

B12 Proven Essential for Every Cell

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STORY AT-A-GLANCE

- > Vitamin B12 influences metabolism in every one of your cells, brain and nervous system, even regulating and synthesizing DNA
- > While it's produced by just a few organisms, B12 is required by nearly all of them and, as such, holds a lot of clout
- > Women with a B12 deficiency have a 21% greater likelihood of having a preterm birth

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Practically everybody knows getting the right amount of vitamins is important. Occasionally, new information arises that shows some vitamins to be of greater consequence than previously thought, often because they deal with crucial functions throughout your body.

That's true with vitamin B12, not only because it directly influences metabolism in every one of your cells throughout your brain and nervous system, as it regulates and synthesizes DNA and how your blood is formed, but because of findings that suggest vitamin B12 may be far more important to microbial life than previously thought.

Evidence revealed by researchers at the U.S. Department of Energy's (DOE) Pacific Northwest National Laboratory in Richland, Washington shows that vitamin B12, also called cobalamin, may in fact play a "pivotal" role in cell growth and coordination of cells in complex multicellular systems.

The study, published in Proceedings of the National Academy of Sciences (PNAS), reported two "unexpected discoveries" as a result of their research.¹ One publication noted that while B12 is produced by a mere few organisms, it's required by nearly all of them and, as such, holds a lot of clout.

Chemist Aaron Wright and his team studied a microbial "mat" taken from Hot Lake in Washington state. EurekAlert described it as a "community" of microbe layers with lots of members "living together and trading nutrients like carbon and oxygen in hot, salty water, thick with growth of algae and other micro-organisms."²

Probing Vitamin B12's Influence on Crucial Functions

Wright noted the enormous amount of energy required for a microbe to synthesize the 30 biochemical steps in the process of making B12, "signifying that the substance is highly valuable and carries out important functions."³

According to EurekAlert,⁴ Wright's team made a chemical mock-up B12 to work just like the original, but which offers greater options for scientists to track living cells.

They used affinity-based protein profiling to tag molecules that are most active, and a technique called mass spectrometry to determine which proteins held the most interest. New Hope Network noted:

"Wright's team found that B12 interacts with 41 different proteins in the bacterium, and ... is central to the regulation of folate, ubiquinone and methionine – substances crucial to the ability of microbial cells to create energy, build proteins, repair DNA and grow.

The findings about methionine show an expanded influence of B12 compared to what has been known. The vitamin also changes the instructions it sends to genes depending on whether it's day or night – not a surprise in a community of organisms for which light is a central driver."⁵

Scientists have probed the role of B12 in genes, and enzymatic microbes involved in DNA and protein development, for years, but two more scientists, Andrew Goodman at Yale and Michiko Taga at University of California at Berkeley, also previously disclosed even more functions of this vitamin.

The Importance of Vitamin B12 in Your Diet

Vitamin B12 is connected to the proteins in food. Once it's consumed, the hydrochloric acid in your stomach separates out the B12, which then combines with a compound known as intrinsic factor so it can be absorbed by your intestines. New cell production and maintenance, as well as DNA synthesis, makes vitamin B12 vital for health.

Left unattended, low vitamin B12 levels could result in neurological problems or inefficient blood cell production. One indication is a "pins and needles" sensation resembling electric shock waves due to low oxygen levels. Other symptoms include:⁶

Dizziness	Unexplained fatigue	Pale complexion
Muscle weakness	Poor vision	Forgetfulness
Anemia	Nervous system damage	Menstrual difficulties
Diarrhea	Mouth sores	Weight loss

One study noted that vitamin B12 deficiency also may be linked to fractures, as men over age 75 in the lowest quadrant of B12 blood concentrations had 70% more fractures, and 120% of the time they were in the lumbar region.⁷

To get the proper amounts, it must be consumed and absorbed for [optimal metabolism](#). According to the U.S. National Institutes of Health (NIH), required amounts of vitamin B12 in supplement form are:⁸

- 0.5 micrograms for children age 7 to 12 months
- 0.9 micrograms for children age 1 to 3 years

- 1.2 micrograms for children age 4 to 8 years
- 1.8 micrograms for children age 9 to 13
- 2.4 micrograms for people from age 14 and above

Pregnant women are advised to take 2.6 micrograms of vitamin B12 per day, while breastfeeding women should take 2.8 micrograms.

Vitamin B12 Helps Protect Against Birth Risks and Other Problems

According to a 2017 study conducted by the Norwegian University of Science and Technology, women with a B12 deficiency had a 21% greater likelihood of having a [preterm birth](#).⁹

The 11-country study assessed 11,216 pregnancies and births, which showed this to be the case. (Mayo Clinic defines preterm births as those which take place before 37 weeks of pregnancy have transpired, or three weeks before the baby's due date.)¹⁰

Birth weight in the Norwegian study did not appear to be affected by low B12, but around the world, low birth weight and preterm births remain of the leading cause of death in infants.¹¹

Further, the World Health Organization (WHO) reported that complications with preterm births are the leading cause of death for children under age 5.¹² Tormod Rogne, Ph.D., formerly with Norway's Akershus University Hospital and lead study author of the study, noted:

"Vitamin B12 is an essential nutrient found only in products of animal origin such as meat, milk and eggs. Pregnant women who consume too few animal-derived foods increase their risk of developing a vitamin B12 deficiency."¹³

As important as it is to get adequate amounts of vitamin B12, it's important to choose high-quality foods to maintain optimal levels.

Vegetarians and Vegans at Higher Risk of B12 Deficiency Also Have Options

Socioeconomic status, such as poverty, [malnutrition](#) or social upheaval in some areas of the world, can play into a higher risk of a vitamin B12 deficiency among women in such populations, affecting length of pregnancies, possibly babies' birth weight and subsequent health.

So can vegetarianism – and especially veganism. The difference is that while the former group will often eat eggs, fish and dairy, the latter group generally doesn't, necessitating that these individuals be more conscious of their nutrient intake.

[Nutritional yeast](#) present one way vegetarians (or anyone else, for that matter) can augment their B12 intake through their diet. [Raw, organic grass fed milk, yogurt and cheese](#) – meaning it must be derived from pastured cows that ate mostly grass and hay – are additional options with naturally high B12 content.

Sources and References

- [1 PNAS December 29, 2016](#)
- [2, 4 EurekAlert! January 30, 2017](#)
- [3, 5 New Hope Network February 9, 2017](#)
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