

Evidence-based Vitamin B12 Usage

Name(s): Cobalamine, hydroxocobalamin

Description: Vitamin B12 was the last water-soluble B vitamin developed. This vitamin cannot be synthesized; it must be produced by bacteria or moulds. The cobalt present in vitamin B12 gives it a dark red colour. RNA and DNA production is influenced by this vitamin. Iron is able to function better when cobalamine is present. This vitamin is crucial for normal metabolism of fats, proteins, and carbohydrates as well as in the metabolism of nerve tissue.¹

Absorption/Storage: In the absorption process of vitamin B12, calcium must be present. Once absorbed, this vitamin binds to serum proteins called globulins and is taken to different tissues via the bloodstream. The main tissues that receive the vitamin are those that play a part in red blood cell formation. These tissues include the liver, kidneys, heart, brain, blood, and bone marrow. Since this is a water-soluble vitamin, storage is not an important factor, the excess is excreted.¹

Recommended Dietary Allowance/Dietary Reference Intake:²

Persons	U.S. (mcg)
Birth to 3 years of age	0.4-0.9
4 to 8 years of age	1.2
9 to 13 years of age	1.8
Adolescent and adult males	2.4
Adolescent and adult females	2.4
Pregnant females	2.6
Breast-feeding females	2.8

Optimum Daily Allowance (Adult): 200-400 mcg.³

Tolerable Upper Intake Levels: None available.

Principal Uses: Age related cognitive decline,⁴⁻⁷ asthma and sulphite sensitivity,⁸⁻¹⁰ depression (especially in the elderly),¹¹⁻¹⁷ high homocysteine (with folic acid and vitamin B6),¹⁸⁻³⁰ and pernicious anaemia.³⁰⁻³³

Proposed Uses: Bell's palsy, canker sores (for deficiency only), chronic fatigue syndrome, cystic fibrosis (in people with vitamin B12 deficiency), infertility (male), low back pain (in combination with vitamin B1 and vitamin B6), sickle cell anaemia (for sickle cell patients with B12 deficiency).³⁴

Traditional Uses: Alzheimer's disease, atherosclerosis, bipolar disorder, bursitis, Crohn's disease, dermatitis herpetiformis (in people with vitamin B12 deficiency), diabetes, heart attack, hepatitis, HIV support, hives, immune function, insomnia, lung cancer (reduces risk), osteoporosis (to lower homocysteine), pain, phenylketonuria (in people with vitamin B12 deficiency), pre- and post-surgery health, preeclampsia, retinopathy (associated with childhood diabetes), schizophrenia, cradle cap/seborrheic dermatitis (injection), shingles (herpes zoster)/postherpetic neuralgia (injection), stroke, tinnitus (injection) and vitiligo.³⁴

Healthy Sources:

High (40%+ US RDA): Nutritional yeast,³⁵ Maypo cereal, and so-called fortified, ready-to-eat cereals.³⁶

Medium (25-39% US RDA): None.

One brand of nutritional yeast, Red Star T-6635+, has been tested and shown to contain active vitamin B12. This brand of yeast is often labelled as Vegetarian Support Formula with or without T-6635+ in parentheses following this new name. It is a reliable source of vitamin B12. Nutritional yeast, *Saccharomyces cerevisiae*, is a food yeast, grown on a molasses solution, which comes as yellow flakes or powder. It has a cheesy taste. Nutritional yeast is different from brewer's yeast or torula yeast. It can often be used by those sensitive to other yeasts. The RDA is provided by a little less than 1 tablespoon of Vegetarian Support Formula (Red Star T-6635+) nutritional yeast.³⁵

Contraindications: If you are taking this dietary supplement without a prescription, carefully read and follow any precautions on the label. For vitamin B12, the following should be considered:

Allergies--Tell your health care professional if you have ever had any unusual or allergic reaction to vitamin B12. Also, tell your health care professional if you are allergic to any other substances, such as foods, preservatives, or dyes.

Pregnancy--It is especially important that you are receiving enough vitamins when you become pregnant and that you continue to receive the right amount of vitamins throughout your pregnancy. Healthy foetal growth and development depend on a steady supply of nutrients from mother to foetus. However, taking large amounts of a dietary supplement in pregnancy may be harmful to the mother

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and/or foetus and should be avoided.

You may need vitamin B12 supplements if you are a strict vegetarian (vegan-vegetarian). Too little vitamin B12 can cause harmful effects such as anaemia or nervous system injury.

Breast-feeding--It is especially important that you receive the right amounts of vitamins so that your baby will also get the vitamins needed to grow properly. If you are a strict vegetarian, your baby may not be getting the vitamin B12 needed. However, taking large amounts of a dietary supplement while breast-feeding may be harmful to the mother and/or baby and should be avoided.

Children--Problems in children have not been reported with intake of normal daily-recommended amounts.

Older adults--Problems in older adults have not been reported with intake of normal daily-recommended amounts.

Medicines or other dietary supplements--Although certain medicines or dietary supplements should not be used together at all, in other cases they may be used together even if an interaction might occur. In these cases, your health care professional may want to change the dose, or other precautions may be necessary. Tell your health care professional if you are taking any other dietary supplement or any prescription or non-prescription (over-the-counter [OTC]) medicine.

Other medical problems--The presence of other medical problems may affect the use of vitamin B12. Make sure you tell your health care professional if you have any other medical problems, especially:

- Leber's disease (an eye disease)--Vitamin B12 may make this condition worse.³⁷

Interactions:

Decreases Vitamin Availability:	AZT, cycloserine, erythromycin, isoniazid, lansoprazole, metformin, methyldopa, sulfamethoxazole, trimethoprim, ³⁴ anticonvulsants, cholesterol lowering drugs, colchicine, histamine blockers, neomycin, nitrous oxide, tetracycline, ^{34,38} alcohol, aminopterin, antipsychotics, charcoal, corticosteroids, fibre supplements, high fibre diet, individually supplemented B vitamins, methotrexate, omeprazole, oral contraceptives, para-aminosalicylic acid, phenformin, potassium supplements, ³⁸ extended release potassium preparations, cobalt irradiation of the small bowel and large doses of ascorbic acid. ³⁹
Increases Vitamin Availability:	Vitamin B6, lithium, ³⁸ and prednisone. ³⁹
Is Increased By Vitamin Availability:	Folic acid. ³⁸

Deficiency: A large majority of the population is deficient in vitamin B12. The signs of a deficiency include soreness of the legs and arms, a reduction in reflex time, memory loss and fatigue. Pernicious anaemia may result from an insufficient amount of vitamin B12. This form of anaemia is caused by an inability of the bone marrow to produce mature red blood cells. Symptoms of this disease are as follows: soreness of the tongue, a yellowing of the skin, complications of the digestive tract, diarrhoea, and loss of appetite. Pernicious anaemia may be fatal unless treated.¹

Toxicity/Side Effects: Along with its needed effects, a dietary supplement may cause some unwanted effects. Cyanocobalamin or hydroxocobalamin does not usually cause any side effects.

However, check with your health care professional immediately if any of the following side effects occur:

Rare--soon after receiving injection only

- Skin rash or itching; wheezing

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Check with your health care professional as soon as possible if either of the following side effects continues or is bothersome:

Less common

- Diarrhoea; itching of skin

Other side effects not listed above may also occur in some individuals. If you notice any other effects, check with your health care professional.³⁷

Treatment for Overdose: None.

Storage: To store this dietary supplement:

- Keep out of the reach of children.
- Store away from heat and direct light.
- Do not store in the bathroom, near the kitchen sink, or in other damp places. Heat or moisture may cause the dietary supplement to break down.
- Do not keep outdated dietary supplement or those no longer needed. Be sure that any discarded dietary supplement is out of the reach of children.³⁷

References:

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