designs for health®

Magnesium Glycinate Complex

300 mg per serving with superior absorption

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Designs for Health's Magnesium Glycinate Complex features magnesium glycinate chelate buffered (MgGlyC-B), a practitioner-grade magnesium formulation designed to support optimal bioavailability and gastrointestinal (GI) tolerability.* This formula uses a buffered chelate system that combines magnesium glycinate chelate (also referred to as magnesium bisglycinate chelate) with magnesium oxide (MgO) to deliver a higher amount of elemental magnesium per serving while supporting solubility and digestive comfort.[1] Through a patented chelation process, each magnesium ion is bound to two molecules of the amino acid glycine, forming a stable, ring-like complex that supports efficient absorption and intestinal magnesium uptake.[1] Compared with MgO alone, MgGlyC-B has been shown to exhibit substantially greater magnesium absorption in laboratory intestinal models, with nearly 4X the amount.[2] The chelated structure may be less susceptible to interference from common dietary inhibitors such as phytates, which can impair magnesium absorption.[1] Moreover, participants in a randomized, placebo-controlled clinical trial who received 250 mg/day of magnesium glycinate chelate for 28 days reported no GI discomfort.[3] Together, these characteristics distinguish Magnesium Glycinate Complex from many conventional magnesium products.

Magnesium supplementation is important because magnesium acts as a cofactor in more than 600 biochemical reactions in the body,[4,5] yet nearly 50% of U.S. adults do not obtain sufficient magnesium from food alone.[6] Furthermore, nearly 50 medications are known to deplete magnesium.[7] Thus, Magnesium Glycinate Complex may be beneficial for the general population and may be especially supportive for individuals consuming plant-forward diets, those with increased magnesium needs due to medication use or poor dietary intake, or individuals who experience occasional GI discomfort with other forms of magnesium supplementation.*

Formula Highlights

- Provides 300 mg of elemental magnesium per 2-capsule serving from magnesium glycinate chelate buffered for enhanced solubility, bioavailability, and absorption
- The chelated buffered form of Mg has been shown in vitro to have ~4X greater absorption than magnesium oxide alone[2]
- The glycine in the magnesium chelate helps maintain gastrointestinal pH levels between 5.5 and 6.5 at the intestinal absorption site — an optimal range for magnesium absorption[1]
- Buffered chelate system delivers higher elemental magnesium while demonstrating a lower potential to cause GI complaints often associated with other forms of magnesium supplementation, such as loose stools
- Less susceptible to absorption interference from dietary inhibitors such as phytates
- Gluten-free, dairy-free, and soy-free; non-GMO

Benefits*

- Supports optimal magnesium status, including in individuals with compromised digestive function[1,2,20,22,23,28]
- Supports healthy energy production and glucose metabolism[4,6,14,36,39,50]
- Promotes muscle function and bone health[6,32,39,54-58]
- Promotes cardiovascular health and healthy blood vessel function[8,39,46-49,52,53]
- May promote physical relaxation and healthy sleep responses[3,32,39,41,42]
- Promotes healthy stress responses[11,41,43-45]

Supplement Facts

Serving Size 2 capsules
Servings Per Container 30 | 60 | 120

Amount Per Serving		% Daily Value
Magnesium (as TRAACS® Magnesium Bisglycinate Chelate Buffered - from Magnesium Bisglycinate Chelate and Magnesium Oxide)	300 mg	71%

Other Ingredients: Cellulose (capsule), vegetable stearate.

Why Not Just Use Magnesium Glycinate Chelate (Unbuffered)?

Magnesium glycinate chelate is already a well-absorbed form of Mg because the glycine helps maintain a mildly acidic luminal pH (~5.5 to 6.5), an environment that supports efficient paracellular Mg absorption through claudin-regulated tight junctions at high intakes, like 300 mg.[1,17,19] The buffered system is included in this product to further optimize Mg absorption; in an unpublished crossover study (150 mg elemental Mg; n = 14), the buffered MgGlyC-B form produced 37% greater serum magnesium exposure over eight hours (AUC) compared with magnesium glycinate chelate alone (0.225 vs 0.164).[23]

Why Not Use More Magnesium Oxide?

MgO contains a high amount of elemental Mg but is poorly soluble and can raise intestinal pH, which may limit Mg absorption and contribute to laxative properties when used alone.[1,29-31] The MgGlyC-B form limits MgO to ~21% of the Mg source and pairs it with magnesium glycinate chelate. This buffered design delivers higher elemental Mg per serving while preserving the absorption and tolerability advantages of the chelated form.*

Magnesium Summary

Magnesium (Mg) is an essential and abundant mineral that functions as a cofactor in more than 600 enzymatic reactions throughout the body.[4,5] Good dietary sources include green leafy vegetables, legumes, nuts, seeds, and whole grains. The Recommended Dietary Allowance (RDA) for adults aged 18 years and older ranges from 310 to 420 mg/day, depending on sex and pregnancy or lactation status. NHANES dietary intake data from 2013 to 2016 indicate that approximately 48% of Americans do not meet their Estimated Average Requirement (EAR) for Mg.[6]

Certain populations are at particularly high risk for inadequate Mg intake, including older adults (≥71 years) and adolescents. The true prevalence of Mg deficiency is difficult to determine because Mg status is not routinely assessed in national surveys or in standard clinical practice. Less than 1% of total body Mg is found in serum, and serum concentrations are tightly regulated, making them an unreliable indicator of total body magnesium stores.[6] Magnesium insufficiency may be exacerbated by Western dietary patterns, demineralized water and soil, high intake of processed foods or alcohol, GI disorders, diabetes, and increased physiological stress.[6,8-11] Medication exposure is also an under-recognized contributor.[6] According to one review, nearly 50 medications have been associated with hypomagnesemia.[7] Commonly used drug classes that increase Mg loss include proton pump inhibitors (PPIs), used by approximately 18% of adults aged 60 to 79, and diuretics, taken by roughly 45% of individuals with hypertension.[6,12,13] Dietary Mg inadequacy has been associated with increased risk of several chronic conditions, including hypertension, type 2 diabetes mellitus (T2DM), cardiovascular disease, and osteoporosis.[6,14]

The adult human body contains approximately 25 g of Mg, with about 50% to 60% stored in bone. Magnesium plays a central role in energy production as a cofactor in adenosine triphosphate (ATP)-dependent reactions during glycolysis and oxidative phosphorylation. It contributes structurally to bone as part of the hydroxyapatite mineral matrix and functions as a natural calcium channel blocker. Magnesium is essential for neuronal signaling, smooth muscle relaxation, cardiac function, and electrolyte balance through sodium-potassium pump activity. It is also required for DNA, RNA, protein, and glutathione synthesis, supports blood glucose regulation, and helps maintain normal heart rhythm and blood pressure.[6] Magnesium also serves as a cofactor in vitamin D biosynthesis, transport, and activation.[15]

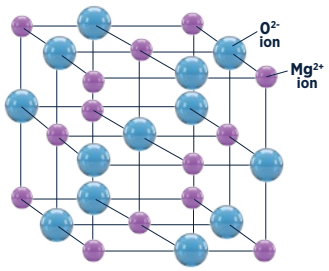
Magnesium Absorption Pathways

Magnesium homeostasis in humans is regulated primarily by intestinal absorption rather than by tight hormonal control, making the chemical form of supplemental magnesium a key determinant of bioavailability and physiological effectiveness.[16,17] Magnesium absorption occurs along the length of the GI tract, with the ileum serving as a particularly important site of uptake.[17,18] Human intestinal magnesium absorption is generally described as a dual-process system. At lower luminal magnesium concentrations, absorption occurs via active transcellular transport mediated in part by the magnesium channels TRPM6 and TRPM7, which play critical roles in fine-tuning magnesium uptake and systemic balance.[17,18] At higher magnesium intakes (approximately >250 mg), passive paracellular transport predominates, with magnesium moving between enterocytes through tight junctions regulated by proteins such as claudins.[1,17]

Passive absorption is strongly influenced by luminal pH and magnesium solubility. As intestinal pH becomes progressively more alkaline along the GI tract, magnesium solubility and apparent bioavailability decline.[1] According to mechanistic data, paracellular magnesium transport appears to be optimized in a mildly acidic pH range of approximately 5.5 to 6.5, supporting tight-junction–mediated diffusion.[1,17,19]

Figure 1. Buffered blend of magnesium glycinate chelate and magnesium oxide to support elemental Mg delivery and absorption

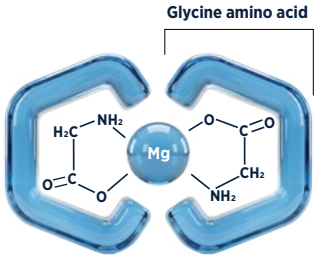
Magnesium Oxide



Molecular structure of a MgO nanoparticle

- High elemental magnesium content
- On its own, MgO exhibits poor solubility and intestinal absorption, which limit Mg bioavailability (despite high elemental content)

Magnesium Glycinate Chelate



Molecular structure of the magnesium glycinate chelate, a component of MgGlyC-B

- Glycine chelation helps maintain a favorable luminal pH (5.5 to 6.5) that supports optimal Mg absorption conditions via intestinal tight junction proteins, and may allow for peptide-like handling through amino acid-associated absorption pathways*
- Promotes efficient absorption; MgGlyC-B demonstrated ~4X greater Mg uptake than MgO in an in vitro intestinal model[2]
- Less likely to cause occasional GI discomfort with supplementation*
- Less susceptible to interference with dietary inhibitors, such as phytates*

Magnesium Glycinate Chelate

The chelation process binds each magnesium ion to two glycine molecules in a defined, stable, stoichiometric structure, forming a magnesium glycinate (or magnesium bisglycinate) chelate.[1,20] This chelation occupies magnesium's reactive sites, enhances compound solubility, and reduces interactions with dietary inhibitors, such as phytates, that are known to impair magnesium absorption.[1,16,21] These properties support improved absorption and bioavailability compared with poorly soluble, non-chelated Mg forms.[2,22,23] Chelation may also help limit excessive hydration of the Mg ion, a property associated with laxative effects observed with certain Mg salts.[1]

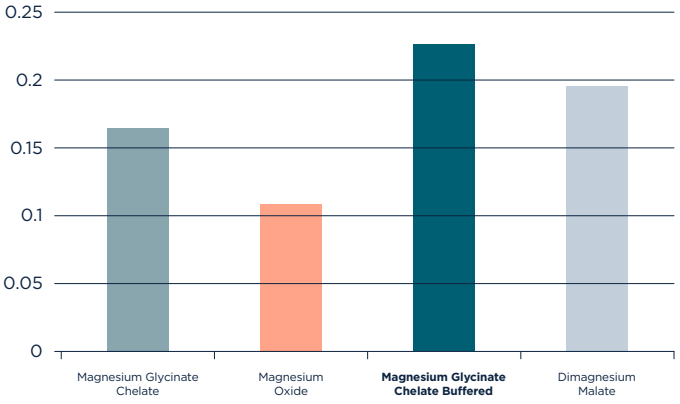
Mechanistic and preclinical research suggest that magnesium glycinate chelate is absorbed through multiple mechanisms rather than relying on a single transport pathway. The reviews of mineral–amino acid and peptide–mineral complexes describe two plausible fates for chelated minerals within the intestinal lumen: (1) partial or complete dissociation of the mineral followed by absorption of free Mg^{2+} through established paracellular and TRPM6/7-mediated transcellular pathways, and (2) handling of the chelated complex in a manner similar to small peptides.[24-27] Additionally, because magnesium glycinate chelate may be taken up in part via amino acid–associated pathways, it may help reduce mineral–mineral competition during intestinal absorption, further supporting its bioavailability.[22,28]

Buffered Magnesium Glycinate Chelate (MgGlyC-B)

The "buffered" MgGlyC-B system combines magnesium glycinate chelate with magnesium oxide (MgO) to increase elemental magnesium content while preserving chelate-associated advantages (**see Figure 1**).[1] MgO alone is known to have relatively low bioavailability due to limited intrinsic solubility and its tendency to increase luminal pH, which can impair magnesium uptake.[29-31] In this buffered formulation, glycine helps modify the local chemical environment at the site of absorption by supporting Mg solubility, buffering the MgO component, and helping maintain a mildly acidic pH of approximately 5.5 to 6.5 at the luminal surface for efficient absorption.[1] This design allows MgO to contribute its high elemental magnesium content without sacrificing solubility or bioavailability.[1]

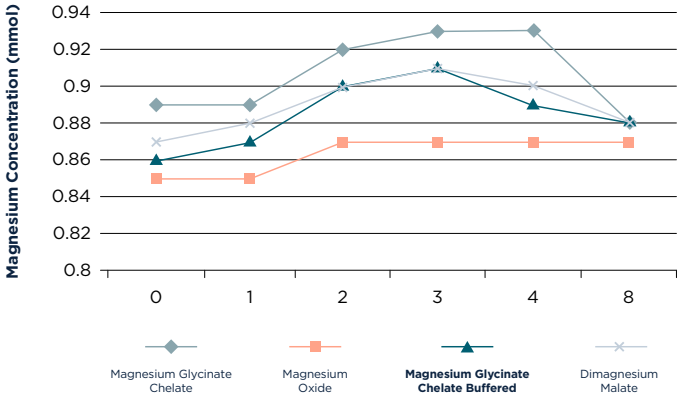
In a randomized, double-blind, four-arm crossover study, healthy adults (n = 14) received a single 150-mg bolus dose of magnesium as MgO, magnesium glycinate chelate, MgGlyC-B, or dimagnesium malate. The goal was to compare the three organic sources of magnesium with MgO in terms of bioavailability, as determined by serum magnesium levels measured over eight hours and calculated as Area Under the Curve (AUC). All organic forms, including MgGlyC-B, produced statistically significantly higher serum concentrations than MgO ($p < 0.05$), and no treatment-related adverse events were reported. MgGlyC-B achieved a 37% greater mean AUC compared to magnesium glycinate chelate alone (0.225 vs. 0.16), and a 106% greater AUC than MgO (0.225 vs. 0.109) (**see Figures 2 and 3**).[23] Additionally, an in vitro intestinal absorption model further demonstrated that MgGlyC-B exhibited absorption comparable to that of other well-absorbed organic magnesium forms and approximately 4X the absorption of MgO alone.[2]

Figure 2. Area Under the Curve (AUC) for 8 Hours



Higher AUC = greater Mg absorption and bioavailability. Compared with MgO, the three organic Mg forms showed a trend toward a greater 8-hour AUC, with MgGlyC-B having the highest among them. MgGlyC-B resulted in 37% greater AUC than magnesium glycinate chelate alone (0.225 vs. 0.164), and a 106% greater AUC than MgO (0.225 vs. 0.109).[23]

Figure 3. Absolute Average Serum Concentrations of Magnesium for 8 Hours (From Baseline)



Compared with MgO, all three organic forms resulted in a statistically significant higher serum Mg concentration ($p < 0.05$).[23]

Human clinical studies in pregnant women (n = 86), healthy active individuals (n = 36), patients with ileal resection (n = 12), and adults reporting poor sleep quality (n = 155) reported good absorption and tolerability of magnesium glycinate chelate, a component of the buffered form used in this product. These studies also reported positive outcomes across diverse clinical applications, including musculoskeletal comfort, cardiovascular parameters, and sleep quality.[3,26,28,32,33] For example, in a randomized controlled trial (RCT) of 155 adults, individuals receiving 250 mg/day of magnesium glycinate chelate experienced a statistically significant reduction in insomnia severity over 28 days compared with placebo, with no serious adverse events or GI-related symptoms reported.[3] This unique form of Mg may be especially supportive to individuals with malabsorption issues, such as those with inflammatory bowel disease (IBD), where overt Mg deficiency may be as high as 88% of patients.[34] Patients who have been on long-term PPIs or other stomach acid-reducing medications may benefit from extra Mg, as hypochlorhydria may prevent adequate liberation of minerals from their food bases, including Mg.[35] Collectively, these findings support that MgGlyC-B delivers magnesium in a form that optimizes solubility, minimizes inhibitory interactions, supports favorable intestinal handling, and enhances bioavailability compared with inorganic magnesium salts.

Magnesium and Brain Health*

Magnesium is essential for brain energy metabolism and neuronal function. As a critical cofactor for ATP-dependent enzymes, magnesium supports cerebral energy homeostasis, mitochondrial function, and glucose utilization. These processes help maintain normal neuronal activity and metabolic resilience, particularly during periods of increased energetic demand, such as migraine.[36,37] Magnesium contributes to neuronal protection by limiting oxidative stress and excitotoxic signaling.[37,38] It also regulates neuronal excitability through its role as a physiological calcium antagonist at the N-methyl-D-aspartate (NMDA) receptor, where it limits excessive calcium influx and glutamate-mediated excitotoxicity.[37,39]

These mechanisms are relevant to migraine pathophysiology. Individuals diagnosed with migraines, including menstrual migraine and cluster headache, have been shown to exhibit lower Mg levels.[39] Emerging evidence further supports Mg's role in supporting individuals prone to migraine through effects on cortical spreading depression, vascular tone, oxidative stress, inflammation, neuronal hyperexcitability, neurotransmitter release, and electrolyte balance.[40]

Magnesium also supports brain and mental health by modulating psychoneuroendocrine activity and neurotransmitter balance. By attenuating NMDA receptor activity, suppressing excessive glutamatergic signaling, and supporting

GABAergic tone, Mg contributes to balanced hypothalamic–pituitary–adrenal (HPA) axis activity.[41] Low dietary Mg intake has been associated with an increased risk of anxiety and depression, and clinical studies suggest that Mg supplementation may support a healthy mood and perceived stress levels.[41-45]

Magnesium and Cardiometabolic Health*

Through its role in muscle contraction, relaxation, and nerve conduction, Mg supports healthy cardiovascular function and normal blood pressure.* Serum Mg concentration has been inversely associated with the risk of developing heart failure, atrial fibrillation, and microvascular complications in patients with T2DM.[46] Magnesium deficiency may increase angiotensin II-mediated aldosterone synthesis and the production of thromboxane and vasoconstrictor prostaglandins, mechanisms that may adversely affect blood pressure regulation.[39] A meta-analysis reported that individuals receiving Mg supplementation at 120 to 973 mg/day experienced reductions in both systolic and diastolic blood pressure, with more pronounced effects at intakes higher than 370 mg/day.[39]

In vitro, animal, and human studies suggest that magnesium supports cardiovascular health through multiple complementary mechanisms, including enhancing endothelium-dependent vasodilation, improving lipid metabolism, reducing inflammation, and inhibiting platelet aggregation.[47-49] A systematic review and meta-analysis further found that higher circulating Mg levels were associated with reduced cardiovascular disease risk, and that dietary Mg intake above 250 mg/day was associated with lower risk of ischemic heart disease.[49]

Magnesium may influence glucose and insulin metabolism by regulating insulin receptor tyrosine kinase activity and by modulating glucose transporter type 4 (GLUT4) activity. These mechanisms may be clinically relevant for individuals with insulin resistance or T2DM.[39] In a systematic review and meta-analysis of double-blind RCTs, participants receiving oral magnesium supplementation (primarily 250 to 600 mg/day, with some outliers) showed significant improvements in fasting plasma glucose and markers of insulin sensitivity compared with placebo in individuals with diabetes or at high risk of diabetes.[50]

In observational analyses of women with polycystic ovary syndrome, those in the highest quartile of serum Mg concentrations had significantly lower fasting glucose, HOMA-IR, and testosterone levels. After adjustment for confounding variables, serum Mg was independently and inversely associated with markers of insulin resistance while positively associated with insulin sensitivity.[51] Meta-analyses of RCTs further indicate that participants receiving oral magnesium supplementation (approximately 98.6 to 730 mg/day, with most trials administering 200 to 400 mg/day) demonstrated significant improvements in flow-mediated dilation, a marker of endothelial function, particularly in unhealthy adults, individuals over 50 years of age, and those with elevated body mass index.[52,53]

Magnesium and Bone Health*

Magnesium plays an important role in bone formation and remodeling by supporting osteoblast proliferation and normal mineralization.[54] Magnesium deficiency has been associated with abnormal hydroxyapatite crystal formation, increased pro-inflammatory cytokine activity that stimulates osteoclast function, and reduced parathyroid hormone (PTH) and vitamin D status, all of which may negatively affect bone integrity.[54,55] Moreover, a systematic review and meta-analysis reported a positive association between magnesium intake and hip and femoral neck bone mineral density (BMD).[55] In aging populations, low serum Mg concentrations and inadequate dietary intake are common and have been linked to osteoporosis, vascular calcification, sarcopenia, and other age-related conditions.[56,57] Supplementation with various forms of magnesium (250 to 1,800 mg/day for up to 30 days to two years) has been shown to support the interconnected cardiovascular–sarcopenia–osteoporosis triad in aging adults.[56]

A review of 28 studies found that lower Mg status was consistently associated with osteoporosis, with 30% to 40% of participants exhibiting hypomagnesemia (mainly menopausal women). Individuals consuming less than the RDA for Mg had lower BMD and increased fracture risk. Across studies, participants who received Mg supplementation (250 to 1,800 mg/day) demonstrated improvements in BMD and reductions in fracture risk.[58] In addition to its role in bone health, Mg has been studied for musculoskeletal comfort. In an RCT of 86 healthy pregnant women experiencing frequent leg cramps, women who supplemented with 300 mg/day of magnesium glycinate chelate for four weeks demonstrated a 50% significant reduction in both cramp frequency and intensity compared with placebo, with no significant differences in reported side effects.[32]

Recommended Use: Take 2 capsules per day 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-glycinate-complex-techsheet-references

Dosing recommendations are given for typical use based on an average 150-pound healthy adult. Health-care 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.**

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