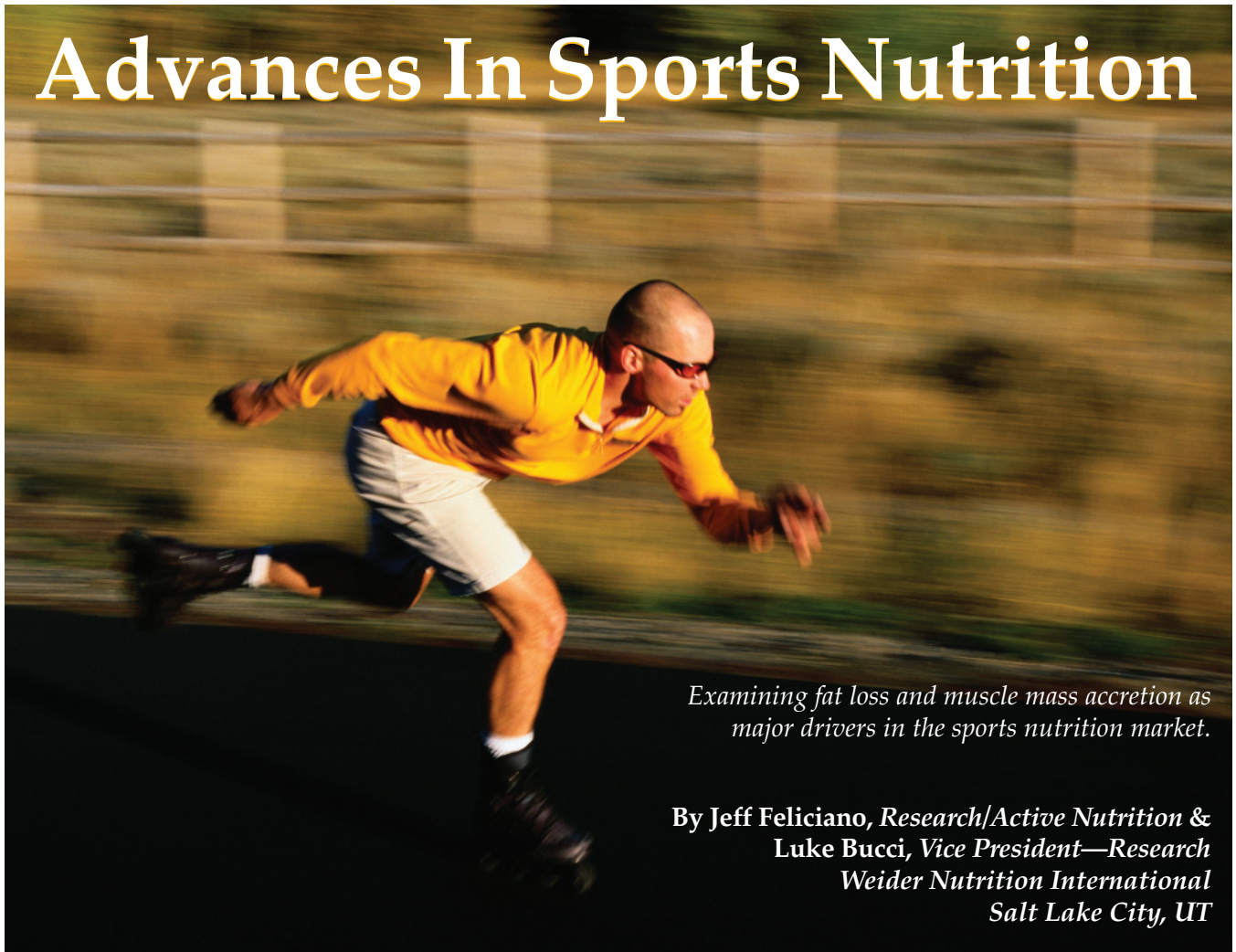


# Advances In Sports Nutrition



*Examining fat loss and muscle mass accretion as major drivers in the sports nutrition market.*

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One of the “megatrends” over the past few years has been the continued conglomeration of the sports and fitness craze with the dieting and weight loss industry. The line between sports nutrition products and weight loss products has now been blurred to the point that they have become synonymous with each other. Like dieters, athletes and sportspersons almost universally share a common goal of leanness (fat loss/control with muscle retention/gain). This commonality has merged these two separate categories into one.

## **Diet**

The diet category looks different today than it did a couple of years ago. The industry is reemphasizing the basics as a platform from which to fight the ever-increasing “American Bulge.” This means that magic bullets are “out” and diet pro-

grams are “in,” emphasizing exercise and caloric restriction, often couched as exercise and eating less, as the road to fat loss.

## **Mental Energy & Fatigue: The Real Noncompliance Culprits**

From the outside, it seems like most Americans don’t want to diet, yet they don’t want to sweat. But it’s more complicated than that. Time and fatigue are more of a problem than the effort and inconvenience of exercising and dieting. Not being able to fit it all in one day or having the energy is often responsible for the noncompliance of diet and exercise programs. Fortunately, many commonly used supplements have these features built in, and the realization of this is growing.

The time required for weight management is much less if diet is coupled with exercise. But the combination of exercise

and a diet of sufficient caloric restriction often produces a period of fatigue. Trying to acclimate to fluctuations in energy is where most people decide that they can’t follow through. Making a living and raising kids supercedes other efforts—efforts that may appear as more elective than necessary—so weight management often takes a back seat to daily responsibilities.

### ***This article in a nutshell:***

- Diet
- Mental fatigue
- Energy management
- New directions, well-worn supplements
- Fighting fat with fat
- The low-carb craze
- The future

### Energy Management

It's important that diet and exercise programs include suggestions with regard to energy management. Stimulation without over stimulation is the order of the day as an effective way to hurdle periods of fatigue as your body becomes accustomed to new levels of exercise and caloric restriction.

The good news is that small doses (60-100 mg) of caffeine throughout the day may effectively increase vigilance without producing over stimulation. After all, soft drink manufacturers have practiced this for decades—remember the 10-2-4 ad campaign? Nowadays, diet soft drinks fill this want. But, there is no substitute for tenacity, and there is no room for over stimulation, so defaulting to more potent stimulants is ill-advised if for no other reason that they confound metabolic response and the ability to make diet choices necessary for long term weight management. Effecting “fast” weight change is perhaps more a medical concept reserved for severe weight management, rather than a viable option for most individuals. The slow, extended approach that emphasizes enduring changes in food selection coupled with exercise remains the most logical way to successful long term weight management.

### New Directions, Well-Worn Supplements

While science is leading the way to improved food selection, the need for supplementation may be just as beneficial. Perhaps the best example of this is mineral supplementation. Deficiencies of chromium, selenium, calcium, magnesium and zinc appear to be more frequent than previously believed, especially in the context of caloric restriction and exercise.

New roles in thyroid function, metabolic rate, hormone production, translation of hormone signals to cellular machinery and mental energy have cast a new light on mundane minerals. The key is to have a consis-

tent, adequate intake. Mineral overload does not help and can be counter-productive.

### Fighting Fat with Fat

Conjugated linoleic acid (CLA) is another bright spot in the sports nutrition segment. Not a stimulant and not a magic bullet, CLA appears to be an effective adjunct to diet and exercise based on its putative mechanism of action. However, two hurdles remain regarding greater acceptance. First is the dose of CLA required to effect statistically significant fat loss. And the second hurdle, which is related to the first, revolves around how to get the most efficient results from a relatively costly ingredient. In other words, what kind of diet and exercise program along with CLA gives the best results?

Clinical results in CLA weight loss studies are equivocal, which may be a function of intensity of exercise as well as the amount of active cis-trans isomers being consumed per day. (Trans isomers are the same thing as in trans fatty acids, which are generally not healthy. However, naturally-produced trans fats as CLA are healthy. Where the trans double bond is on the CLA molecule is what determines how well it works for promoting fat loss.). While different Wisconsin Alumni Research Foundation (WARF)-licensed manufacturers produce CLA products with somewhat different amounts of the two active isomers, clinical studies suggest that exercise may be the most important variable to control results and isomer content per serving a secondary consideration. In other words, intensity and frequency of exercise is initially more critical than are differences between the sources of CLA. The harder a person trains the more effective are lower doses of CLA.

Regarding mechanism of action, this is still far from being resolved. But it looks like CLA redirects lipid metabolism around the body, so that CLA is utilized for energy rather than stored in adipose tissue. Over time, CLA

helps a dieter “hold their ground” through the occasional times when he/she falls off the dieting wagon, so-to-speak. In other words, caloric restriction and exercise burn the fat, while CLA slows down the ability to restore lipid as fat.

This may not seem like much, but in the grand scheme of dieting, “one step forward and two steps backward,” makes dieting efforts more futile than productive. Of course, the non-professional dieter—a class where most of us falls—has as a tough time staying with their new schedule of diet and exercise. This is a result of several factors. Without CLA, little set backs are enough to slow or plateau progress, making the entire effort seem futile. Including CLA, however, seems to flatten these occasional little bumps in the dieting and exercise road, resulting in less frustration and more success.

The clinical data also suggest that CLA produces fat loss, while maintaining or promoting an increase in lean body mass. The majority of research studies find a loss in fat mass with no change in scale weight, which indicates that while fat decreased, muscle stayed the same or in some cases increased. With those who exercise intensely, the data suggest that subjects, at the very least, held on to the muscle they had, and many of them increased lean mass. A more sedentary group, while consuming almost three times the dose, also seemed to respond by maintaining lean mass.

No one is saying that CLA is a magic fat loss bullet, or that it eliminates the yo-yo effect. However, it is fair to say that CLA helps maintain the weight loss effected by a successful diet and exercise program as long as it is used while an individual continues to diet and exercise.

### The Low-Carb Mentality is Here to Stay

Other mechanisms and gadgets used to ward off the American Bulge are low-carb diets and supplements

designed to help a consumer through that experience. Over the past 12 months more peer-reviewed research has found support for diets that restrict carbohydrates, replacing them with a combination of protein and fat. Typically known as low-carb dieting, there is a right way and a wrong way to eat a low-carb diet for long term health.

It's probably safe to say that restricting carbohydrates results in weight loss, the greater proportion of the loss being from fat metabolism. This has been the goal of many other diet concepts, such as the Zone or anti-sugar plans. However, these plans control carb intake rather than eliminate it.

There are a lot of no- or low-carb diets that can be used. The simplest type removes sugar and saturated fat from the diet. In most situations, this simple manipulation will result in the improvement of a spectrum of biochemical and physiological parameters, not the least of which is fat loss—whether you exercise or not.

The next level of commitment for the low-carb dieter involves changing higher glycemic carbohydrates with ones that have lower glycemic responses. Potatoes replaced by brown rice and steamed vegetables becomes something that can automatically be consumed freely.

### **Low Carb=Low Energy?**

The next level of fat loss reduces the gram amount of starchy carbohydrates such as rice and breads, and replaces them with an equal amount of protein. This is the change that produces some of the biggest increases in fat loss and some of the biggest dips in energy as well. Increased protein and fiber with a concomitant decrease in digestible carbohydrates is the ultimate goal of a low-carb dieter, and with this macronutrient manipulation, the low-carb dieter must also increase fluid intake to ensure proper hydration. For most people, this manipulation comes with a price—a drop in energy.

This is where adding a bit of caffeine during the day is most beneficial, since caffeine not only increases vigilance and mood, but also stimulates fat breakdown. Nothing major, mind you, but every little bit helps, and this is especially true with caffeine.

The final adjustment, which actually occurs while increasing protein intake, requires an increase in mono and polyunsaturated fats, with an emphasis on omega 3 fatty acid consumption. This is the most difficult change for most folks since they have been indoctrinated with the low-fat dogma.

Adding fats like those contained in peanut butter and olive oil not only improves physiological function, but it also supplies the energy needed to get through the day.

Unfortunately there is much controversy regarding fat intake and low-carb dieting. Most of the controversy surrounds saturated fat intake. Some diets say you can eat as much as you want, while the anti-low-carb school of thought points to this claim as being the weakest. Remember that saturated fat is not an essential nutrient, and the body can easily make saturated fats from either protein, carbs or other fats.

In terms of supplements, there are several that may help individuals through the tough spots. CLA can be helpful when coupled with a low-carb diet and exercise plan, as well as carnitine and medium-chain triglycerides (MCTs). Carnitine is utilized to transport fats into the mitochondria and there are data that indicate consuming at least 2 grams of carnitine per day favorably affects biochemical markers associated with exercise recovery. So not only is carnitine involved in a process that you want to increase, but it also makes exercising less of a chore.

MCTs are fats that enter the mitochondria without carnitine by a different mechanism than do long chain fatty acids, so they can contribute to energy generation faster and more efficiently. This translates to a boost of en-

ergy for the low-carb dieter. MCTs make life for the low-carb dieter easier to tolerate.

$\beta$ -hydroxy  $\beta$ -methylbutyrate monohydrate (HMB) is another supplement that like MCTs may contribute to energy metabolism during a low-carb diet. Combining HMB with carnitine may help a low-carb dieter's energy levels in between meals. A shot of MCTs along with carnitine and HMB is a ketogenic dieter's secret weapon to help maintain the energy and attitude to get through a tough day.

Another supplement that is catching a lot of interest is alpha-GPC, alpha glycerylphosphorylcholine. Although not new to the supplement industry, new research on alpha-GPC indicates that taken prior to exercise, it improves normal, intensity-related endocrine response such as growth hormone (somatotropin or hGH) secretion. A bump in hGH secretion can help maintain and even grow new muscle, while increasing fat metabolism, when coupled with resistance training in a manner to which the body is accustomed.

There is even data to indicate that taking alpha-GPC prior to bed on an empty-stomach can effect a greater increase in sleep-induced hGH secretion. Maintaining muscle while decreasing fat is the ultimate goal of any fat loss supplement plan since metabolism and muscle mass are so closely linked. Of course, many products have promised the "dream away your pounds while you sleep" concept, but few if any had effective doses of hGH secretagogues, and none had clinical evidence of efficacy. Alpha-GPC holds more promise for delivery on this concept because of a lower dose needed to release hGH than amino acids or other secretagogues previously used.

### **Future Bright Spots**

From the sports nutrition side, the future of both fat loss and muscle mass accretion looks a lot brighter than a few years ago. Supplements can have immediate, well-supported, meaningful

and positive results on mood and mental energy levels, which can lead to greater compliance in diet and exercise programs. Diet and exercise will always have more quantitative metabolic effects than supplements, but these powerful effects are worthless if

a plan is not consistently adhered to. Supplements can provide enough mental energy to maintain motivation to stick with the program. **NW**

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### **JAMA Review Of Low-Carb Diets Released**

*More long term studies on the effects of low-carbohydrate diets needed.*

According to an article published in the April 9th issue of *Journal of the American Medical Association (JAMA)*, low-carbohydrate diets have been popularized without detailed evidence of their efficacy or safety. In addition, the literature has no clear consensus as to what amount of carbohydrates per day constitutes a low-carbohydrate diet.

The objective of researchers in this study was to evaluate changes in weight, serum lipids, fasting serum glucose and fasting serum insulin levels and blood pressure among adults using low-carbohydrate diets in the outpatient setting. Researchers included articles describing adult, outpatient recipients of low-carbohydrate diets of four days or more in duration and 500 kcal per day or more, and which reported both carbohydrate content and total calories consumed. Literature searches identified 2609 potentially relevant articles of low-carbohydrate diets, which included 107 articles describing 94 dietary interventions reporting data for 3268 participants; 663 participants received diets of 60 grams a day or less of carbohydrates—of whom only 71 received 20 grams a day or less of carbohydrates. Study variables (eg, number of participants, design of dietary evaluation), participant variables (eg, age, sex, baseline weight, fasting serum glucose level) and diet variables (eg, carbohydrate content, caloric content, duration) were abstracted from each study.

According to researchers, included studies were highly heterogeneous with respect to design, carbohydrate content (range, 0-901 grams a day), total caloric content (range, 525-4629 kcal a day), diet duration (range, 4-365 days) and participant characteristics (eg, baseline weight range, 57-217 kg). No study evaluated diets of 60 grams a day or less of carbohydrates in participants with a mean age older than 53 years. Only five studies (nonrandomized and no comparison groups) evaluated these diets for more than 90 days. Among obese patients, weight loss was associated with longer diet duration and restriction of calorie intake, but not with reduced carbohydrate content. Low-carbohydrate diets had no significant adverse effect on serum lipid, fasting serum glucose and fasting serum insulin levels or blood pressure.

Researchers concluded that there is insufficient evidence to make recommendations for or against the use of low-carbohydrate diets, particularly among participants older than age 50 years, for use longer than 90 days or for diets of 20 grams a day or less of carbohydrates. Among the published studies, researchers said, participant weight loss while using low-carbohydrate diets was principally associated with decreased caloric intake and increased diet duration but not with reduced carbohydrate content.

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