Key Terms

- anabolism
- anatomic position
- anatomy
- catabolism
- cell
- disease
- extracellular fluid
- homeostasis
- intracellular fluid
- metabolism
- negative feedback
- organ
- pathology
- physiology
- system
- tissue

Studies of the Human Body

Anatomy
- Study of (-logy) body structure
  - Dissection (-tomy) cutting reveals anatomy

Physiology
- Study of body function (-physi/o = physical)

Pathology
- Study of disease (path/o)

Learning Outcomes
1. Define the terms anatomy, physiology, and pathology.
2. Describe the organization of the body from chemicals to the whole organism.
3. List 11 body systems and give the general function of each.

Levels of Organization

- Simple compounds
- Basic units of life/chemical compounds combined
- Groups of cells
- Groups of tissues
- Organs working for same purpose
- Systems work together to maintain the organism
Studies of the Human Body

Body Systems (organized by function)
- Protection, support, and movement
  - Integumentary – skin, hair, nails, sweat/oil glands
  - Skeletal – 206 bones
  - Muscular – smooth, cardiac, & skeletal muscles
- Coordination and control
  - Nervous – brain, spinal cord, nerves
  - Endocrine – glands producing hormones

What do specialized groups of cells form?

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Studies of the Human Body

Body Systems (organized by function)
- Circulation and immunity
  - Cardiovascular – heart & blood vessels
  - Lymphatic – lymph glands & vessels
- Energy supply and fluid balance
  - Respiratory – lungs and air passages
  - Digestive – stomach, intestines, liver, etc.
  - Urinary – kidneys, bladder
- Production of offspring
  - Reproductive – external genitals

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Studies of the Human Body

Checkpoints
1-1 What are the studies of body structure and body function called?
1-2 What do organs working together combine to form?

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Metabolism and Its Regulation

Learning Outcomes
4. Define metabolism and name the two types of metabolic reactions.
5. Define and give examples of homeostasis.
6. Explain how negative feedback maintains homeostasis.

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Metabolism and Its Regulation

Types of Metabolism

- **Catabolism**
  - Reactions that break substances down
  - Used to form ATP
- **Anabolism**
  - Reactions that build substances up
  - Often require ATP

Figure 1-2 Metabolism.

What type of metabolism does the digestive system do?

Figure 1-3 Negative feedback.

How does a thermostat respond to a room temperature that falls below normal?

Figure 1-4 Negative feedback and body temperature.

How does the brain respond to an increase in body temperature?

Homeostasis: Body’s maintenance of internal balance

- Body fluid balance is especially important
  - Extracellular fluid
    - Blood plasma
    - Lymph
    - Fluid between cells
  - Intracellular fluid
    - Fluid within cells

Homeostasis

- Negative feedback
  - Critical for maintaining our health
  - Keeps body conditions within a normal range by reversing any upward or downward shift
Figure 1-5 Negative feedback in the endocrine system.

What happens to insulin levels after a meal?

Metabolism and Its Regulation

Effects of Aging
- Gradual changes in all body systems
- Some changes are harmless.
  - Wrinkles and gray hair
- Some changes may result in injury and disease.
  - Decreased kidney function
  - Loss of bone mass
  - Formation of deposits within blood vessels

Metabolism and Its Regulation

Checkpoints
1-3 What are the two types of metabolic reactions and what happens during each?
1-4 Compare the locations of extracellular and intracellular fluids.
1-5 What is the main method used to maintain homeostasis?

Body Directions

Body Directions Learning Outcomes
7. List and define the main directional terms for the body.
8. List and define three planes of division of the body.

Body Directions

Directional Terms
- Healthcare professionals use standardized terms to describe body directions.
  - Superior and inferior – above/below
  - Anterior (ventral/front) and posterior (dorsal/back)
  - Medial and lateral – middle/side
  - Proximal and distal – near/far

- All descriptions assume that the body is in anatomic position.
Body Directions

Planes of Division
- Anatomists can divide the body along three planes, each of which is a cut through the body in a different direction
  - Frontal plane – divides the body into anterior and posterior
  - Sagittal plane – divides the body into left and right
  - Transverse plane – divides the body into superior and inferior

Which plane divides the body into superior and inferior parts? Which plane divides the body into anterior and posterior parts?

Tissue sections.
- Cross section
- Longitudinal section
- Oblique section

Which section would cut a blood vessel in half along its long axis?
Body Directions

Checkpoints

1-6 What term describes a location closer to an origin, such as the elbow in comparison to the wrist?

1-7 What are the three planes in which the body can be cut?

Body Cavities

Learning Outcomes

9. Name the subdivisions of the dorsal and ventral cavities.

10. Name and locate the subdivisions of the abdomen.

11. Cite some anterior and posterior body regions along with their common names.

Body Cavities

The body is divided into two main cavities.

Dorsal Cavity
- Two main subdivisions
  - Cranial cavity - contains brain
  - Spinal cavity - encloses spinal cord

Ventral Cavity
- Two main subdivisions separated by diaphragm
  - Thoracic cavity - above diaphragm
  - Abdominopelvic cavity - below diaphragm

Thoracic Cavity
- Further subdivided
  - Pericardial cavity - formed by pericardial sac, contains the heart
  - Pleural cavity - pleura membranes surround the lungs
  - Mediastinum - space between the lungs, (includes organs in that space)
Body Cavities

Abdominopelvic Cavity

- Further subdivided
  - Abdominal cavity – contains organs such as stomach, intestines, liver, gall bladder, pancreas
  - Pelvic cavity – (imaginary line) bladder, rectum and internal reproductive organs

Body Cavities

Divisions of the Abdomen

- The abdomen can be divided into nine regions.
  - Epigastric
  - Umbilical
  - Hypogastric
  - Hypochondriac (left and right)
  - Lumbar (left and right)
  - Iliac, or inguinal (left and right)

Figure 1-12 The nine regions of the abdomen.

Which region contains the spleen?

Figure 1-13 Quadrants of the abdomen.

In which region is pain from appendicitis most likely to be felt?

Figure 1-14 Adjectives for some anterior body regions.

Where would a pedal pulse be felt?
Figure 1-15 Adjectives for some posterior body regions.

Where would cervical pain be felt?

Body Cavities

Checkpoints

1-8 Name the two main body cavities.
1-9 Name the three central regions and the three left and right lateral regions of the abdomen.

See the box Health Information Technicians in the Student Resources on thePoint for description of a profession that requires knowledge of medical terminology.

Case Study

Learning Outcomes

12. Find examples of anatomic and physiologic terms in a case study.

Some anatomic and physiologic terms from the case study:
- Hemorrhage
- Hormone
- Hypertensive
- Hypotensive
- Hypothermia
- Intraabdominal
- Palpate
- Tachycardia

Word Anatomy

Learning Outcomes

13. Show how word parts are used to build words related to the body’s organization.
### Word Anatomy

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