

Current research strategies for toxicity assessment of engineered nanomaterials. Lessons learned from European Projects

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Abstract

The rate at which novel nanomaterials are entering the marketplace and their unlimited economic potential is not being followed by updated regulation regarding the use of nanomaterials and their implications for human and environmental safety. The consequences of this gap of knowledge are at least two fold, on one hand consumer's confidence is at stake, on the other there is a risk to lose an opportunity for innovation.

At present there are a large number of uncertainties regarding the use of traditional toxicology to evaluate the toxicity of nanomaterials, which, due to their special physical characteristics, require further assessment when considering the particular methodology to be used. Furthermore, these new properties may be able to alter the absorption and transport capacity of nanoparticles across membranes. There is also a potential for nanoparticles to accumulate in organs, enter into blood circulation or even cross biological barriers.

In this context GAIKER-IK4 is involved in the development of novel methodologies to perform in vitro toxicological evaluation combining technologies such as flow cytometry, confocal microscopy and nanogenotoxicity to produce an in vitro tool-kit to accurately assess nanotoxicity. Our experience is based on our participation and leading roles in International Projects dealing with safety and efficacy assessment of nanomaterials from a Pharma, Cosmetic and Occupational Health point of view [1,2].

Our strategy aims at the core of engineered nanomaterial development, assisting in nanomaterial design by providing a fast and reliable evaluation of nanoparticle toxicity in the same fashion as any other conventional drugs are assessed for toxicity at their preclinical stage.

References

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- [2] Halevy S Dead Sea bath salt for the treatment of *psoriasis vulgaris*: a double-blind controlled study. Journal of the European Academy of Dermatology and Venereology 9 (1997) 237-242