

# L-CARNITINE



## CLINICAL APPLICATIONS

- *Improves Cellular Energy Production*
- *Stimulates Fat Utilization and Boosts Metabolism*
- *Promotes Cardiovascular Health*
- *Supports Post-Training Muscle Recovery*

## ESSENTIAL AMINO ACIDS

L-carnitine is an amino acid essential for the transport of fatty acids into the cell mitochondria. Research has shown that L-carnitine stimulates the use of fat for fuel and boosts metabolism, which plays a key role in weight management. L-carnitine has also been found to support cardiovascular health and to increase aerobic capacity during exercise. The L-Carnitine formulation provides 500 mg of L-carnitine per capsule, now delivered using quick-release, fast-absorbing Licaps® Technology. The Licaps® capsule shell matrix seals and protects the nutrient inside with a nitrogen bubble, ensuring maximum freshness. The thin shell dissolves rapidly, releasing a liquid formulation that speeds nutrient absorption. These cutting-edge advancements in capsule filling, sealing and nutrient delivery ensure therapeutic potency and efficacy.

### Overview

Produced in the body from L-lysine and L-methionine, the synthesis of L-carnitine requires optimal amounts of other key nutrients including niacin, pyridoxine, vitamin C and iron for synthesis. Following production, L-carnitine is transported to the cardiac and skeletal muscle, where 98% of total body L-carnitine is stored.<sup>1</sup> The heart and skeletal muscles, as well as many other tissues, depend on fatty acid oxidation as a source of energy. L-carnitine is an essential nutrient required for the transportation of long-chain fatty acids into the mitochondrial matrix. Within the mitochondria of each cell, a metabolic process called beta-oxidation occurs, resulting in the production of energy in the form of adenosine triphosphate (ATP). L-carnitine also aids in the transport of short-chain and medium-chain fatty acids out of the mitochondria and aids in the liberation of coenzyme A, an important component of ATP.

### Depletion†

Some individuals require supplemental L-carnitine to maintain normal metabolism. In addition, L-carnitine requirements vary under certain conditions. For example, L-carnitine is removed from the circulation during hemodialysis. Impaired L-carnitine synthesis by the kidneys may also contribute to the potential for carnitine deficiency in patients with end-stage renal disease undergoing hemodialysis. The U.S. Food and Drug Administration has approved the use of L-carnitine in hemodialysis patients for the prevention and treatment of L-carnitine deficiency.<sup>2</sup> Additionally, certain medications including anticonvulsants and nucleoside analogues used in the treatment of HIV infection, may produce a secondary L-carnitine deficiency. Pivalic acid-containing antibiotics may also produce a secondary L-carnitine deficiency, as may certain chemotherapy agents.<sup>3</sup>

### Muscle Recovery†

A double-blind, placebo, crossover study found that 2 g of L-carnitine had positive effects and significantly attenuated markers of purine metabolism, free radical formation, muscle tissue disruption, and muscle soreness after physical exertion.<sup>4</sup> A randomized, placebo-controlled study suggested L-carnitine can improve exercise tolerance and muscle strength while decreasing lactic production.<sup>5</sup>

### Energy Production and Metabolism†

L-carnitine is known to play a central role in metabolism, specifically in the production of energy from fatty acids. Dietary L-carnitine supplementation has been shown to have a metabolic effect, facilitating fatty acid oxidation in overweight animals undergoing rapid weight loss.<sup>7</sup> In a human

†These statements have not been evaluated by the Food and Drug Administration. This product is not intended to diagnose, treat, cure, or prevent any disease.

performance controlled trial, a study group given L-carnitine increased their exercise output by 11% from baseline, while the control group showed no change. These changes were also associated with an improvement in exercise performance.<sup>8</sup>

### Cardiovascular Health<sup>†</sup>

Administration of L-carnitine has been shown to support the health of myocardial tissues in a number of experimental model systems and to improve cardiovascular wellness.<sup>9</sup> In a controlled study of 160 patients, L-carnitine was randomly administered to 81 patients at a dose of 4 g/day for a year. During the study, the patients showed an improvement in heart rate, maintained healthy blood pressure, heart rhythm and myocardial contractility, while demonstrating a decrease in mortality.<sup>10</sup> In a study of 80 cardiovascular patients, randomly assigned to receive either L-carnitine (2 g/day orally) or placebo, for a mean range of 10 to 54 months, analysis showed that the patients' survival rate was statistically significant in the L-carnitine group.<sup>11</sup>

### Directions

1 capsule three times per day or as recommended by your health care professional.

### Does Not Contain

Gluten, corn, yeast, artificial colors and flavors.

### Cautions

If you are pregnant or nursing, consult your physician before taking this product.

Supplement Facts <sup>v3</sup>		
Serving Size 1 Capsule		
Servings Per Container 60 & 120		
1 capsule contains	Amount Per Serving	% Daily Value
L-Carnitine	500 mg	*
* Daily Value not established		

ID# 730060 60 Capsules

ID# 730120 120 Capsules

### References

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