

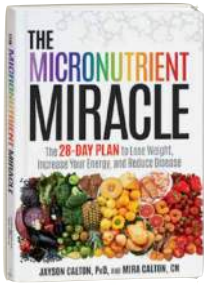
THE **MICRONUTRIENT** MIRACLE QUICK START GUIDE TO:

**Stress, Anxiety and Depression:**

**An In-Depth Look at 13 Micronutrient  
Used in the Prevention and Treatment**



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# THE MICRONUTRIENT MIRACLE

## QUICK START GUIDE TO:

### Stress, Anxiety and Depression:

#### An In-Depth Look at 13 Micronutrient Used in the Prevention and Treatment

A, **B1**, B2, **B3**, **B5**, **B6**, B7, **B9**, B12, Choline, **C**, **D**, E, Calcium, **Chromium**, **Copper**, Iodine, **Iron**, **Magnesium**, Potassium, Selenium, **Zinc**, **Omega-3**, Carnitine



**Do you suffer from stress, anxiety or depression?** If you answered yes, you are NOT alone. A startling 80 percent of Americans experience intense, chronic stress, anxiety or depression. And the problem is a global one: According to the World Health Organization, more than 15 percent of the world population is suffering from a stress-related disorder. Stress is something that most, if not all, of us have in our lives more often than we would like. For the majority of people stress comes mostly from the workplace or from home. However, stress hides everywhere. Stress can be hiding even in the most pleasurable situations. On vacation, stress may be lurking at ticket counters, security checkpoints, and at the destination itself (poor weather or lost luggage). Studies show that the cumulative impact of stress and depression has been linked to a host of age-accelerating conditions and degenerative diseases, including cardiovascular disease, diabetes, and various cancers. However, you may never have considered how these emotions are caused by micronutrient (vitamin and mineral) deficiencies, and that by becoming sufficient in these very same micronutrients you can prevent and/or reverse these feelings all together.

### YOUR B VITAMINS

The B vitamins have come to be known as anti-stress nutrients because they are often the first deficiencies to develop during times of stress. Vitamins B1 and B5 help fight off stress by maintaining proper function of the adrenal glands (the most important glands in the fight against stress). Both vitamins B6 and B9 help equip you to better cope with the anxiety that you do experience by aiding in the formation of chemicals called neurotransmitters, which are necessary for balancing emotions. In one study, conducted by the Mayo Clinic, researchers found that you don't need a great deficiency in the B vitamins to set in before you really start to feel it. The study revealed that subjects who were given just half the daily requirement of vitamin B1 (thiamine) became "irritable, depressed, quarrelsome, uncooperative, and fearful that some misfortune awaited them."

## VITAMIN C

Similarly, requirements for vitamin C increase tenfold during stressful periods, which can cause this water-soluble vitamin to become depleted relatively quickly. And as with the B vitamins, when you deplete vitamin C, you are depleting the very same micronutrient that can help to eliminate the stress in the first place. Research indicates that individuals with sufficient levels of vitamin C do not show the expected mental and physical symptoms of stress when subjected to acute psychological, tension-driving challenges. Additionally, those sufficient in C bounce back from stressful situations faster than insufficient individuals. This is due to the relationship between vitamin C and cortisol.

According to Psychology Today magazine, vitamin C can “abolish the secretion of cortisol”, which is often called the “stress hormone.” It is responsible for the fight-or-flight response to stress and adequate vitamin C squashes its ability to set someone on edge. Conversely, according to research out at the University of Maryland, even slight deficiencies of vitamin C can increase cortisol output. Humphry Osmond, MD, a former psychology professor at the University of Alabama, and Abram Hoffer, MD, a former psychiatrist from British Columbia, believe that weight for weight, vitamin C is “as active as Haldol,” a drug prescribed to help people deal with stress.

This is great news as long as you are sufficient in vitamin C, however when vitamin C is deficient, cortisol is free to send a message of stress throughout the body which leads to further micronutrient deficiencies. This is because when too much cortisol is present in the body for an extended period of time, your immune system is lowered. This causes the body to use *all* your immune-boosting micronutrients, including your antioxidants, at a more feverish pace.

## OMEGA-3

Omega-3 can also help ward off cortisol output. Recent research shows that omega-3 fatty acids can play a key role in keeping stress at bay. However, our Western diet doesn't supply us with enough of these essential fats, primarily found in fish, eggs, and meat, so supplementation is a smart choice for anyone who doesn't eat fish daily. One study from Japan, focused on how DHA (part of the omega-3 chain) affected aggressive behavior in college students. Researchers proved that DHA prevented the study's 41 participants from becoming more frustrated, even when burdened with mental stress. Scientists stated that omega-3 supplementation “inhibits the adrenal activation elicited by a mental stress,” leaving cortisol levels “significantly blunted” when omega-3 levels are high. In fact, omega-3 supplementation can reduce the body's stress-induced production of cortisol by 22 percent.

One amazing study at Gettysburg College in Pennsylvania proved just how powerful omega-3 can be. Participants who supplemented with omega-3 had significantly lower cortisol levels compared to those taking a placebo. This resulted in them losing three-and-a-half times more body fat while increasing lean muscle mass. Isn't that awesome news? By adding the omega-3 fatty acids DHA and EPA into either your diet or your supplementation regimen, you too can quiet cortisol, reduce stress, and eliminate much of the micronutrient depletion that stress may have cost you (and perhaps lose a few pounds of fat and add a few pounds of

## **MAGNESIUM (and calcium too!)**

Are you a stress binger? Have you been known to grab a muffin, candy bar or bag of chips when stress comes knocking at your door? While you may have heard that you are eating to stifle your emotions or anxiety, we want you to know that stress, anxiety and depression themselves may be physically responsible for your snacking. Did you know that both magnesium and calcium deficiencies can cause food cravings for both sweet and salty foods? It is true! And stress, anxiety and depression causes both of these water-soluble minerals to be used quickly, resulting in rapid depletion. It is due to this mineral depletion that you begin to binge or stress eat. So know that you're not mentally or emotionally damaged or weak, just mineral deficient. Make sure to supplement smart, and both the stress and cravings will be a thing of the past.

## **CHROMIUM**

Studies going back to the 1970s have shown that chromium increases the body's sensitivity to insulin and helps facilitate uptake of glucose from the blood stream. The brain requires a constant supply of glucose to maintain proper function. Scientists know that diabetics have a rate of depression that is at least twice that of the general population. The rate is even higher for diabetic women. Depression makes the body less sensitive to insulin. Under normal conditions insulin also increases the amount of tryptophan, an amino acid that is a precursor to serotonin, reaching the brain. Best known for its role in regulating mood, serotonin also reduces pain and decreases appetite as well as producing a state of calm. Several studies showed antidepressant properties of different forms of chromium.

### **SOME SAD NEWS FOR THOSE TRYING TO GET HAPPY**

Currently, upwards of 50 percent of older people use benzodiazepines—a class of antidepressant medications that includes Xanax, Valium, and Klonopin—for some kind of mental health problem. However, a 2014 French study published in the journal BMJ found that use of benzodiazepines for 3 months or more increased one's risk of developing Alzheimer's disease by as much as 51 percent! This shouldn't be surprising as this class of drugs depletes vitamins B6, B9, B12, and C and CoQ10. The B vitamins work in unison to lower homocysteine, which can cause atrophy in the part of the brain most affected by Alzheimer's. Both CoQ10 and vitamin C have been shown to fight the free radicals caused by oxidative stress, and evidence suggests that increased oxidative stress is common in Alzheimer's patients. Taking this class of micronutrient-depleting drugs will likely only supply a short-term smile and possibly much greater sadness later on.

**EXCERPT FROM THE MICRONUTRIENT MIRACLE**

## IRON

An iron deficiency can lead to anemia, a condition caused by reduced delivery of oxygen to your cells, resulting in fatigue and weakness. Iron deficiency is one of the most prominent nutritional deficiencies, affecting as much as 80 percent of the world population, according to the World Health Organization. And Anemia is very closely linked to anxiety disorders. In one study, published in the journal *Behavioural Brain Research*, it was shown that iron-deficient laboratory rats displayed more anxiety-like behaviors than normal rats. An additional study, published in the journal *Nutrition*, showed a strong correlation between iron deficiency and behavioral variables such as anxiety, stress and depression in young mothers, with iron supplementation resulting in a 25-percent improvement in stress and depression in mothers who were previously iron deficient. Lastly, research published in *Acta Medica Okayama* shows that people experiencing panic attacks had less than half the concentration of iron, and B6 as the non-panic attack group.

While it is clear that iron deficiency is common and supplementation improves anxiety in many cases, supplementation can be problematic in that too much iron can cause serious health complications. Because of this, you want to take an iron-free multivitamin to avoid iron overload, a medical condition that causes excess iron to be stored in vital organs such as the liver and heart. Too much iron may be toxic—and even fatal. In general, iron supplementation is not recommended for adult males and postmenopausal women. If you are a pre-menopausal woman, an athlete that works out for more than 6 hours a week, or a strict vegan/vegetarian you may want to consider iron supplementation. However, you should know that iron competes with ten (10) other micronutrients – making multivitamins formulated with iron highly susceptible to poor absorption rates. If you choose to use an iron supplement, you should take it at a separate time from your daily multivitamin to avoid these numerous competitions.

## ZINC AND COPPER

When it comes to zinc and copper it isn't all about deficiency. In fact, it is too much copper that seems to be the problem. As it happens, due to micronutrient competitions, excess copper is key for two reasons. First, You simply don't want too much copper. This is one of the most common causes of panic attacks. Copper excess in the tissues enhances the production of stimulatory neurotransmitters and appears to stimulate the activity of the diencephalon. This is also called the “animal brain” or the “emotional brain”. This causes generally heightened emotions, one of which is often anxiety and feelings of panic. Secondly, because these two nutrients are competitive, the excess copper will cause a reduction in the absorption of zinc.

300 or more enzymes in our bodies use zinc to help them perform their function. Zinc modulates GABA and glutamate regulation and its deficiency, along with concurrent oxidative stress, may lead to decreased levels of GABA and glutamate levels, resulting in anxiety. Sufficiency in zinc reduces anxiety and depression, and boost immunity and fighting inflammation. Much like with the B vitamins and vitamin C, zinc is utilized heavily at times of stress, increasing the likelihood even further that levels will fall deficient and lead to more aggravated anxiety and further depression.

While zinc should be supplemented copper should not. In fact, too much copper in the body can also hinder your body's ability to destroy the proteins that form the plaques found in

## ZINC AND COPPER CONT.

the brain of Alzheimer’s patients. Many Alzheimer’s patients have been found to have elevated levels of copper, and in studies, it was determined that many of those effected took multivitamins with copper. Additionally, pregnant woman should avoid copper in multivitamins because copper levels can nearly double during pregnancy making toxicity a concern. Cramps, abdominal pain, vomiting, nausea, diarrhea, and liver damage are all common when taking supplements that include copper. Additionally, Physicians Committee for Responsible Medicine (PCRM) published a statement calling for the FDA to require multivitamin manufacturers to reformulate many of the most trusted multivitamins on the market without copper or iron. Neal Barnard, M.D., president of the Physicians Committee, stated in his letter to FDA Commissioner Margaret Hamburg, M.D. “Given that nearly half of Americans develop Alzheimer’s disease by age 85, we need to urge consumers to err on the side of caution...Research on the links between metals and brain damage is ongoing. Even so, the evidence that excess iron and copper contribute to brain deterioration has reached the point where we have to take it seriously.”

Commonly Prescribed Anxiety & Depression Medications (and which micronutrients they deplete)		
<b>Tricyclic antidepressants:</b> amitriptyline (Elavil), doxepin (Silenor, Zonalon, Prudoxin), desipramine (Norpramin), imipramine (Tofranil, Tofranil-PM), amoxapine (Asendin), protriptyline (Vivactil)	Depression	B2, sodium, COQ10, melatonin
<b>Psychoactive drugs:</b> benzodiazepines (Valium, Xanax, Ativan, Klonopin); SSRIs (Celexa, Luvox, Lexapro, Prozac, Paxil)	Anxiety, Depression	B6, B9, B12, C, D, COQ10, melatonin, omega-3, omega-6, amino acids
<b>Atypical antipsychotics:</b> clozapine (Clozaril, Fazaclo), aripiprazole (Abilify)	Schizophrenia	Selenium
<b>Phenothiazine:</b> Chlorpromazine, Promethazine, Thioridazine	Antipsychotic	B2, sodium

# Vitamin A

RDI:5000 IU

## Why you need it?

The primary function of this fat-soluble vitamin is to preserve eyesight. Vitamin A is also essential for the formation and development of bone, teeth, and connective tissue. It also maintains the integrity of the skin and the linings of your urinary tract, lungs, and digestive system. It is required for DNA translation and both male and female reproductive processes. Vitamin A also helps fight viral infections and is thought to help fight cancer as well.

## What you should know?

There are two types of vitamin A. Preformed vitamin A (also called retinoid) includes retinol, one of the most usable forms of vitamin A. This type is found only in foods of animal origin. The second type, found in plants, is called pro-vitamin A, and includes certain members of the carotenoid family, such as beta-carotene. While many people consider beta-carotene to be the same as vitamin A, it is really an inactive precursor to vitamin A, and only converts to vitamin A in the body at a rate thought to be approximately 21:1.

## Where you get it?

### Vitamin A

- Liver (polar bear liver contains the most with 100,000 IU per ounce!)
- Kidney
- Cod liver oil
- Butter
- Egg yolk
- Whole milk/cream
- Shrimp

### Beta-Carotene

- Sweet Potatoes
- Carrots
- Winter Squash
- Dark Leafy Greens
- Romaine Lettuce
- Bok Choy



## How it is destroyed in preparation?

Light and air exposure can partially deplete the vitamin A content in our foods; however, vitamin A is relatively stable when exposed to heat and is not significantly affected by cooking. In fact, chopping, puréeing and cooking carotenoid-containing vegetables can make the carotenoids (i.e. beta-carotene) more bioavailable.

## What are some signs of vitamin A deficiency



- Frequent viral infections or colds
- Night blindness (nyctalopia)
- Dry eyes (xerophthalmia)
- Goose bump-like appearance of the skin known as hyperkeratosis.
- Bone deformities or poor growth in children.
- Irritability, Stress & Depression
- Hypothyroidism

# Vitamin B1 (Thiamine)

RDI: 1.5 mg

## Why you need it?

Thiamine was the first of the B vitamins to be discovered, and it is imperative for energy production. This water-soluble vitamin is necessary for the proper functioning of the nervous system and muscles and conversion of amino acids and fatty acids into proteins, hormones, and enzymes. Thiamine can help to prevent cataracts. Deficiency can cause depression, irritability, memory loss, cardiovascular disease, and insomnia.

## What you should know?

A deficiency in thiamine can cause beriberi, a potentially deadly disease that was widespread during the late 19th and early 20th century particularly in Asia.

## Where you get it?

- Brewers yeast
- Lamb
- Seeds (sunflower)
- Pork
- Green peas
- Organ meats
- Fish (trout, salmon, tuna)
- Poultry
- Beans
- Asparagus
- Spinach
- Whole wheat
- Romaine lettuce
- Mushrooms
- Wheat germ
- Eggs
- Watermelon
- Nuts
- Blackstrap Molasses



## How it is destroyed in preparation?

Vitamin B1 is extremely unstable and is easily damaged by heat, acid, and chemicals. The processing of grains used for cereals and breads reduces B1 content by more than half. This is because most of the vitamin B1 is found in the germ of grain, which is removed during the milling of grain. Both sulfites and nitrites, which are often used in food preservation, inactivate vitamin B1. Sulfur dioxide used as a preservative in food depletes B1.

## What are some signs of vitamin B1 deficiency?



- Loss of appetite
- Sensation of “pins and needles”
- Numbness in legs
- Calf muscle soreness, tender muscles
- Depression, irritability and memory loss in elderly
- Anxiety & stress
- Cardiovascular symptoms include edema, increased pulse rate, and palpitations.
- Insomnia
- Extreme deficiency cause deficiency disease beriberi
- Eye pain
- Constipation



# Vitamin B2 (Riboflavin)

RDI: 1.7 mg

## Why you need it?

Vitamin B2 is essential for normal growth and development, physical performance, reproduction, lactation, and well-being. It is utilized in essential biochemical reactions, especially energy production. Like all the B vitamins, B2 is water-soluble and must be supplied daily. Additionally, it is necessary for growth and reproduction and the healthy growth of skin, hair, and nails. Riboflavin is critical for the metabolism of carbohydrates, fats, and protein. It assists with antioxidant activity and prevents oxygen-based damage. It is part of the enzyme glutathione reductase. Glutathione is a protein like “antioxidant” molecule that reduces this damage and must constantly be recycled. Vitamin B2 allows for that recycling to take place

## What you should know?

The activated form of B2 is Riboflavin-5-phosphate. This is the ingredient you want to see on your supplement facts. It is the vitamin responsible for turning urine bright yellow.

## Where you get it?

- Liver
- Milk
- Cheese
- Asparagus
- Meats
- Eggs
- Dark green vegetables
- Almonds
- Salmon and tuna
- Avocados
- Mushrooms
- Wheat germ



## How it is destroyed in preparation?

While heat and air have no large damaging effect on B2, light is a factor. In fact, riboflavin rich foods should be stored in opaque containers, and cooked in covered pots. This includes pasta and milk, which are better purchased in boxes than see through bags and light blocking cartons rather than clear containers. Along with vitamin B1, B2 is found in the germ of grain, which is removed during the milling and processing of grain.

## What are some signs of vitamin B2 deficiency?



- Migraines
- Cataracts
- Sore throat
- Depression, irritability and memory loss in elderly
- Chelosis, which is characterized by cracks in the corners of the mouth, burning lips, mouth, and tongue.
- Red eyes that tear, burn or itch and are light sensitive
- Scaly skin on face around the nose and genitalia
- Dull or oily hair
- Split nails
- Irritability, stress & depression

# Vitamin B3 (Niacin & Niacinimide)

RDI: 20 mg.

## Why you need it?

Vitamin B3 can be found naturally in foods or can be synthesized in humans by converting the amino acid tryptophan to niacin (vitamins B1, B6,, and iron are necessary for this conversion). It is imperative for energy production, helps to lower cholesterol, and protects against DNA damage and cancer. This water-soluble vitamin aids in the regulation of insulin and stabilization of blood sugar. Vitamin B3 protects against heart attacks, Alzheimer's disease, and cognitive decline. Niacin is part of about 200 enzymes, each of which are necessary for chemical reactions in the body to occur, which clearly shows just how important this B vitamin is to your health.

## What you should know?

Most multivitamins contain only niacinamide. However, the two forms of vitamin B3 perform completely different functions in your body. Niacinamide controls blood sugar, but only niacin, a completely different form of vitamin B3 that is usually not found in multivitamins, is the form that has been shown to lower LDL (bad cholesterol) and raise HDL (good cholesterol). Nutreince, our reinvention of the multivitamin, contains both forms because when we say complete, we mean it.

## Where you get it?

- Fish (tuna, salmon, mackerel)
- Organ meats
- Poultry
- Beef
- Eggs
- Yeast
- Peanuts
- Legumes
- Crimini mushrooms
- Whole wheat



## How it is destroyed in preparation?

Great News! Heat, air, and light have little damaging effect on vitamin B3.

## What are some signs of vitamin B3 deficiency?



- Dermatitis- dry patchy scaly skin.
  - Digestive problems including swollen tongue
  - Muscular weakness
  - Mental confusion and delirium in advanced deficiencies.
  - Lack of energy
  - Insomnia
  - Migraines
  - Irritability
  - Anxiety
  - Depression
- Pellagra- A severe deficiency of B3 is known as pellagra which means rough skin. It is characterized by the four D's – dermatitis, dementia, diarrhea, and death. It is common in areas where corn is the main food staple.

# Vitamin B5 (Pantothenic Acid)

RDI: 10 mg

## Why you need it?

Once absorbed, pantothenic acid is converted into co-enzyme A (CoA), which is the only known biologically active form of vitamin B5. CoA is required for the chemical reactions that generate energy from food (carbohydrates, fats, and proteins) and in the synthesis of the essential fats, steroid hormones, cholesterol, the neurotransmitter acetylcholine, and the hormone melatonin. It controls fat metabolism, is essential for the brain and nerves, and helps to maintain healthy skin and hair. This water-soluble vitamin helps to fight stress by keeping the adrenal glands functioning properly and aids in the detoxification of alcohol.

## What you should know?

D-calcium pantothenate is the natural form of pantothenic acid and is the most commonly used supplemental form of this vitamin. It is more stable than free pantothenic acid and is well absorbed in the digestive tract.

## Where you get it?

- Avocado
- Yogurt
- Liver
- Chicken
- Fish (trout, salmon)
- Sunflower Seeds
- Shiitake Mushrooms
- Legumes
- Sweet Potato
- Broccoli
- Whole Eggs



## How it is destroyed in preparation?

Cooking, freezing and commercial processing can significantly deplete Pantothenic acid. Frozen foods, and canned foods and fruit juices all show depletion ranges from 7-70%.

## What are some signs of vitamin B5 deficiency?



- Fatigue
- Sensations of weakness
- Numbness, tingling or burning sensations in the feet.
- Acne
- Muscle tremors or spasms
- Teeth grinding
- Anxiety or tension
- Irritability
- Depression

# Vitamin B6 (Pyridoxal 5 Phosphate)

RDI: 2 mg

## Why you need it?

Vitamin B6 is part of more than 100 enzyme reactions. Many of the activities of vitamin B6 are related to the metabolism of amino acids and other proteins, including hemoglobin, serotonin, hormones, and prostaglandins. This water-soluble vitamin is also essential for brain function and helps to balance sex hormones. Moreover, it is a natural diuretic and antidepressant and may decrease the risk of colon cancer. It promotes the breakdown of sugar and starches. It is key for heart health because vitamin B6 works alongside vitamin B9 (folate) and vitamin B12 to keep blood levels of homocysteine, an amino acid, within a normal range. It supports your nervous system. The production of neurotransmitters that foster communication between nerve cells is made possible by a compound that contains vitamin B6. It reduces inflammation that can cause type 2 diabetes, cardiovascular disease, and obesity. Those individuals with inflammation actually need more vitamin B6.

## What you should know?

The bioactive form of Vitamin B6 is Pyridoxal 5 Phosphate. However, many inferior multivitamin products utilize Pyridoxine HCL, which is not the active form of this B vitamin.

## Where you get it?

- Wheat Germ
- Liver
- Peanuts
- Legumes
- Pork
- Bananas
- Yellowfin Tuna
- Salmon
- Poultry
- Potatoes with skin on



## How it is destroyed in preparation?

Large amounts of vitamin B are lost during most forms of cooking and processing. Approximately 38% of B6 is lost from canning of fruits, 15% from freezing of fruits, 70% from the canning of vegetables, and up to 75% in the conversion of fresh meat into meat by-products. In general, the more acidic a food, the more B6 is lost during cooking.

## What are some signs of vitamin B6 deficiency?



- Depression & Anxiety
- Sleep disturbances
- Nerve inflammation
- PMS
- Nausea & vomiting
- Convulsions or seizures
- Skin disorders including eczema
- Lethargy
- Anemia
- Altered mobility
- Elevated homocysteine
- Infrequent dream recall
- Water retention

# Vitamin B7 (Biotin)

RDI: 300 mcg

## Why you need it?

Biotin is essential for the activity of many enzyme systems. It aids in the metabolism of fat and sugar and converts sugar to its usable chemical energy. Biotin is also required for an enzyme called CoA carboxylase to put together the building blocks for the production of fat in the body. Fat, a part of every cell membrane, aids in separating the inner workings of cells from their environment. This is especially important for cells that must be rapidly replaced, such as skin cells.

## What you should know?

Avidin, a protein found in egg whites, can bind with biotin and prevent its absorption. However, thoroughly cooking the egg whites denatures avidin, allowing body to absorb biotin.

## Where you get it?

- Liver
- Milk
- Egg Yolk
- Yeast
- Pork
- Salmon
- Avocado
- Cheddar Cheese
- Peanuts
- Swiss Chard
- Cauliflower
- Almonds



## How it is destroyed in preparation?

Great news! Biotin is fairly stable when exposed to heat, light and oxygen.

## What are some signs of vitamin B7 deficiency?



- Hair loss
- Loss of hair color
- Depression
- Scaly dermatitis
- Lesions on the nose and mouth
- Anorexia
- Numbness and tingling of the extremities
- Nausea
- Muscle pain
- Cardiac irregularities.
- Seizures
- Poor muscle tone
- Anxiety & stress

# Vitamin B9 (Folate)

RDI: 400 mcg

## Why you need it?

Folate is often publicized for its importance in pregnancy to prevent neural tube defects (spina bifida). It has been shown that mothers with folate deficiency give birth to a greater number of infants with neural tube defects. Additionally, it also works with vitamins B6 and B12 to lower homocysteine levels. Deficiency in folate can lead to megaloblastic anemia, but it is important to note that megaloblastic anemia caused by a folate deficiency is identical to the anemia caused by a vitamin B12 deficiency, making a B12 deficiency hard to identify. B9, a water-soluble vitamin, also reduces dementia and Alzheimer's, prevents bone fractures and aids in healthy circulation. One of folate's most important duties is cell reproduction. B9 is necessary for making the nucleic acids DNA and RNA, which act as instruction manuals for your cells.

## What you should know?

Research published in the American Journal of Epidemiology shows that more than 34% of the U.S. population may have a genetic enzyme defect known as MTHFR mutation that makes it difficult for them to convert folic acid into biologically active L-5-MTHF, and new estimates suggest that up to 60% of the population may be affected. For these individuals and many others, L-5-MTHF may be a more effective method of folate supplementation. Nutreince is one of the only multivitamins to contain the full RDI of 400 mcg of L-5-MTHF.

## Where you get it?

- Romaine Lettuce
- Spinach
- Asparagus
- Liver
- Beans (Garbanzo)
- Lentils
- Broccoli
- Whole Grain - Wheat Germ
- Eggs



## How it is destroyed in preparation?

Plants (like spinach) can lose up to 40% of their folate content from cooking, while folic acid in meat is far more stable when cooked. Despite the fact that processing of grains causes up to 70% of folic acid to be depleted, folic acid is not one of the micronutrients that is enriched in these products.

## What are some signs of vitamin B9 deficiency?



- Irritability
- Mental fatigue and forgetfulness
- Depression & Anxiety
- Fatigue
- Hair loss
- Gingivitis
- Cleft palate
- Periodontal disease
- Vitiligo (loss of skin pigmentation)
- Dry skin

# Vitamin B12 (Cobalamin)

RDI: 6 mcg

## Why you need it?

Vitamin B12 works with folate (B6) and vitamin B6 to regulate elevated homocysteine levels, a risk factor for cardiovascular disease. This water-soluble vitamin is also an essential growth factor and plays a role in the metabolism of cells. B12 helps to maintain the nervous system in that it is required for the synthesis of myelin, the insulation around nerves. Moreover, deficient levels of B12 are also thought to play a role in Alzheimer's disease and depression. Vitamin B12 is naturally available only in animal products. Gastric acid in the stomach is needed to properly separate B12 from our food and create free form B12, which can then be absorbed (supplemental B12 is already in its free form so it does not require gastric acid). However, proper B12 absorption is dependent on its binding with a protein made in the stomach called intrinsic factor, which helps B12 make its way from the gastrointestinal tract—the stomach and intestines—into the rest of the body. Without intrinsic factor, vitamin B12 cannot gain access to the rest of the body where it is needed. People who do not eat animal foods and who don't consume the suggested amount of vitamin B12 from dietary supplements are prone to vitamin B12 deficiency. Additionally, as you age, the risk of inadequate vitamin B12 absorption rises. A deficiency can cause pernicious anemia, a condition in which red blood cells fail to develop properly. B12 is also unique among water-soluble vitamins in that a relatively large amount can be stored in the liver.

## What you should know?

The standard source of B12, cyanocobalamin, is not a natural source. In fact, it's not found anywhere in nature and must be converted by the liver into methylcobalamin in order to be utilized in humans (and all other animals). Cyanocobalamin is typically found in inexpensive products offered in grocery stores. Methylcobalamin is the form of vitamin B12 active in the central nervous system. It is essential for cell growth and replication.

## Where you get it?

- Clams
- Mussels
- Crab
- Salmon
- Snapper
- Liver
- Oysters
- Venison
- Shrimp
- Scallops
- Beef
- Cheese



## How it is destroyed in preparation?

B12 in animal foods is well preserved during cooking. Approximately 70% of this vitamin remains after heating animal foods for a period of about 30 minutes.

## What are some signs of vitamin B12 deficiency?



- Dandruff
- Nervousness/Anxiety
- Decreased blood clotting
- Numbness or tingling in feet
- Decreased reflexes
- Paleness
- Depression
- Red or sore tongue
- Difficulty swallowing
- Fatigue/Weakness
- Heart palpitations
- Memory problems
- Weak pulse
- Menstrual problems

# Choline

425 mg

## Why you need it?

Choline assists vitamin B6 and folate in the methylation process, which helps with building DNA, exchanging signals in the brain and detoxification processes in the liver. It is also essential in producing phosphatidylcholine: a key structural building block to every cell in the body. Moreover, it provides the backbone to the neurotransmitter acetylcholine, which provides the signal to keep the heart, intestines and muscles moving, amongst other things.

## What you should know?

While the research is still evolving, a daily intake of 425 mg is a safe daily reference point for dietary intake of choline.

## Where you get it?

- Shrimp
- Eggs
- Scallops
- Chicken
- Turkey
- Tuna
- Cod
- Salmon
- Beef
- Collard Greens



## How it is destroyed in preparation?

Great news!! Choline appears to be a fairly stable nutrient to heat and storage.

## What are some signs of iodine deficiency?



- Difficulty Focusing
- Memory Problems
- Lack of Energy
- Persistent Brain Fog
- Anxiety



# Vitamin C

RDI: 60 mg.

## Why you need it?

Vitamin C is so critical to living creatures that almost all mammals can make it with in their own bodies. However, humans—along with gorillas, chimpanzees, bats, birds, and guinea pigs—are among the few species that cannot make vitamin C. Optimal doses of vitamin C have been associated with the improvement of many health conditions, including cardiovascular diseases, cancers, joint diseases, cataracts, and the common cold. It is also the cure for scurvy, for which it was first discovered. This water-soluble vitamin plays a role in collagen and elastin synthesis, both necessary elements in bone matrix, skin, tooth dentin, blood vessels, and tendons. This powerful antioxidant helps to protect against oxygen-based damage to our cells (free-radicals). It is required for fat synthesis and because of its antiviral and detoxifying properties, it can even help to heal wounds.

## What you should know?

Science has shown us that more is not always better when it comes to the amount of vitamin C one should be taking if they are currently taking a statin drug. The anti-inflammatory effect of cholesterol lowering statin drugs can be inhibited by taking megadoses of vitamin C (more than 200 mg). A multivitamin should not contain more than 200 mg of vitamin C to be within the safe range for statin takers. While vitamin C has not been proven to cause kidney stones, in some individuals its metabolic pathway produces high amounts of oxalic acid, which could lead to calcium oxalate stones. Therefore, people with a history of gout, kidney stones, or kidney disease should not take more than 500 mg of vitamin C daily without medical supervision.

## Where you get it?

- Yellow Bell Peppers
- Strawberries
- Oranges (and Juice)
- Grapefruit (and Juice)
- Limes
- Broccoli
- Liver (Beef, Calf, Pork, Chicken)
- Oysters
- Kale
- Snow Peas
- Cauliflower
- Watermelon
- Cabbage
- White Potato



## How it is destroyed in preparation?

Vitamin C is highly sensitive to light, air and heat, so you'll get the most vitamin C if you eat fruits and vegetables raw or lightly cooked. Approximately, 25% of vitamin C is lost during the blanching (prior to freezing), boiling, or thawing processes. Cooking for about 20 minutes can cause over half of this vitamin to be destroyed. Reheated canned vegetables only contain a third of the original vitamin C content.

## What are some signs of vitamin C deficiency?



- Inability to heal wounds
- Frequent infections, colds or flu
- Lung-related problems
- Easy bruising
- Tender swollen joints
- Lack of energy
- Bleeding gums/ Tooth decay
- Nosebleeds
- Anxiety and stress

# Vitamin D

RDI: 400 IU

## Why you need it?

Vitamin D is unique in that it is the only vitamin that can be made when our skin comes into contact with strong ultraviolet B rays from the sun. Because of this, vitamin D is also known as the “sunshine vitamin.” In fact, this fat-soluble vitamin is actually a hormone triggered by sunlight called calcitrol, 1,25-dihydroxy vitamin D3. This vitamin was first discovered as a cure to help prevent the bone development disease, rickets, in children. Vitamin D helps regulate our metabolism, bone and teeth development, muscle function, immune function, insulin activity, calcium balance, and phosphorous balance. It is imperative for maintaining cognitive function and cancer prevention and aids in the reduction of inflammation. It is imperative for healthy heart function. Due to a major micronutrient synergy, without enough vitamin D circulating in your bloodstream, it’s impossible to absorb all the calcium you need.

## What you should know?

There are two forms of vitamin D available in supplemental form: vitamin D2 (ergocalciferol) and vitamin D3 (cholecalciferol). D3 is the form that is produced in our skin when we are exposed to sunlight. It is more biologically active and superior for supplementation. In fact, supplementation with D2 has shown a reduction in serum vitamin D levels rather than an increase.

## Where you get it?

- Egg Yolks
- Liver (Fish, Beef)
- Salmon, Herring, Sardines (wild caught fish are higher in D)
- Shiitake Mushrooms
- Oysters



## How it is destroyed in preparation?

Vitamin D is fairly stable, approximately 1/4 of the D content will be lost when cooked at temperatures above 400°F or 200°C.

## What are some signs of vitamin D deficiency?



- Muscle weakness, pain or twitching
- Frequent fall in elderly or stunted growth in children
- Asthma
- Lowered immunity
- Depression
- Autoimmune disorders
- Hearing loss due to loss of bone in the middle ear
- Pale skin
- Obesity
- Arthritis
- Tooth decay
- Anxiety
- Thyroid dysfunction

# Vitamin E (Tocopherol/Tocotrienol)

RDI: 30 IU

## Why you need it?

Vitamin E is a powerful antioxidant shown to help repair muscle tissue. Recent research on muscle cells indicates that one of vitamin E's main functions is its antioxidant repair mechanism, which aids in repair of cell membranes that have been compromised. This new finding may have implications for enhanced athletic performance as well as with genetic muscle-wasting diseases such as muscular dystrophies or amyotrophic lateral sclerosis (ALS), also known as Lou Gehrig's disease. As a powerful antioxidant, this fat-soluble vitamin prevents cell damage from free radicals. This is important for heart health as it decreases platelet adhesion and prevents LDL cholesterol from being oxidized. It promotes healthy skin by protecting the skin from ultraviolet radiation (UV light). Vitamin E can also prevent the oxidation of the fatty portion of the cell membranes in the lens of your eye, which protects against AMD and cataracts.

## What you should know?

Vitamin E is split into two families the tocopherols and the tocotrienols, each containing four unique derivatives (alpha, beta, gamma, and delta). Smart supplements (like our patented multivitamin, Nutreince) contain the full spectrum of each. Additionally, you should search for a natural source of mixed tocopherols (vitamin E) not a synthetic source of alpha-tocopherol (just one of four tocopherols). According to research published in the American Journal of Clinical Nutrition researchers found that levels of natural vitamin E (d-tocopherol) in the blood and in the organs were double that of synthetic vitamin E (dl-tocopherol) when compared, showing natural vitamin E is better retained and more biologically active than synthetic. Finally, for those taking a statin it has been recommended to keep daily vitamin E intake to 100 IU or less as both vitamin E and vitamin C have been shown to inhibit the anti-inflammatory effects of statins.

## Where you get it?

- Almonds/Hazelnuts/Peanuts/Sunflower Seeds
- Sunflower, Safflower and Olive Oils
- Mustard Greens/Chard/Kale
- Chili peppers
- Wheat germ
- Avocado
- Papaya
- Spinach
- Sweet Potato



## How it is destroyed in preparation?

Vitamin E is greatly depleted by factory processing. In the wheat flour that is used to make 90% of all bread and pasta sold in the US, nearly 90% of the vitamin E (alpha tocopherol) and 43% of the beta tocopherols have been removed. This is because the majority of the vitamin E in wheat is found in the germ, which is removed during commercial processing. To protect vitamin E in oils make sure they are kept in airtight containers. High temperature cooking is also quite destructive.

## What are some signs of vitamin E deficiency?



- Liver and gallbladder problems
- Easy bruising
- Thyroid dysfunction/Hypothyroid
- PMS/Hot flashes
- Eczema/Psoriasis
- Poor wound healing
- Tingling in extremities
- Sterility
- Anxiety
- Dry Skin

# Calcium

RDI: 1000 mg

## Why you need it?

Calcium is the most abundant mineral in the human body, making up 1.5% of total body weight. About 99% of calcium is found in the bones and teeth, with the remaining 1% found in cells and body fluids. A calcium deficiency is one of the causative factors of osteoporosis; a disease characterized by brittle and porous bone that affects more than 20 million Americans. Additionally, studies have shown that a sufficiency in calcium may reduce the risk of colon cancer and prevent or treat moderate hypertension. It is also required for muscle contraction, blood clotting, and nerve transmission.

## What you should know?

Choose a supplement that delivers the maximum amount of calcium that can be absorbed by the body at one time (500- 600mg). This is the only micronutrient that should be less than 100% RDI. While pills and capsules should utilize calcium citrate as it is more absorbable, liquids and powders have an extra advantage. Combining calcium carbonate with non-GMO citric acid stimulates the conversion of the calcium carbonate to calcium citrate in water. Thus supplying the best absorption in a liquid form. Additionally, while media has reported that calcium should not be supplemented because it causes calcification of the arteries, the truth is that it is essential to the human body. This calcification can be completely eliminated by making sure that supplements also contain vitamin K2 so that it can direct the calcium into the bones where it belongs.

## Where you get it?

- Milk/Dairy Products
- Sardines
- Sesame Seeds
- Broccoli
- Legumes
- Canned (bone-in) Salmon
- Bone Broth (minimal)
- Green Leafy Vegetables



## How it is destroyed in preparation?

Great News! Cooking and storing do not have an adverse effect on Calcium.

## What are some signs of calcium deficiency?



- Osteoporosis or rickets
- Bone pain or fractures
- Muscle pain
- Numbness or tingling in extremities
- Growth retardation in children
- Insomnia
- High blood pressure
- Tooth decay
- Sugar Cravings
- PMS
- Anxiety and stress

# Chromium

AI: 120 mcg

## Why you need it?

Chromium plays important role in the regulation of blood sugar levels, the enhancement of insulin effectiveness and the activation of various enzymes for energy production. It also seems to help lower elevated serum cholesterol and triglycerides.

## What you should know?

Research has suggested that chromium picolinate may be linked to causing DNA damage. While the jury is still out, the safest, most absorbable form of chromium is chromium polynicotinate - a pure niacin-bound form of chromium, identified by U.S. government researchers as the active component of true GTF (Glucose Tolerance Factor) - which regulates the bodies use of glucose and helps balance blood sugar levels. This is an extremely important micronutrient for those with diabetes. According to Dr. Walter Mertz, M.D. former director of the USDA Human Nutrition Research Center, "Type II Diabetes is not a disease. It is the lack of a natural ingredient known as GTF Chromium."

- Broccoli
- Onions
- Tomatoes
- Whole Grains - Wheat Germ
- Romaine Lettuce
- Lean Meats
- Cheese
- Legumes
- Nuts



## Where you get it?

### How it is destroyed in preparation?

Chromium is found in the germ and bran of whole wheat and is usually removed when processed. Chromium also naturally found in sugar cane, but it is removed during the process of making sugar.

### What are some signs of chromium deficiency?



- Impaired glucose tolerance.
- Diabetes
- Cardiovascular disease
- High Cholesterol
- High blood pressure
- Cold hands
- Decreased Fertility
- Need for frequent meals
- Cold sweats
- Metabolic Syndrome
- Depression & Anxiety
- Obesity

# Copper

RDI: 2 mg

## Why you need it?

Copper is essential trace mineral that plays an important role in metabolism and is critical functional component in a number of essential enzymes, known as cuproenzymes. It becomes incorporated into liver enzymes, which are then secreted into the blood as ceruloplasmin - a copper-carrying protein and important blood-based antioxidant. Another important role is in oxidation-reduction (redox) reactions, whereby it has an ability to scavenge free radicals. Copper is present in every tissue of the body, with the highest concentrations stored in the liver. It is also required for the formation of the connective tissue that helps support the heart, blood vessels, skin, and bones. Copper is important for the utilization of iron, so iron deficiency anemia may be a sign of a copper deficiency.

## What you should know?

Taking a multivitamin with copper is generally not recommended because too much copper in the body can hinder your body's ability to destroy the proteins that form the plaques found in the brain of Alzheimer's patients. Many Alzheimer's patients have been found to have elevated levels of copper, and in studies, it was determined that many of those effected took multivitamins with copper. Additionally, pregnant woman should avoid copper in multivitamins because copper levels can nearly double during pregnancy making toxicity a concern. Cramps, abdominal pain, vomiting, nausea, and diarrhea are all common when taking supplements that include copper.

## Where you get it?

- Beef Liver/Organ Meats
- Oysters/Clams/Crab/lobster
- Nuts
- Lentils
- Mushrooms
- Green Leafy Vegetables
- Whole Grain Breads & Cereals
- Chocolate
- Sesame/Sunflower Seeds



## How it is destroyed in preparation?

Long periods of heat can greatly deteriorate copper levels in foods. The processing of grain produces copper content by about 70%.

## What are some signs of copper deficiency?



- Anemia
- Fatigue
- Loss of color in the hair and skin (due to decreased synthesis of melanin)
- Low body temperature
- Nervous system disorders
- Blood vessels that rupture easily
- Skin sores
- Elevated LDL cholesterol
- Osteoporosis
- Elevated copper leads to anxiety

# Iodine

RDI: 150 mcg

## Why you need it?

Iodine's main function is the synthesis of thyroid hormones, (T4) thyroxine and (T3) triiodothyronine, and is essential for normal thyroid function. Cells in the thyroid, a small gland located in the front of the neck just under the voice box, are the only cells capable of absorbing iodine. Thyroid cells capture iodine and combine it with an amino acid, tyrosine, to produce thyroid hormones that are then released into the bloodstream. A deficiency of dietary iodine causes the thyroid to become unable to make thyroid hormones, which control a variety of biological and physiological activities including body temperature, physical growth, reproduction, neuromuscular function, the synthesis of proteins, and the growth of skin and hair. In some cases of iodine deficiency, the thyroid will enlarge (this is known as a goiter). If the thyroid gland is absent or damaged, and individuals basal metabolic rate (BMR) can decline to as low as 55% of its normal rate, resulting in impaired growth and development; conversely, if the thyroid gland is hyperactive, and individuals BMR can go up to as high as 160%, causing tachycardia, nervousness, and excitability.

## What you should know?

Iodine can have a normalizing effect on the thyroid gland, meaning thin people with thyroid trouble, due to iodine deficiency, can gain weight and obese people can lose weight simply by becoming sufficient in iodine. Many people with low salt diets can fall short in this mineral, as iodized table salt is the primary source of iodine in the U.S. diet. Kelp, or supplements containing kelp are an excellent natural source of iodine.

## Where you get it?

- Seaweed
- Iodized salt
- Cod
- Seafood
- Milk
- Yogurt
- Eggs
- Potato (with Peel)
- Turkey
- Navy Beans
- Strawberries



## How it is destroyed in preparation?

Iodine does not lose potency in preparation or cooking. Instead, it is added into many processed foods in the form of iodized table salt

## What are some signs of iodine deficiency?



- Goiter
- Depression
- Hypothyroid/Hashimotos
- Weakness/Fatigue
- Weight gain

# Iron

RDI: 18 mg

## Why you need it?

Iron is an essential micronutrient that is found in every cell in the human body. The primary functions of iron include oxygen transport within blood and muscle, and the conversion of blood sugar into energy. About 70% of the iron in the body is stored in the blood in the form of hemoglobin. Dietary iron is found in two forms: heme iron and non-heme iron; however, heme iron is primarily found in animal sources and has an absorption rate of ~30% compared to the ~3% rate absorbed from non-heme iron. Vitamin C can enhance the absorption of iron, particularly of non-heme iron. A deficiency in iron leads to the inability of the red blood cells to carry oxygen needed by the cells; when this happens, anemia may result. This mineral is needed for optimal immunity and aids in fatty acid metabolism as well as liver detoxification.

## What you should know?

Iron is a vital mineral your body needs to function normally. However, the National Institutes of Health's Office of Dietary Supplements, has indicated that too much iron can cause serious health complications. Because of this, you may want to take an iron-free multivitamin to avoid iron overload, a medical condition that causes excess iron to be stored in vital organs such as the liver and heart. Too much iron may be toxic—and even fatal. In general, iron supplementation is not recommended for adult males and postmenopausal women. If you are a child, teen, pre-menopausal woman, an athlete that works out for more than 6 hours a week, or a strict vegan/vegetarian you may want to consider iron supplementation. Additionally, iron is an extremely competitive nutrient, having competitions with 10 other vitamins and minerals. Because of this iron should always be taken away from one's multivitamin.

## Where you get it?

- Liver
- Oysters, Mussels
- Beef/Fish/Poultry
- Kidney Beans/Lentils
- Dried Fruits (Prunes/Raisins)
- Potato, with Skin
- Cashew Nuts
- Black-Strap Molasses
- Tofu



## How it is destroyed in preparation?

Refining and processing of grain removes about 75% of the iron. However, some is added back in through fortification, but this type is less absorbable. While many people believe that spinach is a good form of iron, the oxalic acid in raw spinach depletes the availability by as much as 97%.

## What are some signs of Iron deficiency?



- Weakness/Fatigue
- Headaches
- Brittle nails
- Anxiety & Depression
- Poor immune system
- Inability to concentrate
- Pale skin
- Thyroid dysfunction



# Magnesium

RDI: 400 mg

## Why you need it?

Magnesium is involved in over 300 essential metabolic reactions in the body and is necessary for the transmission of muscular activity, nerve impulses, temperature regulation, blood pressure regulation, detoxification reactions, and for the formation of healthy bones and teeth. It is also involved in the synthesis of DNA and RNA and in energy production. Deficiency in magnesium can compromise cellular activity, especially in the tissues of the heart, kidneys and nerves. In our bodies, the majority of magnesium is found mostly in our bones (~60-65%) and muscles (25%), but as with all minerals, it cannot be made in our body and thus needs to be plentiful in the diet in order for us to remain healthy. Moreover, a magnesium deficiency can cause a sugar craving.

## What you should know?

Most multivitamins supply small amounts of magnesium because of its bulky size. Locate supplements that supply 400 mg of magnesium, a micronutrient responsible for over 300 essential metabolic reactions in the body as well as controlling sugar cravings. Similarly to calcium carbonate, in water, the magnesium carbonate is converted to magnesium citrate, one of the most bioavailable forms, through ionic conversion utilizing non-GMO citric acid.

## Where you get it?

- 100% Bran Cereal
- Oat Bran
- Brown Rice
- Nuts/Seeds
- Legumes
- Dark Leafy Vegetables
- Broccoli
- Potato Skin
- Banana
- Milk/Cheese
- Fish/Shellfish



## How it is destroyed in preparation?

Blanching, steaming and boiling can cause a major completion of magnesium. For example, spinach loses 1/3 of the magnesium when blanched, and beans can lose up to 65%. Processing of grain causes major magnesium depletion. Approximately 85% is lost when white flour is produced.

## What are some signs of magnesium deficiency?



- Weakness
- Muscle cramps
- Loss of appetite
- GI disorders
- Fear & irritability
- High blood pressure
- Anxiety & Depression
- Insomnia
- Increased heart rate
- Imbalanced blood sugar levels

# Potassium

AI: 4700 mg

## Why you need it?

Along with sodium and chloride, potassium is one of the body's three major electrolytes, which means they have the ability to conduct electricity when dissolved in water and are the main particles responsible for osmotic pressure and body fluids. Potassium is the primary electrolyte functioning inside our cells, while sodium and chloride predominately function outside the cell. Potassium is important in regulating the frequency and degree to which our muscles contract and the degree to which our nerves become excitable. This essential mineral helps regulate pH levels in body fluids, blood pressure as well as muscle, and nerve activity, including the beating of the heart.

## What you should know?

Potassium is readily absorbed through the intestinal tract, and excess is efficiently excreted in the urine via the kidneys. However, kidney failure, the use of potassium-sparing diuretics, or a large oral dose of potassium (more than 18g) may lead to dangerously elevated potassium concentrations (hyperkalemia). Symptoms are tingling of hands and feet, muscular weakness, and temporary paralysis. This can lead to an abnormal heart rhythm and eventual cardiac arrest.

## Where you get it?

- Potato with Skin
- Prunes
- Raisins
- Banana
- Acorn Squash
- Lima Beans
- Green Leafy Vegetables
- Crimini Mushrooms
- Coconut Water
- Meat
- Pumpkin
- Cauliflower
- Dairy Products



## How it is destroyed in preparation?

Losses from cooking are extensive (~50%). It is easily leached out by water.

## What are some signs of potassium deficiency?



- Fatigue
- Heart problems
- Muscle weakness
- Irritability
- Cellulite
- Thyroid dysfunction/ Hypothyroid
- High blood pressure

# Selenium

RDI: 70 mcg

## Why you need it?

Humans and animals require selenium for the synthesis of selenium-dependent enzymes called selenoproteins. Selenium plays important roles in detoxification and antioxidant defense mechanisms in the body and seems to have a strong protective synergy with vitamin C and E. A deficiency in selenium may put one at risk for impaired immune function, viral infection, certain types of cancer and cardiovascular diseases. Adequacy of selenium can help to protect against the free radicals that are generated by everyday living, and in response to cigarette smoke, pollution, heavy metals, and other environmental factors including today's modern toxins found in foods as well as in home and beauty products. Like iodine, selenium is essential for proper functioning of the thyroid gland. It helps to regulate how much T3 (a version of the thyroid hormone) is produced.

## What you should know?

Selenomethionine is a superior bioavailable form.

## Where you get it?

- Brazil Nuts
- Seafood (tuna, halibut, lobster, salmon)
- Liver
- Dairy (Human Breast Milk contains 6x more Selenium than Cow's Milk)
- Eggs
- Muscle Meats
- Whole Grains
- Garlic
- Cabbage
- Celery



## How it is destroyed in preparation?

Selenium in beans and vegetables is easily destroyed by boiling (~50%). In addition, 75% of the Selenium is depleted when wheat is turned into white flour. Processing of rice is equally as devastating (brown rice has 15x more Selenium than white rice). Selenium in meat sources is quite stable when cooked.

## What are some signs of selenium deficiency?



- White nail beds
- Discoloration of skin and hair
- Weakness in the muscles
- Anxiety and depression
- Thyroid dysfunction
- Signs of premature aging
- Cataracts
- High blood pressure
- Infertility

# Zinc

RDI: 15 mg

## Why you need it?

Zinc is an essential micronutrient that is required for the functioning of over 300 different enzymes and plays a vital role in an enormous number of biological processes. Additionally, zinc is necessary for the regulation of genetic activity and protein and cell membrane structure. In humans, the highest concentrations of zinc are found in the liver, pancreas, bone, kidneys and muscles, but it is also highly concentrated in parts of the eye, prostate gland, sperm, skin, hair and nails. This essential mineral helps to regulate a wide variety of immune system activities. Zinc supports smell and taste because Gustin, a small protein that is directly related to taste, must be attached to zinc for taste to work. Taste and smell are so entwined that this then affects smell. Additionally, zinc is necessary for dark adaptation and night vision, wound healing, thyroid function, metabolic rate, sexual function, and blood sugar balance.

## What you should know?

Zinc is relatively non-toxic and although the toxicity has been reported in humans, it is uncommon. Zinc deficiency can be due to diets high in foods containing large amounts of phytic acid, which has an absorption blocking effect on the zinc.

## Where you get it?

- Oysters, mussels, crab
- Liver
- Dairy
- Dungeness Crab
- Beef
- Dark Meat Chicken
- Eggs
- Pork
- Whole Grain
- Lamb
- Nuts
- Green Peas



## How it is destroyed in preparation?

Food processing removes 75% of zinc content from grains. Like most minerals, zinc incurs great losses in the presence of water. Boiling and blanching should be avoided.

## What are some signs of zinc deficiency?



- Growth failure (dwarfism, hypogonadism and failure to mature sexually).
- Anxiety & Depression
- Impaired sense of taste and/or smell
- Poor immune system
- Poor appetite
- Night blindness
- Stretch marks
- Acne
- Hypothyroid/Thyroid dysfunction

# Omega-3

RDI 1.6 g

## Why you need it?

Omega-3 fatty acids (ALA, EPA, DHA) are one of the two classes of micronutrients called essential fatty acids (EFAs). As their name implies, EFAs are essential to mammals because we cannot synthesize them. A major source of their benefits can be found in their anti-inflammatory properties. Omega-3 is a structural component of cell membranes. DHA may have an especially important role in vision and nervous system function in that it is selectively incorporated into postsynaptic neuronal cell membranes, as well as retinal cell membranes. Studies indicate that DHA is required for the normal development and function of the retina, where DHA is found in high concentrations. DHA is found in high proportions in the phospholipids of the gray matter of the brain. A deficiency of DHA may be related to learning defects. Research shows that both omega-3 and omega-6 fatty acids may actually have the ability to modulate the expression of our genes, including genes involved in inflammation and fatty acid metabolism. Omega-3s are also heart protective, as they serve as the raw materials for making compounds that are critical to proper blood clotting, helping arteries to relax and contract properly.

## What you should know?

Omega-3s can be found in both plant and animal sources; however, plant sources only contain a kind of omega-3 known as alpha linolenic acid (ALA) and do not contain EPA or DHA. Conversely, animal/algae sources naturally contain both EPA and DHA, which do not require conversion and can be directly absorbed. This is important because ALA has not been shown to have the same cardiovascular benefits as EPA and DHA. While it is true that humans can convert ALA into EPA and then DHA in the body, this elongation process only takes place at efficiency rate of ~5-10% and ~2-5%, respectively.

## Where you get it?

- Herring/Sardines (all fish should be wild caught)
- Salmon (Chinook, Atlantic, then Sockeye)
- Oysters/Dungeness Crab
- Rainbow Trout
- Canned, White Tuna (and Light)
- Flaxseeds/Flaxseed (linseed) Oil
- Chia Seeds
- Walnuts (English)/Walnut Oil
- Grass-Fed Beef
- Pastured Eggs
- Mammal Brains and Eyes (Lamb, Pork, etc.)



## How it is destroyed in preparation?

All polyunsaturated oils, including omega-3 and omega-6 fatty acids are extremely susceptible to oxidation (becoming rancid) from heat, light and oxygen. Whole food sources such as flaxseeds as opposed to flaxseed oil are better protected. Omega-3 oil's should be stored in a dark or opaque glass container in a refrigerator or freezer and should never be heated on the stove for sautéing, as this will damage the oil. Instead, use these oils cold in yogurt or on salad.

## What are some signs of Omega-3 deficiency?



- Dry scaly rash
- Decreased growth in infants and children
- Decreased immune system
- Poor wound healing
- Health conditions marked by inflammation (-itis)
- Anxiety & Depression

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