

Magnesium Malate



Highly bioavailable form of magnesium

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This information is provided as a medical and scientific educational resource for the use of physicians and other licensed health-care practitioners ("Practitioners"). This information is intended for Practitioners to use as a basis for determining whether to recommend these products to their patients. All recommendations regarding protocols, dosing, prescribing, and/or usage instructions should be tailored to the individual needs of the patient considering their medical history and concomitant therapies. This information is not intended for use by consumers.

Designs for Health's Magnesium Malate features a highly absorbable and bioavailable form of elemental magnesium as magnesium malate.* Each 2-capsule serving provides 360 mg of magnesium as di-magnesium malate. Magnesium participates in hundreds of enzymatic reactions and supports proper energy production, metabolism, muscle relaxation, cardiovascular health, and brain health, and may promote sports performance and healthy stress responses.*

Highlights

- 360 mg of magnesium (as di-magnesium malate) per 2-capsule serving
- Highly absorbable and bioavailable magnesium malate form
- Gluten-free, dairy-free, and soy-free
- Non-GMO

According to epidemiological studies, magnesium (Mg) intake in the U.S. has decreased significantly from 500 mg to 175 mg to 225 mg per day.¹ Individuals following a Western-style diet consume less than 30% to 50% of the Recommended Daily Allowance (RDA) for magnesium, which is 320 mg to 420 mg per day for adults.¹ Magnesium insufficiency is common in the U.S. due to the wide use of demineralized water and soil and the increased consumption of processed foods.¹ Magnesium is also depleted by stress, excessive alcohol consumption, gastrointestinal disorders, diabetes, and certain medications.^{1,2} Dietary magnesium is inversely associated with the incidence of diabetes, hypertension, heart disease, and metabolic syndrome.³

Magnesium is an essential mineral that serves as an enzyme cofactor for more than 300 biochemical reactions in the body, including those of glycolysis, the first step in harnessing energy from carbohydrates. It is a structural component of the hydroxyapatite mineral matrix of bone, a natural calcium channel blocker, muscle relaxant, facilitator of calming effects upon the nervous system, and a required element for electrolyte balance and proper functioning of sodium-potassium pumps. It plays a crucial role in supporting physical strength and mobility, smooth muscle relaxation, neurological health, cardiac function, and psychological balance. Magnesium is required for DNA, RNA, glutathione, and protein synthesis, and it assists in blood glucose control and blood pressure regulation.⁴ It is also a cofactor for vitamin D biosynthesis, transport, and activation.⁵ The role of magnesium as an enzyme cofactor for processes that generate adenosine triphosphate (ATP) underlies its importance for maintaining energy levels and metabolic efficiency.⁴

Magnesium for Compromised Digestive Function

Patients who have been on long-term proton pump inhibitors (PPIs) or other stomach acid-reducing medications may benefit from extra magnesium, as hypochlorhydria may prevent adequate liberation of minerals from their food bases, including magnesium.* Continued use of PPIs (and other medications) have been shown to inhibit proper absorption of oral magnesium leading to overt hypomagnesemia.^{6,7} In human and mouse studies of Crohn's disease and colitis, the subjects given supplementation with magnesium experienced lower inflammatory damage and improved mucosal integrity.^{8,9}

Magnesium Malate and Energy Production

Owing to the role of magnesium and malate in the body, magnesium malate may help support proper cellular energy production.* Malate is an intermediate of the citric acid cycle found in the mitochondrial and cytoplasmic membrane and a fundamental compound in energy production.¹⁰ Each ATP molecule binds to magnesium to create its biologically functional form. Magnesium serves as a cofactor for several kinases involved in glycolysis, as a regulator of several enzymes of the citric acid cycle, and as it assists in exporting mitochondrial ATP into the cytosol for energy delivery.¹¹

Magnesium malate is a highly bioavailable form of magnesium.* The bioavailability of different magnesium preparations were compared in a study using rodent models. After 8 hours, a group receiving 400 mg of magnesium malate showed significantly higher serum magnesium than the other groups (sulfate, oxide, acetyl taurate, and citrate).¹²

Magnesium and Sports Performance

Magnesium requirements may be elevated in physically active subjects due to increased metabolic activity compared to inactive individuals.¹¹ Meta-analyses observed that although physically active individuals tend to have significantly higher

Benefits*

- Supports metabolism and energy production
- Promotes sports performance
- Promotes musculoskeletal and cardiovascular health
- Supports brain health and a healthy stress response
- May support magnesium status in individuals with compromised digestive function

Supplement Facts

Serving Size 2 capsules Servings Per Container 120		
Amount Per Serving		% Daily Value
Magnesium (as Di-Magnesium Malate)	360 mg	86%

Other Ingredients: Cellulose (capsule), vegetable stearate.

intakes of magnesium than controls, their magnesium levels still fell below the RDA.¹³ Magnesium is necessary for the proper regulation of muscle contractions and cardiorespiratory functions, and it may influence exercise performance in its role in the glucose metabolic pathway, based on animal studies.^{11,14}

Athletes with suboptimal or deficient magnesium levels may experience less efficient energy metabolism and endurance capacity.¹⁴ Several cross-sectional surveys have reported a positive association between magnesium intake or serum magnesium concentrations and outcomes related to muscle strength, muscle performance, or muscle power, including grip strength, lower-leg power, knee extension torque, ankle extension strength, maximal isometric trunk flexion, rotation, and jumping performance.^{11,14} Human studies suggest proper magnesium status may improve performance parameters in both aerobic and anaerobic exercises, and may significantly reduce muscle soreness and perceived exertion and recovery.^{14,15}

Animal studies suggest magnesium supplements may improve exercise performance and delay exhaustion by enhancing glucose availability in the brain, muscle, and blood, and by reducing or delaying lactic acid accumulation in skeletal muscle.¹¹ One clinical trial administered magnesium supplementation (8 mg/kg per day or approximately 500 mg per day) to physically active college students. The students who received magnesium experienced increased endurance performance during submaximal exercise.¹¹

One human clinical study concluded that magnesium supplementation may improve athletic anaerobic performance, even if the athletes are not magnesium deficient. For 4 weeks, researchers administered a placebo or 350 mg of magnesium per day to 25 professional male volleyball players who were not magnesium deficient based on erythrocyte, plasma, and urinary magnesium levels. The experimental group of volleyball players exhibited improved athletic anaerobic performance through countermovement jumps and arm swings.¹⁶

Further human clinical trials support the potential benefit of magnesium supplementation for muscle strength and exercise performance in adults.^{11,14} In one study, 26 untrained young adults were given 8 mg/kg of magnesium supplementation per day for 7 weeks during a strength training program. Compared to a placebo, the group with magnesium supplementation showed improved muscle strength, specifically quadriceps torque.¹¹ Another clinical trial supplemented 350 mg of magnesium per day for 1 week to 13 recreational athletes. Compared to a placebo and baseline measurements, the experimental group reported significantly increased muscle strength and an 8% increase in bench press scores.¹¹

Magnesium and Brain Health

Magnesium is essential for brain energy homeostasis and plays a key role in regulating cerebral glucose levels and neuronal activity.^{14,17} One function of magnesium is inhibiting calcium influx in neurons by competing with it on the N-methyl-D-aspartate (NMDA) receptors, which may play a role in supporting those with migraines.^{17,18} Human studies have found that patients with cluster headaches or migraines, especially menstrual migraines, have low levels of magnesium.¹⁸

A clinical trial of 81 patients (aged 18 to 65 years) with migraine headaches were administered a placebo or 600 mg of magnesium daily for 12 weeks, according to the criteria of the International Headache Society. During weeks 9 through 12, migraine frequency attacks were reduced by 41.6% in the magnesium group and by 15.8% in the placebo group compared to baseline.¹⁸ Human and animal studies suggest that magnesium may be clinically relevant in supporting a healthy stress response for the general population and for individuals with fibromyalgia and also for those with fibromyalgia-related stress.¹⁹⁻²²

Recommended Use: Take 2 capsules per day with meals or as directed by your health-care practitioner.

For a list of references cited in this document, please visit:

<https://www.designsforhealth.com/api/library-assets/literature-reference---magnesium-malate-tech-sheet-references>

Dosing recommendations are given for typical use based on an average 150 pound healthy adult. Healthcare practitioners are encouraged to use clinical judgement with case-specific dosing based on intended goals, subject body weight, medical history, and concomitant medication and supplement usage.

***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.**

To contact Designs for Health, please call us at (860) 623-6314, or visit us on the web at www.designsforhealth.com.