**CHAPTER 1: A FIRST LOOK AT ANATOMY**

# CHAPTER OVERVIEW

This chapter is designed to help students get excited about learning anatomy. It also will help get them oriented to the body and alleviate some of the fears associated with the extensive terminology. The chapter distinguishes between anatomy and physiology and demonstrates the complementarities of structure and function and homeostasis. Chapter 1 also presents the human body as a whole organism. The body plan and basic anatomical terminology are presented, including anatomical position, directional terms, body regions, and planes of section. The major body cavities, their contents, and the serous membranes associated with each are described.

Chapter 1 is an important foundation for further understanding of the details of anatomy. Learning the general structure of the body will lead to a more complete comprehension of individual structures. The most challenging part of chapter 1 is for the student to not become overwhelmed by all the terms, which seem like a foreign language to many. It is important to establish the significance of anatomical terminology early in the course; students need to understand that they can be successful in anatomy only if they master the terminology. The information regarding anatomical position, directional terms, body regions, and planes of section are very important for the students to learn and understand. This will make further studies much easier for them to assimilate.

# KEY POINTS TO EMPHASIZE WHEN GETTING STARTED IN ANATOMY

1. This is the best time to get students excited about the human body. Many are taking the course because it is a requirement; breaking through the barriers is not always easy.
   1. A good way to start is to demonstrate to the students that they already know quite a few structures of the human body.
      1. Many students work out at a gym and know several of the muscle groups of the body: the abdominals (abs), biceps, quadriceps (quads), hamstrings, deltoid, rotator cuff, etc. They do not know the individual muscles, but they can use their existing awareness to augment the learning experience in anatomy.
      2. They are also familiar with many of the structures of the digestive tract.
      3. They often think they know “everything” about the reproductive system. Even though they do not, this “knowledge” can be used to ease their stress levels when beginning this class.
   2. Explain that anatomy (along with physiology) is the foundation of our daily lives. We make decisions about our eating habits and we evaluate information that we are inundated with by TV, the Internet, and magazines. Understanding how structures in the body are put together and how they work in everyday instances is useful in showing the importance of anatomy (and physiology).
   3. Every chance you get, it is best to relate the anatomy topic to something that students see or hear and are immediately concerned about. For example, when

explaining the anatomical quadrants, relate appendicitis, gallstones, stomachache, menstrual cramps, etc., to each quadrant to make this topic more realistic.

1. When describing the anatomic position, spend some time explaining terms that relate to it: sagittal plane, transverse plane, midline of body and appendages. Students can get confused easily when dealing with even simple terms like *lateral* and *medial* when related to the midline of an appendage.
2. If using the cat or another four-legged animal in the lab, be sure to explain that terms like *dorsal/ventral, anterior/posterior,* and *superior/inferior* refer to different body regions for humans versus the cat (four-legged animals). Also, remind the class that more than one anatomical term can be used correctly to describe the position of a structure.
3. Explain the origins of terms (using their Greek and Latin roots) as much as possible. You can show that the anatomical term *manus* means “hand” by relating it to “manual.” “Pelvic” is derived from the root *pelv-,* which means “basin.” So, the pelvic cavity is a basin-shaped cavity enclosed by the pelvic bones. Anatomy is derived from the prefix *ana-*, which means “up” and the root *–tom-*, which means “something cut.” So, anatomy is an observational science in which anatomists dissect or “cut up” so as to view internal structures of a specimen. And so on. Remind students that the root origins and pronunciation of virtually all new terms are given in the textbook.
4. The human body is organized on various levels. Each of these levels builds on the other(s) to makeup an organism. For example, cells make up tissues, tissues make up organs, organs make up organ systems, and organ systems work together to constitute an organism. Understanding this concept is important in understanding how the different parts and systems of the body work together to form one organism. Likewise, emphasize the textbook chapters are organized based on the various levels of organization. The authors take a reductionist approach to organizing the textbook, beginning with the simplest cellular level (chapter 2) and build up to the more complex organ system level (chapters 5-28) to better understand the human organism.
5. Anatomical terms related to the limbs can be confusing. The anatomist calls these the *upper* and *lower limbs,* while *arm* means “between shoulder and elbow,” and *leg* “between knee and ankle.”
6. No matter what position it is in, for descriptive purposes the body is always imagined to be in the anatomic position, standing erect, arms by the sides, and palms facing forward. In this position directions are given by the terms *superior, inferior, anterior,* and *posterior.* These are equivalent to the zoologist’s *cephalic, caudal, ventral,* and *dorsal.* Thus, the eyes are always superior to the mouth, even if the patient is lying down or standing on his head. These terms are not quite equivalent to *above, below, in front of,* and *behind.* Therefore, to a layperson an acrobat’s feet are *above* her head when she is dangling from a trapeze; to an anatomist they are *inferior* to it.
   1. To help make the anatomic position “stick” in their minds, stand in the position and ask how it differs from the usual standing position. Students will quickly see that there are just a few differences to remember.
7. Other dimensions are referred to the midline—*median, medial,* or *lateral*—or to their closeness to the body surface: *superficial* or *deep.* In the limbs, superior and inferior are replaced with proximal and distal; structures near the trunk are *proximal and* those farther away are *distal.* We have a problem with the hands and feet: The palms of the hands resemble the soles of the feet and the thumb is equivalent to the great toe. But the *palmar* surface of the hand faces anteriorly and the back is *dorsal*. In the foot we defy logic and call the inferior surface *plantar* (equivalent to *palmar*) and the superior surface *dorsal,* even though it faces upwards. To make these terms even more fun, point out that the great toe is *medial* but the thumb is *lateral*.

***VISUALS, IN-CLASS DEMONSTRATIONS, AND DISCUSSIONS***

1. Use of visuals of the body cavities and internal structures are quite helpful to students.
2. To ease their stress levels, remind students that they already know many structures of the human body. To demonstrate this, large torso models are good for student involvement: Take out all of the internal parts and have students put them back in the proper spots. This works best if done in small groups (of two or three) if you have several torsos.
3. Charts of body cavities and their contents are useful for review.
4. Dissectible models of the adult body are good visuals.
5. Use figure 1.4 to show the systems of the body. This figure reinforces the fact that the students have knowledge of many of the organs and systems of the human body. Likewise, anytime you can tie learning objectives together it helps students make connections with the textbook content. With that said, when discussing the organ systems be sure and emphasize their functions (included for each system in figure 1.4) as they relate to homeostasis.
6. Have students locate body regions on their own bodies.
7. Demonstrate preserved human organs and tissues. Seeing the brain, heart, lungs, and kidneys is often exciting to students.
8. Three-dimensional visualization is often difficult for many students, particularly when they try to reconstruct serial sections of an organ or organs. To visually demonstrate what to expect in sections, use a clear plastic container with an irregular object inside and explain how each section might appear. This can be quite helpful.
9. For some fun, call out the common names for a variety of body parts and have the students call out the anatomical names (or the other way around).
10. Use a balloon to demonstrate the relationship between the two layers of serosa by pushing your fist into the balloon. Also, have students put two wet microscope slides together (lengthwise). Demonstrate how the slides will “slip” against each other but are difficult to pull apart. This is a good visual for explaining the “space” between the two layers of serosa. Point out that the pericardium and pleura are good examples of this.
11. Show images of a variety of sections through the human body. It is easier for students to understand sagittal, coronal, parasagittal, and other planes if they see the body sections.
12. When discussing the nine abdominopelvic regions, use figure 1.11. Since the umbilical region should be the most familiar to the students, start with it and mark an “X” on that region. As you move from one region to another, arbitrarily mark either an “X” or an “O” on each of them. Students will quickly see that you’ve made a tic-tac-toe game. This makes the lesson more fun. At the same time, directional terms can used to describe the locations of the various abdominopelvic regions; ask students to describe the location of one abdominopelvic region relative to another.
13. To get them thinking about the relationship between structure and function (and as a preliminary to systems to be studied later), ask students to describe the relationships between the cardiovascular and the respiratory systems (or between one of them and the digestive, endocrine, urinary, lymphatic, or reproductive system), between muscles and bone, between nerves and muscles, etc. Throughout the course it’s important to emphasize that structure is complementary to function.
14. Ask students if they consider one system to be more important than another. If so, why? If not, why not? This gets them thinking about the interrelationships of many of the systems of the body.
15. Tell students to write down the common names for ten body parts that consist of three letters (arm, leg, eye, ear, etc.); then have them write the names on the board. Next, ask them to substitute the anatomical name for each. You could try this with four-letter words too, but this version can get out of hand.

***CHAPTER OUTLINE***

|  |  |  |  |
| --- | --- | --- | --- |
| 1.1 | History of Human Anatomy | |  |
| 2. | Definition of Anatomy | |  |
|  |  | Anatomy |  |
|  |  | Comparison of Anatomy and Physiology |  |

* 1. Microscopic Anatomy
     + Cytology
     + Histology
     + Gross Anatomy
     + Comparative anatomy
     + Developmental anatomy
     + Embryology
     + Regional anatomy
     + Surface anatomy
     + Systemic anatomy
     + Pathologic anatomy
     + Radiographic anatomy
     + Surgical anatomy

1. Structural Organization of the Body
   * Atoms
   * Molecules and macromolecules
   * Organelles
   * Cells
   * Tissues
   * Organs
   * Organ systems
   * Organism
   * Characteristics of Living Things
   * Organization
   * Metabolism
   * Growth and development
   * Responsiveness
   * Adaptation
   * Regulation
   * Reproduction
2. Introduction to Organ Systems
3. Precise Language of Anatomy
4. Anatomic Position
5. Sections and Planes
   * Coronal plane
   * Transverse plane
   * Midsagittal plane
   * Sagittal plane
   * Oblique plane
6. Anatomic Directions
7. Regional Anatomy
   * Axial region
   * Appendicular region
   * Additional regions, most of which are shown and described in Table 1.3
8. Body Cavities and Membranes
9. Posterior Aspect

|  |  |
| --- | --- |
|  | Cranial cavity |
|  | Vertebral canal |

1. Ventral cavity
   * Serous membranes

o Parietal layer o Visceral layer o Serous cavity

1. Thoracic cavity

|  |  |
| --- | --- |
|  | Mediastinum |
|  | Pericardium |
|  | Pleura |

* + Abdominopelvic cavity
  + Diaphragm

1. Abdominopelvic Regions and Quadrants
   * Regions
     + Epigastric region
     + Umbilical region
     + Hypogastric region
     + Hypochondriac regions (R & L)
     + Lumbar regions (R & L)
     + Iliac regions (R & L)
   * Quadrants
     + Right upper quadrant o Left upper quadrant o Right lower quadrant o Left lower quadrant

|  |  |  |
| --- | --- | --- |
| 5. | Clinical Terms |  |
| 6. | Chapter Summary |  |
| 7. | Challenge Yourself |  |
| 8. | Answers to “What Do You Think?” |  |