Iron

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Supplement Forms/Alternate Names
• Iron Sulfate; Chelated Iron

Principal Proposed Uses
• Correction of Iron Deficiency; Sports Performance Enhancement

Other Proposed Uses
• Attention Deficit Disorder; Enhancing Mental Function in Women; Fatigue; HIV Support; Menorrhagia (Heavy Menstruation); Reduction of ACE Inhibitor Side Effects; Restless Legs Syndrome; Stimulating flow of Saliva

The element iron is essential to human life. As part of hemoglobin, the oxygen-carrying protein found in red blood cells, iron plays an integral role in nourishing every cell in the body with oxygen. It also functions as a part of myoglobin, which helps muscle cells store oxygen. Without iron, your body could not make ATP (adenosine triphosphate, the body's primary energy source), produce DNA, or carry out many other critical processes.

Iron deficiency can lead to anemia, learning disabilities, impaired immune function, fatigue, and depression. However, you shouldn't take iron supplements unless lab tests show that you are genuinely deficient.

Requirements/Sources

The official US recommendations for daily intake of iron are as follows:

• Infants
  • 0-6 months: 0.27 mg
  • 7-12 months: 11 mg
• Children
  • 1-3 years: 7 mg
  • 4-8 years: 10 mg
• Males
  • 9-13 years: 8 mg
  • 14-18 years: 11 mg
  • 19 years and older: 8 mg
• Females
  • 9-13 years: 8 mg
  • 14-18 years: 15 mg
  • 19-50 years: 18 mg
  • 50 years and older: 8 mg
• Pregnant Women: 27 mg
• Nursing Women: 9 mg (10 mg if 18 years old or younger)

Iron deficiency is the most common nutrient deficiency in the world; worldwide, at least 700 million individuals have iron-deficiency anemia. While iron deficiency is widespread in the developing world, it is also prevalent in
developed countries. Groups at high risk are children, teenage girls, menstruating women (especially those with excessively heavy menstruation, known as menorrhagia), pregnant women, and the elderly.

There are two major forms of iron: heme iron and nonheme iron. Heme iron is bound to the proteins hemoglobin or myoglobin, whereas nonheme iron is an inorganic compound. (In chemistry, “organic” has a very precise meaning that has nothing to do with farming. An organic compound contains carbon atoms. Thus ”inorganic iron” is an iron compound containing no carbon.) Heme iron, obtained from red meats and fish, is easily absorbed by the body. Nonheme iron, usually derived from plants, is less easily absorbed.

Rich sources of heme iron include oysters, meat, poultry, and fish. The main sources of nonheme iron are dried fruits, molasses, whole grains, legumes, leafy green vegetables, nuts, seeds, and kelp. Contrary to popular belief, there is no meaningful evidence that cooking in an iron skillet or pot provides a meaningful amount of iron supplementation.

Iron absorption may be affected by the following substances: antibiotics in the quinolone (Floxin, Cipro) or tetracycline families, levodopa, methyl dopa, carbidopa, penicillamine, thyroid hormone, captopril (and possibly other ACE inhibitors), calcium, soy, zinc, copper, or manganese, or multivitamin/multimineral tablets. Conversely, iron may inhibit their absorption, too.

In addition, drugs in the H₂-blocker or proton pump inhibitor families may impair iron absorption.

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**Therapeutic Dosages**

The typical short-term therapeutic dosage to correct iron deficiency is 100 to 200 mg daily. Once your body's iron stores reach normal levels, however, this dose should be reduced to the lowest level that can maintain iron balance.

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**Therapeutic Uses**

The most obvious use of iron supplements is to treat iron deficiency. Severe iron deficiency causes anemia, which in turn causes many symptoms. Iron deficiency too slight to cause anemia may impair health as well. Several, though not all, double-blind trials suggest that mild iron deficiency might impair sports performance. In addition, a double-blind, placebo-controlled study of 144 women with unexplained fatigue who also had low or borderline-low levels of ferritin (a measure of stored iron) found that iron supplement enhanced energy and wellbeing. Another study found that iron supplements improved mental function in women who were iron deficient. However, don't take iron just because you feel tired. Make sure to get tested to see whether you are indeed deficient. With iron, more is definitely not better. (See Safety Issues.)

Excessively heavy menstruation (menorrhagia) can certainly cause iron loss, and thereby may warrant iron supplements. Interestingly, a small double-blind trial found evidence that iron supplements might actually help reduce menstrual bleeding in women with menorrhagia who are also iron deficient.

A study of 71 HIV-positive children noted a high rate of iron deficiency. One observational study of 296 men with HIV infection linked high intake of iron to a decreased risk of AIDS 6 years later.

Individuals taking drugs in the ACE inhibitor family frequently develop a dry cough as a side effect. One study suggests that iron supplementation can alleviate this symptom. (However, iron can interfere with ACE inhibitor absorption, so it should be taken at a different time of day.)

Pregnant women commonly develop iron deficiency anemia. Iron supplements, however, can be hard on the
stomach, thereby aggravating morning sickness. One study found evidence that a fairly low supplemental dose of iron—20 mg daily—is very nearly as effective for treating anemia of pregnancy as 40 mg or even 80 mg daily and is less likely to cause gastrointestinal side effects. 64

Iron has been suggested as a treatment for attention deficit hyperactivity disorder, but there is only preliminary evidence that it may effective in hyperactive children with low iron levels as indicated by ferritin levels. 66

Preliminary studies have linked low iron levels to restless legs syndrome. 30-32 However, a small double-blind study found no benefit when iron supplements were given to healthy people (eg, those who were not iron deficient). 33

One study tested whether supplemental iron could increase rate of saliva flow, but it failed to find benefit. 62

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What Is the Scientific Evidence for Iron?

Sports Performance

A double-blind, placebo-controlled trial of 42 non-anemic women with evidence of slightly low iron reserves found that iron supplements significantly enhanced sports performance. 36 Participants were put on a daily aerobic training program for the latter 4 weeks of this 6-week trial. At the end of the trial, those receiving iron showed significantly greater gains in speed and endurance as compared to those given placebo.

In addition, a double-blind, placebo-controlled study of 40 non-anemic elite athletes with mildly low iron stores found that 12 weeks of iron supplementation enhanced aerobic performance. 37

Benefits with iron supplementation were observed in other double-blind trials as well also involving mild low iron stores. 31,52 However, other studies failed to find significant improvements, 53-55 suggesting that the benefits of iron supplements for non-anemic, iron-deficient athletes is small at most.

Menorrhagia

One small double-blind study found good results using iron supplements to treat heavy menstruation. This study, which was performed in 1964, saw an improvement in 75% of the women who took iron (compared to 32.5% of those who took placebo). Women who began with higher iron levels did not respond to treatment. 38 This suggests once more that supplementing with iron is only a good idea if you are deficient in it.

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Safety Issues

Iron supplements commonly cause gastrointestinal upset, but, when taken at recommended dosages, serious adverse consequences are unlikely. However, excessive dosages of iron can be toxic—damaging the intestines and liver, and possibly resulting in death. Iron poisoning in children is a surprisingly common problem, so make sure to keep your iron supplements out of their reach.

Mildly excessive levels of iron may be unhealthy for another reason: it acts as an oxidant (the opposite of an antioxidant), perhaps increasing the risk of cancer and heart disease (although this is controversial). 39, 60 Elevated levels of iron may also play a role in brain injury caused by stroke. 40 In addition, excess iron appears to increase complications of pregnancy, 41 and, if breastfed infants who are not iron-deficient are given iron supplements, the effects may be negative rather than positive. 57

Note: Simultaneous use of iron supplements and high-dose vitamin C can greatly increase iron absorption,
possibly leading to excessive iron levels in the body. 42-49

One study found that iron does not impair absorption of the drug methotrexate. 61

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**Interactions You Should Know About**

If you are taking:

- Antibiotics in the tetracycline or quinolone (Floxin, Cipro) families; levodopa; methyldopa; carbidopa; penicillamine; thyroid hormone; calcium; soy; zinc; copper; or manganese: To avoid absorption problems, wait at least 2 hours following your dose of medication or supplement before taking iron.
- Drugs that reduce stomach acid such as antacids, H₂-blockers, and proton pump inhibitors: You may need extra iron.
- High doses of vitamin C: You may absorb too much iron.
- ACE inhibitors: Iron may reduce coughing side effect; however, to avoid absorption problems, you should wait at least 2 hours following your dose of medication before taking iron.

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**References [+]**


