



B12 METHYLCOBALAMIN

Helps to form red blood cells and maintain good health

It is known that vitamin B12 does more than merely prevent anemia. This water-soluble vitamin is necessary for at least eight important areas of whole body health, including: 1) energy production; 2) production of the genetic materials, DNA and RNA; 3) nervous system function, as it is needed to produce myelin, the fatty substance that forms a protective sheath around nerves; 4) production of acetylcholine, a neurotransmitter that helps with memory and learning; 5) brain health, since it may be helpful for some forms of depression; 6) slowing the cognitive decline that comes with aging; 7) the synthesis of red blood cells; and 8) cardiovascular health (vitamin B12 works with folic acid to control high homocysteine levels that dramatically increase the risk of heart disease and stroke).

HOW B12 WORKS

Vitamin B12, like folic acid, functions as a “methyl donor”. A methyl donor is simply any substance that can transfer a methyl group (a carbon atom attached to three hydrogen atoms) to another substance. Referred to as methylation, many important biochemical functions rely on this process, such as proper energy metabolism, immune function, and nerve function. More specifically, methyl donors help in the production of several brain chemicals and hence improve cognitive function, mood, energy, and sleep. As we age our body’s ability to methylate declines, contributing to the aging process.

B12 DEFICIENCIES AND SYMPTOMS

Unlike other water-soluble nutrients, vitamin B12 is stored in the liver, kidneys and other body tissues. As a result, the signs and symptoms of vitamin B12 deficiency may not show themselves until five to six years of poor dietary intake, or inadequate secretion of “intrinsic factor” (produced along with stomach acid for absorption of B12), have transpired. The classic deficiency symptom is pernicious anemia, however it appears that a deficiency will affect the brain and nervous system first. Impaired nerve function can cause numbness, a pins and needles sensation, or a burning feeling in the feet, as well as impaired mental function. Due to the fact that naturally-occurring vitamin B12 is found in foods of animal origin, vegetarians and vegans are particularly susceptible to B12 deficiencies.

Much more prevalent than a true deficiency is malabsorption due to mild or moderate atrophic gastritis, resulting from decreased secretion of the gastric acid that is necessary to cleave protein-bound vitamin B12 from food. Our B12 levels also decrease as we age. “Age-related deficiency is associated with hearing loss, memory impairment and psychiatric disorders, along with heart disease and stroke. Alzheimer’s patients have less B12 in their spinal fluid than people without the disease. They also have less SAME – the substance required to methylate cobalamin to methylcobalamin, the active form of B12. The failure of B12 supplementation to improve Alzheimer’s in some studies may be due to their inability to activate B12 in the brain. Methylcobalamin is already methylated: it doesn’t require SAME” (Mitchell).

Vitamin B12 status is also affected by smoking, high alcohol consumption, and prescription drugs such as Tagamet, Prilosec and other medications that inhibit stomach acid. Even if blood levels

appear normal, a deficient distribution of B12 can still result in cellular deficiency. Interestingly, without B12, folic acid will leave the body, creating a deficiency associated with birth defects.

METHYLCOBALAMIN – A SUPERIOR FORM OF B12

An enhanced form of vitamin B12 called methylcobalamin offers advantages over all other forms of B12, including injections given by your doctor. Methylcobalamin is a highly bioavailable form of B12 that does not require intrinsic factor. The sublingual form of methylcobalamin B12 offers even further advantages as it dissolves quickly under the tongue and is readily absorbed directly into the blood stream, bypassing digestion. Blood levels of B12 indicate that sublingual B12 becomes available as early as 15 minutes after administration and is still elevated 24 hours later. When used daily, this form maintains a sufficient B12 level, in contrast to injections, which provide a B12 surge followed by a progressive drop until the next injection. An editorial entitled “Oral Cobalamin for Pernicious Anemia: Medicine’s Best-Kept Secret,” which appeared in *JAMA*, confirmed that oral therapy is a reliable and effective treatment even in severe cases of pernicious anemia (Lederly). So although it is popular to inject B12, it is not necessary. Furthermore, the costs of administering B12 injections can be prohibitive for many patients, whereas oral B12 can be self-administered and is therefore more affordable.

COMPARING OTHER FORMS

Cyanocobalamin is the most common, but not the best, form of vitamin B12. While cyanocobalamin may help healthy young people avoid some forms of anemia, it does not convert to enough methylcobalamin to correct other forms of anemia, neurological defects, or age-related cognitive decline, as larger doses are needed to regenerate neurons and the myelin sheath that protects axons and peripheral nerves. There are two reasons why oral cyanocobalamin is inferior. First, enough of the protein intrinsic factor, normally found in stomach acid, must be produced for absorption. Surprising numbers of people, both young and old, have a problem producing enough intrinsic factor. Second, even if cyanocobalamin is absorbed, the liver converts only about 1% of it to its active form, methylcobalamin. Methylcobalamin is already in the active form, and as the tablet dissolves under the tongue, the B12 immediately starts to benefit the blood, brain, and body. Two other forms of B12, hydroxocobalamin and adenosylcobalamin, while better than cyanocobalamin, are no match for superior sublingual methylcobalamin. Sublingual methylcobalamin has also produced better results in clinical trials than cyanocobalamin and other forms of B12.

IMPROVING COGNITIVE FUNCTION

People over 45, and especially elderly people suffering from neurological impairment (such as senility), find that B12 supplementation greatly improves their cognitive function. Published studies show that vitamin B12 in supplement form is absorbed better by older people than vitamin B12 that is bound to food. Supplementation with vitamin B12 has shown benefit in reversing impaired mental function in the elderly with low levels of vitamin B12. In one large double-blind study, a complete recovery was observed in 61%

of cases of mental impairment due to low levels of vitamin B12. It was thought that the remaining 39% did not respond because of irreversible damage to the brain due to long-term B12 deficiency (Healton, *et al*). Several studies have shown the best clinical responders are those who have been showing signs of impaired mental function for less than six months (Van Goor, *et al*).

MINIMIZING BRAIN CELL DEATH

One cause of brain cell death is glutamate toxicity. Although brain cells use glutamate as a neurotransmitter, too much is neurotoxic to the brain. One way methylcobalamin protects against glutamate toxicity is through enhancing brain cell methylation. This key process can prevent the onset of many age-related cognitive-decline diseases such as Alzheimer's (Mitchell).

COMBATting SLEEP DISTURBANCES

Those with sleep problems, including shift workers, can benefit from sublingual methylcobalamin. It is well-known that shift workers have more trouble falling asleep and staying asleep. Poor sleep quality is probably why they have greater susceptibility to illness, including cancer, and have more accidents than other sectors of the population. In *How to Prevent and Treat Cancer with Natural Medicine*, Drs. Murray, Pizzorno, Birdsall and Reilly comment on the role of methylcobalamin and sleep: "Inside our brain is a kind of master clock that coordinates the timing of many physiological functions. One important role of sleep is to help orchestrate these various biological rhythms. We achieve optimal health if we keep our rhythms in sync. Several studies have shown that methylcobalamin is an effective treatment to improve sleep in shift workers as well as in people with excessive daytime sleepiness, restless nights, and frequent nighttime awakenings. The subjects taking methylcobalamin experience improved sleep quality and increased daytime alertness and concentration, and in some cases improved mood. Much of the benefit appears to be a result of methylcobalamin's influence on melatonin secretion and resetting the biological clock. Specifically, methylcobalamin causes a significant decrease in daytime melatonin levels while increasing nighttime levels" (Murray, *et al*).

BALANCING HOMOCYSTEINE LEVELS

Homocysteine is formed when the body breaks down the sulphur amino acids found in meat and dairy products. Homocysteine is a factor in the progression of both atherosclerosis and osteoporosis. In fact, elevations in homocysteine are an independent risk factor for heart attack. Elevations in homocysteine are found in approximately 20% to 40% of patients with heart disease. Without

adequate levels of folate, B6 and B12, homocysteine builds up in the blood rather than being metabolized back into methionine (a process called remethylation) or other harmless substances for elimination through the kidneys. High homocysteine levels are also suspect in Alzheimer's, chronic fatigue syndrome and rheumatoid arthritis. Although much of the focus has been on folic acid supplementation as a mechanism to lower homocysteine levels, the prevalence of suboptimal levels of folate, B6 and B12 in men with elevated levels were 56.8%, 59.1%, and 25%, respectively, indicating that folic acid supplementation will only lower homocysteine levels if there are adequate levels of B12 and B6. Because of the interconnectedness of these three nutrients, the best approach to lowering homocysteine levels is to supplement with all three (Ubbink, *et al*).

ADVANCED NEUROLOGICAL DISORDERS

A vitamin B12 deficiency in multiple sclerosis (MS) may aggravate the disease and accelerate the progressive deterioration of the myelin sheath. There is evidence that individuals with MS have a defect in the utilization of vitamin B12. In preliminary studies, the oral administration of 60 mg per day of methylcobalamin improved sensory nerve function in MS patients by nearly 30%. However, motor (muscular) function did not improve. 60 patients with Bell's Palsy were assigned to three different treatment groups: group one was given steroids only, group two was given methylcobalamin and steroids, and group three was given only methylcobalamin. It took an average of 7.79 weeks for the steroids-only group to completely recover. In contrast, the methylcobalamin-only group recovered in 5.1 days (Jalaludin).

DOSAGE

1 tablet daily or as directed by a health care practitioner. Dissolve under the tongue for maximum benefit. For advanced neurological disorders such as MS, Bell's Palsy, diabetic neuropathy, and Alzheimer's, take 5,000 mcg per day. Persons with any severe neurological condition should work closely with their health care practitioner.

Natural Factors provides B12 Methylcobalamin in 1,000 mcg and 5,000 mcg sublingual tablets. As all the B vitamins work together, it makes sense to take a B-complex daily when taking high amounts of any B vitamin.

SAFETY

The minimum daily requirement for vitamin B12 can be exceeded ten thousand-fold with no signs of toxicity. Excesses are excreted in the urine. High doses of methylcobalamin have been used in humans for degenerative neurological disorders, such as Parkinson's,

Alzheimer's, Bell's Palsy and multiple sclerosis. People with amyotrophic lateral sclerosis (Lou Gehrig's disease) took 25 mg (25,000 mcg) a day of methylcobalamin for a month and patients with multiple sclerosis were given 60 mg (60,000 mcg) daily.

Pregnancy and lactation: Vitamin B12 supplementation is generally regarded as safe during pregnancy and lactation. However, therapeutic dosages, such as those found in stand-alone vitamins, should only be used under the supervision of a health care practitioner. The appropriate dosage of vitamin B12 is found in specially-designed prenatal vitamins.

Children: Although vitamin B12 is considered suitable for children even at the adult dosage, it is preferable that children using high dosages do so under the supervision of a health care practitioner. Multivitamins such as those found in Big Friends or Learning Factors are appropriate for daily maintenance.

Contraindications: B12 supplementation can mask a folate deficiency. Consult a health care practitioner if you are uncertain whether or not you are taking adequate folate.

Drug interactions: None known.

Anyone can benefit from methylcobalamin B12, whether or not they are suffering from a severe neurological condition. The health benefits of this bioavailable form of B12 are particularly valuable as we age. It also provides a cost-effective, pain-free alternative to B12 injections.

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