

**WATER - SOLUBLE VITAMINS:  
VITAMIN B<sub>12</sub> (COBALAMIN)**

Patient Resource



# WATER - SOLUBLE VITAMINS : VITAMIN B<sub>12</sub> (COBALAMIN)

## Patient Resource

### Functions of Vitamin B<sub>12</sub>

- Cell Metabolism
- Energy
- Brain & Nervous System Function
- Blood Cell Formation
- DNA production

### Other Names for Vitamin B<sub>12</sub>

- Cobalamin
- **Active Forms in Human Metabolism:**
  1. Methylcobalamin
  2. 5-deoxyadenosylcobalamin

## Sources

### Animal Sources



- Dairy
- Fish & Shellfish (i.e. sardines, clams, tuna, trout)
- Meat (i.e. beef, veal)
- Organ meats (i.e. liver, kidney)
- Oysters
- Pastured Eggs
- Sardines
- Wild Salmon

### Other Sources

- Fortified Cereals
- Fortified Non-Dairy Milk
- Fortified Nutritional Yeast

### Plant Sources



#### Are there any plant sources?

Basically, vitamin B<sub>12</sub> is created by combining some bacteria and the mineral cobalt. Plant soil doesn't typically contain enough of the mineral to activate vitamin B<sub>12</sub>.

Scientists are studying a special aquatic plant known as Mankai duckweed (*Wolffia globosa*) as they believe it may contain bioactive form of vitamin B<sub>12</sub>.

#### What if I am a vegan or vegetarian?

For those eating diets restricted in animal products or meat, it is recommended that you discuss fortified sources or oral supplements with your healthcare providers.



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## Dietary Reference Intakes

The recommended amount of vitamin B12 recommended for daily intake depends on your age. Intake is based on the **Adequate Intake (AI)** level for those under one year old. This is the level assumed adequate to meet nutritional needs. An AI is established when there is not enough evidence for a Recommended Dietary Allowance, or RDA.

For children and adults, those one year and older, the recommended intake is based on the **Recommended Dietary Allowance (RDA)**. This is the amount covering the needs of 97-98% of people in that specific age group or life stage (i.e. pregnancy).

## Deficiency

### At risk:

- Vegans/Vegetarians
- Inadequate dietary intake
- Older Adults (50+ years of age)
- People with digestive tract disorders or conditions affecting absorption of nutrients (i.e. Celiac or Crohn's disease)
- Lack of intrinsic factor (a protein helping with vitamin B12 absorption in the intestine)
- Autoimmune disease
- Above average heat production (i.e. hyperthyroidism)
- Pregnancy

### Signs & Symptoms:

- Pernicious Anemia
- Fatigue
- Muscle Weakness
- Difficulty with movement (i.e. staggering, balance problems)
- Intestinal problems
- Mood and memory disturbances
- Temporary infertility in women
- Delirium
- Strange sensations, such as numbness or tingling in the hands, legs, or feet
- Cognitive difficulties

## Helpful Terms to Know

- **Recommended Dietary Allowance (RDA)**: covers the needs of 97-98% of individuals in a group; the average amount of a nutrient a healthy person should consume daily. Vary by gender, age, and whether a woman is pregnant or breastfeeding. Developed by the Food and Nutrition Board at the Institutes of Medicine (IOM) of the National Academies.
- **mcg** = micrograms
- **Adequate Intake (UL)**: recommended daily intake of a nutrient; established by Institute of Medicine (IOM) to meet or to exceed the needed amount to maintain adequate nutrition for most people in a particular stage of life or gender group; established when not enough evidence is available to determine the RDA



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Dietary Reference Intakes, continued from previous page.

Dietary Reference Intakes (DRIs) for Vitamin B12 (Cobalamin) in mcg/day	
<b>Infants</b>	
0-6 months	0.4
7-12 months	0.5
<b>Children</b>	
1-3 years	0.9
4-8 years	1.2
<b>Adolescents &amp; Adults</b>	
9-13 years	1.8
14-70+ years	2.4
<b>Pregnancy</b>	
14- 50 years	2.6
<b>Lactation</b>	
14-50 years	2.8

Image created by ANNI WEEKS. Based on *Dietary Reference Intakes (DRIs): Recommended Dietary Allowances and Adequate Intakes, Vitamins*. Food and Nutrition Board, Institute of Medicine, National Academies.

## Older Adults

Since 10-30% of older adults may not properly absorb vitamin B12 from food, it is advised that people aged 50 years and older consume foods fortified with B12 or ask their healthcare team about options for supplemental B12.

Symptoms of deficiency may show in older adults when vitamin B12 levels reach below 100 picograms per milliliter (pg/mL)



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## How stable is Vitamin B<sub>12</sub>?

Vitamin B<sub>12</sub> remains in its most stable form when it is well-packaged and properly stored.

## Toxicity & High Levels of Vitamin B<sub>12</sub>

High levels of vitamin B<sub>12</sub> can indicate liver disease or certain types of cancer.

While there is not an upper level (UL) for vitamin B<sub>12</sub>, it is important to follow your healthcare providers recommendations and the recommended doses for your age and life stage.

## NOTE:

It can be helpful to bring in your supplements to a doctor's visit or your next appointment with your healthcare providers. Providing the actual containers of products you take can help your healthcare team to avoid under- or over-dosing you or your family members on supplements. It is also a helpful practice since there are many B vitamins and their variants can go by different names.

## SUPPLEMENTATION & TREATMENT

### Uses

Supplemental vitamin B<sub>12</sub> can be prescribed, **under appropriate medical direction and supervision**, following medical diagnosis and prescription, for the following:

- Tingling in the extremities (i.e. hands, feet)
- Balance problems
- Abnormal heartbeat
- Confusion or dementia
- Weakness
- Loss of appetite
- Pernicious anemia (reduction of red blood cells)

*If you have these conditions, be sure to ask the advice of your doctors and healthcare team before supplementing.*

## Supplementation Treatment Options

1. **Weekly vitamin B<sub>12</sub> shots:** Ask your doctor or dietitian about vitamin B<sub>12</sub> shots as a treatment option.
2. **Daily vitamin B<sub>12</sub> pills:** Your healthcare provider may prescribe B<sub>12</sub> pills at a higher-dose as part of your daily regimen if you are at risk.
3. **Supplementing with a Standard Multivitamin:** Most people who don't fall into at risk categories can safely meet their vitamin B<sub>12</sub> needs through a combination of diet and supplementing with a standard multivitamin. Other options include new technologies like nasal sprays.

