

# HEALTH ADVISORY

## The Role of Diet and Supplements in Health and Fitness

As part of the overall picture, poor nutrition is one of the lifestyle factors responsible for the onset of such modern maladies as heart disease, diabetes and cancer. Poor diet is one of the top factors in explaining why a large percentage of the population is significantly overweight. While it is beyond the scope of this article to fully explain the role of nutrition in both health and fitness, sound nutrition is sound nutrition, no matter what the activity. It is far better to apply basics consistently, as that will improve your overall health more than nutritional fads that may only last a few weeks.

### Metabolism, Exercise and Diet

Metabolism refers both to the physiological processing of various macro-nutrients and to the direct and indirect physiological effects of food and exercise. To stay at your best weight for optimum health and fitness, your food intake should match the needs of your metabolism and activity levels. Exceed your nutritional needs in calories and you gain weight, dip below those needs and you lose weight. Basal metabolic rate, or BMR, can vary greatly from one individual to another and is a function of activity level, genetics, muscle mass, fitness level, and training type and frequency; just to name a few factors. Most human energy needs are determined by movement and constant physical activity. During exercise the number of calories expended is determined by the exercise level or actual work output. There is also a post-exercise effect in which more calories are expended when the body is at rest, and this is a key feature in successful weight loss. The higher the intensity or difficulty of the exercise and the longer the exercise session, then the higher the post-exerciser metabolism. Exercise contributes to weight loss not only by the direct expenditure of calories during the exercise, but also in the indirect expenditure of calories after the exercise is finished.

Basic fuels and building blocks: carbohydrates, fats and proteins

### Vitamins and Minerals

Supplements can be viewed as fertilizer for your brain because they help neuronal connections. In a perfect world no one would need supplements, but given the poor quality of our food supply, the toxins in our environment and our stressful lifestyle, we need basic daily supplies of raw materials for enzymes and biochemistry to run efficiently.

Vitamins and minerals don't actually contain energy. In reality, only carbohydrates, fats, proteins and alcohol contain food energy. Vitamins and minerals only aid in physiological functions such as metabolism – they provide no energy in themselves.

Complex chemicals known as enzymes are necessary to help the body control metabolism and growth. Enzymes are catalysts for the release of energy and nutrients. Vitamins are important components in the work of enzymes and are either fat or water soluble. Thirteen vitamins are needed for energy, growth and tissue repair. For example, some of the B vitamins are responsible in part for metabolism and are therefore useful in exercise and health and fitness. But just how many vitamins a person gets from the diet is the subject of debate. Eating a varied, regular and balanced diet including a wide variety of fruits and vegetables is the best first step toward making sure your diet is adequate in vitamins and minerals.

Minerals have similar functions to vitamins but are inorganic. These substances, such as calcium, copper and manganese have diverse functions in the human body. Minerals are necessary for growth, especially of the bones and teeth. In addition, minerals aid certain functions, such as muscular contraction and nerve impulses. Minerals are generally taken into the body with foods, especially plant foods. Twenty-five of the 106 elements are considered essential minerals in human nutrition.

Moderate health and fitness goals don't normally warrant massive dietary supplementation of vitamins and minerals. If you have poor nutritional habits and most people do, your need for supplementation grows. Because of substantial research documenting the toxic effects of mega doses of certain vitamins and minerals, massive over supplementation is not recommended. In other words, taking a multiple vitamin-mineral preparation with around 100% of each vitamin's and mineral's RDA is considered safe and even prudent if you have less than the best nutritional habits.

## **Understanding Nutrition**

Fuel for human energy comes from two primary sources: fats and carbohydrates. Proteins, fats and water are considered "macro" nutrients essential for human survival and growth. Micro nutrients include vitamins and minerals which are essential for growth and enhance the function and usability of macro nutrients.

Calories are the units by which the energy potential of food is measured. The calorie unit used as a measure of energy potential in food is equivalent to the amount of energy needed to raise the temperature of one gram of water 1 degree Celsius. A better measurement is the kilocalorie, or kcal, which is the amount of energy needed to raise the temperature of one kilogram of water 1 degree Celsius. Whenever you see "Calories" spelled with a capital C, the word is actually representative of kilocalories.

Which foods provide the most food energy? Carbohydrates and proteins provide 4 kcals of energy per gram, alcohol provides 7 kcals per gram, and fat provides a whopping 9 kcals per gram. This is why two teaspoons of butter (a pure fat) on a medium-sized baked potato (a complex carbohydrate) have more calories than the entire potato. The octane rating of the food energy is not always relative to the physical size of the food, it is more a matter of fuel type.

## **Carbohydrates: Rocket Fuel**

Carbohydrates are foods whose molecules form into simple or complex chains of sugars. Simple sugars include single and double sugar molecules known as monosaccharides and disaccharides. The key thing to remember about simple sugars is that whatever their form (fruit juice, milk, sugar, corn syrup, honey, fructose, or simple table sugar), they are readily accessible for the energy needs of the body. Restricting simple sugars in the diet improves overall energy, heightens athletic performance and reduces excess weight. Complex carbohydrates, such as the starches found in plant foods like rice, whole grains and potatoes have become a hot topic over the last ten years. These long chains of sugar molecules provide a longer fuel "burn" during activity and have more vitamins and minerals than simple sugars.

## **Nutrient Density: The Key to Choosing Carbohydrates**

Nutrient density is a term that describes how many calories a food contains along with the number of other nutrients it has, such as essential vitamins and minerals. In general, the simpler the sugar, the less nutrient-dense. For example, although honey is considered by many to be a "natural food", its effect on the body is almost the same as that of processed table sugar and it has almost the same nutrient density.

Carbohydrates should be also chosen for their glycemic index, or how fast they are converted to blood sugar. For health and fitness, carbohydrates and food combinations which lower the glycemic response of insulin production-which helps regulate blood sugar – will result in better maintenance of blood sugar and energy levels. Factors which influence this index are the amount of fiber and sugar/carbohydrate profile of the food. For example, bread, even though a complex carbohydrate, has a high glycemic index. Vegetables, some fruits and legumes (dried peas and beans) because of their fiber content have a low glycemic index.

## **Fats: Tortoise Fuel**

Fats serve a number of important functions in the body, including carrying the fat-soluble vitamins A, D, E and K, and insulating and cushioning the organs. Fats are the most energy-rich macronutrient at nine kcal per gram, which means fats require a long time to metabolize. Fats burn slow, steady and long, whereas carbohydrates burn fast and hot – a kind of metabolic tortoise-and-hare scenario.

Fats have a number of components, including triglycerides, cholesterol and lecithin. Triglycerides are found in all fatty foods and supply energy. They are also the form in which fat is stored in the body, in fat cells. Fats can be further divided into saturated and unsaturated fats. Saturated fat is found in animal products such as meat, whole dairy products and eggs. These fats are solid at room temperature. Plant foods are the primary sources of unsaturated fats, which include vegetable oils, avocados, olives, soybeans and nuts. Unsaturated fat is liquid at room temperature.

Most people eat too much animal fat and not enough unsaturated fat, thus their dietary profiles are heavy in saturated fats. Current studies indicate that Americans on the average get more than 44% of their total calories from fat. This dietary profile has been linked to elevated blood cholesterol levels, which is a major factor in coronary heart disease. American Heart Association guidelines state that saturated or animal fats should make up no more than 10% of total calories, and only 30% of total calories should come from all fats.

For improved health and weight loss, this requires lowering fat intake to the level recommended by the American Heart Association and making sure that total fat intake occurs over the course of the day rather than all at one meal. Your body uses fat for essential functions. It can make or synthesize much of the fat it needs. Linoleic acid, a polyunsaturated fat found in nuts, vegetable oils, and wheat germ, can't be made by the body and must be eaten in your diet. Linoleic acid, is also important for hormonal production and regulation. This is why consuming a wide variety of vegetables, nuts or nut products (taken sparingly because of their high calorie content) and fish is important to nutritional health.

## **Proteins: Raw Materials**

Proteins are used by the body for energy and for building and maintaining tissue. Although proteins are not the primary source of energy during health and fitness, they can and will be used as energy by the body when there is not enough carbohydrate and fat present. However, extra protein in the diet is not easily converted to energy because the process of converting it is chemically complex.

Amino acids are known as the "building blocks of protein" and are of two types: essential and nonessential. Of the 22 total amino acids, nine cannot be synthesized by the human body and must be taken from food. The quality of the protein you eat will affect your training results, especially in resistance training. Generally, animal products provide a better balance of the nine essential amino acids, yet they generally have a higher fat content than plant sources such as beans or tofu, and they contain cholesterol which plant foods do not. Plant sources of protein need to be combined in order to assure that the balance of the nine essential amino acids is met because no single plant source contains all the essential amino acids.

## **Water, a Fluid Connection**

Water serves a number of functions, including transportation of nutrients, hormones, antibodies and waste products. Water helps to regulate body temperature, which is essential to effective physical training. The adult human body is roughly 55% water, and that water volume must be replaced approximately every 12 days. Muscle is approximately 78% water, so without adequate hydration, muscle won't function properly.

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