**Vitamins**

**Vitamins** are complex organic substances vital to life. They differ from the energy nutrients, carbohydrate, protein and fat, in three ways:

1. Structure: Vitamins are not linked together in units as molecules. They are individual units.

2. Function: Vitamins do not provide energy or become part of the body, but they combine with coenzymes to help chemical reactions take place in the body. Metabolism is one such reaction. Vitamins team up with other nutrients to perform various functions and the body cannot function properly without them.

You may hear some vitamins referred to as “antioxidants”. **Antioxidants** are vitamins that include beta-carotene, selenium, and vitamins C and E. Humans need oxygen to live, but oxygen causes undesirable oxidation (like the process that turns sliced apples and potatoes dark, when cut and exposed to air). Oxidation sometimes produces dangerously reactive substances (“free radicals”), which are normally formed within the body. While the body has its defenses against such substances, they still have potential to damage key components, such as DNA, proteins and lipids (fats). Antioxidants are capable of stabilizing free radicals before they can cause harm, in much the same way that coating sliced apples with lemon juice (actually ascorbic acid, or vitamin C) will prevent browning. For this reason, antioxidants may help protect your body from heart disease, some cancers and some eye problems.

3. Amounts found in foods: Vitamins and minerals are needed in very small amounts, milligrams or micrograms. Not all foods contain all vitamins and sometimes the body does not absorb the vitamins from the food you eat. Plant foods are your best source. There are two basic types of vitamins- water-soluble and fat-soluble. Water-soluble vitamins, which include the B-Vitamins and Vitamin C, mix only with water and cannot be stored by the body. It is important to replenish them each day. Fat-soluble vitamins dissolve in lipids, rather than water. These vitamins are usually carried in the blood in lipoproteins, and your body stores any extra that you consume, in the liver. This group of vitamins includes Vitamins A, D, E and K. Vitamins can be destroyed by heat, oxygen, acid, alkali or processing. Care must be taken to preserve them when preparing foods.

While the body cannot make most vitamins, it sometimes assembles them from raw materials. A precursor is a compound that can be changed into a vitamin, in the body. Vitamin precursors are also called **provitamins**; these precursors are not vitamins themselves. Vitamin A, for example, is made from the precursor beta carotene, in the intestines and liver. The precursor of vitamin D is made in the liver, from cholesterol. Some amino acids are also precursors for some vitamins.