



NUTRITION

✓ Evidence Based

10 Evidence-Based Benefits of Manganese



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Manganese is a trace mineral, which your body needs in small amounts.

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

While your body stores up to about 20 mg of manganese in your kidneys, liver, pancreas and bones, you also need to get it from your diet.

Manganese is considered an essential nutrient and can be found especially in seeds and whole grains, as well as in smaller amounts in legumes, beans, nuts, leafy green vegetables and tea.

Here are 10 evidence-based benefits of manganese.



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1. May Improve Bone Health in Combination With Other Nutrients

Manganese is essential for [bone health](#), including bone development and maintenance.

When combined with the nutrients calcium, zinc and copper, manganese supports bone mineral density. This is particularly important in older adults.

Studies have shown that about 50% of postmenopausal women and 25% of men aged 50 or older will suffer from an osteoporosis-related bone break (1 )

Research suggests that taking manganese with calcium, zinc and copper may help reduce spinal bone loss in older women (2 )

In addition, a one-year study in women with weak bones found that taking a supplement with these nutrients, as well as vitamin D, [magnesium](#) and boron may improve bone mass (3 )

However, other studies suggest that supplements containing only calcium

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Manganese may play a positive role in bone health by working in concert with other vitamins and minerals to improve bone mineral density.

2. Strong Antioxidant Properties May Reduce Disease Risk

Manganese is a part of the antioxidant enzyme superoxide dismutase (SOD), which is arguably one of the most important antioxidants in your body (6 ✓).

Antioxidants help protect against free radicals, which are molecules that can cause damage to cells in your body. Free radicals are believed to contribute to aging, heart disease and some cancers (7 ✓).

SOD specifically helps combat the negative effects of free radicals by converting superoxide — one of the most dangerous free radicals — into smaller molecules that won't damage your cells (8 ✓).

In one study in 42 men, researchers concluded that low levels of SOD and poor total antioxidant status may play a larger role in heart disease risk than total [cholesterol](#) or [triglyceride](#) levels (9 ✓).

Another study showed that SOD was less active in people with rheumatoid arthritis, compared to individuals without this condition (10 ✓).

Therefore, researchers proposed that proper intake of antioxidant nutrients may reduce free radical generation and improve antioxidant status in those with the disease (10 ✓).

As manganese plays a role in SOD activity, consuming the mineral may

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damage to your cells.

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3. Helps Reduce Inflammation, Particularly in Combination With Glucosamine and Chondroitin

Due to its role as part of the powerful antioxidant superoxide dismutase (SOD), manganese may [reduce inflammation](#).

Research suggests that SOD is potentially useful as a therapeutic agent for inflammatory disorders ([13](#) )

Evidence supports that combining manganese with glucosamine and chondroitin can reduce osteoarthritis pain.

Osteoarthritis is considered a wear-and-tear disease leading to the loss of cartilage and joint pain. Synovitis, which is inflammation of the membrane inside the joints, is a critical driver of osteoarthritis ([14](#) )

In one study in 93 people with osteoarthritis, 52% reported symptom improvements after 4 and 6 months of taking a manganese, glucosamine

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Another 16-week study in men with chronic pain and degenerative joint disease found that taking the supplement helped decrease inflammation specifically in the knees (16 )

SUMMARY

It appears that manganese may contribute to decreasing inflammation and pain associated with inflammatory diseases.

4. Plays a Role in Blood Sugar Regulation

Manganese appears to play a role in [regulating blood sugar](#).

In some animal species, manganese deficiency can lead to glucose intolerance similar to diabetes. However, results from human studies are mixed.

Multiple studies have shown that people with diabetes have lower manganese blood levels (17 , 18 )

Researchers are still trying to determine if low levels of manganese contribute to developing diabetes, or if a diabetic state causes manganese levels to drop.

Additionally, manganese is heavily concentrated in the pancreas. It's involved in the production of insulin, which removes sugar from your blood. Thus, manganese may contribute to the proper secretion of insulin and help stabilize blood sugar (19, 20 )

Other research has shown that individuals with diabetes have lower levels of the antioxidant enzyme manganese superoxide dismutase (MnSOD)

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Manganese has a variety of functions that can help regulate blood sugar levels in your body. Low levels of this trace mineral may negatively affect blood sugar control.

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5. Linked to Lower Incidences of Epileptic Seizures

Stroke is the leading cause of epilepsy in adults over 35. They're caused by decreased blood flow to your brain (22 .

Manganese is a known vasodilator, which means it helps enlarge veins to efficiently carry blood to tissues like the brain. Adequate manganese levels in your body may help increase blood flow and decrease your risk of some health conditions like strokes.

In addition, part of your body's manganese content is found in the brain. Several studies suggest that manganese levels may be lower in individuals with seizure disorders (23 .

However, it's unclear whether seizures reduce levels of manganese in your body, or if low levels cause individuals to be more susceptible to

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between the trace mineral and seizures is not yet fully understood.

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6. Plays a Role in the Metabolism of Nutrients

Manganese helps activate many enzymes in metabolism and plays a role in a variety of chemical processes in your body.

It helps with [protein](#) and amino acid digestion and utilization, as well as the metabolism of cholesterol and carbohydrates ([25](#) ✓).

Manganese helps your body utilize a number of vitamins, such as [choline](#), thiamine, and vitamins C and E, and ensures proper liver function.

Additionally, it works as a cofactor, or helper, in development, reproduction, energy production, immune response and the regulation of brain activity ([25](#) ✓).



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7. May Reduce PMS Symptoms in Combination with Calcium

Many women suffer from a variety of symptoms at certain times in their menstrual cycle. These may include [anxiety](#), cramping, pain, mood swings and even depression.

Early research shows that taking manganese and [calcium](#) in combination may help improve premenstrual (PMS) symptoms.

One small study in 10 women showed that those with low blood levels of manganese experienced more pain and mood-related symptoms during pre-menstruation no matter how much calcium was provided ([26](#) )

However, the results are inconclusive as to whether this effect is from manganese, calcium or the combination of the two.

SUMMARY

When combined with calcium, manganese may act as a natural remedy for decreasing PMS symptoms.

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One way it does this is through its antioxidant properties, particularly its role in the function of the powerful antioxidant superoxide dismutase (SOD), which can help protect against free radicals that could otherwise damage brain cells in the neural pathway.

Additionally, manganese can bind to neurotransmitters and stimulate faster or more efficient movement of electrical impulses throughout your body. As a result, brain function may be improved (27[✓]).

While adequate manganese levels are necessary for your brain's functioning, it's important to note that too much of the mineral can have negative effects on the brain.

You may obtain too much manganese by consuming more than the Tolerable Upper Intake Limit (UL) of 11 mg per day or by inhaling too much from the environment. This may result in Parkinson's-disease-like symptoms, such as tremors (28[✓], 29[✓], 30[✓]).

SUMMARY

Manganese may help with brain function by protecting this organ from damage caused by free radicals and by improving cognitive function.

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Manganese is an essential cofactor for various enzymes, meaning that it helps these enzymes function and work properly in your body.

It also plays a role in the production of thyroxine.

Thyroxine is a vital hormone, important for the normal function of your thyroid gland, which helps you maintain a proper appetite, metabolism, weight and organ efficiency (31[✓]).

As a result, a manganese deficiency could cause or contribute to a [hypothyroid](#) condition, which may contribute to weight gain and hormone imbalances (31[✓]).

SUMMARY

Manganese is essential for thyroxine production and proper thyroid health and functioning.

10. May Aid Wound Healing by Playing a Role in Collagen Production

Trace minerals, such as manganese, are important in the healing process of wounds.

Wound healing requires an increased production of [collagen](#).

Manganese is needed for producing the amino acid proline, which is essential for collagen formation and wound healing in human skin cells.

Early research shows that applying manganese, calcium and zinc to chronic wounds for 12 weeks may improve healing (32[✓]).

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Manganese may help with wound healing by playing a role in collagen formation in skin cells, but more studies are needed.

Dosage and Sources

While there is no Recommended Dietary Allowance (RDA) for manganese, the Adequate Intake (AI) recommendation is 1.8–2.3 mg per day. The AI for children differs depending on age (30⁺).

The Tolerable Upper Intake Level (UL) is 11 mg per day for adults 19 and older. Like zinc, copper, selenium and iron, manganese is considered a heavy metal, and consuming too much can be dangerous.

Manganese is used therapeutically to correct deficiencies and to balance zinc and copper. It's typically taken orally but can be given intravenously (IV) for those who are deficient.

Many foods are high in manganese. It can be found in the greatest concentrations in seeds and whole grains, as well as in smaller amounts in legumes, beans, nuts, leafy green vegetables and tea.

SUMMARY

Adequate manganese intake is important for overall health, but it's not recommended to take more than needed, as it's considered a heavy metal, and excess consumption may prove dangerous.

Side Effects and Dangers

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A healthy person with functioning liver and kidneys should be able to excrete excess dietary manganese. However, those with liver or kidney disease need to be cautious.

What's more, research has found that those with [iron deficiency anemia](#) may absorb more manganese. Therefore, individuals with this condition should watch their consumption of the mineral ([33](#) )

In addition, consuming excess manganese by inhaling it, which may happen when welding, provides health risks. In this case, manganese bypasses the body's normal defense mechanisms ([29](#) , [34](#) , [35](#) )

An accumulation can cause damage to the lungs, liver, kidneys and central nervous system.

Prolonged exposure may cause Parkinson's-disease-like symptoms, such as tremors, slowness of movement, muscle rigidity and poor balance — this is called manganism ([28](#) )

Most individuals consuming manganese from food do not have to worry about over-consumption.

SUMMARY

While manganese is safe in adequate amounts, those with iron deficiency anemia and liver or kidney disease, as well as those who inhale the mineral should be cautious.

The Bottom Line

Without adequate dietary manganese, many chemical processes in your

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To get the biggest health boost, make sure to consume a variety of manganese-rich foods, such as whole grains and seeds. If you're considering a supplement, talk to your doctor first.



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Medically reviewed by [Natalie Olsen, R.D., L.D., ACSM EP-C](#)

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