**Carnitine: A Boost for Battling the Bulge**

It’s no secret that losing weight and keeping it off is a challenge for many patients. The frustration and disappointment they face after repeated failed attempts to reshape their bodies often leads them to grasp at straws, and put all their faith—not to mention their hard-earned pounds—in the latest miracle cures advertised in magazines and on TV.

It’s nice to know that amidst all of the weight loss schemes, there are nutrients that may be beneficial when it comes to helping patients with weight loss. L-carnitine is such a nutrient. Carnitine is considered a conditionally essential nutrient, since most people—including vegetarians—can synthesize it endogenously. However, like many nutrients, certain physiological states may increase the requirement for carnitine beyond what the body can produce on its own and absorb from dietary sources. (The richest sources are meat, poultry, seafood, and dairy; most plant foods contain only miniscule amounts.) When synthesized by the body, carnitine is a derivative of the amino acids lysine and methionine.

The primary role that carnitine plays in the body is to transport fatty acids into the mitochondria to be used to generate energy (ATP); therefore, it should come as no surprise that the biggest consumers of carnitine are [hardworking tissues that use fats as their primary source of fuel](http://invivoclinical.us7.list-manage.com/track/click?u=d1bce5200eb78ca6246d362e9&id=15323239c6&e=5cc5f29cb3). In fact, [98% of the body’s carnitine stores are in the heart and skeletal muscles](http://invivoclinical.us7.list-manage.com/track/click?u=d1bce5200eb78ca6246d362e9&id=4c7e0db5cb&e=5cc5f29cb3). And since carnitine is such an integral element for metabolizing fat, supplementing with carnitine may offer a slight advantage when it comes to fighting the battle of the bulge.

A single-blind randomized controlled trial involving 4g/day of L-carnitine delivered intravenously showed a very modest advantage for weight loss and reduction of waist circumference in the carnitine group, compared to placebo. However, a more interesting result was that [perceived hunger and fatigue were both significantly lower in the L-carnitine group](http://invivoclinical.us7.list-manage.com/track/click?u=d1bce5200eb78ca6246d362e9&id=283cf8dd1a&e=5cc5f29cb3), compared to placebo. Even if carnitine doesn’t increase fat loss directly, these indirect effects may be beneficial for helping patients *stick to* weight loss regimens—often the hardest part!

Another indirect influence carnitine may exert is selectively partitioning more of the fuel used during low-to-moderate intensity exercise towards fat, while sparing muscle glycogen, suggesting that for the same amount of work output, [fat would preferentially be used to fuel the activity](http://invivoclinical.us7.list-manage1.com/track/click?u=d1bce5200eb78ca6246d362e9&id=76e1e6914b&e=5cc5f29cb3).

Supplemental carnitine might also have beneficial effects on insulin sensitivity and glucose handling in the body. And being that deranged carbohydrate metabolism often underlies weight gain, interventions that help ameliorate this could be beneficial for fat loss. [A review of carnitine supplementation in animals and humans](http://invivoclinical.us7.list-manage.com/track/click?u=d1bce5200eb78ca6246d362e9&id=9df0a54d0d&e=5cc5f29cb3) suggested that the upregulation of fat oxidation via increased carnitine may reduce lipid accumulation in skeletal muscle, leading to better insulin sensitivity. This is supported by a small study investigating carnitine supplementation in healthy young men, which showed that [carnitine may reduce overall carbohydrate oxidation in favor of fat oxidation](http://invivoclinical.us7.list-manage.com/track/click?u=d1bce5200eb78ca6246d362e9&id=46c4e112b9&e=5cc5f29cb3), with that fat coming preferentially from intramuscular fat stores. Reducing this intramuscular fat pool may improve insulin sensitivity. [Research shows that carnitine helps to increase glycogen storage](http://invivoclinical.us7.list-manage.com/track/click?u=d1bce5200eb78ca6246d362e9&id=49bfafcb4b&e=5cc5f29cb3), while also increasing fat oxidation. Another review lends additional weight to the idea of carnitine having [an influence over enzymes involved in carbohydrate metabolism](http://invivoclinical.us7.list-manage1.com/track/click?u=d1bce5200eb78ca6246d362e9&id=f12ddb9dfd&e=5cc5f29cb3). It’s worth noting that [even in the absence of weight loss](http://invivoclinical.us7.list-manage.com/track/click?u=d1bce5200eb78ca6246d362e9&id=183bfc8a6a&e=5cc5f29cb3), a more efficient overall metabolism—particularly one where fat, rather than carbohydrates is the primary fuel source—can have beneficial effects on markers for chronic illness. So again, even if carnitine doesn’t lead to fat loss directly, it may still play a role in improving health, especially among those with metabolic syndrome.

It is recommended that carnitine be used as part of a multifaceted strategy that includes caloric reduction (particularly carbohydrate reduction) along with increased physical activity and other helpful lifestyle modifications. With this comprehensive regimen, carnitine be a part of a successful weight loss program, and therefore, help patients stick to healthy habits.