



Position paper on nano particles of Zinc Oxide used in sun protection products

A recent paper by scientists from Nanyang Technology University in Singapore, published in *Biomaterials*, may lead to believe that nano particles of Zinc Oxide used as sunscreen can create cancer.

The research was done with the particles placed in direct contact with cells that had lost their robust p53 protective ability to defend themselves. This is of course far from the real life use of sun protection products.

Damaging effects of the sun on the skin has been scientifically proven for many years. Sun damage leads to excessive pigmentation, wrinkles, destruction of the collagen and elastin fibers as well as skin cancer.

Sun protection with effective sunscreens or clothing is the only way to prevent these.

There are just a few sunscreen ingredients that have been approved by the regulatory authorities for their safety and combination of these ingredients are necessary to provide a broad, safe and effective protection. Among these ingredients, only two are minerals: titanium dioxide and zinc oxide. For several years now, these minerals are available in nano size particles for more efficient sunscreen protection. The safety of these materials is constantly reviewed by scientists in EU (Scientific Committee for Consumer Safety, SCCS), in US (Cosmetic Ingredient Review Board, CIR) and FDA, in Australia⁽¹⁾ (Therapeutic Goods Administration, TGA) or ASEAN (ASEAN Cosmetic Scientific Body, ACSB). To this date all the reviews have concluded to the safety of the materials.

The published research from the NTU scientists was done using cells deprived of their natural defense mechanism called p53, and placing the particles in direct contact with the cells.

Why is this not relevant?

Sun protection products are complex formulations applied on the skin. The intention is for the sunscreen to remain on the skin surface, not to penetrate the protective barrier of the skin surface.

Nano particles in the formulation agglomerate and create clusters; they do not remain as separate units.

Multiple studies have shown, under exaggerated test conditions, that neither nano-structured titanium dioxide nor zinc oxide penetrates beyond the stratum corneum of the skin ⁽²⁾. It is important to remember that the evidence having implicated nano particles as skin toxins has been generated from *in vitro* studies, meaning they were performed outside the living body. Topical application studies performed *in vivo* i.e. within living organisms have not yielded the same results ⁽³⁾. This is largely due to the protective barrier of the skin. Many studies have investigated the ability of the nano particles to penetrate the skin and have concluded that the particles do not pass the stratum corneum to reach the living cells.

A cell which has lost its natural protection has a high chance of evolving to cancer. If you drive downhill a car without brakes, the car will crash. Concluding that all cars will crash if driven downhill is irrelevant!

There are laws and regulations established by governments to ensure that the companies will only produce and market safe products. The industry associations around the world including in ASEAN are working very hard to promote safety and quality standards among their members and make sure that companies take compliance seriously and work hard to earn and keep the trust of their consumers and their families.

Consumers have to rest assured that Industry and Regulators are working towards ensuring the safety, quality and efficacy of the cosmetic products available to them. In case unsafe products are found in the market, Regulators keep the public informed of their decisions and actions.



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- (1) TGA Fact Sheet: Sunscreen, 2010;
- (2) Schilling, K. et al. Photochem. Photobiol. Science, 2010, 9 (4) 495-509;
- (3) Nanodermatology Society Guidelines, www.nanodermsociety.org