

# Eight Signs You Might Be B12 Deficient

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✓ Fact Checked

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## STORY AT-A-GLANCE

- › Eight signs that you might be B12 deficient include fatigue, anemia, nausea, digestive issues, weakness, skin infections, mental confusion and nerve problems
- › Areas of your body that function optimally when B12 levels are adequate reveal how vital this vitamin really is, especially because it's responsible for producing red blood cells and keeping your nervous system healthy
- › You may not realize how all-encompassing and debilitating a vitamin B12 deficiency can be until symptoms like fatigue, nausea, vision problems and others morph into more serious disorders and diseases
- › Like most vitamins, B12 is not manufactured by your body, so it must come from another source – namely food and supplements
- › Worms called *C. elegans*, like humans, can't produce B12, but this discovery helped scientists find that a deficiency may increase the risk of infection by two potentially deadly pathogens
- › Several areas of the body can be adversely affected if you have low B12 levels, which helps explain why jaundiced skin, dementia, anemia and osteoporosis can all stem from this problem

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When you experience symptoms like fatigue, numbness, faint nausea, foggy vision or an increased tendency toward forgetfulness, you might entertain many different scenarios. Some of them might be scary, but a possibility you may not consider is that of a vitamin B12 (aka cobalamin) deficiency.

Nearly half of the American population has less-than-stellar blood levels of vitamin B12, but the symptomology is so varied that it's hard to pin down just how many people suffer from it, according to Harvard Health, which describes the "sneaky" symptomology behind a 62-year-old man's seemingly unrelated symptoms, developed over two months. According to his case report, published in *The New England Journal of Medicine*,<sup>1</sup> he had:

*"Numbness and a 'pins and needles' sensation in his hands, had trouble walking, experienced severe joint pain, began turning yellow, and became progressively short of breath ... It could have been worse – a severe vitamin B12 deficiency can lead to deep depression, paranoia and delusions, memory loss, incontinence, loss of taste and smell, and more."<sup>2</sup>*

It's problematic that symptoms like the above may cause people to focus on treating them instead of investigating the source of the problem. Sooner or later, though, unless it's met head-on, a shortage of vitamin B12 in your system can be so devastating that serious disorders, such as Alzheimer's disease, Crohn's disease and irreversible brain damage could take their toll.

## **Low Vitamin B12 Symptoms Not so Unrelated After All**

The list of symptoms that could be placed on a B12 deficiency's proverbial doorstep is a long one, but many symptoms are associated with your central nervous system. Too little B12 in your system might also resonate if you've experienced poor vision, weakness, tingling in your hands or feet and incidences of "clumsiness." Eight common signs that indicate low B12 levels are:

Fatigue

Anemia

Nausea	Digestive issues
Weakness	Skin infections
Mental confusion	Nerve problems

But it's also important to understand that several areas of the body can be adversely affected with a vitamin B12 deficiency, and that while many of the symptoms may seem unrelated, as the saying goes, one thing often leads to another.

## **Low B12 Can Cause Anemia, Which Has Its Own Set of Symptoms**

As is true for every human, vitamin B12 is necessary to keep your nervous system healthy, as well as to make DNA, which is the genetic material in all cells.<sup>3</sup> B12 is also needed to produce red blood cells, which transport oxygen throughout your body.

But with a shortage of B12, many of your red blood cells are abnormally formed and/or too large, so they can't carry oxygen; the process is disrupted. Too few red blood cells or an abnormally low amount of hemoglobin in individual red blood cells causes anemia, one of the most common and noticeable signs that a shortage is becoming a problem.<sup>4</sup>

Anemia can cause some of the previously listed symptoms, such as weakness, fatigue, dizziness, cold hands and feet, pale skin and chest pain, which occur because your heart has to work harder to move oxygen-rich blood through your body, The National Heart, Lung, and Blood Institute (NHLBI) reports.<sup>5</sup> In turn, this can lead to irregular heartbeat or arrhythmia, enlarged heart and even heart failure.<sup>6</sup>

Recognizing B12 deficiency sooner rather than later is crucial, as left unchecked it can lead to permanent damage in your body.<sup>7</sup> According to the Linus Pauling Institute,<sup>8</sup> a B12 deficiency may also be culpable in several other serious diseases and conditions, including:

Breast cancer <sup>9</sup>	Chronic stomach inflammation <sup>10</sup>
Depression <sup>11</sup>	Neural tube defects <sup>12</sup>
Osteoporosis <sup>13</sup>	Gastric cancer <sup>14</sup>
Thyroid dysfunction <sup>15</sup>	DNA damage <sup>16</sup>

## How Does Low B12 Cause Jaundiced Skin and Dementia?

Because B12 – and a lack thereof – is closely associated with your nervous system, the sign known as "pins and needles" is one that indicates a nerve issue that should be addressed as soon as possible, and shows how interconnected your body's functions are.

Because vitamin B12 is important for the maintenance of your central nervous system, including the conduction of nerve impulses and producing the myelin sheath, it protects and "insulates" your nerves. Without this protective insulation, your nerves can be damaged, leading to symptoms like "pins and needles" in your hands and feet, as well as central and peripheral nervous system damage.<sup>17</sup>

If you've noticed that your skin has a pale or jaundiced cast, it's a warning sign that your body is unable to produce an adequate number of red blood cells. You may not have thought about it, but it's the red blood cells circulating under your skin that give it its healthy color.

Vitamin B12 deficiency can cause megaloblastic anemia, which can weaken your blood cells, after which other symptoms begin appearing. When your liver breaks down red blood cells, it releases bilirubin, a brownish substance that lends your skin a jaundiced appearance, often seen in infants.<sup>18</sup>

As if these problems weren't enough, people with low levels of B12 may also suffer problems with clear thinking, which later turns into the condition doctors call cognitive

impairment or dementia.<sup>19</sup>

The symptoms often become evident when someone has reasoning difficulties and memory loss, but often, that is what is treated rather than exploring the possibility of a B12 deficiency, which could alleviate the symptoms if addressed.

An all-encompassing review in Australia in 2012 revealed associations between low vitamin B12 levels and neurodegenerative disease. A total of 43 studies revealed that "subclinical low-normal ranges are associated with Alzheimer's disease, vascular dementia and Parkinson's disease."<sup>20</sup> Another study notes:

*"Vitamin B12 deficiency should always be looked for when a patient presents with memory loss, since it is generally reversible with treatment. Many neuropsychiatric symptoms have been observed, and many in patients who do not have a megaloblastic anemia.*

*These include memory loss, psychosis including hallucinations and delusions, fatigue, irritability, depression and personality changes."*<sup>21</sup>

## **A B12 Deficiency Often Shows Up in Your Mouth**

One symptom of anemia that often shows up are mouth ulcers, sometimes known as canker sores or aphthous ulcers, small yellow or white ulcers that can appear on your gums or just inside your lip. While they usually clear up in a week or two, they're often quite painful.

But a B12 deficiency can cause other symptoms in your mouth as well, including on your tongue. One study relates the experience of a middle-aged female patient – a common demographic for her symptoms – with a persistent burning sensation on her tongue for several months.

Diagnosed with glossitis, which causes a noticeably swollen, smooth, red tongue, she was given a single injection of vitamin B12, which "resulted in complete resolution of her symptoms and the normal clinical appearance of her tongue after three days."<sup>22</sup>

## Low B12 Carries Increased Risk for Serious Infections

People with deficiency in vitamin B12 are at a higher risk of infections caused by two potentially deadly pathogens. Findings of a study published in the journal PLOS Genetics<sup>23</sup> involved 1 millimeter-long (pencil tip-sized) nematodes or worms called *Caenorhabditis elegans* (*C. elegans*), one of the world's most basic organisms.

Vital to the study was that nematodes share an interesting characteristic with humans: They can't produce their own vitamin B12, either. As reported by MedIndia, the study involved two worm populations: one with and one without a diet sufficient in B12, showing that a B12-deficient diet harms the worm's health at a cellular level by reducing its ability to metabolize branched-chain amino acids (BCAA):

*"The research showed that the reduced ability to break down BCAAs led to a toxic buildup of partially metabolized BCAA byproducts that damaged mitochondrial health ... 'We used C. elegans to study the effect of diet on a host and found that one kind of food was able to dramatically increase resistance to multiple stressors – like heat and free radicals – as well as to pathogens,' said [researcher Natasha Kirienko]."*<sup>24</sup>

Many labs around the world use *C. elegans* to study the effects of disease. By feeding the worms *E. coli*, a common and sometimes harmful gut bacteria, and switching between *E. coli* strain OP50 and strain HT115, the worms' stress tolerance was "dramatically altered," Kirienko said. "We found that switching between *E. coli* strain OP50 and strain HT115 dramatically altered the worm's stress tolerance." Co-author Alexey Revtovich noted:

*"The key difference between the two diets is the ability of HT115 and OP50 to acquire B12 from the environment ... We showed that HT115 is far more efficient at this, making about eight times as much of the protein that it needs to harvest B12 as compared to OP50."*<sup>25</sup>

Significantly, the team also found that *C. elegans* on an HT115 diet had the ability to resist infection by another deadly human pathogen, *Enterococcus faecalis*, a leading

cause of hospital-acquired infections and recognized by the World Health Organization and U.S. Centers for Disease Control and Prevention (CDC) as a superbug.<sup>26</sup>

Kirienko noted that the B12 finding surprised the research team. They noticed the effect when they studied "the mechanisms of pathogenesis of *Pseudomonas aeruginosa* (*P. aeruginosa*), a potentially deadly disease in both worms and humans that infects some 51,000 U.S. hospital patients each year,"<sup>27</sup> according to the CDC.<sup>28</sup>

## How to Optimize Your Vitamin B12 Levels

Some people have a greater risk than others for vitamin or mineral deficiencies, but in this case vegans and vegetarians are at particular risk because B12 is derived from animal products. Additionally, older adults and people with gastrointestinal and malabsorption issues are also at risk.

Studies have also shown that those on metformin (for diabetes) and prolonged use of proton pump inhibitors (for stomach acid) are also at an increased risk for vitamin B12 deficiency, leading researchers to suggest "it seems prudent to monitor vitamin B12 levels periodically in patients taking metformin."<sup>29</sup>

Because it's not manufactured by your body, vitamin B12 must come from another source – namely food and supplements. That said, good sources for cobalamin or vitamin B12 include:

Grass fed organic beef and beef liver	Lamb
Venison	Scallops
Organic, pastured chicken and eggs	Raw organic, grass fed milk
Nutritional yeast	

As for supplementation, according to the National Institutes of Health (NIH),<sup>30</sup> the average person age 14 and older should get 2.4 micrograms (mcg – one-millionth of a gram<sup>31</sup>) of vitamin B12 per day; pregnant women should get 2.6 mcg; and breastfeeding women should get 2.8 mcg. Newborns and children up to age 13 require between 0.4 and 1.8 mcg.

The type of a vitamin B12 supplement you should take is also something to consider. Between cyanocobalamin, the synthetic form,<sup>32</sup> and methylcobalamin, which is the naturally occurring form found in food, methylcobalamin is the better choice, one reason being that your body retains it in greater amounts.<sup>33</sup>

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