WHAT IS MAGNESIUM?

FORMS OF MAGNESIUM

WHY WE NEED IT
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What is Magnesium?
Forms of magnesium - Why we need it

Part I

What is Magnesium? How it Functions in the Body

Magnesium is an abundant mineral inside human cells, and the fourth most abundant positively charged ion mineral in the human body. Within the body’s cells, it serves literally hundreds of functions.

The Articles Include:

(1) Introduction-Safeguarding the Function of Magnesium...7

(2) What Is Magnesium? Understanding Ionic Magnesium and the Body’s Chemistry...9

(3) Magnesium powers our enzymes...12

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**Article (1)**

**Introduction**

**Safeguarding the Function of Magnesium**

Without magnesium we could not produce energy, our muscles would be in a permanent state of contraction, and we could not adjust the levels of cholesterol produced and released into the blood stream. Magnesium is the central element in chlorophyll and the basis of early life on the planet.

*Magnesium ions regulate over 300 biochemical reactions in the body through their role as enzyme co-factors.*

They also play a vital role in the reactions that generate and use **ATP**, the fundamental unit of energy within the body’s cells.

Why does magnesium have such a far-reaching impact on the body? The secret is how it functions within the cells, even now a subject of intense study with entire journals dedicated to its research.

- What is magnesium?
- Why is it a vital regulator of basic health?

Magnesium has been re-discovered as an overlooked **key** to overall wellness, with numerous medical-researchers recommending increases to the RDA. Some researchers are suggesting amounts as high as double the current recommendations. With its role in regulating the thousands of biochemical reactions that occur on an on-going basis, sufficient magnesium is essential to achieving the delicate balance necessary to the body’s function.

*Protecting this delicate balance should be considered a fundamental goal in achieving optimal health and well-being.*

In the following articles you will learn not only what magnesium is but also how magnesium regulates and maintains:

- Enzyme Activity, enabling thousands of bio-chemical processes
- Energy production and ATP, the energy storage unit of the body’s cells
- DNA and RNA, the body’s internal instructions for building proteins and new cells
- Mineral Imbalance, necessary to maintain cell life
Read on about the following health benefits of magnesium in the related articles found in this section *What is Magnesium? / Forms of magnesium /Why we need it*  Parts I, II, and III

These Health Benefits include prevention, treatment, and overall physical performance.

**Watch These Videos on Magnesium:**

**How Magnesium Functions in the Body:** Dr. Carolyn Dean describes magnesium's role in the body and why you need it in conjunction with other minerals. She also explains why many people are deficient in magnesium and what that might cause.

[http://youtu.be/y8FUxg2usFk](http://youtu.be/y8FUxg2usFk)

**Magnesium: The most powerful relaxation mineral available:** Could a deficiency in a magnesium be to blame for some of your chronic health problems, lack of sleep or anxiety? In this Ultra-Wellness blog, Mark Hyman, M.D. reveals why this “secret antidote to stress” works so well and tells you how to get more of it -- naturally.

[http://www.youtube.com/watch?v=GUL1o2hSrs&feature=share&list=PLAA2CA67255804FF](http://www.youtube.com/watch?v=GUL1o2hSrs&feature=share&list=PLAA2CA67255804FF)
**What is Magnesium? How it Functions in the Body**

**Understanding Ionic Magnesium and the Body’s Chemistry**

*Magnesium an abundant element inside human cells and the fourth most abundant positively charged ion mineral in the human body.*

(1), (2) *Within the body’s cells, it serves literally hundreds of functions.*

In nature, magnesium can be found in many different forms, bonded with other atoms, such as:

- Magnesium chloride, found naturally in the sea
- Magnesite, the insoluble rock salt also known as magnesium carbonate
- In plant matter, as the central element in chlorophyll

*The average human body contains about 25 grams of magnesium, one of the six essential minerals that must be supplied in the diet.*

One readily accessible and easily absorbed form of magnesium is magnesium chloride. Because it is soluble in water, magnesium chloride readily dissociates, increasing rate of absorption. Learn about magnesium chloride in *Burt’s Remedies* articles in this section *What is Magnesium? / Forms of magnesium/Why we need it* - Part VII “Why Burt’s Remedies Topical Transdermal Mineral Magnesium Chloride?”
All organic matter—plants, animals, and the human body—is made up of combinations of elements such as oxygen, carbon, and hydrogen.

These tiny building blocks join to create the compounds that make up our:

- Tissues
- Bodily fluids
- Microscopic elements that regulate the body’s function.

Oxygen, carbon, hydrogen and nitrogen form the basis of compounds found in all living matter. Beyond compounds built from these four most common elements, the rest of the body’s contents is made up of minerals.

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Magnesium is a macro-mineral, which, unlike trace minerals, is needed by the body in large amounts. Calcium, sodium, and potassium are also macro-minerals. The average human body contains about 25 grams of magnesium, one of the six essential minerals that must be supplied in the diet.

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Once magnesium enters the body through food, supplements, or topical applications, it is broken down and released to form independent magnesium atoms, or “ions”. In its ionic form, magnesium has a positive charge, commonly noted as $\text{Mg}^{2+}$.

Magnesium cations function as a part of the structure of the body through their presence in bone. But arguably more important is their function as cell regulators in hundreds of chemical reactions throughout the body.

See also:

Read more about magnesium absorption and bioavailability in Burt’s Remedies articles in this section What is Magnesium? / Forms of magnesium/Why we need it- Part VI “Topical Magnesium: How It Works”

Learn how magnesium supplements vary in how they are absorbed by reading our Burt’s Remedies related articles in this section What is Magnesium? / Forms of magnesium/Why we need it- Part V “Magnesium Supplementation”
Read more about “Burt’s Remedies Topical Transdermal Mineral Magnesium Oil and Flakes (Magnesium Chloride) in related articles in this section What is Magnesium? /Forms of magnesium / Why we need it-Parts VI, VII, and VIII.

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**References for: What is Magnesium? / Forms of magnesium / Why we need it**

**Part I—“What is magnesium? How it Functions in the Body”/ “Understanding Ionic Magnesium and the Body’s Chemistry”**

Magnesium powers our enzymes.

Magnesium is crucial to more than 300 enzyme-driven biochemical reactions occurring in the body on a near constant basis.

All nutrients used by the human body function as either:

- Sources of energy
- Building blocks for body structures
- Elements needed to regulate and control the body’s many functions

Like most vitamins, magnesium’s role is primarily regulatory. It allows enzymes to function properly, which in turn enable a vast majority of the body’s chemical reactions.

Enzymes are the basis of the body’s ability to function while supporting life. Many of the necessary chemical reactions that the body carries out, such as the breakdown of sugars in the digestive system, can only normally be performed under extreme heat or acidity.

Enzymes, however, allow these reactions to occur without damaging the body’s fragile tissues and organs.

Yet enzymes do not function alone. Substances known as enzyme co-factors must regulate the functions of enzymes in order to control the rate of reactions within the body. These co-factors act as “keys” to switches within each enzyme, instructing it to start or stop activity.

Magnesium is one of the most common co-factors in the body. Its presence is crucial to:

- Glucose and fat breakdown
- Production of proteins, enzymes and antioxidants such as glutathione
- Creation of DNA and RNA
- Regulation of cholesterol production
Without enzyme co-factors—including both hormones and vital minerals such as magnesium—reactions could easily spiral out of control.

In fact even slight imbalances can chronically impact the body’s level of performance and health. Thus, magnesium’s function as an enzyme cofactor can be seen as analogous to the important role that our body’s hormones play.

The crucial difference, however, is that our body can manufacture most hormones itself using basic building blocks. Magnesium, on the other hand, cannot be manufactured by the body, it must be taken in.

In the same way that multiple bodily systems suffer in cases of thyroid malfunction or insulin resistance, magnesium deficiency has far-reaching implications for the body’s level of functioning.

Learn more:

Do you have signs of deficiency? Check our magnesium self-assessment test (10 Signs) in our Burt’s Remedies—“Magnesium Deficiency”—Part II “Signs of Magnesium Deficiency”. Need more magnesium? Read about the types of magnesium supplements and topical magnesium supplementation in our Burt’s Remedies articles in this section What is Magnesium? / Forms of magnesium /Why we need it—Part V “Magnesium Supplementation” and Part VI “Topical Magnesium: How It Works”
Magnesium is a required ingredient of the energy-production process that occurs inside the tiny structures within cells.

The molecule ATP, or adenosine tri-phosphate, is the fundamental unit of energy used in human cells. Many of the functions carried out by cells require ATP to provide the energy for the action. These include:

- Muscle fiber contraction
- Protein synthesis
- Cell reproduction
- Transport of substances across the cell barrier

ATP can be thought of as fuel for the cell’s activities, much in the same way that gasoline fuels a car.

Mitochondria inside the cell function as the cell’s power plants and constantly produce ATP by converting simple units of glucose, fatty acids, or amino acids. Without the presence of sufficient magnesium, the nutrients we take in could not be metabolized into usable units of energy.

In addition, the form in which ATP exists and is utilized is typically MgATP, (magnesium complexed with ATP). These MgATP units must be present to sustain movement, to perform cell maintenance, and to maintain a healthy balance of minerals inside and outside of the cells.

The interdependence of ATP and magnesium can have far-reaching effects on nerve transmission, calcification of tissues and blood vessels, and muscle excitation, underlining the importance of maintaining adequate magnesium levels.
MAGNESIUM PROTECTS OUR DNA.

Studies have shown that DNA synthesis is slowed by insufficient magnesium. (1), (3) DNA, or deoxyribonucleic acid, is the body’s genetic code, used in the building of proteins and the reproduction of cells. The cells in our body are constantly being replaced by new cells. Different types of cells turnover at different rates, with the average age of a cell in the human body estimated at seven years.

Studies have shown that DNA synthesis is slowed by insufficient magnesium.

Thus, it is especially important that our DNA remain stable, avoiding mutations that can negatively impact cellular function.

DNA stability is dependent in part on magnesium. Magnesium not only stabilizes DNA structures, it also functions as a cofactor in the repair of DNA damage by environmental mutagens. (4) Combined with ATP, magnesium also assists in the healthy production of RNA, responsible for “reading” DNA and manufacturing the proteins used in our body.

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References for: What is Magnesium? / Forms of magnesium / Why we need it

“Magnesium protects our DNA”

**Article (6)**

**Magnesium regulates our electrolyte balance.**

Within every cell in the body, a proper balance of mineral content must be maintained. Magnesium's role in the healthy balance ("homeostasis") of important minerals such as calcium, sodium and potassium affects the conduction of nerve impulses, muscle contraction and heart rhythms.

The body allows mineral ions to flow into and out of the cell from the extra-cellular fluid, depending on concentrations inside or outside the cell. Minerals, in their ionic form, seek to equalize their concentrations by flowing through open membrane channels designed to allow movement of ions, water molecules, and small water-soluble compounds.

However, ideal levels for minerals inside and outside the cells are not equal, as minerals serve various purposes inside the body and the cells. To keep cells healthy, a distribution such as the following must be maintained.

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<tr>
<td>Sodium</td>
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<td>High</td>
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<tr>
<td>Magnesium</td>
<td>High</td>
<td>Low</td>
</tr>
<tr>
<td>Potassium</td>
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Because of the tendency of ions to equalize across membranes, like water flowing toward the sea, the cell must actively move ions into or out of the cell, expending energy to create a healthy balance using special "exchange pumps".

These mineral exchange pumps perform one of the most vital functions of the cell membrane, regulating the electrical action potential inside and outside of the cell, and maintaining homeostasis of minerals in the body. Without constant efforts by exchange pumps, cells would be flooded with calcium and sodium moving in, and potassium and magnesium moving out as they strived to achieve equilibrium.

One such exchange pump, known as the "sodium-potassium" pump, pumps sodium out of the cell in exchange for potassium. Embedded in the cell membrane, the "sodium-potassium" pump is activated by magnesium inside the cell.
Magnesium deficiency impairs the “sodium-potassium pump”, allowing potassium to escape from the cell, to be lost in the urine, potentially leading to potassium deficiency (hypokalemia). Those with a known potassium deficiency, therefore, often do not respond to treatment until magnesium deficiency is also corrected.

Similarly, magnesium’s role in calcium regulation is pivotal to its role in maintaining heart health. Magnesium is a known modulator of calcium, competing with calcium for entrance into cells and keeping many cellular processes in balance.

- The effect of magnesium on blood vessels is one of dilation, whereas calcium promotes contraction.
- Magnesium is also thought to antagonize calcium promotion of blood clotting.

References for: What is Magnesium? / Forms of magnesium / Why we need it
“Magnesium regulates our electrolyte balance”

Article (7)

What Do the Experts Have to Say About Magnesium even Transdermally?

WATCH This Video/Dr. Hyman MD. on magnesium

Magnesium: The most powerful relaxation mineral available... Uploaded on Oct 31, 2007. Could a deficiency in a magnesium be to blame for some of your chronic health problems, lack of sleep or anxiety? In this week’s UltraWellness blog, Mark Hyman, M.D. reveals why this “secret antidote to stress” works so well and tells you how to get more of it -- naturally
http://youtu.be/GUWL1o2h5rs

* Mark Sircus, Ac., OMD, author of the book Transdermal Magnesium Therapy, discusses magnesium supplementation and the pros and cons of oral versus topical applications.

Marc Sircus is an author, a nationally certified acupuncturist, honorary doctor of Oriental Medicine, and a founding director of the International Medical Veritas Association (IMVA). His book, Transdermal Magnesium Therapy, explores groundbreaking information in the use of magnesium chloride transdermally.

Note: You can purchase Dr. Sircus’s book “Transdermal Magnesium Therapy” on our Burt’s Remedies site.

*Mike Mahler gives advice on magnesium’s benefits for athletic performance, hormone levels, DHEA, and weight training.

Mike Mahler, the fitness guru, explains why magnesium is essential for performance & recovery time, hormone optimization, insulin sensitivity, stress management, and overall health. Mike does workshops on these topics worldwide and has written over 100 articles for publications such as Muscle & Fitness, Men’s Fitness, and Ironman Magazine.

* Dr. Kathleen Akin discusses magnesium’s impact on muscle spasms, sports injuries, muscle twitching, pain, and detox.
Dr. Akin is a Certified Chiropractic Sports Physician with over 15 years of experience in her field. Based on her work with professional athletes and patients with ALS and other disorders, Dr. Akin has seen the dramatic affect that mineral deficiencies have on the human body. By using hair analysis for testing, she is able to track her patients’ progress and the alleviation of their symptoms through the use of topical magnesium.

* Daniel Reid describes magnesium’s key role in transdermal therapies, detoxification, self-healing and body alkalizing.

Daniel Reid is a bestselling author and a leading expert on eastern philosophy and medicine. He has written numerous books and magazine articles on various aspects of Asian self-health and self-healing practices, and has established an international reputation for the practical efficacy of his traditional approach to modern health problems. After spending years in the Orient, he now resides in Australia directing detoxification programs and continuing to educate on natural and organic healing methods.

* Dr. William McAuliffe discusses just how far we as a society have fallen into magnesium deficiency, and the difficulty of trying to reverse it through food alone.

Dr. McAuliffe, who received a B.S. from Fordham University, is a Doctor of Chiropractic in New Jersey with over 30 years of postgraduate education. From his first days in private practice his approach to patient care has always been to acquire the most current and comprehensive wellness information to pass along to his patients. He has been a Nutritional Consultant to the U.S. Army Special Forces in Ft. Benning, Georgia, and has lectured on wellness and proper nutrition at the Olympic Training Grounds in Colorado Springs, Colorado.

* Rochelle McKay Masterton describes her encounters with magnesium as it applies to both women’s health and the alleviation of pain in general.

Rochelle McKay Masterton, founder of the She Oaks Natural Fertility in Maleny, Queensland, has spent over 15 years studying natural healing techniques. As a Naturopath she provides patients with comprehensive individual treatment plans while also addressing issues such as infertility, miscarriage, endometriosis, chronic fatigue, poly cystic ovarian syndrome, fibroids, PMT and many other hormonal conditions. During her time spent working with women’s health, she’s acquired an intimate knowledge of just how crucial health and nutrition are for balance, vitality, and overall well-being.
How much magnesium do you need and where can you get it?

Read about the sources of magnesium in the Burt’s Remedies article “Magnesium Part III” for the answers to these questions and more.

4 ways to get magnesium without bulky pills or uncomfortable side effects — read about transdermal magnesium in Burt’s Remedies articles in this section What is Magnesium? / Forms of magnesium / Why we need it - on “Topical Transdermal Mineral Magnesium Oil” -Parts VI, VII, and VIII”.

How do you choose a magnesium supplement? Learn how to sort out the good from the bad in Burt’s Remedies article in this section What is Magnesium? / Forms of magnesium / Why we need it - “Magnesium Supplementation” -Part V.
WHAT IS MAGNESIUM?
FORMS OF MAGNESIUM - WHY WE NEED IT

PART II

MAGNESIUM FACTS AND INFORMATION

There are about 4-6 teaspoons of magnesium in the human body. Researchers have estimated that magnesium is the fourth most abundant mineral in the body. Magnesium is the ninth most abundant element in the universe, and the eighth most abundant element in the Earth’s crust.

THE ARTICLES INCLUDE:

(1) Introduction...22
(2) Magnesium’s Chemical Composition and Related Properties...24
(3) Interesting Health and Historic Facts about Magnesium...26
(4) Magnesium Benefits...30
**Introduction**

Magnesium is a common metal that, in the body, activates hundreds of cellular, biochemical reactions. In the nervous system, it functions as a dampener.

* Magnesium is the ninth most abundant element in the universe *(1)*
* and the eighth most abundant element in the Earth’s crust. *(2)*

Below you’ll find over two dozen interesting facts about magnesium — including the history of magnesium, chemical composition, and health information on magnesium.

* Without the presence of magnesium, energy could not be produced in the cells, muscles could not contract and relax, and key hormones could not be synthesized to help control vital bodily functions.*

---

* Warning Signs of Deficiency*

Symptoms of an existing magnesium deficit may include:

- Muscle cramps and chronic pain
- Facial tics or muscle spasms
- Headaches
- Anxiety or hyperactivity
- Sleep problems
- Weakness

* Magnesium is the central element in chlorophyll and the basis of early life on the planet.*
Unstable in its pure state, magnesium typically forms a white coating of magnesium oxide. In nature, most of its compounds appear as white crystals. Approximately 320,000 tons of magnesium is extracted annually for commercial use. (3) Magnesium is commonly extracted from seawater, where it is the third most common component.

*Why do we use Genuine Zechstein: The Pure Magnesium Oil:*

Learn more about this magnesium chloride in Burt’s Remedies article in this section What is Magnesium? / Forms of magnesium / Why we need it—“Why do we use Genuine Zechstein: Pure Magnesium Oil”—Part IX.
**Article (2)**

**Magnesium’s Chemical Composition and Related Properties**

Magnesium has the atomic number 12 with 12 protons and approximately 12 neutrons inside its shell, surrounded by 12 electrons orbiting in three shells, with two valence electrons.

- The atomic weight of magnesium is 24.3050.
- Magnesium’s outer shell has only two electrons out of the ordinary eight, making it highly reactive. It cannot be found in nature as an independent compound. In seawater, for example, it is found as the salt Magnesium Chloride, comprised of one magnesium cation and two chloride anions.
- On the periodic table, magnesium is known as an alkaline earth metal. Other alkaline earth metals include calcium, beryllium, barium, strontium, and radium. Strontium and radium are radioactive metals, particularly dangerous to the body because their similarity to calcium and magnesium can lead to their uptake and absorption

**Magnesium in the Body:**

There are about 4-6 teaspoons of magnesium in the human body. (6)

Magnesium is the second most abundant positively charged intracellular (inside the cells) ion in the body. Other positively charged cations found in the body include calcium, sodium, and potassium. Negatively charged anions include phosphate and chloride.

Only 1% of totally body magnesium is found in the blood, the remainder is found in the bone and inside the cells of the muscles, heart and liver.

The cells of a healthy heart contain ten times the amount of magnesium found in blood. (7) 50-60% of body magnesium is incorporated into the crystal mineral lattice of bones and teeth. (8)

Magnesium absorption occurs in the small intestine and begins as early as 1 hour after ingestion in the jejunum, but primarily occurs in the ileum, or “distal” intestine. (9)

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References for: What is Magnesium? / Forms of magnesium / Why we need it

Part II- “Magnesium Facts and Information” / “Magnesium’s Chemical Composition and Related Properties”


(7) Gaby A. *Magnesium: How an important mineral helps prevent heart attacks and relieve stress*. New Canaan, CT: Keats
Publishing; 1994.
Article (3)

Interesting Health and Historic Facts about Magnesium

Estimated U.S. Intake of Magnesium:

- Magnesium is one of six "macro-minerals", major minerals needed by the body in larger amounts. The other five major minerals are calcium, sodium, potassium, phosphorous and chloride.

- The US RDA for magnesium in adults over age 31 is currently set at 420 mg per day for men, 320 mg per day for women, and 360 mg per day for pregnant women. (10)

- The average American diet contains barely over 50% of the US RDA of magnesium. (10), (11)

- Roughly 75% of U.S. adults consume less than the recommended daily allowance (RDA) of magnesium. (8), (10), (12), (13)

- 19% of U.S. adults—one in 5—consume less than half of the RDA of magnesium. (13)

- 50% of cases of magnesium deficiency may go unrecognized due to statistical errors in serum magnesium testing. (14)

- 7-11% of hospitalized patients and 65% of intensive care patients are deficient in magnesium. (15), (16), (17)

- Only about 20-50% of magnesium intake is actually absorbed by the body. (9), (15), (18), (19)

- Over three dozen prescription medications interfere with magnesium absorption and retention in the body, including some antibiotics, diuretics, allergy and asthma medications, and chemotherapy treatments. (8), (20)

- Absorption of magnesium supplements varies. Magnesium oxide, the most common form of magnesium supplement found in drug stores, has been found to have only a 4% absorption rate. (21) Other forms of magnesium supplements, however, including magnesium chloride,
have been found to have much higher rates of absorption due to their higher solubility in water.

**Magnesium and Disease**

- Low magnesium intake and low magnesium levels have been associated with osteoporosis (8), (22), (23), diabetes (24), (25), metabolic syndrome (26), (27) and heart disease (8), (29), (30).

**Historic Facts about Magnesium:**

*Magnesium was first discovered outside of the Greek city of Magnesia.*

- In 1808, Sir Humphrey Davy first isolated several of the alkaline earth metals, naming them after their oxides as barium, strontium, calcium, and magnium. Davy derived the term “magnium” from the common name for magnesium oxide: magnesia. Eventually the term magnesium replaced the term magnium in general usage.
- Magnesium was used as a curative as early as ancient times, in the form of laxatives and Epsom salts.
- In the 1600’s, water from the famous Epson spring discovered in England was a popular curative, used as an internal remedy and purifier of the blood. In 1695, magnesium sulfate as a salt was isolated from the Epsom spring water by Nehemia Grew.
- Marie de Medici, of the famous and powerful Italian family, described the healing properties of Epsom spring water as, used by “a great store of citizens” especially by “persons of quality”. (4)
- Richard Will Statter won the Nobel Prize in 1915 for describing the nature of the structure of chlorophyll in plants, noting magnesium as the central element.
- Magnesium is regularly used in the acute treatment of eclampsia during pregnancy.

References for: What is Magnesium? / Forms of magnesium / Why we need it

Part II- “Magnesium Facts and Information” / “Interesting Health and Historic Facts about Magnesium”


Magnesium Benefits

Magnesium’s benefits can include reduced symptoms from conditions such as chronic pain, fatigue and insomnia. Magnesium may also provide protection from a number of chronic diseases, especially those associated with aging and stress.

Recently re-discovered as an overlooked key to good health, a number of medical researchers are recommending increases to the RDA for magnesium — sometimes suggesting as much as double the current recommendations — to ensure protection from diseases such as osteoporosis and hypertension.

Essential to life, necessary for good health, and a vital component within our cells, magnesium’s benefits help our bodies maintain balance, avoid illness, perform well under stress, and maintain a general state of good health.

Explore studies linking low magnesium intake to chronic disease, and learn how this miracle mineral performs so many functions in the healthy human system. (See Burt’s Remedies articles on Magnesium Deficiency Parts I, II, III and IV)

Discover magnesium’s value for preventive health and increased physical performance, including an overview of published studies on its potential to address a variety of conditions and symptoms.

Learn how magnesium is used by the cells to produce and store energy, regulate electrolyte balance, and prevent cell mutations.
Highlights of the most interesting and amazing facts about magnesium.

What Conditions Can Benefit from Magnesium?

Magnesium is known to reduce muscle tension, lessen pain associated with migraine headaches, improve sleep, and address neurological disorders such as anxiety and depression.

Conditions linked to magnesium levels include:

Pain:
- Headaches
- Muscle Spasms and Muscle Cramps
- Fibromyalgia
- Mental Health and Sleep:
- Anxiety

Depression
- Autism and ADD
- Restless Leg Syndrome (RLS)
- Insomnia

Other Conditions:
- Psoriasis, Acne and Eczema
- Asthma
- Blood Pressure

Diabetes
- Osteoporosis Tics

Addressing some conditions linked to magnesium levels:

Osteoporosis:

In a review of nutrition and bone health published by the American College of Nutrition, it was noted that among four unique population studies each found a positive correlation between magnesium and bone mineral density.

These studies are backed up by research demonstrating that magnesium deficiency results in:
- Decreased bone strength
- Decreased bone volume
- Poor bone development
- Excess release of calcium from bone into the blood without accompanying bone formation. (6), (5), (7), (8)

Researchers from the Jean Mayer US Department of Agriculture Human Nutrition Research Center on Aging at Tufts University studied the bone mineral density (BMD) of members of the original Framingham Heart Study cohort, a longitudinal study initiated in 1948.

Statistical analysis of bone mineral density and diet for members of the study suggested that long term diets high in magnesium protect against loss of BMD. (9)

**Depression:**

*Studies show a high percentage of chronically depressed people exhibit magnesium deficiency.*

Experimental and clinical data suggest an association between magnesium deficiency and depression. As early as 1996, a study by Dr. Richard Cox and Dr. Norman Shealy, neuroscientist, noted a correlation between low magnesium and rates of depression, finding 100% of 475 chronically depressed exhibited deficient magnesium in magnesium tolerance testing. (10)

A more recent and much larger study published in 2009 in the Australian and New Zealand Journal of Psychiatry confirms these findings. Examining data from 5700 adults in the Hordaland Health Study in Norway, researchers noted a statistically significant relationship between magnesium intake and depression. Participants who reported dietary habits low in magnesium were more likely to test positive for symptoms of depression using the Hospital Anxiety and Depression Scale. Results remained significant when adjusted for age, gender, blood pressure, and socioeconomic status. (11)

Correlations between incidence of magnesium deficiency and depression have led researchers and clinicians to investigate magnesium supplementation as a potential treatment for chronic and major depression.

Those investigating magnesium for depression are quick to point out side effects experienced as a result of current prescription anti-depressants—including, disturbingly, an increased number of suicides and attempts, particularly among young people and children. Magnesium supplementation has none of these possible neurological side effects and is
seen as a promising consideration, especially when serum or load testing reveals possible magnesium deficiencies.

Georgy Eby of the Eby Research Institute reported several case studies showing rapid recovery from major depression with of 125-300 mg supplemental magnesium. More recently, a randomized, controlled trial of elderly patients suffering from both type 2 diabetes and depression compared an FDA-approved antidepressant with magnesium chloride equivalent to 450 mg. Both treatments, magnesium and the prescription antidepressant, proved equally effective in reducing symptoms of depression. (22)

**Hypertension:**

High magnesium intake has been shown to reduce the risk of developing hypertension. A study by the Harvard School of Public Health examined 30,000 male health professionals without high blood pressure. A lower risk of hypertension was associated with diets with increased magnesium and dietary fiber.

Among those who did not develop hypertension during the four year study, higher dietary fiber, magnesium, and potassium were related to decreases in systolic and diastolic blood pressure, with increases in systolic and diastolic figures connected to lower intakes of magnesium and related nutrients. (2)

**Heart Health:**

The Atherosclerosis Risk in Communities study similarly found that higher blood levels of magnesium were associated with lower risk of heart disease. The study followed 14,000 adults free of coronary heart disease for over 4-7 years, comparing blood magnesium levels between those who did and did not develop heart disease. (3)

The Honolulu Heart Study followed 7,000 men over a period of 30 years, comparing those with magnesium intakes below 186 mg per day to those with intakes above 340 mg per day. After observing a twofold increase in heart disease rates among those with the lowest magnesium intake, the study concluded that higher intake of dietary magnesium was associated with a reduced risk of coronary heart disease. (12), (13)

A review published in the Southern Medical Journal of 15 studies on the effect of magnesium supplementation on hypertension found that 67% of studies showed a statistically significant decrease in blood pressure. (24) Intravenous magnesium used after an acute heart attack has been shown to reduce the risk of death.

Similarly, a landmark study by the National Heart, Lung and Blood Institute (part of the NIH) found that a diet high in potassium and magnesium correlated with a decrease in blood pressure. (25) The DASH diet (Dietary Approaches to Stop Hypertension), created
as a result of this study, is now recommended by the American Heart Association and the National Cancer Institute.

The level of magnesium intake in the heart-healthy DASH diet is over 50% higher than the amounts recommended in the US RDA. (26) This is especially notable when considering that three quarters of Americans fail to meet even the comparatively low amounts suggested by the RDA. (27) Intravenous magnesium used after an acute heart attack has been shown to reduce the risk of death, as reported in the British Medical Journal. (28),(29) Calling for additional studies toward developing safe, effective magnesium regimens, the study concluded:

“This overview of seven randomized clinical trials of intravenous magnesium in 1301 patients with suspected acute myocardial infarction [heart attack] indicates that, in patients at relatively high risk, treatment reduces mortality during the first few weeks by between one third and two thirds.” (29)

**Health Effects of Magnesium on Existing Conditions**

Magnesium is becoming a mainstream medication for people with migraines, diabetes, asthma, and preeclampsia.

— Alan Pressman, PhD, Board Certified Dietician and Nutritionist. (13)

**Migraine Headaches:**

Dr. Alexander Mauskop, Fellow of the American Academy of Neurology and head of the New York Headache Center, published an expert review with his colleague Dr. Sun-Edelstein on the role of magnesium in the prevention and treatment of migraine. Their review was based on both
published clinical evidence and their personal experience treating migraines at their cutting edge clinic. The doctors concluded:

“The use of magnesium in both acute and preventive headache treatment has been researched as a potentially simple, inexpensive, safe and well-tolerated option. Studies have shown that preventive treatment with oral magnesium and acute headache treatment with intravenous magnesium may be effective, particularly in certain subsets of patients.” (14)

Two double-blind, placebo controlled studies particularly corroborate the use of magnesium for prevention of migraines and reduction of pain. The first, conducted specifically with a group of women experiencing menstrual migraines, found a significant reduction in the number of days with headache and the severity of pain after supplementation of 360 mg of magnesium daily. (15) The second, larger controlled study found a reduction in attack frequency of over 41% in those treated with 600 mg magnesium each morning, compared with a 16% reduction in the placebo group. (16)

At the New York Headache Center, Dr. Mauskop recommends intravenous infusion of magnesium in cases of poor tolerance and absorption of oral magnesium. (17), (18) Studies also support the use of intravenous magnesium treatment of acute migraine attacks, including two randomized, placebo-controlled studies (one double-blind, one single-blind). (19), (20)

DIABETES:

In January 2004, researchers at the Harvard School of Public Health reported a significant correlation between magnesium intake and risk of Type II diabetes. Their report was the result of two large scale long term studies following over 170,000 health professionals and evaluating diet and its impact on disease: The Nurses’ Health Study and the Health Professionals’ Follow-up Study. (1) The impact of magnesium supplementation on late onset diabetes is actively under study, and a number of studies have recommended supplementation as a means of improving glucose handling in those diagnosed with diabetes mellitus. One such study, published in the American Journal of Clinical Nutrition,
found that daily magnesium supplements activate glucose transport, improve the behavior of hormone regulators, and improve overall oxidative glucose metabolism. (23)

**Asthma:**

Magnesium has shown promise in the short-term treatment of asthma attacks. It is postulated that magnesium relaxes smooth muscles at the bronchial level in the same manner it acts on smooth vascular muscle (blood vessels), by blocking excess calcium through its influence on calcium channels across cellular membranes.

In a review of seven trials examining intravenous emergency room magnesium for patients with acute asthma, it was found that magnesium is safe and beneficial for those patients presenting with severe acute asthma. In severe cases, peak expiratory flow rates (PEFR) were improved by 52 L/min, and forced expiratory volume (FEV₁) by 10%. (33)

**Preeclampsia:**

Intravenous doses of magnesium are a standard treatment for preeclampsia, a form of pregnancy-induced hypertension. In 2002, the international Magpie Trial of 10,000 women confirmed the use of magnesium to be effective in preventing the progression of preeclampsia to eclampsia and its accompanying eclamptic seizures. Among those treated with magnesium, risk of eclampsia was reduced by 58%. (30)

Reasons for the reduction of dangerously high blood pressure by magnesium include both:

- *Magnesium’s action as a calcium antagonist* (31)
- *A magnesium-facilitated release of prostaglandins, hormone-like substances that reduce inflammation and mediate blood pressure.* (32)

Magnesium works within our cells — the powerhouses, factories and regulators of the body’s systems.

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*Because it is a necessary part of hundreds of biochemical reactions occurring constantly inside our cells, magnesium’s presence or absence affects the brain, the muscles, and the heart and blood vessels.*

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**What are the Effects of Magnesium?**

While many are aware of the importance of calcium, the parallel and in some ways even more
crucial is the role of the mineral—magnesium. The role of this essential mineral is less widely known. As a result, adequate magnesium intake is rare, especially in the U.S.

There are fifteen essential minerals required by our bodies to function properly. These can be divided into “trace minerals”, those required in very small amounts, and “macro-minerals” or “major minerals”, those required in larger amounts.

The six major minerals required in excess of 250 mg per day include:

- Calcium
- Magnesium
- Potassium
- Phosphorous
- Sodium
- Chloride

The body needs these minerals on a regular basis as it cannot manufacture them. Four percent of the body’s weight is made up of minerals, but their function as regulators is vast.

Magnesium impacts nearly all of systems of the body due to its cellular and molecular function. As a fundamental ion in the body (a charged particle soluble in water) magnesium is utilized in key chemical reactions on a microscopic level throughout the body’s cells,

including its vital role as a co-factor to over 300 enzyme functions, and its role in DNA and RNA stability. (12)

Magnesium’s effect on the body can be as intense as that of many prescription drugs, because magnesium functions as a regulator of electrolyte balance, metabolism, and other biochemical reactions.
Unlike prescription drugs, however, magnesium is recognized as an essential component of the body, not a foreign element.

When supplied sufficiently, magnesium is actually conserved by the body for future use. Medications, on the other hand, tend to treat only one symptom or disease, and are flushed out of the body as toxins, thus taxing the liver and the body’s detoxification systems.

**Summing up why we need magnesium:**

- Is an important factor in muscle relaxation and heart health
- Allows nerves to send messages in the brain and nervous system
- Aids and regulates the body’s use of calcium and other minerals
- Assists in bone and teeth formation
- Regulates the metabolism of nutrients such as protein, nucleic acids, fats and carbohydrates
- Regulates cholesterol production and helps modulate insulin sensitivity (3)
- Assists in energy production, DNA transcription and protein synthesis (2)
- Maintains the structural health of cell membranes throughout the body

Healthy magnesium levels have been linked to lowered **blood pressure, reduced incidence of type II diabetes, emergency migraine treatment, reduced symptoms of asthma, and improved memory.**

Magnesium is also a healthy part of bone and a necessary element in healthy calcium regulation. Increased magnesium has been linked to reduced bone loss in older adults.

**Why Do We Need Magnesium?**

Magnesium is distinguished as being not only one of the most vital and essential enzyme co-factors, regulating more reactions than any other mineral, but it is also responsible for two of the most important cellular functions: **energy production** and **cellular reproduction.**
When we don’t take in adequate magnesium, our bodies will either remove magnesium from our bones or function in deficiency.

Magnesium and other minerals absorbed into the body are utilized as “ions” and circulated throughout the body via the blood. There, magnesium is used by our cells in order to perform routine functions such as creating energy, building hormones, maintaining cells, and bodily movement. Once circulated through the body, magnesium is filtered by our kidneys and excreted on a regular basis.

Magnesium must be continually supplied to the body as it is needed on an ongoing daily basis. When we don’t take in adequate magnesium daily, our bodies will either remove magnesium from our bones, where it is needed, or function in deficiency.

Though some amount of magnesium is stored within the bones and can be accessed for future use, magnesium turnover tends to contribute to unhealthy bone loss and the release of calcium from the bone into the bloodstream.

Operating in magnesium deficiency disrupts the balance of not only magnesium but other minerals in the body, causing problems that reverberate throughout the body’s systems.

Low magnesium intake has been linked to risk factors for:

- Osteoporosis
- High blood pressure
- Issues of heart health
- Diabetes
- Asthma

Magnesium and Preventive Health

Without the presence of magnesium in the body, energy could not be produced or used in the cells, muscles could not contract and relax, and key hormones could not be synthesized to help control vital bodily functions.
It is not surprising, then, the role that magnesium has been shown to play in the prevention of common diseases and conditions.

According to the National Institutes of Health:

Magnesium helps maintain normal muscle and nerve function, keeps heart rhythm steady, supports a healthy immune system, and keeps bones strong. Magnesium also helps regulate blood sugar levels, promotes normal blood pressure, and is known to be involved in energy metabolism and protein synthesis. (4)

Magnesium is Good for Your Health!

Magnesium is a safe and required dietary element, whose ability to contribute towards optimal health is explained simply by observing one of the primary causes poor health—a body functioning in deficit.

Medical scientists continue to tease out the details of the biochemical processes that can malfunction as a result of magnesium deficiency. Yet it remains true that scientists have known for decades that magnesium is an essential mineral vital to good health. And natural sources of magnesium have been prized both for nutrition and healing for centuries.

Proof for the ability of magnesium to address a wide range of health concerns comes on an ongoing basis. Meanwhile, we live in a population starved for more of this essential nutrient. No further proof is necessary to maintain and seek the benefits of magnesium toward optimal health and well-being.

What’s Next?

Get on the fast track to replenishing magnesium levels with Burt’s Remedies Transdermal Magnesium Therapy.

An estimated 75% of Americans have magnesium-deficient diets. Are you getting enough?

Learn about the:

Signs of Magnesium Deficiency (Ten Signs to Watch for) and Symptoms of Low Magnesium in our Burt’s Remedies articles on Magnesium Deficiency Part II.
References for: What is Magnesium? / Forms of magnesium / Why we need it Part II
“Magnesium Facts and Information” / “Magnesium Benefits”

**What is Magnesium?**

Forms of magnesium - Why we need it

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**Part III**

**Magnesium in the Diet**

The sources of magnesium include food, water, and supplements. While clearly a “good” source of magnesium is one that is readily available and easily absorbed, most experts recommend a combination of sources, taking advantage of both dietary magnesium and absorbable magnesium.

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**Article (1)**

**INTRODUCTION**

The sources of magnesium include food, water, and supplements. While clearly a "good" source of magnesium is one that is readily available and easily absorbed, most experts recommend a combination of sources, taking advantage of both dietary magnesium and absorbable magnesium.

*As a “macro-mineral”, magnesium is one of the six essential minerals that the body needs in large quantities.*

The articles in this section list common dietary sources of magnesium, and also explain how magnesium absorption affects the body’s ability to make good use of those sources.
The Bad News about Magnesium Food Sources

With magnesium deficiencies on the rise, a common question is, “How do you get enough magnesium in your diet?”

Magnesium content in vegetables has seen declines from 25-80%. Yet — while it’s always important to seek out magnesium rich foods — many are unaware of the drastic declines in food based nutrient sources that have occurred over the last century. These factors, coupled with poor food choices, now cause many health professionals to question the ability to get sufficient magnesium exclusively from food.

Magnesium content in vegetables has seen declines from 25-80% since pre-1950 figures, and typical grain refining processes for bread and pasta remove 80-95% of total magnesium.

What is happening to our food sources, and how is it shaping the rise of chronic diseases such as hypertension and metabolic disorder?

Magnesium food sources were once commonly consumed, but have diminished in the last century due to industrialized agriculture and changing diets. (For more information on magnesium deficiencies see Burt’s Remedies article on “Magnesium Deficiencies” Parts I, II, and III.)

The foods magnesium is found in include:

- Beans and nuts
- Whole grains such as brown rice and whole wheat bread
- Green leafy vegetables

Given current food preferences, however, it’s easy to see how it’s hard to achieve 100% of RDA (* % Daily Value in Magnesium Containing Foods) for magnesium.
The majority of good magnesium sources contain only about 10% or less of recommended daily amounts, as seen in a list of the magnesium content in common food sources of magnesium. Those sources that do contain more magnesium, such as certain nuts, fish and whole grains, are often eaten in too small quantities by the average person.

But, in fact, percent daily value figures are just averages. For every individual:

- Absorption rates can vary, and according to studies can sometimes be as low as 20%. (6), (7)
- Factors can interfere with magnesium absorption, including phytic and oxalic acid found in certain foods, prescription drugs, age, and genetic factors.

Learn more:

- Read about magnesium absorption and bioavailability in this article.
- Learn about risk factors for magnesium deficiency in our Burt’s Remedies article on “Magnesium Deficiency” Part II.

* The Problem With Dietary Magnesium

Why is a high magnesium diet harder to achieve today? What is changing our vitamin and mineral food sources?

Reduced Nutrients in Crops Due to Industrial Farming

There three basic reasons we can’t get enough magnesium in the diet:
1. Reduced levels due to processing.
2. Reduced levels due to soil conditions.
3. Changes in eating habits.

*Processed Foods and the Magnesium Rich Diet*

Food processing essentially separates plant food sources into components, both for ease of use and to reduce spoilage.

In processing grain into white flour, the bran and the germ are removed. In processing seeds and nuts into refined oils, the oils are super-heated and the magnesium content is strained out or removed through the use of chemical additives.

It is these removed portions of the plant that often contain the highest amount of minerals such as magnesium.

- **Refined oils remove all magnesium.** The result of oil refining is a zero magnesium product. Safflower seeds, for example, contain 680 mg of magnesium per 1,000 calories. Safflower oil lacks magnesium entirely. (8)

- **Refined grains remove 80-97 percent of magnesium.** 
  
  Burt’s Remedies (9) At least twenty nutrients are removed in refining flour. And only five are put back in when refined flours are “enriched” (10) Magnesium is not one of them.

- **Refined sugar removes all magnesium.** Molasses, which is removed from the sugar cane in refinement, contains up to 25% of the RDA for magnesium in one tablespoon. Sugar has none.

An unfortunate additional side effect of the processing of these foods is, in fact, an increase in calories by volume. For example, when wheat is refined into white flour, calories are increased by about 7 percent. (8), (10)

The typical American convenience food diet of fast food, pizzas, pastries, cookies and fried foods consists almost exclusively of refined grains, oils and sugars. Over time, excess consumption of these foods can lead to both obesity and magnesium deficiency, a potentially fatal combination.

Dr. Mildred Seelig, author of *The Magnesium Factor*, spells it out clearly:

“If restaurant, homemade, or store-bought food contains fat, refined flour, and/or sugar as one or more of the major ingredients, it is a low-magnesium, and quite possibly a high-calorie, food. A steady
"diet of such foods, year after year, can produce magnesium deficit and, with it, metabolic syndrome X—a major factor in heart disease.”

(8)

* Where Do Foods Containing Magnesium Come From? ... From Soil Containing Magnesium

It is well known among experts that the quality of our crops is decreasing. In 2004, the Journal of the American College of Nutrition released a study which compared nutrient content of crops at that time with 1950 levels. Declines were found as high as 40%. (11)

Dr. Donald Davis, lead researcher for the study, offers one explanation for the dramatic declines:

“During those 50 years, there have been intensive efforts to breed new varieties that have greater yield, or resistance to pests, or adaptability to different climates. But the dominant effort is for higher yields. Emerging evidence suggests that when you select for yield, crops grow bigger and faster, but they don’t necessarily have the ability to make or uptake nutrients at the same, faster rate.” (12)

Several similar studies have been done using food tables from the USDA in the US, and Food Standards Agency in the UK. Declines found for magnesium were significant:

<table>
<thead>
<tr>
<th></th>
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</thead>
<tbody>
<tr>
<td>Average across fruits and vegetables studied</td>
<td>21%</td>
<td>35%</td>
</tr>
<tr>
<td>Spinach</td>
<td>10%</td>
<td>not available</td>
</tr>
<tr>
<td>Corn</td>
<td>23%</td>
<td>not available</td>
</tr>
<tr>
<td>Carrots</td>
<td>35%</td>
<td>not available</td>
</tr>
<tr>
<td>Collard Greens</td>
<td>84%</td>
<td>not available</td>
</tr>
</tbody>
</table>
These declines are not limited to vegetable crops. A study by David Thomas published in *Nutrition and Health* examined average nutritional content of foods across food categories using the UK government’s *Composition of Food* tables.

Thomas found consistent declines in magnesium content:

- Vegetables declined by 24% between 1940 and 1991.
- Fruit declined by 17%.
- Meat declined by 15%.
- Cheeses declined by 26%. (17)

Government agencies and food industry organizations have questioned the reliability of these results, citing the possibility that changes in measurement techniques may account for the differences. But Dr. Joel Wallach of the *Longevity Institute* refutes this claim.

Were these differences the result of errors in measurement, explains Dr. Wallach, such errors would be present consistently across food types and categories. Yet when comparing USDA food tables between 1963 and 1998, Wallach reports that:

- Crops whose harvesting practices have not changed historically showed stable vitamin and mineral content over the years.
- By contrast, significant reductions in vitamin and mineral content were consistently present in crops that are produced by more intensive, industrialized farming practices. (18)

Our crops’ lack of magnesium and other nutrients has a direct impact on the ability to achieve sufficient magnesium in the diet.

Ultimately, even those who seek out a balanced high magnesium diet with magnesium-rich vegetables and whole grains may not be able to rely upon food alone to provide sufficient magnesium levels.

* Pesticides Destroy Organisms That Provide Nutrients to Plants

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*Experts link vitamin and mineral depletion in the soil to use of pesticides and fertilizers.*
Today’s soils produce vegetation with dramatically reduced vitamin and mineral content.

Though it was believed initially that pesticides would work simply to rid farmland of unwanted weeds and pests, it was soon learned that their use was causing irreversible damage. Vitamin-fixing bacteria in the soil, as well as earthworms, natural soil aerators and fertilizers, were being first reduced and then extinguished from American crop land.

Without this living environment, soils produce vegetation with dramatically reduced vitamin and mineral content.

For example, vegetarians are commonly advised to supplement their diet with certain B vitamins, especially B12, as an all-vegetable diet has been shown to be deficient in these vitamins. What is less commonly known is that in the past these vitamins were in fact found commonly in root vegetables due to the action of living, beneficial bacteria in the soil. Today’s soils, have essentially eradicated these bacteria populations. These soils now cannot be relied upon to provide B12 in any significant amount. However, Swiss researchers with the Institute of Plant Sciences in Zurich have demonstrably shown that a return to organic farming practices can reintroduce B12 content. The long term use of organic fertilizers (rather than synthetic) more than doubled the B12 content of spinach and tripled the B12 content of barley. (19)

* Fertilizers Diminish Mineral Absorption

Modern fertilizers are a convenient substitute for centuries old crop rotation practices which prevented farmland from becoming depleted through repetitive use. Yet they do little to improve the vitamin and mineral content of crops, and in many cases actually worsen it.

In fact, minerals are even more susceptible to the reductions in soil quality than vitamins. Whereas many vitamins can actually be produced by growing plants themselves, if minerals are not first present in the soil they will not be present in the produce grown there. (9)

And because mineral content of crops is in no way regulated, modern industrialized farming practices typically do not concern themselves with this standard of quality when choosing fertilizers.
Potash, a commonly-used potassium fertilizer easily taken up by plants, actually reduces the amount of both magnesium and calcium absorbed by the plant. And modern nitrogen-based fertilizers have a tendency to make crops bulkier, yet nutrient poor. *Mother Earth News* recently interviewed agricultural expert Charles Benbrook, Ph.D., who explained the phenomenon:

“High nitrogen levels make plants grow fast and bulk up with carbohydrates and water. While the fruits these plants produce may be big, they suffer in nutritional quality. (20) The effect is one which is beneficial to the producer, but not the consumer. Consumers pay more for heavier, water-laden produce that contains less vitamins and minerals.”

* Bottom Line: An Adequate Magnesium Diet Goes Beyond Food Sources

Agricultural industry emphasizes those fertilizers that improve the “look” of the harvest, and not the actual nutritional value of the produce itself.

- It’s possible to produce healthy-looking plants with low content of vitamins and minerals.
- The actual magnesium content of produce grown today is drastically lower than in pre-industrial times, and varies widely depending on farming practices, quality of soil, and storage and transportation methods.
- Food tables are at best averages, and no current regulations require testing or monitoring of nutritional content of produce or meat sources.

The wide variability in the vitamin and mineral content of foods debunks the myth that you can get all the nutrients you need through a balanced healthy diet.

*Unfortunately for the majority of people in industrialized nations, the old adage, “You can get all your vitamins and minerals from food” is no longer true.*

In fact, the average American today is deficient in at least three vital nutrients. (21)
Noted magnesium researchers Burton and Bella Altura have linked ongoing declines in magnesium intake with increased incidence of life-threatening disease. In their 2006 report to the International Magnesium Symposium held in Osaka Japan, they state:

“The data accumulated so far indicate that magnesium deficiency caused either by a poor diet or errors in magnesium metabolism may be a missing link between diverse cardiovascular risk factors and atherogenesis.” (12)

The body is equipped to absorb dietary magnesium sources, and even in cases of mild or severe deficiencies it is always recommended that you include magnesium-rich foods in your diet. Yet with the state of modern agri-business today and the increasing risks to health and longevity, relying upon magnesium food sources alone can be a risky proposition.

References for: What is Magnesium? / Forms of magnesium / Why we need it Part II "Magnesium in the Diet" / “The Bad News about Magnesium Food Sources”


## The Good Sources of Magnesium in Food

### Foods High in Magnesium

*Chart of Magnesium Rich Foods*

The following list of the magnesium content in common food sources of magnesium is sorted by milligrams magnesium per gram of food content.

<table>
<thead>
<tr>
<th>Common Units</th>
<th>Serving Size, Common Grams</th>
<th>Milligrams of Magnesium</th>
<th>Milligrams of Magnesium per Gram</th>
<th>Daily Value (DV) %</th>
</tr>
</thead>
<tbody>
<tr>
<td>2 tbsp.</td>
<td>10</td>
<td>52</td>
<td>5.24</td>
<td>14%</td>
</tr>
<tr>
<td>1 oz.</td>
<td>28</td>
<td>78</td>
<td>2.78</td>
<td>19%</td>
</tr>
<tr>
<td>1 oz.</td>
<td>28</td>
<td>75</td>
<td>2.68</td>
<td>19%</td>
</tr>
<tr>
<td>1 oz.</td>
<td>28</td>
<td>73</td>
<td>2.61</td>
<td>18%</td>
</tr>
<tr>
<td>1 oz.</td>
<td>28</td>
<td>73</td>
<td>2.61</td>
<td>18%</td>
</tr>
<tr>
<td>1 tbsp.</td>
<td>20</td>
<td>48</td>
<td>2.42</td>
<td>12%</td>
</tr>
<tr>
<td>1 oz.</td>
<td>28</td>
<td>49</td>
<td>1.75</td>
<td>12%</td>
</tr>
<tr>
<td>2 tbsp.</td>
<td>32</td>
<td>49</td>
<td>1.53</td>
<td>12%</td>
</tr>
<tr>
<td>1 slice</td>
<td>28</td>
<td>37</td>
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<td>9%</td>
</tr>
<tr>
<td>3 oz.</td>
<td>85</td>
<td>91</td>
<td>1.07</td>
<td>23%</td>
</tr>
<tr>
<td>1 oz.</td>
<td>28</td>
<td>28</td>
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<td>7%</td>
</tr>
<tr>
<td>Food</td>
<td>Serving Size</td>
<td>Calories</td>
<td>Carbs</td>
<td>Protein</td>
</tr>
<tr>
<td>----------------------------------</td>
<td>--------------</td>
<td>----------</td>
<td>-------</td>
<td>---------</td>
</tr>
<tr>
<td>Mackeral</td>
<td>3 oz.</td>
<td>85</td>
<td>83</td>
<td>0.97</td>
</tr>
<tr>
<td>Spinach, boiled</td>
<td>1/2 cup</td>
<td>90</td>
<td>79</td>
<td>0.87</td>
</tr>
<tr>
<td>Whole Wheat Bread, store bought</td>
<td>1 slice</td>
<td>28</td>
<td>23</td>
<td>0.82</td>
</tr>
<tr>
<td>Coffee, espresso</td>
<td>2 oz.</td>
<td>60</td>
<td>48</td>
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</tr>
<tr>
<td>Spinach, raw</td>
<td>1 cup</td>
<td>30</td>
<td>24</td>
<td>0.79</td>
</tr>
<tr>
<td>Quinoa, cooked</td>
<td>1/2 cup</td>
<td>92.5</td>
<td>59</td>
<td>0.64</td>
</tr>
<tr>
<td>Milk Chocolate</td>
<td>1 oz.</td>
<td>28</td>
<td>18</td>
<td>0.63</td>
</tr>
<tr>
<td>Soybeans, boiled</td>
<td>1/2 cup</td>
<td>90</td>
<td>54</td>
<td>0.60</td>
</tr>
<tr>
<td>Black-Eyed Peas (Cowpeas), boiled</td>
<td>1/2 cup</td>
<td>87.5</td>
<td>46</td>
<td>0.52</td>
</tr>
<tr>
<td>Buckwheat Groats (Kasha), cooked</td>
<td>1/2 cup</td>
<td>84</td>
<td>43</td>
<td>0.51</td>
</tr>
<tr>
<td>Parsley, raw</td>
<td>1 oz.</td>
<td>28</td>
<td>14</td>
<td>0.50</td>
</tr>
<tr>
<td>Lima Beans, boiled</td>
<td>1/2 cup</td>
<td>94</td>
<td>40</td>
<td>0.43</td>
</tr>
<tr>
<td>Acorn squash, baked</td>
<td>1/2 cup</td>
<td>102.5</td>
<td>44</td>
<td>0.43</td>
</tr>
<tr>
<td>Swiss Chard</td>
<td>1/2 cup</td>
<td>175</td>
<td>75</td>
<td>0.43</td>
</tr>
<tr>
<td>Artichokes</td>
<td>1 whole</td>
<td>120</td>
<td>50</td>
<td>0.42</td>
</tr>
<tr>
<td>Egg, fried</td>
<td>1 whole large</td>
<td>46</td>
<td>18</td>
<td>0.39</td>
</tr>
<tr>
<td>Tofu</td>
<td>1/2 cup</td>
<td>126</td>
<td>47</td>
<td>0.37</td>
</tr>
<tr>
<td>Bacon, pan-fried</td>
<td>3 oz.</td>
<td>85</td>
<td>31</td>
<td>0.36</td>
</tr>
<tr>
<td>Pork Tenderloin, broiled</td>
<td>3 oz.</td>
<td>85</td>
<td>31</td>
<td>0.36</td>
</tr>
<tr>
<td>Okra, boiled</td>
<td>1 cup</td>
<td>160</td>
<td>58</td>
<td>0.36</td>
</tr>
<tr>
<td>Bulgur Wheat, cooked</td>
<td>1/2 cup</td>
<td>91</td>
<td>29</td>
<td>0.32</td>
</tr>
<tr>
<td>Salmon</td>
<td>3 oz.</td>
<td>85</td>
<td>26</td>
<td>0.31</td>
</tr>
<tr>
<td>Whole Wheat Spaghetti</td>
<td>1/2 cup</td>
<td>70</td>
<td>21</td>
<td>0.30</td>
</tr>
<tr>
<td>Parsnips, boiled</td>
<td>1/2 cup</td>
<td>78</td>
<td>23</td>
<td>0.29</td>
</tr>
<tr>
<td>Chicken Breast, roasted</td>
<td>3 oz.</td>
<td>85</td>
<td>24</td>
<td>0.29</td>
</tr>
<tr>
<td>Ground Beef, pan browned</td>
<td>3 oz.</td>
<td>85</td>
<td>24</td>
<td>0.28</td>
</tr>
<tr>
<td>Oatmeal</td>
<td>1/2 cup</td>
<td>117</td>
<td>32</td>
<td>0.27</td>
</tr>
<tr>
<td>Broccoli, boiled</td>
<td>1/2 cup</td>
<td>78</td>
<td>16</td>
<td>0.21</td>
</tr>
<tr>
<td>Pasta Sauce</td>
<td>1/2 cup</td>
<td>128</td>
<td>27</td>
<td>0.21</td>
</tr>
<tr>
<td>Potatoes, boiled without skin</td>
<td>1 cup</td>
<td>156</td>
<td>31</td>
<td>0.20</td>
</tr>
<tr>
<td>Lettuce</td>
<td>2 leaves</td>
<td>34</td>
<td>4</td>
<td>0.12</td>
</tr>
<tr>
<td>Milk, 2%</td>
<td>1 cup</td>
<td>244</td>
<td>27</td>
<td>0.11</td>
</tr>
<tr>
<td>Apple</td>
<td>1 medium</td>
<td>182</td>
<td>9</td>
<td>0.05</td>
</tr>
<tr>
<td>Coffee, from grounds</td>
<td>6 oz.</td>
<td>178</td>
<td>5</td>
<td>0.03</td>
</tr>
</tbody>
</table>

Good Sources of Magnesium in Food

Traditional 4

Traditionally, four foods highest in magnesium content are:

- green vegetables
- whole grain cereals
- nuts and beans
- seafood

USDA Top 5

According to USDA food charts, the five foods with the highest magnesium per typical serving are:

- Halibut
- Mackerel
- Boiled spinach
- Bran breakfast cereal
- Almonds
Foods with highest magnesium per milligram, regardless of typical intake, are:

- (1) Cocoa
- (2) Bran breakfast cereal
- (3) Almonds
- (4) Cashews
- (5) Pumpkin seeds

Watch videos on magnesium in food

Magnesium Rich Foods
http://youtu.be/j6koMgYTFZI
Foods that Boost Magnesium
Magnesium Rich Foods
http://youtu.be/4T2NyysAgCq
How Magnesium Functions in the Body/ Dr. Dean
http://youtu.be/y8FUxg2usFk
How to Get Magnesium in Your Diet/Richard Gerhauser M.D. reveals why this “secret antidote to stress” works so well and tells you how to get more of it -- naturally.
http://youtu.be/B3ajAqkqugg

Learn why it’s more difficult than ever to get enough magnesium, in Article (4) “Magnesium Absorption and Bioavailability” under (1) “What Factors Raise or Reduce the Body’s Use of Bioavailable Magnesium”? 
MAGNESIUM ABSORPTION AND BIOAVAILABILITY

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:

(1) What Factors Raise or Reduce the Body’s Use of Bio-available Magnesium?
(2) What prevents magnesium absorption in the digestive tract
(3) Methods of improving magnesium absorption, including transdermal magnesium therapy, a form of topical absorbable magnesium

(1) WHAT FACTORS RAISE OR REDUCE THE BODY’S USE OF BIO-AVAILABLE 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 magnesium rich foods, using magnesium oil, or taking oral magnesium supplements.
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) (See Burt’s Remedies article on “Topical Transdermal Mineral Magnesium Oil Parts I, II and III” which 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 transdermal magnesium. (Read Burt’s Remedies information on transdermal magnesium therapy in our Burt’s Remedies article “Topical Transdermal Mineral Magnesium Oil-Part VI, VII AND VIII”) 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!

However, several factors can impair your ability to get magnesium from the foods you eat, including:

- Lowered magnesium availability in foods due to industrial farming practices
- Dietary habits leading to low magnesium uptake, such as consumption of sodas and carbonated beverages
- Excess stress or illness, which lowers the ability of the body to utilize magnesium
- Mineral imbalances, such as excess calcium, which blocks cellular magnesium activity
- Metabolic differences in individuals, such as excess magnesium excretion by the kidneys, sometimes resulting in magnesium losses and deficiency

*Paths of Magnesium Absorption and Elimination,

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 ones 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)

* 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.

*More information:* Do you suffer from diarrhea and magnesium intolerance? Learn about transdermal magnesium, a new way to supplement magnesium with no digestive issues.
See *Burt’s Remedies* article on *Transdermal Magnesium Therapy-Part VIII*

*Are you at risk for magnesium deficiency?*

Take our *online magnesium assessment test* by going to our *Burt’s Remedies* article “Magnesium Deficiency” Part II (10 signs to watch for) to find out.
(2) What prevents magnesium absorption in the digestive tract

* 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 the magnesium passes from tiny “villa”, finger like surfaces inside the small intestines, into capillaries, tiny blood vessels surrounding 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%. (3), (6)
And certain forms of magnesium supplements, such as magnesium oxide, may have absorbable magnesium potency as low as 4%. (7), (8)

**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

*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 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 un-sprouted 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.

**Diuretic foods such as coffee, tea and alcohol that 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. Though 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. (6) , (9) , (10)

* 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. (6)

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. (11)

Today’s high intake of soda is placing 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. For more information on magnesium deficiency see Burt’s Remedies articles on “Magnesium Deficiency” Parts I, II, and III.

(3) Methods of improving magnesium absorption, including transdermal magnesium therapy, a form of topical absorbable magnesium

* 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 drug-delivery 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.
**Do you want to know what others have to say about magnesium?**

*Mark Sircus, Ac., OMD, author of the book *Transdermal Magnesium Therapy*, (This book can be purchased on this our Burt’s Remedies web site.)* discusses magnesium supplementation and the pros and cons of oral versus topical applications.

Marc Sircus is an author, a nationally certified acupuncturist, honorary doctor of Oriental Medicine, and a founding director of the *International Medical Veritas Association (IMVA)*. His book, *Transdermal Magnesium Therapy*, explores groundbreaking information in the use of magnesium chloride transdermally.

- **Mike Mahler** gives advice on magnesium’s benefits for athletic performance, hormone levels, DHEA, and weight training. This *Kettlebell* guru, strength trainer, and fitness & health journalist, **Mike Mahler** explains why magnesium is essential for performance & recovery time, hormone optimization, insulin sensitivity, stress management, and overall health. Mike does workshops on these topics worldwide and has written over 100 articles for publications such as Muscle & Fitness, Men's Fitness, and Ironman Magazine.

- **Dr. Kathleen Akin** discusses magnesium’s impact on muscle spasms, sports injuries, muscle twitching, pain, and detox. **Dr. Akin** is a *Certified Chiropractic Sports Physician* with over 15 years of experience in her field. Based on her work with professional athletes and patients with ALS and other disorders, **Dr. Akin** has seen the dramatic affect that mineral deficiencies have on the human body. By using hair analysis for testing, she is able to track her patients’ progress and the alleviation of their symptoms through the use of topical magnesium.

- **Daniel Reid** describes magnesium’s key role in transdermal therapies, detoxification, self-healing and body alkalizing. **Daniel Reid** is a bestselling author and a leading expert on eastern philosophy and medicine. He has written numerous books and magazine articles on various aspects of Asian self-health and self-healing practices, and has established an international reputation for the practical efficacy of his traditional approach to modern health problems. After spending years in the Orient, he now resides in Australia directing detoxification programs and continuing to educate on natural and organic healing methods.
Dr. William McAuliffe discusses just how far we as a society have fallen into magnesium deficiency, and the difficulty of trying to reverse it through food alone. Dr. McAuliffe, who received a B.S. from Fordham University, is a Doctor of Chiropractic in New Jersey with over 30 years of postgraduate education. From his first days in private practice his approach to patient care has always been to acquire the most current and comprehensive wellness information to pass along to his patients. He has been a Nutritional Consultant to the U.S. Army Special Forces in Ft. Benning, Georgia, and has lectured on wellness and proper nutrition at the Olympic Training Grounds in Colorado Springs, Colorado.

Rochelle McKay-Masterton describes her encounters with magnesium as it applies to both women’s health and the alleviation of pain in general. Rochelle McKay-Masterton, founder of the She Oaks Natural Fertility in Maleny, Queensland, Rochelle McKay-Masterton, has spent over 15 years studying natural healing techniques. As a Naturopath she provides patients with comprehensive individual treatment plans while also addressing issues such as infertility, miscarriage, endometriosis, chronic fatigue, poly cystic ovarian syndrome, fibroids, PMT and many other hormonal conditions. During her time spent working with women’s health, she’s acquired an intimate knowledge of just how crucial health and nutrition are for balance, vitality, and overall well-being.

Peter Liddy, a veteran in treating a wide spectrum of athletes, tells us why his professional patients use magnesium oil as their emergency pain relief. Peter Liddy, owner of Jai Dee Wellness Centre and an alternative practitioner, has been studying complimentary modalities since 1985. During his time at Queensland Institute of Natural Science in Australia, Peter became well versed in touch and energy based healing, building upon that knowledge when he became certified in Bowen Therapy as well as studying traditional Thai massage in Thailand.

Does 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.

 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. (12)

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.” (12)

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.” (13)

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 world-wide whose intake is insufficient.
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 in Burt’s Remedies articles on “What is magnesium? How it Functions in the Body”/Parts III thru IX.

References for: What is Magnesium? / Forms of magnesium / Why we need it Part III
“Magnesium in the Diet” / “Magnesium Absorption and Bioavailability”

WHAT IS MAGNESIUM?
FORMS OF MAGNESIUM - WHY WE NEED IT

PART IV

MAGNESIUM CHLORIDE
THE MASTER MAGNESIUM COMPOUND

THE ARTICLES INCLUDE:

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(2) Why Magnesium Chloride?...74
(3) Magnesium Chloride Benefits Digestion...77
(4) Efficacy of Magnesium Chloride Oil Preparations...78
(5) Magnesium Potency and Assimilation...80
(6) Shortfalls in Oral Magnesium Supplements...81
(7) Uses and Benefits of Magnesium Chloride...83
Magnesium Chloride is recognized by many medical professionals as the “Master Magnesium Compound” for both dietary and topical uses, due to its high potency and efficient action.

Magnesium is undeniably therapeutic to the human body, yet much is left unsaid about the type and quality of various forms of magnesium.

Not all types of magnesium deliver the same recognizable benefits. Like other minerals of nutritional value, magnesium occurs as various inorganic and organic forms in nature. Each of these forms has varying degrees of efficiency in human biochemistry.

- In supplement form, magnesium oxide, the most common form of magnesium sold in pharmacies and grocery stores, has been shown to have as low as a 4% absorption rate. (1)
- Other forms of magnesium, especially the naturally occurring magnesium chloride, have been demonstrated to achieve much greater bioavailability.

Choosing a highly soluble form of magnesium brings both high potency and superior benefits toward health. For fast-acting therapeutic use, magnesium chloride is especially recommended. One particularly safe and natural form is now available through Burt’s Remedies in a pure, unadulterated magnesium oil extracted from a pristine ancient sea bed and tested free of contaminants. You can now order an 8 ounce spray bottle of Burt’s Remedies “Topical Transdermal Mineral Magnesium Oil” on our Burt’s Remedies site.
**Article (2)**

**Why Magnesium Chloride?**

*The Magnesium Miracle*, by Carolyn Dean, M.D. N.D.

Note: To order Dr. Dean’s book “The Magnesium Miracle” off Amazon, just mouse arrow over top of picture, hold down on Ctrl key and click.

According to Dr. Carolyn Dean, M.D., N.D., author of *The Magnesium Miracle* and expert on magnesium therapy, magnesium chloride and other inorganic magnesium salts occur as metal-ligand complexes, substances bound around a single, central metal atom, in this case magnesium. These metal-ligand compounds may each be assigned a “stability constant”, which defines their relative ability to dissociate into ionic form.

Stability constants range from values less than one to values under twenty. With regard to forms of magnesium supplements, the closer the stability constant is to zero, the more bioavailable the supplement. Lower stability constants represent soluble complexes, more easily broken down into ionic form for bioavailability. This is important, as we assimilate magnesium not as the magnesium chloride compound, but rather as free magnesium and chloride ions.

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*Stability Constants of Common Magnesium Compounds*

The following chart lists the stability constants of some common magnesium compounds, with lower stability constants reflecting higher bioavailability: (2), (3)
<table>
<thead>
<tr>
<th>Magnesium Complex</th>
<th>Stability Constant</th>
<th>Ionization</th>
</tr>
</thead>
<tbody>
<tr>
<td>Magnesium chloride</td>
<td>0</td>
<td>[totally ionized]</td>
</tr>
<tr>
<td>Magnesium acetate</td>
<td>0.51</td>
<td>[essentially ionized]</td>
</tr>
<tr>
<td>Magnesium gluconate</td>
<td>0.70</td>
<td>[essentially ionized]</td>
</tr>
<tr>
<td>Magnesium lactate</td>
<td>0.93</td>
<td>[essentially ionized]</td>
</tr>
<tr>
<td>Magnesium malate</td>
<td>1.55</td>
<td>[essentially ionized]</td>
</tr>
<tr>
<td>Magnesium glutamate</td>
<td>1.90</td>
<td>[essentially ionized but neurotoxic]</td>
</tr>
<tr>
<td>Magnesium aspartate</td>
<td>2.43</td>
<td>[essentially ionized but neurotoxic]</td>
</tr>
<tr>
<td>Magnesium citrate</td>
<td>2.80</td>
<td>[essentially ionized]</td>
</tr>
</tbody>
</table>


Magnesium chloride potency is clearly revealed in this data. With a stability constant of zero, magnesium chloride is completely ionized across a wide pH range—from a low pH of 2 to 3, found in stomach acid, to the slightly alkaline physiologic pH of 7.4, found in the main extracellular body fluids such as serum and lymph. (2)

Notably, the natural pH of the skin mantle is a mildly acidic 4.5 to 6, creating an ideal environment for total ionization of magnesium chloride. Thus optimal uptake into underlying tissues is possible with topical magnesium chloride use as found in Burt’s Remedies “Topical Transdermal Mineral Magnesium Oil”.

Learn more about “Transdermal Magnesium Therapy” in Parts VI, VII and VIII of Burt’s Remedies “Topical Transdermal Mineral Magnesium Oil”.

Learn more:

Read about Burt’s Remedies Transdermal Mineral Magnesium Supplementation in Part II Of Burt’s Remedies Magnesium- “Magnesium Supplementation”- “Topical Transdermal Mineral Magnesium Oil”.
Burt’s Remedies transdermal magnesium spray is a convenient way to supplement magnesium without pills or side effects.

References for: What is Magnesium? / Forms of magnesium / Why we need it Part IV
“Magnesium Chloride-The Master Magnesium Compound” / “Why Magnesium Chloride”?

As to the success of magnesium chloride for health via oral supplementation, the benefits are admirable. Many researchers advocate magnesium chloride as the most effective form of dietary supplementation, in part due to the vital role that chloride has in the production of hydrochloric acid in the stomach.

*Magnesium plays a vital role in the production of hydrochloric acid in the stomach.*

Some people simply do not produce enough hydrochloric acid (HCl), which can result in a number of health issues related to metabolism and nutrient absorption. These deficiencies can be due to various disorders that affect the stomach, or simply due to individual differences or reasons unknown. As we age, production of HCl in the stomach declines, often dramatically, and is nearly always left undiagnosed.

Magnesium chloride’s use as a magnesium supplement has the added benefit of helping to reduce many potential problems that could arise from steadily declining secretions of gastric acid in the stomach.

These can include:

- Mal-absorption of vitamins and minerals
- A failure in proper digestion
- An increased susceptibility to unwanted bacteria, viruses, and yeasts passing through the gut

These advantages come from the extra chloride found in magnesium chloride, enough to increase production of gastric acid, thereby enhancing absorption and assimilation of magnesium itself, and improving overall digestive efficiency — creating an ideal environment for the assimilation of critical micronutrients important to health, especially as we age.
**Efficacy of Magnesium Chloride Oil Preparations**

Magnesium chloride potency and efficacy is particularly achieved when applied topically to the skin in a form known as “magnesium chloride oil”. Positive reports from medical professionals and consumers regarding the health benefits achieved from using topical magnesium chloride highlight its convenience and its effectiveness in addressing a variety of symptoms including those related to the skin, muscles and nervous system.

**Magnesium Chloride** is sourced from the *Ancient Zechstein Sea*

Supporters of magnesium chloride describe in detail the immediate and profound impact that topical or “transdermal” magnesium has had on their health, where oral dosages of various magnesium compounds have fallen short of their expectations.

A small study conducted by **Dr. Norman Shealy, M.D.**, founder of the *American Holistic Medical Association*, provides documented research on the effect of topical magnesium chloride on blood chemistry. **Dr. Shealy** compared intracellular magnesium levels of participants before and after a period of daily application of topical magnesium, via magnesium baths and spray application of magnesium chloride oil.
With 75% of participants showing marked improvement, Dr. Shealy concluded that the unique properties of supersaturated magnesium chloride allow it to be absorbed effectively into the skin, raising intracellular magnesium levels in the majority of individuals.

More information:

Learn more about Dr. Shealy’s study and other studies on Transdermal Magnesium Therapy in Part I article (9) “What Do the Experts Have to Say about Magnesium even Transdermally?”.

A commonly asked question among professionals and consumers is exactly what percentage of Burt’s Remedies magnesium chloride oil, is absorbed by the skin? And, how effectively are topical preparations of magnesium chloride absorbed in comparison to oral use?

To find the answer to those two question read the next two articles on “Magnesium Potency and Assimilation” and “Shortfalls in Oral Magnesium Supplements” in articles 5 and 6.
A commonly asked question among professionals and consumers is exactly what percentage of Burt’s Remedies magnesium chloride oil or flakes is absorbed by the skin? And, how effectively are topical preparations of magnesium chloride absorbed in comparison to oral use?

Fick’s Law of Diffusion states that the amount of any solute absorbed (e.g. magnesium chloride oil) is directly dependent upon:

- The concentration of the solution
- The length of time the solute is in contact with the membrane (e.g. the skin)
- Additional variables, including application sites on the body, temperature of the solution, etc.

While these points do provide insight into the conditions which would favor effective uptake of magnesium by the skin, a definitive answer as to precisely how many milligrams are absorbed is of course unattainable in vivo. Exact values are similarly unattainable when oral dosages are called into question. Far too many intrinsic factors exist to influence exactly how much and how fast magnesium is assimilated and subsequently sent into circulation, whether via the oral or topical route.

However, the clear-cut efficiency of the skin for mineral uptake coupled with the broad benefits of magnesium chloride in topical applications certainly provides a well-laid foundation for rapid results to the user. What is measurable are the effects on blood chemistry as demonstrated in Dr. Shealy’s study, along with immediate improvements in one’s health from restoration of magnesium deficient cells.

What those who have experience with topical magnesium therapy generally acknowledge:

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*Magnesium chloride arguably delivers more usable magnesium to the cells than any other form, especially when the skin is used as a primary path of entrance.*

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Shortfalls in Oral Magnesium Supplements

Learn more about magnesium supplementation in Burt’s Remedies Related Link articles on “Burt’s Remedies Topical Transdermal Mineral Magnesium Oil and Flakes in What is Magnesium? Forms of magnesium, Why we need it Parts IV, V” and VI, VII and VIII.

It’s important to note that oral magnesium presents unique challenges for many individuals. For many, these challenges become barriers to restoring intracellular magnesium levels effectively.

Magnesium oxide, common in popular dietary supplements, could have a fractional absorption in the gut as small as 4 percent.

Firstly, realistic absorption rates from oral magnesium supplements are rarely taken into account when dosage recommendations are given. Usage of poorly ionized forms of magnesium can therefore result in ineffective supplementation. A study in 2001 indicated that magnesium oxide, an inexpensive magnesium complex included in many popular dietary supplements, could have a fractional absorption in the gut as small as 4 percent. (1)

If one was to ingest the commonly recommended (albeit modest) adult dosage of 300-400 mg magnesium per day in this poorly absorbed form, it could equate to a usable dosage of only 12-16 mg.

Secondly, and perhaps more important, is the fact that nearly all magnesium supplements share a common tendency to create a laxative effect in the bowels. The effect of different magnesium compounds on bowel motility and stool softness is further amplified with the quantity ingested in a single dose.

The higher any single dosage, the greater the potential to cause diarrhea, thereby reducing transit time through the bowels. This is of key importance, and as Dr. Shealy indicates in his book Holy Water, Sacred Oil: The Fountain of Youth, there is reliable evidence to indicate that absorption relies heavily on magnesium’s staying power in the intestine—at minimum 12 hours. If transit time is reduced to less than 12 hours, the percentage of magnesium absorbed may be drastically impaired.
When these points of consideration are taken in conjunction with the unpredictability of each individual’s efficiency to absorb magnesium through oral means, the results become unreliable in many cases. In contrast, bypassing the digestive system with topical use of Burt’s Remedies Topical Transdermal Mineral Magnesium Oil circumvents the many common drawbacks that can accompany oral supplementation.

References for: What is Magnesium? / Forms of magnesium / Why we need it Part IV

“Magnesium Chloride-The Master Magnesium Compound” / “Shortfalls in Oral Magnesium Supplements”

Uses and Benefits of Magnesium Chloride

A quick search of Pub Med yields thousands of scientific studies highlighting the benefits of various magnesium compounds in human biochemistry. From migraines and pain management to depression, anxiety, sleeplessness and memory, magnesium has clearly demonstrated enormous versatility as a healing mineral.

However, magnesium chloride has expressed unique characteristics beyond the scope of other inorganic magnesium salts that are of special interest. As discovered in 1915 by French surgeon Pierre Delbet, M.D.:

- The application of a magnesium chloride solution to external wounds had favorable effects over leucocytic activity and phagocytosis, making it ideal for wound cleansing.
- Oral magnesium chloride was a powerful immuno-stimulant, exhibiting a broad tonic effect on the host.*

Thirty years later, another French doctor, A. Neveu, M.D., used magnesium chloride orally for a broad spectrum of disorders benefiting from the immune bolstering effects that magnesium chloride offered. (4)

Dr. Jose Perez AlbelaBeraun, M.D., director of the Instituto Bien de Salud in Lima, Peru, is a zealous supporter of magnesium, where magnesium chloride is the form used almost exclusively in his work. Dr. Albeloa spreads the word of magnesium chloride and health through his various radio shows, public lectures, and colleagues, and in fact manufactures and distributes single dose packets of magnesium chloride, often giving them away to the needy. Success stories from the patients of Dr. Albeloa could fill an entire book.

Dr. Carolyn Dean, M.D., N.D., describes the unique benefits of topical magnesium chloride oil:

“A very exciting addition to the magnesium family is a product loosely referred to as magnesium oil. It’s not actually an oil at all, but a super saturated solution of magnesium chloride. Magnesium oil can be sprayed or rubbed on the body, and is readily absorbed through the skin. It helps to greatly increase the amount of magnesium in body tissues and overcomes the problems that some people have with loose stools when they try to take enough magnesium to meet their needs. This can be especially important in cases of severe

◊ 83 ◊
magnesium deficiency that were only treatable with IV magnesium before magnesium oil came along.” (2)

Since not all magnesium supplements are equal, it pays to consider the efficiency of various forms of magnesium before choosing the one that’s right for you.

The fast-acting ability of topical magnesium chloride deliver magnesium beyond that possible with oral forms makes it ideal for restoring optimal health.

Magnesium is now openly acknowledged by organizations as diverse as the World Health Organization and the National Institutes of Health as an important subject of study for its potential benefits toward cardiovascular health, diabetes, osteoporosis, and a variety of health conditions on the rise in our industrialized age. (2)

There are literally hundreds of peer-reviewed medical studies examining the efficacy of magnesium in a wide range of health enhancing applications, yet not much attention has been directed at the method of delivery.

References for: What is Magnesium? / Forms of magnesium / Why we need it Part IV

“Magnesium Chloride-The Master Magnesium Compound” / "Uses and Benefits of Magnesium Chloride"

What is Magnesium?
Forms of magnesium - Why we need it

Part V

Magnesium Supplementation

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(2) Types of Magnesium Supplements...87
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(4) Why Isn’t Magnesium Recommended More Often?...94
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ARTICLE (1)

INTRODUCTION

Magnesium Supplementation is recommended for a number of reasons, given magnesium’s startling impact on the body’s central processes. Several types of magnesium supplements are available, though some are superior to others.

Magnesium serves hundreds of functions within the body and is an important part of bone health, heart health, a healthy nervous system, cellular energy, hormone regulation and the relaxation and activation of muscle tissue. Three quarters of all Americans eat a diet that is deficient in magnesium, according to a report published by the World Health Organization. (1), (2)

Yet low magnesium is exceedingly simple to correct.

And, for those who experience side effects such as diarrhea when taking oral supplements, transdermal magnesium is available, which makes increasing magnesium intake as easy as taking a bath or applying a lotion.

References for: What is Magnesium? / Forms of magnesium / Why we need it Part V
“Magnesium Supplementation” / “Introduction”

TYPES OF MAGNESIUM SUPPLEMENTS

There are a number of types of magnesium available, which vary by delivery and form of magnesium.

* **Oral Supplements**

Oral forms of magnesium are swallowed and pass through the digestive tract. Tested levels of absorption of oral magnesium supplements vary from 4% absorbed to about 50%.

* **Mineral Salts of Magnesium**

These forms of magnesium are typically minerals or salts found in nature, such as magnesium chloride, a common component of sea waters.

Another term used for these types of magnesium supplements is “inorganic”, however this can be misleading as this form is often closest to the forms of magnesium actually found in nature.

Mineral salt forms of magnesium supplements include:

- Magnesium Bicarbonate
- Magnesium Carbonate
- Magnesium Chloride
- Magnesium Hydroxide
- Magnesium Oxide
- Magnesium Phosphate
- Magnesium Sulfate (or Magnesium Sulphate)
Magnesium Chloride has been found to have the highest bioavailability of the above types of magnesium, due to its superior solubility in water. In fact, water solubility has been found to be directly related to supplement absorbability, as it is believed that the “non-saturable” component of magnesium absorption in the digestive system is related to “solvent drag”, the mechanism by which minerals and electrolytes accompany solvents such as water in the process of digestion and absorption. (2)

Magnesium Oxide is a common compound in the earth’s crust, comprising 35% of its content by mass. However, it has been found in medical studies to have one of the lowest degrees of bioavailability, as low as 4% bioavailable in one study. Therefore, most experts therefore do not recommend magnesium oxide as the magnesium supplement of choice. Magnesium oxide is used in most store-bought brands of magnesium supplements due to its low cost and high availability.

Magnesium Acid Complexes: These forms of supplements represent acids bonded with magnesium, typically in a laboratory environment, to form a complex between magnesium and a compound of hydrogen, oxygen and sometimes carbon and nitrogen, known by chemists as an “organic compound”.

These types of magnesium are often referred to as “organic salts” of magnesium, as they are organic in the manner defined by a laboratory chemist, not in the manner defined in agriculture. Since they are typically not derived from food or plants, they cannot classify as “organic” by USDA standards.

They include:

- Magnesium Ascorbate
- Magnesium Aspartate*
- Magnesium Citrate
- Magnesium Fumarate
- Magnesium Gluconate
- Magnesium Glutamate*
- Magnesium Lactate
- Magnesium Malate
- Magnesium Pidolate

* Both magnesium aspartate as well as magnesium glutamate break down into neurotransmitters that, when not bound with other amino acids, are neurotoxic.
*Amino Acid Magnesium Chelates*

This is a picture of the molecular formula for glycine which is an amino acid.

Chelated magnesium supplements are a type of biological acid complex in which the magnesium is bonded to an amino acid containing nitrogen, one of the basic building blocks of proteins.

Due to the complex chemical processes required to produce amino acid magnesium chelates in the laboratory, chelated supplements tend to be among the most expensive choices in magnesium supplements.

Magnesium amino acid chelates include:

- Magnesium Glycinate
- Magnesium Lysinate
- Magnesium Orotate
- Magnesium Taurate

Acid complexes of magnesium and their subset, amino acid chelates, are generally more readily absorbed by the body. They rely not on solubility but on protein pathways for bio-availability.

Only Magnesium Chloride, a magnesium mineral salt with extremely high solubility, has been found in medical studies to match or surpass the absorption of these forms of magnesium. Magnesium chloride is found naturally in sea water. The purist form of magnesium chloride are sourced from the ancient Zechstein sea, an underground source which has been protected from modern impurities. Read about Zechstein in this article.

See also:

- Read in this article How Topical Magnesium Works. Learn how magnesium is absorbed through the skin, a method of bypassing the GI tract for absorption directly to the cells
- To learn about factors that affect how magnesium is absorbed in the digestive system, read Magnesium Absorption in this article.
**Transdermal Magnesium**

Magnesium applied to the skin can be absorbed directly into your cells, bypassing the digestive system. Transdermal or “topical” magnesium products work in a way that is similar to transdermal patches. Such patches as those used for birth control or smoking cessation.

Transdermal magnesium is becoming more and more popular amongst those struggling to achieve a healthy daily intake of magnesium, especially those who experience side effects associated with oral magnesium and the GI tract.

**Oral Magnesium and Diarrhea**

Unlike oral magnesium, transdermal magnesium (Learn more about transdermal magnesium in this article by reading about “Burt’s Remedies Topical Transdermal Mineral Magnesium Oil”)

Many users of oral magnesium have found that they experience intolerance and side effects after relatively low doses, limiting the amount of oral magnesium that can be taken daily.

Transdermal magnesium has provided a convenient solution to this dilemma, and a powerful means of increasing magnesium intake. Adding magnesium spray to a normal morning or evening routine is simple and straightforward, and does not require the swallowing of pills or coordination with meals.

Transdermal magnesium therapy is typically delivered using magnesium chloride, due to its stability, bio-availability and naturally occurring abundance. Magnesium chloride is the most soluble and absorbable magnesium of the various ionic salts, and is derived in a natural state from seawater sources.

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References for: What is Magnesium? / Forms of magnesium / Why we need it Part V

“Magnesium Supplementation” / “Types of Magnesium Supplementation”

**Article (3)**

**Benefits of Magnesium Supplementation**

The most notable advantage of magnesium is its place as a fundamental nutrient. Since magnesium is required by the body’s cells for energy production, enzyme activity and a host of other functions, its use not only improves the symptoms associated with deficiency, but also supplies every cell in the body with a vital and much needed nutrient.

However, sufficient magnesium intake is the exception, not the norm. Especially in industrialized nations, chronic low magnesium intake is on the rise, and researchers such as Mildred Seeling, author of *The Magnesium Factor*, hold the silent epidemic of magnesium deficiency responsible for poor heart health and increased cases of metabolic syndrome around the world. (3)

Given an increasing awareness of the problem of low intake and its accompanying impacts on health, magnesium supplementation has become more and more common among health-conscious adults.

**The benefits of magnesium supplements are:**

1. They are affordable and widely available.
2. There is a history of scientific research supporting magnesium’s health benefits.
3. Magnesium is very safe when taken at normal dosages, except in cases of kidney disease.
4. Magnesium is an essential mineral absolutely required by the body for normal function.

Magnesium is a member of the group of essential vitamins and minerals that cannot be manufactured within the body. Adequate amounts must be achieved through a combination of diet and supplementation. And because sufficient levels of magnesium are both required and actively regulated by the body, supplementing with magnesium has almost no side effects. Diarrhea, which may be encountered with oral supplements, is not experienced when using transdermal magnesium.

The positive impact of magnesium supplementation has been linked to many troubling conditions, and may prove an unexpected solution for those still seeking help. Adequate magnesium is necessary for proper cell function, so correcting a deficiency in magnesium can have reverberations throughout the body’s systems.
According to clinical trials, conditions that have responded to magnesium supplementation include:

- Migraine headaches (4),(5)
- Depression (6),(7)
- Diabetes (8),(9)
- High Blood Pressure(10), (11), (12)
- Asthma and immune health (13), (14)

For those experiencing the symptoms of magnesium deficiency (You can read more about symptoms of magnesium deficiency in our Burt’s Remedies “Magnesium Deficiency Part II”) and those suffering from chronic diseases related to magnesium deficiency.

Supplementation of magnesium is often recommended by health practitioners as a first line of treatment, and in many cases problems will resolve upon receiving adequate intake.

In other circumstances, magnesium can provide an affordable adjunct to other treatments, helping ensure that the body is functioning effectively alongside other therapies.

Learn more:

For more complete information on magnesium and health, see our section on magnesium benefits, a collection of informative articles on magnesium’s use in the body in our Burt’s Remedies What is Magnesium?/ Forms of magnesium / Why we need magnesium Parts I, II and III.

References for: What is Magnesium? / Forms of magnesium / Why we need it Part V

“Magnesium Supplementation” / “Benefits of Magnesium Supplementation”


7. (Barragán-Rodríguez L, Rodríguez-Morán M, Guerrero-Romero F. Efficacy and safety of oral magnesium supplemen-


WHY ISN’T MAGNESIUM RECOMMENDED MORE OFTEN?

Though magnesium has been used in acute treatments for decades, such as the use of intravenous magnesium for high blood pressure during pregnancy (preeclampsia), many doctors are unfamiliar with the potential of magnesium except in these emergency scenarios.

Meanwhile, many researchers believe increased magnesium intake could drastically lower rates of chronic symptoms related to insulin resistance, heart health, nervous system disorders, and pain from muscle cramps and tension. More and more research and information is being made available regarding the benefits of magnesium supplementation, and scientists are beginning to understand the factors that link, for example, magnesium’s use in preeclampsia and its benefits toward heart health.

A solution has been published in the Journal of the American College of Nutrition by Doctors Dierck-Hartmut Liebscher, MD, and Dierck-Ekkehard Liebscher, MD.

In their paper, entitled, “About the Misdiagnosis of Magnesium Deficiency”, they recommend lowering the threshold for diagnosing magnesium deficiency. Doing so, they state, will capture the great many people whose low magnesium levels often go unrecognized. They then recommend magnesium supplementation therapy whenever symptoms or diseases potentially related to low magnesium are present. The doctors conclude:

“Based on experience, it is our on conviction that many patients with so-called exclusion diagnoses (as for example, attention deficit hyperactivity disorder (ADHD), chronic fatigue syndrome (CFS)) would have their symptoms improved through Mg therapy.—Similarly, patients with diagnoses of depression, epilepsy, diabetes mellitus, tremor, Parkinsonism, arrhythmias, circulatory disturbances (stroke, cardiac infarction, arteriosclerosis), hypertension, migraine, cluster headache, cramps, neuro-vegetative disorders, abdominal pain, osteoporosis, asthma, stress dependent disorders, tinnitus, ataxia, confusion, preeclampsia, weakness, might also be consequences of the magnesium deficiency syndrome.” (15)
Magnesium supplements are a safe, effective way to ensure an adequate magnesium intake. Magnesium supplementation therapy is recommended by both researchers and health practitioners when encountering common signs of low magnesium.

And for those who fall in high risk groups for magnesium depletion, magnesium supplements may be a necessary element of maintaining good health. Dr. Carolyn Dean, MD ND and author of The Magnesium Miracle have said:

“To obtain enough magnesium from the diet takes special care and knowledge of magnesium-rich foods, but we still need to supplement with magnesium.” (16)

Not all magnesium supplements are created equal. For the best combination of convenience and bioavailability, seek a combination of foods containing magnesium, a transdermal magnesium product for convenience that bypasses problems associated with the GI tract, and a dosage of oral magnesium that does not produce side effects.

References for: What is Magnesium? / Forms of magnesium / Why we need it Part V
“Magnesium Supplementation” / “Why Isn’t Magnesium Recommended More Often?”

Article (5)

WHY MAGNESIUM THERAPY?

Widespread acknowledgement of the depletion of magnesium in American diets has made it one of the most important nutrients to supplement in the diet.

Magnesium is one of seven nutrients placed on the U.S. Department of Health’s list of nutrients of concern, published as a part of its Dietary Guidelines for Americans. (1)

Recognition of low magnesium intake across all industrialized nations has led to an exponential growth of magnesium research. Magnesium’s potent activities as a healing agent are part of a diverse history in traditional medicine around the world, and have been studied actively by medical practitioners as early as the 1600’s. Today’s medical research has even more pressing motivations.

- A 2006 report from the World Health Organization estimated that 75% of adults consume a diet that is deficient in magnesium. (2)
- One in five adults consumes less than half of the U.S. RDA for magnesium. (3)

With poor health on the rise, and dietary magnesium levels at an all-time low, scientists have begun to turn to magnesium as the possible “missing link” behind several of today’s most troubling illnesses. A study by scientists at the Centers for Disease Control, published in the Journal of Nutrition, explains:

“Despite the role of magnesium in maintaining health, much of the U.S. population has historically not consumed adequate amounts of magnesium...Magnesium is an essential element that is crucial to hundreds of physiologic processes in humans. Not surprisingly, inadequate intake of magnesium has been linked to various adverse health outcomes, including the development of cardiovascular disease, hypertension, diabetes mellitus, and headaches. Furthermore, magnesium is important in bone growth and may play a role in athletic performance.” (4)
References for: What is Magnesium? / Forms of magnesium / Why we need it Part V
“Magnesium Supplementation” / “Why Magnesium Therapy?”

A clear benefit of transdermal magnesium is its potential to accelerate the process of Magnesium Replacement Therapy. It has been shown that restoration of magnesium levels can take anywhere from six weeks to an entire year. (5), (6)

In order to achieve faster results, intravenous magnesium has previously been the only option. Yet magnesium injections are expensive, painful and inconvenient.

Dr. Carolyn Dean, licensed M.D. and naturopathic doctor, summarized some of the benefits of transdermal magnesium in her book The Magnesium Miracle:

Magnesium oil can be sprayed or rubbed on the body and is easily absorbed through the skin. It helps to greatly to increase the amount of magnesium in body tissues and overcomes the problems that some people have with loose stools when they try to take enough magnesium to meet their needs. This can be especially important in cases of severe magnesium deficiency that were treatable only with IV magnesium before magnesium oil came along. (7)

In contrast with intravenous magnesium injections, transdermal magnesium’s price is inexpensive and its application requires no professional experience.

References for: What is Magnesium? / Forms of magnesium / Why we need it Part V
“Magnesium Supplementation“ / “Magnesium Replacement Therapy?”

HOW DO I KNOW IF I NEED MAGNESIUM TREATMENTS?

Magnesium deficiency is not easily diagnosed, which is why so many people operate with low-level chronic deficiencies unaware of the long term effects on their health, or the cause of symptoms such as eczema, allergies, headaches, anxiety and chronic pain — all of which may signify chronic magnesium depletion.

The most common laboratory test for assessing magnesium status is serum magnesium, which is known to inconsistently represent actual total-body or intracellular magnesium content (content inside the cells). In a study published by the American College of Nutrition, it was noted that as many as 50% of cases of magnesium deficiency are not recognized, due to statistical errors in the normal range set for serum magnesium testing. (9)

Researchers suggested both changes in the way that serum magnesium tests are evaluated, as well as a more proactive stance by the medical community on providing magnesium therapy for patients whose symptoms or diagnoses stood to benefit. These included:

- ADHD
- Chronic fatigue syndrome
- Depression
- Epilepsy
- Diabetes mellitus
- Tremors
- Parkinson’s disease
- Arrhythmias
- Hypertension
- Migraines
- Circulatory disturbances (stroke, cardiac infarction, arteriosclerosis)
- Cluster headaches
- Cramps
- Abdominal pain
- Osteoporosis
- Asthma
- Stress-dependent disorders
- Tinnitus
- Ataxia
- Confusion
- Preeclampsia
- Weakness

In addition, dietary habits and other risk factors can play a part in magnesium status. Conditions and circumstances of high risk groups include:

- Low stomach acid, common in older adults
- Low magnesium diets, processed foods and sodas
- Soft water sources
- Active calcium supplementation
- Certain prescription and over the counter medications
- Stress, surgery, and chronic disorders such as diabetes
- Diarrhea and vomiting for any reason
- Excessive use of alcohol
- Crohn’s disease, celiac sprue, and any disorder of the digestive or intestinal function
- Kidney disorders
- Genetic magnesium absorption disorders

References for: What is Magnesium? / Forms of magnesium / Why we need it Part V
“Magnesium Supplementation” / “How Do I Know if I Need Magnesium Treatments?”

Dr. Mark Sircus, Ac. OMD, author of *Transdermal Magnesium Therapy* and director of the International Medical Veritas Association (IMVA), has written extensively on the use of magnesium to promote good health.

Natural Allopathic Medicine, a recent title by author Dr. Mark Sircus

The following excerpt, from his highly informative website, Magnesium for life, explains very clearly the impact various magnesium chloride sources can have upon the health benefits of topical magnesium. The excerpt concludes with discussion of magnesium oil, price and quality.

Dr. Sircus writes about:

**Magnesium Oil and Mercury-Contaminated Sea Water**

“*Mercury is also a problem in some of the available magnesium products and it’s a growing concern on earth today. There is at least one company selling magnesium chloride brine from the Great Salt Lake but federal scientists studying the lake have found some of the highest levels of mercury ever measured anywhere. Concentrations of methyl-mercury, the element’s most poisonous form exceeded 25 nanograms per liter of water. Fish consumption warnings have been issued when there was just 1 nanogram per liter. “We thought we would find some high levels of methyl-mercury,” said David Naftz, the USGS Research Hydrologist who is heading the Great Salt Lake*”
The deepest waters of the Great Salt Lake may contain even more toxic mercury than previously known. That’s according to water tests done by Kennecott Utah Copper a few years ago, two years after samples that triggered alarms about mercury throughout Utah. The large surface area of the lake may collect a lot of mercury from atmospheric deposition. Once in the lake, sulfate-reducing bacteria that live in the deep brine layer may facilitate the creation of methyl-mercury. Preliminary analyses indicate that methyl-mercury levels in the deep brine layer of Utah’s Great Salt Lake are among the highest ever measured by the USGS.
**Article (9)**

**Pure Magnesium Oil vs. Open Sea and Ocean Minerals Magnesium Oil**

Dr. Sircus notes that one needs to be seriously concerned about purchasing products coming from the Great Salt Lake and companies making claims about purity yet have no documentation to prove support their assertions. There are very few producers of transdermal magnesium products that actively test their product with standardized labs tests, let alone disclose these tests to the public. It is not advisable to take someone’s word on such matters.

Magnesium Oil, a solution gathered by salt water evaporation has been our favorite magnesium chloride solution until now but we found after a few years of experience that is was not pure enough for medical or health use. Certainly it could never be taken orally as the pharmaceutical stuff can be. Though it can be filtered fairly well if it is bottled in a certified laboratory and bottling company it can still smell and sting when put on the skin. Dr. Sircus only recommend magnesium oil products that come from certified laboratories and bottling companies and even then do not suggest sea water magnesium oil from open and unprotected ponds. These kinds of ponds where created to produce magnesium chloride in large quantities for use as a road salt and for crop dusting. It makes a wonderful fertilizer for the soil.

*Special Note for Health Care Practitioners:* In critical situations where heavy application is a must, one needs the confidence that patients will be able to tolerate without discomfort the application of the magnesium chloride all over the body. To have an emergency situation where a patient is in desperate need we need the purest available.

**Zechstein Minerals**

For the very purest magnesium oil we now have to turn to Europe. Deep underground is a time old inactive sea of magnesium chloride oil that has never been touched by modern day pollution and there is enough of it down there to last humanity hundreds of years. It is so pure that Dr. Sircus uses it as a mouth wash and then swallows what is in my mouth for oral supplementation. It is ideal not only for oral intake but practically insures that skin reactions will be absent even at full strength.

To gaze on 64 ounce of it is to gaze on the purest, most powerful medicine obtainable anywhere in the world. Its’ pure healing power and versatility of its use make it a non-option in every medicine cabinet and in every doctor’s dispensary. It certainly would be the product of choice
for skin beauty care and for straight oral supplementation. Beauty and health are in reality highly related subjects. Rarely do we see an unhealthy person who is beautiful or a beautiful person who is grossly unhealthy.

As we lose our health our beauty is diminished by the diseases we fall victim to. In ancient China magnesium is called the beautiful metal and it will bring nothing but beauty to one’s life, body and skin.

One of Hawaii’s fastest-growing exports is based on a commodity the state is soaking in: seawater. Super-cold water sucked up from thousands of feet below the Pacific Ocean’s surface is being marketed as healthy, pure, mineral-rich drinking water. Japanese consumers are paying top dollar for desalinated Hawaiian deep-sea water being marketed as a dietary supplement that aids weight loss, stress reduction, skin tone and digestion. So valuable do they find this that they are willing to pay a cool $2,144 a gallon for a concentrated form of this deep sea water. Two-ounce bottles of Hawaii Deep Marine’s Kona Nigari seawater mineral concentrate (to mix with regular water) sell for $33.50 at the Key of Life store in the Royal Hawaiian Shopping Center, reported USA Today.

However, the magnesium oil from this ancient deposit in Northern Europe will be a hit in the Far East where they appreciate the purity and quality of such products especially because the cost is dramatically lower than the price from Hawaii. Lesser quality evaporated seawater magnesium oil would come in at an average of about $1.60 for two ounces (when purchased by the gallon) but there are certain limits we have to put on contamination with heavy metals and other contaminants with any medicinal.

Special Note about “Pharmaceutical Grade” magnesium chloride products: Recently there have been several manufacturers of transdermal magnesium chloride products on the web, simply stating the purity of their product as “pharmaceutical grade.” Unfortunately, this is insufficient. It does not give us any real information or insight into the quality of the product. First and foremost, many of them cannot or will not supply laboratory proof to support their claim. Secondly, the standards for pharmaceutical grade magnesium chloride are too relaxed. A producer can refer to their magnesium chloride products as pharmaceutical grade provided that it does not contain more than 10 parts per million of heavy metals (mercury, cadmium, lead, etc) which is definitely not considered to be a product suited for medical use. [end excerpt]
Learn more about Burt’s Remedies Ultra-Pure Mineral Magnesium Oil: “Great Quality and Low Price”

Most toxic industrially created magnesium chloride products would weigh in around 80 cents for two ounces and we readily recommend them when nothing else is available.
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PART VI

TOPICAL MAGNESIUM: HOW IT WORKS

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Topical magnesium, a method of delivering minerals to the body through the skin, may seem at first mysterious and new, but it's based on both age-old principles and cutting edge science.

Have you ever used a patch to help you quit smoking, or to alleviate pain? What about Ben Gay? Or how about that expensive skin crème you bought to help give your skin a healthy glow?

If you've used or are familiar with any of these products, then you are familiar with the basic concepts behind topical applications of topical transdermal magnesium.
How is topical magnesium absorbed through the skin?

The skin, the largest organ of the body, has three primary functions:

- Temperature control
- Detoxification
- Barrier function

While one function of the skin, its barrier function, is to keep water and moisture in while keeping germs and toxins out, the skin’s other functions, temperature control and detoxification, could not occur if the skin was truly a complete barrier.

Imagine the skin as a circulation. To understand how this works, imagine a tightly woven fabric. While from a distance it may appear impervious, at close range it is actually highly porous. It is this porous nature of the skin, with its millions of tiny openings, that allows not only sweat and other toxins to escape, but also enables the absorption of some substances.

The process is known as dermal absorption. Once a substance passes through the outer layers of skin, it passes into the lymph and local vascular (blood vessel) system and soon after into the bloodstream. (1)

Routes of Absorption of Topical Magnesium

While the exact mechanisms of skin transfer are yet to be completely understood, three routes of penetration have been hypothesized:

- **Intercellular Skin Absorption**, which occurs between the cells of the “stratum corneum”, the outermost layer of the skin
- **Transcellular Skin Absorption**, where substances actually pass through the skin cells themselves
* Skin Absorption Through the Follicles and Glands, also known as “appendageal absorption“, which may also exhibit “reservoir effects” in which substances may be stored within the glands for absorption over time

* **Skin Permeability: The Good and The Bad**

Some of the most convincing stories of substances passing into the body via the skin come from governmental agencies actively studying and monitoring dermal absorption through their chemical safety divisions.

A 2005 report published by the World Health Organization takes a very clear position on skin permeability:

> “While the skin does act as a barrier, it is not a complete barrier. Many chemicals do penetrate the skin, either intentionally or unintentionally, and cutaneous metabolism does occur. Because of its large surface area, the skin may be a major route of entry into the body in some exposure situations.”

This “major route of entry” has become a concern in many circumstances where toxic substances are released into air, water, and even city water supplies.

* The California Environmental Protection Agency issued a report entitled “Chlorinated Chemicals in Your Home“, warning of the risks of cancer due to chlorinated chemicals. The agency issued the statement:

> * “Taking a long, hot shower in a typical small shower stall can substantially increase your exposure to chloroform. If you use indoor spas, hot tubs, or swimming pools, you are also likely to be exposed to high levels of chloroform.” (2)*
*Health Canada* has estimated that skin exposure to certain toxic hydrocarbons in the Great Lakes may be as dangerous as oral exposure, issuing alerts to bathers, especially those affected by sunburn, which may enhance absorption (3).

- **Worker safety** is an issue. Workers in various industries have suffered poisoning, in some cases fatal, from substances penetrating exclusively through the skin and into the bloodstream, such as through dermal exposure to leaded gasoline and insecticides. (4)

- **The European Commission and the World Health Organization** have both issued Guidance Documents, such as the “*Guidance Document on Dermal Absorption*” and *International Programme on Chemical Safety*. Environmental Health Criteria serve to instruct agencies on how to protect workers from exposure to toxic compounds.

While government agencies such as those above work to stop the transfer of chemicals through the skin, transdermal drug delivery methods seek to take advantage of it. Transdermal patches are produced as delivery systems for nicotine, hormones, pain killers, and others.

These methods are coveted for their clear advantages over oral medications, as outlined by Stanley Scheindlin, pharmaceutical chemist, in the journal *Molecular Interventions*:

> “Patients often forget to take their medicine, and even the most faithfully compliant get tired of swallowing pills, especially if they must take several each day. Additionally, bypassing the gastrointestinal (GI) tract would obviate the GI irritation that frequently occurs and avoid partial first-pass inactivation by the liver.” (2)

While transdermal drugs are well known in the medical community, the difference with magnesium oil topical treatments is, of course, the fact that magnesium is an essential mineral to the human body, in a natural form. Thus, use of *Burt’s Remedies Topical Mineral Magnesium oil* brings all the advantages of transdermal applications, but none of the disadvantages of introducing foreign substances into the body.

**Transdermal magnesium is a needed substance.** While the chemicals in transdermal pharmaceuticals are actively filtered, inactivated, and excreted by the body’s detoxification systems, magnesium is welcomed and actively taken in by the cells.


What is the history of transdermal delivery?

Humans have been using the skin as a direct pathway into the body for centuries, and only recently have we begun to understand the science behind it.

Ancient Roman Bath in Bath, England

Many people are familiar with the healing properties of saunas, used quite often for detox and general well-being. Saunas are the closest modern equivalent to the ancient practice of “balneology”, a healing method that can be traced to antiquity.

Ancient treatments in fact involved a variety of transdermal therapies ranging from mineral baths, to herbal compresses, to mud packs, to steam and sweat lodges. These topical remedies were not limited to one culture, but were a part of many of the documented societies spread
Through-out the world and still used today.

In Homer’s Odyssey he frequently mentions the bathing habits of his heroes, drawing repeated attention to the significance of the deed. In the tenth century Paul of Aegina, a great physician, discusses balneology in a medical text, specifically detailing various forms of mineral waters for different ailments. The city of Bath in England took its name from the hot mineral springs it contains. The traditional tale of its origins told of how the son of an ancient king contracted leprosy. After he was banished from the palace he found the mineral waters in Bath and returned miraculously healed of the disease.

When Ponce de Leon and Hernando DeSoto sought the “Fountain of Youth” in the new world, many speculate that the exaggerated tales that arose referenced the healing properties of a mineral-dense geothermal spring. Prior to commercialization, these same hot springs were a place where the native Indian populations would bring their sick or wounded, and would fight viciously to protect what they felt was sacred ground.

More recent examples of topical and transdermal therapies can be found from the 18th through the early 20th century and eventually led to the technological advancements seen today. Throughout Europe, the skin as a gateway for medical therapy became increasingly popular in the late 18th century. In an age where open wounds often led to infection, topical remedies were favored over risky surgeries. For instance, soaking in sulfurous mineral baths became a widespread treatment for gout, which might otherwise have meant amputation.

Early editions of the United States Pharmacopoeia (USP) contained several plasters, pastes applied with a cloth binding cover, which are precursors to current transdermal patches. Similarly, herbalists utilize compresses and ointments based on the healing properties of plants.

In the same way that modern science has not only verified but also capitalized on traditional knowledge of the power of herbs and plant constituents, ongoing studies today explore the mechanisms of skin absorption, gradually confirming the practices of healers from before written history.
Are there studies on topical magnesium intake?

Documented research on the effect topically applied magnesium chloride has on blood chemistry includes the work of Dr. Norman Shealy, M.D. Ph.D. Founder of the American Holistic Medical Association, Dr. Shealy enlisted sixteen individuals with low intracellular magnesium levels.

Participants were instructed to perform a 20 minute foot-soak with magnesium chloride flakes, in addition to spraying their entire body once daily with magnesium oil. After just four weeks of foot soaking in magnesium chloride, %75 of participants showed a very significant increase in their cellular levels of magnesium. (6)

A second study, conducted by Dr. DH Waring at the University of Birmingham, demonstrated that a 1% solution of magnesium sulfate in a warm bath had immediate effects on serum levels of magnesium. (7)

Finally, a study in Poland specifically addressed the issue of ion diffusion through the skin. Using ion chromatography, researchers demonstrated in vitro that the metal cation magnesium can in fact diffuse through the skin.

These Polish researchers found evidence for multiple routes of absorption:

“Diverse influences... on the grade of metal ion permeability suggest the presence of different routes of ions penetration through the skin. It is also supported by different transportation characteristics of individual ions through the skin over time.” (8)

Notably, the concentrations explored in this study were only low level atmospheric concentrations, compared with the much higher concentrations typically employed in therapeutic applications of topical magnesium oil.

There is also no shortage of positive reports from medical professionals and consumers regarding the health benefits achieved from using magnesium chloride topically. Many of these reports describe immediate and profound impacts on health through the use of topically applied...
magnesium chloride, and frequently come from individuals whose oral dosages of various magnesium compounds have previously fallen short of their expectations.

References for: What is Magnesium? / Forms of magnesium / Why we need it Part VI

“Topical Magnesium: How It Works” / “Are there studies on topical magnesium intake?”


CAN I INCREASE THE TOTAL SKIN ABSORPTION OF TOPICAL MAGNESIUM OIL?

There are a number of factors that increase the amount of magnesium oil absorbed through the skin. They include:

- Increasing the area of application
- Increasing the amount of time the application is left on the skin
- Increasing the frequency of application
- Varying the location of application, with areas such as the scalp and armpits exhibiting higher rates of absorption
- Increased temperature of the area of application
- Well-hydrated skin

Individual choices will vary based upon preferences and individual response. Consult our Burt’s Remedies Guide to: Topical Transderal Mineral Magnesium Application and Use
**Article (6)**

**Why use topical magnesium oil when there is magnesium in food?**

Though it’s possible and preferable to get magnesium from a variety of sources, studies show that most Americans have magnesium deficient diets, with one in five getting less than half the RDA for magnesium in their daily diets. (9)

Oral supplementation, on the other hand, is affected by numerous things in your gut – no matter what type of oral magnesium you use. Because all magnesium taken orally is potentially laxative, the ability to absorb magnesium through the GI tract is limited by shortened transit time.

Oral magnesium can be inconvenient as well, due to the amount needed for adequate dosage. Adequate magnesium is typically not added to multi-vitamins in an attempt to reduce the size and dosage, and magnesium supplements themselves can be large.

Considering these difficulties and the numerous factors that may negatively impact oral magnesium absorption in the GI tract, topical magnesium shows clear benefits.

From pain killers to anti-depressants to hormone replacement, countless people have turned to transdermal medicine, whether because they can’t swallow pills, their digestive systems are impaired, or simply due to personal preference. Using magnesium transdermally addresses all of these concerns.

Topical magnesium:

- **Is safe, convenient, affordable and effective.**
- **Allows you to maximize the amount you’re getting daily without having to worry about diarrhea, digestion, or swallowing additional pills several times a day.**
- **Is especially helpful with pain and can be applied directly to the trouble area with immediate results, rather than waiting for it to work its way through your GI tract.**

*So long as a molecule or ion is small enough to pass through the porous surface of the skin, it will eventually end up in your blood stream. Topical magnesium takes advantage of the absorptive properties of body’s largest organ, putting it to work for you in the*
form of a simple spray, soak, or massage.

The skin is a living, breathing organ — the most efficient organ for detoxification with tremendous potential for re-mineralizing the body. What happens when combine the human body’s most well-functioning organ with one of the most life-giving minerals available? Burt’s Remedies Transdermal Mineral Magnesium Oil for achieving vibrant health.

References for: What is Magnesium? / Forms of magnesium / Why we need it Part VI—“Topical Magnesium: How It Works” / “Why use topical magnesium oil when there is magnesium in food?”

WHAT IS MAGNESIUM?
FORMS OF MAGNESIUM - WHY WE NEED IT

PART VII

WHY BURT’S REMEDIES TOPICAL TRANSDERMAL MINERAL MAGNESIUM CHLORIDE?

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(4) Topical Transdermal Mineral Magnesium Oil is recommended by Leading Magnesium Experts such as: ...123
Burt’s Remedies magnesium product offers a convenient form of transdermal magnesium — absorbed through the skin — for those who prefer to avoid the hassle of taking pills and the difficulties inherent with poorly tolerated oral supplements.
Have you ever made a commitment to making a difference in your own health?
If supporting your body’s healing potential while avoiding costly mineral deficiencies is important to you, now is the time to take action.

- The US Department of Health and Human Services has placed magnesium on its short list of nutrients of concern. (1)
- Less than 30% of Americans meet the RDA for magnesium. (2), (3) Other industrialized nations exhibit similar rates of suboptimal intake.
- The National Institutes of Health DASH dietary plan for reducing high blood pressure includes 50% more magnesium than the RDA. (1)

Revered as the “beautiful mineral” in Chinese Medicine, magnesium is as essential to the body as water and air, its beauty attributed to its undeniable healing potential. Although there are only a few ounces of magnesium in the body, it is a necessary element to hundreds of biochemical reactions occurring on a constant basis.

Magnesium contributes to the manufacture of energy, cardiovascular function, and cellular reproduction. Strong bones and teeth, radiant skin, balanced hormones, a healthy nervous system, and relaxed body and mind are all made possible by sufficient magnesium in our cells.

References for: What is Magnesium? / Forms of magnesium / Why we need it Part VII

“Why Burt’s Remedies Topical Transdermal Mineral Magnesium Chloride?” / “A Commitment to Good Health–Is a Commitment to Health’s Essentials”

3) King DE, Mainous AG 3rd, Geesey ME, Woolson RF. Dietary magnesium and C-reactive protein levels. Journal Of The American College Of Nutrition. 2005
Burt’s Remedies magnesium product is healing by way of the skin, our body’s largest organ.

Our product is designed to deliver magnesium through the skin, bypassing the gastrointestinal tract for convenient, rapid absorption into the cells.

Some benefits of Burt’s Remedies topical magnesium:

- Restores cellular magnesium levels
- Natural cellular protectant
- Facilitates safe and effective detoxification
- Relief of aches, pains, spasms
- Elevates mood and relieves stress
- Encourages healthy skin tissue
- Helps maintain proper muscle function
- Boosts energy levels
- Supports a healthy immune system
- Balances the hormonal system
- Calms overactive nerves
- Improves quality of sleep
- ...and much more
Transdermal Mineral Magnesium Oil is recommended by leading Magnesium experts such as:

Mark Sircus, Ac., OMD; Daniel and Snow Reid

Dr. Sircus has written many books and articles on magnesium. You can purchase Dr. Sircus’ book “Transdermal Magnesium Therapy” (With Forward from Daniel Reid) on this Burt’s Remedies web site. For information on Dr. Sircus and his work visit IMVA on the web.

Daniel Reid has written numerous books and magazine articles on various aspects of Asian self-health and self-healing practices, and has established an international reputation for the practical efficacy of his traditional approach to modern health problems. For information on Daniel Reid, visit www.danreid.org.

Drs. Burton and Bella Altura, Dr. Carolyn Dean, and Dr. Alan Gaby all have something to be thankful for as well.

The current surge in medical studies on the actions and applications of magnesium is a sign that we are finally heeding their call. Though these pioneers work in differing capacities — two are medical researchers, one an active natural health practitioner, and one a medical editor — they share a common vision that is finally taking shape: a public awareness of magnesium as vital preventive and curative nutrient.

Magnesium is now openly acknowledged by organizations as diverse as the World Health Organization and the National Institutes of Health as an important subject of study for its potential
benefits toward cardiovascular health, diabetes, osteoporosis, and a variety of health conditions on the rise in our industrialized age. (2)

There are literally hundreds of peer-reviewed medical studies examining the efficacy of magnesium in a wide range of health enhancing applications, yet not much attention has been directed at the method of delivery.

Burt’s Remedies brand magnesium product is designed to deliver magnesium through the skin, bypassing the GI tract for absorption directly to the cells.

We utilize an ultra-pure, highly concentrated form of naturally occurring magnesium chloride along with other trace minerals, natural and pure magnesium.

Why topical? Because the skin is a living, breathing organ, and is not only the most efficient organ for detoxification, but also holds tremendous potential for re-mineralizing the body.

An estimated 75% of Americans have magnesium-deficient diets. Are you getting enough? Read about magnesium deficiency and the 10 signs to watch for in our Burt’s Remedies “Magnesium Deficiency” articles Parts I, II, and III.

References for: What is Magnesium? / Forms of magnesium / Why we need it Part VII
“Why Burt’s Remedies Topical Transdermal Mineral Magnesium Chloride?” / “Transdermal Mineral Magnesium Oil is recommended by Leading Magnesium Experts such as mark Sircus and Daniel Reid”


WHAT IS MAGNESIUM?
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PART VIII

TRANSDERMAL MAGNESIUM THERAPY

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Introduction

Answers to commonly asked questions on how magnesium is absorbed through the skin and how to increase its effectiveness.

Transdermal magnesium therapy is a new form of magnesium supplementation that is easy, convenient, and affordable. Transdermal, or “topical” magnesium is particularly helpful for those seeking a safe method of increasing magnesium intake beyond that possible with oral supplements.

Transdermal magnesium is also an excellent choice for the many people who are suffering with low tolerance from oral magnesium, evidenced by diarrhea or other intestinal complaints.

Learn more about transdermal magnesium and get answers you are looking for.
Widespread acknowledgement of the depletion of magnesium in American diets has made it one of the most important nutrients to supplement in the diet. Magnesium is one of seven nutrients placed on the U.S. Department of Health’s list of nutrients of concern, published as a part of its Dietary Guidelines for Americans. (1)

Recognition of low magnesium intake across all industrialized nations has led to an exponential growth of magnesium research. Magnesium’s potent activities as a healing agent are part of a diverse history in traditional medicine around the world, and have been studied actively by medical practitioners as early as the 1600’s. Today’s medical research has even more pressing motivations.

- A 2006 report from the World Health Organization estimated that 75% of adults consume a diet that is deficient in magnesium. (2)
- One in five adults consumes less than half of the U.S. RDA for magnesium. (3)

With poor health on the rise, and dietary magnesium levels at an all-time low, scientists have begun to turn to magnesium as the possible “missing link” behind several of today’s most troubling illnesses. A study by scientists at the Centers for Disease Control, published in the Journal of Nutrition, explains:

“Despite the role of magnesium in maintaining health, much of the U.S. population has historically not consumed adequate amounts of magnesium...Magnesium is an essential element that is crucial to hundreds of physiologic processes in humans. Not surprisingly, inadequate intake of magnesium has been linked to various adverse health outcomes, including the development of cardiovascular disease, hypertension, diabetes mellitus, and headaches. Furthermore, magnesium is important in bone growth and may play a role in athletic performance.” (4)
* **Benefits of Transdermal Magnesium**

Transdermal magnesium is a powerful tool in the battle against magnesium deficiency.

Benefits reported by those who use transdermal applications of magnesium relate specifically to its therapeutic application on the skin and its direct absorption into the cells:

- Increased sleep
- Reduced muscle aches, pains, cramping and spasms
- Healthy skin and reduced outbreaks of eczema and psoriasis
- Better relaxation and stress management
- Increased energy levels and improved moods

* **How is Transdermal Magnesium Used?**

This is a super-concentrated form of magnesium chloride, a form of magnesium known for its superior solubility. Magnesium is absorbed through the skin, giving transdermal magnesium therapy many of the same benefits as some of the transdermal patches available today.

Though it is commonly prescribed as a treatment by holistic health practitioners, transdermal magnesium is applied easily and quickly in one’s own home, either by simply spraying directly on the skin, or even more effortlessly through the simple ritual of taking a bath.

**Transdermal Magnesium:**

- Is an easy and convenient, “do it yourself” method of magnesium supplementation
- Avoids problems of gastrointestinal irritation and diarrhea, through bypassing the digestive system entirely

Passes directly into the tissues via the skin, where it is quickly transported to cells throughout the body. For more information on how to use “Burt’s Remedies Topical Transdermal Mineral Magnesium Oil” see “Burt’s Remedies Guide to Topical Mineral Magnesium Oil Application and Use”

**References for:** What is Magnesium? / Forms of magnesium / Why we need it Part VIII

“Transdermal Magnesium Therapy” / “Why Magnesium Therapy?”

1) U.S. Department of Health and Human Services, U.S. Department of Agriculture. Adequate Nutrients Within Calorie


A clear benefit of transdermal magnesium is its potential to accelerate the process of Magnesium Replacement Therapy. It has been shown that restoration of magnesium levels can take anywhere from six weeks to an entire year. (5), (6)

In order to achieve faster results, intravenous magnesium has previously been the only option. Yet magnesium injections are expensive, painful and inconvenient.

Dr. Carolyn Dean, licensed M.D. and naturopathic doctor, summarized some of the benefits of transdermal magnesium in her book *The Magnesium Miracle*:

> Magnesium oil can be sprayed or rubbed on the body and is easily absorbed through the skin. It helps to greatly to increase the amount of magnesium in body tissues and overcomes the problems that some people have with loose stools when they try to take enough magnesium to meet their needs. This can be especially important in cases of severe magnesium deficiency that were treatable only with IV magnesium before magnesium oil came along. (7)

In contrast with intravenous magnesium injections, transdermal magnesium’s price is inexpensive and its application requires no professional experience.

**References for: What is Magnesium? / Forms of magnesium / Why we need it Part VIII**

“Transdermal Magnesium Therapy” / “Magnesium Replacement Therapy”

Dr. Norman Shealy, M.D. Ph.D. and founder of the American Holistic Medical Association, was an early advocate for the advantages of magnesium and the particular benefits of transdermal applications of magnesium:

“The problem is magnesium absorption, as well as magnesium deficiency in our diets. The soil in every country in the world except Egypt has been farmed to a point of magnesium depletion... Furthermore, magnesium salts are laxatives so that all of them may lead to a more rapid gut transit time. Magnesium needs to travel through the intestinal system slowly, so if the gut transit time is less than twelve hours, one is not likely to absorb the magnesium well.”

(6)

Upon being introduced to the potential of liquid soaks for magnesium and natural DHEA stimulation, Dr. Shealy, a trained neuroscientist and medical researcher who studied at Duke University, performed experiments to test the ability of the skin to absorb magnesium.

Sixteen individuals with low intracellular magnesium levels were enlisted in his study. Participants were instructed to perform a 20 minute foot-soak daily with transdermal magnesium flake baths in addition to spraying their entire body once daily with magnesium oil. Intracellular magnesium levels were assessed on all participants after 4 weeks, utilizing a diagnostic called ExaTest. The results – 12 of the 16 participants in the study showed marked improvements in their intracellular magnesium levels. (8)

Averaged diagnostic results after 4 weeks of daily body spraying and foot soaks:

<table>
<thead>
<tr>
<th>Electrolyte Name</th>
<th>Before</th>
<th>After</th>
<th>Reference Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>Magnesium</td>
<td>31.4</td>
<td>41.2</td>
<td>33.9 – 41.9</td>
</tr>
</tbody>
</table>
Calcium  |  7.5 |  4.8 |  3.2 – 5.0  
--- | --- | --- | ---  
Potassium  |  132.2 |  124.5 |  80.0 – 240.0  
--- | --- | --- | ---  
Sodium  |  3.4 |  4.1 |  3.8 – 5.8  
--- | --- | --- | ---  
Chloride  |  3.2 |  3.4 |  3.4 – 6.0  
--- | --- | --- | ---  
Phosphorous  |  22.2 |  17.6 |  14.2 – 17.0  
--- | --- | --- | ---  
Phosphorous/Calcium  |  4.2 |  8.6 |  7.8 – 10.9  
--- | --- | --- | ---  
Magnesium/Phosphorous  |  1.4 |  2.3 |  1.8 – 3.0  
--- | --- | --- | ---  
Magnesium/Calcium  |  4.2 |  8.6 |  7.8 – 10.9  
--- | --- | --- | ---  
Potassium/Calcium  |  17.6 |  26.1 |  25.8 – 4.6  
--- | --- | --- | ---  
Potassium/Magnesium  |  4.2 |  3.0 |  2.4 – 4.6  
--- | --- | --- | ---  
Potassium/Sodium  |  39.1 |  30.5 |  21.5 – 44.6  
--- | --- | --- | ---

**Dr. Shealy’s** conclusion was that the unique properties of supersaturated transdermal magnesium allow it to be absorbed into the skin, raising intracellular magnesium levels in nearly all individuals.

In discussing transdermal magnesium therapy versus oral magnesium supplements, **Dr. Shealy** has explained that:

- **Transdermal therapy creates “tissue saturation”, which allows magnesium to travel to the body’s tissues and cells at a high dose without losses through the gastrointestinal tract.**
- **When taken orally, however, magnesium may be absorbed inefficiently, either due to the laxative effect of oral doses; due to the effect of other foods, vitamins or minerals in the gut that lessen absorption; or due to individual differences, such as leaky gut syndrome, that reduce magnesium processing.**

**Dr. R.H. Waring** of the **University of Birmingham** has also studied topical magnesium absorption in the form of magnesium sulfate salts. In his study, nineteen subjects in good health took daily baths of 12 minutes in duration for a period of seven days. Magnesium Sulphate was added to baths and agitated to solution prior to entry. Magnesium blood levels and urine samples were measured in the study, by a flame photometric method.

The results of the study reported changes in magnesium levels in blood before and after the testing period. Blood levels showed an average increase of 10 ppm/ml after one day of soaking,
and 36.3 ppm/ml after seven days, indicating an increase in blood magnesium concentration after prolonged soaking.

Dr. Waring’s study proposed that bathing in solutions of magnesium produces effects consistent with saturation of the skin transporters.

The study concluded that bathing 2-3 times per week in a 1% solution of magnesium bath salts would result in health benefits related to an increase in magnesium levels.

References for: What is Magnesium? / Forms of magnesium / Why we need it Part VIII
“Transdermal Magnesium Therapy” / “What Studies Prove Transdermal Magnesium is Effective?”


6) Shealy N. Life Beyond 100: Secrets of the Fountain of Youth. Tarcher; 2006.


How Do I Know If I Need Magnesium Treatments?

Magnesium deficiency is not easily diagnosed, which is why so many people operate with low-level chronic deficiencies unaware of the long term effects on their health, or the cause of symptoms such as eczema, allergies, headaches, anxiety and chronic pain — all of which may signify chronic magnesium depletion.

The most common laboratory test for assessing magnesium status is serum magnesium, which is known to inconsistently represent actual total-body or intracellular magnesium content (content inside the cells). In a study published by the American College of Nutrition, it was noted that as many as 50% of cases of magnesium deficiency are not recognized, due to statistical errors in the normal range set for serum magnesium testing. (9)

Researchers suggested both changes in the way that serum magnesium tests are evaluated, as well as a more proactive stance by the medical community on providing magnesium therapy for patients whose symptoms or diagnoses stood to benefit. These included:

- ADHD
- Chronic fatigue syndrome
- Depression
- Epilepsy
- Diabetes mellitus
- Tremors
- Parkinson’s disease
- Arrhythmias
- Hypertension
- Migraines
- Circulatory disturbances
- Cluster headaches
- Cramps
- Abdominal pain
- Osteoporosis
- Asthma
- Stress-dependent disorders
- Tinnitus
- Ataxia
- Confusion
- Preeclampsia
- Weakness (9) (stroke, cardiac infarction, arteriosclerosis)

In addition, dietary habits and other risk factors can play a part in magnesium status. Conditions and circumstances of high risk groups include:

- Low stomach acid, common in older adults
- Low magnesium diets, processed foods and sodas
- Soft water sources
- Active calcium supplementation
- Certain prescription and over the counter medications
- Stress, surgery, and chronic disorders such as diabetes
- Diarrhea and vomiting for any reason
- Excessive use of alcohol
- Crohn’s disease, celiac sprue, and any disorder of the digestive or intestinal function
- Kidney disorders
- Genetic magnesium absorption disorders

References for: What is Magnesium? / Forms of magnesium / Why we need it Part VIII
“Transdermal Magnesium Therapy” / “How Do I Know if I Need Magnesium Treatments?”

**What Do I Need to Know Before I Begin Taking Magnesium Transdermally?**

There are almost no precautions to observe with regard to transdermal magnesium therapy. For most people without kidney disorders, the skin automatically regulates safe intake, so dosage issues are simply a matter of personal choice. However it must be noted that the information on this site is not intended to replace a one-on-relationship with a qualified health care professional and is not intended as medical advice. The information on this site about magnesium is a sharing of knowledge. Burt’s Remedies encourages you to make your own health care decisions based upon your own research and in partnership with a qualified health care professional.

**Note:** If you are on certain prescription drugs check with your doctor to make sure there is no contraindications.

**Application**

Application may differ for each individual; to find what’s right for you read our article on “Burt’s Remedies Guide to Topical Mineral Magnesium Oil Application and Use.”

**Dosage**

Considering the significant number of magnesium-related symptoms and conditions, you may want to seek information on your personal level of magnesium deficit, as this can provide clues as to the amount of magnesium replacement therapy may be required for you.

Consulting with a medical practitioner knowledgeable and active in the area of nutrition can be helpful. You can also take our Magnesium Self Assessment Test for a good starting point as to whether you may be deficient. This Magnesium Self-Assessment can be found in Burt’s Remedies article “Magnesium Deficiency-Part II”. Also see “Burt’s Remedies Guide to Topical Mineral Magnesium Oil Application and Use”
The Miracle of Transdermal Magnesium

Magnesium supplementation may be the new panacea of our age. The deficiency is so widespread that at least three out of four adults in industrialized nations have cause to actively increase their intake — especially to avoid symptoms which can otherwise linger and compound over years to produce serious chronic illness.

Transdermal magnesium therapy is a powerful new tool that combines the healing power of the body’s largest organ — the skin — with the life sustaining properties of one of our most vital minerals. It stands poised to usher in a new era of health.

Get details on replenishing your magnesium, using your skin as the gateway. Read the articles in all three Parts VI, VII, and VIII of Burt’s Remedies Topical Transdermal Mineral Magnesium Oil.

References for: What is Magnesium? / Forms of magnesium / Why we need it Part VIII
“Transdermal Magnesium Therapy” / “The Miracle of Transdermal Magnesium”


1, 2010.
**What is Magnesium?**

**Forms of magnesium - Why we need it**

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**Part IX**

**Why do we use Genuine Zechstein: Pure Magnesium Oil**

Among minerals, magnesium is the most life giving available, central to energy manufacture, balance and regulation. Magnesium has been hailed by some as the panacea of our age, and its deficiency our silent epidemic. Yet rising levels of contaminants in our sea waters today threaten the most convenient and soluble form of magnesium: topical magnesium produced from natural magnesium chloride.

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Among minerals, magnesium is the most life giving available, central to energy manufacture, balance and regulation. Magnesium has been hailed by some as the panacea of our age, and its deficiency our silent epidemic. Yet rising levels of contaminants in our sea waters today threaten the most convenient and soluble form of magnesium: topical magnesium produced from natural magnesium chloride.

It is simply no longer possible to naturally harvest a true pure magnesium oil from modern bodies of water, due to contamination by heavy metals such as mercury and lead.

Yet a clean source of magnesium oil’s healing abilities is in fact available through a combination of the work of geologists, medical experts, and a single brand committed to health through the original power and purity of the earth and sea.
How can I find natural and pure magnesium oil?

Is it possible to achieve real purity in a magnesium oil product?

In the late 1990s a rare and pristine source of unadulterated magnesium chloride was located in an ancient geological formation, and ties were made with the health community and advocates of magnesium supplementation. This occasion solved the dilemma of achieving topical magnesium oil that is both natural and pure. The source is the ancient Zechstein Seabed.

The Zechstein salt beds are a perfectly preserved snapshot of pure magnesium chloride.

Some 250 million years ago the Zechstein Sea was a concentrated inland salt water sea, with many of the characteristics of the Dead Sea today. The striking difference between the Dead Sea and the Zechstein Sea is the fact that the Zechstein Sea was active in an age prior to man’s industrialization and pollution of our water supplies, in a time where dinosaurs still roamed the earth.

Magnesium chloride, a natural salt of magnesium, was plentiful in this sea and concentrated by a combination of flooding by sea waters and slow evaporation. Over time, these dense waters found their way deep into underground deposits, slowly accumulating through fissures in the earth over millions of years, trapped underground by overlying rock.

Though the Zechstein Sea itself no longer exists today, the Zechstein salt beds are a perfectly preserved snapshot of pure magnesium chloride as it existed in its natural state, many years ago.

In our commitment to a truly natural product that is also guaranteed free of impurities, we use only Genuine Zechstein™ magnesium chloride in our topical magnesium products. This unadulterated pure magnesium chloride is drawn from the ancient Zechsten Seabed from approximately 2 miles beneath the surface of the earth.
Genuine Zechstein™ magnesium has been detected free of:

- Mercury
- Lead
- Arsenic
- Fluoride

Each batch is produced under strict GMP, ISO 9001, and ISO 14001 quality control standards.

Our ultra-pure magnesium oil and ultra-pure topical magnesium products feature the Genuine Zechstein™ emblem as a mark of purity, and our commitment to providing only the finest and purest natural magnesium chloride in the world.
Dr. Mark Sircus, Ac. OMD, author of *Transdermal Magnesium Therapy* and director of the International Medical Veritas Association (IMVA), has written extensively on the use of magnesium to promote good health.

Natural Allopathic Medicine, a recent title by author Dr. Mark Sircus

The following excerpt, from his highly informative website, Magnesium for life, explains very clearly the impact various magnesium chloride sources can have upon the health benefits of topical magnesium. The excerpt concludes with discussion of magnesium oil, price and quality.

*Dr. Sircus writes about:*

* Magnesium Oil and Mercury-Contaminated Sea Water

“Mercury is also a problem in some of the available magnesium products and it’s a growing concern on earth today. There is at least one company selling magnesium chloride brine from the Great Salt Lake but federal scientists studying the lake have found some of the highest levels of mercury ever measured anywhere. Concentrations of methyl-mercury, the element’s most poisonous form exceeded 25 nanograms per liter of water. Fish consumption warnings have been issued when there was just 1 nanogram per liter. “We thought we would find some high levels of methyl-mercury,” said David Naftz, the USGS research hydrologist who is heading the Great Salt Lake project, “but not some of the highest (the USGS) has ever found.” (For more information on
methyl-mercury see Burt's Remedies articles on “Toxins/Heavy Metal and Chemicals” and “Heavy metals-Mercury”

The deepest waters of the Great Salt Lake may contain even more toxic mercury than previously known. That’s according to water tests done by Kennecott Utah Copper a few years ago, two years after samples that triggered alarms about mercury throughout Utah. The large surface area of the lake may collect a lot of mercury from atmospheric deposition. Once in the lake, sulfate-reducing bacteria that live in the deep brine layer may facilitate the creation of methyl-mercury. Preliminary analyses indicate that methyl-mercury levels in the deep brine layer of Utah’s Great Salt Lake are among the highest ever measured by the USGS.
One needs to be seriously concerned about purchasing products coming from the Great Salt Lake and companies making claims about purity yet have no documentation to prove support their assertions. There are very few producers of transdermal magnesium products that actively test their product with standardized labs tests, let alone disclose these tests to the public. It is not advisable to take someone’s word on such matters.

Magnesium Oil, a solution gathered by salt water evaporation has been our favorite magnesium chloride solution until now but we found after a few years of experience that it was not pure enough for medical or health use. Certainly it could never be taken orally as the pharmaceutical stuff can be. Though it can be filtered fairly well if it is bottled in a certified laboratory and bottling company it can still smell and sting when put on the skin. I now only recommend magnesium oil products that come from certified laboratories and bottling companies and even then do not suggest sea water magnesium oil from open and unprotected ponds. These kinds of ponds where created to produce magnesium chloride in large quantities for use as a road salt and for crop dusting. It makes a wonderful fertilizer for the soil.

**Special Note for Health Care Practitioners:** In critical situations where heavy application is a must, one needs the confidence that patients will be able to tolerate without discomfort the application of the magnesium chloride all over the body. To have an emergency situation where a patient is in desperate need we need the purest available.
For the very purest magnesium oil we now have to turn to Europe. Deep underground is a time old inactive sea of magnesium chloride oil that has never been touched by modern day pollution and there is enough of it down there to last humanity hundreds of years. It is so pure that I use it as a mouth wash and then swallow what is in my mouth for oral supplementation. It is ideal not only for oral intake but practically insures that skin reactions will be absent even at full strength.

To gaze on 64 ounce of it is to gaze on the purest, most powerful medicine obtainable anywhere in the world. Its’ pure healing power and versatility of its use make it a non-option in every medicine cabinet and in every doctor’s dispensary. It certainly would be the product of choice for skin beauty care and for straight oral supplementation. Beauty and health are in reality highly related subjects. Rarely do we see an unhealthy person who is beautiful or a beautiful person who is grossly unhealthy. As we lose our health our beauty is diminished by the diseases we fall victim to. In ancient China magnesium is called the beautiful metal and it will bring nothing but beauty to one’s life, body and skin.

One of Hawaii’s fastest-growing exports is based on a commodity the state is soaking in: seawater.

Super-cold water sucked up from thousands of feet below the Pacific Ocean’s surface is being marketed as healthy, pure, mineral-rich drinking water. Japanese consumers are paying top dollar for desalinated Hawaiian deep-sea water being marketed as a dietary supplement that aids weight loss, stress reduction, skin tone and digestion. So valuable do they find this that they are willing to pay a cool $2,144 a gallon for a concentrated form of this deep sea water. Two-ounce bottles of Hawaii Deep Marine’s Kona Nigari seawater mineral concentrate (to mix with regular water) sell for $33.50 at the Key of Life store in the Royal Hawaiian Shopping Center, reported USA Today.

However, the magnesium oil from this ancient deposit in Northern Europe will be a hit in the Far East where they appreciate the purity and quality of such products especially because the cost is dramatically lower than the price from Hawaii. Lesser quality evaporated seawater magnesium oil would come in at an average of about $1.60 for two ounces (when purchased by the gallon) but there are certain limits we have to put on contamination with heavy metals and other contaminants with any medicinal.
**Special Note about “Pharmaceutical Grade” magnesium chloride products:** Recently there have been several manufacturers of transdermal magnesium chloride products on the web, simply stating the purity of their product as “pharmaceutical grade.” Unfortunately, this is insufficient. It does not give us any real information or insight into the quality of the product. First and foremost, many of them cannot or will not supply laboratory proof to support their claim. Secondly, the standards for pharmaceutical grade magnesium chloride are too relaxed. A producer can refer to their magnesium chloride products as pharmaceutical grade provided that it does not contain more than 10 parts per million of heavy metals (mercury, cadmium, lead, etc) which is definitely not considered to be a product suited for medical use. [end excerpt]

**Learn more about Burt’s Remedies Ultra-Pure Mineral Magnesium Oil: “Great Quality and Low Price”**

Most toxic industrially created magnesium chloride products would weigh in around 80 cents for two ounces and we readily recommend them when nothing else is available.

**Burt’s Remedies** brand offers it all including **Zechstein oil** the unbeatable purest medicinal in the world at an unbeatable price. Medical doctors and all healthcare professionals have to be concerned with the price of products without dropping the ball on quality.

**Burt’s Remedies + Genuine Zechstein = Pure Magnesium**

**Burt’s Remedies Topical Transdermal Mineral Magnesium Oil** is pure magnesium, plain and simple. **Ancient Zechstein Mineral Magnesium Oil** is the most recommended magnesium oil among health practitioners and nutritionists worldwide.

To learn more about our ancient, unadulterated source, visit [GenuineZechstein.com](http://GenuineZechstein.com).