

Folate

Fact Sheet for Consumers



Folic acid is added to many grain-based products. Check the label to find out whether folic acid has been added to a food.



National Institutes of Health
Office of Dietary Supplements

What is folate and what does it do?

Folate is a B-vitamin that is naturally present in many foods. A form of folate, called folic acid, is used in dietary supplements and fortified foods.

Our bodies need folate to make DNA and other genetic material. Folate is also needed for the body's cells to divide.

How much folate do I need?

The amount of folate you need depends on your age. Average daily recommended amounts are listed on the next page in micrograms (mcg) of dietary folate equivalents (DFEs).

All women and teen girls who could become pregnant should consume 400 mcg of folic acid daily from supplements, fortified foods, or both in addition to the folate they get naturally from foods.

Life Stage	Recommended Amount
Birth to 6 months	65 mcg DFE
Infants 7–12 months	80 mcg DFE
Children 1–3 years	150 mcg DFE
Children 4–8 years	200 mcg DFE
Children 9–13 years	300 mcg DFE
Teens 14–18 years	400 mcg DFE
Adults 19–50 years	400 mcg DFE
Adults 51–70 years	400 mcg DFE
Adults 71 years and older	400 mcg DFE
Pregnant teens and women	600 mcg DFE
Breastfeeding teens and women	500 mcg DFE

What foods provide folate?

Folate is naturally present in many foods and food companies add folic acid to other foods, including bread, cereal, and pasta. You can get recommended amounts by eating a variety of foods, including the following:

- Vegetables (especially asparagus, Brussels sprouts, and dark green leafy vegetables such as spinach and mustard greens).
- Fruits and fruit juices (especially oranges and orange juice).
- Nuts, beans, and peas (such as peanuts, black-eyed peas, and kidney beans).
- Grains (including whole grains; fortified cold cereals; enriched flour products such as bread, bagels, cornmeal, and pasta; and rice).
- Folic acid is added to many grain-based products and corn masa flour (used to make corn tortillas and tamales, for example). To find out whether folic acid has been added to a food, check the product label.

Beef liver is high in folate but is also high in cholesterol, so limit the amount you eat. Only small amounts of folate are found in other animal foods like meats, poultry, seafood, eggs, and dairy products.

What kinds of folic acid dietary supplements are available?

Folic acid is available in multivitamins and prenatal vitamins. It is also available in B-complex dietary supplements and supplements containing only folic acid.

Am I getting enough folate?

Most people in the United States get enough folate. However, certain groups of people are more likely than others to have trouble getting enough folate:

- Teen girls and women aged 14–30 years (especially before and during pregnancy).
- Non-Hispanic black women.
- People with disorders that lower nutrient absorption (such as celiac disease and inflammatory bowel disease).
- People with alcoholism.

What happens if I don't get enough folate?

Folate deficiency is rare in the United States, but some people get barely enough. Getting too little folate can result in megaloblastic anemia, which causes weakness, fatigue, trouble concentrating, irritability, headache, heart palpitations, and shortness of breath. Folate deficiency can also cause open sores on the tongue and inside the mouth as well as changes in the color of the skin, hair, or fingernails.

Women who don't get enough folate are at risk of having babies with neural tube defects, such as spina bifida. Folate deficiency can also increase the likelihood of having a premature or low-birth-weight baby.

What are some effects of folate on health?

Scientists are studying folate to understand how it affects health. Here are several examples of what this research has shown:

Neural tube defects

Taking folic acid regularly before becoming pregnant and during early pregnancy

helps prevent neural tube defects in babies. But about half of all pregnancies are unplanned. Therefore, all women and teen girls who could become pregnant should consume 400 mcg of folic acid daily from supplements, fortified foods, or both in addition to the folate they get naturally from foods.

Since 1998, the U.S. Food and Drug Administration has required food companies to add folic acid to enriched bread, cereal, flour, cornmeal, pasta, rice, and other grain products sold in the United States. Because most people in the United States eat these foods on a regular basis, folic acid intakes have increased and the number of babies born with neural tube defects has decreased since 1998.

Preterm birth, congenital heart defects, and other birth defects

Taking folic acid might reduce the risk of having a premature baby and prevent birth defects, such as congenital heart problems. But more research is needed to understand how folic acid affects the risk of these conditions.

Cancer

Folate that is found naturally in food may decrease the risk of several forms of cancer. But folate might have different effects depending on how much is taken and when. Modest amounts of folic acid taken before cancer develops might decrease cancer risk, but high doses taken after cancer (especially colorectal

cancer) begins might speed up its progression. For this reason, high doses of folic acid supplements (more than the upper limit of 1,000 mcg) should be taken with caution, especially by people who have a history of colorectal adenomas (which sometimes turn into cancer). More research is needed to understand the roles of dietary folate and folic acid supplements in cancer risk.

Heart disease and stroke

Some scientists used to think that folic acid and other B-vitamins might reduce heart disease risk by lowering levels of homocysteine, an amino acid in the blood. But although folic acid supplements do lower blood homocysteine levels, they don't decrease the risk of heart disease. Some studies have shown that a combination of folic acid with other B-vitamins, however, helps prevent stroke.

Dementia, cognitive function, and Alzheimer's disease

Folic acid supplements with or without other B-vitamins do not seem to improve cognitive function, but more research on this topic is needed.

Depression

People with low blood levels of folate might be more likely to suffer from depression and might not respond as well to treatment with antidepressants as people with normal folate levels.

Folic acid supplements might make antidepressant medications more effective. But it is not clear whether these supplements help people with both normal folate levels and those with folate deficiency. More research is needed to learn about the role of folate in depression and whether folic acid supplements are helpful when used in combination with standard treatment.

Can folate be harmful?

Folate that is naturally present in food is not harmful. Folic acid in supplements and fortified foods, however, should not be consumed in amounts above the upper limit, unless recommended by a health care provider.

Taking large amounts of folic acid might hide a vitamin B12 deficiency. Folic acid can correct the anemia but not the nerve damage caused by vitamin B12 deficiency. This can lead to permanent damage of the brain, spinal cord, and nerves. High doses of folic acid might also increase the risk of colorectal cancer and possibly other cancers in some people.

The upper limits for folic acid are listed on the next page.

Life Stage

Upper Limit

Birth to 6 months	Not established
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Infants 7–12 months	Not established
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Children 1–3 years	300 mcg
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Children 4–8 years	400 mcg
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Children 9–13 years	600 mcg
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Teens 14–18 years	800 mcg
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Adults	1,000 mcg
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Are there any interactions with folate that I should know about?

Folic acid supplements can interact with several medications. Here are some examples:

- Folic acid could interfere with methotrexate (Rheumatrex[®], Trexall[®]) when taken to treat cancer.
- Taking anti-epileptic medications such as phenytoin (Dilantin[®]), carbamazepine (Carbatrol[®], Tegretol[®], Equetro[®], Epitol[®]), and valproate (Depacon[®]) could reduce blood levels of folate. Also, taking folic acid supplements could reduce blood levels of these medications.
- Taking sulfasalazine (Azulfidine[®]) for ulcerative colitis could reduce the body's ability to absorb folate and cause folate deficiency.

Tell your doctor, pharmacist, and other health care providers about any dietary supplements and medicines you take. They can tell you if those dietary supplements might interact or interfere with your prescription or over-the-counter medicines or if the medicines might interfere with how your body absorbs, uses, or breaks down nutrients.

Folate and Healthful Eating

People should get most of their nutrients from food, advises the federal government's *Dietary Guidelines for Americans*. Foods contain vitamins, minerals, dietary fiber and other substances that benefit health. In some cases, fortified foods and dietary supplements may provide nutrients that otherwise may be consumed in less-than-recommended amounts. For more information about building a healthy diet, refer to the *Dietary Guidelines for Americans* and the U.S. Department of Agriculture's MyPlate.

Where can I find out more about folate?

For general information on folate:

- Office of Dietary Supplements Health Professional Fact Sheet on Folate
- Folic acid and Folic acid in diet, MedlinePlus®

For more information on food sources of folate:

- U.S. Department of Agriculture's (USDA) National Nutrient Database
- Nutrient List for folate (listed by food or by folate content), USDA

For more advice on buying dietary supplements:

- Office of Dietary Supplements Frequently Asked Questions:
Which brand(s) of dietary supplements should I purchase?

For information about building a healthy diet:

- MyPlate
- *Dietary Guidelines for Americans*

Disclaimer

This fact sheet by the Office of Dietary Supplements provides information that should not take the place of medical advice. We encourage you to talk to your healthcare providers (doctor, registered dietitian, pharmacist, etc.) about your interest in, questions about, or use of dietary supplements and what may be best for your overall health. Any mention in this publication of a specific brand name is not an endorsement of the product.



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