



# PRO Tri B12

## SUMMARY

PRO Tri B12 combines three different forms of highly bioavailable vitamin B12 including; hydroxycobalamin, adenosylcobalamin, and methylcobalamin. Hydroxycobalamin is a stable form of vitamin B12 that is able to convert into the biologically active methyl and adenosyl forms of B12, each with their own unique functions. When used in combination, they effectively replenish vitamin B12 deficiency.

## WHOLESALE

\$20.95

## SRP

\$34.95

NPN: 80084062

**Adult dosage:** Dissolve one lozenge under the tongue first thing in the morning, or as directed by a qualified health care practitioner.

**Cautions:** Consult a health care practitioner for use beyond four months. If you are pregnant or breastfeeding, consult a health care practitioner prior to use. This product contains corn derived ingredients, do not use if you have an allergy.

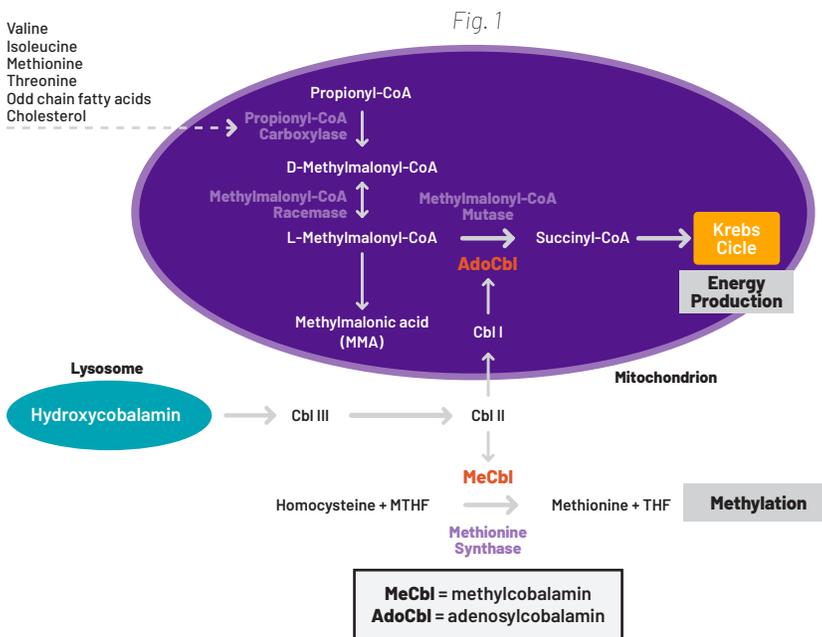


Figure 1: Hydroxycobalamin is able to form either methylcobalamin within the cytosol, or adenosylcobalamin within the mitochondria. Adenosylcobalamin is involved in amino acid, odd chain fatty acid and cholesterol metabolism as part of the Propionyl-CoA Pathway, important for energy production. During a deficiency of adenosylcobalamin, methylmalonyl-CoA metabolism is diverted to methylmalonic acid (MMA). High levels of MMA reflect adenosylcobalamin deficiency within the mitochondria and lead to disruption in carbohydrate, fat, amino acid and urea metabolism. Extreme cases of excess MMA can advance into reduction in neuronal myelin synthesis, mitochondrialopathy, metabolic acidosis and neurological dysfunction. Alternatively, a deficiency in methylcobalamin blocks the conversion of homocysteine into methionine. High levels of homocysteine indirectly reflect vitamin B12 levels within the cytosol.

REF: Scolamiero, E. et al. Maternal Vitamin B12 deficiency detected in expanded newborn screening. 47. (2014).

Combines  
Three Different  
Forms of  
Vitamin B12

## UNIQUE FUNCTIONS OF ADENOSYLCOBALAMIN VS METHYLCOBALAMIN

	ADENOSYLCOBALAMIN	METHYLCOBALAMIN
Metabolism	<p>Adenosylcobalamin is the major form of B12 found within the mitochondria and supports the production of cellular energy.</p> <p>Its use is within the <b>Propionate pathway</b> as a cofactor for the conversion of methylmalonyl-CoA to succinyl-CoA, important for odd-chain fatty acid, carbohydrate and amino acid metabolism.</p>	<p>Methylcobalamin is the major form of B12 found in the cytosol.</p> <p>Its use is within the <b>Methylation pathway</b> as a cofactor for the enzyme methionine synthase, which uses methylcobalamin and methyl-tetrahydrofolate (5-MTHF) for the conversion of homocysteine to methionine.</p>
Clinical Applications	<p>Adenosylcobalamin is useful for:</p> <ul style="list-style-type: none"> <li>• Fat, carbohydrate and amino acid metabolism</li> <li>• Improving myelin production and for neurological conditions repairs including neurodegenerative autoimmunity</li> <li>• Cognitive decline and dementia, gait and balance impairment, tinnitus, hyporeflexia</li> <li>• Depression and mood disturbances</li> <li>• Peripheral neuropathies: numbness tingling, tremors</li> <li>• Susceptibility to infection</li> </ul>	<p>Supports production of s-adenosylmethionine (SAME), a methyl donor in hundreds of essential biochemical pathways, including DNA synthesis, epigenetic maintenance, red blood cell production in the bone marrow, neurotransmitter, hormone and sulphur metabolism, phosphatidylcholine production, creatine synthesis and detoxification pathway among others. Studies show benefit in the following:</p> <ul style="list-style-type: none"> <li>• Megaloblastic anemia, low platelet, WBC</li> <li>• Cardiovascular disease and high homocysteine</li> <li>• Neurological function</li> <li>• Mood disorders and sleep disorders</li> <li>• Gastrointestinal disorders</li> <li>• Infertility and pregnancy</li> </ul>
Marker for Deficiency	<p>Methylmalonic acid (MMA) (indirect)</p> <p>Note: high levels of B12 in serum and low levels of MMA is a key indicator that adenosylcobalamin is needed.</p>	<p>Serum B12 (direct), homocysteine, MCV, RDW (indirect)</p>
Genetic Insight	<p>A combination of adenosyl-, hydroxy- and methylcobalamin are ideal for those with a decrease in methylation due to genetic variations in genes (MTR, MTRR and MTHFR in addition to the slow version of the COMT enzyme. These individuals may be sensitive to methylcobalamin alone due to poor clearance of catecholamines.</p> <p>Note methyl donors support the conversion of norepinephrine to epinephrine, which is cleared by the COMT enzymes.</p>	<p>Increase need for those with poor absorption, transport, metabolism or recycling of B12 due to genetic variations in FUT2, TCN2, MTR or MTRR respectively.</p>

## CLINICAL TAKE AWAY

PRO TriB12 Synergy contains all three forms of B12 so it can replace methylcobalamin in every way. It provides a more balanced and gentle delivery of active B12 to both the cell and mitochondria.

## POPULATIONS AT RISK OF DEFICIENCY

- Elderly
- Heavy alcohol drinkers
- Smokers
- Vegans (low methionine diets) and vegetarians

## CAUSES OF DEFICIENCY

- Chronic antibiotic use
- Certain medications (antacids, PPIs, metformin)
- Impaired microbiota
- Malabsorption
- Pernicious anemia
- Poor diet
- Chronic digestive conditions: Crohn's, Celiac, Ulcerative colitis
- Genetic Factors



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