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understanding sunscreens

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WITHOUT QUESTION, SUNSCREEN is the most important aspect of any skin care regimen. It is imperative to maintaining treatment results and the prevention of skin cancer. Unfortunately, misleading and often incorrect consumer-directed information has led many patients to believe that these crucial products are actually harmful. It is imperative that all skin care professionals feel comfortable speaking about the importance of SPF and are prepared to dispel some of the myths regarding these invaluable products. Also, by developing a deeper understanding of how sun protection products work to safeguard the skin, the clinician is able to identify the most effective sunscreens on the market.

Ultraviolet (UV) radiation

To understand sunscreens, one must first understand the ultraviolet light they are designed to screen out. UV light is electromagnetic energy ranging from 200 to 400 nanometers (nm). It is critical to realize that one does not have to be outdoors to be exposed. Human beings are constantly in contact with UV radiation, as it is emitted from multiple sources including the sun, tanning beds, black lights, germicidal lamps, halogen lights and fluorescent and incandescent lights. The almost unavoidable exposure to UV radiation makes daily sunscreen application essential for healthy skin. UV rays have been officially categorized as a known carcinogen, and as we learn more regarding the risks of overexposure, groups such as the Indoor Tanning Association (ITA) are finally being held accountable for their actions. In January 2010, the Federal Trade Commission charged the ITA with making false claims regarding the health benefits of tanning.

UV rays are divided into three types: UVA, UVB and UVC. UVC radiation ranges from 200-280nm. Fortunately, UVC is almost completely absorbed by the atmospheric ozone and exposure is minimal. Although light sources such as germicidal lamps and certain types of tanning booths utilize UVC rays, specific topical protection for UVC is not believed to be necessary.

UVB rays span from 280-320nm, and are thought to be responsible for the majority of the sun's negative effects on the skin. Although the inflammation and erythema produced by a sunburn is the most obvious change, it is what is happening *within* the skin that is the most worrisome. UVB radiation is responsible for a cascade of events inside the epidermal cells, including increasing levels of damaging free radicals and reactive oxygen species (ROS). In addition, UVB causes a reduction of the skin's endogenous, or natural, antioxidant levels, making it even more vulnerable to DNA damage and mutation. The UV-induced DNA mutation is the number one cause of skin cancers. UVB rays can be remembered as the rays responsible for burning.

UVA radiation ranges from 320 to 400 nm, and makes up the majority of the rays that reach the Earth's surface. UVA rays are believed to be the primary cause of premature visible aging. The deeper, dermal penetration of UVA leads to the breakdown of structural components such as collagen and elastin. UVA radiation is able to penetrate glass and most clothing, and its strength remains constant throughout the day, which makes daily sunscreen use imperative, even if one remains indoors. Like UVB rays, UVA rays increase cellular oxidation and decrease the body's natural defense mechanisms. Although UVA is thought to play a less significant role in carcinogenesis compared to UVB, it is still responsible for approximately 20 percent of the sun's cancer-causing effects.

UV protection

There are thousands of sun-shielding products currently available in the U.S., and their level of usefulness varies widely when it comes to their UVA and UVB screening abilities. The clinician should be able to identify which products offer the best protective benefits in order to preserve the health and appearance of their patients' skin.

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THE **SEARCH** FOR THE **IDEAL**
SUN PROTECTION

Sunscreen agents are classified as physical or chemical. A physical sunscreen is an inorganic product that sits on the surface and reflects or scatters UV radiation before it induces cellular damage. In the past, although physical sun protection was effective, it was often associated with thicker product consistency and a white appearance on the skin. Proper formulation and smaller particle sizes can alleviate these concerns, leading to a lighter and more appealing product feel. In contrast, a chemical sunscreen is an organic substance that penetrates the corneocytes and absorbs UV rays before they affect the skin. Many people avoid chemical sunscreens out of concern for sensitivities. In actuality, reactions typically occur in response to a product's base rather than its active ingredients. Therefore, even patients with sensitive skin should be able to find an effective sunscreen.

Numerous ingredients are FDA-approved to either reflect or absorb UV radiation. Each of these ingredients is able to counteract specific wavelengths, and a blend is typically needed for ideal protection. The following are some of the most commonly used active sunscreen agents in the United States.

Sun protection terms defined

Many of the words that are used to describe sunscreen products can be confusing to both the patient and the clinician. Understanding these commonly used terms can greatly assist skin professionals in choosing and recommending protective products.

The term "SPF" is the abbreviation for a product's Sun Protection Factor. It only indicates a product's ability to screen the sun's burning rays, or UVBs. Consumers typically do not understand what SPF is and often believe that a product's effectiveness is solely determined by the SPF number. It is important to educate patients and explain that the level of protection is not proportionate with the SPF rating. In fact, an SPF of 15 provides protection from 93 percent of UVB rays, SPF 30 protects from 97 percent of UVB rays and an SPF of 60 protects from 98 percent of UVB radiation. Many dermatologists believe that an SPF higher than 30 is of little value. In most circumstances, products with an extremely high SPF are thicker and heavier, and because they provide minimal added protection, they are often unnecessary. In addition, people often incorrectly believe that re-application is not warranted when using a high SPF product. In reality, nearly all sunscreen products break down and must be re-applied every two hours. Personally, I would prefer my patients wear an SPF 15 product daily rather than an SPF 70 only when they are outside.

The term "broad-spectrum" indicates a product's ability to protect against both UVA and UVB radiation. At this time, the U.S. has not implemented a rating system for UVA protection. The only way to ensure that a sunscreen absorbs UVA rays is to read the ingredient label on the back of the bottle. At least one of the following must be on an ingredient list in order to achieve true broad-spectrum, UVA/UVB protection: avobenzone, ecamsule titanium dioxide or zinc oxide.

Water and sweat-proof claims are false and irresponsible, as there are no such products, and these terms are misleading to the patient. Products *can* however be water or sweat-resistant, meaning that they are able to maintain their protective effects in water for a certain amount of time.

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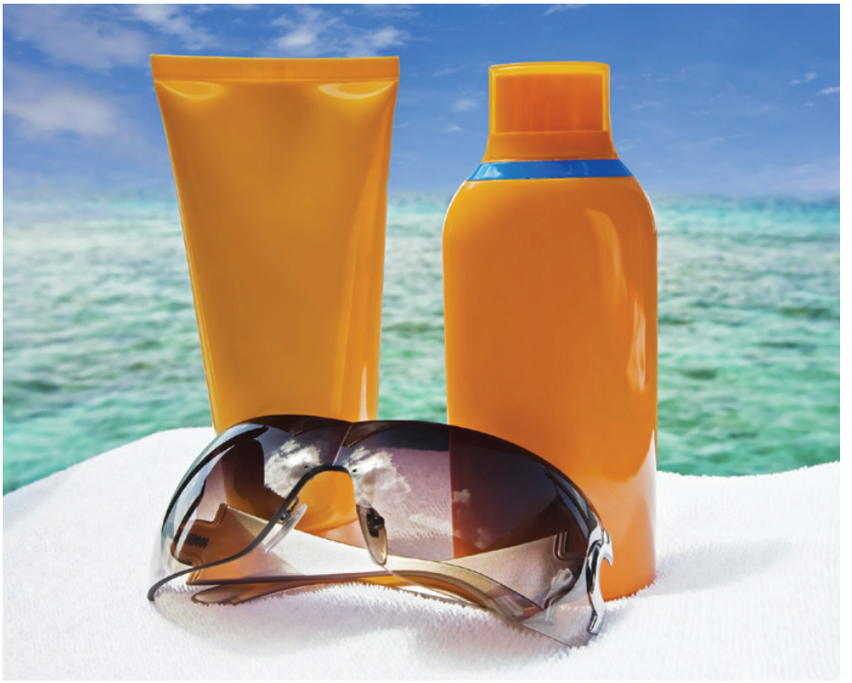
sunblock 101

	ingredient	wavelengths filtered	type of UV protection
physical suncreens	Zinc oxide	290-400 nm	UVB and UVA
	Titanium dioxide	290-400 nm	UVB and UVA
chemical sunscreens	Octisalate	260-310 nm	UVB
	Oxybenzone	270-350 nm	UVB
	Homosalate	290-315 nm	UVB
	Octyldimethyl PABA (Padimate O)	290-315 nm	UVB
	Octocrylene	290-320 nm	UVB
	Octinoxate	290-380 nm	UVB
	Avobenzone (Parasol 1789)	310-400 nm	UVB
	Ecamsule (Mexoryl)	310-400 nm	UVB

chart courtesy of Jennifer Linder, M.D.



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A water-resistant product remains active for up to 40 minutes of submersion, and a very water-resistant product maintains results for up to 80 minutes. Regardless of a product's claims, all sunscreens should be reapplied after swimming, sweating, toweling off or vigorous outdoor activity.

Dispelling sunscreen myths and misconceptions

While the Internet can be an excellent source of information, it is also often full of erroneous data. Recently, a consumer-focused website falsely claimed that many of the available sunscreens on the market do not provide adequate protection. Such reports create confusion and actually discourage many patients from using any type of SPF products. The statements made in the report have been discredited and criticized by dermatologists and the Skin Cancer Foundation.

The frequent misleading claims regarding the biological need for sun exposure for vitamin D production can also be confusing for the patient. Although it is true that vitamin D is essential to overall health, research has shown that the sun is not only a dangerous source of vitamin D, it is also unreliable. The recommended dose of vitamin D for an adult is 1,000-2,000 IU per day. Adequate amounts should be obtained through milk and fish consumption, vitamin supplementation and sun exposure from normal daily activities while wearing sunscreen.

A study conducted by the University of California, Riverside, triggered multiple incorrect and confusing media reports claiming that sunscreens actually caused cancer. While the study itself was valid, its findings were completely taken out of context in the report. The research showed that when exposed to UV rays for prolonged periods of time, sunscreen ingredients can break down and stimulate cellular oxidation, or free radical damage. While this seems worrisome, these effects can be completely avoided through proper reapplication. In most circumstances, a sun protection product should be re-applied every two hours, regardless of SPF number, active ingredients or water-resistance. Further, the use of sunscreens formulated with added antioxidants or antioxidant products in conjunction with SPF can also eliminate this concern. Look for ingredients such as caffeine, silymarin, L-ascorbic acid, tocopherol (vitamin E), resveratrol and glutathione for superior protection against sun-induced free radical damage.

The ongoing search

Locating products with optimal UV-protective blends, potent antioxidants and a cosmetically elegant feel may seem like a daunting task, but once you have found them, your patients will thank you for years to come. Developing knowledge of the sun-shielding ingredients and their unique UV-protective capabilities will aid you in this search. As professionals, we must also research what our patients are reading online and hearing from other media outlets and be prepared to dispel any myths. Educating patients on the truth about sunscreen and offering exceptional products promotes overall health and beautiful skin. ■

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