

The Carbohydrate Connection

As the leading energy source for the human body, carbohydrates are able to be used by any cell within the body. This differs from protein and fat, which have limited cell usage, but they are similar to fats, in that they save protein for the use of building and maintaining all tissues within the body.

Carbohydrates come in various forms from simple sugars known as monosaccharides and disaccharides to complex carbohydrates called polysaccharides and fiber. The monosaccharide group, or one sugar, is made up of three different types of sugar: glucose also known as blood sugar, fructose also known as fruit sugar, and galactose. The monosaccharides are readily available for energy use by the cells. Once fructose and galactose are absorbed by the body, they get converted into glucose.

The disaccharide group, or two sugars, is made up by a combination of the monosaccharides. When glucose and fructose combine, they produce sucrose, otherwise known as table sugar or honey. When glucose and galactose combine, they produce lactose, or milk sugar which can only be found in milk or milk products such as yogurt and cheese. Maltose or malt sugar is the combination of 2 glucose molecules and is the least common of all disaccharides.

The simple sugars are known for their sweet taste. They range in sweetness from the greatest being fructose, to the least sweet being the disaccharides. There have been other substances put on the market to provide a sweet taste in many prepared foods. These products include saccharin, a complex, non-carbohydrate substance

having 0 calories and aspartame, which is a protein, having 4 calories per gram. Saccharin is not able to be broken down within the body and aspartame normally has very few calories because only a very small amount is needed to provide the same sweetness as sucrose.

Alcohol sugars are added to chewing gum and dietetic candies to provide a sweet flavor. Alcohol sugars are found in fruit and contain only 4 calories per gram, the same as carbohydrates. Alcohol can be used by the body as an energy source, but instead of being converted to glucose, it gets converted to fatty acids. This causes alcohol to have 7 calories per gram. If alcohol is consumed in excess to the energy demands, it then gets stored and converted to fat.

There are three sources of complex carbohydrates, plant starch, glycogen (stored form of glucose), and dietary fibers. The complex carbohydrates are also known as polysaccharides, which are made up of chains of three or more simple sugars. Dietary fibers are commonly found in plants and are created by glucose bonding together in bonds that cannot be broken down by human digestive enzymes.

The two forms of dietary fibers are fibrous and non-fibrous. The fibrous sources include seeds and the bran covering wheat, rice, rye, which are not water soluble. They are responsible for aiding in food movement through the digestive system. The non-fibrous fibers which are water soluble swell when combined with water to produce a gel-like substance. The sources of non-fibrous fibers include the pulp of dried beans, oat bran, vegetable and fruits. These fibers

commonly slow down food passage through the digestive system. The recommended intake for fiber is 20-35 grams per day.

Carbohydrates are easily and very quickly absorbed by the body, even the complex carbohydrates are able to be absorbed once they are broken down into a form of monosaccharide. Carbohydrates are used as an energy nutrient, when we eat a monosaccharide; they require no digestive process to be absorbed. Some of the digestion begins directly when the carbohydrate is placed into the mouth, however most is done in the small intestine. From there the monosaccharide is absorbed by the bloodstream and taken to the liver, where it can be converted to energy or changed to glycogen to be stored as fat, or even changed into nonessential amino acids. Other cells within the body can receive glucose through the bloodstream and use it in the same way.

Diabetes is a disease that results from glucose building up in the blood and fluid around cells. Insulin is a hormone responsible for allowing glucose to be moved across the cell membranes, with the help of receptors. Insulin is able to regulate the glucose level in and around the cells, when the insulin levels are too high or non-existent, that person is then suffering from diabetes.

The dietary recommendations suggest that 58% or more of calories intake should be from carbohydrates, mostly complex. The brain alone normally uses 500 calories worth of carbohydrates per day. Simple sugars are usually major ingredients in empty calories food such as cookies, cakes, and candy and are known in promoting tooth decay and leading to obesity.