

# Magnesium Complex



## Clinical Benefits

- Delivers Three Forms of Highly Absorbable Magnesium
- Helps Maintain Healthy Blood Pressure, Glucose, and Insulin Levels
- Supports Musculoskeletal and Nervous System Health
- Promotes Optimal Glutathione and Nitric Oxide Status

**Magnesium Complex provides a targeted three-chelate complex in a base of highly absorbable pure elemental magnesium.**

Encapsulated for convenience, Magnesium Complex quickly restores essential magnesium reserves by utilizing a targeted blend of the three most absorbable chelates available: citrate, glycinate, and malate. Unlike most mineral supplements that use just a single mineral chelate, Magnesium Complex leverages the power of multiple chelates to maximize absorption across several pathways, quickly boosting its whole-body benefits while being gentle on the digestive system.

**Magnesium** is a mineral that is vital for life. Yet, while it is required by every cell of the body, studies estimate that as many as 75% of Americans do not meet the recommended dietary allowance of magnesium.<sup>1,2,3</sup>

As the fourth most abundant mineral in the body, **magnesium** is used as a cofactor in over 300 enzyme systems, supporting a multitude of metabolic activities.<sup>3,4,5,6</sup> These activities include protein synthesis, DNA and RNA synthesis, cell growth and reproduction, cellular energy production and storage, and the stabilization of mitochondrial membranes.<sup>3,6,7,8,9,10</sup> Magnesium is one of the minerals responsible for helping to maintain healthy bone metabolism, blood glucose, and blood

### Supplement Facts

Serving Size: Two Capsules  
Servings Per Container: 45

Amount Per Serving		% DV
Magnesium (as citrate)	100 mg	24%
Magnesium (as glycinate)	100 mg	24%
Magnesium (as malate)	100 mg	24%
Magnesium (as krebs cycle)	50 mg	12%
Malic acid	550 mg	†

† The % Daily Value (DV) is not established.

**Other Ingredients:** Vegetarian capsule (hypromellose and water), vegetable stearate, vegetable medium chain triglycerides, and organic brown rice.

Size: 90 Capsules

Product Code: MMG

 Vegetarian Formula

 Gluten Free

 Hypoallergenic



# Magnesium Complex

pressure.<sup>3, 6, 7, 8, 9, 10, 11, 12, 13</sup> And it also plays a role in the active transport of calcium and potassium ions across cell membranes, all of which support healthy neuromuscular and cardiac function.<sup>3, 6, 7, 8, 9, 10, 13</sup> Additionally, magnesium is required to produce glutathione, the most powerful antioxidant in the human body.<sup>6</sup>

Diets that include excessive intake of calcium, coffee, salt, soda, or alcohol are known to deplete intracellular **magnesium** levels.<sup>14</sup> Profuse sweating, excessive menstruation, prolonged stress, and many drugs are also known to deplete the body's magnesium reserves.<sup>14</sup> With the waning nutritional content of our foods and our fast-paced, modern lifestyles, supplementing this necessary mineral is an essential aspect of supporting our overall health and wellbeing.

## Magnesium & Cardiometabolic Health

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Research shows that **magnesium** supports healthy nitric oxide status, endothelial function, and vascular tone.<sup>15</sup> And magnesium insufficiency has been observed to trigger changes in blood pressure levels.<sup>14</sup> While the evidence is inconsistent and inconclusive, consuming diets with adequate magnesium may reduce the risk of high blood pressure (hypertension).<sup>6, 16</sup>

**Magnesium** also plays a key role in glucose and insulin metabolism by supporting normal cell signaling, glycogenolysis, and activity of the glucose transporter protein.<sup>1, 3, 6, 17, 18, 19, 20, 21, 22, 23, 24</sup>

## Magnesium & Musculoskeletal Health

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Bone tissue contains 50-60% of the body's **magnesium**, and studies (including a few clinical trials) show that magnesium status is positively correlated with bone mineral density.<sup>1, 3, 6, 25, 26, 27</sup> In addition to structurally supporting bone tissue, magnesium may also protect bone tissue by contributing to healthy acid-base balance.<sup>3, 28</sup> As an alkaline mineral, magnesium may contribute to counteracting diets high in acid-forming foods such as meats and cereal grains, which contribute to metabolic acidosis. Studies examining the DASH diet, which is high in magnesium and potassium, have shown significantly reduced biochemical markers of bone turnover.<sup>3, 29, 30</sup>

**Magnesium** also plays a major role in muscle contraction and relaxation.<sup>31</sup> And, when muscles contract, it is magnesium that orchestrates calcium re-uptake by the sarcoplasmic reticulum, helping to maintain normal muscle function.<sup>31, 32</sup>

## Magnesium & Nervous System Health

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Adequate daily intake of **magnesium** is critical for a balanced stress response.<sup>33</sup> And studies show that magnesium status is highly associated with our subjective sense of wellbeing.<sup>33, 34, 35</sup> While the exact role of magnesium in our perception of wellness is yet to be determined, potential mechanisms include the glutamatergic, serotonergic, and adrenergic neurotransmitter systems, as well as several neuro-hormones.<sup>33</sup> Magnesium helps maintain balanced neuronal signal transduction and protects against the effects of stress.<sup>35, 36</sup>



# Magnesium Complex

**Recommended Dosage**

As a nutritional supplement, take 2-4 capsules daily, or as directed by your healthcare professional.

**Does Not Contain**

Wheat, gluten, dairy, peanuts, tree nuts, egg, artificial colors, sweeteners, or preservatives.

**Caution**

Consult your healthcare practitioner if pregnant, nursing, or taking other nutritional supplements or medications. Keep out of the reach of children.

\* 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.



## Citations

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- 1 Guerrero, M. P., Volpe, S. L., & Mao, J. J. (2009). Therapeutic uses of magnesium. *American family physician*, 80(2), 157-162.
- 2 Alaimo, K., McDowell, M. A., Briefel, R. R., Bischof, A. M., Caughman, C. R., Loria, C. M., & Johnson, C. L. (1994). Dietary intake of vitamins, minerals, and fiber of persons ages 2 months and over in the United States: Third National Health and Nutrition Examination Survey, Phase 1, 1988-91. *Advance data*, (258), 1-28.
- 3 National Institutes of Health Office of Dietary Supplements. (2021, March 26). Potassium Fact Sheet for Health Professionals. U.S. Department of Health and Human Services, National Institutes of Health. <https://ods.od.nih.gov/factsheets/Potassium-HealthProfessional/>
- 4 Elin R. J. (1994). Magnesium: the fifth but forgotten electrolyte. *American journal of clinical pathology*, 102(5), 616-622. <https://doi.org/10.1093/ajcp/102.5.616>
- 5 Takaya, J., Higashino, H., & Kobayashi, Y. (2004). Intracellular magnesium and insulin resistance. *Magnesium research*, 17(2), 126-136.
- 6 National Institutes of Health Office of Dietary Supplements. (2022, March 1). Magnesium Fact Sheet for Health Professionals. U.S. Department of Health and Human Services, National Institutes of Health. <https://ods.od.nih.gov/factsheets/Magnesium-HealthProfessional/>
- 7 Newhouse, I. J., & Finstad, E. W. (2000). The effects of magnesium supplementation on exercise performance. *Clinical journal of sport medicine : official journal of the Canadian Academy of Sport Medicine*, 10(3), 195-200. <https://doi.org/10.1097/00042752-200007000-00008>
- 8 Bohl, C. H., & Volpe, S. L. (2002). Magnesium and exercise. *Critical reviews in food science and nutrition*, 42(6), 533-563. <https://doi.org/10.1080/20024091054247>
- 9 Rude RK, Shils ME. (2005). Magnesium. In Shils ME, Shike M, Ross AC, Caballero B, Cousins RJ. (Eds.), *Modern Nutrition in Health and Disease* (10th ed., pp. 223-248). Lippincott Williams & Wilkins.
- 10 Chubanov, V., Gudermann, T., & Schlingmann, K. P. (2005). Essential role for TRPM6 in epithelial magnesium transport and body magnesium homeostasis. *Pflugers Archiv : European journal of physiology*, 451(1), 228-234. <https://doi.org/10.1007/s00424-005-1470-y>
- 11 Institute of Medicine, Food and Nutrition Board. (1997). Dietary Reference Intakes: Calcium, Phosphorus, Magnesium, Vitamin D and Fluoride. National Academy Press. <https://www.nap.edu/read/5776/chapter/1>
- 12 Rude RK. (2010). Magnesium. In Coates PM, Betz JM, Blackman MR, Cragg GM, Levine M, Moss J, White JD (Eds.), *Encyclopedia of Dietary Supplements* (2nd ed., pp. 527-37). Informa Healthcare.
- 13 Rude RK. (2012). Magnesium. In Ross AC, Caballero B, Cousins RJ, Tucker KL, Ziegler TR (Eds.), *Modern Nutrition in Health and Disease* (11th ed., pp. 159-75). Lippincott Williams & Wilkins.
- 14 Johnson S. The multifaceted and widespread pathology of magnesium deficiency. *Med Hypotheses* 2001; 56(2): 163-70.
- 15 Houston M. (2011). The role of magnesium in hypertension and cardiovascular disease. *Journal of clinical hypertension (Greenwich, Conn.)*, 13(11), 843-847. <https://doi.org/10.1111/j.1751-7176.2011.00538.x>
- 16 U.S. Food and Drug Administration. (2022). RE: Petition for a qualified health claim for magnesium and reduced risk of high blood pressure (hypertension) (docket No. FDA-2016-Q-3770). <https://www.fda.gov/media/155304/download>
- 17 Larsson, S. C., & Wolk, A. (2007). Magnesium intake and risk of type 2 diabetes: a meta-analysis. *Journal of internal medicine*, 262(2), 208-214. <https://doi.org/10.1111/j.1365-2796.2007.01840.x>
- 18 Rodríguez-Morán, M., Simental Mendía, L. E., Zambrano Galván, G., & Guerrero-Romero, F. (2011). The role of magnesium in type 2 diabetes: a brief based-clinical review. *Magnesium research*, 24(4), 156-162. <https://doi.org/10.1684/mrh.2011.0299>



- 19 Paolisso, G., & Barbagallo, M. (1997). Hypertension, diabetes mellitus, and insulin resistance: the role of intracellular magnesium. *American journal of hypertension*, 10(3), 346–355. [https://doi.org/10.1016/s0895-7061\(96\)00342-1](https://doi.org/10.1016/s0895-7061(96)00342-1)
- 20 Barbagallo, M., Dominguez, L. J., Galioto, A., Ferlisi, A., Cani, C., Malfa, L., Pineo, A., Busardo, A., & Paolisso, G. (2003). Role of magnesium in insulin action, diabetes and cardio-metabolic syndrome X. *Molecular aspects of medicine*, 24(1-3), 39–52. [https://doi.org/10.1016/s0098-2997\(02\)00090-0](https://doi.org/10.1016/s0098-2997(02)00090-0)
- 21 Suárez, A., Pulido, N., Casla, A., Casanova, B., Arrieta, F. J., & Rovira, A. (1995). Impaired tyrosine-kinase activity of muscle insulin receptors from hypomagnesaemic rats. *Diabetologia*, 38(11), 1262–1270. <https://doi.org/10.1007/BF00401757>
- 22 Yu, J. S., Lee, S. C., & Yang, S. D. (1995). Effect of Mg<sup>2+</sup> concentrations on phosphorylation/activation of phosphorylase b kinase by cAMP/Ca(2+)-independent, autophosphorylation-dependent protein kinase. *Journal of protein chemistry*, 14(8), 747–752. <https://doi.org/10.1007/BF01886914>
- 23 Arner, P., Pollare, T., Lithell, H., & Livingston, J. N. (1987). Defective insulin receptor tyrosine kinase in human skeletal muscle in obesity and type 2 (non-insulin-dependent) diabetes mellitus. *Diabetologia*, 30(6), 437–440. <https://doi.org/10.1007/BF00292549>
- 24 Chatterjee, R., Slentz, C., Davenport, C. A., Johnson, J., Lin, P. H., Muehlbauer, M., D'Alessio, D., Svetkey, L. P., & Edelman, D. (2017). Effects of potassium supplements on glucose metabolism in African Americans with prediabetes: a pilot trial. *The American journal of clinical nutrition*, 106(6), 1431–1438. <https://doi.org/10.3945/ajcn.117.161570>
- 25 Stendig-Lindberg, G., Tepper, R., & Leichter, I. (1993). Trabecular bone density in a two year controlled trial of peroral magnesium in osteoporosis. *Magnesium research*, 6(2), 155–163.
- 26 Tucker, K. L., Hannan, M. T., Chen, H., Cupples, L. A., Wilson, P. W., & Kiel, D. P. (1999). Potassium, magnesium, and fruit and vegetable intakes are associated with greater bone mineral density in elderly men and women. *The American journal of clinical nutrition*, 69(4), 727–736. <https://doi.org/10.1093/ajcn/69.4.727>
- 27 Hanley, D. A., & Whiting, S. J. (2013). Does a high dietary acid content cause bone loss, and can bone loss be prevented with an alkaline diet?. *Journal of clinical densitometry : the official journal of the International Society for Clinical Densitometry*, 16(4), 420–425. <https://doi.org/10.1016/j.jocd.2013.08.014>
- 28 Weaver C. M. (2013). Potassium and health. *Advances in nutrition (Bethesda, Md.)*, 4(3), 368S–77S. <https://doi.org/10.3945/an.112.003533>
- 29 Tucker, K. L., Hannan, M. T., Chen, H., Cupples, L. A., Wilson, P. W., & Kiel, D. P. (1999). Potassium, magnesium, and fruit and vegetable intakes are associated with greater bone mineral density in elderly men and women. *The American journal of clinical nutrition*, 69(4), 727–736. <https://doi.org/10.1093/ajcn/69.4.727>
- 30 Lin, P. H., Ginty, F., Appel, L. J., Aickin, M., Bohannon, A., Garner, P., Barclay, D., & Svetkey, L. P. (2003). The DASH diet and sodium reduction improve markers of bone turnover and calcium metabolism in adults. *The Journal of nutrition*, 133(10), 3130–3136. <https://doi.org/10.1093/jn/133.10.3130>
- 31 Shrimanker, I., & Bhattarai, S. (2021). Electrolytes. In *StatPearls*. StatPearls Publishing.
- 32 Volpe S. L. (2015). Magnesium and the Athlete. *Current sports medicine reports*, 14(4), 279–283. <https://doi.org/10.1249/JSR.0000000000000178>
- 33 Cuciureanu, M. D., & Vink, R. (2011). Magnesium and stress. In R. Vink (Eds.) et. al., *Magnesium in the Central Nervous System*. University of Adelaide Press.
- 34 Boyle, N. B., Lawton, C., & Dye, L. (2017). The Effects of Magnesium Supplementation on Subjective Anxiety and Stress-A Systematic Review. *Nutrients*, 9(5), 429. <https://doi.org/10.3390/nu9050429>
- 35 Shin, H. J., Na, H. S., & Do, S. H. (2020). Magnesium and Pain. *Nutrients*, 12(8), 2184. <https://doi.org/10.3390/nu12082184>
- 36 Li, X. Y., & Toyoda, H. (2015). Role of leak potassium channels in pain signaling. *Brain research bulletin*, 119(Pt A), 73–79. <https://doi.org/10.1016/j.brainresbull.2015.08.007>

