

ENDURANCE NEWS #28

THE ENDURANCE DIET by Dr. Bill Misner, Ph.D.

PART I OF A 2 PART SERIES.
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Hammer Nutrition Ltd. A diet
for maximal endurance performance
and health!

It should be understood that choosing your foods for efficient fuel transfer directly effects the rate of active energy metabolism required for extreme endurance demand. The "best" dietary selections are the same assembly of food combinations that produce healthy cardiovascular function resulting in longevity with quality of life. Prior to World War II, during the first half of the 20th Century, the traditional American dietary protocols resulted in virtually no degenerative disease from circulatory inefficiency or other types of disabling diet-related disorders observed in our modern era which can hospitalize and/or prematurely take human life.

Five diet types are compared, favoring 4 protocols, which show positive results from the health indices of those who practice them. Indeed, any one of the four dietary plans improves the macro-protocols of the "WESTERN DIET." Today's Western diet should be avoided; it is dramatically unfavorable. Review links it with 8 out of the top ten causes of death in America! Comparative analysis of dietary protein, fat, and carbohydrates from the recommended four exemplary model diets distinctively concludes that health and dietary choices are interrelated. Diet should support bioactive markers of health as indicated by cardiovascular efficiency and the absence of typical accompanying degenerative disease disorders. The dietary plan that accomplishes this best is the model diet for endurance athletic performance.

I. TRADITIONAL DIET* (1A)

Protein	Fat	Carb	Disease Rate	Exercise Rate
12%-33%	21%	45%-65%	nil-low	moderate-high

Characteristics of the Traditional Diet:

*(The ratio of polyunsaturated fats to saturated fats is 1.41, or for every 7 grams of artery-clogging "bad" fats, 10 grams of good fat were eaten to balance lipid profiles, no dietary sugar eaten=0, 60-150 grams daily of soluble and insoluble fiber, and under 700 milligrams sodium ingested per day.) Cardiovascular Disease, as well as a number of degenerative diseases we have in America today, were virtually unheard of at the turn of the century!

II. THE AMERICAN HEART ASSOCIATION DIET* (1B)

Protein	Fat	Carb	Disease Rate	Exercise Rate
15%	30%	55-60%	low	moderate

Characteristics of the AHA Diet:

*(Fat intakes are recommended as no more than 5-10% saturated fats to 20% poly-mono unsaturated fats, translating to a ratio of 1 saturated "bad" fat for every 2-4 "good" mono-polyunsaturated fats.)

III. THE SYNDROME X DIET* (2)

Protein	Fat	Carb	Disease Rate	Exercise Rate
15%	35-45%	45%	nil-low	moderate

Characteristics of the Syndrome X Diet Diet:

*(Fat intakes are recommended as no more than 5-10% saturated fats to 30-35% poly-mono unsaturated fats, translating to the ratio of 1 saturated "bad" fat for every 3-7 "good" mono-polyunsaturated fats.)

IV. THE ENDURANCE DIET* (3)

Protein	Fat	Carb	Disease Rate	Exercise Rate
12-20%	20%	50-60%	nil-low	high

Characteristics of the Endurance Diet:

*(Fat intakes are recommended as no more than 3-5% saturated fats to 15% poly-mono unsaturated fats, translating to the ratio of 1 saturated "bad" fat for every 3-5 "good" mono-polyunsaturated fats. Fiber intake ratio is 30 grams soluble fiber to 10 grams insoluble fiber, less than -10% of the carbohydrates as simple sugar; and sodium intake restricted to 1100 milligrams per day, with a minimum of 100 ounces fluids per day.)

V. TODAY'S WESTERN DIET*

Protein	Fat	Carb	Disease Rate	Exercise Rate
31%	44%	25%	high	low-nil

Characteristics of the Western Diet (1):

*(The ratio of polyunsaturated fats to saturated fats is 0.41, or for every 2 grams of healthy fat eaten, 5 grams of artery-clogging "bad fat" from meat or dairy is eaten. Refined sugar contributes all of the carbohydrates, and only 15-20 grams of dietary fiber are eaten, further contributing to cholesterol and fat reabsorption to elevate blood serum lipids remarkably. Sodium intake exceeds 7000 milligrams; while alcohol intake of 7-10% of the total calories adds itself in at a whopping 7 calories per gram.)

Why should athletes avoid the modern Western Diet?

You cannot possibly perform athletic bests if you are literally killing yourself with a knife and fork! The wrong combinations of too much saturated fat, trans fat, simple sugar, sodium (processed or salted foods), lack of plant-sourced fibers and phytonutrients are the hallmarks of this deadly performance-limiting diet. The results from eating a Western diet appear in our mortality rate:

Eight of the top ten leading causes of death are diet-related:

#1-Heart disease: 726,974	#6-Pneumonia/flu: 86,449
#2-Cancer: 539,577	#7-Diabetes: 62,636
#3-Stroke: 159,791	#9-Liver/cirrhosis: 25,175
#4-Chronic pulmonary: 109,029	#10-Alzheimer's: 22,475

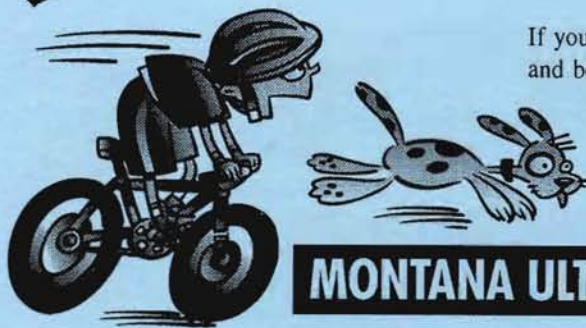
NOTE: Not related to Diet:

#5-Accidents: 95,644	#8-Suicide: 30,535
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Source: Centers for Disease Control and Prevention. (USA 1997)

The macronutrients-(how much and what kind of protein-fat-carbohydrates?) PROTEIN requirements for endurance athletes were determined by a series of research studies done by the Colgan Institutes and others (4) based on urinary nitrogen balance in which athletes were evaluated after

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If you have been wanting to see the majesty and beauty of the Northern Rockies and the home of E-CAPS/Hammer Nutrition, this is the best way to do it as far as I am concerned. Get out your map of Montana and check out the route to

MONTANA ULTRA TOUR 2000

Mark your calendar! A new bicycle touring company, Great Northern Bicycle Tours, based in Whitefish is offering cyclists a tour through the amazing beauty of the state of Montana that will cover 880 miles in nine days beginning on August 24th and finishing on September 2nd. The cost of this tour is \$1,895 and includes lodging, breakfast and lunch each day; full sag support and baggage transport. Airfare and dinners are not included in this price. As a special bonus to our E-CAP/Hammer Nutrition customers, we have negotiated a 10% discount, plus \$50 worth of our products with the tour operators. However, space is limited to 20 riders, so if this is something you might be interested in, start doing your planning and checking now.

Getting to NW Montana is not as hard as you may think. Delta, Northwest and Alaska/ Horizon Air all fly into Kalispell (aka Glacier Park International) Airport. You have the option of flying into Kalispell and leaving from Billings or you can fly into and out of Kalispell, but that will necessitate an 8 hour shuttle ride from Billings back to Kalispell at the end of the tour. If you opt to fly into and out of Kalispell, the shuttle will be free.

You could also plan to arrive a couple of days early and stay in Whitefish. While you're here, you can meet our staff and do some local rides to get your bearings and loosen up your legs for the tour. As an added bonus, Steve Born and/or myself will host a presentation on fueling strategies for ultra distances following Thursday's orientation meeting.

see all of the amazing places that this tour will take you.

Here's what the GNBT web site has to say about the trip, as well as a brief itinerary:

If you are an ultra cyclist or an avid long distance rider, then GNBT has a challenge for you. This incredible tour allows you to see the beauty of the Montana Rockies and cover some serious miles in the process. The Montana Ultra Tour is not for everybody. But, if you enjoy putting in a lot of saddle time, and are eager to grind up some great mountain passes with a great group of cyclists, then come out to Montana and earn your braggin' rights.

Thursday 8/24: Start - West Glacier, MT
Meet for orientation meeting and bike assembly.

Friday 8/25: East Glacier, MT (86)
Morning comes and we start our journey up the famous Going To The Sun Road and over Logan Pass (Continental Divide) to Saint Mary, from there we climb the over Looking Glass pass and continue on to East Glacier.

Saturday 8/26: Bigfork, MT (95)
Today we pedal over Marias Pass (Continental Divide) and around the east side of Glacier Park, a lunch stop at the historic Izaak Walton Inn and then on to the village of Bigfork on the shores of Flathead Lake.

Sunday 8/27: Missoula, MT (120)

Ride through the remote Swan River Valley lined with the Mission Mountains and the Bob Marshall Wilderness Area. Cross the legendary Blackfoot River and you're almost to Missoula.

Monday 8/28: Wisdom, MT (124)

Head down the Bitterroot Valley before climbing the Lost Trail Pass followed by the Chief Joseph Pass.

Tuesday 8/29: Dillon, MT (68)

Shortest day of the tour but still two mountain passes with Big Hole Pass and Badger Pass.

Wednesday 8/30: W. Yellowstone, MT (142)

Two of Montana's authentic ghost towns lie ahead on our trek to W. Yellowstone. Those of you wanting even more of a challenge can take a 45 mile detour over the Reynolds and Targhee Passes.

Thursday 8/31: Bozeman, MT (93)

Wind your way up past Big Sky Resort along the Gallatin River (a famous fly-fishing mecca).

Friday 9/1: Cooke City, MT (82)

Ride beneath towering peaks and next to the Yellowstone River before reaching Gardner at the north entrance to Yellowstone Park. We shuttle you 50 miles through Yellowstone (Park Service banned bikes on the roads) then relax for the night in the secluded alpine town of Cooke City.

Saturday 7/2: Red Lodge, MT (68)

Oh, what a great way to finish this tour! If you loved Glacier you will be amazed by our climb over the 10,947 ft. Beartooth Pass.

I'm sure you'll be back to see Big Sky Country again! For more information or to make your reservation, contact **Great Northern Bicycle Tours** @ www.gnbicycletours.com or PO Box 421, Whitefish, Montana 59937, 1-800-499-2581. ■



INTERNET UPDATE

by Dan Taylor - Marketing & Promotions

Recently, we successfully launched a fantastic range of resources for endurance athletes that are a few mouse-clicks away. Log on to www.e-caps.com and check out some of the resources listed below:

• **Ask Dr. Bill** – Part of the **E-CAPS ON-CALL SYSTEM**, **Ask Dr. Bill** is a searchable database of over 800 questions and answers regarding almost every aspect of endurance training and competition. You can search by category or keyword and just click 'submit.' If you can't find what you are looking for, click on 'submit a question,' type in any question, click submit, and your question will be forwarded to Dr. Bill (available to existing customers only). The ADB database is growing everyday. Try out **Ask Dr. Bill**, you'll be amazed at what you can learn – Instantly! Go to the **ON-CALL** section of the site and then to 'Ask Dr. Bill.'

• **Journal on Endurance** – Like *The Wall Street Journal* is to an investor, *Journal on Endurance* is to an Endurance Athlete. Sign up on-line to receive this amazing, up-to-date electronic newsletter that is brimming with tasty info and detailed reviews of supplements, foods and ergogenic aids. 'JOE' is found under the **ON-CALL** portion of the site as well. This resource is only available to E-CAPS customers.

• **Usage Instructions** - Detailed usage instructions for every E-CAPS product are now available from the **ON-CALL** page and the header bar of the site.

• **Technical Articles/Manuals** – More great information on health, vitality and the quest for optimum performance. Found on the **ON-CALL** page.

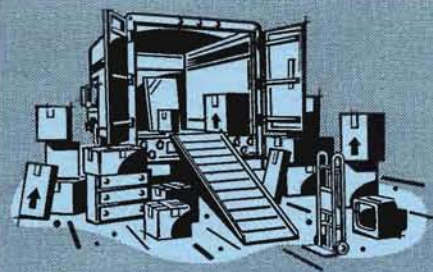
• **Endurance Bulletin Board** – By the time this goes to press, the "Endurance Discussion Group" should be moved to the new 'Endurance Bulletin Board' page of the site. This is going to be a killer resource for sharing ideas. We are using the Ultimate Bulletin Board program for it's great organizational capabilities and easy-to-use interface. The discussion is very relaxed but highly informative, so if you haven't logged on and made yourself known, give it a shot. The EDG can be found on the **ON-CALL** page and the header bar of the site.

• **Downloads** - We are currently working on assembling some very handy guides on race preparation as well as some other great info available as *Adobe Acrobat* downloadable files. Downloads will be available from the **ON-CALL** page.

• **Sponsored Athletes** – All of our sponsored athletes will be added to the site. If you are a sponsored athlete, please send in your bio form ASAP. We prefer that you submit your bio via e-mail to dt@e-caps.com with "Athlete Bio Form (your name)" as the subject. We are always looking for fresh, quality photos so feel free to send along some photos of yourself as well. The sponsored athlete's page can be accessed via the homepage or the site header bar.

The Hammer Nutrition website will share much of this information with the E-caps site and it will have its own fuel specific content. So, be sure to visit the Hammer site as well.

We hope you enjoy our new websites and visit them often. If you have ideas or comments or if you found a typo, please feel free to pass the information along to me. ■



FedEx Shipping Update

It was just too good to last. I knew it was only a matter of time before FedEx would get tired of losing money on their "Express Saver" service and decide to revamp this 3-day delivery service. They introduced this service a couple of years ago to compete with UPS ground service. With rates only slightly higher than UPS ground and delivery in 1-3 working days, they did succeed in running circles around UPS, but they also lost millions in the process. So, they just announced rate increases of 30-40% for the Express Saver service. However, since FedEx has also acquired RPS, they are launching FedEx Ground to coincide with the massive increase in price of their 3-day service. This change will be going into effect in early July. However, these changes and new services are not entirely bad since in many cases it actually lowers your overall shipping charges.

So, why am I telling you about this, and what does it mean to you? Well, for many of you who live west of Texas, Oklahoma, Missouri, Illinois and Wisconsin, the change in service will have only a positive affect. You will still receive packages in 3 days or less and your packages over 2 pounds will cost you substantially less to ship. For the rest of you in the above-mentioned states and all states east of them, your delivery time will increase to 4 or 5 days with FedEx Ground service. However, the trade off is that your rates on 2 pound + packages will also decrease substantially. Of course, 3-day service, as well as 2-day and overnight will always be available and our rates for that level of service are as low as possible.

So, beginning in July, when you order, you will have new shipping options and rates that our customer service department will explain when you call to place your orders. We are also working closely with FedEx to get the new ground and 3-day rates plugged into our websites.

If you have any questions about these new changes, Tony or Greg in our shipping department can assist you. ■



HOW TO TAPER FOR AN EVENT

by Nate Llerandi

Now that the racing season is upon us, I find a lot of an athlete's stress surrounds what to do the week of a race. My answer is: that depends.

If the race is not very important, or what I call a "C" race, then training should be as usual during the week. A "C" race is a training race. The goal is to see how well you can do while tired. Sometimes you'll surprise yourself.

If the race is fairly important, or what I call a "B" race, then training should be as usual through Thursday (for a Sunday race). The rest of the week should continue as follows:

FRIDAY: This is a short, very easy day. I have my athletes keep their HR below 70%, or what I call "Warm up effort." The idea is to recover from the previous days' workouts while keeping the muscles moving.

SATURDAY: This day is longer and more intense than Friday. Some short race pace efforts should be included in your workout(s). I suggest these workouts be done first thing in the morning so they are out of the way. That way, the rest of the day is relaxed.

SUNDAY: This is race day. Get to the race site early enough so your preparation is as stress free as possible. Warm up well, for 20-30 minutes. Include a couple of short bursts. This lets your body know that you are going to test it soon, and it helps burn off nervous energy.

If the race is very important, or what I call an "A" race, then training should be tapered down a week to three weeks before race day, depending on: 1) how much training you do each week; and 2) how long your race is. The more training you do and the longer your race, the more rest you require. The less time you have available for training and the shorter your race, the less rest you need.

For ultra athletes, I suggest a three-week taper. The first week should be about 75-80% of your maximum training week. Week 2 should be

about 50-60% of your maximum training week. The final week should be 30-50% of your maximum training week. Keep the hard days hard, but cut back on the amount of hard work you do on those days. The same holds true for your aerobic days and overdistance days – gradually cut back. The final three days of the taper are identical to a "B" race taper.

For short course specialists, I suggest a one- to two-week taper. For these athletes, where speed at anaerobic threshold is most important, cutting back hours to about 70% the first week and 40-50% the second week is ideal. The final week of the taper, I have my athletes do something hard every day. But each day, they do less and less hard work. These hard repeats are minimal in duration and total distance compared to what they do in a normal week. For example, in a normal training week, cyclists might do 4-6 x (7:00 @ 84-92% with 3:00 easy); a runner might do mile repeats at the track. During a taper week, the cyclist or runner might do 2-5 x (1:30 at 90-95% with 1:30 easy recovery) – each day doing fewer repeats as the race draws near. Intense but nowhere near as hard on the body. You keep yourself sharp without undue lactic acid build up. The final three days of this taper are also similar to the three-day taper for a "B" race.

Ultimately, the main thing to do in a taper is to rest, rest, rest. You'll have more energy, so don't go out and hang drywall or landscape the yard!! Conserve your energy and let it all hang out on race day. ■

Happy Training!
Nate Llerandi

Nate Llerandi is a retired pro triathlete and has enjoyed the benefits of E-CAPS since 1989. His successful racing career culminated with a ranking of top American and 6th overall in the ITU World Cup Series. Nate now coaches endurance athletes of all walks of life and ability levels. Nate welcomes questions about coaching and training at llerandi3@aol.com.

GLUTAMINE AND GLUTAMIC ACID CLARIFICATION

In the last issue of *Endurance News*, We published an article by Dr. Gold that was critical of Aspartame and Monosodium Glutamate (MSG) which generated some concern regarding Glutamine and Glutamic acid foods and supplements.

"Research has shown that both free-form and protein-bound amino acids found in natural food products are absorbed gradually. Because of this gradual absorption from the gut, the liver can help regulate the plasma levels of amino acids that are released into the bloodstream. However, large amounts of free-form amino acids found in additives such as MSG and aspartame and found in some protein supplements are absorbed quickly from the gut and can overwhelm the liver's ability to regulate amino acid levels. Such a difference in absorption is not automatically "bad" but it is important to at least consider the possible consequences.

The main concern related to spiking the plasma levels of amino acids by ingesting MSG, aspartame and some protein supplements revolves around excitotoxic amino acids such as aspartic acid, glutamic acid, and cysteine. At somewhat higher levels of excitotoxic amino acids irreversible cell death can occur. The damage has been seen in studies on infant and young animals in the areas of the brain unprotected by the blood brain barrier. The levels used are similar to the levels that could be obtained by infants ingesting MSG in food. (MSG was removed from baby food in the 1970's for this reason.) Chronic exposure to significantly higher levels of excitotoxic amino acids, below that which causes cell death, may contribute to a variety of degenerative diseases and chronic health problems.

I believe that the amino acids in soy and whey protein supplements are bound in protein molecules and are therefore absorbed slowly. What is of concern are additives with large amounts of free-form excitotoxic amino acids that have been shown to be absorbed quickly and spike plasma levels (e.g., MSG, aspartame) and individual excitotoxic amino acid supplements such as aspartic acid, glutamic acid and cysteine.

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POWERBAR FAILS TO PROVIDE ENERGY!

A RESEARCH SURPRISE!

"Energy bars, touted for improving athletic performance, while providing the right combination of essential nutrients, may not always give endurance athletes the boost they expect. An Ohio State University researcher (1) recently compared two popular energy bars and found that one of the bars didn't give the moderate increase in blood sugar known to enhance performance in endurance athletes. Instead, its effect was much like a candy bar — giving a big rush of sugar to the blood, followed by a sharp decline.

According to Steve Hertzler, an associate professor of medical dietetics at Ohio State, energy bars should theoretically produce more moderate increases and decreases in blood sugar levels than a typical candy bar. Such claims aren't necessarily valid. Hertzler specifically looked at how energy bars affected blood glucose levels.

Glucose is a sugar that provides energy to the body's cells — for example, red-blood cells and most parts of the brain derive most of their energy from glucose. Athletes, especially those involved in endurance sports, want to enhance performance, and energy bars claim to help keep blood sugar levels at a moderate level. Volunteers had to fast for at least 12 hours before taking part in each of four experiments. They then ate one of four experimental "meals" consisting of:

1. Four slices of white bread
2. Snickers bar
3. Ironman PR bar
4. PowerBar.

Each experimental meal provided the same amount of carbohydrates (50 grams). Hertzler then tested the effects these foods had on blood glucose levels at 15-minute intervals for up to two hours after each experimental meal. The volunteers had to wait at least 24 hours between each experimental meal.

Hertzler measured each subject's blood samples for glucose levels to determine which food most raised blood sugar levels.

Both energy bars caused blood glucose levels to peak at 30 minutes, while levels peaked at 45 minutes after the bread and candy bar were consumed. Blood glucose levels declined steadily throughout the duration of testing for all foods except the Ironman PR bar. This bar caused blood glucose rates to remain fairly steady, probably because of the moderate carbohydrate level of the bar, according to Hertzler.

Even though blood glucose rates peaked at 30 minutes with both bars, the high-carbohydrate energy bar, the POWERBAR, caused a much sharper decline, according to Hertzler's data. This decline turned out to be sharper than with the candy bar. Much of the energy derived from the bread and the candy bar came from carbohydrates and the same was true for the PowerBar. While the bar is low in protein and fat, more than 70 percent of it is made up of carbohydrates (such as high-fructose corn syrup; oat bran; and brown rice).

In contrast, 40 percent of the Ironman PR is comprised of carbohydrate (high fructose corn syrup and fructose.) The rest of the bar was comprised of 30 percent fat and 30 percent protein. Hertzler noted the composition of this bar may have been responsible for the diminished blood glucose response. Hertzler suggested that athletes involved in short-duration events who want a quick energy boost should eat a high-carb energy bar or a candy bar. Endurance athletes would be better off to consume an energy bar with a moderate carbohydrate level." ■

REFERENCES

Glycemic index of "energy" snack bars in normal volunteers, Steve Hertzler, Ph.D., RD, J Am Diet Assoc. 2000;100:97-100.

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New Sustained Energy by Steve Born

You may notice something different (besides the new labels) when you receive your next order of Sustained Energy. No, the formula hasn't been overhauled but one new ingredient has been added, a nutrient called Carnosine.

Carnosine, or beta alanyl L-histidine, is the dipeptide of the amino acids L-alanine and L-histidine and is a naturally occurring nutrient in the body. Higher levels are associated with an increase in physical performance as Carnosine is a potent lactic acid buffer. I have used this nutrient on its own in my training and racing and can testify to its effectiveness in this regard.

But there are additional benefits to Carnosine. It is an antioxidant that helps protect the cells from a particular type of free radical called hydroxyl radicals. When oxygen is used to create energy from fats and carbohydrates it requires certain enzymes to make that process more efficient. Perhaps the two most important ones are CoQ10 (in Race Caps) and Cytochrome C (in Enduro Caps). In simple terms, if you want to maximize the efficient use of oxygen to create endurance fuels, keep your stores of these two nutrients at peak levels.

Unfortunately, even at peak levels the most we can hope for is about 95% efficiency. There is a remaining 5% that is partly responsible for the production of the hydroxyl radical. In addition to other antioxidants, Carnosine helps neutralize this particular free radical.

One of the unfortunate negative aspects of aging is a damaging process called glycation which is the term used when glucose binds or crosslinks with proteins in an undesirable way. Eventually the end result becomes something known as Advanced Glycation End products (AGE). AGE produces huge amounts of free radicals that attack our cells and compromise the immune system. Carnosine has been shown in studies (Quinn PR et al., 19) to be a powerful AGE inhibitor as it effectively competes with proteins in the glycation process, neutralizing the negative aspects of this process.

Carnosine is completely tasteless and will not alter the flavor of Sustained Energy in the slightest. Its benefits for increasing endurance and enhancing general health make it a worthy addition to an already phenomenal drink. ■

NEW HAMMER PRO & HAMMER PRO SOY

There have been subtle changes to Hammer Pro and Hammer Pro Soy. Because we felt the need for a pure, "protein only" product in the Hammer Nutrition line, all flavorings and sweeteners have been removed from the products. As always, they are completely free from any artificial sweeteners and fillers as well as any added "supplements" that really have no place in a pure protein product. Instead, you get the benefits of having an easily mixed and digestible protein that goes straight into your system.

Hammer Pro is 100% ion exchange, glutamine enhanced whey protein. With its high amounts of glutamine and cysteine, and high biological value, whey is considered the premium protein for recovery and enhanced immune system function. Each scoop of Hammer Pro contains 18.5 grams of protein. Consider using it not only after your workout but also before sleep to enhance your recovery.

Hammer Pro Soy, the non dairy alternative, is 100% Genetically Modified Organism (GMO) Free Isolated Soy Protein which is also free of any added flavors, sweeteners or fillers. Soy is believed to be beneficial for lowering cholesterol levels and is a preferable protein source for use prior to or during exercise (although it can be used anytime). Unlike whey, soy protein has less potential for producing ammonia, a primary cause of premature fatigue. Each

scoop of Hammer Pro Soy contains 31.5 grams of protein.

Endurance athletes should obtain 1.4-1.7 grams of protein per kilogram of bodyweight daily. To figure out how much you need take your bodyweight in pounds and divide by 2.2. Take this figure and multiply by 1.4 to 1.7. This will give you the total amount of protein (in grams) you need daily. In English, this means that you need about 2/3 to 3/4 of a gram per pound of body weight on a daily basis to properly service and maintain your hard earned lean muscle mass. If you spend some time to evaluate your typical daily diet, you will most likely find that you are only getting about half as much protein as you need. Increasing your whole protein intake from normal dietary foods is the first place to begin your quest for adequate protein intake, but that is often easier said than done.

So, if you have trouble eating enough protein, Hammer Pro and Hammer Pro Soy are an easy way to ensure you are giving your body the protein it needs for retaining hard earned muscle tissue and preserving the integrity of your immune system to boot. Hammer Pro comes in a 30 serving container for \$19.95 while the Hammer Pro Soy comes in a 19 serving container for \$14.95. They are both available from www.hammernutrition.com or by calling us at 1.800.336-1977. ■



THE NEW GUY IN TOWN

In order to accommodate our continuing growth and to be able to serve you even better in the process, I have enlisted the experience and knowledge of Race Across America (RAAM) veteran Steve Born. Besides completing RAAM 3 times as a solo rider, Steve has worked in the supplement industry for over a decade, primarily working in and managing health food stores. Besides this, he may have more experience with the entire range of E-CAPS products than anyone other than myself. And, he undoubtedly has more knowledge and familiarity with competing brands of supplements.

Steve will be taking a month off from early June to early July to be crew chief for an Australian woman who will be competing in her 1st RAAM. However, after that, he will be available to answer your questions and provide personalized recommendations. Steve will

also be serving as a co-host with Dr. Bill and myself on the Endurance Online Discussion group, which is now hosted on our own website. (For more information on the EOL group, see the accompanying web update article.) Below is the greeting Steve posted in mid-May.

Hi everyone! My new e-mail address here at E-CAPS is: steve@e-caps.com. Please feel free to contact me with any questions you may have about E-CAPS/Hammer Nutrition products or, for that matter, any other products currently available. After nearly a decade of ultra marathon cycling I believe I've tried just about everything so I may be able to help you cut through all the potential confusion regarding your own personal supplement program. I have used E-CAPS supplements since 1991 and, along with the expertise of Dr. Bill, would be happy to help you in whatever way I can. Sincerely, Steven

ATP RESEARCH

Well, the research may not have just been published yesterday, but this study, as well as two done by Irshad Chaudry, do support the oral application of Adenosine Triphosphate (ATP). E-CAPS has been working with ATP and offering this universal energy source to our customers for well over a decade. However, this substance has continually drawn criticism from the exercise physiology community because they have all been taught in Phys. Ed. 101 that ATP cannot be effective as an oral supplement. The extremely fragile nature of this compound, coupled with the break down that would normally occur in the stomach, is the usual reasoning used to denounce any supplement that contains ATP.

However, back in the late 1980's our anecdotal responses to sublingual ATP were so positive and consistent, that we opted to offer this promising supplement to our customers. Since that time, our customers, probably many of you who are reading this now, have repeatedly confirmed the impressive ergogenic effects of ATP in every type of event from 500 meter track sprints to Race Across America to Ironman and beyond. Typically, the best results are achieved when ATP is used toward the end of a long event and before extremely high intensity and short duration events such as criteriums or track events.

This study not only supports our contention that orally ingested ATP can and does produce ergogenic effects, but it also indicates that a 14-day loading protocol may produce even better results than the typical on demand usage format. Needless to say, several of our beta testers will be experimenting with a two-week ATP loading cycle before competition and we will

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MERCURY AMALGAM EXPOSURE by Matthew M. Curtin, Ph.D.



Mercury exposure from mercury dental fillings, also known as "silver" fillings and "amalgams", is a life long threat. When a person chews, drinks, swallows and breathes, mercury released from dental fillings is absorbed by the lungs and the linings of the digestive system into the bloodstream. As they corrode, mercury fillings release ionized mercury into the saliva, tooth pulp, and gum tissues leading to the digestive system and bloodstream.

There has been a long running debate over the safety of these dental fillings. Dental industry trade representatives, most notably the American Dental Association (ADA), have long denied that there is any detrimental effects from the use of mercury in repairing dental cavities.

For more than a century, the ADA has contended that once a mercury amalgam filling has "cured", the mercury is chemically bound, and cannot escape the filling. This speculation has always been at odds with the commonplace observation that mercury fillings "wear out"; corroding, eroding, breaking, falling out of the teeth - requiring replacement with new fillings over time.

Recently, evidence has come forward that soundly refutes the contention/speculation that the mercury "stays put" in the fillings.

The center of debate over safety has now switched to the question of "how much mercury exposure does it take to become ill?" Most of the classical work establishing mercury as a potent neuro-toxin has come from acute, that is high dose, short duration exposures. Such exposures demonstrate high levels of mercury in blood and urine, and are the basis of present diagnostic standards for mercury toxicity. Many current investigators have come to believe that chronic low-dose exposure - small amounts over a long time - such as is received from mercury dental fillings follow a different dynamic.

Because of the strong attraction for molecules containing sulfur, low doses of mercury clear from the blood quickly taking residence in the body in an immobilized and not easily detected state. Traditional diagnostic methods and standards for acute mercury toxicity are inadequate for determining health dysfunctions arising from long term low-dose exposure to mercury via dental fillings.

Recent scientific investigations have shown

that persons suffering from Chronic Fatigue Syndrome (CFS) commonly demonstrate immune T-cells that are programmed to react against mercury and other dental metals.

Independent researchers have also shown that CFS sufferers have continuously activated immune systems, though a long sought viral cause for this activation still cannot be identified.

Immune sensitization against mercury and other dental metals changes the nature of the discussion regarding the safety of dental metals. Acute exposure criteria no longer apply when the immune system is directly involved. The standard of practice in allergic immunology is to avoid any substance that stimulates the immune system.

Below we outline what we have gathered from various sources, including researchers and those practicing dentistry and medicine, regarding the resolution of dental mercury and/or dental metal caused illness.

1. Diagnosing metal-caused illness. Every commonly used method of diagnosing dental metal-caused illness has problems. Hair tests can show elevated mercury, but very rarely show enough mercury to meet acute exposure standards. Urine studies are also insufficient to agree with acute exposure criteria. Even with a chelation challenge, people who are not ill will often show similar levels of mercury as those who are ill and suspect their dental fillings.

We are left with only two methods of diagnosing dental metal-caused illness that appear logical, supported by the objective facts.

Process of elimination. When all other potential causes have been eliminated, then the teeth at long last become suspect. If you have mercury dental fillings, you have mercury exposure. You don't need hair, urine or blood studies to determine that you are exposed to mercury - just count your fillings in the mirror. All dental metals release small amounts of their metal in the mouth under normal conditions. Mercury amalgams are reliably exposing the person to mercury on a near constant basis - the more amalgam surfaces, the greater the exposure.

You are immune-exposed to all the dental metals in your mouth. However, that alone doesn't mean you are immune sensitized to any of the metals. People ultimately act on faith and hope to remove their mercury dental fillings when following a process of elimination.

MELISA® Test. MELISA is the only objective test in our awareness that provides direct evidence for illness caused by dental metals. Lymphocytes don't lie or imagine, they swell

up and multiply when stimulated with the metal or pathogen they are programmed to remember - or they don't if there is no direct connection.

2. Detoxifying the teeth. Whether a person is receiving toxicity from a mercury buildup, or immune stimulation from a sensitized metal, the first step toward recovering health is to remove the controllable metal sources; the metal dental restorations in the teeth.

Safe removal of mercury fillings is an important consideration. Drilling can cause a large one-time exposure of mercury vapor. Mercury vapor is poisonous, and can cause increased problems if added to your other exposures. 80% of mercury vapor breathed into the lungs enters the bloodstream where it freely travels to the brain and other vital organs and tissues.

A rubber dam properly installed during drilling will: slow the rate mercury vapor directly enters the tissues of the mouth, stop amalgam particles from going down the throat, and funnel mercury vapor out of your mouth. Suction under the rubber dam will remove mercury vapor that accumulates underneath the dam. A rubber dam doesn't stop mercury vapor; it slows it down so that the high-speed drill created vapor doesn't impel directly into the mouth tissues. Breathing from a respirator becomes essential to reduce exposure since the opening to the mouth is in the immediate area where your nostrils draw air. Using the rubber dam will protect the mouth and throat tissues while increasing the mercury vapor available for nostril breathing.

There are other considerations that don't have a wide consensus, such as the order the fillings should be removed, and how much work to do in one sitting. These are important individual considerations to discuss with your physician.

3. Go to metal-free dental restoration materials. All ceramic systems are now becoming widely available. These have the highly desirable attribute of not corroding and releasing any metals into the mouth.

Metal-free is the standard of care for those suffering "amalgam illness" in Sweden. Even with a MELISA test you cannot determine what metals you will become immune sensitized against. Persons with immune sensitivity to one metal have much higher odds of developing a similar sensitivity to another metal.

If you are acting on a process of elimination and without certain knowledge from a MELISA test, then you are further increasing your odds of a positive outcome by eliminating all metals - since you cannot know which

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Good gastric bacterial balance promotes overall health, helps digest proteins by a process in which lactic acid, hydrogen peroxide, enzymes, antibiotic substances that inhibit pathogenic microorganisms and B-vitamins are produced.

The ideal ratio of Intestinal Lactobacillus to Coliform is 85:15. If an endurance athlete does not have the healthy ratio of good to bad microflora, the following may result: flatulence, constipation, bloating, candida, excess bacterial and fungal growths, impaired digestion, elevated cholesterol, nutrient malabsorption and bowel disorders. Gastric stress during an event is more likely to result when and if "Good Gastric Bacteria" ratios are maintained.

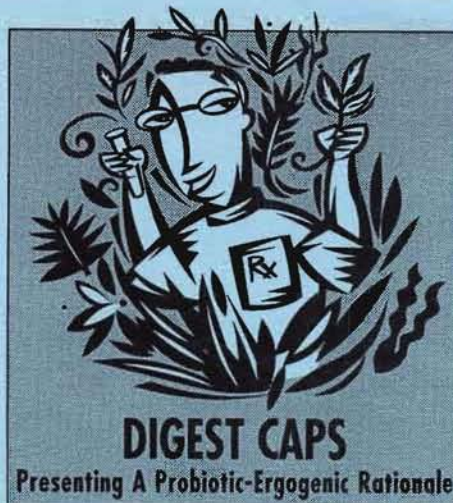
Prescription chemical drugs often prescribed by doctors of allopathic medicine to relieve the overt symptoms of disease, particularly pain, but do nothing to eliminate the root causes, which often lie hidden far from the symptoms. Athletes may grow dependent on such Rx-drugs, using them continuously until they develop a tolerance to them, then switching to stronger chemicals. Often the drugs themselves further aggravate the condition, or cause other ailments in related organ-energy systems.

Antibiotics, potent immunosuppressants, are prescribed for dozens of common ailments. But, in the process of killing the bacteria for which they are prescribed, they also kill off all the friendly lactobacteria in your intestines, severely impairing digestion and assimilation of nutrients at a time when your body needs them most.

Lactobacteria are the only elements in the body which keep candida and other harmful yeast infections under control; whenever one takes antibiotics, candida may spread throughout the system. A primary effect of candida infection is suppression the immune system; the very drug you're taking to combat disease is impairing your only natural defense against it.

Healthy "friendly" intestinal bacteria is essential not only to good intestinal health. In a healthy colon, there are literally billions of beneficial or "friendly" bacteria. Under favorable conditions, they multiply at a fast enough rate to keep pace with the large numbers that are lost during elimination. "Friendly bacteria" synthesize many important vitamins in the digestive tract including Vitamin K and some of the B vitamins.

Another very important function they perform is helping the colon maintain a proper pH or acid-base balance. It is necessary for the pH to stay in the correct range in order for other health supporting bacteria to exist. It is also important to keep levels of antagonistic micro-



organisms under control.

Over 1.5 billion live cells of *L. acidophilus*, *B. bifidum*, and *B. longum* Unique human strains selected specifically to adapt to the human intestinal tract. These bacteria produce acid and other substances which create an environment suitable to beneficial bacteria but adverse to pathogenic bacteria. Friendly bacteria may nutritionally assist in the body's normal response to harmful yeast growth.

Acidophilus bacteria predominantly colonize the upper to lower part of the small intestine, while Bifidobacterium colonize primarily the lower part of the small intestine to the large intestine. Combining these strains may help suppress harmful bacteria and the substances they produce along the entire intestinal tract. A Lactobacillus Acidophilus supplement is recommended to those who have been exposed to antibiotics, or who want to restore their depleted "good" intestinal flora, and for maintaining an ideal 85:15 ratio favoring the beneficial intestinal Lactobacillus bacteria over Coliform Bacteria.

SCIENCE FAVORS "PRO"-PROBIOTICS

Goldin reported, "Probiotics enhance the nutritional content and bioavailability of nutrients and the scientific evidence for the usefulness of probiotics in alleviating the symptoms of lactose intolerance and in enhancing growth development is examined. Goldin's published review focuses on studies of a specific probiotic, Lactobacillus GG which has been extensively investigated for its health benefits in humans and animals. The reviewed studies serve as a model for the potential benefits of probiotics. The ability of Lactobacillus GG to treat or prevent diarrhoeal disease, to serve as an adjuvant for vaccines, to prevent rotavirus-induced diarrhoea, to prevent milk-based allergic reactions, alcohol-induced liver disease and colon cancer were also presented with a discussion of the data supporting the safety of probiotics use." (1)

Ochmanski & Barabasz (1999) stated, "Interest into probiotics has been spurred on by the growing abundance of civilization disorders such as neoplasms, atherosclerosis, heart disease, hypertension and HIV infection. Probiotics are potentially capable of annihilating these disorders. Starter cultures are pure mixed bacterial, fungal or mold cultures which by transformation of their metabolism facilitate favorable changes in appearance, aroma, consistency, and durability of foodstuffs. Contemporary knowledge concerning probiotics and their action is derived from many years of tradition in consumption of fermented milk products and the documentation of much research into strains of lactic bacteria, their harmless action on health and overall beneficial effect." (2)

Veldman's positive review of animal studies favors a human application, "The effects of probiotics on the growth, feed conversion or production of farm animals are, even in specific situations, not consistent enough to consider their use out of economic considerations. Probiotics are used to (re)establish the intestinal flora of patients or persons with lactose intolerance. The claims that probiotics have cholesterol-lowering and anti-tumor actions are based on animal experiments and require further investigations." (3)

Lactobacillus acidophilus-containing yogurt has been observed to reduce serum cholesterol and low density lipoproteins, but it had no effect on serum triglycerides or on high density lipoproteins in animal studies with supposed application to human subjects. (4) The importance of pre- and probiotics as measures to strengthen the neonate's intestinal host defenses in the prevention and treatment of specific age-related disease are positively considered. (5) The ability to adhere to mucosal surfaces is related to many probiotic health effects. In the presence of Lactobacillus GG or Lact. bulgaricus, the adhesion of Bifidobacterium lactis Bb12 to a mucus model was more than doubled. Other tested lactobacilli did not affect the adhesion, nor was the adhesion of the lactobacilli influenced by the bifidobacteria. These results suggest that combinations of probiotics strains may have synergistic adhesion effects. Such specific strain combinations should also be assessed in future clinical studies. (6) Oral consumption of probiotic bacteria has the potential to support the health of American consumers. (7) Arunachalam et al., demonstrated that dietary consumption of B. lactis HN019 can enhance natural immunity in healthy elderly subjects, and that a relatively short-term dietary regime (6 weeks) is sufficient to impart measurable improvements in immunity that

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HOW MUCH CARBOHYDRATE IS TOO MUCH?

What is the maximal amount for delaying fatigue?

by Dr. Bill Misner, Ph.D.

CHO-Carbohydrate Transfer Rate To Energy Cycle

Sure, you're tired, hurting big time, while the temptation to drink or eat your fuel-of-choice to relieve the "bonk" may do just the opposite if you overdo it. With NO rehydrating and NO refueling, most endurance athletes exercise efficiently from 90-120 minutes and then they begin to deteriorate rapidly.

During the first 60 minutes of exercise, the body selects 55-65% of its fuel-for-energy needs from muscle glycogen stores, up to 30% from body fat reserves, and 5-15% from lean muscle amino acids. Depending on the fitness and individual biochemistry, sometime between 70-90 minutes, after initiating a 70-85% VO₂ Max endurance pace rate, the body switches gradually to select 55-60% of its fuels from bodyfat, 30-35% from depleting muscle glycogen stores, and 5-15% from lean muscle mass amino acids. When athletes are told that they spend 10-12 calories but can only replace around 4 calories per minute from Hammer Gel (HG) or Sustained Energy (SE), they shake their heads in shocking disbelief. Nine out of 10 (90%) of all, hyponatremia, gastric stress, and muscle cramping performance failures reported to me typically are associated with too much fuel, too many fluids, and too little electrolytes taken during the race.

Performance may be enhanced by limiting the amounts of fluid and fuel. Elite athletes at the front of the pack who were evaluated for fuel and hydration intake, tend to use far less fuel and fluids than those in the middle of the pack, who also use less than those in the back of the pack. The top comrades ultra marathoners were observed drinking 16 fluid ounces per hour while those suffering in the back with water intoxication and hyponatremia drank in excess of 30 fluid ounces per hour, evidence correlating with over drinking proportionate to performance times. (1) Athletes who overeat or

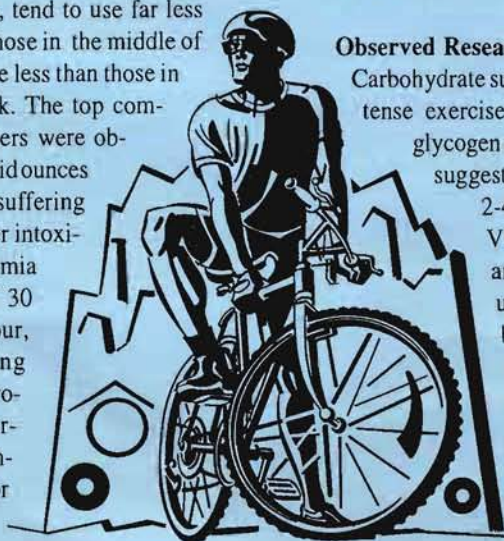
overdrink in an endurance event may reduce performance by imposing a variety of disorders unwanted during the event. Overeating and over-hydrating has been documented to cause a number performance-debilitating maladies such as gastric stress, diarrhea, flatulence, bloating, muscle cramps, premature fatigue, and hyponatremia. Fit athletes rehydrate at rates ranging from 16-24 ounces of fluid per hour. There are of course exceptions to every "rule of thumb," but this adage suggests using these fluid levels as a starting point.

Fuel Intake Volume Applied to Energy Production is Size-Dependant

During strenuous exercise (+70% maximal O₂ consumption) there is a progressive shift from muscle glycogen to blood glucose oxidation with increasing duration of exercise. By maintaining blood glucose concentration and the rate of carbohydrate oxidation necessary to exercise strenuously, carbohydrate consumption throughout exercise delays fatigue by 30-60 minutes in endurance-trained subjects. This requires exogenous glucose supplementation at rates of slightly over 1 gram/min (i.e., 16 mg/kg/min) as evidenced by the observation that intravenous glucose infusion at this rate is required to maintain blood glucose at 5 mM. Delaying fatigue is what a carbohydrate-enhanced gel or energy drink is designed to do. The maximal volume of fuel that cycles into delaying fatigue is 16 mg/kg/min exogenous carbohydrate and has a basis dependant upon bodyweight (2). (See chart on page 11.)

Observed Research Evidence

Carbohydrate supplementation during intense exercise does not spare muscle glycogen utilization in athletes. This suggests that over the course of 2-4 hours of exercise at 70% VO₂max, muscle glycogen and blood glucose contribute equally to TOTAL carbohydrate oxidation. Furthermore, during the latter stages of prolonged exercise, exogenous blood glucose supplementation may be ca-



(ATP RESEARCH cont'd from page 6)



report their findings in the next issue of *Endurance News*. If you haven't yet tried ATP 100, you may be missing a valuable race performance booster. Here is what Dr. Bill recently dug up:

Researchers Herald Ergogenic Results with ATP for Loading Dose Protocols.

A promising study shows a plausible metabolic rationale for oral-routed ATP. Take note, oral dose ATP was observed to produce ergogenic potential in cardiovascular and respiratory response after 14 days high dose of 20mg/kilogram. A 20 mg. per kg. dose translates to over 1400 mg. per day/14 days in a 154 lb. athlete. Such amounts of oral ATP would create too much of an acidic effect on the stomach. E-CAPS has designed a buccal (sublingual) metabolic pathway gastric-bypass entry ATP product. Since buccal routing provides 51% substrate survival, while a gastric tablet only permits an 11% substrate transit, this favors buccal delivery by a factor of 4.6 times! To achieve what the researchers observed in animal subjects a 1400 mg.-effect from gastric entry, a 154 lb. athlete (20 mg./kilogram) need only take 3 each (100 mg.) ATP Surge sublingual tablets for 14 consecutive loading days to achieve ergogenic results:

"No effect on central blood pressure and heart rate is observed, but an increase of the left ventricular work index is noticed subsequent to the diminution of vascular resistance. Rather similar cardiovascular modifications are observed in rabbits given 20mg/kg/day1 adenosine for 14 days but without variation of respiratory parameters. These original effects of repeated oral treatment with ATP may result from an adaptive metabolic response to nucleoside supplementation that might affect the turnover of extracellular purines leading to P1- and/or P2-receptor activation." (1) ■

REFERENCE

(1) Cardiovascular and pulmonary response to oral administration of ATP in rabbits, Ketty Kichenin, Stephanie Decollogne, Jean Angignard, Michel Seman, J Appl Physiol 2000;88 1962-1968.

(continued on page 11)

ones or how many you are reacting against. It is very common to be sensitized to more than one dental metal. Every metal used in dentistry, including gold, titanium, and platinum, has been demonstrated to cause a T-cell mediated immune allergy in some people.

Nickel, a common base metal used in low-cost crowns and as a hardening agent in expensive gold crowns, causes immune sensitivity the most often, followed by inorganic mercury. Even with gold, a CFS sufferer has a 1 in 3 chance of being immune-sensitized to the metal.

We are aware of a case where a person became immune-sensitized to gold after having all amalgams removed and gold alloy crowns installed for the first time. Gold sensitivity was demonstrated by bleeding gums in association with the gold crowns, and a ring finger rash from a previously tolerated gold ring. This person was objectively demonstrated to be immune-sensitized to gold, nickel, and mercury via subsequent MELISA® testing.

4. Restore normal metabolism. Many of the symptoms arising from "amalgam illness" are believed to result from a persistent immune activation wasting away nutritional resources, and the direct consumption and dysregulation of nutritional resources by metals, particularly mercury. Depletion of intracellular glutathione stores is a common result of extended immune activation and from extended mercury exposure. This depletion can be directly related to symptoms of poor immune response and symptoms of hypothyroidism (low thyroid), among many other problems.

In a healthy state, the body's stores of glutathione come to the defense by binding circulating mercury as it oxidizes, and carrying the metal in the waste flow via the liver and kidneys. A slow down in this natural process may be the first step in immune-sensitization, allowing mercury levels to build to a level that enrages the immune system.

An activated immune system further consumes body stores of glutathione, possibly leaving the body even more sensitive and with fewer defenses against the continuous exposure of toxic dental mercury. Restoring intracellular glutathione, antioxidants, B-vitamins, and rare trace minerals are the long-term remedy for many of the symptoms of "amalgam illness." Metabolic restoration can begin even when the suspect metals are still in the teeth.

For some people, IV preparations of nutrients will be required at first to bypass disrupted digestion and absorption. Others can go straight to much less expensive oral supplements such as "Double Defense & Double Replenish" from CFS Nutrition.

5. Reduce the body burden of mercury. There are several drugs and at least one nutrient that seem quite effective in enhancing the body's detoxification rate of extracellular mercury. Each of these are described as a "dithiol" compound.

DMPS is an experimental drug, legally available in the USA only from medical researchers under special FDA license. DMSA is available for prescription under a general FDA approval, though its primary approval is for eliminating a body burden of lead, not mercury. Alpha lipoic acid is a naturally occurring compound found in very small amounts in potatoes and other foods, and is available over-the-counter as a food supplement.

In doses able to heavily influence the excretion of mercury, all of these compounds have anecdotal problem reports. One reason that seems likely is the further dysregulation of important trace minerals caused by these powerful chelating agents. Dithiols pull strongly on essential minerals and not just heavy metals like mercury and lead.

You should know there is an ongoing controversy regarding the safety of dithiol chelators and the use of DMPS in particular. Visit Jana's DMPS Backfire website for information you may not receive at a DMPS chelation clinic. We suggest that a person be on a sure metabolic footing before pursuing any chelation strategy to further enhance mercury detoxification beyond the normal glutathione pathway.

Two supplement programs containing alpha-lipoic acid are available from CFS Nutrition: "Advanced Defense & Replenish" and "Super Defense & Replenish." These offer relatively small and periodic doses of lipoic acid while supporting glutathione levels. We are aware of some persons advocating much more aggressive dosing of lipoic acid for mercury detoxification. We urge caution.

We recommend a person be free of mercury dental fillings and first complete a course of "Defense & Replenish" or "Double Defense & Double Replenish" or their equivalent, before moving on to supplements containing alpha-lipoic acid.

For more aggressive strategies in enhancing mercury excretion, we strongly recommend you consult a physician with a proven record of success in chelating heavy metals while avoiding "backfires," restoring their patients to a more normal health. ■

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may offer significant health benefits to consumers. Salminen et al., defining the exogenous application of bacteria, specifically on probiotic's safety issue, wrote, "Probiotics are commonly defined as viable microorganisms (bacteria or yeasts) that exhibit a beneficial effect on the health of the host when they are ingested. They are used in foods, especially in fermented dairy products, but also in pharmaceutical preparations. The development of new probiotic strains aims at more active beneficial organisms. In the case of novel microorganisms and modified organisms, the question of their safety and the risk to benefit ratio have to be assessed. Lactic acid bacteria (LAB) in foods have a long history of safe use. Members of the genera *Lactococcus* and *Lactobacillus* are most commonly given generally-recognized-as-safe (GRAS) status". (9)

The acceptance for probiotics has widespread application for infant through elderly populations, and of course all those endurance athletes in between. There are a number of formulae for enhancing a variety of "Good Bacterial Ratios" in the intestinal tract ranging from fermented milk by-products to the ultimate concentrated supplement, such as DIGEST CAPS recommended in this text as a healthy modulator for optimal gastric response during immune system stress, exercise-induced substrate-depletion, muscle resynthesis, for an optimal digestive-dependant biomechanical absorption response. ■

REFERENCES

- (1) Goldin BR, Health benefits of probiotics, *Br J Nutr* 1998 Oct 80:4 S203-7.
- (2) Ochmanski W, Barabasz W, Probiotics and their therapeutic properties, *Przegl Lek* 1999 56:3 211-5.
- (3) Veldman A, Probiotics, *Tijdschr Diergeneesk* 1992 Jun 15 117:12 345-8.
- (4) Danielson AD, Peo ER Jr, Shahani KM, Lewis AJ, Whalen PJ, Amer MA. Anticholesteremic property of *Lactobacillus acidophilus* yogurt fed to mature boars. *J Anim Sci* 1989 Apr;67(4):966-74.
- (5) Walker WA. Role of nutrients and bacterial colonization in the development of intestinal host defense. *J Pediatr Gastroenterol Nutr*. 2000;30 Suppl 2:S2-7.
- (6) The mucus binding of *Bifidobacterium lactis* Bb12 is enhanced in the presence of *Lactobacillus GG* and *Lact. delbrueckii* subsp. *bulgaricus*. *Lett Appl Microbiol*. 2000 Jan;30(1):10-3.
- (7) Considerations for use of probiotic bacteria to modulate human health. *J Nutr*. 2000 Feb;130 (2S Suppl):384S-390S. Review.
- (8) Arunachalam K, Gill HS, Chandra RK., Enhancement of natural immune function by dietary consumption of *Bifidobacterium lactis* (HN019), *Eur J Clin Nutr*. 2000 Mar;54(3):263-7.
- (9) Salminen S, von Wright A, Morelli L, Marteau P, Brassart D, de Vos WM, Fondén R, Saxelin M, Collins K, Mogensen G, Birkefeld SE, Mattila-Sandholm T Demonstration of safety of probiotics — a review, *Int J Food Microbiol* 1998 Oct 20 44:1-2 93-106.

(ENDURANCE DIET cont'd from page 1)

sedentary activities, endurance exercise, strength exercise, and power-speed exercise.

TYPE OF EXERCISE & PROTEIN REQUIRED (nitrogen balance)

Strength-short distance speed

2.0 grams/kg. bodyweight

Ball Sports-medium distance running

1.7 grams/kg. bodyweight

Endurance-long distance running

1.4 grams/kg. bodyweight

Protein is rated according to the weakest single amino acid of its essential amino acid profile. The highest score from the PDCAAS-protein rating is 1.0. The only sources of protein with a "perfect" Predicted Digestibility Corrected Amino Acid Score of "1.0" are from soy, whey, or egg whites.

Most meats are in the 0.90-0.92 range, peas-0.73, oats-0.57, peanuts-0.52, rice-0.47, corn 0.42 and wheat 0.25. Cereal grains combined with vegetables, legumes, nuts, or seeds provide a complete 1.0 PDCAAS if ingested within a 24-hour window. There are ways to combine protein sources of less than perfect 1.0 PDCAAS proteins to tally a 1.0 PDCAAS score, IF the dietary proteins are ingested within a 24-hour period.

The optimal protein intake for an endurance athlete is 1.4 grams protein per kilogram body weight. The exceptions to this rule are when endurance efforts exceed 6-hour duration or if speed work is extreme, which may raise the need to 1.7 grams per kilogram bodyweight. There are means to combine proteins of a less-than-perfect 1.0 PDCAAS protein to tally a 1.0 PDCAAS score, when dietary protein sources are ingested within a 24-hour period. Most of us get enough protein, but most of us are eating poor protein choices such as meat, poultry, or dairy by-products which contain a high saturated fat and cholesterol content.

Look for Part II of this article in issue #29 of *Endurance News*. The entire text of this article can be accessed online at www.e-caps.com or by sending a SASE to P.O. BOX 4010, Whitefish MT 59937 with a note asking for a copy of Dr. Bill's Ultimate Endurance Diet. ■



(CARBOHYDRATES continued from page 9)

MAX CARBS/HOURS

Weight	RMC (gm/hour)	(k/cal)	HG (servings)	SE (scoops)
110	48	[192]	2	2.0
121	53	[212]	2	2.17
132	58	[232]	2.3	2.38
143	62	[248]	2.5	2.54
154	67	[268]	2.75	2.75
165	72	[288]	3.0	3.0
176	77	[308]	3.0	3.16
187	82	[328]	3.25	3.36
198	86	[344]	3.50	3.53

RMC=Recommended maximum carbohydrate grams per hour.*
HG=Hammer Gel, SE=Sustained Energy *Footnote-This is a rough estimate: each athlete should exercise trial in training to determine exact biochemistry optimals.

pable of supplying almost all of the carbohydrate requirements of exercise at intensities up to 70% VO₂max. Muscle glycogen and plasma glucose are oxidized by skeletal muscle to supply the carbohydrate energy needed to exercise strenuously for several hours (i.e., 70% maximal O₂ consumption). (2)

With increasing exercise duration there is a progressive shift from muscle glycogen to blood glucose. Blood glucose concentration declines to hypoglycemic levels (i.e., 2.5 mmol/L) in well-trained cyclists after approximately 1 hour of exercise and this appears to cause muscle fatigue by reducing the contribution of blood glucose to oxidative metabolism. Carbohydrate feeding throughout exercise will DELAY fatigue by 30-60 min, apparently by maintaining blood glucose concentration and the rate of carbohydrate oxidation necessary to exercise strenuously. At this time, exogenous glucose disposal exceeds 1 gram/minute (16 mg./kg./min-1) is evidenced by the observation that intravenous glucose infusion at this rate is required to maintain blood glucose at 5 mmol/L. However, at this time these cyclist cannot exercise more intensely than 74% of maximal O₂ consumption, suggesting a limit to the rate at which blood glucose can be used for energy. It is important to realize that carbohydrate supplementation during exercise only delays fatigue by 30-60 minutes, but does not prevent fatigue. Taking more carbohydrate than can be absorbed may stress electrolyte levels in gastric straits, accumulating excess unabsorbed carbohydrates in intestinal pockets, causing bloating, flatulence, nausea, dizziness, burping, stomach cramps, or diarrhea.

Fatigue-like "bonking" occurs during prolonged

strenuous exercise often due to inadequate carbohydrate oxidation, which is partly the result of hypoglycemia, which limits TOTAL carbohydrate oxidation, resulting in muscle fatigue. (3) Our body, in an all-out effort, is able to totally oxidize 12-16 glucose calories per minute from converted bodyfat, lean muscle mass aminos, muscle glycogen, and incoming exogenous sources such as Hammer Gel or Sustained Energy.

Evidence shows that exogenous glucose must be infused at a rate of 2.6 grams/minute or 37 mg/kg/min, which is similar to the total rate of carbohydrate oxidation, in order to maintain

blood glucose at 10 mM following 2 hours of exercise. (2) The total carbohydrate oxidation requirements for an endurance athlete range from 12-16 calories or 3-4 grams glucose per hour. In most athletes, intake of 60-80 grams of carbohydrate will supply the maximum in carbohydrate fatigue-delaying benefits. Much more than this is excessive intake that may add disorders and unwanted problems nobody wants to experience. ■

REFERENCES

- (1) Water Intoxication: A possible complication of endurance exercise, Noakes TD, Goodwin N, Rayner BL, Brankin T, Taylor RKN, Medicine and Science in Sports and Exercise, 1985; 17:370-375.
- (2) Carbohydrate feeding during exercise, Coyle EF Int J Sports Med 1992 Oct 13 Suppl 1 S126-8.
- (3) Carbohydrate supplementation during exercise, Coyle EF, J Nutr 1992 Mar 122:3 Suppl 788-95.

(GLUTAMINE continued from page 4)

My personal recommendation is to focus primarily on obtaining protein from whole food sources. If a protein supplement is used, soy protein and whey protein are reasonable choices. I would avoid MSG, aspartame and supplements of the individual amino acids, aspartic acid, glutamic acid, and cysteine. Glutamine and NAC are fine for supplements and do not have the same adverse effects." ■

More information can be obtained from:

"Excitotoxins: The Taste That Kills" by Neuroscientist Russell Blaylock, MD (good book for laypersons and scientists).

"Excitotoxins in Foods" by John W. Olney, Neurotoxicology, Volume 15, No. 3, pages 535-544, 1994. Mark D. Gold, mgold@tiac.net

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ENDURANCE NEWS MISSION STATEMENT

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

Endurance News features insightful articles on diet, nutrition, training and other topics of interest to 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, EN will include articles highlighting new and existing E-CAPS products and how to get the maximum benefits from them.

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

Brian Frank
Editor

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. ■