

Live Well to

Learn Well

Web:

[health.cornell.edu](http://health.cornell.edu)

Phone (24/7):

607-255-5155

Fax:

607-255-0269

Appointments:

Monday–Saturday

*Check web for hours, services, providers, and appointment information*

110 Ho Plaza,

Ithaca, NY

14853-3101

## Feeling tired?

Fatigue is not a symptom of a specific illness, but has many different causes. If you're tired, first consider whether your sleeping and eating patterns are adequate. If fatigue persists, a medical checkup can help determine whether you have a medical problem, such as 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 women of childbearing age. Fortunately, it can usually be easily diagnosed and treated.

Iron is a mineral contained in all body cells where it is vital for many biochemical reactions. It is a key component in hemoglobin and myoglobin, which transport oxygen in the blood and muscles, and in cellular enzymes needed for energy metabolism. Iron is stored in the liver, spleen, bone marrow and other tissues, but low iron intake or blood loss can deplete these stores and result in anemia.

## What are the symptoms?

Fatigue or weakness sometimes occurs in the early stages of iron deficiency, even before anemia develops. Anemia develops gradually, as bone marrow stores of iron become too low to produce healthy red blood cells. Symptoms can include dizziness, shortness of breath, pale appearance, and lower resistance to infection, but some people do not have any symptoms. Iron deficiency anemia is sometimes associated with psychological depression, impaired cognitive function, and increased food cravings.

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.

## Who needs to worry?

Iron is normally recycled in the body, but a small amount is lost every day— more with any blood loss. If these losses are not replaced by dietary

# Iron Deficiency and Anemia



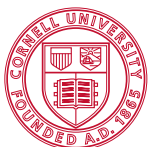
*Iron deficiency is the most common cause of anemia.*

iron, iron stores will become depleted over time. Poor eating habits can create an iron deficit, but even a reasonable food intake sometimes does not supply enough. If you are in one of the following situations, you need to try even harder to get enough iron.

- **Dieting:** 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.
- **Endurance sports:** Endurance athletes such as long-distance runners tend to have increased iron losses.
- **Vegetarianism:** Iron content is lower in most plant foods than in meat, and the iron is less well absorbed.
- **Menstruation:** Monthly blood losses result in increased iron needs (reflected in the RDA's, below). If periods are especially heavy, anemia is more likely to occur.
- **Pregnancy:** Iron needs are higher in pregnancy to meet the needs of the growing fetus and placenta.
- **Other blood loss:** Blood donation, surgery, and illnesses with blood loss create an increased need for iron.

## How much do we need?

The Recommended Dietary Allowances (RDA's) 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 it 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. Other good sources are nuts, enriched or fortified grains, and certain fruits and vegetables. Dairy products are low in iron.

The Percent Daily Value (DV) on food labels corresponds to 18 milligrams (mg). For example, if a label lists a food as containing 25% DV for iron, one serving would contain 4.5 mg.

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

Popeye, the cartoon sailor, became stronger from eating spinach, but iron is not easily absorbed from spinach and other greens.

- **What decreases iron absorption?**  
Plant compounds that inhibit iron absorption include oxalic acid in vegetables such as spinach, tannins in tea, and phytates in whole grains. However, these foods should not necessarily be avoided, as they have other nutritional value.
- **What increases iron absorption?**  
Vitamin C (in citrus fruit, tomatoes, strawberries, peppers and broccoli) greatly increases iron absorption. Red meat, poultry and fish increase the absorption of nonheme iron from other foods consumed at the same time.

Maximize iron absorption from foods or supplements:

- **If you drink tea or coffee**, drink them only between meals and iron supplements.
- **Include a source of vitamin C** (for example, orange juice) at every meal and with iron supplements.

## Who should take an iron supplement?

Iron won't make you stronger, unless you are deficient. And, 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.

If you think you have iron deficiency, a medical provider will help discover its cause, prescribe supplements to correct it, and monitor your recovery. Iron in prescribed supplements comes in various forms and doses, some of which may be better tolerated than others. Side-effects are not dangerous but can include gastrointestinal discomfort and constipation. If a prescribed supplement causes problems, consult with your medical provider. Toleration usually improves over time or with a lower dose.

## What is too much iron?

The most common cause of iron overload is a genetic defect known as hereditary hemochromatosis, which occurs in about 4 out of 1000 people. It causes excess iron absorption and storage in the body, but can be diagnosed by genetic testing and treated.

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.*

## 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](https://ods.od.nih.gov/factsheets/iron.asp)