

# MD+ Amino version III

## The Revolutionary, Research-Driven, Anabolic, Amino Acid Formula



Amino, the most advanced cutting-edge amino acid formulation on the market today, maximizes protein synthesis by providing you with a quick and potent boost of anabolic and anticatabolic hormones and amino acids. The high systemic levels of amino acids and other synergistic ingredients provided by Amino has a direct effect on increasing protein synthesis, and at the same time increases systemic levels of the potent anabolic hormones and growth factors, including insulin, testosterone, growth hormone and IGF-I.

<http://www.mdplusstore.com>

Amino is formulated to maximize protein synthesis and recovery immediately after exercise. It's also useful for boosting protein synthesis and energy metabolism anytime during the day, making it especially useful for decreasing body fat while at the same time sparing muscle.

### Exercise is Catabolic

Post exercise protein supplementation has been shown to result in muscle protein accretion simply on the presence of the protein alone, not on the presence of other macronutrients or even energy content.<sup>1</sup> As well, a recent study has shown that post exercise protein also has significant beneficial effects on health, muscle soreness, and hydration.<sup>2</sup>

But there's more involved in immediate post training nutrition. Most people believe that certain compounds, usually those that are involved in the energy systems and in muscle contraction, should only be used during exercise while you're exerting yourself. While this is true to some extent they're really missing the boat when it comes to the value of post exercise nutrition.

You have to remember that exercise per se is a catabolic activity. The best you can do is to try and decrease catabolism and increase protein synthesis so that you minimize the overall catabolic response as much as possible. Doing this gives you a heads up when it comes to post exercise nutrition as there is less “catch-up” to do and you can get to a positive nitrogen balance faster.

While exercise is always catabolic, the opposite is true of the post exercise period. That's the time when your body heals itself and makes gains in strength and performance. And Amino is formulated to give you an edge within minutes of the end of a training session.

## **History of Amino**

I've been involved in the sports and weight loss business for four decades. For most of that time I've helped athletes in all sports, from professional bodybuilders to Olympic 100 meter gold medallists, optimize their body weight for maximum performance. I also operated a bariatric clinic for over two decades, seeing and helping many thousands of overweight people lose weight and body fat.

As well I've researched and written books and hundreds of magazine articles (in top fitness, sports and bodybuilding magazines) about ways to optimize body composition for over three decades.

During this time I've researched and tried to finesse nutritional supplementation before, during and after training. This was the reason I formulated Exersol, the training solution that includes Amino.

Version III of Amino represents the third evolution of this supplement. Each formulation is an improvement over the previous one, taking into consideration the most recent research and findings, and applying these to make Amino even more effective.

## **Amino version III**

Version III of Amino represents the ongoing improvement of the best immediate post exercise, and amino acid supplement on the North American and International markets. Amino III represents a new paradigm and is a quantum leap above all other products that target the immediate post exercise period.

The previous version of Amino already represented the ultimate post exercise and amino acid product. However, the new version is an improvement on a product that already had no competitors.

In keeping with the aim of maximizing the post exercise anabolic processes the formulation for amino has been improved, with more of some of the ingredients, and half dozen new ingredients. The new formulation further enhances various pathways involved in increasing protein synthesis, decreasing protein catabolism and increasing recovery.

For example the amount of ingredient in the Amino Proprietary Complex (APC) has been increased almost threefold from 3,000 mg to 7,900 mg.

**Vitamin B6** and **Vitamin C** have been added since both are crucial for optimizing protein synthesis and recovery of the neuromuscular system secondary to exercise stress.

**Carnosine** (beta-alanyl-L-histidine) was added to Amino because of its powerful antioxidant effects, as well as its effects on healing and recovery.<sup>345</sup> As discussed exercise is a catabolic process. Ordinarily this catabolic process continues even though exercise is stopped. Carnosine has an immediate effect on helping to change the catabolic state to one that's anabolic and aiding recovery in this and other ways. It also has beneficial effects on muscle damage and on increasing blood flow in muscle.<sup>6</sup>

**Citrulline Malate (CM)**, a mixture of citrulline and malate, was added for several reasons. Citrulline has several effects, including increasing ammonia clearance, increasing bicarbonate, ornithine, arginine, and citrulline levels. Malate, a tricarboxylic acid cycle (TCA) intermediate, has beneficial effects on energy metabolism mainly by facilitating aerobic ATP production through anaplerotic reactions.

Overall, studies suggest that citrulline malate supplementation can boost athletic performance and enhance recovery by eliminating the amino acid breakdown products of protein metabolism and augmenting the detoxifying capacity of liver cells in removal of ammonium and lactate from the blood.<sup>78910111213</sup> These actions decrease fatigue, enhance recovery and facilitate the shift from the catabolic training state to the post exercise anabolic state.

Adding to the effect on energy metabolism is the presence of **arginine**, **glycine** and **methionine** in Amino. That's because creatine can be produced endogenously via a two-step process involving these three amino acids.

As well, the combination of arginine and glycine, along with the ketoisocaproic acid (GAKIC) that is formed from leucine, make up a trio that has been found to be a useful combination if used after exercise, and before doing any further exercise.<sup>14</sup>

Besides the beneficial effects of the added ingredients, Amino III has a host of other ingredients that together make Amino III the premier amino acid supplement.

## Crucial Essential Amino Acid Mix

Amino contains the exact mix and quantity of essential amino acids that in recent research studies maximized post exercise protein synthesis.<sup>1516</sup>

Amino also contains the conditionally and non-essential amino acids that have been shown to be most used for protein synthesis in muscle (serving not only as direct substrates but also sparing the conversion of these amino acids from the essential

ones). This combination is enough to make Amino the best amino acid supplement out there.

As well, Amino contains my Amino Proprietary Complex (APC), a proprietary blend of several ingredients, which along with other ingredients in Amino maximizes mitochondrial anaplerotic flux in the TCA cycle resulting in increased ATP production and increased energy availability for protein synthesis and other functions, including the formation of phosphocreatine.

Amino contains measured amounts of several anapleurotic and other ingredients, including calcium alpha ketoglutarate, arginine aspartate, potassium succinate, citrulline malate, magnesium fumarate and adenosine monophosphate (AMP) that impact on TCA flux and which I feel, maximize mitochondrial metabolism, increase aerobic energy production, and enhance insulin and growth hormone/IGF-I secretion and formation.

While many people feel that various feedback mechanisms act to limit simultaneous increases in hormones and growth factors such as insulin, GH, IGF-I, testosterone, etc. In fact this is not the case under specific environments. For example increasing IGF-I does not seem to decrease GH stimulation by secretagogues such as arginine.<sup>17</sup>

These effects are secondary to both direct and indirect influences of the various ingredients on TCA flux through the increase of TCA intermediates such as succinate,<sup>18</sup> and malate/pyruvate shuttle<sup>19</sup> and both established and novel anaplerotic reactions. As well the APC also results in increased levels of both oxoglutaric acid and glutamate, the former as an anaplerotic TCA intermediate that seems to be glutamine driven as against the logical glutamate, and the latter as a compound that decreases cataplerosis while at the same time indirectly increases insulin secretion.

The overall increase in anapleurotic flux produces an increase in aerobic energy production, insulin secretion, and protein synthesis, and results in an increased adaptive response, a surge in skeletal muscle cell growth, increased fat loss, and improved recovery.

Amino, while formulated to be the ultimate post training supplement, can also be used at other times of the day. An increase in protein intake by itself has been shown to not only increase protein synthesis and decrease muscle breakdown, but has also been shown to increase both aerobic and anaerobic performance.<sup>20</sup> But Amino does much more than simply increasing protein intake.

Amino provides a square wave systemic increase in amino acids that translates into an increase in protein synthesis, which in turn keeps the body in an anabolic state. As such it's perfect as a snack between meals, especially if you're trying to reduce body fat.

Because of the way Amino is formulated, it's especially useful for anyone trying to maximize muscle mass while at the same time minimize body fat. Although the reasons why are a tad technical, it's worth presenting for those who like to know more of the scientific details.

## The Use of Essential Amino Acids after Training Increases 24 Hour Protein Balance

The use of amino acids in and around training, and at other times, has been shown to acutely increase muscle protein synthesis. The question in many people's minds, however, is whether the body compensates for this acute increase after training by decreasing protein synthesis later on during the day or even at night. In other words, does the increase in protein synthesis in response to amino acid ingestion that's seen after training result in a long-term anabolic response, one that is above what we would normally see without their use after training.

The answer is yes, according to a recent study.<sup>21</sup> This study, the first to describe the response of muscle protein balance to exercise and amino acids over a 24-h period, was designed to see if the response of net muscle protein balance to resistance exercise and amino acid ingestion that occurs on an acute basis, reflects the response of net muscle protein balance over an extended period of time. The essential amino acid mixture used included histidine, isoleucine, leucine, lysine, methionine, phenylalanine, threonine, and valine, the same mixture that in a previous study was shown to maximally enhance post training protein synthesis.

The results of this study show that muscle protein balance is increased, primarily because of an increase in muscle protein synthesis, when measured acutely and found that this response is additive to the basal response over a full 24-h period. This increase in muscle protein synthesis is part of the key to maximizing the anabolic results of training.

The bottom line is that taking Amino doesn't rob Peter to pay Paul. The anabolic gains are not sabotaged sometime else and in fact represent true gains on top of whatever else is going on.

## Losing Fat - Not Muscle

Among other reasons, I formulated Amino to increase the efficiency of the Krebs'/TCA/Citric Acid Cycle as far as maximizing the production of ATP for protein synthesis. These ingredients include specific Krebs' Cycle precursors and intermediates such as alpha ketoglutarate, malate, aspartate, succinate, and fumarate. These compounds, as well as certain amino acids that make up the glutamine peptides in Amino, have a dual effect. One is to spare the amino acids needed for protein synthesis, and the other is to produce the energy needed for this increased protein synthesis.

However, even though there are built in ingredients in Amino to increase ATP formation, (this is done by various processes including increasing oxaloacetate production directly or indirectly via the gluconeogenic/glycolytic/pyruvate decarboxylase pathways, increasing acetyl-coA production from the beta oxidation of fatty acids, and increasing anaplerotic flux from various TCA intermediates and precursors, including amino acids) there is the potential of arresting fatty acid oxidation under certain conditions. In

anticipation of this, I worked out one of the most likely problem pathways and added AMP to the formulation. I'll explain some of my reasoning below.

Maximizing ATP production is usually a good thing under certain conditions, but can be counter productive under others. For example, if the TCA flux increases more than the need for ATP, citric acid (citrate) is siphoned off to reduce TCA cycle intermediates. The citrate goes from the mitochondria to the cytoplasm and is turned back to acetyl-coA, which in turn, again when the need for ATP has been met, is complexed with HCO<sub>3</sub> to form malonyl-coA, the first committed step in lipogenesis.

The function of malonyl-coA seems to be not just for the formation of fatty acids, but also seems to be used locally (with possibly no need to proceed to the formation of fatty acids) as a regulator of another enzyme CPT-I which is responsible for the transportation of fatty acyl units from the cytoplasm to the mitochondria. When malonyl-coA levels increase, CPT-I is inhibited and lipogenesis rather than beta oxidation prevails. Various ingredients in Amino were meant to accomplish not only an increase in ATP and protein synthesis but also an increase in fat burning. However, this increase in fat burning is dependent on other factors such as the number of calories taken in and the macronutrient composition of the diet.

As I mentioned above, I included AMP in the Amino formulation. AMP activates AMPK (AMP-activated protein kinase), which in turn, among other effects such as increasing insulin sensitivity in skeletal muscle,<sup>22</sup> decreases the concentration of malonyl-coA in peripheral tissues, (as does exercise BTW) and thus decreases triglyceride accumulation and increases fatty acid oxidation.<sup>23</sup> The overall response to all of this is also an increase in energy output, which under conditions of energy deprivation, such as when you're in the cutting phase, increases fat oxidation further.

On top of all this we have to consider the increase in insulin and GH/IGF-I that occurs with the use of Amino. Depending on the mix, the insulin, again especially with an adequate ATP supply, can upset the malonyl-coA/CPT-I interaction, and increase lipogenesis and decrease beta oxidation of fatty acids, even with the counter effects of an increase in GH and IGF-I (actually while most people assume that it's the IGF-I that counteracts the effects of insulin on fat metabolism, a recent paper points to GH as having lipolytic and beta oxidation effects and IGF-I being involved more in the anti-catabolic and anabolic effects in synergy with insulin, and GH for that matter). Again the whole process is affected by the energy balance in the body.

There's a lot more to the story but the bottom line is that Amino, especially if used several times a day, is so efficient in maximizing protein synthesis and ATP production, that you can cut back on caloric intake and carbs, and maintain muscle mass while dramatically reducing body fat.

In fact, when you're really trying to lean out, cutting back on the calories and carbs helps the whole process by decreasing the amount of cytosolic citrate and malonyl-coA, resulting in a disinhibition of CPT-I. The end result will be that you'll burn more body fat preferentially, while at the same time keeping lean mass.

## L-Tryptophan

One more point about Amino. Unlike some other amino acid products, there's no L-tryptophan in it. Although these products actually highlight their use of tryptophan, I specifically left it out of the Amino formulation for two very good reasons.

Reason number one involves the role L-tryptophan has in muscle anabolism. While it is true that tryptophan stimulates protein synthesis when it's part of an essential amino acid (EAA) or mixed amino acid (AA) mixture, its effects are mainly on liver protein synthesis.

In recent studies,<sup>24</sup> L-tryptophan was not included in the amino acid mix because it (along with tyrosine) has negligible effects on skeletal muscle protein synthesis and in fact, because of its effects on hepatic protein synthesis, is counterproductive if your goal is to maximize muscle protein synthesis. Increasing liver protein synthesis is robbing Peter (muscle) to pay Paul (liver).

The other reason that some people use tryptophan in a post exercise AA mixture is that it increases serotonin levels and as such provides a relaxing effect after training. This is not true since the other large neutral amino acids such as the BCAAs compete with tryptophan for transport across the blood-brain barrier and hence CNS levels of tryptophan do not increase significantly, leaving more of the tryptophan in the system - which is exactly what we don't want if the aim is to maximize skeletal muscle protein synthesis. This of course takes us back to reason number one.

## Summary

Amino, used immediately after training is an easy to take, easy on the stomach, source of amino acids and other ingredients that kicks protein synthesis into high gear so you can begin taking advantage of that post-training window of opportunity. Amino is formulated to provide a square wave increase in the availability of blood amino acids and synergistic compounds within minutes after ingestion, and a measurable increase in muscle protein synthesis within less than half an hour – much faster than other post exercise supplements.

The amino acid, peptide blend, and special ingredients in Amino work together synergistically to immediately increase blood amino acid levels, insulin sensitivity and insulin levels, as well as growth hormone, IGF-I and testosterone levels, resulting in increased muscle protein synthesis which maximizes the anabolic and fat burning effects of exercise and combats overtraining.

Amino can also be used throughout the day to give a rapid pulsed increase in amino acids and anabolic hormones that leads to short burst increases in muscle protein synthesis. Research has shown that pulses of high levels of amino acids is much more effective in increasing protein synthesis than sustained high levels.

The **bottom line** is that the new Amino III will stimulate GH and insulin levels, increase protein synthesis and fat loss, decrease muscle degradation, improve recovery, increase energy, and result in an anabolic kick whenever it's used, especially right after training.

## MD+ Amino

1. Maximizes protein synthesis and decreases muscle breakdown after training and anytime it's used.
2. Maximizes the anabolic and fat burning effects of exercise.
3. Enhances recovery.

Those who want to maximize the anabolic and fat burning effects of exercise should also look at [Exersol](#), the EXERCISE SOLUTION, which includes [Resolve](#), [Power Drink](#) and Amino.

<b>Supplement Facts:</b> Serving Size: 10 Tablets Servings Per Container: 15					
	Amount Per Serving	% Daily Value		Amount Per Serving	% Daily Value
Vitamin C	100 mg	167%	Alanine	250 mg	*
Vitamin B6	10 mg	500%	Glycine	250 mg	*
Vitamin B12 (Cyanocobalamin)	50 mcg	833%	Serine	250 mg	*
Biotin	50 mcg	16.5%	Calcium Alpha Ketoglutarate	300 mg	*
Chromium	25 mcg	21%	L-arginine Aspartate	250 mg	*
Selenium (Selenomethionine)	25 mcg	36%	Alpha Lipoic Acid	100 mg	*
Histidine	650 mg	*	<b>Amino™ Proprietary Complex (APC) 7,900mg</b>		
Isoleucine	700 mg	*	Glutamine Peptides (Glutamine, Proline, Branched Chain		
Leucine	1.2 g	*	Amino Acids, Phenylalanine, Serine, Glutamate, Glycine,		
Lysine	900 mg	*	Arginine, Tyrosine, Threonine, Cysteine, Asparagine/Aspartate,		
Methionine	250 mg	*	Alanine, Histidine, Methionine, Ornithine).		
Phenylalanine	900 mg	*	Carnosine, Citrulline Malate, Dicalcium Phosphate,		
Threonine	900 mg	*	Potassium Succinate, Magnesium Fumarate,		
Valine	700 mg	*	AMP (Adenosine Monophosphate)		
Taurine	500 mg	*			
*Daily Value not established					
Other Ingredients: Stearic Acid, Modified Cellulose Gum, Magnesium Stearate, Silicon Dioxide, Hydroxypropylmethyl Cellulose.					

## References:

(See also [http://www.metabolicdiet.com/pdfs/amino\\_ref.pdf](http://www.metabolicdiet.com/pdfs/amino_ref.pdf) )

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