

# Homocysteine Plus

## with Setria™ Glutathione

**Homocysteine Plus** is an updated version of our original Homocysteine Metabolite Formula, which provided the primary nutrients known to be necessary for the breakdown of homocysteine into methionine and other metabolites: vitamin B6 as pyridoxine and pyridoxal-5'-phosphate (P5P), vitamin B12 as methylcobalamin, folate as 5-methyltetrahydrofolate (5-MTHF), trimethylglycine (TMG), and L-serine.\* **Homocysteine Plus** enhances the formula with vitamin B2 as riboflavin-5-phosphate, Setria® glutathione, zinc, and increased amounts of activated pyridoxal-5'-phosphate.\*



#52580  
90 vegetarian capsules

### Key Features

- Provides nutrients involved with normal, healthy, homocysteine metabolism\*
- Nutritionally supports liver detoxification pathways\*
- With active coenzyme forms of vitamins B2, B6, B12, and folate
- Enhanced with glutathione, zinc, serine, and trimethylglycine\*



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Normal homocysteine levels have been associated with cardiovascular and cognitive health, normal metabolism, and a healthy mood.\* Homocysteine may affect all other methyl and sulfur group metabolism processes either directly or indirectly.

Homocysteine is metabolized from the essential amino acid methionine. To prevent excess homocysteine accumulation, the body can degrade it through two pathways of liver detoxification, transsulfuration and remethylation. The transsulfuration pathway requires both pyridoxine and P5P as well as serine, and the remethylation pathway can involve methylcobalamin, S-adenosyl-methionine (SAME), 5-methyltetrahydrofolate, zinc, and trimethylglycine.

Elevated homocysteine levels are associated with lowered levels of vitamins B6, B12, riboflavin, and folate.\*<sup>1,2</sup> No correlation or only a weak correlation has been found between these individual nutrients and plasma homocysteine levels, whereas various combinations of these nutrients correlate with beneficial changes in homocysteine levels, supporting the likelihood that all these nutrients are in some way required.\* The combination of these nutrients works synergistically in way that any single nutrient cannot.\*

TMG has been shown to be helpful when other nutrients did not improve elevated homocysteine levels.\* TMG can stimulate remethylation of homocysteine to dimethylglycine in some situations.\* Additionally, TMG's methyl donating activity is crucial to liver function and detoxification, and TMG may protect against chemical and alcohol-related damage to the liver.\*

Recently researchers noticed that homocysteine is highly responsive to riboflavin.\* Foodstuffs in North America are commonly fortified with vitamin B2 but are not in Europe, and a specific subset of European individuals with the MTHFR 677 TT genotype were found to have elevated homocysteine levels because of the lack of the riboflavin cofactor.\*<sup>3</sup>

In a recent study, it was found that supplementing with zinc can reduce serum homocysteine and increase vitamin B12 and folate concentrations in individuals with certain types of blood sugar conditions.\*<sup>4</sup>

Cysteine is a component of the tripeptide glutathione. It is the rate limiting amino acid for glutathione production and approximately 50% of the cysteine in glutathione is derived from homocysteine in human liver cells. Antioxidant enzymes such as catalase and superoxide dismutase as well as vitamin E play key roles in enhancing the trans-sulfuration pathway that allows cysteine to build out glutathione.\*<sup>5</sup> Homocysteine inhibits glutathione peroxidase, an enzyme that protects cells against oxidation and is necessary for normal nitric oxide production and endothelial function.\*<sup>6</sup> Blood levels of glutathione have been shown to be negatively correlated with homocysteine levels, and supplementation with glutathione has been shown to reduce levels of homocysteine.\*<sup>7,8</sup>

#### References:

- <sup>1</sup> Wald DS, Law M, Morris JK. *BMJ*. 2002 Nov 23;325(7374):1202.
- <sup>2</sup> Hustad S, Ueland PM, Vollset SE, Zhang Y, Björke-Monsen AL, Schneede J. *Clin Chem*. 2000 Aug;46(8 Pt 1):1065-71.
- <sup>3</sup> McNulty H, Doweley le RC, Strain JJ, Dunne A, Ward M, Molloy AM, McAnena LB, Hughes JP, Hannon-Fletcher M, Scott JM. *Circulation*. 2006 Jan 3;113(1):74-80. PMID: 16380544
- <sup>4</sup> Heidarian E, Amini M, Parham M, Aminorroaya A. *Rev Diabet Stud*. 2009 Spring;6(1):64-70. PMID: 19557297
- <sup>5</sup> Vitvitsky V, Mosharov E, Tritt M, Ataullakhanov F, Banerjee R. *Redox Rep*. 2003;8(1):57-63. PMID: 12631446
- <sup>6</sup> Weiss N, Zhang YY, Heydrick S, Bierl C, Loscalzo J. *Proc Natl Acad Sci U S A*. 2001 Oct 23;98(22):12503-8.
- <sup>7</sup> Ovrebø KK, Svardal A. *Pharmacol Toxicol*. 2000 Sep;87(3):103-7.
- <sup>8</sup> Pizzorno J. *Integr Med (Encinitas)*. 2014 Aug; 13(4): 8-14.

## Supplement Facts


Serving Size 1 Capsule  
Servings Per Container 90

Amount Per Serving	% Daily Value*	
Riboflavin (as Riboflavin-5-phosphate)	10 mg	769%
Vitamin B6 (50% as Pyridoxine HCl and 50% as Pyridoxal-5-Phosphate)	30 mg	1765%
Folate (as 400 mcg of 5-Methyltetrahydrofolate (from 740 mcg [6S]-5-methyltetrahydrofolic acid, glucosamine salt))	667 mcg DFE	167%
Vitamin B12 (as Methylcobalamin)	400 mcg	16,667%
Zinc (as Zinc Picolinate)	5 mg	45%
Trimethylglycine	500 mg	†
L-Serine	100 mg	†
L-Glutathione (Reduced)	50 mg	†

† Daily Value not established \* Percent Daily Value are based on a 2,000 calorie diet

Other ingredients: Hydroxypropyl methylcellulose, magnesium stearate, microcrystalline cellulose, silicon dioxide.

**Suggested Use:** As a dietary supplement, 1 capsule one or two times daily with meals, or as directed by a healthcare practitioner.

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