6 Common Nutrient Deficiencies:

Causing Low Energy, Mood Swings & Weakened Immunity.

PLUS A-Z OF NUTRIENTS

FOOD MATTERS INSTITUTE®

FOOD MATTERS Nutrition Certification PROGRAM

How to Use This Ebook:

This eBook is a resource from the **Food Matters Nutrition Certification Program**. A 10-module, online training program that will teach you how to heal yourself and others. This resource is from Module 3: Understanding Nutrients & Superfoods.

It's essential that you understand the power of nutrients, specifically which nutrients, vitamins, and minerals make each food so powerful.

Inside this eBook, you'll discover the nutrients that are commonly associated with low energy, moods, and immunity, as well as 20 other incredible and essential nutrients needed for the body. For every nutrient, you'll learn the food sources that are rich in each nutrient and the signs and symptoms that the body may be running low.

What are Nutrients?

A nutrient is defined as “anything that provides nourishment essential for growth and the maintenance of life.”

Nutrients are abundant in our foods, but if you’re not eating the right foods or enough variety, you can come up short on your recommended intake.

Some of the most common complaints around health include low energy, mood swings, and a weak immune system.

These are too common and can be a result of lifestyle choices, stress, and more, but more often than not, it’s because the body is lacking some essential nutrients.

What is a Deficiency?

Nutritional bodies describe a deficiency as a prolonged period of time without an essential nutrient (vitamin or mineral). There are varying levels of deficiency, from being low in a particular nutrient and feeling a few mild symptoms to a severe deficiency that can lead to more severe health consequences. In this eBook, we will look at the six most common nutrient deficiencies based on population data of the Western World. We will also highlight some key symptoms you may feel if you lack these nutrients.

It is also good to note that many factors can contribute to deficiency, including variety within the diet, soil quality, and the individual’s ability to absorb a nutrient.

This eBook is designed to be used as a guide rather than a prescriptive plan to address chronic deficiencies.

If you think you are experiencing a severe deficiency, you should seek the advice of your health practitioner.

Information within this eBook is retrieved from the following sources:
www.who.int
www.cdc.com

6 Common Nutrient Deficiencies:

IRON

Function:

Iron supports our blood. Blood isn't just something we see when we graze our knees or cut our fingers; it's essential for delivering nutrients like oxygen to every cell in your body. Iron plays a central role in the hemoglobin molecule of our red blood cells where it transports oxygen from the lungs to the body's tissues and carbon dioxide from the tissues to the lungs. When iron levels are low, this function is diminished.

Common Health Complaints:

- Fatigue
- Pale skin
- Headache
- Weakness/dizziness
- Lack of concentration
- Increased risk of infection

Food Sources:

There are two types of iron that we can get from foods. Iron from animal sources is known as heme iron and iron from plant-based sources is called non-heme iron. Heme iron is absorbed more efficiently and in a different way to non-heme iron.

Plant-Based Sources: Spirulina, legumes, dark green leafy vegetables, pistachios, seeds, quinoa, broccoli, dark chocolate, and raw cacao powder.

Animal Sources: Shellfish, grass-fed liver and organ meats, grass-fed red meat, pasture-raised poultry, tuna, sardines, and eggs.

Some foods can help our bodies absorb iron, while others can inhibit it.

To ensure your iron is being absorbed it is recommended that you:

- Eat foods high in vitamin C alongside iron sources, such as citrus fruits or dark green leafy vegetables.
- Cook your plant foods to improve the amount of available iron.
- Avoid having tea, coffee, or calcium during or directly after having a source of iron.

There is research to suggest that as much as 80% of the world's population is low in iron.

Support absorption by eating good quality vitamin C alongside any iron intake.

6 Common Nutrient Deficiencies:

ZINC

Function:

Zinc is an essential mineral that is necessary for proper immune function, normal thymus gland function, and protection of thymus from cellular damage. Zinc is also required for protein synthesis, cell growth, and wound healing, as well as normal skin function, and the maintenance of vision, taste, and smell as well as being critical to healthy male sex hormone and prostate function.

Signs of Deficiency:

A zinc deficiency is seen most commonly in people who do not absorb zinc well due to digestive disorders, people who have undergone gastric surgery, or have kidney or liver disease.

Common Health Complaints:

Hair loss, diarrhea, poor appetite, depressed mood, decreased immunity, loss of taste or smell, and delayed wound healing.

Food Sources:

Most zinc deficiencies can be easily corrected by a change in diet, especially by consuming rich plant-based and animal sources of zinc.

Plant-Based Sources: Pumpkin seeds, pecans, split peas, Brazil nuts, and peanuts.

Animal Sources: Oysters.

You can help enhance zinc absorption by:

- Eating zinc alongside a good source of protein, such as grass-fed meats or legumes.
- Phytates, a natural component of plants, are thought to inhibit absorption of zinc. You can reduce phytates in legumes by soaking or sprouting them before eating.
- Because of zinc's calming properties, it's best to work into your foods at night.

It is estimated that 17.3% of the population is at risk of zinc deficiency due to dietary inadequacy.

Eating zinc alongside a good source of protein has been proven to enhance uptake in the body.

6 Common Nutrient Deficiencies:

Magnesium

Function:

Magnesium plays an important role in assisting enzymes to carry out various chemical reactions in the body such as building proteins and strong bones and regulating blood sugar, blood pressure, and muscle and nerve functions. Magnesium also acts as an electrical conductor that contracts muscles and makes the heartbeat steady - this is why sore muscles often feel relieved after a magnesium soak.

Signs of Deficiency:

Symptoms of a mild deficiency aren't noticeable as the body has mechanisms to preserve stores. Severe deficiency can be a result of alcohol consumption, the use of certain medications, or malabsorption.

Common Health Complaints:

Fatigue, seizures, weakness, poor appetite, muscle cramps, abnormal heart rate, nausea and vomiting, numbness, or tingling in skin.

Food Sources:

Although magnesium is found in a wide variety of foods it is still a common deficiency amongst the population. It is believed to be one of the leading global deficiencies.

Plant-Based Sources: Green leafy vegetables such as spinach and swiss chard, dark chocolate, raw cacao powder, sunflower seeds, cashews, flaxseeds, almonds, pepitas, amaranth, buckwheat, black beans, avocado, quinoa, and spirulina.

To increase your magnesium absorption, try these tips:

- Avoid calcium-rich foods two hours before or after eating magnesium-rich foods, as the two minerals compete for uptake.
- Addressing any underlying vitamin D deficiencies, which play a role in low magnesium.
- Limit alcohol intake and quit smoking, these affect the body's ability to absorb minerals.

Some studies suggest 75% of Americans aren't meeting their adequate intake.

Addressing an underlying vitamin D deficiency can help with magnesium absorption.

Selenium

Function:

One of the most important antioxidants and thyroid nutrients is selenium. This mineral plays a critical role in metabolism and thyroid function and helps protect your body from damage caused by oxidative stress and is considered to be a 'phytonutrient'. In the body, it is responsible for thyroid hormone metabolism, DNA synthesis, reproduction, and protection from infection.

Common Health Complaints:

- Fatigue
- Hair loss
- Mental fog
- Muscle weakness
- Weakened immune system
- Infertility in men and women

Food Sources:

The amount of selenium in foods is largely determined by the amount present in the soil, which makes deficiency of this nutrient more common in certain parts of the world.

Plant-Based Sources: Brazil nuts, brown rice, sunflower seeds, oatmeal, spinach, lentils, cashews, and bananas.

Animal Sources: Fish (sardines and wild-caught salmon), ham, pork, beef, chicken, turkey, cottage cheese, eggs, milk, and yogurt.

Support your selenium uptake with these simple tricks:

- Brazil nuts are a great source of selenium, just eat two per day to meet the RDI (Recommended Daily Intake).
- The body retains organic sources of selenium better, so eat some of the best selenium-rich foods rather than supplements!
- If you are receiving dialysis, have HIV, or Crohn's Disease, it can impair selenium uptake. Make sure you work through this with your practitioner.

Selenium deficiency is predicted to rise under climate change due to the loss of selenium from crop soils.

Ethically-farmed Brazil nuts are a great source of selenium, and as few as two per day can help you meet the RDI.

6 Common Nutrient Deficiencies:

Vitamin B12

Function:

The B-group vitamins (there are eight essentials) have widespread functions in the body. Vitamin B12, one of the most commonly occurring deficiencies due to dietary, lifestyle, and age factors, has a significant role in the production of red blood cells and DNA. Without it, our bodies can become nutritionally depleted.

Signs of Deficiency:

Symptoms of deficiency can take years to show up and can sometimes be mistaken for folate deficiency. Some of the symptoms include: Mouth ulcers, disturbed vision, pins and needles, weakness & fatigue, pale and jaundiced skin, significant mood changes, breathlessness, and dizziness.

Food Sources:

Vitamin B12 deficiency is common, especially amongst the elderly, those who've recently had a part of their bowel removed, and people who follow a nutritionally inadequate vegan diet.

Plant-Based Sources: Nutritional yeast, seaweed, algae, and mushrooms contain very small amounts.

Animal Sources: Pasture-raised dairy products, eggs, grass-fed meat organ meats, grass-fed meats, wild-caught salmon, wild-caught trout, clams, and sardines.

Try supporting your B12 intake these ways:

- Too much folic acid can mask a vitamin B12 deficiency. Research suggests that high folate levels can even exacerbate the anemia and cognitive symptoms associated with a lack of vitamin B12, so ensure you are monitoring these.
- Decrease your alcohol intake, as this has been shown to impair absorption.

In the U.S. and the U.K., 6% of adults under 60 have vitamin B12 deficiency, but the rate is closer to 20% in those older than 60.

Eating good-quality food sources of vitamin B12, such as grass-fed meats or nutritional yeast, can quickly return the body to normal.

6 Common Nutrient Deficiencies:

Vitamin D

Function:

Vitamin D might just be a crowd favorite because it comes directly from sunshine but it's just as important in the body too. Vitamin D is used in the mineralization of bones by boosting the absorption of calcium and phosphorus in the digestive tract and signaling for the kidney to retain more of these two nutrients.

Signs of Deficiency:

Vitamin D intake is more challenging to measure, but these are some common symptoms people may struggle with; anxiety, hair loss, bone loss, depression, weight gain, muscle pain, bone & back pain, fatigue & tiredness, impaired wound healing, weakened immune system, Rickets, and osteomalacia in later life.

Food Sources:

Vitamin D is synthesized in the body with the help of sunlight!

Plant-Based Sources: Mushrooms; like us, mushrooms synthesize vitamin D from sunlight.

Animal Sources: Fatty fish and seafood like tuna, wild-caught salmon, sardines, anchovies, oysters, eggs, and cod liver oil.

Vitamin D absorption can be increased by:

- Sunbaking your mushrooms. By leaving your mushrooms in the direct sunlight for 20 minutes, it increases the availability of the essential vitamin.
- Going for a daily walk, no more than 20 minutes, with bare arms and legs exposed to the sun. Vitamin D is best absorbed by sunlight.
- Eating egg yolks (if eggs are included in your diet).

Your overall risk may be linked to certain underlying conditions, as well as lifestyle factors.

Boost levels by getting 20 minutes of unfiltered sunlight, or letting your mushrooms soak up the sun for you.

A-Z of Nutrients

FOOD MATTERS® INSTITUTE

VITAMIN A

Function:

Vitamin A is essential for optimal vision. It helps to maintain the cornea, which is the transparent cover of the front portion of the eye. Vitamin A also stimulates the production and activity of white blood cells, takes part in remodeling bone, helps maintain healthy endothelial cells (those lining the body's interior surfaces), and regulates cell growth and division such as needed for reproduction.

Signs of Deficiency:

Deficiency is rare in developed nations. It manifests as night blindness, corneal abnormalities, impaired immunity, and white lumps on the skin (hyperkeratosis).

Toxicity:

Toxicity is more common than deficiency in developed countries and is mostly due to supplementation. Vitamin A is also fat-soluble, meaning that excess is stored in fat tissue or the liver and can lead to toxicity.

Symptoms of Toxicity:

- Acute: blurred vision, nausea, vomiting, vertigo, headaches, muscle incoordination.
- Chronic: reduced bone density, liver abnormalities, birth defects.

Food Sources:

Food sources: There are two forms of vitamin A:

1. Carotenoids such as beta-carotene (Provitamin A) are converted to retinol in the body.

Plant-based sources: Butternut squash, sweet potato, carrots, spinach, red and yellow peppers, watercress, tomatoes, dark green leafy vegetables, broccoli, wheatgrass, spirulina.

2. Retinol (pre-formed vitamin A) is in a form that the body can use without transformation.

Animal sources: Liver, cod liver oil, oily fish, cheese, eggs, butter, and cream.

VITAMIN B1 (THIAMIN)

Function:

Thiamin plays a vital role in the growth and function of various cells.

Signs of Deficiency:

Because thiamin is involved in several basic cell functions and the breakdown of nutrients for energy, a deficiency can lead to various problems in the brain and heart that require a constant supply of energy.

Toxicity:

It is very unlikely to reach toxicity from food sources of vitamin B1 because the body is able to flush out excess through the urine.

Food Sources:

Plant-based sources: Nutritional yeast, seaweed, sunflower seeds, whole grains, legumes, flax seeds, nuts, asparagus, brussel sprouts.

Animal sources: Wild-caught salmon, mussels, grass-fed organ meats.

VITAMIN B2 (RIBOFLAVIN)

Function:

Riboflavin is a key component of coenzymes involved with the growth of cells and energy production.

Signs of Deficiency:

Riboflavin deficiency is very rare in developed nations and generally occurs alongside other deficiencies in those who are malnourished. Symptoms may include cracked lips, sore throat, swelling of the mouth or tongue, hair loss, and skin rashes or lesions.

Toxicity:

Toxicity is unlikely as the gut can only absorb a limited amount, and any excess is excreted through the urine.

Food Sources:

Plant-based sources: Dark green leafy greens, mushrooms, almonds, avocado.

Animal sources: Dairy, grass-fed liver, eggs, wild-caught salmon.

Notes:

Riboflavin is easily destroyed by UV light & irradiation.

VITAMIN B3 (NIACIN)

Function:

Niacin is a coenzyme required for more than 400 reactions in the body. Niacin helps to convert nutrients into energy, create cholesterol and fats, create and repair DNA, and exert antioxidant effects.

Signs of Deficiency:

A niacin deficiency is rare because it is found in many foods, both animal and plant.

Toxicity:

Toxicity has been seen in individuals who take niacin supplements. Symptoms include flushing of the skin, rapid heartbeat, nausea, and dizziness.

Food Sources:

Plant-based sources: Sunflower seeds, peanuts, green peas, brown rice, mushrooms, avocado, sweet potatoes, asparagus.

Animal sources: Pasture-raised chicken, grass-fed liver, tuna, turkey, wild-caught salmon, sardine, grass-fed beef.

VITAMIN B5 (PANTOTHENIC ACID)

Function:

It is used to make coenzyme A (CoA), a chemical compound that helps enzymes to build and break down fatty acids as well as perform other metabolic functions, as well as acyl carrier protein (ACP), which is also involved in building fats.

Signs of Deficiency:

B5 is usually a rare deficiency as it is found in a wide variety of foods, it is only really seen in malnourished individuals.

Toxicity:

Toxicity of B5 has not been observed from food sources.

Food Sources:

Plant-based sources: Sunflower seeds, avocados, mushrooms, lentils, cauliflower, broccoli, sweet potatoes, whole grains, nuts, eggs.

Animal sources: Grass-fed meats, pasture-raised dairy products.

VITAMIN B6 (PYRIDOXINE)

Function:

Folate facilitates the formation of DNA and RNA and is involved in protein metabolism. It plays a key role in breaking down homocysteine, an amino acid that can exert harmful effects in the body if it is present in high amounts. Folate is also needed to produce healthy red blood cells and is critical during periods of rapid growth, such as during pregnancy and fetal development.

Signs of Deficiency:

Deficiency of folate is generally rare as it is found in so many foods. However, alcohol abuse or gastric surgeries can impede your body's ability to absorb the nutrient. Pregnancy also has an increased need for folate.

Symptoms:

Megaloblastic anemia (a condition arising from a lack of folate in the diet or poor absorption that produces less red blood cells, and larger in size than normal); weakness, fatigue, irregular heartbeat, shortness of breath, difficulty concentrating, hair loss, pale skin, and mouth sores.

Toxicity:

It is extremely rare to reach a toxic level when eating folate from food sources. However, an upper limit of folate has been recorded as it can mask vitamin B12 deficiency.

Food Sources:

Plant-based sources: Spinach, black-eyed peas, asparagus, brussel sprouts, romaine lettuce, avocado, broccoli, legumes, beets.

Animal sources: Grass-fed beef liver, eggs.

Note:

Although there are many food sources rich in folate, studies have shown that food fortified with folic acid (which is a different form) is better absorbed by the body.

VITAMIN B7 (BIOTIN)

Function:

Vitamin B7, also known as biotin, is involved in a wide variety of metabolic processes such as the breakdown of fats, carbohydrates, and proteins in food.

Signs of Deficiency:

People who have health problems such as Crohn's disease can become deficient due to the inability to absorb the vitamin through the gut lining. Symptoms of deficiency are gradual and build up over time, they include seizures, brittle nails, skin infections, and neurological problems such as depression, lethargy, hallucinations, and pins and needles.

Toxicity:

Because biotin is a water-soluble vitamin, excess that your body can't absorb is excreted through the urine.

Food Sources:

Plant-based sources: Nutritional yeast, legumes and beans, avocado, berries, bananas, sweet potatoes, cauliflower, whole grains, mushrooms, nuts and seeds.

Animal sources: Eggs, grass-fed liver, wild-caught salmon, pasture-raised dairy products.

VITAMIN B12 (COBALAMIN)

Function:

Vitamin B12 has a significant role in the production of red blood cells and DNA.

Signs of Deficiency:

Vitamin B12 deficiency is common, especially amongst the elderly, those who've recently had a part of their bowel removed, and people who follow a nutritionally inadequate vegan diet. Symptoms of deficiency can take years to show up and can sometimes be mistaken for folate deficiency. Some of the symptoms include; pale and jaundiced skin, weakness & fatigue, pins and needles, mouth ulcers, breathlessness and dizziness, disturbed vision, and significant mood changes.

Toxicity:

Because vitamin B12 is a water-soluble vitamin and excess is excreted through the urine, no upper limit or toxicity has been established or recorded.

Food Sources:

Plant-based sources: Nutritional yeast, seaweed, algae & mushrooms contain very small amounts.

Animal sources: pasture-raised dairy products, eggs, grass-fed meat organ meats, grass-fed meats, wild-caught salmon, wild-caught trout, clams, sardines.

VITAMIN C

Function:

Vitamin C, also known as ascorbic acid, is necessary for the growth, development, and repair of all body tissues. It plays an important role in controlling infections and healing wounds, and is a powerful antioxidant that can neutralize free radicals and prevent oxidative stress. It is required for collagen production, efficient absorption of iron, an important protein that makes up about ⅓ of all protein in the body. It is essential for healthy joints, skin elasticity, bone structure, and more.

Signs of Deficiency:

Vitamin C deficiency is rare in developed countries but can include symptoms stemming from a loss of collagen (delayed wound healing, hair loss, skin issues.) It can also manifest as a lower immune system or iron deficiency anemia (small-cell type).

Deficiency Disease:

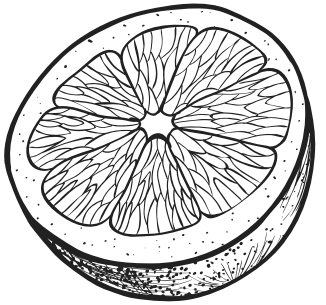
Scurvy; which includes symptoms of bruising, bleeding gums, weakness, fatigue, and rashes.

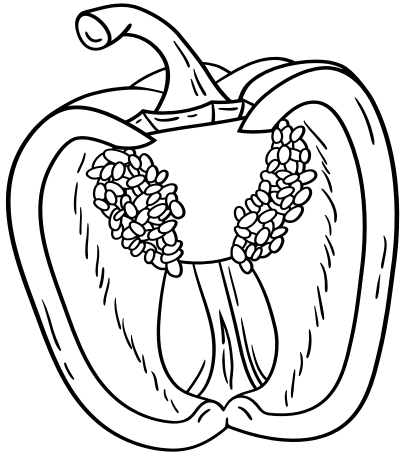
Food Sources:

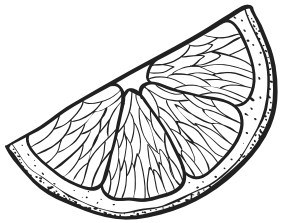
Plant-based sources: Fruits and vegetables are the best sources, including citrus fruits, berries, cabbage type vegetables (Brussels sprouts, cauliflower), dark green vegetables, capsicum, papaya, mangoes, goji berries, Kakadu plums, acerola cherries, kiwi fruit, lemons, permissions, fresh herbs.

Note:

To make sure you're getting the most Vitamin C out of your foods, eat them raw and unprocessed!







CALCIUM

Function:

Calcium is a mineral most often associated with healthy bones and teeth, although it also plays an important role in blood clotting, helping muscles to contract, and regulating normal heart rhythms and nerve functions. About 99% of the body's calcium is stored in bones, and the remaining 1% is found in blood, muscle, and other tissues.

Signs of Deficiency:

Blood levels of calcium are tightly regulated, if you're not consuming enough calcium through your diet your bones will release calcium into the blood and no symptoms usually occur. Serious deficiency of calcium is called hypocalcemia, which results from diseases such as kidney failure, invasive surgeries of the digestive tract like gastric bypass, or medications like diuretics that interfere with absorption.

Symptoms of hypocalcemia:

- Poor appetite
- Abnormal heart rate
- Muscle cramps or weakness
- Numbness or tingling in fingers

A gradual deficiency of calcium because of diet or inability to absorb the mineral can result in the degradation and density of the bones. The first early stage of bone loss is called osteopenia and, if untreated, osteoporosis.

Toxicity:

Too much calcium in the blood is called hypercalcemia. This can sometimes occur from supplement overdose in people over the age of 50, which can result in an increased risk of kidney stones, prostate cancer, and constipation.

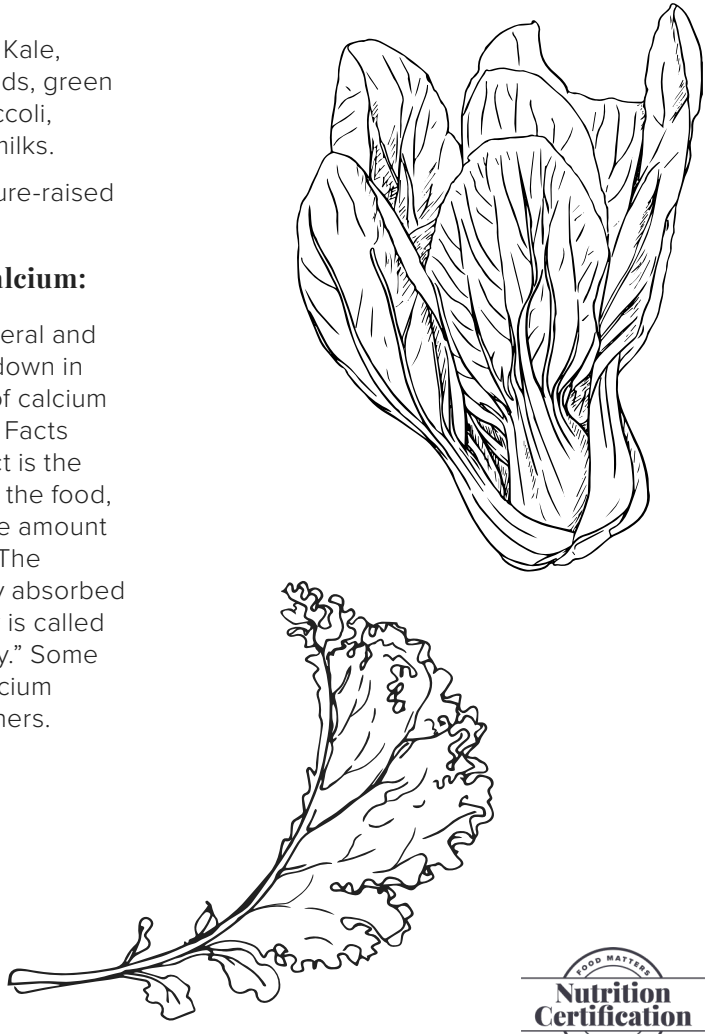
Food Sources:

Plant-based sources: Kale, okra, bok choy, almonds, green leafy vegetables, broccoli, fortified plant-based milks.

Animal sources: Pasture-raised dairy, sardines.

Bioavailability of Calcium:

Calcium is a large mineral and not so easy to break down in the gut. The amount of calcium listed on the Nutrition Facts label of a food product is the measure of calcium in the food, but not necessarily the amount the body will absorb. The amount that is actually absorbed and used by the body is called "calcium bioavailability." Some foods have higher calcium bioavailability than others.



CHLORIDE

Function:

Functions in the maintenance of water balance and distribution, kidney and adrenal function, acid-base (alkaline) balance, muscle and nerve cell function, and heart function.

Signs of Deficiency:

Chloride deficiency can be caused by fluid loss through nausea or vomiting or by existing conditions, diseases, or medications.

Toxicity:

Chloride toxicity has not been observed in humans except in the special case of impaired sodium chloride metabolism.

Food Sources:

Plant-based sources: Tomatoes, leafy vegetables like lettuce and celery, olives, seaweeds and rye.

CHROMIUM

Function:

Chromium is important in the breakdown of fats and carbohydrates, and aids in insulin action and glucose breakdown. It also stimulates fatty acid and cholesterol synthesis.

Signs of Deficiency:

Chromium deficiency is more common than you would realize. Deficiency can result in a range of symptoms, including some that mimic those of diabetes, such as weight loss, impaired glucose tolerance, neuropathy, anxiety, fatigue, and muscle weakness.

Toxicity:

Toxicity of chromium is rare as the body is able to excrete excess through the urine.

Food Sources:

Plant-based sources: Broccoli, potatoes, garlic, basil, orange, green beans, apples, bananas, whole grains.

Animal sources: Grass-fed beef, pasture-raised poultry, pasture-raised dairy products.

Note:

Chromium can not be synthesized in the body and must be consumed through the diet.

COPPER

Function:

Copper is a component of several enzymes that act as antioxidants in the body and support the absorption of iron.

Signs of Deficiency:

Anemia, and bone abnormalities.

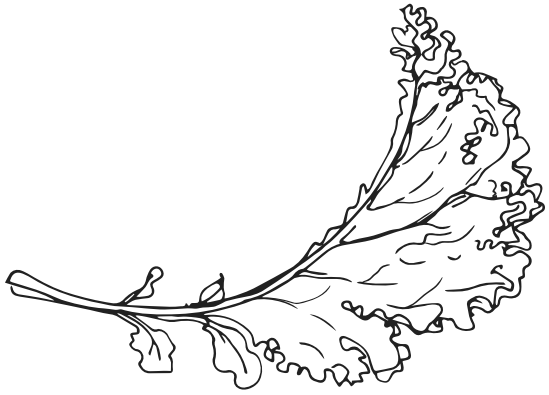
Toxicity:

Rare, but can result in liver damage. Excess is excreted through the urine.

Food Sources:

Plant-based sources: Spirulina, mushrooms, nuts, seeds, green leafy vegetables, dark chocolate, raw cacao, legumes.

Animal sources: Grass-fed liver, oysters, seafood.



VITAMIN D

Function:

Mineralisation of bones by boosting the absorption of calcium and phosphorus in the digestive tract and signaling for the kidney to retain more of these two nutrients.

Signs of Deficiency:

Anxiety, hair loss, bone loss, depression, weight gain, muscle pain, bone & back pain, fatigue & tiredness, impaired wound healing, weakened immune system, Rickets, and osteomalacia in later life.

Toxicity:

Vitamin D toxicity is generally rare, but if it does occur it's usually from an overdose of Vitamin D supplements rather than from the sun or food sources. The main consequence is the accumulation of calcium in the blood, which brings on nausea, vomiting, frequent urination, and weakness.

Food Sources:

Vitamin D is synthesized in the body with the help of sunlight!

Plant-based sources: Mushrooms. Like us, mushrooms synthesize vitamin D from sunlight.

Animal sources: Fatty fish and seafood like tuna, wild-caught salmon, sardines, anchovies, oysters, eggs, cod liver oil.

VITAMIN E

Function:

Vitamin E's main role is to act as an antioxidant, protecting the body from cell damage and oxidative stress. It also enhances immune function and prevents clots from forming in heart arteries.

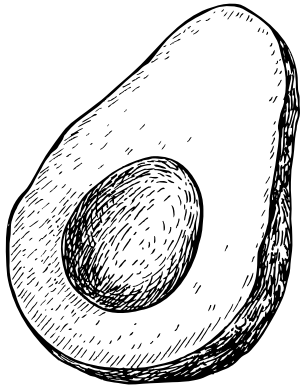
Signs of Deficiency:

Because vitamin E is widely available in foods, deficiency is very rare. If deficiency does occur, it can present as red blood cell breakage (known as erythrocyte hemolysis) and nerve damage.

Food Sources:

Plant-based sources: Extra virgin olive oil, avocado, nuts, seeds, flaxseed oil, tomatoes, carrots, wholegrains.

Animal sources: Wild-caught salmon and trout.



IODINE

Function:

Also called iodide, iodine is a type of mineral that's naturally found in the earth's soil and ocean waters. Many salt water and plant-based foods contain iodine, and this mineral is most widely available in iodized salt. Iodine regulates hormones, fetal development, and more. It's particularly important during pregnancy, and exposure in the womb may even help prevent certain health conditions later in life.

Signs of Deficiency:

Studies report that up one-third of the population could be deficient in iodine. One of the main reasons for this deficiency is the lack of this mineral in the soil. Common symptoms include unexpected weight gain, fatigue, hair loss, flakey dry skin, changes in heart rate, and heavy or irregular periods.

Toxicity:

Iodine toxicity is generally rare, however, if it occurs it can cause thyroid gland inflammation and potentially thyroid cancer. Getting a very large dose of iodine can cause; nausea or vomiting, diarrhea, fever, burning sensations in the throat and mouth, and stomach pain.

Food Sources:

Plant-based sources: Seaweed, lima beans.

Animal sources: Cod, tuna, eggs, shrimp, pasture-raised dairy products.

Note:

Some countries fortify certain foods with iodine, because of a lack of the mineral that occurs naturally in the soil.

IRON

Function:

Plays a central role in the hemoglobin molecule of our red blood cells where it transports oxygen from the lungs to the body's tissues and carbon dioxide from the tissues to the lungs.

Signs of Deficiency:

A large proportion of the global population suffers from iron deficiency. One of the most noticeable symptoms of iron deficiency is fatigue and lack of energy. Other symptoms can be weakness, pale skin, shortness of breath, dizziness, headaches, brittle nails, fast heartbeat, strange cravings for non-food substances like ice or dirt (called pica), cold hands and feet, tingling, or a crawling feeling in the legs.

Toxicity:

Toxicity is rare because the body regulates iron absorption and will absorb less if iron stores are adequate. Excessive iron occurs most often from taking high-dosage supplements.

Common signs:

- Constipation
- Upset stomach
- Nausea, vomiting
- Abdominal pain

Food Sources:

Heme & Non-Heme iron: Iron from food comes in two forms: heme and non-heme. Heme is found only in animal flesh like meat, poultry, and seafood. Non-heme iron is found in plant foods like whole grains, nuts, seeds, legumes, and leafy greens. Non-heme iron is also found in animal flesh (as animals consume plant foods with non-heme iron) and fortified foods.

Plant-based sources: Spirulina, legumes, dark green leafy vegetables, pistachios, seeds, quinoa, broccoli, dark chocolate, raw cacao powder.

Animal sources: Shellfish, grass-fed liver and organ meats, grass-fed red meat, pasture-raised poultry, tuna, sardines, eggs.

VITAMIN K

Function:

Vitamin K is key in facilitating and building healthy bones and maintaining heart health. Vitamin K also needs to be present in the body to synthesis specific proteins that aid in the coagulation of blood (clotting).

Signs of Deficiency:

Vitamin K deficiency is generally rare as it is present in most of the food groups we consume and this may be because your body is also able to recycle the vitamin!

Toxicity:

Vitamin K toxicity is generally rare, because the foods we eat contain adequate amounts of the vitamin.

Food Sources:

There are two types of vitamin K; vitamin K1 is found in green leafy vegetables (phylloquinone) and vitamin K2 is found in fermented foods and some animal products (menaquinone).

Some data indicates that vitamins K1 and K2 function differently, but it is yet to be adequately reported on.

Vitamin K1: Kale, collard greens, spinach, turnip greens, broccoli greens, Brussel sprouts.

Vitamin K2: Beef liver, pork chops, chicken, goose liver, bacon, ground beef, pork liver.

Absorption boosters: Because vitamin K is a fat-soluble vitamin, it helps to consume fat along with vitamin K-rich foods to help with absorption. Try adding some avocado or olive oil to your leafy green salad.

Absorption blockers: Antibiotic medicines can destroy vitamin K-producing bacteria in the gut, thereby potentially decreasing vitamin K levels, especially if taking the medicine for more than a few weeks.

MAGNESIUM

Function:

Magnesium plays an important role in assisting enzymes to carry out various chemical reactions in the body such as building proteins and strong bones and regulating blood sugar, blood pressure, and muscle and nerve functions. Magnesium also acts as an electrical conductor that contracts muscles and makes the heartbeat steady.

Signs of Deficiency:

Although magnesium is found in a wide variety of foods it is still a common deficiency amongst the population. It is believed to be the leading global deficiency. Symptoms of a mild deficiency aren't noticeable as the body has mechanisms to preserve stores. Severe deficiency can be a result of alcohol consumption, the use of certain medications, or malabsorption.

- Fatigue
- Weakness
- Poor appetite
- Nausea and vomiting
- Numbness or tingling in skin
- Muscle cramps
- Seizures
- Abnormal heart rate

Toxicity:

Toxicity is rare from food sources because the kidneys will remove excess magnesium in the urine. However toxic levels may occur with long-term use of high-dosage supplements.

Food Sources:

Plant-based sources: Green leafy vegetables such as spinach and swiss chard, dark chocolate, raw cacao powder, sunflower seeds, cashews, flaxseeds, almonds, pepitas, amaranth, buckwheat, black beans, avocado, quinoa, spirulina.

MANGANESE

Function:

It's required for the normal functioning of your brain, nervous system, and many of your body's enzyme systems.

Signs of Deficiency:

Because manganese is found in a wide variety of foods, deficiency is rare. However, a deficiency could result in the following symptoms:

- Poor bone growth or skeletal defects
- Slow or impaired growth
- Low fertility
- Impaired glucose tolerance, a state between normal glucose maintenance and diabetes
- Abnormal metabolism of carbohydrate and fat

Toxicity:

Manganese toxicity can result in a permanent neurological disorder known as manganism with symptoms that include tremors, difficulty walking, and facial muscle spasms. These symptoms are often preceded by other lesser symptoms, including irritability, aggressiveness, and hallucinations.

Food Sources:

Plant-based sources: Whole grains, nuts, soybeans and other legumes, rice, leafy vegetables, coffee, tea, many spices, such as black pepper.

Animal sources: Clams, oysters, mussels.

MOLYBDENUM

Function:

Molybdenum is a mineral that activates enzymes to help break down harmful sulfites and prevent toxins from building up in the body.

Signs of Deficiency:

Since molybdenum is found in many common foods, the average daily intake exceeds requirements. As long as you eat a diet with variety, you should not be worried about becoming deficient.

Toxicity:

Molybdenum toxicity is rare and studies in humans are limited. However, in animals, very high levels have been linked to reduced growth, kidney failure, infertility, and diarrhea.

Food Sources:

Plant-based sources: Legumes such as black-eyed peas and lima beans. Whole grains, rice, nuts, potatoes, bananas, green leafy vegetables.

Animal sources: Beef, chicken, eggs, dairy products, like milk, yogurt, and cheese.

PHOSPHORUS

Function:

Phosphorus is the second most plentiful mineral in your body. Your body needs phosphorus for many functions, such as filtering waste and repairing tissue, cells, and building bones.

Signs of Deficiency:

Most people generally have too much phosphorus in their body than too little. However, people who suffer from diabetes, kidney issues, or abuse alcohol can experience deficiencies. Phosphorus levels that are too high or too low can cause medical complications, such as heart disease, joint pain, or fatigue.

Toxicity:

Phosphorus toxicity can cause diarrhea, as well as a hardening of organs and soft tissue. High levels of phosphorus can affect your body's ability to effectively use other minerals, such as iron, calcium, magnesium, and zinc.

Food Sources:

Plant-based sources: Lentils, peanuts.

Animal sources: salmon, halibut, beef, turkey, chicken, almonds, eggs.

POTASSIUM

Function:

Potassium is sometimes referred to as an electrolyte because it carries a small electrical charge that activates various cell and nerve functions. Its main role in the body is to help maintain normal levels of fluid inside our cells. Sodium, it's counterpart, maintains normal fluid levels outside of cells. Potassium also helps muscles to contract and supports normal blood pressure.

Signs of Deficiency:

Potassium deficiency can be a result of any conditions that increase fluid losses beyond normal such as vomiting, diarrhea, and certain medications like diuretics. Potassium deficiency is called hypokalemia. Generally, it is highly unlikely to become deficient in potassium from food sources because it is present in so many foods.

Symptoms of hypokalemia include:

Fatigue, muscle cramps, weakness, constipation, muscle paralysis, and irregular heart rate (with severe hypokalemia).

Toxicity:

The kidneys work to maintain normal blood levels of potassium by flushing out excess amounts through urine. However, toxicity can occur in people with advanced kidney disease or people who are taking medications that hold on to potassium.

Symptoms of toxicity include:

- Weakness, fatigue
- Nausea, vomiting
- Shortness of breath
- Chest pain
- Heart palpitations, irregular heart rate

Food Sources:

Potassium is widely available in many foods, especially fruits and vegetables. Leafy greens, beans, nuts, dairy foods, and starchy vegetables like winter squash are rich sources.

SELENIUM

Function:

One of the most important antioxidants and thyroid nutrients is selenium. This mineral plays a critical role in metabolism and thyroid function and helps protect your body from damage caused by oxidative stress and is considered to be a 'phytonutrient'. In the body, it is responsible for thyroid hormone metabolism, DNA synthesis, reproduction, and protection from infection.

Signs of Deficiency:

The amount of selenium in foods is largely determined by the amount present in the soil, which makes deficiency of this nutrient more common in certain parts of the world.

The most common symptoms are:

- Infertility in men and women
- Muscle weakness
- Fatigue
- Mental fog
- Hair loss
- Weakened immune system

Toxicity:

Selenium toxicity is generally rare from food sources, rather it occurs from acute or chronic ingestion of excess selenium. Symptoms of selenium toxicity include nausea, vomiting, nail discoloration, brittleness, and loss; hair loss, fatigue, irritability, and foul breath odor.

Food Sources:

Fish (sardines and wild-caught salmon), ham, pork, beef, chicken, turkey, cottage cheese, eggs, milk, and yogurt.

SODIUM

Function:

Salt, also known as sodium chloride, is made up of 40% sodium and 60% chloride. The human body requires a small amount of sodium to conduct nerve impulses, contract and relax muscles, and maintain the proper balance of water and minerals. Sodium is also used as a preservative for foods as bacteria cannot survive in the presence of large amounts.

Signs of Deficiency:

Sodium deficiency is generally uncommon, as many foods contain trace amounts and it is generally a mineral that you don't need to be conscious of consuming. Low blood sodium (hyponatremia) can however occur in people if your body loses too much water and electrolytes. Hyponatremia may also be a symptom of certain medical conditions.

Symptoms:

- Weakness
- Fatigue or low energy
- Headache
- Nausea
- Vomiting
- Muscle cramps or spasms
- Confusion
- Irritability

Primary causes of low sodium are:

- Dehydration
- Diarrhea
- Taking certain medications (some antidepressants)
- Taking diuretics
- Kidney disease
- Liver disease
- Heart problems
- Adrenal conditions

Toxicity:

An upper limit for toxicity hasn't been established for sodium. However excessive sodium intake over time can lead to chronic conditions such as high blood pressure and heart conditions.

Food Sources:

Sodium can be found in trace amounts in vegetables, meats, legumes, and dairy products. However, most of our sodium comes from processed foods, which can become problematic if you're mostly consuming these sorts of foods.

According to The Centers for Disease Control and Prevention, the top 10 sources of excess sodium in our diets include; breads/rolls, pizza, sandwiches, cold cuts/cured meats, soups, burritos, tacos, savory snacks (chips, popcorn, pretzels, crackers), chicken, cheese, eggs, and omelets.

Note:

High salt intake increases blood pressure, which can lead to heart disease, while high potassium intake can help relax blood vessels and excrete sodium while decreasing blood pressure. Our bodies need far more potassium than sodium each day, but the typical US diet is just the opposite: Americans average about 3,300 milligrams of sodium per day, about 75% of which comes from processed foods, while only getting about 2,900 milligrams of potassium each day.

ZINC

Function:

Necessary for proper immune function, normal thymus gland function, and protection of thymus from cellular damage. Required for protein synthesis, cell growth, and wound healing, as well as normal skin function. Essential for the maintenance of vision, taste, and smell. Critical to healthy male sex hormone and prostate function.

Signs of Deficiency:

A zinc deficiency is rare and is seen most commonly in people who do not absorb zinc well due to digestive disorders, people who have undergone gastric surgery, or have kidney or liver disease.

- Loss of taste or smell
- Poor appetite
- Depressed mood
- Decreased immunity
- Delayed wound healing
- Diarrhea
- Hair loss

Toxicity:

Toxicity occurs almost exclusively from zinc supplements rather than food.

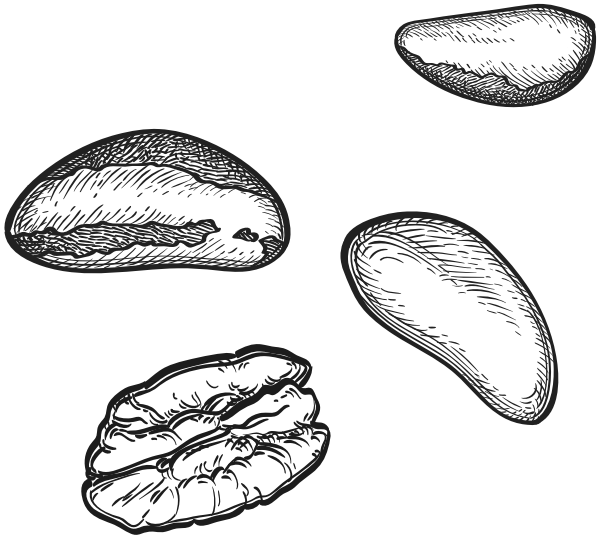
Signs of toxicity include:

- Nausea, vomiting
- Poor appetite
- Abdominal pain or cramping
- Headaches
- Diarrhea

Food Sources:

Plant-based sources: Pumpkin seeds, pecans, split peas, Brazil nuts, peanuts.

Animal sources: Oysters.



You did it!

You've now learned about 26 essential nutrients and how they function in the body. You also now know how to spot the signs and symptoms of nutrient deficiencies and understand which foods you can eat to boost those nutrients.

This information is so important but only the tip of the iceberg when it comes to understanding nutrition.

Studying nutrition changed my life when Lauentine and I began our studies back in 2007. It helped me cut through the confusion of paleo, veganism, plant-based, intermittent fasting, and more to experience lasting energy, vitality, and improved immunity.

It gave me the tools and knowledge to help heal my father, successfully getting him off 6 medications, losing over 50lbs, and completely recovering his life and health. This laid the groundwork for starting an online movement that has inspired millions around the world.

Unfortunately, we aren't taught about real nutrition in school. We have a medical profession that is rarely trained to use food as medicine, and the multi-billion dollar fast-food and pharmaceutical industries thrive on misleading consumers.

We've created this eBook to celebrate the launch of our Nutrition Certification Program. We've welcomed over 2,000 students to our 10-week online, accredited Nutrition Program, transforming lives and careers!

We've assembled the greatest minds, independent from big business interests, to share with you the most trusted research on nutrition and healing in the world including Mark Hyman M.D, David Wolfe, Libby Weaver Ph.D., Elizabeth Rider, Dave Asprey, Dr. Joe Dispenza, Dr Alejandro Junger, and more!

We'd be thrilled to have you study with us. To learn more about upcoming enrollments dates and special offers, visit: www.foodmatters.com/study-nutrition

In good health,

James Colquhoun
Filmmaker and founder of Food Matters Institute

FOOD MATTERS

Nutrition Certification

PROGRAM

Learn to Heal Yourself and Others with the Food Matters Nutrition Certification Program.

WWW.FOODMATTERS.COM/STUDY-NUTRITION