HMB PRO

Supports Maintenance and Restoration of Muscle Health*

Available in 150 vegetarian capsules

Clinical Applications

- Supports Muscle Recovery Following Exercise*
- Supports Muscle Health*
- Supports Increased Protein Synthesis and Decreased Protein Degradation*

HMB PRO *features beta-hydroxy-beta-methylbutyrate (HMB), a natural metabolite of leucine that supports increased protein synthesis and decreased protein degradation. Vitamin D, which supports skeletal muscle health and function, complements HMB to render this formula an optimal choice for supporting muscle health.**

Discussion

HMB

Beta-hydroxy-beta-methylbutyrate (HMB) is a metabolite of the essential amino acid leucine, naturally present in human muscle cells, and it has been reported to have anabolic effects on protein muscle metabolism.[1,2] Several mechanisms of action have been proposed to explain the action of HMB on muscle health. Among them are that HMB attenuates training-induced proteolysis via downregulation of proteolytic pathways, and it acts as a signaling molecule for the stimulation of protein synthesis.[2-4] Studies conducted mostly in athletes have suggested that HMB supplementation may exert beneficial effects on muscle mass and function, most notably when combined with resistance-type exercise training.*[3,5]

In a randomized, double-blind, placebo-controlled, parallel design study, subjects (N = 31) aged 70 and older were given 3 g of HMB or placebo daily for eight weeks with a prescribed exercise program for five days per week. In the supplemented group, subjects showed an increase in lean body mass similar to that previously demonstrated in studies of young adults that had reported a decrease in muscle proteolysis and an increase in fat-free mass with resistance training. The researchers suggested that these findings are indicative of the role HMB plays in decreasing proteolysis.*[6]

Results from a randomized study in young, healthy, sedentary subjects (N = 37) given 3 g of supplemental HMB daily for three weeks showed an increase in fat-free mass and total body strength, suggesting that HMB partially attenuates muscle protein breakdown without exercise.[7] To further illustrate the benefit of HMB supplementation on muscle health without any form of exercise, a randomized, double-blind, placebo-controlled, parallel design study was conducted with healthy subjects (N = 24) aged 60-76 years who were confined to complete bed rest. Subjects in the test group were given 3 g of HMB five days prior to bed rest through to the end of the 10-day rehabilitation phase, resulting in the preservation of muscle mass when compared to the placebo group. The results suggested that HMB helped preserve muscle mass during the immobilization period.*[8]

Several systematic reviews and meta-analyses have helped solidify the body of evidence supporting the effectiveness of HMB on strength, body composition, and muscle health in trained and untrained individuals. A meta-analysis of randomized placebo-controlled trials with supplemental HMB in doses ranging from 1.5 to 6 g/day for three to nine weeks indicated sufficient data to support strength gains in untrained participants and a negligible effect in trained individuals but with an inconsequential effect on body composition.‡[2] A meta-analysis exploring the potential benefit of supplements on lean mass and strength with resistance training reviewed over 250 different supplemental ingredients of which only six had adequate research for inclusion. Nine HMB studies qualified with analyses that demonstrated that a 3 g/day dose provided support for a net gain in strength and gains in lean mass.[9] The results of a systematic review and meta-analysis assessing the outcome of HMB supplementation in a clinical setting of subjects (N = 2,137) with conditions characterized by loss in skeletal muscle mass and weakness were in line with previous reviews of older adults and athletes, suggesting that the effect of HMB increases skeletal muscle mass and improves muscle strength.*[10]

Vitamin D

Vitamin D has a well-known function in bone health due to its role in the regulation of calcium and phosphate homeostasis. It has also been linked to skeletal muscle health and function.[11,12] Low serum levels of vitamin D are correlated with muscle weakness and myopathy. In vitro studies have shown that vitamin D contributes to the mitochondrial function of providing energy to skeletal muscle cells.*[13]

A cross-sectional study examining the relationship between vitamin D status and strength in collegiate athletes (N = 103) showed that a decrease in serum D was correlated with a decrease in indicators of muscle strength and anaerobic power. The authors concluded that vitamin D should be considered as a component of training to maximize performance in sports requiring muscular strength.*[14]

A systematic review and meta-analysis of 17 randomized controlled trials assessing vitamin D supplementation and its role in muscle strength suggested that in individuals with baseline vitamin D levels, the outcome of supplementation was not significant; however, a limited number of studies demonstrated an increase in strength in individuals who were deficient.[11] Another study analyzing the role of vitamin D in muscle function with data from 30 randomized trials involving over 5,600 participants indicated that supplementation has a positive impact on muscle strength. The authors suggested that additional research is needed to define optimal dose, duration, and mode of administration.*[12]

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There have also been studies on the combined effect of vitamin D with HMB. In a randomized, double-blind, placebo-controlled, 12-month trial in older subjects (N = 117), HMB (3 g) and vitamin D (2,000 IU) were shown to be of benefit to muscular function with or without resistance training.[15] Another study looked at previous data of vitamin D status in older adults who used HMB supplements. It was found that muscle mass increased regardless of vitamin D status, but strength increases were observed only in individuals with adequate vitamin D status, demonstrating a synergistic effect of HMB and vitamin D on muscle function.*[16]

HMB PRO features the combined effects of HMB and vitamin D, making it an optimal choice for supporting the maintenance and restoration of muscle health.

‡Errata in Rowlands 2009 meta-analysis. The results in the studies cited in Rowlands 2009 meta-analysis were presented in grams (g) not milligrams (mg).

HMB PRO Supplement Facts

Serving Size: 6 Capsules

	Amount Per Serving	%Daily Value
Calories	15	
Vitamin D3 (cholecalciferol)	12.5 mcg	63%
Calcium (from calcium beta-hydroxy-beta-methylbutyrate-monohydrate)[S1]	390 mg	30%
Calcium Beta-Hydroxy-Beta-Methylbutyrate-Monohydrate[S1]	3 g	**

** Daily Value not established.

Other Ingredients: Capsule (hypromellose and water), ascorbyl palmitate, hydroxypropyl cellulose, and silica.

DIRECTIONS: Take 6 capsules daily, or use as directed by your healthcare professional.

Consult your healthcare professional before use. Individuals taking medication should discuss potential interactions with their healthcare professional. Do not use if tamper seal is damaged.

STORAGE: Keep closed in a cool, dry place out of reach of children.

FORMULATED TO EXCLUDE: Wheat, gluten, yeast, soy, dairy products, fish, shellfish, peanuts, tree nuts, egg, sesame, ingredients derived from genetically modified organisms (GMOs), artificial colors, and artificial sweeteners.

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NSF CERTIFIED SPORT

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All XYMOGEN® Formulas Meet or Exceed cGMP Quality Standards.

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