

Vitamin D and Depression

<http://www.vitamindcouncil.com/depression.shtml>

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Is psychiatry that branch of medicine that can explain everything but predict nothing? No group of scientists is working harder to change that definition than those at the National Institute of Mental Health. Among the scientists at NIMH are many of the most famous names in psychiatry and some of my personal heroes.

They know that nothing could be a crueler message than to tell those suffering from major depression that physiological amounts of vitamin D will cure it. Premature claims for a variety of nonprescription supplements have given suffering millions hopes that were soon dashed on the rocks of scientific reality. Even the supplements that may help, such as SAME, omega-3/omega-6 intake ratios or lowering homocysteine with adequate methylating B vitamins/TMG are not cure-alls.

Perhaps raising false hopes of curing an illness as devastating as major depression is not as serious as some of psychiatry's past crimes, such as telling mothers of schizophrenics that they caused their child's illness or using false recovered memories of sexual abuse to the destroy innocent families. That said, we must not raise false hopes. Nevertheless, what do we know about major depression and vitamin D?

We know that 15 years ago, Professor Walter E. Stumpf of the University of North Carolina, one of the great pioneers in vitamin D research, predicted a substantial role for both [bright light and vitamin D](#) in psychiatry.

Bright light in the visible spectrum (without any vitamin D producing UVB) clearly improves mood although it is hard to conduct good studies due to the lack of a control condition. Therefore, the question is does vitamin D have an effect on mood that differs from, or is complimentary to, the effect of bright light?

Does Vitamin D Supplementation Help Depression?

Harris and Dawson-Hughes found 400 IU of ergocalciferol (vitamin D2) did not help the [seasonal mood swings](#) of 125 Boston women compared to placebo. Such mood swings can be severe and are related to season, latitude and sun exposure. The authors did not obtain 25(OH)D levels but we now

know 400 IU of ergocalciferol is close to a homeopathic dose of vitamin D. We also know ergocalciferol is a significantly less potent form of vitamin D than is the naturally occurring vitamin D, cholecalciferol. One of the authors, Professor Dawson-Hughes, will be the first one to tell you 400 IU of ergocalciferol is an inadequate dose of vitamin D.

If you are thinking that Oren, Schulkin and Rosenthal have already shown that vitamin D has nothing to do with seasonal affective disorder, I am sorry to tell you they measured the wrong [vitamin D metabolite](#), 1,25(OH)D, which can be high, low or normal in almost any condition. The only lab test that should be used to measure vitamin D stores, vitamin D deficiency and vitamin D adequacy is 25(OH)D, which they did not measure.

In a 1998 controlled experiment, Australian researchers found that cholecalciferol (400 and 800 IU), significantly enhanced positive affect when given to healthy individuals. Forty-four subjects were given 400 IU cholecalciferol, 800 IU cholecalciferol, or placebo for 5 days during late winter in a random double-blind study. Results on a self-report measure showed that vitamin D₃ enhanced positive affect a full standard deviation and there was some evidence of a reduction in negative affect. The authors concluded, "[vitamin D3 deficiency](#) provides a compelling and parsimonious explanation for seasonal variations in mood."

In 1999, in an even more interesting study, the vitamin D scientist, Bruce Hollis, teamed up with Michael Gloth and Wasif Alam to find that 100,000 IU of vitamin D given as a one time oral dose improved depression scales better than light therapy in a small group of patients with [seasonal affective disorder](#). All subjects in the vitamin D group improved in all measures and, more importantly, improvement in 25(OH)D levels was significantly associated with the degree of improvement.

[Are Low Vitamin D Blood Levels Associated With Major Depression?](#)

[German](#) authors found healthy controls had an average serum 25-OH-D of 46 ng/L while depressed subjects had 37 ng/L. [Finnish](#) authors found no seasonal differences between seasonal affective disorder patients and normal controls but also found no seasonal variations in 25(OH)D levels in the same patients. Most recently, a direct correlation was found between [25\(OH\)D levels and mental health](#) scores in a group of healthy, elderly adults, but 1,000 IU of cholecalciferol did not improve mental health scores of these highly-functional subjects.

Has Depression Increased As Vitamin D Levels Have Fallen?

To further strengthen the case that vitamin D deficiency causes some cases of depression, evidence should exist that the incidence of depression has increased over the last century. During that time, humans have reduced their sunlight exposure via urbanization (tall buildings and pollution reduce UVB), industrialization (working inside reduces UVB exposure), cars (glass totally blocks UVB), clothes (even light clothing blocks UVB), sunblock and misguided medical advice to never let sunlight strike you unprotected skin.

All these factors contribute to reduce circulating 25(OH)D levels. Klerman and Weissman's claim that [major depression has increased](#) dramatically over the last 80 years is one of the most famous (and controversial) findings in modern psychiatry. Something called recall bias (a type of selective remembering) may explain some of the reported increase, but does it explain it all?

But if you really want to know about increasing rates of mental illness over the last 2 and 1/2 centuries (when vitamin D levels must have really plummeted), read the incredible book by the scientist the Washington Post called the "most famous psychiatrist in America." E. Fuller Torrey: [The Invisible Plague: The Rise of mental Illness from 1750 to the Present](#), 2002, Rutgers University Press.

Is Major Depression Associated With Vitamin D Deficiency Diseases?

Is depression associated with other [conditions](#) thought to be associated with vitamin D deficiency, such as heart disease, hypertension, diabetes, rheumatoid arthritis, cancer or osteoporosis? For example, there is a strong association between heart disease and depression, and countless theories to explain it. The obvious one - that heart disease would cause anyone to get depressed - is incorrect. You see, depression often precedes the heart disease, suggesting a third factor causes both. Moreover, if depression were associated with [heart disease](#), one would expect [excess unexplained mortality](#) in major depression, which is a well-established finding.

(Remember that association does not mean causation. If A is associated with B, then A could cause B, B could cause A, or a third factor(s), C, could cause both A and B. Therefore, if heart disease is associated with depression then the possibilities are depression caused the heart disease, heart disease caused the depression, or an unknown factor(s), perhaps vitamin D deficiency, caused some portion of both the depression and the heart

disease. Perhaps being the key word. Remember, most of the serious errors in psychiatry (and medicine) are made when associations are confused with causation; or when subsequence is confused with consequence)

- 0. What about other diseases associated with vitamin D deficiency? What explains the significant association between depression and [hypertension](#)?
 - . Depression and [diabetes](#)?
- 0. Depression and [rheumatoid arthritis](#)?
- 0. Depression and [cancer](#)? [advanced cancer](#), [pancreatic cancer](#)
- 0. Depression and decreased [bone mineral density](#)? [bone mineral density in women](#), [bone mineral density in women](#) additional study.
 - . The abstract of our favorite study showing the association between [depression and bone mineral density](#) concludes with the following sentence, "We postulate that there may be an unmeasured third factor, such as an endogenous steroid, that is responsible for both low BMD and depression." The paper says not a word about the steroid hormone, vitamin D.

Therefore, heart disease, hypertension, diabetes, rheumatoid arthritis, cancer and low bone mineral density are all associated with depression. One parsimonious explanation is that vitamin D deficiency causes some portion of all these illnesses. Remember, all these diseases are multifactorial, so we are only talking about the percentage of the illness possibly caused by vitamin D deficiency. See Zittermann for the best review of [diseases associated with vitamin D deficiency](#).

Does Vitamin D Effect The Brain?

Vitamin D rapidly increases the in-vitro genetic expression of [tyrosine hydroxylase](#) (the rate-limiting enzyme for the catecholamine biosynthesis) by threefold.

Summer sunlight increases brain [serotonin](#) levels twice as high as winter sunlight, a finding compatible with both bright light in the visible spectrum and vitamin D affecting mood.

Vitamin D is widely involved in brain function with nuclear receptors for vitamin D localized in neurons and glial cells. Genes encoding the enzymes involved in the metabolism of vitamin D are expressed in brain cells. The reported biological effects of vitamin D in the nervous system include the biosynthesis of neurotrophic factors, inhibition of the synthesis of inducible nitric oxide synthase and increased glutathione levels, suggesting a role for

the hormone in [brain detoxification](#) pathways.

What Does It Mean?

Evidence suggests that vitamin D may help mood but that evidence is not conclusive. (Remember, the way our medical literature system works, scientists often do not publish negative studies). The two positive studies above used vitamin D to treat seasonal affective disorder, not major depression. We were unable to find any studies in the literature in which patients with depression were treated with enough natural sunlight, artificial sunlight or plain old cholecalciferol to raise their levels to 35ng/ml or higher. We all know how we feel after a week at the beach, but is that bright light or vitamin D or something else?

Evidence exists that major depression is associated with low vitamin D levels and that depression has increased in the last century as vitamin D levels have surely fallen. Evidence exists that depression is associated with heart disease, hypertension, diabetes, rheumatoid arthritis, cancer and low bone mineral density, all illnesses thought to be caused, in part, by vitamin D deficiency. Finally, vitamin D has profound effects on the brain including the neurotransmitters involved in major depression.

Recommendations:

Therefore, vitamin D may help major depression. It is too early to say. To know for sure, patients with severe major depression would have to have baseline 25(OH)D blood levels, be treated with doses of vitamin D adequate to raise their levels to at least 35 ng/ml for several months and be compared to a normal control group treated with placebo. No one has ever published such a study.

However, it is not too early to heed the following advice: If you have depression, get your 25(OH)D level checked and, if it is lower than 35 ng/ml (87nm/L), you are vitamin D deficient and should take the steps outlined below to raise it. If you are not depressed, get your 25(OH)D level checked and, if it is lower than 35 ng/ml (87nm/L), you are vitamin D deficient and should take the steps outlined below to raise it.

No one knows for sure if vitamin D will help depression. I can tell you with absolute scientific certainty that vitamin D will cure routine vitamin D deficiency.

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