

nutrition performance

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More Strength, More Reps, More Muscle: *Beta-Alanine Does it!*

By now, many of you are likely hearing about amino acid beta-alanine and the huge buzz and impact it is currently making on the bodybuilding and science communities. It's rare to find a supplement that both the bodybuilding and the science community are in awe of. The typical scenario often looks something like this: We have some geeky researcher who has never set foot in a gym telling us about the next breakthrough supplement. They go on and on, how a certain supplement is the next "big thing," trying to impress us with statistics that show huge percentage increases in muscle mass, strength or endurance. The problem is that while a supplement can seem to work great in a lab setting and look impressive "on paper," the big gains in muscle and increases in strength and endurance often don't carry over to real results where we need them.

On the other side of the coin, we have certain supplements that gym rats swear by as being effective. Many of these supplements have built a solid reputation within the bodybuilding community as being extremely effective in causing muscle, strength and endurance gains. But when these same supplements are put under scientific scrutiny in the lab, they fail miserably. There are a few exceptions to the above explanation, creatine being the most notable. Now we have another. Beta-alanine is this other exceptional

supplement, and one that is shocking both the bodybuilding and science community— a rare feat, indeed. Gym rats and performance athletes who have used beta-alanine already know it works and works very well in increasing strength, endurance and muscle mass. But let's take a brief look on how it works from a scientific perspective.

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What Stops Us From Reaching Our Full Potential?

When we exercise, especially when it's at a high intensity, our body's energy systems release large amounts of hydrogen ions (H⁺). The release and accumulation of H⁺ causes our muscle's pH to drop (become more acidic). This process is occurring whether you feel a burn or not.

The breakdown of ATP and the subsequent rise in H⁺ concentrations

occur in all of our energy systems, but H⁺ buildup is most prevalent in an energy system called glycolysis, which also produces lactic acid. At physiological pH, lactic acid dissociates (releases) H⁺ and is the primary source of released H⁺ ions during exercise. It is the released H⁺ from lactic acid that causes muscular fatigue and performance problems, not the leftover lactate ions as many incorrectly believe. While lactic acid is the primary source of released H⁺, it is not the only source. H⁺ ions are also being released at a rapid rate when you break down the high-energy compound ATP during exercise. With the presence of many sources during energy production releasing H⁺, pH quickly drops.

As our muscles' pH quickly drops, so does their ability to contract forcibly and maintain a high level of performance throughout your workout session. Not being able to perform and maintain forceful muscular contractions and push your body to the limit during your workout session seriously hampers your ability to maximally overload your muscles and force new muscle gains. In a nutshell, H⁺ causes your muscles' pH to drop, in turn decreasing your strength and causing you to fatigue faster. These limitations stop you from adequately overloading your muscles and forcing new muscle gains.

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How Can Beta-Alanine Help Us Overcome This Drop In pH?

Much of beta-alanine's effects are realized through its ability to boost the synthesis of a powerful intramuscular H⁺ buffer called carnosine.

Carnosine is a naturally occurring dipeptide that has the ability to stabilize muscular pH by soaking up these fatigue-causing hydrogen ions (H⁺) that are released at an accelerated rate during intense exercise.

Carnosine is found in both type 1 and type 2 muscle fibers, but is in significantly higher concentrations in type 2 fibers. Type 2 muscle fibers are primarily used in high-intensity strength workouts and are most responsive to muscular growth.

By boosting carnosine concentrations with beta-alanine, our type 2 muscle fibers can soak up more H⁺ and stay in an optimal pH range. By keeping our type 2 muscle fibers in an optimal pH range, they are better able to maintain maximal strength and endurance throughout your workout session and bring on new muscle gains.

Increased Carnosine And Exercise Performance

Boosting carnosine levels with beta-alanine is effective at all points during your set, whether you're lifting heavy or doing endurance work. Your body uses three energy systems to perform work: the ATP-PC system, which is primarily used during heavy lifting and for sets up into the 5-6 rep range; the glycolytic system, which is predominantly used roughly within the 7-15 rep range and up; and the oxidative/fat system, which is used primarily in endurance training. Our energy systems are utilized simultaneously, however, depending on the

level of intensity or duration of exercise and fitness levels of the individual, certain energy systems will become more dominant in producing energy needed for that activity. Anybody who trains with weights will primarily use the first two systems and, in both cases, the buildup of hydrogen ions will contribute to fatigue in both systems, especially glycolysis.

This is where the supplement creatine falls a little short. It is mostly effective in the ATP-PC system, which relies on stored ATP and resynthesis using phosphocreatine (PC) for intense, high-energy contractions. Taking creatine will help your explosive strength but it won't help you much in the 7-15 rep range. As anyone trying to build bigger muscles knows, you must train in both heavy and moderate (7-15 reps) ranges to maximize muscle mass gains. Beta-alanine, by increasing carnosine concentrations, can buffer/fight the H⁺ buildup that occurs in both these ranges, allowing you to maintain forceful contractions for longer periods of time.

Decreasing cellular fatigue is an additional strength of beta-alanine. A recent study demonstrates that beta-alanine outperformed creatine in decreasing cellular fatigue, giving it yet another advantage over what has been considered the most effective sports supplement of the last decade. With beta-alanine yielding impressive results in university performance studies and in the gym, creatine's days at the top may be numbered.

How Much Beta-Alanine Is Needed To Cause Performance Increases?

Research has shown that you can take an amount between 3.2 grams and 6.4 grams per day to significantly boost carnosine levels and improve

performance. The most recent research, now using 4-5 grams a day, is showing comparable carnosine concentration and performance improvements to those using 6.4g daily. Based on the most current research, we suggest around 4 grams of beta-alanine a day.

Quality Research On Beta-Alanine Continues To Pile Up

Another important point in regard to beta-alanine research is the subjects used in the studies. What is often found with sports supplement research is the subjects used in the studies are sedentary individuals. This is important to mention, because it is easy to bring about big changes in performance or body composition changes when you are using individuals who do not exercise (sedentary) and are often out of shape. The results from studies using subjects who are sedentary is yet another reason why so many supplements disappoint in bodybuilding and athletic communities. The good news is the studies on beta-alanine often use strength/power athletes, active individuals and elite athletes and the results are still highly impressive, showing big performance increases.

Recent Beta-Alanine Study Using Wrestlers

A recent beta-alanine study on 18 collegiate wrestlers, using the commercial beta-alanine supplement IntraXCell, was just completed. The subjects took IntraXCell daily, supplying 4 grams/day of beta-alanine for eight weeks. The researchers measured changes in strength, power and endurance during the course of the wrestler's competitive season. The results were impressive, showing significant increases in anaerobic strength, power and muscular endurance.

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Benefits Of Beta-Alanine As Supported By Scientific Studies

- Boosts explosive muscular strength and power output
- Increases lean body mass
- Boosts muscular anaerobic endurance
- Increases aerobic endurance
- Increases exercise capacity so you can train harder and longer

How Long Will It Take To Start Noticing Benefits?

Performance benefits typically occur in as little as two weeks, although some individuals will notice benefits within one week. As carnosine levels increase, the benefits will follow. The most dramatic results are generally experienced within the three- to four-week range, but they don't stop there. Recent research is now showing carnosine levels continue to increase for a minimum of 12 weeks, which is why we recommend staying on beta-alanine for at least three months to optimize your carnosine levels.

Immediate benefits: Many users experience intense vasodilation/pumps from the very first dose of beta-alanine. This experience may occur because beta-alanine increases carnosine and carnosine is a powerful precursor in generating nitric oxide synthase (a group of enzymes necessary for making the powerful vasodilator nitric oxide).

Closing Remarks

We hope our article has given you a much better understanding of how beta-alanine works and why it is so effective. It truly is the next tier in sports nutrition, with both the body-

building and science community finding some common ground. Look for beta-alanine to grow in popularity as more people experience the power firsthand and beta-alanine rises to the forefront in sports performance university research. n

Sebastian Balcombe is the owner of Athletic Edge Nutrition. Anssi Manninen has no financial interest with companies selling beta-alanine supplements.

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