

Introduction to anatomy & human body

Definition:

1. **Anatomy:** the study of the **structure** (morphology) of body parts.
2. **Physiology:** the study of the **function** of body parts.

Levels of Structural Organization in the human body: The human body has **6 main levels** of structural organization.

1-Chemical level– The chemical level includes the building blocks of matter, **atoms** which combine to form **molecules**.

2-Cellular level– the cellular level is made up of the smallest unit of living matter, the **cell**.

3-Tissue level– Tissues are groups of similar cells that have a common function. A **tissue** must contain two different types of cells.

4-Organ level– an **organ** is a structure composed of at least two different tissue types. Examples the brain, stomach, and liver.

5- System level– One or more organs work in unison to accomplish a common purpose. The heart and blood vessels work together to make cardiovascular system

6-Organismal level– The organismal level is the highest level of organization. It is the total of all structural levels working together.

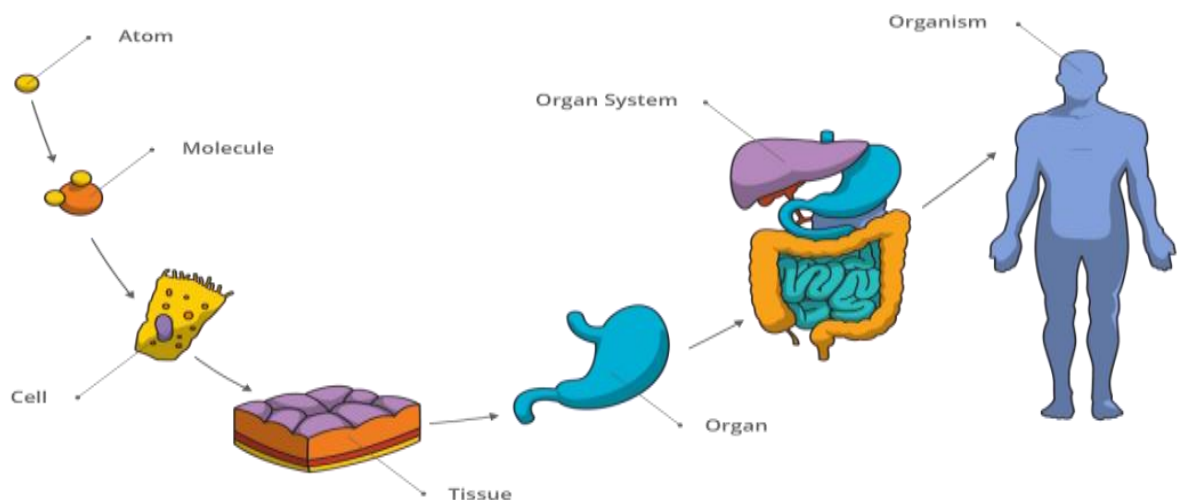


Fig1: Levels of organization of the human body

Anatomical Position: The standard anatomical position include The body standing upright, with the feet at shoulder width and parallel, the upper limbs are held out to each side, and the hands face forward.

Directional Terms: Directional terms are used to describe the location of one body part in relation to another.

1. **Anterior (ventral)**: that a body part is located toward the front. The **toes** are anterior to the **foot**.
2. **Posterior (dorsal)**: that a body part is located toward the back. The **heart** is posterior to the **rib cage**.
3. **Superior (cranial)**: that a body part is located above another part. The **face** is superior to the **neck**.
4. **Inferior (caudal)**: that a body part is below another part or toward the feet. The **navel** is inferior to the **chin**.
5. **Lateral**: that a body part is farther away from the midline. The **eyes** are lateral to the **nose**.
6. **Medial**: that a body part is nearer than another part to midline of the body. The **nose** is medial to the **eyes**.
7. **Proximal**: that a body part is closer to the point of attachment to the trunk. The **elbow** is proximal to the **hand**.
8. **Distal**: that a body part is farther from the point of attachment from the trunk. The **hand** is distal to the **elbow**.
9. **Superficial (external)**: means that a body part is located near the surface. The **skin** is superficial to the **bones**.
10. **Deep (internal)**: describes a position farther from the surface of the body. The **brain** is deep to the **skull**.

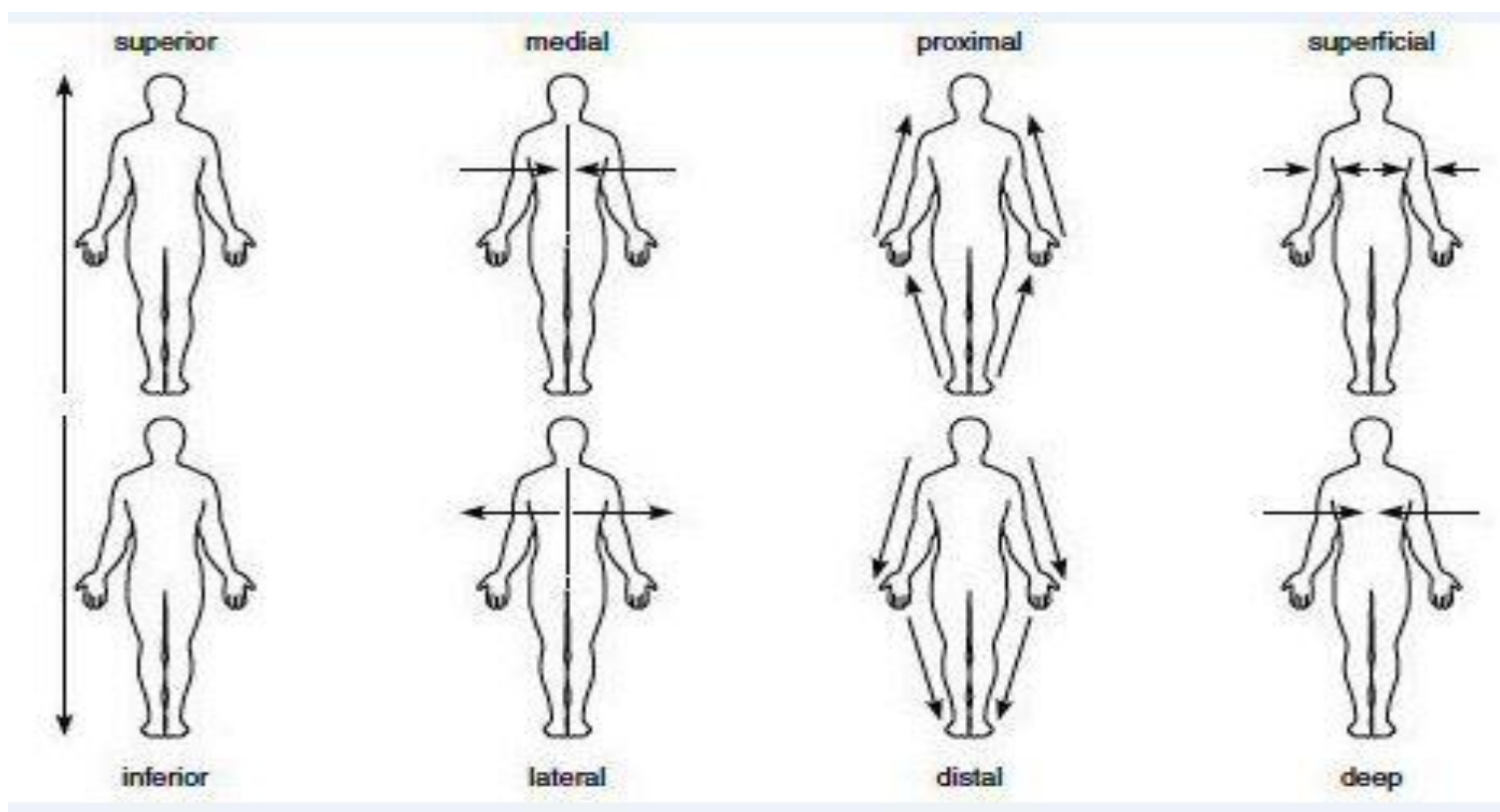


Fig 2: Directional terms.

Body Planes & sections: The human body is customarily sectioned along the following **planes**:

- A. **The sagittal plane:** the plane that divides the body or an organ vertically into right and left sides.
- B. **The frontal plane:** the plane that divides the body or an organ into an **anterior (front)** portion and a **posterior (rear)** portion.
- C. **The transverse plane:** the plane that divides the body or organ horizontally into **upper** and **lower** portions.

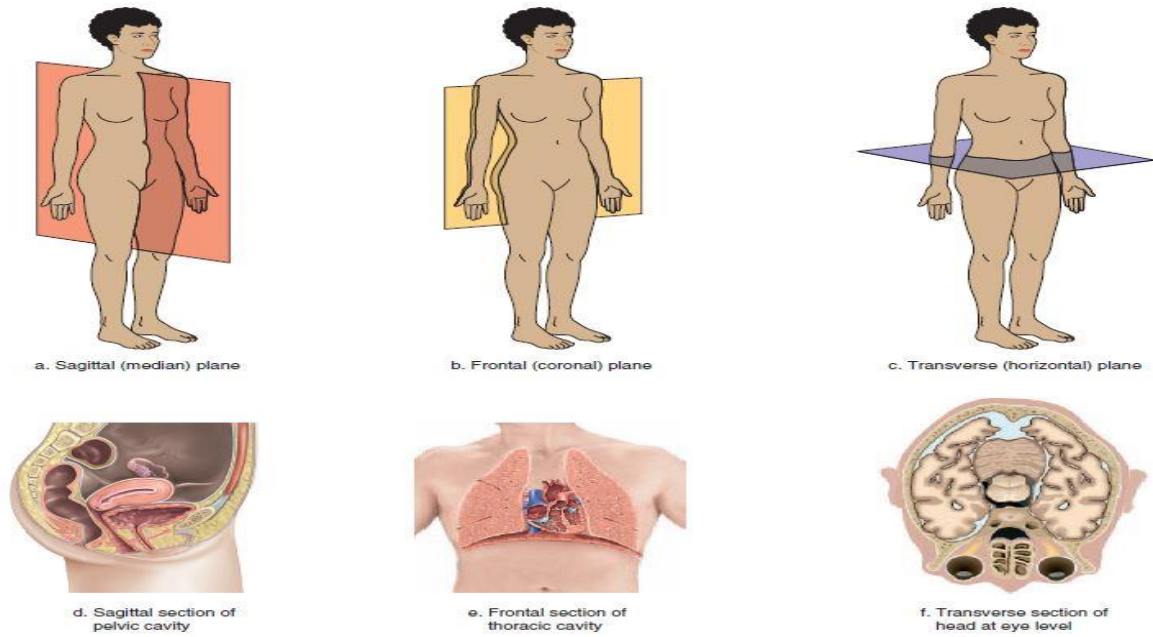


Fig 3: Body Planes & sections

Body regions (Regions of the Human Body): the human body can be divided into (a) axial and (b) appendicular portions.

A. The **axial portion** includes the head, neck, and trunk the trunk can be divided into the thorax, abdomen, and pelvis.

B. The **appendicular portion** of the human body includes the limbs—that is, the upper limbs and the lower limbs.

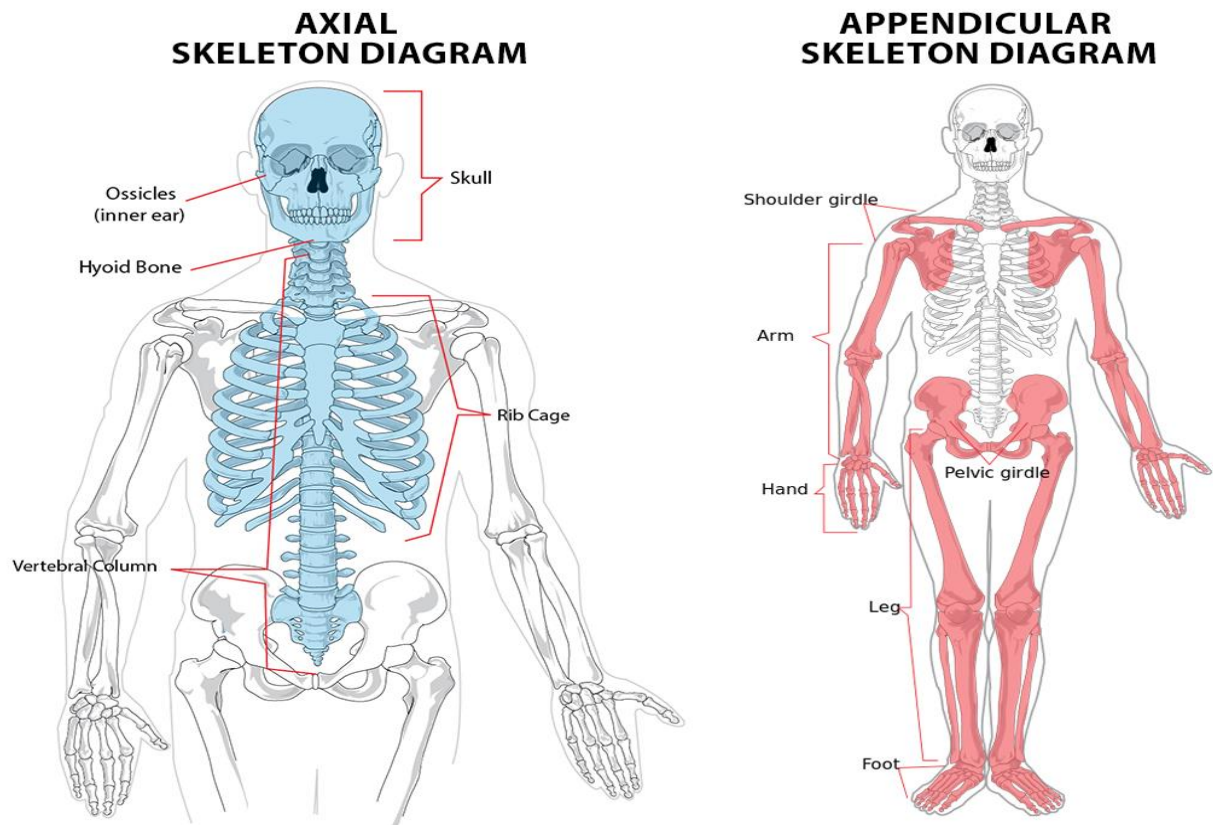


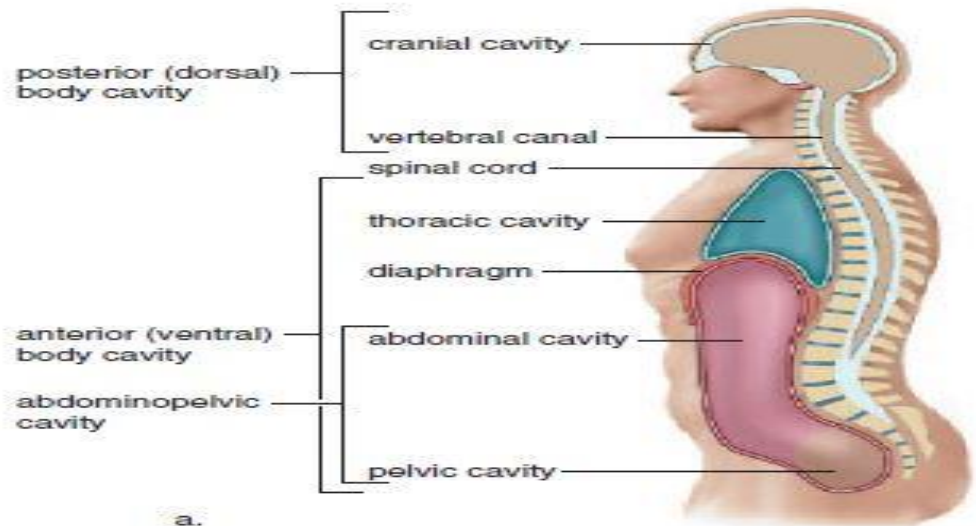
Fig 4: Body parts and areas

Body Cavities: the human body is divided into two internal cavities: the **posterior (dorsal)** body cavity and the **anterior (ventral)** body cavity. Each of these major cavities is then **subdivided** into smaller cavities.

A. The posterior (dorsal) cavity: is subdivided into **cranial** and **spinal** cavities.

B. The anterior (ventral) cavity: is subdivided into **thoracic** and **abdominopelvic** cavities.

Fig 5: Posterior (Dorsal) and Anterior (Ventral) Cavities



Subdivisions of the Posterior (Dorsal) Cavity:

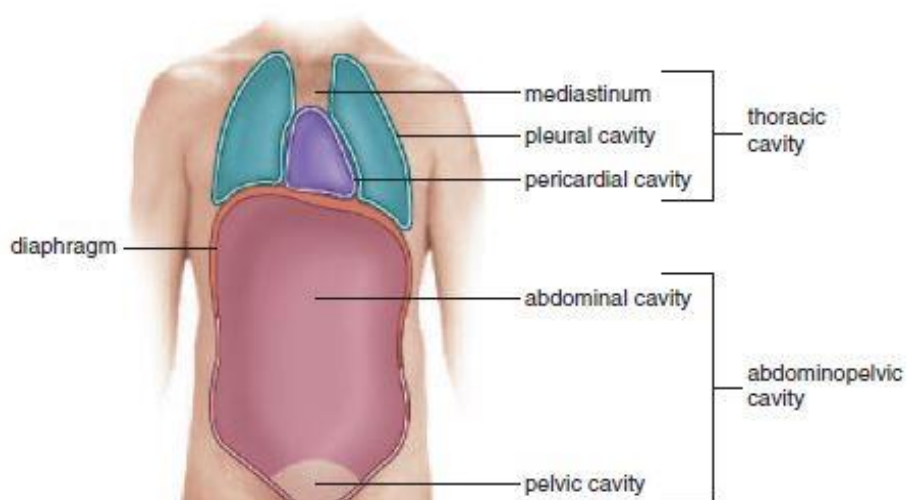
1. The **cranial cavity:** contains **the brain (Houses the brain).**
2. The **spinal cavity (or vertebral cavity)** contains **the spinal cord**

The brain and spinal cord are protected by the bones of the skull and vertebral column and by cerebrospinal fluid.

Subdivisions of the Anterior (Ventral) Cavity:

1. The **thoracic cavity:** is contains the **lungs** and the **heart**, the **diaphragm** forms the floor of the thoracic cavity.
2. The **abdominopelvic cavity:** is the largest cavity in the body. Contains the **digestive organs** , **pelvic cavity**, and the **reproduction organ**.

Fig 6: Anterior (Ventral) Cavities



Tissues and Membranes

Membranes of the Posterior (Dorsal) Body Cavity:

The posterior body cavity is lined by **three membranous layers** called the **meninges** the space between this layer and the next layer is filled with **cerebrospinal fluid**.

Membranes of the Anterior (Ventral) Body Cavity:

- **Serous membrane** (also referred to as a serosa) is one of the thin membranes that cover the walls and organs in the thoracic and abdominopelvic cavities.

- **The parietal layers:** are line the walls of the body cavity.

- **The visceral layers:** are covers the organs (the viscera).

Between the parietal and visceral layers is a very thin, **fluid-filled** serous space **that is meant to cushion and reduce friction on internal organs when they move**.

1. Thoracic Cavity membrane:

. **The lungs** are surrounded by a serous membrane called the (**pleura**) the pleural cavity is filled with **pleural fluid**.

. **The heart** is covered by the two-layered membrane called the **pericardium** the **pericardial cavity** is small space contains **pericardial fluid**.

2. Abdominopelvic Cavity membrane: the organs of the cavity are covered by **the peritoneum**; the peritoneum cavity is containing **peritoneal fluid**.

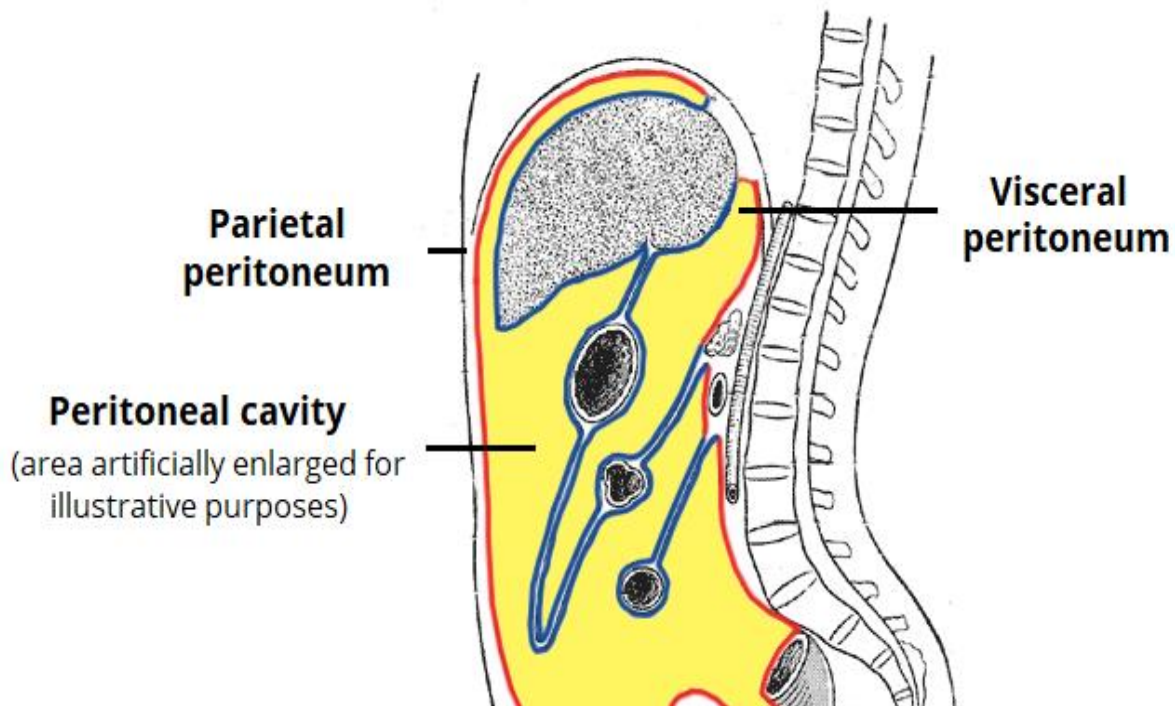


Fig 7: Peritoneum cavity