

SLEEP HYGIENE: SIMPLE TIPS CAN HELP YOUR PATIENTS GET A GOOD NIGHT'S REST

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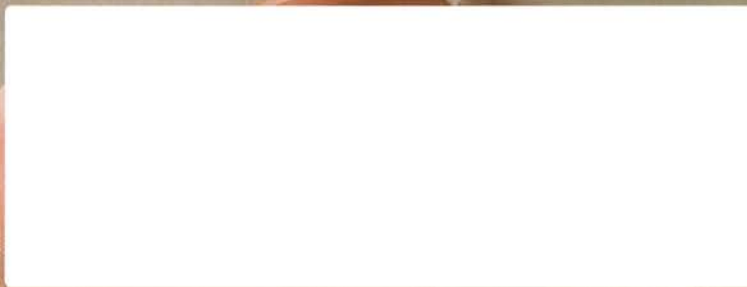
JAN//FEB 2006

**SUNSCREENS**  
Separating Fact  
from Fiction

**ENDING  
BREAST  
CANCER**

Simple Dietary Choices  
Defend Women From  
This Disease

**WOMEN'S  
HEALTH:  
CHARTING  
THE FUTURE  
OF HRT**

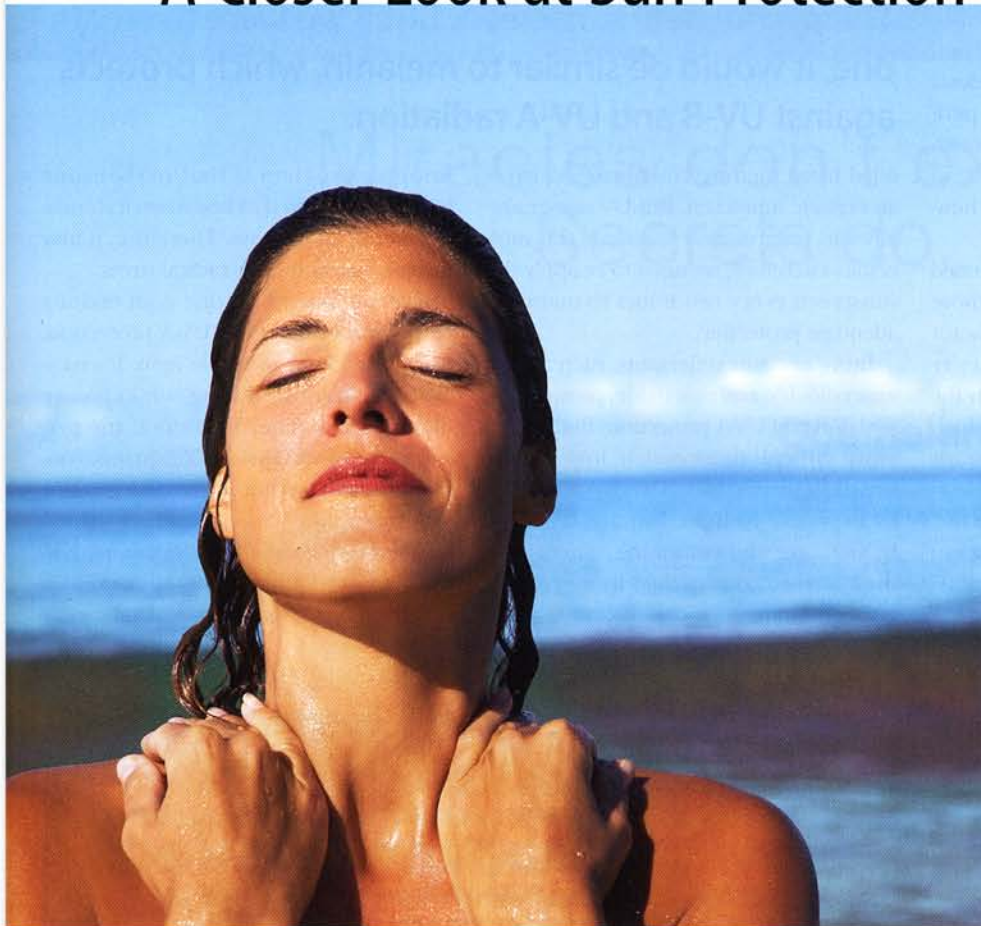


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## A Closer Look at Sun Protection



**Sunscreens with high SPFs will not block out all UV light. Our patients have been duped into thinking they will.**

**W**hen it comes to sunlight, we're in an equivocal position. From a recreational standpoint, sunlight makes us feel good. It warms and soothes, and promotes a healthy mental state. From a physiological standpoint, sunlight helps the body produce natural vitamin D, which can protect us from three lethal cancers—breast, bowel and prostate—as well as osteoporosis.<sup>1</sup>

But if we get too much sun, we risk photoaging and, eventually, skin cancers.<sup>2</sup>

Skin cancers (even melanoma) are statistically a smaller risk to our lives than the diseases promoted by inadequate vitamin D. Somehow, we have to find the ideal balance between the benefits and the dangers of sunlight.

Fortunately, we only need suberythemal doses of UV-B for maximal vitamin D synthesis. This means exposing the skin to direct sunlight for only five to 10 minutes daily. If we expose the skin for longer than that, we destroy vitamin D.

### UV-A and UV-B Radiation

Although UV-B rays are more powerful than UV-A rays, the atmosphere filters out most of them. Therefore, only about 5 percent of UV-B radiation reaches the skin.

UV-B rays are the most energetic of UV radiation, but they penetrate only into the epidermis. With exposure, people experience redness and feel a burning sensation, which is a signal to get out of the sun.

UV-A rays are more insidious. We're unaware of their damaging effects because they manifest as erythema about 24 hours *after* exposure. UV-A rays are dangerous because they cannot be filtered out adequately and play a key role in skin cancer. Penetrating into the dermis, they injure the fibroblasts and dermal matrix.

UV-A rays also activate genes to produce collagenases and matrix-metalloproteinases, which destroys collagen and elastin. Delivering a double hit to the skin, UV-A rays deplete vitamin A and destroy vitamin D.<sup>3</sup>

### Molecules, Electrons & Atoms

Let's explore the molecular and electron interaction between sunlight and the skin. At the molecular level, specific photons may be absorbed by endogenous chromophores, changing the molecule's structure.<sup>4</sup> Each photon has a specific energy, depending on its wavelength. Among others, DNA and vitamin A (as retinyl palmitate) absorb specific UV photons and, consequently, are altered. After exposure to UV light, some molecules may fluoresce or become free radicals. Melanin is an unusual chromophore and isn't altered by absorbing light energy.

In the case of DNA, mutations may occur that ultimately lead to skin cancer. Vitamin A protects the skin and Langerhans cells,<sup>5</sup> as well as controls the activation of matrix-metalloproteinases, which destroys collagen and elastin.<sup>6</sup> When vitamin A absorbs UV energy, it's irreversibly changed into an inactive state.

On the subatomic electron level, photons may collide with vulnerable electrons of atoms in cellular structures. This



creates free radical chain reactions that may overwhelm the natural antioxidant network<sup>7</sup> and, consequently, lead to the destruction of vitamins A (retinyl palmitate), C (ascorbic acid), E (tocopherol) and other molecules.

### The Role of Sunscreens

We've come a long way in educating our patients about the dangers of the sun. Yet, they've been duped into believing that sunscreens will keep them safe. Therefore, they stay out in the sun for longer periods of time, believing they're protected. They're not burning or getting red, so they think they're fine. In actuality, however, they're sustaining damage.

This false sense of security is heightened with "total block" sunscreens and those that have a high sun protection factor (SPF). Again, our patients think they're safe, no matter how long they stay in the sun. The truth, however, is that these high SPF products don't protect the skin nearly as much as we hope or believe.

No matter what SPF sunscreen we use, none are totally effective at blocking out UV light. An SPF 16 blocks out almost 97 percent of UV-B rays, while an SPF 30 will

block out about 98 percent. An "SPF 100" will block out only marginally more. About 2 percent UV-B light and more than 60 percent UV-A light will get through the best "total block."

Nevertheless, certain ingredients can offer our patients excellent protection in the sun. The best protection for UV-B is

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ethyl hexyl methoxycinnamate, which is an organic sunscreen. But UV rays gradually and progressively inactivate this molecule. Therefore, we need to re-apply the sunscreen every two hours to maintain adequate protection.

Inorganic sun reflectants, such as titanium dioxide and zinc oxide, provide better UV-B and UV-A protection. But they're more difficult to formulate into strong, invisible protection. They're activated by exposure to light, but are removed by sweating and swimming. Therefore, they need to be reapplied frequently, or after swimming.

The best organic sunscreens in the United States for UV-A are Avobenzene (Parsol 1789-butyl methoxydibenzoylmethane) and the Mexoryl™ variants.

The most common so-called "UV-A screen" in the United States is oxybenzone (phenobenzene). But it's not that effective, and acts more as a UV-B screen.

Another problem is that oxybenzone becomes an excited radical when it absorbs the energy of UV rays. Therefore, it may actually aggravate free radical stress.

Hydroxy phenyl triazine is an exciting new absorber that gives UV-A protection, extending closer to visible light. It's recycled continuously during sun exposure into its active state. Therefore, the person receives sustained UV-A protection. However, this has not yet been cleared for use in the United States.

Zinc oxide is another effective ingredient against UV radiation. But it's difficult to formulate into an invisible sun block.

## SMART SUN EXPOSURE

Share these smart tips with your patients.

1. Avoid being in the sun for an extended time two hours before and after solar noon. That's because 50 percent to 60 percent of UV irradiation occurs during that time, and 80 percent occurs between 9 a.m. and 4 p.m.
2. If you stay out of the sun, remember that a significant proportion of UV irradiation comes from the scattering effect of the atmosphere. So make sure you're well in the shade.
3. Clothing and hats are the most effective sun protection. Even average, cotton summer garments offer better protection than any sunscreen.
4. For daily "round the town" exposure with only a short period of sun exposure, a product with SPF 4 to 8 is usually quite adequate. It will allow you to make vitamin D without permitting significant damage. Make sure that the UV-A protection is the best.
5. For prolonged outdoor exposure, use a sunscreen with an SPF 16 to 20 that contains antioxidants. Remember to apply before going out into the sun and then re-apply every two hours that you're in the sun. UV-A protection of four stars is essential. However, bear in mind that people with darker skin types do not need such high protection unless they have melasma or some other medical condition.
6. Use adequate amounts of sunscreen (30 milliliters for the whole body.)
7. Always re-apply after swimming.
8. Strictly avoid using sun lamps or tanning beds.
9. Eat tomatoes or, preferably, tomato paste/sauce. This helps protect the skin against UV damage.
10. Use topical retinyl palmitate every day to maintain optimal vitamin A protection.

—Des Fernandes, MB, BCh, FRCS





### Searching for Ideal Protection

Unfortunately, there's no ideal sunscreen. But if we were to create one, it would be similar to melanin, which is the most effective UV screen against UV-B and UV-A radiation. But melanin can't be used topically. So the best we can do is use organic UV-A and B sunscreens supplemented by inorganic sun reflectants, such as zinc oxide and/or titanium dioxide.

This is still not good enough because light comes through the skin, even when we use the most powerful agents. We cannot reflect or absorb every UV ray that penetrates the skin. Therefore, we need another "back-up defense" system to deal with as many of those rays as possible. This is where antioxidants come to the rescue.

Vitamin A, for example, reduces the

number of sunburn cells after UV irradiation. If the skin is rich in antioxidants, then the levels of vitamin A remain normal and the network antioxidants (vitamin C, vitamin E, co-enzyme Q10, alpha lipoic acid and glutathione) recycle each other back into activity.

The ideal sunscreen should contain a strong antioxidant brigade, including vitamins C and E, beta carotene and alpha lipoic acid. Seleno-methionine and many other antioxidants also promote antioxidant activity. In addition, carotenoids and flavonoids play an important part in protecting the skin. They, too, should be included in sun protective products.

Of course, we cannot get all of these ingredients into a sun protection product, but we should have as many of

them as possible.

Vitamin A exerts a major influence and tends to oppose the damaging mechanisms that are set into place with sun exposure. In addition, vitamin A ester—retinyl palmitate—exerts a photoprotective action by absorbing UV-B radiation.

Applying retinyl palmitate topically in high doses (about 2 percent) is as efficient as using an SPF 20 sunscreen.<sup>8</sup> This is quite contrary to retinoic acid and retinol, which are photosensitizers. Using topical retinyl palmitate daily will address the vitamin A deficiency caused by the sun. Therefore, people who use retinyl palmitate every day not only rejuvenate the skin, but also increase their resistance to photodamage.

I believe it's our moral duty to educate our patients about practicing sensible sun exposure. Sunscreens aren't as safe or effective as people think. We need to communicate that message to our patients and advise them against sunbathing.

By doing so, we will have a valuable influence on their lives. ■

**DES FERNANDES, MB, BCH, FRCS**, studied medicine in Witwatersrand University, Johannesburg, South Africa, and obtained his fellowship in 1973 in surgery at the Royal College of Surgeons in Edinburgh, Scotland. He trained as a cardiac surgeon and worked in the National Heart Hospitals of the United Kingdom and then in South Africa. He subsequently specialized in the field of plastic surgery and is now heavily involved in anti-aging skin care. He is in active practice as a plastic reconstructive and cosmetic surgeon at the Renaissance Body Science Institute in Cape Town, South Africa. He also is a consultant in the plastic surgery department in Groote Schuur Hospital, University of Cape Town in South Africa.

Disclosure: Dr. Fernandes indicates that he is the founding owner of Environ Skin Care Co. He also is the senior medical advisor to Environ in Cape Town, South Africa, as well as the medical consultant for Vivida Close Corp., also in Cape Town.

For a list of references, go to [www.advanceweb.com/healthyaging](http://www.advanceweb.com/healthyaging) and click on the references toolbar.