The Health Nugget

Iron Strong

A cleaning lady finds blood transfusion materials used by the Austrian cross country ski team. Three cross country skiers are banned from the next two winter Olympics the last day of the 2002 Winter Olympics. Tour de France cyclists have titles revoked. Lance Armstrong is suspected. Blood doping is the thing of news and athletic champions.

Illicitly boosting the number of red blood cells (RBCs) in order to enhance athletic performance has been termed blood doping. Typically, red blood cells are isolated from drawn blood and then stored. They are then reinjected a few days before a competitive event. When the stored red blood cells are reinfused, temporary excess occurs. Injecting hormones that stimulate red blood cell formation is another method used for achieving the same results. Why would elevated RBC levels boost athletic performance?

The percentage of blood that is composed of red blood cells, called hematocrit, in a typical adult male hovers around 45. In other words, 45% of whole blood is composed of red blood cells, which are responsible for transporting oxygen throughout the body and for circulating carbon dioxide to the lungs where it can be exhaled. Since red blood cells carry oxygen, an excessive amount of them, as experienced with blood doping, should increase the oxygen carrying capacity of blood, which could translate into greater endurance and speed, reduce fatigue and give the athlete an edge. But blood doping comes with risks. The 1984 Olympic cycling team doped its way to nine medals. However, shortly after their victories, some of the cyclists contracted hepatitis as they had used the contaminated blood of others. Even when using one's own blood there are risks. Blood doping thickens the blood, increasing its viscosity, making it more difficult for the heart to pump. As a result, risk of stroke and heart attack increase.

Our body places a huge emphasis on the importance of oxygen-loading. Every breath we take is for this purpose. Inhaled oxygen enters the air sacs where an exchange occurs between gas and liquid. From air sacs, oxygen enters the capillaries where red blood cells pick it up. Red blood cells are basically little bags of hemoglobin, a protein that gives them their color. Each hemoglobin molecule contains four iron atoms. It is these four iron atoms that combine with four molecules of oxygen. A single red blood cell contains 250 million hemoglobin molecules. As a result, one microscopic red blood cell can scoop up about one billion molecules of oxygen! As you might suspect, the mineral iron is an integral part of the oxygen-energy–athletic edge story.

About 65-70% of the body's iron supply is in hemoglobin. When evaluating iron levels there are several substances in the blood that can be tested. "Of all of these tests, hemoglobin is the most commonly used to screen for anemia as a proxy for iron deficiency because of its low cost, the ease and speed of the procedure, and its better performance compared with hematocrit. However, as an indicator related to red blood cell population turnover, hemoglobin only detects the late stages of iron deficiency; mild iron deficiency may not affect the hemoglobin concentration."[1]

Anemia occurs when the body does not have enough healthy red blood cells. Although it can be attributed to a variety of factors, one thing is for certain, the blood's ability to transport oxygen is reduced. More specifically, iron deficiency anemia occurs as a direct result of a lack of iron.

April 2012

by Risë Rafferty

"Iron deficiency is the most common micronutrient deficiency in both developing and developed countries, particularly among children and women of childbearing age."[2] When hemoglobin molecules are normal, but red blood cells contain fewer than the usual number, a nutritional anemia is suspected.

Your body doesn't make iron. You must get it from your diet. Dietary sources of iron come in two forms: heme and non-heme. The only place you will find heme iron is in hemoglobin and as such can only be consumed in meat. It is efficiently absorbed. But where did the cow and chicken get their iron? Their iron stores came from greens and grains. Plant sources of iron come in the non-heme form, and are a bit touchier. They have to be dissolved and repackaged in order to be absorbed.

While vegetarian sources of iron are plentiful, knowing which ones and how to properly prepare them are important. For example, lentils and beans are high in iron. But, they also contain iron inhibitors, called phytates. If simply cooked, legumes can retain up to 92 percent of these inhibitors. Reportedly, soaking legumes in very warm water overnight yields the best results in reducing phytates. After soaking, make sure legumes are rinsed before cooking. All of the minerals contained in legumes will be better absorbed.

Whole grains are also a good source of iron. However, they too contain iron inhibitors. In a Swedish study, it was found that soaking rolled oats before cooking them as a breakfast cereal significantly increased iron absorption.

Soaking allows enzymes, and other helpful organisms, to break down and neutralize phytic acid. As little as seven hours of soaking in warm water will neutralize a large portion of phytic acid in grains. The simple practice of soaking cracked or rolled cereal grains overnight will vastly improve their nutritional benefits.

Green leafy vegetables are another excellent source of iron. One cup of cooked spinach has almost twice as much iron as the same caloric amount of sirloin steak! But remember it is not as absorbable. One study reported however, that adding 63 mg of vitamin C to a meal rich in non-heme iron yielded a 2.9-fold increase in iron absorption. Ascorbic acid "is the most efficient enhancer of non-heme iron absorption when its stability in the food vehicle is ensured."[3]

Even more significant than ascorbic acid though is your own stomach acid. It is a secret ingredient for non-heme iron absorption. It has been observed that as stomach pH rises, becoming less acid, absorption of non-heme iron decreases. Studies have found deficient stomach acid in children and adults with chronic anemia. When supplementary HCL (hydrochloric acid) is given to people with anemia and low stomach acid, their iron absorption improves and their anemia disappears.

We live in a society where performance is everything. Whether it is in athletics, academics, at work, in personal relationships, or even in our quest to exemplify Christ-like virtues, we feel the pressure to achieve or perform to a certain standard. The pressure, in and of itself, can be exhausting at times. Often I tell myself, you've got to be strong. And we do. But all of our self-doping methods will not furnish the lasting endurance we need.

Our flesh and our heart will fail, but God is the strength of our heart (Psalm 73:26).

[1]Zuguo Mei, Ibrahim Parvanta, Mary E. Cogswell, Elaine W. Gunter, Lawrence M. Grummer-Strawn. *Erythrocyte protoporphyrin or hemoglobin: which is a better screening test for iron deficiency in children and women?* http://www.ajcn.org/content/77/5/1229.full.

[2]Ibid.

[3]B. Teucher, M. Olivares, H. Cori, *Enhancers of iron absorption: ascorbic acid and other organic acids*. http://www.ncbi.nlm.nih.gov/pubmed/15743017.

Light Bearers Ministry
37457 Jasper Lowell Rd • Jasper, OR 97438
ph (541)988-3333 • *fax* (541)988-3300
www.lbm.org • *email* rise@lbm.org