

# Preview and Review

## ***I. An Overview of Anatomy and Physiology (pp. 2–3)***

- A. Anatomy is the study of the structure of body parts and their relationships to each other, and physiology is the study of the function of body parts (p. 2).
- B. Topics of Anatomy (pp. 2–3)
  - 1. Gross (macroscopic) anatomy is the study of structures large enough to be seen with the naked eye.
  - 2. Microscopic anatomy is the study of structures that are too small to be seen with the naked eye.
    - a. Histology is the study of tissues.
- C. Complementarity of Structure and Function (p. 3)
  - 1. The principle of complementarity of structure and function states that function is dependent on structure, and that the form of a structure relates to its function.

## ***II. Levels of Structural Organization (pp. 3–4)***

- A. The chemical level is the simplest level of organization (Marieb Fig. 1.1).
  - 1. Atoms, tiny building blocks of matter, combine to form molecules.
  - 2. Molecules combine in specific ways to form organelles, which are the basic unit of living cells.
- B. The cellular level is the smallest unit of life, and varies widely in size and shape according to the cells' function.
- C. The tissue level is groups of cells having a common function.
- D. The organ level is made up of discrete structures that are composed of at least two groups of tissues that work together to perform a specific function in the body.
- E. The organ system level is a group of organs that work closely together to accomplish a specific purpose (Marieb Fig. 1.3).
- F. The organismal level is the total of all structures working together to promote life.

## ***III. Homeostasis (pp. 8–12)***

- A. Homeostasis is the ability of the body to maintain a relatively constant internal environment, regardless of environmental changes (p. 9).
- B. Homeostatic Control Mechanisms (pp. 9–12; Marieb Figs. 1.4–1.6)
  - 1. Components
    - a. Variable: the regulated factor or event.
    - b. Receptor: structure that monitors changes in the environment and sends information to the control center.
    - c. Control center: structure that determines the set point for a variable, analyzes input, and coordinates an appropriate response.
    - d. Effector: structure that carries out the response directed by the control center.
  - 2. Negative Feedback Mechanisms
    - a. Most homeostatic control mechanisms are negative feedback mechanisms.

- b. A negative feedback mechanism causes the variable to change in a way that opposes the initial change.
  - c. Both the nervous system and the endocrine system are important to the maintenance of homeostasis.
  - d. The goal of negative feedback mechanisms is to prevent sudden, severe changes in the body.
3. Positive Feedback Mechanisms
- a. A positive feedback mechanism causes the variable to change in the same direction as the original change, resulting in a greater deviation from the set point.
  - b. Positive feedback mechanisms typically activate events that are self-perpetuating.
  - c. Most positive feedback mechanisms are not related to the maintenance of homeostasis.
4. Homeostatic imbalance often results in disease.

#### **IV. The Language of Anatomy (pp. 12–22)**

- A. Anatomical Position and Directional Terms (p. 12; Marieb Table 1.1; Marieb Fig. 1.7)
- 1. Anatomical position is a position in which the body is erect, palms face forward, and thumbs point away from the body.
    - a. In anatomical position, right and left refer to the right and left sides of the person viewed.
    - b. In anatomy, anatomical position is always assumed, regardless of the actual position of the body.
  - 2. Directional terms are used to explain exactly where one body part is in relation to another.
- B. Regional Terms (pp. 12–14)
- 1. There are two fundamental divisions of the body.
    - a. The axial region includes the head, neck, and trunk.
    - b. The appendicular region consists of the upper and lower limbs.
  - 2. Regional terms designate specific areas within the axial and appendicular divisions. (Not covered in lecture, must know for Lab Exam 1).
- C. Body Planes and Sections (p. 15; Marieb Fig. 1.8)
- 1. Body planes are flat surfaces that lie at right angles to each other.
    - a. Sagittal plane: a vertical plane that separates the body into right and left parts.
    - b. Frontal (coronal) plane: a vertical plane that separates the body into anterior and posterior parts.
    - c. Transverse, or horizontal, plane: a plane that runs horizontally from right to left, and divides the body into superior and inferior parts.
  - 2. Sections are cuts made along specific planes.
- D. Body Cavities and Membranes (pp. 15–19; Marieb Figs. 1.9–1.13)
- 1. Body cavities are spaces within the body that are closed to the outside and contain the internal organs.
  - 2. The dorsal body cavity is the space that houses the central nervous system, and has two subdivisions: the cranial cavity and the vertebral cavity.
    - a. The cranial cavity is within the skull, and houses the brain.
    - b. The vertebral, or spinal, cavity is within the vertebral column, and houses the spinal cord.
  - 3. The ventral body cavity is anterior to and larger than the dorsal cavity and has two main subdivisions: the thoracic cavity, and the abdominopelvic cavity.

- a. The thoracic cavity is a superior division of the ventral cavity that is further subdivided into the lateral pleural cavities that surround the lungs.
  - b. The thoracic cavity also contains the medial mediastinum, which includes the pericardial cavity surrounding the heart and the space surrounding the other thoracic structures.
4. The ventral body cavity houses the body organs, or viscera.
5. Membranes in the Ventral Body Cavity
  - a. Serous membranes, or serosae, cover the inner walls of the ventral cavity and the outer surfaces of organs.
  - b. The parietal serosa lines the body cavity walls, and is named for the specific cavities it is associated with.
  - c. The visceral serosa covers the outer surfaces of organs, and is named for the specific organs it is associated with.
  - d. Serous membranes secrete and are separated by a thin layer of lubrication fluid called serous fluid, which allows organs to slide without friction along cavity walls and between each other.
6. Abdominopelvic Regions and Quadrants
  - a. There are nine abdominopelvic regions used primarily by anatomists.
  - b. There are four quadrants used primarily by medical personnel.
7. Other Body Cavities – Covered in their relevant body systems (digestive, respiratory, etc.)