

## **Is Sunscreen Good for Your Health?**

Although some say the ingredients that make your sunscreen easy to apply and comfortable on your skin are bad for your health, is this the truth?

For years, titanium dioxide and zinc have been used in sunscreens. They serve as physical barriers to UVB and UVA radiation from the sun. But their white chalky residue has been a down side.

Nanotechnology, the science of materials that are 1 billionth of a meter, has allowed for improved versions of sunscreens with titanium and zinc. However, the safety of this technology has been brought into question.

### **What is nanotechnology?**

The technology that allows for the design, production, and application of materials that are extremely small (1 nanometer=one billionth of a meter).

You often hear it used in reference to computer chips. It also can be applied to cosmetics and in this case, sunscreen.

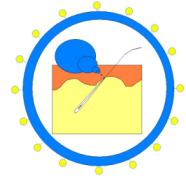
### **What's the value of using nanotechnology this way?**

In the case of sunscreens, when titanium and zinc are nano-sized, the thick feel and chalky appearance typically associated with these sunscreen products disappear, making them spread more easily, feel more comfortable on the skin, and appear transparent.

### **What's the concern about nanotechnology and sunscreens?**

- #1 That nanoparticles are toxic to living cells
- #2 They capable of being absorbed through the skin into the bloodstream.

One of the concerns regarding these tiny ultraviolet radiation blocking particles is that they themselves can produce free radicals when exposed to sunlight. Free radicals, if left unchecked, can go on to damage DNA and important machinery needed to keep you and your skin healthy. Although these dangerous molecules can be produced by zinc oxide and titanium dioxide in the lab when directly exposed to cells, these products have been used in sunscreens for decades and to date there have been no reported problems. Why is that?



The reason for this is in order for the damage associated with free radical formation to occur these nano-products need to interact with living cells just like they did in the laboratory. Two barriers must be overcome for the nano-sized sunscreen to any problems: penetration in the body via the skin, and host defenses against free radicals.

### **Should we worry about this?**

Over 40 studies have investigated the ability of nano-titanium and zinc to penetrate the skin with the **majority** demonstrating an *inability* of particles to pass through the skin and reach living cells—not even through hair follicles. However, this is generally in the setting of healthy, disease free skin. It is not known if penetration may occur in the setting of injured skin or diseased skin, such as eczema. Fortunately, work is under way to figure this out.

### **The Bottom Line:**

A recent study from Australia reported that daily sunscreen use reduces the risk of melanoma by 50% and reduces the risk of squamous cell carcinoma, another type of skin cancer, by 39%.

The importance of sun protection via sunscreen is **unquestionable**.

Consumers using zinc and titanium sunscreen products are exposed to 20% less UVA radiation than those using sunscreens without.

Nano-titanium and zinc do not penetrate the outer layer of the human skin, even through hair follicles, and do not reach living cells and therefore, as far as we know, pose no risk.

### **Online Resources**

1. [www.nanodermatologysociety.org](http://www.nanodermatologysociety.org)
2. <http://www.nanotech-now.com/nanotechnology-medicine-glossary.htm>
3. <http://www.nano.gov/>
4. <http://www.nanotechproject.org/inventories/>