

Folic Acid/Neural Tube Defect

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### Folic acid is and how it Affects the Body

Folic acid, also known as vitamin B9 or folate, is one of the eight B vitamins. All the B vitamins assist the body to convert carbohydrates into glucose, which the body then uses to generate energy. These B vitamins, regularly referred to as B complex vitamins, are also essential in helping the body to use protein and fats. The body requires the B complex vitamins for healthy hair, skin, liver and eyes. These vitamins also assist the nervous system to work properly. While folic acid is a synthetic form of vitamin B9 found in fortified foods and supplements, folate is naturally found in food (Larsen, 2011). This section of the report discusses folic acid and its essence in the human body.

Folic acid is essential for the proper functioning of the brain and is an important component of emotional and mental health. It helps in the production of RNA and DNA, the genetic material of the body, and is highly important during rapid growth of tissues and cells during pregnancy, infancy and adolescence (Lehne, 2007). Folic acid works hand in hand with vitamin B12 to facilitate adequate iron levels and ensure that red blood cells work properly.

Folic acid works with vitamin B12 and B6 together with other nutrients to keep the levels of the amino acid called homocysteine in check. High homocysteine levels are linked to heart disease. It is fairly common for individuals to have low folic acid levels. Some of the causes of folic acid deficiency are alcoholism, celiac disease and inflammatory bowel disease. Some medications may also lower the body's folic acid levels. Some of these drugs include diuretics, sedatives, and anticonvulsant medication. They interfere with the body's absorption of folic acid (Lehne, 2007).

Low folic acid levels can affect various body parts and cause grave health implications. Since folic acid is essential to both adults and children in the production of red blood cells, insufficient intake of folic acid may put a person at risk of developing anemia. Folic acid is responsible for making hemoglobin in red blood cells that function to carry oxygen to the body's cells. Low folic acid levels result in a low hemoglobin count in the body, which may bring about persistent dizziness, headache, chest pain, fatigue, pale skin, shortness of breath, or cold feet and hands (Larsen, 2011). Pregnant women with low folic acid levels carry a greater risk of developing low birth weight, neural tube defects or giving birth to premature babies. Folic acid supplements are helpful in protecting women against neural tube defects. Additionally, low folic acid levels in infants as well as new-born babies can slow down normal growth rates. Research posits that in the last six months of an infant's first year, folic acid plays an important role in determining how fast the baby grows. Supplementation of folic acid during and before pregnancy affects the new born baby's folate levels and may potentially be a limiting factor to its growth. As mentioned above, low folic acid affects homocysteine levels in the body. Folic acid assists the body to metabolize homocysteine thus reducing its level in the blood. This consequently protects the coronary arteries from clotting and being damaged (Lehne, 2011).

#### Neural Tube Defects and their Causes

Neural tube defects are among the most common birth defects and occur in about 1 in every 1000 live births within the United States. A neural tube is an opening in the brain or spinal cord that manifests at a very early stage of human development. An embryo's early spinal cord normally begins as a flat region that rolls into a neural tube (a narrow sheath that closes to form the embryo's spinal cord and brain) twenty-eight days following the baby's conception. Failure of the neural tube to close completely leads to the development of a neural tube defect

(Oppenheimer, 2007). This section of the report explicates the types and essential causes of neural tube defects.

Neural tube defects emerge even before most women realize they are pregnant. Anencephaly and Spina bifida are the two most common problems ascribed to brain and spine development. Together, they are known as neural tube defects. Anencephaly results from the neural tube's failure to close at the head. The skull bones and brain do not develop as they normally do. Babies born with anencephaly die at, or a short time following birth (Oppenheimer, 2007). Spina bifida, a literal meaning for 'separated spine', is characterized by the incomplete development of the spinal cord, brain, or/and meninges (the brain and spinal cord's protective covering).

#### Types of Spina Bifida

**Occulta:** this is the most common and mildest type in which one or additional vertebrae are not formed properly. The name 'occulta' means 'hidden', indicating that the opening or malformation in the spine is covered by a layer of skin. This type of neural tube defect is a rare cause of disability.

**Closed neural tube defects:** this type consists of a diverse range of spinal defects where the spinal cord experiences the malformation of membranes, fats, or bone. Some patients exhibit few or no symptoms at all. In other patients the malformation results in complete paralysis coupled with bowel and urinary dysfunction (Wyszynski, 2006).

**Meningocele:** in this type, the meninges protrude from the opening of the spinal cord and these may, or may not be covering the malformation with a layer of skin. Certain patients with

meningocele may have little or no symptoms, whereas others may show symptoms likened to those of closed neural tube defects (Wyszynski, 2006).

Myelomeningocele: this is the most severe type. It is attributed to the exposure of the spinal cord through the spine's opening, resulting in the partial or complete paralysis of the body parts below the spinal opening. The paralysis can be so severe such that the affected person may be incapable of walking and may have bowel and urinary dysfunction (Wyszynski, 2006).

The elaborate cause of the disruption of the neural tube's complete closure is unknown. Scientists suggest that nutritional, genetic, as well as environmental factors may play a role. Research studies cite that insufficient folic acid intake (a common B vitamin in the diet of expectant women) is an elemental factor in the cause of spina bifida as well as other neural tube defects. Prenatal vitamins that are prescribed for women usually consist of B vitamins, and folic acid features prominently in abating neural tube defects (Oppenheimer, 2007).

#### The Importance of Taking Folic Acid While Pregnant

All nutrients are important in preparation for pregnancy. Folic acid however merits some special consideration. Folic acid assists in developing the neural soon after conception. The developed neural tube then becomes the baby's brain or spinal cord. Expectant women who consume sufficient folic acid, particularly during the weeks prior to conceiving as well as within the first six weeks of being pregnant potentially reduce the risk of neural tube defects (Larsen, 2011). The Center for Disease Control and Prevention cites that women taking the recommended daily dose of folate beginning at least a month prior to conception and during the pregnancy's first trimester reduce the infant's risk of having neural tube defects by between 50 and 70 percent.

Folic acid is essential in facilitating the normal development of cells in the unborn baby. Many women do not realize the essence of regular folic acid intake prior to and during pregnancy. Research shows that women with folic acid deficiency are at two to three times greater risk of giving birth to premature babies.

Folic acid also helps to minimize the bay's risk of a cleft palate or cleft lip. The cleft lip is a birth defect affecting the roof or upper part of the mouth. Sufficient folic acid intake by expectant women also minimizes the risk of heart defects in the infant. Moreover, it functions to facilitate the quick and healthy growth of the placenta and the fetus. The absence of folate may impair cell division and fetal growth (Lehne, 2007). Folic acid also plays an important role in the production of deoxyribonucleic acid and the extra blood cells required during pregnancy. Getting sufficient folic acid is therefore vital for the placenta's growth and the body's development. Besides that, it lowers possible risks of contracting Alzheimer's disease, cancer, stroke, and heart attack. This simple B vitamin can prevent complications and pain for both the new born and the mother (Lehne, 2007).

## References

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