



Grains of truth about **FOLIC ACID**

What is folic acid?

Folic acid, also called folate or folacin, is not a household word, but it will be. Folic acid is a B vitamin that has been shown to protect against neural tube defects such as spina bifida (a birth defect in which the spinal cord is not completely encased in bone) and anencephaly (a fatal defect in which part of the brain never develops). It may also prevent against oral and facial birth defects such as cleft palate.¹

Folates are also needed for cell growth and blood production. As a fetus grows, it steals folates from the mother's blood, which in turn creates a shortage in the mother.

There is also some evidence folic acid may help protect against cervical cancer, particularly in women at high risk for the disease. In addition, preliminary evidence suggests folic acid may protect against colorectal and lung cancers.

Because of its control over homocysteine, an amino acid produced by the body, folates are thought to afford some protection against heart disease. High levels of homocysteine in the blood may be a risk factor for heart attacks.

Where do I get it?

Many foods contain a little folic acid, but the best sources are legumes, yeast, dark green leafy vegetables, some fruits, whole grains and fortified cereals and other enriched grain products. Effective January 1, 1998, a new fortification law required enriched grain products—white bread and flour, pasta and rice—to contain specific levels of folic acid (see fortification section). Folic acid has a higher absorption rate than natural occurring folate. Lengthy cooking can destroy folate.

In 2002, CDC reported that neural tube birth defects have decreased by 23 percent following folic acid fortification, resulting in an additional 900 healthy babies each year.² A Nova Scotia study showed a 50 percent decrease in neural tube birth defects between 1998 and 2000.³

According to a study conducted from General Mill's Bell Institute, grain foods and breakfast cereals contributed over 62.5 percent of dietary folic acid⁴.

FOOD

FOLATE mg/SERVING

(FOLIC ACID when noted)

Dietary Folate Equivalents* (DFE) of Common Foods

		<i>mcg</i>
Ready-to-eat breakfast cereals (read labels for exact amount)	1 ounce	100-400
Enriched wheat flour tortilla	1, 8" tortilla	98
Corn flour tortilla	1, 6" tortilla	48
Enriched pasta	½ cup cooked	80
Whole wheat bread	1 slice (1-oz.)	14
Enriched white bread	1 slice (1-oz.)	34
Asparagus	½ cup cooked	121
Kidney beans	½ cup cooked	114
Lentils	½ cup cooked	179
Navy beans	½ cup cooked	127
Orange	1 medium	48
Orange juice, fresh squeezed	½ cup	37
Pinto beans	½ cup cooked	148
Spinach, raw	½ cup	29
Spinach, boiled	½ cup	131
Sunflower seeds, dry roasted	½ cup	152
Beef liver, braised	3 ounces	184

- Dietary folate equivalents accounts for the folic acid content which is better absorbed than natural occurring folate.

How much do I need?

Females of childbearing age need 400 micrograms daily. Because spina bifida and similar birth defects occur in the first two weeks of pregnancy, women need to build up their folate stores long before they become pregnant. Because 50 percent of pregnancies in the United States are unplanned, it is even more crucial for all women of childbearing age to continually consume large intakes of folic acid.

The Centers for Disease Control (CDC) has undertaken a national prevention program through the Public Health Service for neural tube defects. They recommend that women of childbearing age increase their dietary levels of folic acid, including fortified foods, and take vitamin supplements to ensure an intake of 400 micrograms daily. The CDC estimates that 50 to 70 percent of spina bifida and anencephaly could be prevented if the Public Health Service recommendations are followed. The Recommended Dietary Allowance (RDA) for pregnant women is 600 micrograms of folic acid per day.

Adult men and older women also need 400 micrograms (μg) to meet the RDA for folic acid. Folic acid has been linked with reducing the risk of heart disease, stroke and some forms of cancer. A new CDC study, estimates that fortified flour used in grain foods may be resulting in a reduction of 31,000 stroke-associated deaths and 17,000 ischemic heart disease deaths per year.

About the only way anyone can obtain 400 micrograms per day through diet is by eating folic acid-fortified grains and breakfast cereals. If you do not make a conscious effort to do this daily, a folic acid supplement is strongly recommended.

Cigarette smoking and alcohol intake can also affect folate status.⁵ A study showed that smokers require an average folate intake of 658 micrograms/day to have the same blood plasma level as a non-smoker consuming only 200 micrograms daily.

Folic acid fortification

Enrichment and fortification has been an effective way to prevent diseases in the past. Enrichment of niacin, thiamine and riboflavin in refined grain products in the 1940s has basically eradicated the occurrence of beri beri and pellagra.

In 1993, the Food and Drug Administration (FDA) proposed a regulation that required manufacturers to add folic acid to enriched flours, breads, rolls, buns, corn grits, cornmeal, farina, rice, pasta and noodle products. The regulation became effective January 1, 1998.

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Over-consumption of folic acid can mask vitamin B-12 deficiency; however, FDA concluded this is unlikely to happen if total intakes of folate are below 1,000 micrograms/day.⁶

The fortification level is 0.7 mg folic acid per pound of flour. At this level, a slice of enriched bread will contain 37 micrograms and a half-cup of cooked pasta will have 60 micrograms. If consumers ate at least six ounces from the bread and grains group daily, this would allow them to reach the RDA of 400 micrograms. For example, three ounces of bread (bagels, tortillas, English muffins, etc.) would total 81 micrograms; a cup of pasta, 120 micrograms; and a fortified breakfast cereal with at least 200 micrograms would fulfill the requirement for women of childbearing age.

Foods qualifying for a folic acid health claim must meet or exceed at least 10 percent of the Daily Value (DV) (40 micrograms) of folic acid. This amount meets requirements for a "good" source claim. Possible health claims could read: "Healthful diets with adequate folate may reduce women's risk of having a child with a brain or spinal cord birth defect" or "Adequate folate in healthful diets may reduce a woman's risk of having a child with a brain or spinal cord defect." The terms folate, folacin or folic acid are all acceptable on the claims, as are neural tube defects, birth defects, spina bifida or anencephaly. If the food/supplement contains more than 100 percent of the DV (400 micrograms), they must identify the upper limit of 1,000 micrograms/day.

References:

- 1) University of California at Berkeley Wellness Letter. Vol. 12 (8) 1996.
- 2) Mathews TJ, Honein MA, Erickson JD. *Spina Bifida and Anencephaly Prevalence-United States, 1991—2001*. CDC website, Sept. 2002
- 3) Persad VL, Vanden Hof MC, Dube JM, Zimmer, P. *Incidence of open neural tube defects in Nova Scotia after folic acid fortification*. CMAJ 167 (3) 241-245, 2002.
- 4) The Bell Institute of Health & Nutrition Dietary Intake Study, 2000-2002. General Mills, Inc., Minneapolis, MN. Unpublished data.
- 5) Piyathilake CJ, Macaluso M, Hine RJ, Richards EW, Krumdieck CL. *Local Systemic effects of cigarette smoking on folate and vitamin B12*. *AJ Clin. Nutr.* 60, 559-566, 1994.
- 6) *Journal of the American Dietetic Association*. Commentary. 96 (5) 451-452, 1996.

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