

Understanding Basic Nutrition and Nutrition Needs of Athletes



Macronutrients

The body needs three primary nutrients: protein, carbohydrates, and fats.

The total caloric intake will vary significantly based on the swimmer's training volume, intensity, goals (e.g., weight maintenance, weight loss), and individual metabolism.

Macronutrient	RDA Range (%)	Grams/Kg Body Weight
Carbohydrates	55-70%	6 - 10 g
Proteins	10-20%	1.2 - 1.8 g
Fats	20-30%	Not specified

Carbohydrates

Carbohydrates are the body's primary energy source during high-intensity training and competition. They help to restore glycogen stores, which are how the body stores extra energy. Glycogen is stored within the muscles to be used when the most recent energy intake is depleted. Glycogen is critical for endurance and high performance in swimmers.

Carbohydrates are a large food group broken into two categories: complex and simple carbs. Complex carbs take longer to break down and provide a sustained energy source. It is best to choose complex carbs for meals and snacks not immediately before or after competition. These include whole grains, legumes, and starchy vegetables. Simple carbs are helpful for

quick, immediate energy needs and recovery post-workout. These include foods such as fruit, milk, and honey. Regardless of the type of carbohydrate, it is best to find whole food sources.

Some carbs are a better fuel source than others. For example, although simple carbs such as honey or sugar can provide a rush and burst of energy, they are short-lived, meaning the body uses them quickly. Sometimes, this is desired; if necessary, athletes can incorporate gels and sports chews before, after, or during performance. These require little digestion and provide that instantaneous fuel source, however, these must be tested before meet day and used sparingly unless crucial during extreme energy expenditure events. They are not recommended for daily use, and dependence upon them over food for fuel is not optimal. It is better to provide the body with sustainable carbohydrate sources that provide energy for performance, replenish those glycogen stores, and aid the body in recovery and repair.

On average, a swimmer must take in 55-70% of their daily caloric intake from carbohydrates. This averages about 6-10 grams of carbohydrate per kg of body weight for moderate to high training. In high elite levels of competition, there is more precision to the cycling of carbohydrate intake; for the high school athlete, it is enough to be aware of carbohydrates.

Complex Carbohydrates	Simple Carbohydrates
<p>Starches:</p> <ul style="list-style-type: none"> - Potatoes - Rice (brown and white) - Quinoa - Oats - Barley - Corn <p>Legumes</p> <ul style="list-style-type: none"> - Lentils - Chickpeas - Black beans - Kidney beans - Peas <p>Whole Grains</p> <ul style="list-style-type: none"> - Whole wheat bread - Brown rice - Whole grain pasta - Millet - Farro - Buckwheat <p>Vegetables (especially starchy vegetables):</p>	<p>Monosaccharides (single sugar units):</p> <ul style="list-style-type: none"> - Glucose (found in fruits and honey) - Fructose (found in fruits and root vegetables) - Galactose (found in milk and dairy products) <p>Disaccharides (two sugar units):</p> <ul style="list-style-type: none"> - Sucrose (table sugar, found in sugarcane and sugar beets) - Lactose (found in milk and dairy products) - Maltose (found in malted foods and beverages, and produced during digestion of starch) <p>Processed and Refined Sugars:</p> <ul style="list-style-type: none"> - Candy and sweets - Syrups (like corn syrup and maple syrup) - Soft drinks and fruit juices - Baked goods made with white flour and sugar <p>Fruits (although they contain fiber and other nutrients, they are primarily sources of simple sugars):</p> <ul style="list-style-type: none"> - Apples

- Sweet potatoes
- Butternut squash
- Carrots
- Beets

Fruits

- Apples
- Bananas
- Berries (like blueberries and strawberries)
- Oranges

- Grapes
- Watermelon
- Mangoes

Protein

Protein is essential for the body and athlete, but does not provide direct energy such as carbohydrates or fats. Protein is the building block of tissues within the body, supporting muscle growth and repair. Intense training causes micro-tears in muscle fibers. Protein provides the amino acids necessary for repairing and rebuilding these tissues, leading to muscle growth (hypertrophy). Protein supports muscle strength, enhancing overall performance in sports requiring power and explosiveness. For endurance athletes, protein can help preserve lean muscle mass during prolonged exercise, helping maintain performance levels. Intense training can temporarily suppress the immune system.

Adequate protein intake supports immune function, helping athletes stay healthier and avoid illnesses, particularly during heavy training periods. Proteins produce hormones that regulate various bodily functions, including metabolism, growth, and muscle repair. This is particularly important for recovery and energy balance. During periods of caloric deficit or weight loss that can happen in intense training, higher protein intake helps preserve lean muscle mass, ensuring that most weight loss comes from fat rather than muscle. While carbohydrates are the primary energy source during exercise, protein can also be used for energy when carbohydrate stores are low, particularly during prolonged exercise or when calorie intake is

inadequate. Consuming protein post-exercise can help reduce muscle soreness and speed up recovery, allowing athletes to train harder and recover faster between sessions. Protein foods provide essential amino acids that the body cannot synthesize. These are vital for various physiological processes, including muscle repair, neurotransmitter synthesis, and overall health.

Protein should constitute 10-20% of a swimmer's total daily caloric intake. This is, on average, 1.2-1.8 grams of protein per kg of body weight. This amount will vary based on the season of training. Generally, protein can increase slightly if training intensity decreases, and carbohydrate intake can decrease slightly. Special Note: Research shows that if optimization of protein synthesis is desired, then an intake of 0.3 g/kg of high bioavailable protein must be eaten shortly after a high-performance output.

Protein sources can be animal or plant-based. Animal proteins include chicken, turkey, beef, lamb, pork, fish, eggs and dairy products. Plant-based choices include legumes, nuts and seeds, beans, tofu, tempeh, and some vegetables and whole grains. When choosing plant-based proteins, it is important to eat a variety of sources to ensure all essential amino acids are consumed, as many sources for plant-based proteins are not complete proteins, meaning they do not contain all the nutrients that an animal protein does.

Protein Options (serving size and grams)

Chicken (3 oz- 23 grams)

Salmon (3 oz- 20 grams)

Lean Beef (3 oz- 25 grams)

1 egg - 6 grams

$\frac{3}{4}$ cup Greek yogurt - 16grams

4oz tofu - 10 grams

3 TBSP Chia seeds - 9 grams

1 cup lentils - 18 grams

2 TBSP Peanut Butter - 8 grams

Fats

Fats are an essential macronutrient that provides various benefits for athletes, contributing significantly to overall health, performance, and recovery. Fats provide nine calories per gram, making them a concentrated energy source. This is especially important for athletes engaged in prolonged, endurance-based activities with high energy demands. Fats are not a quick source of energy like carbohydrates and are primarily utilized during lower-intensity exercises and endurance events, allowing athletes to maintain energy levels over extended periods. During prolonged events (like marathons or triathlons), the body uses its fat stores for energy once glycogen (carbohydrate stores) is depleted. This endurance capacity is crucial for many athletes.

Consuming healthy fats, such as omega-3 fatty acids found in fish and flaxseed, can help reduce inflammation in the body. This benefits recovery and can lead to improved outcomes following intensive training sessions. The body needs to maintain a balance between omega 3 and 6 fatty acids. This balance supports repair and manages inflammation. Inflammation happens during injury and is not necessarily a bad thing, however, a poor diet and other factors can also promote inflammation and that type of inflammation is not good. Essential fatty acids are vital for maintaining cell structure and function, influencing hormone production and cellular signaling. Fats are essential for synthesizing hormones, including sex hormones (like testosterone and estrogen) and hormones involved in metabolism (like insulin). Adequate fat intake supports optimal hormonal balance.

Dietary fats are necessary to absorb fat-soluble vitamins (A, D, E, and K). These vitamins play critical roles in various processes, including immune function, skin health, and bone health. Fats, particularly omega-3 fatty acids, are essential for brain health. Adequate fat intake supports cognitive function, which is important for mental focus, decision-making, and overall performance during competition. Fats also play a role in insulating the body and maintaining temperature regulation, which can be particularly beneficial for athletes training in cold environments.

Fats should comprise approximately 20-30% of the athlete's daily caloric intake. Food sources of fat include avocado, nuts, seeds, olive oil, fatty fish, and dairy.

Healthy Fats

Avocados

- High in monounsaturated fats and packed with fiber and potassium.

Nuts

- Almonds
- Walnuts
- Cashews
- Pecans
- Hazelnuts (rich in omega-3 and omega-6 fatty acids)

Seeds

- Chia seeds
- Flaxseeds
- Pumpkin seeds
- Sunflower seeds

Oils

- Olive oil (particularly extra virgin)
- Coconut oil
- Avocado oil
- Flaxseed oil

Fatty Fish

- Salmon

- Mackerel
- Sardines
- Trout
- Herring (rich in omega-3 fatty acids)

Nut Butters

- Almond butter
- Peanut butter (preferably natural without added sugars or oils)

Dark Chocolate

- Contains healthy fats along with antioxidants (choose varieties with at least 70% cocoa content).

Full-Fat Dairy

- Greek yogurt
- Cheese
- Whole milk (in moderation, depending on individual dietary preferences)

Eggs

- Especially the yolks, which contain healthy fats and essential nutrients.

Incorporating these healthy fat sources in moderation can provide great taste and nutritional benefits while supporting overall health.