SpectraCell Laboratories
Science + Health + Solutions

LABORATORY REPORT

Account Number: 264914

Consultation Account - Micronutrient
Mail Results to Physician
,
United States

Name: **Cheryl Winter**
Gender: Female DOB: No DOB Given

Accession Number: N29125
Requisition Number:

Date of Collection: 10/28/2014
Date Received: 10/29/2014
Date Reported: 11/10/2014

Summary of Deficient Test Results

Testing determined the following functional deficiencies:

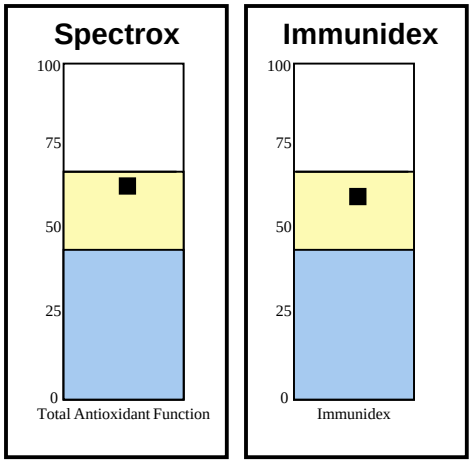
Choline	Oleic Acid	Chromium	Zinc
Magnesium			

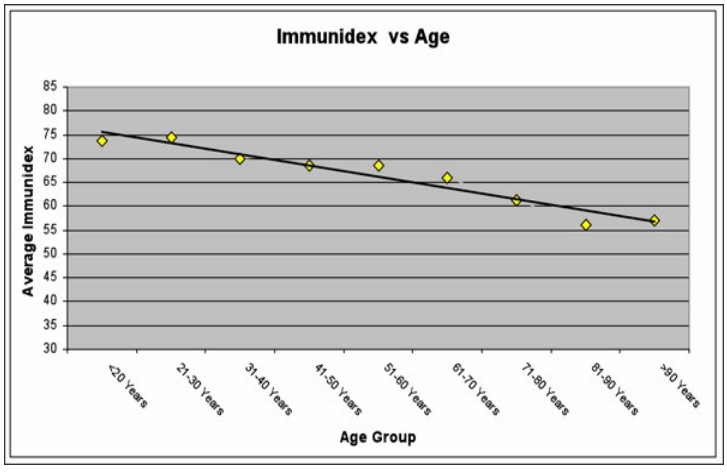
Borderline deficiencies include:

Vitamin B2	Inositol	Vitamin D3	Calcium
Spectrox	Immunidex		

IMPORTANT NOTE:

No date of birth or age was provided for this patient. The reference range reported for this patient is that of an adult.





John F. Crawford, Ph.D.
Laboratory Director

CLIA# 45D0710715

Adequate
Borderline
Deficient

Deficient
Values in this area represent a deficiency and may require nutrient repletion or dietary changes

Borderline
Values in this area represent a borderline and may require nutrient repletion or dietary changes.

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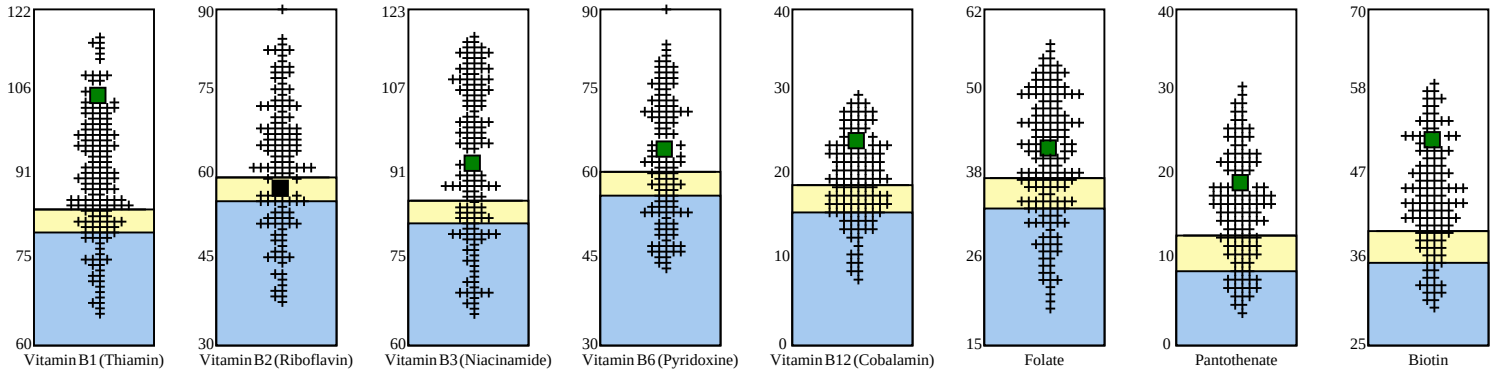
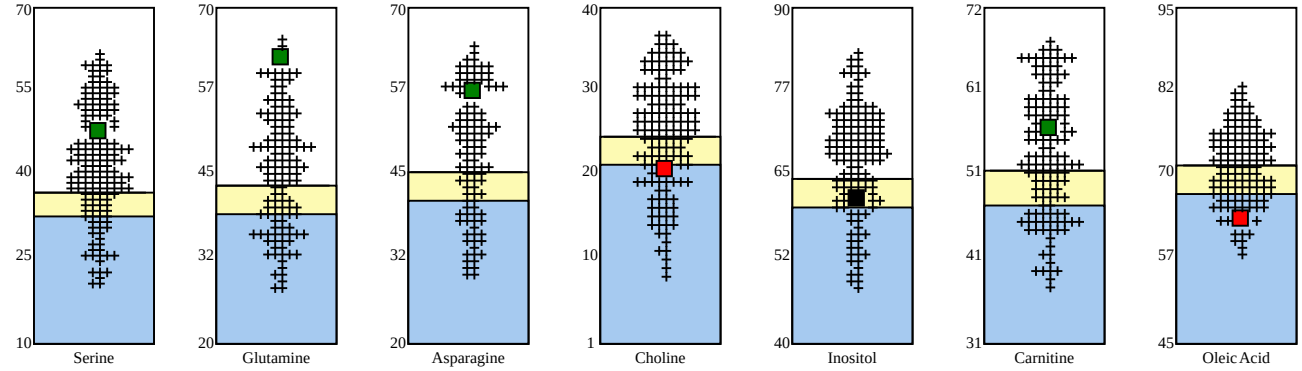
Cheryl Winter

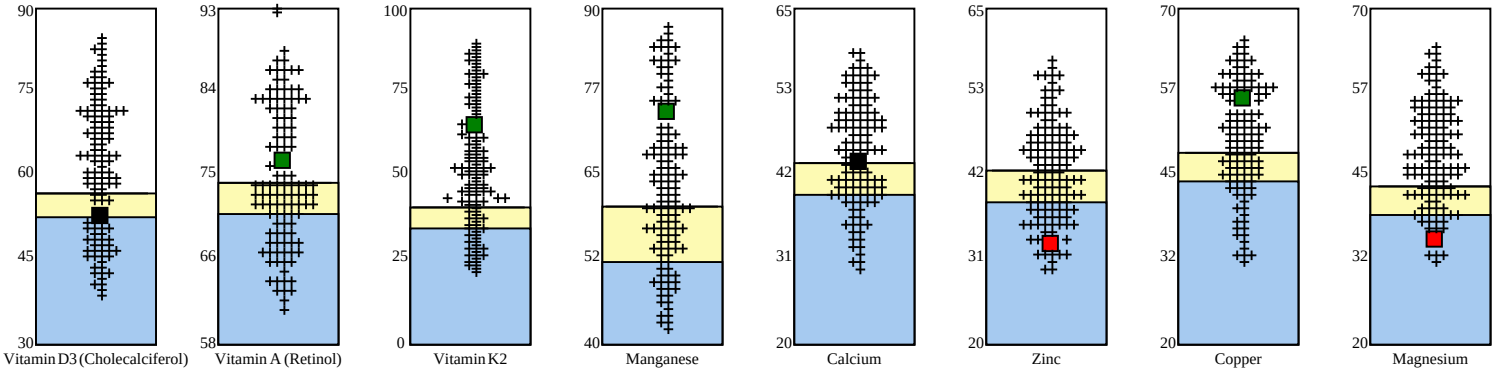
B Complex Vitamins



Amino Acids & Metabolites



Other Vitamins & Minerals



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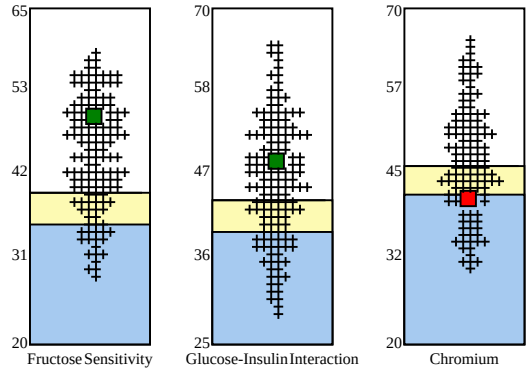
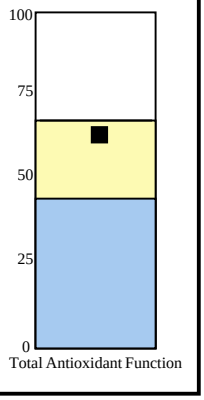
Carbohydrate Metabolism



Spectrox

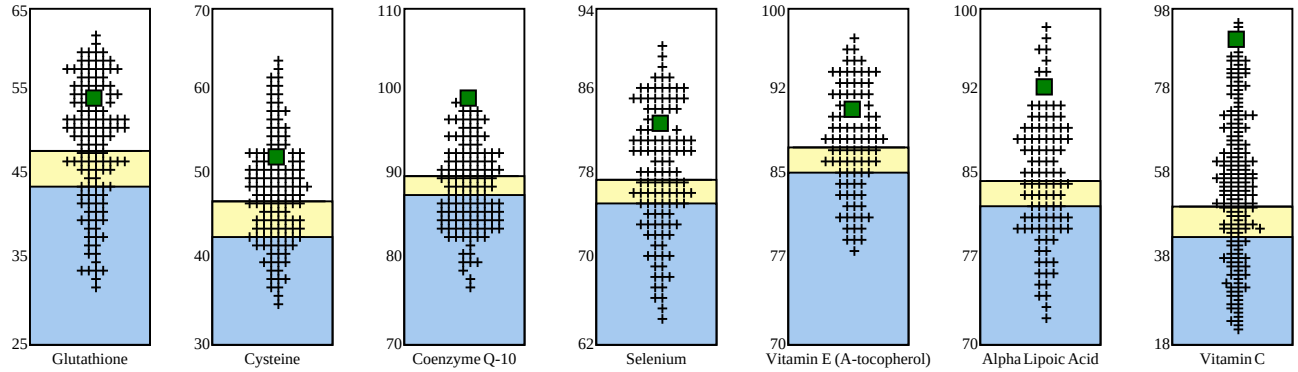


A Spectrox value above 65%-
indicates a desirable status for apparently healthy individuals. Since antioxidants are protective nutrients, the most desired status would be the greatest ability to resist oxidative stress.

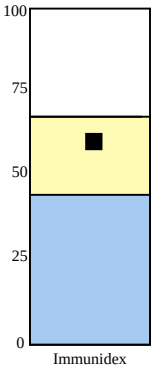
A Spectrox value between 40% and 65%-
indicates an average antioxidant function for apparently healthy individuals. An average status means the ability to resist oxidative stress similar to the majority of persons. However, average status is not ideal, nor is it clearly deficient.

A Spectrox value below 40%-
indicates a deficient antioxidant function resulting in a decreased ability to resist oxidative stress or an increased antioxidant load.

Individual Antioxidants



Immunidex



The Immunidex is an indication of the patient's T-Lymphoproliferative response to mitogen stimulation relative to the response of a control population. An average or weakened immune response may improve with correction of the nutritional deficiencies determined by the micronutrient testing.

An Immunidex above 65% indicates a strong response, a measurement of cell-mediated immune function.

An Immunidex between 40% and 65% - indicates an average response.

An Immunidex below 40% may indicate a weakened cell mediated immune response.

Micronutrients	Patient Results (% Control)	Functional Abnormals	Reference Range (greater than)
B Complex Vitamins			
Vitamin B1 (Thiamin)	104		>78%
Vitamin B2 (Riboflavin)	56	Borderline	>53%
Vitamin B3 (Niacinamide)	92		>80%
Vitamin B6 (Pyridoxine)	63		>54%
Vitamin B12 (Cobalamin)	23		>14%
Folate	41		>32%
Pantothenate	18		>7%
Biotin	51		>34%
Amino Acids			
Serine	46		>30%
Glutamine	61		>37%
Asparagine	56		>39%
Metabolites			
Choline	20	Deficient	>20%
Inositol	60	Borderline	>58%
Carnitine	56		>46%
Fatty Acids			
Oleic Acid	62	Deficient	>65%
Other Vitamins			
Vitamin D3 (Cholecalciferol)	51	Borderline	>50%
Vitamin A (Retinol)	76		>70%
Vitamin K2	62		>30%
Minerals			
Calcium	43	Borderline	>38%
Manganese	73		>50%
Zinc	32	Deficient	>37%
Copper	55		>42%
Magnesium	34	Deficient	>37%
Carbohydrate Metabolism			
Glucose-Insulin Interaction	48		>38%
Fructose Sensitivity	49		>34%
Chromium	40	Deficient	>40%
Antioxidants			
Glutathione	53		>42%
Cysteine	51		>41%
Coenzyme Q-10	98		>86%
Selenium	82		>74%
Vitamin E (A-tocopherol)	90		>84%
Alpha Lipoic Acid	92		>81%
Vitamin C	88		>40%
SPECTROX™			
Total Antioxidant Function	63	Borderline	>40%
Proliferation Index			
Immunidex	57	Borderline	>40%

The reference ranges listed in the above table are valid for male and female patients 12 years of age or older.

Repletion Suggestions

1. Choline	1000 mg b.i.d. (2000 mg daily) Choline from Choline Bitartrate, Citrate or Chloride salts
2. Oleic Acid	2-3 tbsp olive oil daily for repletion of Oleic Acid. Deficiency of Oleic Acid suggests impaired synthesis of unsaturated long chain fatty acids. Take 600 mg b.i.d. (1.2 grams daily) of EPA and DHA in Omega-3 Fatty Acids.
3. Chromium	200 mcg daily of chromium nicotinate or glycinate for 90 days
4. Zinc	25 mg daily
5. Magnesium	150 mg b.i.d. (300 mg daily) as aspartate, citrate, lysinate, glycinate, or malate

Please note: Supplementation is usually required for four to six months to effect the repletion of a functional deficiency in lymphocytes

Suggestions for supplementation with specific micronutrients must be evaluated and approved by the attending physician. This decision should be based upon the clinical condition of the patient and the evaluation of the effects of supplementation on current treatment and medication of the patient.

Choline

Status:

The patient's lymphocytes have shown a deficient status for Choline.

Function:

Choline is an essential nutrient that is part of cell membranes and is used by nerves to send impulses. Choline is known to be essential for mammals, and is essential for human cell growth. A dietary requirement for choline in humans has not been proven, although recent data on infants and dietary choline depletion in adults suggests that choline is an essential nutrient. Historically, choline is considered as a lipotrope and member of the B vitamin complex. Choline has several distinct functions. First, choline serves as a source of one-carbon units (methyl groups) for biosynthesis of other compounds. Interactions with methionine, Vitamin B12, folate, ethanolamine, and betaine allow choline to partially replace, or be replaced by other constituents in one-carbon metabolism. Second, choline is a component of phosphatidyl choline, the major component of cell membranes. Lecithin is a commercial name for phospholipids containing 10-35% phosphatidyl choline. Phosphatidyl choline has interactions with cholesterol and lipoprotein metabolism.

Deficiency Symptoms:

Symptoms of Choline deficiency in humans primarily include: liver dysfunction and decreased serum cholesterol. Abnormal liver function resembling Choline deficiency symptoms in animals has been noticed long-term intravenous feeding (containing no Choline), and during malnutrition. Symptoms of inadequate cholinergic transmission may indicate an increased need for Choline.

Repletion Information:

Dietary sources richest in Choline (per serving) include:

Phosphatidyl Choline Supplements	Lecithin
Choline Supplements	Egg Yolks
Liver	Soy Products
Wheat Germ	Peanuts and Legumes
Brain and Organ Meats	Potatoes
Lettuce	

At this time, there is not regulatory guideline for choline intake in humans. Usual dietary intake is from 0.5 - 1.0 gram daily. Choline intake can be accomplished by two types of choline forms: choline salts and phospholipids. Choline salts include choline chloride, choline bitartrate, and choline citrate. No apparent adverse effects after daily intakes of up to 10 grams of choline as choline salts have been reported. However, doses of 20 grams daily or more have been associated with symptoms of excess cholinergic stimulation (increased salivation, sweating, nausea, dizziness, depression, and ECG changes). Choline supplementation in the form of lecithin or phosphatidyl choline in daily doses of up to 100 grams appears to have no toxicity. However, occasional changes in bowel habits or upset stomachs appear, and the caloric content of additional lipids needs to be considered.

Oleic Acid

Status:

The patient's lymphocytes have shown a deficient status for Oleic Acid (long-chain, monounsaturated, fatty acid)

Function:

Oleic acid is the most common monounsaturated fatty acid in human cells. Oleic acid is incorporated into cell membrane phospholipids, where it is important for important for proper membrane fluidity. Hormone responsiveness, infectivity of pathogens, mineral transport, and immune competence are affected by membrane fluidity.

Oleic acid is a major energy source for cells. Oleic acid is catabolized to acetyl groups used for energy (ATP) production and biosynthesis of many essential metabolites.

Oleic acid is obtained by cells from endogenous biosynthesis or from serum triglycerides. Biosynthesis of fatty acids (like oleic acid) utilizes the same enzymes responsible for elongation of other fatty acids which are precursors for eicosanoids (prostaglandins). Thus, deficient oleic acid status may also indicate deficient eicosanoid production, signifying a need for essential fatty acids.

Deficiency Symptoms:

No deficiency symptoms are clearly defined for oleic acid since a dietary intake is not absolutely essential. Monounsaturated fat intake may be beneficial for reducing high blood cholesterol levels. A need for oleic acid may possibly reflect a need for essential fatty acids (linoleic acid, linolenic acid), or omega-3 fatty acids (alpha linolenic acid, EPA, and DHA).

Repletion Information:

Dietary sources rich in Oleic Acid include:

Canola Oil	Olive Oil
Avocado Oil	Almond Oil
Avocados	High Oleic Safflower Oil

Although some margarines and shortenings are high in monounsaturated fats, a considerable amount is in the form of trans-monosaturated isomers (elaidic acid). Reductions in these foods are recommended to improve oleic acid status.

No RDA exists for oleic acid. No overt toxicity for fats rich in oleic acid is known, except for a laxative effect when consumed in large amounts (>50-100 grams per serving). Daily doses of 1-2 tablespoons of oleic-rich oils (olive, canola, avocado) are usually adequate to add significant dietary amounts of oleic acid.

Although flaxseed oil (edible linseed oil) contains little oleic acid, it is an excellent source of the essential fatty acids, linoleic acid and linolenic (omega-3) acid. Daily doses of 1-2 tablespoons per day will provide sufficient essential fatty acids to prevent essential fatty acid deficiencies.

Chromium

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Status:

The patient's lymphocytes have shown a deficient status for Chromium.

Function:

Chromium is an essential trace mineral that plays an important role in optimizing insulin function and the regulation of blood glucose levels. Chromium may also be anti-atherogenic and assist in lowering cholesterol. Following food intake, blood glucose levels rise causing insulin to be secreted by the pancreas. Insulin lowers blood glucose levels by increasing the rate at which glucose enters a person's cells. Chromium is believed to facilitate the attachment of insulin to the cell's insulin receptors. Studies also indicate that chromium participates in cholesterol metabolism, suggesting a role for this mineral in maintaining normal blood cholesterol levels and preventing atherosclerosis. Chromium also plays a role in nucleic acid synthesis.

Deficiency Symptoms:

Due to processing methods that remove most of the naturally occurring chromium from commonly consumed foods, dietary deficiency of chromium is believed to be widespread in the United States. Chromium deficiency may increase the likelihood of insulin resistance, a condition in which the cells of the body do not respond to the presence of insulin. Insulin resistance can lead to elevated blood levels of insulin (hyperinsulinemia) and elevated blood levels of glucose, which can ultimately cause heart disease and/or diabetes. Deficiency of chromium is associated with metabolic syndrome. Metabolic syndrome represents a constellation of symptoms, including hyperinsulinemia, high blood pressure, high triglyceride levels, high blood sugar levels, and low HDL cholesterol levels. These symptoms increase one's risk for heart disease. Low levels of chromium are also associated with an increased risk of coronary artery disease incidence and mortality.

Chromium deficiency correlates with depressed nucleic acid synthesis. Chromium is essential for maintaining the structural stability of proteins and nucleic acids and animal studies have found that this element is also vital for healthy fetal growth and development. Studies on humans have established that premature infants, and those with evidence of intrauterine growth retardation, have significantly lower chromium status compared to infants born full-term. Others have found that multiparous women (women who've given birth two or more times) have far lower body chromium levels compared to nulliparae (women who've never given birth). These findings suggest that chromium is an essential trace element during fetal growth and development.

Repletion Information:

In 2001, the Institute of Medicine at the National Academy of Sciences conducted a thorough review of the chromium research and concluded that excessive intake of chromium from foods or supplements is not associated with any adverse effects. As a result, no Tolerable Upper Intake Level (UL) was established for this mineral. However, people with liver or kidney disease may be more susceptible to adverse effects from excessive intake of chromium, and such individuals are cautioned to avoid taking more than 200 micrograms of chromium supplements per day. There is limited evidence to suggest that long term chromium picolinate supplementation at levels greater than 200 micrograms per day may also be hazardous to chromosome integrity and should be avoided.

Zinc

Status:

The patient's lymphocytes have shown a deficient status for Zinc.

Function:

The primary role of zinc is to activate almost 200 enzymes with vital roles in cell regulation, immune function, acid/base balance, DNA, RNA, and protein synthesis, lipid metabolism, eicosanoid production, and digestion. Zinc also is a component of insulin (energy metabolism), thymic hormones (immune function) and gustin (taste acuity).

Deficiency Symptoms:

Symptoms of zinc deficiency include fatigue, dermatitis, acne, loss of taste, poor wound healing, anorexia, decreased immunity, delayed growth, hypogonadism and delayed sexual maturation, diarrhea, skeletal abnormalities, alopecia, behavioral disturbances, white spots on fingernails, infertility and night blindness.

Those at risk for zinc deficiency include alcoholics, malnourished, malabsorption (Crohn's Disease, celiac disease), long-term parenteral nutrition, chronic renal disease, anorexics, dieters, pregnant women, elderly, and sickle-cell disease.

Repletion Information:

Dietary sources rich in Zinc (per serving) are:

Nutritional Supplements	Oysters
Red Meats	Wheat Germ
Seeds	Nuts
Soybean Products	Legumes
Potatoes	Zinc-Fortified Cereal Products

Compounds found in meats enhance absorption of zinc from plant sources.

The 1989 RDA for zinc is 12-15 mg. In general, daily doses up to 50mg of elemental zinc appear safe. Acute toxicity (nausea, vomiting, diarrhea, fever, muscle pain) may occur after intake of 1-2 grams of zinc. Chronic intakes of 150 mg of zinc for several months may impair certain immune responses, decrease high-density lipoprotein levels, or impair copper status (possibly leading to normocytic anemia). Significant differences in tolerability between inorganic zinc salts and organic zinc chelates exist with organic chelates recommended for supplementation.

Magnesium

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Status:

The patient's lymphocytes have shown a deficient status for Magnesium.

Function:

Magnesium is predominantly found intracellularly, where it is vital for proper cell functions. Magnesium is the second most prevalent intracellular cation (after potassium). Magnesium functions are numerous and essential, including enzyme activation (over 300 types), neuromuscular activity, membrane transport and interactions, energy metabolism (carbohydrates, fats, proteins), and roles in calcium and phosphorus metabolism.

Deficiency Symptoms:

Deficiency symptoms are both acute (Trouseau and Chvostek signs, muscle spasms, tetany, cardiac arrythmias, ataxia, vertigo, convulsions, organic brain syndrome) and chronic (thrombophlebitis, hemolytic anemia, bone loss, depressed immune function, poor wound healing, hyperirritability, burxism, hyperlipidemia, fatigue, hypertension).

Those at risk for Magnesium deficiency include: malabsorption, malnourished, alcoholics, diabetics, diuretic therapy, children, elderly, pregnant and lactating women, postmenopausal women with osteoporosis, athletes, digitalis therapy, long-term therapy with antibiotics, chemotherapeutic and immunosuppressive medications. In addition, the following diseases are associated with Magnesium deficiency: cardiovascular disease, cirrhosis, renal disease, parathyroid diseases, thyroid conditions.

Repletion Information:

Dietary sources richest in Magnesium (per serving) are:

Nutritional Supplements	Seeds (especially pumpkin)
Nuts	Soybeans
Whole Grains	Potatoes
Legumes	Fresh Vegetables

The 1989 RDA for Magnesium is between 280-400 mg daily for adults. Large oral intakes of Magnesium (400-1000 mg daily), when spread throughout the day, are not considered harmful, except for some persons with impaired renal function. Higher doses have been used as laxatives and antacids. Excessive Magnesium intake may cause diarrhea, nausea, vomiting, hypotension, bradycardia, and CNS depression. Continued excessive intakes of Magnesium may imbalance calcium and phosphorous metabolism.