

PART I

YOUR DAILY PERFORMANCE DIET

Optimal Food and Fluid Choices for Endurance Training and Health

Proper nutrition is essential for any athlete, but it plays a particularly important role for endurance athletes because of the special demands and stresses of their sport. Whether you are an enthusiastic recreational participant or a serious endurance sport competitor, the subject of nutrition—part art and part science—is one that is well worth mastering. It involves choosing the proper foods, but knowing how much to eat—and when to eat it—is just as important as knowing what to eat. Eating right for your training regimen and competition schedule allows you to replace the fuel you burn during training and supplies the ingredients required to build strength and muscle. As you begin to focus on optimal nutritional recovery from day to day, and from workout to workout, your efforts will be rewarded. You will derive the maximum benefit from your exercise program, and when you arrive at the start of an event or race, you will be in top nutritional shape. The bottom line is that when your diet meets the nutritional demands placed upon your body, you will perform at your best.

Bodies trained and primed for endurance sports require premium fuel for staying healthy throughout the season. If you suffer from lackluster training days, injuries, and more than a fair share of colds and bouts of flu, you may not be making the highest-quality fuel choices. When it comes to daily diet, endurance sport athletes need to obtain each of more than forty-five different nutrients required for optimal functioning of the human body.

Part I of *Sports Nutrition for Endurance Athletes* provides guidelines for building a training diet that will promote optimal health and a strong immune system. This section also identifies the

most nutritious sources of carbohydrates, proteins, and fats; how to balance them for optimal training and health; and how to meet the fluid, vitamin, and mineral intakes necessary to build the foundation of a cutting-edge sports diet and good health.

Like any good diet, an endurance training diet simply emphasizes high-quality foods, variety, and balance among the food groups. But this wide-angle view of the endurance training diet is not enough—one needs to take a closer look to truly learn how to use nutrition to enhance performance. Many categories of foods are complex and provide several nutrients that work in tandem to keep an athlete's body well nourished and healthy. Which foods complement each other, and how can one best approach meals and snacktimes throughout the day? How can an athlete make sure there is enough variety in his or her diet? Within each food group are nutrient-packed choices that are minimally processed, fresh, and wholesome. It is best for your lasting good health that you avoid the highly processed foods so prevalent in the North American diet. But how can this best be achieved? Chapters 1 to 3 focus on the details of applying solid nutritional principles to sports nutrition for the endurance athlete.

Quality eating for training and good health takes knowledge and planning, and having a working knowledge of food groups is a key first step. Foods can be categorized in different ways. We often think of basic outlines, such as the government food pyramid, or even systems used by a variety of commercial diet programs. But these food group systems simply do not work for the endurance athlete. Foods are more often grouped according to carbohydrate, protein, and fat content, as the proper balance of these nutrients is required for optimal training and recovery in endurance sports. However you look at it, there is an optimal combination of food groups that come together to produce a cutting-edge diet for each endurance sport and for every individual athlete. Some individuals may find that placing a strong emphasis on fruit and vegetable intake enhances their training and performance, especially because of the excellent immune system boost these foods provide. These athletes will likely focus on plant protein sources and may obtain most of their fat intake from nuts and seeds rather than oils, or may or may not prefer to have a significant amount of dairy products in their diet.

While grouping and categorizing foods can be useful in planning a healthy endurance sports diet, it can also lead to oversimplification. The next step in planning a healthy training diet is to look at some of the choices available within each of the main food groups to see what nutrients they provide. For example, some oils can be highly processed and are a very poor nutritional choice, while others are relatively healthy and can be beneficial. Animal proteins can contain varying levels of fat, and some meats are much too high in fat to be a regular part of any serious athlete's diet. Skim milk and yogurt, in contrast, contribute carbohydrates in addition to high-quality protein. Grains can be wholesome, high in fiber, and even provide small amounts of protein, or they can be highly processed and nutritionally very poor.

Ultimately, the goal is to come to appreciate which choices are the most nutritious and to design a diet plan that works for you. How you portion and time these healthy foods is what distinguishes your endurance training diet from an everyday diet geared toward good health.

TABLE I.1 NUTRIENTS FOR THE ENDURANCE DIET

NUTRIENT	FUNCTIONS	FOOD SOURCES
Carbohydrates	Primary high-energy fuel source during exercise Replenish body stores of glycogen Provide dietary fiber	Grains, breads, cereals, rice, pasta Fruit and fruit juices Vegetables Dairy and soy milk, yogurt
Fat	Provides essential fatty acids Provides fat-soluble vitamins Adds flavor to foods Used as a fuel source Protects and insulates body organs Component of cell structures	Liquid oils Margarine and butter Nuts and seeds Avocado Fish
Minerals	Involved in energy production Play role in building body tissue Play role in muscle contraction Involved in oxygen transport Maintain acid-base balance of blood	Fruits and vegetables Lean protein foods Whole grains Oils, nuts, and seeds
Protein	Provides essential amino acids Required for maintaining and developing muscle and other body tissue Essential component of enzymes, hormones, and antibodies Needed for the formation of hemoglobin	Meat, poultry, fish, cheese, eggs Soy, dried beans, lentils Dairy and soy milk, yogurt
Vitamins	Enhance energy production Involved in tissue repair and protein synthesis Play role in red-blood-cell formation Act as antioxidants	Fruits and vegetables Lean protein foods Whole grains Oil, nuts, and seeds
Water	Carries oxygen and nutrients to cells Plays a role in digestion Cools the body through sweat production Has important role in many cellular processes Significant component of muscle tissue	Tap water Bottled water Fruit juices, dairy milk, soy milk Solid foods that contain water, such as fruits, vegetables, yogurt

Table I.1 outlines the functions and food sources of many of these important nutrients. More information on how to determine food portions and how to time meals and snacks to complement your training program is provided in Part II.

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DAILY HYDRATION **ESSENTIALS**

Drinking It In

WATER IS ONE OF THE MOST ESSENTIAL nutrients for the endurance athlete. Some two-thirds of your total body weight is water, and this remarkable substance plays an important role in every major organ and system keeping you alive. We've all seen the need for hydration in a sweat-logged athlete. But for the athlete, the distraction of competition can make it easy to forget to keep drinking water. Many athletes also have not taken the time to learn valuable hydration strategies. While much research and emphasis has been placed upon an endurance athlete's fluid intake directly before, during, and after training or racing, emptying your bottles of fluid during a swim, bike ride, rowing session, or run is only one of many hydration strategies essential for top performance. Paying attention to daily fluid intake on nonactive days is also important. Nevertheless, daily water and fluid intake is often a secondary nutritional consideration, and many athletes frequently fall short on the everyday consumption of this life-sustaining nutrient.

Years of hydration research indicate that athletes should try to prevent even mild levels of dehydration. Although an athlete may not always be aware of how much he or she is sweating, even relatively small fluid losses during training and competition can be significant enough to hinder performance. And sweating doesn't take place only during hot weather; it takes place in cool weather and during winter sports as well. Studies demonstrate that even in thirst-inspiring hot weather, athletes usually fail to replace all the fluid that is lost through sweat during training and competition. To prevent any adverse performance effects, every athlete should arrive for training sessions optimally hydrated, and to do so means staying on top of your daily fluid intake.

WATER: THE FIRST NUTRIENT

Much marketing fuss has been made about the optimal ingredients for the fluids that athletes require. But before the plethora of sports-related drinks and designer fluids flooded the market, there was simply water. Water is basic and unpretentious and flows naturally into an active sport life with no packaging or gimmicks attached. Don't take basic H₂O for granted. Carbohydrates may be the premium fuel for your energy tank, but when you are about to train or compete in your sport, your fluid stores should be topped off as well.

Water plays an integral role in the optimal functioning of your body both during training and during rest and recovery. Well-hydrated muscles are high in fluid content—in fact, water makes up to 70 to 75 percent of an athlete's muscle tissue. Fat tissue is relatively low in water content, at about 10 percent. Consequently, muscular athletes will have high water content when adequately hydrated. Water is stored in many body compartments, and it moves freely among these various spaces. About two-thirds of your body's water is stored inside your cells, giving them their shape and form. The rest of the water in your body surrounds these cells and flows within your blood vessels. Even bones, though seemingly solid, are about 32 percent water. Water plays a role in cooling the body and also provides structure to body parts, protecting important tissues such as your brain and spinal cord and lubricating your joints. When fluids become depleted through sweating, both your cells and blood decrease in water content and volume.

Athletes should appreciate that water is also the main component of their blood. Blood performs the important function of carrying oxygen, hormones, and nutrients such as glucose to your cells. The protein content of blood, muscle, and other tissues also holds water in those tissues. Muscle glycogen holds a considerable amount of water, and water removes lactic acid from exercising muscles, which can be an advantage to athletes who are well hydrated. Water aids digestion through saliva and stomach secretions, and it eliminates waste products through urine and sweat. Water is also essential for the proper functioning of all your senses, particularly hearing and sight.

Clearly the role water plays in maintaining your overall health is extremely important. That's why you can't live without water for more than a few days. But the role that water plays in your performance is equally vital. Being even slightly underhydrated dramatically impedes top athletic performance. As the primary component of sweat, water plays a major role in body temperature regulation. It is water that enables you to maintain a constant body temperature under various environmental conditions because it allows you to continually make adjustments to either gain or lose heat.

Your fluid balance is simply the result of your intake of fluids versus your output of fluids. Intake is the net result of the water and other hydrating fluids we consume, the water in some of the foods we eat, and the metabolic water produced by your body. When you are not training,