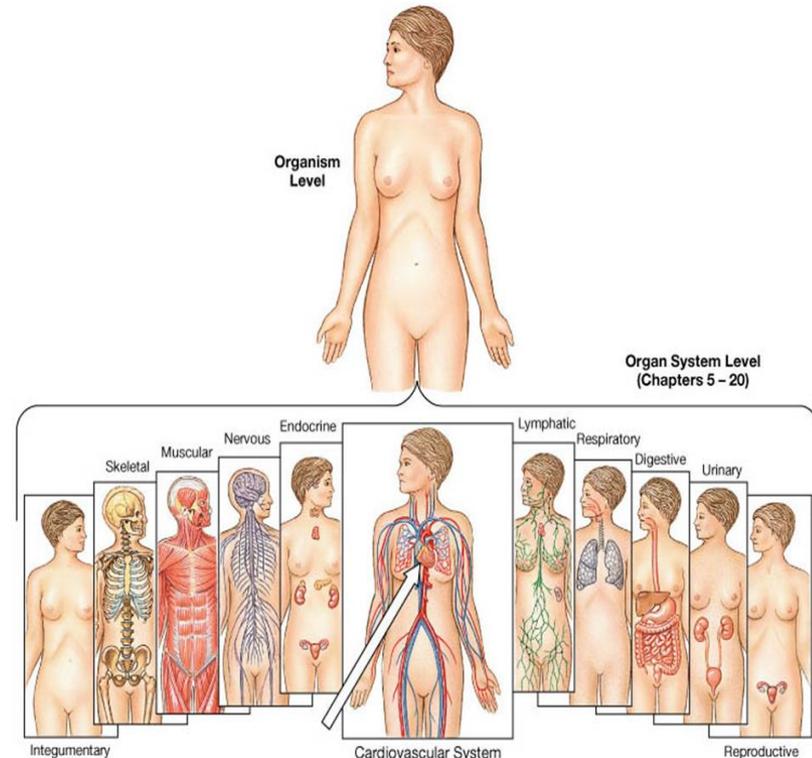




*CNCS, Biology Department*  
*Mammalian Anatomy and*  
*Physiology*  
*By : Anchiye G. (Ms.C)*

# Anatomy and Physiology

- ❖ **Anatomy** deals with the structure (morphology) of the body and its parts, in other words, what are things called?
- ❖ **Physiology** studies the functions of these parts or asks the question, “how do they work?”
- ❖ The two disciplines are closely interrelated because the functional role of a part depends on how it is constructed.

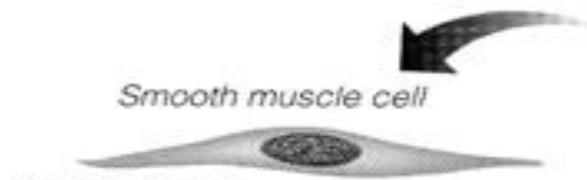


## Basic Life Processes

- **Metabolism;**- Sum of all biochemical processes of cells, tissues, organs, and organ systems
- **Responsiveness;**- Ability to detect and respond to changes in the internal and external environment
- **Movement;**- Occurs at the intracellular, cellular, organ levels
- **Growth;**- Increase in number of cells, size of cells, tissues, organs, and the body. Single cell to multicellular complex organism
- **Differentiation;**- Process a cell undergoes to develop from a unspecialized to a specialized cell
- **Reproduction;**- Formation of new cells for growth, repair, or replacement, or the production of a new individual.
- **Homeostasis;**- Equilibrium of the body's internal environment produced by the interaction of organ systems and regulatory processes (feedback systems).

The human body is the sum of its parts and these parts can be studied at a variety of levels of organization.

1. Atoms are the simplest level.
2. Two or more atoms comprise a molecule.
3. Macromolecules are large, biologically important molecules inside cells.
4. Organelles are aggregates of macromolecules used to carry out a specific function in the cell.
5. Cells are the basic living unit.
6. Tissues are groups of cells functioning together.
7. Groups of tissues form organs.
8. Groups of organs function together as organ systems.
9. Organ systems functioning together make up an organism.



*Smooth muscle cell*

**Cellular level**

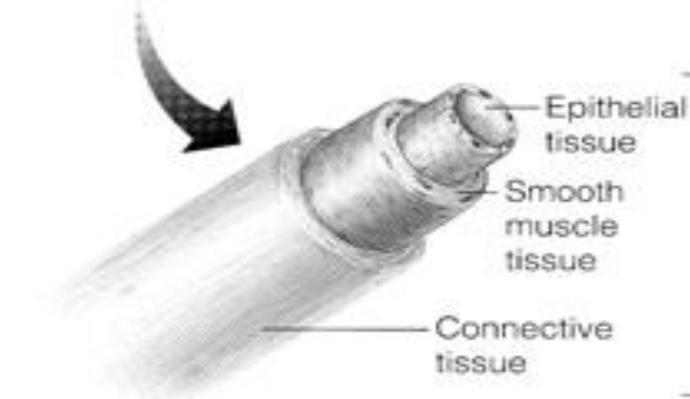
Cells are made up of molecules



Smooth muscle tissue

**Tissue level**

Tissues consist of similar types of cells



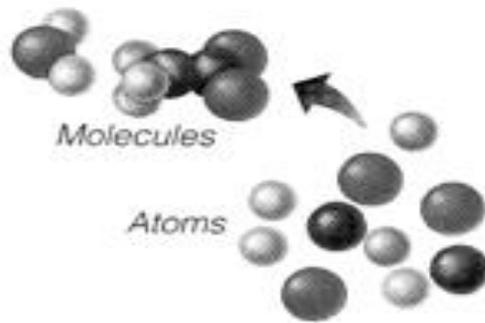
Epithelial tissue

Smooth muscle tissue

Connective tissue

**Organ level**

Organs are made up of different types of tissues



*Molecules*

*Atoms*

**Chemical level**

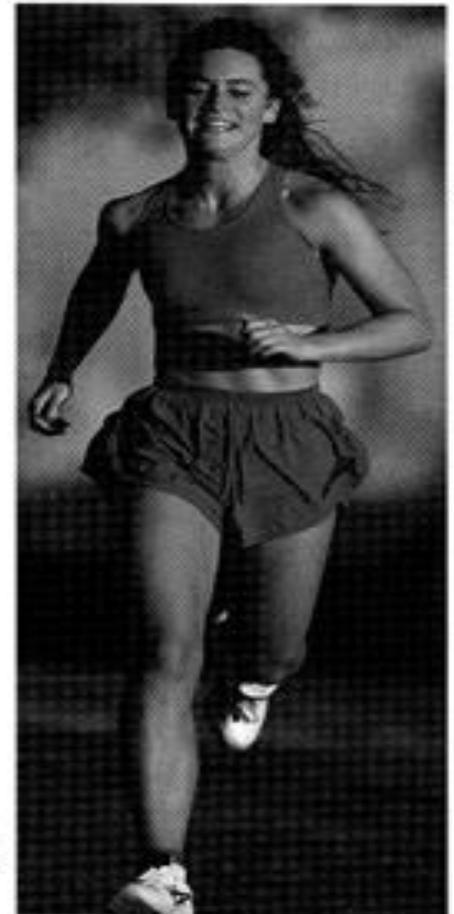
Atoms combine to form molecules



Cardio-vascular system

**Organ system level**

Organ systems consist of different organs that work together closely

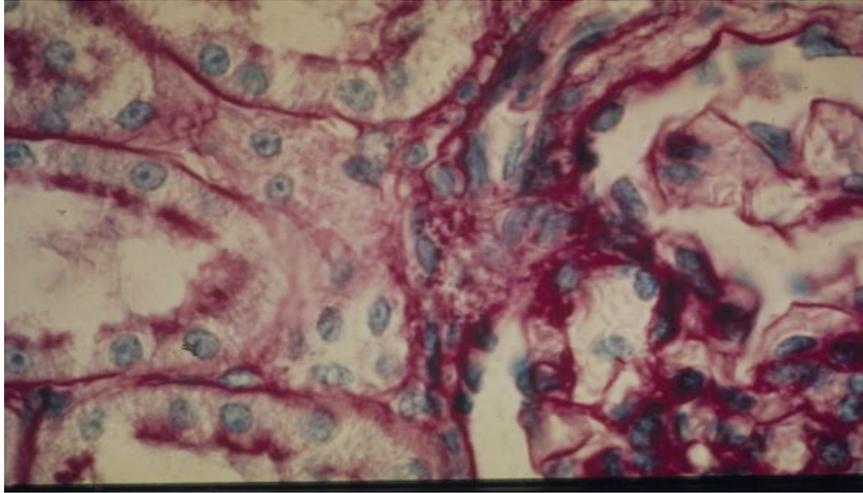


**Organismal level**

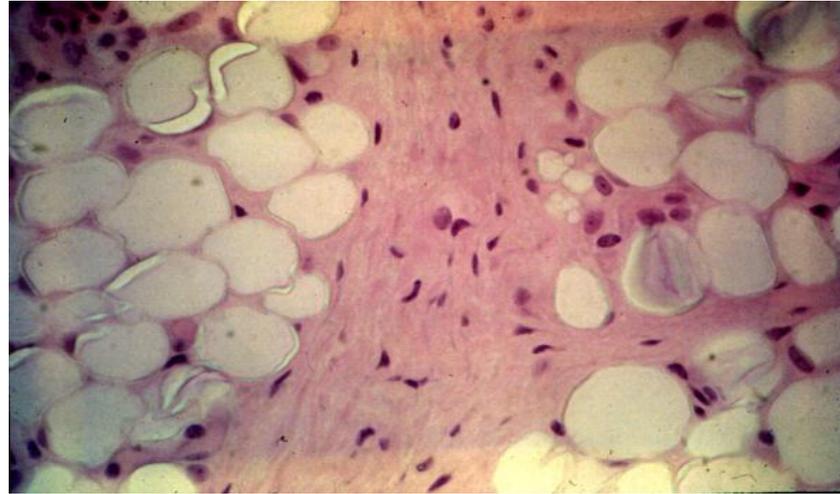
Human organisms are made up of many organ systems

# Four Basic Types of Tissue

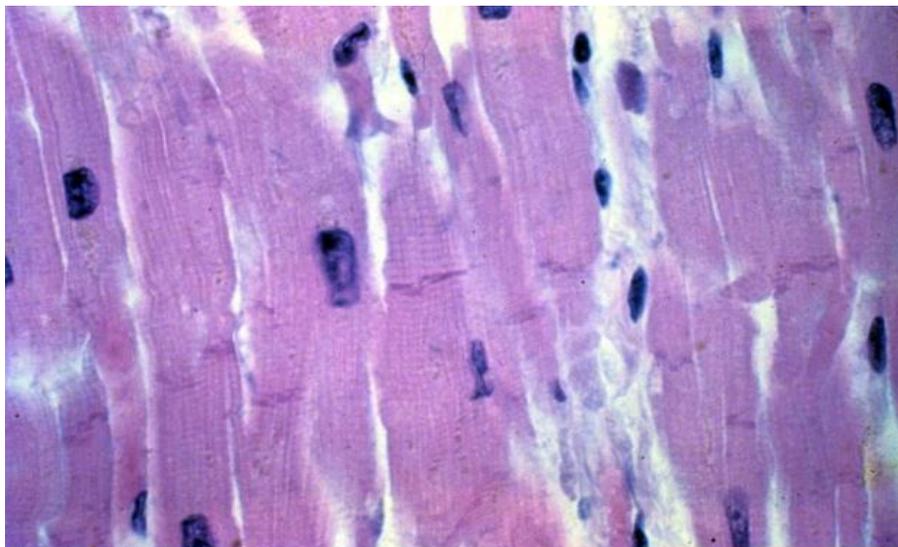
***EPITHELIUM TISSUE***



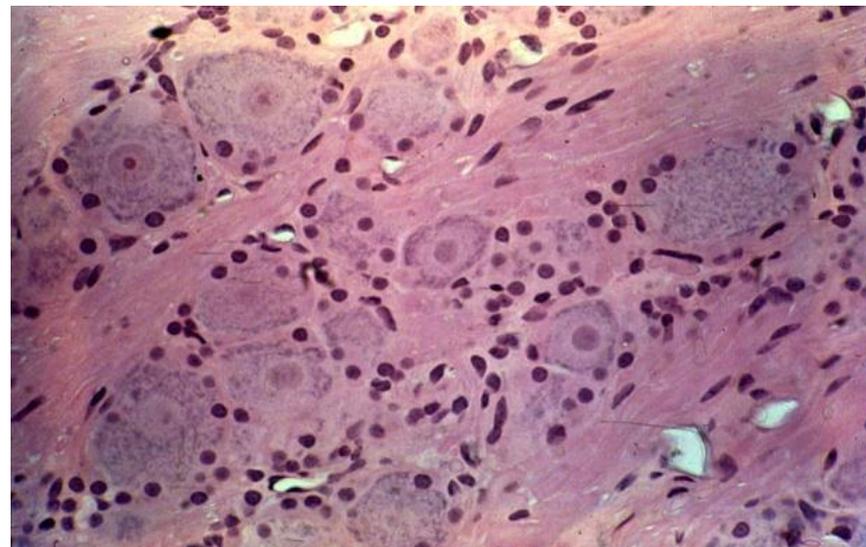
***CONNECTIVE TISSUE***



***MUSCULAR TISSUE***



***NERVOUS TISSUE***

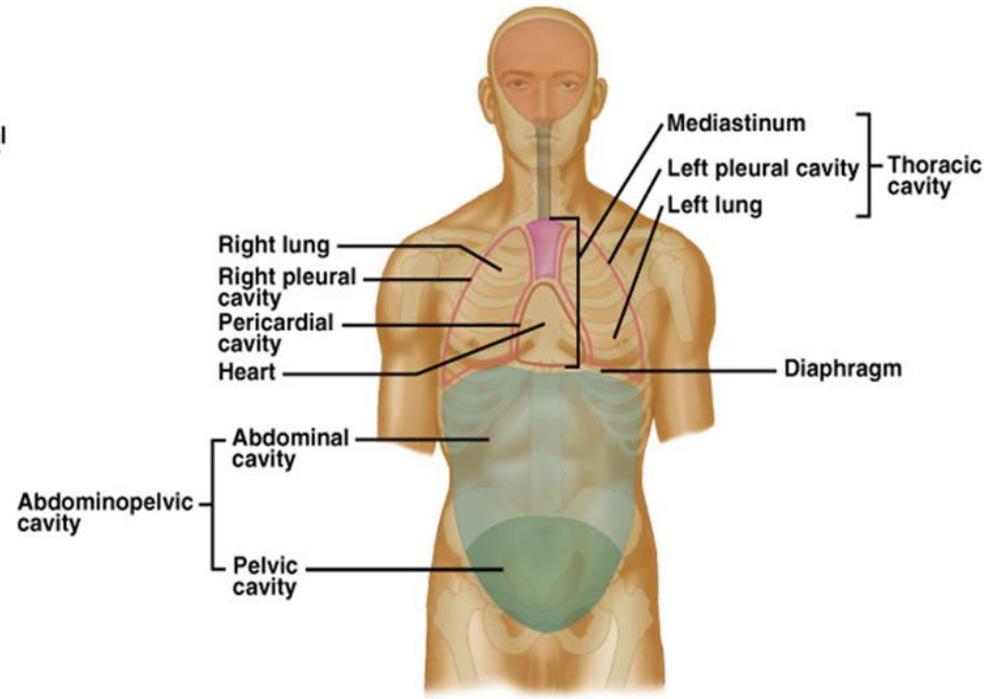
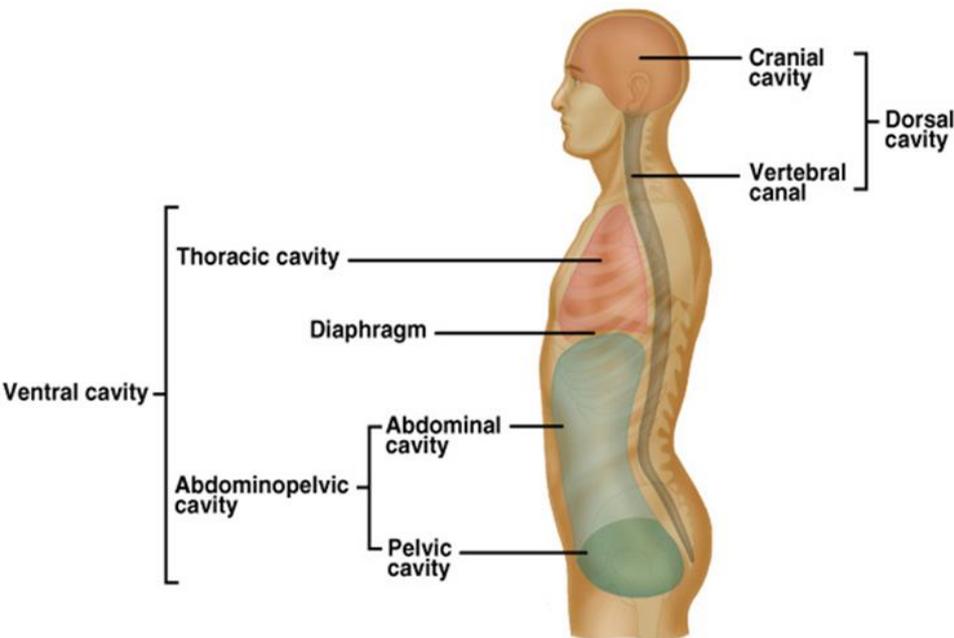


# Body Cavities:

- ❖ Body cavity is a house of organ and filled by fluid
- ❖ The body can be divided into an appendicular portion (upper and lower limbs) and an axial portion (head, neck, and trunk), which includes a **dorsal** and a **ventral** cavity.
- ❖ Organs within these cavities are called viscera.

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- a. The **dorsal cavity** forms within a bony skull and column of bones the vertebrate.
- They can be divided into the cranial cavity and vertebral canal.
- b. The **ventral cavity** is much larger and extends anteriorly from the area bound by the ribcage and vertebral column posteriorly to the area contained within the ventral body muscle (abdominals) and pelvic girdle.

- ventral cavity is made up of a thoracic cavity and an abdominopelvic cavity, separated by the diaphragm.
  - i. The mediastinum divides the thorax into right and left halves.
  - ii. The abdominopelvic cavity can be divided into the abdominal cavity and the pelvic cavity.
- c. **Smaller** cavities within the head include the oral cavity, nasal cavity, orbital cavities, and middle ear cavities.

- ❖ **Coelom** is a fluid filled body cavity completely formed within the embryonic mesoderm layer of some animals of ventral cavity.
- ❖ They used to envelop and suspend several organs
- ❖ In the abdominopelvic cavity the coelomic space is the peritoneal cavity.
- ❖ Heart and lungs invade and greatly constrict the coelom space (thoracic cavity).
- ❖ The thin space with mesoderm layers around the heart is the pericardial cavity, whereas lungs is pleural cavity
- ❖ There is no coelom in dorsal cavity b/c they don't formed from mesoderm.
- ❖ Instead vertebral cavity is from nerve cord
- ❖ it protective from the ectoderm of embryo folds on its self and create hollow tube

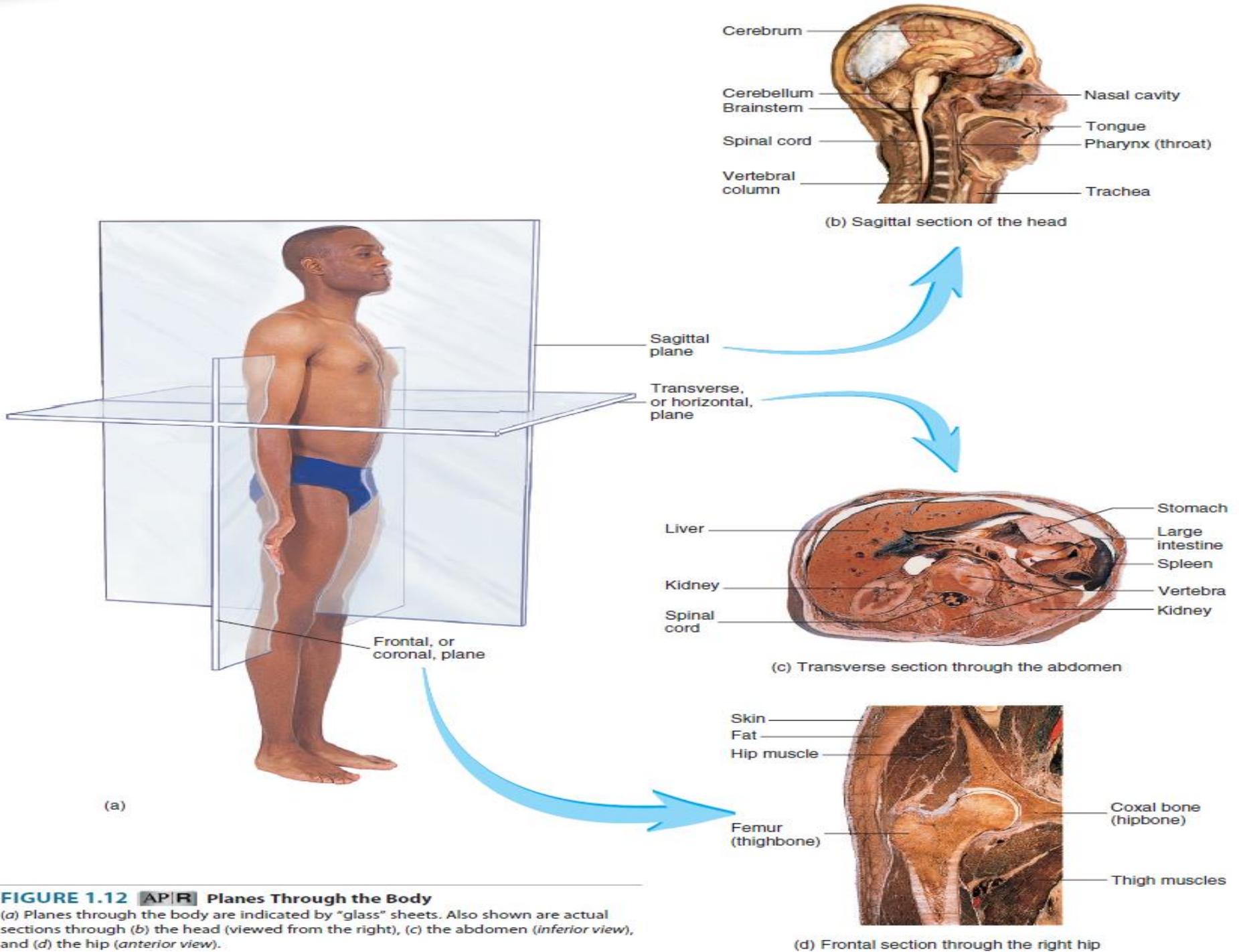
# **Planes**

## **1. Planes of the body**

- A sagittal plane divides the body into right and left parts. A median plane divides the body into equal right and left halves.
- A transverse (horizontal) plane divides the body into superior and inferior portions.
- A frontal (coronal) plane divides the body into anterior and posterior parts.

## **2. Sections of an organ**

- A longitudinal section of an organ divides it along the long axis.
- A transverse (cross) section cuts at a right angle to the long axis of an organ.
- An oblique section cuts across the long axis of an organ at an angle other than a right angle.

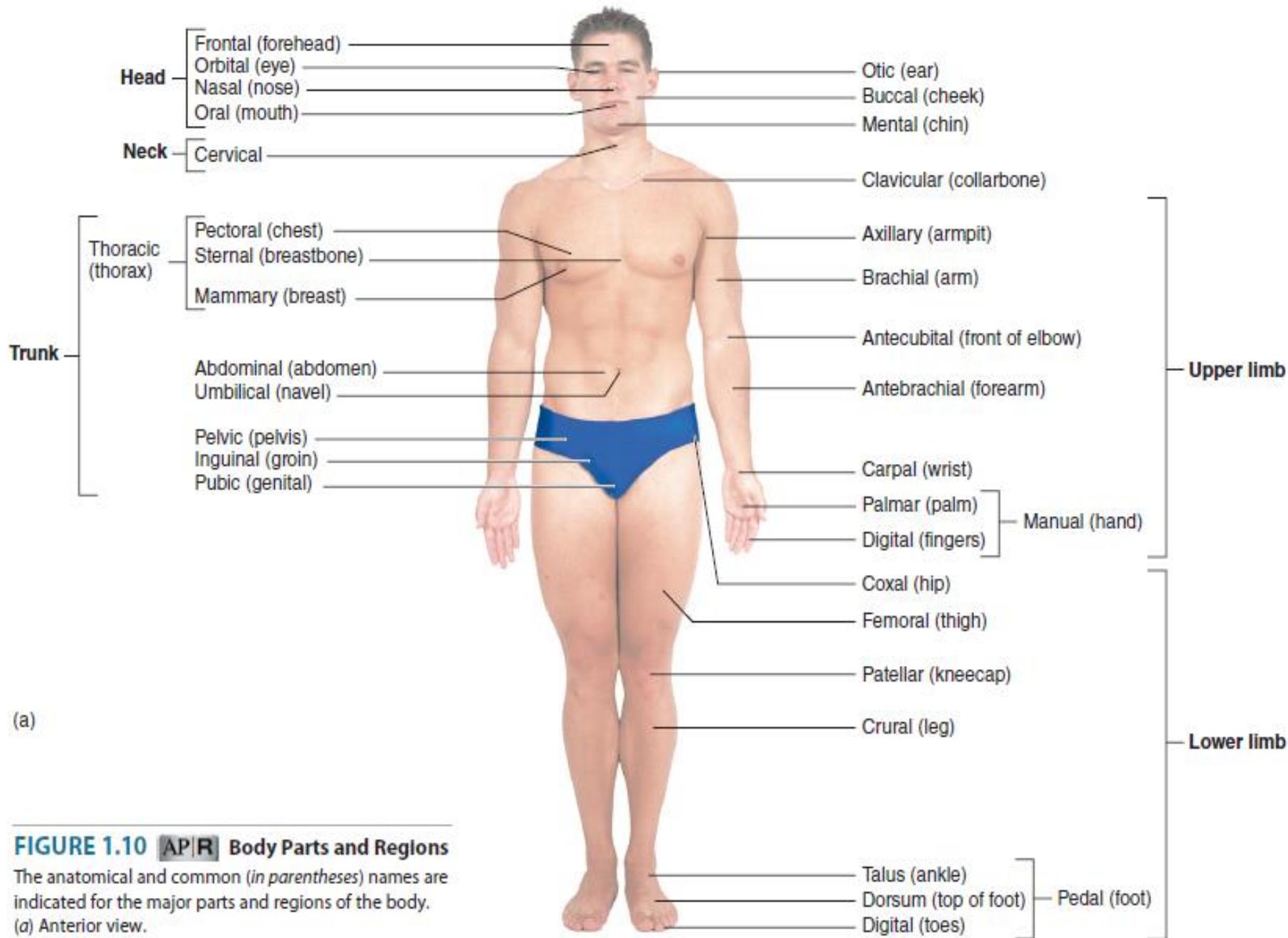


**FIGURE 1.12** **AP|R** **Planes Through the Body**

(a) Planes through the body are indicated by “glass” sheets. Also shown are actual sections through (b) the head (viewed from the right), (c) the abdomen (*inferior view*), and (d) the hip (*anterior view*).

## **Body Parts and Regions**

- 1.** The body can be divided into a central region, consisting of the head, neck, and trunk, and the upper limbs and lower limbs.
- 2.** Superficially, the abdomen can be divided into quadrants or into nine regions.
  - These divisions are useful for locating internal organs or describing the location of a pain or a tumor.

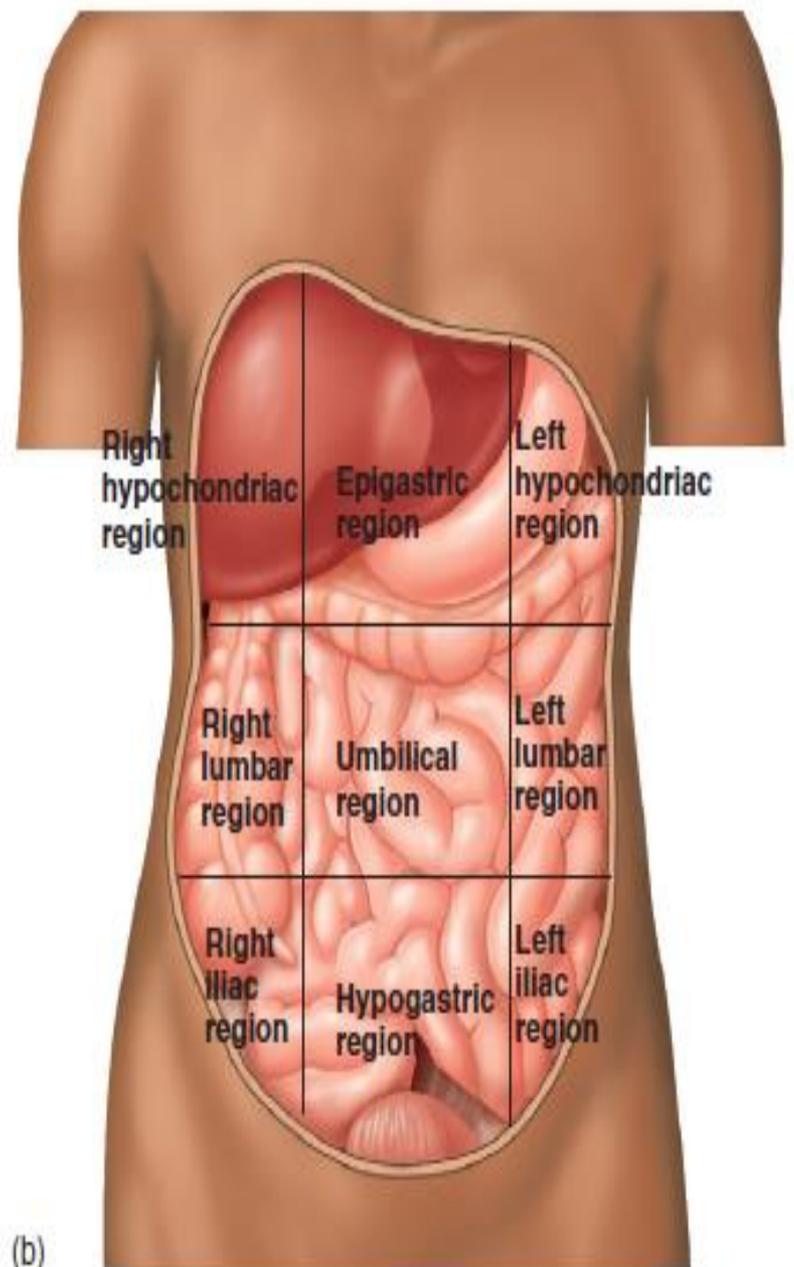
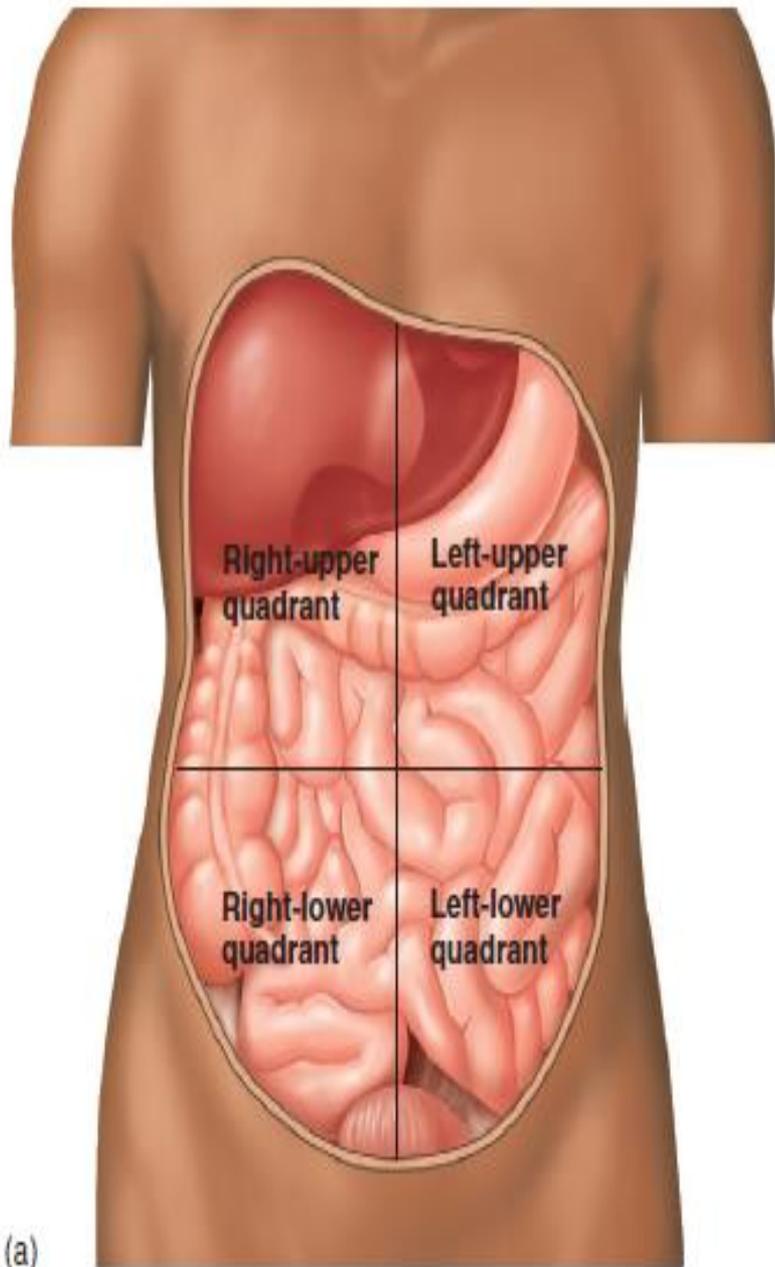


(a)

**FIGURE 1.10** **AP|R** **Body Parts and Regions**

The anatomical and common (*in parentheses*) names are indicated for the major parts and regions of the body.

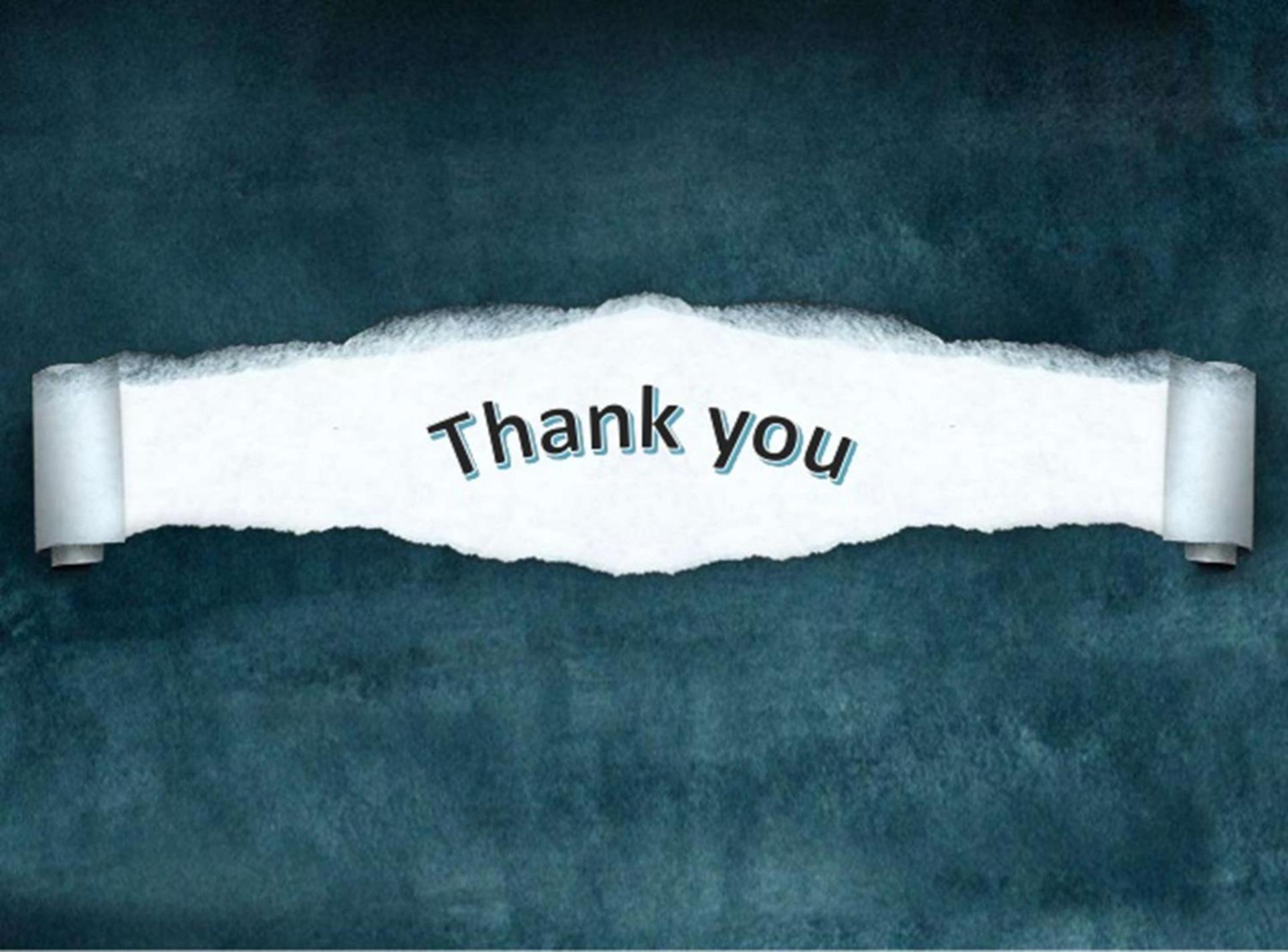
(a) Anterior view.



(a)

(b)

**FIGURE 1.11** **AP R** Subdivisions of the Abdomen

A horizontal strip of white paper with irregular, torn edges is centered against a dark blue, textured background. The words "Thank you" are printed on the paper in a bold, black, sans-serif font. The text has a subtle blue drop shadow effect, making it stand out against the white paper. The paper appears to be a single sheet that has been torn, with the edges showing a rough, fibrous texture.

**Thank you**