

# ENDURANCE NEWS

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Issue 046



The Newsletter For Endurance Athletes

An E-CAPS & Hammer Nutrition Publication

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## Are You Getting Enough? : Food May Not Provide Sufficient Micronutrients

Dr. Bill Misner

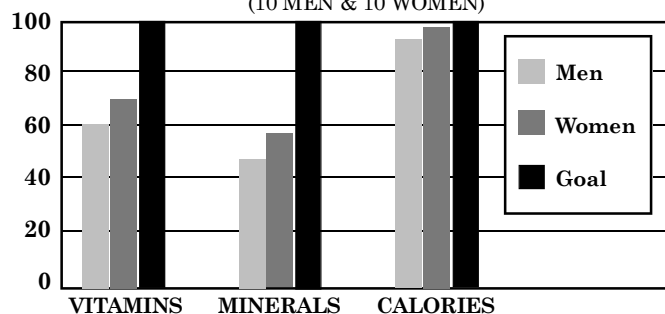
Reference Daily Intakes (RDIs) is a new term that replaces the familiar U.S. Recommended Daily Allowances (U.S. RDAs). RDIs are based on a population-weighted average of the latest RDAs for vitamins and minerals for healthy Americans over 4 years old. RDIs are not recommended optimal daily intake figures for any particular age group or sex. Government-established Reference Daily Intake guidelines (RDIs) are designed to prevent nutrient-deficiency diseases. Most nutritionally oriented professionals' reference research that supports selection of foods and/or supplements to supply all micronutrients well above RDI levels to maintain optimal health and prevent degenerative disease.

Vitamin C is a water-soluble vitamin that like other water-soluble vitamins when it is excessive above the body's needs is excreted via urine. Colgan2 measured vitamin C excretion rate subjects and reported that some could take 5000 milligrams with no increase in excretion rate while others after taking only 1000 mg showed extraordinary urine excretion rate. Colgan calls this remarkable difference in individual's vitamin requirement, "Biochemical Individuality".3 I wondered therefore, in spite of great differences in "Individual Biochemistry," does our food intake provide 100% of the RDI level of micronutrients required for a deficiency disease preventative?

**METHOD:** A computer-generated dietary analysis was performed on whole food intake from the diets of 20 subjects, 10 men (ages 25-50y) and 10 women (ages 24-50y). This computer-program default utilized the Harris-Benedict formula for determining energy expense against micronutrient needs based on activity-induced calorie expenditure, age, gender, and Body Mass Index (BMI). Each subject was selected based on the highest number of foods consumed daily

of 42 dietary analysis subjects. The purpose of this search was to determine if food intake alone provided the Reference Daily Intake (RDI) requirements for 10 vitamins and 7 minerals. The ten vitamins examined were Vitamin A, Vitamin D, Vitamin E, Vitamin K, Vitamin B-1, Vitamin B-2, Vitamin B-3, Vitamin B-6, Vitamin B-12, and Folate. The seven minerals examined for were Iodine, Potassium, Calcium, Magnesium, Phosphorus, Zinc, and Selenium. Diets were analyzed from the following active individuals (A): 2 professional cyclists, 3 amateur cyclists, 3 amateur triathletes, 5 eco-challenge amateur athletes, 1 amateur runner. Six (6) of the subjects were sedentary (S) non-athletes. Fourteen (14) active subjects (A) were compared to six (6) sedentary subjects (S). Based on each subject's caloric expense, age, gender, BMI, 10 of the diets were calculated as calorie-excessive, above energy requirements (4 men and 6 women), but the remaining 10 diets were calculated

TABLE I. MICRONUTRIENT DEFICITS FROM FOOD INTAKE  
(10 MEN & 10 WOMEN)



calorie-deficient, not meeting 100% of their energy requirements (6 men and 4 women).

**RESULTS:** When total calorie intake percentages were averaged for each group, men consumed only 92.6% of the calories required for their total energy requirements, while women consumed only 97.3% of the calories required to meet their energy requirements. To view this graphically, see table 1.

(see MICRONUTRIENTS on page 10)

## Dear Client,

Spring time is in the air and the racing season is upon us. Hopefully your base training went well and you are ready to start hammering. We are ready to help you make 2005 your best season yet with one stop shopping for all of your fueling and supplement needs.

Like the previous 45 issues of Endurance News, this issue is packed full of useful information that you cannot get anywhere else. In fact, we had so much content for this issue that we had to go to 20 pages and still left out a few articles that will have to wait until the July issue.

Whether it's Dr. Bill's landmark research that debunks the tired "balanced diet" mantra, or the interview with George Brunstad, a 70 year old swimming the English Channel, this is simply a must read issue.

If you have been looking for an alternative to the "high calorie, high fluid, high sodium, party line that all of the companies pushing sugar and the media who they support continue to blabber about, be sure to read Steve's articles on page 7 and 14. The big mistake that everyone else is making is

focusing on what you lose during exercise, not what you can effectively replace.

So as you get ready to start your season, remember that we're your source for superior products and sound knowledge.

To your health,

*Brian Frank*

## The 4th Annual Highline Hammer Weekend : Come Ride In The Rockies

*Brian Frank*

We are pleased to announce the dates for the 4th Annual Highline Hammer Weekend. The festivities this year will be held over the weekend of August 4-7, 2005. If you missed out on last year's event, or had so much fun that you can't wait to do it again, please consider this your invitation to join Steve, Dr. Bill, Joe, and myself for a weekend of long miles, beautiful scenery, good conversation, great food, and a lot of valuable "face" time with our endurance gurus. Allen Larsen, 2003 Insight Race Across America winner, will be joining us again this year to share his "ultra" experiences, ride with us and do a video documentary of the weekend. As an added bonus, every attendee will receive a 30 minute DVD as a keepsake along with a CD of all of the photographs taken during the weekend.

Here is a quick itinerary; **Thursday** afternoon ride followed by an informal recovery social. **Friday** features two nutrition/fueling seminars and morning or afternoon group ride culminating in a feast of Italian propor-

tions. **Saturday** is the epic 136 mile "Highline" loop through Glacier National Park - easily one of the top 5 rides in the country for beauty and challenge, followed by a gourmet dinner. **Sunday** offers two ride options - 87 miles around Flathead Lake or a shorter 50 mile loop and of course we'll finish it all off with a big barbeque at our headquarters.

We can confidently say that every client who has joined us in the past 3 years has had the time of their life. In fact, we already have nearly 15 slots for the 2005 event reserved by 2004 attendees. That leaves 20 spots available, so there is still plenty of room for you.

We'd love to have you join us this year. If this sounds like something that would be of interest to you, please visit [www.e-caps.com/highline](http://www.e-caps.com/highline). You will find all of the nitty gritty details there as well as a bunch of images and a 5 minute video clip from the 2004 event. If you are the analog type, give us a call @ 800.336.1977 and we'll send you all of the information you need. See you in August!



*Mike Freeman powers up Going-To-The-Sun Road during the 2004 Highline Hammer*

### Correction

In our last issue of Endurance News we listed the 2004 Inside Triathlon All-Americans. Unfortunately, we left out long-time client and super triathlete, Christine Mackrides. Sorry for the mix-up Christine, and congratulations on a great season.

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*\*Articles written by Dr. Bill Misner are not proofed by David Levin*

### Our Mission

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.

Back issues of Endurance News are available online at:  
[www.e-caps.com](http://www.e-caps.com)

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.

*The FDA has evaluated none of the statements in this newsletter.*

## What's In Your Energy Food? : Read the Label Carefully!

Steve Born

With so many products flooding the markets these days it can be pretty challenging to sort through the hype and pseudo-science jargon to discern whether or not you would want to use it.

Below is our suggestion for what to seek out and what to avoid in a energy drink, bar or gel or pretty much any packaged food.

### PROTEIN -

Some companies that don't offer protein fortified energy drinks say that there are no benefits from consuming protein during exercise. That's only true when exercise is less than two hours in length. However, for workouts and races longer than that, 5-12% of your energy requirements will be derived from protein. If your fuel source does not contain 10-15% protein, your body will have no choice but to get that protein from muscle stores. Some energy drinks provide 25% protein, but this is 10-15% more than you need. Also, every other drink and gel on the market that incorporates protein uses whey. Whey is a great protein but it should not be used during exercise as it releases excess ammonia into the muscles as it is being metabolized. Soy or rice protein are the only ones suitable for use immediately before and during exercise.

### Raspberry Hammer Gel

| Nutrition Facts            |                     |
|----------------------------|---------------------|
| Serving Size: 36g          |                     |
| Servings per container: 26 |                     |
| Amount Per Serving         |                     |
| Calories 88                | Calories from fat 0 |
| Total Fat 0g               | %DV*                |
|                            | 0%                  |
| Sat. Fat 0g                |                     |
| Cholesterol 0mg            |                     |
| Sodium 18mg                |                     |
| Total Carbohydrates 22g    |                     |
| Dietary Fiber 0g           |                     |
| Sugars 2g                  |                     |
| Protein 0g                 |                     |
| Vitamin A 0%               | Vitamin C 2%        |
| Calcium 1%                 | Iron 0%             |

INGREDIENTS: Long-chain Maltodextrin, Filtered Water, Energy Smart (Fruit Juice, Natural Grain Dextrins), Raspberry Puree, Natural Flavors, Citric Acid, Sodium Benzoate (as a preservative), Amino Acids (L-Leucine, L-Alanine, L-Valine, L-Isoleucine), Sodium Chloride, Potassium Chloride.

### SUGARS -

1. You should **AVOID** products that are comprised primarily or completely of **sucrose, glucose, dextrose, and fructose**, and use products that are comprised of complex carbohydrates only. There are several significant health reasons for that, but let's focus on the digestibility/fuel availability:

With a simple sugar fuel, the body will only permit a calorically weak 6-8% solution of it into circulating serum for fuel replacement. On the other hand, complex carbohydrate fuels are easily and more-rapidly absorbed in a 15-20% solution. This means that more calories are absorbed faster, and are available for energy production, from complex carbohydrates than simple sugar.

2. You should **AVOID** products that contain more than 10% of their total carbohydrate content as simple sugars. The higher the percentage of simple sugar in a product, generally the more trouble it will cause over a long period of time. Fueling with simple sugars also dramatically increases electrolyte and fluid demand as well as the potential for GI distress.

**INGREDIENTS - AVOID** simple sugars such as sucrose, fructose or dextrose by themselves or in combination with other carbohydrate sources.

**AVOID** any fuel that contains artificial colors (such as FD&C Red #40) or artificial sweeteners such as **Acesulfame K, sucralose**, and **aspartame**. Your body has no need for these toxins so there's no reason to put them in your body! Absolutely avoid products that rely on the use of these ingredients.

## Be Kind To Your Teeth : Drink HEED

Recently, a widely publicized report claimed that all of the major sports drinks are very corrosive for your teeth due to their sugar content. So much so that you are now advised to swish with plain water after consuming a sugary sports drink. The experts found that the sports drinks were harder on teeth than soda pop! Of course Hammer Nutrition's HEED energy drink was not included in these finding since it contains no simple refined sugars and actually may improve oral hygiene due to the the presence of xylitol, which is a naturally occurring 5-carbon sugar alcohol found in many fruits and vegetables. We're thinking the new motto could be "switch to HEED, your teeth will thank you". Here's to happy teeth!



Alternatives : Does Honey or Brown Rice Syrup Make An Effective Energy Gel?

Dr. Bill Misner

Honey is for Bees, Bears, and Sedentary Humans

If you have tried honey for your energy gel, you may already have learned that it is not the best idea. "Normal" harvested honey presents a fructose to glucose ratio of 1:20 and a small amount of organic acids, mostly citric acid. Excessive simple sugar may work for bees and bears, but in people it likely results in transient hyperglycemia to lingering hypoglycemia. In terms of optimal high-demand human endurance performance, simple sugars including honey are not the best choice.

HONEY is analyzed by an average, range, and standard deviation for its major constituents. The standard deviation is an estimation of the variable for each specific ingredient. The higher the number, the more the difference found among various kinds of honey. EXAMPLE: The standard deviations themselves show a large range from 70.9 (total protein is extremely variable) to 0.126 (fructose/glucose ratio is more consistent). Although the percentage of fructose and glucose constituents are about the same in honeys, glucose is more variable with a standard deviation of 3.04 as opposed to fructose's 1.77.

TABLE 1 shows what is natural honey and how much each ingredient varies.

Composition of Honey

Honey is composed mainly of a variety of SUGARS, traces of pollen and water. There are also enzymes present. TABLE 2, on the opposite page, shows numbers from 490 samples of largely uncrystallized honeys. Fructose is the major sugar component, which provides the extreme sweetness in honey. Fructose & glucose in honey generate simple sugars that are not absorbed rapidly in the stomach unless they are in an isotonic solution of 6% or less. The lower glycemic index of honey is however favorable for resting food sugar per se, but during exercise, honey is not gastrointestinal friendly in amounts large enough to generate caloric demands. The standard moisture content in

honey is typically around 18.6%. Not all honey is the same, and even that made in the same area, varies with each batch, bees, climate, etc. Example: Two honey products from Florida: "Florida Tupelo Honey" is well known for high fructose content and tenden-

TABLE 1

| INGREDIENT             | AVERAGE      | RANGE                  | STANDARD DEVIATION |
|------------------------|--------------|------------------------|--------------------|
| Fructose/Glucose Ratio | 1.23         | 0.76-1.86              | 0.126              |
| Fructose %             | 38.38        | 30.91-44.26            | 1.77               |
| Glucose %              | 30.31        | 22.89-40.75            | 3.04               |
| Minerals (Ash) %       | 0.169        | 0.020-1.028            | 0.15               |
| Moisture %             | 17.2         | 13.4-22.9              | 1.46               |
| Reducing Sugar %       | 76.75        | 61.39-83.72            | 2.76               |
| Sucrose %              | 1.31         | 0.25-7.57              | 0.87               |
| Total Acidity, meq/kg. | 29.12        | 8.68-59.49             | 10.33              |
| True Protein, mg/100g. | 168.6 (1.7%) | 57.7-567 (0.57%-5.67%) | 70.90              |

cy not to granulate in time forming pure "sugar." The percentage of sucrose in other forms of honey from the same state generates a larger range of table sugar than might be expected. "Florida Citrus Honey" has been rejected in some markets because of its high Sucrose (table sugar) content. High sucrose honey content sitting in a container in time turns into a granulated form of table sugar, not a good source for an energy gel in an endurance event. The point is honey products vary in their sugar and fructose contents. Whether it is fructose high or sucrose high, both can only be absorbed in a 6% solution which limits how much can be absorbed and if it can be absorbed as a simple sugar solution without causing gastrointestinal upset.

Brown Rice Syrup

Brown Rice Syrup is made from fermented or enzymatic processed brown rice. A number of Brown Rice Syrups are manufactured producing a higher percent of sugar than table sugar! Some Brown Rice Syrups are made with low dextrose equivalences like maltodextrin, while others have very high dextrose equivalences like corn

syrup solids. Brown Rice Syrup is first processed through grinding and the heated to make a thick syrup resulting in 50 PERCENT MALTOSE + 37 percent complex carbohydrates. What the remaining 37% carbohydrate mixtures are or how it is processed determines its total glycemic index.

Based on glycemic index, Brown Rice Syrup is similar to the GI-value of maltodextrin, with values slightly higher, but it too like honey can only be absorbed in a 6-8% solu-

tion, which has the potential to increase the risk of stomach upset during an endurance event. TABLE 3 shows the related data.

Glycemic Index here is set by white bread as the reference food, set to equal 100. The length of glucose chains positively influences absorption rate. If there is a large percentage short-chain sugars in the compound put into a solution, only a small portion of it [6-8%] will cross intestinal membranes, while a large portion of the calories sit, waiting for the body to draw out electrolyte and fluids in order to lower the osmolality pressure so that the simple individual sugars can cross over and be absorbed. Conversely, if there is

TABLE 3

| INGREDIENT                          | GLYCEMIC INDEX | SOLUTION % ABSORBED |
|-------------------------------------|----------------|---------------------|
| Maltose (50% Maltose in rice syrup) | 150            | 6-8%                |
| Glucose                             | 137            | 6-8%                |
| Honey                               | 83             | 6-8%                |
| Sucrose                             | 92             | 6-8%                |
| Brown Rice Pasta                    | 131            | 8-10%               |
| Maltodextrin                        | 137            | 15-18%              |

a high percentage of long-chain sugars in the compound solution, a substantially larger

portion (15-18%) of the calories will cross intestinal membranes and return to the energy cycle at the rate of 240-280 calories per hour during exercise. High Glycemic Index foods should be restricted during sedentary mealtimes, except after exercise or moderately during exercise. Avoiding the dietary-induced insulin response during sedentary states is important to health. Too much insulin from too much total high glycemic carbohydrates at one time when blood sugar demand is low due to not exercising may create an environment producing higher risk of cardiovascular disease, diabetes, and Syndrome X. If the turnover in blood sugar is high, created by muscle demand for energy during exercise, then the glycemic index rating is not the concern as how much fuel food is transmitted across gastric lining. I conclude in favor of long-chain maltodextrin products in preference over short-chain ones such as sugar-rich honey or brown rice syrup gels. The difference between absorption rate of simple sugars and complex carbohydrates is the difference between gastrointestinal stress risk and having an abundance of energy to successfully complete your endurance event of choice.

1 U. S. Dept. of Agriculture Technical bulletin 1261, "Composition of American Honeys" by J.W. White Jr., M. L. Reithof, M. H. Subers, and I. Kushnir, 1962.

**TABLE 2**

| SUBSTRATE MEASURE | PERCENT OR LEVEL |
|-------------------|------------------|
| Levulose          | 38.19 (%)        |
| Dextrose          | 31.28 (%)        |
| Sucrose           | 1.31 (%)         |
| Maltose           | 7.31 (%)         |
| Higher sugars     | 1.50 (%)         |
| Undetermined      | 3.1 (%)          |
| Moisture          | 17.2 (%)         |
| pH                | 3.91             |
| Free Acidity      | 22.03            |
| Lactone           | 7.11             |
| Total Acidity     | 29.12            |
| Lactone/Facid     | 0.335            |
| Ash               | 0.169 (%)        |
| Nitrogen          | 0.041 (%)        |
| Diastase          | 20.8             |



## Ask Dr. Bill

Bill Misner, Ph.D.

**QUESTION :** I have seen some information on Citrulline Malate that indicates they could be beneficial to athletic performance. Is Citrulline Malate the same thing that is in Anti-Fatigue Caps?

**ANSWER :** "CITRULLINE", (molecular formula  $C_6H_{13}N_3O_3$ ), is metabolized within the kidneys to form arginine, raising plasma arginine by +60%. Arginine then raises nitric oxide. Nitric oxide helps regulate blood pressure, blood flow, by causing the wall of a vessel to dilate. In addition, citrulline is converted by the small intestines from dietary glutamine or ornithine. Citrulline hastens removal of ammonia ( $NH_3$ ) excreting of urea out of the body and detoxifies alcohol (ethanol). Endurance exercise produces ammonia, the more ammonia generated the more fatigue is experienced. Citrulline potentiates detoxification relieving the immune system's burden, reduces time to fatigue, increases energy, and recovery.

### BIOCHEMISTRY OF CITRULLINE IN THE UREA CYCLE

Arginine—>Ornithine—>CITRULLINE—  
 >Aspartic Acid—>  
 —>Arginosuccinic Acid—>Arginine<—  
 >Fumaric Acid  
 ...|...|—|  
 ...|...V—V  
 ...|... $NH_3$ —>Carbamyl Phosphate  
 ...|.....|...|  
 ...V.....|...|  
 ...V.....V...V  
 ...UREA EXCRETION

Malate or malic acid is a type of alpha-hydroxy acid a primary intermediate that proceeds out from a reaction of water and fumaric acid found in the CITRIC ACID/KREBS CYCLE:

Citric Acid—>Cis Aconitate—>Isocitric Acid—>Oxalosuccinic Acid—  
 >Alpha Ketoglutarate Acid—>Succinyl Coenzyme A—>Succinic Acid—

>Fumaric Acid—>MALIC ACID—>Citric Acid.

Your body makes these kreb cycle intermediates with enzymes, amino acids, minerals, and gases reproducing energy at a remarkably high reaction-like rate, but as with high energy metabolite demand, during extreme exercise intensity or duration they may suffer depletion. Adding citrulline-malate is a rational ingredient to enhance both kreb cycle intermediate production and increasing blood flow dynamics favorably effecting pre-, during, and post- endurance exercise.

ANTI-FATIGUE CAPS is a potent krebs cycle intermediate formula made up of potassium/magnesium aspartates, citrulline, and ornithine alpha ketoglutarate. Each of these are active fatigue-reducing agents which can be taken before, during, or after prolonged endurance exercise sessions. Citrulline, Ornithine, and Aspartic Acid spare energy via detoxification of excess ammonia released from overworked muscle groups during exercise, and each (especially citrulline) acts as a precursor to malic acid reproducing other intermediates in the kreb cycle, though having a malic acid moiety adjoined to Citrulline should be a good energy-sparing ingredient.

## Calling all athletes....

Our graphic department is always looking for good photos of our athletes to use in advertisements, brochures, catalogs, and other printed materials. If you have any photos of yourself that you'd be willing to share, email them to [graphic@e-caps.com](mailto:graphic@e-caps.com) or send them snail mail to the address on the back of this newsletter (attn. graphic department). Photos will be returned. Please be sure to include your name, the name and location of where the photo was taken, and to whom photographer credit should be given. One thing we ask is that you not send in any copyrighted photos. *Thanks so much!*

## Product Spotlight : Anti-Fatigue Caps

Steve Born

Several years ago, as the desire to improve my athletic performance naturally via the use of nutritional supplements intrigued me more and more, I came upon a section in a book by Dr. Michael Colgan that discussed ammonia and its detrimental effects on performance. Colgan wrote:

A second inhibitor of exercise, happening simultaneously with the accumulation of acidity, is accumulation of ammonia. All anaerobic and endurance exercise produces oodles of the stuff. Bad news! Ammonia is toxic to all cells, reduces the formation of glycogen, and inhibits the energy cycle. It has devastating effects on brain function. We still don't know how much it contributes to fatigue, but we do know that the higher your blood ammonia, the poorer your performance. So the second thing that a successful ergogenic supplement has to do is reduce ammonia accumulation.

(Colgan, Michael. Optimum Sports Nutrition. New York: Advanced Research Press, 1993, pp. 282-3)

Well, Colgan's words were all I needed to begin the investigation to determine which nutrients could aid in the removal of performance-robbing ammonia. I only had to read a bit further to get some answers. Later in his book, Colgan discussed the tremendous losses of glutamine during exercise and why it wasn't the best idea to replenish these losses with supplemental glutamine. Instead, he suggested a nutrient called OKG (ornithine alpha-ketoglutarate):

... glutamine is not used with catabolic patients because it adds to the ammonia burden. To overcome this problem researchers in France developed alpha-ketoglutarate,

which has the same carbon skeleton as glutamine, that is, provides a substrate for glutamine, but contains virtually no ammonia. Far from adding to the ammonia burden, alpha-ketoglutarate acts in the body as an ammonia scavenger. Ornithine also acts as an ammonia scavenger. The combination of the two is a potent way to reduce your ammonia burden." pp. 377-78 (note: bold mine).

I immediately began taking OKG supplements in my longer workouts and races. Still, I wondered if there were other ammonia-scavenging nutrients I could consider. After quite a bit of investigation, I located two more likely substances, the amino acids aspartic acid and citrulline, in a book by James Balch, M.D. Balch had this to say about these two amino acids:

Because aspartic acid increases stamina, it is good for fatigue and plays a vital role in metabolism. Chronic fatigue may result from low levels of aspartic acid, because this leads to lower cellular energy. It is good for athletes, and helps to protect the liver by aiding in the removal of excess ammonia. ... Citrulline promotes energy, stimulates the immune system ... and detoxifies ammonia ...

(Balch, James F. Prescription for Nutritional Healing. Garden City Park, NY: Avery Publishing Group, 1997, pp. 36-37)

Bingo! Ammonia scavenging nutrients #2 and #3 discovered! Now all I had to do was find a source to buy them (which I eventually did) and assemble, in my own kitchen,

ammonia-fighting packets to take during my events. And that's just what I did for many years in my ultra cycling career.

A few years ago we combined all three of these substances into one capsule and gave it the appropriate name Anti-Fatigue Caps, because it delays or even prevents ammonia build-up, a major contributor to muscle fatigue. It really is an amazing product (and I'm VERY thankful that it's an all-in-one formula... that makes things a lot easier). Anyway, while it's a product that you need not take daily, it is a product that can be of significant aid for the following applications:



- 1.) As a pre-workout supplement during shorter workouts when you're increasing your training volume
- 2.) Every hour during workouts longer than 2-3 hours in length
- 3.) When you're making a jump in the length of race you're doing such as going from a century to a double century on your bike, or going from doing sprint or Olympic distance triathlons to half or full iron distance triathlons
- 4.) As a non-stimulating energy booster any time during the day

Anti-Fatigue Caps may not be the premier supplement in the E-CAPS line (I'd give the nod to Premium Insurance Caps, Race Caps Supreme, and Mito-R Caps there) but oh, does it ever work well under specific conditions and for certain applications. It's been a long-time "secret weapon" of mine and it's definitely a product you should consider, too.

## What are you doing August 4th-8th? Come hammer with us!



The 4th Annual Highline Hammer is rapidly approaching. Reserve your spot now for this epic weekend of food, fun, fellowship, and cycling through the Rockies.

Read the article on page 2 or visit [www.e-caps.com/highline](http://www.e-caps.com/highline) for more details.

## Fueling : High Intake Fueling Strategies DON'T WORK

As I mention in my "From the Saddle" column, endurance athletes are being bombarded with fueling suggestions from a variety of "expert" sources that seem to emphasize that you need to replenish what you lose (fluids, calories, and electrolytes) in large amounts, sometimes nearly equal to depletion rates.

Unfortunately, this "high volume replacement" type of fueling program works against normal body mechanisms and usually yields nothing more than a poorer-than-desired performance, if not an outright DNF. We've heard from so many frustrated athletes who have tried to follow a high calorie/fluid/salt regimen (with only dismal results to report) that it simply cannot be coincidental.

Fluids, calories, and electrolytes need to be replenished in amounts that cooperate with your body, not in amounts that overwhelm it. If you'll re-supply your body in smaller volumes of fluids, calories, and electrolytes you'll not only greatly reduce the opportunity of any number of undesired maladies from occurring, you'll enjoy enhanced performance.

Here are our general recommendations - and remember, you need to test everything in your training, tailoring these suggestions to fit your specific needs - for fluids, calories, and electrolytes. Use this as your gauge and see if you don't experience better results in your training and racing.

**FLUIDS** - We find that most athletes do very well, under most conditions with a fluid intake

of 20-26 ounces per hour (roughly the equivalent of a small to large water bottle).

**CALORIES** - Our common recommendation is approximately 60-70 grams of carbohydrates (240-280 calories) hourly. That will, in most situations, and for most athletes, provide enough carbohydrates for energy production (the limit of what the body can metabolize) while taking into account a percentage of those calories being lost/burned during the digestive/metabolic processes. Larger athletes may need slightly more, lighter weight athletes less.

**ELECTROLYTES** - Don't oversupply the salt. Most athletes in most conditions do not need more than 200-400 mg of sodium per hour. The key for electrolyte replenishment, as it is with calories and fluids, is to provide an adequate dose to support bodily functions without overwhelming the body with too much. We suggest consistent/hourly replenishment from Endurolytes, which provides all the required electrolytic minerals (not just sodium chloride) and in amounts that allow for flexible and precise dosing.

Electrolyte expenditure (and thus replenishment) varies tremendously from athlete to athlete. Body weight, level of fitness, weather conditions, acclimatization level, and biological predisposition all greatly affect electrolyte depletion and hence, the need for replenishment.

Try following a "moderate" fluid, calorie and electrolyte fueling protocol and see how much better it works!

## Culinary Corner

Sponsored athlete Nancy Lux recently sent us this recipe for these easy-to-make, No-Bake Flax Snacks. They are an excellent source of omega-3 and 6 fatty acids and fiber and use Hammer Gel in place of high glycemic index syrups. Enjoy!

### No-Bake Flax Snacks

3/4 cup ground flaxseed  
3 tbsp oat flour  
1 1/2 tsp ground cinnamon  
1 1/2 tsp ground cloves  
2 tbsp peanut butter  
1/2 cup orange flavor hammer gel  
Approx. 1/2 cup ground flaxseed for dusting

1. Combine the first four ingredients in small mixing bowl.
2. Add peanut butter & hammer gel & knead mixture thoroughly (by hand if necessary).
3. By the teaspoonful, scoop out the mixture and roll into 3/4 to 1 inch balls.
4. Put balls in bowl with extra flaxseed, roll around until coated, & then place on waxed paper.
5. Serve immediately or chill in airtight container for future use.

Makes about 24 balls

## Endurance News Goes Electronic : Inbox Or Mailbox, It's Your Choice

*Brian Frank*

It only took us 12 years, but I am pleased to announce that we are now offering Endurance News as an HTML e-mail newsletter. Co-produced by our talented graphic artist Angela Nock and web wizard Mandy Hallos, you can be sure that your electronic version will be just as readable as our printed version.

If you are wondering why you should sign up to receive Endurance News electronically, let me give you a couple of compelling reasons. The first is consistency. You may have noticed that even though we publish quarterly, sometimes you get one and sometimes you don't. This is because the size of our client base has become so large that we can only mail to those of you who have ordered within the past four months. We used to go back an entire year, but due to ever escalating printing and postage costs and the aforementioned size of our mailing list, we've had to cut back.

Of course we wouldn't mind if you made a point of ordering every 120 days or so, but we don't expect you to just so you can receive every issue of Endurance News, especially with an increasing number of you buying our Hammer products from your local retailer. So, you can be sure to get all the news in every issue by subscribing to the e-version. If you prefer to read on paper instead of the computer screen, each issue will have a "printer friendly" button that will allow you to print out your copy to read and pass along to friends.

The second reason is our desire to conserve natural resources in all that we do. 15,000 issues at 12 to 16 pages each means a lot of paper, and that means a lot of trees. If even 50% of you sign up to receive EN electronically, we'll be able to save a lot of trees.

Of course, we save money when we send an issue electronically instead of mailing a

paper copy to you, but really, this is not our primary motivation. All savings will go right back into improving the publication and circulation. We can reach clients who are more than four months out from their last order, increase the content of each issue, and possibly increase from four to six issues per year.

Lastly, let me assure you that by subscribing to Endurance News in HTML e-mail form, you are not agreeing to let us spam you daily with junk mail or sell your address to a third party. We take your in-box very seriously and we'll put Endurance News in it only if you subscribe. Go to [www.e-caps.com](http://www.e-caps.com) today and enter your email address into the field on the left. You'll be signed up for Endurance News online.

As you can see, there are several good reasons to subscribe, and I can't think of any not to. Do it today; you'll be glad you did.

## COMPEX : Compex Users Weigh In On This Revolutionary Product

As part of our post-sales follow up, and in an effort to better serve you, we asked those clients who had already purchased a Compex EMS unit to give us some feedback about how they've used the unit, what gains they've noticed, and whether or not they would recommend the purchase of a Compex.

Here are the questions we asked and just some of the responses...

### How many days/times per week do you use the Compex?

|                |      |
|----------------|------|
| Paul Romero    | 6-10 |
| Joe Gatti      | 5-6  |
| Steve Teal     | 5    |
| Thomas Stroup  | 4    |
| Robert Veroba  | 3    |
| Eddy Hilger    | 3-4  |
| John McClellan | 3-4  |
| Bill Nicolai   | 6    |
| Andy Kilhoffer | 3-5  |
| Michael Rickey | 2-3  |

### What is your favorite program(s) to use and when?

Endurance, and Active Recovery  
*Paul Romero*

The Recovery program after my long runs, and the endurance program after my gym days. I don't like to run on those days, they seem to be when I am most prone to injury.  
*Steve Teal*

Strength. Recovery after hard rides or intensity workouts.  
*Robert Veroba*

I just got the Compex a few weeks ago, so I'm a novice user. So far I've focused on the Active Recovery program, especially in the evenings after hard workouts / races. I used the Resistance program once, and plan to start a strength oriented program in the next few weeks after I've completed my racing season.  
*John McClellan*

### How have you incorporated Compex routines into your normal schedule, please give examples?

I use it after long weekends of training. For example I use it Saturday nights after a long brisk workout. Sundays, after a long run day.

This allows me to recover well enough to ride in group rides on Monday - Tuesday. I also use on Monday and Tuesday nights.

*John Schlagenhauf*

I use Compex as a supplement to my "leg" workouts, primarily as a way to build additional muscle without the wear and tear on my knees of running or cycling. I'm 50, so building and maintaining without stressing my knees is increasingly important.

*Thomas Stroup*

Strength program to supplement weight training. Recovery program after hard training.

*Robert Veroba*

### Have you used it to correct muscle strength imbalances? If so, give examples.

When I first started using the COMPEX I noticed my left quads shaking more than my right quads. I read and re-read the instructions you provided on helping correct muscle imbalances. In a nutshell, I crank up the sessions and watch my muscles. If I notice that my right leg isn't twitching as much as my left and that it doesn't feel as intense I simply increase the levels until I see an equal degree of muscle twitch (and it usually feels the same). Sometimes I won't even bother looking at the muscle twitch. Rather, I can feel the difference and will increase the intensity on the weaker muscle group until it feels equal to the other, stronger, group.

*Steve Zenone*

Yes, my entire left leg was weaker than my right leg - calf, quad, hamstring and buttock. After a few sessions, I noticed the improvement in the muscles of the left leg, both during the Compex session and, more importantly, on the bike rides.

*Andy Kilhoffer*

### What has surprised you was an unexpected benefit of using the Compex Sport?

The intensity of muscle contraction is more than I could ever achieve with weights. This should really improve strength on the bike.

*Robert Veroba*

How relaxing the Active Recovery program is. I fall asleep every time and the beeping at the end wakes me up.

*John Schlagenhauf*

My legs feel "there". What I mean by that is that I feel that when I run or bike that my legs are totally in the zone and are able to crank out the power as needed without delay. The Active Recovery program, I believe, has helped reduce/eliminate post workout/training/race soreness.

*Steve Zenone*

The elimination or significant reduction of quad soreness the next day after intense workouts or races.

*Joe Gatti*

I have been impressed with immediate results achieved. For the amount of time the payoff is great.

*Robert Dacus*

### What would you say to an athlete who was considering buying one?

Based on personal use and the essays provided on the E-CAPS website, I believe the Active Recovery program provides a significant advantage to someone who is taking training seriously enough to approach an over-training threshold or who is having their training performance negatively impacted due to high training volume. My experience has been that the Strength and Endurance programs do improve muscle tone and definition. I believe that the Compex is a valid investment for a serious endurance athlete.

*Richard Simmons*

This is an awesome investment. Your body is totally worth it. As with any training, you'll need to be consistent with your use of the Compex to notice the gains/improvements you've heard about. In addition, periodize your workouts and take plenty of time to rest and recover...since this is where you really make your improvements (i.e., over-compensation occurs during this time).

*Steve Zenone*

Buy it now. The Compex will allow you to achieve higher levels of performance with less effort and less impact than traditional methods.

*Lynn Nicholson*

So there you go, feedback from athletes who have purchased and used the Compex EMS. If you'd like more information about the Compex log on to [www.e-caps.com/compex](http://www.e-caps.com/compex) or call 1.800.336.1977.

## Nate's Corner : Changing of Focus

Nate Llerandi

Now that the racing season is upon us, the focus on your training should be shifting. You either have peaked in your weekly hours or will do so soon, depending on when your key races are.

Also, you will be shifting to more anaerobic work and less aerobic. The majority of your training is still aerobic - 80% or more - but this should be considerably less than during the winter, when maybe 95% was aerobic. With the increase in intensity, there should be a leveling off or decrease in weekly training hours (up to 20%). This decrease in hours compensates for the increase in intensity. If you schedule deliberate recovery weeks every 4th or 5th week, you can get by with more hours and more hard training. If you still don't include rest weeks of reduced hours (around 50-60% of normal weeks) and reduced workloads (90-100% aerobic - below 75%), then you should think about it. Nothing derails great fitness like overtraining.

Finally, it's time to start cutting back on

weights. If you've been lifting 3 days a week (hopefully not more than that), then it's time for 2 days. The fall and winter was the time to make gains in your strength. With 2 sessions a week, you should still make some gains. But you need to reduce the amount of weight work you're doing now that you're increasing your intensity in your primary sport(s). Soon, it will be time to reduce your weight routine to once per week, probably in another 4-6 weeks. At that point, the goal is simply to maintain the strength gains you've made, not to build on them. Too much weight work will break you down and keep the muscles from recovering properly as the rigors of the racing season pile up.

Happy Training,  
Nate Llerandi

*Nate Llerandi is a former national champion class swimmer/world class triathlete. He has been coaching since 1990 and creates programs for athletes of all sports and ability levels. You can contact him at [natellerandi@yahoo.com](mailto:natellerandi@yahoo.com)*

## Product Usage Manuals : A Handy Reference Tool

With each order that you receive you've no doubt received a number of what we like to call 'inserts', product fact sheets that contain usage instructions and specific notes for that product. You've also probably wondered what to do with them after you've read them.

In an attempt to simplify things for our shipping crew and to improve upon the information that we send to athletes, we've redesigned all the inserts and made a Product Usage Manual for both the E-CAPS and Hammer Nutrition line of products. These small (4.25 x 5.5) booklets contain the proper application, usage/mixing instructions, notes, and dosage charts (where applicable) for each product in that line. A marked improvement on past inserts, these handy little guidebooks are a wonderful reference tool that we're sure you'll want to hold on to.

## Online Forum : Endurance Discussion Group

One of the many knowledge-based offerings that we provide for our clients is the "Endurance List". The "Endurance List" is a private email discussion group/forum that provides a place for clients of E-CAPS and Hammer Nutrition endurance athletes to discuss all facets of training, diet, nutritional supplements and fuel sources. Endurance athletes such as roadies, ultra cyclists, ultra runners, marathon runners, triathletes from sprint to double iron distance, nordic skiers, mountain bikers and adventure racers will find our discussion interesting and useful.

It's super easy to join!

- 1.) Go to [groups.yahoo.com/group/endurancelist/](http://groups.yahoo.com/group/endurancelist/) and click the button titled "Join This Group".
- 2.) You will need to have a Yahoo ID. If you do not have one, you can sign up with Yahoo.
- 3.) We will receive your request to join the discussion list and review your membership within one or two business days.
- 4.) Once your membership is approved, you can expect a welcome letter that will give you detailed instructions on how to access the discussion list, post messages, change e-mail preferences and other features.

## Join the J.O.E. : Journal of Endurance

The Journal of Endurance (J.O.E.) is written by Bill Misner, Ph.D. and contains synopses of peer-reviewed, published research and articles of interest concerning endurance performance and health outcome. If you're serious about your health and performance, and want to know the latest findings in the world of science regarding them, you need to subscribe to the Journal of Endurance! The J.O.E. is distributed monthly via e-mail and also appears on the E-CAPS web site under the knowledge link. Subscribe today! Simply send a BLANK email to: [join-joe@joe.e-caps.com](mailto:join-joe@joe.e-caps.com).

Also, don't forget that the first 100 issues of the J.O.E. are available on CD for \$49.95 (a steal!) in the bookstore section of the E-CAPS website. The J.O.E. 100 CD is a compilation of the first 100 issues of the Journal of Endurance and contains 753 pages of relevant articles and studies with timeless advice for athletes in all disciplines at any level. The indexed, PDF format provides an easy way to search for topics of interest and a "comments" column is included in each article to explain the scientific data in laymen's terms. Dr. Bill Misner says, "The information is quite compact and extensive. So many wonderful scientists submitted excellent in-depth information, work which no doubt could be called 'hallmark' in light of what enhances both health and endurance exercise results."

## Complex Owners Lounge : The Complex Yahoo Group

We would like to offer you the opportunity to join a private list for owners of Complex muscle stimulators who are primarily endurance athletes. The purpose of this list is to gain and share knowledge concerning the best applications and usage of the Complex devices. This list is owned and maintained by Brian Frank, the owner of Endurance Marketing Group, Inc. which does business as E-CAPS and Hammer Nutrition.

To join the Yahoo Complex Endurance discussion group...

- 1.) Go to: [groups.yahoo.com/group/complex\\_endurance/](http://groups.yahoo.com/group/complex_endurance/) and click the button titled "Join This Group".
- 2.) You will need to have a Yahoo ID. If you do not have one, you can sign up with Yahoo.
- 3.) We will receive your request to join the discussion list and review your membership within one or two business days.
- 4.) Once your membership is approved, you can expect a welcome letter that will give you detailed instructions on how to access the discussion list, post messages, change e-mail preferences and other features.

(from MICRONUTRIENTS on page 1)

### RESULTS: (Continued)

Of the 20 diets analyzed, 50% were calorie-sufficient and 50% calorie-deficient resulting in an overall -7.4% deficiency for men and a -2.7% deficiency in women. Calorie-deficient menus tended to record a greater number of micronutrient deficiencies as compared to the calorie-sufficient. Of the 340 micronutrient entries generated from 17 micronutrients analyzed, all subjects presented a deficiency of between 3 and 15 deficiencies based on Reference Daily Intake (RDI) values taken from their food intake alone. Males averaged deficiencies in 40% of the vitamins and 54.2% of the minerals Reference Daily Intake (RDI) required. Females recorded deficiencies in 29% of the vitamins and 44.2% of the minerals Reference Daily Intake (RDI) required. The male food intake was RDI-deficient in 78 out of 170 micronutrient entries, or 45.8% of the 10 vitamins and 7 minerals analyzed. The female dietary intake was RDI-deficient in

60 out of 170 micronutrients or 35.2% of the 10 vitamins and 7 minerals analyzed. Both male and females as a single entity recorded 138 micronutrient deficiencies out of the possible 340 micronutrients analyzed, or 40.5% micronutrient RDI-deficiency from food intake alone.

**CONCLUSION:** This twenty-subject food analysis is not representative of the entire population, but these results imply that micronutrient deficiencies do exist to some degree in spite of calorie adequacy, inadequacy, activity, or inactivity. Activity's effect on caloric deficiency, further imposes micronutrient deficiency and predictably increases the risk of deficiency disease. In highly active persons, micronutrient deficiencies occur at the highest rate when micronutrient-rich foods are not consumed to replace the calories spent. Food alone in these 20 subjects did not meet the minimal Reference Daily Intake (RDI) micronutrient requirements for preventing micronutrient-deficiency related disease-like disorders. The more active the person, the greater the need

to employ balanced diet of micronutrient-rich foods; otherwise, micronutrient supplementation is a preventative protocol for preventing deficiencies.

Competing Interests: Bill Misner Ph.D. is the director of Research & Product Development for an endurance athletes' supplement company, E-CAPS INC. & HAMMER NUTRITION LTD @ www.e-caps.com

By permission, courtesy of Dr. Bill Misner, Ph.D. in the Townsend Letter for Doctors and Patients (c)April 2005 #261; pages 49-52.  
www.tldp.com / info@townsendletter.com

1 Bill Misner Ph.D. is the director of Research & Product Development for an endurance athletes' supplement company, E-CAPS INC. & HAMMER NUTRITION LTD @ http://www.e-caps.com

2 Colgan M. Your Personal Vitamin Profile. New York: Morrow, 1982.

3 Colgan M. Optimum Sports Nutrition. New York: Advanced Research Press. 1993.

4 Iodine is present in sea vegetation, but not in most foods unless iodized salt is added. An iodine intake of less than 20 micrograms (ug) per day is considered severe deficiency; 20-50 micrograms (ug) per day is considered moderate deficiency and 50-100 micrograms (ug) per day are considered mild deficiency. Iodized salt is widely used and some other foods are fortified with iodine. Two grams of iodized salt supplies 150 micrograms (0.15 mg). None of the dietary analysis included salt added by the consumer to their foods. This may an inaccurate estimate of the iodine deficiency rate.

TABLE II. GROUP I & GROUP II DIETARY ANALYSIS RESULTS

| GROUP I (5 MEN, 5 WOMEN)                             |                              |           |           |           |           |                              |           |           |           |           |
|------------------------------------------------------|------------------------------|-----------|-----------|-----------|-----------|------------------------------|-----------|-----------|-----------|-----------|
| MICRONUTRIENT                                        | MEN %                        |           |           |           |           | WOMEN %                      |           |           |           |           |
|                                                      | Reference Daily Intake (RDI) |           |           |           |           | Reference Daily Intake (RDI) |           |           |           |           |
| MALE (M)<br>WOMEN (W)<br>ACTIVE (A)<br>SEDENTARY (S) | M1<br>(A)                    | M2<br>(A) | M3<br>(S) | M4<br>(A) | M5<br>(A) | W1<br>(A)                    | W2<br>(A) | W3<br>(A) | W4<br>(A) | W5<br>(A) |
| TOTAL CALORIES<br>INTAKE REPORTED                    | 55%                          | 59%       | 53%       | 161%      | 112%      | 64%                          | 77%       | 138%      | 104%      | 103%      |
| VITAMIN A                                            | 71%                          | 116%      | 69%       | 445%      | 49%       | 241%                         | 1617%     | 203%      | 95%       | 807%      |
| VITAMIN D                                            | 19%                          | 59%       | 63%       | 30%       | 32%       | 10%                          | 38%       | 1%        | 70%       | 8%        |
| VITAMIN E                                            | 43%                          | 135%      | 18%       | 76%       | 66%       | 146%                         | 95%       | 154%      | 64%       | 206%      |
| VITAMIN K                                            | 19%                          | 311%      | 11%       | 122%      | 61%       | 18%                          | 511%      | 44%       | 78%       | 155%      |
| VITAMIN B-1                                          | 71%                          | 103%      | 140%      | 290%      | 183%      | 64%                          | 168%      | 334%      | 389%      | 264%      |
| VITAMIN B-2                                          | 69%                          | 95%       | 67%       | 209%      | 342%      | 77%                          | 146%      | 183%      | 382%      | 183%      |
| VITAMIN B-3                                          | 155%                         | 87%       | 64%       | 294%      | 123%      | 117%                         | 267%      | 256%      | 270%      | 214%      |
| VITAMIN B-6                                          | 90%                          | 144%      | 55%       | 137%      | 77%       | 81%                          | 231%      | 143%      | 180%      | 213%      |
| VITAMIN B-12                                         | 99%                          | 156%      | 123%      | 193%      | 357%      | 119%                         | 140%      | 78%       | 99%       | 328%      |
| FOLATE                                               | 55%                          | 235%      | 76%       | 255%      | 233%      | 73%                          | 130%      | 249%      | 174%      | 311%      |
| IODINE                                               | 0%                           | 58%       | 0%        | 0%        | 36%       | 0%                           | 25%       | 31%       | 0%        | 58%       |
| POTASSIUM                                            | 124%                         | 212%      | 67%       | 253%      | 144%      | 94%                          | 206%      | 217%      | 201%      | 238%      |
| CALCIUM                                              | 53%                          | 90%       | 77%       | 179%      | 111%      | 65%                          | 84%       | 118%      | 182%      | 99%       |
| MAGNESIUM                                            | 51%                          | 124%      | 44%       | 175%      | 73%       | 82%                          | 140%      | 207%      | 119%      | 156%      |
| PHOSPHORUS                                           | 105%                         | 169%      | 138%      | 175%      | 248%      | 89%                          | 113%      | 411%      | 218%      | 249%      |
| ZINC                                                 | 35%                          | 55%       | 48%       | 124%      | 97%       | 35%                          | 78%       | 144%      | 67%       | 164%      |
| SELENIUM                                             | 30%                          | 44%       | 24%       | 159%      | 97%       | 3%                           | 120%      | 256%      | 117%      | 174%      |
| INDIVIDUAL<br>MICRONUTRIENT<br>DEFICIENCIES          | 14                           | 7         | 15        | 3         | 9         | 13                           | 5         | 4         | 7         | 3         |

BLACK = SUFFICIENCY  
GREY = DEFICIENCY

**TABLE II. GROUP I & GROUP II DIETARY ANALYSIS RESULTS**

| <b>GROUP II (5 MEN, 5 WOMEN)</b>            |                                                     |                  |                  |                  |                   |                                                       |                  |                  |                  |                   |
|---------------------------------------------|-----------------------------------------------------|------------------|------------------|------------------|-------------------|-------------------------------------------------------|------------------|------------------|------------------|-------------------|
| <b>MICRONUTRIENT</b>                        | <b>MEN %</b><br><i>Reference Daily Intake (RDI)</i> |                  |                  |                  |                   | <b>WOMEN %</b><br><i>Reference Daily Intake (RDI)</i> |                  |                  |                  |                   |
| <b>MALE (M)</b><br><b>WOMEN (W)</b>         | <b>M6</b><br>(S)                                    | <b>M7</b><br>(A) | <b>M8</b><br>(A) | <b>M9</b><br>(A) | <b>M10</b><br>(A) | <b>W6</b><br>(A)                                      | <b>W7</b><br>(S) | <b>W8</b><br>(S) | <b>W9</b><br>(S) | <b>W10</b><br>(S) |
| TOTAL CALORIES<br>INTAKE REPORTED           | 42%                                                 | 161%             | 56%              | 93%              | 134%              | 125%                                                  | 118%             | 76%              | 104%             | 64%               |
| VITAMIN A                                   | 248%                                                | 445%             | 105%             | 129%             | 117%              | 533%                                                  | 318%             | 326%             | 216%             | 130%              |
| VITAMIN D                                   | 75%                                                 | 30%              | 66%              | 13%              | 125%              | 86%                                                   | 43%              | 60%              | 6%               | 16%               |
| VITAMIN E                                   | 1%                                                  | 76%              | 0.2%             | 123%             | 93%               | 19%                                                   | 195%             | 9%               | 173%             | 39%               |
| VITAMIN K                                   | 205%                                                | 122%             | 104%             | 95%              | 73%               | 341%                                                  | 110%             | 197%             | 189%             | 28%               |
| VITAMIN B-1                                 | 101%                                                | 290%             | 95%              | 137%             | 187%              | 255%                                                  | 206%             | 98%              | 176%             | 155%              |
| VITAMIN B-2                                 | 100%                                                | 209%             | 106%             | 167%             | 189%              | 219%                                                  | 191%             | 113%             | 143%             | 84%               |
| VITAMIN B-3                                 | 119%                                                | 294%             | 126%             | 130%             | 198%              | 204%                                                  | 207%             | 163%             | 186%             | 167%              |
| VITAMIN B-6                                 | 97%                                                 | 137%             | 73%              | 117%             | 167%              | 168%                                                  | 141%             | 125%             | 133%             | 128%              |
| VITAMIN B-12                                | 146%                                                | 193%             | 179%             | 216%             | 224%              | 111%                                                  | 191%             | 182%             | 161%             | 98%               |
| FOLATE                                      | 151%                                                | 255%             | 137%             | 190%             | 260%              | 327%                                                  | 156%             | 131%             | 209%             | 171%              |
| IODINE                                      | 0%                                                  | 0%               | 18%              | 0%               | 0%                | 0%                                                    | 0%               | 0%               | 0%               | 0%                |
| POTASSIUM                                   | 136%                                                | 253%             | 99%              | 137%             | 260%              | 206%                                                  | 135%             | 171%             | 122%             | 73%               |
| CALCIUM                                     | 59%                                                 | 179%             | 77%              | 127%             | 193%              | 178%                                                  | 95%              | 103%             | 114%             | 69%               |
| MAGNESIUM                                   | 75%                                                 | 175%             | 72%              | 92%              | 146%              | 167%                                                  | 125%             | 110%             | 130%             | 77%               |
| PHOSPHORUS                                  | 119%                                                | 321%             | 135%             | 193%             | 254%              | 213%                                                  | 148%             | 149%             | 144%             | 65%               |
| ZINC                                        | 41%                                                 | 124%             | 71%              | 68%              | 96%               | 98%                                                   | 98%              | 67%              | 63%              | 56%               |
| SELENIUM                                    | 55%                                                 | 159%             | 47%              | 74%              | 122%              | 125%                                                  | 85%              | 173%             | 146%             | 115%              |
| INDIVIDUAL<br>MICRONUTRIENT<br>DEFICIENCIES | 8                                                   | 3                | 10               | 6                | 4                 | 4                                                     | 5                | 5                | 3                | 11                |

BLACK = SUFFICIENCY  
GREY = DEFICIENCY

**TABLE III. GROUP I & II SUMMARY TOTALS**

| <b>TOTALS</b>                                                | <b>MEN</b>                                   | <b>WOMEN</b>                                 |
|--------------------------------------------------------------|----------------------------------------------|----------------------------------------------|
| TOTAL<br>MICRONUTRIENT<br>ENTRIES                            | 170<br>(100 VITAMIN &<br>70 MINERAL ENTRIES) | 170<br>(100 VITAMIN &<br>70 MINERAL ENTRIES) |
| TOTAL GROUP<br>INDIVIDUAL<br>MICRONUTRIENT<br>DEFICIENCIES   | 78                                           | 60                                           |
| TOTAL<br>CALORIC AVERAGE<br>DEFICIENCY                       | 92.6%<br>-7.4%<br>DEFICIENCY                 | 97.3%<br>-2.7%<br>DEFICIENCY                 |
| TOTAL VITAMIN<br>DEFICIENCIES                                | 40<br>40%<br>DEFICIENCY                      | 29<br>29%<br>DEFICIENCY                      |
| TOTAL MINERAL<br>DEFICIENCIES                                | 38<br>54.2%<br>DEFICIENCY                    | 31<br>44.2%<br>DEFICIENCY                    |
| TOTAL<br>MICRONUTRIENT<br>DEFICIENCY                         | 78<br>45.8%<br>DEFICIENCY                    | 60<br>35.2%<br>DEFICIENCY                    |
| GROUP I & II<br>MALE & FEMALE<br>MICRONUTRIENT<br>DEFICIENCY | <b>40.5% DEFICIENCY</b>                      |                                              |

**TABLE IV**

DEFICIENCY BY INDIVIDUAL MACRO- &amp; MICRONUTRIENTS

| <b>MACRO-<br/>MICRONUTRIENT</b> | <b>PERCENT OF<br/>SUBJECTS WITH<br/>DEFICIENCY</b> | <b>MEN WITH<br/>DEFICIENCY</b> | <b>WOMEN<br/>WITH<br/>DEFICIENCY</b> |
|---------------------------------|----------------------------------------------------|--------------------------------|--------------------------------------|
| IODINE <sup>4</sup>             | 100%                                               | 10                             | 10                                   |
| VITAMIN D                       | 95%                                                | 9                              | 10                                   |
| ZINC                            | 80%                                                | 8                              | 8                                    |
| VITAMIN E                       | 65%                                                | 8                              | 5                                    |
| CALORIES                        | 50%                                                | 6                              | 4                                    |
| CALCIUM                         | 50%                                                | 5                              | 5                                    |
| SELENIUM                        | 45%                                                | 7                              | 2                                    |
| VITAMIN K                       | 45%                                                | 5                              | 4                                    |
| MAGNESIUM                       | 40%                                                | 6                              | 2                                    |
| VITAMIN B-6                     | 30%                                                | 5                              | 1                                    |
| VITAMIN B-2                     | 25%                                                | 3                              | 2                                    |
| VITAMIN A                       | 25%                                                | 3                              | 2                                    |
| VITAMIN B-1                     | 20%                                                | 2                              | 2                                    |
| VITAMIN B-12                    | 20%                                                | 1                              | 3                                    |
| POTASSIUM                       | 20%                                                | 2                              | 2                                    |
| FOLATE                          | 15%                                                | 2                              | 1                                    |
| VITAMIN B-3                     | 10%                                                | 2                              | 0                                    |
| PHOSPHORUS                      | 10%                                                | 0                              | 2                                    |



## George Brunstad

### Swimming Sensation

*Our Athlete Spotlight this issue is on George Brunstad of Ridgefield, CT. George is a National and World Masters Swimming Champion and on August 28-29, 2004, at the age of 70, he became the oldest person to swim the English Channel - 32 miles in 15 hours, 59 minutes. The previous age record was 67, set by Australian Clifford Bates in 1987 and the American record was 65 by Ashley Harper. There have been only five men over the age of 60 who have swum the Channel.*

*George used his record-breaking swim to help raise funds to help build a medical center, school, and orphanage in Haiti, a project named the Center of Hope ([www.channelhopeforhaiti.org](http://www.channelhopeforhaiti.org))*

**Steve:** George, congratulations on a superb effort. That's quite an accomplishment. Can you give us a little background about yourself?

**George:** Thank you. I was born and raised in Washington State of Norwegian parents and graduated from Washington State University - BS 1956, MS 1957 - and was a member of the varsity swim team there. I was in the US Air Force for 7 years and flew for American Airlines for 30 years. I also flew for the Air National Guard for 3 years flying refueling tankers. After mandatory airline retirement at age 60, I owned and operated a MiG-17 jet fighter for 5 years and flew it in air shows until age 66. I am married to Judy and we have five grown children (37-43) and ten grandchildren (3-13).

**S:** Can you tell us a little bit about your masters swimming? What other sports are you involved in?

**G:** I resumed competitive swimming when the United States Masters Swimming (USMS) program began in 1972. I have trained continuously since that time. I also include work in the fitness room with about 20 different machines and weights along

with the ski-cross trainer, all for balanced muscle support. I enjoy my mountain bike and cross-country skiing, but I am not consistent year-around with these and am not competitive in these two disciplines.

**S:** Well, you certainly sound healthy to me!

**G:** With all my consistent year around training over the last 32 years, my resting pulse is 38 and I can run it up to 180-190 at age 70 if needed. My blood pressure is 110/70 at 38 beats per minute. I have never smoked or taken any drugs or stimulants, including caf-



George Brunstad : Photo by Bryan Haeffle

feine, nicotine or alcohol. My wife Judy is a nutritionist and has seen to it that I eat a healthy diet including as much raw food as possible including fruits, vegetables, salads, nuts, whole grains and protein sources that have little fat.

**S:** Can you share some of your accomplishments with us?

**G:** I have won over 100 National Masters Swimming Championships, in the pool and in open water competitions. I have won National championships in butterfly and IM (Individual Medley: the combination race which includes butterfly, backstroke, breaststroke and Freestyle) as well as freestyle but have concentrated on freestyle and open water swims since 1992. I have won multiple

Masters World Open Water Championships and am current repeat World Champion. I was the only American male to win an age division at the Masters World Open Water Championships in Riccione, Italy in 2004. The previous one was in Christchurch, New Zealand in 2002 (only one event held every other year). But these races are only either 3k or 5k and are not in the same class as an English Channel swim. I have a strong and healthy constitution but do not consider myself as a gifted natural swimmer or athlete. I am an ordinary man that has accomplished an extraordinary feat with discipline and consistent hard work.

**S:** What got the idea of doing the English Channel in your mind?

**G:** I became acquainted with a number of Channel swimmers over the years, chatting with them during the course of swim competitions. During 2002-2003 I watched a 50-year old man named Jim Bayles preparing for the Channel and became familiar with his training program, chatting often with him about all that was required. Jim had a successful Channel swim the summer of 2003.

Another good friend was Marcia Cleveland, Vice-chair of the USMS Long Distance committee, successful English Channel swimmer and author of the authoritative book *Dover Solo*. I also chatted with other Channel swimmers during the course of the 2003 competitive season. I was aware that the age record was by a 67 year-old Australian set in 1987, Bertram Clifford Batts (now deceased), that the American record was 65 by Ashley Harper, and the record for a woman was 57 by American Carol Sing set in 1999.

**S:** And when did you decide to go for it?

**G:** I had a vision one night in the twilight of my sleep and I saw myself as an old man regretting having passed on the opportunity to become the oldest person in the world to swim the English Channel. This bothered me. I thought the age 70 mark was a significant barrier to cross. Taking machines or human performance beyond what anyone had done before or going places no one had been before have always been of intense interest.

On my 69th birthday, with my family around me, I was asked what I would like to do on my landmark 70th birthday. I blurted out,

"Swim the English Channel!" All were in accord, "Yes! Do it!" All except my wife, Judy, that is. "For whose glory would this be for?" she asked. When I pointed out that two swimmers, Jim Bayles and Dave Parcells had raised substantial amounts for charity through their swims, Judy approved. This has led to the Center of Hope project. She has proven to be a driving force in the fundraising efforts.

**S: Tell us about your specific training for the English Channel attempt**

**G:** I had to modify my training for the Channel effort. I consulted with 10 veterans of the Channel and also the Channel chat website and picked up bits and pieces from some 200 members worldwide as well as the boat captains. I settled on a Monday through Friday training regimen with recovery on the weekends. Monday and Wednesday were swim days with a mixture of some distance, drills, intervals and some IM work for balance. Tuesdays and Thursdays were dry land cross-training time in the fitness room. I dropped Friday as a workday. This paved the way for ever-increasing distance swims on Friday. I started with 4 miles and ended up at 14 miles (7 hours).

These swims included turning over on my back every 30 minutes and taking about 40-50 seconds to down Perpetuem from a plastic squeeze bottle. Multiply by 4 for the time and energy equivalents for running. Example, 14 mile swim = 56 mile run. The intervals I would do in the middle of my Tuesday & Thursday swims would be 10 X 100 meters on 2 minutes holding 1:30 with :30 rest between intervals. This would be like 10 X 400 meters (440 yards or 1/4 mile) on the track holding the same time on the same interval. This pace was the pace I held for 1500 meters in winning that event at the USMS National Championships in 2004. The 1500 meters is the longest pool distance for USMS competition, the Olympics and the open World Championships.

**S: The English Channel is most certainly quite a bit different than that though, isn't it?**

**G:** Yes, the English Channel is not 1500 meters and it does not have smooth water with wave absorbing lane lines. The Channel does have rough water, jellyfish, tides, currents, unpredictable weather and cold water. Fourteen miles would be the

longest swim I would make in preparation for the Channel. I would have to more than double that time and distance in the Dover Straits. I would have to give an accurate estimate of my swimming pace to the boat pilot (Captain) without having swum half the distance required to complete the swim. I figured 3200 meters per hour, exactly two miles per hour. This proved to be exactly correct; I swam 32 miles in one minute less than 16 hours.

**S: Tell us about the Hammer Nutrition products you used.**

**G:** I tried several products (containing simple sugars) with unsatisfactory results before trying Hammer products. Hammer products were introduced to me by Adam and Andrew Pemberton, brothers and accomplished triathletes who train out of the Wilton YMCA where I work and train. This would prove to be a key to my success in swimming the English Channel.

During training I took two capsules of Tissue Rejuvenator with meals each day and two Race Caps Supreme an hour before workouts. I never ate food within 3 hours of my workouts. I used Perpetuem during my training, feeding each 30 minutes with a mixture of two scoops per 24 ounces of water. I also added a scoop of Endurolytes Powder to the mix. I would sometimes have only Hammer Gel between Perpetuem feedings. I used a mix of Hammer Whey and Hammer Gel for a recovery drink immediately after finishing the training sessions.

During the swim I ate no breakfast prior to departure at 9:13 AM from Abbot's Cliff south of Dover on 28 August 2004. I used the Perpetuem mix regimen with Endurolytes powder through six hours taking the liquid in a plastic squeeze bottle on the end of a rope each 30 minutes. Also added was one Tissue Rejuvenator capsule per 24 oz. I also took some water most feedings and a little mouthwash every two hours or so to remove the saltwater taste. I figure I was taking about 260 calories per hour and burning 800-900.



A map shows the route George swam.

At the 6 hour point the liquid was beginning to hold in my stomach and I could not down more than two or three ounces of liquid. The Captain (boat pilot) told my crew to skip one feeding and then go with the straight maltodextrin Hammer Gel with Tissue Rejuvenator each 30 minutes. This worked like a charm. I did lose 7 pounds during the swim

from 215 to 208 and that was to be expected. This weighing was done 4 days after the swim. I was not dehydrated during or after the swim. I can report that I am as of now back to my normal 200 pounds.

At age 70 I completed the 32 miles in 15 hours 59 minutes with no aches or pains in my muscles or joints, no cramps or stitches and never ran out of energy. I truly believe the Tissue Rejuvenator had much to do with the extraordinary lack of any duress to my muscles or joints during the entire training cycle and during the epic record-breaking swim. The last five hours was in darkness under the moon and I had a surge of energy at the end as I ran onto the beach at Sangatte south of Calais, France. I believe the performance of the Hammer products proved more than capable for this extraordinary task. The results speak for themselves. Swimming the English Channel at age 70 has taken human performance and endurance out where it has never been before.

**S: You mentioned earlier that your English Channel swim was also a charity fundraiser as well.**

**G:** Yes, I have now raised \$46,000 for The Center of Hope orphanage, school and medical clinic in Haiti. The Center of Hope charity info can be viewed at [www.channelhopeforhaiti.org](http://www.channelhopeforhaiti.org).

The English Channel album can be viewed with 48 photos and narration at [www.thechannelswimmers.com](http://www.thechannelswimmers.com).

*George will be inducted into the International Swimming Hall of Fame in May, 2005.*



Steve Born : Senior Technical Advisor

Welcome to the spring issue of Endurance News! This issue also marks the beginning of my 6th year here at E-CAPS/Hammer Nutrition (Wow! Has it been that long?). I can honestly say that I'm enjoying the job now as much, if not more, than I did when I first came on board. One reason is that the constantly evolving world of nutritional supplementation never stands still, and that keeps things fresh and exciting. For example (and you kind of had to be there to get the full effect), when Dr. Bill and I first started discussing the landmark research done by Dr. Bruce Ames on acetyl l-carnitine and  $\alpha$ -lipoic acid and their effects on mitochondrial health and longevity, you should have heard the almost uncontrollable excitement in my voice... this research was something really spectacular! Now to some people (most people?) finding out that a couple of readily available nutrients could improve mitochondrial health would most likely elicit not much more than a yawn. But to me, because I am so passionate about naturally improving my performance and health, this research was, and still is, about as exciting as it gets. I was stoked!

That's one reason why, after five years at Hammer Nutrition, I'm as excited about what I do as the day I began. I have a passion for the always-changing world of nutritional supplementation. The desire to continue to learn and apply what I've learned only gets stronger, and it's why I'm always keeping tabs on what's happening in the world of nutritional science. And it's this passion that I want to share with you and express to you whenever you read one of my articles or whenever I respond to an email. The passion I have for being the best athlete I can be, the things I've learned from the mistakes I made early in my athletic career, and the knowledge I've been blessed to have accumulated over the course of many, many years is what I vowed to offer you from the beginning. The passion and desire to work with you and help you be the best athlete you can be has only increased with each year. So, as I look for-

## From The Saddle Of Steve Born : Still Diggin' It

ward to another year with the company, you have my word that I'll do my very best to share with you all that I possibly can.

### The "Same Ol', Same Ol'" or Still-Valid Information?

I love going to events, meeting athletes, answering questions, and talking about the products. Oftentimes I am asked to give a clinic at the various events, and I always enjoy doing them. The majority of the time my discussion centers on what constitutes proper fueling during exercise. I never get tired of talking about that subject, but once in awhile I start wondering if I'm wearing it out, or if athletes have already heard that information before and are sick of hearing it. As I'm finding out, most athletes are pretty amazed when they hear the information I have to offer because it's usually quite different than what they've been told. So really, the information that comes from us at Hammer Nutrition never goes stale, especially when so many of today's "experts" are still dispensing the advice that the athlete needs to eat more, drink more, and take in more salt during exercise. Some seem to actually be upping the ante when it comes to how many calories, fluids, and electrolytes you need to replenish. They often suggest that since you're burning "x" amount of calories, you need to replace at a rate as close as possible to "x." One well-known athlete/expert suggests amounts that are, quite frankly, staggeringly high. These same "experts" often quote several sweat studies (taking nothing else into account) and use them as the basis for stating that the athlete needs to take in large volumes of sodium (sometimes even in multi-gram amounts!) to replace losses. Lastly, many "experts" still suggest consuming very large quantities of fluids to stave off the "dreaded consequences of dehydration."

This sort of advice has two major problems: it's not in cooperation with how your body deals with its losses, and it's likely to do more harm than good. Simply put, you cannot replace nutrients in amounts equal to, or even near, depletion rates. While you may think you're helping your body by ingesting huge amounts of calories, fluids, and salt, you're only overcompensating, which almost invariably results in poorer performance and/or getting sick. This is a lose-lose strategy. You spend more money and get worse results!

Our position is that yes, you do need to replenish your body with calories, fluids, and electrolytes, but you need to do so in amounts that cooperate with and not over-

ride normal body mechanisms and functions. As Dr. Bill says (and it's been my fueling "mantra" for a long time), "To suggest that fluids, sodium, and fuels-induced glycogen replenishment can happen at the same rate as it is spent during exercise is simply not true. Endurance exercise beyond 1-2 hours is a deficit spending entity, with proportionate return or replenishment always in arrears. The endurance exercise outcome is to postpone fatigue, not to replace all the fuel, fluids, and electrolytes lost during the event. It can't be done, though many of us have tried." Your goal is to support your body's stored nutrients, not replace spent nutrients. If you're a serious endurance athlete, you should adopt this as your fueling mantra.

### The Endurance Athlete's Guide To Success

A few years ago we distilled our fueling knowledge into a small handbook we called The Endurance Athlete's Guide to Success. We've edited, revised, and expanded the handbook a few times, but the basic information it contains remains valid and as useful today as it was even before we wrote it. What you won't find in the guide are recommendations of high calorie, fluid, and electrolyte intakes. Instead, you'll find research-based fueling strategies that work with your body and its wondrously complex mechanisms and functions. Sounds pretty funny that we would advise that you take less of the products we sell, but that's usually the case. As good as our fuels are, we don't want you to consume more of them, we want you to consume the right amounts of them, which usually means a lot less than what you may be hearing from some other company or "expert." We never want to increase sales at the expense of your performance.

If you're unsure how to properly fuel your body prior to, during, and after exercise, this guide is a vital ally that will provide you with sensible suggestions that sometimes fly in the face of what so many "experts" are recommending. Now, at the beginning of the season, is the time to dial in your fueling protocol. Download a free copy of The Endurance Athlete's Guide to Success from [www.e-caps.com](http://www.e-caps.com) today!

### Dr. Bill on Fancy Forms of Simple Sugars

Dr. Bill's article on honey and brown rice syrup reveals that they are nothing more than fancy forms of simple sugars, which

(see FROM THE SADDLE on page 15)

(FROM THE SADDLE from page 14)

your body cannot efficiently process for energy. The amount of calories from simple sugars that your body can accept and convert to energy is severely limited, leaving you in a calorie/energy deficit during endurance events. That's one of the reasons why we recommend long-chain carbohydrates. Instead of a weak 6-8% solution, the strongest permitted for efficient absorption of simple sugars, complex carbohydrates allow for a 15-18% solution concentration. Even at this seemingly high concentration, complex carbohydrate solutions will digest efficiently and without the gastric distresses so common with too-concentrated simple sugar fuels. The beauty of complex carbs is that they allow a greater volume of calories to digest efficiently and be available for energy production. I don't know about you, but I'd rather have 280 calories processed and available for use than the scrawny 80-100 calories per hour that simple sugar fuels will allow.

#### **Athlete Spotlight : George Brunstad**

George is my all-time favorite athlete that we've profiled in Endurance News. I mean, far too many guys, when they hit the age of

70, just want to have all their "parts" in place and working in some degree of acceptability. George? He's a guy, like Dr. Bill, who shatters the concept of what "getting older" is all about. Heck, I personally believe that a good gauge of what being in shape is, is hanging with Dr. Bill going up Logan Pass here in Glacier National Park. If I can do that, I'm doing OK, fitness-wise. Anyway, do check out George's interview in this issue and tell me you're not both impressed and inspired.

By the way, one of the things I absolutely love about George's interview came in one of his answers where he mentions that he consumed, on average, 260 calories per hour versus the estimated 800+ that he burned during his English Channel crossing. I can only imagine how many people would have thought that was an absolutely crazy protocol to follow ("George, you're burning 800 calories an hour so shouldn't you be eating at least 500 to replace what you're losing?"), but look how wonderfully it worked for George... he set a record!

I guess what I'm trying to say is that there is a lot of information available to athletes, too much perhaps, and the only way you can know for sure what works for you is to put

this information to the test. Having said that, I can assure you that you won't be disappointed with our fuels or our suggested use of those fuels. After five years here I have seen and/or heard from literally hundreds to thousands of athletes who, while perhaps skeptical at first, found that they experienced better quality performances in their workouts and their races by using our fuels and following our fueling suggestions. The percentage of those responding favorably to the fueling protocols we outline is so heavily skewed towards the positive that it's not even close.

And you know what? When you don't have to worry about your fuel or whether or not you're using the right amounts of it - when things go right fueling-wise and you can finally focus on getting down the road a little faster than you did before - it makes racing and training a heckuva lot more fun. Maybe that's the biggest reason why I dig my job as much now as I did when I first started: seeing other athletes enjoying success and knowing we played a role in it.

I can't wait for the new season... bring it on and make it your best!

## **Take Training & Racing To The Next Level**

With the Compex Sport you can dramatically improve muscle recovery, improve muscle elasticity, increase strength and endurance, develop explosive strength and have a better and faster warm-up.

Don't let this season pass you by. Take your training and racing to the next level with the Compex Sport EMS.

#### **REAL ATHLETES : REAL RESULTS**

I started using the Strength program in December 2004. I measured my quads and glutes about 3 weeks after I started the program and then measured them again recently. I have gained 2 inches around my quads and 1 1/2 inches around my glutes! In my late 20's I lifted weights for 2 straight seasons and I never saw muscle development like this. I am 43 now and I would have never expected better development than when I was in my 20's. It is proof to me that the Compex does exactly what it claims to do. I feel I have tremendous strength at the moment and I'm sure my racing will improve this season because of this. - Joe Amone, Cyclist



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## COMPEX : More Kudos for Complex

Steve Born

### New Study Shows Neuromuscular Electrical Stimulation (NMES) Training Improves Abdominal Strength and Muscular Endurance

In the April edition of the Journal of Endurance (J.O.E.), which is now available for viewing online at the Knowledge link at [www.e-caps.com](http://www.e-caps.com), the fourth item is well worth checking out. Here you'll find the eye-opening details of recent studies showing the effectiveness of neuromuscular electrical stimulation training in terms of abdominal strength and endurance.

41 volunteer subjects participated in the 8-week study, using a new COMPEX product called the Slendertone FLEX™. These 41 individuals were randomly assigned into two groups: a control group and a stimulation group. None of the subjects were allowed to alter their diet or engage in any additional exercise during the 8-week study. The subjects were given a battery of tests at beginning of the study, halfway through, and at the end of the eight weeks. These tests included:

- Skinfold measurements
- Circumference measurements
- Abdominal strength assessment
- Abdominal endurance measurement

The training in the stimulation group involved the use of the Complex five times weekly for eight weeks, increasing the

amplitude on the stimulator regularly, to the highest tolerable level. Here's how the program looked:

- **Week One** - Two sessions using Program 1 (20 minutes per session), three sessions using Program 2 (25 minutes per session)
- **Weeks Two to Four** - Five sessions using Program 3 (30 minutes per session)
- **Weeks Five to Eight** - Five sessions using Program 4 (40 minutes per session)

All 41 subjects completed the study, though the results of one of the male's subjects were not used in the analysis. While there were no significant changes in the various skinfold measurements for either group, both abdominal and waist circumference were significantly decreased with the stimulation group, whereas the control group showed no changes.

Even more impressive is that the stimulation group had a 58% improvement in isometric abdominal strength and a whopping 72% increase in abdominal muscular endurance. The results of the study found that "NMES significantly increased the isometric strength and dynamic endurance of the abdominal musculature." What is interesting to note is the strength gain of 58% is nearly double that found in other studies, which is most likely due to the increased length of this particular study (8 weeks vs. 4 weeks). This suggests that beneficial effects of Neuromuscular Electrical Stimulation are cumulative and have the potential to

increase over time.

The conclusions of this study showed that "the use of the Slendertone FLEX™ belt (by COMPEX) significantly increased strength and endurance, decreased waist girth, and improved self-perceived abdominal firmness and tone. *The results probably can be attributed to the strength of the electrically induced muscle contractions made possible by the quality of the electrodes utilized in the belt system, as well as the stimulator itself.*"

One reason I've italicized that portion above is because I believe it illustrates that the results of this research have exciting implications for the use of the COMPEX Muscle Trainer on other areas of the body (anyone out there use their quads, hamstrings, calves, back, and shoulders in your workouts?). Simply put, The COMPEX Muscle Trainer is the finest product of its type and research is proving it to be a highly effective and extremely valuable tool in the training "arsenal" of all strength and endurance athletes, taking high quality training to a level it's never before seen.

To find out more about the COMPEX products available at E-CAPS, give us a call or log-on to [www.e-caps.com](http://www.e-caps.com). The full-length study can be found in the Knowledge section of the E-CAPS web site. Click on the Journal of Endurance link and it'll be the top one, the April 2005 edition.

## Improve The Way You Train And Race!

Complex technology helps athletes excel and achieve their dreams by enhancing athletic performance, physical fitness, and post workout recovery beyond what is achievable through conventional training alone.

### REAL ATHLETES : REAL RESULTS

COMPEX is part of my training effort and has been paying huge dividends. I am able to target sore muscles with the Active Recovery mode and the next day I feel great! - Robert Kelly : Triathlete



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## Hammer Gel Safe For Diabetics : Complex Carbohydrate Formula Good For Glucose Levels

Is Hammer Gel a safe carbohydrate source for a diabetic to consume during exercise?

Physician endurance athlete, Dr. Marty Reynolds M.D., recently shared an interesting "case study" for appropriately answering this question:

"My wife is a Type I diabetic (on an insulin pump) that is running her first half-marathon in Austin in February. We tested ALL gel products, and found Hammer Gel to be the most reliable and consistent in providing carbohydrate to keep her blood glucose level normal during a run (we tested almost every alternative product we could obtain. A friend of ours that also has diabetes (on an insulin pump too), who has successfully completed four Ironman Triathlons, has told us that she has found your gel products to be the best for her glucose control. If you ever receive any queries from athletes with diabetes that would like to talk to someone about Hammer Gel for glucose control, I'd be happy to respond to their e-mail. This data was obtained by measuring blood glucose after taking Hammer Gel when my wife Paula, diabetic athlete, was NOT exercising. She and I have even gone to the extreme of taking a unit dose of the gel, then measuring blood glucose levels (which will rise in a diabetic in direct correlation to carbohydrate absorption, when insulin is not given to cover) every 15 minutes for two hours to plot out pharmacodynamic curve of Hammer Gel. This interesting data shows that the Hammer Gel begins absorption approximately 30-45 minutes after ingestion, then supplies carbohydrates at a steady state for the next approximately 45 minutes, and then tapers off. Knowing this alters how I take the gel (i.e. I take the first gel at the start of the run, and I won't take any during the last

hour of a run as it makes no sense to do so, unless you are relying on it for glycogen repletion after exercise has terminated...

The table below shows how Hammer Gel affected my wife's blood glucose levels taken during rest. The figures were taken during rest (not during exercise when blood sugar turnover rate is higher), which is why the recorded rise in blood glucose was modestly above the ideal glucose values. If my wife had been exercising during that time, her blood glucose would have been normal and stable. In fact, she recently completed a two-hour run using Hammer Gel with her blood glucose at the end of exercise being a healthy normal 112 mg/dl. This shows that Hammer Gel is virtually perfect for keeping blood glucose levels NORMAL and STABLE. The dose amount and timing should be worked out for each individual. For her, at 57 kg body weight, when performing at a moderate intensity rate (heart rate ~ 70-75% of maximum), a single packet of Hammer Gel works out just perfect. Athletes with diabetes with different body weights or doing exercise with different intensity levels may need to adjust the dose amount.

Therefore, I adopted the following guidelines for taking Hammer Gel during exercise:

"Take one dose of Hammer Gel approximately 30 minutes prior to beginning exercise. This one dose alone will cover an exercise session of 45 minutes or less. If the exercise session is planned to continue beyond 45 minutes, then another dose of Hammer Gel is taken at the beginning of exercise. The dose is subsequently repeated every 45 minutes (frequency can be decreased to once an hour during prolonged exercise of > 2 hours). No additional doses of Hammer Gel should be taken when the exercise session is expected to end in less than 75 minutes. When following this protocol, blood glucose values are

normal at the start of exercise (between 120-140 mg/dl) and remain stable throughout the exercise sessions (+/- 15% of the starting value), and continue normal through to the end of exercise (usually between 120-140 mg/dl). This is ideal for diabetic blood sugar control and athletic performance.

If any type I diabetic patients need more information, an excellent source is the book, *Pumping Insulin*, by John Walsh & Ruth Roberts. Chapter 18 and 19 discuss the gram amount of carbohydrate intake required based upon athlete's weight, exercise intensity, and exercise duration. The only thing missing from their discussion is what commercially available carbohydrate formulations provide a steady state glucose absorption over time, and what timing should be used for their intake so that a diabetic athlete's blood glucose level can be maintained in a steady state. This is the final piece of information that Paula and I had to derive by word of mouth from other diabetic athletes, as well as trial and error, and our mini-experiment. However, doing this has allowed her to successfully complete a half-marathon and begin training for a full marathon using your company's product."

Sincerely,  
Marty Reynolds, M.D.

**COMMENT:** This remarkable "case study" reports how a diabetic athlete controlled blood sugar using Hammer Gel during exercise. This does not conclude that everyone with a blood sugar disorder will enjoy the same results using the same frequency and dose. However, these guidelines help diabetics to determine how much Hammer Gel to take and how often for generating a healthy blood glucose response during exercise. I wish to thank Dr. Reynolds and his wife, Paula, for sharing this report.

| Hammer Gel Effects<br>Diabetic I Glucose Levels<br>At Rest |               |
|------------------------------------------------------------|---------------|
| Time (min.)                                                | Glucose mg/dl |
| 0                                                          | 103           |
| 15                                                         | 113           |
| 49                                                         | 146           |
| 68                                                         | 185           |
| 81                                                         | 191           |
| 104                                                        | 199           |

**Note:** At time 0 a Type I diabetic with a stable blood glucose level ingested one serving of Hammer Gel and no additional insulin was given to cover this carbohydrate intake, blood glucose levels were then measured periodically over the next two hours.

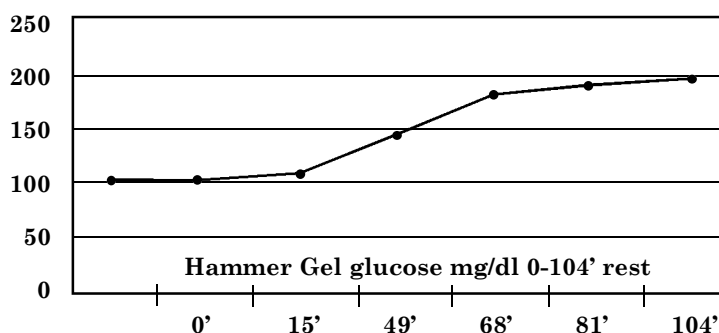


Figure 1. Hammer Gel glucose mg/dl 0-104' curve diabetic I female (at rest)

## Food Alone Won't Cut It! : The Need for Supplementation Proven Once Again

Steve Born

As Dr. Bill's research article suggests, a great many people run the risk of having micronutrient deficiencies, even if they consume what most may deem a good diet. The scary thing about these deficiencies is that they fall below the minimal standard for preventing deficiency diseases. Forget about being below optimal levels, we're talking about being below minimal standards, standards that exist to help prevent disease. Anyway, his research echoes something he wrote many years ago: "Athletes today ingest only 11% of the organic nutrients from their food sources that the athletes of the 1940's enjoyed." His article serves as a strong reminder that taking care of basic nutrient needs is something we as athletes need to focus on first and foremost.

The sad fact is that we're simply not getting what we need from our diet. Our intake for many nutrients doesn't even meet minimum RDI levels. Sure, you've been told that eating a healthy diet will provide you with all the nutrients you need, but that statement is becoming less and less valid with time. Far too many people, let alone athletes, are not even getting the MINIMAL amount of many nutrients in their diets. Yes, a variety of foods is still your best bet for obtaining all the phytochemicals from specific food sources (fruit, vegetable). However, to ensure that you're obtaining satisfactory-to-optimal levels of vitamins and minerals, an ever-growing body of evidence clearly indicates that food alone, even in a good diet, won't do the job. Supplementation is not only wise, it's vital.

Many of the athletes I've worked with resist the idea of taking a multivitamin/mineral product, despite evidence that glaring deficiencies exist in even the best of diets. It's pretty easy to guess why—a multivitamin isn't exactly the sexiest supplement we offer. "Multivitamin" conjures up images of the One-a-Day® or Flintstones® pills your mom made you take as child, or doddering old folks looking for their bottle of Centrum Silver®. Quite frankly, many (most?) endurance athletes aren't going to fly for something they may associate with kids and geriatrics. They want a product for them, one that screams, "Knock 10 minutes off your PR." If that's your current attitude, or if you're unwilling to pay for something you think you're getting in your diet, you've got to change that attitude. We've said this before, and we'll keep saying it: an

endurance athlete is a healthy person first, an athlete second, and an endurance athlete third. If you don't support the first two functions, you don't have a chance at the third. When basic micronutrient deficiencies exist and remain unremediated, the whole body suffers and optimal athletic performance and health will most likely never be achieved.

I've long considered the Recommended Daily Allowances (RDA, now changed to RDI) to be an archaic standard to begin with and absolutely irrelevant for athletes, whose dietary needs far exceed that of the sedentary population. My belief in the inability of the RDA/RDI (or whatever you want to call it) to satisfy an athlete's requirements is confirmed by one well-known sports nutritionist who stated, "If you use the RDAs to plan your nutrition, you will never, never reach your athletic potential." Also, the RDA handbook has this caveat: "RDAs are recommendations for the average daily amounts of nutrients that population groups should consume over a period of time. RDA should not be confused with requirements for a specific individual." In fact, a former chairman of the RDA Committee has even been quoted stating that RDAs "are not recommendations for the ideal diet."

You, my friend and endurance athlete, are a "specific individual." You need far more than RDI amounts. Don't look at the side of your cereal box and think you're doing fine. So even though a multivitamin/mineral supplement may not be glamorous compared to many other supplements, the evidence tells us it's a primary nutritional key for achieving optimal athletic performance and overall health. That's why we sell Premium Insurance Caps and that's why, if you're not already taking this product, you should be. Failing to provide the body with adequate supplies of basic nutrients (vitamins, minerals, phytochemicals, and other micronutrients) is like building a house without a strong foundation. The foundation might go unnoticed, and it sure isn't the prettiest part of the house, but the

entire structure and its contents depend on that foundation. Without it, the house will have no structural integrity, it won't withstand any physical stress, and it won't be of much use.

Log on to our website and scope out the nutrient profile that just one packet of Premium Insurance Caps adds to your diet. You'll find that this is a powerhouse product, loaded with ideal amounts of key nutrients that address needs far beyond the RDI's minimal standards. We use the

Optimal Daily Intake (ODI) standard for Premium Insurance Caps, a standard much more reflective of athletes' prodigious needs. As Dr. Bill alludes to in his article, we want to select foods and/or supplements that will supply our nutrient needs at levels well above RDI amounts in order to maintain optimal health and prevent degenerative disease. That's why I encourage you to incorporate Premium Insurance Caps into your daily supplement regimen. We truly believe and guarantee that

it is the most comprehensive and cost effective way to remedy the problem of nutrient deficiency. It's a true Daily Essential, a product you should use every day, year round.

On the subject of diet, health, and micronutrients, let me add a quick footnote here about our Phytomax capsules. Unless you live near the equator and have home-grown fruits and vegetables available all year, you're probably running a big deficit in the phytochemical column. That's why we have Phytomax in our lineup. Please read more about this interesting product on our website or in our catalog, or give us a call. It's yet another way to ensure that your nutritional basics are well met.




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In April of 2003 I wrote an article entitled "Athlete Octane : Liquids v. Pills," I published this article in our quarterly newsletter, Endurance News, and on our website. I hereby retract the criticism of the person mentioned in the article and regret any problems it may have caused.

## Race Report : Catching Up With A Few Amazing Athletes

### A Stellar Season Is Honored

Hammer sponsored athlete, John McGovern, named USAT Duathlete of the Year

*From a USAT News and Information Press Release:*

COLORADO SPRINGS, Colo. (March 16, 2005) - USA Triathlon has announced its age group Athlete of the Year Award winners, as determined by the Age Group Commission and members of other committees and commissions.

The committee members considered the results from various high profile races during the 2004 season including the USAT Age Group National Championship, the long course national championship, results from the world international and long course championships and the Ironman Triathlon World Championship.

From these and other races, the committee congratulates the following outstanding athletes on their accomplishments:

#### **Duathlon**

##### **Open Division Male John McGovern**

**(40, Kingston, N.Y.):** McGovern had strong overall finishes at the two major world championship races (second American at short course worlds, first American at long course worlds), and top finishes at short course nationals (seventh overall) and long course nationals (third overall).

### **Congratulations To An All-American ...and up & coming pro mountain biker**

Thanks again for your support over the last season. I just checked at USAT and I made All-American last season!

I'm in heavy training for Ironman Arizona right now, but am in the middle of the State Mountain Bike Series as well. I'm doing well on the mountain bike side, this being my first year as a Pro. I have so far taken 6th in the season opener and just a week ago stood on the podium with a 3rd! Hammer Gel and HEED are great for these races and I use Race Caps Supreme beforehand.

Training for Ironman is coming along very well. I've had some great runs and rides, and have a nutrition plan with Hammer Gel, Perpetuem, and Endurolytes that is working great.

Thanks,  
Brian Grasky

*Steve's Note :* John's 2004 season was, in a word, stellar. Check out these results:

Powerman Alabama, 1st Masters  
Virginia Duathlon, 1st Amateur  
(2nd to Greg Watson)  
USAT New England Du Championships,  
1st Amateur  
(2nd to Travis Kuhl, fastest bike split)  
Rochester F1 Duathlon, 1st Overall  
Bronx Duathlon, 1st Overall  
Queens Duathlon, 1st Overall  
Trooper Duathlon, 1st Overall  
Hudson Valley Duathlon, 1st Overall  
Harriman Duathlon, 1st Overall  
Duathlon Long Course Worlds,  
3rd in age group  
Duathlon Short Course Worlds,  
7th in Age Group  
Duathlon Long Course Nationals,  
1st Masters  
Duathlon Short Course Nationals,  
1st Masters  
USAT Duathlon Grand Prix Overall Winner

... and, of course

USAT Duathlete of the Year

Congratulations on a superb year John and for being named USAT Duathlete of the Year!

### **Feet Feats**

#### **Ultrarunning accomplishments**

Congratulations to Connie Gardner who won the women's 50-mile race at the 2004 Sunmart in a time of 7:16:24. Connie was also recently named one of the top 5 Women Runners Of 2004 by UltraRunning magazine and her time of 15:48:04 at the Olander Park 100 garnered recognition as one of the top 5 Women's Performances of 2004.

In other ultra running news, sponsored athlete Scott Eppelman's 144.03 miles at the World 24 Hour competition was named one of the top 10 Men's Performances of 2004.

Great job Connie and Scott!

### **ACT-UPMC's Papp is #1 in USCF Rankings**

ACT-UPMC's team captain Joe Papp is currently the top-ranked rider in the United States Cycling Federation's Road Race Rankings for Category 1 men. "I'm very happy to have topped the rankings," says Papp, who in 2004 was one of the most consistent elite amateurs racing in the USA.

Congratulations from all of us at E-CAPS and Hammer Nutrition!

### **Rain, Rain Go Away....**

#### **Beating the elements in Arizona**

I returned yesterday from my first race of the season (24 hours of Old Pueblo) in Arizona. Warm, sunny Arizona turned into rainy, hail, fog, and high wind Arizona for the race. The most brutal race I have ever seen but I finished on a high note Sunday. I placed first overall female, and 8th overall out of 80+ solo men and women. I also had the fastest solo female lap with 16 miles, in 1:13. A great way to start the season.

Thanks for all the support!

Heather Mosley

### **Cyclo-Cross King**

#### **Cruising to victory**

I just wanted to thank you for your support. Your products are really great! I had my best cyclo-cross season yet using Race Caps Supreme, Hammer Gel, Endurolytes and Tissue Rejuvenator. I was 2nd overall in the Elite division of the Cyclo-cross Crusade series which averages 500 racers per race. I placed 1st, 2nd, 2nd, 4th, 4th and 4th and I am 44 years old!

#### **Other results:**

1st Disco Cross, Hood River, OR

1st Thrill in the Milla Series, Bend, OR placing 1st, 1st, 1st and 2nd

1st Frozen Cross, Bend

3rd in 45-49 age group at Nationals in spite of having a broken seat post.

Thanks,  
Mark King



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# The Back Page

## Earn FREE Product : The Athlete Referral Program

Tell your friends, neighbors and training partners (just not your competition) about us and you could earn a mess of free products!

Here's how it works....you tell your friend Hank Hammer, who's never ordered from us before, about our products. Hank Hammer places his very first order and mentions either your first and last name or your client number. Hank Hammer gets 15% off his first order and you get 25% of his order credited to your account (i.e. Hank Hammer spends \$100 and you get \$25 credited to your account). You can then use that \$25 just like real cash...purchasing whatever you want from our product and clothing lines.

So, without a lot of work you can earn free product from E-CAPS/Hammer Nutrition. You'd better get going!

**For more information and all the details, give us a call at 1.800.336.1977.**

### The Details :

- Referral credit can be used just like cash for the purchase of any products, accessories and/or apparel.
- We keep track of your referral credit for you. Want an update? Just ask.
- Whenever you place an order, you can apply it to that order or save it for future use.
- If you order online, just put in a note asking that we apply any available credit to that order.
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