

*Helping you live
well to learn well*

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What is anemia?

Anemia is a low level of red blood cells or hemoglobin in the blood. Nutritional causes of anemia include insufficient iron, protein, or vitamins B12 and folate. Anemia can also be caused by illness or by genetic factors, including sickle-cell and thalassemia.

Iron deficiency is the most common cause of anemia. It is also the most common nutritional deficiency in the US and worldwide, affecting mainly young children and menstruating individuals. Fortunately, it can usually be easily diagnosed and treated.

Diagnosis of anemia is not difficult and is indicated by low hemoglobin or hematocrit (percentage of red cells in whole blood). A complete blood count (CBC) provides additional information, and iron status is further determined by checking serum levels of iron transport and storage proteins, including ferritin.

What are the symptoms?

Symptoms of iron deficiency can include fatigue, dizziness, shortness of breath, pale appearance, and lowered resistance to infection. Iron deficiency anemia is also sometimes associated with psychological depression, impaired cognitive function, and increased food cravings. However, some people do not have any symptoms.

Anemia develops gradually. For some, fatigue or weakness occurs in the early stages of iron deficiency, even before anemia develops. Fatigue can have many different causes. If you're tired, consider whether your sleeping and eating patterns are adequate. A medical checkup can help determine whether you have a medical problem, such as anemia.

Who is at increased risk for deficiency?

While anyone can develop a iron deficiency, some individuals are at higher risk, such as:

- **Those who aren't consuming enough calories:** The less you eat, the less likely that you will take in enough iron. Note that the amount of iron from a 2000-calorie diet averages only about 12 milligrams, which is below the RDA for women.

Iron Deficiency and Anemia



Iron deficiency is the most common cause of anemia. Fortunately, it can usually be easily diagnosed and treated.

- **Endurance athletes:** Endurance athletes such as long-distance runners tend to have increased iron losses.
- **People following a plant-based diet:** Iron content is lower in most plant foods than in meat, and the iron is less well absorbed.
- **Menstruating individuals:** Monthly blood losses result in increased iron needs (reflected in the RDAs, below). If periods are especially heavy, anemia is more likely to occur.
- **Pregnant individuals:** Iron needs are higher in pregnancy to meet the needs of the growing fetus and placenta.
- **Those with other causes of blood loss:** Blood donation, surgery, and illnesses with blood loss create an increased need for iron.

How much iron do we need?

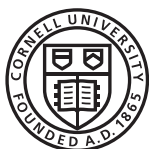
Recommended Dietary Allowances (RDAs):

| Age | Male/ AMAB* | Female/ AFAB** | Pregnant | Lactating |
|-------|----------------|-------------------|----------|-----------|
| 14-18 | 11 mg | 15 mg | 27 mg | 10 mg |
| 18-50 | 8 mg | 18 mg | 27 mg | 9 mg |

* People assigned male at birth (AMAB)

** People assigned female at birth (AFAB)

The RDAs for different age groups take into account that not all the iron we eat gets absorbed. Iron absorption from foods varies with individuals, with type of iron in the food, and with other components in foods. With iron deficiency, a higher intake than the RDA is needed to replenish iron stores.



Where is iron found?

Iron in food is found primarily in meat, poultry, fish, and beans. Heme iron (from animal sources) is better absorbed than non-heme iron (from plant sources).

Some high-iron foods include:

| Heme sources (better-absorbed) | Non-heme sources (less easily absorbed) |
|---|---|
| <ul style="list-style-type: none">• seafood, especially shellfish• beef• liver• pork• ham• turkey• chicken• eggs | <ul style="list-style-type: none">• fortified breakfast cereals and other fortified grains• tofu• beans• lentils• sesame seeds• cashews• spinach• poi (taro root)• sweet potatoes• winter squash |

The Percent Daily Value (DV) on food labels corresponds to 18 milligrams (mg).

For example, if a label lists a food as containing 50% DV for iron, one serving would contain 9 mg. Some fortified cereals contain 80-100% of the DV!

Iron from cast-iron cooking pots and some water supplies can also find its way into the body, but the amount cannot easily be measured. When acidic foods (such as tomatoes) are cooked in iron pots, additional iron enters the food.

Iron absorption

- **What decreases iron absorption?** Iron is not easily absorbed from spinach and other greens. Plant compounds that inhibit iron absorption include oxalic acid in vegetables such as spinach, tannins in coffee tea, and phytates in whole grains. These foods should not necessarily be avoided, though, as they have other nutritional value. (However, if you drink tea or coffee, drink them separately from meals and iron supplements to avoid inhibiting iron absorption.)
- **What increases iron absorption?** Vitamin C (found in citrus fruit, tomatoes, strawberries, peppers,

broccoli, and other brightly colored fruits and vegetables) greatly increases iron absorption. Consuming red meat, poultry and fish increases the absorption of non-heme iron from other foods consumed at the same time. Include a source of vitamin C at every meal and with iron supplements to improve iron absorption!

Who should take an iron supplement?

Iron won't make you more energized unless you are deficient. Generally, you should generally avoid iron supplements unless there is a clear diagnosis of deficiency. Most multivitamin/mineral supplements contain small amounts of iron, which is not usually a problem. These supplements can help prevent iron deficiency, but are not sufficient to replenish iron stores once depleted.

What is too much iron?

Iron overload can also occur from excessive intake of supplements over time. If not treated, iron overload can result in organ damage. Acute iron overdose can be toxic or fatal and is the number one cause of accidental overdose in children. *Keep iron supplements out of reach of children.*

Next steps?

If you have iron deficiency, a medical provider will help discover its cause, recommend supplements to correct it, and monitor your recovery. Iron in supplements comes in various forms and doses, some of which may be better tolerated than others. Side-effects can include gastrointestinal discomfort and constipation. If a supplement causes problems, consult with your medical provider. Tolerance usually improves over time or with a lower dose. Consulting with a dietitian can help you adjust your diet to treat and/or avoid iron deficiency.

More information

More information about iron can be found at the National Institutes of Health (NIH) Office of Dietary Supplements: ods.od.nih.gov/factsheets/iron.asp.

Interested in more support?

Schedule an appointment with one of Cornell Health's Registered Dietitian Nutritionists or medical providers by logging in to myCornellHealth from health.cornell.edu, or by calling 607-255-5155.