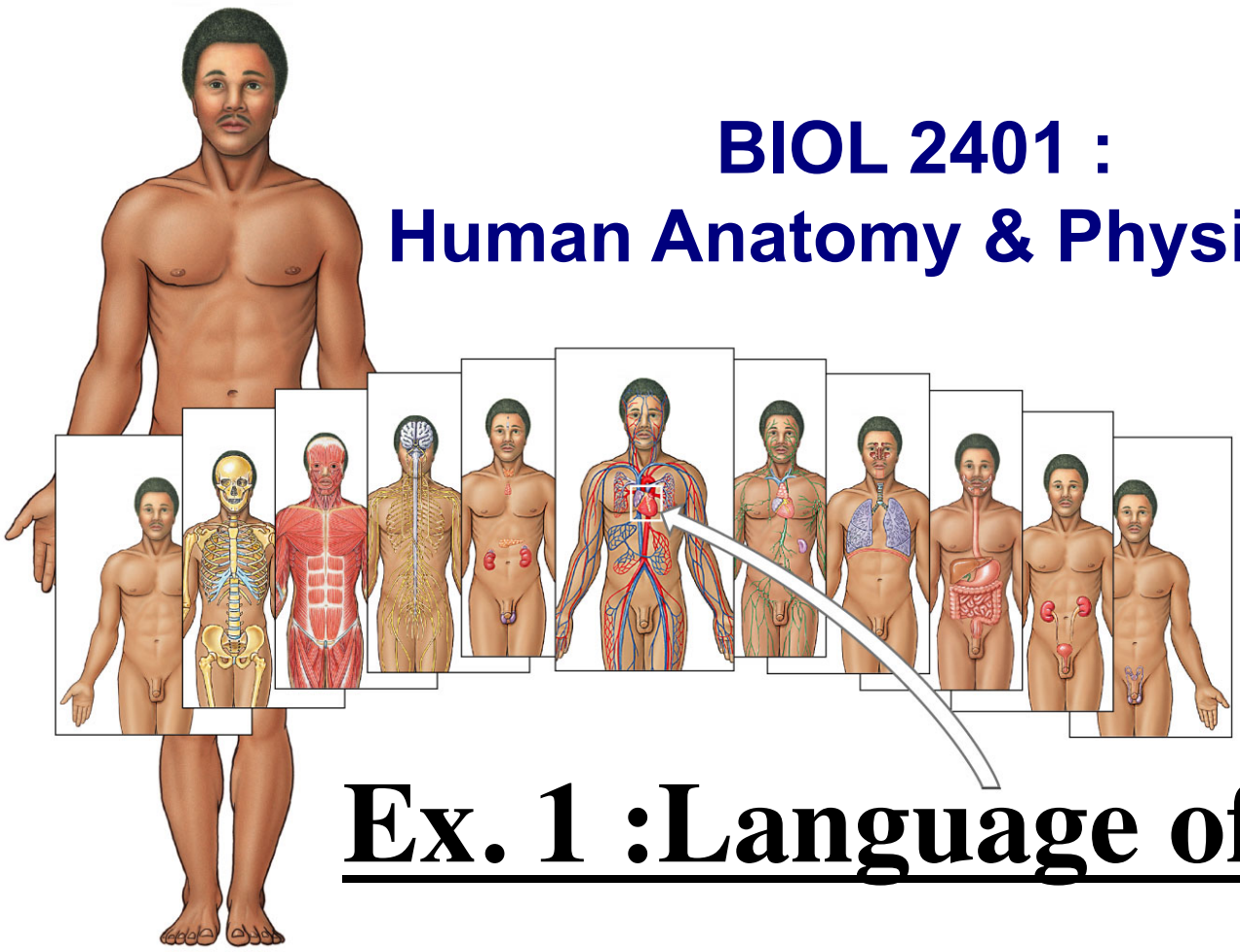
Collin College

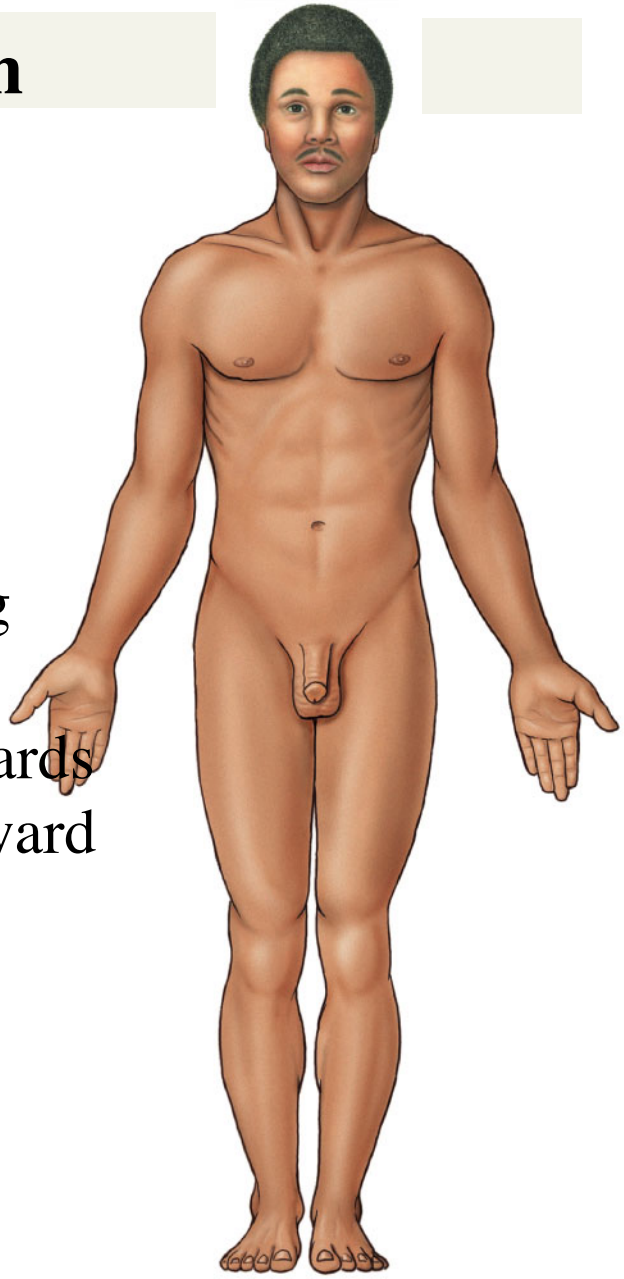
BIOL 2401 :
Human Anatomy & Physiology



Ex. 1 :Language of Anatomy

The Anatomical Position

- Used as a reference point when referring to specific areas of the human body
  - Body erect
  - Head and toes pointing forward
  - Arms hanging downwards with palms facing forward



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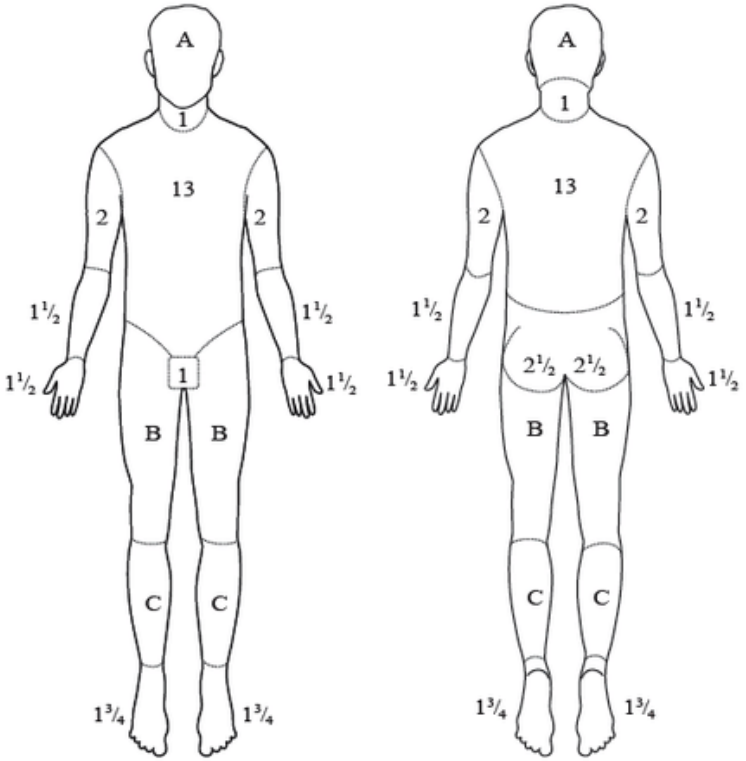
The Anatomical Position

Therapeutic Guidelines

Lund and Browder chart for calculating the percentage of total body surface area burnt



Region	Partial thickness (%) [NB1]	Full thickness (%)
head		
neck		
anterior trunk		
posterior trunk		
right arm		
left arm		
buttocks		
genitalia		
right leg		
left leg		
Total burn		
NB1: Do not include erythema		

Area	Age 0	1	5	10	15	Adult
A = half of head	9½	8½	6½	5½	4½	3½
B = half of one thigh	2¾	3¼	4	4½	4½	4¾
C = half of one lower leg	2½	2½	2¾	3	3¼	3½

Example of Anatomical Position used in burn chart

Surface Anatomy

- Refers to visible surface landmarks that can be used for study of the human body and for reference and unambigiuous location.

- They are divided into
  - Axial areas : relating to head, neck, trunk (axis of the body)
  - Appendicular areas : relating to limbs and their attachments

- The body landmarks can further be studied by separating them into anterior and posterior landmarks

- It is important you get a handle on these terms early on. Terminology is important in Anatomy.

Surface Anatomy

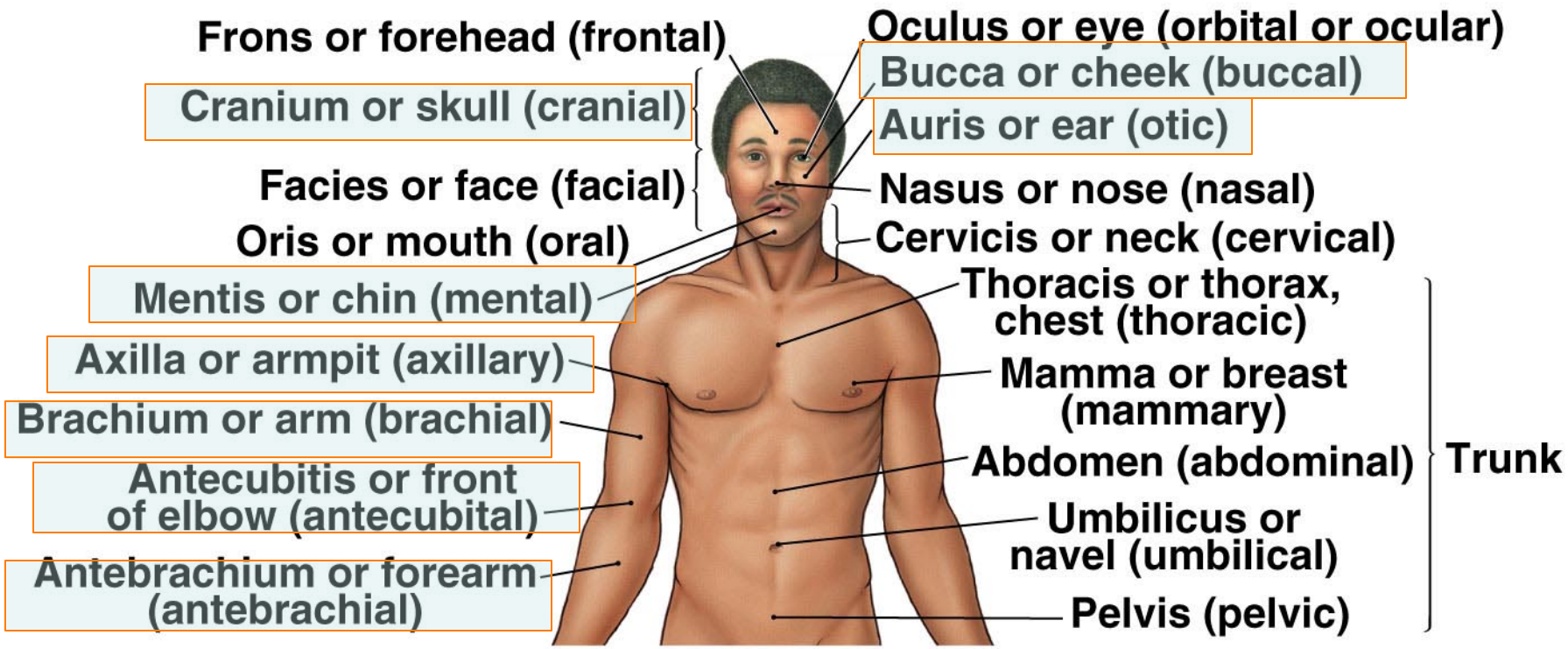
Table 1.1 Regions of the Human Body (Figure 1.1)

Region	Description	Region	Description
Abdominal	Located below the ribs and above the hips	Nasal	Nose
Acromial	Point of the shoulder	Occipital	Back of the head
Antebrachial	Forearm	Olecranal	Back of the elbow
Antecubital	Anterior surface of the elbow	Oral	Mouth
Axillary	Armpit	Orbital	Bony eye socket
Brachial	Arm (upper portion of the upper limb)	Otic	Ear
Buccal	Cheek	Palmar	Palm of the hand
Calcaneal	Heel of the foot	Patellar	Kneecap
Carpal	Wrist	Pedal	Foot
Cephalic	Head	Pelvic	Pelvis
Cervical	Neck	Perineal	Between the anus and the external genitalia
Coxal	Hip	Plantar	Sole of the foot

Surface Anatomy

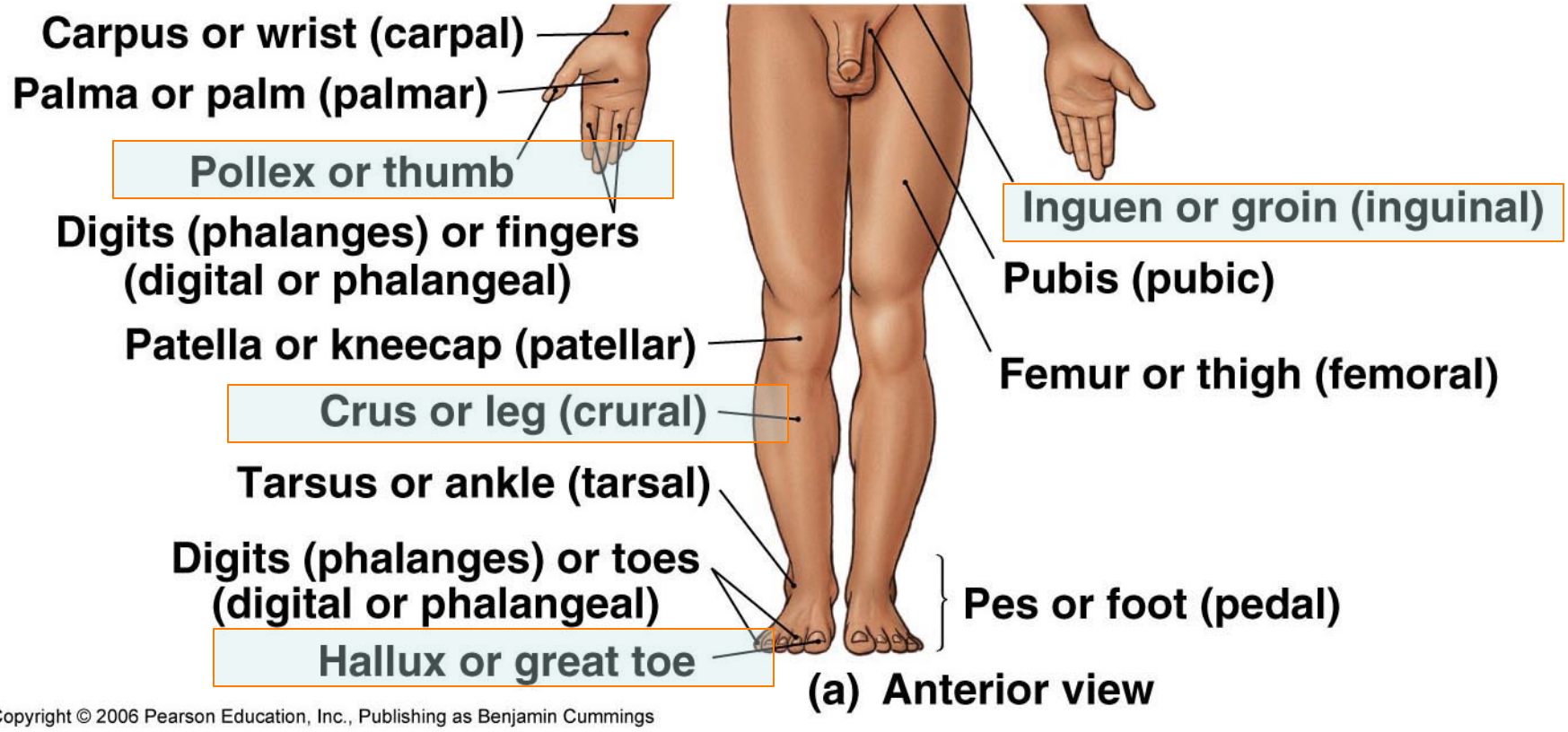
Crural	Leg	Pollex	Thumb
Digital	Fingers or toes	Popliteal	Back of the knee
Femoral	Thigh	Pubic	Genital
Fibular (peroneal)	Side of the leg	Sacral	Posterior region between the hip bones
Frontal	Forehead	Scapular	Shoulder blade
Gluteal	Buttocks	Sternal	Breastbone
Hallux	Great toe	Sural	Calf
Inguinal	Groin	Tarsal	Ankle
Lumbar	Lower back	Thoracic	Chest
Mammary	Breast	Umbilical	Naval
Manus	Hand	Vertebral	Spine
Mental	Chin		

Anterior Surface Anatomy

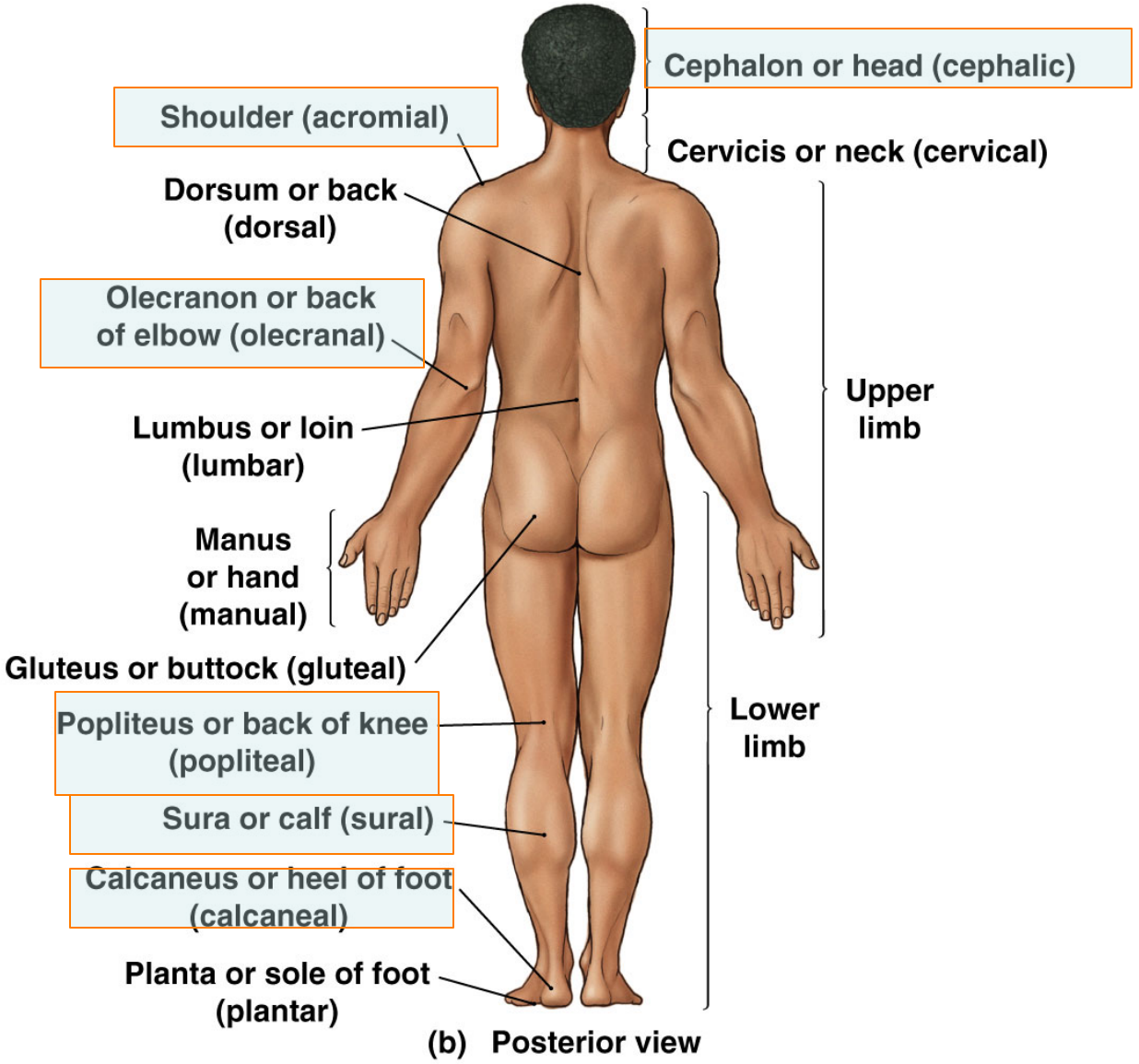


Underscored are terms that may be new to you. Others, like oral, facial, or umbilic and pelvic, are terms used quite often.

Anterior Surface Anatomy



Posterior Surface Anatomy

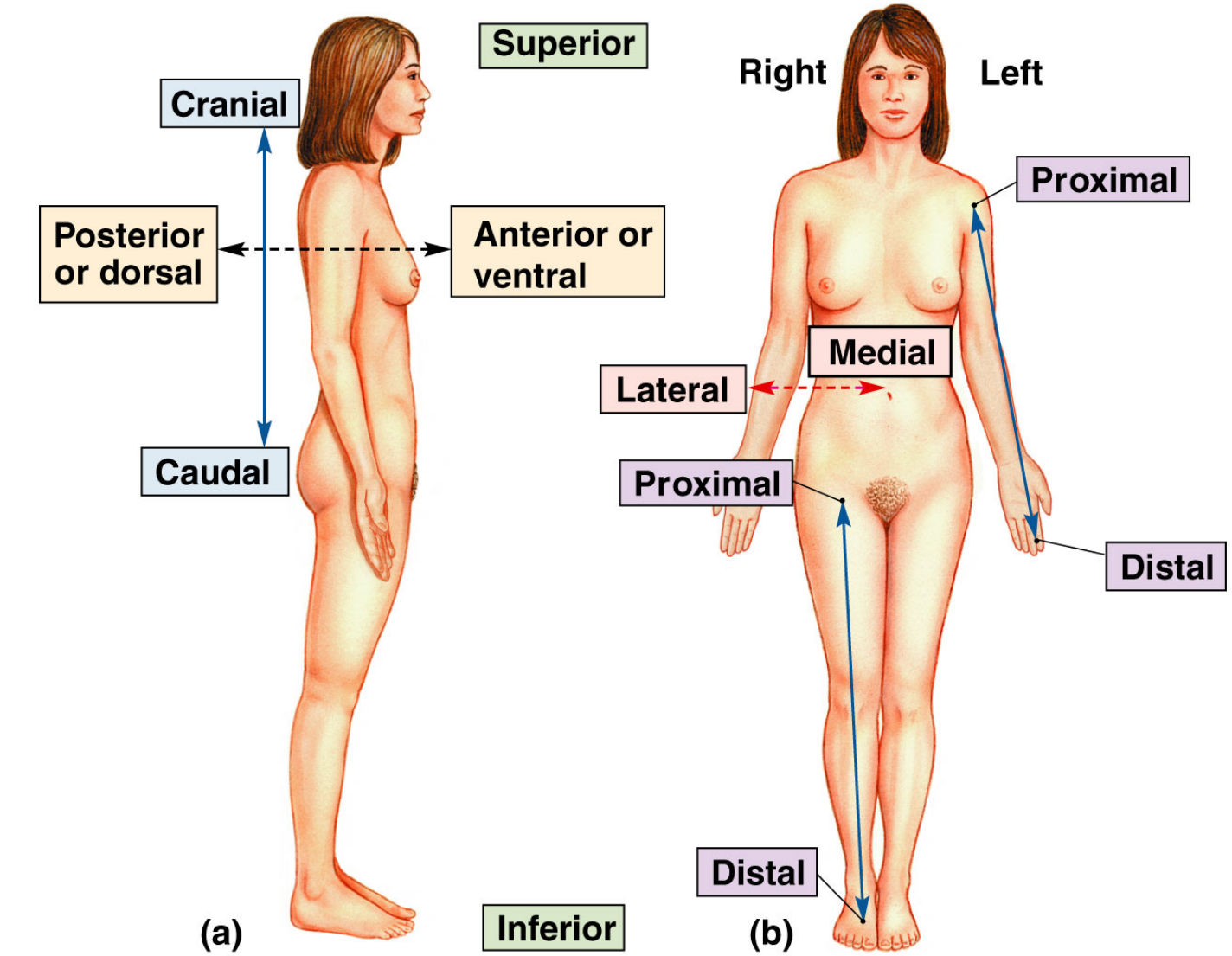


Body Orientation and Direction

- These terms are used to locate body structures in relation to other structures when the body is in the anatomical position.

- They thus usually occur in pairs, the same as the terms “ right” and “left”

Body Orientation and Direction



Body Orientation and Direction

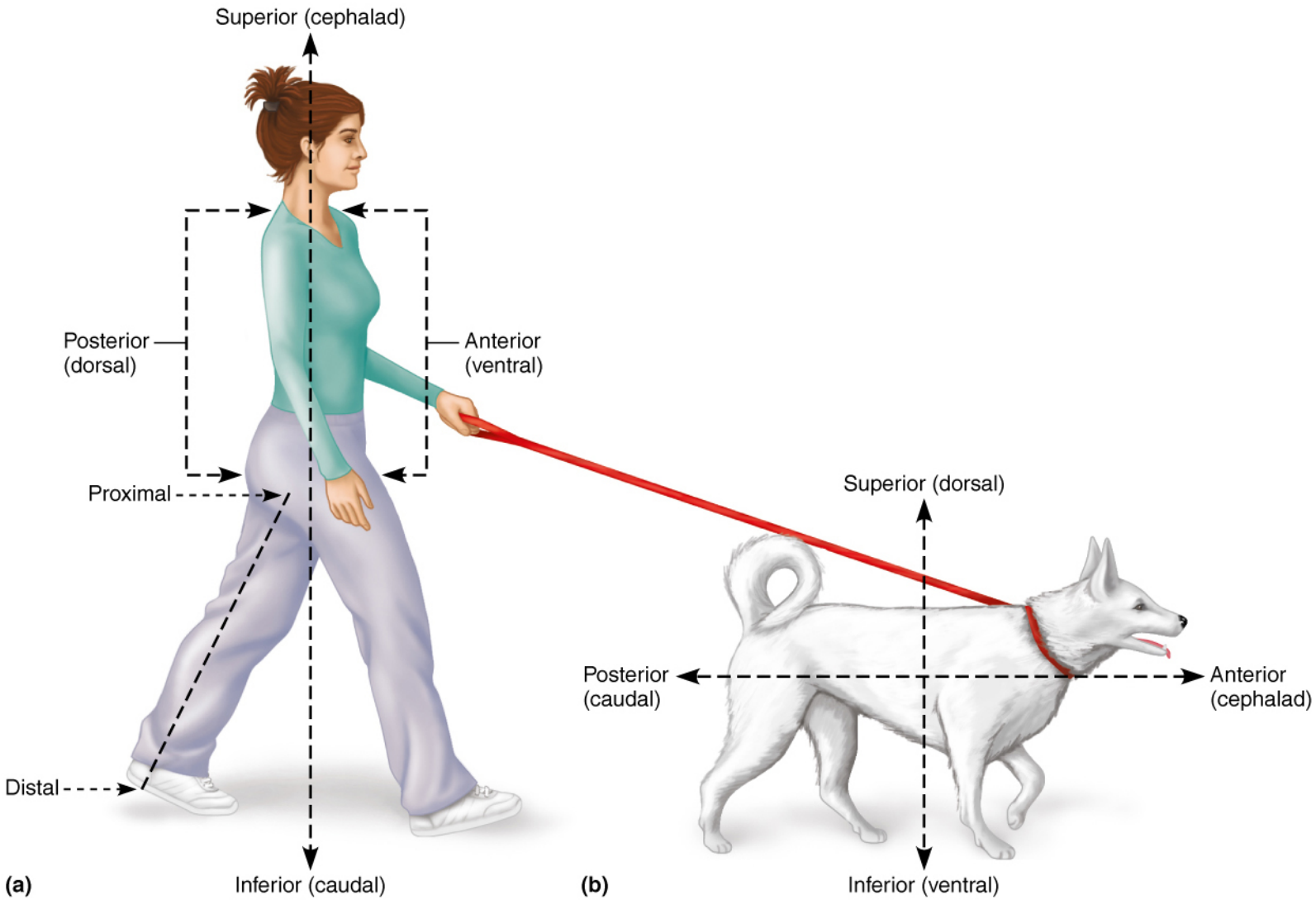
- **Superior vs Inferior : Towards the top versus the bottom**
- **Cranial vs caudal: Towards the head versus the tail**
- **Anterior vs posterior: Towards the front versus towards the back**
- **Ventral versus dorsal: Same meaning**
- **Lateral vs medial: Away from the middle versus to the middle**
- **Proximal vs distal: Closer to the body versus farther from the body (used mostly when dealing with arms and legs – but also can be used in terms of organ structures)**
- **Superficial versus deep: Closer to the surface versus deeper inside the body/organ**

Body Orientation and Direction

Questions:

- **Nose is what with respect to the eyes ?**
- **Patella bone is what with respect to your calcaneal bone ?**
- **In terms of your hand, the pollex is finger I and pinky is finger V. So if you stand in anatomical position , what directional terminology do you use to describe pollex with respect to pinky ?**
- **How many digits are in fingers II to V ? How would you name the digits in each finger using directional terminology ?**
- **What is the difference between medial and median ?**
- **Notice that a lot of terminology ends in –al. This means towards that structure or belonging to that structure. Example: breastbone is called the sternum. The region where it is located is called sternal region. If it is broken we have a sternal fracture.**

Body Orientation and Direction



Body Planes and Sections

- These refer to imaginary surface sections, lines or planes used when making cuts through body walls , organs or tissues

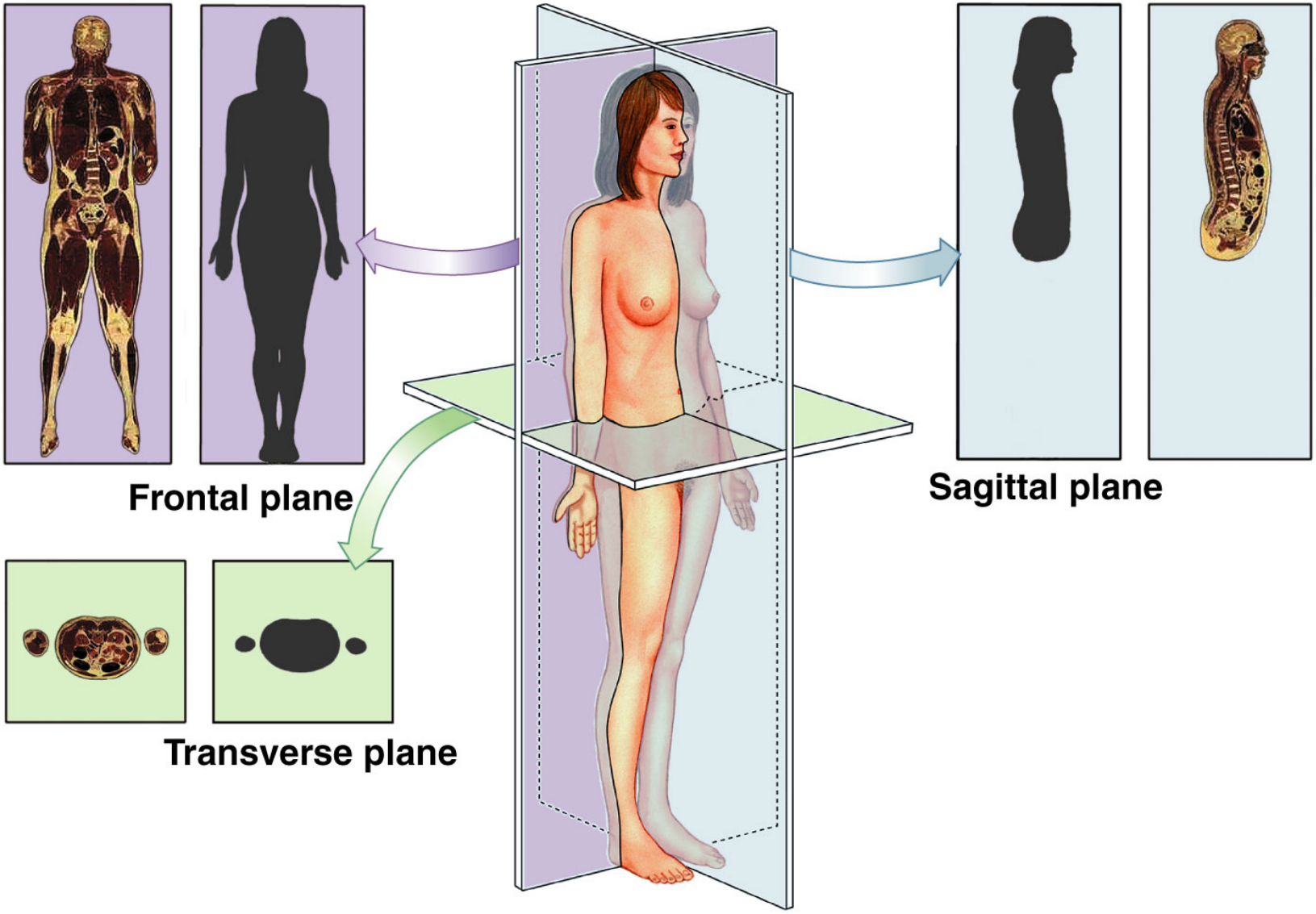
- Since we are 3-dimensional structures, such planes or sections commonly come in 3 forms and lie at right angles to each other

  - **Sagittal plane**: longitudinal section that divides the body into left and right sides
    - Midsagittal plane (median plane) divides the body into eqaul mirror images
    - All other sagittal planes are Parasagittal planes

  - **Frontal Plane** (Coronal plane) : longitudinal plane that divides the body into anterior and posterior parts

  - **Transverse plane** (cross section) runs horizontally and divides body into superior and inferior parts

Body Planes and Sections



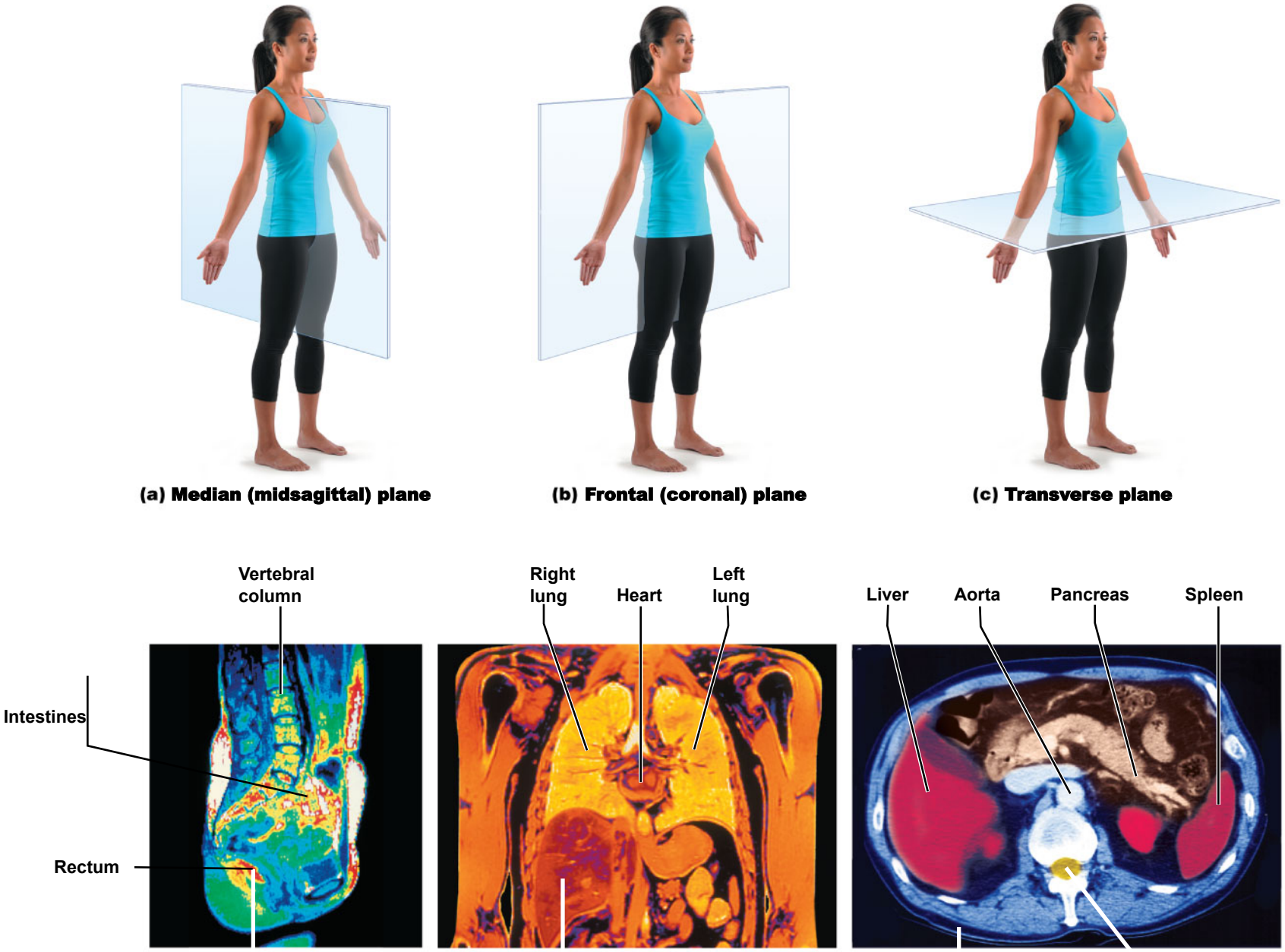
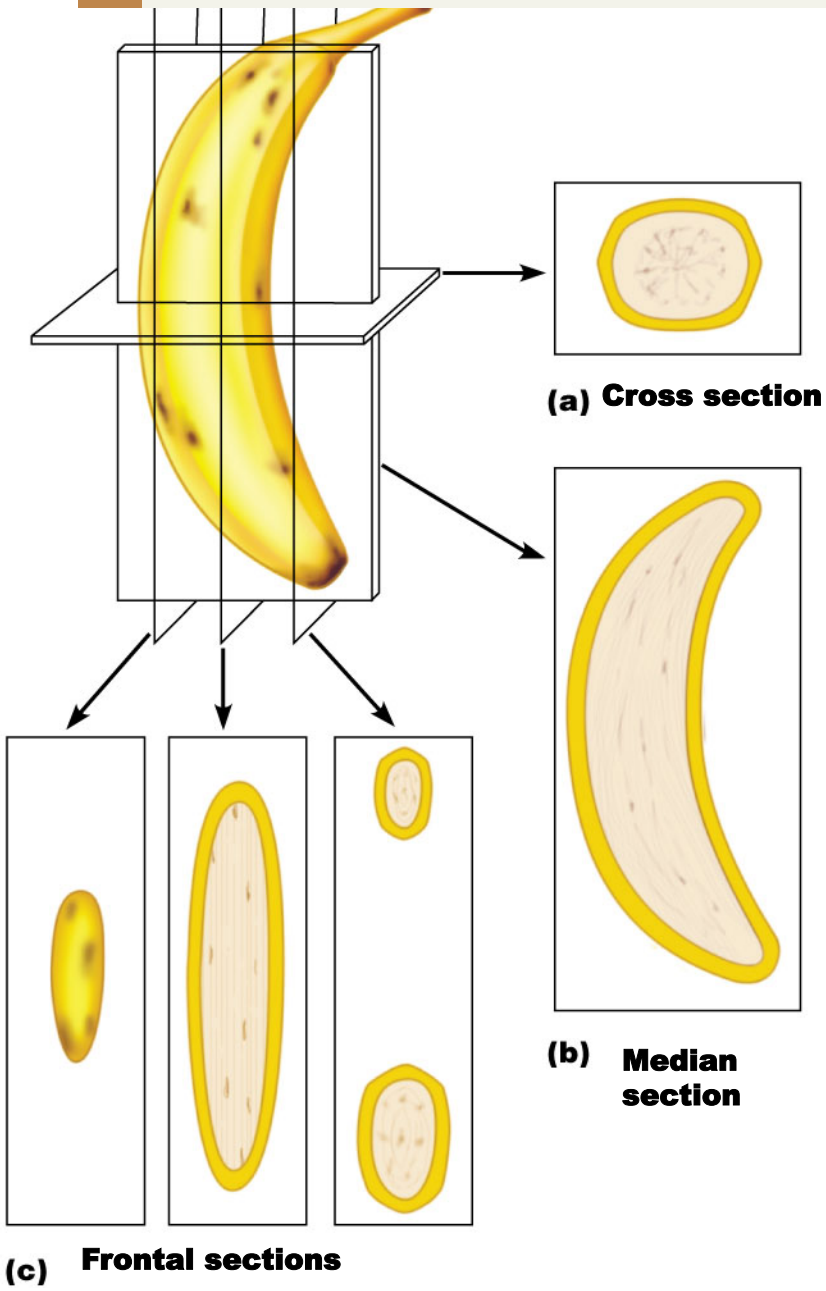


Figure 1.3 Planes of the body with corresponding magnetic resonance imaging (MRI) scans.

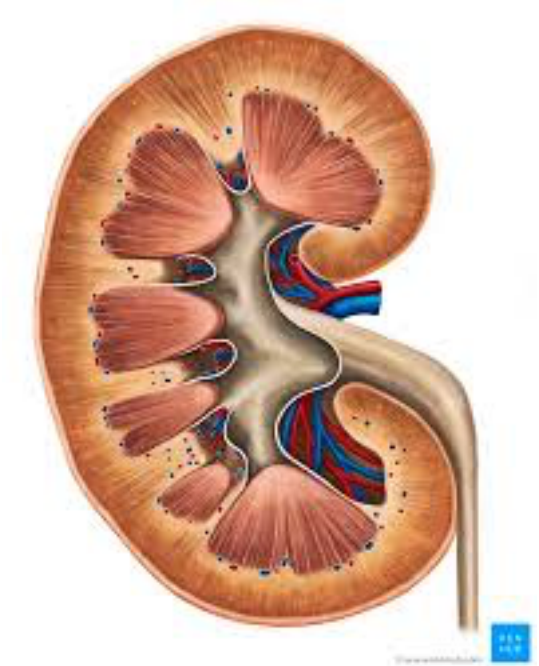
Body Planes and Sections



Objects can look odd when viewed in section.

Keep this in mind when viewing histological slides, X rays, MRI images,…

Body Planes and Sections

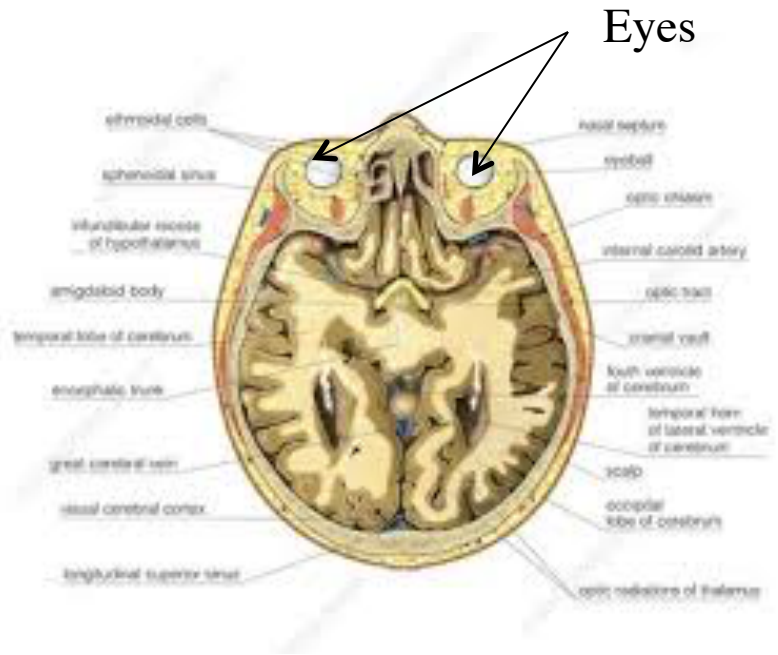


If we take this kidney and imagine it was cut like that when still in the human body we have a coronal section

But if we took the kidney out of the body and then cut it right down the middle like this, it is referred to as a mid-sagittal section

Don't worry about the blurry details on this left image. It is a slice through the head.

What kind of section do we have here ?



Body Planes and Sections

- Sections of any kind provide different information about a non-spherical body or organ
- Such different information from several to hundreds of sections are used to “reconstruct” the micro-anatomy of organs and tissues.
- Modern scanning instruments such as MRI and CAT are used similarly to non-invasively reconstruct internal organs and structures.

Lung abscess. Magnetic Resonance Image (MRI) of the chest of a 42 year old patient showing a large abscess (top left) in the right lung (at left). An abscess is an accumulation of pus within a cavity in tissue. It is usually as a result of an infection or other foreign material.

Body Cavities

Axial body portion has two main body cavities that provide protection to the organs located within

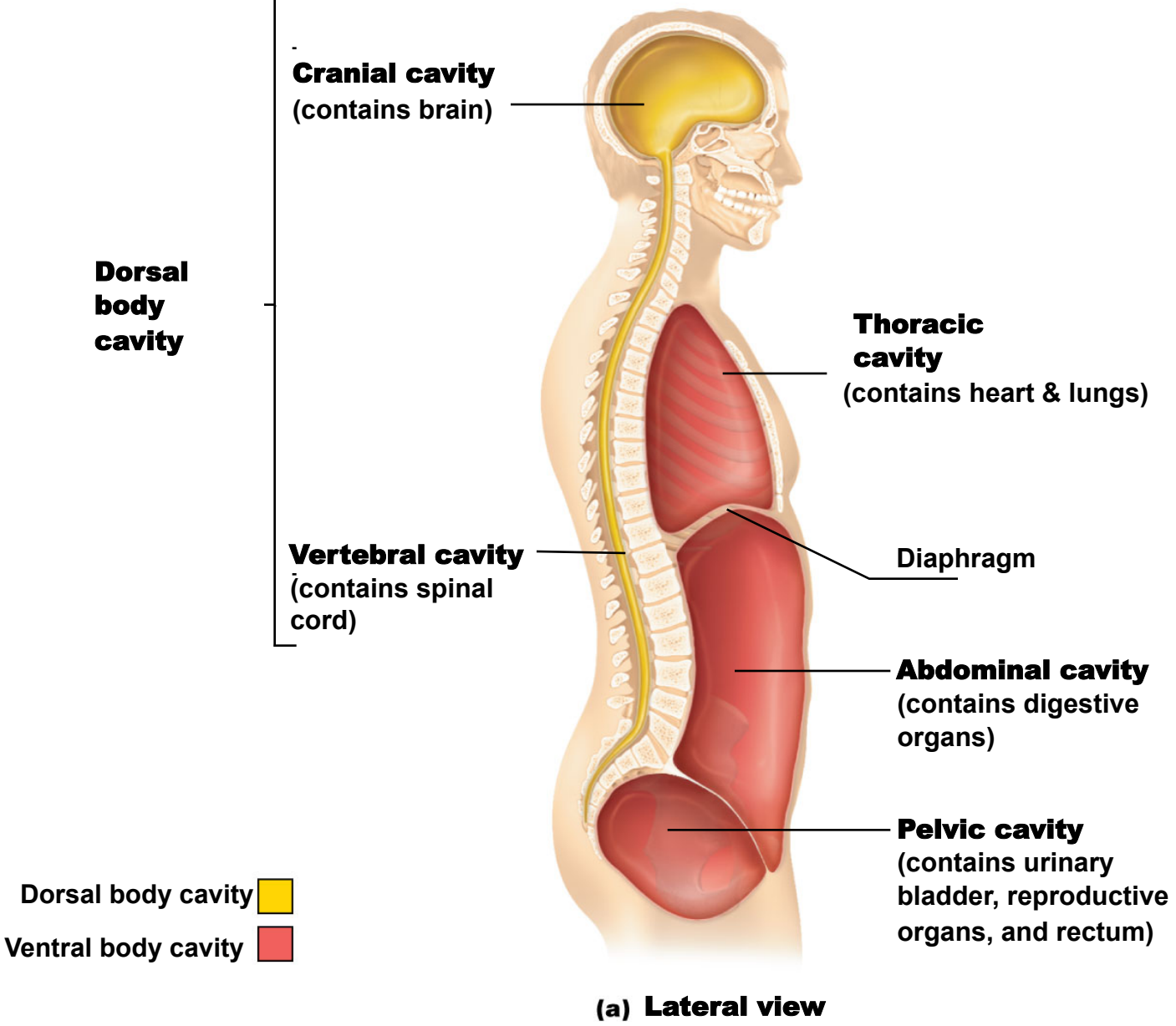
Dorsal Body cavity

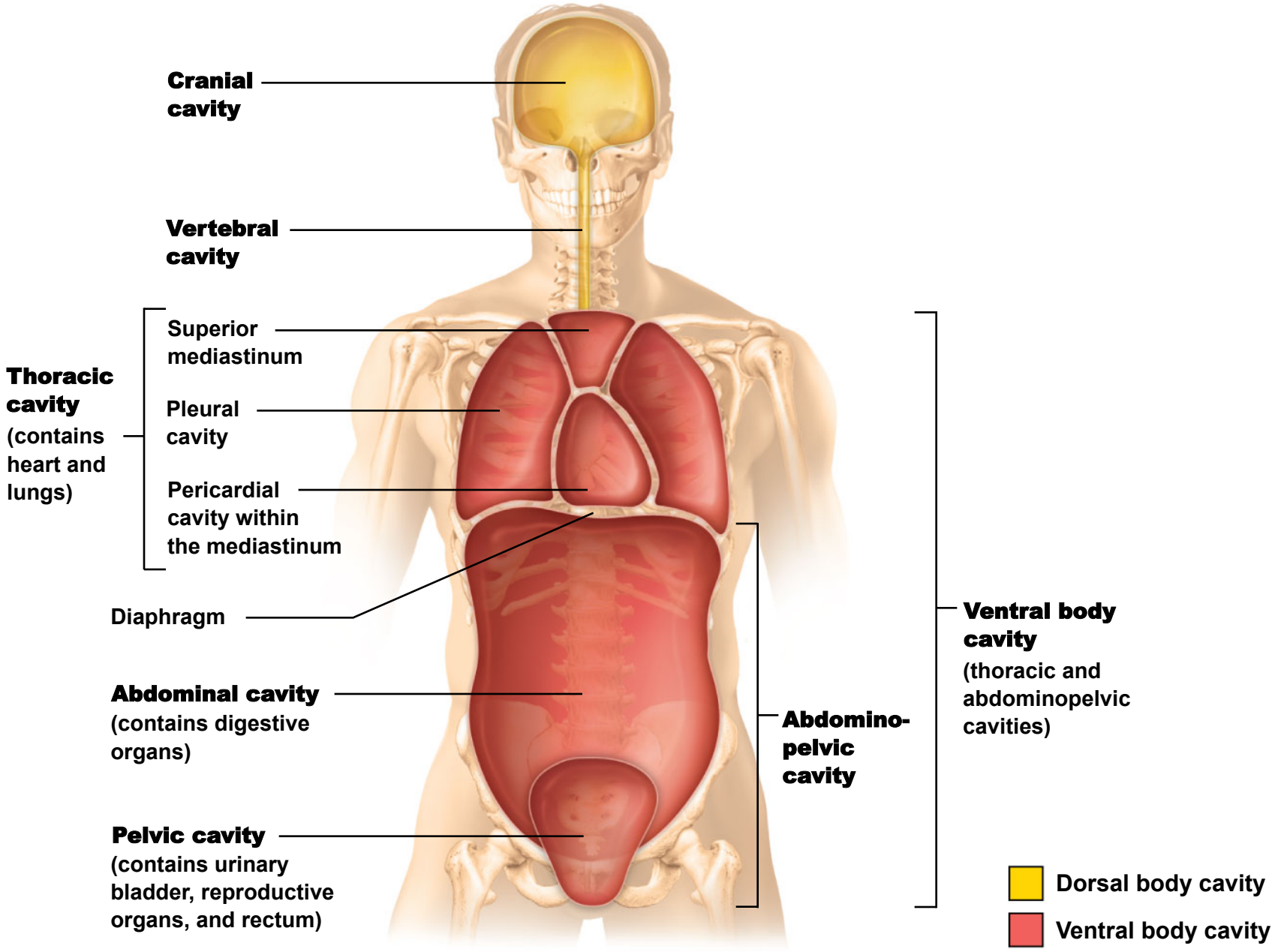
- Cranial cavity
- Spinal cavity

Ventral Body cavity

- Thoracic cavity (above diaphragm)
- Abdominopelvic cavity (below diaphragm)
  - Abdominal cavity
  - Pelvic cavity

Body Cavities





(b) Anterior view

Body Cavities and Membranes

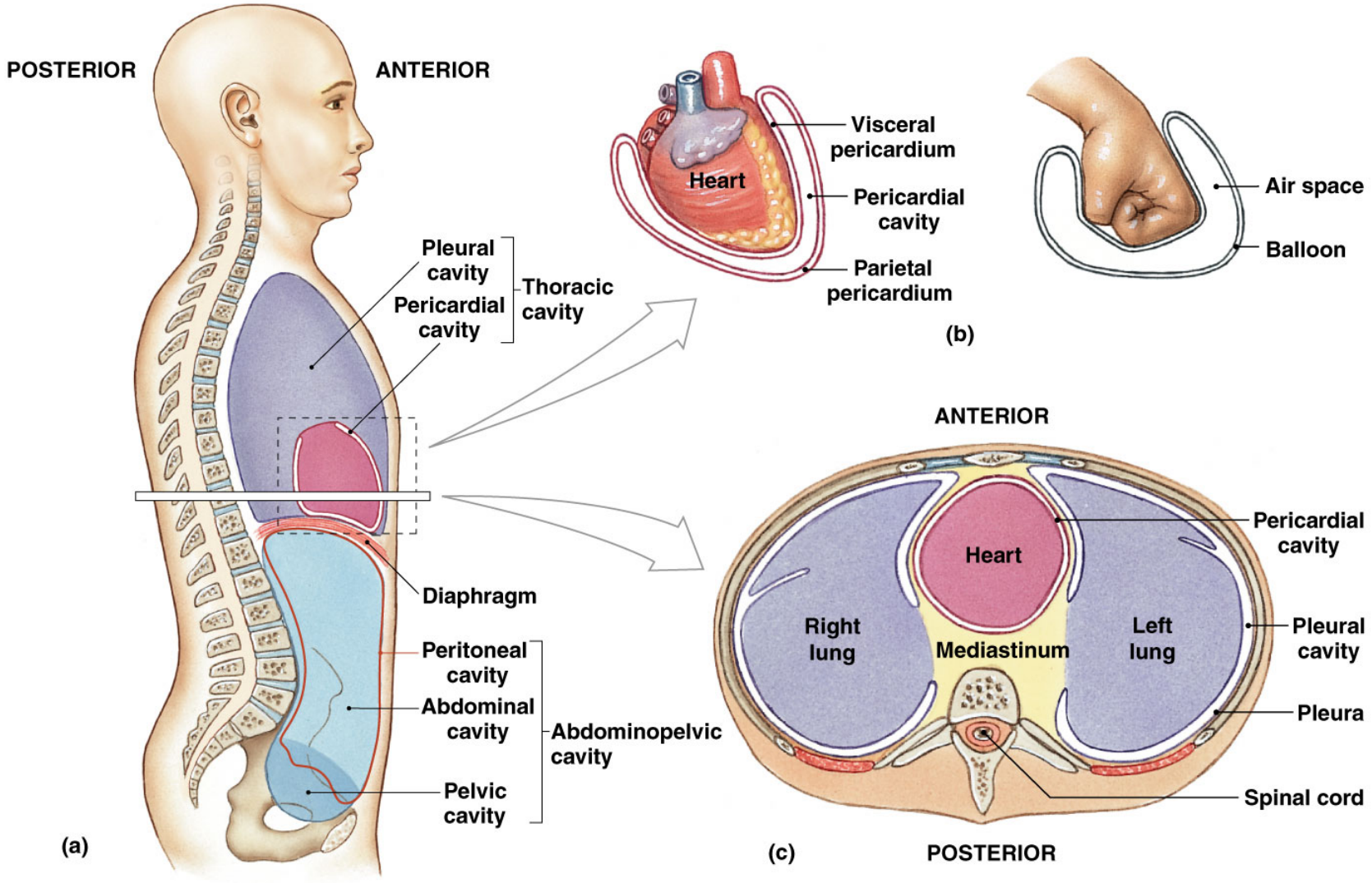
Walls of the ventral body cavity and the organs in it are covered with a very thin double layered membrane called the **serosa**.

- The layer against the body wall is called the parietal serosa layer
- The layer against the organs is called the visceral serosa layer

Name of the serosa membrane depends on the organs involved

- Serosa around the heart is called the **pericardium**
- Serosa around the lungs is called the **pleura**
- Serosa lining the abdominal cavity is the **peritoneum**

Body Cavities and Membranes



Body Cavities and Membranes

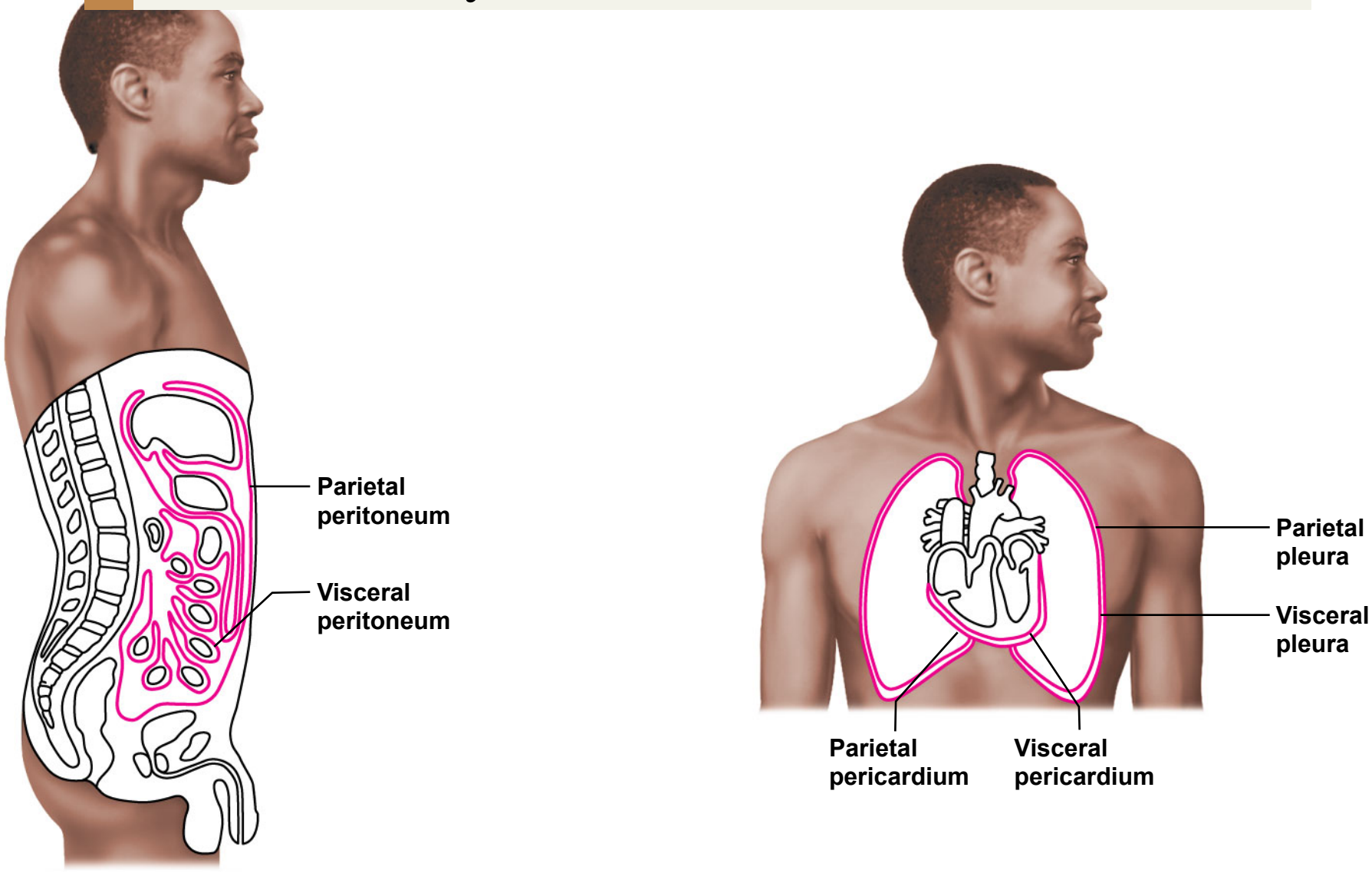


Figure 1.6 Serous membranes of the ventral body cavities.

Quadrants and Regions

Because the abdominoplevic area is quite ‘large’and contains many organs, it is useful to subdivide it into smaller areas

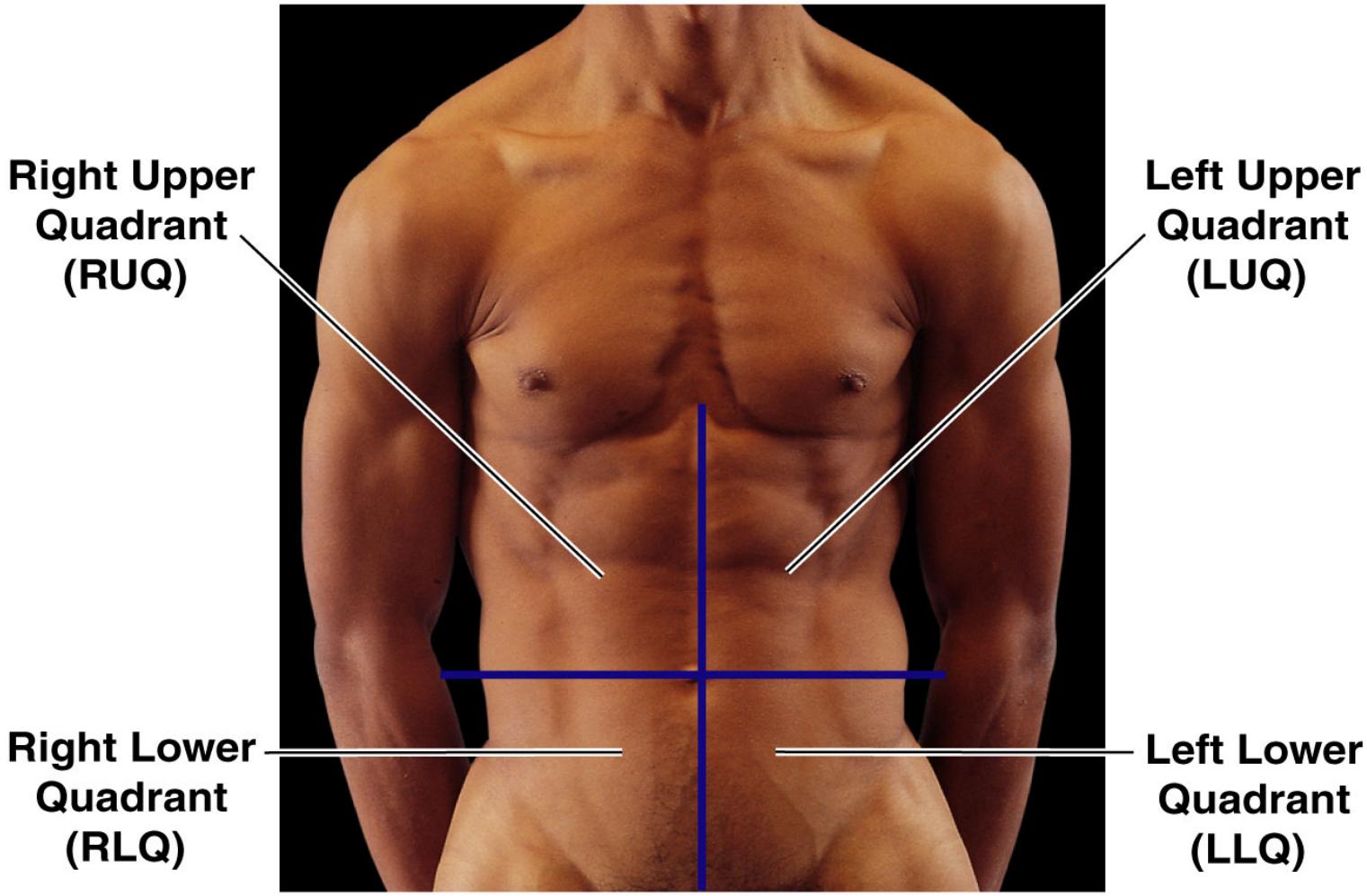
Quadrants

- divides the area into 4 equal areas (right and left upper quadrants, and right and left lower quadrants)

Regions

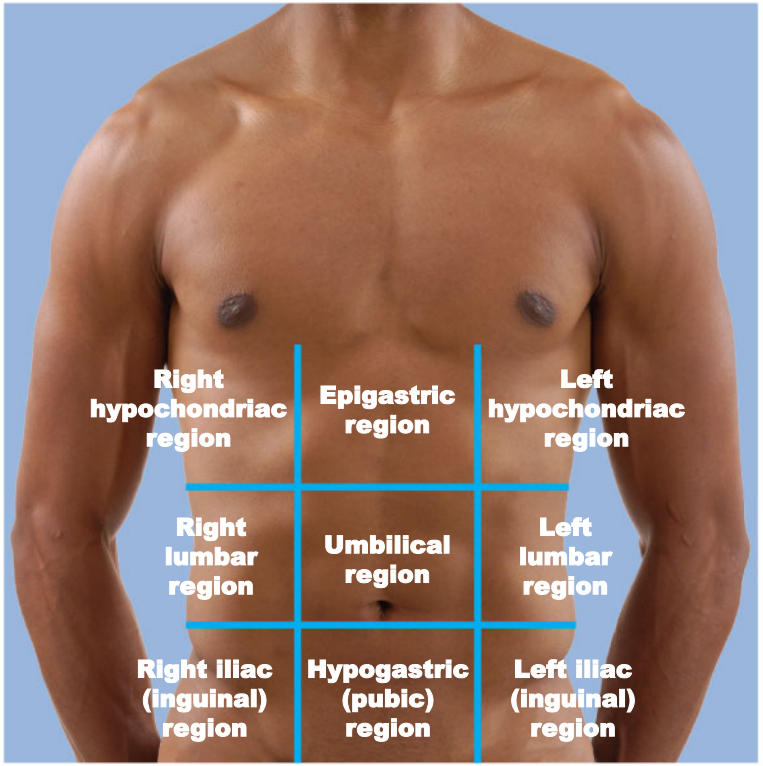
- Divides the area into 9 regions by using four imaginary planes

Quadrants and Regions

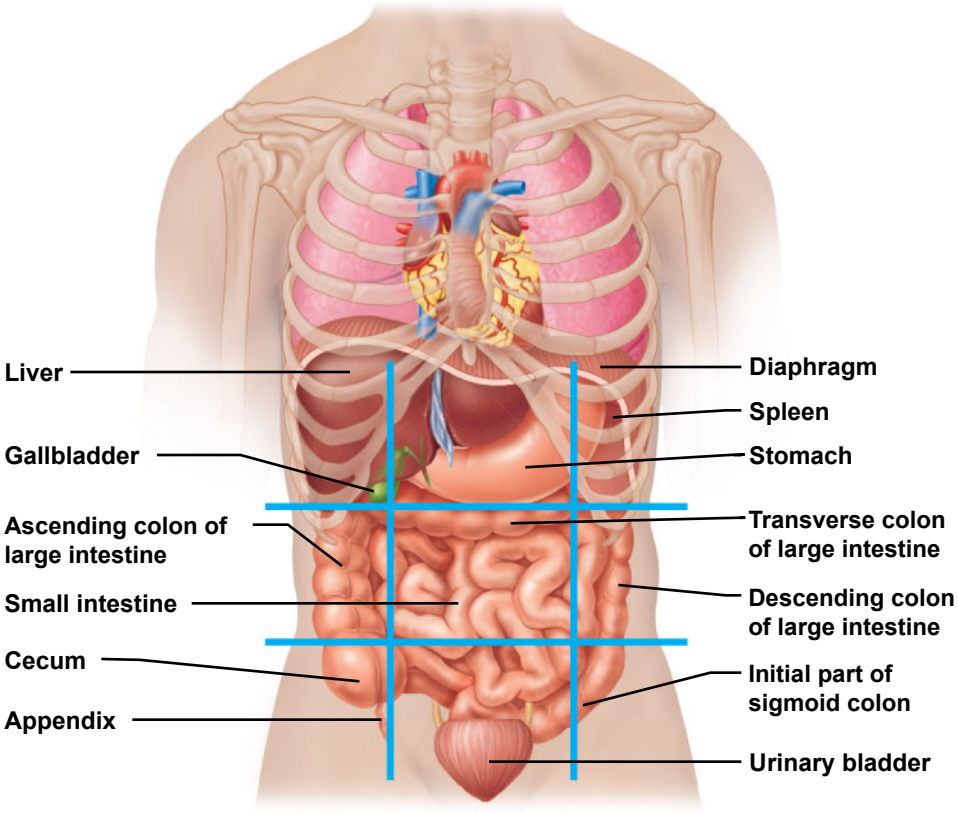


(a) Abdominopelvic quadrants

Quadrants and Regions



(a)



(b)

Body Cavities

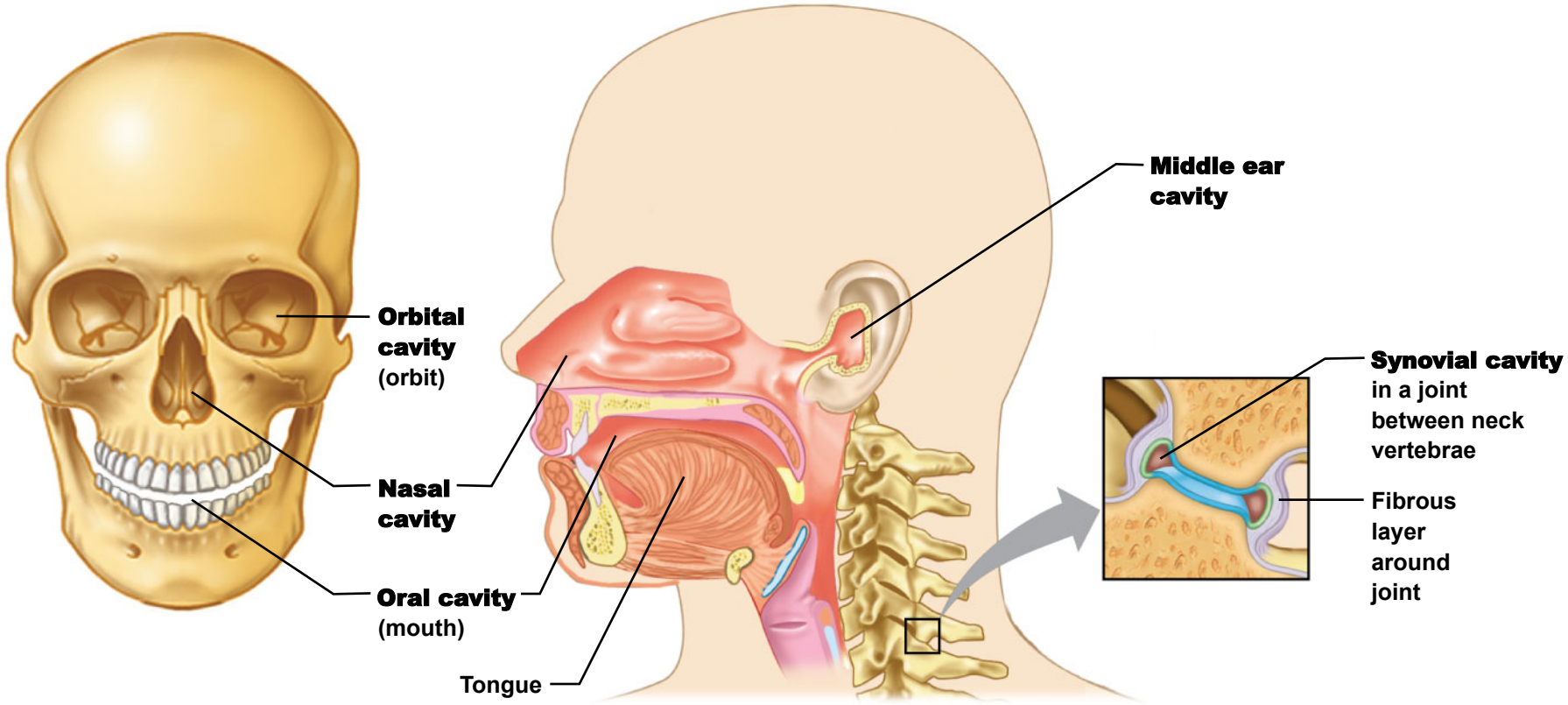
Besides the large, closed body cavities, there are several smaller body cavities. Some open to the body exterior.

Oral cavity and Nasal cavities

Orbital cavities

Middle ear cavities

Synovial (joint) cavities


Orbital cavity (orbit)
Nasal cavity
Oral cavity (mouth)
Tongue
Middle ear cavity
Synovial cavity in a joint between neck vertebrae
Fibrous layer around joint