

# 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.

## What is folate and what does it do?

Folate is a B-vitamin that is naturally present in many foods. Your body needs folate to make DNA and other genetic material. Your body also needs folate for your cells to divide. A form of folate, called folic acid, is used in fortified foods and most dietary supplements.

## How much folate do I need?

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

Ages	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+ years	400 mcg DFE
Pregnant teens and women	600 mcg DFE
Breastfeeding teens and women	500 mcg DFE

The measure of mcg DFE is used because your body absorbs more folic acid from fortified foods and dietary supplements than folate found naturally in foods. Compared to folate found naturally in foods, you actually need less folic acid to get recommended amounts. For example, 240 mcg of folic acid and 400 mcg of folate are both equal to 400 mcg DFE.

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 from following a healthy eating pattern.

## What foods provide folate?

Folate is naturally present in many foods, and folic acid is added to some foods. You can get recommended amounts by eating a variety of foods, including the following:

### Folate is naturally present in:

- Beef liver
- 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)

### Folic acid is added to the following foods:

- Enriched bread, flour, cornmeal, pasta, and rice
- Fortified breakfast cereals
- Fortified corn masa flour (used to make corn tortillas and tamales, for example)

To find out whether a food has added folic acid look for “folic acid” on its Nutrition Facts label.

### What kinds of folate dietary supplements are available?

Folate is available in multivitamins and prenatal vitamins. It is also available in B-complex dietary supplements and supplements containing only folate. In dietary supplements, folate is usually in the form of folic acid, but methylfolate (5-methyl-THF) is also used. Dietary supplements containing methylfolate might be better than folic acid for individuals who have a certain mutation in a gene called *MTHFR* because their bodies can use this form more easily.

### Am I getting enough folate?

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

- Teen girls aged 14–18 years, women aged 19–30 years, and non-Hispanic black women
- People with alcohol use disorder
- People with disorders that lower nutrient absorption (such as celiac disease and inflammatory bowel disease)
- People with a specific mutation in the *MTHFR* gene

### What happens if I don't get enough folate?

Folate deficiency is rare in the United States, but some people do not get enough. Getting too little folate can result in megaloblastic anemia, a blood disorder that 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 before becoming pregnant and during early pregnancy helps prevent neural tube defects in babies. Neural tube defects are major birth defects in a baby's brain (anencephaly) or spine (spina bifida). 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 from following a healthy eating pattern.

Since 1998, the U.S. Food and Drug Administration (FDA) has required food companies to add folic acid to enriched bread, flour, cornmeal, pasta, rice, and other grain products sold in the United States. In 2016, the FDA allowed manufacturers to voluntarily add folic acid to corn masa flour. Because most people in the United States eat these foods, folic acid intakes have increased since 1998, and the number of babies born with neural tube defects has decreased.

### Cancer

Folate that is found naturally in food may decrease the risk of several forms of cancer. But folate supplements might have different effects on cancer risk depending on how much the person takes and when. People who take recommended amounts of folic acid before cancer develops might decrease cancer risk, but taking high doses after cancer (especially colorectal cancer) begins might speed up its progression. For this reason, people should be cautious about taking high doses of folic acid supplements (more than the upper limit of 1,000 mcg), especially if they 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.

### Depression

People with low blood levels of folate might be more likely to have depression. In addition, they might not respond as well to antidepressant treatment as people with normal folate levels.

Folate supplements, particularly those that contain methylfolate (5-methyl-THF), might make antidepressant medications more effective. But whether supplements help both people with normal folate levels and those with folate deficiency isn't clear. More research is needed to better understand the role of folate in depression and whether folate supplements are helpful when used in combination with standard treatment.

#### Heart disease and stroke

Folic acid supplements lower levels of homocysteine, an amino acid in the blood that's linked to a higher risk of heart disease. But the supplements don't directly 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 or prevent dementia or Alzheimer's disease. But more research on these topics is needed.

#### Preterm birth, congenital heart defects, and other birth defects

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

#### Autism Spectrum Disorder (ASD)

ASD affects communication and behavior, usually beginning by age 2. People with ASD have limited interests, repetitive behaviors, and difficulty communicating and interacting with others.

Some studies have shown that taking recommended amounts of folic acid before and during early pregnancy may help reduce the risk of ASD in the child. However, because the study results are inconclusive, more research is needed to understand the potential role of folic acid in lowering the risk of ASD.

#### Can folate be harmful?

Folate that is naturally present in food is not harmful. However, you should not consume folate in supplements or fortified foods in amounts above the upper limit, unless recommended by a healthcare provider.

Taking large amounts of folate supplements might hide a vitamin B12 deficiency because these supplements can correct the anemia that the vitamin B12 deficiency causes, but not the nerve damage that the vitamin B12 deficiency also causes. The vitamin B12 deficiency can lead to permanent damage of the brain, spinal cord, and nerves. Large doses of folate supplements might also worsen the symptoms of vitamin B12 deficiency.

High doses of folic acid might also increase the risk of colorectal cancer and possibly other cancers in some people.

High doses can also lead to more folic acid in the body than it can use, but whether these increased folic acid levels are harmful is not completely clear.

The upper limits for folic acid are listed below.

Ages	Upper Limit
Birth to 6 months	Not established
Infants 7–12 months	Not established
Children 1–3 years	300 mcg
Children 4–8 years	400 mcg
Children 9–13 years	600 mcg
Teens 14–18 years	800 mcg
Adults 19+ years	1,000 mcg

#### Are there any interactions with folate that I should know about?

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

- Folate supplements could interfere with methotrexate (Rheumatrex®, Trexall®) when taken to treat cancer.
- Taking anti-epileptic or anti-seizure medications, such as phenytoin (Dilantin®), carbamazepine (Carbatrol®, Tegretol®, Equetro®, Eptitol®), and valproate (Depacon®), could reduce blood levels of folate. Also, taking folate 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 healthcare 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 and beverages, according to 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 people otherwise might consume in less-than-recommended amounts. For more information about building a healthy diet, see 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

### 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 (ODS) 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 product or service, or recommendation from an organization or professional society, does not represent an endorsement by ODS of that product, service, or expert advice.



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