

# Folic Acid 1 mg Tablets



## Product Summary:

Folic acid deficiency is probably the most common vitamin deficiency in North America. It is needed for the proper formation of red blood cells, and lowers the risk of cardiovascular disease. It is especially important during and before pregnancy, as a deficiency can lead to neural tube defects in infants.

## Properties/Uses:

The claim as approved by the *Natural Health Products Directorate* (NHPD): Helps prevent neural tube defects when taken before and during the early stages of pregnancy. Helps produce red blood cells.



GENERAL HEALTH  
& WELLNESS



## Pharmacology:

Folate is a water-soluble B-vitamin (vitamin B9) found in many foods but is most abundant in green leafy vegetables. Folic acid is the form of folate used in supplements and added to fortified food. Folate found in food is only 4-5% bioavailable, while folic acid from supplements is 100% bioavailable.<sup>1</sup>

Folic acid is used to treat folate deficiency, lower the risk of cardiovascular disease and reduce the risk of neural tube defects during pregnancy. Folate is also needed for proper red blood cell formation.

In 1968, Dr. McCully of Harvard University showed a relationship between plasma homocysteine levels and coronary heart disease. He also developed the understanding that vitamins B6, B12, and folic acid are the natural cofactors for metabolically reducing plasma homocysteine, and thereby ameliorate the risk of coronary heart disease.<sup>2</sup> Originally met with fierce opposition, this clinical understanding is essentially widely accepted now.

Homocysteine is a metabolic by-product arising from the activity of the principle methylation agent, S-adenosylmethionine (SAM). S-adenosylmethionine dependent methylations are essential for the synthesis of a variety of cellular components including creatine, epinephrine, carnitine, phospholipids, proteins, DNA, and RNA.<sup>3</sup> The by-product of these methylation reactions is S-adenosylhomocysteine. Its fate requires hydrolysis to adenosine and homocysteine. In each cell where homocysteine is generated, it is intended to have a transient intracellular existence by methylation conversion to methionine via methyl groups from folate or betaine facilitated by the methyl donor cofactors of folic acid and/or vitamin B12. Alternatively, homocysteine undergoes transsulfuration whereby a sulfur is transferred to the serine to form cysteine, a process facilitated by vitamin B6.<sup>3</sup>

Without folate or vitamins B6 or B12 for the amount of protein consumed, homocysteine is not properly metabolized. Homocysteine is neurotoxic, causing DNA damage and cell apoptosis. Over time, homocysteine initiates endothelial focal lesions that evolve into atherosclerosis. Many experts believe that homocysteine is a greater risk for atherosclerosis than is cholesterol. This may well be correct since many coronary thrombosis heart attacks occur in people with cholesterol levels within the acceptable or lower range. It is estimated that about 10 percent of heart disease arises from homocysteine.<sup>4,6</sup>

Folic acid plays an important role in pregnancy, both during and prior to pregnancy. Folic acid helps regulate embryonic and fetal nerve cell formation, which is vital for normal development. Low folate levels have been associated with recurrent spontaneous pregnancy loss. Furthermore, Folic acid supplementation prevents neural tube defects in the fetus if taken in the month prior to pregnancy and the first month of pregnancy. The dosage for pregnant women and women intending to become pregnant has been recommended as between 600 and 1000 micrograms per day.<sup>1,6</sup>





Folic acid is a methyl-donor in the production of neurotransmitters, thus reducing the risk of depression and other brain problems. Many psychiatric patients demonstrate folic acid deficiencies, and when corrected lead to remarkable reversals in mental and psychological status.<sup>4</sup>





## Manufactured product information:

**Manufacturer:**

WN Pharmaceuticals® Ltd

**Size/UPC:**

100's ..... 7 77747 10295 2

**NPN:**

80000273

**Expiry Date:**

36 months from date of manufacture

**Active Ingredient:**

Each tablet contains:

Folic Acid (Folate) ..... 1 mg

**Non-Medicinal Ingredients (in descending order):**

Microcrystalline cellulose, dibasic calcium phosphate dihydrate, magnesium stearate

**Appearance:**

Light yellow, very lightly speckled round tablet.

**Packaging:**

175 cc white round bottle with safety seal under a 38 mm white induction sealed cap with vented interior seal and a label applied to the bottle. Lot number and expiry date are printed on the label applied to the exterior of the bottle.

**Storage:**

Preserve in well closed container.





## Dose:

The recommended daily allowances (RDA) and tolerable upper intake levels (UL) for folic acid are given below.<sup>7</sup>

AGE	RDA (MCG)	TOLERABLE UL (MCG)
1-3 years	150	300
4-8 years	200	400
9-13 years	300	600
Adolescents 14-18 years	400	800
Adults >18 years	400	1000
Pregnant	600	1000
Lactating	500	1000

Folic acid is considered to be one of the most deficient nutrients stemming from poor dietary intake and easy destruction of the vitamin through heat and oxygen.

Many health care providers believe the optimal supplemental amount is 1000 mcg per day because folic acid is so central to robust health.

Since it has been established to play a central role in cell multiplication via DNA synthesis, and a deficiency has been linked with neural tube defects such as spina bifida, the standard recommendation is now at least 400 mcg per day for all women of child bearing age without waiting until pregnancy is recognized. Fetal neural defects can occur before a woman realizes that she is pregnant.

Men and women are recommended to supplement with at least 400 mcg per day to avert the risk of cardiovascular disease due to serum homocysteine build-up due to diminished methylation secondary to low folic acid levels. Some researchers think that osteoporosis develops in part from elevated levels of homocysteine, as well as other recognized risk factors.<sup>4,8</sup>

Cervical dysplasia associated with birth control medication is thought to stem from OC inhibited folic acid absorption. As high as 10 milligrams per day of folic acid may be needed to correct cervical dysplasia and allow continuation of birth control.<sup>4</sup>

## Directions:

**(Adults):** 1 tablet daily or as recommended by a physician.





## Caution:

The caution as approved by the *Natural Health Products Directorate* (NHPD): KEEP OUT OF THE REACH OF CHILDREN. Consult a physician if you think you may have a vitamin B12 deficiency as Folic Acid supplementation can mask such a deficiency. STORE AT ROOM TEMPERATURE IN A DARK, DRY PLACE. DO NOT USE IF SEAL UNDER CAP IS BROKEN OR MISSING.

Folic acid supplementation should always be complemented with vitamin B12 supplementation because folic acid can mask a B12 deficiency. While folic acid can reverse macrocytic anemia, that would otherwise be a marker for B12 deficiency, it cannot reverse the neurological damage caused by unresolved B12 deficiency.<sup>4</sup>

Vitamin B12 is absorbed through the action of a gastric intrinsic factor. An acquired genetic defect can lead to missing or inadequately supplied intrinsic factor. The lack of the intrinsic factor may be associated with some people with vitiligo. It may be appropriate to recommend that those with vitiligo be accessed for vitamin B12 adequacy before continuing in folic acid supplementation.

## Deficiency Symptoms:

Folic deficiency is associated with increased plasma homocysteine levels. It can also lead to megaloblastic anemia. Folic acid deficiency disturbs cell cycling, induces cell apoptosis, and increases the rate of cell death.<sup>1</sup> Furthermore, people with low folate status or lower dietary folate intake have a higher risk for depression.<sup>1</sup> Folic acid deficiency one month prior to pregnancy and during the first month of pregnancy can lead to neural tube defects in infants.<sup>1</sup>

## Drug Interactions/Contraindications:

Folic acid may be partially inactivated if taken at the same time with vitamin C and iron.<sup>8</sup>

Corticosteroids in long term use long term can deplete the body of B6, B12, and folic acid.<sup>4,9</sup>

Folic acid supplementation should always be complemented with vitamin B12 supplementation since folic acid can mask a B12 deficiency.<sup>4</sup>

Alcohol interferes with folic acid absorption.<sup>4,9</sup>

ASA lowers folic acid levels. Regular users of ASA should supplement with 400 to 1000 mcg or as directed by their physician.<sup>9</sup>





Methotrexate reduces the absorption of folic acid, as well as B12. Clinically important imbalances may result. This drug is finding a wider application to include arthritis and psoriasis. Supplementation should be discussed.<sup>9</sup>

Birth control pills are associated with reduced folic acid absorption, as well as B6. Cervical dysplasia can result from prolonged folic acid depletion.<sup>4,9</sup>

Triamterene-containing drugs deplete the body of folic acid. Supplementation is recommended at 400 to 1000 mcg per day.<sup>9</sup>

Questran and other bile acid sequestrants can interfere with folic acid absorption. Supplementation is recommended at 400 to 1000 mcg per day.<sup>9</sup>

Epilepsy drug blood levels like barbiturates and phenobarbital can be lowered by folic acid, as well as B6, increasing the potential for seizures.

Phenytoin may cause depletion of folic acid as well as B6. However, supplementation must be directed by the physician since it can reduce the effectiveness of the phenytoin with resultant seizures. More than 2 mg of folic acid per day is a risk, while 80 mg per day of B6 will reduce the efficacy of phenytoin by 50 per cent.<sup>4,9</sup> Folic acid supplementation at >1 mg is contraindicated in those taking phenytoin, unless prescribed by a physician.

Estrogen replacement therapy can lower folic acid and B6. Risk of depression is associated with low B6 levels, while low folic acid levels is a risk of cervical dysplasia.<sup>4,9</sup>

Sulfasalazine interferes with folic acid absorption. Supplementation is recommended at 400 to 1000 mcg per day.<sup>4,9</sup>

Para-aminosalicylate may deplete the body of folic acid as well as B12. Supplementation may be necessary.<sup>9</sup>

Nitrofurantoin long term can interfere with folic metabolism. Consultation with the physician may be necessary.<sup>9</sup>

Metformin may deplete the body of folic acid and B12 (Cited in the CPS).

## Toxicity/Adverse Reactions:

Folic acid is well tolerated. Daily doses of 15 mg are not toxic, what cannot be retained is loss in the urine.<sup>10</sup> However, in the high dose range of 5 to 10 milligrams per day, folic acid can cause increased flatulence, nausea, and loss of appetite.<sup>4</sup> In very rare cases folic acid can have a toxic effect when supplemented at greater than 1000 mcg per day but only when taken without vitamin B12.<sup>8</sup>





## Allergen Content/Ingredient Sensitivity:

NO	YES
Artificial Colors	
Artificial Flavors	
Artificial Sweeteners	
Corn Products	
Egg Products	
Fish	
Gluten	
Hydrolyzed Plant Protein	
Lecithin	
Milk Products	
Peanuts	
Preservatives	
Sesame Products	
Shellfish	
Soy Products	
Starch/Modified Starch	
Sulphites (<10 ppm)	
Tartrazine	
Tree Nuts	
Wheat Products	
Yeast	

**ACCEPTABLE FOR THE FOLLOWING DIETARY RESTRICTION:**

Free of animal products

**NOT ACCEPTABLE FOR THE FOLLOWING DIETARY RESTRICTION:**

Kosher







### References:

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3. Stipanuk MH. Homocysteine, Cysteine, and Taurine. In: Shils ME, Olson JA, Shike M, Ross AC (eds). Modern Nutrition in Health and Disease, ninth edition. Lippincott Williams & Wilkins, New York NY, 1999.
4. Murray, MT. Encyclopedia of Nutritional Supplementation, Prima Publishing, Rocklin, CA, 1996
5. Weir DG, Scott JM. Vitamin B12 "Cobalamin". In: Shils ME, Olson JA, Shike M, Ross AC (eds). Modern Nutrition in Health and Disease, ninth edition. Lippincott Williams & Wilkins, New York NY, 1999.
6. Office of Dietary Supplements, Dietary Supplement Fact Sheet: Folate, Accessed April 6, 2011 [Available from: <http://ods.od.nih.gov/factsheets/>]
7. Food and Nutrition Board, Institute of Medicine. Dietary Reference Intakes for Thiamin, Riboflavin, Niacin, Vitamin B6, Folate, Vitamin B12, Pantothenic Acid, Biotin, and Choline (2000). Washington, DC: National Academy Press, 2000. [Available from: <http://books.nap.edu/books/0309065542/html/>]
8. Cooney C. Methyl Magic, Andrews McMeel Publishing, Kansas City, MO, 1999
9. Graedon J, Graedon, T. Deadly Drug Interactions, St Martin's Griffin, New York, 1995
10. Garrison Jr RH, Somer E. The Nutrition Desk Reference, Keats Publishing, New Canaan, CT, 1990

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