

SUNSCREENS

The good, the bad and the ugly...

There is much misinformation and hype surrounding the topic of tanning, burning, cancer and sunscreens. In this issue we will attempt to decode the catchphrases and steer you in the right direction.

The most obvious and important issue is that in Australia we enjoy a climate which sends us outdoors for much of the year and we are living under one of the thinnest sections of the earth's protective ozone layer. It is well established that the UV radiation that beats down on us is harsher and more direct than in many other parts of the world. So what is this UV radiation and what are its effects?

UV or ultraviolet radiation is classified into three different wavelengths of light. Two of these wavelengths, referred to as UVA and UVB radiation, affect our skin. UVC radiation is largely absorbed by gases in the Earth's atmosphere and does not reach our skin. While both UVA and UVB can cause DNA changes within the layers of our skin, it is predominantly UVA which causes the most common forms of skin cancer (melanomas) and accelerates the visible signs of aging. UVB predominantly causes burning. The purpose of a sunscreen is (or should be!) to reduce the severity of UVA and UVB affecting our skin negatively (sunlight is also constructive for several biochemical processes, including our production of vitamin D and the regulation of our sleep - or circadian rhythm - obviously, it was once natural to spend time in the sun).

However, not all sunscreens achieve this. When you buy sunscreen you most likely look for the SPF number (Sun Protection Factor), but what does this number refer to? It indicates the length of time you can stay in the sun without burning relative to your normal burn time if you apply the sunscreen first. For example, if you would normally burn after one hour of exposure to sunlight and the SPF of the sunscreen you are using is 15, then technically you can stay in the sun for 15 hours before burning. This can be incredibly misleading. It means that the sunscreen guarantees to block out UVB radiation 15 times NIL protection but in fact there are no guarantees regarding UVA radiation, ie. radiation that causes melanoma.

If you feel safe staying in the sun for longer and there is no protection against UVA radiation in the sunscreen, skin cancer risk could be 15 times higher than normal. Queensland has the highest incidence of skin cancers in the world. Have we all been misled by the sunscreen marketing?

According to the American Food and Drug Administration website (see references), no system yet exists to rate UVA protection. You must also reapply sunscreens after sweating or swimming unless the product states "water resistant", meaning the SPF stands even after exposure to water.

So let's look at the sunscreen ingredients themselves. Generally, sunscreen ingredients are divided into their modes of activity. They are either UV absorbers or UV reflectors or have a combined action. UV absorbers physically contain the UV radiation to stop it from reaching our skin. In this process, the active particles become energised to a higher energetic level (or frequency) to contain the UV radiation. This is the key to the problems with this type of sunscreen ingredient. When UV exposure reduces (when you come out of the sun), the energetic level of the sunscreen particles drops to their former frequency, releasing energy again. The energy is released into the epidermis of your skin where it can then cause changes to the DNA, predisposing the skin to cancer.

UV reflectors work by scattering UV light so it cannot penetrate the skin. Generally, this process depends on the physical size of the sunscreen particles. Hence, application of these ingredients is usually thicker and opaque. It is the UV reflectors which are most effective at blocking UVA radiation. The possible downside of UV reflectors, apart from (or because of) the thick application

necessary is that they tend to plug the pores of the skin which can produce miliaria, a consequence of blocked sweat glands. Due to both modes of action, all sunscreens need to be washed from the skin thoroughly once you have come out of the sun.

Now we'll look at some sunscreen agents commonly in use:

Octyl Methoxycinnamate and other cinnamates cause photo and contact allergy and do not effectively block UVA. We must ask, what is the point of using a sunscreen agent that causes allergy in the presence of sunlight?

Benzophenones/oxybenzone/benzoylmethanes do absorb some UVA radiation but have been found to cause photo/contact allergy and most significantly, they tend to irritate and therefore exacerbate existing skin disease (including acne).

Titanium dioxide effectively blocks out UVA radiation and therefore protects against skin cancer. Although this is also a photon scattering agent (UV reflector), it does absorb UV radiation which produces free radicals in the presence of water, predisposing the skin to cancer. Many manufacturers use different methods to "coat" the particles, making them less reactive, however, this is usually done after the particles have been reduced in size to reduce the pasty appearance of the naturally large titania particles. They can then block the sweat glands more easily as they can penetrate the skin deeper.

Salicylates commonly cause photo allergy. **PABA (Paramino benzoic acid)** is part of the B group of vitamins. Taken internally, it can help prevent UV damage. Used externally, it causes phototoxicity and sensitisation. PABA generates free radicals when exposed to sunlight, predisposing the skin to cancer. It does not effectively block UVA radiation.

Zinc oxide effectively blocks out UVA radiation, has the benefit of being inert on the skin (it does not absorb UV radiation) and has skin healing properties. It does, however, contain large particles and forms a paste when applied to skin (as in the old zinc creams).

Iron oxide is found naturally in mineral clays which have an ochre colour due to the ferrous (iron) content. Due to the large particle size, iron oxide also acts as a UV reflector and is inert in the sun (does not produce free radicals). Natural mineral clays also contain varying proportions of other UV protectors such as titania.

It must also be noted that this discussion of the active constituents in sunscreens is academic without paying respect to the ingredients in the carrier or base formulation. Do they cause free radical damage themselves and in particular, how well do they stand up to sun exposure?

There are instances of people using sunscreens who have reacted to the excipients (base materials/carriers) included in the formulation, such as preservatives, fragrances and emulsifiers, which have caused contact allergies. So there is cause for concern not only about the active ingredients in sunscreens, but about the inert ingredients as well. (Dingle, p33)

Third Stone Botanicals' Sunfilter Lotion contains a base similar to our lotions. It is fortified with the antioxidant vitamins C and E at effective concentrations. Vitamins C and E (tocopherol) are known to protect against skin cancer, particularly when applied topically as they prevent free radical damage from UV radiation. Certified organic shea butter, sesame and avocado oils are also included in the formula for their natural UV protective qualities, primarily due to their vitamin A and E content. Shea butter also protects against burning (UVB radiation) and is an excellent emollient, softening the skin and preventing the formation of wrinkles. The Sunfilter Lotion also contains aloe vera, a plant which has been shown to prevent DNA damage to the skin following sun exposure and its use in treating burns of all descriptions is well-known. Antioxidant medicinal

strength herbal extracts of ginkgo biloba, green tea and pomegranate are also used for their ability to protect against DNA damage from UV radiation.

The Australian Bush Flower Essence Mulla Mulla is included in all Third Stone Botanicals day moisturisers and lotions for its ability to protect against heat radiation on the subtle energetic level (it is prescribed for the effects of all burns, including the fear associated with fire and dehydration).

The major active ingredient in the **Sunfilter Lotion** is superfine zinc oxide at 15% which provides broad-spectrum UV protection and an equivalent UVB protection of SPF30. The **Sunfilter Moisturiser** (for face) provides equivalent UVB protection of SPF15, resulting in a light lotion which disappears when rubbed thoroughly into the skin and is comfortable enough for daily wear under makeup. Both Sunfilter products are scented with lavender essential oil, famed for its soothing and burn-healing properties.

The Sunfilter Lotion must be thoroughly rubbed into the skin in exposed areas 15 minutes prior to exposure and reapplied every 2 hours for maximum efficacy. Wash the Sunfilter products off with a quality cleanser following sun exposure to prevent blockage of sweat glands.

Third Stone Botanicals Sunfilter Lotion and Sunfilter Moisturiser are truly natural 85% certified organic sunscreens which are effective, economical, non-greasy and suitable for infants, sensitive skin and the whole family.

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REFERENCES

American Food and Drug Administration website
www.fda.gov/bbs/topics

www.sunscreenresearch.com (subscribe online to receive their free newsletter)

Begoun, P. ***The Beauty Bible***, Beginning Press, Washington USA, 1997

Dingle, P. & Brown, T. ***Dangerous Beauty: Cosmetics and Personal Care***, Healthy Home Solutions, Mundaring Australia, 1999

Hampton, A. ***Natural Organic Hair and Skin Care***, Organica Press, Tampa USA, 1987

Statham, B. ***The Chemical Maze***, Possibility.com, 2001

Winter, R. ***A Consumer's Dictionary of Cosmetic Ingredients***, 3rd ed., Crown Publishers, New York USA, 1989