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Risk Analysis
Glucose Based Sports Drinks vs. Structured Water for Hydration

The modern athlete is increasingly aware of the need for adequate hydration to achieve optimal performance. Athletes also pay much closer attention to diet and nutritional supplements. Terms like carbohydrates, amino acids, nitrogen balance, dehydration and electrolytes are becoming common terms in training facilities around the world. Sports energy drinks like Gatorade, PowerAde and Gleukos have been heavily promoted as providing the glucose needed for energy production, electrolytes for ionic balance and water for hydration. Unfortunately, the promotion of the product has been better then the science behind the glucose drinks.

The only athletes that need a supply of glucose are marathon runners, iron men competitors and others involved in intense endurance sports. It takes a massive amount of exercise to deprive the body of a ready supply of blood glucose. Blood glucose is easily kept in balance by the body's stores of glycogen. Large reservoirs of glycogen are found in the liver and muscles and are converted on demand into blood glucose by a process called glycolysis. The term glycolysis simply means glycogen is converted into blood glucose.

When the athlete begins to burn through his normal circulating levels of blood glucose, the adrenal glands release a hormone called cortisol. This hormone initiates the process of glycolysis and blood sugar levels are brought into balance. Athletes store enough glycogen in their muscles and liver through proper diet and nutrition to exercise at an intense level for several hours and never deplete the body of blood glucose. What most athletes experience with fatigue is poor blood sugar regulation, not a shortage of blood sugar. Blood sugar regulation is dependent on the glycemic index of the food they are eating plus the ability of the adrenals to produce cortisol, the pancreas to produce insulin and how the cells respond to insulin. The last thing most athletes need is a glucose drink. The glucose interferes with the glycolysis process and should only be used when glycogen stores are running down.

Only an athlete participating in an intense endurance event needs to worry about a shortage of blood glucose. The electrolytes can also become out of balance with the intense loss of salts through sweat. This is why heat and humidity conditions play a role in regulating human performance. These factors can all combine to create a need for a rapid replenishment of blood glucose and electrolytes. The endurance athletes are the ones that will experience these conditions. A man working out in the gym, even during an intense workout, will not come close.

In fact, spiking the blood with glucose during a normal workout may actually induce a temporary hypoglycemic effect. The presence of the elevated blood glucose induces a signal to the

pancreas to release insulin. The insulin will sweep the blood glucose into all of the cells of the body, not just the muscles. A sudden drop of blood glucose occurs and this is known as hypoglycemia. There is a temporary shortage of blood glucose until the process of glycolysis can be increased to catch up. The athlete may experience a burst of energy followed by a period of fatigue. This does little to train his body for peak performance. In fact, constantly spiking blood glucose can stress the pancreas and lead to adult son-set diabetes. The glucose drinks do more harm then good for the average athlete and even the superb athlete when used as a recreational source of sports energy.

What all athletes need is a source of hydration. Pure hydration to keep the cells loaded with water. This is a pure and simple observation that has been verified by a multitude of scientific studies. Bio-impedance machines that are registered with the FDA as biofeedback devices can measure cell hydration. The bio-impedance machines can measure the hydration within the cells. This is where the water has to be located in order to benefit the athlete.

That has been demonstrated over and over again by the hydration studies. The water has to increase cell hydration in order to increase performance. The presence of a small amount of electrolytes does seem to improve cell hydration. The electrolytes appear to change the physical properties of the water to enhance the osmotic pressure gradient and improve hydration. However, if the salt concentration is too high then the salt water will dehydrate the cells. This is why you cannot drink salt water from the ocean. So there is a delicate balance even when talking about electrolyte drinks. You should only drink them when there is a defined need for the electrolytes. That is not during a routine work out.

There is an option to enhance cell hydration without the need for adding electrolytes to the water. Structured water is designed to produce cell hydration. Structured water is a water technology that creates hydrating water that is rapidly and easily absorbed into the cells of the human body. A structured water can be identified by it physical properties. For example, structured water will have a lower viscosity then tap water or purified bottled water. The viscosity measures how thick the water is and how easily it will flow. The lower the viscosity the thinner the water is and the easier it will flow into the body.

A second physical property of water is the surface tension. The surface tension measures how well the water adheres or sticks to a surface. Water that is sticky will not absorb very well. A structured water will have a lower surface tension then tap water or bottled water. The lower surface tension helps the water to absorb through the aquaporin channels of the intestinal tract and be absorbed into the blood and delivered to the cells. Structured water will hydrate the cells of the body two to three times faster then regular tap water or bottled water. Rapid and complete cell hydration is what the athletes need. You can get this with structured water without the risks that come with the glucose drinks.

There are several structured waters on the market. The structured waters are sold primarily through health food stores. The leading brand is Penta, closely followed by EON and Rapid.

The Stowe Foundation helped BodyExtreme create a premium structured water to maximize cellular hydration called Hydrate 2O. One benefit of premium grade structured water is the ability to donate a proton to the Krebs cycle of the mitochondria. A cell physiologist calls the donation of a proton, the proton flux. Muscle cells cannot generate energy without a source of protons. B-vitamins are the most recognized source of protons. This is why athletes respond very well to injections of vitamin B-12. Athletes also respond very well to structured water. It is a matter of understanding how muscles work. The muscles need protons and Hydrate 2O is a proton donor.

Keeping the cells hydrated provides the following benefits to an athlete:

- Mental Clarity is Enhanced
- Joints and Disks are Better Lubricated
- Body Temperature is More Efficiently Regulated
- Muscle Oxygen Tension Levels Increase
- Cells are Protected from Oxidative Stress
- Blood Sugar Regulation Improves
- Kidneys Eliminate Toxins More Effectively

These benefits do not require the presence of glucose or electrolytes. The benefits come risk free even for diabetics. The benefits are optimized when the athlete drinks structured water.

The glucose and electrolyte drinks have their place in the sports world. However, it is not in the training gym or on the practice field or even during the normal athletic competition. The glucose and electrolyte drinks are for the endurance events and the athletes performing under exceptionally harsh conditions. The vast majority of athletes need optimum cell hydration and proper nutrition. That is what they get from structured water and a balanced diet. It is a pure and simple concept.