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Women's Nutrition: Folate/Folic Acid[1]

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A well-balanced diet with enough vitamins and minerals is an important part of a healthy lifestyle for everyone. But for some groups of people there are special recommendations for certain nutrients. One of these groups is women *capable of becoming pregnant.* To decrease their chance of having a baby with certain types of births defects, women in this category need to consume enough of the vitamin called folate/folic acid ***before*** they become pregnant. This article provides information about the folate/folic acid needs of women who are capable of becoming pregnant, including its role in preventing birth defects, sources, and strategies for meeting the recommended intake. For general information about folate/folic acid for other healthy populations, see EDIS publication *Healthy Eating: Folate* (http://edis.ifas.ufl.edu/fy066).

What is folate/folic acid?

Folate is a general term used to refer to both forms of this B vitamin—food folate and folic acid. Food folate is found mostly in certain fruits, vegetables, and legumes. Folic acid, the man-made form of this vitamin, is added to certain foods and vitamin pills. This form of the vitamin is easier for the body to absorb compared to the natural form found in foods. Once absorbed, both forms of this vitamin are used for important body functions, including DNA synthesis. DNA is needed to make new cells to support growth and development during pregnancy and throughout the growing years. It also is needed to make new cells to replace skin, hair, blood, and other types of cells that are lost or damaged. For this reason, consuming enough folate is important for people of all ages.

Figure 1.
Credits: Mike Watson Images/moodboard/Thinkstock.com

What are the health benefits of folate/folic acid?

Folate/folic acid has been linked to reduced risk for heart disease (Wald, Law, & Morris, 2002), certain types of cancer (Larsson, Giovannucci, & Wolk, 2007; Oaks et al., 2010), and certain birth defects (Czeizel, 1998). Most notably, folic acid has been linked with a reduction in the risk for having a baby with a neural tube defect (NTD) (Czeizel, 1998; Wolff, Witrkop, Miller, & Syed, 2009) or other birth defects

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such as cleft lip, cleft palate, and defects of the heart (Botto, Mulinare, & Erickson, 2000; Botto, Mulinare, & Erickson, 2003; Badovinac, Werler, Williams, Kelsey, & Hayes, 2007; Kelly, O'Dowd, & Reulbach, 2012; van Beynum et al., 2010).

What is a neural tube defect (NTD) and how does folic acid help to reduce NTD risk?

The neural tube is the structure that becomes the baby's brain, spinal cord, and spine. It develops during the earliest stage of pregnancy. Research has shown that the chance of having a baby with an NTD is much lower in women who took a folic acid pill before becoming pregnant and throughout the early months of pregnancy (Czeizel, 1998; Berry et al., 1998; Wolff, Witrkop, Miller, & Syed, 2009). The evidence for this effect is strong (Berry, et al., 1998; Witrkop, Miller, & Syed, 2009) even though the exact way that folic acid works to reduce NTD risk is unknown.

When should women who can become pregnant take folic acid?

Women need to consume enough folic acid ***before*** they become pregnant because the neural tube forms during the first four weeks of pregnancy, before most women know they are pregnant. One out of three pregnancies in the United States is unplanned (Mosha, Jones, & Abma, 2012), so all women who can become pregnant, not just those planning a pregnancy, are advised to consume the recommended dose of folic acid.

How much folic acid is needed for NTD risk reduction?

The US Department of Health and Human Services (2010) and the Institute of Medicine (1998) recommend that all women who can become pregnant consume 400 mcg of folic acid every day, plus food folate from a varied diet. This advice also applies to teenage girls who have started their menstrual cycle and can become pregnant.

Women who have had a baby with an NTD in the past are at higher risk for having another baby with an NTD. These women should talk with their doctors if they are thinking about having another baby because they may need a larger dose of folic acid. A larger dose (4000 mcg a day, or 10 times the usual dose) has been associated with a lower risk for having another baby with an NTD.

How can women capable of becoming pregnant make sure they get enough folic acid?

An easy way to get the recommended 400 mcg of folic acid is to take a supplement every day. Many multivitamin and multivitamin/multimineral pills include folic acid along with other nutrients. Look at the Supplement Facts label (Figure 2) to find a brand that contains 400 mcg of folic acid. Some brands list the word "folate" on the label, others use "folic acid," but either term is okay as long as the supplement provides 400 mcg.

Supplement Facts
Serving Size: 1 tablet

	Amount Per Serving	% DV
Vitamin A	5,000 IU	100%
Vitamin C	60 mg	100%
Vitamin D	400 IU	100%
Vitamin E	20 IU	67%
Thiamin	1.5 mg	100%
Riboflavin	1.7 mg	100%
Niacin	20 mg	100%
Vitamin B6	2 mg	100%
Folic Acid	400 mcg	100%
Vitamin B12	6 mcg	100%
Biotin	30 mg	10%
Pantothenic Acid	10 mg	100%
Calcium	162 mg	16%
Iron	18 mg	100%
Magnesium	100 mg	25%
Zinc	15 mg	100%
Copper	1.5 mg	75%

Figure 2. Supplement Facts panel.
Credits: Caroline Dunn

Women who need a larger dose because of having an NTD baby in the past should talk with their doctor or dietitian to learn the best way to get the right amount of folic acid. Taking more than one multivitamin pill a day might lead to unsafe levels of intake of other nutrients.

Another option is to take a supplement that only contains folic acid. These pills are smaller than a multivitamin, so they are a good choice for people who have trouble swallowing large pills. This also is a low cost way to get the recommended dose of folic acid. Select a brand (store or name brand) at the best price that contains 400 mcg of folic acid per pill.

Some women find it hard to remember to take a supplement. Putting supplements in a place where they are easy to spot can make it simpler to remember to take them. Examples include next to the coffee pot, toothbrush, keys, or medications that are taken daily.

Which foods are sources of folate/folic acid?

Fortified foods

Folic acid fortified foods are those to which folic acid has been added during processing. The U.S. began to fortify certain foods with folic acid in 1998 to help women achieve the level of folic acid intake associated with NTD risk reduction. In the US, grain foods labeled as enriched are fortified with folic acid. This includes enriched bread, cereal, pasta, rice, white flour, and foods made with these products, such as cookies, crackers, and others. Eating enriched grain products is an easy way to increase folic acid intake. A quick way to spot a food fortified with folic acid is to look for the word "enriched" on the ingredients label.

Another way to increase folic acid intake is to consume ready-to-eat breakfast cereals. Many of these cereals contain between 100 to 400 mcg of folic acid per serving, making them good to excellent sources of folic acid.

It is not easy to tell how much folic acid is present in fortified foods because labeling information for this nutrient is inconsistent. The surest way to get enough folic acid is to take a supplement containing 400 mcg of folic acid. Another option is to eat a ready-to-eat breakfast cereal every day that lists the folic acid content (some labels use the word "folate") as meeting 100% of the Daily Value (DV). Keep in mind that only enriched grain foods are fortified with folic acid. Whole grains such as whole wheat bread, brown rice, and whole wheat pasta are not fortified with folic acid.

Food sources

Food folate, the naturally occurring form of the vitamin, is found mainly in certain fruits, vegetables, and legumes. While other foods may contain some food folate, the amount is generally low. Women who can become pregnant are advised to consume food folate from a varied diet in addition to 400 mcg a day of folic acid from fortified foods and/or supplements.

Examples of sources of food folate include:

Asparagus	Lentils
Avocado	Mustard greens
Beans—pinto, black, kidney, navy	Orange juice/oranges
Black-eyed peas	Peanuts
Broccoli	Spinach
Collard greens	Turnip greens

How much folate/folic acid do women who are pregnant or breastfeeding need?

Once a woman becomes pregnant, the recommended intake switches from 400 mcg folic acid plus food folate from a varied diet to something called "Dietary Folate Equivalents," or DFEs. DFEs represent the amount of folate present in foods as food folate and/or folic acid. DFEs account for the fact that folic acid is easier to absorb compared to folate naturally present in foods. Recommendations for everyone except women capable of becoming pregnant are in DFEs. The recommended daily intake is 600 mcg DFE for pregnant women and 500 mcg DFE for breastfeeding women. Taking a supplement containing folic acid is an option for women who find it hard to meet these recommendations from food sources alone.

Is there an upper limit for folic acid?

Too much folic acid, the man-made form of the vitamin, may mask deficiencies of other important vitamins or may have other risks. For this reason, a daily upper limit of 1000 mcg of folic acid has been set for adults (IOM, 1998). Only people who have been told by their healthcare provider to take folic acid for a medical reason, like those women who have had a past pregnancy affected by a neural tube defect, should exceed this limit. The upper limit does not apply to folate naturally found in foods (i.e., food folate).

Summary

Folate and folic acid are important for everyone, especially for women who can become pregnant. Women capable of becoming pregnant are advised to consume 400 mcg of folic acid every day from supplements and/or fortified foods to help reduce the chance of having a baby with an NTD. Remember that not all pregnancies are planned, so all women who can become pregnant are advised to meet this recommendation.

Learn More

Healthy Eating: Folate—http://edis.ifas.ufl.edu/fy066

Resources

National Council on Folic Acid—http://folicacidinfo.org/

Florida Folic Acid Coalition—http://folicacidnow.net/index.shtml

Centers for Disease Control and Prevention—http://www.cdc.gov/ncbddd/folicacid/index.html

US Department of Health and Human Services, Women's Health—http://womenshealth.gov/publications/our-publications/fact-sheet/folic-acid.html

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