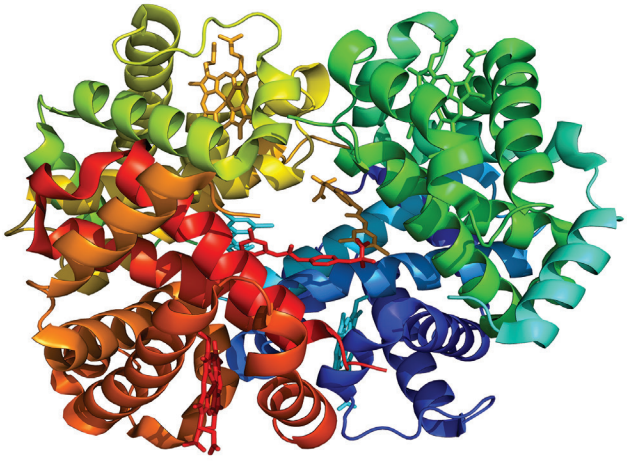
Meat, Fish, Poultry & Eggs

Protein Connection

Did you know that protein can be found in every living cell?



Protein is one of the three **macronutrients** our body needs in large amounts to survive. The other two necessary macronutrients are carbohydrates and fats. Protein is necessary for a healthy body. It is important for many reasons including the building and repair of body tissues, body regulation processes, muscle contraction, and energy. However, consuming too much protein can cause extra stress for some of our organs, like the kidneys.

Since protein consumption is needed for muscle growth and maintenance, very active individuals may need to slightly increase the protein in their diet. New muscle growth can only occur when protein synthesis (the making of new proteins) exceeds the protein breakdown of food. You will learn more about the relationship between protein and muscles in Food Lab Explorations Part II of this chapter.

The chemical structure of protein is unique, making it different from carbohydrates and fat. Like carbohydrates and fat, proteins contain carbon, hydrogen, and oxygen; however, unique to protein, they also contain nitrogen.

The building blocks of proteins are called ***amino acids***. Once consumed, protein is broken down into amino acids and absorbed by the digestive system. Amino acids can then be reused to make new proteins that can maintain muscles, bones, blood, and organs. Our bodies use 22 different amino acids to make protein. Some amino acids are considered essential. ***Essential amino acids***, also called ***limiting amino acids***, cannot be made by the body and must be obtained from our diet. The nine essential amino acids are Phenylalanine, Methionine, Isoleucine, Valine, Leucine, Tyrptophan, Threonine, Histidine, and

Animal sources including meat, poultry, fish, eggs, and dairy are called "Complete Proteins" and contain all the essential amino acids our bodies can't make.

Lysine. All 22 amino acids are needed to make a protein. Not consuming enough of the essential amino acids may result in limited protein synthesis. You will learn more about amino acids and protein synthesis in *Food Lab Explorations Part I* of this chapter.

There are some foods that have ***complete proteins***. Complete proteins have all of the essential amino acids our bodies can't make. Animal sources including meat, poultry, fish, eggs, and dairy contain all the essential amino acids. Plant sources of protein including beans, nuts, grains, and seeds can provide us with some of the essential amino acids, but not all. You can combine two or more plant-based foods to create a complementary protein. ***Complementary proteins*** work together to provide our bodies with the essential amino acids needed to form a complete protein. You should be careful to choose the right combination of foods. For example, combining legumes (e.g. beans) with grains, nuts, or seeds will make complementary proteins.

Protein is necessary for life. We need to make sure we consume enough to keep our bodies healthy. Consuming a variety of both plant and animal sources is recommended for optimal health. The unique characteristics of protein make it essential for our body to function properly. Let's find out exactly what proteins look like!

Think About It

Food Explorations Lab I

1. Provide three (3) reasons why having protein in our diet is important.

   a. _____

   b. _____

   c. _____

2. The building blocks of proteins are called _____.

3. The amino acids we must get from our diet are called _____.

4. Two proteins that must be eaten together in order to have all essential amino acids are called

_____.

Food Explorations Lab II

1. Explain why protein consumption is important for our muscles.

   _____

2. More protein in the diet is needed by an _____ (active/inactive) person.

3. For muscle growth, protein synthesis must be _____ (greater/less) than protein breakdown.