The Definitive Mineral Guide

For Vegetarians

Getting Enough Minerals From Your Vegetarian Diet? Are You Sure?

If you are vegetarian you need the most extensive, in depth information on minerals in regards to dietary health. Why? Because you are excluding many foods that provide a range of nutrients.

Plus, mass farming practices means the amounts of minerals in food continues to plummet. Add to that makers of ubiquitous fast and pre packaged food and drink have put convenience and taste ahead of nutrition punch.

So obtaining the latest knowledge about minerals is now more important than ever, if you want to achieve optimum health.

Does your vegetarian diet fall short of needed minerals?

If you are a vegetarian, or are considering going that route, you no doubt are very conscious that it's a decision that affects the health of your body. Regardless if you've made the choice due to economic, ethical or health reasons, the facts are that giving up animal products changes the array and amount of minerals that you ingest.

Most are aware that it is a considerable dietary deviation to go completely vegetarian, nutritionally speaking. Throughout our long history we have usually consumed some amount of food derived from animals, albeit in lesser amounts than presently. Many consider an omnivorous diet of plant and animal to be optimum, because that is the diet that helped our forefathers and mothers (and more importantly their offspring) live to see another day.

However, going animal free apparently has strong positive associations with reduced coronary heart disease, cancer and unwanted weight gain. But is it possible to get all the necessary nutrients when avoiding whole categories of food we've traditionally eaten?

This guide will explore and drill to the bottom of the debate (avoiding any moral/ethical issues) of whether it's physically possible to get all the same and necessary minerals as a vegetarian as one when eating from all the food groups.

Also, IF the exact same minerals can be gained from a strictly vegetarian diet, then where and in what amounts are these nutrients found.

As well, more questions will be addressed and answered such as: does cooking and freshness affect mineral levels, and if so, by how much? What are the mineral levels of mass farmed vegetables versus organically farmed?

If the conclusion is that a mineral shortfall is possible – or likely- when living as a vegetarian, then what steps can be taken to remedy it? Options such as supplementation will be thoroughly investigated. Does supplementation work, or is it 'snake oil' that gets mileage from the placebo effect? If effective, are there differences of quality? How much do you need to take to ensure you're firing on all cylinders? What does 'calcium fortified' really mean?

It's time to cut through the agenda filled conjecture, and see what lies beneath.

CHAPTER 1

Why Fuss Over Minerals?

Minerals compose approximately 4% of the human body. We cannot create minerals within our bodies, so we must get them from our food. Minerals ultimately come from the earth and eventually return to the earth after being consumed by us. 45% of rich traditional soil is composed of minerals. Yet today's soil has been altered and depleted because of man-made fertilizers, mono-cropping, constant usage that doesn't allow for minerals to bounce back, and more.

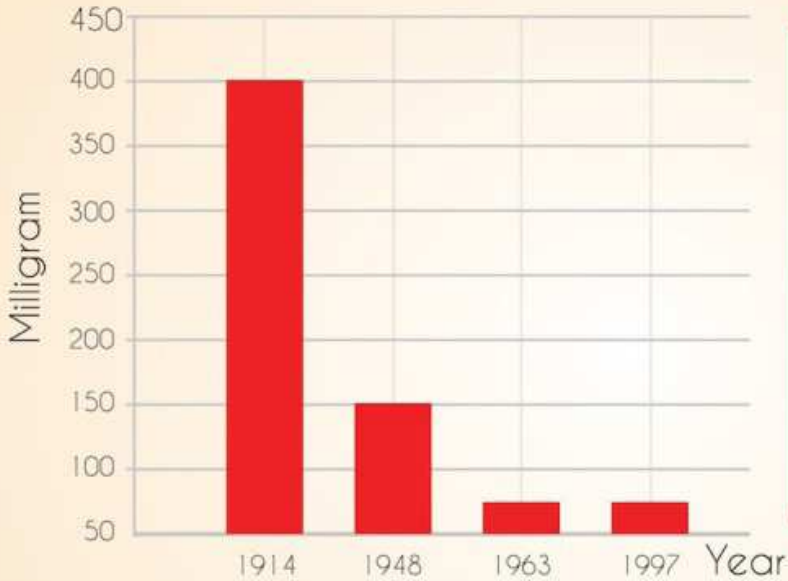
According to a 1992 study, US soils contain 86% less minerals than they did 100 years ago, which means your food has much less minerals than previous generations. (1)

Minerals are all that remain in ash form when plant or animal tissues are burned. Roughly 5 pounds of ash are all that is left from a cremated body.

Of the 103 known minerals, at least 18 are mandatory for good health, yet mineral imbalance and deficiency is epidemic.

THE IMPORTANCE OF MINERALS IN YOUR DIET

Your body needs essential minerals, but mass farming practices have reduced the mineral content, even in fresh vegetables



Between 1914 and 1997, the average mineral content in US Vegetables (cabbage, lettuce, tomatoes, spinach) has dropped from over 400mg to just over 50mg

Source: Lindlahr 1914; Hamaker 1982; US Department of Agriculture 1963 and 1987

Roughly 85% of the female population after childhood fails to get the recommended intake of calcium

Some minerals (like Calcium, Magnesium, Potassium, Sulfur, Chloride, Sodium and Phosphorus) are considered "major" because the body needs them in doses of 100 mg/day or greater; i.e. greater than 0.01% of body weight

AlgaeCal®

Major Essential Minerals - Can't Leave Home Without Them!

Certain minerals are considered "major" because the body needs them in doses of 100 mg/day or greater; i.e. greater than 0.01% of body weight.

They are: Calcium, Magnesium, Potassium, Sulfur, Chloride, Sodium and Phosphorus.

Vegetarians must pay even closer attention to them, where they are found and in what amounts because they are eating from fewer food groups.

Let's take a closer look at these major minerals that are the underpinning of your health.

Calcium is possibly the most important of all the essential minerals for human health. Why? Because it enables muscle contraction, blood clotting, blood vessel contraction and expansion, the secretion of hormones and enzymes, and sending messages through the nervous system.

Over 99% of the calcium in your body is found in your bones and teeth where it is a pivotal component that gives structure. The amount of calcium inside your cells is very low compared to the amount that's in your blood. In response to large numbers of chemicals, like hormones, cells let calcium inside.

Once inside the cells, calcium:

1. Helps insulin open cells up to glucose
2. Assists the release of chemicals that transmit a signal from a nerve cell to a target cell (for example, when a nerve tells a muscle to move)
3. Assists the actual process of contraction of the muscle cell
4. Facilitates fertilization with the movement of sperm into an egg.

Bone is made by cells that construct a ‘scaffold’ with proteins. Calcium and phosphorous combine to form crystal on top of this scaffold, and is integral to give your bone added strength.

Interestingly, calcium (calcium carbonate) is a main ingredient in building construction (a component of cement) used for the same purpose as in your body, as a bond to add strength. (2)

SOURCES:

J. Marler and J. Wallin. Human Health, the Nutritional Quality of Harvested Food and Sustainable Farming Systems, 2006, 1-8.

http://en.wikipedia.org/wiki/Calcium_carbonate#Industrial_applications

CHAPTER 2

The Many Helpful Hats of Calcium

Our skeletons used to be considered an inert calcified part of our physiology, that serve to only keep us from collapsing, much like a tent pole. Our bones have always been viewed as different from our pulsating organs and arteries that are actively working to keep us moving. Maybe that is why bones have not been given the same priority as say, our heart and liver.

However, due to advances in research, modern medicine has begun to view our skeletal system differently. Scientists have discovered that bone plays a critical role in controlling energy balance and weight, sugar metabolism, suggesting the skeleton is actually part of the endocrine system.

Dr. Gerard Karsenty, chair of the department of Genetics and Development at Columbia University Medical Center, and senior author of the paper, explained:

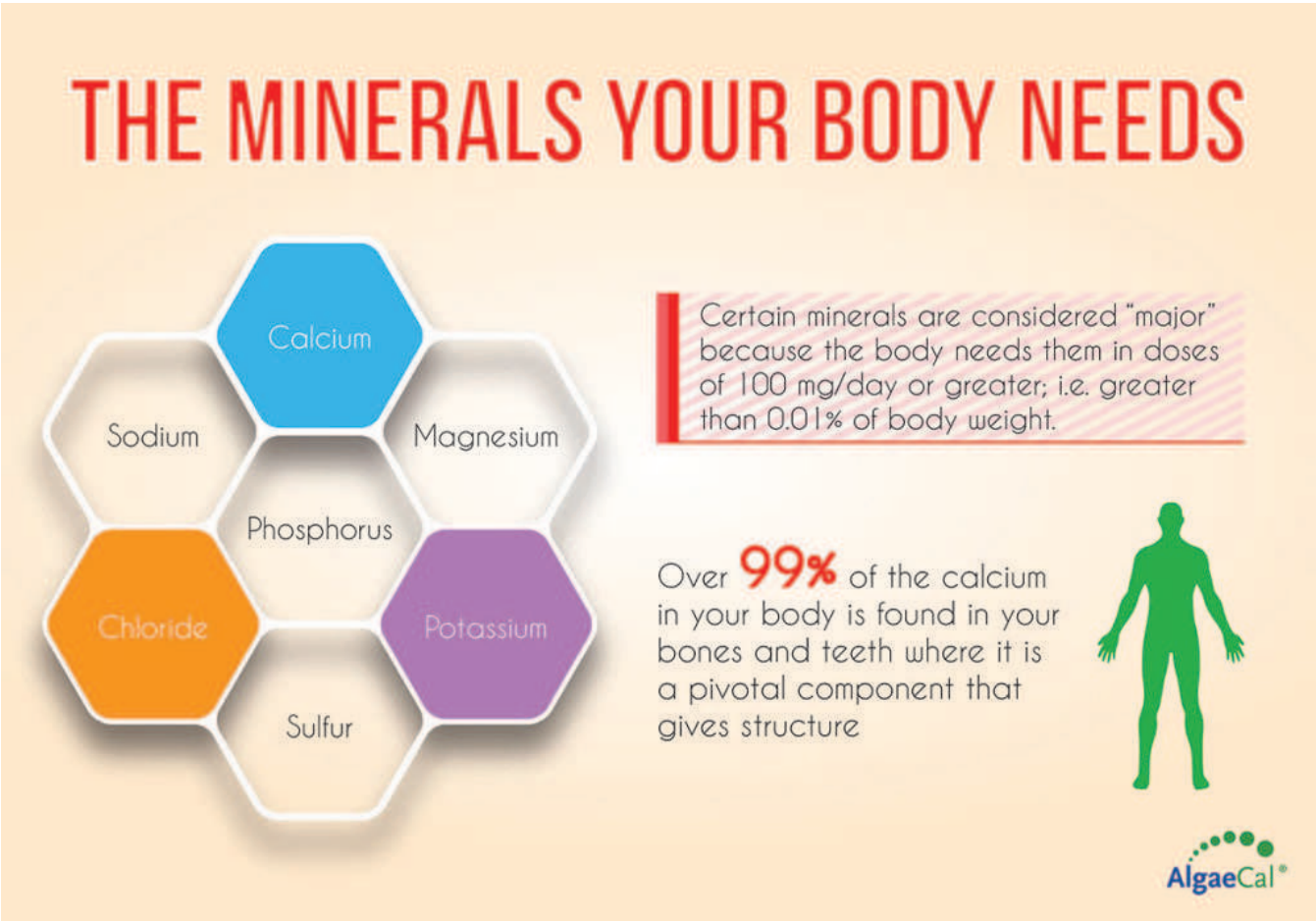
"The discovery that our bones are responsible for regulating blood sugar in ways that were not known before completely changes our understanding of the function of the skeleton and uncovers a crucial aspect of energy metabolism."

The researchers believed that our bone might be involved in metabolism because leptin, involved in the control of bone formation, is also a hormone released by fat cells. So they looked for more molecules that may be communicating between the endocrine system and bone forming cells.

They discovered (using laboratory mice) metabolic processes in which a hormone called osteocalcin (that is released in bone forming cells known as osteoblasts and is known to regulate bone mineralization), also regulates blood sugar and fat deposition.

The research team was able to show that increasing osteocalcin helped prevent the development of obesity and type 2 diabetes in the laboratory mice. (3)

The message from this information is that your bone health influences your overall health and should be given full attention.



Your bones are in a constant state of growth and breakdown. We see the same phenomenon of losing and growing with our skin and hair. Under our skin a perpetual balancing act of formation and resorption (breakdown) is going on with the greatest imbalance being in our youth when growth hugely outpaces resorption. By middle age the balance of new bone creation versus bone loss is roughly equal. After middle age the scale tilts far in favour of more bone loss than formation.

After middle age bone loss outpaces bone growth by about 1% a year. (4)

And there are factors that will even accelerate bone loss beyond 1% per year such as:

1. **Menopause** it leads to an estrogen drop that increases bone loss greater than 1% per year. Estrogen drops even in the 2-8 years leading up to menopause (perimenopause). And in the five to seven years after menopause, a woman can lose up to 20% of her bone density. (5) During certain cancer treatments, females may also experience a drop in estrogen.
2. **Excessive thyroid hormone** can cause bone loss. If your thyroid is overactive, or taking too much thyroid hormone medication to treat an underactive thyroid can increase bone loss.
3. **Excessive alcohol consumption** interferes with the body's ability to absorb calcium, consumption of more than two alcoholic drinks a day over time increases your risk of osteoporosis.
4. **Vitamin D deficient** long term sunscreen use is one of the reasons that most North Americans (especially those who live in the northern weaker sun regions) are vitamin D deficient. Vitamin D is essential for calcium absorption, so D deficiencies have been linked with increased bone loss beyond the norm.

SOURCES:

http://www.medicalnewstoday.com/articles/79522.php
http://jcem.endojournals.org/content/91/3/0.1.full
http://nof.org/articles/235
http://press.endocrine.org/doi/full/10.1210/jcem.91.3.9997

CHAPTER 3

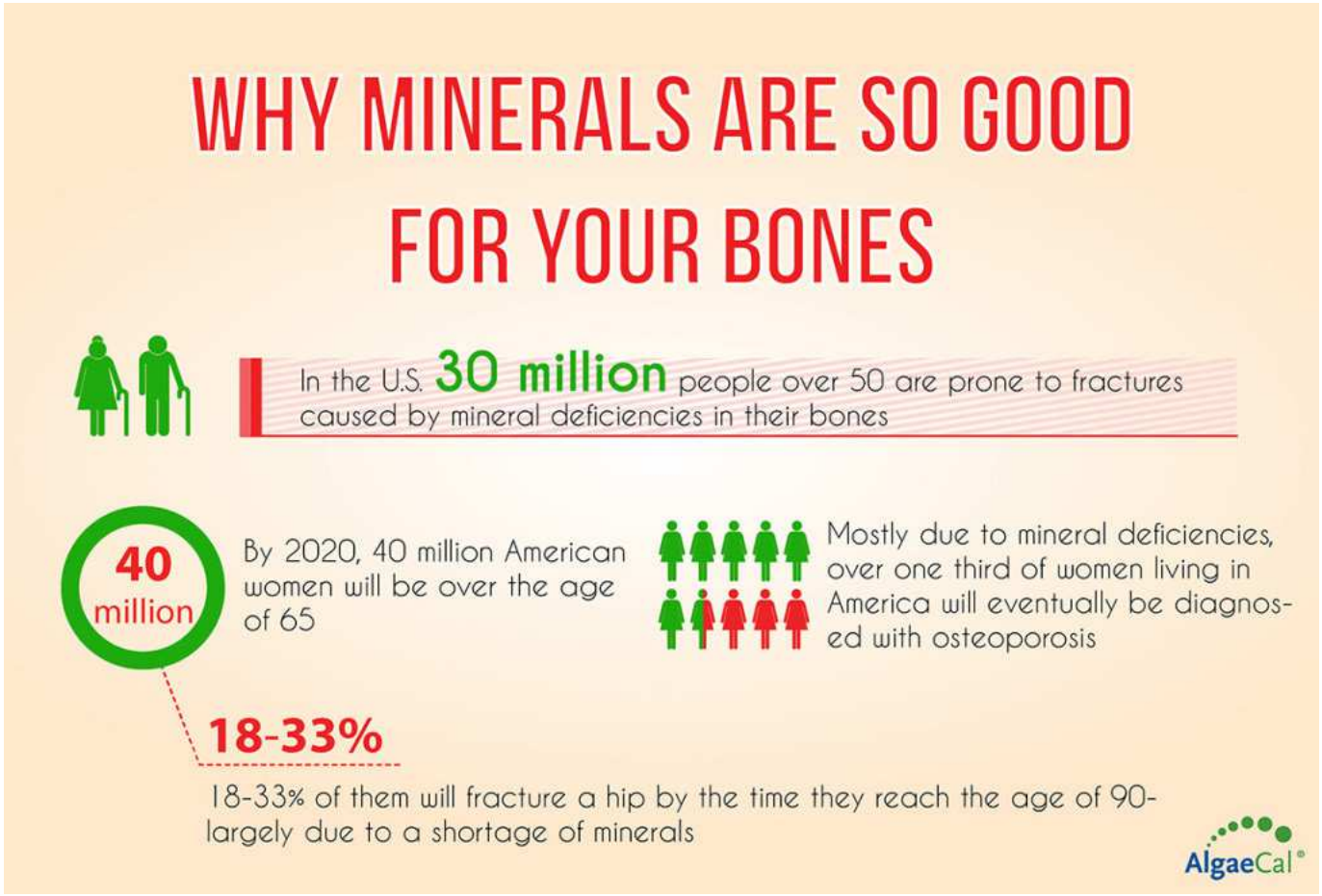
Are We Getting Enough Minerals?

That mineral deficiency is widespread can be seen in the sharp increase in osteoporosis. It is on the rise in most western countries. In the U.S. 30 million people over 50 are prone to fractures caused by mineral deficiencies in their bones. Over one third of women living in America will eventually be diagnosed with osteoporosis.

Osteoporosis is often allowed to get a virtually irreversible foothold because only when you've lost approximately 30% of your bone mass will you be diagnosed with the disease.

By then it is very hard for most people to climb back from that amount of bone deficit. As well, it is speculated that the majority of westerners, due largely to poor diets, have some type of joint degeneration by the time they are 40 years old.

In a perpetual process of breakdown and renewal, every year roughly 20% of our bone mass is recycled and replaced. Bones are huge warehouses for calcium, magnesium, phosphorous, and other minerals, all of which are critical for the healthy operation of every cell in the body. When blood calcium and other mineral levels run low, or if your blood becomes too acidic, a sequence of complex biological reactions begin, telling the body to take needed minerals from bone. When mineral levels in the blood go back to normal, these feedback mechanisms are reversed.



The Calcium Paradox

Calcium for instance is one mineral that is forced to vacate its post in the bones for the greater emergency of buffering (essentially 'mopping up') overly acidic blood. This is one of the main reasons people in western countries, who consume the highest levels of calcium globally, still suffer from the highest rates of osteoporosis. It's so prevalent that it has come to be known as a definition of 'the calcium paradox'.

Vegetarians are generally not as prone to this paradox because it's diets high in animal products that typically drive up the acidity of the blood. But still there are many ways vegetarians can end up with acidic blood that will end up leaching calcium from their bones.

Vegetarians who consume ample calcium still get osteoporosis, and here are some of the reasons why:

Vegetarian Blood Acidifiers :

1. Coffee
2. Alcohol
3. Refined foods (white bread, white rice)
4. Processed foods
5. Sugar

If you consume any or all of these then getting ample calcium is mandatory in order to make up for the possible deficit.

The Calcium Paradox - Part 2

Another often overlooked reason that osteoporosis is hitting epidemic proportions (it's predicted that by 2020, 40 million American women will be over the age of 65, and 18- 33 percent of them will fracture a hip by the time they reach the age of 90) is because of a shortage of other minerals. (1)

So the problem is not just to do with calcium. Phosphorous, magnesium, and other minerals such as vanadium, silica, strontium, manganese and more all are 'ingredients' that make up our bone matrix. This is exactly why optimum amounts of these are necessary to provide the building blocks necessary to stave off osteoporosis.

Trace minerals will be covered later in this article, but first let's consider...

How Much Calcium Do You Need?

Recommended Dietary Allowances (RDAs) for Calcium (3)

Age	Male	Female	Pregnant	Lactating
0 – 6 months *	200 mg	200 mg		
7 – 12 months *	260 mg	260 mg		
0 – 6 months *	200 mg	200 mg		
1 – 3 years	700 mg	700 mg		
4 – 8 years	1,000 mg	1,000 mg		
9 – 13 years	1,300 mg	1,300 mg		
14 – 18 years	1,300 mg	1,300 mg	1,300 mg	1,300 mg
19 – 50 years	1,000 mg	1,000 mg	1,000 mg	1,000 mg
51 – 70 years	1,000 mg	1,200 mg		
71 + years	1,200 mg	1,200 mg		

Calcium Intake Chart

CALCIUM		
Age in years	AI (mg)	% Not meeting AI
Males & Females:		
1-3	500	5
4-8	800	32
Males		
9-13	1300	83
14-18	1300	58
19-30	1000	44
31-50	1000	42
51-70	1200	74
71 and over	1200	86
Females:		
9-13	1300	88
14-18	1300	90
19-30	1000	72
31-50	1000	67
51-70	1200	92
71 and over	1200	93
Pregnant 19-50	1000	27
Total		94

The message from the chart above is that 75% of females and 64% of males are not meeting what's considered to be the 'adequate intake' (AI) of calcium.

Plants That Deliver You Calcium

Food	Serving	Calcium
Collard Greens (Cooked)	1 cup	357 mg
Blackstrap molasses	2 Tbsp	344 mg
Figs	1 cup	300 mg
Turnip Greens (Cooked)	1 cup	249 mg
Kale (Cooked)	1 cup	179 mg
Okra (Cooked)	1 cup	177 mg
Bok Choy (Cooked)	1 cup	158 mg
Dandelion Greens	1 cup	147 mg
Mustard Greens	1 cup	150 mg
Tahini	2 Tbsp	130 mg
Brocoli	1 cup	100 mg
Almonds	1/4 cup	89 mg
Almond Butter	2 Tbsp	86 mg
Garbanzo Beans	1 cup	80 mg

SOURCES

http://www.iofbonehealth.org/facts-and-statistics/index.html
Committee to Review Dietary Reference Intakes for Vitamin D and Calcium, Food and Nutrition Board, Institute of Medicine. Dietary Reference Intakes for Calcium and Vitamin D. Washington, DC: National Academy Press, 2010.

CHAPTER 4

Magnesium: The Soothing Mineral

Did you know that mighty magnesium is responsible for over 300 biochemical reactions in your body? Some of the tasks magnesium does on a daily basis are maintenance of normal muscle and nerve function, steadies your heart rhythm and nerves, keeps your immune system strong and protective, and helps to maintain your bone density and strength, blood glucose control, and blood pressure regulation. (1)

You have almost a full ounce of magnesium in you, and half of that is in your bones, with the rest being in your soft tissues. Only a very small and specific amount (less than 1%) is in your blood.

Equilibrium is tightly controlled by the kidneys, and about 120 mg per day is excreted through urine. Amazingly, if you are low on magnesium your body headquarters will sense it and reduce excretion of it.

Though the amount of magnesium in your blood is very small compared to your bones, it is used as the gage to tell if you are getting enough, or too much. This makes the accuracy of such measurements questionable, as the majority of magnesium is in your cells and bones.

Other methods are also used such as measuring urine and saliva, but still there is uncertainty to the accuracy. This is why it is very important to self monitor for deficiency symptoms, which will be covered later.

Recommended Dietary Allowances (RDAs) for Magnesium (2)

Age	Male	Female	Pregnant	Lactation
0 – 6 months	30 mg*	30 mg*		
7 – 12 months	75 mg*	75 mg*		
1 – 3 years	80 mg	80 mg		
4 – 8 years	130 mg	130 mg		
9 – 13 years	240 mg	240 mg		
14 – 18 years	410 mg	360 mg	400 mg	360 mg
19 – 30 years	400 mg	310 mg	350 mg	310 mg
31 – 50 years	420 mg	320 mg	360 mg	320 mg
51 + years	420 mg	320 mg		

* Adequate Intake (AI)

Foods Where Magnesium Lives

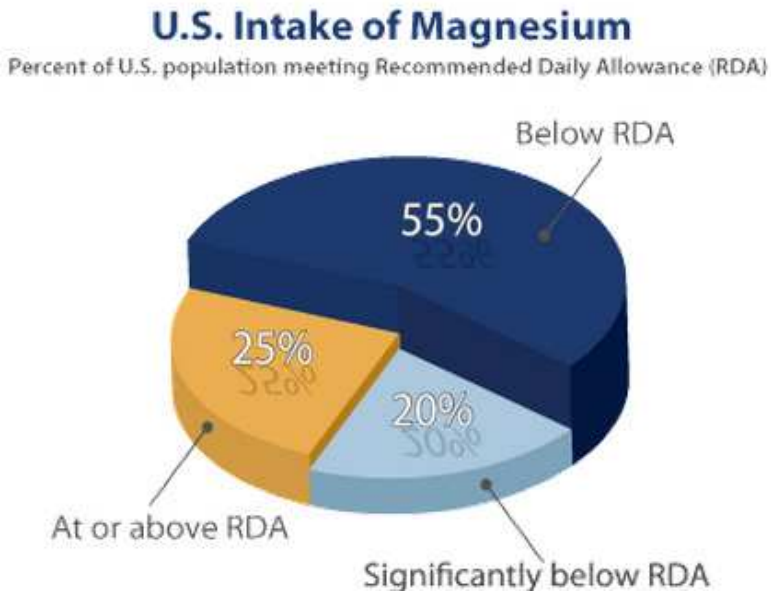
Generally speaking, foods that are high in fiber also contain magnesium. For the most part magnesium is found in many plants and animal products, and is added to things such as breakfast cereals and more – so it is readily available. Yet many still don't get enough magnesium.

Selected Food Sources of Magnesium [3]

Food	Milligrams (mg) per serving	Percent DV*
Almonds, dry roasted, 1 ounce	80	20
Spinach, boiled, ½ cup	78	20
Cashews, dry roasted, 1 ounce	74	19
Peanuts, oil roasted, ¼ cup	63	16
Cereal, shredded wheat, 2 large biscuits	61	15
Soymilk, plain or vanilla, 1 cup	61	15
Black beans, cooked, ½ cup	60	15
Edamame, shelled, cooked, ½ cup	50	13
Peanut butter, smooth, 2 tablespoons	49	12
Bread, whole wheat, 2 slices	46	12
Avocado, cubed, 1 cup	44	15
Potato, baked with skin, 3.5 ounces	43	11
Rice, brown, cooked, ½ cup	42	11
Yogurt, plain, low fat, 8 ounces	42	11
Breakfast cereals, fortified with 10% of the DV for magnesium	40	10
Kidney beans, canned, ½ cup	35	9
Banana, 1 medium	32	8
Salmon, Atlantic, farmed, cooked, 3 ounces	26	7
Milk, 1 cup	24-27	6-7
Halibut, cooked, 3 ounces	24	6
Raisins, ½ cup	23	6
Chicken breast, roasted, 3 ounces	22	6
Beef, ground, 90% lean, pan broiled, 3 ounces	20	5
Broccoli, chopped and cooked, ½ cup	12	3
Rice, white, cooked, ½ cup	10	3
Apple, 1 medium	9	2
Carrot, raw, 1 medium	7	2

Could YOU Be Magnesium Deficient?

Magnesium deficiency is fairly uncommon because of the impressive ability of our body to deal with shortages. When you are consuming too little magnesium from your diet, as mentioned previously, your body chooses to excrete less of it through urine, as a method to conserve what it can. However, even this remarkable rationing system can only succeed for so long. Because chronic long term low intake of magnesium, or alcoholism or using certain medications leach minerals to a greater degree than your body can compensate for.



Magnesium deficiency is so dangerous, because the initial symptoms of appetite loss, nausea, vomiting lead to even greater deficiency. The next more serious stage is increased fatigue, weakness, personality changes, muscle contractions and cramps, numbness, tingling, seizures,abnormal heart rhythms, and coronary spasms. The most severe magnesium deficiencies will start to negatively affect your calcium and potassium levels because mineral homeostasis is disrupted. (4)

SOURCES:

http://ods.od.nih.gov/factsheets/Magnesium-HealthProfessional/
Dietary Reference Intakes: Calcium, Phosphorus, Magnesium, Vitamin D and Fluoride. Washington, DC: National Academy Press, 1997.
U.S. Department of Agriculture, Agricultural Research Service. USDA National Nutrient Database for Standard Reference, Release 25. Nutrient Data Laboratory Home Page, 2012.

CHAPTER 5

Potassium: Can it Make You Smarter?

Potassium, a soft silvery metal is an essential electrolyte. Elemental potassium is very reactive with water, creating enough heat to ignite the hydrogen emitted in the reaction and burning with a blue flame. 0.2% of your body is potassium, which makes it eighth or ninth most common element by mass. That means most adults have a total of about 120 g of potassium within them. We all have in us the same amounts of potassium as sulfur and chlorine. Only calcium and phosphorus are more abundant in our bodies.

What It Does

Potassium is crucial for neuron (brain and nerve) function, and for osmotic balance between cells and the interstitial fluid, which is the fluid outside of your cells. It helps to lower blood pressure in men and women more so in people with high blood pressure and in black men and women. So given today's high sodium diets, potassium is your ally as it combats the blood pressure-raising effects of a high sodium diet.

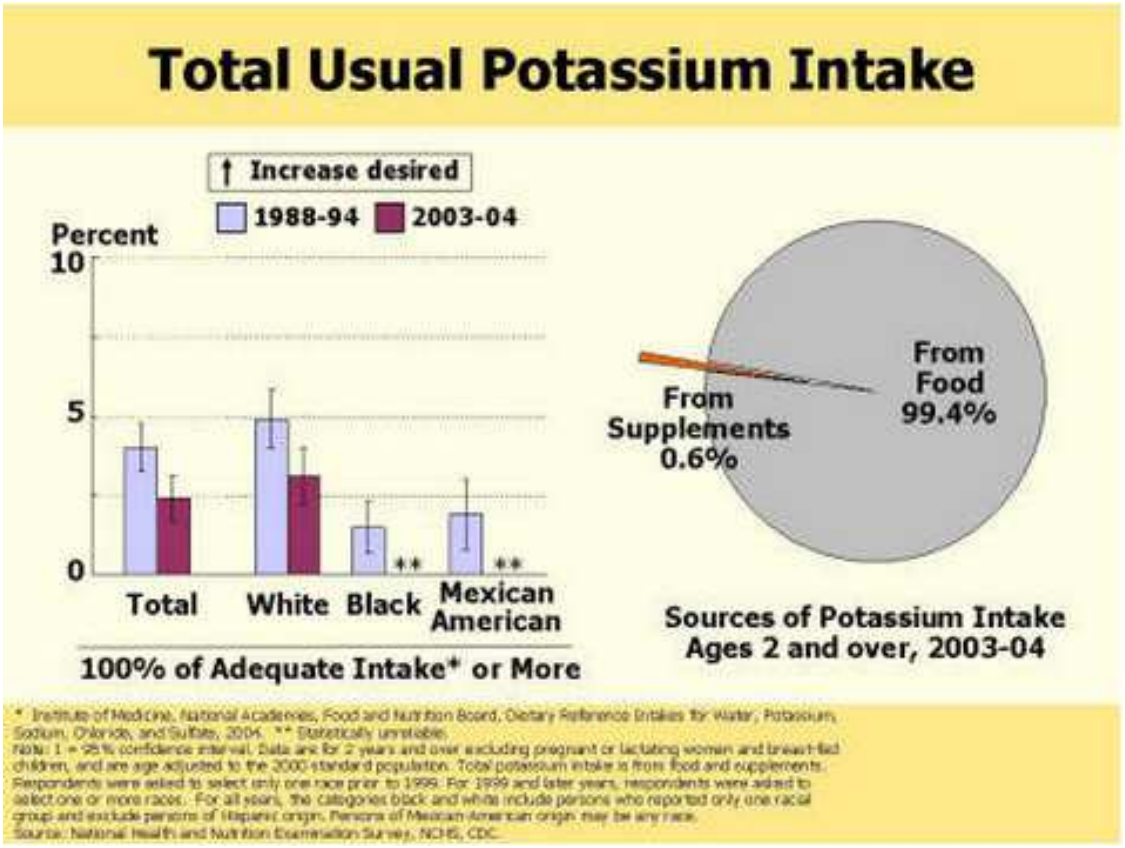
How Much Potassium?

We need 4.7 grams of potassium per day but approximately 10% of men and less than 1% of women get this amount of potassium. Most people take in roughly 60% of the amount of potassium that is recommended. (1)

Potassium triggers three of the five types of taste sensations, according to concentration so it can be detected by taste.
So small amounts of potassium are sweet, making moderate concentrations in milk and juices palatable. But larger concentrations are more bitter and salty to the taste. As a result liquid drinks with high-dose potassium supplementation are a challenge for consumers.

Potassium Rich Foods

White beans, parsley, spinach, dried apricots, dried milk, chocolate, various nuts (especially almonds and pistachios), potatoes, bamboo shoots, bananas, avocados, soybeans, and bran, most meats and fish.



The graph above shows that less than 5% of people (in 2003-4) are reaching 100% of what's considered to be 'adequate' levels of potassium.

That means the majority of people, due to inadequate potassium levels, are experiencing low energy, cramping, anxiety and more…

SOURCES:

http://ods.od.nih.gov/factsheets/Magnesium-HealthProfessional/#h7

CHAPTER 6

Chloride: Carries Nutrients in, Waste Out

Chloride (along with the other major potassium and sodium) is an essential electrolyte. That means it dissolves in water and carries an electrical charge. As the body is made mostly of water, electrolytes are found in all corners - in cells, in the areas between cells, the blood, glands and more.

As electrolytes have electrical charges (chloride is positive, potassium and sodium are negative), they travel back and forth easily through the membranes of cells. Crucial, because they carry other nutrients in with them as they move into a cell, and they carry out waste products and excess water as they move out of it. (1)

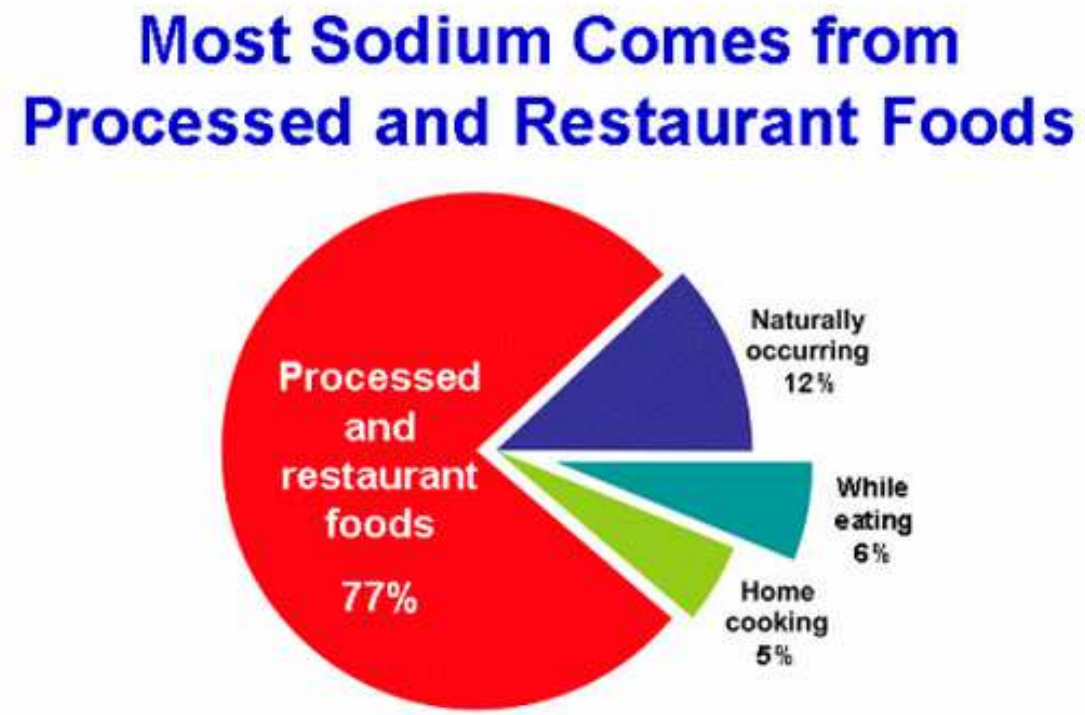
Chloride is in charge of maintaining acid/base balance, sending nerve impulses, and with the help of sodium and potassium allows for the passage of fluid in and out of cells. We get chloride everyday mostly from salt, such as sea salt or standard table salt. But you are also ingesting it in common foods such as olives, lettuce, celery and tomatoes. And as you'd suspect there's quite a bit in items like seaweed and dulse.

Chloride moves around your body mostly with sodium and water. And it assists in generating the osmotic pressure of body fluids.

Chloride is crucial for your digestion as it's a big component of the key digestive stomach acid, hydrochloric acid. It's mandatory to keep regular your acid-base balance. Depending on whether they are trying to increase or decrease body acid levels, the kidneys get rid of or hang on to chloride mainly as sodium chloride. As well it is believed that chloride is instrumental in allowing the liver to get rid of waste products.

Too Much or Too Little?

Too much chloride (in excess of 15 grams daily) typically is a result of salt consumption. If it happens your acid alkaline balance will be affected, though the real culprit is the sodium itself and you'll experience an increase in your blood pressure. Most adults need 1.7-5 grams daily. The RDA (Recommended Dietary Allowance) is 2.3 grams and the UL (Tolerable upper intake levels) is 3.6 grams , but due to our salt rich western diets many people exceed that range.



Too little chloride in your body is usually a result of diarrhea, vomiting, or sweating.

The outcome is your body fluids become too alkaline (called alkalosis) and you can experience low fluid volume, and urinary potassium loss. This can exacerbate the acid alkaline imbalance, but is alleviated by ingesting chloride.

SOURCES:

http://www.traceminerals.com/research/chloride

CHAPTER 7

Sulphur and Phosphorous

Sulphur is the third most abundant mineral in your body, after calcium and phosphorous.

Sulphur :

1. Increases cardiovascular health because it thins the blood and lowers blood cholesterol.
2. Manufactures taurine, an amino acid essential for a healthy heart.

Sulphur is needed for

3. The proper function of the mitochondria, the energy manufacturers inside your cells. It is even a part what makes up the crucial hormone insulin.
4. Cartilage and connective tissues contain proteins with supple sulphur bonds, giving those structures the needed flexibility and sulphur increases the body's immune response, and is believed to inhibit the growth of some tumours.
5. Hair and nails that are made up of a resilient protein called keratin that has sul phur bonds that helps give it its strength and resilience.
6. Amino acids contain sulphur and are are excellent antioxidants that have cancer prevention properties. (1)

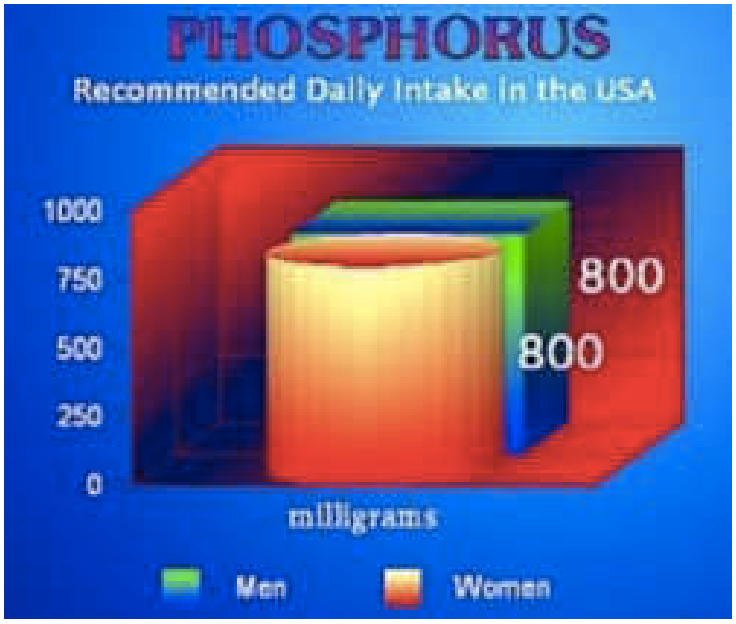
Sulphur-rich foods

1. **Vegetables:** broccoli, cauliflower, cabbage and Brussels sprouts, kale, callaloo, spinach, asparagus, okra, lettuce, sweet corn, and eggplant.
2. **Allium vegetables**: onions, garlic, leeks, shallots and chives. This group is an excellent source of sulphur.
3. **Beans:** Beans are high in sulphur, steamed soybeans have the highest sulphur content of all, as are most types of peas.
4. **Fruits:** The avocado is the fruit with the highest sulphur content, followed by kiwi, bananas, pineapple, strawberries, melons, grapefruit, grapes, oranges and peaches.
5. **Meats**: Turkey, chicken, goat, pork, most fish and beef are very high in sulphur.
6. **Eggs:** Eggs are a great source of sulphur. Chicken eggs, particularly the yolks, are rich in sulphur. One quail's egg offers almost as much sulphur as a serving of meat.
7. **Other foods**: Other high-sulphur foods include dairy products, chocolate, cof fee, tea, grains, sesame seeds, cashews, peanuts, pistachios and other nuts

Phosphorous - Your Body's Buffer

Phosphorus is the second most plentiful inorganic element in the body and is a part of many important compounds. Approximately 85% of the body's phosphorus is found your bones and the rest is distributed through the soft tissues. (2)

It is crucial because it helps to maintain normal acid-base pH balance by acting (along with calcium) as one of the body's most important buffers. Additionally, the phosphorus-containing molecule binds to hemoglobin in red blood cells and affects oxygen delivery to the tissues of the body. Phosphorous also acts as a temporary store and transport mechanism for energy.



Up to 70 percent of absorbed and retained phosphorus combines with calcium to help form one and tooth structure, while the remaining 30 percent combines with nitrogen to metabolize fats and carbohydrates.

As well, nucleic acids (DNA and RNA), which store and transmit genetic information, are long chains of phosphate-containing molecules. A number of enzymes, hormones, and cell-signaling molecules depend on phosphorylation for their activation. Phosphorylation is the addition of a phosphate group to a protein or other organic molecule.

It is recommended that we get roughly 800 mg daily of phosphorous. Bioavailability estimates of phosphorous range from 55 to 70% for adults.

Inadequate intakes or malabsorption of phosphorus include anorexia, anaemia, muscle weakness, bone pain, rickets, osteomalacia, increased susceptibility to infection, paresthesias (sensation of burning or tingling skin), ataxia (coordination issues), confusion and possibly death. (3) However, phosphorus is so common in the food supply that deficiency is rare.

Phosphorus Content of Selected Foods

Food Item	Portion size	Phosphorus (mg)
Cottage cheese	1 cup	340
Cereal, 100% bran	1/2 cup	340
Wheat bran	1/2 cup	304
Beef, sirloin, braised	3.5 oz	259
Yogurt, fruit flavored	1 cup	247
Milk, whole	1 cup	228
Chicken, roasted, light meat	3.5 oz	216
Rye bread	1 slice	40
Cereal, corn flakes	1 cup	11

SOURCES:

http://umm.edu/health/medical/altmed/supplement/sulfur
http://umm.edu/health/medical/altmed/supplement/phosphorus
http://www.acu-cell.com/pna.html

CHAPTER 8

Trace Minerals: What do You Need?

Trace minerals are referred to as such because unlike the 'major' minerals calcium, magnesium and a few others, we need only 50 micrograms to 18 milligrams of these per day.

Trace Mineral	Recommended Dietary Allowance (RDA)	Important Dietary Sources
Iron	10.0 – 18.0	Whole grain product; enriched breads & cereals; meat (especially organ meats), poultry, fish, vegetables and legumes
Zinc	15.0	Meats (especially beef and organ meats), poultry, seafood (especially oysters)
Manganese	2.5 – 5.0	Whole grain products; nuts
Cooper	2.0 – 3.0	Nuts; organ meats; legumes; whole grain products; fruits and vegetables
Flouride	1.5 – 4.0	Flouridated water, seafood, green leafy vegetables
Molybdenum	0.15 – 0.5	Meats; whole grain products; legumes
Iodine	0.15	Iodinized salt, seafood, dairy products
Chromium	0.05 – 0.2	Meats, meat products; cheese; whole grain products
Selerium	0.02 – 0.2	Whole grain products; meats; poultry, fish

Cobalt

It serves as a constituent of the vitamin B-12. It plays a major role in the process of erythropoiesis, in which red blood cells are produced. It is necessary for daily growth and routine maintenance. Health experts recommend around 1.5 µg of vitamin B12 daily; the daily B12 RDA is 2.4 µg for adults. To date no Cobalt RDA has been established.

Cobalt Food Sources : Foods that are highly rich in cobalt include milk, green leafy vegetables, meat, liver, clams and oysters. The USDA recommends every individual to have sufficient amount of cobalt rich food daily.

Copper

Essential for the formation of red blood cells and connective tissue formation. Acts as a catalyst to store and release iron to help form hemoglobin. It also helps in keeping the blood vessels, nerves, immune system, and bones healthy.

1. **Copper Food Sources :** Oysters and shellfish, whole grains, dark leafy greens, dried fruits such as prunes, cocoa, black pepper, and yeast beans, nuts, potatoes, and organ meats (kidneys, liver) are good sources of copper.

Iodine

Crucial for normal thyroid function, and for the production of thyroid hormones. A deficiency in iodine can lead to: goiter (enlargement of the thyroid gland), fatigue, weakness, depression, and weight gain.

Adequate amounts of iodine are essential for growth and development of the brain. Other conditions associated with low iodine include ADHD, multiple sclerosis, Alzheimer's disease, pregnancy loss, Parkinson's disease and other nervous system diseases.

2. **Iodine Food Sources** : Sea vegetables, yogurt, cow's milk, eggs, strawberries and mozzarella cheese. Fish and shellfish can also be concentrated sources of iodine.

Iron

Iron is needed for the formation of red blood cells and is mandatory for the transport of oxygen through the body. Iron is important for optimal brain functioning and is required in greater amounts for women of childbearing age.

Iron is part of haemoglobin (the pigment of the red blood cells) binding to the oxygen and facilitating its movement from the lungs by way of the arteries to cells throughout the body.

After the oxygen is delivered, the iron (as part of haemoglobin) binds the carbon dioxide, which is then moved back to the lung, where it gets exhaled. Iron also plays a needed role in the conversion of blood sugar to energy. The production of enzymes also relies on iron, and is crucial during the recovery process from illnesses or following strenuous exercise.

The immune system is dependent on iron to properly function and mental and physical growth require sufficient iron levels. Low iron levels can cause iron-deficiency-anemia which will show itself in various ways such as dizziness, pale skin, low energy, and peeling nails.

Vegetarians need almost twice the daily recommended (18-45mg/day) amount of iron compared with non-vegetarians because Iron from plant-based foods is not absorbed as well by our bodies as animal sources.

1. **Iron Food Sources :** Meat, fish and poultry, dried beans, peas and lentils and some fruits and vegetables.

Manganese

Manganese is an important component of enzyme systems, including oxygen-handling. It supports brain function and reproduction and is required for blood sugar regulation and optimal bone structure.

1. Assists to utilize several crucial nutrients such as biotin, thiamin, ascorbic acid, and choline
2. Helps make bones strong and healthy
3. Assists body to synthesize fatty acids and cholesterol
4. Maintains proper blood sugar levels
5. Promotes best functioning of thyroid gland
6. Maintains health of nerves
7. Protects cells from free-radical damage

8. **Manganese Food Sources :** Nuts, wheat germ, bran, mussels, oysters, clams, flaxseed.

Molybdenum

Molybdenum helps to break down sulfite toxin build-ups in the body, and is thought to prevent cavities and is considered to have antioxidant properties. It helps to fight nitrosamines, which are linked with cancer, and is believed to help prevent anemia. It is also required for normal cell function and nitrogen metabolism.

9. **Molybdenum Food Sources :** Milk, lima beans, spinach, liver, grain, peas and other dark green leafy vegetables.

Selenium

It plays a role in the detoxification of heavy metals, such as mercury. Selenium is a crucial component of a key antioxidant enzyme, and is essential for normal growth and development. It is important for the production of antibodies by the immune system, and is part of the matrix of teeth and bone.

Zinc

As with iron, zinc is a mineral that is better absorbed from animal sources, though present in plant foods. It's an essential part of over 200 enzymes involved in digestion, metabolism, reproduction and wound healing. Zinc plays a critical role in immune response and is better absorbed when eaten in combination with vitamin C rich foods.

1. **Zinc Food Sources :** Soy products, legumes, grains, cheese and nuts. (1)

SOURCES:

http://ajcn.nutrition.org/content/78/3/633S.long

CHAPTER 9

Could YOU be Mineral Deficient?

Let's look at the numbers of how many people suffer needlessly from mineral deficiency.

One of the leading researchers on calcium writes that 'roughly 85% of the female population after childhood fails to get the recommended intake of calcium'. (1)

The NIH (National Institute of Health) has announced in the 'New Recommended Daily Amounts' that adults should make sure to get a minimum of 1000-1300 mg of calcium per day.

Yet despite the recommendation, the average American gets only around 700 mg per day.

The WHO (World Health Organization) have stated that 75% of Americans do not reach the Recommended Daily Intake (RDI) of magnesium. (2) This chart shows a possible correlation between risk of stroke and your magnesium and potassium levels.

Someone You Know is Mineral Deficient

Certain groups, due to medical conditions that restrict absorption, and lifestyle choices are more likely than others to be at risk of mineral deficiency:

Gastrointestinal Diseases

Mineral depletion can result from chronic diarrhea and fat malabsorption that characterizes celiac disease, regional enteritis and Crohn's disease. And malabsorption is often one of the by products of resection or bypass of the small intestine, especially the ileum.

Type 2 diabetes

Higher concentrations of glucose in the kidney is a result of insulin resistance and/or type 2 diabetes. This factor increases urine output, which increases mineral loss.

Alcohol dependence

Chronic alcoholism creates many health issues, and mineral deficiency is a common one. It's a cumulative effect due to all the surrounding problems that arise from chronic alcoholism: poor dietary intake, gastrointestinal problems (vomiting, diarrhea, and steatorrhea resulting from pancreatitis); renal dysfunction that leads to excess excretion of minerals into the urine, as well as phosphate depletion; lack of vitamin D, and extreme alcoholic ketoacidosis all contribute to decreased mineral levels.

Older adults

People past middle age statistically consume less dietary minerals than younger adults. As well, with age, absorption from the gut goes down and renal excretion goes up. Aging adults are also more likely to take medications that alter mineral status, and have chronic diseases which often increase their risk of depletion and deficiency.

THE QUEST FOR PRECIOUS MINERALS

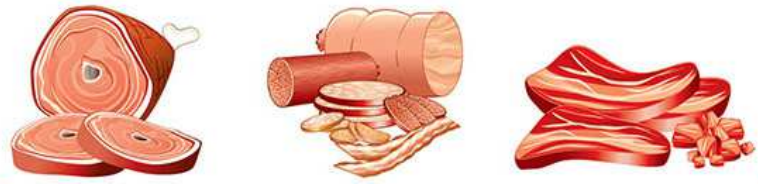
55% of Americans take in less than the Recommended Daily Amount (RDA) of magnesium

Most people get only 60% of the Recommended Daily Amount (RDA) of potassium

Vegetarians need almost twice the daily recommended (**18-45mg/day**) amount of iron compared with non-vegetarians

AlgaeCal®

(Because iron from plant-based foods is not absorbed as well by our bodies as meat and dairy sources)



How Much Minerals Do You Really Need?

There are varying opinions on how much minerals we really need. Many people rely on an intuition of sorts, thinking that the body instinctively knows what is lacking and gravitates towards it. But if that were true, no one would ever have a mineral deficiency.

The fact is, mineral deficiencies are a very real and documented issue even these days, so it proves the body actually doesn't just 'know' and gravitate to what it needs.

To be in peak health requires keeping the tank full. To do that means a more systematic mineral monitoring system is needed. Let's first see what the government says is needed by the body.

What's RDA, UL and DV Mean?

1. Tailored to women, men, and specific age groups the RDA (Recommended Dietary Allowance) and the AI (Adequate Intake) are the amount of minerals required to avoid nutritional deficiencies, according to U.S. and Canadian authorities.
2. The maximum amount that you can safely take without overdosing or having serious side effects is referred to as UL (Tolerable Upper Intake Level).
3. On food and supplement labels the only measurement you'll find, due to spacelimitations, is the DV (Daily Value). It represents the amount of a vitamin or nutrient that a person should get for optimum health from a 2,000 calories-a-day diet.Sometimes the DV is same as the RDA, but not always. (3)

But Does ‘Recommended’ and ‘Adequate’ Mean ‘Ideal’?

The government RDA and AI are amounts suggested so that you avoid getting diseases such as scurvy (from too little vitamin C) and osteoporosis (too little calcium). Defined as “the daily dietary intake level of a nutrient considered sufficient by the Food and Nutrition Board to meet the requirements of 97.5% of healthy individuals in each life-stage and gender group.” (4)

But is there a benefit from increasing the amounts past the recommendations? Some sources indicate the RDA amounts are based on dated information and geared simply for basic survival. Also Roger Williams, Ph.D. and others state that mineral requirements can be a 10 fold difference between individuals.

Many authorities challenge the suggested RDIs as being far too low. Linus Pauling, a pioneer and advocate of orthomolecular levels of vitamin C devoted his life’s work to proving that 100 to 300 times the RDA level was closer to what is optimum. (5)

Are there health benefits to be had from increasing mineral amounts?

According to proponents of ‘orthomolecular’ or ‘megadose’ therapy the answer is often “yes”, because RDI tables are incorrect in assuming all people have the same mineral needs, and because the amounts needed to stay alive is different from the amounts needed to thrive. (6)

Mineral Deficient? An Easy Fix

The statistics imply that most people are mineral deficient:
“70 percent of all adults and children in the U.S. do not eat the recommended five to nine servings of fruits and vegetables a day for good health,” says the National Cancer Institute. (7)

This is despite decades of mass education on the topic of nutrition. And for the 30% who do, it’s not certain they are getting enough minerals, due to widespread soil depletion.

As well, roughly 1/3rd of Americans say they are are on a diet at any given time, which is problematic, as studies show many popular weight loss plans are nutrient deficient, unless supplements are added. (8)

And how do vegetarians fare? Many feel that their mineral needs must be adequately covered - because they eat more vegetables than the norm. There is intuitive logic to this viewpoint, as vegetables typically are where most minerals are found.

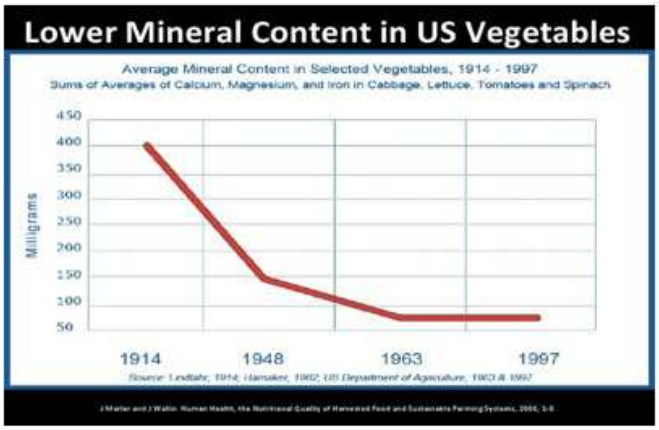
However, what must be kept in mind is that vegetables are only as mineral rich as the soil they are grown in. Soil depletion due to mass farming is not a theory, but a proven fact. Each successive generation of pest-resistant, speed grown vegetable is less nutritious than the one before. (9) Add to that countless fertilizers and pesticides that bind trace minerals in the soil (allowing fewer minerals to be absorbed by the fruits and vegetables grown in that soil).

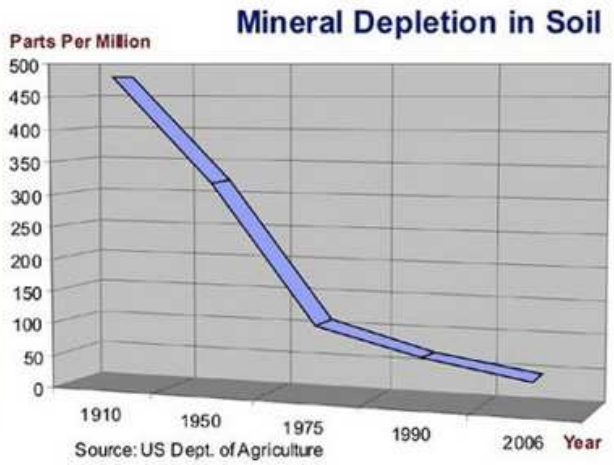
Fertilizers are used to make up for mineral depletion in soils (caused by over farming, as well as acid rain).

However, fertilizers typically replace only 3-5 minerals, a far cry from the 70 trace ones traditionally present in soils. They say you can’t get blood from a stone, or for vegetables to draw trace minerals from soil that has none.

Some Disturbing Evidence

An analysis of nutrient data from 1975 to 1997 found that average calcium levels in 12 fresh vegetables has fallen 27 percent, iron 37 percent; vitamin A 21 percent, and vitamin C 30 percent. (10)





Another study published in the British Food Journal looked at 20 different vegetables and discovered that from 1930 to 1980 calcium had fallen 19 percent; potassium 14 percent, and iron 22 percent.

SOURCES:

http://ajcn.nutrition.org/content/85/1/300S.full
http://www.ancient-minerals.com/magnesium-deficiency/#footnote_0_109/
http://en.wikipedia.org/wiki/Dietary_Reference_Intake
http://lpi.oregonstate.edu/infocenter/lifestages/children/
http://lpi.oregonstate.edu/lpbio/lpbio2.html
http://www.orthomolecularhealth.com/nutrients/vitamins-minerals/
http://forums.lymphoma.com/archive/index.php/t-16698.html
http://www.jissn.com/content/7/1/24
http://www.nutritionalwellness.com/archives/2006/jul/07_depleted_soil.php
http://www.scientificamerican.com/article.cfm?id=soil-depletion-and-nutrition-loss

CHAPTER 10

Supplements: Safety AND Insurance

After years of knocking supplements, the Journal of the American Medical Association (JAMA) has finally acknowledged how people are needlessly vitamin and mineral deficient, and recently published the statement that every person should take a multi mineral/vitamin daily saying “suboptimal intake of some vitamins (and minerals), above levels causing classic deficiency, is a risk factor for chronic diseases and common in the general population, especially the elderly.” (1)

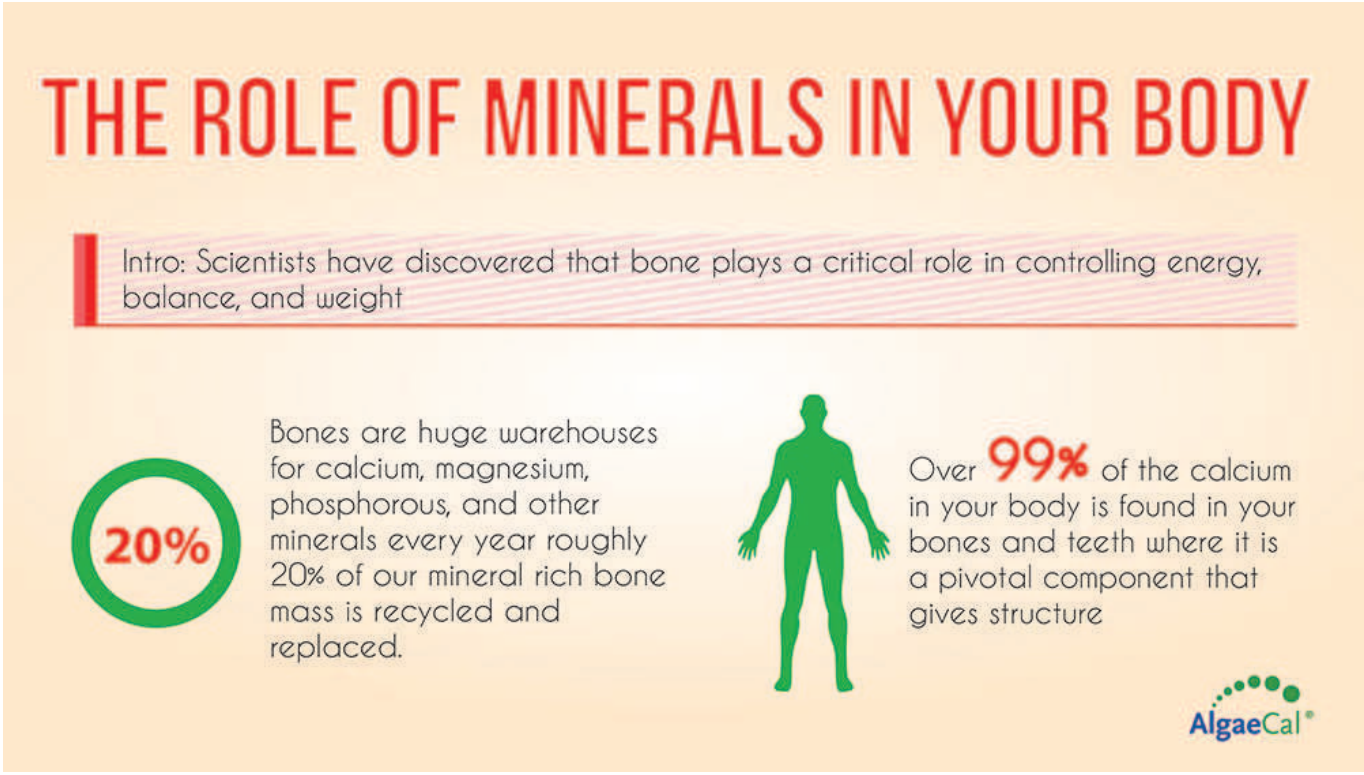
But deciding which supplements to go with can be tricky, as there are hundreds of products to choose from, with many different quality ranges.

There are many stand alone products you can buy to top up individual minerals. For example, calcium, or magnesium only products are plentiful. However, statistically the more pills or capsules that we have to remember to take translates into greater non-compliance. So is it possible to get all your minerals in one source, rather than buying and taking many different products?

Typical multivitamins do help the problem of ‘compliance’ as taking one capsule or tablet per day is 5 times more likely than taking 5 capsules per day, especially over the long run.

However, the danger of multivitamins are that they are false insurance because of the often

Granted that some amounts of minerals are attained through the foods we eat, ‘Centrum for Adults’ may allow the average person to approach 100% Daily Value for a few trace minerals, but not for the 5 major minerals listed. (2)



Specialized Supplements?

Since multi vitamins generally provide a false sense of mineral security, is the answer to buy dedicated, specialized supplements, like a calcium only tablet?

Unfortunately that has downsides too. In the case of typical, traditional calcium supplements for example, increased heart attack risk is one of the documented pitfalls. This is due specifically to the fact that these types of supplements are lacking necessary co-factors like vitamin D and K2 that are essential for getting the calcium to your bones, not your arteries.

Adding to the problem is that traditional calcium supplements are sourced from rock. Often disguised by the more palatable name of ‘calcium carbonate’, rock calciums, which account for approximately 90% of ‘stand alone’ calcium supplements, are not properly absorbed, especially when compared to plant sources of calcium.

Plant Based Multi Mineral Supplements

However, multi mineral supplements, featuring high levels of calcium, magnesium, as well as ample amounts of needed trace minerals like silica, copper, manganese and more (made entirely from sea algaes) have emerged on the market. They appear to be making traditional rock calciums obsolete as they naturally are absorbed better by your body; the calcium and other minerals is directed straight to the bones not the arteries, due to added vitamin D and K2 that certain select products like AlgaeCal Plus include.

As well, calcium supplements sourced from plant instead of rock have been accompanied with published clinical studies showing increases in bone density. Considering that traditional rock sourced ‘calcium carbonate’ products statistically only slow down bone loss, plant calciums such as AlgaeCal as welcome allies in the fight against bone disorders such as osteoporosis.

SOURCES:

Fletcher RH and Fairfield KM. Vitamins for Chronic Disease Prevention in Adults: Clinical Applications JAMA. 2002; 287:3127-3129.
http://www.centrum.com/centrum-adults#tablets

CHAPTER 11

Organic vs. Non Organic: What is the Difference?

ORGANIC VS CONVENTIONAL

Vegetables Type of Soil Management	Minerals (in milliequivalents)						
	Calcium	Magnesium	Potassium	Sodium	Manganese	Iron	Copper
Snap Beans							
Organic	40.5	60.0	99.7	8.6	60.0	227.0	69.0
Conventional	15.5	14.8	29.1	0.0	2.0	10.0	3.0
Cabbage							
Organic	60.0	43.6	148.3	20.4	13.0	94.0	48.0
Conventional	17.5	15.6	53.7	0.8	2.0	20.0	0.4
Lettuce							
Organic	71.0	49.3	176.5	12.2	169.0	516.0	60.0
Conventional	16.0	13.1	53.7	0.0	1.0	1.0	3.0
Tomatoes							
Organic	23.0	59.2	148.3	6.5	68.0	1938.0	53.0
Conventional	4.5	4.5	58.6	0.0	1.0	1.0	0.0
Spinach							
Organic	96.0	293.9	257.0	69.5	117.0	1584.0	0.0
Conventional	47.5	46.9	84.0	0.8	1.0	19.0	0.5

Research conducted by Firman E. Bear at Rutgers University in the Natural Gardener's Catalog (1995)

The chart above states the different levels of 7 minerals in 5 vegetables. Organic outpaces conventional in terms of mineral levels by 86 times in the 5 vegetables shown!

Organic contains, on average:

3x more calcium, 5x more magnesium, 3x more potassium, 35x more sodium, 40x more manganese, 500x more iron and 20x more copper.

Organic - Is It Worth the Price?

Lots of people, when asked what 'organic' food means to them, will say with scorn "It means more expensive!"

The chart below indicates that eating organic costs $2.89 per day versus $1.87 for non organic, which is 1.5 (154%) more money. Quite a price difference it seems.But not at all if you remind yourself that, according to the USDA Agri Marketing Service: organic food outpaces conventional in terms of mineral levels by 86 times!

USDA Agricultural Marketing Service

In the Works...

Shopping List	Price	Servings
1 bunch broccoli	$ 1.80	3
1 lb pkg mixed type salad	$ 1.34	5
1 pkg celery	$ 1.40	4
1 lb zucchini	$ 1.35	2
2 bunches radishes	$ 1.32	1
2 lb sweet potatoes	$ 1.82	4
3 lb tomatoes	$ 3.69	9
4 lb carrots	$ 1.52	12
2 red Bell peppers	$ 1.98	1
8 ears sweet corn	$ 2.88	8
10 lb round white potatoes	$ 2.88	16
2 cucumbers	$ 1.30	3
3 lb cabbage	$ 1.50	6
1 head cauliflower	$ 2.73	4
2 lb yellow squash	$ 2.72	4
3 lb green beans	$ 4.32	6
7 lb bananas	$ 3.71	28
2 lb strawberries	$ 4.87	6
3 lb Red Delicious apples	$ 3.99	10
1 cantaloupe	$ 2.33	4
2 lb Bartlett pears	$ 2.78	4
Weekly Total:	$ 52.23	140
Cost Per Person Per Day:	$ 1.87	

Shopping List (84 % Organic)	Price	Servings
1 bunch broccoli (ORG)	$ 2.38	3
1 lb pkg mixed type salad (ORG)	$ 5.81	5
1 pkg celery (ORG)	$ 1.63	4
1 lb zucchini (ORG)	$ 1.37	2
2 bunches radishes	$ 1.32	1
2 lb sweet potatoes (ORG)	$ 3.58	4
3 lb tomatoes (ORG)	$ 8.79	9
4 lb carrots (ORG)	$ 4.40	12
1 lb red Bell peppers (ORG)	$ 3.99	1
8 ears sweet corn	$ 2.80	8
2-5 lb bags Russet potatoes (ORG)	$ 7.98	16
2 cucumbers	$ 1.30	3
3 lb cabbage (ORG)	$ 2.28	6
1 head cauliflower	$ 2.73	4
2 lb yellow squash (ORG)	$ 3.32	4
3 lb green beans	$ 4.32	6
7 lb bananas (ORG)	$ 5.81	28
2 lb strawberries (ORG)	$ 6.60	6
3 lb Red Delicious apples (ORG)	$ 3.99	10
1 cantaloupe (ORG)	$ 2.73	4
2 lb Bartlett pears (ORG)	$ 3.76	4
Weekly Total:	$ 80.89	140
Cost Per Person Per Day:	$ 2.89	

Highlighted Items are comparable organic replacements

"Whatever the nutritional potential of a food, its contribution is nonexistent if it does not pass the test of absorption. Those nutrients that have not been transferred through the intestinal mucosal cell to enter the circulation have, for all nutritional intent and purpose, have never been eaten. The variety of nutrients from the organism's environment that have been made available by absorption must be transported through the circulatory system to the aqueous microenvironment of the cells. There, they serve their ultimate purpose: participation in the metabolic activities in the cells on which the life of the total organism depends." (1)

Minerals Fight Toxins?

Stripped down to the basics, a toxin is a poisonous substance produced within living cells or organisms. (2) However, use of the word has become more general.

In the context of human health, toxin is used to describe substances detrimental to health, such as pesticides, insecticides, toxic metals and PCBs in plastics, to everyday food items like refined sugar or additives such as monosodium glutamate

The United States Environmental Protection Agency (EPA) states that environmental toxins are linked to numerous health problems such as obesity, cancer, thyroid problems, hormone issues, autism, attention deficit and hyperactivity in children, as well as other mental illness including violent behavior. Heart disease and diabetes risk is increased with exposure to toxins. Some evidence shows children to be at most risk from environmental toxins. (2)

70 percent of American women over the age of 50 have been found with problematic levels of cadmium. Estimates are that this increases risk for osteoporosis by 40 percent (and may be a contributing factor for one fifth of osteoporosis cases for that age group) and myocardial infarction by 80 percent. Current science indicates that arsenic more than doubles risk of diabetes. (3)

What Nutrients Protect You From

Toxins	Protective Nutrients
Alumium	Magnesium
Arsenic	Selenium; Iodine; Calcium; Zinc; Vitamin C; Sulfur; Amino Acids (in garlic, hen's eggs, and beans)
Cadmium	Zinc, Calcium, Vitamin C, Amino Acids, Sulfur
Lead	Zinc, Iron, Calcium, Amino Acids, Vitamin C, Vitamin E, Sulfur
Mercury	Vitamin C, Selenium, Pectin, Sulfur Amino Acids

Cooking, Freezing, and Canning on Minerals

The results of a study looking at how processing, storage, and cooking of fresh, frozen, and canned fruits and vegetables affects nutrient levels indicate that minerals (as well as carotenoids, vitamin E) are “generally similar in comparable fresh and processed products.” (4)

A second study also found that there is only marginal mineral difference between fresh or frozen vegetables.
However, Aloysa Hourigan from Nutrition Australia comments on the effect of air and light on produce. “If you have had things that were fresh sitting around on supermarket shelves for a while, they can start to lose some of their nutritional value just from exposure to air and light.”

SOURCES:

Ruth L. Pike and Myrtle L. Brown. Nutrition: An Integrated Approach. John Wiley & Sons, 1984 I, p. 283
http://www.epa.gov/epahome/children.htm
http://www.ehjournal.net/content/11/1/38
http://www.mealtime.org/uploadedFiles/Mealtime/Content/jsfaarticle_partiiucdavis_may07.pdf

CHAPTER 12

Summary and Useful Links

According to the Academy of Nutrition and Dietetics, stringent, properly planned vegetarian diets can be healthy, nutritionally full, and can provide benefits in the prevention, reduction and treatment of chronic diseases through all stages of life.

Vegetarian diets have been linked to lower levels of obesity, lower risk of cardiovascular disease and decreased total mortality. Vegetarians compared to non-vegetarians display reduced cholesterol levels and type 2 diabetes, lower blood pressure, and lessened rates of hypertension, and certain types of cancer.

Vegetarians (2.3% of the population in the U.S., approximately 4.9 million people) generally consume less overall calories, less calories from fat (particularly saturated fat) and cholesterol; consume more fruits, vegetables, nuts, whole grains, soy products, fiber, than non-vegetarians.

However, because mineral levels in common foods are more than 400% less than in the 1920s, even the most vigilant about their diets are falling short on minerals. (1)

This article was written as a ‘Mineral Guide’ for individuals choosing a vegetarian lifestyle. Just as a car comes with a guide to shed light on, and pre-empt problems, by listing causes and warning signs, this write up can be used in the same way, but for your body.

Please share if you found it helpful. Thanks!

SOURCES:

1. J. Marler and J. Wallin. Human Health, the Nutritional Quality of Harvested Food and Sustainable Farming Systems, 2006, 1-8.
2. http://en.wikipedia.org/wiki/Calcium_carbonate#Industrial_applications
3. http://www.medicalnewstoday.com/articles/79522.php
4. http://jcem.endojournals.org/content/91/3/0.1.full
5. http://nof.org/articles/235
6. http://www.iofbonehealth.org/facts-and-statistics/index.html
7. Committee to Review Dietary Reference Intakes for Vitamin D and Calcium, Food and Nutrition Board, Institute of Medicine. Dietary Reference Intakes for Calcium and Vitamin D. Washington, DC: National Academy Press, 2010.
8. http://ods.od.nih.gov/factsheets/Magnesium-HealthProfessional/
9. Dietary Reference Intakes: Calcium, Phosphorus, Magnesium, Vitamin D and Fluoride. Washington, DC: National Academy Press, 1997.
10. U.S. Department of Agriculture, Agricultural Research Service. USDA National Nutrient Database for Standard Reference, Release 25. Nutrient Data Laboratory Home Page, 2012.
11. http://ods.od.nih.gov/factsheets/Magnesium-HealthProfessional/#en10
12. http://www.nal.usda.gov/fnic/DRI/DRI_Water/water_full_report.pdf
13. http://www.traceminerals.com/research/chloride
14. http://umm.edu/health/medical/altmed/supplement/sulfur
15. http://umm.edu/health/medical/altmed/supplement/phosphorus
16. http://www.acu-cell.com/pna.html
17. http://ajcn.nutrition.org/content/78/3/633S.long
18. http://ajcn.nutrition.org/content/85/1/300S.full
19. http://www.ancient-minerals.com/magnesium-deficiency/#footnote_0_109
20. http://en.wikipedia.org/wiki/Dietary_Reference_Intake
21. http://lpi.oregonstate.edu/infocenter/lifestages/children/
22. http://lpi.oregonstate.edu/lpbio/lpbio2.html
23. http://www.orthomolecularhealth.com/nutrients/vitamins-minerals/
24. http://forums.lymphoma.com/archive/index.php/t-16698.html
25. http://www.jissn.com/content/7/1/24
26. http://www.nutritionalwellness.com/archives/2006/jul/07_depleted_soil.php
27. http://www.scientificamerican.com/article.cfm?id=soil-depletion-and-nutrition-loss
28. Fletcher RH and Fairfield KM. Vitamins for Chronic Disease Prevention in Adults: Clinical Applications, JAMA. 2002; 287:3127-3129.
29. http://www.centrum.com/centrum-adults#tablets
30. Ruth L. Pike and Myrtle L. Brown. Nutrition: An Integrated Approach. John Wiley & Sons, 1984, p.283
31. http://www.epa.gov/epahome/children.htm
32. http://www.ehjournal.net/content/11/1/38
33. http://www.mealtime.org/uploadedFiles/Mealtime/Content/jsfaarticle_partiiucdavis_may07.pdf