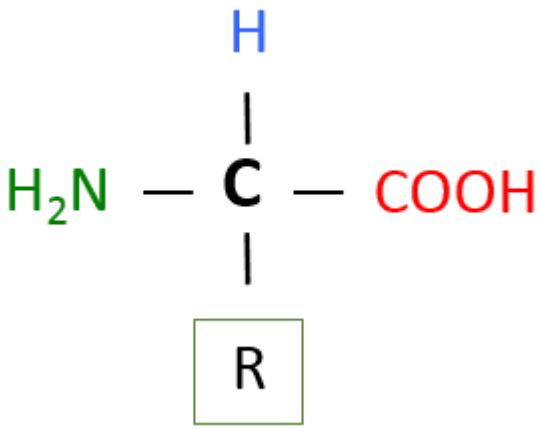
3.3.1

Amino Acids

Like polysaccharides and nucleic acids, proteins are polymers of smaller subunits or monomers. The monomers that make up proteins are the **amino acids**. Although there are 20 different amino acids that make up the proteins in humans, all have the same basic structure. Each has a central carbon with four different groups attached to it. The figure below shows the basic structure of an amino acid. Attached to the central carbon is an **amine group** (-NH2) and a **carboxyl group** (-COOH). The carboxyl group acts as a weak acid (a proton donor) at physiologic pH. The name amino acid is derived from these two groups. Additionally, there is an **R group**. In organic chemists' shorthand, the R group represents some other organic group. In the case of the amino acids, there are 20 different R groups, hence 20 different amino acids. It is the different R groups that confer the different properties to the amino acids. Some R groups are nonpolar (hydrophobic); others are polar (hydrophilic). Some R groups contain ions, either anions or cations (hydrophilic). In this image, the R group simply represents some type of organic group. Understanding the properties of R groups is important to understand protein folding and 3-dimensional shape.



Amino Acid Structure: Carbon (C), Amine Group (-NH2), Carboxyl Group (-COOH), Hydrogen (-H), and One of 20 various Amino Acid R Groups. *Image created by MG BYU-Idaho 2013*

In this class, you will not need to learn the names and structures of the individual amino acids. However, if you are interested in learning more about their structures and characteristics, check out the following links:

http://www.aminoacidsguide.com/

https://books.byui.edu/-sMw