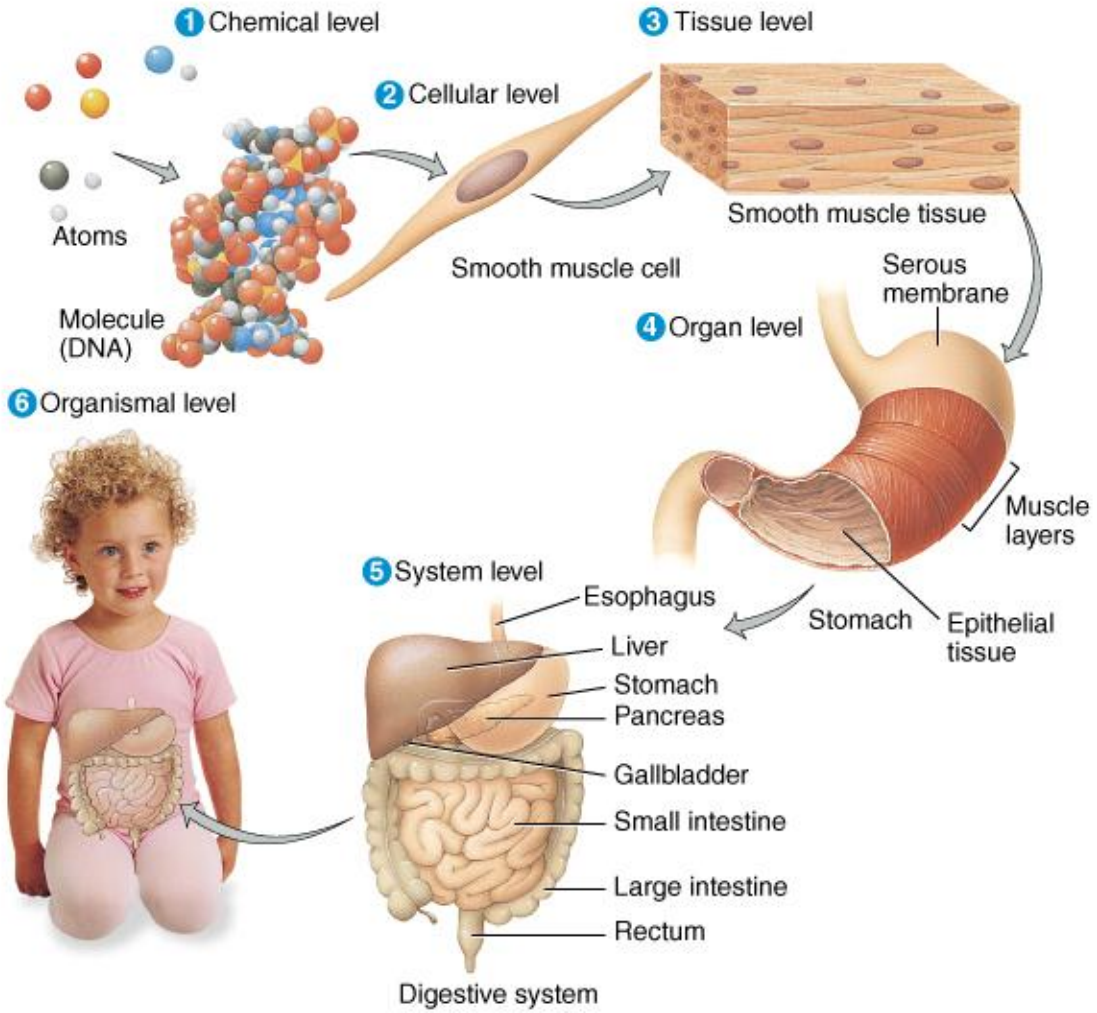
Chapter 1
An Introduction to the Human Body

- Anatomy
  - science of structure
  - relationships revealed by dissection (cutting apart)
- Physiology
  - science of body functions

Levels of Organization



- Chemical
- Cellular
- Tissue
- Organs
- System Level
- Organismic Level

Levels of Structural Organization

- **Chemical Level**
  - atomic and molecular level, ex. DNA
- **Cellular level**
  - smallest living unit of the body
- **Tissue level**
  - group of cells and the materials surrounding them that work together on one task,
  - ex. Muscle tissue contracts

Levels of Structural Organization

- **Organ level**
  - grouping of 2 or more tissue types into a recognizable structure with a specific function.
  - Ex. Heart
- **Organ system**
  - collection of related organs with a common function
  - sometimes an organ is part of more than one system
  - Ex. Circulatory system
- **Organismic level**
  - one living individual.

The Body Systems

List the 11 body systems below

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

Homeostasis

- Maintaining the internal environment within physiological limits
- Example
  - blood glucose level is kept within narrow range 70-110/100ml
    - What happens if out of the normal range?

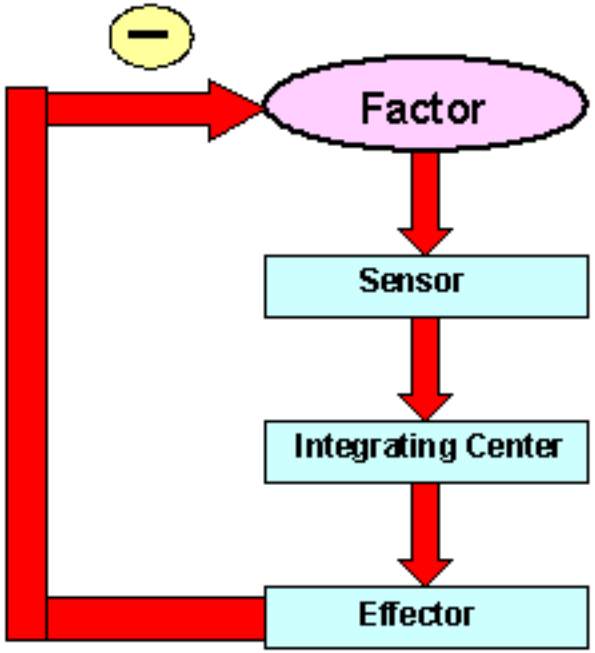
Hyperglycemia- blood sugar level to high
Hypoglycemia- blood sugar level to low
Diabetes – chronic condition where blood sugar is to high

Feedback Systems

A cycle of events required to maintain homeostasis.

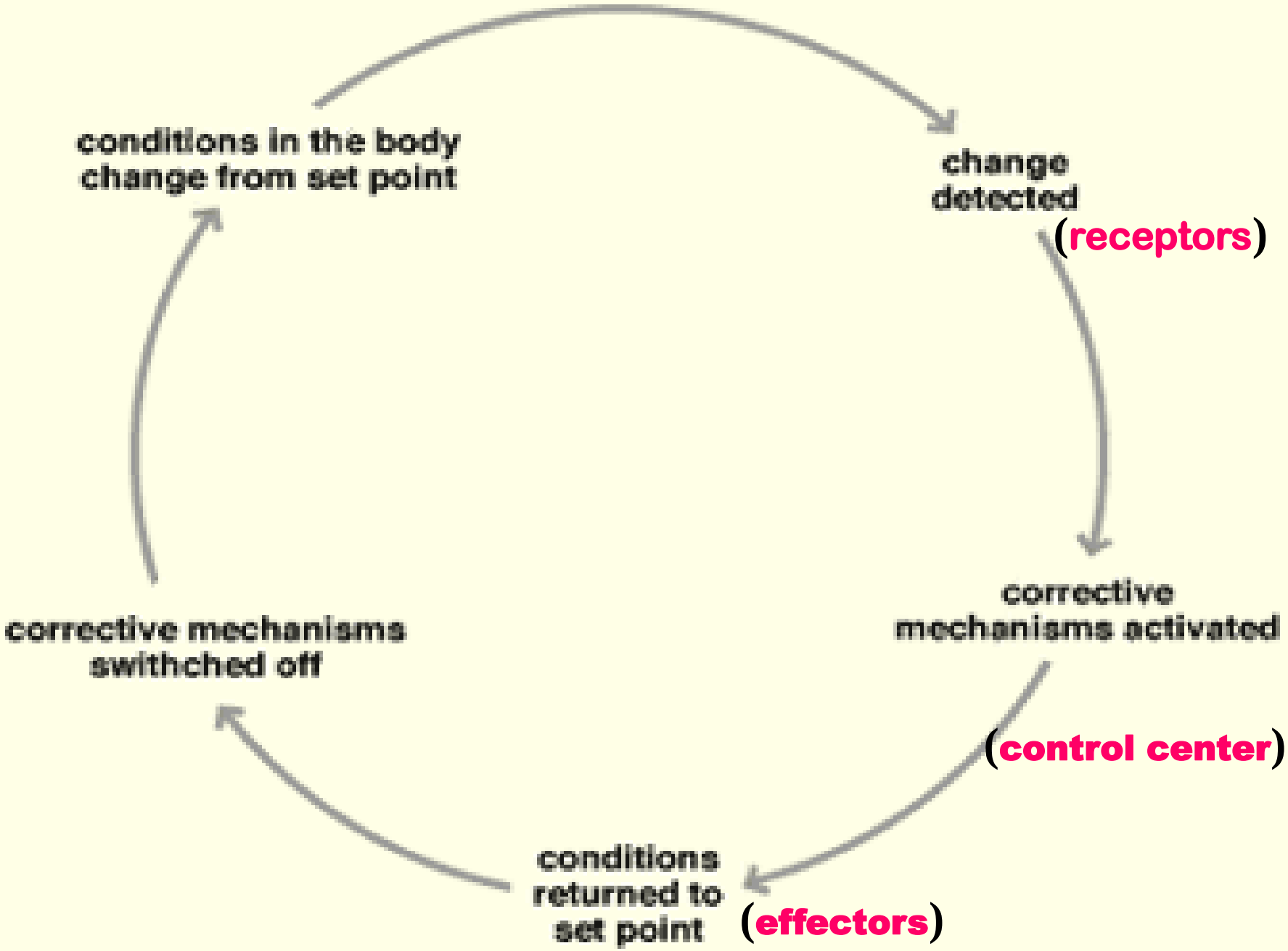
It consists of:

1. a receptor
2. a control center
3. an effector.



Negative Feedback

A mechanism that tries to maintain a constant environment by resisting changes from the normal levels.


conditions in the body change from set point
change detected
(receptors)
corrective mechanisms activated
(control center)
conditions returned to set point
(effectors)
corrective mechanisms switched off

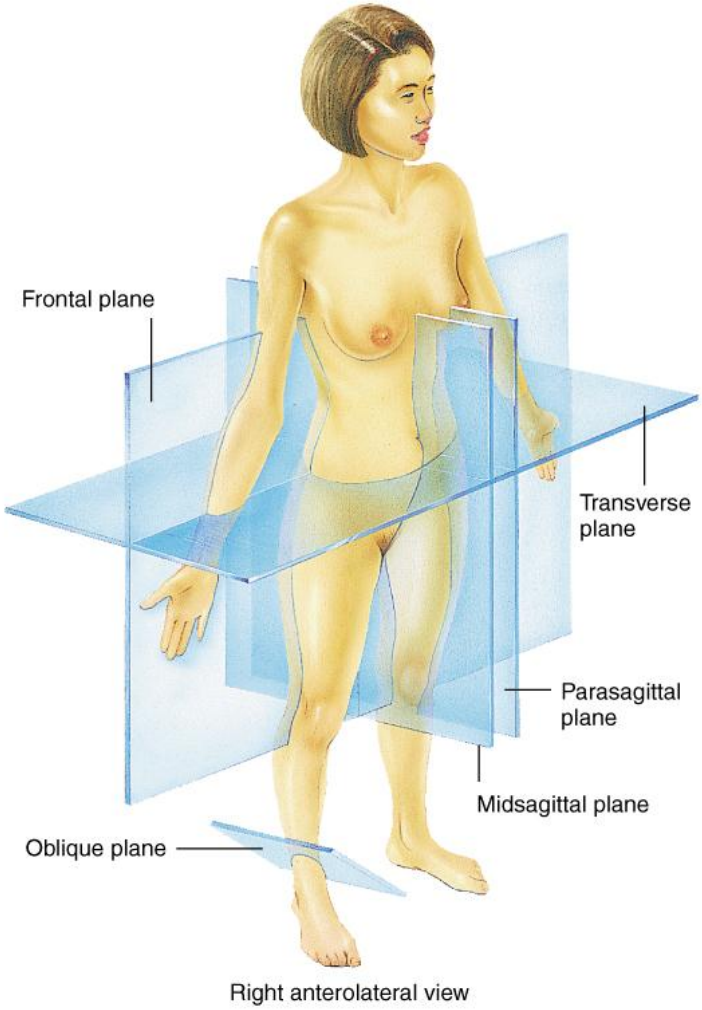
Positive Feedback

When changes in a system occur the body responds by making the change larger. (rare in humans)

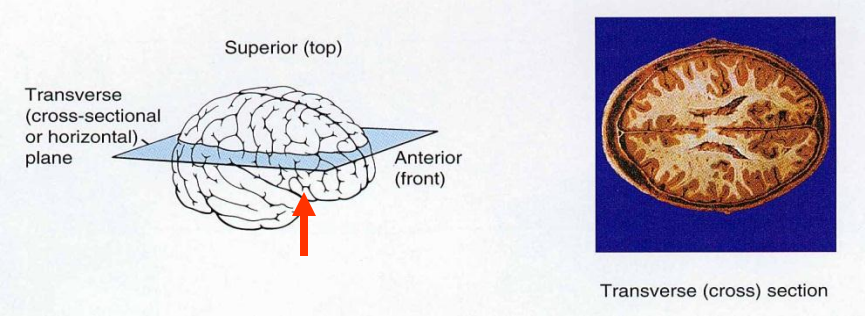
Ex.-Stretching of the uterus, and contractions during child birth.

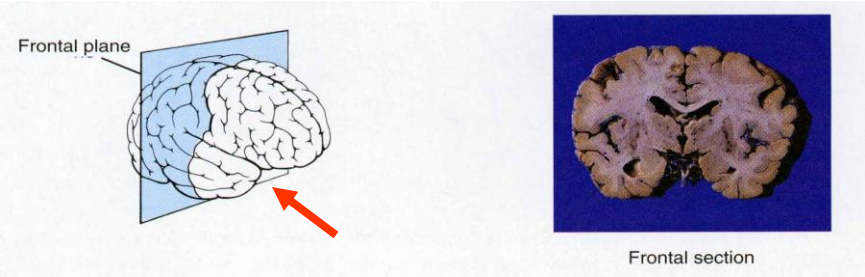
Planes and Sections

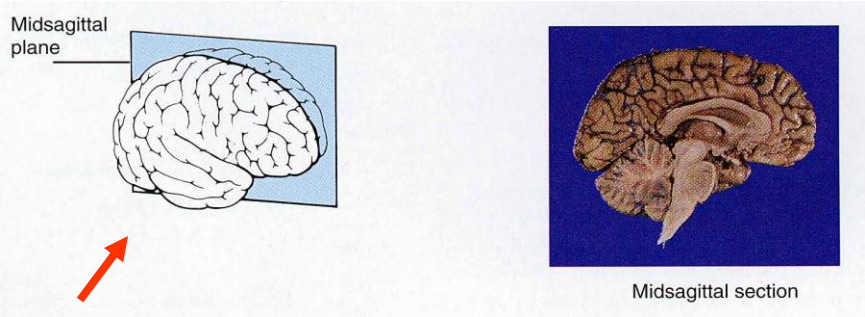
- A **plane** is an imaginary flat surface that passes through the body.
- A **section** is one of the 2 surfaces (pieces) that results when the body is cut by a plane passing through it.



Planes and Sections of the Brain
(3-D anatomical relationships revealed)

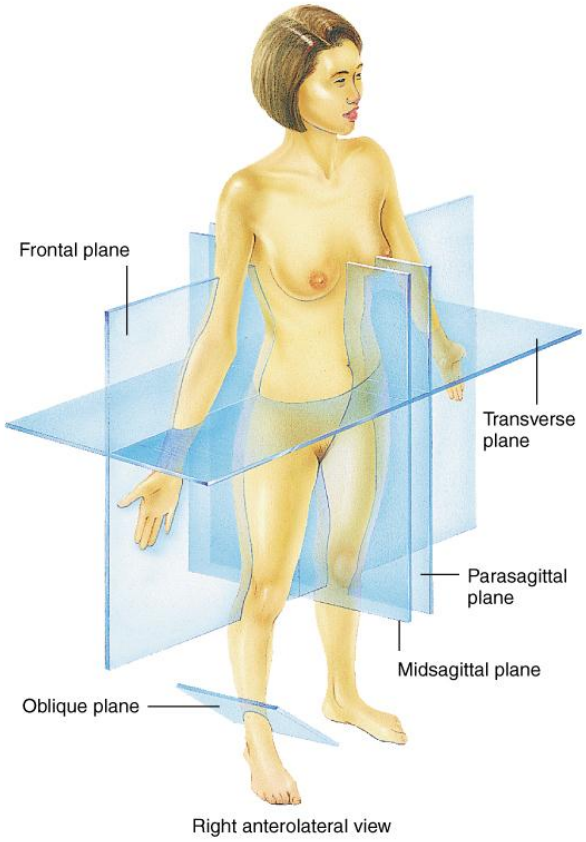






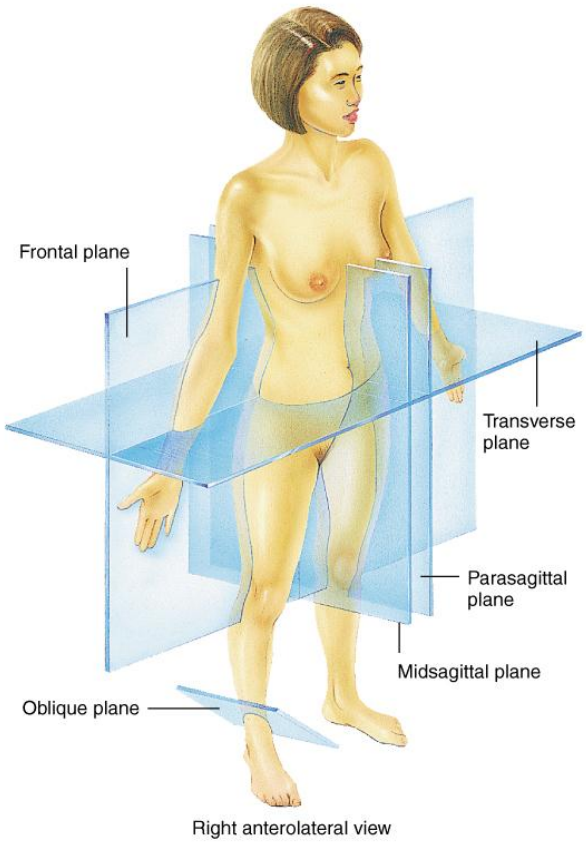
- Horizontal Plane (transverse)
- Frontal Plane (coronal)
- Mid**sagittal** Plane (vertical)

Sagittal Plane



- Sagittal Plane
  - Divides the body or an organ into left and right sides
- Midsagittal Plane
  - Produces equal halves
- Parasagittal Plane
  - Produces unequal halves

Other Planes and Sections



- Frontal or Coronal Plane
  - Divides the body or organ into front (anterior) & back (posterior) portions
- Transverse (cross-section) or horizontal Plane
  - Divides the body or organ into upper (superior) or lower (inferior) portions
- Oblique Plane
  - Some combination of 2 planes

Body Positions

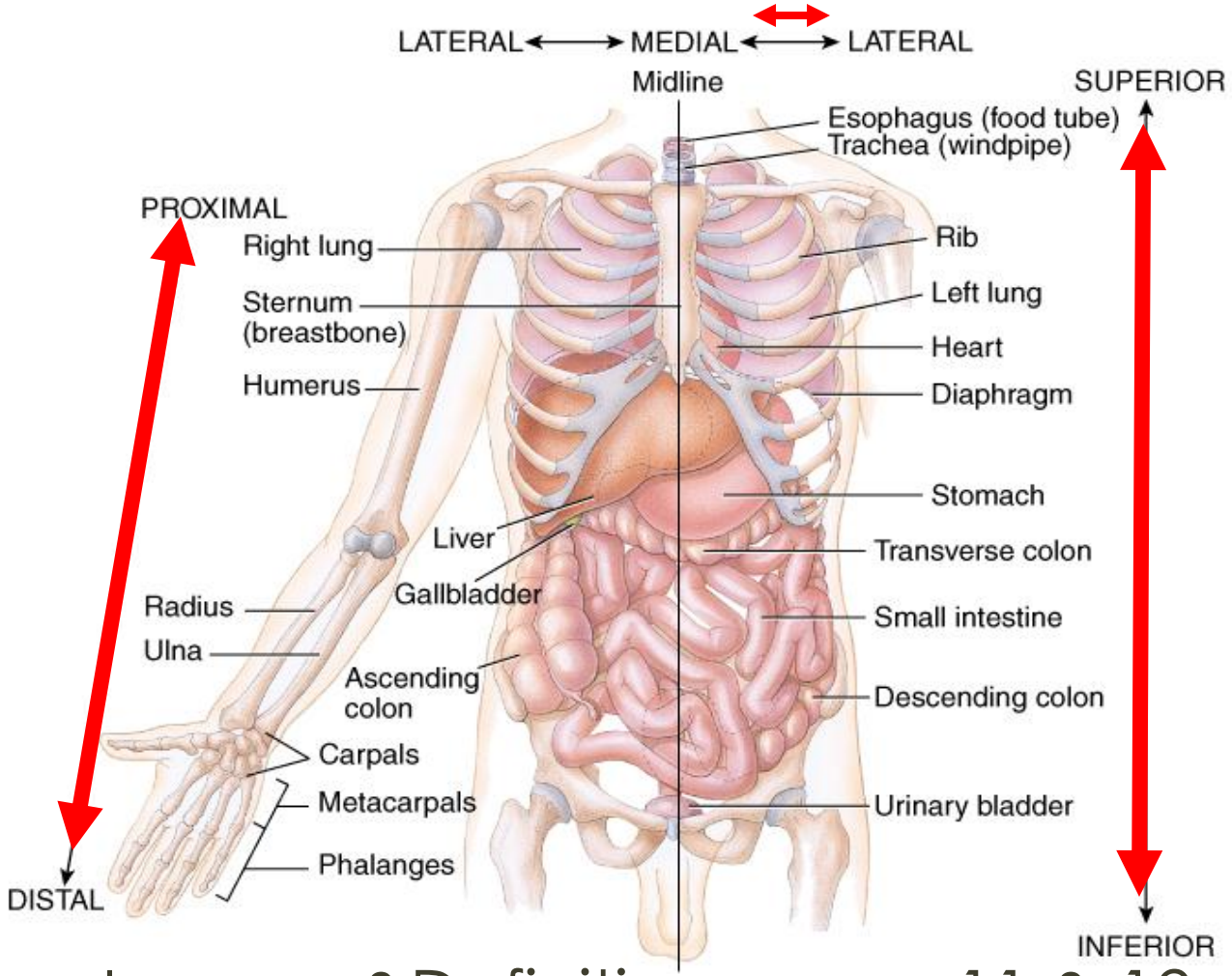
Anatomical Position:

- Standardized position from which to describe the directional terms
  - **Standing upright**
  - **Facing the observer, head level**
  - **Eyes looking forward**
  - **Feet flat on the floor**
  - **Arms at your sides**
  - **Palms turned forward**

Supine

Prone

Major Directional Terms

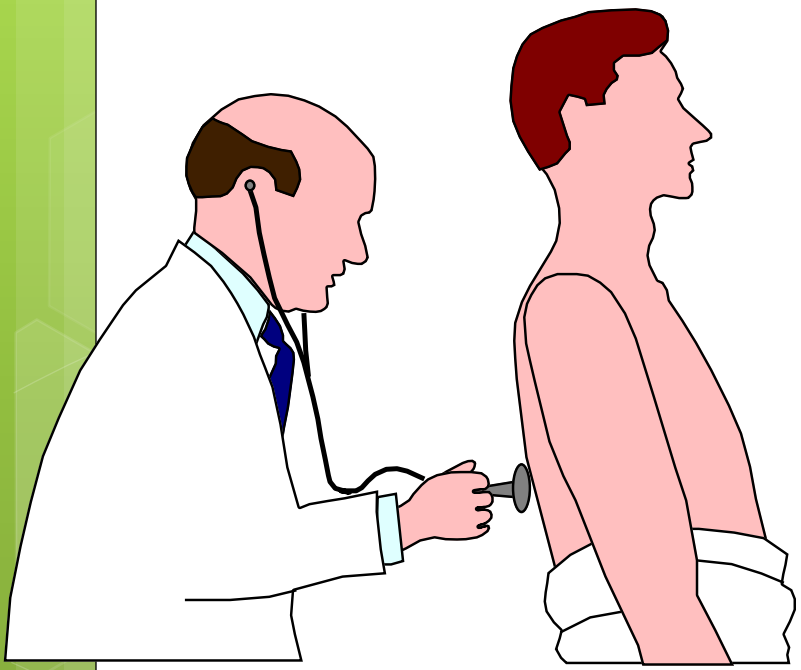


- See Images &Definitions page 11 & 12

Superior or Inferior

- Superior
  - **towards the head**
  - **The eyes are superior to the mouth.**
- Inferior
  - **away from the head**
  - **The stomach is inferior to the heart.**

Dorsal or Ventral

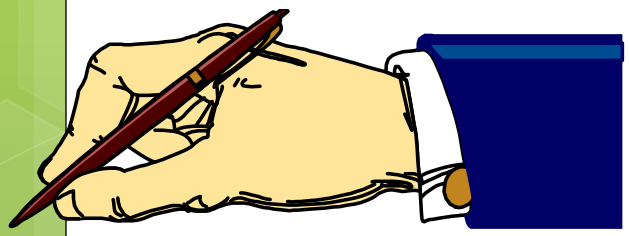


- Dorsal or Posterior
  - **at the back of the body**
  - **The brain is posterior to the forehead.**
- Ventral or Anterior
  - **at the front of the body**
  - **The sternum is anterior to the heart.**

Medial or Lateral

- Medial
  - **nearer to the midline of the body**
  - **The heart lies medial to the lungs.**
- Lateral
  - **farther from the midline of the body**
  - **The thumb is on the lateral side of the hand.**

Proximal or Distal



- Proximal
  - nearer to the attachment of the limb to the trunk
  - The knee is proximal to the ankle.
- Distal
  - farther from the attachment of the limb to the trunk
  - The wrist is distal to the elbow.

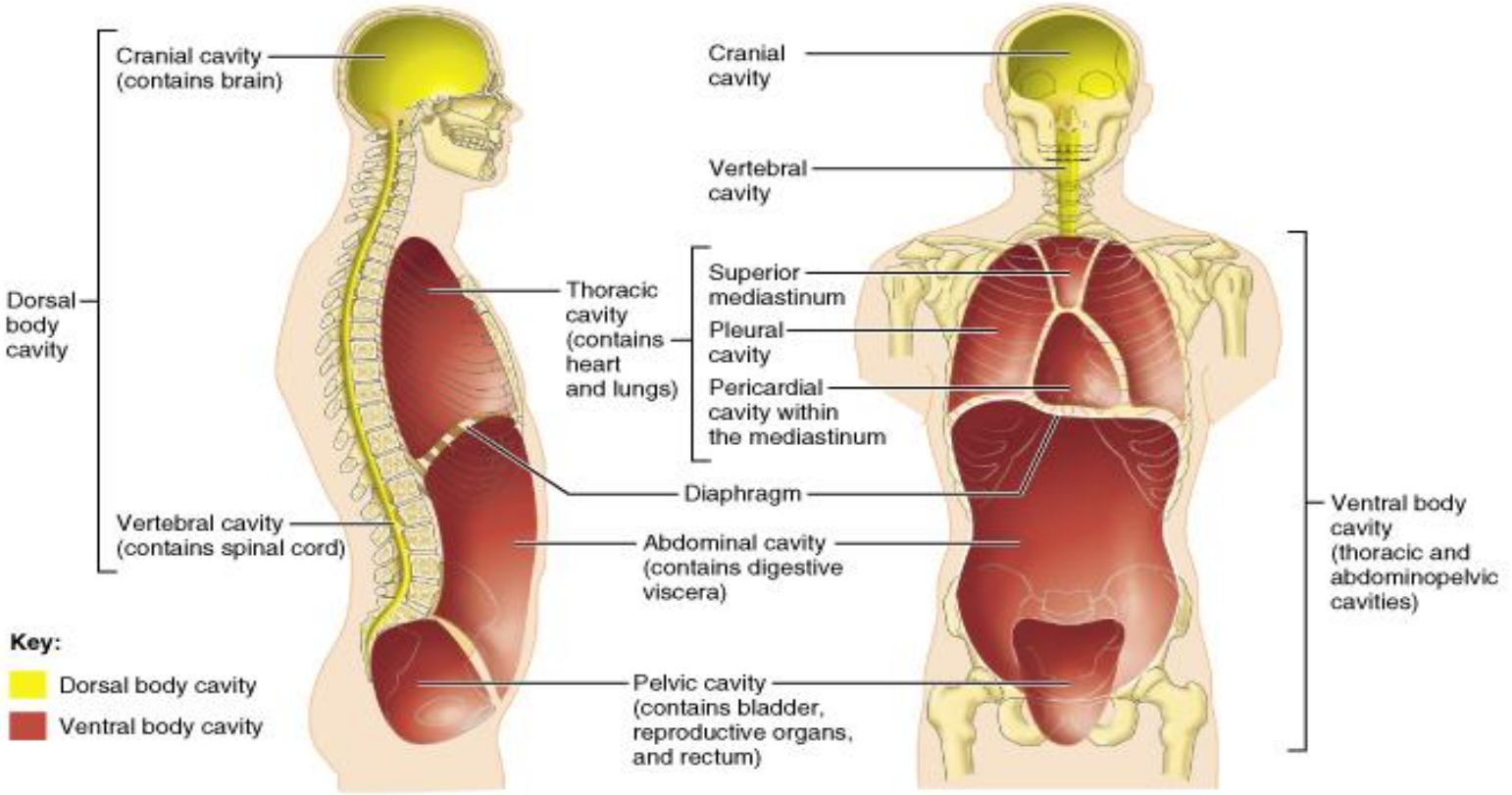
Body Cavities

Dorsal- to the back

- ✓ **Cranial- holds brain**
- ✓ **Vertebral or Spinal**

Ventral- to the front

- ✓ **Thoracic- above diaphragm**
- ✓ **Abdominal- below diaphragm**



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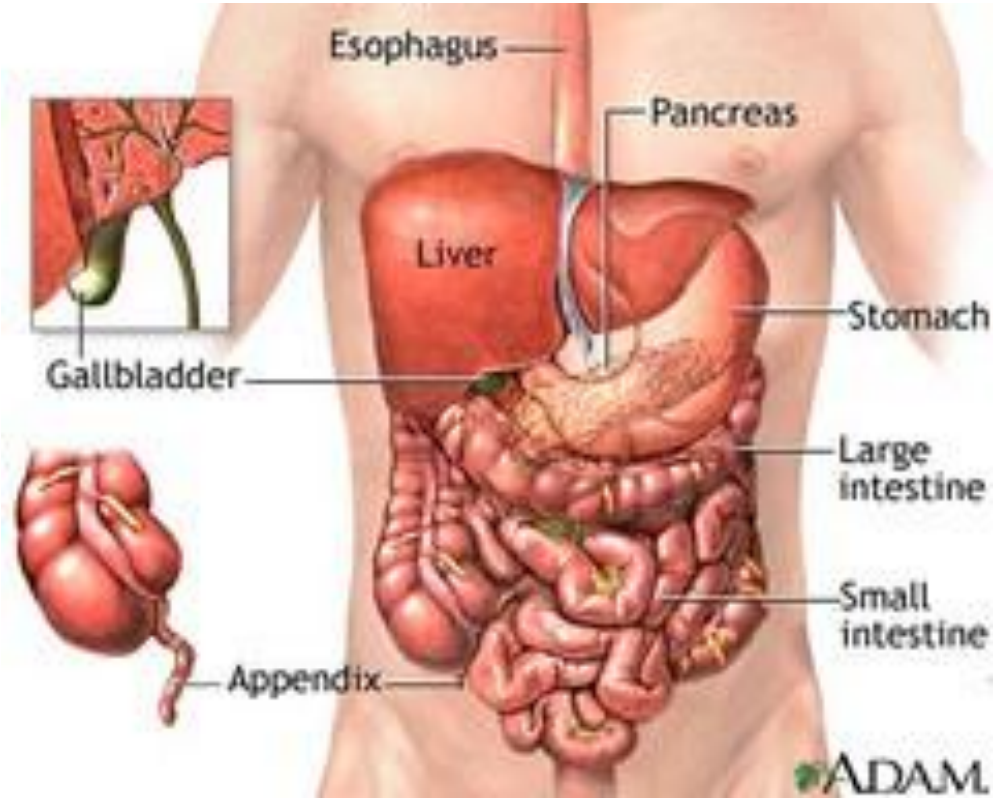
Abdominal Cavity Organs



Inferior portion of ventral body cavity below diaphragm

Abdominal Subdivisions

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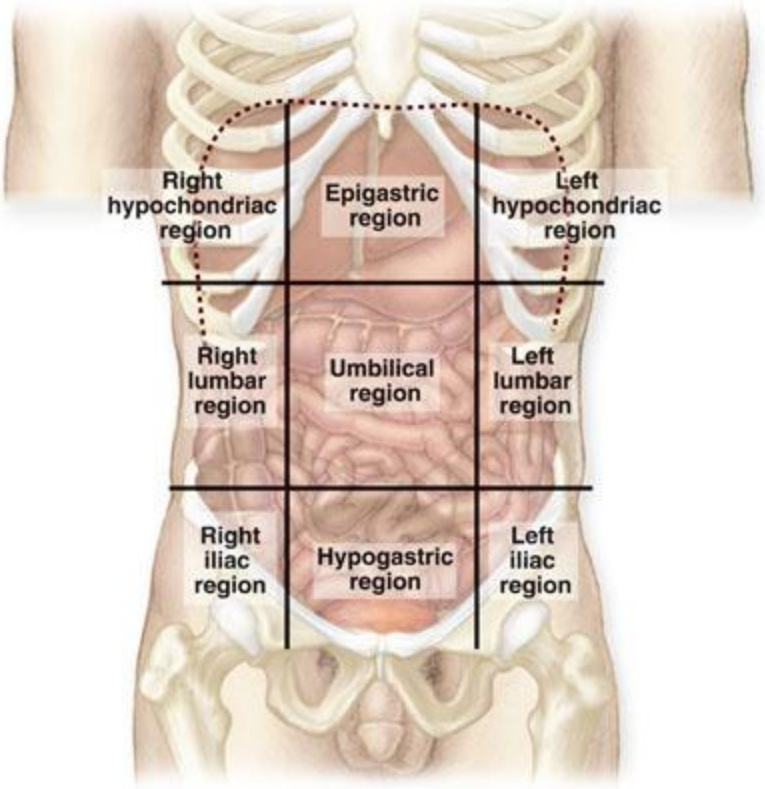
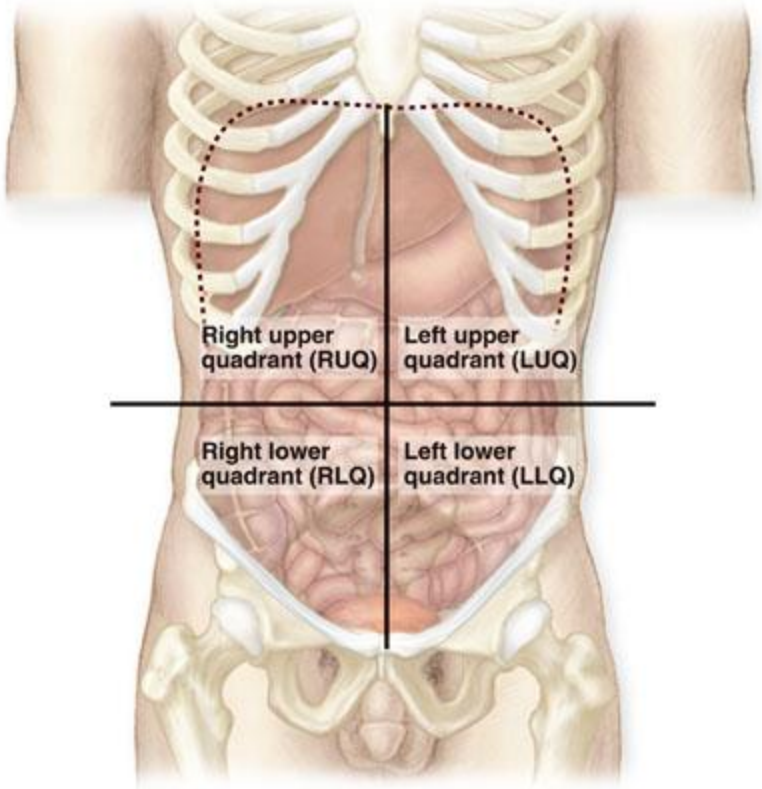


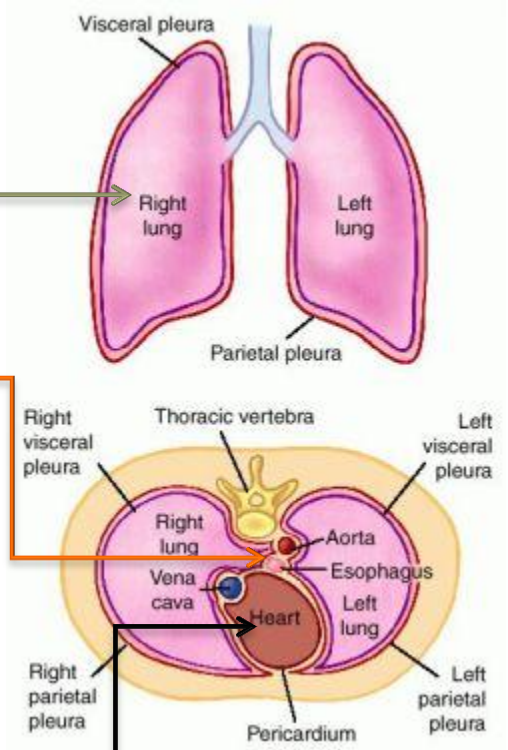
(a) Abdominopelvic regions



(b) Abdominopelvic quadrants

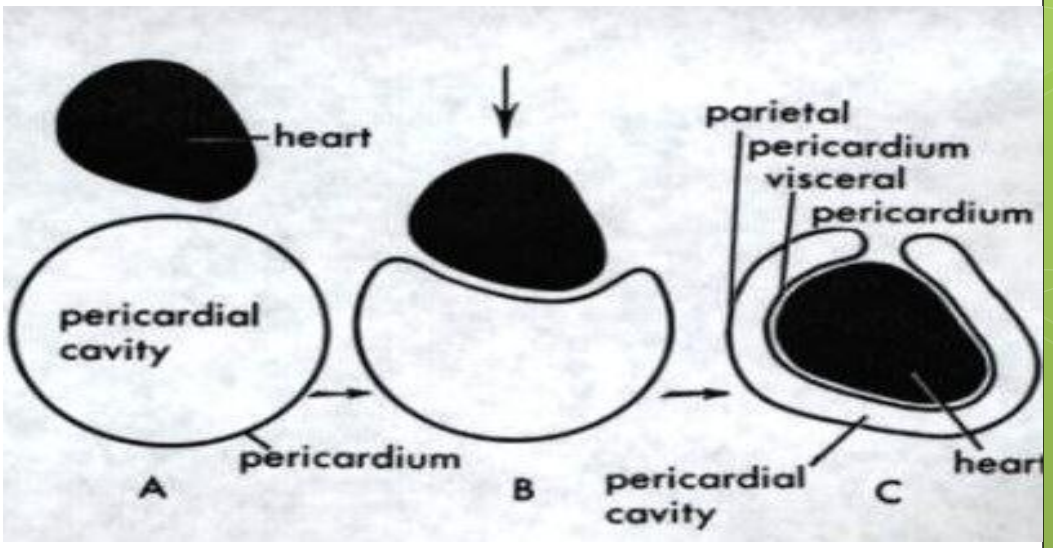
Throacic Cavity

- 2 **pleural cavities** (one around each lung)
- **Medastinum** which is the division between the pleural cavities
  - Contains heart, major blood vessels, trachea, esophagus, and thymus gland
- **Pericardium** covering around the heart

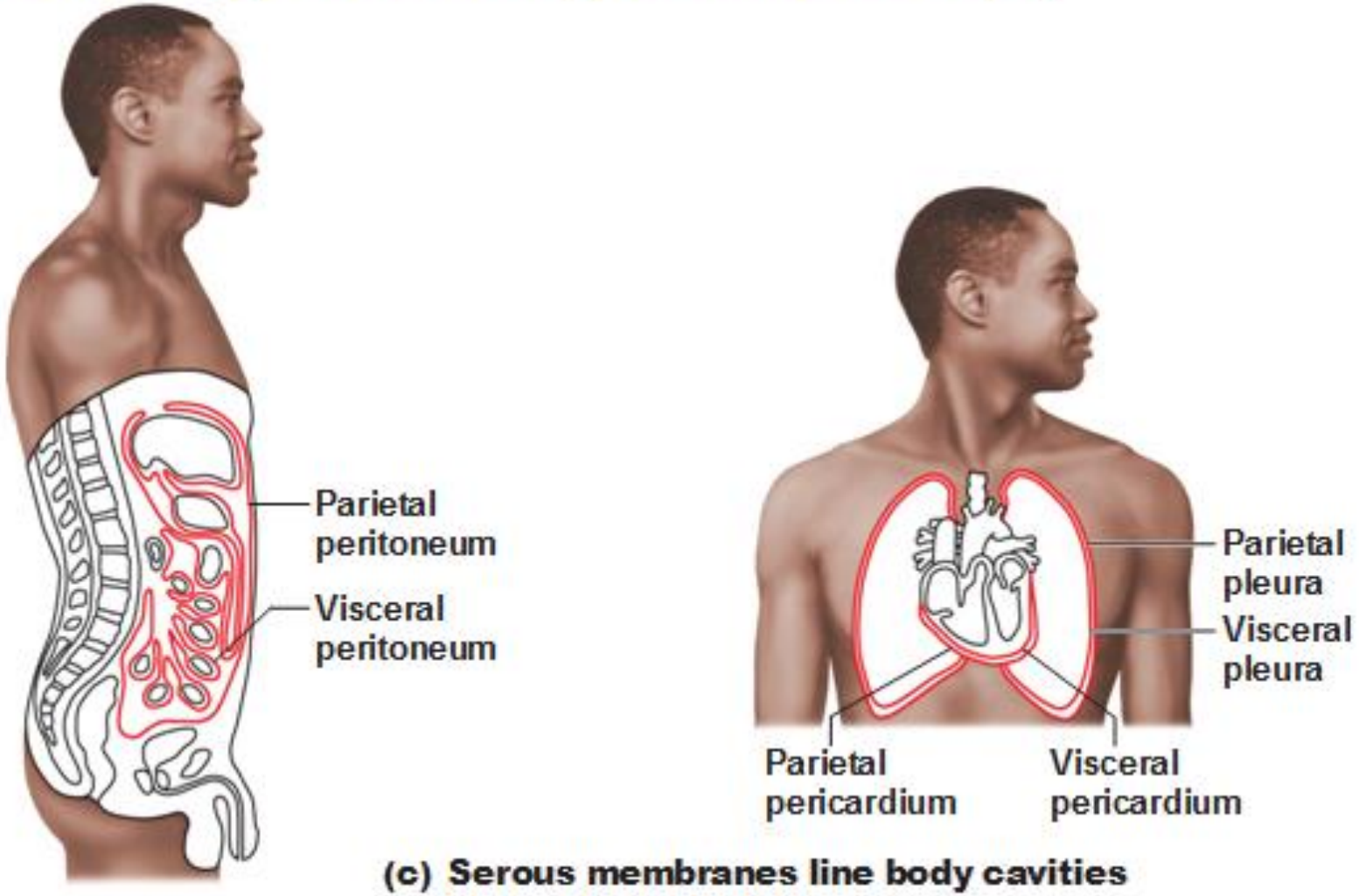


Serous Membranes

- Cover the organs of the trunk cavities and line the trunk cavities not open to the outside.
- **Visceral-** touching the organ
- **Parietal-** around the fluid filled space that is over the visceral serous membrane



Covering and Lining Membranes (3)



(c) Serous membranes line body cavities closed to the exterior.

Homework

- Visit the website and practice labeling your body cavities.
- Read chapter 1 and study the diagrams
- Quiz on chapter 1 labeling of body cavities, directional terms, planes of the body, and abdominal subdivisions on _____