

## **Electrolytes: A Primer for Summer Running**

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Summer running season is upon us. Those “salts stains” on your hat and clothes indicates more than just lost fluid. It means loss of electrolytes, which are important for proper muscle function and hydration.

A lot of runners don't have any idea what the term “electrolytes” really means, why we need them, or what functions electrolytes perform.

Read on for short answers to those questions.

### **What are electrolytes, and what do they do?**

Electrolytes are minerals in your bodily fluids that carry electrical charges. They exist in your blood, inside the cells, and in the fluid surrounding the cells. The major electrolytes in the human body are sodium, potassium, chloride, calcium, magnesium, bicarbonate, phosphate and sulfate.

Electrolytes are important because your nerve cells and muscle cells use them to carry electrical impulses. Think of it this way: When your brain sends an electronic signal to your muscles to contract or relax, the electrolytes carry that signal from the nerves to the muscle cells.

Electrolytes are also important in maintaining proper fluid balance throughout the body, from the bloodstream to the cell membranes. To function normally, the body maintains the balance of electrolytes within very narrow ranges, and is constantly moving fluids and electrolytes into or out of cells. Your kidneys filter and excrete excess electrolytes.

### **How does exercise affect electrolytes?**

Many runners think of electrolytes as merely “salt,” and equate exercise with sweat, and sweat with loss of “salt.” But don't confuse sodium with ordinary table salt, which is sodium chloride (NaCl). Likewise, don't overlook the importance of potassium, which exists at levels almost twice that of sodium.

Sodium exists primarily in the blood and in the fluid *outside* of the cells. Potassium exists chiefly *inside* the cells. When your muscles contract, potassium is drawn out of the cells, while a small amount of sodium is drawn into the cells. At the same time, because the water in sweat is drawn mostly from the blood and extracellular fluids, a great deal of sodium (and a lesser amount of potassium) is lost with sweat.

For the muscles to relax, each muscle cell must “pump” potassium back into the cell. If potassium and sodium are not replaced during exercise, muscle cells are less able to contract and

relax. With heavy fluid loss through sweating, the loss of electrolytes can result in cramping. As dehydration continues, entire muscle groups become fatigued and begin to fail.

### **How much of the electrolytes do I need to replace?**

There was a time when coaches gave salt tablets to athletes when conditions were hot and humid. True, the sodium replacement was helpful. However, ingestion of too much sodium can lead to all kinds of problems, from bloating and stomach cramps to a “shut down” of sweating (as the dehydrated body tries to hold onto water in order to preserve the balance of sodium-to-water).

Along came Gatorade and other sports drinks designed to replenish electrolytes and fluids. Today, there are many different products on the market that are designed to replace electrolytes. Not only is the science complicated, but the problem of sorting out what to eat or drink, and when to consume it, has become more complex.

There is no single answer to the questions of how to replace electrolytes, and when. Sweat rates and electrolyte loss-rates are different from person to person. In addition, it is impossible to replace all of the electrolytes that are lost in sweat during exercise. At most, you can replace about half of what is lost.

The most common way that athletes replace electrolytes during exercise is by consuming sports drinks. It is true that your body will rehydrate more efficiently drinking a sports drink than from water alone. Also, some gels and electrolyte tablets typically have very high quantities of sodium and potassium.

Again, there is no single formula to determine what works for an individual athlete. It is a process of trial and error (which means you should not wait until race day to start experimenting with electrolyte replacement techniques). The runner next to you at the starting line who is popping handfuls of electrolyte tablets and chasing them with sports drink might actually need all those electrolytes, whereas you will just get sick if you don't need the same amount.