5% Nutriton’s ALL DAY YOU MAY: Rich Piana’s LEGENDARY Amino Supplement

written by Mike Roberto | August 19, 2021

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Over *six* years ago, we published our original article on one of the industry’s most innovative amino acid supplements: **Rich Piana’s ALL DAY YOU MAY**. This well-rounded amino acid formula took an entirely new spin on the category in *multiple* ways:

First, “ADYM” *embraced* the gym culture phenomenon of filling a milk jug with two gallons of water to sip throughout the day – only now with amino acids on hand – rather than attempting to *replace* the classic hydration practice. But even more importantly, Rich Piana and 5% Nutrition pioneered a ***Sweet Tea*** flavored amino acid supplement, which has been copied by *countless* brands ever since.

With these two innovations, along with Rich Piana’s massive personality, ALL DAY YOU MAY quickly solidified *legendary* status. And now the tubs reflect that as well:

LEGENDARY Status: 5% Nutrition's All Day You May is moving to the white tub, but the formula is mostly unchanged. See how Rich Piana shattered the industry with this supplement, especially with that Southern Sweet Tea flavor!

The ALL DAY YOU MAY *Legendary* Series

If you haven't noticed, All Day You May now features a *white* tub – this is part of the new *Legendary* look and branding from 5% Nutrition. This article has been updated to include new science and to reflect some of the *very* minor changes that the product has undergone over the years.

It's still true to the legend himself, Rich Piana, including endurance boosters, joint support, and even liver protection on top of the amino acids, but has had some improvements as well.

What is this legendary supplement and why should you sip on it ALL DAY long? We dig into ADYM below to see what it has to offer, but first, make sure to check our prices below for the best deal and sign up for PricePlow alerts:

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Our ALL DAY YOU MAY REVIEW

As mentioned above, the *Southern Sweet Tea* flavor is ***INCREDIBLE!***

See us review this insanely good flavor in the video below – skip to 7:30 if you want to check out the flavor portion:

ALL DAY YOU MAY Ingredients

Rich's latest supplement is aimed at growth and recovery from workouts. Specifically, it's being promoted to *repair joints*, *reduce muscle fatigue*, *strengthen the immune system*, *protect your liver*, and even *improve digestion*. Let's dig in, but first, it starts with the amino acids themselves:

- **Branched Chain Amino Acid (BCAA) Blend – 6,000 mg**


BLUEBERRY LEMONADE

Supplement Facts

Serving Size: 1 Scoop (15g)
Servings Per Container: 30

	Amount Per Serving	% Daily Value
Vitamin C (as Ascorbic Acid)	200 mg	222%
Vitamin B6 (as Pyridoxine Hydrochloride)	2 mg	118%
Vitamin B12 (as Cyanocobalamin)	125 mcg	5208%
Calcium (as Dicalcium Phosphate)	65 mg	5%
Phosphorus (as Dicalcium Phosphate)	50 mg	4%
Branched Chain Amino Acid (BCAA) Blend: L-Leucine, L-Isoleucine, L-Valine	6,000 mg	*
Conditionally Essential Amino Acid Blend: L-Glutamine, L-Carnitine L-Tartrate	2,750 mg	*
Amino Acid Support Blend: L-Taurine, Raw Coconut (*Cocos nucifera*)(fruit) Water Concentrate, Alpha-Hydroxyisocaproic Acid (Leucic Acid), Bromelain, Blueberry (*Vaccinium angustifolium*) (fruit) Powder	960 mg	*
Intra-Cellular Buffer Blend: Beta-Alanine, Dicalcium Phosphate, Sodium Bicarbonate	800 mg	*
Joint & Liver Support Blend†: D-Glucosamine Sulfate Potassium, Methylsulfonylmethane (MSM), Milk Thistle (*Silybum marianum*) (seed)	650 mg	*
Essential Amino Acid Blend: L-Phenylalanine, L-Threonine, L-Lysine HCl, L-Histidine HCl,L-Tryptophan, L-Methionine	205 mg	*

† Daily Value not established

Other Ingredients: Citric Acid, Natural & Artificial Flavors, Silicon Dioxide, Sucralose, Acesulfame K, Glucose Polymers, FD&C Blue No. 1
Contains: Tree Nuts (Coconut)

ALL DAY YOU MAY… drink this! 4 scoops in your gallon jug and *go!*

Right off the bat, Rich serves up a hefty dose of **branched-chain amino acids** *(BCAAs)*, which no intra or recovery product should be without. While not specified on the label, the 5% website notes that the BCAA ratio is 10:1:1 leucine:isoleucine:valine, meaning we get **5 grams of leucine**, **500 milligrams of isoleucine**, and **500 milligrams of valine**.

When it comes to *preserving* muscle mass in the wake of extreme training, BCAAs

are critically important, as they're anti-catabolic[1-3] and keep your body from ripping apart its *own* muscles when it needs these aminos to function. They also increase endurance.[4-6]

10:1:1 ratio? Bring in the leucine

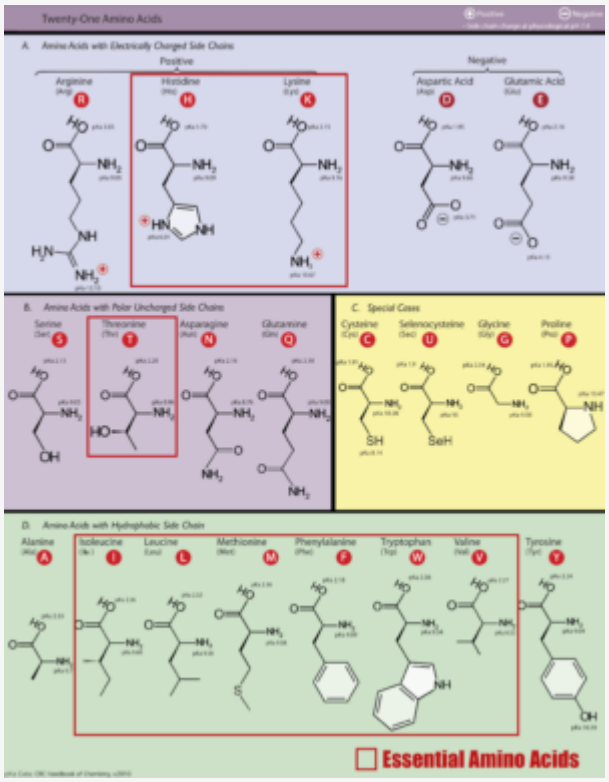
Now why would Rich always want a massive 10:1:1 ratio front-loaded with leucine? Because **Leucine is the main BCAA that activates mTOR, initiating muscle protein synthesis**.[7-9] The other aminos are great, but leucine is the spark plug that gets things going.

There's much more to go, however.

- **Conditionally Essential Amino Acid Blend – 2,750 mg**

  Conditionally essential amino acids are ones that the body *can* make on its own, but in times of extreme duress or physical exertion (think 3RM squats), it can't synthesize enough to meet the body's demand. This is when supplementing becomes extremely beneficial.

  L-Glutamine and **L-Carnitine L-Tartrate** make up this 2.8g blend, but we're not sure how much of each one.



Amongst these primary amino acids, the essential amino acids are in red. Leucine, Valine, and Isoleucine are the three *Branched-Chain* Amino Acids.

During tough workouts, the body uses a lot of **glutamine** – it's the muscle's most abundant amino acid, which can lead to improved endurance in some users (as well as the rate of glycogen replenishment).[10,11] That may then lead to improved recovery and less soreness,[12] and we often discuss the gut health improvements that others see from it.[13]

Finally, glutamine is critical for the immune system's function.[14] While it's not the muscle *builder* it was once billed as, it is beneficial to sip on if you're banging at the weights day in, day out.

Also conditionally essential, **L-Carnitine** has been around the supplementation game for a long time and is crucial for *several* metabolic processes, since it helps the mitochondria transport fatty acids to the cell for use.[15]

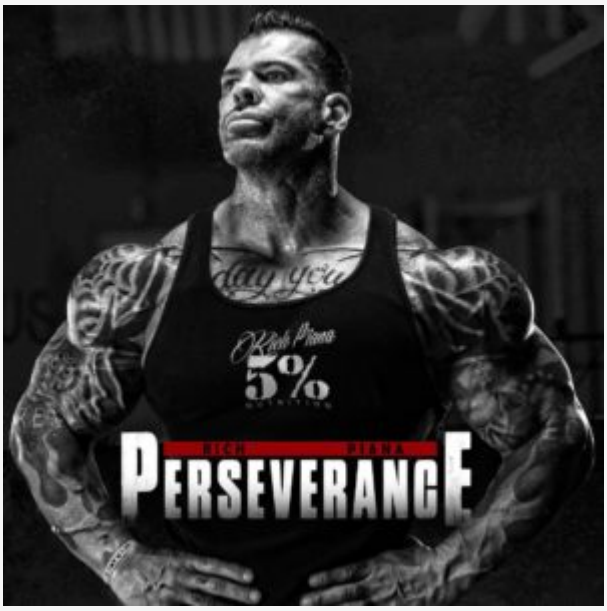
This leads to *numerous* benefits – including better performance,[16,17] endurance / fatigue prevention,[16-23] recovery,[24-27] and weight loss,[28,29] as shown with numerous types of L-carnitine. It's most beneficial to those who are deficient, either due to lack of red meat consumption or are simply hitting it so hard in the gym (or on the field) that they're depleted.[30-36]

5% Nutrition is using **L-Carnitine *L-Tartrate***, a type that is bound to tartaric acid. We also call it *LCLT*, and one unique study with this form even showed that it increased testosterone levels,[37] although it was at 2 grams per day and we don't know how much of it is in All Day You May. We'd also love to see that study replicated.

The point is that we're *extremely* pro-carnitine, especially if you're not pounding the steaks and ground beef on a daily basis.

- **Amino Acid Support Blend – 960 mg**

  L-Taurine, *Raw Coconut Water Concentrate*, *Alpha-Hydroxyisocaproic Acid (HICA)*, *Bromelain*, and *Blueberry Fruit Powder* comprise the Amino Acid Support Blend.



The man’s legendary status would have persevered regardless, but 5% Nutrition is putting together some *very* sharp “legendary” white branding to keep it on point!

Just like carnitine above, we’ve become big believers in **L-taurine**, which we also consider to be *conditionally* essential – especially for athletes. Since All Day You May first came out, we’ve had a meta analysis showing how incredible taurine is for endurance – and it works on the *first* use![38] There are numerous other benefits as well, including cognition[39] and cell volumization / hydration,[40] but that may depend on the dose.

Alpha-Hydroxyisocaproic Acid (HICA) is a metabolite of L-Leucine and is the catalyst for the mTOR pathway in the body that stimulates muscle protein synthesis. Additionally, HICA has been shown to increase lean muscle mass, speed recovery, decrease fat mass, and reduce soreness, albeit in larger doses.[41] This is one ingredient we don’t see enough of, and love to have it paired with all that leucine.

Since ADYM launched, **coconut water** gained a *lot* more steam (coincidence?) in the fitness industry for its electrolyte-replenishing benefits.[42] We all know that sweating during exercise depletes the body of electrolytes, and maintaining adequate levels ensures that you can keep the muscles firing on all cylinders.

Bromelain is popular for its anti-inflammatory effects and can help reduce pain and inflammation.[43]

Finally, **blueberry fruit powder** has become a unique inclusion to *several* of 5% Nutrition’s supplements, and it has vastly underrated effects in terms of increasing recovery and reducing muscle damage[44] while preventing damage to the DNA.[45-47]

- **Intra-Cellular Buffer Blend – 800 mg**

  Yet another blend awaits us in ALLDAY with the Intra-Cellular Buffer Blend consisting of endurance-boosting *Beta-Alanine* and some supporting electrolyte drivers.

Need more beta alanine if you're not drinking 4 scoops of ALL DAY all day? Then take KILL IT pre workout – The Push Pop flavor is an unmistakable throwback to those orange & cream push pops from childhood!

First, realize that this *alone* won't be a big enough dose of beta alanine unless you're loading your jugs up with several scoops of ADYM (3.2 grams is the daily clinical dose). If you want to capitalize on its performance benefits, you'll need more throughout the day. Thankfully, it's well-dosed in *all* of Rich Piana's other pre workouts (***Kill It***, ***Kill It Reloaded***, and ***5150***).

With that said, if you *do* get to that clinical dose, you'll be treated to increased endurance, as demonstrated by two well-performed meta analyses done on *several* subjects over time.[48,49] Beta alanine works by combining with *L-Histidine* to create more *carnosine*,[50,51] which then helps your muscle tissue buffer lactic acid, clearing the acidic environment and allowing them to last longer.

Second, and possibly more interesting is 5% Nutrition's inclusion of **sodium bicarbonate** (yes, *baking soda!*) in the formula. We're not sure why we don't see this more often, because sodium bicarbonate has *very consistently* been shown to boost endurance,[52] especially when combined with beta alanine![49] It works by also lowering acidity in the environment, so we're not sure if it overlaps with beta alanine's carnosine mechanism or is additive.

It'll add just a bit of pop and fizzle to the supplement as well, but not much

since we'd probably need larger amounts for that.

Either way, with so much research on the subject, we'd expect to see more sodium bicarbonate in these endurance-minded supplements, but we never do. The road less traveled is clearly one that a Rich Piana brand takes.

- **Joint & Liver Support Blend – 650 mg**

  No doubt you've seen countless joint support formulas in the stores that are composed of **glucosamine sulfate** and **methylsulfonylmethane** (MSM). ALL DAY YOU MAY borrows two of those ingredients for its Joint Support Blend, and also adds **milk thistle** to the mix for liver protection.

"Beneficial to almost any age group, Joint Defender prides itself not only on quality but providing effective and immediate results."

There's a lot of research on glucosamine and MSM, but it's generally at larger doses with 1.5 grams per day in glucosamine[53-55] and 1 gram per day at MSM.[56-59] If you want more of these ingredients, which are "helpers" here in ADYM, you *must* check out the fantastically-dosed **5% Nutrition *Joint Defender***.

Your joints are going to take a beating if you are regularly hitting the weights. These two ingredients will help support and rebuild joints, tendons, and ligaments that will become gradually worn down from all the intense training.

Meanwhile, **milk thistle** has been added to the blend, and it's an ingredient also covered in depth in our article on **5% Nutrition's *Post Gear*** for PCT support (it's also in ***Liver & Organ Defender*** if you're looking for *on*-cycle support). There are countless studies showing milk thistle's efficacy for

liver protection, including a couple great meta-analyses.[60,61]

- **Essential Amino Acid Blend – 205mg**

  The **Essential Amino Acid** (EAA) blend consists of *L-Phenylalanine*, *L-Threonine*, *L-Lysine*, *L-Histidine*, *L-Tryptophan*, and *L-Methionine*. These are *essential* because the body can't produce them on its own (at least not in any meaningful way). They must be obtained through the diet or supplements, or else various biochemical and physical processes in your body simply won't operate correctly.

  L-Methionine behaves like an antioxidant in the body by preventing the spread of free radicals and the ensuing oxidative damage that can be caused by intense training.

Rich Piana has pre workout options for everyone!

L-Phenylalanine is converted to tyrosine first, and then converted into epinephrine, norepinephrine, and dopamine (3 key neurotransmitters in the body) which can help improve energy, mood and focus.

L-Threonine is necessary for the production of serine and glycine to spark muscle protein synthesis.

L-Lysine is important for collagen formation, and like leucine, is a non-glucogenic amino acid.

L-Histidine serves many important functions in the body, strengthening the immune system and synthesizing hemoglobin, as well as combining with our *beta alanine* to form endurance-boosting *carnosine*.

L-Tryptophan assists with serotonin production, and is critical for mood support.

While these aren't massively dosed, they're true to Rich Piana's original vision of the supplement – and guess who was adding EAAs *long* before other brands were. The Legend.

The other three essential amino acids, of course, are the BCAAs, which are efficaciously dosed at the top.

Dosing: Do it the *real* man's way

Mix a one scoop serving of ALLDAYYOUMAY with 12 to 16 ounces of water and consume in between meals, right before a workout, during a workout, and after a workout.

The *real* recommended dosing for this product, however, is to place 4 scoops in a gallon of water, mix well, and sip on throughout the day.

Flavors Available

Only available for a limited time, so jump on it quickly – Starry Burst ALL DAY YOU MAY!

Wrap Up: Another legendary Rich Piana supplement

Heil to the true king of sports nutrition, and to 5% Nutrition for keeping ALL DAY YOU MAY as close to the legendary classic as possible!

Every time we drink a *sweet tea* flavored supplement that's *not* named ALL DAY YOU MAY, a part of us laughs inside, because of one simple fact: **Rich Piana did it first**. There's a phrase that goes *"often imitated, never duplicated"* – and while that's exactly the case in the amino acid industry, it's *not* the case when it comes to Rich's persona. So much bigger than life, the man can *never* be duplicated, and nobody even bothers trying.

Rich's long-standing fans are treated with a legendary "BCAA-plus" amino acid supplement that, when used *properly* – as in the gallon milk jug – has tons of ingredients to help get you through a brutal day.

Like we said in our recent KILL IT *Push Pop* article, while we endorse fully disclosed supplements, when it comes to Rich's original formulations, we'd be *upset* if they changed too much. Some things just get taken to the grave, but this supplement should last forever. All *Life* You May, if you will.

Note: This article was originally published on published on May 12, 2015 and has been updated in 2021 for the new Legendary update.

References

1. *Freund, H et al. "Infusion of the branched chain amino acids in postoperative patients. Anticatabolic properties." Annals of surgery vol. 190,1 (1979): 18-23. doi:10.1097/00000658-197907000-00004; https://www.ncbi.nlm.nih.gov/pmc/articles/PMC1344449/*
2. *Wolfe, RR; "Branched-chain amino acids and muscle protein synthesis in humans: myth or reality?"; J Int Soc Sports Nutr; 14(1):30; 2017; https://jissn.biomedcentral.com/articles/10.1186/s12970-017-0184-9*
3. *Kobayashi H, Kato H, Hirabayashi Y, Murakami H, Suzuki H; "Modulations of muscle protein metabolism by branched-chain amino acids in normal and muscle-atrophying rats"; J Nutr. 2006;136; https://pubmed.ncbi.nlm.nih.gov/16365089*
4. *Ea, Newsholme, and Blomstrand E. "Branched-Chain Amino Acids and Central Fatigue." The Journal of Nutrition, 1 Jan. 2006; https://pubmed.ncbi.nlm.nih.gov/16365097/*
5. *E, Blomstrand, et al. "Administration of Branched-Chain Amino Acids during Sustained Exercise—Effects on Performance and on Plasma Concentration of Some Amino Acids." European Journal of Applied Physiology and Occupational Physiology, 1991; https://pubmed.ncbi.nlm.nih.gov/1748109/*
6. *Ab, Gualano, et al. "Branched-Chain Amino Acids Supplementation Enhances Exercise Capacity and Lipid Oxidation during Endurance Exercise after Muscle Glycogen Depletion." The Journal of Sports Medicine and Physical Fitness, 1 Mar. 2011; https://pubmed.ncbi.nlm.nih.gov/21297567/*
7. *Lynch, Christopher J., et al. "Leucine Is a Direct-Acting Nutrient Signal That Regulates Protein Synthesis in Adipose Tissue." American Journal of Physiology-Endocrinology and Metabolism, vol. 283, no. 3, Sept. 2002, pp. E503–E513, 10.1152/ajpendo.00084.2002; https://journals.physiology.org/doi/full/10.1152/ajpendo.00084.2002*
8. *Lynch, Christopher J., et al. "Tissue-Specific Effects of Chronic Dietary Leucine and Norleucine Supplementation on Protein Synthesis in Rats." American Journal of Physiology-Endocrinology and Metabolism, vol. 283, no. 4, 1 Oct. 2002, pp. E824–E835, 10.1152/ajpendo.00085.2002; https://journals.physiology.org/doi/full/10.1152/ajpendo.00085.2002*
9. *Lynch, C. J., et al. "Regulation of Amino Acid-Sensitive TOR Signaling by Leucine Analogues in Adipocytes." Journal of Cellular Biochemistry, vol. 77, no. 2, 1 Mar. 2000, pp. 234–251; https://pubmed.ncbi.nlm.nih.gov/10723090/*
10. *Khogali, Shihab E. O., et al. "Is Glutamine Beneficial in Ischemic Heart Disease?" Nutrition (Burbank, Los Angeles County, Calif.), vol. 18, no. 2, 1 Feb. 2002, pp. 123–126, 10.1016/s0899-9007(01)00768-7; https://pubmed.ncbi.nlm.nih.gov/11844641/*
11. *Bowtell, J. L., et al. "Effect of Oral Glutamine on Whole Body Carbohydrate Storage during Recovery from Exhaustive Exercise." Journal of Applied Physiology, vol. 86, no. 6, 1 June 1999, pp. 1770–1777, 10.1152/jappl.1999.86.6.1770; https://journals.physiology.org/doi/full/10.1152/jappl.1999.86.6.1770*
12. *Legault, Zachary et al.; "The Influence of Oral L-Glutamine Supplementation on Muscle Strength Recovery and Soreness Following Unilateral Knee Extension Eccentric Exercise."; International journal of sport nutrition and exercise metabolism vol. 25,5 (2015): 417-26. doi:10.1123/ijsnem.2014-0209; https://pubmed.ncbi.nlm.nih.gov/25811544/*
13. *Benjamin, Jaya, et al. "Glutamine and Whey Protein Improve Intestinal Permeability and Morphology in Patients with Crohn's Disease: A Randomized Controlled Trial." Digestive Diseases and Sciences, vol. 57, no. 4, 26 Oct. 2011, pp. 1000–1012, 10.1007/s10620-011-1947-9; https://pubmed.ncbi.nlm.nih.gov/22038507/*
14. *Calder, P C, and P Yaqoob.; "Glutamine and the immune system."; Amino acids vol. 17,3 (1999): 227-41. doi:10.1007/BF01366922; https://pubmed.ncbi.nlm.nih.gov/10582122/*
15. *Sahlin, Kent; "Boosting fat burning with carnitine: an old friend comes out from the shadow"; Journal of physiology; vol. 589; Pt 7; 2011; 1509-10; https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3099008/*
16. *Jacobs, Patrick L, et al. "Glycine Propionyl-L-Carnitine Produces Enhanced Anaerobic Work Capacity with Reduced Lactate Accumulation in Resistance Trained Males." Journal of the International Society of Sports Nutrition, vol. 6, no. 1, 2 Apr. 2009, 10.1186/1550-2783-6-9; https://www.ncbi.nlm.nih.gov/labs/pmc/articles/PMC2674410/*
17. *Jacobs, Patrick L, and Erica R Goldstein. "Long-Term Glycine Propionyl-l-Carnitine Supplemention and Paradoxical Effects on Repeated Anaerobic Sprint Performance." Journal of*

the International Society of Sports Nutrition, vol. 7, no. 1, 28 Oct. 2010, 10.1186/1550-2783-7-35; https://www.ncbi.nlm.nih.gov/labs/pmc/articles/PMC2984406/

18. *Malaguarnera, Mariano, et al. "L-Carnitine Treatment Reduces Severity of Physical and Mental Fatigue and Increases Cognitive Functions in Centenarians: A Randomized and Controlled Clinical Trial." The American Journal of Clinical Nutrition, vol. 86, no. 6, 1 Dec. 2007, pp. 1738–1744, 10.1093/ajcn/86.5.1738; https://pubmed.ncbi.nlm.nih.gov/18065594/*
19. *Malaguarnera, Mariano, et al. "L-Carnitine Treatment Reduces Severity of Physical and Mental Fatigue and Increases Cognitive Functions in Centenarians: A Randomized and Controlled Clinical Trial." The American Journal of Clinical Nutrition, vol. 86, no. 6, 1 Dec. 2007, pp. 1738–1744, 10.1093/ajcn/86.5.1738; https://academic.oup.com/ajcn/article/86/6/1738/4649810*
20. *Ciacci, C., et al. "L-Carnitine in the Treatment of Fatigue in Adult Celiac Disease Patients: A Pilot Study." Digestive and Liver Disease: Official Journal of the Italian Society of Gastroenterology and the Italian Association for the Study of the Liver, vol. 39, no. 10, 1 Oct. 2007, pp. 922–928, 10.1016/j.dld.2007.06.013; https://pubmed.ncbi.nlm.nih.gov/17693145/*
21. *Vermeulen, Ruud C. W., and Hans R. Scholte. "Exploratory Open Label, Randomized Study of Acetyl- and Propionylcarnitine in Chronic Fatigue Syndrome." Psychosomatic Medicine, vol. 66, no. 2, 1 Mar. 2004, pp. 276–282, 10.1097/01.psy.0000116249.60477.e9; https://pubmed.ncbi.nlm.nih.gov/15039515/*
22. *Pistone, Giovanni, et al. "Levocarnitine Administration in Elderly Subjects with Rapid Muscle Fatigue." Drugs & Aging, vol. 20, no. 10, 2003, pp. 761–767, 10.2165/00002512-200320100-00004; https://pubmed.ncbi.nlm.nih.gov/12875611/*
23. *Malaguarnera, Michele, et al. "Acetyl L-Carnitine (ALC) Treatment in Elderly Patients with Fatigue." Archives of Gerontology and Geriatrics, vol. 46, no. 2, 1 Mar. 2008, pp. 181–190, 10.1016/j.archger.2007.03.012; https://pubmed.ncbi.nlm.nih.gov/17658628/*
24. *Volek, Jeff S., et al. "L-Carnitinel-Tartrate Supplementation Favorably Affects Markers of Recovery from Exercise Stress." American Journal of Physiology-Endocrinology and Metabolism, vol. 282, no. 2, 1 Feb. 2002, pp. E474–E482, 10.1152/ajpendo.00277.2001; https://journals.physiology.org/doi/full/10.1152/ajpendo.00277.2001*
25. *Kraemer, William J., et al. "The Effects of L-Carnitine L-Tartrate Supplementation on Hormonal Responses to Resistance Exercise and Recovery." The Journal of Strength and Conditioning Research, vol. 17, no. 3, 2003, p. 455, 2.0.co;2″>10.1519/1533-4287(2003)017<0455:teolls>2.0.co; https://pubmed.ncbi.nlm.nih.gov/12930169/*
26. *Ho, Jen-Yu, et al. "L-Carnitine L-Tartrate Supplementation Favorably Affects Biochemical Markers of Recovery from Physical Exertion in Middle-Aged Men and Women." Metabolism, vol. 59, no. 8, Aug. 2010, pp. 1190–1199, 10.1016/j.metabol.2009.11.012; https://pubmed.ncbi.nlm.nih.gov/20045157/*
27. *Spiering, Barry A, et al. "Effects of L-Carnitine L-Tartrate Supplementation on Muscle Oxygenation Responses to Resistance Exercise." Journal of Strength and Conditioning Research, vol. 22, no. 4, July 2008, pp. 1130–1135, 10.1519/jsc.0b013e31817d48d9; https://pubmed.ncbi.nlm.nih.gov/18545197/*
28. *Pooyandjoo, M., et al. "The Effect of (L-)Carnitine on Weight Loss in Adults: A Systematic Review and Meta-Analysis of Randomized Controlled Trials." Obesity Reviews, vol. 17, no. 10, 22 June 2016, pp. 970–976, 10.1111/obr.12436. https://pubmed.ncbi.nlm.nih.gov/27335245/*
29. *Ruggenenti, Piero, et al. "Ameliorating Hypertension and Insulin Resistance in Subjects at Increased Cardiovascular Risk: Effects of Acetyl-L-Carnitine Therapy." Hypertension (Dallas, Tex.: 1979), vol. 54, no. 3, 1 Sept. 2009, pp. 567–574, 10.1161/HYPERTENSIONAHA.109.132522. https://pubmed.ncbi.nlm.nih.gov/19620516/*
30. *Fielding, Roger, et al. "L-Carnitine Supplementation in Recovery after Exercise." Nutrients, vol. 10, no. 3, 13 Mar. 2018, p. 349, 10.3390/nu10030349. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5872767/*
31. *Krajcovicová-Kudlácková, M., et al. "Correlation of Carnitine Levels to Methionine and Lysine Intake." Physiological Research, vol. 49, no. 3, 2000, pp. 399–402; https://pubmed.ncbi.nlm.nih.gov/11043928/*
32. *Lombard, K A, et al. "Carnitine Status of Lactoovovegetarians and Strict Vegetarian Adults and Children." The American Journal of Clinical Nutrition, vol. 50, no. 2, 1 Aug. 1989, pp. 301–306, 10.1093/ajcn/50.2.301; https://academic.oup.com/ajcn/article-abstract/50/2/301/4651007*
33. *Krajcovicová-Kudlácková, M., et al. "Correlation of Carnitine Levels to Methionine and Lysine Intake." Physiological Research, vol. 49, no. 3, 2000, pp. 399–402; https://pubmed.ncbi.nlm.nih.gov/11043928/*
34. *Rebouche, Charles J. "Carnitine Function and Requirements during the Life Cycle." The FASEB*

Journal, vol. 6, no. 15, Dec. 1992, pp. 3379–3386, 10.1096/fasebj.6.15.1464372; https://faseb.onlinelibrary.wiley.com/doi/abs/10.1096/fasebj.6.15.1464372

35. *Malaguarnera, Mariano, et al. "Serum Carnitine Levels in Centenarians." Clinical Drug Investigation, vol. 17, no. 4, 1999, pp. 321–327, 10.2165/00044011-199917040-00008; https://link.springer.com/article/10.2165/00044011-199917040-00008*
36. *Malaguarnera, Mariano, et al. "L-Carnitine Treatment Reduces Severity of Physical and Mental Fatigue and Increases Cognitive Functions in Centenarians: A Randomized and Controlled Clinical Trial." The American Journal of Clinical Nutrition, vol. 86, no. 6, 1 Dec. 2007, pp. 1738–1744, 10.1093/ajcn/86.5.1738; https://pubmed.ncbi.nlm.nih.gov/18065594/*
37. *Kraemer, William J., et al. "Androgenic Responses to Resistance Exercise." Medicine & Science in Sports & Exercise, vol. 38, no. 7, July 2006, pp. 1288–1296, 10.1249/01.mss.0000227314.85728.35; https://pubmed.ncbi.nlm.nih.gov/16826026/*
38. *Waldron, M., et al. May 2018. "The Effects of an Oral Taurine Dose and Supplementation Period on Endurance Exercise Performance in Humans: A Meta-Analysis." Sports Medicine vol. 48,5; 1247-53. https://pubmed.ncbi.nlm.nih.gov/29546641*
39. *Chen, C. et al. Aug. 2019. "Roles of Taurine in Cognitive Function of Physiology, Pathologies, and Toxication." Life Sciences vol. 15, 231; https://pubmed.ncbi.nlm.nih.gov/31220527/*
40. *Ripps, H. et al. Nov. 2012. "Review: Taurine: A "Very Essential Amino Acid." Molecular Vision vol. 18. 2673-86. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3501277/*
41. *Mero, Antti A, et al. "Effects of Alfa-Hydroxy-Isocaproic Acid on Body Composition, DOMS and Performance in Athletes." Journal of the International Society of Sports Nutrition, vol. 7, 5 Jan. 2010, p. 1, 10.1186/1550-2783-7-1; https://jissn.biomedcentral.com/articles/10.1186/1550-2783-7-1*
42. *Kalman, Douglas S, et al. "Comparison of Coconut Water and a Carbohydrate-Electrolyte Sport Drink on Measures of Hydration and Physical Performance in Exercise-Trained Men." Journal of the International Society of Sports Nutrition, vol. 9, no. 1, 2012, p. 1, 10.1186/1550-2783-9-1; https://www.ncbi.nlm.nih.gov/labs/pmc/articles/PMC3293068/*
43. *Walker, A. F., et al. "Bromelain Reduces Mild Acute Knee Pain and Improves Well-Being in a Dose-Dependent Fashion in an Open Study of Otherwise Healthy Adults." Phytomedicine, vol. 9, no. 8, 1 Jan. 2002, pp. 681–686, 10.1078/094471102321621269; https://pubmed.ncbi.nlm.nih.gov/12587686/*
44. *McLeay, Yanita, et al. "Effect of New Zealand Blueberry Consumption on Recovery from Eccentric Exercise-Induced Muscle Damage." Journal of the International Society of Sports Nutrition, vol. 9, no. 1, 2012, p. 19, 10.1186/1550-2783-9-19; https://www.ncbi.nlm.nih.gov/labs/pmc/articles/PMC3583121/*
45. *Wilms, Lonneke C., et al. "Impact of Multiple Genetic Polymorphisms on Effects of a 4-Week Blueberry Juice Intervention on Ex Vivo Induced Lymphocytic DNA Damage in Human Volunteers." Carcinogenesis, vol. 28, no. 8, 1 Aug. 2007, pp. 1800–1806, 10.1093/carcin/bgm145; https://academic.oup.com/carcin/article/28/8/1800/2526773*
46. *Del Bo´, Cristian, et al. "A Single Portion of Blueberry (Vaccinium Corymbosum L) Improves Protection against DNA Damage but Not Vascular Function in Healthy Male Volunteers." Nutrition Research, vol. 33, no. 3, Mar. 2013, pp. 220–227, 10.1016/j.nutres.2012.12.009; https://pubmed.ncbi.nlm.nih.gov/23507228/*
47. *Riso, Patrizia, et al. "Effect of a Wild Blueberry (Vaccinium Angustifolium) Drink Intervention on Markers of Oxidative Stress, Inflammation and Endothelial Function in Humans with Cardiovascular Risk Factors." European Journal of Nutrition, vol. 52, no. 3, 1 Apr. 2013, pp. 949–961, 10.1007/s00394-012-0402-9; https://pubmed.ncbi.nlm.nih.gov/22733001/*
48. *Hobson, R M et al. "Effects of β-alanine supplementation on exercise performance: a meta-analysis." Amino acids vol. 43,1 (2012): 25-37. doi:10.1007/s00726-011-1200-z; https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3374095/*
49. *Saunders, Bryan, et al. "β-Alanine Supplementation to Improve Exercise Capacity and Performance: A Systematic Review and Meta-Analysis." British Journal of Sports Medicine, vol. 51, no. 8, 18 Oct. 2016, pp. 658–669; https://bjsm.bmj.com/content/51/8/658.long*
50. *Hill, CA et al.; Amino Acids; "Influence of beta-alanine supplementation on skeletal muscle carnosine concentrations and high intensity cycling capacity ;" February 2007; https://jissn.biomedcentral.com/articles/10.1186/1550-2783-6-7*
51. *Trexler, E.T., Smith-Ryan, A.E., Stout, J.R. et al.; "International society of sports nutrition position stand: Beta-Alanine."; J Int Soc Sports Nutr 12, 30 (2015); https://jissn.biomedcentral.com/articles/10.1186/s12970-015-0090-y*
52. *Matson, Larry G., and Zung Vu Tran. "Effects of Sodium Bicarbonate Ingestion on Anaerobic Performance: A Meta-Analytic Review." International Journal of Sport Nutrition, vol. 3, no.*

1, Mar. 1993, pp. 2–28, 10.1123/ijsn.3.1.2; https://pubmed.ncbi.nlm.nih.gov/8388767/

53. *Ostojic SM, et al; Glucosamine administration in athletes: effects on recovery of acute knee injury. Res Sports Med; 2007; https://pubmed.ncbi.nlm.nih.gov/17578751*
54. *Ostojic, S., Arsic, M., Prodanovic, S., Vukovic, J., & Zlatanovic, M. (2007). Glucosamine Administration in Athletes: Effects on Recovery of Acute Knee Injury. Research in Sports Medicine, 15(2), 113-124; https://pubmed.ncbi.nlm.nih.gov/17578751*
55. *Herrero-Beaumont, G., Ivorra, J. A., Trabado, M. D., Blanco, F. J., Benito, P., Martín-Mola, E., . . . Branco, J. (2007). Glucosamine sulfate in the treatment of knee osteoarthritis symptoms: A randomized, double-blind, placebo-controlled study using acetaminophen as a side comparator. Arthritis & Rheumatism, 56(2), 555-567; https://pubmed.ncbi.nlm.nih.gov/17265490*
56. *Peel S. et al. The Effects of MSM Supplementation on Knee Kinetics during Running, Muscle Strength, and Muscle Soreness following Eccentric Exercise- Induced Quadriceps Damage. Presented at American Society for Biomechanics Conference Aug, 2015; https://www.docdroid.net/a3czJbh/peel-2015.pdf.html*
57. *Pagonis TA, Givissis PK, Kritis AC, Christodoulou AC. The Effect of Methylsulfonylmethane on Osteoarthritic Large Joints and Mobility. International Journal of Orthopaedics 2014; 1(1): 19-24; https://www.ghrnet.org/index.php/ijo/article/view/745*
58. *Kim et al. Efficacy of methylsulfonylmethane (MSM) in osteoarthritis pain of the knee: a pilot clinical trial. OsteoArthritis and Cartilage 2006, 14:286-294; https://www.oarsijournal.com/article/S1063-4584(05)00285-2/fulltext*
59. *Usha, P.R. & Naidu, M.U.R. Randomised, Double-Blind, Parallel, Placebo-Controlled Study of Oral Glucosamine, Methylsulfonylmethane and their Combination in Osteoarthritis. Clin. Drug Investig. (2004) 24: 353; https://docdro.id/84iXcMd*
60. *Polachi, Navaneethakrishnan, et al; "Modulatory Effects of Silibinin in Various Cell Signaling Pathways against Liver Disorders and Cancer – A Comprehensive Review."; European Journal of Medicinal Chemistry; U.S. National Library of Medicine; 10 Nov. 2016; https://www.ncbi.nlm.nih.gov/pubmed/27517806*
61. *de Avelar, Camila Ribeiro et al; "Effect of silymarin on biochemical indicators in patients with liver disease: Systematic review with meta-analysis."; World journal of gastroenterology; vol. 23,27; 2017; 5004-5017; https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5526770/*