

10 Common Nutrient Deficiencies

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STORY AT-A-GLANCE

- › Your body depends on essential nutrients for growth, development and health maintenance, and deficiencies in certain vitamins can impact your immunity, vision, wound healing, bone health and much more
- › Common nutrient deficiencies include vitamin D, magnesium, vitamin K2, carnosine (beta-alanine) and vitamin B12
- › Many people also do not consume enough omega-3 fats, vitamin A, vitamin E, iodine and saturated fat from butter and animal products
- › The best way to ward off nutrient deficiencies is to intentionally fortify your meals with whole, nutrient-dense foods, including healthy saturated and omega-3 fats; targeted supplements can also be beneficial to make up for any nutritional gaps

Nutrient deficiencies are very common, even among people who believe they're eating a balanced diet. In the U.S., 31% of the U.S. population was found to be at risk of at least one vitamin deficiency or anemia,¹ increasing the risk of health problems over a lifetime.

Your body depends on essential nutrients for growth, development and health maintenance, and deficiencies in certain vitamins can impact your immunity, vision, wound healing, bone health and much more. Neurological damage is possible from lack of vitamin B12, for instance, while vitamin A deficiency can lead to night blindness.

It's also estimated that 1 in 3 Americans is deficient in at least 10 minerals, putting them at risk of chronic diseases such as heart disease and diabetes.² Even at a subclinical

level, being deficient in vitamins and minerals can cause a range of symptoms, including:³

- Fatigue
- Irritability
- Aches and pains
- Decreased immune function
- Heart palpitations

Being aware of which nutrient deficiencies are most widespread is the first step to ensuring that your levels are optimized.

Avoid These 10 Common Nutrient Deficiencies

- 1. Vitamin D** – An estimated 40% of Europeans are deficient in vitamin D, while 13% are severely deficient.⁴ Among older Americans, however, it's estimated that up to 100% may be deficient, in large part due to less time spent outdoors.⁵

It's now known that vitamin D is necessary not only for healthy bones but for health throughout the body. As a powerful epigenetic regulator, vitamin D influences that activity of more than 2,500 genes, and vitamin D receptors are present all over the body, including in the intestine, pancreas, prostate and immune system cells.⁶

Vitamin D plays a role in numerous diseases, including:⁷

- Cancer
- Diabetes
- Acute respiratory tract infections
- Chronic inflammatory diseases
- Autoimmune diseases such as multiple sclerosis

To ward off infection and prevent chronic diseases, the level you're aiming for is between 60 and 80 ng/mL, with 40 ng/mL being the low cutoff point for sufficiency to prevent a wide range of diseases, including cancer.

The single most important method of optimizing your vitamin D levels is exposing enough of your skin to the sun during around solar noon, which is 1 p.m. for those who live in Daylight Savings Time in the summer. One must be careful to never get burnt while understanding that the primary reason most people burn is that they have too much linoleic acid in their fat and that is the molecule the sun damages, which leads to burns and skin cancers.

Not only will regular sun exposure help to optimize your vitamin D levels but it will also increase melatonin in your mitochondria, which will decrease oxidative stress and increase energy production efficiency. It will also help to metabolize vitamin A and optimize your immune function.

If you are unable to reach at least 40 ng/ml with sun exposure you might want to consider an oral supplement, but that should be your last resort. I haven't swallowed vitamin D for well over a decade and my level is still over 50 in the winter and 70 to 80 in the summer.

If you had zero sun exposure on significant areas of your bare skin, like most people, then research suggests it would require 9,600 IUs of vitamin D per day for most to reach 40 ng/mL,⁸ but individual requirements can vary widely, and you'll need to get your levels tested to ensure you take the correct dosage required to get you into the optimal range.

The only way to gauge whether you might need to supplement, and how much to take, is to get your level tested, ideally twice a year, in the early spring, after the winter and early fall when your level is at its peak and low point. It's important to note that vitamin D supplementation must be balanced with other nutrients, namely vitamin K2 (to avoid complications associated with excessive calcification in your arteries), calcium and magnesium.

2. Magnesium – It's estimated that more than half the U.S. population may not be consuming enough magnesium.⁹ The primary role of minerals is to act as cofactors for enzymes, but that's just the bare minimum.

"They literally are the shields for oxidative stress," James DiNicolantonio, Pharm.D., author of "The Mineral Fix," explains, "because they make up our antioxidant enzymes. They help us produce and activate ATP, help us produce DNA, protein, so literally every function in the body is dependent, in some way, on minerals."¹⁰

Your levels of powerful antioxidants like glutathione are directly dependent on your magnesium status. Further, magnesium, which is required for the conversion of vitamin D into its active form, works in concert with vitamin D and is important to ensure you're properly utilizing the vitamin D you're taking.

You only need about 150 milligrams (mg) to 180 mg a day to prevent deficiency, but optimal levels are closer to the 600 mg/day level. For comparison, the RDA for magnesium is around 310 mg to 420 mg per day depending on your age and sex.¹¹ But like DiNicolantonio, many experts believe you may need around 600 mg to 900 mg per day. As noted in Open Heart:¹²

"Investigations of the macro- and micro-nutrient supply in Paleolithic nutrition of the former hunter/gatherer societies showed a magnesium uptake with the usual diet of about 600 mg magnesium/day ...

This means our metabolism is best adapted to a high magnesium intake ... In developed countries, the average intake of magnesium is slightly over 4 mg/kg/day ... [T]he average intake of magnesium in the USA is around 228 mg/day in women and 266mg/day in men ..."

Dark green leafy vegetables are a good source of magnesium, and juicing your greens is an excellent way to boost your intake, although supplementation is likely necessary for most people. You can measure your red blood cell magnesium to see just how good your magnesium status is.

If your magnesium levels are low, it would certainly be wise to supplement. For oral supplementation, my personal preference is magnesium threonate, as it appears to be the most efficient at penetrating cell membranes, including your mitochondria and blood-brain barrier.

- 3. Vitamin K2** – There are two types of vitamin K: phylloquinone, or vitamin K1; and menaquinones, or vitamin K2. Vitamin K2, known for its role in bone and heart health, is found in grass fed animal products such as meat, eggs, liver and dairy, as well as in fermented foods, including sauerkraut, certain cheeses and the fermented soy food natto – items that many Americans do not consume enough of.

One of the reasons why vitamin K2 is so important for heart health has to do with a complex biochemistry involving the enzymes matrix gla-protein (MGP), found in your vascular system,¹³ and osteocalcin, found in your bone.

“Gla” stands for glutamic acid, which binds to calcium in the cells of your arterial wall and removes it from the lining of your blood vessels. Once removed from your blood vessel lining, vitamin K2 then facilitates the integration of that calcium into your bone matrix by handing it over to osteocalcin, which in turn helps “cement” the calcium in place inside your bone.

Vitamin K2 activates these two proteins, so without it, this transfer process of calcium from your arteries to your bone cannot occur, which raises your risk of arterial calcification. In fact, in one study, those who had the highest amount of vitamin K2 were 52% less likely to experience severe calcification in their arteries and 57% less likely to die from heart disease over a seven- to 10-year period.¹⁴

Vitamin K2 also works in tandem with vitamin D and magnesium. Unfortunately, there’s no easy way to screen or test for vitamin K2 sufficiency. Vitamin K2 cannot at present be measured directly, so it’s measured through an indirect assessment of undercarboxylated osteocalcin. This test is still not commercially available, however. For most people it is wise to consider supplementing with a vitamin K2 supplement.

As a general rule, if you have osteoporosis, heart disease or diabetes, you're likely deficient in vitamin K2. Further, it's believed that the vast majority of people are in fact deficient and would benefit from more K2, which you can achieve by eating more of the following foods:

- Certain fermented foods such as natto, or vegetables fermented using a starter culture of vitamin K2-producing bacteria
- Certain cheeses such as Brie, Munster and Gouda, which are particularly high in K2
- Grass fed organic animal products such as egg yolks, liver, butter and dairy

4. Vitamin B12 – Vitamin B12, a water-soluble vitamin also known as cobalamin, plays a role in numerous biochemical reactions and neurological functions in your body, including DNA synthesis.¹⁵ Your body can't make vitamin B12 on its own, so it must be obtained via your diet or supplementation.

A deficiency can be serious and leads to a number of related changes, including personality disturbances, irritability and depression, along with a wide range of symptoms, including joint pain, "pins and needles" sensations, numbness and shortness of breath.¹⁶

It's been suggested that nearly two-fifths of Americans may have lower than ideal B12 levels, with 9% deficient and 16% below 185 pmol/L, which is considered marginally deficient.¹⁷ While vegetarians and vegans are susceptible since B12 is derived from animal products, even meat eaters may be deficient, as problems with absorption are common.

B-12 is the largest vitamin molecule and as such has a hard time being absorbed by your body. Your stomach produces a glycoprotein called intrinsic factor, which combines with vitamin B-12 so it can be absorbed in your lower small intestine. The problem is that as people age many lose the ability to produce intrinsic factor and are prone to developing vitamin B-12 deficiency.

B12 is tightly bound to proteins and high acidity is required to break this bond. Some people may not have sufficient stomach acid to separate the B12 from the protein. Advancing age may also diminish your ability to absorb the vitamin from food and increase your risk of deficiency.

Regularly eating B12-rich foods, such as grass fed beef liver, wild rainbow trout and wild sockeye salmon, is important to maintain adequate levels, but if you suspect you may be deficient, weekly B12 shots or a high-dose, daily supplement may be necessary.

Methylcobalamin, which is the naturally occurring form of vitamin B12 found in food, is more absorbable than the cyanocobalamin, which is the type found in most supplements.¹⁸ If you are elderly, it is an inexpensive insurance approach to take a B-12 supplement with methylcobalamin.

- 5. Omega-3 fats** — An omega-3 index test is one of the most important annual health screens that everyone needs, and it's a more important predictor of your heart disease risk than your cholesterol levels. In fact, research supported by the National Institutes of Health suggests that an omega-3 test can give you an idea of your overall health and all-cause mortality.^{19,20}

The study measured the omega-3 index in 2,500 participants and found that those with the highest omega-3 index had lower risks of heart problems and lower total mortality. The omega-3 index measures the amount of EPA and DHA in the membranes of your red blood cells (RBC). Your index is expressed as a percent of your total RBC fatty acids.

The omega-3 index has been validated as a stable, long-term marker of your omega-3 status, and it reflects your tissue levels of EPA and DHA. An omega-3 index over 8% is associated with the lowest risk of death from heart disease, while an index below 4% places you at the highest risk of heart disease-related mortality.

The ideal sources for EPA and DHA include cold-water fatty fish, like wild-caught Alaskan salmon, sardines, herring and anchovies. If you do not eat these fish on a

regular basis, consider taking a krill oil supplement.

In addition, be aware that your omega-6 to omega-3 ratio should be about 1-to-1 or possibly up to 4-to-1, but most Americans consume far too many omega-6 fats and not enough omega-3. In addition to increasing your omega-3, it's important to cut down on omega-6, especially in the form of industrially processed seeds oils, often referred to as "vegetable oils," in most processed foods.

- 6. Vitamin A** – An estimated 51% of adults are not consuming enough vitamin A,²¹ increasing their risk of degenerative diseases like macular degeneration, a leading cause of blindness in the U.S. – and the third leading cause of blindness globally (after cataracts and glaucoma).²²

People who eat foods rich in vitamin A, or retinol, not beta-carotene, experience a reduced risk of developing squamous cell skin cancer as well, as vitamin A affects cell growth and differentiation, which plays a role in the development of cancer.^{23,24}

Vitamin A is a group of nutrients that falls into two different categories: retinoids found in animal foods and carotenoids found in plant foods. The two are chemically different and provide different health benefits, but both are necessary for optimal health. Plant foods high in beta-carotene include sweet potatoes, carrots, cantaloupe and mangoes.²⁵ Animal foods rich in vitamin A include liver, egg yolks and grass fed butter.

- 7. Vitamin E** – Vitamin E is a powerful antioxidant that acts as a sink for the many reactive oxygen species in your body. Vitamin E is also neuroprotective, helping to protect your eyes from glaucoma,²⁶ and needed by your body to boost immune function and widen blood vessels to keep blood from clotting.²⁷

But many Americans do not consume enough vitamin E-rich foods, putting them at risk of deficiency. You can find vitamin E in nuts and seeds, as well as spinach and broccoli. Remember that antioxidant supplements such as vitamin E are fat-soluble and best taken with a fatty meal.

8. Iodine — Nearly 2 billion people worldwide don't get enough iodine in their diet.²⁸

Your body uses iodine across several organ systems, but it is most commonly known to synthesize thyroid hormones. Clinically low levels of iodine are associated with visible symptoms, such as a goiter (swelling of the thyroid gland), hypothyroidism or pregnancy-related problems. However, subclinical iodine deficiency can also interfere with your thyroid function.

Even moderately imbalanced thyroid levels may be associated with increased risk of metabolic syndrome, researchers noted in the journal *Environmental International*, which is why “studying factors that contribute to low thyroid function, even at the subclinical level, is of high public health importance.”²⁹

Thyroid hormones, for instance, are essential for normal growth and development in children, neurological development in babies before birth and in the first year of life, and in regulating your metabolism.³⁰

In addition, iodine is an essential mineral that helps prevent polyunsaturated fats from oxidizing, alkalizes your body's pH, protects against cancer and is a natural antibacterial agent. Foods that are naturally iodine-rich include spirulina, sea vegetables, prunes, raw dairy products, eggs and Himalayan pink sea salt. Eating these foods on a regular basis will help ensure adequate levels.

9. Carnosine (beta-alanine) — Carnosine is a dipeptide composed of two amino acids: beta-alanine and histidine. It's a potent antioxidant as it binds to advanced lipoxidation endproducts (ALEs) that are the result of oxidized seed oils in your diet. The highest concentrations of carnosine are found in your muscles and brain.

If you're a vegetarian or vegan, you will have lower levels of carnosine in your muscles. This is one reason why many strict vegans who do not properly compensate for this and other nutritional deficiencies tend to have trouble building muscle. Carnosine itself is not very useful as a supplement as it is rapidly broken down into its constituent amino acids by certain enzymes. Your body then reformulates those amino acids back to carnosine in your muscles.

A more efficient alternative is to supplement with beta-alanine, which appears to be the rate limiting amino acid in the formation of carnosine. Eating beef is known to efficiently raise carnosine levels in your muscle,³¹ which is why if you're a vegetarian or vegan this supplement may be particularly important.

10. Saturated fat from butter, animal products – The introduction of the first Dietary Guidelines for Americans in 1980, which recommended limiting saturated fat and cholesterol, coincided with a rapid rise in obesity and chronic diseases such as heart disease.

As saturated fats fell out of favor, and health officials wrongly urged Americans to avoid such healthy fats as butter, Americans began replacing them with products made from refined vegetable/seed oils, which are among the worst foods to consume.

Many are still not consuming enough saturated fats, such as those from grass fed butter. In a systematic review and meta-analysis of nine publications including 15 country-specific cohorts, butter consumption was not significantly associated with cardiovascular disease, coronary heart disease or stroke, but increased consumption was associated with a lower incidence of diabetes.³²

Grass fed butter, alone, is a rich source of vitamin A in the most absorbable form, vitamin E, vitamin K2, antioxidants, conjugated linoleic acid, iodine in a highly absorbable form, vitamin D and more.³³ By consuming nutritious whole foods like butter, you can lower your risk of multiple nutrient deficiencies at once.

The best way to ward off nutrient deficiencies is to intentionally fortify your meals with whole, nutrient-dense foods, including healthy saturated and omega-3 fats. Targeted supplements can also be beneficial to make up for any nutritional gaps. When choosing any multivitamin or mineral supplements, look for a manufacturer that has checks and balances in place to ensure the quality of the product.

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