

Balance your **Homocysteine** levels



RISK FACTORS FOR HYPERHOMOCYSTEINEMIA:

- **GENETIC FACTORS**
- **DIETARY DEFICIENCY** of folate, vitamins B₆ or B₁₂.
- **RENAL OR HEPATIC INSUFFICIENCY**, hypothyroidism, neoplasia, etc.
- **MEDICATIONS AND TOXINS** (excessive consumption of coffee and/or alcohol, smoking, etc.).
- **THE CONSUMPTION OF ANIMAL PRODUCTS** that increase cholesterol oxides (oxysterols) in the blood.

HOMOCYSTEINE REDUCERS

Betaine (Trimethylglycine, TMG) (12-13)

Acts as a methyl group donor in the remethylation of homocysteine into methionine. It supports **hepatic function** (fatty liver) and **digestion** and helps improve performance and **muscular resistance** in athletes.

Choline (14-18)

Oxidized in the body to produce betaine.

Folate (21-23)

L-methylfolate calcium is a substrate for the enzyme methionine synthase in the remethylation of homocysteine.

Vitamin B₁₂ (19-20)

Participates in the remethylation of homocysteine into methionine.

Vitamin B₆ (24-28)

Pyridoxal 5'-phosphate (vit. B6) is an enzymatic cofactor of cystathionine beta-synthase which participates in homocysteine catabolism.

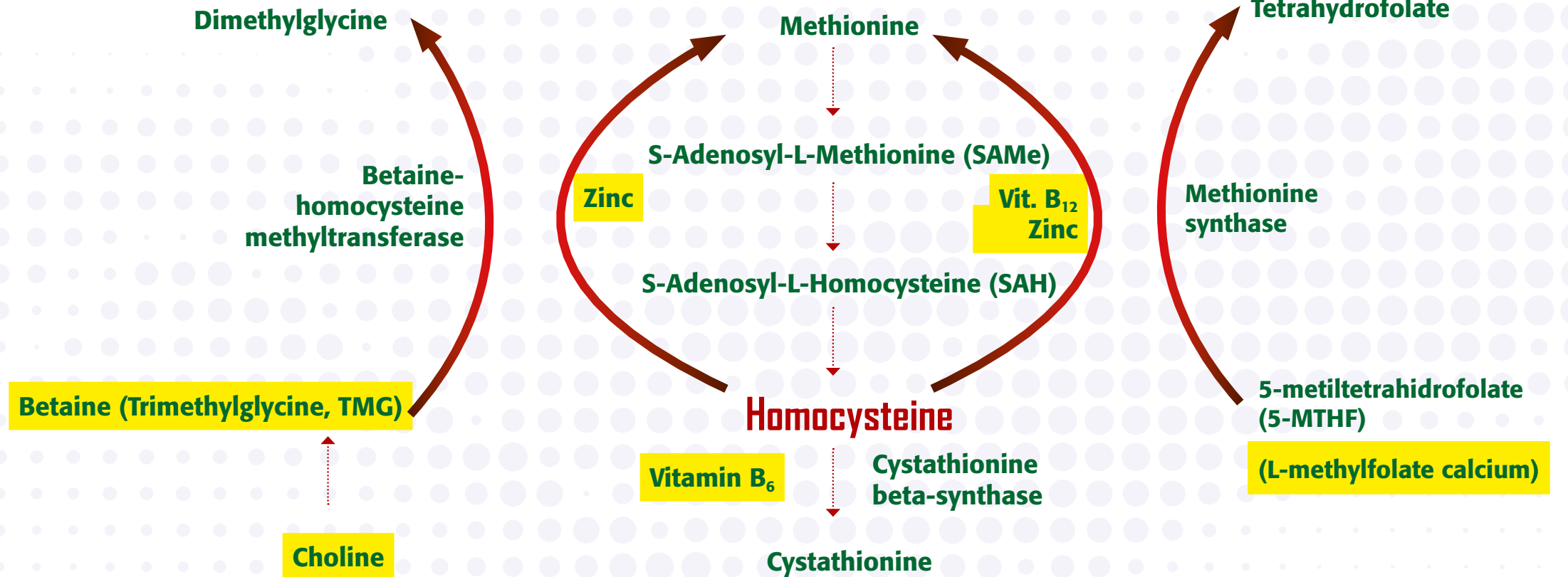
Zinc (29-30)

Necessary for the proper functioning of metabolic enzymes of homocysteine (methionine synthase, betaine-homocysteine methyltransferase).

The following levels of HOMOCYSTEINE are considered HIGH:

10,4 µmol/L in women

11,4 µmol/L in men



Lipotropic factors (9-11)

- Inositol**
 - Choline**
 - Betaine**
- Participate in fat metabolism, mainly helping the liver decompose and excrete it from the body.
Improve the assimilation of B vitamins.

HIGH HOMOCYSTEINE LEVELS ARE ASSOCIATED WITH:

- **CARDIOVASCULAR DISEASES** (coronary artery disease, atherosclerosis, thrombosis, etc.) (1)
- **CEREBROVASCULAR DISEASES** (ischemic and haemorrhagic cerebrovascular disease) (2)
- **NEUROLOGICAL DISEASES** (cerebral atrophy, depression, etc.) (3-4).
- **REPRODUCTIVE PROBLEMS** (Polycystic Ovary Syndrome, recurring miscarriage) (5-8)

HOMOCYSTEINE METABOLISM

Homocysteine is the by-product of L-methionine metabolism. When it builds up in the bloodstream and lymphatic system, it impairs cardiovascular performance, which increases the risk of stroke. It also contributes to tissue damage within the central nervous system.

Homocysteine Balance contains important synergistic nutrients (betaine trimethylglycine; inositol; choline bitartrate; zinc; and vitamins B₆, B₁₂, and folate) that are known to help with homocysteine metabolism.



Nutritional information:	1/2 scoop (2,344 g)
Betaine (Trimethylglycine, TMG)	1 g
Inositol	0,375 g
Choline (bitartrate)	0,25 g
Zinc (from zinc bisglycinate)	7,5 mg (75%*)
Vitamin B ₆ (pyridoxine)	
(from 2,5 mg pyridoxal 5'-phosphate)	1,37 mg (98%*)
Vitamin B ₁₂ (methylcobalamin)	375 µg (15.000%*)
Folate (from calcium-L-methylfolate)	250 µg (125%*)

*NRV: Nutrient Reference Value in %.

Recommended daily dose: 1/2 scoop daily with food. Mix with 150-250 ml of water (dilute to taste).

Format: 285 g

References:

- Wald, David S., Malcolm Law, and Joan K. Morris. "Homocysteine and cardiovascular disease: evidence on causality from a meta-analysis." *Bmj* 325.7374 (2002): 1202.
- Hoque, M. M., M. Z. Rahman, and M. R. Rahman. "Role of homocysteine in cerebrovascular disease." *Mymensingh medical journal: MMJ* 17.2 Suppl (2008): S39-42.
- Miwa, Kaori, et al. "Increased total homocysteine levels predict the risk of incident dementia independent of cerebral small-vessel diseases and vascular risk factors." *Journal of Alzheimer's Disease* 49.2 (2016): 503-513.
- Bryce, B., et al. "Homocysteine and Cerebral Atrophy." *Journal of Alzheimer's Disease* 62.2 (2018): 877-885.
- Maharjan, Pranita, and Peng Dan Hong. "The Effects of Plasma Homocysteine in PCOS Women: A Review." *Open Journal of Obstetrics and Gynecology* 8.01 (2018): 39.
- Forges, Thierry, et al. "Impact of folate and homocysteine metabolism on human reproductive health." *Human reproduction update* 13.3 (2007): 225-238.
- Del, A. Bianco, et al. "Recurrent spontaneous miscarriages and hyperhomocysteinemia." *Minerva ginecologica* 56.5 (2004): 379-383.
- Chakraborty, Pratip, et al. "Recurrent pregnancy loss in polycystic ovary syndrome: role of hyperhomocysteinemia and insulin resistance." *PLoS One* 8.5 (2013): e64446.
- Ridout, Jessie H., et al. "Lipotropic factors and the fatty liver produced by feeding cholesterol." *Biochemical Journal* 40.4 (1946): 494.
- Shimada, Masaya, Masato Hibino, and Anna Takeshita. "Dietary supplementation with myo-inositol reduces hepatic triglyceride accumulation and expression of both fructolytic and lipogenic genes in rats fed a high-fructose diet." *Nutrition Research* 47 (2017): 21-27.
- Azadmanesh, V., and R. Jahanian. "Effect of supplemental lipotropic factors on performance, immune responses, serum metabolites and liver health in broiler chicks fed on high-energy diets." *Animal Feed Science and Technology* 195 (2014): 92-100.
- Olthof, Margreet R., et al. "Low dose betaine supplementation leads to immediate and long term lowering of plasma homocysteine in healthy men and women." *The Journal of nutrition* 133.12 (2003): 4135-4138.
- McRae, Marc P. "Betaine supplementation decreases plasma homocysteine in healthy adult participants: a meta-analysis." *Journal of chiropractic medicine* 12.1 (2013): 20-25.
- Finkelstein, J. D. "The metabolism of homocysteine: pathways and regulation." *European journal of pediatrics* 157.2 (1998): S40-S44.
- Zeisel, SH. "Choline, homocysteine, and pregnancy." *The American Journal of Clinical Nutrition* 82.4 (2005): 719-720.
- da Costa, Kerry-Ann, et al. "Choline deficiency in mice and humans is associated with increased plasma homocysteine concentration after a methionine load-." *The American journal of clinical nutrition* 81.2 (2005): 440-444.
- Olthof, Margreet R., et al. "Choline supplementation as phosphatidylcholine decreases fasting and postmethionine-loading plasma homocysteine concentrations in healthy men-." *The American journal of clinical nutrition* 82.1 (2005): 111-117.
- Wallace, Julie MW, et al. "Choline supplementation and measures of choline and betaine status: a randomised, controlled trial in postmenopausal women." *British Journal of Nutrition* 108.7 (2012): 1264-1271.
- Homocysteine Lowering Trialists' Collaboration. "Lowering blood homocysteine with folic acid based supplements: meta-analysis of randomised trials." *Bmj* 316.7135 (1998): 894-898.
- Quinlivan, E. P., et al. "Importance of both folic acid and vitamin B12 in reduction of risk of vascular disease." *The Lancet* 359.9302 (2002): 227-228.
- Nygård, Ottar, et al. "Major lifestyle determinants of plasma total homocysteine distribution: the Hordaland Homocysteine Study." *The American journal of clinical nutrition* 67.2 (1998): 263-270.
- Wang, Xiaobin, et al. "Efficacy of folic acid supplementation in stroke prevention: a meta-analysis." *The Lancet* 369.9576 (2007): 1876-1882.
- Ntaios, George, et al. "The effect of folic acid supplementation on carotid intima-media thickness in patients with cardiovascular risk: a randomized, placebo-controlled trial." *International journal of cardiology* 143.1 (2010): 16-19.
- Vermeulen, EGJE GJ, et al. "Effect of homocysteine-lowering treatment with folic acid plus vitamin B6 on progression of subclinical atherosclerosis: a randomised, placebo-controlled trial." *The Lancet* 355.9203 (2000): 517-522.
- Smith, A. David, et al. "Homocysteine-lowering by B vitamins slows the rate of accelerated brain atrophy in mild cognitive impairment: a randomized controlled trial." *PLoS one* 5.9 (2010): e12244.
- Almeida, Osvaldo P., et al. "B-vitamins reduce the long-term risk of depression after stroke: the VITATOPS-DEP trial." *Annals of neurology* 68.4 (2010): 503-510.
- Till, Uwe, et al. "Decrease of carotid intima-media thickness in patients at risk to cerebral ischemia after supplementation with folic acid, vitamins B6 and B12." *Atherosclerosis* 181.1 (2005): 131-135.
- McKinley, Michelle C., et al. "Low-dose vitamin B-6 effectively lowers fasting plasma homocysteine in healthy elderly persons who are folate and riboflavin replete." *The American journal of clinical nutrition* 73.4 (2001): 759-764.
- Heidarian, Esfandiar, et al. "Effect of zinc supplementation on serum homocysteine in type 2 diabetic patients with microalbuminuria." *The review of diabetic studies: RDS* 6.1 (2009): 64.
- Pakfetrat, Maryam, et al. "Effects of zinc supplement on plasma homocysteine level in end-stage renal disease patients: a double-blind randomized clinical trial." *Biological trace element research* 153.1-3 (2013): 11-15.

