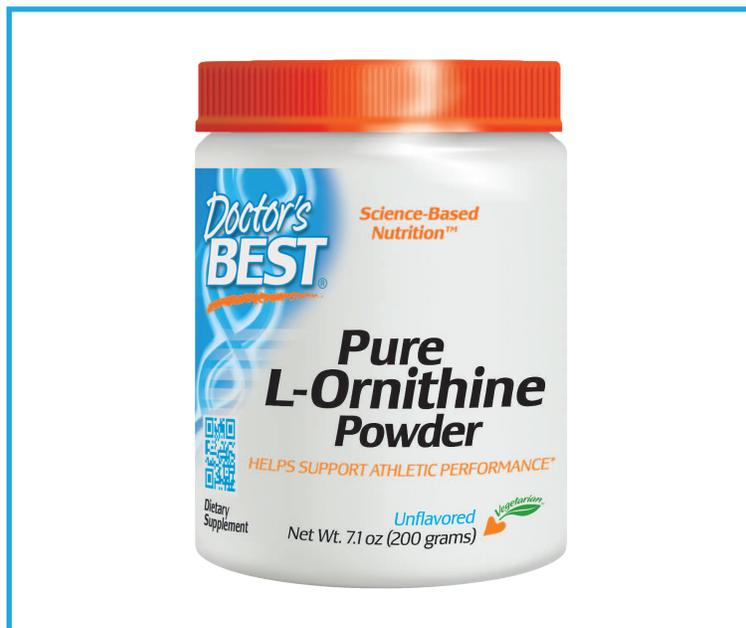


# Pure L-Ornithine Powder



## INGREDIENTS

L-Ornithine is an amino acid that helps in the formation of citrulline, proline, and glutamic acid, three amino acids that help supply energy to every cell in the body. L-Ornithine helps support athletic performance and helps lower exercise-induced fatigue, especially when combined with other amino acids.\* Doctor's Best Pure L-Ornithine powder is unflavored and can be combined with water, protein-shakes, or your favorite sports performance drink.

L-Ornithine is an amino acid produced as a metabolite from L-Arginine in the citric acid cycle. L-Ornithine is naturally occurring and can be found in dairy, meat, and fish in very small amounts. Ornithine plays a role in the energy systems of the body. The conversion of L-Ornithine into L-citrulline also lowers circulating ammonia content (elevated ammonia levels can be an effect of exhaustive exercise and fatigue).

## BENEFITS

- Helps support athletic performance\*
- Helps lower exercise-induced fatigue\*
- Helps lower factors of stress and fatigue\*

## EXTENDED BENEFITS

L-Ornithine plays a role in nitrogen detoxification and ammonia regulation. The conversion of L-Ornithine to L-citrulline via the Ornithine carbamoyl transferase enzyme during the urea cycle causes a reduction in ammonia.<sup>1,2</sup> The accumulation of ammonia has been shown to be a major contributing factor in fatigue resulting from environmental factors or exercise induced symptoms, such as central nervous system fatigue.<sup>3,4</sup> L-Ornithine's vital role in the urea cycle helps limit the ammonia levels in the body, which can prevent fatigue from various causes.

L-Ornithine has been shown to improve factors related to body composition. Studies have demonstrated L-Ornithine's effect on recovery factors following resistance training, which demonstrated a positive effect on strength and lean body mass growth factors.<sup>5,6</sup>

## CLINICAL STUDIES

A double-blind, placebo-controlled, 2-way crossover study was conducted to examine L-Ornithine's effects on physical fatigue. The volunteers were split into two groups and either supplemented with L-Ornithine or placebo for 8 days. The L-Ornithine supplementation was shown to promote fat metabolism, increasing free fatty acids and ketones, as well as promoting urea cycle changes resulting in lower levels of ammonia. The L-Ornithine was shown to significantly attenuate feelings of fatigue, as well as improving physical performance, compared to the placebo group. The authors found L-Ornithine exerted an antifatigue effect through increasing the efficiency of energy consumption and promoting the excretion of ammonia.<sup>7</sup>

A randomized, double-blind, placebo-controlled clinical study was conducted on L-Ornithine's ability to combat fatigue and stress in Japan. Individuals that were fatigued and stressed were either given L-Ornithine or placebo for 8 weeks. Both groups were given daily tests for cortisol and hormonal factors of stress, and given various tests on stress and sleep quality. Cortisol levels and hormonal indicators of stress were reduced in the L-Ornithine group, as well as incidences of stress related anger. The L-Ornithine group also improved their sleep quality.<sup>8</sup>

A double-blind, placebo-controlled, crossover study was conducted to see if L-Ornithine could buffer increased levels of ammonia created during exercise. Fourteen fit, young adults were given either L-Ornithine or placebo then tested at various points through an intense bout of exercise. The L-Ornithine group demonstrated an ability to buffer ammonia during and after the exercise.<sup>9</sup>

A double-blind, placebo-controlled study using untrained males was used to determine L-Ornithine's ability to aid in strength training. The subjects

## Supplement Facts

Serving Size 1 Scoop (≈2 grams)  
Servings Per Container Approximately 100

	Amount Per Serving	% Daily Value
L-Ornithine (as L-Ornithine HCl)	2 g	†

† Daily Value not established.

**Other Ingredients:** None.

**Suggested Adult Use:** Dissolve 1 scoop in 8 ounces of juice, favorite beverage or protein drink, preferably taken on an empty stomach. For best results, drink 1 hour before exercise. Repeat after exercise or before bedtime, or as recommended by a nutritionally-informed physician. Do not take more than 10g per day.

**WARNING:** Do not take L-Ornithine if pregnant or nursing. Consult your physician if taking MAOIs and other medications for possible interactions while taking concomitant with L-Ornithine.

**NOTE:** Settling of contents may occur, which may cause slight variations in the number of servings.

**Non-GMO / Gluten Free / Soy Free / Vegetarian**

Store in a cool dry place.

\* 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.

were given L-Ornithine or placebo and asked to follow a strength training regimen. They were tested for the hormonal effects of the strength training during the study. There was a significant increase in growth hormone following the resistance exercises in the L-Ornithine group compared the placebo group. The authors characterized the size of this effect as large.<sup>5</sup>

A placebo-controlled, double-blind study was designed to investigate the effect of L-Ornithine (in combination with L-arginine) after resistance training and its ability to influence growth factors. The volunteers were split into L-Ornithine/L-arginine supplementation and a placebo group. These two groups were then subjected to the exact same resistance training program. Blood samples on the hormonal effects of the exercises were taken prior to any exercise, immediately following, and one-hour post-exercise. There was no significant difference in blood tests prior to any exercise, however post exercise the L-Ornithine/L-arginine saw significant increases in growth hormone and insulin-like growth factor-1.<sup>6</sup> Both markers are important regulators of body composition and response adaptations to exercise.<sup>10</sup>

## SCIENTIFIC REFERENCES



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