

## Nanoparticles by emitting EM radiation pose a health risk

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*Experiments showing DNA damage and increased cancer risk are supported by theoretical arguments that fine nanoparticles emit UV radiation and should be banned from commercial products.*

**Background** Nanoparticles (NPs) are currently used in electronics, cosmetics, chemical manufacturing, among other industries. NPs are now being used as an antibacterial agent in food processing. Medicinally, NPs are used to reduce infections in burn treatment, sunscreen lotions, and treating cancer tumors. However, there is a downside. Over the past decade, experiments have unequivocally shown NPs be a health risk. NPs induce DNA damage in mammalian cells, reduce mitochondrial function, produce reactive oxygen species (ROS) in the form of hydroxyl radicals and hydrogen peroxide that induce apoptosis/cell death.

**Oxidative Stress Paradigm** In 2003, the oxidative stress paradigm formulated as the measure of ROS was the area of fine (

**QED induced UV radiation and DNA damage** QED induces fine NPs to emit continuous EM radiation beyond the UV from the kT energy absorbed upon collisions of solution molecules. The NPs need not enter the biological cell because the UV emissions from NPs near a biological cell easily penetrate the membrane wall. Regardless, the UV radiation forms the hydroxyl radical that causes DNA damage. See [www.nanoqed.org](http://www.nanoqed.org) at link "2009" and "NP induced DNA damage."

**Modified Oxidative Stress Paradigm** QED induced EM radiation requires fine NPs to emit higher frequency EM radiation than coarse NPs consistent with the oxidative stress paradigm. But particulate matter is a mix of both fine and coarse NPs. Observations showing coarse NPs produce more DNA damage than fine NPs do not consider the interaction in the mix of NPs. The coarse NPs produce VIS and NIR, but not UV. The increased DNA damage is caused by fine NPs that absorb the VIS/NIR from coarse NPs, thereby enhancing their UV emission above that induced by collisions alone.

**Conclusions** Sunscreens should use coarse NPs that would absorb UV radiation that then is frequency down-converted or redshift to DNA non-damaging VIS and NIR radiation. Similarly, the widespread use of fine silver NPs in limiting bacteria in food processing and anti-microbial action should cease immediately for risk of developing cancers. Indeed, QED induced EM radiation allows the conjecture to be made that natural and man-made NPs are the most likely cause of ALL cancers thereby urging the ban on the use of fine NPs in commercial products.

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About QED induced Radiation: Classically, thermal EM radiation conserves heat by an increase in temperature. But at the nanoscale, temperature increases are forbidden by quantum mechanics. QED radiation explains how heat is conserved by the emission of nonthermal EM radiation.

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