



Methylation Support

VITAMIN FORMULA

Supports healthy homocysteine levels and liver function

- Helps the body to metabolize carbohydrates, fats and proteins
- Helps in red blood cell and tissue formation
- Provides 50 mg of vitamin B₆, 801 mcg of vitamin B₁₂ and 400 mcg of folate (from Metafolin®) per day
- Helps to prevent vitamin B₆, vitamin B₁₂, and folate deficiency

GENESTRA BRANDS Methylation Support provides a combination of B vitamins, choline, and betaine to help support homocysteine level.¹ Homocysteine is an amino acid that can be further metabolized into methionine or cysteine.¹ Normal homocysteine levels are necessary for the methylation of nucleic acids, proteins and lipids, as well as protein production.¹ A randomized, double-blind trial involving 76 adults demonstrated that supplementation with 1.5 g of betaine daily for six weeks significantly better maintained homocysteine levels when compared to a placebo treatment.² Betaine also helps support liver function through its role in stimulating the production and export of very low density lipoproteins (VLDL) from the liver.³ Methylation Support contains the physiologically active forms of vitamin B₆, folate and vitamin B₁₂, B vitamins involved in tissue formation, red blood cell formation, and macronutrient metabolism, respectively.⁴ As a result of their interrelated pathways, it is important to have metabolic balances between choline, betaine, homocysteine, vitamin B₆, vitamin B₁₂ and folate.⁵



EACH CAPSULE CONTAINS:

Vitamin B ₆ (pyridoxal 5-phosphate)	16.7 mg
Folate (calcium L-5-methyltetrahydrofolate, Metafolin®).....	133 mcg
Vitamin B ₁₂ (methylcobalamin)	267 mcg
Betaine (from <i>Beta vulgaris</i> root)	500 mg
Choline (choline bitartrate)	25 mg

Non-Medicinal Ingredients: Hypromellose, cellulose, silica

*Metafolin® is a registered trademark of Merck KGaA, Darmstadt, Germany

Recommended Adult Dose: Take three capsules daily or as recommended by your healthcare practitioner.

Product Size: 90 Vegetable Capsules

Product Code: 02372

NPN 80056026



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Scientific Rationale:

Vitamin B₆, vitamin B₁₂, folate, choline and betaine are all involved in homocysteine metabolism.^{1,2} Homocysteine is an amino acid involved in both remethylation and transsulfuration reactions.³ In all tissues, the vitamin B₁₂-dependent remethylation reaction occurs when folate donates a methyl group to homocysteine in order to form methionine.³ Specifically in the liver, betaine donates the methyl group to promote methionine formation.³ A large proportion of methionine produced from homocysteine is further metabolized to form S-adenosylmethionine (SAM).³ SAM is the universal methyl donor to many compounds, including DNA, RNA, hormones, lipids and proteins.³ In transsulfuration, homocysteine is involved in the formation of cysteine through a vitamin B₆-dependent reaction.³ Cysteine is a conditionally essential amino acid involved in the synthesis of protein and other compounds including glutathione and taurine.⁴ Therefore, normal homocysteine levels are required for the production of important biological molecules.³ As homocysteine can also be cytotoxic at high concentrations, research has investigated methods of promoting healthy homocysteine levels.³ Recent studies have demonstrated that betaine supplementation increases the availability of betaine in the liver, which results in increased remethylation of homocysteine into methionine.⁵

In a crossover trial involving healthy male adults, acute betaine intake significantly mediated homocysteine levels. Participants were randomized into either a control or betaine group (where they consumed 560 mg of betaine). Fasted blood samples were collected at baseline and hourly for 8 hours, as well as 24 hours after the treatment was consumed. Plasma homocysteine levels were analyzed at baseline, and four and six hours after the treatment period commenced. Urine samples were collected at baseline and every 2 hours for eight hours, after which an overnight urine collection occurred. The study days were one day per week, and the rest of the week acted as the washout period. After six hours, betaine supplementation significantly increased plasma betaine levels and decreased plasma homocysteine levels when compared to the control group's values. In the second part of the study, participants underwent a methionine load test, which determines an individual's ability to metabolize a test dose of methionine. It reflects the activity of the transsulfuration pathway as the methionine consumed orally is first converted to homocysteine, which can be further metabolized to cysteine. Participants received a methionine load (0.1 g of methionine per kg body weight) in addition to their betaine treatment. Supplementation with betaine significantly increased betaine levels and decreased homocysteine levels after the methionine load. As little betaine appeared in the urine of the participants, the authors noted

that dietary betaine replenished tissue betaine stores, and also lowered homocysteine levels – even after a methionine load.⁶ This is worthwhile to note as elevated homocysteine levels after methionine load tests have been associated with impaired endothelial function in adults.^{7,8}

Similarly, in a double-blind, placebo-controlled trial involving 76 adults, supplementation with betaine for six weeks significantly decreased homocysteine levels. Participants were randomized to consume betaine treatments twice daily (totalling 1.5, 3 or 6 g of betaine daily) for six weeks. A methionine load test was completed four times over the course of the study (before the trial, on the first trial day, after two weeks of treatment, and after 6 weeks of treatment). During this test, after a fasted blood sample was taken, participants consumed 100 mg of methionine, and another blood sample was collected after 6 hours. Fasting homocysteine levels and homocysteine levels after the methionine load test were significantly decreased by all three betaine doses after two and six weeks of supplementation.⁵

Liver

The liver is a major site of choline metabolism, where it is metabolized to form betaine.⁹ Betaine is stored in high levels in the liver, and helps support liver function as an important osmolyte – regulating cell volume and fluid balance.⁹ Betaine supplementation is also involved in regulating liver function through its role in stimulating the generation of phosphatidylcholine (PC) from choline.^{9,10} PC is necessary for the formation of very low density lipoproteins (VLDL) in the liver as well as their export from the liver.^{9,10} As a result, betaine supplementation helps to decrease VLDL and triglyceride build-up in the liver, which would otherwise negatively affect liver function and health.¹⁰

B vitamins

Vitamins B₆ and B₁₂ are involved in the metabolism of carbohydrates, fats and proteins, while vitamin B₁₂ and folic acid help form red blood cells – which help transport oxygen through the body.¹ Vegan diets tend to provide low levels of vitamin B₁₂, and malabsorption of the vitamin from food, but not supplements, increases with age.¹¹ This is because elderly individuals may not produce enough gastric acid to release the vitamin when it is bound to food.¹¹ In addition preventing vitamin B₁₂ deficiency, Methylation Support also helps prevent folate and vitamin B₆ deficiencies.

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Methylation Support Companion products



Col-Sterol

- Supports the maintenance of cardiovascular health by reducing low density lipoprotein (LDL) and total cholesterol
- Provides 1300 mg of plant sterol esters per daily dose



Liv Complex

- Includes extracts from globe artichoke, dandelion, milk thistle, bupleurum, fringetree and rosemary
- Used in Herbal Medicine to help support liver function, increase bile flow and relieve digestive disturbances



Omega EFA Liquid

- Helps to reduce serum triglyceride levels and maintain cardiovascular health in adults
- Provides 1915 mg of EPA and 1005 mg of DHA per teaspoon
- Delicious natural orange flavour