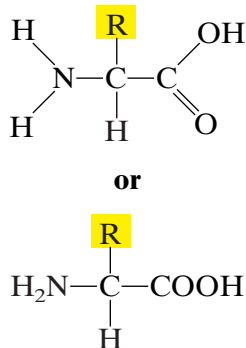


SECTION 2

OBJECTIVES

- Describe the basic structure of amino acids and the formation of polypeptides.
- Determine the significance of amino acid side chains to the three-dimensional structure of a protein and the function of a protein.
- Describe the functions of proteins in cells.
- Identify the effects of enzymes on biological molecules.

FIGURE 7 Amino acids have the same basic structure. The *R* represents a side chain.



Amino Acids and Proteins

Amino acid molecules are the basic building blocks of proteins. Although only 20 types of amino acids are found in human proteins, more than 700 types of amino acids occur in nature. The human body can synthesize only 11 of the 20 amino acids as needed. The other nine, called the *essential amino acids*, have to be supplied by the food that we eat.

Amino Acids

Amino acids are organic molecules that contain two functional groups: a basic -NH_2 amino group and an acidic -COOH carboxylic acid group. All of the 20 amino acids have the general structure shown in **Figure 7**. The “R” represents a side chain that is different for each amino acid. The R-groups of the amino acids present in a protein determine the protein’s biological activity. The structures of four amino acids—cysteine, valine, glutamic acid, and histidine—are shown below.

