DESCRIPTION: A delicious berry-flavored small lozenge providing 1,000 mcg of methylcobalamin - the active form of vitamin B12.

FORMULA:
Our B12-Plus Lozenges provide 1,000 mcg of methylcobalamin in each naturally-flavored lozenge. This specialized form of B12 is created by fermentation with a proprietary strain of bacteria, resulting in a high-potency, gluten-free, vegan form of this essential nutrient.

INDICATIONS:
Vitamin B12 is an essential nutrient for life, and deficiencies are not uncommon. Vitamin B12 deficiencies are associated with:
- Nerve pain
- Fatigue
- Alcoholism
- Chronic illness
- Pregnancy
- Improper vegetarian diets

B12 is indicated as a dietary supplement for:
- Supporting energy production
- Normalizing homocysteine synthesis
- Promoting healthy cognitive function
- Supporting the sleep-wake cycle
- Elderly patients who often have deficiencies and/or higher requirements of this nutrient.

BACKGROUND:
Vitamin B12 helps maintain healthy nerve and red blood cells in humans and is needed to make DNA. Vitamin B12 is bound to proteins in food, and must be separated from protein in order to be used by the body. Hydrochloric acid (HCl) in the stomach separates B12 from protein. Once released, B12 combines with a compound called intrinsic factor (IF), which allows B12 to be absorbed into the bloodstream.

Humans can store several years’ worth of vitamin B12 in the body. However, deficiency can result from being unable to use vitamin B12 from a defect in absorption, reduced intake of B12 (such as in vegans or strict vegetarians) or reduced ability to make HCl (occurs during the aging process). The most common inability to absorb vitamin B12 from the intestinal tract manifests as a disease known as pernicious anemia. Vitamin B12 deficiency can result in abnormal neurologic and psychiatric symptoms. According to the NIH’s Medline Plus, “these symptoms may occur when vitamin B12 levels are just slightly lower than normal.”

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Mechanisms of Action
The majority of the B12 circulating in blood is in the methyl form. The difference between cyano- and methyl-

cobalamin is that cyano B12 has a cyanide group (CN) attached, whereas methyl B12 carries a methyl group (CH3).

Before cyano B12 can be properly used by the body, it has to be stripped of its cyano group and ‘reduced’ (gain

electrons). Once that is done, it is ready to take on a methyl group and be distributed throughout the body as methyl

B12.

Cobalamin is reabsorbed from the bile each day. This explains why strict vegetarians who do not consume animal

proteins can develop vitamin B12 deficiency after many years. However those with absorptive defects (e.g. stomach

removal, bariatric surgery, or hereditary defects) show signs as quickly as 2-3 years.\(^1\) Intestinal bacteria are another

source of internally produced cobalamin.

Homocysteine appears to accumulate in the body whenever B12 gets low, and this accumulation has been linked

with increased risk of cardiovascular and Alzheimer's disease and osteoporosis. Folate and B12 are necessary

cofactors for the enzymatic conversion of homocysteine to methionine.

Importance in homocystine, SAM-e and fat metabolism regulation
Methylcobalamin transfers the methyl portion to homocysteine to form methionine. Inadequate dietary intake of

methyl groups leads to low methylation of important pathways such as disturbed hepatic protein (methionine)

metabolism as determined by elevated plasma homocysteine concentrations and decreased S-adenosylmethionine

(SAM-e) concentrations, and inadequate hepatic fat metabolism, which leads to steatosis (fatty accumulation) and

ensuing plasma dyslipidemia. Such disturbed liver metabolism may lead to coronary, cerebral, hepatic, and vascular

diseases.\(^3\)

Brain Health
Homocysteine is harmful to neurons and blood vessels, including the cerebral microvasculature. It is possible that

such effects contribute to the cascade of events that leads to cognitive decline, dementia, and depression in later

life.\(^5\)

Sleep-Wake Cycle Effects
One double-blind, placebo-controlled study looked at methylcobalamin’s role in circadian rhythm disorders. High

doses (6 mg/day) of methylcobalamin showed some benefits (although not statistically significant) compared to

placebo at the 8\(^{th}\) week. Benefits were defined as improved mood at waking and less daytime sleepiness.\(^6\)

DIRECTIONS:
Take 1 lozenge daily with or without meals. May be chewed.

The RDA for adults is 2.4 mcg/day of vitamin B12 (for adults and adolescents over age 14). This level was set due to

evidence that 1 mcg/day is needed to maintain normal levels. Given the variability of individual factors, 2 mcg/day

was set to cover all needs. However, in those individuals where a defect in absorption occurs, daily replacement is

necessary and their needs may be higher than normal individuals.\(^1\)

Because 10-30% of older adults do not absorb dietary vitamin B12 efficiently, those over age 50 should meet the

RDA by eating foods fortified with B12 or by taking a vitamin B12 supplement. Supplements have been used to

maintain vitamin B12 levels in older adults.\(^3\)

Patients taking Proton Pump Inhibitors (PPI’s) or H2 Blockers may be at risk for vitamin B12 deficiency due to

associated achlorohydria (low stomach HCl). Diabetic patients who take the drug Metformin, a B12 and folic acid

deficiency may occur, leading to high homocysteine levels.\(^3\)

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