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Basic life processes, Homeostasis and Aanatomical terminology

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Life Processes

Metabolism: the sum of all chemical processes that occur in the body.

Responsiveness: how a body detects and responds to changes in its internal or external environment.

Movement: motion of the whole body, organs, single cells, even organelles.

Growth: increase in body size; the size of cells, number of cells, or amount of material surrounding cells.

Differentiation: process when unspecialized cells become specialized cells. i.e. egg cell into you!

Reproduction: formation of new cells for growth, repair or replacement or making someone new.



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HOMEOSTASIS

The maintenance of a relatively stable internal environment despite changes both internal and external conditions.

Homeostasis is required in order for the systems and organs within the human body to function effectively and work optimally.

Large part of this system is the *interstitial fluid*, which surrounds body cells, and should be kept at an internal 37 degrees C



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Homeostasis

Controlled mainly by the nervous and endocrine systems.

Any disruption that causes a change in a controlled condition is called a stimulus.

Homeostasis is maintained by means of *feedback mechanisms*.



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Feedback Systems!!

The components of a feedback system are:

CONTROL CENTER

RECEPTOR

EFFECTOR



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Components of a Feedback System

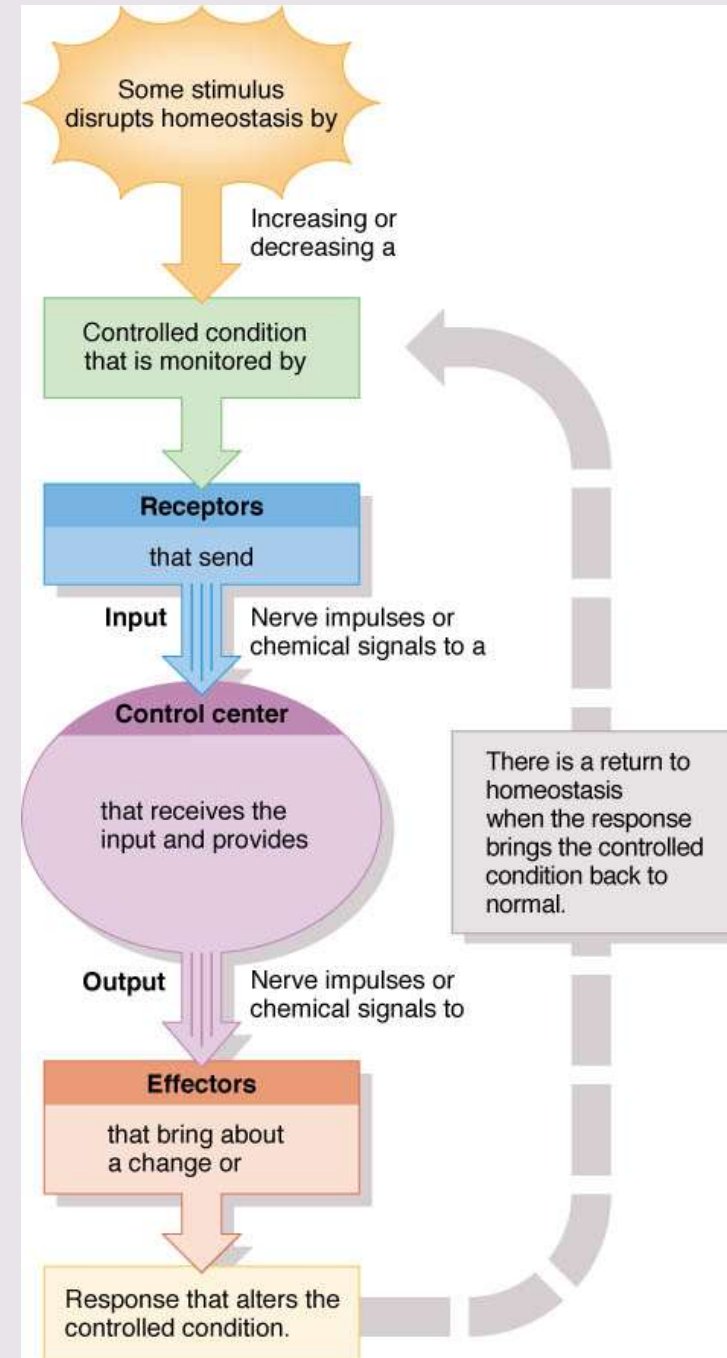


Figure 1.02 Components of a Feedback System



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Negative Feedback Systems

A negative feedback system reverses a change in a controlled condition in order to maintain homeostasis.

Most feedback systems in the body are negative!



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Positive Feedback Systems

A positive feedback system reinforces the initial change in the controlled condition.

If positive feedback should occur, its results are usually destructive or deadly. However, a few are beneficial such as **contractions in childbirth, ovulation and blood clotting.**



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Homeostasis of Blood Pressure

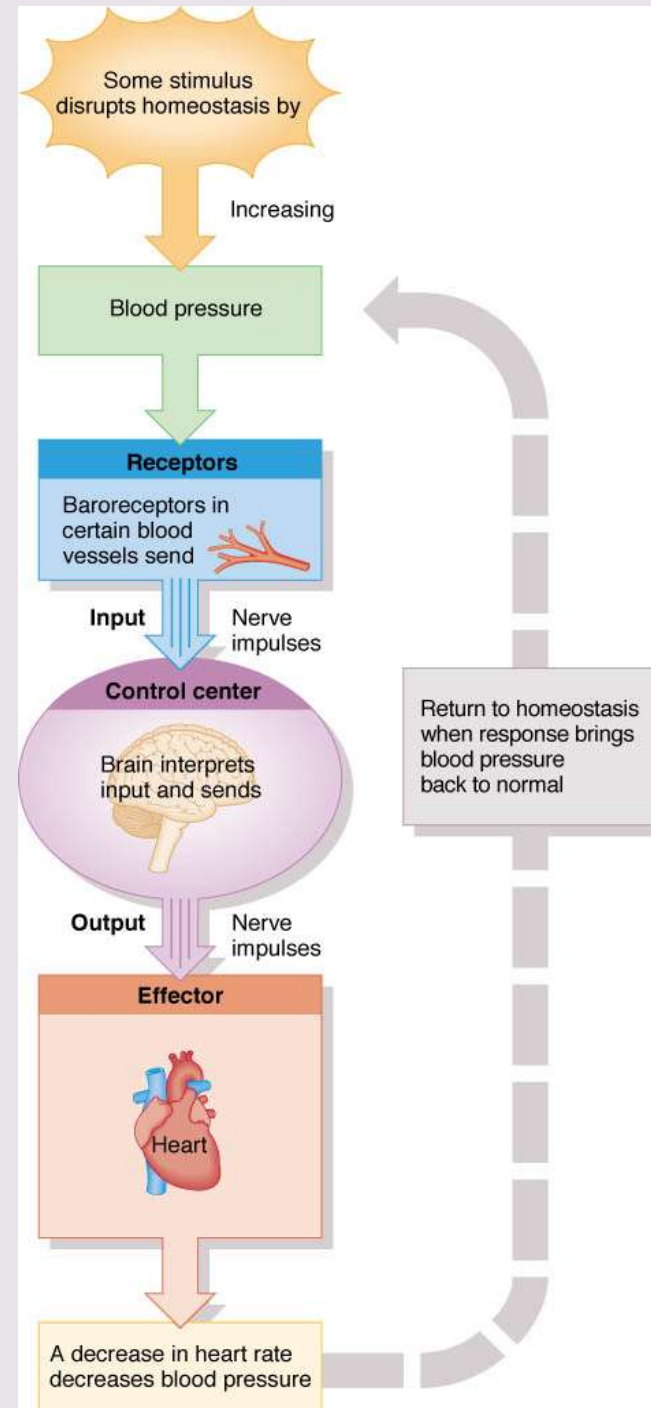


Figure 1.03 Homeostasis of Blood Pressure



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For Example:

Homeostasis of Blood Pressure

In order to sustain life your blood pressure needs to be maintained at an appropriate pressure. This depends on the rate and strength of the heartbeat. i.e. if the heart beats faster, more blood pushes into the arteries and elevates the pressures.

Increased pressure is detected by baroreceptors (pressure sensitive nerve cells located in the walls of certain blood vessels.) These respond by sending impulses to the brain.



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Homeostasis in BP control

The brain will then send nerve impulses to the heart and certain other blood vessels to slow the heart rate, thereby decreasing BP.

This cycle is called a FEEDBACK SYSTEM.

A feedback system involves a cycle of events in which the information about body conditions is continually monitored and fed back into a central control region.



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Homeostasis Finished

Aging is a normal process characterized by a progressive decline in the body's ability to restore homeostasis.

The changes associated with aging are apparent in all body systems.



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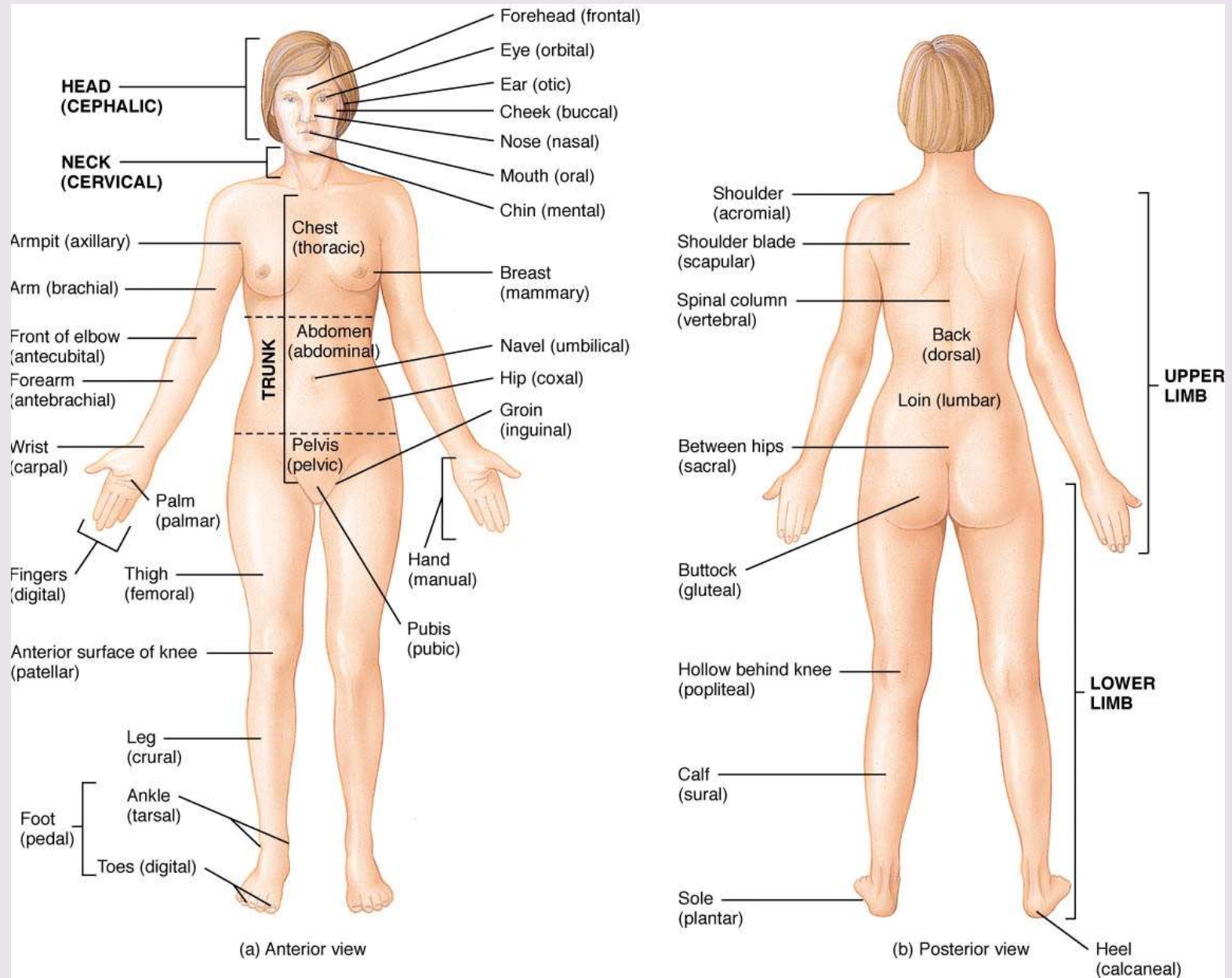


Figure 1.04 The Anatomical Position



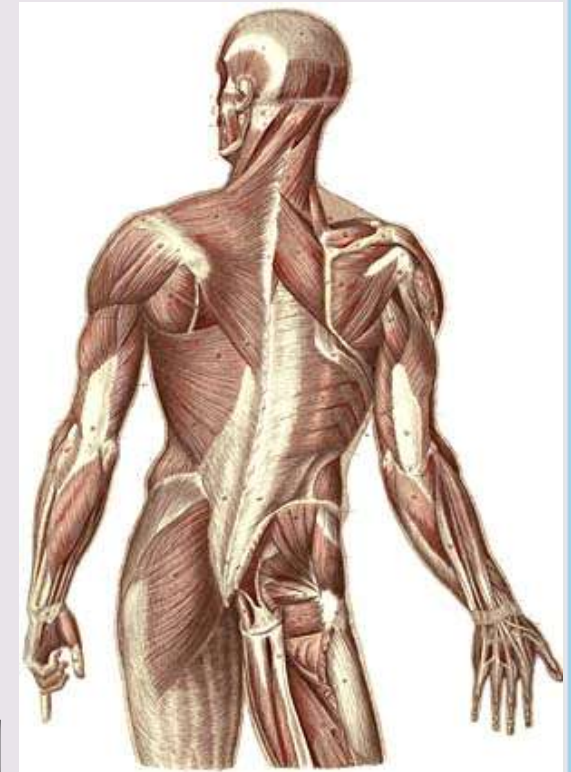
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Anatomical Terms

Directional terms are always given in regard to the body in **ANATOMICAL POSITION**.

In anatomical position, the subject stands erect facing the observer, with the head level and the eyes facing forward. The feet are flat on the floor and directed forward and the arms are at the sides with palms turned forward.





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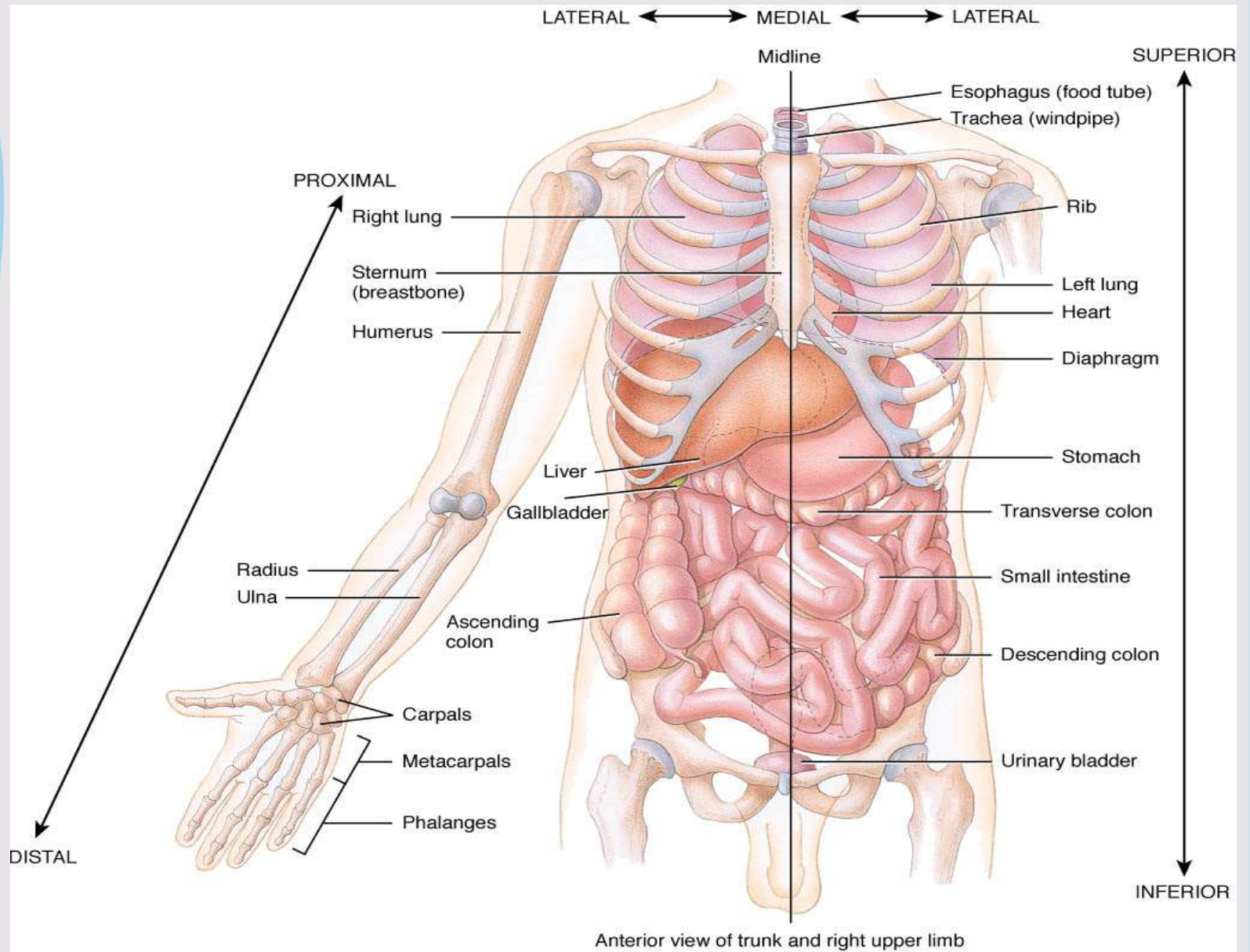


Figure 1.05 Directional Terms



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Anatomical Terms

SUPERIOR – towards the head, or the upper part of a structure

INFERIOR – towards the feet, or the lower part of a structure

ANTERIOR/VENTRAL – nearer to or at the front of the body

POSTERIOR/DORSAL – nearer to or at the back of the body

MEDIAL – nearer to the midline or midsagittal plane

LATERAL – farther from the body midline or midsagittal plane



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Anatomical Terms

INTERMEDIATE – between two structures

PROXIMAL – nearer to the attachment of a limb to the trunk

DISTAL – farther from the attachment of a limb to the trunk

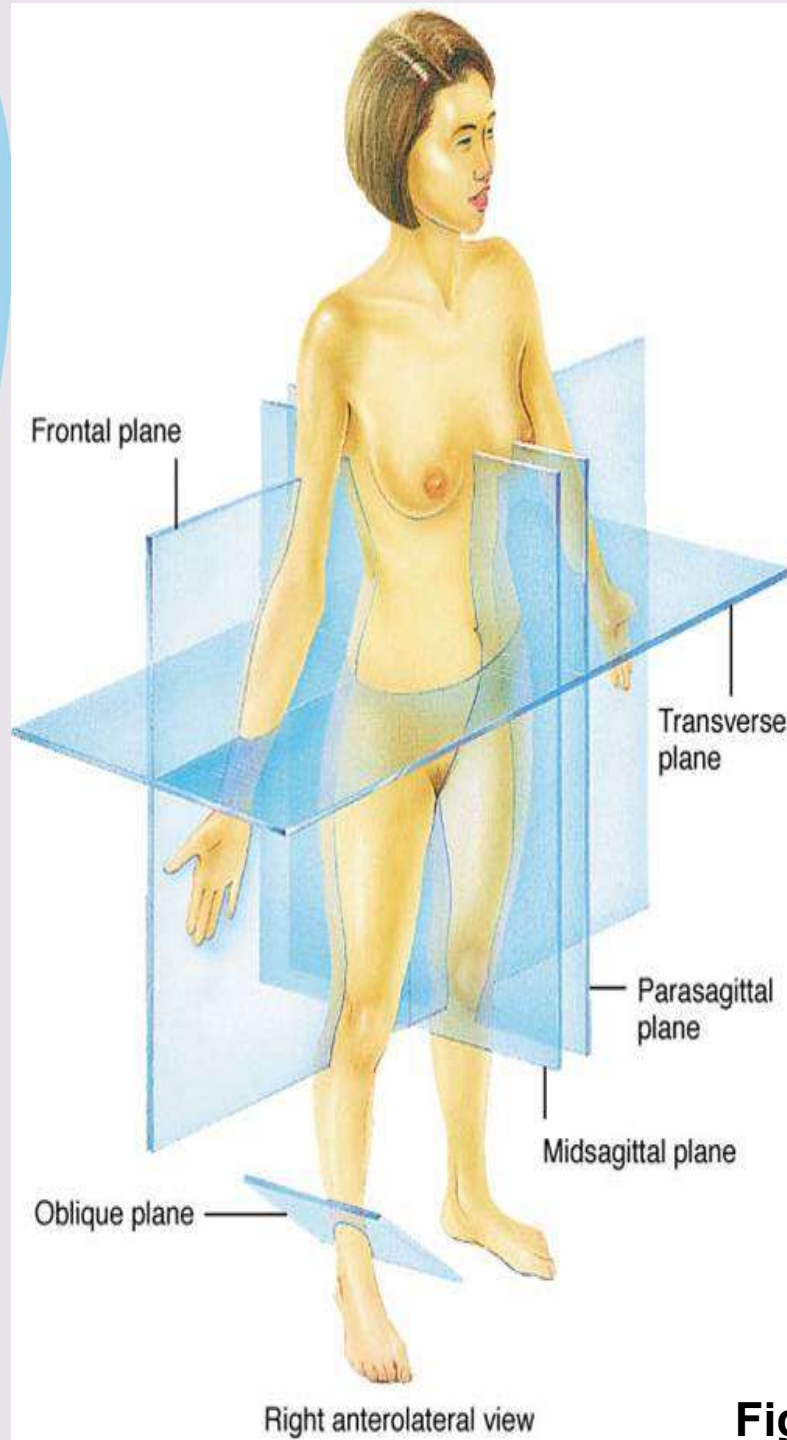
SUPERFICIAL – toward or on the body surface

DEEP – away from the surface of the body



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Right anterolateral view

Body Planes

BODY PLANES

Sections that are imaginary flat surfaces that pass through the body parts

Figure 1.06 Planes of the Human Body



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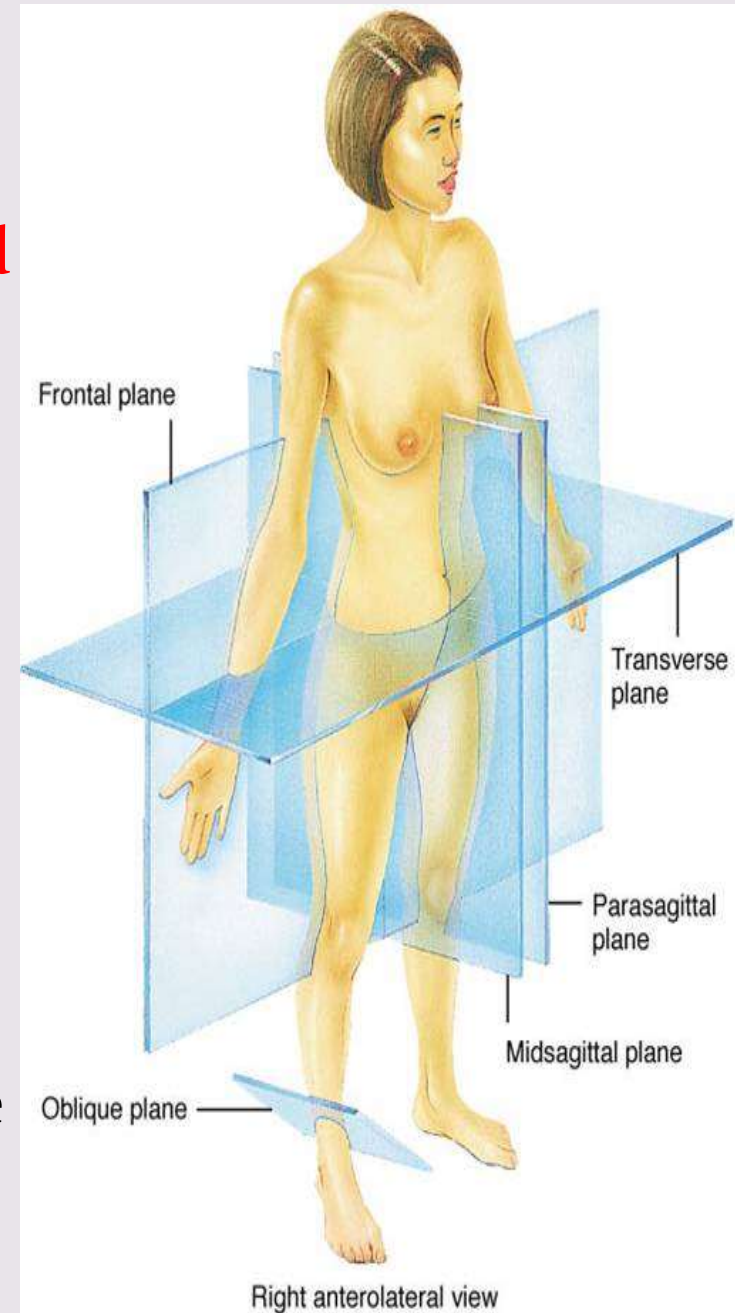
Body Planes

SAGITTAL PLANE

Vertical plane that divides the body or an organ into **RIGHT and LEFT** sides.

If the right and left sides are equal in size, it is called a **MIDSAGITTAL** plane and runs through the midline of the body or organs.

If the body or organ is divided into unequal right and left sides, the plane is called a **PARASAGITTAL** plane.





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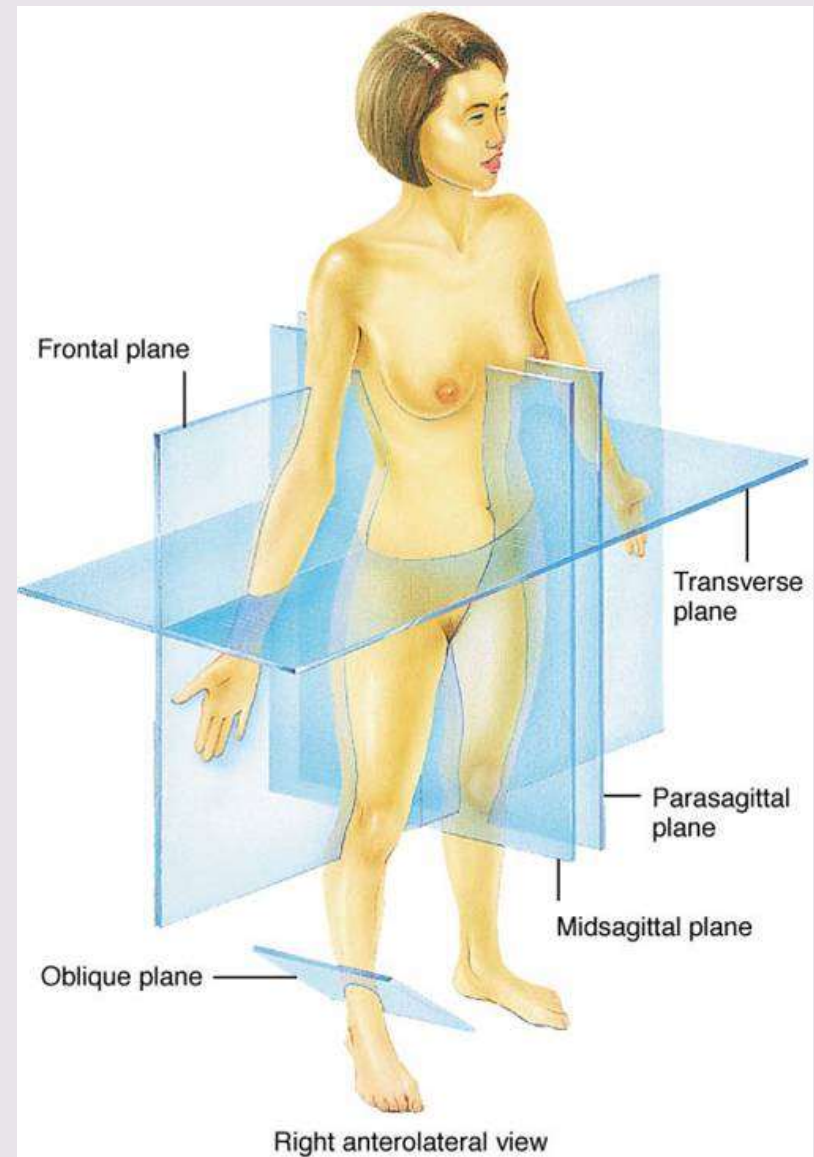
Body Planes

FRONTAL (CORONAL) PLANE

Divides the body or organ into **anterior and posterior positions.**

TRANSVERSE PLANE

Divides the body into superior and inferior positions.





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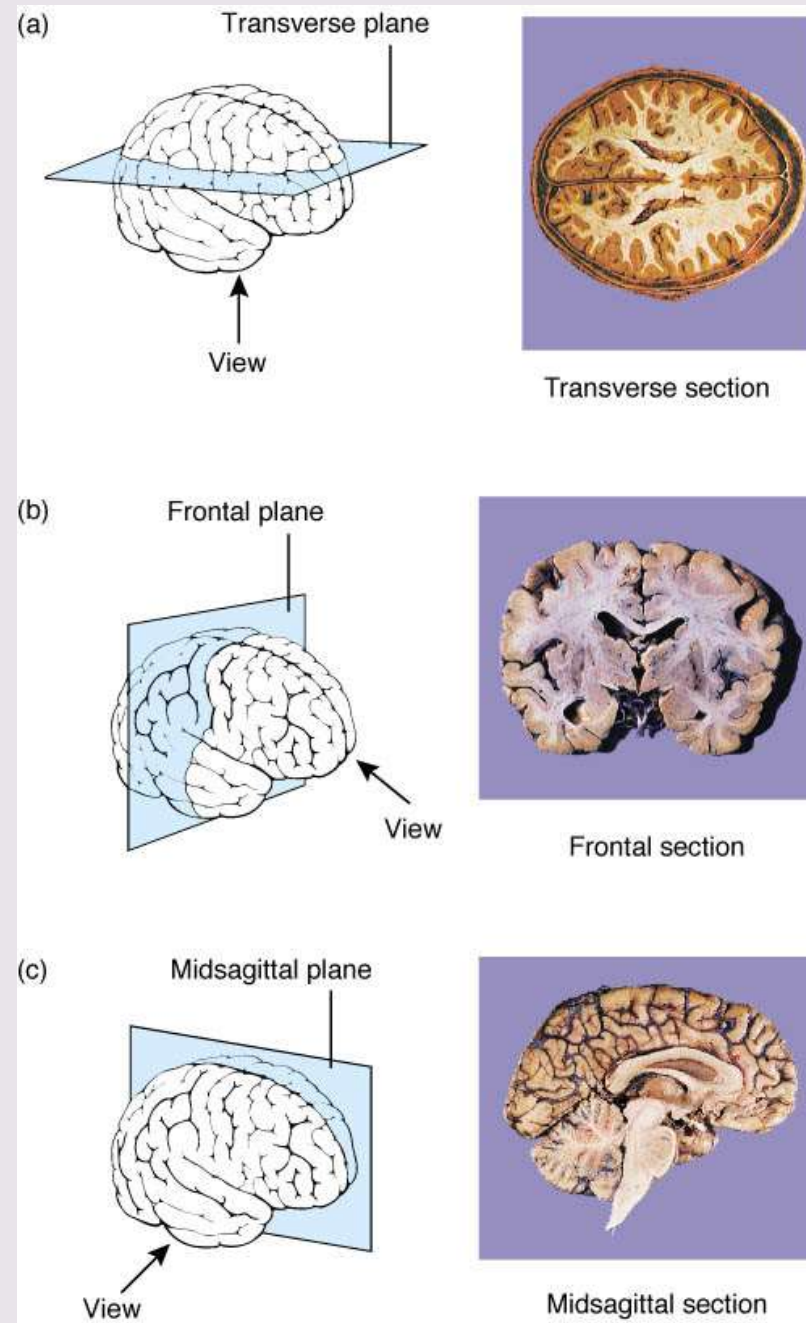


Figure 1.07 Planes and Sections Through Different Parts of the Brain



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Body Cavities

CAVITIES are spaces within the body that contain, protect, separate and support internal organs.

Two principal cavities are the DORSAL and VENTRAL cavities.



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Body Cavities

The DORSAL CAVITY is subdivided into the **CRANIAL CAVITY**, which is formed by the cranial (skull) bones and contains the brain, and the **VERTEBRAL (spinal) CANAL** which is formed by the bones of the vertebral column and contains the spinal cord.



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Body Cavities

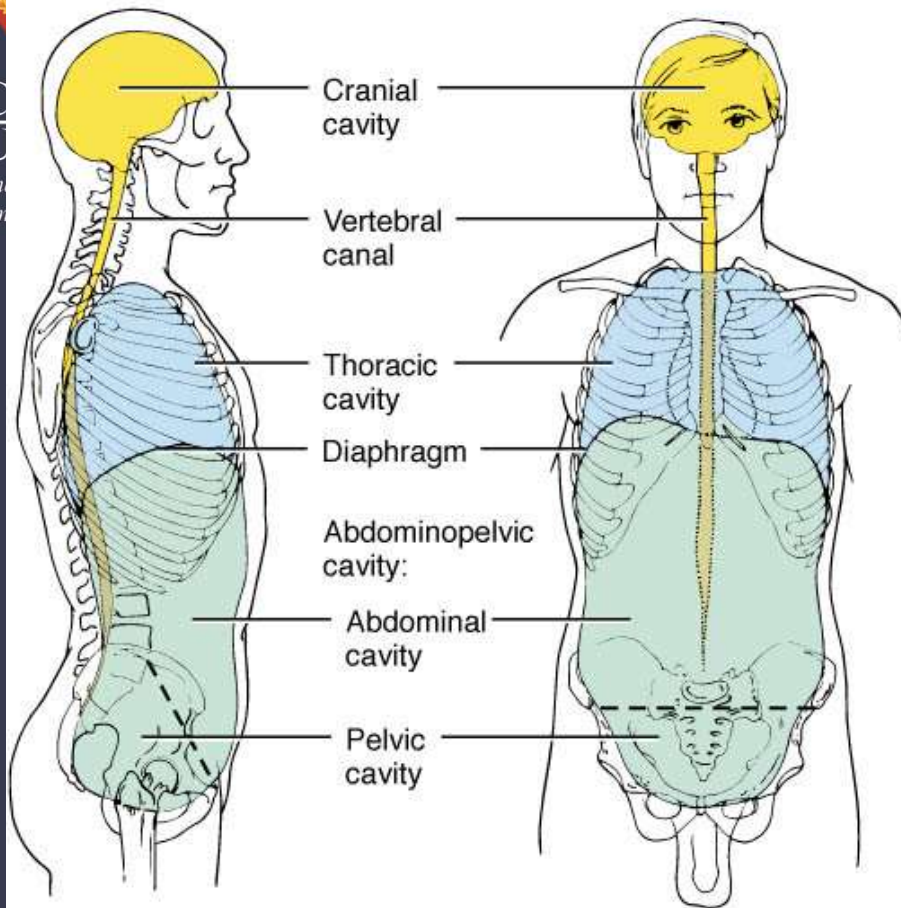
The VENTRAL CAVITY is subdivided by the diaphragm into:

The THORACIC CAVITY, which contains the heart, lungs, associated blood vessels, and respiratory organs

The ABDOMINOPELVIC CAVITY, which lies inferior to the diaphragm

DORSAL BODY CAVITY

 VENTRAL BODY CAVITY



(a) Right lateral view

(b) Anterior view

| CAVITY | COMMENTS |
|---------------------------------|--|
| DORSAL | |
| Cranial | Formed by cranial bones and contains brain and its coverings. |
| Vertebral | Formed by vertebral column and contains spinal cord and the beginnings of spinal nerves. |
| VENTRAL | |
| Thoracic* | Chest cavity; separated from abdominal cavity by diaphragm. |
| <i>Pleural (right and left)</i> | Contain lungs. |
| <i>Pericardial</i> | Contains heart. |
| <i>Mediastinum</i> | Region between the lungs from the breastbone to backbone that contains heart, thymus, esophagus, trachea, bronchi, and many large blood and lymphatic vessels. |
| Abdominopelvic | Subdivided into abdominal and pelvic cavities. |
| <i>Abdominal</i> | Contains stomach, spleen, liver, gallbladder, small intestine, and most of large intestine. |
| <i>Pelvic</i> | Contains urinary bladder, portions of the large intestine, and internal female and male reproductive organs. |

* See Figure 1.9 for details of the thoracic cavity.

Figure 1.08 Body Cavities



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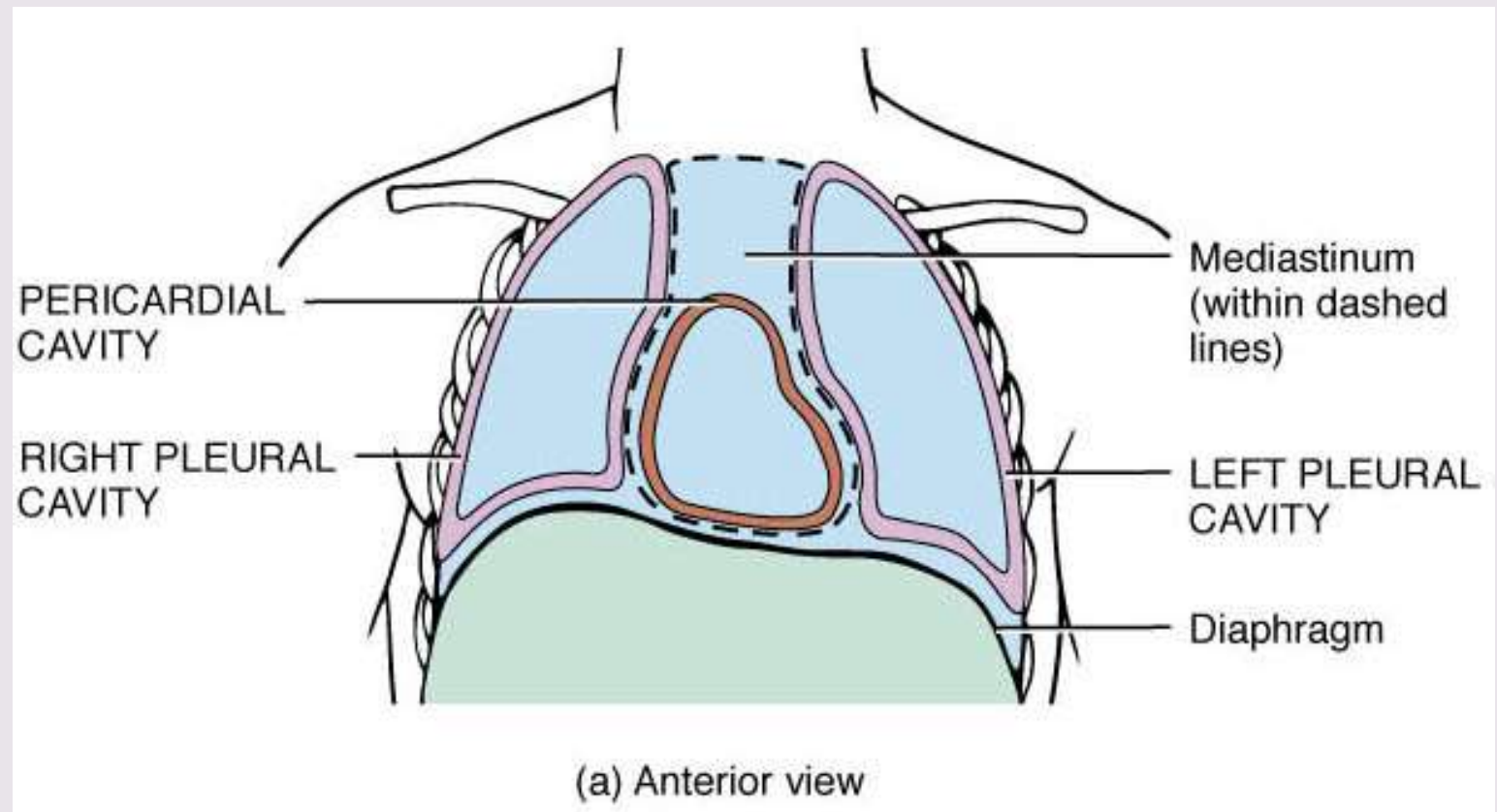


Figure 1.09 Thoracic Cavity



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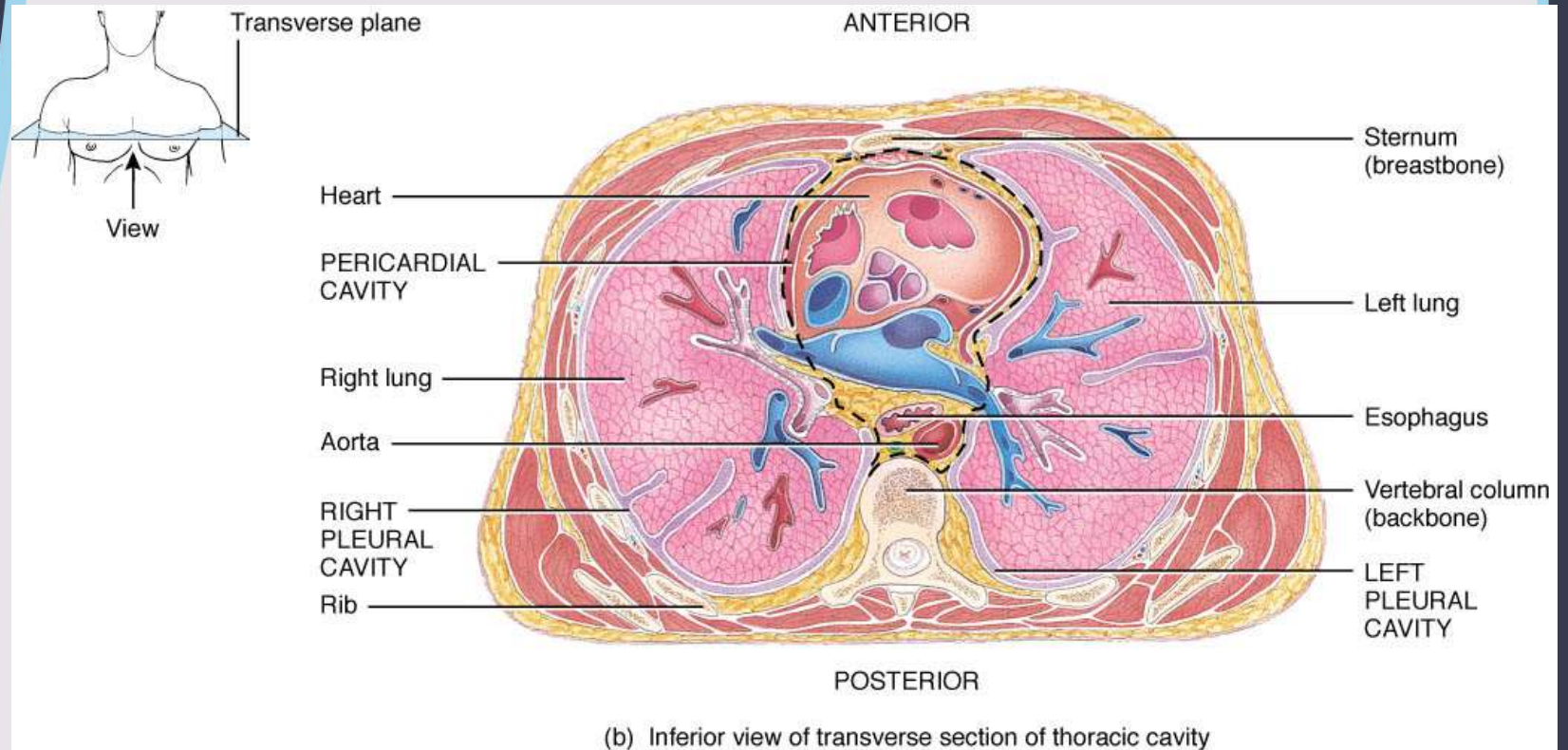


Figure 1.09b Thoracic Cavity



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ABDOMINOPELVIC REGIONS

The names of
the nine

(9)

**ABDOMINOP
ELVIC
REGIONS** are:

Epigastric

Right Hypochondriac

Left Hypochondriac

Umbilical

Right Lumbar

Left Lumbar

Hypogastric

Right Iliac

Left Iliac



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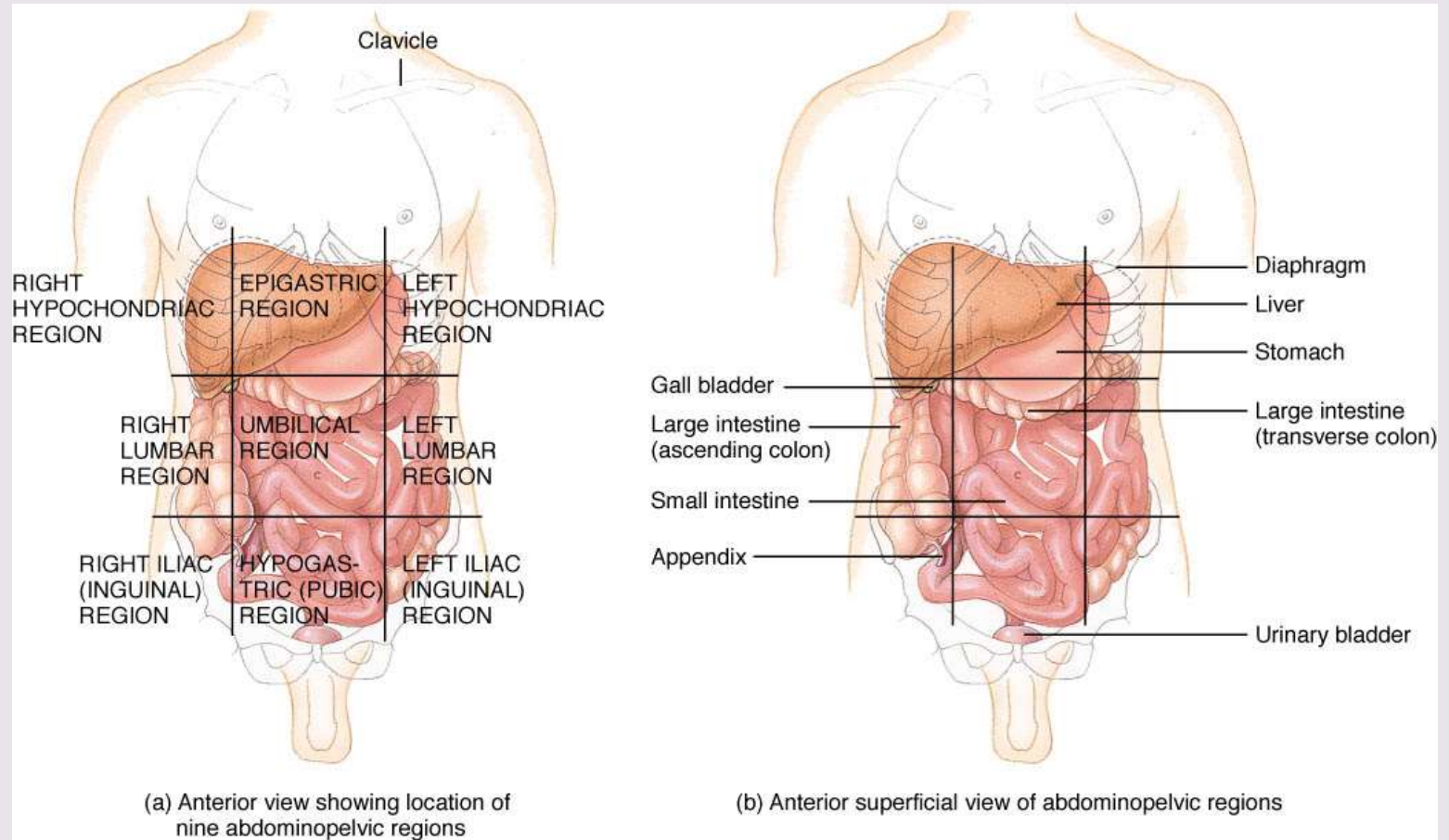


Figure 1.10 The Nine Regions of the Abdominopelvic Cavity



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ABDOMINOPELVIC Quadrants

Right Upper
Quadrant
(RUQ)

Left Upper Quadrant (LUQ)

Right Lower Quadrant (RLQ)

Left Lower Quadrant (LLQ)



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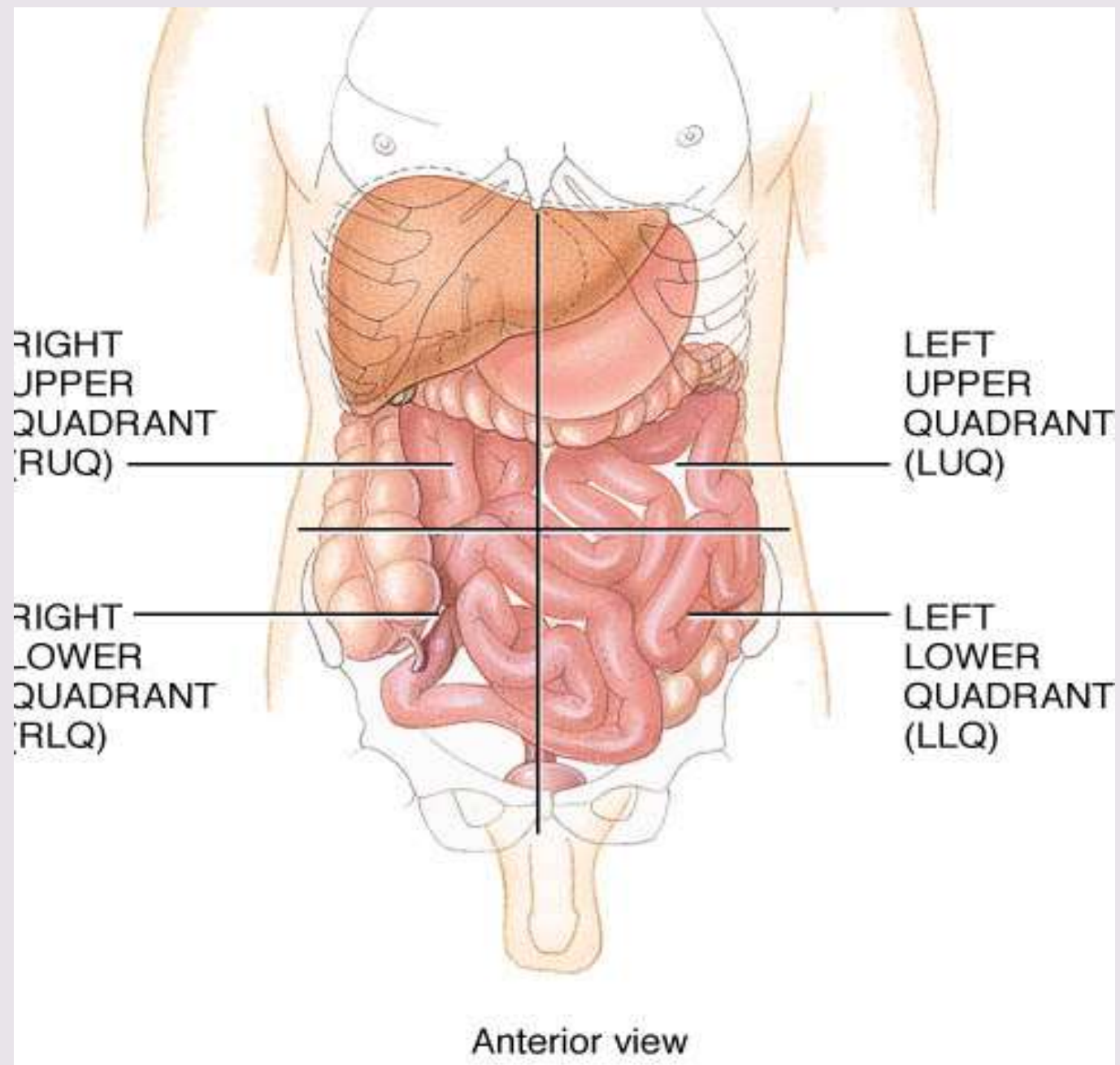


Figure 1.11 Quadrants of the Abdominopelvic Cavity