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IRON - YES OR NO? by Bill Misner, Ph. D. & Steve Born

Two questions we frequently field are "Why don't Premium Insurance Caps contain iron?" and "Do I need to take iron supplements?"

Iron, as most athletes know, is found in every cell in the body. It is an important mineral for all body functions. Most of the body's iron is in the form of hemoglobin found in the red blood cells. A smaller portion of iron is found in myoglobin, a type of hemoglobin that is found in muscle tissue, and in the oxidative enzymes within the mitochondria. Hemoglobin is responsible for oxygen transport from the lungs to the muscles. Both myoglobin and oxidative enzymes are major components in energy production. Iron is also very important in immune system function.

It's apparent that iron is an extremely important nutrient, especially for

endurance athletes. An iron deficiency can negatively effect oxygen transport to the muscles if below-levels of hemoglobin are detected. An iron deficiency can also impair energy production if myoglobin and mitochondrial enzymes are sub-normal. However, there are also risks involved (increased free radical production being one) from a too-high iron intake. So do we need to take supplemental iron? Why don't Premium Insurance Caps contain iron?

Most Americans, if they consume adequate calories via balanced menu, consume enough iron without the need to supplement iron. Lieberman & Bruning (1990) recommend an Optimal Daily Allowance (ODA) of 15-25 mg. for men and 20-30 mg. for women. It is very easy to exceed these values from food alone. In humans, high levels of

(see Iron on page 3)

HEAT STRESS

by Bill Misner, Ph.D. & Steve Born

Every year, usually beginning in May, both Dr. Bill's and my email "IN" box becomes increasingly full of questions asking how to overcome hyperthermic (hot weather) performance-limiting fatigue, nausea, muscle cramps, and gastric stress. The following is a portion of Dr. Bill's article, which will appear (if it hasn't already) on our web site under the "Knowledge" link. In this article, I've added more information about sodium and electrolytes, which I believe is an absolutely crucial component of fueling. Some of this information may be old news but, especially at this time of the year, it's worth reviewing.

RESOLUTIONS SUGGESTED:

WHAT REALLY WORKS?

The following practices have been

reported to resolve most problems encountered especially those in hyperthermic events [above 60 degrees F. & 60% Humidity]:

A. HYDRATION REPLETION

RATE as a preventative, requires consuming 10-12 glasses or 80-100 fluid ounces liquid daily.

B. REHYDRATION RATE

during an event requires between 16-24 fluid ounces liquid each hour. Warning: Athletes who consume 34 fluid ounces per hour or more may predispose themselves to diluting serum sodium stores resulting in hyponatremia, a clinical medical emergency.

C. ELECTROLYTE REPLETION

RATE is generally adequate if 300-600

(see Heat Stress on page 7)

A Personal Note



from Brian Frank

Hammer Gel In Hawaii!

If you live in Hawaii, most people would say that you are very lucky, and they'd be right. However, there is a price for living in paradise, and it's usually much higher than here on the mainland.

Whether it's real estate, gas for your car or food to put on the table, it costs you more than it does here. The good news is that Hammer Gel will not be one of those items.

We have established a distribution facility in Kihei, Maui that enables us to provide bike shops and other retail outlets with our popular 26 serving jugs and our new single serving pouches for the same price that retailers on the mainland pay. This savings will be passed on to you with a retail price point of \$16.99 to \$17.99 per jug and 99¢ per unit on the pouches.

If you've been buying Hammer Gel directly from us, you're probably wondering how it is that \$17 is cheaper than the \$13.50 plus shipping that you've paid in the past. The answer is the doubling of US Postal rates as of July 1st - see accompanying article. It will now cost \$15.75 in postage to send you those 3 jugs of hammer gel. If you do a little math, that comes out to \$18.75 per jug. Ouch!

At the end of this article, we've listed some of the shops that have been stocking Hammer Gel or have just begun to

carry it. We are asking two favors of all of our customers who live in Hawaii and those of you who visit for Ironman or other events. 1) Go to the shops that are carrying it and buy from them. 2) If you know of a shop that does not yet carry the Hammer Gel, ask them if they would and send an e-mail to Tom Kern, our distributor in Maui (hammergel@hawaii.rr.com), with the shop name so that he can send them a dealer pack and samples.

Lastly, be sure to check the dealer location on our web site as we are adding shops daily. If there isn't one listed near you, there will be soon.

Aloha Bicycle Tours
448 A-1 Crater Road • Kula

Bikefactory
740 Ala Moana Blvd • Honolulu

HP Bike Works
74-5599 Luhia St • Kailua Kona

Island Bikes
415 Dairy Rd • Kahului

Island Triathlon & Bike
569 Kapahulu Ave • Honolulu

Nytro Hawaii
691 Auahi St • Honolulu

South Maui Bicycles
1993 S Kihei Rd Ste 5 • Kihei

The Bike Shop
1149 South King Street • Honolulu

The Bike Shop
98-019 Kamehameha Hwy • Aiea

The Bike Shop
270 Kuulei Road • Kailua

Tri Paddle Maui
92 North Market St, Suite B • Wailuku

West Maui Cycles
840 Waivee Street • Lahaina

Brian Frank

Mission Statement

The objective of Endurance News is to provide you, the serious endurance athlete, with a valuable resource that you will find to be informative, educational, thought provoking and helpful in your ongoing pursuit of optimum performance and health.

Endurance News features insightful articles on diet, nutrition, training and other topics of interest for endurance athletes — written by myself as well as professional and elite amateur athletes and other experts in the area of nutrition and exercise. In addition, Endurance News will include articles highlighting new and existing E-Caps products and how to get the maximum benefits from them.

In reading this and future issues, please remember that the views expressed in this publication will always be biased in favor of a healthy diet, hard training that emphasizes quality over quantity, and prudent supplementation to improve health and performance. But above all, we at Endurance News believe there are no short cuts, and success can only come from hard work.

*Brian Frank
E-Caps Co-Founder*

Legal disclaimer: The contents of Endurance News are not intended to provide medical advice to individuals. For medical advice, please consult a licensed health care specialist.

Back issues of Endurance News are available online. Point your browser to www.e-caps.com/oncall/enews.cfm

(Iron from page 1)

storage iron, as well as low iron binding capacity, are considered at-risk for ischemic heart disease progression. The mechanism for this is likely elevated hydroxyl radical production due to an enlarged transit iron pool. Researchers van Jaarsveld, Kuyl, & Wiid determined whether diet-containing iron concentrations near the recommended upper limit tended to alter the degree of myocardial ischemic/reperfusion injury in rats or whether simultaneous antioxidant supplementation had cardiovascular- debilitating effects. [Res Commun Mol Pathol Pharmacol 1994 Dec;86(3):273-85]

If an athlete consumes excessive above RDA levels of dietary iron, they may experience an increase in harmful free radical oxygen species damages. Such increases in free radical levels may impose premature fatigue or further neutralize the supply circulating exogenous antioxidants.

IRON INTAKE FROM FOOD INTAKE OF ATHLETES AND NON-ATHLETES

ENDURANCE ATHLETES

Men - Daily Iron Intake From Foods

9 Subjects

AVERAGE=279%

Women- Daily Iron Intake From Foods

7 Subjects

AVERAGE=193%

SEDENTARY NON ATHLETES

Men- Daily Iron Intake From Foods

4 Subjects

AVERAGE=158%

Women- Daily Iron Intake From Foods

5 Subjects

AVERAGE=115%

The above results may implicate an iron-supplemented diet as imposing increased degree of oxidative injury if simultaneous antioxidant supplementation prevented much of this increase. Twenty three customers, 16 athletes and 9 non-athlete's iron food intake was determined by computer-generated dietary analysis performed over a 36-month period. Male athletes [279% x RDA] and female athletes [193% x RDA] consume more calories than sedentary counterparts, therefore their total iron intake from food sources exceeds dramatically their required daily allowance (by a combined average of

241% x RDA). This along with the advice of a cardiovascular surgeon led us to remove iron from Premium Insurance Caps. This also is the basis for the suggestion that blood serum markers of iron deficiency substantiate and be medically monitored during any sort of iron supplementation, dose, and duration. Editors at the Life Extension Foundation have suggested not taking iron supplements unless a blood test reveals a deficiency. According to the Foundation, "Most people have too much iron in their body. Excess iron generates massive free radical reactions. Human epidemiological studies show that those with high iron levels are far more likely to contract cancer and heart disease. A growing body of evidence implicates iron in neurological disorders such as Parkinson's disease."

So for the majority of us, adequate iron is easily obtained from the diet, and supplemental amounts are not necessary. If you aren't sure about your iron status, a CBC (Complete Blood Count) / Chemistry Profile blood test will determine what your iron status is and whether supplementation is necessary.

USPS RATE INCREASES!!

By now most of you are probably aware of the most recent hike in postage prices. Besides the one ounce stamp increasing from 34¢ to 37¢, there has been a massive increase in the priority mail rates for packages over 1 pound. So, beginning on Monday, July 1st, all "cheapest way" packages weighing over 1 pound will be shipped via UPS ground or FedEx ground. Previously, packages up to 4 pounds were sent via Priority Mail.

For those of you who live in the lower 48, the only change you might notice is that UPS or Fedex will now be delivering packages that used to go USPS. For those of you who live in Hawaii, see accompanying story. This news is not so bad either because of our new distribution facility in Maui...at least for

Hammer Gel and Endurolytes. We hope to add the Sustained Energy, Soy Pro and Whey Pro to the list of items that will be locally available in Hawaii before the end of the year.

That leaves customers in Alaska, Puerto Rico, Guam and military personnel with the short end of the stick on this deal. For some of you, UPS 2day or FedEx may not cost any less but will get your order to you faster. For military athletes that receive orders at an APO or AE address, there is no other option besides USPS. We regret the inconvenience and added cost that will result from this rate increase. As we always have, we will continue to do our very best to deliver your products to you as inexpensively as possible.

RAAM 2002

This year's RAAM (Race Across America) is JUST ending as we go to press. More about this amazing race in a future Endurance News but for now a quick and sincere "congratulations!" to all the finishers, especially the following riders who used E-CAPS/HAMMER NUTRITION products during their race:
(D=Days, H=Hours, M=Minutes)

3rd Place - Allen Larsen - 10D, 1H, 5M
7th Place - Sam Beal - 11D, 2 H, 55M
8th Place - Guus Moonen - 11D, 10H, 21M

1st Place Tandem (9th overall)
George Thomas/Terri Gooch
11D, 19 H, 21M

2nd Place Two-Person Team
Terry Zmrhal/Tracy McKay
8D, 3H, 59M

Ask Dr. Bill



Question: Can you teach your energy system to more efficiently convert fats to energy by having a higher fat ratio diet ie: 40/30/30 as opposed to a high carb diet? Is it true that your body will use all its carbs first for energy before converting fat to energy?

Answer: What you provide in your personal dietary fuel source may impose a level [volume] of specific enzymes for your mitochondria to convert those foods into energy fuels to regenerate ATP. Athletes who train on a high fat diet will create a sport-specific need to produce more fatty acid converting enzymes than an athlete who trains on a high carbohydrate diet.

Endurance training on a relatively high carbohydrate diet [60%+] typically generates enough glycogen stores to fuel 70-90 minutes aerobic pace exercise. Athletes training on less than 60% carbohydrates, say in the 40-30-30 protocol, run the risk of not refueling glycogen stores to the maximum, though sheer volume of carbohydrates, if well timed, in the presence of glycogen synthase may "top off" glycogen stores.

The body can be trained to dispose of stored fuel sources based on what you eat. Most sport scientists will insist that a high carbohydrate diet is superior to the high fat alternative, which has the potential to not meet glycogen store capacity. This will, with time and training, impose greater demand on fatty acid metabolic pathways and their enzymatic contribution to meet energy demand. For an Olympic distance triathlon, for example, muscle glycogen stores may be performance limiting since this event requires a higher VO₂ Max energy output than the longer Ironman, which requires greater donation from fatty acid stores. You have stored enough fat to run from Los Angeles to Dallas. The best way to increase that efficiency is to train it to perform a specific distance at a specified rate. This occurs gradually and with periodic training interventions. In my opinion the 40-30-30 protocol supports neither performance outcome nor the training interventions required to increase the efficiency of fatty acid's enzymatic fuel transition. Not everyone agrees with me on this issue.

Here is a chart, which helps illustrate energy expenditure:

TIME AEROBIC EXERCISE	FUEL SOURCE PERCENT
First 60 minutes	Carbs-55%-65% (Glycogen)
First 60 minutes	Fat-30%-35%
First 60 minutes	Protein-5%-15%
After 90 minutes*	Carbs-30%-35%
After 90 minutes*	Fat-55%-65%
After 90 minutes*	Protein-5%-15%

*Assumes aerobic pace 75% VO₂ Max or less and that the athlete has achieved fitness for duration and rate of exercise.

IS HAMMER GEL AT YOUR FAVORITE SHOP?

Does your favorite local shop carry the Hammer products that you use regularly? Would it be more convenient to be able to get the products without waiting for UPS to deliver your order and paying shipping charges? You can help make it happen.

Even though the list of shops carrying Hammer Gel is currently over 500, with almost 100 in California alone, there are still several thousand that do not. We'd sure love your help in reaching as many of these other shops as possible. With our new single serving pouches, we can appeal to all types of shops and customers.

Most shops are sensitive to the needs and requests of their customers. Ask them if they would please carry the Hammer Nutrition products in their shop so you can purchase directly from them. They can call, e-mail or fax a request for dealer information from us, and we will make sure they get all the details they will need. Or, we will gladly contact them directly so all you have to do is call and give us their phone number and the name of the shop. Before you know it, they will have all your favorite products available so you can purchase them the day before the big race when you realize you just ran out.

You can have them contact us at:

Ph: 800-336-1977

Fax: 406-862-4543

e-mail: jj@e-caps.com

SUSTAINED ENERGY MIXING/STORAGE FAQ

by Bill Misner Ph.D. & Steve Born

Question: Can Sustained Energy be pre-mixed/refrigerated the day before use? Can leftovers be stored until the next workout? How long?

Answer: We do not recommend this practice; SE is very bioactive, meaning retro degradation is also rapidly transferred into the energy cycle. Like any natural uncooked food, without preservatives or additives, it should be ingested at 40 degrees temperature within 4-8 hours after mixing for best results.

Question: When taking *both* Sustained Energy and Hammer Gel (HG) during long workouts, should the recommended amounts of extra water for each be maintained (i.e. about 25oz x 2) or combined (i.e. about 25oz)?

Answer: For osmolar-advantaged absorption rate, each scoop of SE or each serving of HG, it is suggested 4-5 ounces water for cool temps, and 8-10 ounces for hot/humid conditions. Be sure to use Endurolytes at the rate of 1-3 per hour (more if the weather dictates a higher intake), and ALWAYS give this trial within your specific physiology response in training to confirm and

determine optimal dose ratios of fluid-fuel-electrolytes. Fuel should be in the 250-350 calories per hour, while fluids are recommended at the ranges of 16-24 ounces per hour.

Question: Why is it that once SE is mixed with water it starts to ferment in 12 hours or so if not refrigerated and HG seems to last forever. Aren't they both pretty much the same stuff?

Answer: Sustained Energy contains roughly 12.3% Soy Protein Isolates and 85-86% of three separately unique chain length maltodextrins. When carbohydrates and proteins touch in the presence of humidity crystallization begins, retrograding into what you named "Fermenting." These Hydrolytic reactions commence at an enhanced rate when water is mixed in with the dry powdered SE. Heat further enhances retro gradation, enhancing enzymatic processes further and further until putrefaction is easily noticeable by both taste and smell. If a 20% maltodextrin solution and a 20% Soy Protein Isolates solution [by weight] are mixed, the soy will "Spoil" or retrograde first, but the

maltodextrin solution will last a long, long time. Add the soy and the maltodextrins together, and the spoilage process will be hastened.

Question: If one mixes SE and keeps it in the fridge for a day or two, will it break down any of the desired properties due to sitting for awhile and not being used right away?

Answer: Pre-mixed SE will taste like or smell like "sour milk" after about a week in the fridge or 7-8 hours in warm or hot air. SE will last 14-16 hours if kept 40 degrees or less. The affinity of carbohydrates and protein substances is well known resulting in some crystallization or hardening. Airborne or waterborne microorganisms appear to flourish in the presence of amino acids. You can mix maltodextrins with water in an open container almost indefinitely. The effectual benefits ("desired properties") are not lost, but the L-Carnitine in SE may deteriorate some forming crystals within the mix since it is very hygroscopic (has an affinity for water). The deterioration, if any, is minimal in 48 hours post mix, refrigerated. The ideal is to use mixed SE within 24 hours for races.

DID YOU KNOW...

...that many of the E-CAPS & HAMMER NUTRITION products have quantity discounts? Check out some of these every day specials:

Race Caps	\$44.95 ea.
<i>3 or more-</i>	<i>\$39.95 ea.</i>
ATP100	\$19.95 ea.
<i>2 or more-</i>	<i>\$17.50 ea.</i>
PIC's	\$59.95 ea.
<i>3 or more-</i>	<i>\$54.95 ea.</i>
Phytomax	\$24.95 ea.
<i>3 or more-</i>	<i>\$22.95 ea.</i>
Omegasource	\$ 9.95 ea.
<i>3 or more-</i>	<i>\$ 7.95 ea.</i>
Super AO	\$39.95 ea.
<i>3 or more-</i>	<i>\$34.95 ea.</i>

Tissue Rejuvenator	\$19.95 ea.
<i>3 or more-</i>	<i>\$17.50 ea.</i>
Shark Cartilage	\$24.95 ea.
<i>3 or more-</i>	<i>\$19.95 ea.</i>
Hammer Pro Whey	\$19.95 ea.
<i>4 or more-</i>	<i>\$17.50 ea.</i>
Hammer Pro Soy	\$17.95 ea.
<i>4 or more-</i>	<i>\$14.95 ea.</i>

And don't forget our everyday 3-jug special (\$13.50 vs. \$16.00) on Hammer Gel or our "kit" prices on the Race Caps/Enduro Caps and Cardio Caps/Enduro Caps combinations with or without Xobaline or Liquid Xobaline. E-CAPS/HAMMER NUTRITION products have a superb shelf life so if

you use them regularly (and you should!) stocking up is a great way to save money. We also have fantastic automatic re-supply programs available for many of our products, which provide the lowest prices on our products AND free shipping. We take care of all the paperwork and ship the products to you at specific periodic intervals. For you this means less hassles and never having to worry about running out of product. It's a very flexible program as well, allowing you to change the quantities or shipping schedule if needed. It's definitely worth looking into so give us a call at 1-800-336-1977 and we'll be happy to give you all the details.

RACE REPORT • Catching up with our athletes

Chris Cline • Team Half-Athletes

Wild in Wasatch

I just wanted to send everyone at E-Caps/HammerGel a quick note saying THANKS for your sponsorship and especially for your product line. My team (Half-Athletes) finished the Wasatch Adventure Race this weekend in fine style. The race was only 90 miles but ended up being quite difficult due to almost obscene amounts of mud in the mountains (thanks to a late-season snow-storm and a warming trend afterwards). We paddled and skated, then pushed our bikes up steep, rocky canyons and across miles of snow/mud roads. Then we got to our transition area and pushed our bikes through more mud before starting off on a night-time orienteering trek through (you guessed it) more mud. We (along with most of the other teams) spent a fair amount of time between 3AM and 6AM wandering around lost looking for a checkpoint, but happened to find it faster than most, and made it down to the morning transition area well ahead of the cut-off times, to pick up our bikes for more mud pushing. After we descended into dryer terrain (about the only rideable part, but unfortunately, we had all gone through our brake pads and

had to ride slowly and/or walk the steep parts!), we did one last bike push up to the top of the 300' rappel, walked our bikes back down the steep hill to the valley below (again, due to no brakes), did one last little 4-mile hike, an 8 mile inline skate, and a final paddle out the Provo River into Utah Lake. We finished in 25 hrs and 45 minutes. Not bad for a "24-36 hr" race! This put us in at 6th overall and 3rd in our division (3-person mixed), and qualified us for the US Adventure Racing Association National Championships (which I believe is on the east coast this year).

I used the Race Day Boost and Liquid Endurance for 4 days before the race, then used Enduro Caps, Race Caps, and Super AO throughout the race, in addition to SE and HammerGel. At no point did I cramp up or feel like I was losing it (despite some stomach cramps for a couple hours after eating some solid food at the transition). The most amazing thing was how good I felt the NEXT day! No soreness, and a lot more energy than I felt it was right to have. I even went for a fairly hard mountain bike ride

with my boyfriend, featuring several "interval" efforts of chasing him down.

I can't say if any specific product was responsible for how good I felt...I think it's the entire E-Caps/HammerGel SYSTEM that makes the difference.

Unfortunately we were so covered in mud most of the time that it was hard to display the E-Caps and Hammer Gel logos, but they are prominently affixed to my bike and pack, and I will wear the shirt and hats (one at a time!) with pride during group runs and I've got those cards in my wallet. Even though racing will only get harder as more people find out about your products, I will HAPPILY spread the word to my friends.

Thanks again I really appreciate your support AND your great products.

Chris Cline
Team Half-Athletes
Salt Lake City, UT

Kip Koelsch • Team Specialized Adventure Racing

Ph(F)lorida Phenomenon

I just wanted to let everyone know that I finished second overall and was the first soloist to finish the Caloosahatchee Adventure Triathlon that was held on March 9 near Ft. Myers, Florida.

It was an awesome sprint race on a fairly cool Florida morning (I had a sweatshirt on before the race). Over 90 teams/individuals showed for the event—4 miles of paddling, a 3-mile trail run, and 6 miles of trail biking. I came out of the paddle second to one of my marathon paddling buddies, but my quick transition started us on the run together. Just before the bike transition we were passed by one relay runner. My friend handed off to his biker and I made my transition to the bike. So, I knew there were two bik-

ers ahead of me. While I was changing my shoes another relay runner must have come in, but I never saw him. Early in the bike I whizzed by the two I knew were ahead of me and (sipping a dilute mix of Hammer Gel, endurolytes, and SE) I continued to hammer on the fast bike course. The volunteers along the way cheered me on and when I crossed the finish line I thought I was in first—only to hear them say "number two" as I came across the line. After my initial disappointment I realized what had happened—a relay biker had indeed gone off while I was making my transition.

Regardless, I had a great race—good training for my solo effort in this year's Florida Coast to Coast Eco Adventure

Race. THAT should be an awesome challenge. Memorial Day weekend—55 miles of paddling, 95 miles of biking, and 55 miles on foot—from Crystal River to Daytona Beach!

Kip Koelsch
Team Specialized Adventure Racing

Athletes....would you like the E-Caps/Hammer Nutrition community to know what you're up to? Send us a short email to graphic@e-caps.com (please put *Race Report* in the subject line) about your recent accomplishments and we'll try to include it in our Race Report

(Heat Stress from page 1)

milligrams sodium are consumed each hour in a divided dose format in the presence of other electrolytes such as potassium, magnesium, calcium, chloride, and manganese. Remarkable dose variation exists between athletes. One female ultramarathoner successfully won a 100-mile running race on 100 mg Sodium per hour for 17 consecutive hours. Her measured blood serum sodium levels varied only -2% and were within normal reference range both before and after the event. Others have reported requirements of over 6 times the former low dose, or as high as 600 mg Sodium each hour in addition to other electrolytes. Perhaps no other component of fueling is as individual as electrolyte replacement.

There is a point in time at which the body cannot replace losses from exogenous (outside) sources. Overdose of a single electrolyte at its repletion rate may lead to other imbalances triggering other systemic reactions that could lead to further problems that might inhibit performance. In other words, just like with water and calories, the body has a limit to how much it can absorb and assimilate with regards to electrolytes. Even though you may be losing "X" amount of sodium and other electrolytes per hour, the body is simply not capable of replenishing it at the same rate it loses it. Fortunately, the body has a very complex yet effective way of monitoring, regulating, and re-circulating sodium and other electrolyte losses... if you don't interfere with it.

Many athletes have suffered needlessly with swollen hands and feet from water retention due to ingestion of salt tablets or electrolyte products too high in sodium during prolonged exercise in the heat. Too much sodium is counterproductive as it interferes with or neutralizes the complex body mechanics involved in re-circulating and monitoring proper blood-serum sodium levels. At some point in dose-presentation, sodium in the blood serum creates

signals from the brain to the kidneys to throw off excess sodium either in urine or in distal tissue stores, which results in edema-like symptoms. That point occurs for most of us between 300-1000 mg sodium per hour. We want our body to re-circulate "adequate" sodium for systemic balance of osmolality, carbohydrate transit across gastric membranes, and nerve transmission for muscle contractions. In other words, sodium is a crucial component for helping many body functions including digestion and proper muscular function but it must be in a supportive and in-balance dose. Too much sodium may contribute toward water weight gain or swollen hands, feet, and face edema (definitely not performance-enhancing). Too little sodium may result in hyponatremia or low serum sodium resulting in muscle spasms, nerve transmission failure or muscle cramping, which not only hinders performance but can become a medical emergency.

What athletes require is a low-sodium approach to electrolyte replacement that emphasizes a balance of essential minerals to cooperatively enhance the body's natural hormone and enzyme mechanics. In essence, we want to work with our body, not against it. The body needs your help to do what it wants to do and can do naturally, but, if you overdo it in replenishment, you will "short circuit" all these very complex mechanisms already in place in the body. Electrolytes, calories, and water are the essential components of fueling the body during exercise, but they can work for you or against you depending on what you choose to do regarding replenishment. Too much or too little will negatively affect performance and may also cause more serious problems.

D. FUEL REPLETION RATE suggested is 4.0-4.6 calories per minute, or approximately 240-280 calories each hour in 3-4 divided doses. This dose recommendation represents how much fuel the stomach and liver are able to return as an energy substance in working

muscles. The human body prefers small portions and shows its appreciation by absorbing a greater amount of a small dose than a larger volume. High complex carbohydrate energy gels or powdered drinks are reported to absorb at body fluid osmolality in higher solutions [15%] with less gastric side effects than products containing simple sugar solutions [6-8%], such as fructose, sucrose, dextrose, or maltose. In other words, complex carbohydrates, even at a higher rate of concentration, are better absorbed and assimilated than products whose primary carbohydrate source is simple sugar. This allows your body to have more calories available for energy production.

E. REDUCED RACE PACE will help reduce core body temperature. The faster pace generates more core heating than a slower pace. Adding a walk break during a run or splashing the whole face and upper torso will reduce body core temperature.

F. BODY WEIGHT is expected to decrease -2% in hyperthermic events lasting 3 hours or more. Always weigh before and after events to determine if the hydration protocol was adequate, excessive, or inadequate. The 2% lost reflects water produced during muscle glycogen metabolization. Weighing after 2 or more hours of aerobic exercise should result in 1-2% weight loss, no muscle cramping, and no hand, feet, or facial edema to confirm adequate sodium intake with fluids and fuels.

It's summer and it's hot!
Be sure to stock up on
Endurolytes and Liquid
Endurance, your ally
against heat and muscle
cramping. Find out more
about these great products
at www.e-caps.com
or call 1-800-336-1977

MICRONUTRIENT EXPENSE AND DEMAND

(or, How Many Premium Insurance Caps Should I Take?) *by Bill Misner, Ph.D.*

Whether or not to ingest large multiple vitamin and mineral supplements is argued favorably in relationship to total caloric intake and expense. Micronutrients are spent proportionately more in younger adults, males, increased duration/intensity of exercise, and by larger athletes. The immediate demand is for anti-oxidants to reduce free radical increases generated by intensity or duration. Skeletal muscle has one of the highest requirements of all tissues for oxygen, exercise increases total oxygen consumption by approximately 10-20 fold, causing an increased rate of production of REACTIVE OXYGEN SPECIES (ROS). To meet or reduce exercise-induced free radical production, Table A and Table B show estimates for rational daily PIC dosages.

MICRONUTRIENT DEPLETION DURING EXERCISE

The micronutrient RDA supplies equal, or exceeds 97.725% of the sedentary population's micronutrient requirements. A number of micronutrients, most notably vitamins in the B family, play a critical role as co-factors in energy metabolism. As co-factors, B vitamins function as parts of enzymes involved in converting carbohydrates, proteins and fats in to energy. In some cases, B vitamin intake is tied to energy intake and protein intake. For example, the Recommended Dietary Allowance (RDA) for three B vitamins, Thiamin (0.5 mg), Riboflavin (0.6 mg) and Niacin (6.6 mg), is based on increments of 1000 calories consumed - (based on a 2,000 calories per day diet). Daily intake of another B-vitamin, B6, is based on protein intake (0.016 mg per gram of protein) because of its involvement in protein metabolism.

Thiamin is needed for metabolism of

carbohydrate and branched chain amino acids (BCAA) - both of which play important roles in energy and fatigue during exercise. Riboflavin is necessary for the production of two key energy-generating enzymes - flavin adenine dinucleotide (FAD) and flavin mononucleotide (FMN) - which are needed during the metabolism of glucose, amino acids and fatty acids for energy. In addition to the role that vitamin B6 plays in amino acid and general protein metabolism, B6 also has crucial functions in energy production from carbohydrate - as in the conversion of lactic acid to glucose in the liver and the release of muscle glycogen to the bloodstream as free glucose. The bad news, of course, is that if you're satisfying your caloric needs with empty calories or highly refined or processed foods, there's a chance that your intake of B vitamins is sub-optimal. Does exercise increase the need for more vitamins and minerals?

Exercise participation can increase your need for many nutrients, most notably water and energy. Whether vitamin and mineral needs are increased as well is still an issue of some debate. Some nutrients are almost certainly needed in higher amounts by athletes, some nutrient requirements are probably no different for athletes and couch potatoes and even other nutrients can be thought of as specifically tailored for exercisers - because they improve athletic performance, yet have virtually no benefits for sedentary folks. [1]

Because athletes need to compensate for the high-energy expenditure of training and competition, they generally consume more food and a higher number of calories than the average person. The extra calories serve to support the energy needs of exercise and maintain adequate energy stores of

glycogen in the liver and muscles. The fact that you're consuming more food to provide those needed calories also means that you're getting an increased intake of calories containing limited vitamins and minerals per calorie.

Although the increased energy needs of exercise are usually satisfied by a higher intake of the energetic nutrients (carbohydrates, protein and fat), it is important to keep in mind that vitamins and minerals play a vital role in the metabolic processes which are responsible for extracting the energy from foods. In addition to their role in energy production and storage, vitamins and minerals function as crucial co-factors for synthesis and repair of muscle tissue and red blood cells and for protection of many tissues from the damaging effects of oxidative stress.

EXCESSIVE FEELINGS OF TIREDNESS AND FATIGUE IN ATHLETES

This can sometimes be linked back to inadequate dietary intake of B vitamins or carbohydrates. While vitamin B supplements and carbohydrate rich foods are often an effective and safe nutritional approach to combating fatigue, unless iron deficiency anemia is documented by a laboratory test (plasma ferrin analysis), high dose iron supplements should be avoided unless specifically recommended by your physician. In men high dose iron supplements can rapidly build up with the potential for promoting tissue damage in the heart, liver and muscles.

INTENSE EXERCISE CAN INCREASE OXYGEN CONSUMPTION 10-20 TIMES OVER RESTING LEVELS.

A side effect of elevated oxygen consumption, however, is the generation

(see Micronutrient on page 9)

(Micronutrient from page 8)

of free radicals (electrically charged particles) and “oxidative stress” - which can damage tissues and cellular membranes. In defense of body cells and tissues, the body produces a variety of antioxidant enzymes that help to counteract many of the damaging effects of free radicals. In mounting its own antioxidant defenses, the body uses a number of minerals, such as zinc, copper, magnesium and selenium, in manufacturing enzymes to counter-balance the damaging effects of free radicals. In addition other nutrients, like vitamins C and E, contribute to the body’s antioxidant defenses. Vitamin E is one of the most important fat-soluble antioxidants - providing crucial protection for cell membranes and internal cellular structures. Vitamin C, a water-soluble vitamin, performs important antioxidant functions in the blood and fluid compartments within and between cells of the body.[1] The general recommendation for athletes is that a macronutrient diet should provide 55-75% carbohydrates, 20-25% fats and 15% protein in terms of energy. It should also supplement 10% more micronutrients in sedentary subjects while a supplemented RDA level for each 1000 calories spent from exercise is rational.

REFERENCE:

[1]-SUPPLEMENT WATCH WEBSITE
http://www.supplementwatch.com/articles/sports_nutrition/exercise_vitamins.html

FOOTNOTE EXPLICATION:

This is Dr. Bill’s opinion generated by review of several research papers on fuel and micronutrient expense from a number of metabolic research observations. In that the interpretation is solely Dr. Bill’s, it should be noted that many Sports Nutritionists do not favor high dose micronutrient repletion rate.

TABLE A

ANTI-OXIDANT DOSE FOR REDUCING EXERCISE INDUCED FREE RADICALS. (ROS - Reactive Oxygen Species)

	ONE HR.	TWO HRS.	THREE HRS.
SEDENTARY ROS	-100%	-200%	-300%
RDA DOSAGE AO - ROS	25%	-50%	-75%
AEROBIC EXERCISE ROS	1200%	2400%	3600%
ANAEROBIC EXERCISE	2400%	4800%	6000%
PIC AO DOSE FOR ROS	7 CAPS	14	17
PIC AO RESPONSE ROS	2485%	4970%	6035%

TABLE B

PREMIUM INSURANCE CAPS DOSE RATE BASED ON FUEL REPLETION, GENDER AND BODY WEIGHT

FEMALES’ ENERGY FUEL/PIC MINIMUM AND MAX. CAPSULES/DAY

	120 lbs.	130 lbs.	140 lbs.	160 lbs.
BMR	1373	1418	1462	1544
K/CAL NEEDED	2060	2128	2194	2317
PIC’S MINIMUM	4	5	6	7
PIC’S MAXIMUM	7	7	8	10

MALES’ ENERGY FUEL/PIC MINIMUM AND MAX. CAPSULES/DAY

	150 lbs.	170 lbs.	190 lbs.	210 lbs.
BMR	1745	1836	1922	2002
K/CAL NEEDED	2617	2755	2883	3000
PIC’S MINIMUM	7	7	8	10
PIC’S MAXIMUM	14	14	14	14

NATE LLERANDI • A Double Dose

Note: I have an email folder of Nate's "Tips of the Day" that I like to look through occasionally. After spending the past several weeks helping many of the riders who competed in RAAM this year, I thought these two were quite appropriate; they really hit home for me. I hope you enjoy.
-Steve

Mind Over Grind

More is Better. That's the credo to which many athletes subscribe. Unfortunately, it's the easiest way to become over trained and/or injured. The argument is that if you start feeling strong after a few weeks of pounding yourself, then a few more weeks will make you that much stronger.

Up to about 8-12 weeks, this is the case. But to try to extend it any further than that really opens you up to possible lasting pain and misery. We're an instant gratification society. The goal is to break away from this mentality and look to make steady, consistent gains that are sustainable over time. Don't pull a Nasdaq death spiral with your training.

To make steady, consistent gains, you need to implement scheduled rest periods. I have my athletes subscribe to a 5-week cycle (4 weeks hard/1 easy). This give the body time to absorb the hard work just completed and get ready for the next challenging bout.

Likewise, there needs to be flexibility within a week. Having a schedule is great, but it's just a template. Write it in pencil because at some point things will change. If you're not feeling well or feeling drained, then skip/alter the hard session you have planned for that day. The body changes day to day, so honor that. Don't put yourself into a rut and refuse to get out of it. If you normally do hard training during the week, but now you're racing every weekend, then switch things around. Use the constant racing as your hard workouts and do your aerobic training during the week, for example.

Nate Llerandi is a former national class swimmer/world class triathlete who, after a 5-year retirement from the sport, is getting back into it. He has been coaching since 1990 and creates programs for athletes of all sports and ability levels.



Hammer Gel...good to the last drop!

Thanks to Kyle Inman for sending us this picture of a Hammer Gel pouch in action at the Middle Mountain Mama mountain bike race in Virginia.

Chuck the Pen and Pull Out the #2 Pencil

We all try to come up with the "Secret Master Plan" that will vault us ahead of the competition and/or to personal bests. We mull ideas over and over in our heads until we come up with a plan that seems infallible, then we write it down. The idea is that if we stick to the master plan to a "T", then we'll be breathing fire when it's time to race.

The problem most athletes face (me included, at times) is that we get so focused on this master plan that we don't allow for the flexibility to deviate from it. This is the biggest mistake we can make. What worked last year - heck, what worked last month - will not be as effective today.

Notice I didn't say, "probably won't be. . ." What worked in the past will not work as well today. Sure, bits and pieces of successful training regiments will always be cornerstones of any program - the long run for the marathoner, for example - but even then there needs to be room for experimentation with how that long run is completed.

Along these lines, my college swim coach is the most successful collegiate coach in NCAA history for any sport. Our Men's team has won 22 straight NCAA titles and our women won 17 straight before just losing last March. Every year he throws out the previous year's training plan and starts from scratch. Some plans worked better than others, and every one was very challenging.

Don't be afraid to go against tradition or your master plan. Only by doing so can we find new and innovative ways to produce results. The trick is recognizing quickly when a new approach (or old approach) is counterproductive and eliminating it.

HERE BANNER, BANNER, BANNER....

Our banners are homesick. If we've sent you a banner to use at your event and you haven't sent it back, please send it to:

4952 Whitefish Stage Rd.
Whitefish, MT 59937

Thanks for your help!

26 MONTHS *and counting...*

by Steve Born

This issue of Endurance News marks my two-year (well, actually a bit longer) anniversary here at E-CAPS and I wanted to take a moment to reflect on a couple things I've experienced in these past two years. Without getting too sappy I just wanted to express how fulfilling this job has been and continues to be... I have you athletes to thank for that. While I still pursue my own goals as an athlete, it is incredibly satisfying to be a part of the attaining of your goals. Although sometimes I can't seem to keep up with the emails I receive, I do try to answer each and every one in a timely fashion. The reason I strive to thoroughly and completely answer your questions is because I know from my own trial and error just how confusing this area of athletic performance can be. Heaven knows I made many mistakes in my athletic career when it came to figuring out nutrition and supplementation. A very real passion of mine is to share the knowledge garnered from those mistakes (and boy, have there been some real bone headed ones) so that hopefully you won't have to experience the same ones. Being able to help athletes take the confusion out of proper fueling and supplementation is a job I doubt I'll ever truly get tired of. So, as long as Brian will keep me around, I hope to be able to do that and more for all of you for a long time to come.

One of the things I'd meant to do quite awhile ago, but will do now, is to introduce you to (and yes, brag about) the staff here at E-CAPS. Although Brian, Dr. Bill and I are probably the names and faces you most recognize, I can tell you that everyone here is integral to this company. Their presence here makes my job much more enjoyable and so much easier. They are just such great people to work with and I'm honored to have them as friends.

At the beginning and end of each and every day Joe Arnone and I shake hands. It's a nice gesture that reminds me just how much of a team effort this is. Among the many other things he does here, Joe has been instrumental in

handling the monumental task of coordinating athlete and team sponsorships. It's been so great not only working with Joe but also to ride with him, Brian, and Susen (from the shipping department). We have our weekly after-work ride, which is not only a time for us to train but often times it's kind of like a mini staff meeting.

I can't say enough about our customer service staff. Gail Dykstra, Mary Meagher, Dennis Bain, and Barbara Magone are incredible. The amount of calls, emails, web orders, and re-supply/continuity orders they receive and process is enormous and seems to grow every day. Still, I can tell you that they really do love what they do and honestly enjoy being able to help you. Sure, with well over 100 orders being placed on a daily basis, every once in awhile one gets botched, but, you know, it really is the rare exception and not the rule. They are very organized (I could take a lesson from them!) and meticulous in their efforts to make sure your order gets done right. One of Brian's original desires when he first started E-CAPS, to get your order out the same day you place it (as much as is humanly possible), has never changed; it is still what our customer service staff strives for. We've had a few customer service people come and go in the two-plus years I've been here but I believe right now we have the very best.

Angela Nock is our graphics whiz, and all the catalogs, brochures, mailings, other advertisements, and this newsletter have her professional touch on them. As with any business, producing quality advertising and related materials is such an important part of our company, and her ability to take my thoughts and ideas and make something artistic out of them never ceases to amaze me. There have been a couple other graphic designers here at E-CAPS, but Angela is by far and away the best. No question, she has made this aspect of my job noticeably more efficient and effective. In addition, we have an awful lot of fun putting

brochures, mailers, etc., together.

Tony Siorek runs the shipping department. The responsibilities he and his crew manage on a daily basis are awesome with all the shipping options, schedules, rates, etc., etc...it's mind-boggling! Add to that other responsibilities, like receiving and maintaining inventory, and it makes for a very hectic day... every day! Still, Tony, Susen Ladd (a very good cyclist by the way), Eric Haze, and Wes Davis are truly dedicated to getting your orders accurately packed and out as fast as possible. On the back page of this issue is a letter from one of our customers where he mentions that the warehouse here is (paraphrased) so clean that you could eat dinner off the floor. That, and all aspects of the shipping department, are what these people are all about - neat, efficient, and very organized.

Greg "Girth" Magone is our on-staff computer whiz, helping make our work day (and our computers!) run much better. In addition, Greg's been a real blessing in helping me put together the orders for the 400+ events we sponsor. There's just no way I could do that without his help.

Anyway, it's been a very fulfilling two-plus years at E-CAPS working with these great people and being a part of your athletic goals. Our commitment to you has never been stronger, and we've got some great things in store for the future.

In closing I just want to say thanks for the trust you've put in me and for letting me be a part of your athletic goals. I give you my word that I will strive to never lose that trust.

I hope you all have a great summer!



The Last Lap

MAILBAG!!!

Toward the end of February I had the opportunity to visit the headquarters of E-Caps & Hammer Nutrition in Whitefish, Montana. The hospitality was great. I spent a great deal of time with the founder and owner, Brian Frank. Brian and the rest showed me the in's and out's of the operation and how everything runs. If only everyone could experience this tour. The offices and warehouse was so clean one could eat off the floor. I was very

impressed but I guess I shouldn't have expected anything else out of them. The staff at E-Caps and Hammer Nutrition is truly one big family. Now I know why everything is done in such a professional manner. I will never forget the tour of the facilities, but most of all I will never forget the -40 degree weather.

Chris Huff
Triathlete

