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Healthy nutrition and performance

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Abstract

Nutrition is the biochemical and physiological process by which an organism uses food to support its life. It includes ingestion, absorption, assimilation, biosynthesis, catabolism and excretion. The science that studies the physiological process of nutrition is called nutritional science. Nutritionists use ideas from molecular biology, biochemistry, and genetics to understand how nutrients affect the human body. Nutrition also focuses on how people can use dietary choices to reduce the risk of disease, what happens if a person has too much or too little of a nutrient, and how allergies work. Nutrients provide nourishment. Proteins, carbohydrates, fat, vitamins, minerals, fiber, and water are all nutrients. If people do not have the right balance of nutrients in their diet, their risk of developing certain health conditions increases. The effective management of food intake and nutrition are both key to good health. Smart nutrition and food choices can help prevent disease. Eating the right foods can help your body cope more successfully with an ongoing illness. Understanding good nutrition and paying attention to what you eat can help you maintain or improve your health.

Keywords: Nutrition, carbohydrates, fat, protein, mineral, and water

Introduction

Food and nutrition are the way that we get fuel, providing energy for our bodies. We need to replace nutrients in our bodies with a new supply every day. Water is an important component of nutrition. Fats, proteins, and carbohydrates are all required. Maintaining key vitamins and minerals are also important to maintaining good health. For pregnant women and adults over 50, vitamins such as vitamin D and minerals such as calcium and iron are important to consider when choosing foods to eat, as well as possible dietary supplements. A healthy diet includes a lot of natural foods. A sizeable portion of a healthy diet should consist of fruits and vegetables, especially ones that are red, orange, or dark green. Whole grains, such as whole wheat and brown rice, should also play a part in your diet. For adults, dairy products should be non-fat or low-fat. Protein can consist of lean meat and poultry, seafood, eggs, beans, legumes, and soy products such as tofu, as well as unsalted seeds and nuts. Why is Sports Nutrition so important? At the most basic level, nutrition is important for athletes because it provides a source of energy required to perform the activity.

The food we eat impacts on our strength, training, performance and recovery. Good nutrition also involves avoiding certain kinds of foods. Sodium is used heavily in processed foods and is dangerous for people with high blood pressure. The USDA advises adults to consume less than 300 milligrams (mg) per day of cholesterol (found in meat and full-fat dairy products among others). Fried food, solid fats, and trans fats found in margarine and processed foods can be harmful to heart health. Refined grains (white flour, white rice) and refined sugar (table sugar, high fructose corn syrup) are also bad for long-term health, especially in people with diabetes. Alcohol can be dangerous to health in amounts more than one serving per day for a woman and two per day for a man. A number of factors contribute to success in sport, and diet is a key component. An athlete's dietary requirements depend on several aspects, including the sport, the athlete's goals, the environment, and practical issues. The importance of individualized dietary advice has been increasingly recognized, including day-to-day dietary advice and specific advice before, during, and after training and/or competition. Athletes use a range of dietary strategies to improve performance, with maximizing glycogen stores a key strategy for many. Carbohydrate intake during exercise maintains high levels of carbohydrate oxidation, prevents hypoglycemia, and has a positive effect on the central nervous system.

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Nutrition is increasingly recognized as a key component of optimal sporting performance, with both the science and practice of sports nutrition developing rapidly. Recent studies have found that a planned scientific nutritional strategy compared with a self-chosen nutritional strategy helped nonelite runners complete a marathon run faster and trained cyclists complete a trail faster. Becoming an elite athlete requires good genes, good training and conditioning and a sensible diet. Optimal nutrition is essential for peak performance. Nutritional misinformation can do much harm to the ambitious athlete as good nutrition can help. An individual involved in a general fitness regimen can meet their nutrition needs by adhering a balanced diet. However, athlete involved in moderate or high frequency training programme will need to increase their intake to meet nutritional requirements.

Table 1: Essential nutrient

Macronutrients			Micronutrients		
Carbohydrate	Fat	Protein	Vitamins	Minerals	Water

Carbohydrates

Carbohydrate is a biomolecule consisting of carbon, hydrogen and oxygen atoms. Carbs are starches, sugars, and fibers found in grains, vegetables, fruit, and milk products. While carbohydrates are essential to a healthy diet, they can be harmful in excess. Carbohydrates are divided into four types: monosaccharides, disaccharides, oligosaccharides, and polysaccharides. Complex carbohydrates come from foods such as potatoes, beans, vegetables, whole grain pasta, cereals and other grain products. Simple carbohydrates are found in foods such as fruits, milk, honey and sugar. During digestion, the body breaks down carbohydrates to glucose, which is the utilized for energy is converted to glycogen and stored in the muscles and liver to fulfil later energy needs. Some of the major functions of Carbohydrates are:- Living organisms use carbohydrates as accessible energy to fuel cellular reactions. They are the most abundant dietary source of energy (4 kcal/gram) for all living beings. It is stored as glycogen in animals and starch in plants. Stored carbohydrates act as an energy source instead of protein. Carbohydrates are intermediates in the biosynthesis of fats and proteins. It aid in the regulation of nerve tissue and is the energy source for the brain. They are linked to many proteins and lipids.

Carbohydrates are an important fuel source. In the early stages of moderate exercise, it provide 40 to 50 percent of the energy requirement. As work intensity increases, carbohydrate utilization increases. Carbohydrates yield more energy per unit of oxygen consumed than fats. Because oxygen often is the limiting factor in long duration and high intensity events, it is beneficial for the athlete to use the energy source requiring the least amount of oxygen per kilocalories produced. Depending on the intensity, duration, and frequency of exercise, in general athletes should consume between 6-10 grams of carbohydrates per kilogram of body weight per day. (A kilogram equals 2.2 pounds.) Carbohydrate requirements are also affected by the athlete's sex and body mass, as well as total daily energy expenditure and environmental conditions. Carbohydrate is an important energy source during exercise. During short, heavy exercise it may be the only energy source for the working muscle and may be derived exclusively from the glycogen stores within the muscle fibers themselves. Carbohydrate is the primary fuel for most types of exercise and the most important nutrient

for athletic performance. Our body runs most efficiency with a balance of protein, fat and carbohydrates, but adequate carbohydrate is a key source of energy for athletes. Stored energy for later use. During intense, intermittent exercise and throughout prolonged physical activity, muscle glycogen particles are broken down, freeing glucose molecules that muscle cells then oxidize through anaerobic and aerobic processes to produce the adenosine triphosphate (ATP) molecules required for muscle contraction. Research has demonstrated that endurance athletes on a high-carbohydrate diet can exercise longer than athletes eating a low-carbohydrate, high-fat diet. However, constantly eating a high-carbohydrate diet is not advised. This condition the body to use only carbohydrates for fuel and not the fatty acids derived from fats.

FAT

Fats are nutrients and are a stored form of energy known as triacylglycerols or triglycerides, that give you energy. Fats have 9 calories in each gram. Fats help in the absorption of fat-soluble vitamins A, D, E, and K. Fats are either saturated or unsaturated, and most foods with fat have both types. A small amount of fat is an essential part of a healthy, balanced diet and is a source of essential fatty acids, which the body cannot make itself. Fats serve useful functions in both the body and the diet. In the body, fat functions as an important depot for energy storage, offers insulation and protection, and plays important roles in regulating and signalling. Large amounts of dietary fat are not required to meet these functions, because most fat molecules can be synthesized by the body from other organic molecules like carbohydrate and protein (with the exception of two essential fatty acids). However, fat also plays unique roles in the diet, including increasing the absorption of fat-soluble vitamins and contributing to the flavour and satisfaction of food. In the human body, fat can be stored in skeletal muscle, the liver and adipose tissue, and is used for many functions. This includes providing structure for cell membranes, insulating and protecting vital organs, regulating endocrine system function (how hormones are produced), helping transport vitamins and minerals around the body, and as a source of energy for many cellular functions. Fat provides approximately 70% of the energy for body functions when at rest and during low-intensity physical activity.

Fat provides the main fuel source for long-duration, low-to moderate-intensity exercise (Endurance sports, such as marathons). Even during high-intensity exercise, where carbohydrate is the main fuel source, the body needs fat to help access the stored carbohydrate (glycogen).

Using fat to fuel exercise, however, is not a simple process. It has three parts, Digestion, Transportation and Conversion. Fat is slow to digest and be converted into a usable form of energy. This process can take up to six hours. Even during high-intensity exercise, where carbohydrate is the main fuel. So athletes need to carefully time when and how much fat they eat. In general, it's not a great idea to eat foods high in fat immediately before or during intense exercise. First, the workout will be done before the fat is available as usable energy and the second, doing so can cause uncomfortable gastro intestinal symptoms, such as nausea, vomiting and diarrhoea. An hour before exercising, having a light snack that contains some protein, and is higher in carbohydrate and lower in fat, can help you perform during your training and recover afterwards.

Protein

Proteins are essential nutrients for the human body and is a macronutrient that is essential to building muscle mass They are one of the building blocks of body tissue and can also serve as a fuel source. As a fuel, proteins provide as much energy density as carbohydrates: 4 kcal per gram; in contrast, lipids provide 9 kcal per gram. It is commonly found in animal products, though is also present in other sources, such as nuts and legumes. There are three macronutrients: protein, fats and carbohydrates. Macronutrients provide calories, or energy. It is important for individuals to consume protein every day. Daily protein intake plays a role in keeping your cells in good shape and should be part of your daily health maintenance plan. "Protein is made up of amino acids, commonly known as building blocks, because they are attached in long chains. It is also considered a "macronutrient," meaning that you need relatively large amounts of it to stay healthy.

Eating high-protein foods has many fitness benefits, including: Speeding recovery after exercise and/or injury, reducing muscle loss, building lean muscle, helping maintain a healthy weight, curbing hunger.

Protein is important in sports performance as it can boost glycogen storage, reduce muscle soreness and promote muscle repair. For those who are active regularly, there may be benefit from consuming a portion of protein at each mealtime and spreading protein intake out throughout the day. Protein promotes satiety, or the feeling of fullness, more than both carbohydrates and fat. This can be beneficial for athletes who are often fuelling their bodies for long stretches of time. An elite athlete working towards an ideal body composition or just someone trying to lose a little belly fat, consider replacing some of your carbs and fats with protein in your daily meals and snacks. Eating adequate amounts of protein helps maintain your muscle mass and prevents muscle wasting. So if you walk a lot, enjoy cycling, or do any sort of exercise to stay active, you need to eat protein. Athletes and individuals with more muscle need to eat larger amounts of protein daily to maintain their higher muscle mass. Combining regular activity and exercise with high protein intake promotes muscle growth and strengthening.

Vitamins

Vitamin is an organic molecule that is an essential micronutrient which an organism needs in small quantities for the proper functioning of its metabolism. Essential nutrients cannot be synthesized in the organism, either at all or not in sufficient quantities, and therefore must be obtained through the diet. Each organism has different vitamin requirements. These are substances that our bodies need to develop and function normally. They include vitamins A, C, D, E, and K, choline, and the B vitamins (thiamin, riboflavin, niacin, pantothenic acid, biotin, vitamin B6, vitamin B12, and folate/folic acid). They help shore up bones, heal wounds, and bolster your immune system. They also convert food into energy, and repair cellular damage.

In general, vitamin supplementation to an athlete on a well-balanced diet has not been shown to improve performance. However, additional research with certain vitamins appears to be warranted, such as with the vitamin B complex and fine motor control, and with vitamin E and endurance at high altitudes. Vitamins and minerals are crucial for a variety of activities in the body such as turning food into energy and keeping bones healthy. They also may affect how well the body performs. Most important to focus on

for athletes are calcium, iron, zinc, magnesium, the B vitamins, and vitamin D, as well as some antioxidants such as vitamins C and E, beta-carotene, and selenium. The key is for athletes to figure out where they may be deficient and come up with a dietary plan to rectify those problems rather than popping supplements left and right. This doesn't mean they have to analyze all of the food they eat. But it does mean athletes should be aware of how their food choices affect their intake of vitamins and minerals.

Minerals

Minerals are those elements on the earth and in foods that our bodies need to develop and function normally. Those essential for health include calcium, phosphorus, potassium, sodium, chloride, magnesium, iron, zinc, iodine, chromium, copper, fluoride, molybdenum, manganese, and selenium. Minerals are important for our body to stay healthy. Body uses minerals for many different jobs, including keeping bones, muscles, heart, and brain working properly. It also important for making enzymes and hormones.

Important minerals for an athlete are sodium, potassium, chloride, calcium, zinc, magnesium and iron. Sodium, potassium and chloride are important electrolytes that play a vital role in hydration, nerve transmission and muscle contraction. Physiologic roles of minerals important to athletes are their involvement in: muscle contraction, normal heart rhythm, nerve impulse conduction, oxygen transport, oxidative phosphorylation, enzyme activation, immune functions, antioxidant activity, bone health, and acid-base balance of the blood. Vitamin B12 is a crucial vitamin for energy metabolism. Every cell in the body depends on vitamin B12, as it plays a part in the synthesis of fatty acids and energy production, making it a crucial vitamin for athletic performance.

Water

Water is needed for most body functions, including to: Maintain the health and integrity of every cell in the body. Keep the bloodstream liquid enough to flow through blood vessels. It plays many important roles in the body including flushing waste from the body, regulating body temperature, transportation of nutrients and is necessary for digestion. When an athlete exercise, the core body temperature rises. In response, the body sweats to dissipate excess heat so it doesn't overheat. "Staying hydrated replaces the water lost through sweating and is essential for thermoregulation, helping to prevent cramps, heat exhaustion and heat stroke. Exercise performance begins to decline once water loss exceeds 2% of an individual's body mass. In addition to physical impairments, dehydration also impairs cognitive function, including reaction time, task performance and mood state.

Conclusion

Whether It is for Personal achievement or to meet international demands the heigh of the bar facing the athlete, they required well balanced and healthy diet. Recent research has focused on athletes training with low carbohydrate availability to enhance metabolic adaptations, but whether this leads to an improvement in performance is unclear. The benefits of protein intake throughout the day following exercise are now well recognized. Athletes should aim to maintain adequate levels of hydration, and they should minimize fluid losses during exercise to no more than 2% of their body weight. Supplement use is widespread in athletes,

with recent interest in the beneficial effects of nitrate, beta-alanine, and vitamin D on performance. However, an unregulated supplement industry and inadvertent contamination of supplements with banned substances increases the risk of a positive doping result. Although the availability of nutrition information for athletes varies, athletes will benefit from the advice of a registered dietician or nutritionist.

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