What is Magnesium?

Magnesium is a mineral (element) found in the earth’s crust which is available to us through foods consumed in our diet. It is absorbed predominantly in the small intestine. Magnesium is the second most concentrated mineral in every cell. It is required to help perform some of the body’s most vital functions. Its primary function is to act as a co factor or “spark plug” to over 350 enzymes which drive chemical reactions in the body. Approximately 60% of our body’s magnesium stores are in the bone, 25% is in the muscles and the rest is in the soft tissues and body fluids. Unfortunately magnesium is often deficient in many diets due to over consumption of processed foods which contain very little magnesium. Its deficiency is implicated in many modern diseases.

Why is Magnesium important and what does it do in the body?

Along with calcium, magnesium should be regarded as one of the most important minerals in the body. Magnesium is involved in many chemical reactions especially those in active tissues and organs such as the brain, heart, liver and kidneys. It helps support the production of energy, especially from glucose, and helps reduces the risk of diabetes. Magnesium also regulates the heart rate and facilitates muscle contraction and muscle relaxation. Magnesium is commonly known as the anti stress mineral.

It protects nerves, aids in protein formation and helps strengthen bones and the enamel coating on the teeth. It is necessary for the metabolism of calcium, vitamin C, vitamin E, (especially when used to convert glucose to energy) and phosphorus. It regulates the sodium and potassium pump which pumps sodium out of the cells and potassium into the cells. This is very important as a deficiency in magnesium may lead to low potassium levels in the cell which will adversely affect cell function. Magnesium also plays an important role in calcium metabolism. It influences a number of hormones including parathyroid hormone and calcitonin which balance calcium levels in the body. It also aids in urine retention and may be of benefit to individuals who have poor bladder control including children who wet the bed. It may also support cholesterol levels, aid in relieving angina pain, help prevent premature labor and alleviate premenstrual syndrome.

What amount of Magnesium do you need each day?

Magnesium should be provided in a 1:2 ratio with calcium. For example if 400 mg of magnesium is given, 800 mg of calcium should be given as calcium is a natural antagonist to magnesium and increases calcium excretion.

The DRI (Daily Recommended Intake) /RDA (Recommended Daily Allowance) of dietary Magnesium are listed on the next page:
Please Note: By definition, the DRI/RDA recommendations apply only to 98% of healthy individuals and are not sufficient for those with higher nutrient requirements based upon their biochemical individuality, genetics, health status, deficiencies, lifestyle, and toxic exposures.

The following are daily dietary recommendations from the Institute of Medicine.

### Adult

- Males 19 - 30 years of age: 400 mg daily
- Females 19 - 30 years of age: 310 mg daily
- Males 31 years of age and over: 420 mg daily
- Females 31 years of age and over: 320 mg daily
- Pregnant females 19 - 30 years of age: 350 mg daily
- Pregnant females 31 and over: 360 mg daily
- Breastfeeding females 19 - 30 years of age: 310 mg daily
- Breastfeeding females 31 years of age and over: 320 mg daily

The body’s need for magnesium increases during pregnancy, after surgery or illness, and after physical exertion such as athletic training.

### Pediatric

Do not give magnesium supplements to a child without a doctor’s supervision.

- Children 1 - 3 years of age: 40 - 80 mg daily
- Children 4 - 8 years of age: 130 mg daily
- Children 9 - 13 years of age: 240 mg daily
- Males 14 - 18 years of age: 410 mg daily
- Females 14 - 18 years of age: 360 mg daily
- Pregnant females 14 - 18 years of age: 400 mg daily
- Breastfeeding females 14 - 18 years of age: 360 mg daily

### Precautions

Since magnesium is excreted by the kidneys, people with kidney disease should only take magnesium supplements under their doctor’s supervision. If you are currently being treated with any of the following medications, you should not use magnesium without first talking to your health care provider.

**Aminoglycoside Antibiotics:** streptomycin, kanamycin, tobramycin, gentamicin and neomycin - concomitant use with magnesium may cause neuromuscular weakness and paralysis.

**Blood Pressure Medications - Calcium Channel Blockers:** Particularly procardia and nifedipine - magnesium may increase the risk of side effects (such as dizziness, nausea, and fluid retention in pregnant women. Other calcium channel blockers include:

- Amlodipine (Norvasc)
- Diltiazem (Cardizem)
- Felodipine (Plendil)
- Verapamil (Calan)

**Fluoroquinone Antibiotics:** Gemifloxacin, Amifloxacin, Balofloxacin, Pefloxacin - Concomitant use of these with magnesium may decrease their absorption and effectiveness. Fluoroquinones should be taken a minimum of 4 hours before any products containing magnesium.

**Hormone Replacement Therapy** - Magnesium levels tend to decrease during menopause. Clinical studies suggest that hormone replacement therapy may help prevent loss of this mineral. Postmenopausal women, or those taking hormone replacement therapy, should talk with a health care provider about the risks and benefits of magnesium supplementation.

**Labetol:** Concomitant use with magnesium can slow the heart beat abnormally and reduce cardiac output.

**Levomethadyl:** Concomitant use with magnesium may precipitate a heart condition called QT prolongation.

**Levothyroxine:** There have been case reports of magnesium-containing antacids reducing the effectiveness of levothyroxine, a medication for underactive thyroid gland.

**Medications for Osteoporosis:** Tiludronate (Skelid) and Alendronate (Fosamax) -- Magnesium may interfere with absorption of these medications used in osteoporosis, Magnesium (or antacids containing magnesium) should be taken 1 hour before, or 2 hours after taking these medications.

### RECOMMENDED DAILY ALLOWANCE
300mg/Day

### OPTIMAL DAILY ALLOWANCE
500mg/Day
What are possible Magnesium deficiency conditions and symptoms?

- Cardiovascular disease
- Constipation
- Convulsions and/or seizures
- Depression
- Diabetes
- High blood pressure (hypertension)
- High cholesterol
- Hyperactivity
- Insomnia
- Irregular/rapid Heart beat
- Kidney stones
- Loss of appetite
- Muscle weakness, twitching or spasms
- Nervousness
- Osteoporosis
- Polycystic Ovarian Syndrome (PCOS)
- Pre Menstrual Syndrome (PMS)
- Salt cravings
- Stress and Anxiety

What are possible Magnesium excess symptoms?

Magnesium excess may lead to diarrhea, low blood pressure, low calcium levels, low phosphorus levels and facial flushing

What steals Magnesium from the body?

- Oral contraceptives
- Diuretic drugs: Hydralazine (Apresoline), Furosemide (Lasix), Bumetamide (Bumex), Torsemide (Demadex), Ethacrynic acid (Edecrin), Hydrochlorothooiazide (Esidrix, hydroDIURIL), Indapamide (Lozol), Metolazone (Zaroxolyn) Amiloride (Midamor, Moduretic), Triamterene (Dyazide, Dyrenium, Maxzide) Spironolactone (Aldactazide, Aldactone).
- Tetracycline antibiotics: these chelate (attract, attach and remove) magnesium.
- Antacid drugs:
  - Aluminium-containing antacids: Gaviscon, Maalox, Mylanta.
  - Calcium-containing antacids: Mylanta, Rolaids, Tums.
  - Magnesium-containing antacids: Gaviscon, Maalox and Mylanta and Alka Seltzer - reduce stomach acidity, which is important for magnesium absorption.
  - Penicillamine: a medication used to treat Wilson’s disease and rheumatoid arthritis, can inactivate magnesium
  - Anti-arrhythmia drug: Digoxin (Lanoxin)
  - Calcium, sodium alginate and phosphate salts can also combine with magnesium and reduce its absorption.
  - Phytic acid – from raw cereals and legumes.
  - Oxalic acid - from spinach, chocolate, Swiss chard, parsley, beet greens and rhubarb all impair magnesium absorption.
  - Caffeine and alcohol.
  - Dairy products, protein and fats - can increase calcium levels and affect absorption.

What tests can be used to assess Magnesium levels?

- MBC (Mononuclear white blood cell) level
- RBC (Red Blood Cell) level
- Serum magnesium
What foods contain the highest amounts of Magnesium?

**TOP 10 MAGNESIUM RICH FOODS ARE:**

1. **Pumpkin seeds**
   534mg/100g
2. **Dark chocolate**
   327mg/100g
3. **Mackerel**
   97mg/100g
4. **Lentils**
   86mg/100g
5. **Raw spinach**
   79mg/100g
6. **Kale**
   76mg/100g
7. **Chard**
   75mg/100g
8. **Dried figs**
   68mg/100g
9. **Brown rice**
   44mg/100g
10. **Avocados**
    29mg/100g

**What are the best Magnesium products?**

Most magnesium forms are well absorbed but the preferred sources are the magnesium forms bound to aspartate, or the Krebs cycle intermediates: malate, succinate, fumarate and citrate. Aspartate forms may be of benefit to individuals with fatigue as they support the conversion of fats, protein and glucose into cellular energy. These forms are preferable to magnesium oxide or the other inorganic insoluble forms: magnesium chloride or magnesium carbonate.

**REFERENCES**

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Harpers review of Biochemistry. Lange Med 26 Ed 2009
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All the statements, including product labels, supporting literature and/or product manufacturers websites have not been evaluated by FDA. These products are not intended to diagnose, treat, cure or prevent any disease.
Magnesium

What are the very best Magnesium products to buy?

**PRL Coral Legend**
Dietary Supplement
Sango Marine Coral Formula
Whole Body Mineral Support, Including the Bones, Joints, Teeth and an Alkaline pH. This coral-based formula provides legendary mineral...

**Klaire VitaSpectrum**
Powdered multiple vitamin/mineral supplement for children with Autism Spectrum Disorders. Natural berry-pomegranate flavor. This comprehensive multiple vitamin/mineral supplement contains 28 highly bioavailable...

**ProThera MultiThera 3**
Iron- and copper-free multiple formula. Both iron and copper have been eliminated from this version of MultiThera® to address the needs of patients who may have elevated tissue identical in all other respects to MultiThera® 1...

**PRL pH Pro**
Dietary Supplement
Coral-Based pH Formula
Whole Body Support, Including Bones, Joints and an Ideal Alkaline pH pH-Pro™ is the perfect formula to support whole...

**Pure Caps Womens Pure Pack**
Women’s Supplement to Support Bone and Heart Health. Now With Metafolin® L-5-MTHF. Sizes Available 30 packets. Each packet contains 6 different supplements, including...

**Pure Caps Mens Pure Pack**
Regardless of your walk of life, all men need to ensure that they get enough of an array of important nutrients. However, who wants to spend their time picking out supplements for a daily...