

# Vitamin B12 Fact Sheet for Consumers



Foods from animals, but not plants, naturally have vitamin B12. These include fish, meat, poultry, eggs, milk, and other dairy products.

## What is vitamin B12 and what does it do?

Vitamin B12 is a nutrient that helps keep your body's blood and nerve cells healthy and helps make DNA, the genetic material in all of your cells. Vitamin B12 also helps prevent megaloblastic anemia, a blood condition that makes people tired and weak.

## How much vitamin B12 do I need?

The amount of vitamin B12 you need each day depends on your age. Average daily recommended amounts for different ages are listed below in micrograms (mcg):

Life Stage	Recommended Amount
Birth to 6 months	0.4 mcg
Infants 7–12 months	0.5 mcg
Children 1–3 years	0.9 mcg
Children 4–8 years	1.2 mcg
Children 9–13 years	1.8 mcg
Teens 14–18 years	2.4 mcg
Adults	2.4 mcg
Pregnant teens and women	2.6 mcg
Breastfeeding teens and women	2.8 mcg

## What foods provide vitamin B12?

Vitamin B12 is found naturally in a wide variety of animal foods, and manufacturers add it to some fortified foods. Plant foods have no vitamin B12 unless they are fortified. You can get recommended amounts of vitamin B12 by eating a variety of foods including the following:

- Fish, meat, poultry, eggs, milk, and other dairy products contain vitamin B12.
- Clams and beef liver are some of the best source of vitamin B12.
- Some breakfast cereals, nutritional yeasts, and other food products are fortified with vitamin B12.

To find out if a food has *added* vitamin B12, check the [Nutrition Facts label](#).

Manufacturers are not required to list vitamin B12 on the label if a food naturally contains this vitamin.

## What kinds of vitamin B12 dietary supplements are available?

Vitamin B12 is available in multivitamin/multimineral supplements, in B-complex supplements, and in supplements containing only vitamin B12. It is usually in a form called cyanocobalamin. Other common forms are adenosylcobalamin, methylcobalamin, and hydroxycobalamin. Vitamin B12 is also available in a form that's dissolved under your tongue (called sublingual vitamin B12). Research has not shown that any form of supplemental vitamin B12 is better than the others.

The amount of vitamin B12 in supplements varies widely. Some provide doses of vitamin B12 that are much higher than recommended amounts, such as 500 mcg or

1,000 mcg, but your body absorbs only a small percentage of it. These doses are considered safe. Check the Supplement Facts label to see how much vitamin B12 a supplement contains.

A prescription form of vitamin B12 can be given as a shot. This is usually used to treat vitamin B12 deficiency. Vitamin B12 is also available by prescription as a nasal gel that's sprayed into the nose.

### Am I getting enough vitamin B12?

Most people in the United States get enough vitamin B12 from the foods they eat. But some people have trouble absorbing vitamin B12 from food. The body absorbs vitamin B12 from food in a two-step process. First, hydrochloric acid in the stomach separates vitamin B12 from the protein that it's attached to. Second, the freed vitamin B12 then combines with a protein made by the stomach, called intrinsic factor, and the body absorbs them together.

Vitamin B12 in dietary supplements isn't attached to protein and doesn't require the first step. However, B12 in supplements does need to combine with intrinsic factor to be absorbed.

People with pernicious anemia, an autoimmune disease, can't make intrinsic factor. As a result, they have trouble absorbing vitamin B12 from foods and dietary supplements.

Vitamin B12 deficiency affects between 3% and 43% of older adults. Your doctor can test your vitamin B12 level to see if you have a deficiency.

Certain groups of people may not get enough vitamin B12 or have trouble absorbing it:

- Many older adults don't have enough hydrochloric acid in their stomach to absorb the vitamin B12 that's naturally present in food. People over 50 should get most of their vitamin B12 from fortified foods or dietary supplements because, in most cases, their bodies can absorb vitamin B12 from these sources.
- People with an autoimmune disease called atrophic gastritis might not absorb enough vitamin B12 because they make too little hydrochloric acid and intrinsic factor in their stomach.
- People with pernicious anemia do not make the intrinsic factor needed to absorb vitamin B12. As a result, they have trouble absorbing vitamin B12 from foods and dietary supplements. Doctors usually treat pernicious anemia with vitamin B12 shots, although very high doses of vitamin B12 given by mouth might also be effective.
- People who have had some types of stomach or intestinal surgery (for example, to lose weight or to remove part or all of the stomach) might not make enough hydrochloric acid and intrinsic factor to absorb vitamin B12.
- People with disorders of the stomach and small intestine, such as celiac disease or Crohn's disease, might not absorb enough vitamin B12.

- People who eat little or no animal foods, such as vegetarians and vegans, might not get enough vitamin B12 from their diets. Only animal foods have vitamin B12 naturally. When pregnant women and women who breastfeed their babies are strict vegetarians or vegans, their babies might also not get enough vitamin B12.

### What happens if I don't get enough vitamin B12?

Your body stores 1,000 to 2,000 times as much vitamin B12 as you'd typically eat in a day, so the symptoms of vitamin B12 deficiency can take several years to appear.

If you have a vitamin B12 deficiency, you may feel tired or weak. These are symptoms of megaloblastic anemia, which is a hallmark of vitamin B12 deficiency. You might also have pale skin, heart palpitations, loss of appetite, weight loss, and infertility. Your hands and feet might become numb or tingly, a sign of nerve problems. Other symptoms of vitamin B12 deficiency include problems with balance, depression, confusion, dementia, poor memory, and soreness of the mouth or tongue.

In infants, signs of a vitamin B12 deficiency include failure to thrive, delays in reaching the typical developmental milestones, and megaloblastic anemia.

Vitamin B12 deficiency can damage the nervous system even in people who don't have megaloblastic anemia, so it's important to treat a deficiency as soon as possible.

### What are some effects of vitamin B12 on health?

Scientists are studying vitamin B12 to understand how it affects health. Here are several examples of what this research has shown.

#### Cancer

Some research shows that people with high levels of vitamin B12 have a higher risk of cancer. But other research shows that the risk of cancer is higher in people with low levels of vitamin B12 or that vitamin B12 levels don't affect cancer risk. More evidence is needed to understand whether vitamin B12 levels affect cancer risk.

#### Heart disease and stroke

Vitamin B12 supplements (along with other B vitamins) reduce blood levels of homocysteine, a compound linked to an increased risk of having a heart attack or stroke. But despite reducing homocysteine, research shows that these vitamins don't reduce the risk of developing cardiovascular disease or stroke.

#### Dementia and cognitive function

Most studies show that low blood levels of vitamin B12 don't affect the risk of cognitive decline in older people, regardless of whether they have dementia or Alzheimer's disease. More clinical

trials are needed to better understand the effects of vitamin B12 supplementation on cognitive function in older adults.

#### Energy and endurance

Manufacturers often promote vitamin B12 supplements for energy, athletic performance, and endurance. But vitamin B12 doesn't provide these benefits in people who get enough B12 from their diet.

#### Can vitamin B12 be harmful?

Vitamin B12 has not been shown to cause any harm, even at high doses.

#### Does vitamin B12 interact with medications or other dietary supplements?

Yes. Vitamin B12 supplements can interact or interfere with some medicines that you take. Here are several examples.

#### Gastric acid inhibitors

People take gastric acid inhibitors to treat certain digestion problems, such as gastroesophageal reflux disease and peptic ulcer disease. These drugs can interfere with vitamin B12 absorption from food by slowing the release of hydrochloric acid into the stomach, leading to vitamin B12 deficiency. Gastric acid inhibitors include omeprazole (Prilosec®), lansoprazole (Prevacid®), cimetidine (Tagamet®), and ranitidine (Zantac®).

#### Metformin

Metformin is used to treat prediabetes and diabetes. Metformin might reduce vitamin B12 absorption and lower blood levels of vitamin B12.

Tell your doctor, pharmacist, and other healthcare providers about any dietary supplements and prescription or over-the-counter medicines you take. They can tell you if the dietary supplements might interact with your medicines. They can also explain whether the medicines you take might interfere with how your body absorbs or uses other nutrients.

#### Vitamin B12 and healthful eating

People should get most of their nutrients from food and beverages, according to the federal government's *Dietary*

*Guidelines for Americans*. Foods contain vitamins, minerals, dietary fiber, and other components that benefit health. In some cases, fortified foods and dietary supplements are useful when it is not possible to meet needs for one or more nutrients (e.g., during specific life stages such as pregnancy). For more information about building a healthy dietary pattern, see the [Dietary Guidelines for Americans](#) and the U.S. Department of Agriculture's [MyPlate](#).

#### Where can I find out more about vitamin B12?

##### For general information on vitamin B12:

- Office of Dietary Supplements Health Professional Fact Sheet on [Vitamin B12](#)
- [Vitamin B12](#), MedlinePlus®

##### For more information on food sources of vitamin B12:

- U.S. Department of Agriculture's (USDA) [FoodData Central](#)
- Nutrient Lists for vitamin B12 (listed by [food](#) or by [vitamin B12 content](#)), USDA

##### For more advice on choosing dietary supplements:

- Office of Dietary Supplements [Frequently Asked Questions: Which brand\(s\) of dietary supplements should I purchase?](#)

##### For information about building a healthy dietary pattern:

- [MyPlate](#)
- [Dietary Guidelines for Americans](#)

#### Disclaimer

This fact sheet by the Office of Dietary Supplements (ODS) provides information that should not take the place of medical advice. We encourage you to talk to your healthcare providers (doctor, registered dietitian, pharmacist, etc.) about your interest in, questions about, or use of dietary supplements and what may be best for your overall health. Any mention in this publication of a specific product or service, or recommendation from an organization or professional society, does not represent an endorsement by ODS of that product, service, or expert advice.



For more information on this and other supplements, please visit our Web site at: <http://ods.od.nih.gov> or e-mail us at [ods@nih.gov](mailto:ods@nih.gov)

Updated: July 7, 2021