

OPTIMAL HEALTH UNIVERSITY™

Presented by Katie Gravesen, DC

Choose a Safe Sunscreen

When you buy sunscreen, the myriad of bottles and tubes jamming store shelves can leave even the savviest consumer puzzled. What's the difference between UVA and UVB radiation? What's behind those long, unpronounceable ingredient names? And does it really matter which sunscreen you buy?

In a word, yes. Some products do work better than others. What's more, even some sunscreens claiming to be "natural" may contain toxic, possibly disease-causing ingredients. Dr. Gravesen deciphers the jargon on sunscreen labels to help you make an informed choice.

UVA and UVB: Are You Protected?

Two types of ultraviolet radiation from the sun affect our skin: UVA and UVB rays. UVB rays are important for their role in helping the skin produce immunity-protecting vitamin D, but overexposure causes sunburn.

All commercial sunscreens contain active ingredients to protect against UVB rays. The sun protection factor (SPF) on a bottle of sunscreen indicates the level of protection the product provides compared to unprotected skin. Note that ultra-high SPF numbers are less meaningful. According to the American Cancer Society, a sunscreen labeled SPF 55 is less than two percent more effective than one labeled SPF 30. Higher SPF varieties may also contain more possibly harmful chemicals.

While all commercial sunscreens protect against UVB, not all block UVA rays, warns Dr. Gravesen. This form of radiation causes tanning more than burning and is linked to premature aging of the skin and skin cancer (*J Invest Dermatol* 2010; Epub). Sunscreens that offer UVA protection are often labeled "broad-spectrum", although the level of protection is difficult for the consumer to determine since it is not reflected by the SPF value.

To further complicate matters, the testing used to determine SPF values is imperfect. According to researchers, the instruments used in this process have limited precision (*Skin Pharmacol Physiol* 2010;23:201-12). Even when ratings are accurate, the average user applies sunscreen at a quarter of the concentration used in lab testing, hence making it less effective than the number on the bottle implies (*J Am Acad Dermatol* 2010;62:218-22).

Ingredient Safety

In addition to the SPF, the other key information to look for on a sunscreen bottle is the ingredient list. Safe ingredients are important in any personal care product. However, because sunscreen is applied over large areas of skin often multiple times a day, its ingredients should be particularly scrutinized. The skin can absorb many of the active ingredients in sunscreens (*Photochem Photobiol Sci* 2010; 9:482-8).

Are these ingredients safe? There is no easy answer. Which ingredients are allowed, their safety testing and their maximum concentrations are regulated differently in different countries.

In the United States, sunscreens and their allowable active ingredients fall under the purview of the Food and Drug Administration, which has been

criticized for not establishing more stringent rules for ingredient safety testing and labeling claims. Australia and Canada consider sunscreens to be drugs and have stringent guidelines for ingredient safety and product labeling. The European Union regulates sunscreens as cosmetics, controlling ingredient safety but only making non-binding recommendations about their efficacy and labeling.

Active Ingredients

At least 30 different UV filter ingredients appear in commercial sunscreens. Dr. Gravesen lists a few of the most common active ingredients and the health concerns they raise.

Oxybenzone

Oxybenzone is readily absorbed into the skin — in fact, one of its roles in sunscreen is to enhance penetration of other ingredients. Centers for Disease Control studies found oxybenzone in the urine of 97 percent of people who used it topically.



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Oxybenzone is an endocrine disruptor, a chemical that acts like a hormone and disrupts normal hormonal functions (*Environ Health Perspect* 2008; 16:893-7). One study showed that fish exposed to oxybenzone had decreased reproductive ability (*Aquat Toxicol* 2008;90:182-7). This ingredient can also cause allergic reactions in some individuals.

Octinoxate

Octinoxate has the benefit of being a low-allergenic UV filter. However, it is another endocrine interrupter. Multiple animal tests show that octinoxate decreases hormone levels, affecting thyroid function, sexual maturation, and reproduction (*Toxicology* 2007;238:192-9; *Exp Clin Endocrinol Diabetes* 2008;116:94-8).

Zinc oxide and titanium dioxide

Zinc oxide and titanium dioxide are minerals that act as physical blockers — they reflect UV rays away from the skin, unlike chemical blockers that absorb UV rays. They are touted as safe sunscreen options because they are not absorbed into the skin, and they very effectively protect against both UVA and UVB rays.

Many products use one or both of these minerals in the form of nanoparticles, microscopic particles developed to prevent the opaque white streaks of traditional mineral-based sunscreens. Such products may be labeled “clear zinc.” Researchers show mixed results on the safety of this cutting-edge technology.

Because nanoparticles are so tiny, some studies suggest that they could interact with and damage DNA (*Toxicol Lett* 2009;185:211-8). Scientists are continuing to learn more about the health implications of nanoparticles in sunscreen and other skin products.

Inactive Ingredients

Several ingredients common in skin products are also present in many sunscreens. Over 6,000 ingredients are

used in modern cosmetics and skin care products. When considering the chemical load of all the products you use, including sunscreens, the doctor suggests particularly watching out for these ingredients:

Phthalates

Phthalates are a class of chemicals best known for their use in plastics, but they also appear in many personal care products under the guise of “fragrance”. Numerous studies have shown endocrine interruption in animals exposed to phthalates, and newer research implicates their impact on humans in such conditions as breast cancer and hindered fetal testicular development (*Environ Health Perspect* 2010;118:539-44; *Folia Histochem Cytobiol* 2009;47:S67-74).

Parabens

Parabens are a class of preservatives used in many personal care products. Like many other questionable ingredients, they have potential to disrupt the endocrine system. Besides interfering with development of reproductive organs, parabens appear to have a toxic effect on the thyroid in young female rats (*Reprod Toxicol* 2010; 29:306-16).

These effects become even more pronounced when various parabens are combined as is the case in most products that use them. Furthermore, two studies indicate that methylparaben may become a carcinogen when exposed to sunlight, as it certainly would be when included in a sunscreen (*Chem Res Toxicol* 2008;21:1594-99; *Toxicology* 2006;227:62-72).

Make a Smart Choice

Given the alarming research on so many common sunscreen ingredients, how can you and your family protect yourselves? First, be sure to get moderate sun exposure without sunscreen to ensure vitamin D production — this means enough sun to make the skin barely begin to turn pink but not begin to burn. (Anywhere from five to 30 minutes per day, depending on your

skin and climate.) If you are going to be outdoors beyond that point, make shade, tightly-woven clothing and wide-brimmed hats your first line of defense.

When you do need to use a sunscreen, read labels carefully. Look for a broad-spectrum product free of phthalates (fragrances) and parabens, and use SPF values as general guidelines. Choose a mineral-based formulation over chemical blockers and apply it generously for full effectiveness, but only to skin that will be exposed.

If you do use a chemical-based sunscreen, reapply often since many of these active ingredients break down in the sun. Do not leave sunscreen outside or in the car for extended periods, as heat breaks down their effective ingredients.

To avoid inhalation risks, do not use spray or powder sunscreens. Finally, the doctor reminds patients that sunscreens do not prevent sunburn or skin cancer — they simply increase the time you can be in the sun before these risks kick in. Combine sunscreen use with common sense for the best results.



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