Abstract

The past decade has seen intense interest in developing technologies based on the unique properties of nanoscale structures leading to the rapidly expanding and highly diverse field of nanotechnology. However, the very same properties that make engineered nanomaterials so promising from a technological perspective, such as their high degree of reactivity would make them to cross biological barriers to cause biochemical changes, cytotoxicity, mutagenicity and carcinogenicity in humans and damage the environment1-3. The 1st Nobel Forum mini-symposium on nanotoxicology was recently held in Stockholm, Sweden, and the program was devoted to the topic of definitions and standardization in nanotoxicological research, as well as nano-specific risk assessment and regulatory/legislative issues4. Nanoecotoxicological research investigations are mainly focused to collect the data on (a) chemical and physical properties of Nanostructured materials in the environment, (b) their fate, behaviour, interaction and biogeochemistry, (c) toxicological, ecotoxicological and biological effects (d) detection, measurement and bioassays, (e) environmental risk assessment, life cycle analysis, modelling and human health, (f) their environmental and industrial applications. This information would help in the process of (i) knowledge transfer, (ii) regulation, legislation, policy decision and (iii) creation of public awareness. Understanding the basic mechanisms such as the site of absorption, translocation, biotransformation, bioconcentration, biomagnification and bioactivation of these xenobiotic nanosubstances in the biological and non-biological environment is of paramount importance. Nanotoxicological data from toxicity assessment, environmental risk assessment and characterization, hazard identification would help to build conceptual models needed to understand how engineered nanomaterials migrate, behave in the aqueous and biological environment, and ultimately cause health hazards. To overcome unforeseen health and safety problems biomarkers (biomolecular signatures and high-throughput proteomics) are being developed as early warning and pre-symptomatic screening devices that will help to identify the nanoparticles stress induced damage on human and ecosystem health5,6. Use of systems and cellular biology approaches, bioinformatics, and mechanistic studies to predict the damage process and develop technologies, and protect ecosystems and human health from harmful particulate matter will be discussed.

Author did not supply full text of the paper/poster.