



## **Taking Folic Acid While Pregnant Is Good For Fetal Health**

Folic acid is an important vitamin to the developing fetus in that it aids cell development, particularly those cells involved in the development of the baby's spine. A deficiency can result in neural tube defects, in which the neural tube, down through which the central nervous system passes, fails to close properly.

However, let's first discuss the substance itself so that its function in that process can be more easily understood. Neither should we ignore the other benefits that folic acid gives us, or the problems we can have in the event of a deficiency.

Folic acid is a form of Vitamin B9, sometimes referred to as Vitamin M. Its anionic form is known as folate, which is the form in which it is frequently offered in supplements. Incidentally, it gets its name from the Latin for leaf, so is from the same root as foliage. It is water soluble, and like Vitamin C can be leached through the body if not immediately used.

It is available naturally from leafy and green vegetables such as lettuce, broccoli, spinach and peas, but is also available in fortified breakfast cereals, sunflower seeds and some fruits. You would not normally suffer a deficiency, but if you are taking anticonvulsants, have liver problems or undergoing kidney dialysis, then you might need a supplement. Pregnancy, of course, is the important case in which a supplement should be taken, although, surprisingly, many mothers-to-be are unaware of this.

New body cells need folate for their production, particularly when they are dividing and growing rapidly such as during pregnancy and in infancy. The formation of DNA depends on many chemical entities, among them four nitrogenous bases, of which three, thymine and the two purine bases, adenine and guanine, depend on folate for their synthesis. If the growing fetus is lacking folate then DNA synthesis will be hindered. This retards cell division and growth.

Among the conditions this can cause are a form of anemia known as megaloblastic anemia, and neural tube deficiencies, where the sheath that surrounds the main nerve canal up the spine fails to close properly. The best known of such neural tube defects is spina bifida, though any condition caused by a lack of cell division can also occur. Anemia can be contracted by both adults and children, since production of red blood cells takes place constantly throughout your lifetime. These are the reasons why folic acid or folate is used in breakfast cereals.



The biochemistry is fairly simple to understand, and is important because it explains the importance of two other B vitamins, B3 and B12, in DNA synthesis. The initial stages are a six step reaction that forms methyl tetrahydrofolate from folate, starting with the reduction of folate to dihydrofolate, and then a further reduction to the tetrahydrofolate (THF). Vitamin B3 (in the form of nicotinamide adenine dinucleotide phosphate) is an essential cofactor for these reductions. Vitamin B12 is necessary as an acceptor for the methyl-THF so that it can continue along the biochemical pathway - now that is too complex to discuss here!

However, the inference you can rightly draw from this is that a deficiency of Vitamin B12 can cause what is known as a 'methyl trap', whereby the methyl-THF cannot be used, and so a deficiency in Vitamin B12 can lead to the same symptoms as a folic acid or folate deficiency.

The implications of that are that vitamin B12 is also an essential component of a pregnant woman's diet. The problem here is that this vitamin is available only from animal sources, including dairy products. Its presence in vegetable organisms such as certain algae and fungi has been proposed, but it is believed that the cobalamin (chemical term for the vitamin) from these sources is not bioavailable to humans.

Vegans, therefore, who do not eat dairy products, will need a Vitamin B12 supplement in addition to folic acid or folate, particularly when they are pregnant and with young growing children. In this respect, a vegan diet is unsuitable for young children until their rapid growth period has stabilized.

For those of you wondering why the biochemistry above was discussed: that is your answer. Such discussions can frequently explain why certain supplements are necessary, or certain diets should be reconsidered under particular circumstances. Such things are easier to understand and accept when the logic behind them are explained. A folic acid supplement taken from the onset of pregnancy up to 12 weeks at least, and also a Vitamin B12 supplement in the case of those with a low meat intake, should prevent neural tube defects such as spina bifida.

A daily supplement of 0.4 mg should be sufficient, along with a diet rich in green vegetables, fortified cereals and breads and oranges. Your greens are best steamed since prolonged boiling destroys folic acid - as it destroys Vitamin C. One source of folic acid that you might read about is liver, and its additional iron content might lead you to believe this to be a good component of your diet when pregnant. However, although normally a very nutritious food, liver should be avoided during pregnancy due to its high Vitamin A content. This can be harmful to your baby.

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Finally, there are some circumstances under which the dose during pregnancy should be greater. If you have previously had a child with a neural tube defect, or have an NTD yourself (or your partner), if you are diabetic, if you have celiac disease (a gluten allergy) or are taking anti-epileptic medication, you should increase your dose to 5 mg (milligrams) for which you will likely need a prescription from your physician.

NTD is rare, so don't over-worry much about it, but take the above precautions to put your mind at rest since pregnancy is not a time during which you should be nervous but to enjoy. That will pass on to your growing baby, which will then itself be happy.



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