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Folate supplement and childhood leukaemia review urges more research into impact of maternal diet

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Credit: Brunel University

Folic acid supplements taken by mothers before and during pregnancy appear to be beneficial in protecting against the risk of childhood leukaemia in offspring, a new review of existing evidence concludes.

However, in their analysis of almost 200 previous studies, Dr Sabrina Tosi and colleagues at Brunel University London and the University of Palermo also found that the ideal amount of folic acid (or vitamin B9) supplementation has still not been firmly established.

The research team say that further studies on folic acid must consider how the supplement should be combined with other vitamins, in order to determine the most successful combination of nutrients to maintain genomic health and well-being in a foetus and reduce a child's susceptibility to disease in later life.

Folic acid and its derivatives, commonly known as folates, are found in leafy vegetables, eggs, legumes, bran and dried fruit. A synthetic form is also added as a fortifier in cereal grain products or used as a diet supplement.

At present, the intake of folic acid supplements is highly recommended during pregnancy as it is well established that a mother's folate deficiency is associated with neural tube defects and malformations in the developing foetus.

Research has also shown that a deficit of folic acid can be a strong factor in the promotion of cardiovascular diseases, depression and Alzheimer's in adults.

DNA damage due to lack of folates can lead to the formation of chromosomal abnormalities, which are considered a hallmark in cancers such as leukaemia – one of the most prevalent cancers in children under 15. Research on this topic has been contradictory, but recent publications suggest folic acid does play a protective role.

However, research also suggests that the protective effects of folic acid might be dose-dependent, as excessive folic acid could actually nourish

pre-existing cancers or pre-cancerous conditions.

The current recommended consumption is 400 μg/day in adults and 600 μg/day in pregnant women yet in a number of studies reviewed by Dr Tosi and colleagues, unmetabolised folic acid was observed in the body at doses above 200 μg/day. Since the long-term effects of this have not been investigated, the recommended dosage remains questionable.

After reviewing published studies, Dr Tosi and her team found that while some research has been conducted on folic acid intake in fathers (prior to conception) results are still inconclusive and more research should be done in this area to understand how paternal diet could influence the health of the offspring

As incorrect nutrition is a preventable risk factor for the development of diseases, in-depth understanding of how different nutrients work would be greatly beneficial.

The authors conclude that while maternal folic acid supplementation before and during pregnancy seems to confer protection against the risk of childhood leukaemia in offspring, further research must be done in uncovering the role of maternal diet as a whole, as it represents a main factor capable of inducing permanent changes in the foetus and post-natal life.

More information: 'Folate deficiency as predisposing factor for childhood leukaemia: a review of the literature' coordinated by Sabrina Tosi (College of Health and Life Sciences and Institute of Environment, Health and Societies, Brunel University London, UK), written by Catia Daniela Cantarella (Department of Experimental Biomedicine and Clinical Neurosciences, University of Palermo, Italy) and Denise Ragusa with contribution by Marco Giammanco is published on Friday 2nd June 2017 in the journal *Genes & Nutrition*.