

Magnesium, Part II

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How important is magnesium? Last month we reviewed 46 conditions which a magnesium deficiency may cause or exacerbate. Without magnesium, life on this planet would be quite different, if it existed at all. The magnesium present in chlorophyll (the substance that gives plants their green color) enables plants to synthesize glucose and oxygen from sunlight and water, and carbon dioxide from photosynthesis.¹

RDA Tables²

Category	Age	Magnesium (in milligrams)
Infants	0-6 months	40
	6-12 months	60
Children	1-3 years	80
	4-6 years	120
	7-10 years	170
Males	11-14 years	270
	15-18 years	400
	19+ years	350
Females	11-14 years	280
	15-18 years	300
	19+ years	280
Pregnant Women		320
Lactating Women	1st 6 months	355
	2nd 6 months	340

Top Food Sources ¹	Magnesium (mg per 3 1/2 ounce serving)
Wheat bran	597
Wheat germ	364
Sesame seeds	347
Poppy seeds	320
Brazil nuts	318
Soybean flour	310
Almonds	293
Cashews	267
Molasses	258
Peanuts	175
Whole wheat flour	150
Oat flour	110

Beet greens	106
Spinach	104

Formulations

There are many formulations of magnesium available in the marketplace. The most common form is magnesium oxide. It is insoluble in water and, therefore, may not be absorbed in persons with gastrointestinal disorders, including hypoacidity. Magnesium acetate, aspartate, citrate, gluconate, and glycinate are all well absorbed.³ There are not many studies comparing different forms of magnesium head to head. If a patient is displaying signs and symptoms of a magnesium problem and does not respond to supplementation after six weeks, try a different brand and a different form of magnesium for another month before you decide your suspicion of a magnesium problem was incorrect.

Interactions

Diets high in the following substances may inhibit the absorption and/or increase the excretion of magnesium: alcohol, caffeine, fat, phosphorus, and sugar. Excessive calcium consumption may also exacerbate a magnesium deficiency. Make sure that your patients who are taking high levels of calcium for disorders (such as osteoporosis) are ingesting or supplementing with adequate levels of magnesium. There are many drugs which can interact with magnesium: the most commonly used are antibiotics, diuretics, insulin; they may affect magnesium levels. The following will stimulate magnesium absorption: meals, vitamin D, vitamin B6.⁴

Objective Testing

We definitely lack a gold standard in determining magnesium levels with laboratory testing. This was most evident in a recent study last year on magnesium levels in males with angina. The authors who performed the study used five tests (erythrocyte, mononuclear, 24-hour, serum, and urine) to determine magnesium levels.⁵

Magnesium Challenge Test

- may not be accurate if magnesium deficiency is due to urinary losses;
- requires a four-hour IV drip.

Twenty-four Hour Urinary Excretion of Magnesium

- there's a wide variance in normal populations;
 - urinary magnesium doesn't necessarily correlate with serum magnesium concentrations.
- ### Erythrocyte Magnesium
- may be normal when plasma levels of magnesium are low;
 - doesn't correlate with magnesium levels in other cell types.

Mononuclear Blood Cell Magnesium

- can be normal when plasma magnesium levels are low.

Serum Magnesium

- may not correlate to tissue magnesium levels.

Hair Magnesium

- higher if magnesium is lost from bones;
- lower when gray hair is tested.

Ionized Magnesium

- determined by a nonmagnetic resonance ion-selective electrode specific for magnesium;
- May solve laboratory diagnostic problems, but requires more studies to confirm.

Dosing

The average dietary intake of magnesium by healthy adults in the United States ranges from 143-266mg per day,⁶ which is easily below the RDA. To dose magnesium, a vitamin supplement with RDA levels is generally appropriate. A more exact supplementation can be based on body weight: healthy patients receiving 3 mg of magnesium per pound of body weight; and patients who are being treated for magnesium-related disorders at a level of 6mg per pound of body weight.⁶

References

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OCTOBER 1997