



TRICOBALAMIN™

HIGHLY BIOAVAILABLE FORMS OF VITAMIN B12

60 LOZENGES | NPN80087298 | TRIC60-CN

Tricobalamin™ lozenges are formulated to support healthy levels of vitamin B12, providing a synergistic combination of the three bioavailable forms of this vitamin: methylcobalamin, hydroxycobalamin, and adenosylcobalamin. These three forms of B12 are naturally present in foods, and can be readily converted to the active intracellular forms of B12, such as methylcobalamin, adenosylcobalamin, glutathionylcobalamin, and potentially other physiologically active B12 forms.

THE LOZENGE ADVANTAGE

Tricobalamin™ uses a lozenge delivery system, allowing for two routes of absorption for B12: 1) directly through the oral mucosa, and 2) bound by haptocorrin (a binding protein secreted in saliva) and carried to the GI tract.

CONDITIONS ASSOCIATED WITH B12 DEFICIENCY

There are many conditions where a B12 deficiency acts as an etiological or aggravating factor. Many of these conditions have been shown to improve with adequate B12 supplementation (at doses around 0.5-1 mg). It is often necessary to optimize the status of many other synergistic nutrients in order to maintain health. Folate is one of the most important cofactors that helps optimize the benefits of B12 repletion. Other B vitamins, essential minerals, and fatty acids also work in conjunction with B12, and thus a multivitamin, multimineral, and/or fatty acid supplement should always be considered in a well-rounded treatment plan.

SUPPLEMENTATION WITH B12 MAY BE BENEFICIAL FOR:

- Nervous system related impairments: brain and nerve function, myelin repair issues, such as during chemotherapy or any condition involving neurological autoimmunity. Many of these conditions may involve poor cognition, dementia, dizziness, postural hypotension, tinnitus, neuropathy, or hyporeflexia.
- Impaired healing of oral or GI mucosa: canker sores, various inflammatory conditions of the gut, or during treatment with NSAIDs or chemotherapy. Gastric mucosa damage causes B12 malabsorption, thus creating a vicious cycle of worsening B12 status and the health of all mucosal membranes.²³
- Low white blood cells: which impairs immunity.
- Low platelet count: which impairs healing.
- Anemia, and/or macrocytic red blood cells: (high mean corpuscular volume), impaired circulation and oxygen supply.
- Elevated homocysteine: associated with increased risk of birth defects, cardiovascular disease and cognitive decline. It is also an indicator of systemically impaired capacity for methylation, which is involved in neurotransmitter synthesis and clearance, hormonal methylation and genetic expression through DNA methylation. Conditions that involve impairment of energy production and low oxygen supply to cells, such as generalized fatigue, anemia, heart failure, respiratory disease, and shortness of breath may also benefit.
- Poor sleep quality: B12 may be involved in normalization of circadian rhythm.¹⁰⁵
- Impotence, incontinence
- Infertility or high risk of miscarriage or birth defects (5X higher risk for spina bifida) and poor cognitive and motor development of the fetus or infant, due to mother's B12 deficiency during pregnancy and breast-feeding.

COMMON CAUSES OF FUNCTIONAL B12 DEFICIENCY

a. Inadequate dietary intake of B12. Vitamin B12 is readily available only in animal products, primarily dairy, meat, and eggs,⁶⁴ making vegetarians and vegans at highest risk for deficiency. Many vegan sources of B12, such as fermented spirulina or brewer's yeast, may include a high proportion of B12 analogues with no B12 activity in human physiology.^{186,187} Also, as much as 33% of vitamin B12 may be lost due to heating, which is commonly used with animal-derived foods.¹⁵³

b. Malabsorption of B12 from food. This becomes more prevalent with aging, especially after the age of 50.¹⁵⁰

B12 malabsorption may be caused by any of the following^{117,132}:

b.1. Inadequate stomach acidity. Hydrochloric acid (HCl) releases B12 from food proteins, required in order for it to bind to haptocorrin and then to intrinsic factor (IF), which carries it during GI absorption.⁶³ However, the metabolism of B12 found in nutritional supplements does not require optimal HCl levels.

Insufficient stomach acidity may be due to:

- Pharmaceutical drugs that neutralize HCl or reduce HCl production
- Nutritional supplements containing calcium carbonate

b.2. Inadequate pancreatic protease production, which cleaves B12 from haptocorrin and transfers it to IF

b.3. Impaired production of IF. This may be due to congenital IF deficiency, atrophic gastritis or autoimmune conditions that cause antibodies to gastric parietal cells or IF (also referred to as pernicious anemia). Other potential causes include gastric surgeries (gastric bypass), gastric ulcers or cancer.

b.4. GI disorders: ulcerative colitis, celiac disease and other gastro-pathologies due to GI inflammation/infections; treatment with antibiotics or chemotherapy.⁶⁶

b.5. Pharmaceutical drug side-effects. Metformin interferes with B12 absorption.⁶⁵

b.6. Poor B12 binding to transcobalamin (a B12 transport protein in the blood), due to genetic polymorphisms

c. Poor intracellular metabolism of B12. Various genetic polymorphisms may result in poor release of cobalamin from the lysosome or poor conversion of cobalamin to the active forms of B12. Glutathione-S transferase is involved in this step.

ABSORPTION ROUTES AND RATES OF SUPPLEMENTAL B12 ABSORPTION

It is commonly accepted that vitamin B12 is absorbed and transported across cellular plasma membranes in the terminal ileum by two alternate mechanisms:

(i) Endocytosis of B12 bound to gastric IF. This route has limited efficiency due to IF saturation at around 2 mcg per meal, and it is severely impaired in various conditions, as described above.

(ii) Passive diffusion directly into the intestinal cell by mass action of very high doses of B12.

One study evaluated absorption rates of B12 (as cyanocobalamin) when given at escalating doses.¹¹⁶ The results revealed absorption rates of approx. 50% for doses up to 0.5 mcg, 20% for doses around 1 mcg, and only 1-1.2% for doses around 500 mcg. By extrapolation, approximately 10-12 mcg may be absorbed from a total of 1000 mcg B12 ingested at one time. Since the natural forms of B12 are more bioavailable, they may have higher absorption rates than cyanocobalamin, but as of yet this has not been studied.

Medicinal Ingredients (per lozenge):

Vitamin B12 (Hydroxocobalamin, methylcobalamin, adenosylcobalamin)..... 3000 mcg

Non-Medicinal Ingredients: Mannitol, modified cellulose, natural orange flavour and colour, magnesium stearate (vegetable source), citric acid, and luo han guo. **Recommended Dose:** Adults: Take 1 lozenge per day or as directed by your health care practitioner. Allow lozenge to dissolve slowly and completely in mouth and swallow. Consult a health care practitioner for use beyond 3 months. Best taken after a meal. Vitamin B12 carried to the GI tract needs to be released from the haptocorrin transport protein by proteases, which are typically secreted in the GI tract in response to food.

REFERENCES

For a list of references cited in this document, please visit: http://catalog.designsforhealth.com/assets/itemresources/Tricobalamin_B12References.pdf