

Is Your Sunscreen Doing More Harm Than Good?

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STORY AT-A-GLANCE

- › Many chemical sunscreens have been linked to an increased risk of skin cancer. Among the most hazardous are those containing oxybenzone, synthetic fragrances and retinyl palmitate (vitamin A)
- › Sunscreens have also been implicated in the destruction of corals and other sea life. Oxybenzone, found in 70% of sunscreens, is lethal to horseshoe crab eggs
- › Your safest bet is to use topical zinc oxide or titanium dioxide that does not contain nanosized particles

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Vitamin D, often referred to as "the sunshine vitamin," is different from other vitamins in that it influences your entire body.

And, while scientists refer to vitamin D as a vitamin, it is actually a steroid hormone obtained from sun exposure, food sources and supplementation. Vitamin D receptors have been found in almost every type of human cell, from your brain to your bones.

Unfortunately, dermatologists and the media do the public a great disservice by recommending avoiding the sun to decrease skin cancers.^{1,2}

This is because these "experts" fail to realize that vitamin D deficiency not only raises your risk of skin cancer³ but many of the most common cancers as well, which claim far more lives than the deadliest skin cancer, melanoma.

Breast⁴ and prostate^{5,6} cancers are just two examples where low vitamin D renders you more vulnerable to more aggressive forms of the disease. Low vitamin D also raises your risk for heart disease, diabetes, osteoporosis and other chronic diseases.

The scientific evidence, now running in excess of 34,000 studies, details the many benefits of UV exposure, both for vitamin D production and other benefits that are completely unrelated to vitamin D. The most important thing you can do to prevent skin cancer is to spend a sufficient amount of time in the sun as frequently as possible, ideally close to daily to maintain an optimal vitamin D level.

A primary risk factor for skin cancer is intermittent overexposure, not sensible exposure. Appropriate sun exposure means, first and foremost, avoiding sunburn. As long as you avoid sunburn you are getting the benefits of sun exposure.

Sunscreen Chemical Is Lethal to Horseshoe Crabs

Avoid shielding yourself from the sun's rays by slathering on chemical sunscreens, many of which have been linked to an increased risk of skin cancer, as noted by clinical laboratory scientist Elizabeth Plourde, Ph.D.,⁷ in the video above. Sunscreens have also been implicated in the destruction of corals and other sea life.

A symposium on emerging environmental contaminants highlighted the environmental dangers associated with widespread sunscreen use. According to University of Delaware marine biologist Danielle Dixon, the chemical oxybenzone in sunscreens is lethal to horseshoe crab eggs.

In Delaware, beach season coincides with the spawning season of horseshoe crabs, and since they lay their eggs in the sand in shallow water, they're particularly vulnerable to chemical contaminants introduced by beachgoers. Researchers estimate sunscreen-wearing beachgoers introduce as much as 6,000 metric tons of sunscreen into the world's oceans each year. As reported by Cape Gazette:⁸

"Sunscreen exposure strongly influences the development, growth and survivorship of the horseshoe crab egg and larvae," [Dixon] concluded ...

The chemical found in Hawaiian Tropic used in Dixson's study is oxybenzone, which has been found to alter the DNA of coral, increase susceptibility to coral bleaching and disrupt the endocrine systems of marine animals.

Research has found the chemical impacts aquatic life at a concentration of 62 parts per trillion – the equivalent of one drop of water in about six Olympic-size pools, Dixson said."

Sunscreens Contain Many Potentially Hazardous Chemicals

While some sunscreen manufacturers have switched from oxybenzone to avobenzene, researchers like Dixon note no studies have been done to confirm whether avobenzene is actually a safer choice. Chances are, it's not.

Disturbingly, research by the Centers for Disease Control and Prevention found that 96% of the U.S. population has oxybenzone in their bodies, and this chemical is a known endocrine disruptor linked to reduced sperm count in men and endometriosis in women.⁹

Disturbingly, at least nine of the sunscreen ingredients the U.S. Food and Drug Administration (FDA) has approved are known endocrine disruptors.¹⁰

Aside from oxybenzone – which is found in 70% of sunscreens – other commonly used chemicals that can enter your bloodstream and can cause toxic side effects, including hormone disruption, include but are not limited to:¹¹

Octyl methoxycinnamate (OMC)	Para-aminobenzoic acid (PABA)	Octyl salicylate
Phenylbenzimidazole	Octocrylene	Octisalate
Dioxybenzone	Menthyl anthranilate	Homosalate
Octinoxate	Cinoxate	Parabens

Many sunscreens also contain vitamin A and/or its derivatives, retinol and retinyl palmitate, which have been linked to an increased risk of skin cancer by increasing the speed at which malignant cells develop and spread.

Beware of Nanoparticles

Spray-on sunscreens¹² pose an additional hazard by releasing toxic particles into the air. The FDA has previously expressed concern that inhaling these products may be risky, especially to children, and has warned parents to avoid spray-on sunscreens.¹³

The two agents of greatest concern are zinc oxide and titanium dioxide, as these are the two most often used in spray-on sunscreen products. These two minerals are the safest topical sunscreen agents around, but inhaling them is a whole different story.

Most studies to date have shown that zinc oxide and titanium dioxide are safe and unlikely to penetrate your skin when applied topically, as long as they are not nanosized. But when these minerals are inhaled, they have been shown to irritate lung tissues and potentially lead to serious health problems,¹⁴ and the finer the particles, the worse their effects appear to be.

The International Agency for Research on Cancer (IARC) has classified titanium dioxide as a "possible carcinogen" when inhaled in high doses.^{15,16} According to IARC:

"Titanium dioxide causes varying degrees of inflammation and associated pulmonary effects including lung epithelial cell injury, cholesterol granulomas and fibrosis. Rodents experience stronger pulmonary effects after exposure to ultrafine titanium dioxide particles compared with fine particles on a mass basis."

Safe Versus Unsafe Titanium Dioxide and Zinc Oxide

Most nanoscale particles (microscopic particles measuring less than 100 nanometers)¹⁷ found in American sunscreens are either titanium dioxide or zinc oxide.¹⁸ Animal

research has shown that inhaled nanoparticles can reach all areas of your respiratory tract and, since your lungs have difficulty clearing small particles, they may be allowed to pass into your bloodstream.

Other studies have proven some nanoparticles are even able to cross your blood-brain barrier. If allowed to enter your lungs or penetrate your skin, nanoparticles therefore have the potential to cause widespread damage to your cells and organs, immune system, nervous system, heart and brain.¹⁹ Some scientists postulate that the toxic effects of nanoparticles relate to their size being in the range of a virus, which may trigger your body's immune response.²⁰

Inhaling higher amounts of zinc oxide can also lead to "metal fume fever,"²¹ characterized by chest pain, cough, dyspnea, reduced lung volumes, nausea, chills, malaise and leukocytosis. One animal study found zinc oxide nanoparticles to be cytotoxic, interfering with zinc homeostasis, elevating zinc levels and resulting in apoptosis (cell death).²²

An Indian study concluded that zinc oxide particles cause toxicity in human lung cells possibly through "stress-induced apoptosis."²³

Human studies are sorely lacking as to the health effects of inhaling zinc oxide particles, especially at lower levels, such as from brief exposure to sunscreen spray. However, using these spray-on products is clearly an unnecessary risk since safer options are readily available. Your safest bet is to use topical zinc oxide or titanium dioxide that does not contain nanosized particles.

Sun Avoidance Promotes Early Death

One of the most compelling reasons for getting regular, sensible sun exposure on bare skin is that it promotes optimal physical and psychological health and helps prevent chronic diseases of all kinds. As noted in a scientific review²⁴ by dermatologist Dr. Richard Weller, sun exposure has cardiovascular benefits independent of vitamin D, and cardiovascular disease is a far greater public health problem than skin cancer.

In fact, research suggests your risk of dying from heart disease or stroke is 800% greater on average than your risk of dying from skin cancer.²⁵ One of the key messages in Weller's paper is that public health messages really should be determined based on all-cause mortality, not a singular disease.

"Sunlight is a risk factor for skin cancer, but sun avoidance may carry more of a cost than benefit for overall good health," he writes. Another study²⁶ published in the journal *Public Health Nutrition* in 2012 also concluded that:

"The overall health benefit of an improved vitamin D status may be more important than the possibly increased CMM (cutaneous malignant melanoma) risk resulting from carefully increasing UV exposure. Important scientific facts behind this judgment are given."

Even though Weller is ahead of the pack in recognizing the importance of sun exposure, he and most other physicians don't understand why this is so. There are many reasons, but two large ones are:

- Exposure to the sun increases nitric oxide production, which will relax blood vessels, lower blood pressure and decrease platelet activation, making your blood thinner and less likely to clot and form a stroke or heart attack. Nitric oxide will also improve your immune function.
- Red and infrared rays are rarely discussed but research has shown that red at 660 nm and near infrared at 830 nm both have powerful benefits on improving mitochondrial function. This is because cytochrome c oxidase, which is one of the electron transport chains in the mitochondria, are chromophores for those wavelengths and when they absorb that energy the efficiency of ATP and mitochondrial cellular energy is increased.

Sun Avoidance Is as Risky as Smoking

A study^{27,28} driving home this risk-benefit reality was done in Sweden. More than 25,500 Swedish women between the ages of 25 and 64 were followed for 20 years. Detailed

information about sun exposure habits and confounding factors were obtained and analyzed in a "competing risk" scenario.

Overall, women who got regular sun exposure did have a higher risk for melanoma compared to sun avoiders, but they also had a lower all-cause mortality risk, likely due to their increased vitamin D levels.

Women with active sun exposure habits ended up having a lower risk of cardiovascular disease and non-cancer death compared to those who avoided the sun. According to the authors:

"Nonsmokers who avoided sun exposure had a life expectancy similar to smokers in the highest sun exposure group, indicating that avoidance of sun exposure is a risk factor for death of a similar magnitude as smoking.

Compared to the highest sun exposure group, life expectancy of avoiders of sun exposure was reduced by 0.6 [to] 2.1 years."

In short, if you're concerned about mortality, and not just mortality from one specific disease (melanoma), the scales are decidedly tipped toward sun exposure being of tremendous benefit. Five of the many noteworthy properties of spending some quality time in the sun include:²⁹

1. Pain-killing (analgesic) properties
2. Protection from certain immune system diseases, such as Type 2 diabetes, multiple sclerosis and several forms of cancer
3. Regulation of human lifespan (solar cycles appear to be able to directly affect the human genome, thereby influencing lifespan)
4. Daytime sun exposure improves evening alertness
5. Conversion to metabolic energy and alertness
6. Wound healing

Measure Your Vitamin D in Summer and Winter

As a general rule, I recommend measuring your vitamin D level twice a year, in the middle of the summer and winter, to ascertain your annual high and low. Ideally, you want your serum 25-hydroxyvitamin D (25(OH)D) to be between 40 and 65 nanograms per milliliter (ng/mL) year-round. Anything below 20 ng/mL is considered a serious deficiency state that increases your risk of both acute and chronic ill health.

When it comes to optimizing your vitamin D through sensible sun exposure, keep your skin color in mind. African Americans are more prone to vitamin D deficiencies as they produce less vitamin D₃ than do Caucasians in response to usual levels of sun exposure. As a general rule, the darker your skin, the more sun exposure you need, and vice versa.

Remember the absolute best way to optimize your vitamin D level is by sensible sun exposure. I haven't swallowed oral vitamin D for over 10 years now and my level is rarely below 70 ng/mL, but that is because I made a conscious effort to move down to Florida and walk in the sun for 90 minutes nearly every day.

I realize that not everyone can do this, and if you can't, then taking a supplement is likely a wise choice. I just want you to recognize it is a significantly inferior alternative as you are also missing out on the nitric oxide, and the red- and near-infrared benefits from the sun mentioned above.

Reduce Your Risk of Sunburn With 'Internal Sunscreens'

As mentioned, one of the primary risk factors of skin cancer is sunburn, which is an inflammatory process. Aside from paying careful attention to covering up before you get burned, you can reduce your risk of sunburn by eating plenty of antioxidant-rich fruits and vegetables, and/or taking an astaxanthin supplement. The latter has been shown to work as an effective internal sunscreen, protecting your skin from UV radiation damage.

In addition to copious testimonials and anecdotal evidence, scientific studies have substantiated these skin protective effects.³⁰ In one study, subjects who took 4 milligrams (mg) of astaxanthin per day for two weeks showed a significant increase in

the amount of time necessary for UV radiation to redden their skin. Animal studies lend further evidence to astaxanthin's effects as an internal sunscreen:

- In one study, mice were fed various combinations of astaxanthin, beta-carotene and retinol for four months. Astaxanthin was substantially effective in preventing photoaging of the skin after UV radiation, as measured by markers for skin damage³¹
- A rat study found astaxanthin was found to be 100 times stronger than beta-carotene and 1,000 times stronger than lutein in preventing UVA light-induced oxidative stress³²
- The Journal of Dermatological Science published a study in 2002 finding astaxanthin is able to protect against alterations in human DNA induced by UVA light exposure³³

How to Choose a Safer Sunscreen

There are thousands of sunscreens on the market and it may seem daunting to find a safe one. The majority of chemical sunscreens contain endocrine disruptors, which are particularly risky for pregnant women, infants and small children. These can disrupt growth and development, cause early puberty and result in small testicle size and low sperm count in boys. They also have carcinogenic potential.³⁴

Among the worst are those containing oxybenzone, synthetic fragrances and retinyl palmitate. When choosing a sunscreen, your safest choice is a lotion or cream with zinc oxide. It's stable in sunlight and provides the best protection from UVA rays.³⁵ Your next best option is titanium dioxide. Just make sure the product:

- Does not contain nano sized particles
- Protects against both UVA and UVB rays

Keep in mind that SPF protects only from UVB rays, which are the rays within the ultraviolet spectrum that allow your skin to produce vitamin D. The most dangerous rays,

in terms of causing skin damage and cancer, are the UVA rays. Avoid sunscreens with an SPF above 50.

While not intrinsically harmful, the higher SPF tends to provide a false sense of security, encouraging you to stay in the sun longer than you should. Moreover, higher SPF typically does not provide much greater protection. In fact, research suggests people using high-SPF sunscreens get the same or similar exposure to UV rays as those using lower-SPF products.

Other Safe Sunning Tips

I recommend spending time in the sun regularly – ideally daily. Sunshine offers substantial health benefits, provided you take a few simple precautions to protect yourself from overexposure. Here are my top five safe sunning tips:

1. Give your body a chance to produce vitamin D before you apply sunscreen. Expose large amounts of your skin (at least 40% of your body) to sunlight for short periods daily. Optimizing your vitamin D levels may reduce your risk of many internal cancers, and actually reduces your risk of melanoma as well.
2. Stay out just long enough for your skin to turn the very lightest shade of pink. Shield your face from the sun using a safe sunscreen or hat, as your facial skin is thin and more prone to sun damage, such as premature wrinkling.
3. When you'll be in the sun for longer periods, cover up with clothing, a hat or shade (either natural or shade you create using an umbrella). A safe sunscreen can be applied after you've optimized your skin's daily vitamin D production, although clothing is your safest option to prevent burning and skin damage.

Keep in mind that in order for sunscreen to be effective, you must apply large amounts over all exposed areas of your skin. This means the product should not trigger skin allergies and must provide good protection against UVA and UVB radiation. It also should not be absorbed into your skin, as the most effective sunscreen acts as a topical barrier.

4. Consider the use of an "internal sunscreen" like astaxanthin to gain additional sun protection. Typically, it takes several weeks of daily supplementation to saturate your body's tissues enough to provide protection. Astaxanthin can also be applied topically, which is why it's now being incorporated into a number of topical sunscreen products.
5. **Consuming a healthy diet** full of natural antioxidants is another highly useful strategy to help avoid sun damage. Fresh, raw, unprocessed foods deliver the nutrients that your body needs to maintain a healthy balance of omega-6 and animal-based DHA omega-3 oils in your skin, which are your first lines of defense against sunburn.

Vegetables also provide your body with an abundance of powerful antioxidants that will help you fight the free radicals caused by sun damage that can lead to burns and cancer.

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