

Exercise 1: Introduction to the Human Body



Figure 1.1 This painting, entitled "The Master" by Carlos Bonvolot (1914) depicts Professor Henrique de Vilhena conducting an anatomy lesson to his pupils at The University of Lisbon.

Exercise 1 Learning Goals

After completing this lab you should be able to:

- Define Anatomy and its subdivisions: Regional, Systemic, Surface, Microscopic, and Gross.
- Explain how combining the subdivisions of anatomy are important for developing a deep understanding of the 3-dimensional structure of the human body.
- Define histology and describe how you will be using histology in this course.
- Define Physiology. Provide some examples of the subdivisions of physiology: pathophysiology, exercise physiology, neurophysiology. Explain

that for every functional aspect of the human body, there is a corresponding field of physiology.

- Explain how structure relates to function.
- Describe anatomical position. Be able to demonstrate anatomical position. Describe directional terminology and be able to use directional terminology to describe structures in the human body.
- Identify the planes of the body and describe how they different planes bisect the body. Explain why the planes of the body are important in the study of cross-sectional anatomy or in the field of radiology.
- Describe the location of the compartments or cavities of the body.
- Describe the serous membranes for the mediastinal, pleural, and abdominal cavities.
- Describe the regions and quadrants of the abdomen.

Pre-Laboratory Exercise 1

Activity 1

Instructions Using your textbook, complete the following pre-lab activity.

Define Anatomy:
Contrast different approaches to the study of anatomy (Regional, Systemic, Cross-Sectional):
Define Histology:
Define Physiology:
Describe 3 different subfields of physiology:

Exercise 1: Introduction to the Human Body

Activity 1.1: Introduction to Anatomical Position and Directional Terms

Try standing in **anatomical position**, with your feet planted on the floor about hip-width apart, palms facing forward, eyes looking straight ahead. When a person is in anatomical position lying on their back, this is called **supine**. The **prone** position is lying face down. All directional terms are used in reference to the body as it is in anatomical position.

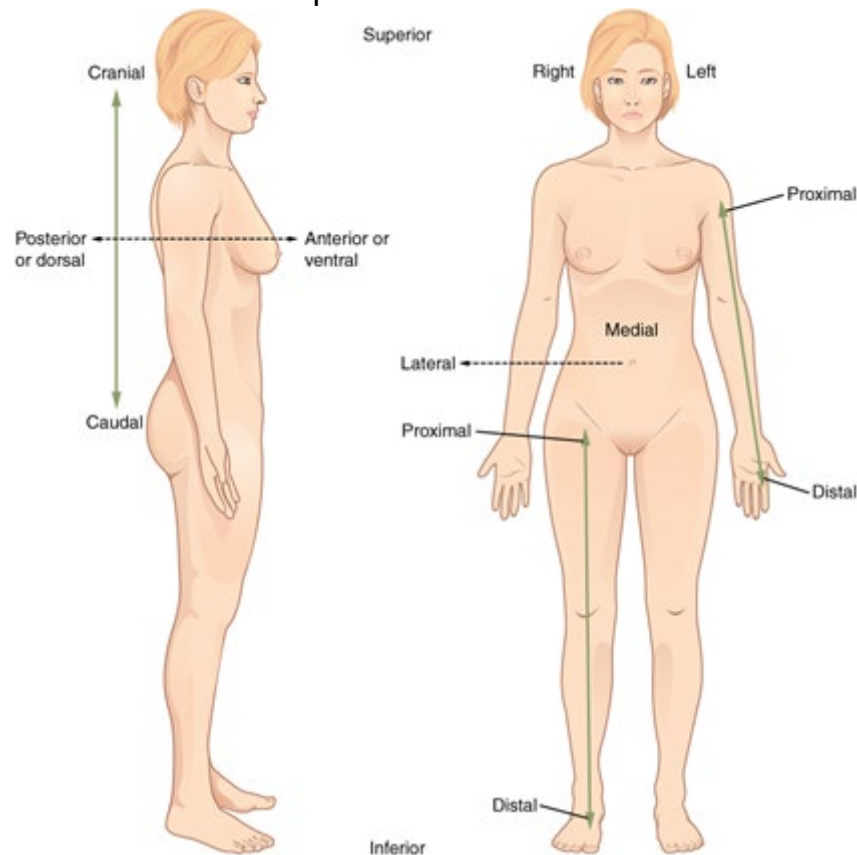


Figure 2 Directional Terms are labeled on this body, which is standing in anatomical position. Credit: CNX Anatomy and Physiology

Go through the pairs of directional terms and use your own body to place them into context. Remember that directional terms are used to describe locations in a relative way. For example, you would use these terms to describe where the heart is relative to the midline of the body, or where the heart is relative to another organ or region.

Anterior/Ventral: towards the front

Posterior/Dorsal: towards the back

A. Note which side of your body is anterior and which side is posterior.

Inferior: towards the bottom

Superior: towards the top

B. On your body, note which direction is inferior and which is superior.

Medial: towards the middle

Lateral: towards the periphery

C. Note which direction is medial and which is lateral.

Proximal and Distal:

Proximal: lying close to the body on a limb (arm/ leg)

Distal: lying away from the body on a limb (arm/leg)

D. On your arm, note which direction is proximal and which is distal.

Superficial: towards the surface of the body or the skin

Deep: away from the surface of the body or the skin

E. Note which structures of your body are superficial and which structures are deep.

Exercise 1.1.1: Fill in the blank with the appropriate directional term:

When standing in anatomical position,

1. your hand (manus) is _____ relative to your elbow (cubital).
2. your head (cranium) is _____ relative to your feet.
3. your shoulder blade (scapula) is _____ relative to your backbone (spinal column).
4. your breastbone (sternum) is _____ relative to your heart.

E. Now, with a partner, use the labels provided and an anatomical model of the body or a skeleton to identify each of the directional terms given above.

Exercise 1.1.2: Answer the following questions

On the skeleton or body model:

1. Locate the heart. Which organs or structures are lateral to the heart?

2. Locate the stomach. Which organs or structures are medial to the stomach?

3. Locate the liver. Which organs or structures are inferior to the liver? Which structures are superior to it?

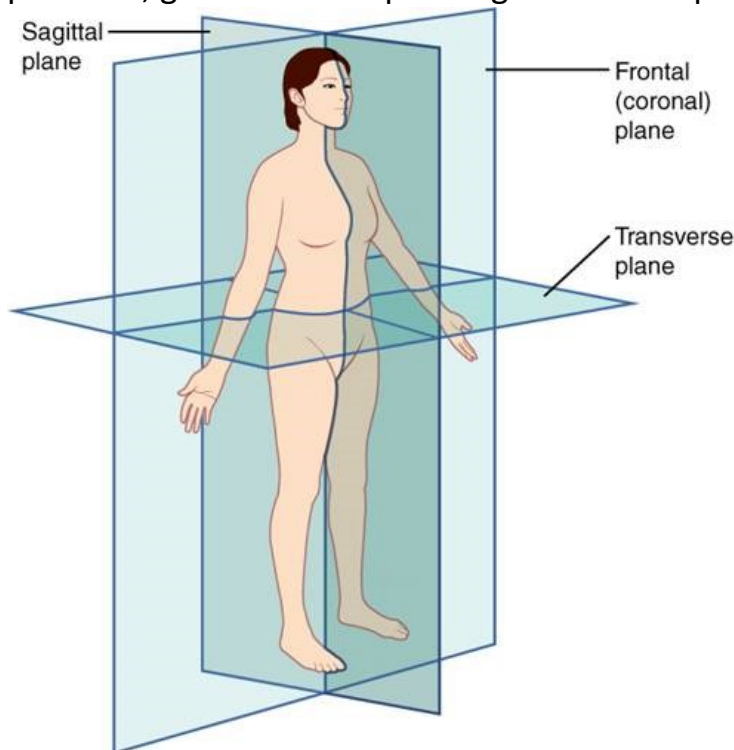
4. Locate the wrist. Which structures are distal to the wrist? Which structures are proximal?

Exercise 1.2.3 Critical Thinking

Why is it important that health professionals have a shared knowledge of anatomical position? Try to think of an example in which it could be detrimental to the patient's health if the involved practitioner does not understand anatomical position and directional terms, such as deep or superficial?

Activity 1.2 Anatomical Planes

While standing in anatomical position, consider how the anatomical planes (shown in the image below) would bisect (cut) the body. For each description provided, give the corresponding anatomical plane.



Exercise 1.2.1: Fill in the Blank

The _____ plane divides the body into left and right halves.

The _____ plane divides the body into anterior and posterior sections.

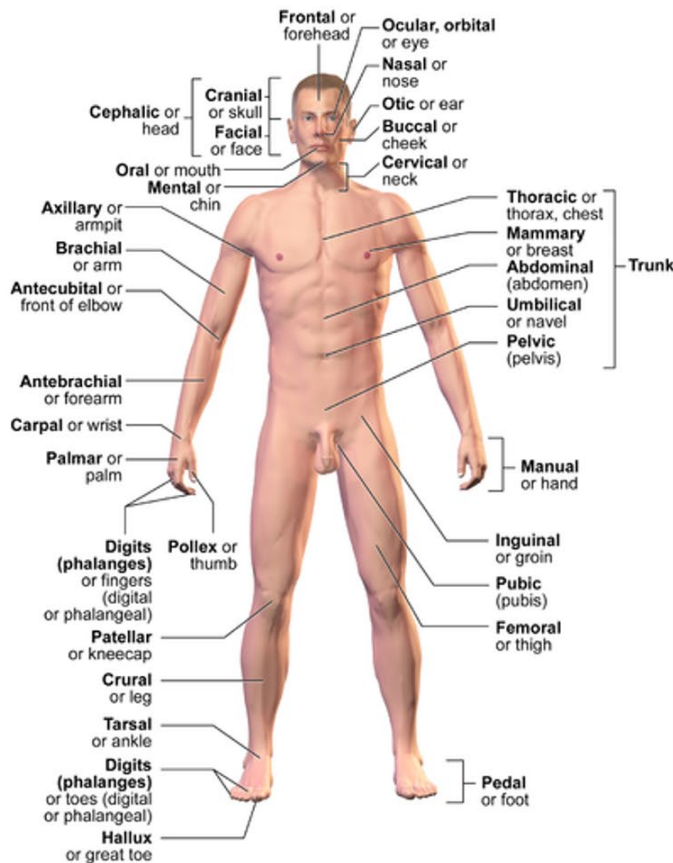
The _____ plane divides the body into inferior and superior sections.

Activity 1.3 Surface Anatomy and Anatomical Terms of the Body

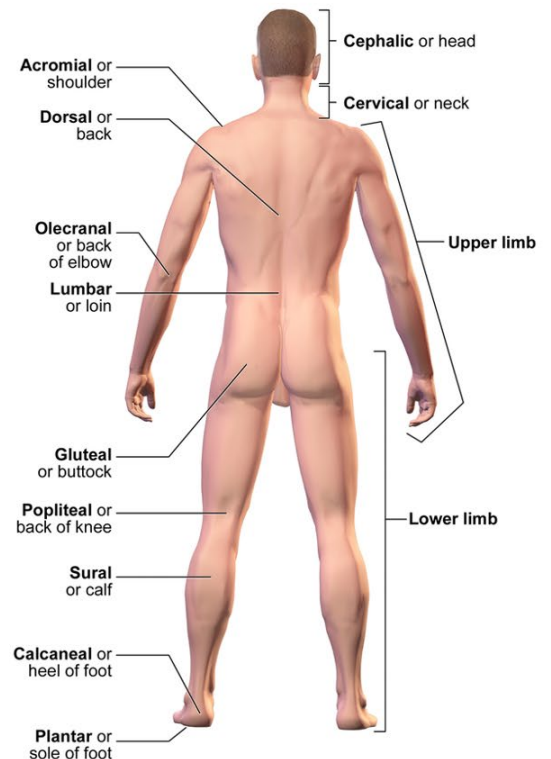
The human body is divided into regions: head, neck, trunk, upper limb, and lower limb. The trunk is further broken into the thorax, the back, the abdomen and the pelvis. Familiarize yourself with these regions before moving on.

Exercise 1.3.1: Label the Skeleton with the Correct Anatomical Landmark

Go by region to identify the terminology related to each anatomical feature. Using the materials provided, label the skeleton or model to label the anatomical feature the term denotes. For example, label the knee with the term “patellar.”



**Anatomical Landmarks
(Anterior View)**



**Anatomical Landmarks
(Posterior View)**

Terms to Label:

Head and Neck:

- Facial: face
- Frontal/Frons: forehead
- Cranial: skull
- Auris/Otic: ear
- Nasus/Nasal: nose
- Oral: mouth
- Orbital: eye
- Buccal: cheek
- Oris/Oral: mouth
- Mental: chin
- Cervical: neck

Trunk:

- Sternal: breastbone
- Costal: rib
- Axillary: armpit
- Clavicular: clavicle
- Mammary: breast
- Dorsum: back
- Sacral: tailbone
- Lumbar: lower back
- Umbilical: naval
- Inguinal: groin
- Pubic: pubic region
- Coxal: hip

Upper Limb:

- Antebrachial: forearm
- Antecubital: front of elbow
- Axillary: armpit
- Brachial: arm
- Carpal: wrist
- Manual: Hand
- Pollex: thumb
- Digital: fingers

Lower Limb:

- Crural: shin (anterior)
- Gluteus: buttocks
- Femoral: femur or upper leg
- Popliteal: back of knee
- Sural: calf (posterior)
- Pedal: foot
- Calcaneal: heel
- Tarsal: ankle
- Digital/phalangeal: Toes

Activity 1.4 Organ Systems

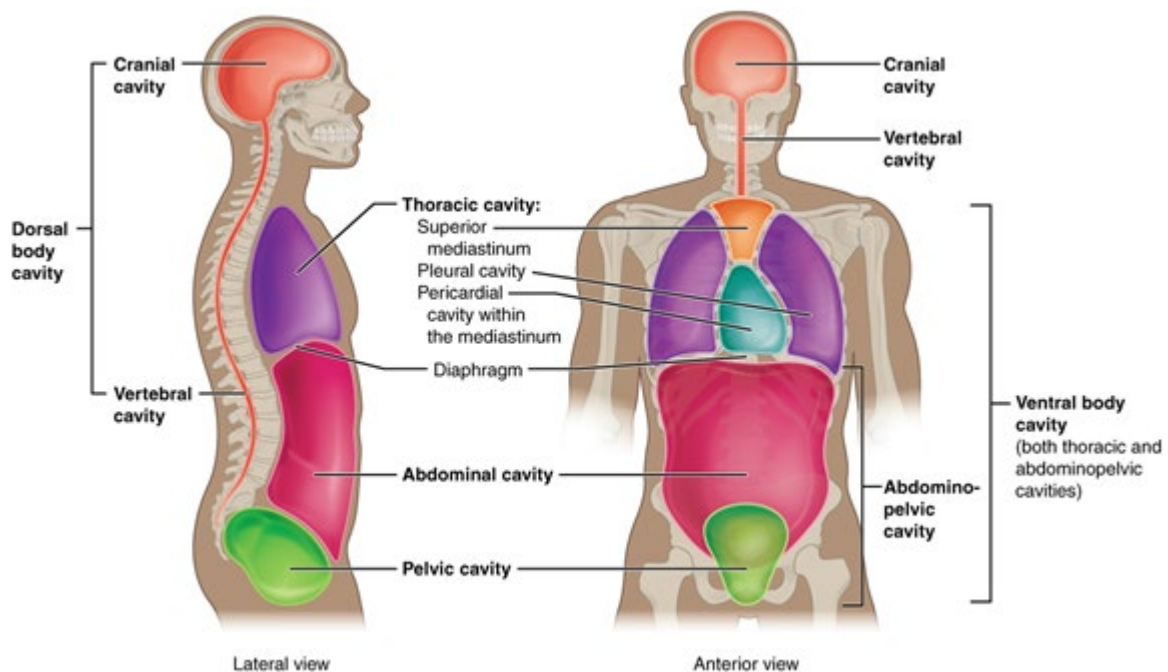
Exercise 1.4.1: Fill in the Chart

Investigate: Using a textbook, the Internet or other lab resources, investigate the 12 organ systems of the body. Which organs are included? What are their primary functions? Locate the various organs of each system on a model.

Organ System	Organs	Primary Function(s)
Integumentary		
Skeletal		
Muscular		
Nervous		
Endocrine		
Cardiovascular		
Lymphatic		
Respiratory		
Digestive		
Urinary		
Reproductive		

Activity 1.5 Body Cavities and Abdominopelvic Regions

A. Body Cavities are regions contained within in the body, which can be separated by bone or muscle. Identify the regions and where they are in relationship to one another. Cavities contain organs, fluid filled spaces, membranes, and other structures, such as arteries and nerves.



Exercise 1.5.1 Matching

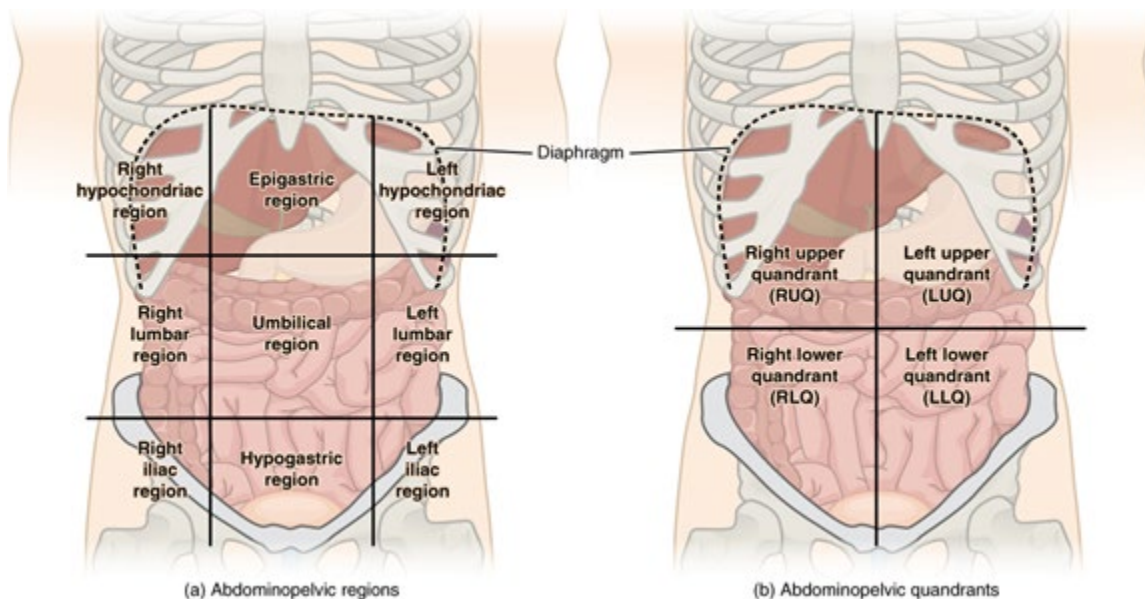
Match the listed structures with the cavities they lie in. The correct answer will be the most descriptive, or the smallest region that the structure is contained within. The regions may be used once, more than once, or not at all.

- | | |
|-------------------------------------|-------------------|
| 1. The Heart and Great Vessels ____ | A. Thoracic |
| 2. The Heart and Lungs ____ | B. Cranial |
| 3. Brain ____ | C. Vertebral |
| 4. Spinal cord ____ | D. Dorsal |
| 5. Bladder ____ | E. Plural |
| 6. Cranial Meninges ____ | F. Mediastinum |
| 7. Spinal Meninges ____ | G. Pericardial |
| 8. Pituitary gland ____ | H. Abdominal |
| 9. Lungs ____ | I. Abdominopelvic |
| 10. Liver ____ | J. Ventral |
| 11. Stomach ____ | |
| 12. Heart ____ | |
| 13. Kidneys ____ | |
| 14. Esophagus ____ | |
| 15. Trachea ____ | |
| 16. Renal Arteries ____ | |
| 17. Brain and Spinal Cord ____ | |
| 18. The Entire Colon ____ | |
| 19. Transverse colon ____ | |
| 20. Rectum ____ | |
| 21. Spleen ____ | |
| 22. Bladder ____ | |
| 23. Aorta ____ | |

Exercise 1.5.2 Answer the Questions Below

1. Which muscular structure serves as a boundary between the thoracic and abdominopelvic cavities?
2. Which bones serve as the lateral boundary for the thoracic cavity?
3. Which bones serve as the superior boundary for the cranial cavity?
4. Which bones serve as all boundaries for the vertebral cavity?
5. Which structures are the anterior boundary of the abdominal cavity?

B. Quadrants are divisions made by imaginary lines drawn through the abdominopelvic region. There are two systems: a system that divides the abdominopelvic region into 4 **quadrants** and a system that divides the abdominopelvic cavity into 9 **regions**. Physicians often use the quadrants, while anatomists prefer the regions because they are more descriptive. These divisional systems can be helpful when describing the location of structures in the abdominopelvic regions because it is a large region that contains many irregularly shaped structures, such as the colon, or large intestine.



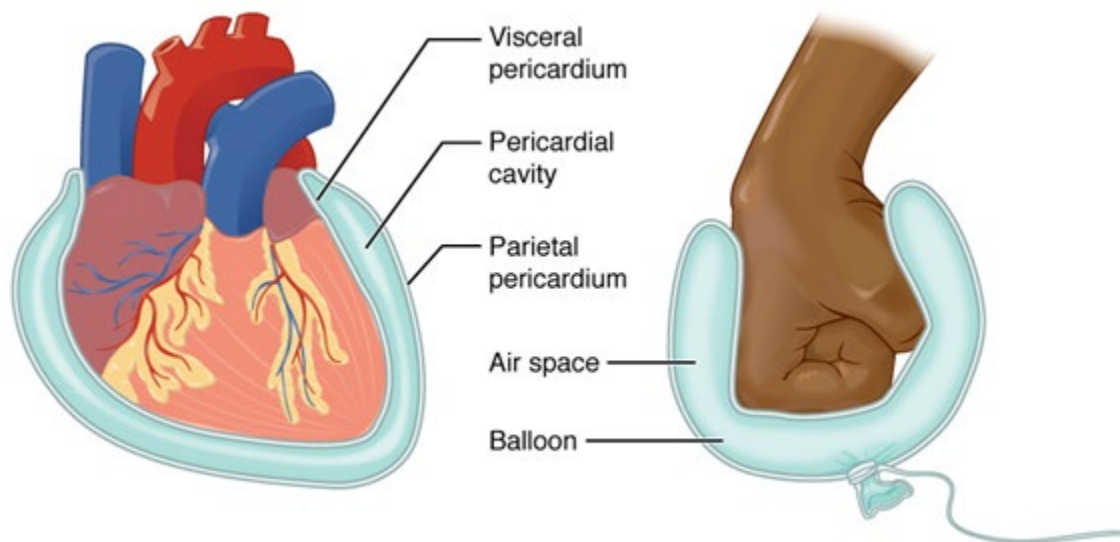
Exercise 1.5.3 Engage

With masking tape, recreate the lines above on an image or body model. Discuss with a lab partner how the lines bisect various organs and which organs fall within each quadrant/ region.

Quadrant	Organs
Right Upper Quadrant (RUQ)	
Left Upper Quadrant (LUQ)	
Right Lower Quadrant	
Left Lower Quadrant	

Activity 1.6 Serous Membranes

Within the pleural, mediastinal, and abdominopelvic cavities are a series of double layered membranes, which protect, lubricate and reduce the friction created by the movement of organs within the body. These double-layered membranes are called **serous membranes**. The serous membrane that covers the lungs is called the **pleura**, or plural membrane. The serous membrane that protects the heart is called the **pericardium** or pericardial membrane. The serous membrane that lines the abdomen and many of the organs within the abdomen is called the **peritoneum**.



While the two layers of the membrane are continuous with one another, each layer has a name. One layer adheres (sticks) to the surface of the organ called the **visceral layer**. This layer gives the organ a shiny look on its surface and must be pulled off to be removed. The other layer will line the wall of the body, along with any organs that are attached to the body wall (like the kidneys). This layer is called the **parietal layer**. The parietal layer adheres to the wall and can be pulled off as well.

Organs in the abdomen, which fall outside of the serous membrane, or behind the parietal layer, such as the kidneys, are described as **retroperitoneal (retro: behind)**. Organs like the small intestine, the transverse colon, and the stomach, which are covered by visceral membrane are called **intraperitoneal (intra: within)**.

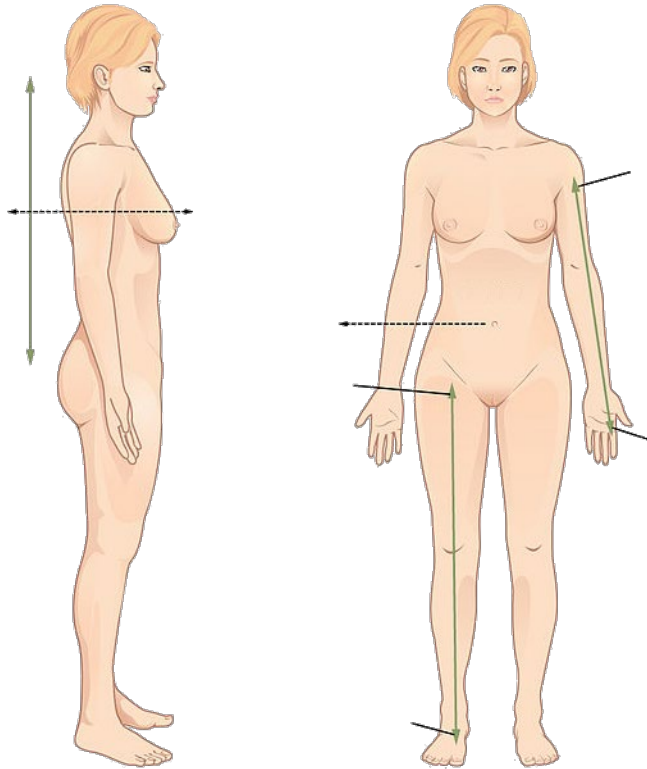
Exercise 1.6.1 Complete the Table

For each organ or structure, describe the associated visceral membrane or parietal membrane, and if in the abdomen, whether the organ is retroperitoneal or intraperitoneal.

Organ	Serous membrane	Retro/Intra?
Heart	Visceral pericardium	
Left lung		
Right lung		
Stomach		Intraperitoneal
Kidneys		
Thoracic wall	Parietal pleura	
Abdominal wall		

Post-Exercise 1 Review Questions

Answer the following questions:



On the image above, label directional terms on the diagram.

[https://commons.wikimedia.org/w/index.php?search=anatomical+terms+of+the+body&title=Special%3ASearch&go=Go#/media/File:Directional_Terms_cleared.png](https://commons.wikimedia.org/w/index.php?search=anatomical+terms+of+the+body&title=Special:Search&go=Go#/media/File:Directional_Terms_cleared.png)

1. The radius is _____ to the ulna.
2. The carpal region is _____ to the phalanges.
3. The axillary region is _____ to the mammary region.
4. The abdominopelvic cavity is _____ to the thoracic cavity.
5. The vertebral cavity is _____ to the cranial cavity.

The following is a list of structures that you probably have not heard of before. However, with your new terminology, the name of each structure should tell you what region of the body it is associated with. For each structure, provide the associated landmark in layman's terms (example: if "patellar", describe it as the "knee"):

1. The mentalis muscle: _____
2. The gluteus minimus muscle: _____
3. The brachial artery: _____
4. The axillary nerve: _____
5. The patellar ligament: _____
6. The inguinal canal: _____
7. The orbicularis oculi muscle: _____
8. The frontalis muscle: _____
9. The cervical vertebrae: _____
10. The femoral artery: _____

