

Folic acid food
fortification is
associated with a
decline in
neuroblastoma



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Folic acid food fortification is associated with a decline in neuroblastoma. Folic acid is essential for healthy cell division and hence is an important nutrient for women of childbearing age. Adequate levels of folic acid at the time of conception and in the initial stages of pregnancy have been shown to reduce the incidence of babies developing neural tube defects like neuroblastoma and spinal bifida. This paper examines the impact of fortification of food using folic acid and the associated decline in neuroblastoma.

Introduction

Neuroblastoma is an embryonic tumor of the peripheral nervous system and is the second most common pediatric tumor and is the most prevalent extracranial solid tumor in children (Olshan, et. al 2002). Neuroblastoma is one of the most common cancers affecting children today, forming 8%-10% of the total seen from birth through age 14 years. It affects one in every 6, 000 to 7, 000 children in North America (Nutra ingredients. com, 2003). It is a disease in which cancer cells are found in certain nerve cells within the body. Neuroblastoma typically begins in the abdominal area either in the adrenal gland (located just above the kidney) or around the spinal cord in the neck, chest, or pelvis (Pressinger & Sinclair, N. D.). Studies show that folic acid food fortification has more than halved the incidence in Canada of the deadly childhood cancer neuroblastoma.

Chemically Folic acid has the molecular formula $C_{19}H_{19}N_7O_6$ with a molecular weight of 441. 40. The scientific name of folic acid is N-[p-[2-Amino-4-hydroxy-6-pteridiny] methyl] amino] benzoyl]-L-glutamic acid. It is a complex organic compound present in liver, yeast, and natural sources; it also may be prepared synthetically (RxList, 2004).

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Metabolically, folic acid is converted to coenzyme forms required in numerous one-carbon transfer reactions involved in the synthesis, interconversion and modification of nucleotides, amino acids and other essential structural and regulatory compounds (Bailey, et al, 2003). As an essential cofactor for the de novo biosynthesis of purines and thymidylate, folate plays an important role in DNA synthesis, stability and integrity, and repair, aberrations of which have been implicated in colorectal carcinogenesis. Folate may also modulate DNA methylation, which is an important epigenetic determinant in gene expression, maintenance of DNA integrity and stability, chromosomal modifications, and the development of mutations. (Kim, 2004).

Daily ingestion of 400 µg of folic acid alone during the preconception period reduced a womans risk of having a fetus or infant with a neural-tube defect. The fact that the ingestion of 400 µg of folic acid alone per day resulted in a reduction in risk similar to that reported in earlier studies, which evaluated the effect of folic acid in combination with multivitamins, suggests that most of the reduction in risk in the earlier studies was due to folic acid (Berry, et al., 1999).

Although folic acid is generally regarded as safe, there continues to be concern that folic acid fortification may have adverse effects in subpopulation groups not originally targeted for fortification. Concerns that folic acid fortification may mask symptoms of vitamin B-12 deficiency, primarily in the elderly population, have been raised. Vitamin B-12 deficiency has been estimated to affect up to 10–15% of the population over 60 years of age. Because of this concern, the amount of fortification chosen was estimated to provide on average 100 µg additional folic acid/day, with only a <https://assignbuster.com/folic-acid-food-fortification-is-associated-with-a-decline-in-neuroblastoma/>

very small proportion of the population receiving > 1 mg (Kim, 2004). There has been concern about the interaction between vitamin B12 and folic acid. Folic acid supplements can correct the anemia associated with vitamin B12 deficiency. Unfortunately, folic acid will not correct changes in the nervous system that result from vitamin B12 deficiency. Permanent nerve damage could theoretically occur if vitamin B12 deficiency is not treated. Therefore, intake of supplemental folic acid should not exceed 1000 micrograms (μg , sometimes mcg) per day to prevent folic acid from masking symptoms of vitamin B12 deficiency. It is important for older adults to be aware of the relationship between folic acid and vitamin B12 because they are at greater risk of having a vitamin B12 deficiency (Wikipedia. org, 2006).

Several studies conducted in United States (Franch, et al., 2003 & Liu, et al., 2004) and China (Berry, et al., 1999) has shown a positive decline in the occurrence of neuroblastoma and other neural tube defects with the administration of food fortified with folic acid or through folic acid supplementation. Neural-tube defects are a worldwide problem, affecting an estimated 300, 000 or more fetuses or infants each year. Our results demonstrate that the ingestion of 400 μg of folic acid alone per day during the preconception period prevents neural-tube defects in areas of both high and low frequency (Berry, et al., 1999).

Conclusion

The results of a number of studies have led to the conclusion that preconception folic acid supplementation reduces the risk of Neural Tube Defects. Since the discovery of the link between deficiency of folic acid and neural tube defects, governments and health organizations worldwide have made recommendations concerning folic acid supplementation for women <https://assignbuster.com/folic-acid-food-fortification-is-associated-with-a-decline-in-neuroblastoma/>

intending to become pregnant and also during the early stages of pregnancy. The United States Public Health Service recommends an extra 0.4 mg/day. Folic acid food fortification will help to cover a larger population and can be used instead of supplementation using pills.

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