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How B Vitamins Improve Brain Health, Cognition, Psychiatric Problems and Mood Disorders

Analysis by Dr. Joseph Mercola | January 06, 2024

STORY AT-A-GLANCE

- Research suggests vitamins B6, B8 and B12 significantly reduce symptoms associated with schizophrenia — more so than standard drug treatments alone. High dose niacin (B3) is another effective treatment
- Other B vitamin deficiencies can also produce symptoms of psychiatric disorders and mood disorders, and can play a role in cognitive decline and dementia
- Vitamins B6, B9 (folate/folic acid) and B12 may help prevent cognitive decline and more serious dementia such as Alzheimer's disease

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It's well-established that healthy fats such as animal-based omega-3s — especially DHA — are vitally important for your brain health, but other nutrients such as vitamins are also necessary for cognition and the prevention of neurological disease and mental disorders.

Psychiatry typically relies on drugs as a first line of treatment, but even more severe psychiatric problems have been shown to benefit greatly from nutritional interventions.

One nutritional deficiency in particular that has the potential to wreak havoc on your psyche is niacin (vitamin B3). Pellagra[1] is a condition caused by niacin deficiency, and

two of its clinical manifestations include delirium and dementia. Interestingly, schizophrenia appears to have some of the features of pellagra.

The disease originates in your gut and is associated with malnourishment and the "poor man's diet" consisting primarily of corn products. Pellagra was epidemic in the American South during the early 1900s, and we just might be dealing with a similar epidemic of malnutrition today.

That said, other vitamin B deficiencies, including B1, B2, B6, B8 and B12 also have an uncanny ability to produce symptoms of neuropsychiatric disorders, and can be a valuable treatment adjunct.

B Vitamins Are Important for Psychiatric Conditions

For example, research[2,3] suggests certain B vitamins "significantly" reduce symptoms associated with schizophrenia — more so than standard drug treatments alone. As noted by the journal Psychological Medicine and lead author Joseph Firth:[4,5]

> *"When used as an adjunctive with antipsychotics, certain vitamins and minerals may be effective for improving symptomatic outcomes of schizophrenia, by restoring nutritional deficits, reducing oxidative stress, or modulating neurological pathways.*
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> *Lead author Joseph Firth, based at the University's Division of Psychology and Mental Health, said: 'Looking at all of the data from clinical trials of vitamin and mineral supplements for schizophrenia to date, we can see that B vitamins effectively improve outcomes for patients.'"*

Vitamins B6, B8 and B12 for Schizophrenia

The meta-analysis[6] in question, which investigated the effect of vitamin and mineral supplementation on schizophrenia, found that studies using high doses of vitamins B6,

B8 (inositol) and B12 in combination were very effective for improving schizophrenic symptoms. Low doses were ineffective.

They also found that supplementation with B vitamins appear to be most effective when implemented early on. According to Firth:

> *"High-dose B vitamins may be useful for reducing residual symptoms in people with schizophrenia, although there were significant differences among the findings of the studies we looked at.*
>
> *There is also some indication that these overall effects may be driven by larger benefits among subgroups of patients who have relevant genetic or dietary nutritional deficiencies."*

One of the reasons for B vitamins' effect on a wide range of mood disorders and neurological and psychiatric conditions relates to the fact that these vitamins have a direct impact on the methylation cycle, and are required for the production and function of neurotransmitters and the maintenance of myelin, the fatty sheath surrounding your nerve cells.

Without this protective coating, nerve signals become slow and sporadic, which can lead to motor function problems, cognitive losses and changes in mood. B8 also aids in cell communication, allowing your cells to properly interpret chemical messages and respond accordingly.[7]

Meanwhile, B6, folate and B12 support the synthesis of S-adenosylmethionine (SAMe), which plays a significant role on the methylation cycle.[8] Hence, a deficiency in one or more of these B vitamins may lead to depression, cognitive impairment and dementia.[9]

The Surprising Links Between Pellagra and Schizophrenia

In 2012, I interviewed Dr. Andrew Saul on the topic of using vitamin B3 (niacin) for psychiatric disorders such as schizophrenia.

Saul is editor-in-chief of the Orthomolecular Medicine News Service, and among his 11 book credits is "Niacin: The Real Story," which he co-wrote with one of the leading niacin researchers and world authorities on the therapeutic use of niacin, Dr. Abram Hoffer.

Niacin, Hoffer found, may actually be a key treatment for psychological disorders, including schizophrenia.

> *"Dr. Hoffer … started doing tests, studies, and research into niacin back in the early 1950s. And by 1954, Hoffer had performed the first double-blind, placebo-controlled nutrition studies in the history of psychiatry,"* Saul said.
>
> *"Hoffer had a Ph.D. in biochemistry … He was also a medical doctor … a board-certified psychiatrist and head of psychiatry for one of the provinces in Canada … Hoffer reasoned that schizophrenia had symptoms that were very similar to those of pellagra.*
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> *Pellagra is extreme or total niacin deficiency. Pellagrans also — in addition to skin problems and many other things — have mental illness symptoms.*
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> *When vitamin B3 or niacin was first added as an enrichment or as a fortification to flour, about half of the people in mental institutions went home. This is not a well-known fact. They were there not because they were mentally ill — because of genetic, environment, or social reasons — but because they were malnourished …*
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> *He wondered about the half that didn't go home … [H]e started giving what at the time were preposterously high doses of niacin: 3,000 milligrams a day. And he was curing schizophrenia in 80% of the cases … Hoffer saw again and again that niacin worked.*
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> *Then he studied it, did the placebo-controlled, double-blind test, and started writing paper after paper on it. At that point, the American Psychiatric Association literally blacklisted him."*

Niacin May Also Work for Other Mental Disorders

A key point brought up in Saul's interview is that certain people have what Hoffer referred to as niacin dependency, meaning they need far more niacin on a regular basis than normal. Essentially, they're beyond deficient — they're dependent on high-doses of niacin in order to remain well.

This particularly appears to be the case with mental disorders. According to Saul, other researchers have since confirmed Hoffer's findings, and found that niacin can also be successfully used in the treatment of other mental disorders, such as:

- Attention deficit disorder
- General psychosis
- Anxiety
- Depression
- Obsessive-compulsive disorder

Cerebral Effects of B12 Deficiency

B12 deficiency is another B vitamin deficiency that can trigger mania, psychosis and paranoid delusions, and this has also been known since the mid-1950s. As noted in a 1956 paper titled "Cerebral Manifestations of Vitamin B12 Deficiency" published in the British Medical Journal:[10,11]

> *"In a series of 25 cases of vitamin B12 deficiency syndrome with involvement of the nervous system … I have encountered 14 cases with well-marked cerebral symptoms …*
>
> *The mental symptoms are extremely variable and include mild disorders of mood, mental slowness, memory defect which may be gross, confusion, severe agitation and depression, delusions and paranoid behavior, visual and auditory hallucinations … violent maniacal behavior and epilepsy.*

> *None of these symptoms is pathognomonic* [ed.note: characteristic of the disease], *and in their absence of anemia or of spinal signs the diagnosis of vitamin B12 deficiency may never be considered until the psychosis is far too advanced to respond to treatment*."

B12 Deficiency Is Common

While vitamin B12 is easily obtained from animal protein foods such as meat, fish, milk, cheese and eggs, advancing age can diminish your body's ability to absorb the vitamin from food.[12] Your body's ability to absorb B12 depends on three factors: adequate stomach acid, the enzyme pepsin and gastric intrinsic factor. With age, stomach acid often diminishes. You may also have insufficient amounts of acid if you take acid blockers for heartburn.

Many also lack gastric intrinsic factor. Pernicious anemia is an even greater concern, as this condition effectively prevents the absorption of B12. Vegans and strict vegetarians are also at high risk of B12 deficiency unless they take a high-quality supplement, since B12 is primarily obtained from animal foods.

As noted by Dr. Rajaprabhakaran Rajarethinam, a psychiatrist at Wayne State University School of Medicine and co-author of a 2009 case report on vitamin B12 deficiency and depression in the elderly:[13]

> *"[I]t is estimated that 10% to 15% of individuals over the age of 60 years may suffer from B12 deficiency and it is believed that atrophic gastritis type B, which may afflict 20% to 50% of the elderly, may lead to poor absorption of B12 and folate …*
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> *In this report, we describe an elderly woman who suffered from severe psychotic depression who did not improve with conventional treatment but recovered significantly following administration of vitamin B12, illustrating the possibility that vitamin B12 deficiency may play a role in the development of mood disorder*."

B Vitamins Also Protect Against Dementia and Slows Alzheimer's

Vitamins B6, B9 (folate, or folic acid in its synthetic form) and B12 have also made headlines for their powerful role in preventing cognitive decline and more serious dementia such as Alzheimer's disease. In fact, mental fogginess and memory problems are two of the top warning signs of vitamin B12 deficiency, indicating its importance for brain health.

Here, one of the mechanisms of action is the suppression of homocysteine, which tends to be elevated when you have brain degeneration. One study confirming this was published in 2010.[14] Participants received either a placebo or 800 micrograms (mcg) of folic acid, 500 mcg of B12 and 20 mg of B6. The study was based on the presumption that by controlling homocysteine levels you might be able to reduce brain shrinkage, thereby slowing the onset of Alzheimer's.

Indeed, after two years those who received the vitamin-B regimen had significantly less brain shrinkage compared to the placebo group. Those who had the highest levels of homocysteine at the start of the trial experienced brain shrinkage at half the rate of those taking a placebo.

A 2013 study[15] took this research a step further, showing that not only do B vitamins slow brain shrinkage, but they specifically slow shrinkage in brain regions known to be most severely impacted by Alzheimer's disease.

Moreover, in those specific areas the shrinkage is decreased by as much as 700%! As in the previous study, participants taking high doses of folic acid and vitamins B6 and B12 lowered their blood levels of homocysteine, and brain shrinkage was decreased by as much as 90%.

Where to Find These Valuable Brain Nutrients

Mood disorders, cognitive decline and psychiatric problems can have many underlying factors, but addressing your diet is often a good place to start. Not only can nutritional

deficiencies wreak havoc with your brain function, your gut health also plays an important role, and toxic exposures from your diet or environment can also contribute.

Ideally, you'd want to address all of these issues. I've written extensively about all of them. As for nutritional deficiencies, B vitamins appear to be very important, as are animal-based omega-3, vitamin C and vitamin D. As a general rule, I recommend getting most if not all of your nutrition from REAL FOOD, ideally organic to avoid toxic pesticides, and locally grown. Depending on your situation and condition however, you may need one or more supplements.

To start, review the following listing of foods that contain the B vitamins discussed in this article. If you find that you rarely or never eat foods rich in one or more of these nutrients, you may want to consider taking a high-quality, ideally food-based supplement.

Also consider limiting sugar and eating fermented foods. The entire B group vitamin series is produced within your gut, assuming you have healthy gut flora. Eating real food, ideally organic, along with fermented foods will provide your microbiome with important fiber and beneficial bacteria to help optimize your internal vitamin B production.

Nutrient	Dietary Sources	Supplement Recommendations
Niacin (B3)	Liver, veal, chili powder and sun dried tomatoes have some of the highest amounts of niacin per gram.[16] Other niacin-rich foods include baker's yeast, paprika, espresso coffee, anchovies, spirulina, duck,	The dietary reference intake established by the Food and Nutrition Board ranges from 14 to 18 mg per day for adults. Higher amounts are recommended depending on your condition. For a list of recommended

Nutrient	Dietary Sources	Supplement Recommendations
	shiitake mushrooms and soy sauce.[17]	dosages, see the Mayo Clinic's website.[18] For pellagra, discussed above, doses range from 50 to 1,000 mg daily.
Vitamin B6	Turkey, beef, wild-caught salmon, sweet potatoes, potatoes, avocado and banana.[19,20]	Nutritional yeast is an excellent source of B vitamins, especially B6.[21] One serving (2 tablespoons) contains nearly 10 mg of vitamin B6. Not to be confused with Brewer's yeast or other active yeasts, nutritional yeast is made from an organism grown on molasses, which is then harvested and dried to deactivate the yeast. It has a pleasant cheesy flavor and can be added to a number of different dishes.

Nutrient	Dietary Sources	Supplement Recommendations
B8 (inositol/biotin)	Meat, egg yolks, fish, liver, poultry, nuts and legumes.[22]	B8 is not recognized as an essential nutrient and no recommended daily intake has been set. That said, it's believed you need about 300 mcg per day. Vitamin B8 is sometimes listed as biotin on supplements. Brewer's yeast is a natural supplemental source.[23]
Folate (B9)	Fresh, raw, organic leafy green vegetables and a wide variety of beans.[24]	Folic acid is a synthetic type of B vitamin used in supplements; folate is the natural form found in foods. (Think: folate comes from foliage, edible leafy plants.) For folic acid to be of use, it must first be activated into its biologically active form (L-5-MTHF). This is the form able to

Nutrient	Dietary Sources	Supplement Recommendations
		cross the blood-brain barrier to give you the brain benefits noted. Nearly half of the population has difficulty converting folic acid into the bioactive form due to a genetic reduction in enzyme activity. For this reason, if you take a B-vitamin supplement, make sure it contains natural folate rather than synthetic folic acid. Nutritional yeast is an excellent source.[25]
Vitamin B12	Vitamin B12 is found almost exclusively in animal tissues, including foods like beef and beef liver, lamb, snapper, venison, salmon, shrimp, scallops, poultry, eggs and dairy products.	Nutritional yeast is also high in B12, and is highly recommended for vegetarians and vegans. Sublingual (under-the-tongue) fine mist spray or vitamin B12 injections are also effective, as they

Nutrient	Dietary Sources	Supplement Recommendations
	The few plant foods that are sources of B12 are actually B12 analogs that block the uptake of true B12.	allow the large B12 molecule to be absorbed directly into your bloodstream.

Sources and References

- [1] Medscape, Dermatologic Manifestations of Pellagra
- [2, 6] Psychological Medicine February 16, 2017, doi: 10.1017/S0033291717000022
- [3] Medical News Today February 16, 2017
- [4] Psychological Medicine. February 16, 2017
- [5] University of Manchester. B Vitamins Reduce Schizophrenia Symptoms. February 16, 2017
- [7] Healthy Eating, Vitamin B8
- [8] The Psychiatric Clinics of North America, 2013 Mar;36(1):1-13. doi: 10.1016/j.psc.2012.12.001
- [9] Current Medical Chemistry, 2016;23(38):4317-4337
- [10] British Medical Journal 956 Dec 15; 2(5006): 1394–1398
- [11] British Medical Journal 956 Dec 15; 2(5006): 1394–1398 (Full article, PDF)
- [12] New York Times September 6, 2016
- [13] Prim Care Companion J Clin Psychiatry 2009; 11(5): 269–270
- [14] PLoS ONE 5(9): e12244
- [15] PNAS 2013 Jun 4;110(23):9523-8
- [16, 17] Healthaliciousness.com, Top 10 High Niacin Foods
- [18] Mayo Clinic Niacin Dosing
- [19] Harvard T.H. Chan School of Public Health. Vitamin 6
- [20] Healthalisciousness.com, Top 10 Foods High in Vitamin B6
- [21] Medical News Today December 21, 2023
- [22] Livestrong. 10 Foods High in Inositol for Better Brain Health. October 16, 2023
- [23] Diethealthclub.com Biotin
- [24] Harvard T.H. Chan School of Public Health. Folate Vitamin B9
- [25] Chalkboard, Nutritional Yeast