ANSWERS TO PRACTICE QUESTIONS

Chapter 1

1. What factors probably stimulated an early interest in the human body?
Understanding the underlying causes of injury and illness and how to treat them.

2. What types of activities helped promote the development of modern medical science?
Asking questions and seeking accurate answers, combined with the advent of techniques for making measurements and performing experiments.

3. What is the role of a hypothesis in the scientific method?
The hypothesis is the idea or proposition being evaluated, or tested.

4. What are the differences between anatomy and physiology?
Anatomy is the study of body structures and relies on examination of those structures. Physiology is the study of the functions of body parts, and relies more on experimentation.

5. Why is it difficult to separate the topics of anatomy and physiology?
Structure and function are closely related. The structure of a body part makes its functions possible.

6. List several examples that illustrate how the structure of a body part makes possible its function.
The arrangement of bones and muscles in the hand allow grasping; the heart's muscular walls pump blood, and heart valves keep blood flowing in the proper direction; the mouth is shaped to receive food and the shapes of the teeth allow them to break down food into pieces; the tongue mixes food with saliva and prepares food particles for swallowing.

7. How are anatomy and physiology both old and new fields?
As ancient as these fields are, new discoveries continue in both, especially at the molecular level.

8. How does the human body illustrate levels of organization?
Larger body structures are made up of progressively smaller ones. For example, the heart is made up of cardiac muscle cells, which are in turn made up of molecules of muscle protein. Proteins, in turn, are made up of specific smaller molecules called amino acids, and so forth. See Table 1.1.

9. What is an organism?
An organism is a complete living unit, and can be as small as a single cell. The human organism is multicellular and consists of interacting organ systems, each made up of organs, which are made up of tissues, which are made up of individual cells.

10. How do body parts at different levels of organization vary in complexity?

Complexity occurs at every level of organization, but the more parts involved, the more complex the structure. Thus, tissues are more complex than cells, organs are more complex than tissues, and so on.

11. How are cells interdependent on each other?
Cells are specialized to make contributions to maintenance of the internal environment. They do this by working together as tissues, which form organs, which in turn form organ systems. Some cells sense changes in the internal environment and communicate with other cells, which then initiate responses to correct the changes.

12. How is balance related to the internal environment?
For the internal environment to be maintained constant, input must be balanced by output. Substances or conditions that are in excess (such as extra heat production) must be matched by increased elimination (such as increased heat loss). Shortages must be matched by increased intake or production.

13. What is the function of metabolism in the body?
Metabolism includes all of the physiological events that obtain, release, and use energy. Examples include absorbing nutrients and, by the process of respiration, using the energy in those nutrients for growth and repair.

14. Which requirements of organisms does the external environment provide?
See Table 1.3.

15. Why is homeostasis so important to survival?
Survival of the human organism depends on the survival of its cells. Homeostasis maintains the internal environment, in which those cells live.

16. Describe three homeostatic mechanisms.
Separate homeostatic mechanisms, based on negative feedback, regulate body temperature and the blood glucose concentration. Another mechanism, based on positive feedback, controls blood clotting.

17. What are the viscera?
Viscera are the organs within the thoracic and abdominopelvic cavities.

18. Which organs occupy the thoracic cavity?
Heart, lungs, trachea, esophagus, thymus
The abdominal cavity?
Stomach, liver, spleen, gallbladder, kidneys, small intestine, large intestine
The pelvic cavity?
Terminal end of the large intestine, urinary bladder, internal reproductive organs

19. Name the cavities of the head.
Cranial cavity, oral cavity, nasal cavity, orbital cavities, middle ear cavities

20. Describe the membranes associated with the thoracic cavity.
Serous membranes are associated with organs in the thoracic cavity, including the two visceral pleural membranes (on the surface of the lungs) and the visceral pericardium (on the surface of the heart.) Serous membranes are also associated with the inner surface of the wall of the cavity, including the parietal pleurae, and the parietal pericardium.

21. Distinguish between the parietal and visceral peritoneum.
The parietal peritoneum lines the inner surface of the wall of the abdominal cavity, and the visceral peritoneum covers the surfaces of the abdominal organs.

22. Name the major organ systems and list the organs of each system.
See Table 1.4.

23. Describe the general functions of each organ system.
See Table 1.4.

24. Define aging.
Aging refers to the changes in the body that occur with the passage of time.

25. List some aging-related changes at the microscopic and whole-body levels.
Microscopic include: decreased production of elastin and collagen proteins, diminished subcutaneous fat leads to skin wrinkling; increased percentage of body fat alters the rate of drug metabolism; DNA repair mechanisms become less efficient, as does energy extraction from nutrients. Other changes include fading hair color, wrinkling skin, a less effective immune system, increased blood pressure, and slightly elevated blood glucose that may become clinically significant.

26. Describe the anatomical position.
Standing erect, face forward, upper limbs at the sides, palms forward

27. Using the appropriate terms, describe the relative positions of several body parts.
See Figure 1.21

28. Describe three types of body sections.
See Figures 1.22 and 1.23

29. Describe the nine regions of the abdomen.
See Figure 1.25(a)

30. Explain how the names of the abdominal quadrants describe their locations.
The umbilicus is the reference point. Above is termed “upper”, below is termed “lower”, and either side is anatomically left or right. See Figure 1.25(b).