



## OPTIONS CENTER NUTRITION TOPIC

### BASIC NUTRITIONAL FACTS

The food you eat plays an important role in the way your body functions. This article discusses the three macronutrients that provide sources of energy from food and two important hormones affected by those foods.

#### Macronutrients

Three macronutrients provide sources of energy from food—proteins, carbohydrates and fats. *Macronutrients* are nutrients that are used in the largest amounts.

**Proteins.** Proteins are found in every cell of the body and comprise approximately 20% of total body weight. Proteins play a primary role in the growth, repair, and maintenance of muscle and skin tissue; and they are a major component of hair, nails, eyes, internal organs and hemoglobin. Without proteins, the immune system would not function. Most hormones are composed of proteins.

Protein is made up of varying patterns of amino acid molecules. Our bodies require 22 types of amino acids to function, and 9 of these are essential – meaning they cannot be manufactured by the body but must be taken in the diet. Complete proteins provide all essential amino acids, and the high Biological Value proteins provide better balance and digestibility.

Good sources of protein include meat, turkey, eggs, whey, and some kinds of fish.

**Carbohydrate (Sugars).** Carbohydrates are molecules composed of carbon, hydrogen, and oxygen which generally break down readily in the body to provide glucose for blood sugar and glycogen (the stored form of glucose) for storage in the liver and muscles. Carbohydrates are often classified as simple or complex.

Simple carbohydrates are comprised of one or two sugar molecules (e.g. sucrose is glucose plus fructose) while complex carbohydrates, sometimes called starches, have much more complex chains of molecules. Complex carbs are generally desirable since they usually provide vitamins, minerals, and fiber that the simple sugars do not.

More important is the glycemic response of carbs, measured by the glycemic index (GI). A common misconception is that complex carbs are slower acting than simple. This is not always the case, as processing and cooking raise the glycemic response of most complex carbohydrates. Fructose, a simple carb, is the slowest acting carbohydrate known, while bread and pasta are complex carbohydrates, but among the highest glycemic.

Good sources of carbohydrates include vegetables and fruits. Poor sources are cereals, beans, sweets and sugars. Dairy products contain some carbohydrates, but also high proportions of protein and fat. Meats, fish and poultry contain almost no carbohydrates.

**Dietary Fat.** Dietary Fat comprises many different types of fats and oils found in food. Fats are the most concentrated energy source (9 calories per gram) and the only source of essential fatty acids necessary for proper functioning of the immune and hormonal systems. Fats are the carriers of



Photo by Tondo Susanto

the fat soluble vitamins A, D, E, and K, are instrumental in appetite satisfaction, and provide long-term energy.

Fat is the most maligned macronutrient, but in reality, it is a crucial part of the diet. Like all nutrients, it should be balanced. Fats are classified as saturated (generally animal fats and tropical oils),



monounsaturated (olive oil) and polyunsaturated (vegetable oils). Most fats are a combination of all three types. Quality fats are healthful; these include natural, cold pressed oils such as extra virgin olive oil, unprocessed vegetable oils, fish oils, and the like. Fats to avoid are processed and hydrogenated vegetable oils, and heated and oxidized oils (such as at the fast food deep frying vat), which may have high percentages of trans fatty acids, which may be very harmful to health.

**Calories.** The *calorie* is a measurement of the energy in food. Calories are actually kilocalories (kcal). Calories are important; because, in general, if you take in more calories than you burn the excess may be stored as body fat. This is undesirable for many people who are at their proper weight or trying to lose weight.

**4-4-9 Rule.** An easy way to remember the calories in these macronutrients is to use the 4-4-9 rule. Protein has 4 calories per gram, carbohydrate has 4 calories per gram, fat has 9 calories per gram.

### **Insulin**

*Insulin* is a hormone secreted by the pancreas to control the levels of blood sugar after eating. Insulin activates cell receptors and allows them to take in blood sugar for storage in the muscle and fat cells. Lack of insulin, or an ineffective insulin system, is the cause of diabetes. Excessive insulin, called hyperinsulinemia, can lead to chronic hunger and weight gain. Carbohydrate intake, especially high glycemic carbs, stimulate insulin. A balanced diet and exercise reduces it.

### **Glucagon**

*Glucagon* is a hormone which acts opposite to insulin. When low blood sugar occurs, glucagon is secreted by the pancreas to release glycogen and stored energy in fat tissue to replenish the blood sugar supply. A higher glucagon to insulin balance (the set point) encourages utilization of body fat as the preferred source of energy. Exercise and protein stimulate secretion of glucagon.

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