

AminoCarnitines® for Human Health and Performance

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Energy. Stamina. Vitality. Health. How does one achieve these desired outcomes? The best approach for most individuals involves the performance of exercise on most—if not all—days of the week. Dietary intake along with regular, consistent sleep, plus relaxation and motivation is of crucial importance to living a productive life. Another strategy is to use certain nutritional supplements, such as **L-carnitine**.

Dietary supplementation with this naturally occurring nutrient has been studied extensively as an aid to promote healthy blood flow to tissues (such as skeletal muscle and the heart); to provide potent antioxidant benefits which may assist with the maintenance of overall health; and to improve fatty acid metabolism, which may result in benefits related to improved physical performance and endurance capacity, as well as increased fat utilization during exercise. Recently, a new generation of carnitine has been developed and is marketed by Sigma-tau Health Science. These are referred to as the **AminoCarnitines®**, which are molecularly bonded forms of carnitine along with specific amino acids. These are branded as raw materials with the names GlycoCarn® (Glycine-Propionyl-L-Carnitine HCL) and ArginoCarn® (Acetyl-L-Carnitine Arginate DiHCL). Both are certified USP-grade dietary supplements. Since 2005, we have been studying the health and performance effects of the AminoCarnitines® within human subjects, where we have been particularly interested in the benefits of these agents related to antioxidant function and blood flow enhancement. Other investigators in North America have been studying the AminoCarnitines® for exercise performance.

Antioxidant Function: A well-described effect of carnitine is the ability of this nutrient to reduce the potentially harmful effects of free radicals. When free radical production overwhelms antioxidant defense, oxidative stress occurs, which has been associated with muscle fatigue. This may be due to the fact that excessive free radical production can damage important molecules such as proteins, DNA, and lipids. Increased oxidative stress is thought to play a role in health issues and accelerated aging. This is possibly related to mitochondrial oxidative stress (oxidation involving the “energy producing” component of the cell), as mitochondrial dysfunction is linked to impaired energy production. In our work with GlycoCarn® we have noted potent antioxidant

properties for this nutrient, in particular as related to lipids.

Blood flow: An important and exciting finding in our work using both GlycoCarn® and ArginoCarn® is an increase in blood levels of nitrate/nitrite (a marker of nitric oxide). Both agents appear to result in an increase in nitrate/nitrite at rest, while we have also demonstrated an increase in this marker in response to a physical challenge when subjects were supplemented with GlycoCarn®. Nitric oxide is an important gaseous signaling molecule with multiple known physiologic properties, one of which is to act on smooth muscle cells within blood vessels in order to promote vasodilation (i.e., opening of vessels). This may allow for enhanced blood flow, which has several potentially important applications. In particular, this may be of importance for those with compromised blood flow due to cardiovascular disease, as well as for athletes seeking to enhance blood flow to working muscles in order to facilitate increased oxygen and nutrient delivery during and following exercise. Admittedly, we have only included biochemical measures (e.g., nitrate/nitrite) in our work and have yet to measure blood flow directly. Therefore, the statements above related to actual flow are speculative at this time.

Blood Glucose Control: Aside from our finding of increased blood nitrate/nitrite with ArginoCarn® supplementation, we have also noted a small (non-statistical) improvement in fasting blood glucose, insulin, and hemoglobin A1c (HbA1c). Because elevated fasting levels of these biomarkers are considered health risk factors, these findings may have relevance for those with impaired glucose tolerance.

Physical Performance: Evidence from work just completed involving GlycoCarn® supplementation indicates significant exercise performance and recovery benefits when subjects engage in repeated bouts of high intensity cycle sprints. Additionally, a significant reduction in exercise-induced blood lactate, a byproduct of anaerobic metabolism, was noted with the use of GlycoCarn®. Such findings may have implications for those involved in regular, high intensity exercise. We are presently designing a follow-up study to extend these findings.

Considering the available evidence, the use of AminoCarnitines® may provide antioxidant, blood flow, performance, and health benefits when used by human subjects at a functional dosage. Finished products containing these ingredients may be considered as one component of a complete supplementation program within otherwise healthy individuals. Experimentation on the part of the individual, together with the approval and supervision by a qualified health care professional is always necessary.



Bio

Richard J. Bloomer holds a PhD in Exercise Physiology and is currently an Assistant Professor within the Department of Health and Sport Sciences at The University of Memphis. He held prior positions at Duke University Medical Center and Wake Forest University. His research focus is centered on oxidative stress and antioxidant therapy.