

ANATOMY AND PHYSIOLOGY

UNIT I

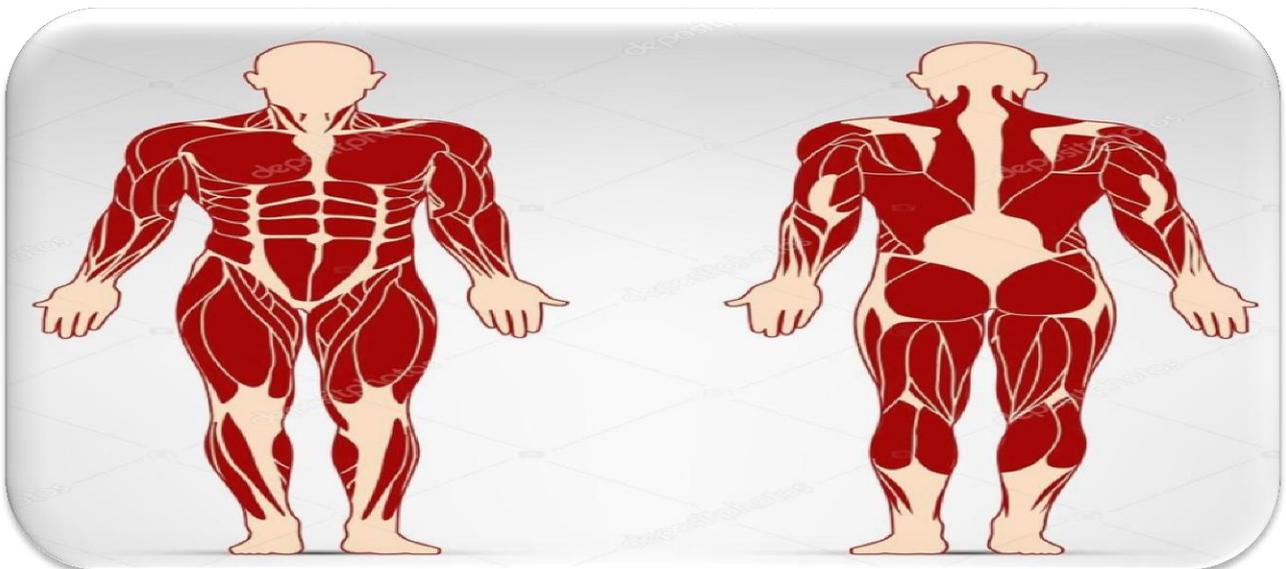
“Introduction to the Body as a Whole”

OBJECTIVES:

- Define the term Anatomy & Physiology (A&P).
- Understand the relationship between A&P.
- Define level of organization of the body.
- Define anatomical position.
- Describe the various body planes.
- Define the body cavities.
- Discuss body cavities and list the organs lying within each cavity.
- Identify abdominal pelvic region & quadrant.
- Identify the organs present in nine abdomino pelvic regions.
- Briefly discuss the importance of abdomino pelvic quadrants and regions.

HUMAN BODY

“The human body is highly technical and sophisticated machine. It operates as a single entity, but is made up of number of systems”.



Two branches of science anatomy and physiology provide the foundation for understanding the body's parts and functions.

ANATOMY

Anatomy is the study of the structure of the body and the physical relationship between its constituent parts.

Ana=Up,
Tomy= Process of cutting

PHYSIOLOGY

Physiology is the study of how the body systems work.

Physiology is subdivided into:

- Viral Physiology
- Bacterial Physiology
- Cellular Physiology
- Plant Physiology
- Human Physiology

Physio= Nature, Logy=Study

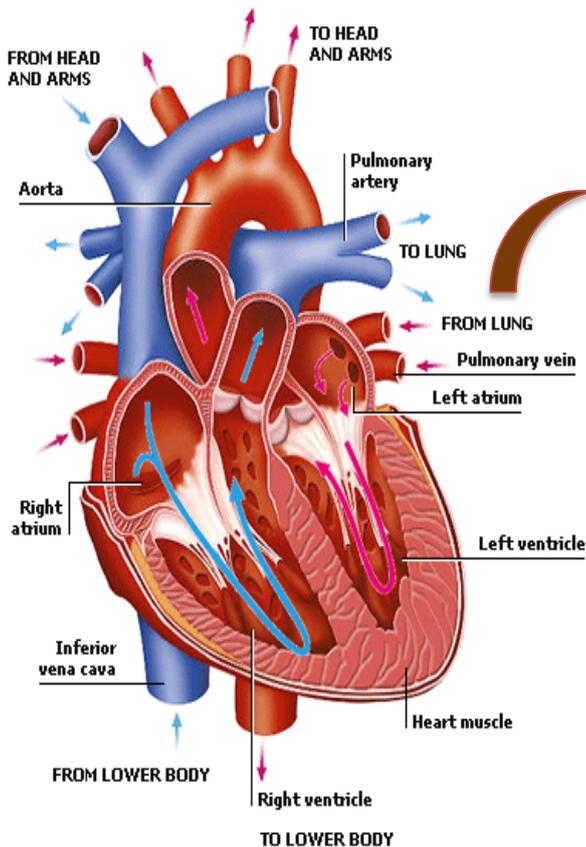
HUMAN PHYSIOLOGY:

Human physiology explains the specific characteristics and mechanisms of the human body that make it a living being.

RELATIONSHIP BETWEEN ANATOMY AND PHYSIOLOGY

Structure (Anatomy) and functions (Physiology) are so closely related.

ANATOMY	PHYSIOLOGY
Tells the structure of the organ.	Tells the function of the organ.
Tells physical relationship between body parts.	Tells the way in which organs integrated activities maintain life and health of the individual.



- Anatomy and physiology have a very close relationship because anatomy is the study of body parts, and physiology is the study of how these body parts work and function.
- It is important to know the names and locations of body parts, and it is equally important to understand how they work.
- For example, we can learn about the anatomy of the heart and blood vessels in the body. Then, we should understand how the heart and blood vessels function for the body.

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LEVEL OF ORGANIZATION OF BODY

There are six level of organization of body which helps us understand the anatomy and physiology.

1. Chemical Level
2. Cellular Level
3. Tissues Level
4. Organ Level
5. System Level
6. Organisms Level/Human Body

CHEMICAL LEVEL:

- Chemical is the most fundamental organizational level of body.
- In these Atoms combines to forms molecules.

CELLULAR LEVEL:

- Molecules combine to form cells.
- Cells are the smallest and basic unit of living organisms.
- Trillion of cells present in human body.
- Cells are too small to be seen with the naked eye.

TISSUE LEVEL:

- Cells with similar structures and functions are found together and forming tissue.

There are just four basic types of tissue in your body. —

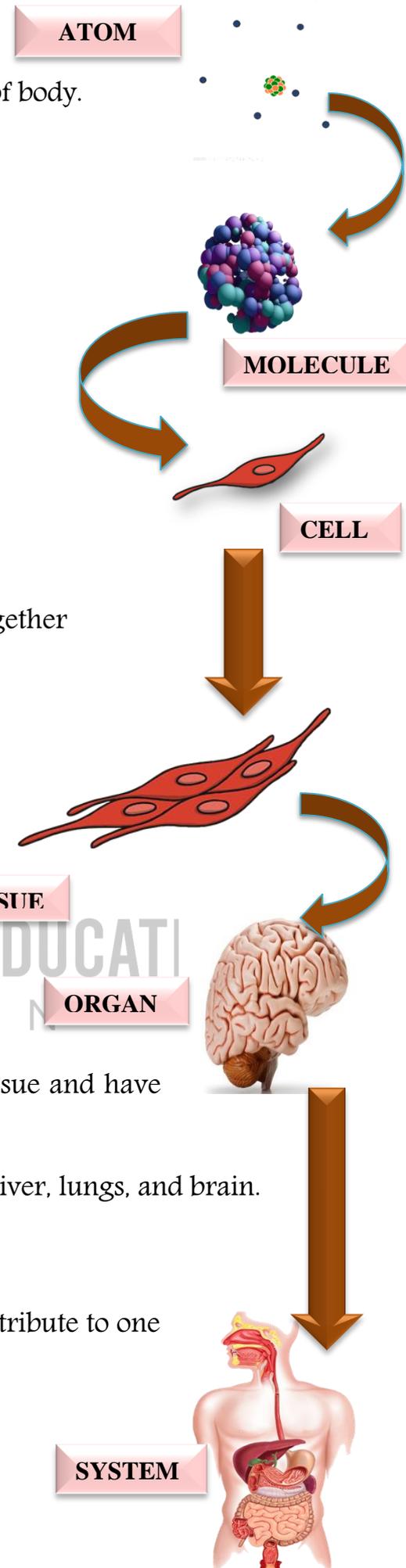
- Epithelial tissue
- Connective tissue
- Muscular tissue
- Nervous tissue

ORGAN LEVEL:

- Organs are made up of number of different types of tissue and have evolved to carry out a specific function.
- Examples of organs are the stomach, skin, bones, heart, liver, lungs, and brain.

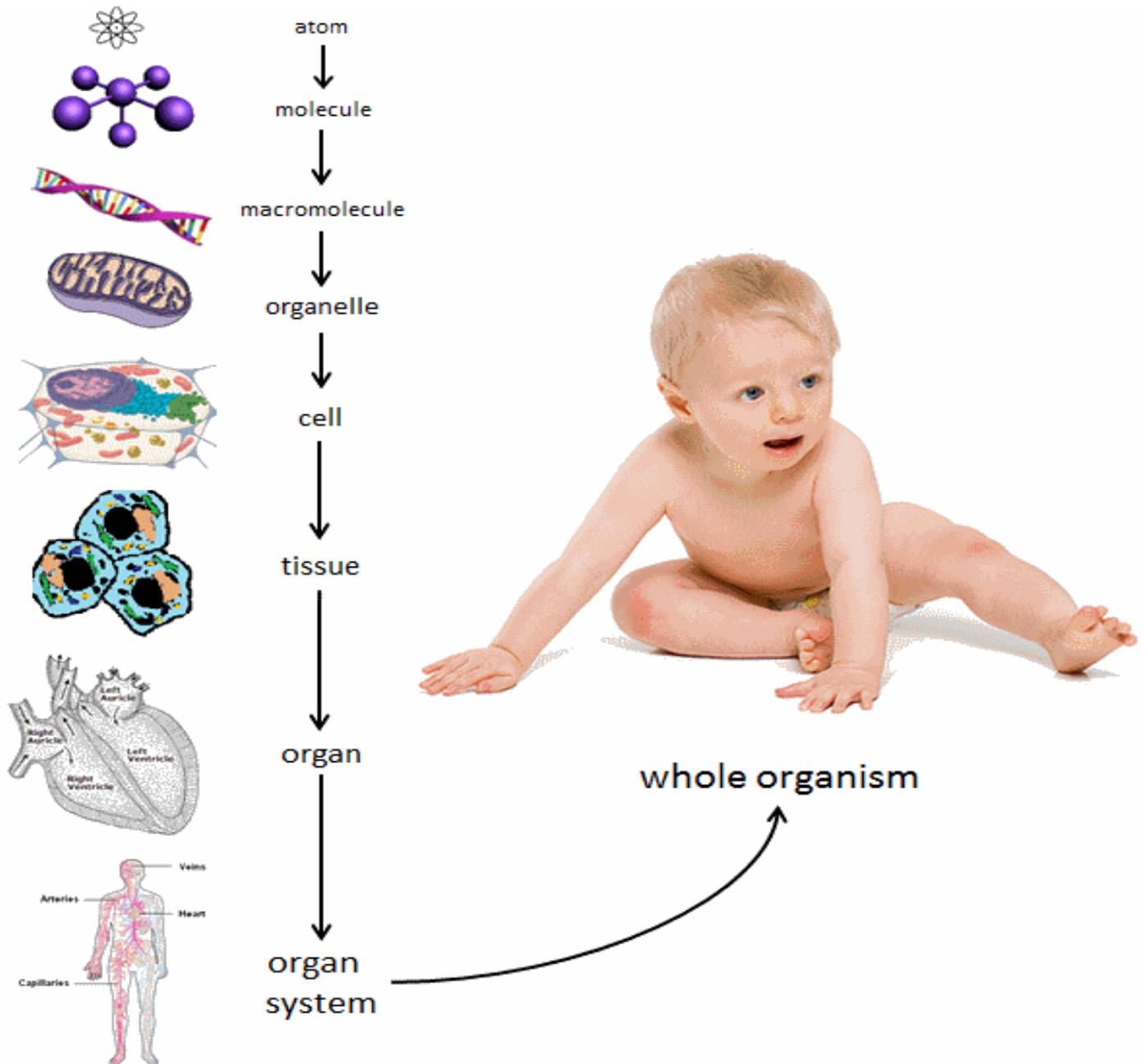
SYSTEM LEVEL:

- Systems consist of a number of organs that together contribute to one or more survival needs of the body.



ORGANISMS LEVEL/HUMAN BODY:

- Human body composed of many organs systems that work together to perform the function of an independent individual.



ANATOMICAL POSITION

“Descriptions of any region or part of the human body assume that it is in a specific stance called the anatomical position”

Some anatomical positions are discussed below:



- Prone Position
- Supine Position
- Superior
- Inferior
- Anterior
- Posterior
- Medial
- Lateral

Supine



Prone



PRONE POSITION:

If the body is placed face-down, it is known as prone position.

SUPINE POSITION:

If the body is lying face up, it is known as supine position.

SUPERIOR:

Towards the upper part of the structure, for example, your knee is superior to your ankle.

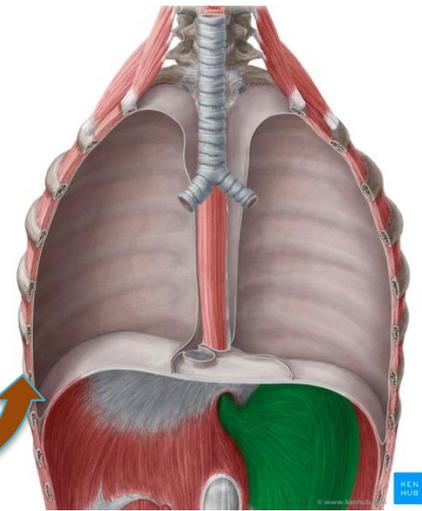
Knee is superior to ankle.



INFERIOR:

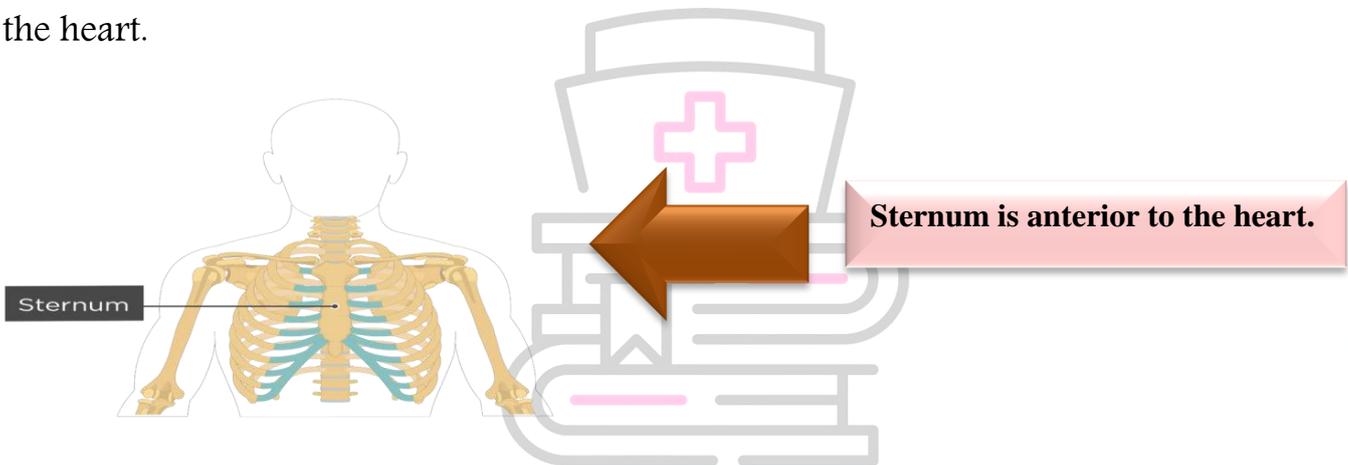
Towards the lower part of the structure, for example, the stomach is inferior to the lungs.

Stomach is inferior to lungs.



ANTERIOR/VENTRAL:

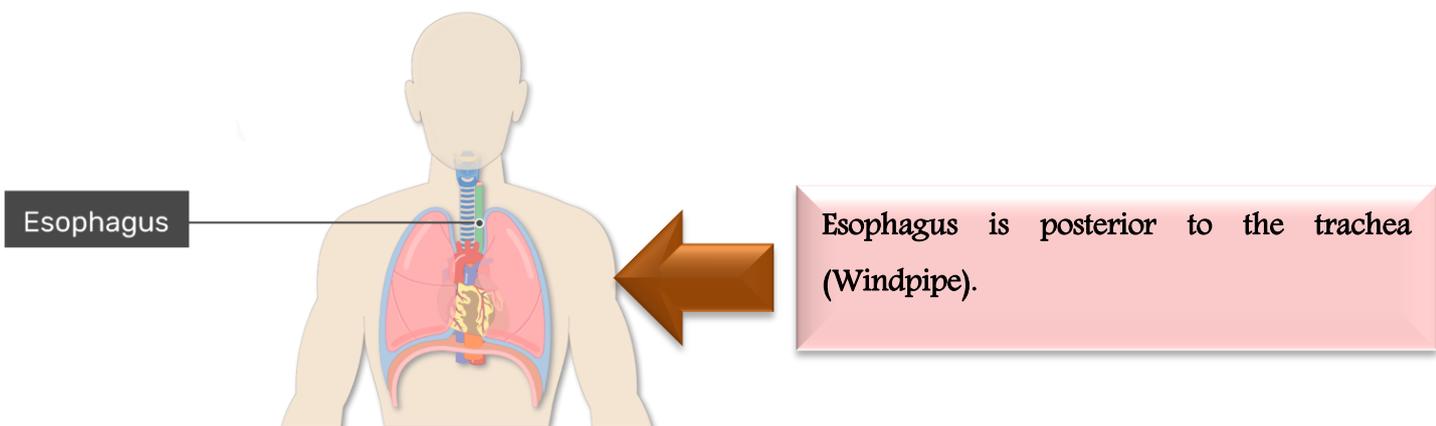
Nearer to or at the front of the body, for example, the sternum (Breast bone) is anterior to the heart.



Sternum is anterior to the heart.

POSTERIOR/DORSAL:

Nearer to or at the back of the body, for example, the esophagus is posterior to the trachea (Windpipe).



Esophagus is posterior to the trachea (Windpipe).



Anterior View

Anterior View is the front of the body.

Posterior View is back of the body.



Posterior View

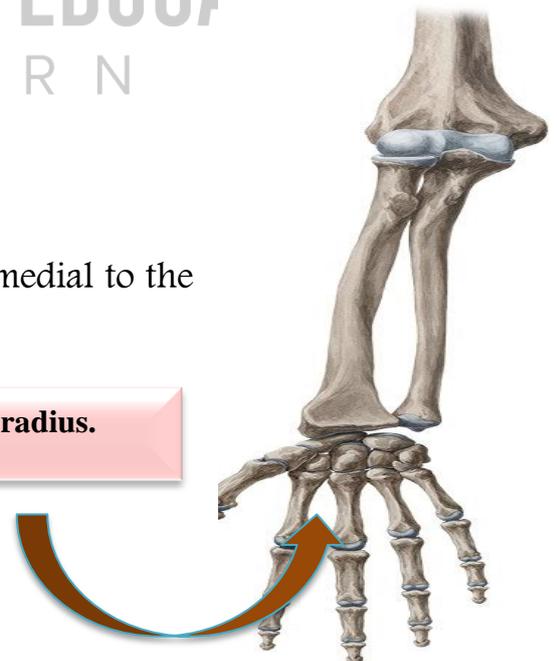
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MEDIAL:

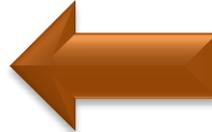
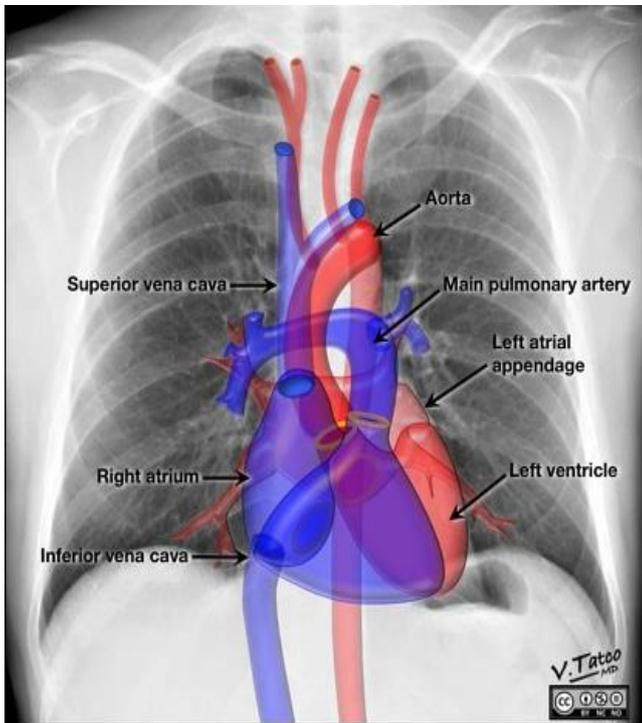
Structure is near to the midline, for example, the ulna is medial to the radius.

Ulna is medial to the radius.



LATERAL:

Structure is further from the midline, or at the side of the body, for example, the lungs are lateral to the heart.



Lungs are lateral to the heart.

BODY PLANES

Planes are used to divide the body and its parts.

Some major planes of body are given below:

- Sagittal Plane
- Frontal Plane
- Transverse Plane

SAGITTAL PLANE:

Sagittal plane is a vertical plane that divides the body or an organ into right and left sides.



FRONTAL/CORONAL PLANE:

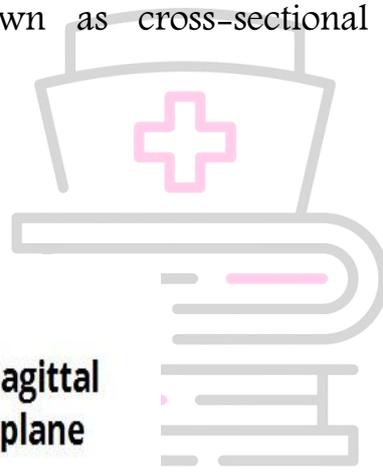
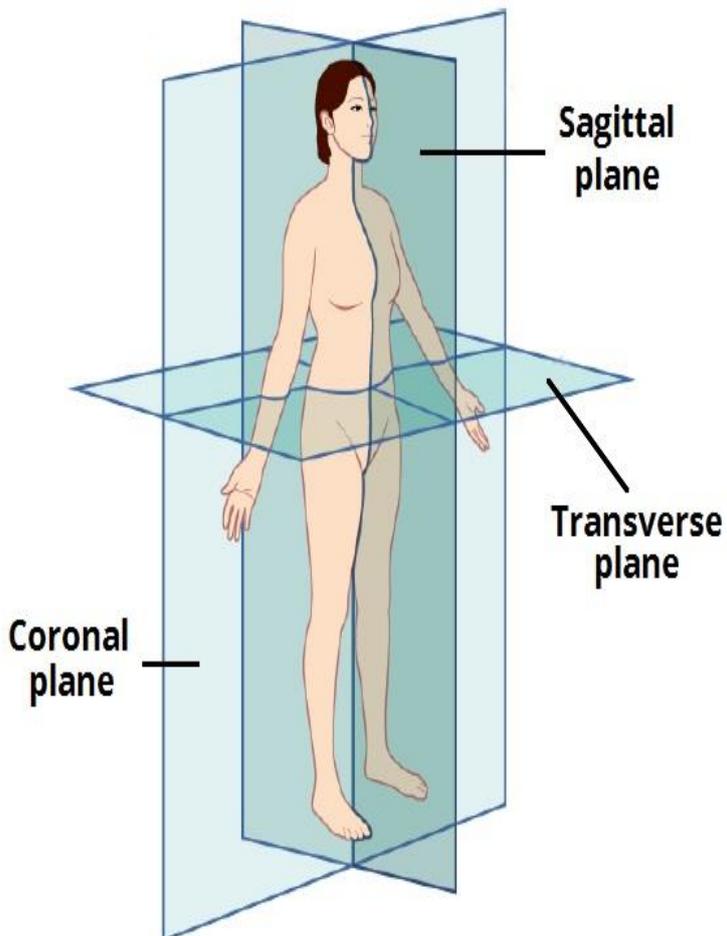
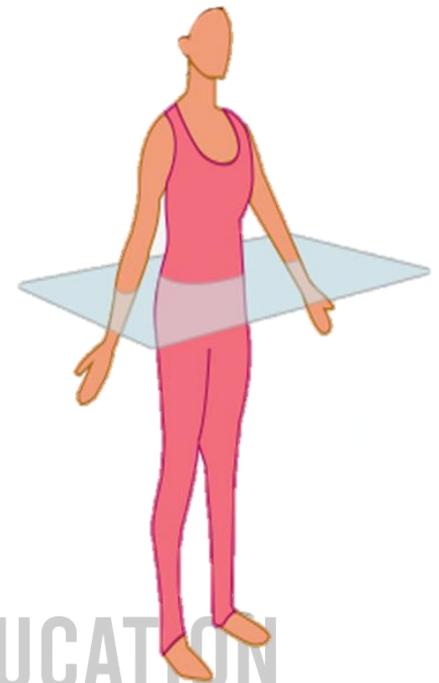
A frontal or coronal plane divides the body or an organ into anterior (front) and posterior (back) portions.



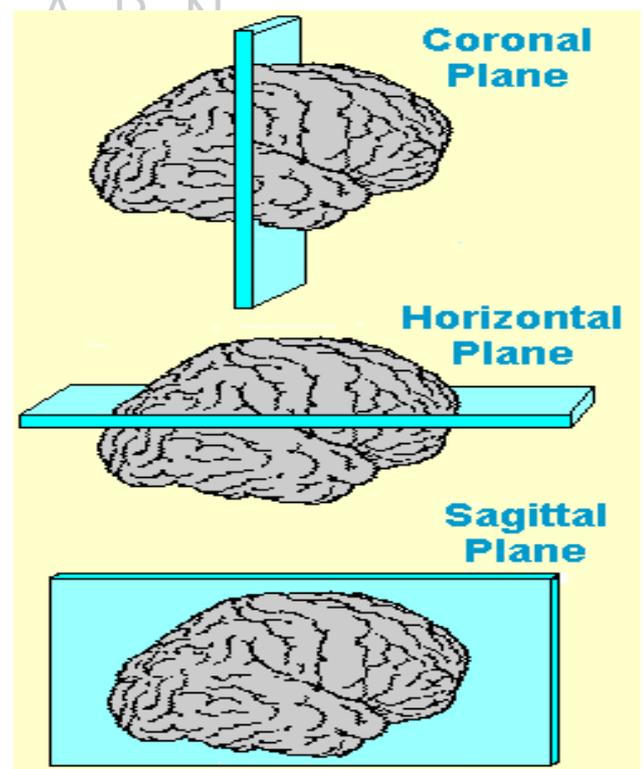
TRANSVERSE PLANE:

A transverse plane divides the body or an organ into superior (upper) and inferior (lower) portions.

Transverse plane is also known as cross-sectional and horizontal plane.



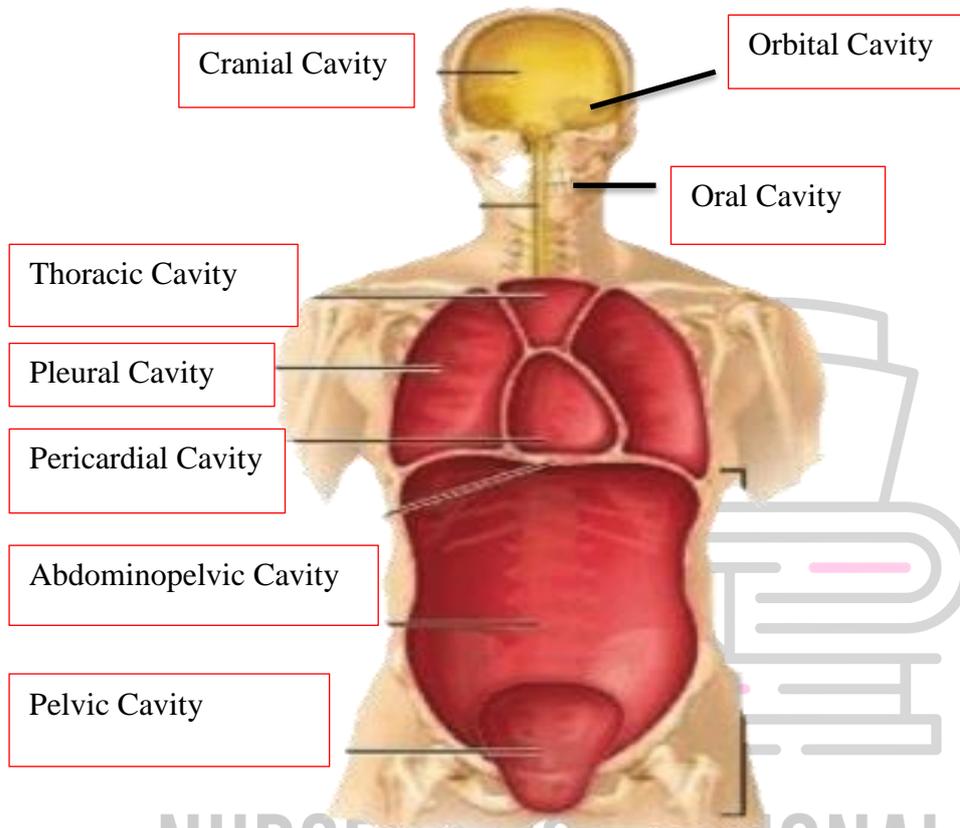
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BODY CAVITIES

Body cavities are spaces within the body that help protect, separate, and support internal organs.

Some body cavities are given below:



- Cranial Cavity
- Vertebral Cavity
- Thoracic Cavity
- Pericardial Cavity
- Pleural Cavity
- Abdominopelvic Cavity
- Oral Cavity
- Orbital Cavity
- Middle Ear Cavity
- Synovial Cavity

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CRANIAL CAVITY:

Cranial cavity formed by cranial bones and contains brain.

VERTEBRAL/SPINAL CANAL:

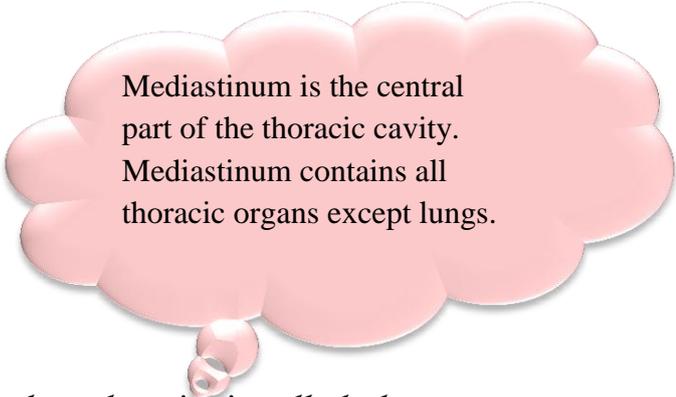
Formed by vertebral column and contains spinal cord and the beginnings of spinal nerves.

THORACIC/CHEST CAVITY:

Thoracic cavity is situated in the upper part of trunk. Thoracic cavity is formed by the ribs, muscle of the chest, sternum, and thoracic portion of the vertebral column. Thoracic cavity contains pleural and pericardial cavities and mediastinum.

PERICARDIAL CAVITY:

PERI= Around, CARDIAL= Heart
Surrounds the heart, the serous membrane of the pericardial cavity is called pericardium.



Mediastinum is the central part of the thoracic cavity. Mediastinum contains all thoracic organs except lungs.

PLEURAL CAVITY:

Each surrounds a lung; the serous membrane of each pleural cavity is called pleura.

ABDOMINOPELVIC CAVITY:

Abdominopelvic cavity subdivides into abdominal and pelvic cavities.

ABDOMINAL CAVITY:

This is the largest body cavity and is oval in shape contains stomach, spleen, liver, gallbladder, small intestine, and most of large intestine. The serous membrane of the abdominal cavity is the peritoneum.

PELVIC CAVITY:

The pelvic cavity is roughly funnel shaped, and extends from the lower end of the abdominal cavity. Pelvic cavity contains urinary bladder, portions of large intestine, and internal organs of reproduction.

ORAL/MOUTH CAVITY:

Oral cavity contains tongue and teeth.

ORBITAL CAVITIES:

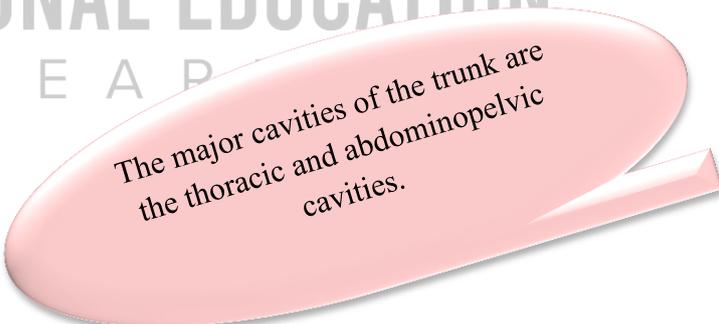
Orbital cavities contains eye ball.

MIDDLE EAR CAVITY:

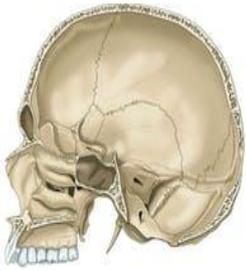
Middle ear cavity contains small bones in the middle ear.

SYNOVIAL CAVITY:

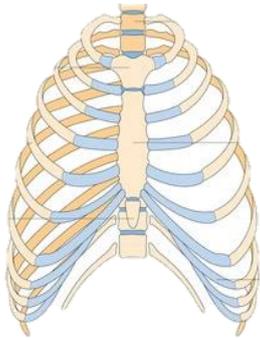
Synovial cavities are found in freely movable joints and contain synovial fluid.



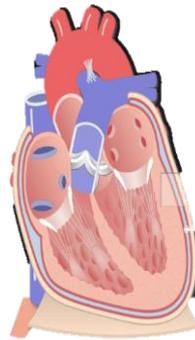
The major cavities of the trunk are the thoracic and abdominopelvic cavities.



Cranial Cavity



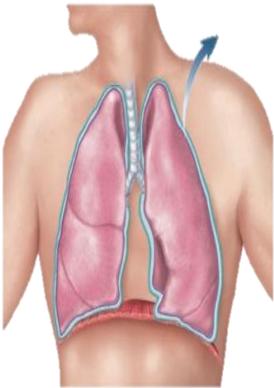
Thoracic Cavity



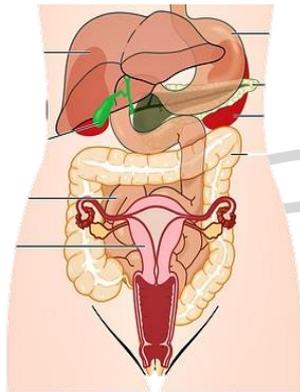
Pericardial Cavity



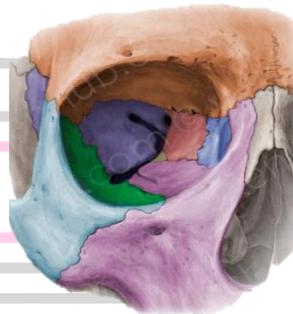
Oral Cavity



Pleural Cavity



Abdominopelvic Cavity



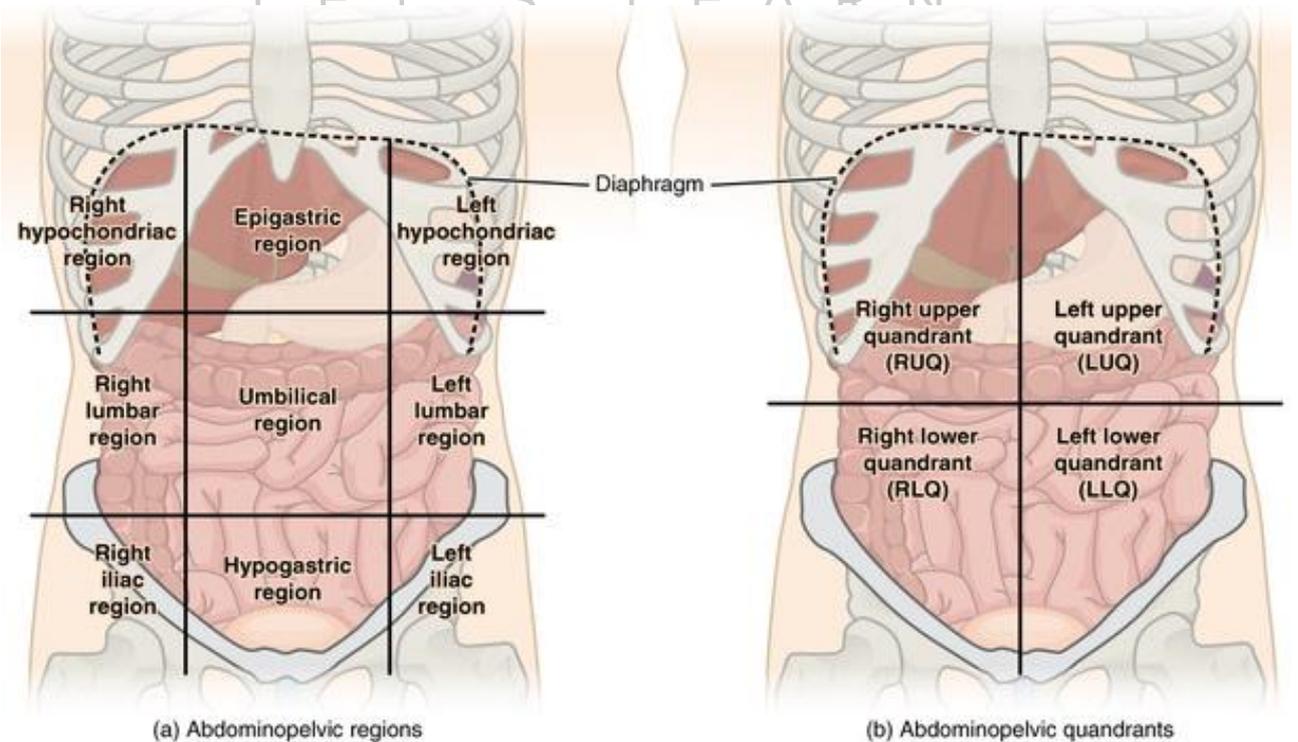
Orbital Cavity



Middle Ear Cavity

ABDOMINOPELVIC REGIONS AND QUADRANTS

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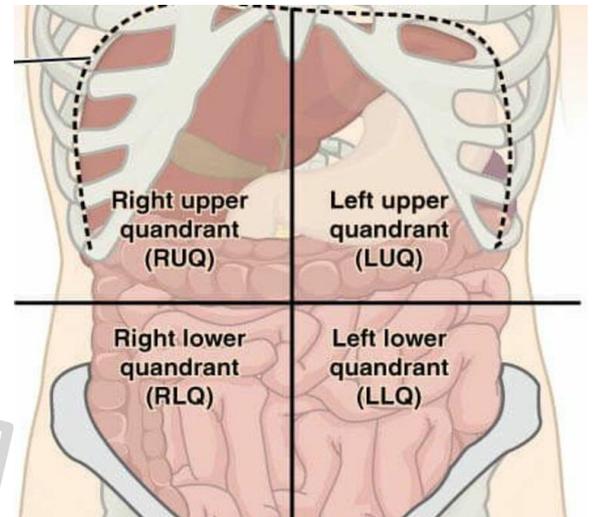
The abdominopelvic cavity is subdivided into four quadrants and nine regions.

ABDOMINAL QUADRANTS:

The quadrant designation is used to locate the site of pain, tumor, or some other abnormality.

There are four quadrants in abdominopelvic cavity.

- Left upper quadrant (LUQ)
- Right upper quadrant (RUQ)
- Left lower quadrant (LLQ)
- Right lower quadrant (RLQ)



LEFT UPPER QUADRANT (LUQ):

The left upper quadrant is the location of the left portion of the liver, the larger portion of the stomach, the pancreas, left kidney, spleen, portions of the transverse and descending colon, and parts of the small intestine.

Pain in this region is associated with malrotation of the intestine and colon.

RIGHT UPPER QUADRANT (RUQ):

The right upper quadrant contains the right portion of the liver, gallbladder, right kidney, a small portion of the stomach, portions of the ascending and transverse colon, and parts of the small intestine.

Pain in this region is associated with infection and inflammation in the gallbladder and liver or peptic ulcers in the stomach.

LEFT LOWER QUADRANT (LLQ):

The left lower quadrant houses the majority of the small intestine, some of the large intestine, the left female reproductive organs, and the left ureter.

Pain in this region is generally associated with colitis (inflammation of the large intestine) as well as pelvic inflammatory disease and ovarian cysts in females.

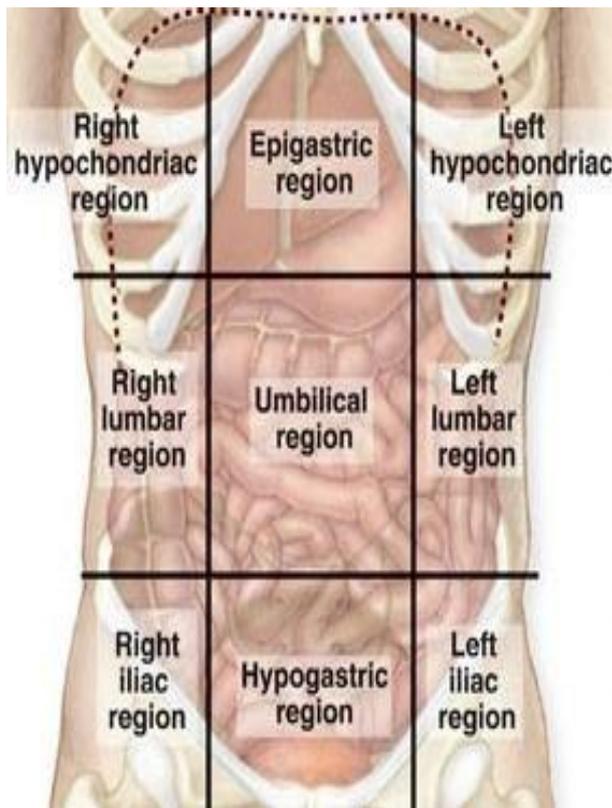
RIGHT LOWER QUADRANT (RLQ):

In the right lower quadrant sits the cecum, appendix, part of the small intestines, the right female reproductive organs, and the right ureter.

Pain in this region is most commonly associated with appendicitis.

ABDOMINOPELVIC REGIONS:

The nine regions of the abdominopelvic cavity are smaller than the four abdominopelvic quadrants. The nine regions division is more widely used for anatomical studies.



The regions of abdominopelvic cavity are:

- Right Hypochondriac Region
- Epigastric Region
- Left Hypochondriac Region
- Right Lumbar Region
- Umbilical Region
- Left Lumbar Region
- Right Iliac Region
- Hypo-gastric Region
- Left Iliac Region

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RIGHT HYPOCHONDRIAC REGION:

The right hypochondriac region contains the right portion of the liver, the gallbladder, the right kidney, and parts of the small intestine.

EPIGASTRIC REGION:

The Epigastric (above stomach) region contains the majority of the stomach, part of the liver, part of the pancreas, part of the duodenum, part of the spleen, and the adrenal glands. This region pushes out when the diaphragm contracts during breathing.

LEFT HYPOCHONDRIC REGION:

The left hypochondriac region contains part of the spleen, the left kidney, part of the stomach, the pancreas, and parts of the colon.

RIGHT LUMBAR REGION:

The right lumbar region consists of the gallbladder, the left kidney, part of the liver, and the ascending colon.

UMBILICAL REGION:

The umbilical region contains the umbilicus (navel), and many parts of the small intestine, such as part of the duodenum, the jejunum, and the ileum. It also contains the transverse colon (the section between the ascending and descending colons) and the bottom portions of both the left and right kidney.

LEFT LUMBAR REGION:

The left lumbar region consists of the descending colon, the left kidney, and part of the spleen.

RIGHT INGUINAL / ILIAC REGION:

The right iliac region contains the appendix, cecum, and the right iliac fossa. It is also commonly referred to as the right inguinal region. Pain in this area is generally associated with appendicitis.

HYPOGASTRIC/PUBIC REGION:

The hypo-gastric region (below the stomach) contains the organs around the pubic bone. These include bladder, part of the sigmoid colon, the anus, and many organs of the reproductive system, such as the uterus and ovaries in females and the prostate in males.

LEFT INGUINAL/ ILIAC REGION:

The left iliac region contains part of the descending colon, the sigmoid colon, and the left iliac fossa. It is also commonly called the left inguinal region.

IMPORTANCE OF ABDOMINOPELVIC QUADRANTS AND REGIONS

- The human abdomen is divided into quadrants and regions by anatomists and physicians for the purposes of study, diagnosis, and treatment.
- The division into four quadrants allows the localization of pain and tenderness, scars, lumps, and other items of interest, narrowing in on which organs and tissues may be involved.

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