Behind the curtains of nanotechnology

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Abstract

Increasing and ongoing investigations on the nanoscale level have put a focus on the necessity to understand the dark side of metallic nanoparticles. Physiological alterations have been described as a negative serious side effect by metals of nanoparticles. The most prominent metal nanoparticles introduced in health sciences, medicine and especially in therapeutical approaches are gold, silver and copper. In the last years, another heavy metal compound that has been applied not only in single use, but also in combination with an accompanying nanoparticle has arisen, zinc nanoparticles. Despite the heavy implementation of nanoparticles in various fields of medicine, there are still unanswered questions about their safety in regard to human health. Studies have associated the use of nanoparticles with inflammation, production of oxidative stress and acute and/or chronic toxicity. Nevertheless, the mechanism of action is not completely understood on how and when nanoparticles transit from being beneficial to harmless. Our investigations focus on the relation between biological physiological abnormalities dependent on type of response, time of exposure, and dosage of the zinc nanoparticle used. Our results show that blood cells treated with zinc nanoparticles up to 4 hours continue to display anti-apoptosis activity, whereas longer exposure induces cell death.

References

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