Chapter 1

An Introduction to the Structure and Function of the Body
Objectives

- Define the terms *anatomy* and *physiology*
- List and discuss in order of increasing complexity the levels of organization of the body
- Define the term *anatomical position*
Objectives

• List and define the principal directional terms and sections (planes) used in describing the body and the relationship of body parts to one another

• List the nine abdominopelvic regions and the abdominopelvic quadrants
Objectives

• List the major cavities of the body and the subdivision of each
• Discuss and contrast the axial and the appendicular subdivisions of the body. Identify a number of specific anatomical regions in each area.
Objectives

• Explain the meaning of the term *homeostasis* and give an example of a typical homeostatic mechanism
Structural Levels of Organization

• Organization is the most important characteristic of body structure
• The body as a whole is a unit constructed of the following smaller units:
  – Atoms and molecules—chemical level
  – Cells—the smallest structural units; organizations of various chemicals
  – Tissues—organizations of similar cells
  – Organs—organizations of different kinds of tissues
  – Systems—organizations of many different kinds of organs
Anatomical Position

• Reference position in which the body is standing erect with the feet slightly apart and arms at the sides with palms turned forward
• Anatomical position gives meaning to directional terms
Anatomical Directions

• Superior—toward the head, upper, above
• Inferior—toward the feet, lower, below
Anatomical Directions

- **Anterior**—front, in front of (same as ventral in humans)
- **Posterior**—back, in back of (same as dorsal in humans)
Anatomical Directions

- **Medial**—toward the midline of a structure
- **Lateral**—away from the midline or toward the side of a structure
Anatomical Directions

• Proximal—toward or nearest the trunk, or nearest the point of origin of a structure

• Distal—away from or farthest from the trunk, or farthest from a structure’s point of origin
Anatomical Directions

- Superficial—nearer the body surface
- Deep—farther away from the body surface
Planes or Body Sections

- Sagittal plane—lengthwise plane that divides a structure into right and left sections
- Midsagittal—sagittal plane that divides the body into two equal halves
- Frontal (coronal) plane—lengthwise plane that divides a structure into anterior and posterior sections
- Transverse plane—horizontal plane that divides a structure into upper and lower sections
Body Cavities

• Ventral cavity
  – Thoracic cavity
    • Mediastinum—midportion of thoracic cavity; heart and trachea located in mediastinum
    • Pleural cavities—right lung located in right pleural cavity; left lung in left pleural cavity
Body Cavities

• Ventral cavity
  – Abdominopelvic cavity
    • Abdominal cavity contains stomach, intestines, liver, gallbladder, pancreas, and spleen
    • Pelvic cavity contains reproductive organs, urinary bladder, and lowest part of intestine
  • Abdominopelvic regions
    – Nine regions
    – Four quadrants
• Dorsal cavity
  – Cranial cavity contains brain
  – Spinal cavity contains spinal cord
Body Regions

- Axial region—head, neck, and torso or trunk
- Appendicular region—upper and lower extremities
The Balance of Body Functions

• Survival of the individual and of the genes that make up the body is of the utmost importance

• Survival depends on the maintenance or restoration of homeostasis (relative constancy of the internal environment)
  – The body uses negative feedback loops and, less often, positive feedback loops to maintain or restore homeostasis
  – Feedback loops involve a sensor, a control center, and an effector
The Balance of Body Functions

• All organs function to maintain homeostasis

• Ability to maintain balance of body functions is related to age: peak efficiency occurs during young adulthood; diminishing efficiency occurs after young adulthood