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GlycoCarn® Improves High Intensity Exercise Performance

Richard J. Bloomer, PhD

The AminoCarnitines® marketed through Sigma-tau HealthScience are molecularly bonded forms of L-carnitine along with specific carnitine precursor amino acids. Over the past few years Sigma-tau has provided research funding to study the metabolic effects of GlycoCarn® (Glycine-Propionyl-L-Carnitine HCl; see www.glycocarn.com), a USP-grade nutritional ingredient, in human subjects. We have been involved in this work since 2005 and have noted some very interesting findings related to both blood antioxidant activity and nitric oxide (NO) levels in active and inactive individuals. Specifically, we have demonstrated an increase in blood levels of NO (measured via the surrogate marker of nitrate/nitrite) with oral GlycoCarn® intake at a daily dosage of 4.5 grams.^{1,2} In addition, we have noted a reduction in the lipid specific biomarker of oxidative stress (i.e., free radical associated oxidation) known as malondialdehyde.¹

The above findings are of interest for the following reasons. First, nitric oxide is known to have multiple key biological functions including the “opening” of blood vessels and the regulation of muscle atrophy/hypertrophy. Such effects may have implications for exercise performance as well as recovery from strenuous exercise. Second, both acute aerobic and anaerobic exercise increase the production of free radicals. Because free radicals appear to be involved in the process of muscle impairment and exercise recovery, excess radical production may be detrimental to muscle performance. This has been shown in laboratory animals (e.g., impaired muscle function, reductions in muscle force output, and higher fatigue rates), and believed by some to occur in exercising humans. Based on our initial findings of enhanced antioxidant activity with GlycoCarn® use, we believed that this ingredient may prove beneficial for enhanced high intensity exercise performance. Although our preliminary work with previously sedentary subjects did not indicate strong effects in this regard, a recent study involving active subjects noted very favorable performance effects of GlycoCarn®, as well as a significant reduction in blood lactate (a byproduct of anaerobic metabolism known to impair muscle performance).³

In this recent study conducted by Dr. Patrick Jacobs and colleagues, 24 healthy, exercise trained men consumed either 4.5 grams of GlycoCarn® or a placebo on two different days separated by one week (double blind, cross-over design). Ninety minutes following ingestion of the assigned treatment, subjects performed five, maximal effort cycle sprints lasting 10 seconds in duration. They were given one minute of “active” recovery between each sprint. Peak and mean power output, in addition to blood lactate, was measured for both conditions. Results indicated that both peak and mean power output was up to 15% higher following the GlycoCarn® trials, while post-exercise blood lactate was 15-16% lower. From a pure exercise performance standpoint, these data are most interesting. That is, our initial findings of increased circulating nitric oxide and



decreased malondialdehyde only suggest that a performance improvement may have been noted. But we did not have the evidence to make this statement. Dr. Jacobs’ work now provides the evidence, which may have application for a wide variety of individuals.

In summary, the above findings of Jacobs et al.³ coupled with our initial work noting effects for GlycoCarn® as an antioxidant and nitric oxide stimulating ingredient make this a “multi-functional” nutraceutical. Considerable attention has been given to GlycoCarn® in recent months, and to the credit of Sigma-tau HealthScience, they continue to provide research funding to support the efficacy of this ingredient. Further study of GlycoCarn® is planned for fall 2009. Stay tuned.

Bio

Richard J. Bloomer holds a PhD in Exercise Physiology and is an Associate Professor within the Department of Health and Sport Sciences at The University of Memphis. His research focus is centered on oxidative stress and nutraceuticals.

References

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THE ENERGY

shortage is not just at the pump.

It's in your muscles, fatigued from pumping iron. Your depleted energy level after a long walk. Your exercise level isn't the issue. Getting energy into your cells is!

Whether you're a week-end warrior, a daily aerobics devotee, or a regular animal at the gym ... work it out effectively with **GlycoCarn**[®]. This patented form of **propionyl-L-carnitine** helps transport fatty acids right to the heart of your energy-producing mitochondria. So you produce energy faster for a quicker recovery after exercise. Experience less muscle fatigue to push your peak performance level. And you'll find **GlycoCarn**[®] at the heart of these two high-energy Life Extension Formulas.



Optimized Carnitine with GlycoCarn[®]

combines three forms of carnitine in one single formula to help you optimize energy.

Acetyl-L-carnitine crosses the blood-brain barrier to combat oxidative stress and promote energy production in brain and central nervous system tissues.¹ It also supports the release of acetylcholine and dopamine.

Acetyl-L-carnitine arginate promotes the growth of neurites that facilitate communication among nerve cells in the brain.²

GlycoCarn[®] quickly penetrates the heart, endothelial and muscle cells. It combats muscle fatigue by increasing energy stores of glycogen³ ... and protects your heart muscle from lack of blood flow.

Two capsules of Optimized Carnitine deliver:

Acetyl-L-Carnitine HCl	800 mg
ArginoCarn[®] Acetyl-L-Carnitine Arginate Di-HCl	300 mg
GlycoCarn[®] Glycine Propionyl-L-Carnitine HCl	300 mg



Sigma-tau HealthScience



Peak ATP[®] with GlycoCarn[®]

positively impacts performance by elevating blood nitric oxide.

GlycoCarn[®] increases blood flow to active tissues. That means more oxygen, more nutrients (including fatty acids, amino acids and glucose) hitting your muscles. So you have what it takes to work harder longer.

Adenosine triphosphate (ATP) is a critical component of the cellular energy cycle. **PEAK ATP**[®] has been tested in human and animal studies. It's readily absorbed and boosts circulating ATP levels.⁴⁻⁶ Red blood cells release ATP to produce endothelial vasodilation (widening of the arteries). Ensuring adequate red blood cell pools of ATP to help regulate vascular tone is critical to maintaining circulatory health.⁷

Two tablets of Peak ATP[®] with GlycoCarn[®] provide:

GlycoCarn[®]	1000 mg
Glycine Propionyl-L-Carnitine HCl (GPLC)	
PEAK ATP[®] Adenosine 5'-Triphosphate Disodium	200 mg

ArginoCarn[®] is also available in Life Extension's Mitochondrial Energy Optimizer, a premier nutritional anti-aging supplement. GlycoCarn[®] and ArginoCarn[®] are trademarks of Sigma-tau HealthScience, Inc. and are protected by U.S. patent Nos. 6,703,042 B1 and 6,245,378 B1. Peak ATP[®] is a registered trademark of Health Sciences, Inc.

These two products are available at fine health food stores everywhere.

These statements have not been evaluated by the Food and Drug Administration. These products are not intended to diagnose, treat, cure or prevent any disease.

References:

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