



Folic Acid

Folic acid is a B vitamin that can help prevent birth defects of the brain and spinal cord called neural tube defects (NTDs). Folic acid works to prevent these birth defects only if taken before pregnancy and in the first few weeks of pregnancy.

Since NTDs originate in the first month of pregnancy, before many women know they are pregnant, it is important for a woman to have enough folic acid in her system before conception. Folic acid is recommended for all women of childbearing age because 50 percent of pregnancies in this country are unplanned.

Here's what women should know about this crucial nutrient.

Why should women of childbearing age take folic acid?

Studies show that, if all women consumed the recommended amount of this vitamin, beginning before conception and continuing into the first month of pregnancy, up to 70 percent of all NTDs could be prevented.

The neural tube is the embryonic structure that develops into the brain and spinal cord. This structure, which starts out as a tiny ribbon of tissue, normally folds inward to form a tube by the 28th day after conception. When this process goes awry and the neural tube does not close completely, defects in the brain and spinal cord can result. About 2,500 babies are born with NTDs each year, and many other affected pregnancies end in miscarriage or stillbirth.

The most common NTDs are spina bifida and anencephaly. Spina bifida, often called open spine, affects the backbone and, sometimes, the spinal cord. Children with the severe form of spina bifida have some degree of leg paralysis and bladder and bowel control problems. Anencephaly is a fatal condition in which a baby is born with a severely underdeveloped brain and skull.

Studies also suggest that folic acid may help prevent some other birth defects as well, including cleft lip and palate.

Folic Acid (Cont'd)

How much folic acid does a woman need?

The March of Dimes recommends that all women who can become pregnant take a multivitamin that contains 400 micrograms of folic acid every day and eat a healthy diet. This is the only sure way a woman can get all the folic acid and other vitamins she needs. Most women get less than half of the recommended amount of folic acid daily.

The Institute of Medicine also recommends that women eat a diet rich in foods that contain folate or folic acid. Folate is the natural form of folic acid that is found in foods. Orange juice, other citrus fruits and juices, leafy green vegetables, beans, peanuts, broccoli, asparagus, peas, lentils and whole grain products all contain folate. Synthetic (manufactured) folic acid is added to certain grain products, including flour, rice, pasta, cornmeal, bread and cereals. These foods are considered "fortified" with folic acid.

The body more readily absorbs folic acid from vitamin supplements and fortified foods than folate from food. It is estimated that 50 percent of food folate is absorbed by the body, while approximately 85 percent of folic acid in fortified foods and 100 percent of the folic acid in a vitamin supplement are absorbed. Cooking and storage also destroy some of the folate in foods. The body cannot distinguish the origin of the vitamin, however; once in the bloodstream the biological function is the same.

Numerous studies have shown that the synthetic form of folic acid helps prevent NTDs. This is why the March of Dimes, the Centers for Disease Control and Prevention (CDC), and the Institute of Medicine recommend that women who could become pregnant consume 400 micrograms a day of the synthetic form. This is the amount contained in most multivitamins. A few breakfast cereals contain this amount in one bowl, but most contain only 25 percent of the recommended amount, so it is important to check the label on the box.

Do some women need more folic acid?

The Institute of Medicine recommends that women increase their intake of synthetic folic acid to 600 micrograms a day once their pregnancy is confirmed. Most doctors recommend a prenatal vitamin that contains at least this amount of folic acid. However, women should not take more than 1,000 micrograms (or 1 milligram) without their doctor's advice.

If a woman already has had a baby with an NTD, she should consult her doctor before her next pregnancy about the amount of folic acid she should take. Studies have shown that taking a larger dose of folic acid daily (4 milligrams), beginning at least one month before pregnancy and in the first trimester of pregnancy, reduced by about 70 percent the risk of having another affected pregnancy.

Folic Acid (Cont'd)

Women with diabetes or epilepsy also are at increased risk of having a baby with an NTD. Women with these disorders should consult their doctors prior to pregnancy to see whether they should take a larger dose of folic acid.

How much folic acid is in fortified foods?

Since January 1, 1998, the U.S. Food and Drug Administration (FDA) has required the addition of 140 micrograms of folic acid per 100 grams of grain to cereals, breads, pastas and other foods labeled "enriched." This makes it a little easier for women to obtain folic acid from their diets. However, the amount added to these foods is small, and most women cannot obtain enough folic acid from their diet alone. It is estimated that the addition of 140 micrograms of folic acid to foods will prevent only about 5 to 20 percent of folic acid-preventable NTDs.

The FDA did not require that more than this amount of folic acid be added to these foods because of the concern that high levels of folic acid might mask a vitamin B-12 deficiency. This potentially dangerous condition is called pernicious anemia and is seen mainly in elderly people. Very high doses of folic acid (over 1,000 micrograms a day) could possibly correct the anemia caused by the vitamin deficiency, but not the deficiency itself, and cause its diagnosis to be delayed. Left untreated, the vitamin B-12 deficiency can cause irreversible neurologic damage. Some health organizations, including the March of Dimes, feel that the level of fortification can be safely increased without risk to the public's health. Research currently is under way to examine the possibility.

How does folic acid prevent birth defects?

How folic acid prevents NTDs is not well understood. Most studies suggest that it may correct a nutritional deficiency, while others suggest that supplemental folic acid helps some people compensate for inborn errors in how the body processes folates.

For example, a 1997 study found that as many as one in seven people may carry a genetic mutation (change) that causes them to have a deficiency in folic acid, even if they are consuming a diet that contains the recommended amount of folates. These people have problems breaking down folates found in food to forms of folic acid the body can use, resulting in lower folic acid levels in the blood. Most mothers of babies with NTDs don't have this gene mutation, but studies suggest that women who do may be at increased risk of having a baby with an NTD. However, taking folic acid raises levels of the vitamin in the blood, which can reduce the risk of having an affected baby. A new study also suggests that women with this mutation may have an increased risk of placental problems, such as placental abruption (when the placenta peels away from the wall of the uterus before delivery). This risk may be reduced by taking folic acid throughout pregnancy.

Folic Acid - How does folic acid prevent birth defects? (Cont'd)

Besides helping to prevent certain birth defects, folic acid plays other important roles during pregnancy. A pregnant woman needs extra folic acid to help her to produce the additional blood cells she needs. Folic acid also is crucial to support the rapid growth of the placenta and fetus. This vitamin is needed to produce new DNA (genetic material) as cells multiply. Without adequate amounts of folic acid, cell division could be impaired, possibly leading to poor growth in the fetus or placenta. One study found that women who were deficient in folic acid were more likely to have a baby who was premature and of low birthweight (less than 5-1/2 pounds). Another recent study found that low levels of folate may be a risk factor for repeated early miscarriages.

Does folic acid have other health benefits?

In recent years, doctors have come to realize that folic acid is very important for everyone in maintaining health. It has long been known that folic acid plays an important role in the production of normal red blood cells, and that individuals who were deficient in folic acid sometimes developed a form of anemia called megaloblastic anemia (characterized by a reduced number of red blood cells).

More recent studies suggest that folic acid also may help prevent heart disease and stroke. It appears that individuals who have a high level of a substance called homocysteine in their blood have an increased risk of heart disease and stroke. When these people take folic acid, the level of homocysteine in their blood drops, possibly decreasing their risk of cardiovascular diseases. (Researchers also are looking at the role of high homocysteine levels in causing birth defects.) Other studies suggest that folic acid also may help prevent certain cancers, especially colon cancer. While these studies have not proven a protective effect, they suggest that many people, besides women of childbearing age, may benefit from taking folic acid.

Is the March of Dimes conducting research on folic acid?

The March of Dimes has several research grantees who are seeking to improve understanding of how folic acid prevents NTDs. Because NTDs may be caused by a combination of genetic and environmental factors (particularly deficiency of folic acid), other grantees are trying to identify genes that increase a woman's risk of having a baby with an NTD. One of these researchers is focusing on five genes that play a key role in how the body utilizes food folates, to see if mutations in any of these genes increase the risk of spina bifida. Another researcher is looking at how folic acid is transferred from the placenta to the fetus, and trying to identify any factors that could interfere with this process. These studies could lead to ways to identify women who are at increased risk of having a baby with an NTD, and to improved ways to treat these women during pregnancy, with the goal of preventing even more NTDs than currently is possible.

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