



Date
Mr. /Ms.
Title
Company
Address

Re: Consumers reject the use of manufactured nanomaterials in sunscreen

Dear Sir/Madam,

I am writing to request a copy of your company's policy in relation to the use of manufactured nanomaterials in sunscreens (manufactured ingredients which are less than 300 nanometers [nm] in size, such as nanosized zinc oxide or titanium dioxide).

I am writing to voice concerns about these potentially dangerous sunscreen ingredients. If your company is using manufactured nanomaterials in its products, we urge you to refrain from doing so and consider our health, the health of workers at your firm, and the environment, all of which could be harmed by this risky practice. If, on the other hand, your company is steering clear of these ingredients, we thank you greatly and would ask that you **please let us know by responding to: iilluminato@foe.org**. Consumers have a right to know whether or not the products they buy contain nanoscale ingredients. Your response will allow us to share this information with our families and other consumers who seek nano-free products.

Scientific research has shown that many types of manufactured nanoparticles can be toxic to human tissue and cell structure.¹ These studies have found that some consequences from using manufactured nanomaterials can include increased oxidative stress, inflammatory cytokine production, DNA mutation and even cell death.² Titanium dioxide nanomaterials used in sunscreen have been demonstrated to catalyze the formation of free radicals in skin cells, which caused damage to DNA.³

Though studies to date suggest nanoscale mineral compounds in sunscreen may not fully penetrate intact skin, government agencies worldwide are still investigating this route of exposure. Scientific studies with other experimental nanomaterials have shown that some skin penetration can occur under various conditions,⁴ such as if skin is flexed⁵ (while exercising, for example), or if other ingredients that enhance penetration are included⁶ (which may be present in certain cosmetics). Damaged skin can absorb particles 70 times larger than a nanoparticle,⁷ suggesting that skin penetration by nanomaterials is likely to occur in people with eczema or acne. Recent research has shown that skin penetration is also more likely in sunburned skin.⁸ We do not yet know if common nanoscale ingredients would more likely penetrate the thinner skin of elderly people or babies, or whether deep penetration would always be necessary to elicit any possible toxic effects that may occur from sub-dermal contact with manufactured nanomaterials.

In the past year we have found additional evidence demonstrating the potential toxicity of manufactured nanomaterials, including their ability to: (1) damage human colon cells;⁹ (2) disrupt brain stem cells of mice;¹⁰ (3) inhibit the function of important microbes in the environment;¹¹ (4) travel up the food chain from small animals to large ones¹² (which is especially concerning when sunscreens are washed into water systems via showering and swimming); (5) potentially penetrate human skin;¹³ (6) cross the human placenta wall, potentially causing intergenerational harm.¹⁴

Please respond with regard to your detailed policy on manufactured nanomaterials by Friday July 16, 2010. Please send your reply to iilluminato@foe.org. This will be an excellent opportunity for your brands to gain positive exposure regarding their nano-free status as public attention turns to such products in the months ahead.

Due to the increasing use of manufactured nanoparticles in sunscreen products, no response or the absence of a clear policy on the use of manufactured nanoparticles means we can only assume that your brand may use these ingredients in some of its products. If this is the case, we will commit to no longer using your products.

Please do not hesitate to contact Friends of the Earth at (250) 477-7135 to discuss this important issue or to arrange a meeting. Friends of the Earth would be happy to provide whatever additional information you may require regarding any health, environmental or liability issues relating to the use of manufactured nanomaterials.

This is an issue of vital importance, so please reply soon. For further information about the health impacts of manufactured nanomaterials, please visit our website: <http://www.foe.org/healthy-people/nanosunscreens>.

Sincerely,

NAME

References

¹ For excellent overviews of the emerging field of nanotoxicology, see Oberdörster G, Oberdörster E and Oberdörster J (2005). "Nanotoxicology: an emerging discipline from studies of ultrafine particles"; Environmental Health Perspectives 113(7):823-839 and Hoet P, Bruske-Holfeld I and Salata O (2004). "Nanoparticles – known and unknown health risks". Journal of Nanobiotechnology.

² Oberdörster G, Maynard A, Donaldson K, Castranova V, Fitzpatrick J, Ausman K, Carter J, Karn B, Kreyling W, Lai D, Olin S, Monteiro-Riviere N, Warheit D, and Yang H (2005). "Principles for characterising the potential human health effects from exposure to nanomaterials: elements of a screening strategy". Particle and Fibre Toxicology 2:8.

³ Donaldson K, Beswick P, Gilmour P (1996). "Free radical activity associated with the surface of particles: a unifying factor in determining biological activity?" Toxicology Letters 88:293-298; Dunford R, Salinaro A, Cai L, Serpone N, Horikoshi S, Hidaka H, Knowland J (1997). "Chemical oxidation and DNA damage catalysed by inorganic sunscreen ingredients". FEBS Letters 418:87-90.

⁴ Ryman-Rasmussen J, Riviere J, Monteiro-Riviere N. 2006. Penetration of intact skin by quantum dots with diverse physicochemical properties. Toxicol Sci 91(1):159-165.

⁵ Rouse J, Yang J, Ryman-Rasmussen J, Barron A, Monteiro-Riviere N. 2007. Effects of mechanical flexion on the penetration of fullerene amino acid derivatized peptide nanoparticles through skin. Nano Lett 7(1):155-160; Tinkle S, Antonini J, Roberts J, Salmen R, DePree K, Adkins E. 2003. Skin as a route of exposure and sensitisation in chronic beryllium disease, Environ Health Perspect 111:1202-1208.

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- ⁶ Monteiro-Riviere N, Yang J, Inman A, Ryman-Rasmussen J, Barron A, Riviere J. 2006. Skin penetration of fullerene substituted amino acids and their interactions with human epidermal keratinocytes. *Toxicol* 168 (#827).
- ⁷ Oberdörster G, Oberdörster E, Oberdörster J. 2005. Nanotoxicology: an emerging discipline from studies of ultrafine particles. *Environ Health Perspect* 113(7):823-839.
- ⁸ Mortensen L, Oberdörster G, Pentland A, DeLouise L. 2008. In Vivo Skin Penetration of Quantum Dot Nanoparticles in the Murine Model: The Effect of UVR. *Nano Lett* 8(9):2779-2787.
- ⁹ Moos P.J., Chung K., Woessner D., Honegger M., Cutler N.S., Veranth J.M. (2010). ZnO Particulate Matter Requires Cell Contact for Toxicity in Human Colon Cancer Cells. *Chem. Res. Toxicol.* 23 (4): 733–739.
- ¹⁰ Deng X., Luan Q., Chen W., Wang Y., Wu M., Zhang H., Jiao Z. (2009). Nanosized zinc oxide particles induce neural stem cell apoptosis. *Nanotech.* 20 (11): 5101.
- ¹¹ See Environmental Health News: <http://www.environmentalhealthnews.org/ehs/news/nanoparticles-damage-microbes>.
- ¹² Zhu X., Wang J., Zhang X., Chang Y., Chen Y. (2010). “Trophic transfer of TiO₂ nanoparticles from daphnia to zebrafish in a simplified freshwater food chain.” *Chemosphere* 79(9): 928-933.
- ¹³ See Australia’s ABC News: <http://www.abc.net.au/pm/content/2010/s2830477.htm>.
- ¹⁴ Wick P., Malek A., Manser P., Meili D., Maeder-Althaus X., Diener L., et al. (2010). Barrier Capacity of Human Placenta for Nanosized Materials. *Environ Health Perspect.* 118: 432-436.