

# NanoSafe – 2014

## Litigation for Skin Cancer caused by Nanoparticles in Sunscreens

Class action litigation is described that requires manufacturers of sunscreens to alert consumers by labeling that states their product contains nanoparticles that cause DNA damage and may lead to skin cancer



**"Friends of the Earth" campaign against nanoparticles in sunscreens**

[PRLog \(Press Release\)](#) - May 8, 2014 - YOUNGWOOD, Pa. -- Background

In 2006, consumer lawsuits filed in Los Angeles Superior Court alleged manufacturers of sunscreens, including the popular Coppertone and Banana Boat brands, made false claims that exposed millions of innocent people to skin cancer. The suits were combined into a class action against Merck, the manufacturer of Coppertone on the grounds Coppertone lacked the labeling to warn consumers about the dangers of skin cancer from prolonged sun exposure. Enhancement of skin cancer by sunscreens containing nanoparticles was not alleged. Prior attempts by the FDA to require sunscreen manufacturers to provide similar warnings on their sunscreens were stayed by intense industry lobbying. Because of this, the class action sought to have Merck remove labels that Coppertone provided a "sunblock" and "all day protection" against harmful UVA and UVB rays known to cause skin cancer. Merck countered by arguing the Coppertone labeling and advertising were in compliance with all applicable laws and FDA regulations and further remarked the lawsuit was litigation gone amok as no consumer lost more than pocket money paid for the sunscreen. Since medical damages for skin cancer were not alleged, the Merck class action suit only sought the removal of misleading labels on Coppertone that the FDA could not do because of the lobbyist. See <http://online.wsj.com/news/articles/SB114909066818167570>

In 2012, the Court ordered Merck to create a \$10 million fund to cover monetary relief for millions of consumer claims, each claimant recovering at least the cost of Coppertone purchases. See "Settlement" [1] The Court also ordered injunctive relief having Merck remove the terms "sunblock" and "all day protection" from Coppertone labeling. The Court ruling excluded monetary relief for skin cancer by consumers, but allowed medical damage lawsuits to be brought in separate lawsuits based on the Merck precedent.

In this regard, sunscreen manufacturers commonly use ZnO – zinc oxide and other nanoparticles in their products of which there is extensive evidence of skin cancer. Indeed, "Friends of the Earth", a non-profit activist group, shown in the thumbnail campaigns on the banner that sunscreens should be labelled to warn the consumer of the danger that nanoparticles in their products may cause skin cancer. See <http://www.abc.net.au/news/2013-03-05/fresh-concern-over-...>

Conversely, sunscreen manufacturers argue the nanoparticles reduce the possibility of skin cancer because the

UVA and UVB rays from the sun are absorbed by nanoparticles on the skin surface and do not reach the epidermal layer and enter the blood stream. In fact, experiments [2] show human macrophage cells do remove ZnO nanoparticles from skin surface; but DNA damage in the epidermal layer was not reported.

#### **DNA damage mechanism at a distance**

DNA damage is of utmost importance in all cancers, which, if not repaired by the immune system, leads to cancer. Indeed, for decades experiments have shown nanoparticles in body fluids cause DNA damage. Skin cancer is no different. See e.g. [3]. Nevertheless, the question remains:

How can nanoparticles on the skin surface not in contact with the DNA in the epidermal layer damage the DNA in the epidermal layer?

To answer this question, cobalt Co-chromium Cr nanoparticles placed on one side of a cellular barrier were found [4] to damage the DNA of human fibroblasts on the other side, even though the nanoparticles never crossed the barrier, a finding that suggests DNA damage also occurred in the experiment [2] even though the ZnO nanoparticles never reached the epidermal layer. The researchers proposed the DNA damage mechanism as a cascade of biological signals in the intervening cells

#### **QED induced Radiation**

In an alternative to DNA damage at a distance by signaling, the toxicity of nanoparticles is more likely caused by the emission of thermal EM radiation [5,6] induced by QED that at UV and higher frequencies damage the DNA by . QED stands for quantum electrodynamics and EM for electromagnetic. QED radiation is based on the QM argument that under TIR confinement the atoms in nanoparticles lack the heat capacity to conserve thermal energy from body fluids by an increase in temperature. QM stands for quantum mechanics and TIR for total internal reflection.

By this theory, nanoparticles cannot conserve thermal energy by an increase in temperature, and therefore emit steady EM radiation that in the UV and above readily penetrates intervening cells to indeed damage the DNA at a distance. Although nanoparticles in sunscreens [2] do absorb harmful UVA and UVB rays from the sun as claimed, QED converts the absorbed EM energy to far more damaging UVC radiation. Therefore nanoparticles in sunscreens make the DNA damage worse than if they were not used at all.

#### **Conclusion**

A class action lawsuit following the Merck precedent is presented that requires manufacturers that include nanoparticles in sunscreens to add labeling such as "contains nanoparticles known to damage DNA that may lead to skin cancer" thereby allowing the consumer to decide on whether or not to purchase the sunscreen. See <http://www.nanoqed.org/>, "Litigation for Skin Cancer caused by Nanoparticles," 2014.

#### **References**

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- [3] G. P. Pfeifer and A. Besaratinia, "UV wavelength-dependent DNA damage and human nonmelanoma and melanoma skin cancer," *Photochem Photobiol Sci.*, 11, 90–97, 2012
- [4] G. Bhabra, et al., "Nanoparticles can cause DNA damage across a cellular barrier," *Nature Nanotechnology*, 4, 876-883, 2009.
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