

Nutrition and Training - Performance 101



- Maintaining a healthy diet during training is just as important as the training itself!
- Here are some of the basics (in part from the LA84 Coaching Manual - rev. 2007):
Proper nutrition for endurance athletes requires six major nutrients: **carbohydrates, proteins, fats, vitamins, minerals, and water.**

Carbohydrates

- Carbs are composed of simple sugars (glucose, fructose, and sucrose). They can be divided into two basic categories: **complex and simple.**

Complex carbohydrates can be found in nutrient rich, complex sugars, and are great sources of sustained energy. Examples include beans, peas, potatoes, pasta, cereal, oatmeal, rice, fruits, yogurt, and natural fruit juices. Be careful of baked goods that have refined or “enriched.” These are simple carbs pretending to be complex!

Simple carbohydrates are nutrient poor, sources of energy that are quickly burned by the body, but can provide a much needed energy boost just prior or during a race. Examples include sports and energy drinks, performance gels, jams and jellies, hard candy, and sweetened baked goods.

- The role of carbohydrates is important. During training, they supply anaerobic energy (energy created at the cellular level without oxygen) to the brain, muscles and nervous system, and can be stored in limited quantities in your muscles and liver in the form of **glycogen**. As an immediate energy reserve, glycogen can be tapped and transformed to **glucose** for immediate performance results during training. Glycogen, along with **triglycerides** (fatty acids which are also converted to glucose), make up the bulk of your harnessed energy during a workout.
- **Carbs and weight gain.** When you eat carbs, they are first converted to glucose and either used right away to give you an immediate performance boost, or stored as glycogen in your muscle tissue and liver, waiting for that next big training day. Good stuff for endurance training, but there’s a catch! Your body can only store a limited quantity of glycogen. After your glycogen levels top out, remaining glucose is converted to fat and stored in fat cells. Unlike glycogen, your body can store an limitless amount of fat. A person that does very little exercise doesn’t allow glycogen stores to be used on a regular basis and may gain weight as a result.

Proteins

- Proteins are made up and converted into **amino acids** during digestion. Amino acids are the key building blocks for enzymes (which promote key chemical processes the body), and antibody (which fight infection) and hormone production. In addition, amino acids play a big role in immune system function, oxygen transport, and other metabolic processes.
- Good sources of protein include lean non processed meats, fish (including tuna fish), eggs, milk, cheese, and beans, and soy products.

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- Proteins promote muscle, bone, and tissue (cuts, bruises, tendonitis, arthritis) repair. In addition to promoting a healthy immune system, proteins can be used as fuel by the body in case of carbohydrate deficiency. Unlike carbohydrates, protein cannot be stored by the body and is either excreted or stored as fat.

Fats

- Fats come in two forms: **saturated and unsaturated**. Unsaturated fats generally have a higher nutritional value. When broken down, resulting fatty acids form the primary fuels for the aerobic energy system (energy produced by the breakdown of carbs during a big spike in oxygen intake such as a marathon).
- Sources of fat include chicken / turkey skin, butter, margarine, cooking oils, salad dressing, sauces, and a variety of processed foods including chips, meats, baked goods, peanut butter, and fried foods.
- Small amounts of dietary fats are needed to produce fatty acids for digestion and to transport certain vitamins. Fat is a necessary component for aerobic energy production.

Vitamins

- Vitamins assist in the production of energy from carbohydrates, fats, and proteins. They can either be **water soluble or fat soluble**. Vitamins do not provide fuel, but are essential in the construction and maintenance of healthy tissue.

Minerals

- **Minerals assist with the transformation of fuel into energy**. They also help maintain healthy tissue, oxygen absorption, and bone mass while regulating body fluids and chemical processes including electrolysis during your workout. Examples include calcium, potassium, sodium, copper, zinc, and iron.
- Many inexpensive fruits and vegetables are especially rich in these key nutrients including bananas, oranges, broccoli and spinach.

Water

- Water makes up close to 60% of your body weight. Good ol' H₂O regulates body temperature, and transports nutrients in the bloodstream and digestive tract to every living cell in your body. You might not know it, but your body uses a complex system of checks and balances to make sure that this percentage is maintained since you need an adequate amount of water in order to survive. **Training strains this system!**
- **Dehydration and fluid intoxication** are the result of too much or too little water in your system. Dehydration will be your main concern as an endurance athlete. Not only will you lose water when you sweat, but also every time you exhale during your workout. Dehydration of only 2% of water weight (that's only 1.2 lbs for a 100 lb runner!) during training can reduce your performance by 10-20% as your blood thickens and your heart begins to work harder to get oxygen and nutrients to cells screaming for attention!



- To make matters worse, a loss of only 3-5% (only 1.8 lbs!) will result in severe impairment including dizziness, nausea, and severe cramps. The easiest way make sure you're well hydrated is to drink plenty of water before, during, and after you train. Begin hydrating at least 2-3 days before any big event and **avoid caffeine, alcohol, and other diuretics** (any drug that elevates the rate of urination). Also if you smoke, try and lay off the nicotine (a vascular constrictor that interferes with blood and oxygen flow) until after the race.

Electrolytes

- Electrolytes are chemical substances (salts, bases, or acids) that promote healthy electrical activity in your brain, muscles, and nervous system during a workout. Deficiencies in electrolytes will lead to severe muscle cramping, and an overall lack of energy also known as "bonking" or "hitting the wall" The most common electrolytes found in sports drinks, performance gels, baked goods, and fruits and vegetables are the salts **sodium** and **potassium**. **Fresh fruits and natural fruit juices (especially orange juice) are a great, inexpensive alternative to well sports drinks during and after everyday workouts.** Save the commercial stuff for race day!

Best of luck this season!

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