



MAGNESIUM

An Essential Mineral for Good Health



MAGNESIUM BASICS

There has been increased attention and research focus on magnesium recently due to its role in many vital biological functions such as heartbeat regulation, muscle contraction, and protein synthesis.^{1,2} Magnesium is the 4th most abundant mineral in the body with 50-60% stored in our bones, 1% found in our blood and remaining magnesium is stored in cells and tissues.³ Despite the importance of magnesium, many American adults fail to consume the recommended daily amount (RDA).⁴ A magnesium supplement may help fill nutrient gaps for this essential mineral.

PHYSIOLOGICAL FUNCTIONS OF MAGNESIUM

Magnesium helps support nerve, muscle and heart function and is involved in over 300 reactions in the body.^{3,5†} This key mineral also plays a role in energy metabolism support, specifically in the production of adenosine triphosphate (ATP) or cellular energy, for our body.[†] Magnesium also supports healthy bones and teeth.[†]

DIETARY MAGNESIUM REQUIREMENTS

The US Food and Nutrition Board (FNB) recommends a daily magnesium intake of 310–320 mg for American females (≥19 y) and 400–420 mg for American males (≥19 y).³

The table outlines the Recommended Daily Allowance (RDA) for magnesium for all age groups as well as different life stages including pregnancy and lactation.

AGE	MALE	FEMALE	PREGNANT	LACTATION
1–3 years	80 mg	80 mg		
4–8 years	130 mg	130 mg		
9–13 years	240 mg	240 mg		
14–18 years	410 mg	360 mg	400 mg	360 mg
19–30 years	400 mg	310 mg	350 mg	310 mg
31–50 years	420 mg	320 mg	360 mg	320 mg
51–70 years	420 mg	320 mg		
71+ years	420 mg	320 mg		

FOOD SOURCES OF MAGNESIUM

Magnesium is found in a variety of foods but at varying levels.^{1–2} Foods that are good sources of magnesium include dark green vegetables, beans and peas, whole grains, as well as nuts and seeds. It is important to include magnesium-rich foods in the diet when possible to help meet individual daily requirements. To meet the RDA for magnesium, you must consume at least 4–8 servings of magnesium-rich foods daily.

DIETARY SUPPLEMENTS

More than half (59%) of American adults (>19 y) are not meeting their magnesium requirements from diet alone.⁴ If a diet is lacking in magnesium rich foods, you may want to determine an appropriate supplement regimen to help you fill in the gap from your dietary intake. There are various forms of magnesium available such as: magnesium oxide (most common form), magnesium citrate (highly absorbable form^{7,8})[†], magnesium gluconate, and magnesium chloride. If additional magnesium is

The table below provides a list of magnesium rich foods.⁶

FOOD	SERVING SIZE	MAGNESIUM
Cereal, oat bran, raw	½ cup	110 mg
Almonds, dry roasted	1 oz.	79 mg
Spinach, frozen, chopped, cooked	1 oz.	78 mg
Cashews, dry roasted	1 oz.	74 mg
Soy Milk, plain or vanilla	1 cup	61 mg
Black beans, cooked	½ cup	60 mg
Peanut butter, smooth	2 Tbsp.	54 mg
Peanuts, oil roasted	1 oz.	50 mg

warranted, different strengths of magnesium supplements are offered for the varying needs of consumers. Some individuals may experience mild transient gastrointestinal discomfort (e.g. diarrhea) with use of magnesium supplements. The FNB has set a tolerable upper limit (UL) of ≤ 350 mg for daily magnesium intake from supplements for healthy adults.³ However, magnesium needs and response to magnesium salts may vary within individuals, particularly those with certain conditions that may need higher levels. You should consult with your healthcare professional to determine the right form and strength to meet your needs.



MAGNESIUM

An Essential Mineral for Good Health



FACTORS AFFECTING MAGNESIUM STATUS

A variety of factors can affect one's magnesium status including: age, health conditions, lifestyle factors, nutrient interactions, and medication use.

- ✓ **Age:** Mature adults tend to consume less dietary magnesium⁹, and magnesium absorption decreases while urinary magnesium excretion tends to increase with age.³
- ✓ **Health Conditions:** Gastrointestinal disorders (Crohn's disease, malabsorption syndromes, celiac disease, bariatric surgery, and/or any surgical removal of the intestine or intestinal inflammation due to radiation) may lead to magnesium depletion. Renal disorders and long-term use of certain diuretics may result in increased urinary loss of magnesium.¹⁻²
- ✓ **Lifestyle Factors:** Poor dietary intake and gastrointestinal issues from chronic alcoholism also leads to increased urinary loss of magnesium.²⁻³
- ✓ **Nutrient Interactions:** High intakes of phosphorus may cause an increase in magnesium excretion, and therefore, a decrease in intestinal magnesium absorption.³
- ✓ **Medication Interactions:** There are some medications that may deplete magnesium from the body including: acid suppressing drugs (i.e. proton pump inhibitors), antibiotics, anti-neoplastic and diuretics drugs.^{1-2,10-15} If individuals have impaired kidney function and/or are taking medications, they should use caution with magnesium supplements and consult their healthcare professional before use as magnesium may affect the effectiveness of certain medications. For example, it is important to take magnesium supplements two hours apart from bisphosphonates as magnesium may affect absorption of bisphosphonates.¹⁰

SO WHAT SHOULD HEALTHCARE PROFESSIONALS DO?

Work with your patients to understand their magnesium needs, and encourage them to consume magnesium-rich foods, such as dark green vegetables, nuts, and seeds regularly. For those who are still unable to meet their needs, discuss the potential to use magnesium supplements as a safe and effective way to incorporate additional magnesium into their diet.

ABOUT NATURE MADE®

For more than 45 years, Nature Made has been a trusted leader in the wellness industry, providing high quality vitamin, mineral and herbal supplements. Nature Made is the national supplement brand with the most products carrying the United States Pharmacopeia (USP) mark*—USP mark verifies that products meet stringent quality criteria for purity and potency. It is also the #1 recommended brand in the U.S. by Pharmacists in eight key vitamin and supplement segments.**

For more information visit: NatureMade.com

These materials are intended for educational purposes only.

‡Magnesium citrate is a more highly absorbable form than magnesium oxide[†]

*Find those Nature Made USP verified products on NatureMade.com/USP

**Based on 2017 U.S. News & World Report - Pharmacy Times Survey

†These statements have not been evaluated by the Food and Drug Administration. These products are not intended to diagnose, treat, cure or prevent any disease.

REFERENCES

1. Rude RK. Magnesium. 11th ed. In: Ross AC, Cabellero B, Cousins RJ, Tucker KL, Ziegler TR, eds. *Modern nutrition in health and disease*. Baltimore: Lippincott Williams & Wilkins. 2014:390-98.
2. Vormann J. Magnesium. 3rd ed. In: Stupank MH, Caudill MA, eds. *Biochemical, Physiological, and Molecular Aspects of Human Nutrition*. St. Louis: Elsevier Saunders. 2013:747-58.
3. Institute of Medicine. Food and Nutrition Board. *Dietary Reference Intakes for Calcium, Phosphorus, Magnesium, Vitamin D, and Fluoride*. National Academy Press. Washington, D.C. 1997.
4. Fulgoni VL, Keast DR, Bailey RL et al. Food, Fortificants and Supplements: Where Do Americans Get Their Nutrients. *J. Nutr* 2011;141: 1847-1854.
5. EFSA Panel on Dietetic Products, Nutrition and Allergies (NDA); Scientific Opinion on the substantiation of health claims related to magnesium and "hormonal health", reduction of tiredness and fatigue, contribution to normal psychological functions, maintenance of normal blood glucose concentrations, maintenance of normal blood pressure, protection of DNA, proteins and lipids from oxidative damage, maintenance of the normal function of the immune system, maintenance of normal blood pressure during pregnancy, resistance to mental stress, reduction of gastric acid levels, maintenance of normal fat metabolism and maintenance of normal muscle contraction. *EFSA Journal* 2010;8(10):1807.
6. US Department of Agriculture, Agricultural Research Service, Nutrient Data Laboratory. *USDA National Nutrient Database for Standard Reference*. Release 27 (revised). Version Current: May
7. Lindberg JS, et al. Magnesium bioavailability from magnesium citrate and magnesium oxide. *J Am Coll Nutr* 1990; 9: 48-55.
8. Walker AF, Marakis G, Christie S et al. Mg citrate found more bioavailable than other Mg preparations in a randomised, double-blind study. *Magnes Res* 2003; 16:183-191, 2015. Internet: <http://www.ars.usda.gov/ba/bhnrc/hndl>
9. Moshfegh A, Goldman J, Ahuja J et al. What We Eat In America, NHANES 2005-2006: Usual Nutrient Intakes from Food and Water Compared to 1997 Dietary Reference Intakes for Vitamin D, Calcium, Phosphorus and Magnesium. US Department of Agriculture. 2009; http://www.ars.usda.gov/SP2UserFiles/Place/12355000/pdf/0506/usual_nutrient_intake_vitd_ca_phos_mg_2005-06.pdf. Accessed on 5 August 2015.
10. US National Library of Medicine (MEDLINE PLUS). Magnesium. Internet: <http://www.nlm.nih.gov/medlineplus/druginfo/natural/998.html>. Accessed on 3 August 2015.
11. Danziger J, William JH, Scott DJ et al. Proton-pump inhibitor use is associated with low serum magnesium concentrations. *Kidney Int*. 2013; 83(4):692-9.
12. US Food and Drug Administration. Proton Pump Inhibitor drugs (PPIs): Drug Safety Communication—Low magnesium levels can be associated with long-term use. U.S. Food and Drug Administration, March 2, 2011. Internet: <http://www.fda.gov/Safety/MedWatch/SafetyInformation/SafetyAlertsforHumanMedicalProducts/ucm245275.htm>. Accessed on 3 August 2015
13. Mackay JD, Bladon PT. Hypomagnesaemia due to proton-pump inhibitor therapy: a clinical case series. *QJM* 2010; 103(6):387-95.
14. Elliot C, Newman N, and Madan A. Gentamicin effects on urinary electrolyte excretion in healthy subjects. *Clin Pharmacol Ther*. 2000; 67(1):16-21.
15. Lameris AL, Monnens LA, Bindels RJ et al. Drug-induced alterations in Mg²⁺ homeostasis. *Clin Sci (Lond)*. 2012; 123(1):1-14.