



Disclaimer: I am not a qualified health practitioner. You should always consult a qualified health practitioner if you are sick. Opinions expressed on this website are my own or come from my own experience or research

Vitamin D

Recent large observational data have suggested that more than 40% of Europeans are deficient in Vitamin D and 13% severely deficient. In the US and Canada the figures for Vitamin D deficiency are reported at 24% and 36% respectively with severe deficiency at 5.9% and 7.4%.

Vitamin D deficiency is currently defined as 25(OH)D levels <50 nmol/L (or 20 ng/ml)
Severe Vitamin D deficiency is currently defined as 25(OH)D <30 nmol/L (or 12 ng/ml)

Worldwide, many countries report high prevalence of Vitamin D deficiency. Severe deficiency is common in over 20% of the population in India, Tunisia, Pakistan and Afghanistan. For example, it is estimated that 490 million individuals are Vitamin D deficient in India.

Low vitamin D status is emerging as a very common condition worldwide, and several studies from basic science to clinical applications have highlighted a strong association with chronic diseases, as well as acute conditions.

Low Vitamin D is associated with an increased risk of developing and worsening cardiovascular disease, different types of cancers such as colon, breast, prostate and haematological cells (relating to blood and the tissues that make it), diabetes, autoimmune diseases, and overall mortality.

What is the cause of Vitamin D deficiency? Well, it is a combination of lack of sunlight, diet, the rise of digital entertainment keeping people indoors and the vigilance of sunscreen application. Of course, we must protect our skin from the damaging rays of the sun in the heat of the day, the connection with skin cancer is clear, but... we actually need those rays when they are gentler, in the morning and late afternoon, for Vitamin D production.

A meta-analysis of randomised controlled trials has found that Vitamin D can reduce mortality from all causes although the indication is that Vitamin D needs to be given with calcium.

When you consider that that you have 30,000 genes in your body and Vitamin D has been shown to affect the transcription of 1,000 target genes, that researchers found 2,776 binding sites along the length of the genome and that vitamin D receptors are found in almost all



human tissues, you can begin to understand the true impact this vitamin can have on your health.

Just one important gene that Vitamin D up-regulates affects your ability to fight infections. This gene produces over 200 anti-microbial peptides, the most important of which is cathelicidin, a naturally occurring broad-spectrum anti-biotic.

General Immunity

As the vitamin D receptor is expressed on immune cells (B cells, T cells and antigen presenting cells), Vitamin D can modulate the innate and adaptive immune responses. Deficiency in vitamin D is associated not only with increased autoimmunity but also an increased susceptibility to infection.

Vitamin D can decrease your risk of common respiratory tract infections. Studies show an inverse relationship between lower respiratory tract infections and Vitamin D levels. Optimising your vitamin D level can lower your risk of colds, flu and other respiratory tract infections.

Auto-immunity

A 2019 literature review in Autoimmunity Review has demonstrated yet again that there is a clear inverse association between vitamin D and the development of several autoimmune diseases.

The review, which considered over 130 studies, found that autoimmune diseases such as SLE, thyrotoxicosis, type 1 diabetes, MS, iridocyclitis, Crohn's disease, ulcerative colitis, psoriasis vulgaris, seropositive RA (Rheumatoid Arthritis) and polymyalgia rheumatica all correlate inversely with vitamin D.

This review highlights how deficiency of vitamin D seems to be part of the pathogenesis of some autoimmune conditions as well as considering the effects of supplementation with vitamin D on an active autoimmune disease.

One possible mechanism appears to be that vitamin D plays an important role on several different aspects of the immune system including effects on modulating T cells and cytokines that are involved in the progression or suppression of autoimmune disorders.

Supplementation with vitamin D had a significant effect on several of the main autoimmune diseases particularly, connective tissue disease, autoimmune thyroiditis, and autoimmune neuromuscular diseases with the effect of vitamin D on those with autoimmune thyroiditis being described as significant for 88.9% of the test population.

Bone Health

Low vitamin D levels could increase your risk of osteoporosis and broken bones. A severe shortage of Vitamin D causes rickets and osteomalacia, which is soft, weak bones.



Vitamin D helps your body absorb and use calcium, which gives your bones their strength and hardness. So, supplementation with both Vitamin D and Calcium is key to managing osteoporosis.

Other supplements like Vitamin K2 and Magnesium could contribute to skeletal health as they both appear to be involved in bone metabolism.

A recent case report discusses a patient who developed an atypical femoral fracture having been treated for osteoporosis for 10 years. He was treated with Vitamin K2 and 4 months later an X-ray showed that the fracture had healed completely. Clearly more research is needed to fully understand the benefits of Vitamin K2.

Data suggests that supplementing with Vitamin K2 might improve bone quality and reduce fracture risk in osteoporotic patients, potentially enhancing the efficacy of Calcium plus Vitamin D. Magnesium deficiency could negatively influence bone and muscle health.

Ref: <https://pubmed.ncbi.nlm.nih.gov/33845598/>

Other Effects of Vitamin D

Vitamin D has other roles in the body such as reduction of inflammation and the modulation of such processes as cell growth, neuromuscular and glucose metabolism.

Cancer

Many gene encoding proteins that regulate cell proliferation, differentiation, apoptosis (programmed cell death) are modulated in part by vitamin D and hence it has a part to play in the prevention of cancer and prevention of death by cancer.

As I mentioned above, almost all human tissues have vitamin D receptors. For example, healthy prostate tissue contains enzymes that convert the inactive form of Vitamin D to the active form.

Studies have shown that the positive expression of the Vitamin D receptor (VDR) in invasive breast tumours is associated with favourable tumour characteristics, such as smaller size, lower grade and a lower risk of mortality.

Many of the studies to date on the correlation between Vitamin D and cancer have been observational. The recent VITAL trial, a large, well designed trial, looking at Vitamin D supplementation and its effects on cancer indicate that in the short term there may not be much benefit but in the longer term, the difference in the incidence of cancer between the groups seemed to widen. The researchers plan to follow the groups for another 2-5 years.

More studies need to be carried out as laboratory studies have suggested that high levels of Vitamin D may reduce the aggressiveness of cancer and the likelihood of metastasis. Other studies have suggested Vitamin D supplementation may reduce the risk of dying from cancer.



Also, different cancers may be more sensitive to Vitamin D supplementation and genetics may play a part as well. There is a lot more to be learned in this area.

General Comment

What is important to understand is that whilst Vitamin D clearly has an important impact on our health, it is not a panacea by itself. The benefits of Vitamin D will be best expressed if you have a healthy gut and are eating a broad, healthy diet ie giving your body the nutrients it needs to function well, along with taking exercise, enjoying community ie family and friends, managing stress, getting enough sleep etc.

If you are eating unhealthy, processed food, drinking too much alcohol, not getting enough sleep, not taking exercise, under stress etc, your body will starved of vital nutrients, your hormones will most likely be out of balance, immune system compromised and have poor gut health. The body will be unable to function properly, repair or maintain itself. Under these conditions, Vitamin D alone is unlikely to prevent the onset of health issues although it may help to some degree and will be part of the solution.

Optimising your Vitamin D

It is difficult to obtain sufficient vitamin D from food. Good sources include oily fish, red meat, liver and egg yolks.

However, farmed salmon contains only 25% (about 250IU) of the Vitamin D found in wild salmon (900-1,300IU).

A typical egg yolk only contains 37IU of Vitamin D. Levels in egg yolks depend on sun exposure and the Vitamin D content of chicken feed. Further, when given the same feed, pasture raised chickens with sun exposure produce egg yolks with 3-5 times the Vitamin D level.

The best way to get Vitamin D is by skin exposure in the warm, sunny months. Expose as much of your skin as possible to the sun, without sun cream or sunblock, before 10am or after 3.30pm for 15-20 minutes every day. If you are unable to do this or the weather does not support it, take a Vitamin D supplement.

It is a good idea to take Vitamin D daily in the cold, dark months, certainly from September to the end of April in the UK. However, dosing with vitamin D is specific to the individual. You should get tested by your doctor first to check your levels.

Many authorities recommend up 2,000IU as a safe dose. Some research claims higher doses are beneficial whereas other research indicates that very high doses ie 5,000IU and 10,000 IU (considered a megadose) do not necessarily give benefit and may cause harm. The upper safe limit is generally regarded as 4,000IU. Research so far shows that Vitamin D has only rare side effects and a relatively wide safety margin.



Zest for Life

To convert ng/mL into the European measurement (nmol/L), simply multiply the ng/mL measurement by 2.5. To calculate how much vitamin D you may be getting from regular sun exposure in addition to your supplemental intake, use the DMinder app.

Vitamin D intake observed to produce noted 25(OH)D serum levels in 90% of adults (age 18 years and older), weighing 150 lbs. (N=7324)

RECOMMENDED RANGE: 40-60 ng/ml

WHAT TO DO

- 1 Test
- 2 Establish recommended intake level
- 3 Test again in 3-6 months

(For supplements, vitamin D3, cholecalciferol may be used.)

Individuals should consult with a health care practitioner to develop a custom plan.

Change in Serum Level Based on Intake (IU/day) for 90% of Adults* (N=7324)

Expected Level (ng/ml)	20	30	40	50	60
10	2000	4000	6000	10,000	10,000
15	1000	3000	6000	9000	10,000
20		2000	5000	8000	10,000
25		1000	4000	7000	10,000
30			3000	6000	10,000
35			1000	5000	9000
40				3000	8000
45				2000	6000
50					4000

* values rounded to the nearest 1000 IU; highest recommended intake is 10,000 IU/day

Example: With a starting serum level of 20 ng/ml, an additional intake of approximately 5000 IU/day would be sufficient for 90% of adults (age 18 years and older, weighing 150 lbs) to achieve a serum level of at least 40 ng/ml.

Finally, it is suggested that you should take Vitamin D3 with K2 for better absorption and improved bone health. I buy mine in liquid form in UK from a company called Nutri – it’s reasonably priced and should last you a while. See below.

<https://www.nutriadvanced.co.uk/vitamin-d3-1000iu-with-k2.html>

References

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