ANATOMY AND PHYSIOLOGY (C.I.)

HUMAN ANATOMY
(Mod. A)

ANATOMICAL TERMINOLOGY

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Biology of Human and Environmental Health
ANATOMICAL POSITION:

ANATOMICAL POSITION is the reference position. All anatomical descriptions, to avoid ambiguity, refer to the body in this position.

- standing upright
- upper limbs held out to each side
- palms of the hands facing forward
- hands with extended fingers
BODY REGIONS

TRUNK
in a broad sense

STEERING/EXTREMITIES

Pectoral girdle
(clavicle + scapula)

Pelvic girdle
(hip bone)

Head

Neck

Thorax

Abdomen

Pelvis/Perineum

Upper limbs

Lower limbs

Trunk
in a narrow sense

Head/Neck

Thorax

Abdomen

Pelvis/Perineum

Upper limb

Dorsum

Lower limb
The human body’s regions have specific terms to help increase precision.

Notice that:

- the term “brachium” or “arm” is reserved for the “upper arm”, which is the portion between the shoulder and the elbow.
- “Antebrachium” or “forearm” is the portion between the elbow and the wrist.
- The term “femur” or “thigh” indicates the portion between the hip and the knee.
- “Leg” or “crus” is reserved for the portion of the lower limb between the knee and the ankle.
DIRECTIONAL TERMS are essential for describing the relative locations of different body structures.

- **Anterior** (or *ventral*) Describes the front or direction toward the front of the body. The toes are anterior to the foot.
- **Posterior** (or *dorsal*) Describes the back or direction toward the back of the body. The popliteus is posterior to the patella.
- **Superior** (or *cranial*) describes a position above or higher than another part of the body proper. The orbits are superior to the oris.
- **Inferior** (or *caudal*) describes a position below or lower than another part of the body proper; near or toward the tail (in humans, the coccyx, or lowest part of the spinal column). The pelvis is inferior to the abdomen.
- **Lateral** describes the side or direction toward the side of the body. The thumb (pollex) is lateral to the digits.
- **Medial** describes the middle or direction toward the middle of the body. The hallux is the medial toe.
- **Proximal** describes a position in a limb that is nearer to the point of attachment or the trunk of the body. The brachium is proximal to the antebrachium.
- **Distal** describes a position in a limb that is farther from the point of attachment or the trunk of the body. The crus is distal to the femur.
- **Superficial** describes a position closer to the surface of the body. The skin is superficial to the bones.
- **Deep** describes a position farther from the surface of the body. The brain is deep to the skull.
<table>
<thead>
<tr>
<th>Term</th>
<th>Etymology</th>
<th>Definition*</th>
<th>Example</th>
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<tbody>
<tr>
<td>Right</td>
<td></td>
<td>Toward the body’s right side</td>
<td>The right ear</td>
</tr>
<tr>
<td>Left</td>
<td></td>
<td>Toward the body’s left side</td>
<td>The left ear</td>
</tr>
<tr>
<td>Inferior</td>
<td>Lower</td>
<td>Below</td>
<td>The nose is inferior to the forehead.</td>
</tr>
<tr>
<td>Superior</td>
<td>Higher</td>
<td>Above</td>
<td>The mouth is superior to the chin.</td>
</tr>
<tr>
<td>Anterior</td>
<td>To go before</td>
<td>Toward the front of the body</td>
<td>The teeth are anterior to the throat.</td>
</tr>
<tr>
<td>Posterior</td>
<td>Posterus, following</td>
<td>Toward the back of the body</td>
<td>The brain is posterior to the eyes.</td>
</tr>
<tr>
<td>Dorsal</td>
<td>Dorsum, back</td>
<td>Toward the back (synonymous with posterior)</td>
<td>The spine is dorsal to the breastbone.</td>
</tr>
<tr>
<td>Ventral</td>
<td>Venter, belly</td>
<td>Toward the belly (synonymous with anterior)</td>
<td>The navel is ventral to the spine.</td>
</tr>
<tr>
<td>Proximal</td>
<td>Proximus, nearest</td>
<td>Closer to a point of attachment</td>
<td>The elbow is proximal to the wrist.</td>
</tr>
<tr>
<td>Distal</td>
<td>di + sto, to be distant</td>
<td>Farther from a point of attachment</td>
<td>The knee is distal to the hip.</td>
</tr>
<tr>
<td>Lateral</td>
<td>Latus, side</td>
<td>Away from the midline of the body</td>
<td>The nipple is lateral to the breastbone.</td>
</tr>
<tr>
<td>Medial</td>
<td>Medialis, middle</td>
<td>Toward the middle or midline of the body</td>
<td>The bridge of the nose is medial to the eye.</td>
</tr>
<tr>
<td>Superficial</td>
<td>Superficialis, surface</td>
<td>Toward or on the surface</td>
<td>The skin is superficial to muscle.</td>
</tr>
<tr>
<td>Deep</td>
<td>Deep, deep</td>
<td>Away from the surface, internal</td>
<td>The lungs are deep to the ribs.</td>
</tr>
</tbody>
</table>

*All directional terms refer to a human in the anatomical position.*
The anatomical axes are imaginary lines that cross the body in the three dimensions of space: LENGTH, WIDTH, DEPTH

**LONGITUDINAL OR CRANIOCAUDAL AXIS (y)**
it is perpendicular to the base of support when the body is standing upright

**HORIZONTAL OR LEFT-RIGHT AXIS (x)**
it is perpendicular to longitudinal axis

**SAGITTAL OR DORSOVENTRAL AXIS (z)**
it goes from the anterior surface to the posterior surface of the body; it is perpendicular to longitudinal and horizontal axes
When two axes intersect each other, they form planes

**SAGITTAL PLANE**
Plane passing through the LONGITUDINAL and SAGITTAL axes. It runs in an antero-posterior position, dividing the body vertically into right and left sides. If this vertical plane runs directly down the middle of the body, it is called the median plane.

**FRONTAL PLANE**
Plane passing through the HORIZONTAL and LONGITUDINAL axes. It runs vertically in a latero-lateral position, dividing the body into an anterior (front) portion and a posterior (rear) portion.

**TRANSVERSE PLANE**
Plane passing through the HORIZONTAL and SAGITTAL axes, it is perpendicular to the sagittal and frontal planes. It divides the body horizontally into upper and lower portions.
A **SECTION** is a cut of the body or one of its organs made along one of the planes just described.

- a. Sagittal (median) plane
- b. Frontal (coronal) plane
- c. Transverse (horizontal) plane
- d. Sagittal section of pelvic cavity
- e. Frontal section of thoracic cavity
- f. Transverse section of head at eye level
Transvers section of the thorax
Sagittal section of the abdomen
Spaces within the human body which contain and protect delicate internal organs. The ventral cavity allows for significant changes in the size and shape of the organs as they perform their functions.
<table>
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<tr>
<th>CAVITY</th>
<th>COMMENTS</th>
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<tr>
<td>Cranial cavity</td>
<td>Formed by cranial bones and contains brain.</td>
</tr>
<tr>
<td>Vertebral canal</td>
<td>Formed by vertebrae column and contains spinal cord and the beginnings of spinal nerves.</td>
</tr>
<tr>
<td>Thoracic cavity*</td>
<td>Chest cavity; contains pleural and pericardial cavities and mediastinum.</td>
</tr>
<tr>
<td>Pleural cavity</td>
<td>Each surrounds a lung; the serous membrane of each pleural cavity is the pleura.</td>
</tr>
<tr>
<td>Pericardial cavity</td>
<td>Surrounds the heart; the serous membrane of the pericardial cavity is the pericardium.</td>
</tr>
<tr>
<td>Mediastinum</td>
<td>Anatomic region in the central portion of the thoracic cavity between the medial walls of pleural cavities; extends from sternum to vertebrae column and from first rib to diaphragm; contains all the structures of the thoracic cavity other than the lungs, including, for example, the heart, thymus, esophagus, trachea, and several large blood vessels.</td>
</tr>
<tr>
<td>Abdominopelvic cavity</td>
<td>Subdivided into abdominal and pelvic cavities.</td>
</tr>
<tr>
<td>Abdominal cavity</td>
<td>Contains stomach, spleen, liver, gallbladder, small intestine, and most of large intestine; the serous membrane of the abdominal cavity is the peritoneum.</td>
</tr>
<tr>
<td>Pelvic cavity</td>
<td>Contains urinary bladder, portions of large intestine, and internal organs of reproduction.</td>
</tr>
</tbody>
</table>

* See figure 1.10 for details of the thoracic cavity.
Body Cavities

Dorsal Cavity
- Cavity in the BACK of the body
  - Cranial Cavity
    - Brain
  - Spinal Cavity
    - Spinal Cord
  - Pleural Cavities
    - Lungs

Ventral Cavity
- Cavity in the FRONT of the body
  - Thoracic Cavity
    - Mediastinum
      - Trachea, Esophagus
  - Abdominal Cavity
    - Abdominal
      - Liver
      - Stomach
      - Pancreas
      - Intestines
  - Pelvic
    - Bladder
    - Reprod. Organs

Pericardial Cavity
- Heart, Great Vessels
ABDOMINAL REGIONS AND QUADRANTS

The simpler quadrants approach, which is more commonly used in medicine, subdivides the cavity with one median sagittal plane and one transverse plane that intersect at the patient’s umbilicus (navel).

The more detailed regional approach subdivides the cavity with

a) two transverse planes
   - a subcostal plane, tangent to the lowest point of the rib cage (at the level of the 10th rib)
   - an interspinous plane, which passes through the anterosuperior iliac spines (at the level of the pelvis)

These 2 planes divide the abdomen into 3 areas: upper, intermediate and lower areas

b) two lateral planes with respect to the rectus abdominis muscle
   - the right lateral plane of the rectus abdominis muscle
   - the left lateral plane of the rectus abdominis muscle
9 abdominal regions derive from the intersection of these two pairs of planes

In the center of the abdominal cavity:
1. the epigastrium, above
2. the mesogastrium
3. the hypogastrium, below

On the sides, above:
4. the right hypochondrium
5. the left hypochondrium

On the sides, at the intermediate level:
6. the right lumbar region
7. the left lumbar region

On the sides, below:
8. the right inguinal region
9. the left inguinal region

Based on the localization of an abdominal pain in a specific one of these areas, it is possible to have an indication of the organ affected by the pain