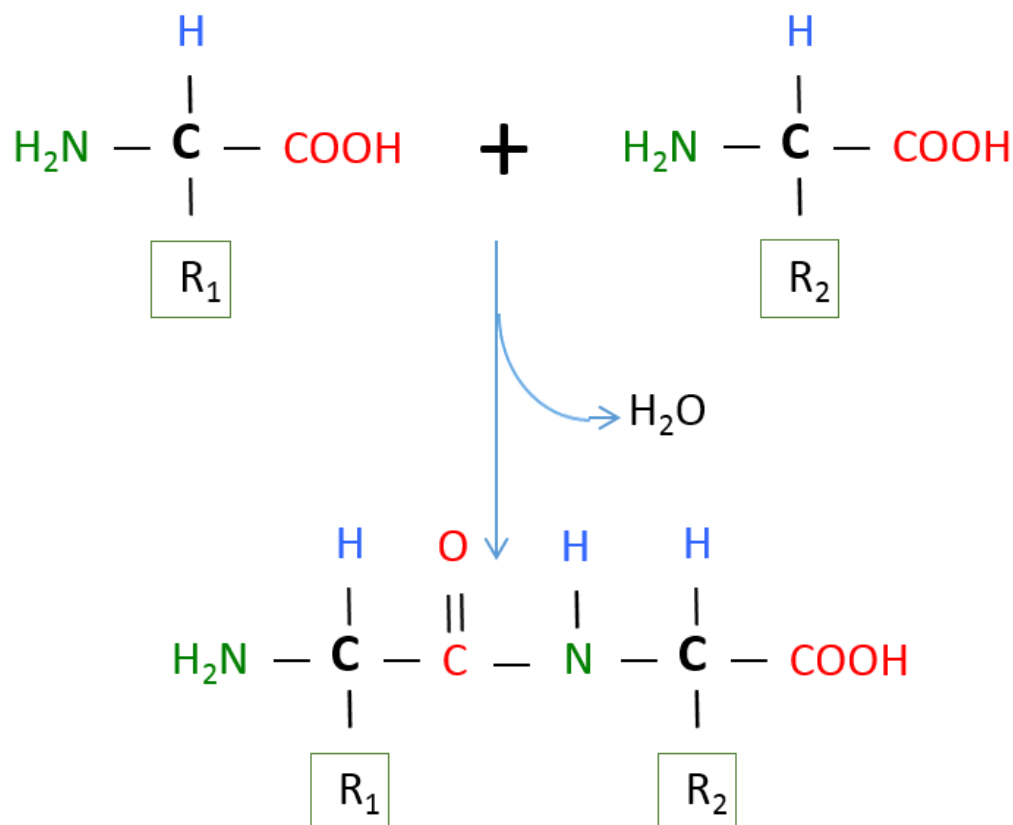


4.3.3

Peptide Bonds and Polypeptides

Proteins are polymers of amino acids. Like all of the polymers we have discussed so far, amino acids are linked together via **dehydration (condensation) synthesis reactions**. The bond that is formed between the amino acids is called a **peptide bond**. The figure below shows how these bonds are formed. In this simple example, we would call the resultant polymer a **dipeptide**. Small peptides are designated tripeptides, tetrapeptides, pentapeptides, etc. The generic term **polypeptide** is used to designate many amino acids linked together. The terms polypeptide and protein are often used interchangeably. A polypeptide chain has at its beginning an unbound amino group and is given the name **amino- or N-terminus**, while the other end of the chain is called **carboxyl- or C-Terminus**.



Peptide Bond formed through Dehydration Synthesis of Amino Acids. Image created by MG BYU-I; 2013.

The image above represents a dehydration synthesis reaction between two amino acids to form a peptide bond. Peptide bonds form between the carboxyl group of one amino acid and the amine group of another.

Almost all living things contain proteins made from 20 amino acids. The human liver is a pretty effective amino acid factory and can synthesize 11 of the 20 amino acids. However, nine amino acids are **essential amino acids**. If they are

not consumed, there won't be enough of the necessary supplies available when new proteins need to be produced. These essential amino acids are histidine, isoleucine, leucine, lysine, methionine, phenylalanine, threonine, tryptophan, and valine.



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