Nanotoxicological issues, nanosegurance, regulatory issues and their implications: Nanoparticle Interactions with Biological Systems.

Antonio Carlos Guastaldi

Universidade Estadual Paulista, Instituto de Química, Rua Prof. Francisco Degni 55, 14800-060 - Araraquara, SP

guastald@iq.unesp.br

The lecture, besides highlighting the importance of technological development in nanomaterials, critically reflects the understanding of the impact of nanoparticles on human health and the environment. The systematic analysis of the national and international literature, from 2000 to 2015, including international and Brazilian investments, as well as the strategic priorities in Government Programs in Nanotechnology; Scientific articles in the areas of nanosciences and nanotechnologies, as well as aspects of toxicity to human health; Alternative methods to the use of animals in nanomaterial toxicity tests; And, recent developments in regulatory nanotechnology issues.

Nanosciences and nanotechnologies have grown in terms of scientific and academic production as well as the development of the world technology market. However, scientists, researchers and governmental and non-governmental organizations as well as consumers are concerned about the risks to human health, occupational safety and the environmental impact of nanotechnology applications. Despite the economic and technological interests, the growing number of publications involving the understanding of the stages of synthesis, characterization and application of nanoparticles presents conflicting scientific and epidemiological data on the risks to human health and the environmental impacts of nanotechnology.

It was concluded that several types of nanoparticles can be cytotoxic and / or genotoxic for in vitro cultured cells, but there are inconsistencies of scientific results, gaps and contradictions of the literature at the present time. In the same sense, in vitro test results may not fully reflect the mechanisms of interactions between the nanoparticles and the cellular system.