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The Link Between Vitamin D and Psoriasis

Analysis by Dr. Joseph Mercola | January 07, 2025

STORY AT-A-GLANCE

- People with psoriasis typically have lower vitamin D levels (averaging 6.26 ng/mL less than healthy individuals) and elevated parathyroid hormone levels, suggesting a connection between the condition and vitamin deficiency
- Research reveals a clear correlation between psoriasis severity and vitamin D levels; patients with more extensive lesions consistently show lower vitamin D levels
- The Wnt5a pathway and vitamin D receptors interact in psoriatic skin — when vitamin D receptors are reduced, Wnt5a becomes overactive, leading to inflammation and rapid cell growth
- Obesity complicates psoriasis management by trapping vitamin D in fat tissue, creating a cycle where deficiency increases inflammation and worsens both conditions
- Safe sun exposure is important for vitamin D production, but those consuming seed oils should limit exposure until their body detoxifies, typically taking four to six months; regularly testing your vitamin D levels and supplementing accordingly may be necessary in some cases

Psoriasis is more than just a skin condition; it's a chronic autoimmune disorder that manifests as red, scaly plaques on your skin. These plaques result from the abnormal proliferation of keratinocytes, driven by an overactive immune system releasing proinflammatory mediators. This condition affects approximately 2% to 3% of the global population, with higher prevalence rates in Northern Europe.[1]

Psoriasis doesn't just affect your skin; it also impacts your quality of life and increases the risk of developing other health conditions, including metabolic syndrome and cardiovascular disease. Mitochondrial function plays a role in the development and progression of **autoimmune diseases** like psoriasis.

Most people have dysfunctional mitochondria, and if you don't have enough mitochondria, you can't create cellular energy efficiently enough to ward off these conditions. However, vitamin D deficiency has also gained attention as a contributor to psoriasis. This essential nutrient influences keratinocyte function, immune response and skin barrier integrity — all of which play a role in the disease.[2]

The Role of Vitamin D in Skin Health

Vitamin D is known primarily for its role in bone health and calcium regulation. However, its importance extends far beyond your skeleton. Vitamin D plays a role in immune modulation and skin health, helping to regulate the proliferation and differentiation of keratinocytes — the cells responsible for forming your skin's outer layer.

It also supports your skin barrier and reduces inflammation, making it essential for maintaining healthy skin. Your body produces vitamin D when your skin is exposed to sunlight, but it can also be obtained from dietary sources such as fatty fish, fortified foods and supplements.

Despite its availability, vitamin D deficiency is common, especially in individuals who avoid sun exposure, live in northern latitudes or have darker skin that reduces vitamin D synthesis. For people with psoriasis, vitamin D deficiency may not just be a consequence of avoiding sun exposure but could also be linked to the disease's underlying mechanisms.

Evidence Linking Vitamin D Deficiency to Psoriasis

Researchers have found that people with psoriasis often have significantly lower levels of serum 25-hydroxyvitamin D (25(OH)D), the marker used to assess vitamin D status.

This deficiency may exacerbate the inflammatory processes underlying psoriasis, making **adequate vitamin D levels** a key consideration in managing the condition.

A systematic review and meta-analysis of 27 studies revealed that individuals with psoriasis have significantly lower serum levels of vitamin D compared to healthy controls. On average, the vitamin D levels of psoriasis patients were 6.26 ng/mL lower than those of individuals without the condition.[3]

Interestingly, the studies also found that psoriasis patients had elevated levels of parathyroid hormone (PTH), a marker often associated with low vitamin D. High PTH levels could reflect the body's effort to maintain calcium balance despite vitamin D deficiency. Some researchers suggest that PTH might even play a role in psoriasis pathogenesis by influencing immune activity, particularly the proliferation of proinflammatory T-helper 17 (Th17) cells.

Psoriasis symptoms may also be deeply tied to inflammation driven by elevated levels of cytokines like IL-17, IL-23 and IL-18.[4] These molecules are central to the immune processes underlying psoriasis, with IL-17 being particularly linked to moderate and severe cases.

Interestingly, vitamin D plays a role in regulating these inflammatory pathways. The active form of vitamin D, 1,25(OH)2D3, has been shown to suppress IL-17 and other proinflammatory cytokines while promoting anti-inflammatory T-regulatory cells.

However, in a recent study, researchers found no direct correlation between serum vitamin D levels and cytokine concentrations, suggesting that vitamin D's regulatory effects might depend on other factors or thresholds yet to be fully understood.[5] These findings emphasize the dual role of vitamin D: While it may not directly lower cytokine levels, maintaining sufficient vitamin D could support your immune system's balance and reduce the overall inflammatory burden.

The Link Between Psoriasis Severity and Vitamin D Levels

Emerging evidence from one of the largest studies to date, presented at Nutrition 2023, the annual meeting of the American Society for Nutrition, highlights another striking connection between vitamin D levels and the severity of psoriasis. Researchers analyzing data from the National Health and Nutrition Examination Survey (NHANES) found a clear, linear relationship: the more severe your psoriasis, the lower your vitamin D levels tend to be.[6]

This comprehensive study, involving almost 500 psoriasis cases, provides fresh insights into the role of vitamin D in managing this chronic inflammatory skin condition. Psoriasis patients with the smallest areas of skin affected by the disease had the highest average levels of vitamin D, while those with the most extensive lesions showed the lowest levels.

Even after adjusting for factors like smoking and body mass index, vitamin D deficiency remained a significant predictor of greater psoriasis severity. While synthetic vitamin D creams are gaining traction as prescription treatments, optimizing your vitamin D levels using safe sun exposure and oral supplementation, if necessary, could serve as an accessible and complementary strategy for psoriasis management.

In addition, your body's response to vitamin D depends on tiny structures inside cells called vitamin D receptors (VDR). In people with moderate to severe psoriasis, research shows these receptors are more active on certain immune cells, especially CD14+ monocytes, compared to healthy individuals.[7]

This increased activity might be linked to the inflammation driving psoriasis. Interestingly, as inflammation improved with treatment, the difference in VDR activity between psoriasis patients and healthy people disappeared, even though the severity of the condition decreased. This suggests that VDR activity is tied more to overall inflammation than directly to how severe your psoriasis is.

While this study didn't find a clear connection between VDR activity and vitamin D levels, ensuring your vitamin D is at healthy levels may still help your body better manage inflammation. It's another reason to consider vitamin D as part of your psoriasis management strategy.

How Cellular Signaling and Obesity Influence Psoriasis

The Wnt signaling pathway acts like a cellular communication system that helps regulate how skin cells grow, divide and repair themselves. It's essential for keeping your skin healthy and balanced. In psoriasis, however, this system appears to go into overdrive, particularly through a protein called Wnt5a. This overactivity can cause skin cells to multiply too quickly and trigger inflammation, leading to the thickened, scaly patches characteristic of the disease.

Researchers found that Wnt5a levels are much higher in psoriatic skin compared to healthy skin, particularly in the upper layers.[8] This suggests Wnt5a is not just involved but actively driving some of the abnormal changes seen in psoriasis. Importantly, Wnt5a interacts with immune cells and encourages the release of inflammation-causing chemicals like IL-17A, which worsen the condition.

VDRs, meanwhile, are like doorways on skin cells that let vitamin D in to do its job. Again, vitamin D helps skin cells grow and repair while reducing inflammation. However, in psoriasis, VDR levels are significantly lower in affected skin compared to healthy skin, making it harder for vitamin D to work effectively. This reduction may weaken your skin's natural defenses and contribute to the inflammation and rapid skin cell growth seen in psoriasis.

The study also found that patients who developed psoriasis later in life had even lower VDR levels, suggesting that age of disease onset may influence how VDRs function.[9] Researchers also revealed a connection between VDRs and Wnt5a, suggesting these two factors might influence each other in psoriasis.

When VDR levels are low, Wnt5a activity may become unchecked, leading to more inflammation and overactive skin cell growth. This imbalance could be a key factor in why psoriasis develops or worsens.[10]

Vitamin D deficiency, obesity and psoriasis are also interconnected in a way that amplifies inflammation and health risks. Obesity is both a risk factor for developing psoriasis and a condition worsened by the systemic inflammation psoriasis triggers.

Lower vitamin D levels are common in obese individuals, as the vitamin gets trapped in fat tissue and less is available for use in your body.[11]

This deficiency creates a vicious cycle: low vitamin D contributes to increased inflammation and poor immune regulation, which worsens psoriasis and its associated comorbidities, like metabolic syndrome and cardiovascular disease. Studies have shown that higher vitamin D levels are associated with reduced risk of these conditions, highlighting the importance of adequate sunlight exposure and supplementation, if necessary, particularly for obese psoriatic patients.[12]

Harnessing Sunlight for Balanced Vitamin D Levels

Mindful exposure to sunlight is the best way to support your vitamin D levels while gaining other health benefits tied to responsible sun exposure. Healthy vitamin D levels often reflect consistent, moderate time in the sun, which is associated with advantages like reduced cancer risk and improved longevity.

Sunlight also stimulates melatonin production, a natural compound with anticancer properties. However, the benefits of sunlight require careful moderation to avoid overexposure. Finding the right balance ensures you reap the rewards while minimizing risks.

If your diet includes seed oils, it's important to be extra cautious with sun exposure. Seed oils are high in linoleic acid (LA), an omega-6 fatty acid that oxidizes under UV light. This reaction triggers inflammation and DNA damage in your skin. To protect your skin and overall health:

- **Limit midday sun exposure —** If seed oils are part of your diet, avoid peak UV hours — typically 11 a.m. to 3 p.m. during summer (Daylight Saving Time) or 10 a.m. to 2 p.m. in Standard Time.
- **Remove seed oils from your diet —** Avoid peak sun exposure until you have removed seed oils from your diet for four to six months. This gives your body time to detoxify accumulated seed oils, allowing for safer, extended sun exposure.

Your body's ability to handle sunlight also depends on factors like body fat and skin color. Adipose tissue stores fat-soluble compounds, including oxidized seed oils, which extend your vulnerability to the sun. Additionally, individuals with darker skin tones need longer sun exposure to synthesize the same amount of vitamin D as those with lighter skin due to higher melanin levels. Understanding your unique needs will help you maximize the benefits of sunlight safely.

Natural Approaches to Sun Protection

Monitoring your skin during sun exposure is a simple but effective strategy for preventing sunburn. Regularly check for any redness or pinkness — a "sunburn test" tailored to your skin type and the season. If your skin remains unaffected, your exposure is likely within a safe range.

As mentioned, reducing your body's stores of LA significantly lowers your risk of sunburn and skin cancer. However, stay attentive to how your skin reacts, and seek shade immediately if redness appears. If you plan to spend time in the sun before your body has fully cleared seed oils, the following additional protective measures will help shield your skin:

- **Astaxanthin —** This potent antioxidant combats free radicals and inflammation, bolstering your skin's resistance to UV damage. Take 12 milligrams daily to strengthen your defenses against sun-related harm.
- **Niacinamide (Vitamin B3) cream —** Protect your skin from UV-induced DNA damage while reinforcing its natural barrier. Apply the cream topically before heading into the sun.
- **Aspirin —** Taking a baby aspirin 30 to 60 minutes before sun exposure helps prevent the conversion of LA into harmful oxidized metabolites (OXLAMs), which are linked to skin cancer. This provides an added layer of protection.
- **Molecular hydrogen (H2) —** This molecule minimizes oxidative stress by neutralizing harmful free radicals, such as the hydroxyl radical. Its ability to

penetrate cells promotes recovery and reduces inflammation while maintaining beneficial reactive oxygen species (ROS). Molecular hydrogen also supports energy production and cellular health, offering protection against sun exposure and dietary LA-related challenges.

Supplementing with Vitamin D When Sunlight Is Limited

If you can't get enough sunlight, vitamin D supplementation helps maintain healthy levels. A deficiency is defined as less than 20 ng/mL, but levels above this threshold are still often insufficient for optimal health. To ensure proper vitamin D3 intake, test your levels twice a year and adjust supplementation and sun exposure accordingly. Retest after three to four months to verify progress. Optimal levels are:

- **Ideal for health and disease prevention —** 60 to 80 ng/mL (150 to 200 nmol/L)
- **Minimum sufficiency threshold —** 40 ng/mL (100 nmol/L in Europe)

By balancing sun exposure, incorporating protective strategies, and supplementing with vitamin D3 as needed, you support your overall health and reduce psoriasis while mitigating the risks associated with too little or too much sun exposure.

Sources and References

- [1, 2, 3] Nutrients. 2023 Jul 30;15(15):3387
- [4, 5] Biomed Pap Med Fac Univ Palacky Olomouc Czech Repub. 2024 Jun; 168(2):124-131
- [6] American Society for Nutrition July 25, 2023
- [7] Int J Mol Sci. 2024 Oct 3;25(19):10677
- [8, 9, 10] Acta Dermatovenerol Alp Pannonica Adriat. 2023 Dec;32(4):129-133
- [11, 12] Rev Endocr Metab Disord. 2017 Feb 7;18(2):195–205