



The Human Body: An Orientation

Most of us have a natural curiosity about our bodies, and a study of anatomy and physiology elaborates on this interest. Anatomists have developed a universally acceptable set of reference terms that allows body structures to be located and identified with a high degree of clarity. Initially, students might have difficulties with the language used to describe anatomy and physiology, but without such a special vocabulary, confusion is bound to occur.

The topics in this chapter enable students to test their mastery of terminology commonly used to describe the body and its various parts, and concepts concerning functions vital for life and homeostasis. Body organization from simple to complex levels and an introduction to the organ systems forming the body as a whole are also covered.

AN OVERVIEW OF ANATOMY AND PHYSIOLOGY

1. Match the terms in Column B to the appropriate descriptions provided in Column A. Enter the correct letter or its corresponding term in the answer blanks.

Column A

- | | |
|--|--|
| | 1. The branch of biological science that studies and describes how body parts work or function |
| | 2. The study of the shape and structure of body parts |
| | 3. The tendency of the body's systems to maintain a relatively constant or balanced internal environment |
| | 4. The term that indicates <i>all</i> chemical reactions occurring in the body |

Column B

- A. Anatomy
- B. Homeostasis
- C. Metabolism
- D. Physiology

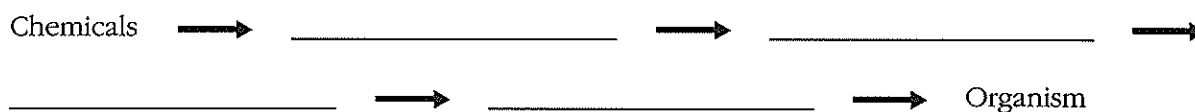
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2. Circle all the terms or phrases that correctly relate to the study of *physiology*. Use a highlighter to identify those terms or phrases that pertain to the study of *anatomy*.

- A. Measuring an organ's size, shape, and weight
- B. Can be studied in dead specimens
- C. Often studied in living subjects
- D. Chemistry principles
- E. Measuring the acid content of the stomach
- F. Principles of physics
- G. Observing a heart in action
- H. Dynamic
- I. Dissection
- J. Experimentation
- K. Observation
- L. Directional terms
- M. Static

LEVELS OF STRUCTURAL ORGANIZATION

3. The structures of the body are organized into successively larger and more complex structures. Fill in the answer blanks with the correct terms for these increasingly larger structures.



4. Circle the term that does not belong in each of the following groupings.

- 1. Atom Cell Tissue Alive Organ
- 2. Brain Stomach Heart Liver Epithelium
- 3. Epithelium Heart Muscle tissue Nervous tissue Connective tissue
- 4. Human Digestive system Horse Pine tree Amoeba

5. Using the key choices, identify the organ systems to which the following organs or functions belong. Insert the correct letter or term in the answer blanks.

Key Choices

- A. Cardiovascular D. Integumentary G. Nervous J. Skeletal
- B. Digestive E. Lymphatic/Immune H. Reproductive K. Urinary
- C. Endocrine F. Muscular I. Respiratory

- _____ 1. Rids the body of nitrogen-containing wastes
- _____ 2. Is affected by the removal of the thyroid gland
- _____ 3. Provides support and levers on which the muscular system can act
- _____ 4. Includes the heart
- _____ 5. Protects underlying organs from drying out and mechanical damage
- _____ 6. Protects the body; destroys bacteria and tumor cells
- _____ 7. Breaks down foodstuffs into small particles that can be absorbed
- _____ 8. Removes carbon dioxide from the blood
- _____ 9. Delivers oxygen and nutrients to the body tissues
- _____ 10. Moves the limbs; allows facial expression
- _____ 11. Conserves body water or eliminates excesses
- _____ 12. Provides for conception and childbearing
- _____ 13. Controls the body with chemicals called hormones
- _____ 14. Is damaged when you cut your finger or get a severe sunburn

6. Using key choices from Exercise 5, choose the organ system to which each of the following sets of organs belongs. Enter the correct letter or term in the answer blanks.

- _____ 1. Blood vessels, heart
- _____ 2. Pancreas, pituitary, adrenal glands
- _____ 3. Kidneys, bladder, ureters
- _____ 4. Testis, vas deferens, urethra
- _____ 5. Esophagus, large intestine, rectum
- _____ 6. Breastbone, vertebral column, skull
- _____ 7. Brain, nerves, sensory receptors

7. Figures 1-1 to 1-6, on pages 4-6, represent the various body organ systems. First identify and name each organ system by filling in the blank directly under the illustration. Then select a different color for each organ and use it to color the coding circles and corresponding structures in the illustrations.

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Blood vessels

Heart

Nasal cavity

Lungs

Trachea

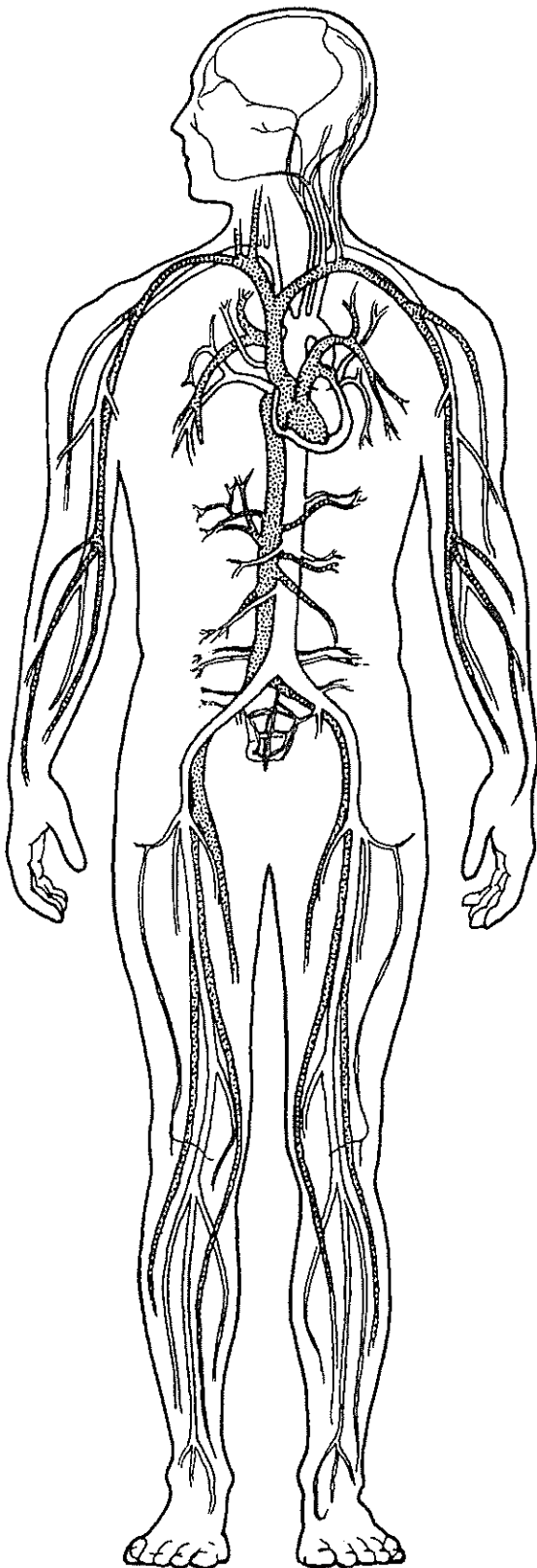


Figure 1-1

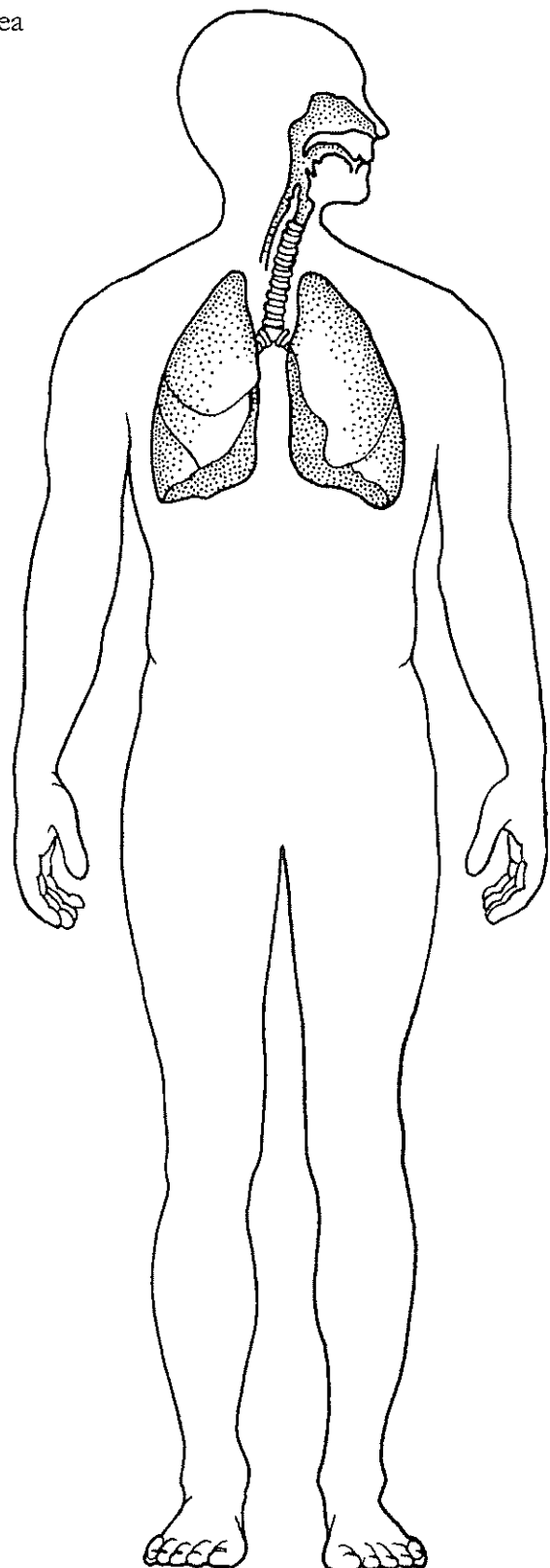


Figure 1-2

○ Brain

○ Spinal cord

○ Nerves

○ Kidneys

○ Ureters

○ Bladder

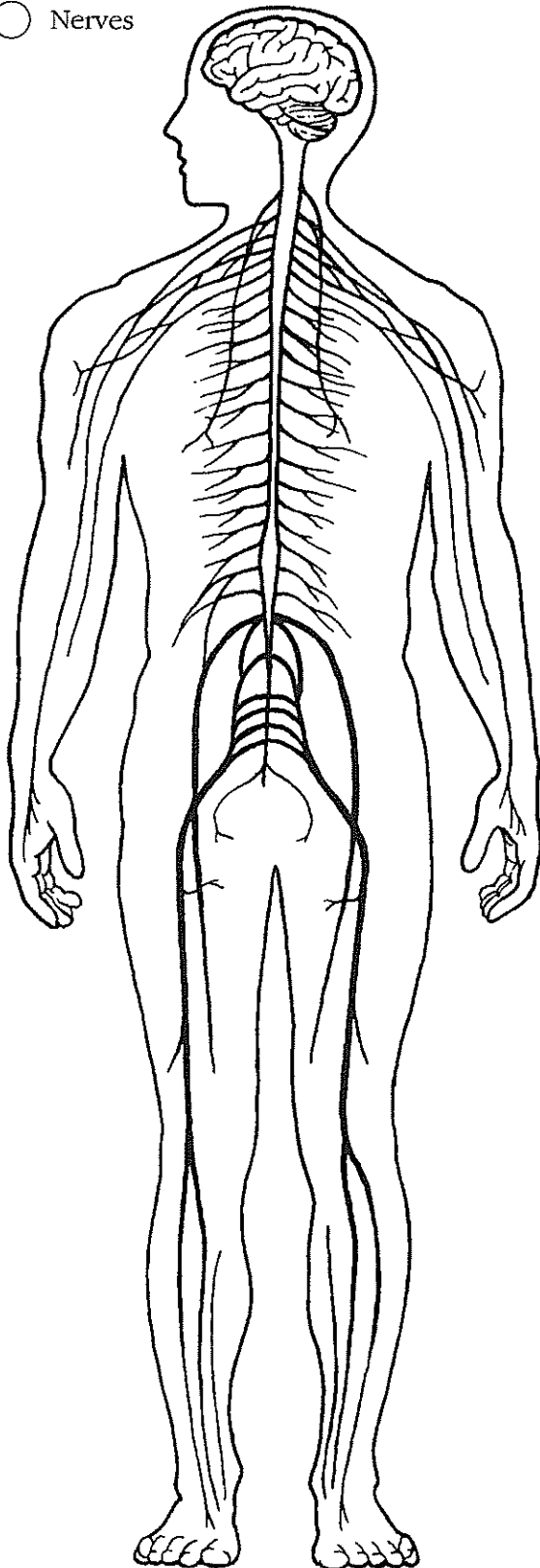


Figure 1-3

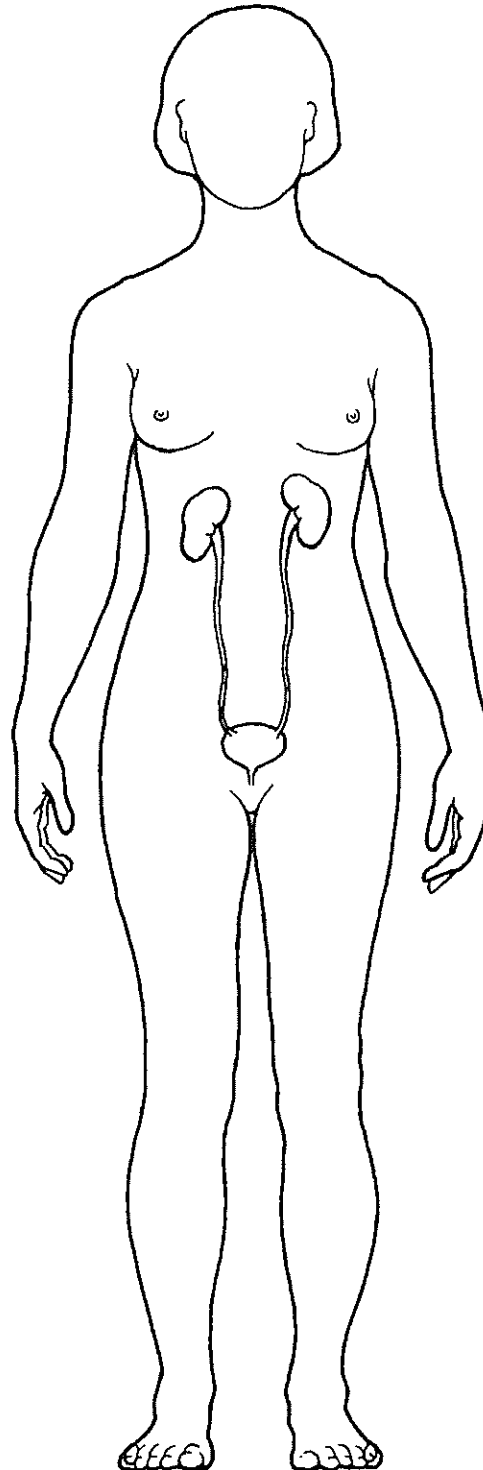


Figure 1-4

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- Stomach
- Intestines

Esophagus

Ovaries

Uterus

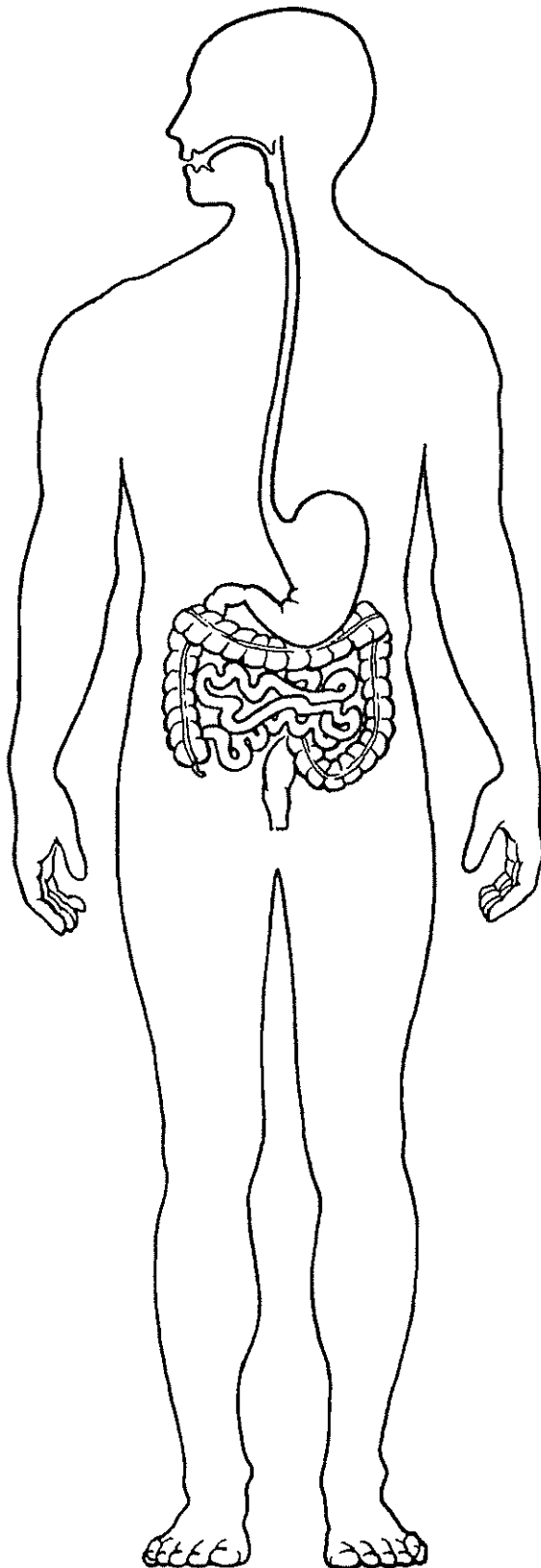


Figure 1-5

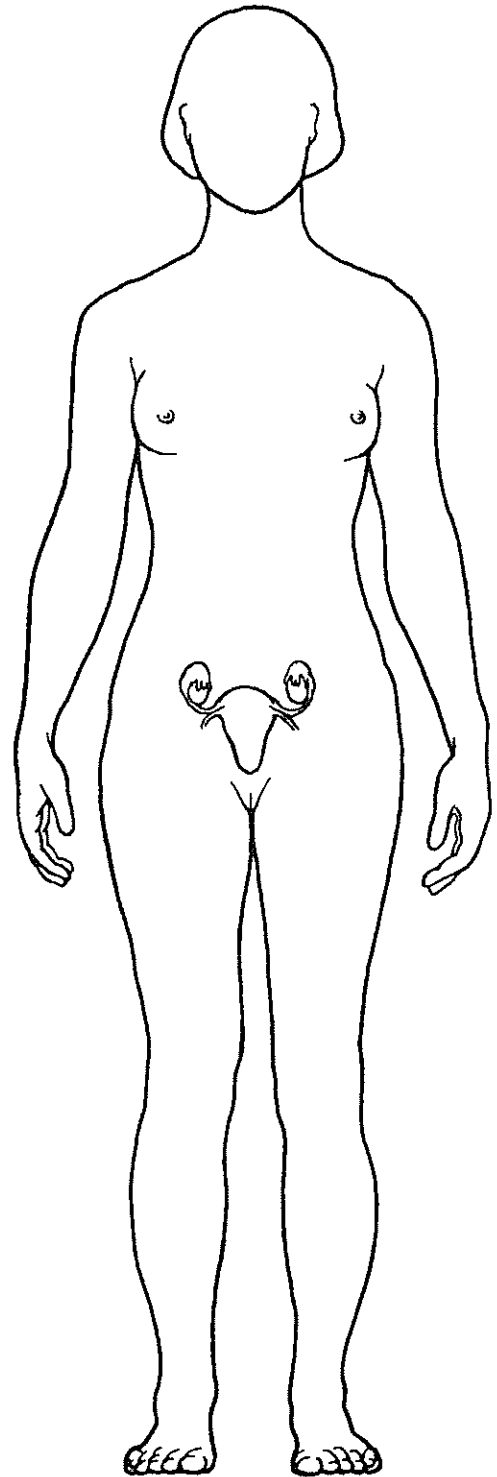


Figure 1-6

MAINTAINING LIFE

8. Match the terms pertaining to functional characteristics of organisms in Column B with the appropriate descriptions in Column A. Fill in the answer blanks with the appropriate letter or term.

Column A	Column B
_____ 1. Keeps the body's internal environment distinct from the external environment	A. Digestion
_____ 2. Provides new cells for growth and repair	B. Excretion
_____ 3. Occurs when constructive activities occur at a faster rate than destructive activities	C. Growth
_____ 4. The tuna sandwich you have just eaten is broken down to its chemical building blocks	D. Maintenance of boundaries
_____ 5. Elimination of carbon dioxide by the lungs and elimination of nitrogenous wastes by the kidneys	E. Metabolism
_____ 6. Ability to react to stimuli; a major role of the nervous system	F. Movement
_____ 7. Walking, throwing a ball, riding a bicycle	G. Responsiveness
_____ 8. All chemical reactions occurring in the body	H. Reproduction
_____ 9. At the cellular level, membranes; for the whole organism, the skin	

9. Using the key choices, correctly identify the survival needs that correspond to the following descriptions. Insert the correct letter or term in the answer blanks.

Key Choices

- | | | |
|---------------------------------|--------------|----------|
| A. Appropriate body temperature | C. Nutrients | E. Water |
| B. Atmospheric pressure | D. Oxygen | |

- | |
|---|
| _____ 1. Includes carbohydrates, proteins, fats, and minerals |
| _____ 2. Essential for normal operation of the respiratory system and breathing |
| _____ 3. Single substance accounting for over 60% of body weight |
| _____ 4. Required for the release of energy from foodstuffs |
| _____ 5. Provides the basis for body fluids of all types |
| _____ 6. When too high or too low, physiological activities cease, primarily because molecules are destroyed or become nonfunctional. |

HOMEOSTASIS

10. The following statements refer to homeostatic control systems. Complete each statement by inserting your answers in the answer blanks.

- _____ 1. There are three essential components of all homeostatic control mechanisms: control center, receptor, and effector. The _____
- _____ 2. (1) senses changes in the environment and responds by sending information (input) to the (2) along the (3)
- _____ 3. pathway. The (4) analyzes the input, determines the appropriate response, and activates the (5) by sending information
- _____ 4. along the (6) pathway. When the response causes the initial stimulus to decline, the homeostatic mechanism is referred to as a (7) feedback mechanism. When the
- _____ 5. response enhances the initial stimulus, the mechanism is called a (8) feedback mechanism. (9) feedback mechanisms are much more common in the body.
- _____ 7.
- _____ 8.
- _____ 9.

THE LANGUAGE OF ANATOMY

11. Complete the following statements by filling in the answer blanks with the correct term.

- _____ 1. The abdominopelvic and thoracic cavities are subdivisions of the (1) body cavity; the cranial and spinal cavities are parts
- _____ 2. of the (2) body cavity. The (3) body cavity is totally surrounded by bone and provides very good protection to the
- _____ 3. structures it contains.

12. Circle the term or phrase that does not belong in each of the following groupings.

- | | | | |
|---------------|-------------|-------------|---------------------|
| 1. Transverse | Distal | Frontal | Sagittal |
| 2. Lumbar | Thoracic | Antecubital | Abdominal |
| 3. Sural | Brachial | Femoral | Popliteal |
| 4. Epigastric | Hypogastric | Right iliac | Left upper quadrant |

13. Select different colors for the *dorsal* and *ventral* body cavities. Color the coding circles below and the corresponding cavities in part A of Figure 1-7. Complete the figure by labeling those body cavity subdivisions that have a leader line. Complete part B by labeling each of the abdominal regions indicated by a leader line.

Dorsal body cavity

Ventral body cavity

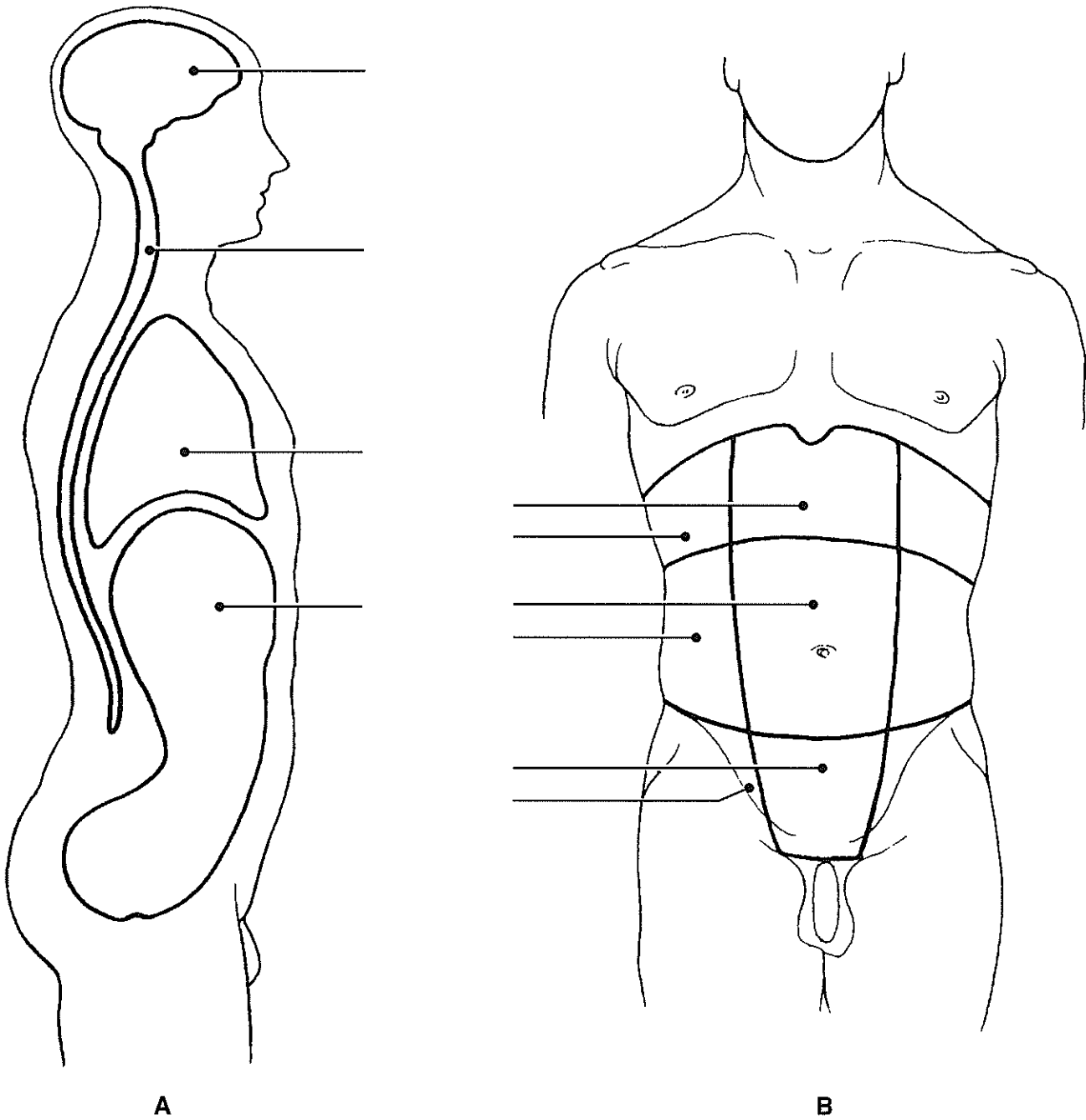


Figure 1-7

- 14.** Select the key choices that identify the following body parts or areas.
Enter the appropriate letter or corresponding term in the answer blanks.

Key Choices

- | | | | |
|----------------|-------------|--------------|--------------|
| A. Abdominal | E. Buccal | I. Inguinal | M. Pubic |
| B. Antecubital | F. Cervical | J. Lumbar | N. Scapular |
| C. Axillary | G. Femoral | K. Occipital | O. Sural |
| D. Brachial | H. Gluteal | L. Popliteal | P. Umbilical |

- _____ 1. Armpit
- _____ 2. Thigh region
- _____ 3. Buttock area
- _____ 4. Neck region
- _____ 5. "Belly button" area
- _____ 6. Genital area
- _____ 7. Anterior aspect of elbow
- _____ 8. Posterior aspect of head
- _____ 9. Area where trunk meets thigh
- _____ 10. Back area from ribs to hips
- _____ 11. Pertaining to the cheek

- 15.** Using the key terms from Exercise 14, correctly label all body areas indicated with leader lines on Figure 1–8.

In addition, identify the sections labeled A and B in the figure.

Section A: _____

Section B: _____

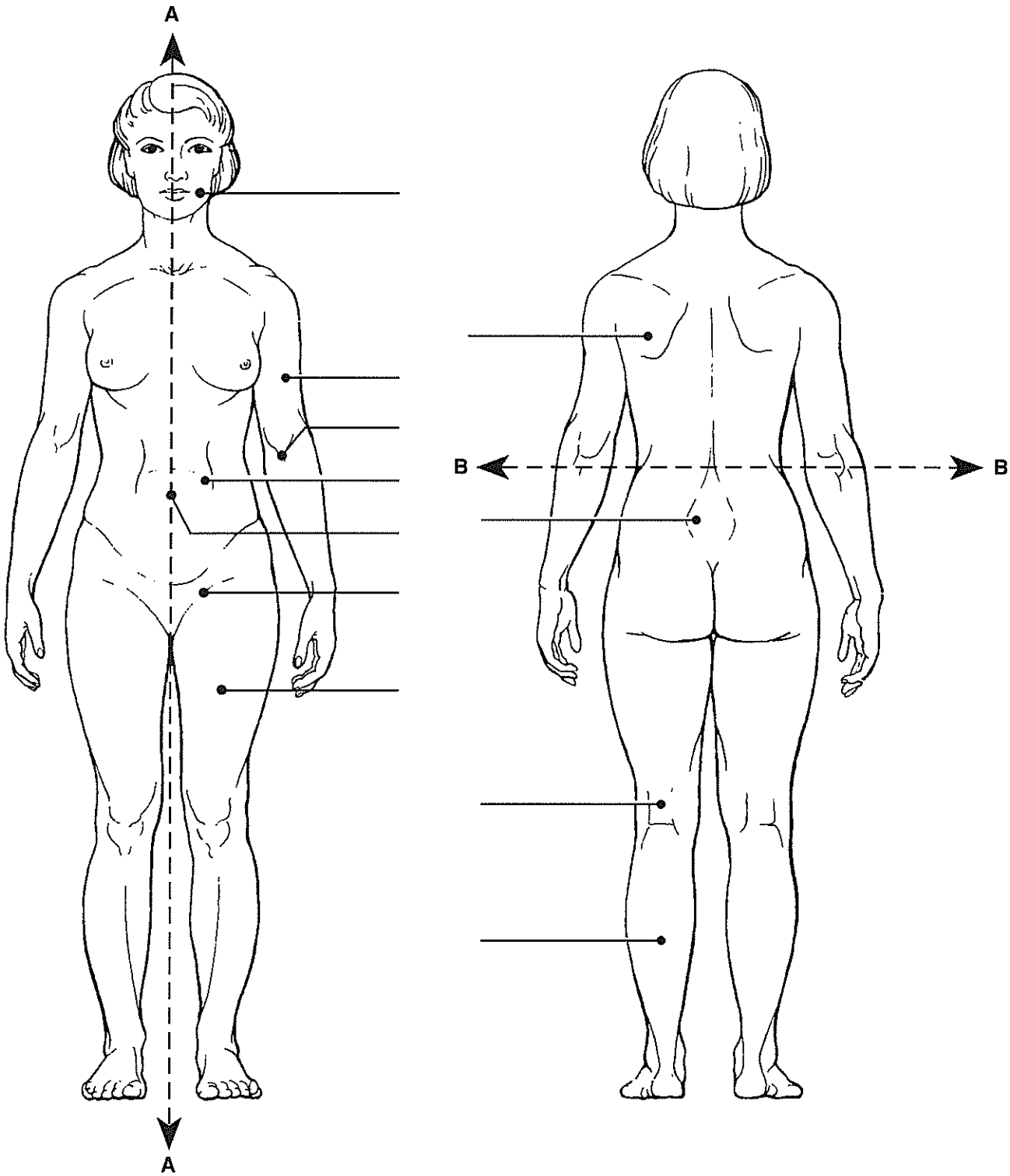


Figure 1-8

16. From the key choices, select the body cavities where the following surgical procedures would occur. Insert the correct letter or term in the answer blanks. Be precise: also select the name of the cavity subdivision if appropriate.

Key Choices

- A. Abdominal C. Dorsal E. Spinal G. Ventral
B. Cranial D. Pelvic F. Thoracic

- _____ 1. Removal of the uterus, or womb
_____ 2. Coronary bypass surgery (heart surgery)
_____ 3. Removal of a serious brain tumor
_____ 4. Removal of a "hot" appendix
_____ 5. A stomach ulcer operation

17. Complete the following statements by choosing an anatomical term from the key choices. Enter the appropriate letter or term in the answer blanks.

Key Choices

- A. Anterior D. Inferior G. Posterior J. Superior
B. Distal E. Lateral H. Proximal K. Transverse
C. Frontal F. Medial I. Sagittal

- _____ 1. In the anatomical position, the face and palms are on the _____ (1) body surface, the buttocks and shoulder blades are on the _____ (2) body surface, and the top of the head is the most _____ (3) part of the body. The ears are _____ (4) to the shoulders and _____ (5) to the nose. The heart is _____ (6) to the spine and _____ (7) to the lungs. The elbow is _____ (8) to the fingers but _____ (9) to the shoulder. In humans, the dorsal surface can also be called the _____ (10) surface; however, in four-legged animals, the dorsal surface is the _____ (11) surface.
- _____ 6.
_____ 7.
_____ 8.
_____ 9.
_____ 10.
_____ 11.

- _____ 12. If an incision cuts the heart into right and left parts, the section is a (12) section, but if the heart is cut so that anterior and posterior parts result, the section is a (13) section.
- _____ 13. You are told to cut an animal along two planes so that the paired kidneys are observable in both sections. The two sections that meet this requirement are the (14) and (15) sections.
- _____ 14.
- _____ 15.

- 18.** Using key choices, identify the body cavities where the following body organs are located. Enter the appropriate letter or term in the answer blanks.

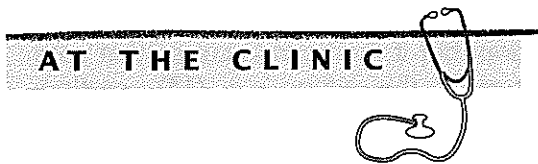
Key Choices

- A. Abdominopelvic B. Cranial C. Spinal D. Thoracic

- _____ 1. Stomach
- _____ 2. Small intestine
- _____ 3. Large intestine
- _____ 4. Spleen
- _____ 5. Liver
- _____ 6. Spinal cord
- _____ 7. Bladder
- _____ 8. Trachea
- _____ 9. Lungs
- _____ 10. Pituitary gland
- _____ 11. Rectum
- _____ 12. Ovaries

- 19.** Refer to the organs listed in Exercise 18. In the spaces provided, record the numbers of the organs that would be found in each of the abdominal regions named here. Some organs may be found in more than one abdominal region.

- _____ 1. Hypogastric region
- _____ 2. Right lumbar region
- _____ 3. Umbilical region
- _____ 4. Epigastric region
- _____ 5. Left iliac region



20. A jogger has stepped in a pothole and sprained his ankle. What systems have suffered damage?
21. A newborn baby is unable to hold down any milk. Examination reveals a developmental disorder in which the esophagus fails to connect to the stomach. What survival needs are most immediately threatened?
22. The Chan family was traveling in their van and had a minor accident. The children in the back seat were wearing lap belts but they still sustained bruises around the abdomen and had some internal organ injuries. Why is this area more vulnerable to damage than others?
23. John, a patient at Jones City Hospital, is in tough shape. He has a hernia in his inguinal region, pain from an infected kidney in his lumbar region, and severe bruises and swelling in his pubic region. Explain where each of these regions is located.