

Nutrition

1. Food and energy
 - a. The energy we need to do all the activity we do comes from our food. To use this energy, our cells convert the energy in food to a chemical called ATP. Cells use ATP to do the work they need to do.
 - b. The energy needed to raise the temperature of 1 gram of water 1°C is called a calorie. This is a very small amount of energy so the energy stored in food is measured in dietary Calories (with a capital C). One Calorie is equal to 1000 calories (*i.e.*, 1 kcal).
 - c. Different types of foods contain different amounts of energy.
 - i. Fats contain about 9 Calories per gram.
 - ii. Carbohydrates and proteins contain about 4 Calories per gram.
 - d. Your daily energy needs depend on your sex and your lifestyle.
 - i. The energy needs of an average teenager are about 2200 Calories per day for females and about 2800 Calories per day for males.
 - ii. If you are active you need more energy than the average person your age.
2. Nutrients are substances in food that supply the energy and raw materials your body needs for growth, maintenance, and repair.
 - a. If you can get energy from all foods, why does it matter what kind of food you eat?
 - i. Food also supplies the raw materials cells need to build and repair body tissue. Food also contains minerals and other nutrients that cells need but cannot make themselves.
 - b. Water is the most important nutrient.
 - i. All cells need water because most of the chemical reactions in cells take place in water. Water is lost by sweating, urine and as water vapor when you breathe or talk.
 - ii. Drinking plenty of water is one of the best things you can do to keep your body healthy.
 - iii. We get water from a variety of sources:
 - (1) Drinking water and other beverages.
 - (2) The water contained in food we eat.
 - c. Carbohydrates are the main source of energy for cells. Contrary to popular belief, they are not “bad” for you.
 - i. The two types of carbohydrates are simple and complex.
 - (1) Simple carbohydrates are generally sweet and are found in fruits, honey, and candy. We usually call these sugars.
 - (2) Complex carbohydrates are found in grains, potatoes, and vegetables. We usually call these starches and in our diet they would come mostly from rice, potatoes, bread and pasta.
 - ii. Carbohydrates that are not needed for energy are converted into glycogen and stored in liver and skeletal muscle. The amount of glycogen you can store is limited so excess carbohydrates are simply burned off.
 - iii. Plants contain the complex carbohydrate cellulose, also called fiber. Although we cannot digest cellulose it is important part of our diet because it helps to fill the colon and move wastes through the digestive tract.
 - d. Fats (or lipids) are needed by the body to build cell membranes and certain hormones as well as for the proper functioning of the nervous system. Contrary to popular belief, fats are an important part of the diet.
 - i. When you eat more fat than you need for energy and other uses, the excess is stored as fat. Fat cells get larger as they absorb this excess fat and this is what causes

- weight gain.
- ii. There are two types of fat:
 - (1) Saturated fats come from animals and are usually solid at room temperature. Saturated fats tend to increase the risk of cardiovascular disease so you should limit the amount you eat.
 - (2) Unsaturated fats come from plants and are usually liquid at room temperature. Unsaturated fats do not contribute as much to cardiovascular disease so you should choose fats from plant sources whenever you can.
 - e. Proteins have a wide variety of roles in cells and in the body.
 - i. All cell parts that are made of protein are repaired and replaced from the raw materials (amino acids) we get from eating proteins.
 - ii. Humans can make 12 of the 20 different amino acids we need. The others (called the essential amino acids) have to be present in our diet to avoid shortages.
 - iii. The main sources of protein in our diet are meat, fish, eggs, and milk.
 - f. Vitamins are organic molecules that help regulate reactions in cells, usually by working with enzymes. Vitamins are divided into two groups:
 - i. Fat-soluble vitamins can be stored in fatty tissue in the body. Because of this, the body can store a small amount of these vitamins.
 - ii. Water-soluble vitamins dissolve in water and cannot be stored in the body. These need to be eaten every day.
 - iii. It is important to note that taking vitamin supplements can be dangerous because some vitamins (like A, D, E, and K) can be toxic in large amounts. It is much better to get the vitamins you need from food but if you intend to take vitamin supplements be sure to check the recommended daily limits for each vitamin before you do.
 - g. Minerals are inorganic nutrients that are needed, usually in small amounts.
 - i. Minerals are lost in sweat, urine and feces and so must be replaced by including them in the diet.
 - h. Science still does not have a full understanding of how various nutrients in foods interact to contribute to good health. Also, there may be nutrients in foods that we have not yet discovered. For these reasons it is important to eat a varied diet and not rely on vitamin and mineral supplements, or protein powders.