

Sports Nutrition Update -- Abstracts from the American College of Sports Medicine 43rd Annual Meeting

PART II: ERGOGENIC AIDS

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Editor's note: Part I of Dr. Andersen's article was published in the 1/27/97 issue of DC.

Antioxidants

Sixteen males, ages 18-34, who ran an average of 20 to 25 miles per week, were tested on a 30 minute run at 80% V02 max, followed by a sprint to exhaustion (this is a hard workout). They were fed an energy bar rich in antioxidants (vitamin C, vitamin E, and mixed carotenoids), or an identical tasting placebo. Testing before and after exercise revealed increases in the activities of oxidant defense enzyme systems which resulted in a lower level of oxidative stress when athletes ate the antioxidant energy bar.¹

Comment: Athletes need extra antioxidants above RDA levels. With such an incredibly safe risk-benefit ratio, it is my opinion that those people who are against nutritional supplements for athletes must prove scientifically that the RDAs are optimal for heavy exercisers. Until that happens, I will continue to recommend that anyone involved in athletic activity on a regular basis supplement his or her diet with antioxidants.

Branch Chain Amino Acids

There have been a lot of conflicting studies on amino acids. Many of the more recent ones have been negative concerning the ergogenic effects of amino acid supplementation. In this double-blind, placebo-controlled study six male subjects consumed a branch chain amino acid mixture or placebo. They then performed eccentric leg extension exercises. Muscle biopsies and blood tests were taken during and after exercise. Calorie intake was controlled and the trials were separated by 30 days. The authors concluded that oral ingestion of branch chain amino acids elevated branch chain amino acids during exercise and recovery, and suppressed the rate of net muscle protein degradation.²

In a study on female college students, 30 minutes prior to exercise tests they took either 11 gm of branch chain amino acid formula or a placebo in a double-blind manner. During all prolonged exercise tests, blood lactate levels were significantly lower in the branch chain amino acid group, and blood ammonia levels were higher in the amino acid group, which the authors state may imply an increased branch chain amino acid utilization. The rate of perceived exertion levels was significantly lower when athletes took branch chain amino acids (i.e., athletes did not feel as tired when they supplemented with BCAAs). The authors stated that branch chain amino acids may improve exercise endurance capacity and the rate of perceived exertion during prolonged exercise of moderate intensity despite

the accumulation of ammonia.³

Comment: What these abstracts show me is that amino acid supplementation can work if enough is taken. In the first study, the amount of amino acids given was seven doses of 38.5 mg/kg of body weight, which for a 154 pound male equates to almost 19 gm. In the latter study, the women were ingesting 11 gm of branch chain amino acids. When you go to the health food store and read labels on amino acid products, you will find that the amounts recommended are not close to the amounts used in the above trials. Furthermore, many of the studies that have been performed on amino acids without favorable results have used levels that are recommended on product labels. It is my opinion that branch chain amino acids can help build muscle and aid in recovery, but they must be dosed in levels (e.g., 2.5 gm seven times a day) that even the most compliant person will have difficulty following on a regular basis.

Creatine

This double-blind study showed that creatine supplementation at the rate of 25 gm per day for seven days resulted in a significant improvement in power output for the bench press and jump squat. Creatine ingestion for one week also increased lean body mass in spite of no change in dietary energy intake. The authors feel this indicates that creatine monohydrate supplementation can increase body mass and enhance muscular performance.⁴

In a double-blind, placebo-controlled trial, college-age men and women consumed 5 gm of creatine monohydrate four times a day for four days and then were tested for a 30 second sprint on an exercise bike. Total muscle creatine was increased but performance was not. The authors concluded that creatine supplementation did not improve performance during a single 30 second exercise bout.⁵

Twelve male runners ingested 20 gm of creatine monohydrate or a placebo for five days. They were then tested in maximal running bouts lasting no longer than two minutes. The authors concluded that the creatine supplementation did not enhance performance in this test.⁶

Comment: There is an increasing amount of literature as well as thousands of anecdotal reports that creatine increases size and strength in the weight room. In the first study, the mass gain with no increase in calories supports the cell volumizing theory of creatine monohydrate, i.e., when a cell is loaded with creatine, the creatine attracts excess fluid. When muscles are hyperhydrated they are bigger and stronger. In my opinion creatine is not the supplement of choice for endurance athletes, however, for anaerobic athletes such as sprinters, creatine supplementation may be of benefit. Although the second and third studies were negative, the creatine was only given for a one week period. We have learned that at the end of a week of supplementation with steroids a person may be stronger in an exercise like the bench press, but it will take longer to affect performance in activities such as sprinting. If creatine can help build muscle size and power, which the weightlifting studies support, I expect that athletes in explosive sports will also benefit from creatine use with properly designed studies science should validate this.

Chromium Picolinate

Chromium picolinate supplementation for weight loss and lean body mass has been controversial in the literature with some initial studies showing promise and most of the recent studies being negative.

In this very interesting study (double blind, placebo controlled) of 40 collegiate swimmers during the competitive season, 24 weeks of supplementation with 400 mcg of chromium picolinate increased lean body mass (3.3%), decreased fat mass (4.6%), and decreased body fat (6.43%). Females lost more body fat (8.2%) than males (4.6%), but the authors speculate that the greater loss of body fat for the women may have been because they had more body fat to begin with. What was most interesting in the study was the greatest rate of change for both males and females in body composition occurred between weeks 12 and 24.⁷

Comment: The authors suggest that the effectiveness of chromium picolinate may require a longer supplementation period than has been routinely used in previous studies, and also may work better with higher intensity exercise as was the case in this study. This abstract was certainly impressive. I hope to see it published and, if replicated, will certainly rehabilitate what in my opinion has been a tarnished image with chromium picolinate due to a host of less than impressive studies over the past couple of years.

Inosine

Inosine is an ergogenic aid that purportedly increases 2-3 diphosphoglycerate concentration in the blood, thus increasing oxygen to the tissues, which results in greater performance. In this test subjects were given 5,000 mg a day of inosine or a placebo. Competitive male cyclists either rode 30 minutes (self-paced), or rode in a supramaximal sprint to exhaustion trial. In the 30-minute test there was no difference in the amount of work produced, but in the sprint test the inosine group fatigued more rapidly than the placebo group.⁸

Comment: Inosine was a hot ergogenic aid in the late 1980s and early 1990s. Its popularity faded in recent years. In this study the inosine was actually ergolytic, i.e., supplementation hurt performance. Although one abstract does certainly not indicate a paradigm shift, I would like to see those companies who market inosine fund further studies on this supplement. I am sure if inosine is proven to be ergolytic that responsible marketers and business people would cease selling this product as a performance enhancer.

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FEBRUARY 1997