
Diana Allen, MS, CNS | Product Development Manager | (800) 851-5444

# The Moss Nutrition Digest

## Timely Tidbits to Support Your Practice

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### Healthy Aging: From Metabolism to Muscle Mass — A Role for L-Glutamine?

When accompanied by related gains in fat mass, sarcopenia (the age-related loss of muscle mass and function) is strongly associated with Type 2 diabetes in older populations. But which came first, the chicken or the egg? Even in lean individuals, hyperglycemia itself poses a significant risk for sarcopenia. And in older adults with long-standing type 2 diabetes, muscle strength may be an independent determinant of glycemic control. Such findings suggest an intimate relationship between insulin and blood sugar metabolism with muscle physiology. It follows that managing blood sugar may be an important key to managing and minimizing sarcopenia as we age, and vice versa.

Many strategies and treatments employed by functional medicine practitioners are used to help balance and stabilize blood sugar levels effectively. Such an approach commonly features low carbohydrate or Mediterranean style whole food diets, regular exercise programs, sleep optimization and nutritional supplements such as alpha-lipoic acid, chromium, and cinnamon.

In a surprising win/win, new research suggests the cost-effective amino acid supplement L-Glutamine—generally recommended for leaky gut issues due to its ability to nourish and promote a healthy GI tract lining—also may be useful in helping to support muscle strength and healthy glycemic control in older individuals.

Glutamine is a conditionally essential amino acid. Made by the body within skeletal muscle, it participates in protein synthesis and supplies the glutamate needed for glutathione production, our most important endogenous antioxidant. Losses in muscle mass provoke insufficient glutamine production, a situation which occurs during times of catabolic stress, or as a result of undereating, or when sarcopenia is present. In such cases, L-Glutamine supplements are a convenient way to match circulating levels with physiologic needs.

Research published in 2021 examined the impact of oral L-Glutamine supplementation on glycemic control, oxidative stress, and muscle function (specifically knee muscle strength and power) in older women. Forty-four Brazilian women between the ages of 60 and 80 were enrolled in the study. First, they were divided into an exercising group (combined strength training and cardio on alternate days) and a non-exercising group. Second, the participants in both the exercising and non-exercising groups were split into a treatment and a non-treatment group. Treatment groups took a daily powdered L-Glutamine supplement (10 g L-Glutamine plus 10 g maltodextrin) mixed in water. Non-treatment groups took a placebo, consisting of 20 g maltodextrin, also mixed in water.

Several parameters were evaluated in this study. Fasting blood samples taken at baseline and after 30 days of

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treatment/placebo measured plasma insulin and D-fructosamine levels to determine changes in glycemic control responses. Reduced and oxidized glutathione, along with iron and uric acid levels, helped to determine redox capacity. Dual x-ray absorptiometry was employed to measure body composition. And isokinetic strength testing, along with functional fitness tests such as the 2-minute step test and the 5-times chair sit/stand, evaluated muscle strength and function.

Following the intervention, it was found that all the women who took L-Glutamine showed a significant reduction in plasma D-fructosamine, a biomarker for hyperglycemia. This decrease occurred in both the exercising and the non-exercising groups. The L-Glutamine treated non-exercising women also exhibited a significant decrease in insulin levels, while both D-fructosamine and insulin levels remained unaltered in women taking the placebo.

In addition, antioxidant glutathione levels increased in the women treated with L-Glutamine, regardless of exercise status. Finally, both glutamine supplemented groups, exercising and non-exercising, showed an increase in peak knee extensor torque, while women in the glutathione-plus-exercise group experienced a 12% increase in knee extensor power.

In short, the findings of this study suggest that simple L-Glutamine supplementation had anti-diabetic effects, enhanced skeletal muscle function, and improved antioxidant status in older women—especially, but not solely in association with an exercise program.

Maintaining muscle mass and function is the number one determinant for quality of life in aging individuals. The intimate relationship between muscle mass, redox capacity and blood sugar balance suggests an important role for L-Glutamine supplementation in older patients. As a bonus, their GI health should improve as well!

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