

# With a Grain of Salt

By Tom Welch, M.D.

**BEFORE DIGGING INTO THIS MONTH'S COLUMN**, I am afraid we will need to have a brief refresher on high school chemistry. "Salt" has a very specific meaning in chemistry: a compound formed by the reaction of an acid and a base. There are countless specific types of "salts." In medicine, when one refers to salt it generally is assumed to be sodium chloride (which is also the

major ingredient in cooking/table salt). The human body is about 60 percent water, and virtually all of that water is actually a sodium chloride solution. When one refers to "salt" in the diet, sodium chloride is generally being referenced. The quantity of "salt" in the diet is usually expressed as the amount of sodium (for example, "a two-gram sodium diet").

Whew. Sorry.

Sodium is a constituent of virtually every food. Unlike most dietary constituents (such as protein, vitamins, or iron), sodium is not often used for bodily functions. Instead, virtually all of the sodium ingested in the diet is excreted in the urine. As one increases sodium intake, daily urinary excretion of sodium increases proportionately. Thus, although one will see a "daily value" of sodium on food labels, this is misleading. There is no actual requirement for a minimum sodium intake for most humans, in the way there is for calories or essential nutrients.

The quantity of sodium in the diet varies among cultures. Americans consume an average of about 3.4 grams of sodium daily, quite high by international standards. (One and a half teaspoons of table salt contains about 3.4 grams of sodium.) Most dietary sodium is actually contained within the food, rather than being added at the table. In general, the more processed a foodstuff is, the higher its sodium content.

High intakes of dietary sodium are unhealthy. Because dietary sodium is excreted in the urine, there is an association between high sodium diets and

kidney stones. More problematic is the impact of sodium intake on blood pressure. Although the relationship is a bit complicated, it is generally agreed that high sodium intake contributes to hypertension, and reduction of dietary sodium intake is one of the first recommendations of physicians treating a patient with high blood pressure.

The body keeps the concentration of sodium in the blood tightly controlled within a very narrow range. Very serious complications occur in people with high ("hypernatremia") or low ("hyponatremia") blood sodium concentrations. Changes in the concentration of sodium in the blood usually occur because of changes in body water. Thus, too much water dilutes the sodium content and causes hyponatremia; too little water concentrates sodium, resulting in hypernatremia.

While hypernatremia is sometimes seen with severe dehydration, hyponatremia is the more common disturbance of sodium. Life-threatening hyponatremia has occurred in some endurance athletes, such as marathoners. This is thought to be caused by a combination of stress and overconsumption of water. There was recently a very disturbing report in a medical journal of an otherwise healthy backpacker in the Grand Canyon who developed fatal hyponatremia on a trek. She had been noted to be consuming large amounts of water before becoming ill.

Because extended treks in warm weather may result in increased sodium losses in sweat, folks often wonder if supplemental sodium is required for

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hikers. In general, the answer is a resounding no. Most commercial backpacking foods and snacks are quite high in sodium content, and should provide sufficient intake. Most trail snacks are also quite generous in sodium content. Sports drinks as a supplement for sodium and other minerals are a waste of money and also result in excess sugar intake. Folks taking a type of hypertension medication (diuretics, sometimes inaccurately called "water pills") should consider discussing their proposed trek diet with their physician.

Over millennia of evolution, mammals have developed sophisticated mechanisms to monitor body sodium concentration and adjust salt and water intake to maintain normal values. Squirrels manage to regulate their salt and water intake without relying on recommendations! As for many things, the best advice for salt and water intake on a trek is to listen to your own body. ▲

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