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 - Symptoms of Low Magnesium
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Magnesium Absorption and Bioavailability

What factors improve or impair the body's ability to use magnesium? See detailed information on combining magnesium sources, vitamins and minerals to improve total magnesium.

Intro Factors Impairments Absorption Food & Vitamins Alternatives

The body typically absorbs only 20-50% of ingested magnesium ^{1 2 3}, so understanding the factors that can improve or prevent magnesium absorption is an important first step to addressing deficiencies and increasing magnesium intake.

Currently, an estimated 75% of Americans have daily magnesium intakes less than the RDA ⁴, with similar figures estimated for most industrialized nations. These radical figures point not only to the need for improved diets, but also to the need for a deeper understanding of the pathways that bring magnesium into and out of the body.

This article describes how magnesium absorption works, and explains:

- Factors that reduce the body's use of magnesium, whether through digestive intolerance or excess excretion by the kidneys
- What prevents magnesium absorption in the digestive tract
- <u>Methods of improving magnesium absorption</u>, including transdermal magnesium therapy, a form of topical absorbable magnesium

What Factors Reduce the Body's Use of Bioavailable Magnesium?

An easy way to think about how magnesium levels are affected is to consider the "ins" vs. the "outs". Levels are decreased when either less magnesium comes in or more magnesium goes out of the body.

Broadly speaking, the following will raise magnesium levels:

- 1. Higher intake eating more <u>magnesium-rich foods</u>, using <u>magnesium bath salts</u> and <u>magnesium oil</u>, or taking oral <u>magnesium supplements</u>
- 2. Higher absorption of magnesium in the small intestines, in the case of oral and dietary magnesium
- 3. Lower elimination as waste through the gastrointestinal "GI" tract (the stomach, intestines and colon) — <u>transdermal magnesium</u> avoids this issue
- 4. Lower excretion by the kidneys

As seen above, the digestive system works alongside another pair of organs, the kidneys, which are equipped both to eliminate wastes and to handle excessive nutrient intake. In doing so, the kidneys help to maintain "homeostasis", a Latin word that literally translates as "the position of sameness". Homeostasis is the process by which the internal systems of the body maintain a balance — essentially a set of internally programmed healthy levels for temperature, pH, nutrient levels, etc. — by adjusting its physiological processes.

In maintaining homeostasis, several systems of the body work together like an internal thermostat. In healthy individuals, two kidneys filter all of the blood in the human body. All of the contents of the blood, including nutrients, ultimately pass through the kidneys' filters and can be excreted out of the body at any time.

So, we can take in magnesium through foods or through the skin (via <u>transdermal magnesium</u> <u>therapy</u>), but we lose magnesium through the GI tract and the kidneys. If we don't take magnesium "in" we obviously can't use it, but in a similar way, if we send it "out" after we take it in, we still can't use it!

A rough illustration of the concept is below:

Problems arise when not enough magnesium is absorbed by the GI Tract, or too much of a nutrient is filtered out of the blood.

Thus, individual variations causing reduced absorption or increased elimination must be compensated for with increased intake — or disease-causing deficiencies may result. This is why magnesium experts such as Dr. Mildred Seeling have emphasized that a program of supplementation is a must for those experiencing magnesium depletion:

If your health assessment leads you to believe that you may have been accumulating a magnesium deficit over some years as a result of a daily magnesium gap, recognize that you will first need to correct that deficit, most likely with magnesium supplements." ⁵

Read more:

- Read about transdermal magnesium therapy, supplementation that bypasses the GI tract.
- Learn about <u>magnesium supplementation</u> and <u>types of magnesium supplements</u>.

What health conditions prevent magnesium bioavailability?

Certain health conditions can impair any number of the functions mentioned above, leading to decreased available magnesium.

Aging, disease, stress, and illness can reduce magnesium absorption.

By removing magnesium from the blood, the kidneys play an important part in determining the amount of magnesium available to the cells. Under normal conditions, adequate amounts of nutrients are "reabsorbed" when passing through the kidneys, ensuring that they return to the blood where they may be re-circulated and passed to needy cells.

However, certain disorders and medications such as diuretics and antibiotics can disrupt the healthy functioning of the kidneys. Under such influences, a nutrient such as magnesium is excreted rather than reabsorbed.

Digestive factors unique to the individual can also influence the amount of magnesium absorbed in the GI tract. These include the ability to breakdown magnesium containing foods in the stomach, and the ability to absorb magnesium in the small intestine. Aging, disease, stress, and illness can also reduce magnesium absorption.

Some conditions known to impact magnesium availability include:

- Individual variations in amount of stomach acid, commonly reduced in older adults
- Excessive use of alcohol
- Crohn's disease, celiac sprue, and any disorder of the digestive or intestinal function
- Kidney disorders
- Genetic magnesium absorption disorders
- Stress, surgery, and chronic disorders such as diabetes
- Diarrhea and vomiting

More information:

- Are you at risk for magnesium deficiency? Take our online magnesium assessment to find out.
- **Do you suffer from diarrhea and magnesium intolerance?** Learn about <u>transdermal magnesium</u>, a new way to supplement magnesium with no digestive issues

How does the digestive system absorb magnesium?

Magnesium, through foods and traditional supplements, pass through the digestive or "gastrointestinal tract". The gastrointestinal (GI) tract is essentially a journey of foods and/or supplements along a pathway:

- 1. The mouth
- 2. The esophagus or throat
- 3. The stomach
- 4. The small intestine
- 5. The large intestine

The first steps in magnesium bioavailability through this pathway are breakdown by the mechanical action of chewing, and the digestive action of gastric acids found in the stomach. Following digestion, magnesium is largely absorbed in the small intestine. There magnesium passes from tiny "villi", finger-like surfaces inside the small intestine, into capillaries, tiny blood vessels surrounding the small intestine.

Magnesium not absorbed in the small intestine continues to travel to the large intestine, where a small

additional amount may be absorbed.

Typical magnesium absorption involves:

- 40% of magnesium intake absorbed in the small intestine
- 5% absorbed in the large intestine
- 55% leaving the body as waste

Depending on the type of magnesium ingested and the magnesium status of the individual, these figures can be higher or lower. Studies have shown overall absorption of magnesium in some individuals as low as 20%. 67

And certain forms of magnesium supplements, such as magnesium oxide, may have an absorbable magnesium potency as low as 4%. ^{8 9}

See also:

• Need to know the most absorbable form of magnesium? Read about <u>Types of Magnesium</u> <u>Supplements</u>.

Which foods and vitamins can enhance or hinder magnesium absorption?

Medical scientists use the term "magnesium absorption" to refer to the intake of magnesium into the blood stream through mechanisms in the small intestines. Less magnesium eliminated in the GI tract, therefore, equals more magnesium absorbed.

Foods

Foods that may help promote best-absorbed magnesium include:

- Fructose and complex carbohydrates
- Protein, with the exception of unfermented soy products
- Medium chain triglycerides, or MCTs, such as coconut oil and palm oil (the same types of fats more

easily absorbed by those with pancreatic disorder and cystic fibrosis)

• Fermentable or soluble fibers, such as fiber from fruits and vegetables, which may enhance magnesium to small degree in the healthy large intestine

Foods that hinder magnesium absorption include:

- Non-fermentable or insoluble fiber, such as whole grain, bran and seeds
- Foods high in phytates, such as whole flours and grains, bran, the hulls of seeds and nuts, and unsprouted beans and soy
- Foods high in oxalates, such as spinach, leafy greens, nuts, tea, coffee and cacao

The above list should be viewed with caution and reservation when selecting foods, however. In many cases, foods that contain high fiber, phytic acid or oxalic acid are also high in absorbable forms of magnesium. For example, choosing high fiber grains, which are high in magnesium, will typically provide better intake and absorption of magnesium than choosing low fiber grains that are low in magnesium, including processed breads made from white flour.

Read more:

- Learn why it's more difficult than ever to get enough <u>magnesium in the diet</u>.
- See a list of <u>foods high in magnesium</u>.

Diuretic foods such as coffee, tea and alcohol tend to reduce available magnesium.

Certain cooking methods can lessen the negative impact of phytates and oxalates on absorbable magnesium. For example, traditional diets commonly include sprouted and fermented grains and legumes. Scientists have now recognized the ability of these techniques to reduce the ability of phytic acid to bond with magnesium.

Cooking reduces oxalic acid, and in one study a diet of cooked spinach was found to have higher absorption than a diet of raw spinach. ¹⁰Though cooking also reduces water-soluble vitamins, water-soluble vitamins also tend to be plentiful in foods that are not high in magnesium.

The following cooking procedures, therefore, can increase magnesium absorption:

- Soaking grains and beans before cooking
- Sprouting beans
- Cooking foods high in oxalic acid, such as spinach and leafy greens, rather than eating them raw

In addition, it generally follows that foods with diuretic properties, such as coffee, tea and alcohol, tend to reduce available magnesium in the bloodstream, due to the action of these foods to increase the excretion of fluids by the kidneys. ¹¹ ¹² ¹³

Vitamins and Minerals

In some studies Vitamin D has been shown to increase magnesium absorption, but the results are not definitive. Given that Vitamin D is one of the nutrients most deficient in industrialized nations, however, it may be worthwhile to combine Vitamin D intake with magnesium as extra assurance, particularly during winter months when Vitamin D supplies tend to be low in the body.

Minerals are generally known to have an antagonistic or competitive effect when it comes to absorption. Thus high intake of any of the following minerals could potentially reduce magnesium bioavailability:

- Calcium
- Phosphorous
- Iron
- Copper
- Manganese

In one study, addition of 300 to 1000 mg of calcium to the diet decreased magnesium absorption significantly in participants consuming an average of 370 of dietary magnesium daily. ¹⁴

Particularly of concern are diets that contain both high calcium and phosphate. Studies have shown that in diets high in both calcium and phosphate, insoluble magnesium-calcium-phosphate complexes are formed, impairing absorption. ¹⁵

High intake of sodas have placed many members of the population at risk for magnesium deficiencies.

One example of a diet high in minerals found to impair magnesium bioavailability would be one high in both milk and phosphorous-containing carbonated beverages, such as colas. For those with a regular daily intake of carbonated beverages, it may be wise to find additional sources of magnesium to supplement intake and prevent deficiency.

Researchers have noted that high intake of sodas have placed many members of the population at risk for magnesium deficiencies. Consuming these beverages with food, as well as common drinks such as coffee and tea, ultimately reduces the amount of magnesium available to the body.

Are there other types of absorbable magnesium?

As has been discovered recently by modern medicine — and practiced by traditional healers for centuries — the digestive tract is not the only avenue of delivery for therapeutic substances. Transdermal therapy is a new way of absorbing both medications and health supplements, with the main organ of delivery being the body's largest organ: the skin.

The advantages of transdermal magnesium overlap the advantages of the common transdermal drugdelivery mechanisms available today, such as transdermal nicotine and birth control systems.

Transdermal magnesium:

- Bypasses the digestive tract, avoiding problems of irritation and diarrhea
- Is easy and convenient
- May be taken as a complement to oral magnesium for those seeking therapeutic levels above that tolerated orally

In addition, topical magnesium has been known to have secondary benefits to health due to its application on the skin. These include benefits toward eczema and psoriasis, as well as muscle cramps and pain.

Transdermal magnesium is currently available in four forms: a spray-on <u>magnesium oil</u>, <u>magnesium bath</u> <u>flakes</u>, <u>magnesium lotion</u>, and a <u>magnesium gel</u>, convenient for massage applications.

Want to know more?

• Learn more about how <u>transdermal magnesium</u> works.

• Watch the videos: Transdermal Magnesium, What the Experts Say.

Does a high magnesium diet equal high magnesium absorption?

Ultimately, a great number of individual factors affect magnesium bioavailability in the individual, including factors such as nutrient filtration by the kidneys, and varying levels of absorption caused by age, stress, certain diseases and individual differences.

So levels of magnesium in the body are not determined simply by choosing the best-absorbed magnesium among dietary sources.

Though a person with healthy kidneys is adept at handling excessive magnesium intake — making magnesium toxicity a truly rare phenomenon — the body appears less adept at coping with a magnesium deficient state. A small amount of magnesium storage is available in the bones, yet deficiencies can occur after as little as one week of insufficient intake. 16

And influences on magnesium bioavailability are particularly a concern in cases of low dietary intake, according to Dr. Anton Beynen of the Utrecht Department of Human Nutrition at the State University, Netherlands.

At low magnesium intakes, differences in magnesium absorption may be expected to influence magnesium retention and thus can either induce or abolish magnesium deficiency." ¹⁷

For some people with issues that hinder magnesium absorption in the gastrointestinal tract, no amount of dietary or oral magnesium can compensate. One promising avenue that bypasses common digestive issues lowering magnesium absorption is that of transdermal magnesium.

Dr. Carolyn Dean, M.D., N.D. writes:

I realized that many people can't take oral magnesium because of the laxative effect. Therefore I began researching and then advising people to put supersaturated magnesium chloride-called magnesium oil on their skin to bypass the intestines; stimulate DHEA production that occurs in the skin; use it in baths and foot baths for muscle aches, joint pain, and foot pain and neuropathy." ¹⁸

Magnesium intakes in industrialized nations are on a downward spiral, and medical studies linking deficiency to a range of conditions are growing. In these times, an adequate magnesium diet must take into account not just the "most absorbable" magnesium sources, but also individual differences that can prevent the absorption of magnesium from the diet.

Transdermal magnesium presents a new form of magnesium that bypasses absorption problems in the GI tract and side effects of oral magnesium, bringing the ability to achieve adequate magnesium levels within reach for the millions of people worldwide whose intake is insufficient.

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References

- 1. ↑ McCarthy J, Kumar R. Divalent Cation Metabolism: Magnesium. In: Schrier R, series editor. *Atlas of Diseases of the Kidney*. Volume 1. Wiley-Blackwell; 1999: 4.1-4.12.
- 2. ↑ Bernstein, L. Improving Magnesium Absorption and Bioavailability. *Geriatric Times*. 2002;3(1). Available at: http://www.cmellc.com/geriatrictimes/g020208.html. Accessed February 10, 2010.
- 3. ↑ Magnesium Mineral. The Nutrition Notebook. 2004. Available at: <u>http://www.springboard4health.com/notebook/min_magnesium.html</u>. Accessed January 21, 2010.
- 4. ↑ World Health Organization. *Calcium and Magnesium in Drinking Water: Public health significance.* Geneva: World Health Organization Press; 2009.
- 5. ↑ Seelig M, Rosanoff A. *The Magnesium Factor*. New York: Avery; 2003.
- 6. ↑ Magnesium Mineral. The Nutrition Notebook. 2004. Available at: <u>http://www.springboard4health.com/notebook/min_magnesium.html</u>. Accessed January 21, 2010.
- 7. ↑ Bohn T. Dietary Factors Influencing Magnesium Absorption in Humans. *Current Nutrition & Food Science*. 2008;4:53-72.
- 8. ↑ Dean C. *The Magnesium Miracle*. New York: Ballantine Books; 2007.
- 9. ↑ Firoz M, Graber M. Bioavailability of US commercial magnesium preparations. *Magnesium Research.* 2001; 14: 257-62.
- 10. ↑ Bohn T. Dietary Factors Influencing Magnesium Absorption in Humans. *Current Nutrition & Food Science*. 2008;4:53-72.
- 11. ↑ Bohn T. Dietary Factors Influencing Magnesium Absorption in Humans. *Current Nutrition & Food Science*. 2008;4:53-72.
- 12. ↑ Kynast-Gales SA, Massey LK. Effect of caffeine on circadian excretion of urinary calcium and magnesium. *Journal of the American College of Nutrition*. 1994; 13: 467-72.
- 13. ↑ Laitinen K, Tahtela R, Valimaki M. The dose-dependency of alcohol-induced hypoparathyroidism, hypercalciuria, and hypermagnesuria. *Bone and Mineral*. 1992; 19: 75-83.

- 14. ↑ Bohn T. Dietary Factors Influencing Magnesium Absorption in Humans. *Current Nutrition & Food Science*. 2008;4:53-72.
- 15. ↑ Brink EJ, Beynen AC, Dekker PR, van Beresteijn EC, van der Meer R. Interaction of calcium and phosphate decreases ileal magnesium solubility and apparent magnesium absorption in rats. *The Journal of Nutrition*. 1992; 122: 580-6.
- 16. ↑ Brink EJ, Beynen, AC. Nutrition and magnesium absorption: a review. *Progress in Food and Nutrition Science*. 1992:16:125-162.
- 17. ↑ Brink EJ, Beynen, AC. Nutrition and magnesium absorption: a review. *Progress in Food and Nutrition Science*. 1992:16:125-162.
- 18. ↑ Dean C. Recommended Resources. 2008.

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