

Drawbacks of sunscreens on the cutaneous synthesis of Vitamin D

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Madam, During sun exposure, the sun-emitted UVB photons with wavelength range of 290-315nm are absorbed by 7-dehydrocholesterol (also known as provitamin D3) in the epidermis and dermis to form pre-vitamin D3 which is then converted to vitamin D3. Cutaneous synthesis of vitamin D induced by sunlight is subjected to significant variations based on the season, hour of the day, altitude, skin colour, sunscreen application and aging. Vitamin D is then processed further in the liver to form 25-hydroxyvitamin D and then in the kidneys by the action of 1 α -hydroxylase that converts vitamin D into its active form, 1,25-dihydroxyvitamin D3, calcitriol. The active form, helps in regulating serum calcium and phosphate levels which are essential for the maintenance of bodily metabolic functions and for the musculoskeletal system.¹

In Western countries, sunscreens have been the most popular method of UV radiation protection for over 40 years. It is known to effectively protect from skin burns, skin cancers, UV-induced immunosuppression, photoaging. The use of sunscreens is considered vital to provide protection from broad-spectrum UVA and UVB radiations.²

Despite this, a study presented more alarming concerns highlighting the potential risks of decrease in cutaneous synthesis of vitamin D by excessive sunscreen use leading to vitamin D deficiency rather than its benefits against cancerous UVB radiations, which has risen to the forefront of public health debate. Sunscreens can cause significant reduction in cutaneous synthesis of vitamin D when applied at the recommended amount of 2mg/cm².²

These findings are corroborated by additional research

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revealing that a sunscreen with 50+ SPF markedly diminished cutaneous synthesis of vitamin D subsequent to a single narrow-band UVB exposure, irrespective of the surface area exposed.³

Another paper also questioned the marketing of sunscreens. Many aspects of SPF can be confusing such as increasing focus on higher numbers, the impact of applying less sunscreen and the concern that sunscreens might inhibit cutaneous synthesis of vitamin D by blocking the wavelength range of 290-315nm required for vitamin D synthesis.⁴

These studies prompt a renewed inquiry into: Are sunscreens really safe to use at this wavelength range of 290-315nm blocking UVB radiations along with halting cutaneous synthesis of vitamin D? We should test new sunscreens with different wavelengths rather than the previous ones covering the range of cutaneous vitamin D synthesis. This area should need more clinical trials to come with more evidence-based studies.

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References

1. Wacker M, Holick MF. Sunlight and Vitamin D: A global perspective for health. *Dermatoendocrinol* 2013;5:51-10. doi: 10.4161/derm.24494
2. Bens G. Sunscreens. *Adv Exp Med Biol* 2014;810:429-63. doi: 10.1007/978-1-4939-0437-2_25
3. Libon F, Courtois J, Le Goff C, Lukas P, Fabregat-Cabello N, Seidel L, et al. Sunscreens block cutaneous vitamin D production with only a minimal effect on circulating 25-hydroxyvitamin D. *Arch Osteoporos* 2017;12:66. doi: 10.1007/s11657-017-0361-0
4. Osterwalder U, Herzog B. Sun protection factors: world wide confusion. *Br J Dermatol* 2009;161(Suppl 3):13-24. doi: 10.1111/j.1365-2133.2009.09506.x
5. Young AR, Narbutt J, Harrison GI, Lawrence KP, Bell M, O'Connor C, et al. Optimal sunscreen use, during a sun holiday with a very high ultraviolet index, allows vitamin D synthesis without sunburn. *Br J Dermatol* 2019;181:1052-6. doi: 10.1111/bjd.17888

literature.

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