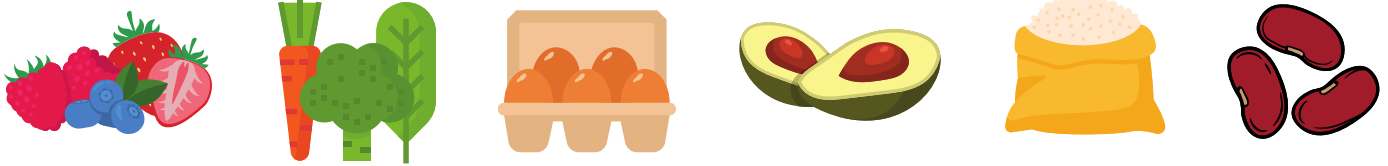


Food as Fuel

The Role of Nutrients



There are 6 groups of nutrients that we get from our food. Carbohydrates, Proteins, Fats, Vitamins, Minerals, and Water. Carbohydrate, protein, and fat are referred to as macronutrients and they provide us with energy. For the body to efficiently utilize the energy from the macronutrients, it needs micronutrients and water. Vitamins and minerals are micronutrients, and they help all the biochemical reactions happen to break down the macronutrients into usable energy for our brain, organs, and muscles. Of course, none of this would happen without water either. Therefore, it is important that we eat and drink enough food and water to fuel our bodies.

CARBOHYDRATES (*aka "Carbs"*)

Carbohydrates are the preferred fuel source during exercise. They are changed into blood sugar or glucose, which muscles use for energy. Any glucose that is not immediately used gets stored in the muscles as glycogen, which can be used for energy later. Glycogen is the preferred fuel for muscles. Therefore, it is important to have enough glycogen storage and blood glucose for exercise training and competition. Carbohydrates are further grouped into starch, fiber, and sugar. Starches are more complex than sugars, thus they take longer to break down. Fiber is actually not able to be broken down and is very important for digestion, to move food through, and make sure blood sugar levels do not get too high. The best sources of carbohydrate for sport and exercise are from whole foods and foods with naturally occurring sugar, not added sugar. Processed foods with added sugar lack vital vitamins and minerals, thus they contribute only calories and may lead to blood glucose spikes and unhealthy weight gain. Choose carbohydrate sources from plants and foods you can imagine growing, and avoid candy, soda, energy drinks, and processed products high in added sugars.

PROTEIN (*more than meat*)

Protein is essential for growth...of everything: muscles, cells, hair, bones, etc. However, we do not need as much meat as popular culture tells us or as much as the standard American typically eats. Protein is actually found in a lot of different foods, but people tend to associate protein with animal meat. Protein is made up of amino acids, and animal protein has all 20 amino acids, while plant sources only have certain amino acids. There are some plant sources that have all of the "essential" amino acids, meaning ones we must get from our diet. For plant sources, certain combinations of foods in a day need to be made to ensure all "essential" amino acids have been consumed. But guess what? Vegetables have protein too! Complete plant protein sources include soy, quinoa, chia seeds, hemp seeds, amaranth, buckwheat, nutritional yeast, and spirulina. Other plant sources of protein are beans, whole grains, lentils, nuts, and seeds. Dairy sources such as milk, yogurt, and cottage cheese are also complete proteins. The recommendation for meat is 4 to 6 ounces per day; one quarter-pound hamburger and that is met. There are better quality meat choices than a hamburger, by-the-way.

FATS (*are essential*)

Fat not only provides more energy per gram than carbohydrate and protein, but they also make food taste better and promote satiety. Fat is part of cell membranes, it protects your organs, and keeps you warm. Fats also help transport the fat-soluble vitamins (A, D, E, & K), without which the body cannot effectively utilize them. There are fats that we cannot make and must get from our diet, essential fats. Essential fatty acids help regulate cholesterol metabolism, are involved with hormone production, and help with many physiological processes. Because fats are larger molecules, they cannot be broken down into energy as quickly as carbohydrates. Therefore, they are not the preferred source of energy during moderate and high intensity exercise. We use fat as energy throughout the day and during low intensity and long endurance activity. Having fat too close to a training session or a competition can take the energy you need for your muscles to your digestion instead. It is important to consume fats from Omega-3 sources such as fish, flaxseeds, walnuts, and canola oil. Other good sources of fats come from plant sources such as avocados, olives, and seeds, and tend to be liquid at room temperature. Fats to be conscious of portion size are those that tend to be solid at room temperature, such as butter, lard, coconut, palm, and whole-fat dairy. Fats to avoid are those that have been chemically modified, labeled as "partially-hydrogenated" and "hydrogenated". From an environmental perspective, the palm oil industry is decimating rain forests. Therefore, by sticking to unprocessed and unrefined foods, you can avoid the fats that can cause problems.

VITAMINS AND MINERALS *(have unique and different roles)*

Vitamins and minerals are found in plants, soil, the ocean, water sources, and animals. Without them, the metabolic processes in the body cannot happen. They are necessary for every movement, process, and reaction in the body. Their levels can vary greatly, in the amounts that they are needed by the body and the amount found in food. It is important to consume a variety of foods to ensure you are getting the necessary vitamins and minerals. Again, the best place to find vitamins and minerals are in whole foods.

WATER *(keep sipping for hydration)*

Water makes up 50 to 65% of the body depending on gender, age, and body composition. The percentage of body water at a given time depends on hydration. We start to feel thirsty when we have already lost 2-3% of our body water, and being dehydrated by 2% causes a decrease in mental function and physical coordination. Hydration levels affect our body temperatures. As our body temperatures rise, energy goes to cooling it down, instead of to the muscles. This can lead to cramping and fatigue very quickly. That is why staying hydrated in hot climates is critical, and it can be difficult for swimmers to stay hydrated as well because they are in the water and may not realize they are sweating and losing water. Water also helps us excrete waste. Without proper hydration, metabolic by-products that have negative impacts on our performance can build up. It is best to start drinking water 2-3 hours before practice or competition, with a goal of 5 to 6 (8 ounce) cups taken in before. Try to drink during practice or competition if you can with 8 to 10 sips at a time. After practice, you can drink another 2 to 3 cups. Training sessions and endurance competitions lasting longer than one hour, especially in hot or humid climates, may require electrolyte supplementation.



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