



Folic acid fortification: What does it mean for patients and physicians?

Folic acid is a form of folate, a “numberless” B-vitamin found primarily in legumes, vegetables and fruits. Studies have shown that for women who have taken vitamin supplements containing this compound around the time of conception, the risk of a disturbance in early fetal development resulting in a neural tube defect was significantly reduced.¹⁻⁷ The health consequences for people affected by a neural tube defect range from death or serious disability to less serious conditions. Anencephaly and spina bifida are the most common forms of neural tube defect. In Canada, approximately 400 babies are born each year with a neural tube defect detected at birth; about one-half of these babies are so seriously affected that they do not survive the early neonatal period.

To be assured of deriving the protective benefit of vitamin supplementation, women must begin to take supplements before conception occurs, a potentially less likely step if pregnancy occurs unexpectedly. Fortification of food is a “passive” public health intervention that can increase women’s intake of folic acid during the critical period of embryonic development.

In February 1996 the United States announced that folic acid fortification of enriched cereal grain products (flour, pasta, rice and corn meal) would become mandatory as of Jan. 1, 1998. The process of making folic acid fortification mandatory for white wheat flour, enriched pasta and corn meal is under way in Canada. Fortification of these products is now permitted, though not mandatory, and some white wheat flour and enriched pasta and corn meal products fortified with folic acid at the same levels as in the US (150 µg/100 g of flour or corn meal, 240 µg/100 g of pasta) are now being sold in Canada. Fortification is expected to increase daily intake of folic acid among women of reproductive age by about 100 µg/day.

It is unknown whether increasing the intake of folic

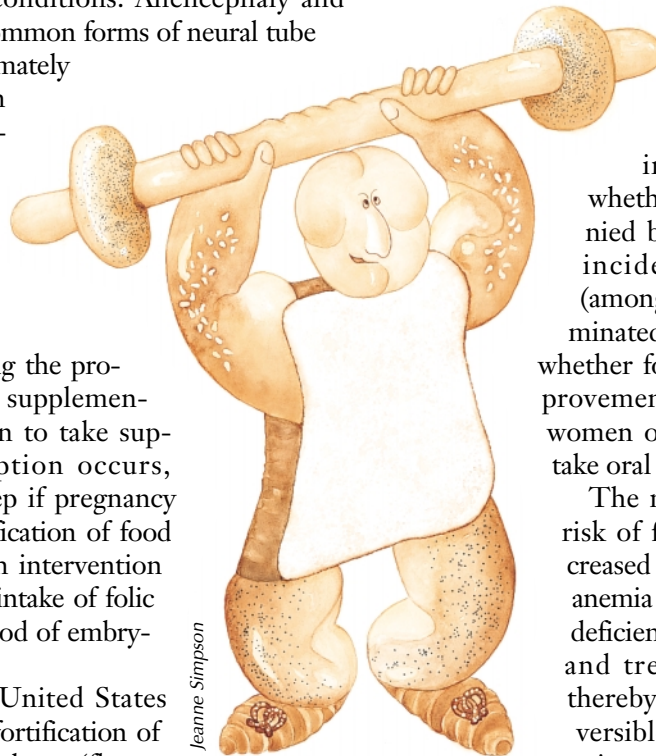
acid by fortification of foods will have the protective effect that has been shown in studies completed to date. In 1 of the 2 randomized controlled trials a much higher dose (4000 µg/day) of folic acid alone, taken as an oral supplement, was shown to prevent neural tube defects in subsequent pregnancies in women whose fetuses had had this problem in an earlier pregnancy.⁷ In the other study, the risk of a first occurrence of neural tube defect was significantly reduced for women who took a daily multivitamin and multimineral supplement containing 800 µg of folic acid.⁶ Observational studies have shown

that supplements containing about 400 µg folic acid appear to be beneficial,¹⁻⁶ although the lower limit of effectiveness is unknown.

Health Canada has therefore initiated a study to determine whether food fortification is accompanied by a reduction in the detectable incidence of neural tube defects (among live births, stillbirths and terminated affected pregnancies) and also whether food fortification leads to an improvement in the blood folate status of women of reproductive age who do not take oral supplements.

The most commonly cited potential risk of food fortification is that an increased intake of folate might mask the anemia often associated with vitamin B₁₂ deficiency, which might delay diagnosis and treatment of this problem and thereby increase the potential for irreversible neurological damage.⁸ Physicians should be aware of this possibility and should remember that vitamin B₁₂ deficiency, although most commonly occurring in the elderly, can occur at any age.^{9,10} Although it will not be possible to determine whether fortification is accompanied by an increase in neurological disorders attributable to this intervention, the Health Canada study proposes to monitor whether there is a change in vitamin B₁₂ status accompanying fortification among people more than 65 years old, the age group most likely to be affected.

Physicians are also advised that oral vitamin supplementation may still be necessary for women to achieve the protective effects of folic acid. Health Canada is now revising its recommendations regarding supplementation



Jeanne Simpson

Fortifying white wheat flour: putting folic acid where your mouth is.



for the primary prevention of neural tube defects, which were first issued in 1993. The new recommendations will be accompanied by advice about the selection of supplements for use in the periconceptional period and additional information for health care professionals to help them give patients and clients more personalized advice and answers to their questions. The revised recommendations and accompanying information are expected to be released shortly and will be incorporated into a professional and public education strategy.

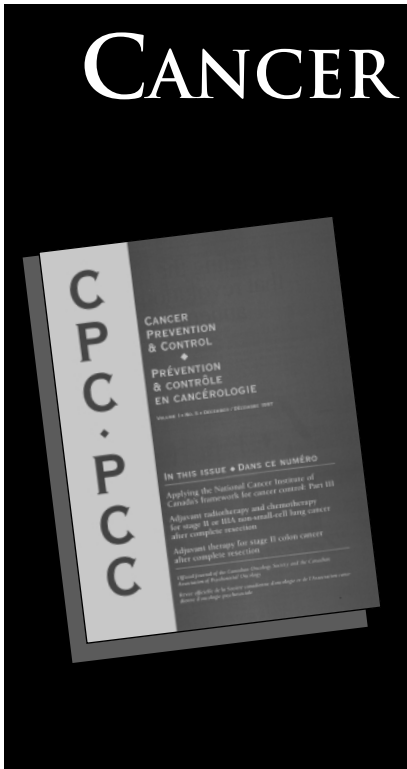
Linda A. Turner, PhD
Consultant Epidemiologist

Catherine McCourt, MD, MHA
Director

Bureau of Reproductive and Child Health
Laboratory Centre for Disease Control
Health Protection Branch
Health Canada
Ottawa, Ont.

References

1. Smithells RW, Sheppard S, Schorah CJ, Seller MJ, Nevin NC, Harris R, et al. Apparent prevention of neural tube defects by periconceptional vitamin supplementation. *Arch Dis Child* 1981;56:911-8.
2. Smithells RW, Seller MJ, Harris R, Fielding DW, Schorah CJ, Nevin NC, et al. Further experience of vitamin supplementation for prevention of neural tube defect recurrences. *Lancet* 1983;1:1027-31.
3. Mulinare J, Cordero JF, Erickson JD, Berry RJ. Periconceptional use of multivitamins and the occurrence of neural tube defects. *JAMA* 1988;260:3141-5.
4. Milunsky A, Jick H, Jick S, Bruell CL, MacLaughlin DS, Rothman KJ, et al. Multivitamin/folic acid supplementation in early pregnancy reduces the prevalence of neural tube defects. *JAMA* 1989;262:2847-52.
5. Werler MM, Shapiro S, Mitchell AA. Periconceptional folic acid exposure and risk of occurrent neural tube defects. *JAMA* 1993;269:1257-61.
6. Czeizel AE, Dudás I. Prevention of first occurrence of neural-tube defects by periconceptional vitamin supplementation. *N Engl J Med* 1992;327:1832-5.
7. MRC Vitamin Research Study Group. Prevention of neural tube defects: results of the Medical Research Council vitamin study. *Lancet* 1991;338:131-7.
8. Herbert V, Biagaouette J. Call for endorsement of a petition to the Food and Drug Administration to always add vitamin B-12 to any folate fortification or supplement. *Am J Clin Nutr* 1997;65:572-3.
9. Babior BM, Bunn HF. Megaloblastic anemias. In: Fauci AS, Braunwald E, Isselbacher KJ, Wilson JD, Martin JB, Kasper DL, et al, editors. *Harrison's principles of internal medicine*. 14th ed. New York: McGraw-Hill; 1998. p. 655-9.
10. McPhee AJ, Davidson GP, Leahy M, Beare T. Vitamin B₁₂ deficiency in a breast fed infant. *Arch Dis Child* 1988;63:921-3.



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