

Nutrients needed by
the body are known



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Nutrients are the substances used by the body for energy, growth, and other functions. The large amounts of nutrients needed by the body are known as macronutrients. The three major macronutrients are carbohydrates, protein, and fats. The food consumed contains a certain percentage of these macronutrients that is then used by the body for energy. Energy is released when the body chemically metabolizes and breaks down the carbon-hydrogen bonds of the consumed nutrients. Amongst the three main macronutrients, carbohydrates provide the body with the fastest acting source of energy. The body is able to breakdown the carbohydrate molecules easily and use as fuel. Even when the carbohydrate molecule forms a long chain, during digestion it is broken down to three simple molecules: glucose which is the principal circulating sugar in the blood, fructose which is the fruit sugar, and galactose which is a component of lactose and other polysaccharides. The three simple carbohydrate structures are then kept for energy transfer, glycogen storage, and circulating glucose within the bloodstream. The brain, muscles, heart and kidneys require carbohydrates to function and prefer glucose as a form of energy. The Dietary Guidelines Advisory Committee suggested a minimum intake of 130g of carbohydrates a day to meet the body's basic energy needs. However, the intake of carbohydrates is independent on the body size, activity levels, and the specific goals of the individual. For highly active individuals, higher intake of carbohydrates would be more beneficial to keep the energy levels high. However, to reduce body fat, it is recommended to have a lower intake of carbohydrates. Though they help in feeling satiated, control blood sugar, and elevate energy, not all types of carbohydrates have the same affect on the body.

Low-processed carbohydrates take longer to be digested and are preferred over refined carbohydrates. Examples include oats, barley, brown rice, quinoa, potatoes, and corn. Fruits such as bananas and apples also contain carbohydrates along with soluble fiber which can be dissolved in water and slows down digestion. Leafy greens, green beans, seeds and nuts contain insoluble fibers. These help the body in speeding the colonic transit speed and helps with constipation and waste elimination.

Higher fiber content helps in ridding the body of waste and therefore reduces the risk of obesity and heart disease. Refined carbohydrates such as white bread, pastries, and white pasta are not recommended since they are consumed rapidly and spike blood sugar. Refined carbohydrates are also low in fiber, can cause inflammation and insulin resistance. Nonetheless, the amount of carbohydrates consumed is to be indirectly proportional to the amount of fat consumed. To avoid excess energy being consumed, it is recommended that if the carbohydrate intake is high, fat consumed has to be low and vice versa.

Fat is a form of macronutrient that has been linked to elevated heart diseases. However, recent studies have shown that dietary fat is essential for overall health and performance. On a molecular level, the simplest unit of fat is known as the fatty acid. Fatty acids help the body regulate hormones, transport vitamins throughout the body, form cell membranes, form the brain and nervous system, and also provide the body with fatty acids that the body cannot produce by itself.

Fatty acid is essentially divided into two main types, saturated fatty acids and unsaturated fatty acids. Unsaturated fatty acids are then categorized as monounsaturated and polyunsaturated fatty acids. Foods high in fat are usually composed of three types of fatty acids that are joined together. For example, the fat found in eggs is divided as follows: 39% saturated fat, 43% monounsaturated fat, and 18% polyunsaturated fat. Having a balanced combination of fatty acids is the key to fat consumption.

Research of the relationship between excess body fat and the consumption of saturated fat has yielded different results. It is not only the consumption of fat that results in the increase cholesterol and heart disease. When combined with a bad diet that combines refined carbohydrates and saturated fats the risks of obesity, high cholesterol and heart disease are significantly higher. Therefore, when consuming fat, it is recommended to take a well-balanced approach. Foods such as avocados, salmon, chia seeds, flax seeds, and walnuts are all rich in healthy fats. The role of dietary fat is important for overall health as it improves the cardiovascular, nervous, and immune system.

The third main macronutrient is protein. Protein is what the body uses to produce new tissues, repair tissues, and maintain body functions. The smallest unit of a protein is the amino acid.

The amino acids can be used by the body for energy, muscle protein synthesis, neurotransmitters in the brain, and for creating tissue enzymes. Protein is essential to the diet as it defines an organism's structure,

hormones, enzymes, and chemicals. There are both animal and plant sources of proteins that provide the essential amino acids for the body.

Examples of animal protein sources are chicken, beef, fish, and milk, whereas plant protein sources such as soy, lentils, black beans, and peanuts. The consumption of protein is important for immune health, metabolism, suppressing hunger, and performance. Therefore, it is recommended for a generally healthy individual to consume 0.8g of protein per kg of body mass. Variables such as body size and level of activity are to be considered since the protein intake has to be adjusted accordingly. For conditioned athletes undergoing high intensity workouts, it is recommended that they consume 1.6g to 2.0g of protein per kg of body mass.