THE CrossFit JOURNAL

Supplementation for Competition

Chris Mason of AtLarge Nutrition outlines a plan of attack for CrossFit competitors interested in using supplements in hopes of optimizing their performances.

By Chris Mason **July 2010**

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The CrossFit Games: perhaps a truer test of human fitness has never been devised. Of course, outside the CrossFit world, there are many definitions and opinions of what constitutes fitness. It's a word that gets bandied about quite a bit. Some might think the winner of the Marathon Des Sables (a 151-mile footrace across the Sahara Desert) is the fittest individual on the planet, while others might choose someone like Joe Decker, whom the *Guinness Book of World Records* certified as the world's fittest man after he completed a Herculean set of endurance tasks in a 24-hour period.

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For my money, the winner of the CrossFit Games is the true embodiment and owner of the title of World's Fittest Man or Woman.

CrossFit is unique in its all-pervasive pursuit of total physical development. Its Games are no different, as they test all the major categories of human physical expression. Varying events test absolute strength, strength endurance, generalized motor skill and aerobic endurance. Winning or even competing in the CrossFit Games is the ultimate goal for many CrossFit practitioners. For those of you who currently compete or want to compete in the future, the balance of this article will focus on one specific aspect of CrossFit performance optimization that has unfortunately heretofore been somewhat overlooked: supplementation.

CrossFit collectively is a no-nonsense, results-driven methodology, and the grossly exaggerated claims and misrepresentations that are so pervasive in the supplement industry simply have no place in the minds and hearts of its practitioners.

Until quite recently, supplementation was not part of the collective CrossFit consciousness. This was, perhaps, part of the CrossFit community's generalized disdain for hyper-consumerism. CrossFit collectively is a no-nonsense, results-driven methodology, and the grossly exaggerated claims and misrepresentations that are so pervasive in the supplement industry simply have no place in the minds and hearts of its practitioners. You know the sayings: "600 percent increase in your bench press!" "Mind-blowing pumps!" etc.

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It's up to the community to decide if supplements improve CrossFit performance.

Whatever the cause, I am glad to see the CrossFit brass willing to allow me to present my thoughts on the subject for the consideration of its practitioners. I truly respect the fact that those at the corporate level for CrossFit value the feedback of their members sufficiently to do so.

Specific Supplement Recommendations for CrossFit Competitors

The following is a list of my supplement recommendations for CrossFit competitors, a description of the benefits each can impart and instructions how to use them:

Creatine Monohydrate

This is the single most studied and proven ergogenic supplement. An overwhelming body of evidence (both university-level studies and empirical) indicates it promotes both anaerobic strength and lean muscle mass.

Creatine supplementation exerts its effects via two distinct pathways. The first involves increased intramuscular stores of creatine and phosphocreatine. Phosphocreatine enhances strength endurance (i.e.,

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Athletes in many sports use supplements to improve performance, but the jury is still out on many of the products. The choice is yours.

the ability to do repetitions with a given barbell load) by helping to synthesize ATP to fuel muscular contraction after the initial stores are exhausted during high-intensity exercise (intramuscular ATP stores are only good for about 2-3 seconds of intense contractions).

The second pathway involves a direct promotion of increased muscular size. Both an increased store of intramuscular water retention (not to be confused with edema) and specific effects on other growth-related mechanisms are thought to be the motors driving creatine's hypertrophy-promoting effects. Interestingly, these two separate effects are very likely synergistic and possibly additive in nature (see more about cell volume and anabolism in the protein information below).

Creatine (in the form of a quality creatine monohydrate) should be incorporated into the athlete's daily regimen at least two months out from any competition. Many athletes choose to use it year round, and this is generally considered a safe practice. A loading phase may not be necessary, but consuming 20 grams per day for the first seven days of use is recommended, followed by a maintenance dose of 5-10 grams per day.

Beta-Alanine

An amino acid, beta-alanine is produced endogenously (in the body) but can also be consumed by eating protein-rich foods containing the dipeptides carnosine, anserine or balenine (most meats).

Beta-alanine's primary mechanism of action is considered to be via its increase of intramuscular carnosine stores. Muscle pH decreases during intense exercise. This exercise-induced acidosis leads to a decline in the muscle's ability to contract forcefully as well as generalized muscular fatigue. Carnosine acts as a buffer to this acidosis by sequestering protons, thus potentially allowing for prolonged intense physical activity.

Theory aside, beta-alanine is a proven ergogen with demonstrated effects on total work capacity, power output at lactate threshold, delayed onset of muscular fatigue during high-intensity exercise and improved sub-maximal endurance performance. It also has beneficial effects on lean body mass via a decrease in body fat and possible increase in lean muscle tissue. All these benefits are highly desirable to the competitive CrossFit practitioner.

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If you choose to use supplements, you've got thousands of options.

Beta-alanine, like creatine, should be introduced at least two months out from competition. Continuous use is considered safe and recommended. It should be consumed daily with a dose of 3-4 grams. No loading phase is required. A phenomena known as paresthesia may occur with single doses exceeding 800 milligrams. It manifests as a tingling or itching sensation on the face and or extremities (in most cases). This is a harmless reaction which is transient (typically only lasting a few minutes) and often reduces and or subsides with continued use.

Depending upon nutrient availability, the body may be in a net negative nitrogen balance after an intense training session. In other words, more protein is being broken down than is being created.

Supplemental Protein and Carbohydrates

These supplements are recommended due to their potential for promoting enhanced recovery from intense exercise.

The post-workout (PWO) "window of opportunity" relative to nutrient intake is a well-known and much-hyped phenomenon. Hype and industry rhetoric aside, the consumption of protein and carbohydrates after a workout has proven benefits relative to optimization of recovery and the potential for supercompensation (adaptation by the body that allows for improved future performance).

Depending upon nutrient availability, the body may be in a net negative nitrogen balance after an intense training session. In other words, more protein is being broken down than is being created (or synthesized). While it is true that training stimulates protein synthesis (even in a fasted state), the net negative balance is a product of protein degradation also being increased to such

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a degree that it outstrips synthesis. The simple PWO consumption of protein reverses this catabolic state, but the addition of carbohydrates even further enhances protein's anabolic stimulus. In addition, the presence of carbs, and thus insulin (which is released in response to the consumption of carbohydrates, especially quick-absorbing carbohydrates), promotes the synthesis of glycogen, which is the energy source of choice for intense muscle contractions.

The above section addresses "what" happens when protein and carbohydrates are consumed PWO. Now we will delve into a very simplified scientific "why." As already stated, protein ingestion is in and of itself a stimulus for protein synthesis (PWO or not), but with the introduction of carbohydrates a turbo-charged effect takes place.

All the above might beg the question as to why protein and carbohydrates should be consumed in the form of a nutritional supplement ... . To be clear, they need *not* be.

The concurrent ingestion of protein and quickly absorbed carbohydrates elicits a potent insulin response. This insulin response initiates a complex interaction that results in a greater increase in muscle protein synthesis (rate limited by the availability of amino acids, hence the consumption of protein with the carbohydrates) when compared to that stimulated by just protein. Insulin may also reduce muscle protein breakdown (there is some scientific argument on this front). The net effect of insulin is a greater protein synthesis response and total net nitrogen state (i.e., a more anabolic state).

Another very interesting phenomenon that occurs in the PWO environment involves muscle-cell volumization. You may have heard this term relative to supplementation, but probably not in the PWO context. Volumization of a cell is simply an increase in its size. The very cool and very interesting part of this phenomenon is that the swelling of muscle cells that occurs after intense training promotes the synthesis of both protein and glycogen. With the availability of both amino acids and glucose, this process can be optimized. In addition, the glycogen-synthesis effects of insulin seem to work additively (providing an *additional* and incremental enhancement of glycogen synthesis) with cell volumization, creating the optimal environment for post-workout glycogen replenishment.

All the above might beg the question as to why protein and carbohydrates should be consumed in the form of a nutritional supplement (a "protein" powder with carbs). To be clear, they need *not* be. Solid or liquid foods can certainly do the job. I recommend a supplement shake for two reasons. The first is that a shake is a highly portable and convenient manner in which to ensure a relatively quick intake of nutrients PWO. It is an easy thing to bring a shaker cup with some powder in it to the gym. Add water, and voila—an effective PWO "meal." The second reason is that there may be a benefit to consuming your PWO protein and carbohydrates in liquid form. The absorption rate may be slightly quicker, and it is definitely easier to drink your nutrients immediately after training.

I recommend a shake consisting of at least 30 grams of a high-quality protein blend (a blend of whey and casein at a minimum) and 30 grams of a quickly absorbed carbohydrate such as dextrose or maltodextrin. Some fats are desirable but not required.

The Crossfit Games competitor should use a PWO shake as a part of their regular training regimen. In addition, I recommend a shake be consumed between events, with a light meal following roughly an hour later if the schedule allows.

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Microlactin

Microlactin is an ergogen you have most likely never heard of. Perhaps a bit less sexy than creatine or beta-alanine, Microlactin is still a supplement with great potential value to the CrossFit competitor.

Its primary ergogenic benefits are improvement in speed of recovery and anti-inflammatory action. It is theorized to aid recovery via its effect on creatine kinase (CK) levels. Blood CK levels are a generally accepted marker of skeletal muscle damage and spike after intense training. Microlactin has been demonstrated to significantly reduce the time required for CK levels to return to baseline after intense training. This indicates either a protective effect against muscle damage or more rapid repair. CK levels also highly correlate with delayed onset muscular soreness (DOMS), and Microlactin reduces DOMS duration for most users.

Microlactin's anti-inflammatory effects work via a different pathway than that of aspirin or NSAIDs. It can thus provide an additive benefit in terms of the reduction of the minor aches and pains inherent to all intense training regimens.

In a nutshell, Microlactin can allow its user to train harder and more often—and that is a *great* thing for any CrossFit competitor.

Microlactin should be taken daily in a 2-4 gram dose.

Because Every Second Counts

CrossFit competition is intense, incredibly demanding and highly competitive. Every participant has the opportunity, within the confines of safety and the rules, to use any and all ergogens at his or her disposal. While the world of nutritional supplements is rife with products that are ineffective, dangerous or outright scams, a few select supplements are key for anyone looking to optimize performance. The list contained in this article, while not comprehensive, notes the safest, most proven sports supplements known (to the point that some of them are health promoting). I believe they should be a staple in the daily regimen of all active and aspiring CrossFit competitors.

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About the Author

Chris Mason is the co-owner of AtLarge Nutrition, where you can find the supplements listed in this article. Chris has been involved with bodybuilding and powerlifting for over two decades. He is an accomplished writer in the genre, having published articles in ***Athlete, Planet Muscle, Ironman*** *and* ***Powerlifting USA*** *magazines, as well as online. You can view several of his articles on his website WannaBeBig.com.*

Chris currently resides in Charlottesville, Va., and makes monthly treks to Ohio to train at Westside Barbell with Louie Simmons. He is also a member of Louie's team for CrossFit Powerlifting Certs.

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