



## Section 1

# PHYSIOLOGIC FEATURES OF THE BODY

### LEARNING OBJECTIVES

When you complete this section, you will be able to:

1. Recognize physiologic features of the body in which blood plays an important role
2. Indicate the major categories of body chemicals

To understand the clinical uses of hematology, it is necessary to review some physiologic features of the body.

**Water** (about 60% of an adult's body mass) is the medium in which the body's chemicals are dissolved, metabolic reactions take place, and substances are transported. The chemical reactions that keep us functioning are mediated by body fluids.

**Homeostasis.** The generation, movement, metabolism, and storage of body fluids are balanced through complex interlocking chemical processes and feedback controls. This balance, called homeostasis, is a dynamic but steady state maintained by the constant expenditure of energy from cellular metabolism. This ensures that the body's fluids carry out functions such as circulation, digestion, excretion, reproduction, etc.

**Metabolism.** Interstitial fluid surrounds and bathes cells and is the medium for exchanges of nutrients and wastes between the blood and the cells. To perform their work, cells must receive oxygen and nutrients (carbohydrates, proteins, fats, water, minerals, and vitamins). Metabolism is the process by which cells take up, transform, and use nutrients. Waste material resulting from metabolism must be removed before it becomes toxic to cells.

The digestive system supplies the nutrients, and the respiratory system supplies the oxygen.

The cardiovascular system (heart, blood vessels, and blood) is the delivery system.

**Body Chemicals.** The body's actions and reactions rely on chemicals that have special characteristics.

These chemicals can be categorized into broad groups:

- Carbohydrates: energizers and sources of energy
- Lipids (fats): energy stores
- Proteins: structural forms, carriers, and sources of energy
- Enzymes: facilitators
- Hormones: chemical messengers
- Electrolytes: gatekeepers that allow movement of substances through cell walls

## TESTING FOR VARIANCES

Normal cellular and metabolic functions are reflected by normal values or concentrations for the cells or chemicals involved in these functions. In disease states, tests show abnormally high or low levels of these chemicals or cells. Note, however, that due to variations in individuals, normal values are almost always given in ranges. Normal ranges may vary somewhat from one source to another and may be reported in a variety of units.

Due to its function as the body's delivery service, blood is a prime indicator of the body's status. Hematology usually refers to the study of gross features of blood such as cell counts, bleeding time, etc.