Objectives

1. State the general rules of student conduct, rules of conduct relative to cadaver usage, and safety procedures you are expected to adhere to when you are in the Gross Anatomy and Anatomy and Physiology lab.
2. State the consequence of not adhering to the rules of conduct for cadaver use.
3. Explain how your lab grade will be determined and how your lab grade counts toward your BIO 141 overall course grade.
4. Learn the first names of your lab partners.
5. Name and draw the listed organs on an apron worn by a lab group member.
6. Identify the listed organs on a picture, model, and/or cadaver.
7. Identify the major body cavities and subdivisions of the major cavities on models and pictures and name in which cavity each listed organ is located.
8. Identify the 4 quadrants of the abdominopelvic cavity.
9. Describe anatomical position and use the directional terms from the table below to correctly describe the anatomy of one structure relative to another.
10. Identify specific planes and sections on pictures (MRI, CT scans, or visible human project images), models, and/or cadavers.
11. Identify selected anatomical regions on pictures, models, and/or cadavers using correct anatomical regional terms.

Background Reading in Textbook

Chapter 1: The Human Body: An Orientation, pp. 1-18

Introduction

In this introductory lab, you will learn about the student code of conduct for lab, safety procedures that you are expected to follow during each lab, and the consequences of not adhering to the lab rules and regulations. You will learn how your lab grade is calculated and how your lab grade calculates into your overall course grade. You will learn about anatomical position, directional and regional terms used in describing anatomical structures, and how to describe planes and sections of the body. You will also learn about cavities and some of the organs located in those cavities. Finally, you will learn directional terms used to describe motions that occur at joints.
Procedures by Objectives

1. **State the general student code of conduct for lab, rules of conduct relative to cadaver usage, and safety procedures you are expected to adhere to when you are in the Gross Anatomy and Anatomy and Physiology lab.**

2. **State the consequence of not adhering to the rules of conduct for cadaver use.**

   On a separate page at the end of this week’s lab manual, you will find the general rules of student conduct, rules of cadaver usage, and safety procedures. This page is for you to keep so you can easily reference this very important information at any time. You will also be provided a second copy of this document at the beginning of the first lab session. Your signing of this document signifies a willingness on your part to adhere to the rules and safety procedures contained within the document and that you understand the consequences of not following the designated rules and safety procedures.

3. **Explain how your lab grade will be determined and how your lab grade counts toward your BIO 141 course grade.**

   Lab counts for 40% of your overall BIO 141 course grade. The scores you receive on three lab practical exams will determine 90% of your lab grade. The remaining 10% of your lab grade is earned by attending your scheduled lab. You will receive 2 points for each lab you attend. If you are unable to attend your scheduled lab, you may attend another lab, but you must first receive permission from both your lab instructor and the lab instructor whose lab you will be attending for the makeup. At the end of the makeup lab, ask the lab instructor to sign the top of your lab manual as proof of attendance. The signed lab manual should then be shown to the lab instructor of your scheduled lab to receive your 2 points.

   The lab exams are practical exams, which means the majority of the exam will be identifying labeled figures, photographs, photomicrographs, radiographs, MRI images, or CT scans, models, human or other animal organs, and/or cadavers. The exams may also consist of explaining how a lab procedure was completed, actually doing a procedure, and/or interpreting the results of a specific lab procedure. No lab instructor will provide a word bank for any lab exam.

4. **Learn the first names of your lab partners**

5. **Name and draw the listed organs on an apron worn by a lab group member.**

   **Exercise 1:** You will attempt to draw the listed organs in their proper locations and correct relative sizes without using references on an apron worn by a member of your lab group. There are two purposes of this ice-breaking exercise: to obtain a baseline of information of what you know about human anatomy and to get to know your lab partners by first name.

   1. For this exercise you will work as a group of four. A group of four consists of the student next to you with whom you share a computer and the two students across from you.
   2. Have one lab group member obtain an apron and a Sharpie marker from the countertop located below the glass wall cabinets at the back of the lab.
3. To navigate to the PowerPoint slide containing the organ list, begin by double-clicking the "virtualslides" folder on the desktop and then double-click in sequence the following files/folders: BIO141 → Lab01Introduction → OrganList.

4. Have one lab group member wear the apron. You will then work as a team to draw the organs listed on the PowerPoint slide on the apron. Include in your drawing the name of the organ and the correct shape, size, and location of each organ.

6. Identify the listed organs on a picture, model, and/or cadaver.

The organs you must be able to identify on a picture, model, or cadaver are listed on the PowerPoint slide used for Exercise 1. To navigate to the file, begin by double-clicking the "virtualslides" folder on the desktop and then double-click in sequence the following files/folders: BIO141 → Lab01Introduction → OrganList.

7. Identify the major body cavities and subdivisions of the major cavities on models and pictures and name in which cavity each listed organ is located.

A body cavity is a space in the body that contains internal organs. The major body cavities and their subdivisions are listed below. (You must know in which cavity the organs in table 1.1 reside)

- The **dorsal cavity** is one continuous space formed by the skull superiorly and the vertebrae inferiorly.
  - The **cranial cavity** is formed by bones of the skull and houses the brain.
  - The vertebral (spinal) canal (cavity) houses the spinal cord and is formed by successive vertebrae of the articulated skeleton (a skeleton that is assembled).

- The **ventral cavity** is the largest of the cavities and is ventrally located relative to the vertebral column. The following cavities are the subdivisions of the ventral cavity.
  - The **thoracic cavity** is separated from the abdominopelvic cavity by the dome-shaped diaphragm. Other than this inferior separation point, the thoracic cavity is enclosed by the rib cage, the sternum, and thoracic vertebrae. The following cavities and one region are the subdivisions of the thoracic cavity.
    - The **pleural cavity** is a cavity that surrounds each lung and contains a small amount of lubricating fluid called serous fluid that allows the surfaces that line the cavity to easily glide against each other during inhalation and exhalation.
    - The **pericardial cavity** is a cavity that surrounds the heart and contains a small amount of lubricating serous fluid that allows the surfaces that line the cavity to easily glide against each other during heart contraction and relaxation.
    - The **mediastinum** is not a cavity, but rather the central region of the thoracic cavity. Many important structures such as the heart, esophagus, and aorta are located in, or pass through the mediastinum.
• The **abdominopelvic cavity** is a large cavity that extends from the diaphragm to the pelvic floor. The abdominal muscles and lower back muscles form the anterior, posterior, and lateral walls of the cavity. It is composed of two cavities that are continuous without a physical separation from each other. However, the anatomical landmark that divides the cavities is the pelvic brim, which is a bony fringe that is oval in females and heart-shaped in males. The space bounded by the brim is the pelvic inlet. Several organs, such as the large intestine, are found in both cavities.

  - The **abdominal cavity** is separated from the thoracic cavity by the diaphragm and extends inferiorly to the pelvic brim.
  - The **pelvic cavity** extends from the pelvic brim to the pelvic floor, and is much smaller that the abdominal cavity.

**Exercise 2:** Identify labeled body cavities. To open the file used for this exercise, begin by double-clicking the “virtualslides” folder on the desktop and then double-click in sequence the following files/folders: BIO141 → Lab01Introduction → Exercise2.

**Slide 1:**

1. __________________________
2. __________________________
3. __________________________
4. __________________________
5. __________________________
6. __________________________
7. __________________________

**Slide 2**

1. __________________________
2. __________________________
3. __________________________
4. __________________________
5. __________________________

8. **Identify the 4 quadrants of the abdominopelvic cavity.**

• The abdominopelvic cavity is divided into quadrants and regions to more specifically describe the location of abdominal organs and to record the location of pain reported to the clinician upon taking a history or doing a physical exam.

• The most common and widely used system for regional division of the abdomen is the 4 quadrant division. The intersection of the four lines dividing the quadrants is located at the umbilicus (belly button). The **sides (right and left)** are named according to the sides of the patient, not the examiner.

  - Right upper quadrant
  - Left upper quadrant
  - Right lower quadrant
  - Left lower quadrant
Exercise 3: Identify the labeled quadrants/regions of the abdominopelvic cavity. To open the file used for this exercise, begin by double-clicking the “virtualslides” folder on the desktop and then double-click in sequence the following files/folders:
BIO141 → Lab01Introduction → Exercise3.

1. __________________________
2. __________________________
3. __________________________
4. __________________________
5. __________________________
6. __________________________
7. __________________________
8. __________________________

Exercise 4: Complete the following table using the labeled manikins. Use the same organ list that you used for exercise 1, which is on the computers in the “Lab01Introduction” folder. We have two labeled manikins in the lab on moveable carts that must be shared, so each group should not have a manikin longer than 20 minutes. Push the cart with the manikin to your group’s table before beginning this exercise. When finished, please put the organs back into the manikin in their proper location and push the cart to a group that has not yet completed this exercise.

<table>
<thead>
<tr>
<th>Column 1: Labeled Organ</th>
<th>Column 3: Cavity (If Applicable)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td></td>
</tr>
<tr>
<td>2.</td>
<td></td>
</tr>
<tr>
<td>3.</td>
<td></td>
</tr>
<tr>
<td>4.</td>
<td></td>
</tr>
<tr>
<td>5.</td>
<td></td>
</tr>
<tr>
<td>6.</td>
<td>-------------------------------</td>
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<tr>
<td>7.</td>
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<td>8.</td>
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<td>9.</td>
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<tr>
<td>10.</td>
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<tr>
<td>11.</td>
<td></td>
</tr>
<tr>
<td>12.</td>
<td></td>
</tr>
<tr>
<td>13.</td>
<td></td>
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<tr>
<td>14.</td>
<td>-------------------------------</td>
</tr>
<tr>
<td>15.</td>
<td></td>
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<tr>
<td>16.</td>
<td></td>
</tr>
<tr>
<td>17.</td>
<td></td>
</tr>
<tr>
<td>18.</td>
<td></td>
</tr>
</tbody>
</table>
9. Describe anatomical position and use the directional terms from the table below to correctly describe the anatomy of one structure relative to another.

To precisely describe one body part relative to another using directional terms, there needs to be a standardized body position; this standardized position is known as anatomical position. In anatomical position, the body is standing on two feet and the upper limbs are straight along the person’s side with the face, toes, and palms facing forward.

All anatomical descriptions assume that a person is standing in anatomical position. In this position, the relative location of structures can be identified using a universal language that relates the position of one structure to another. See the table below for a list and description of the terms you must learn and use correctly.

<table>
<thead>
<tr>
<th>Directional Term</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Superior (Cephalic)</td>
<td>Closer to the head or upper part of the body or structure</td>
</tr>
<tr>
<td>Inferior (Caudal)</td>
<td>Closer to the feet or lower part of the body or structure</td>
</tr>
<tr>
<td>Anterior (Ventral)*</td>
<td>Toward the front side (ventral = belly) of the body</td>
</tr>
<tr>
<td>Posterior (Dorsal)*</td>
<td>Toward the back side (dorsum = back) of the body</td>
</tr>
<tr>
<td>Medial</td>
<td>Closer to the midline of the body</td>
</tr>
<tr>
<td>Lateral</td>
<td>Farther away from the midline of the body</td>
</tr>
<tr>
<td>Proximal</td>
<td>Nearer to the point of attachment when referring to a limb or nearer to the point of origin when referring to an organ</td>
</tr>
<tr>
<td>Distal</td>
<td>Farther away from the point of attachment when referring to a limb or farther away from the point of origin when referring to an organ</td>
</tr>
<tr>
<td>Superficial</td>
<td>Closer to the surface of the body</td>
</tr>
<tr>
<td>Deep</td>
<td>Farther away from the surface of the body</td>
</tr>
</tbody>
</table>

*Ventral and anterior along with dorsal and posterior are only synonymous with each other in bipeds.

**Exercise 5, Part A:** Use the correct directional term to describe the relative positions of familiar body parts or body cavities.

1. The chin is ______________________ to the nose.
2. The thoracic cavity is ______________________ to the abdominopelvic cavity.
3. The shoulder is ______________________ to the wrist.
4. The ankle is ______________________ to the knee.
5. In your “shin” region, bone is ______________________ to the skin.
6. The thoracic cavity is ______________________ to the vertebral canal.
7. The vertebral canal is ________________________ to the mediastinum.

8. The skin is ________________________ to muscle.

**Exercise 5, Part B:** Use the correct directional term to describe the relative positions of organs presented in Exercises 1 and 4.

1. The heart is ________________________ to the spinal cord.

2. The rib cage is ________________________ to the lungs.

3. The diaphragm is ________________________ to the stomach.

4. The heart is ________________________ to the lungs.

5. The pancreas is ________________________ to the stomach.

6. The gallbladder is ________________________ to the liver.

7. The spleen is ________________________ to the pancreas.

8. The esophagus is ________________________ to the trachea.

9. The junction between the esophagus and the stomach is ________________________ to the junction between the stomach and small intestine.

10. The end of the large intestine is ________________________ to the junction between the large and small intestine.

10. **Identify specific planes and sections on pictures (MRI, CT scans, or visible human project images), models, and/or cadavers.**

A **plane** is an imaginary flat surface that separates the body into two parts. Cutting along a plane results in two separate pieces that are called sections. A **section** is named according to which plane was cut, in other words, cutting along the transverse plane results in two transverse sections. Planes and sections are useful for studying internal anatomy. An understanding of planes and sections is essential for interpreting images from medical imaging procedures such as magnetic resonance imaging (MRI) and computed tomography (CT scan). These procedures don’t actually cut the body along a plane, but the images that result show the internal anatomy as if the patient was cut along a given plane. The following is a list of the various anatomical planes:

- The **sagittal plane** separates the body into left and right sides.
  - The **midsagittal plane (median)** separates the body into a left and right side that are of equal size, which means the plane is located along the exact midline of the body. Cutting along the midsagittal plane produces midsagittal sections.
- The **parasagittal plane** separates the body into a left and right side that are not of equal side. It is a plane that is located on either side of the midsagittal plane. The resulting sections after cutting along the parasagittal plane are called parasagittal sections. In clinical medicine, especially radiology, the nonspecific term **sagittal** is used instead of the term parasagittal.

- The **transverse plane** separates the body into top and bottom portions. The resulting sections after cutting along a transverse plane are called transverse sections or cross sections. (Another name for the transverse plane often used in medical imaging is axial.)

- The **frontal (coronal) plane** separates the body into a front portion and a back portion. The resulting sections are called frontal (coronal) sections.

**Exercise 6:** Identify the type of section shown on MRI images. To open the file used for this exercise, begin by double-clicking the “virtualslides” folder on the desktop and then double-click in sequence the following files/folders:

BIO141 → Lab01Introduction → Exercise6.

Slide 1:
1. __________________________
2. __________________________
3. __________________________

Slide 2
1. __________________________
2. __________________________
3. __________________________

Slide 3
1. __________________________
2. __________________________

Slide 4
1. __________________________
2. __________________________

Slide 5
1. __________________________
2. __________________________

Slide 6
1. __________________________
2. __________________________

Slide 7
1. __________________________
2. __________________________
3. __________________________
11. Identify listed anatomical regions on pictures, models, and/or cadavers using correct anatomical regional terms.

Anatomists and clinicians use regional terms to describe specific visible areas of the body. Throughout Anatomy and Physiology I and II you will encounter many of these regional terms, so learning them early in Anatomy and Physiology I will make future anatomical study easier.

Regional Anatomical terms

- **Cranial, Cephalic**: head
- **Cervical**: the neck
- **Trunk**
  - **Thoracic**: the chest
  - **Sternum**: midline of chest
  - **Abdominal**: belly
    - **Umbilical**: naval (belly button)
    - **Inguinal**: “groin,” crease at the junction between the abdomen and thigh
  - **Pelvic**: pelvis region, between the abdomen and lower extremity
  - **Lumbar**: low back
- **Upper limb (extremity)**
  - **Axillary**: the “armpit”
  - **Brachial**: arm, shoulder to elbow
  - **Antebrachial**: forearm, elbow to wrist
  - **Palmar**: palm of hand
  - **Digital**: fingers
- **Lower Extremity**
  - **Femoral**: thigh, between the hip and knee
  - **Patellar**: knee cap
  - **Popliteal**: posterior knee
  - **Crural**: leg, between the knee and ankle
  - **Fibular, Peroneal**: lateral side of leg
  - **Pedal**: foot
  - **Plantar**: sole of foot
  - **Digital**: toes
Exercise 7: Use the regional terms from objective 10 to name labeled anatomical regions on a figure. To open the file used for this exercise, begin by double-clicking the “virtualslides” folder on the desktop and then double click in sequence the following files/folders: BIO141 → Lab01Introduction → Exercise7.

1. __________________________ 11. __________________________
2. __________________________ 12. __________________________
3. __________________________ 13. __________________________
4. __________________________ 14. __________________________
5. __________________________ 15. __________________________
6. __________________________ 16. __________________________
7. __________________________ 17. __________________________
8. __________________________ 18. __________________________
9. __________________________ 19. __________________________
10. __________________________ 20. __________________________

Exercise 8: Complete the table below by identifying each of the listed organs on the cadavers and write the number labeling the organ in the right column. It is best to search for the location of the organ listed rather than searching for labels.

<table>
<thead>
<tr>
<th>Organ Name</th>
<th>Organ Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Trachea</td>
<td></td>
</tr>
<tr>
<td>Lung</td>
<td></td>
</tr>
<tr>
<td>Bronchus</td>
<td></td>
</tr>
<tr>
<td>Stomach</td>
<td></td>
</tr>
<tr>
<td>Heart</td>
<td></td>
</tr>
<tr>
<td>Esophagus</td>
<td></td>
</tr>
<tr>
<td>Spleen</td>
<td></td>
</tr>
<tr>
<td>Kidney</td>
<td></td>
</tr>
<tr>
<td>Liver</td>
<td></td>
</tr>
<tr>
<td>Diaphragm</td>
<td></td>
</tr>
<tr>
<td>Thyroid Gland</td>
<td></td>
</tr>
<tr>
<td>Appendix</td>
<td></td>
</tr>
<tr>
<td>Gallbladder</td>
<td></td>
</tr>
<tr>
<td>Small Intestine</td>
<td></td>
</tr>
<tr>
<td>Large Intestine (colon region)</td>
<td></td>
</tr>
</tbody>
</table>
1. Do not eat, drink, handle contact lenses, apply cosmetics, or smoke in the lab. Any food or drinks must be stored in the student cubby space inside the door. Consumption of food and drinks is prohibited at the lab tables and countertops. If you need to eat or drink during a lab session or open lab time, you must consume the food and/or drink at the cubbies or in the hallway.

2. Using a cell phone during a lab class to email, text, web surf, or make calls is prohibited. If you must use your phone during a lab class for any of the listed phone activities, please excuse yourself from the lab and carry out your phone usage in the hallway.

3. Academic dishonesty is a serious offense and will not be tolerated. The college’s academic dishonesty policy can be found on page 6 of the Student Code of Conduct. It is your responsibility to read and understand this policy. A student who is involved in any form of dishonest action in this course will receive a 0 for that exam or assignment. Dishonest actions include, but are not limited to, talking during exams, viewing another student’s answer sheet during an exam, and sharing what is on an exam after you have completed the exam.

4. It is recommended that you tie back long hair to prevent it from getting in the way during lab exercises, especially during dissections and viewing of prosections.

5. Please inform your lab instructor about any personal medical condition that may necessitate extra precautions for you.

6. If you are pregnant prior to the start of the semester or become pregnant during the semester, you must present your instructor with a note from your obstetrician allowing you to perform the usual activities in the lab. The chemicals formalin and phenol used to preserve our cadavers and other lab specimens may be toxic to developing embryos/fetuses even though these chemicals are in low levels in the lab due to proper ventilation. Arrangements will be made to reduce exposure to formalin should an OB request it for a patient/student.

7. The locations of all lab waste disposal and sharps containers for lancets, blades, etc. will be described during the first lab of the semester and any subsequent lab that will require special disposal procedures. Please use these containers as indicated by your lab instructor.

8. You must wear disposable gloves when handling body fluids like blood and urine and any preserved tissue specimen (human or other animal). Cover open wounds with a sterile bandage prior to donning gloves. Procedures for handling blood and urine, and equipment associated with blood test and urinalysis labs will be described in the introduction to those labs by your instructor.

9. Report all spills and accidents immediately to your lab instructor.

10. Wash hands and remove protective clothing before leaving the lab.

11. Lab specimens (former living tissue), whether they be human or another animal, must never be taken from the lab. The consequence of breaking this rule is immediate failure of the course. More information about the rules governing cadaver and human tissue usage is on the following page.

12. Lab models may not be removed from the lab except by permission granted by an anatomy and physiology instructor or a lab manager.

13. Return all models, equipment, and specimens to their proper location and clean all lab table surfaces with Lysol prior to leaving lab. One Lysol squirt bottle is located on the countertop in the middle of each large lab table.
Gross Anatomy Lab and Human Tissue Rules and Regulations

We are fortunate to have cadavers, human organs, and human bones for our anatomical study, and in order to make sure the college continues to have this privilege, it is important that we have strict rules governing the usage of cadavers and other human tissue. It is important for you to understand that breaking any of these rules will result in immediate expulsion from the course with a grade F, regardless of your present earned grade in either lecture or lab.

The rules listed below are specific to cadaver and human tissue usage and handling. Cadaver usage will take place in the Gross Anatomy lab adjacent to the Anatomy and Physiology laboratory. Viewing of human bones and human organs may take place in the anatomy and physiology laboratory.

1. **The anatomical donors are to be treated with the utmost respect at all times.** Inappropriate or improper behavior and/or comments within and outside the laboratory is/are unacceptable. Articulated human skeletons, skulls, isolated bones and organs are to be afforded the same respect as cadavers.

2. **Do not remove the numbered tag from any cadaver.**

3. **Cadavers will be appropriately draped at all times.** All regions not being studied should always be draped with muslin. *When finished viewing a cadaver, it is extremely important to cover the cadavers or specimens with moist muslin and a plastic cover. Always cover the cadaver(s) or specimens prior to leaving the cadaver room!*

4. **Students observing the cadaver for anatomical study must wear nitrile gloves, which will be provided for you.** Gowns are not required, but are provided for your use if you choose to wear one.

5. **Use of cameras, cell phones, or other photographic or video equipment to photograph a cadaver is strictly prohibited.**

6. **Only students, faculty and other authorized PVCC personnel are allowed to enter the Gross Anatomy lab.** Under no circumstances may a student bring an unauthorized visitor into the lab. Permission to bring a visitor into the lab can be granted only by Drs. Moyer, Walsh, or Yost. Any lab visit is restricted to healthcare professionals or individuals with an approved academic purpose.

7. **Human tissue is never allowed to be removed from the labs.**

8. **Cadavers may be studied during open lab hours, but permission must be granted by a lab instructor or lab manager.**

9. **Food and/or drinks are prohibited in the Gross Anatomy laboratory.**

10. **The external door (hallway door) into the Gross Anatomy lab is to be kept closed at all times.**

I have read and understand the above lab safety rules and regulations. I agree to abide by these and all lab safety procedures whenever I work in the Anatomy and Physiology and Gross Anatomy laboratories during lab sessions and open lab times. I also understand the consequences of not abiding by the listed rules and regulations.

Name (Print): ____________________________________________________________

Signed: _________________________________________________________________

Date: ________________________________________________________________