Integrative Nanomedicine for New Therapies

An overview of nanotoxicological effects towards plants, animals, microorganisms and environment

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Abstract:
In recent years, nanotechnology has reached the limelight of research in applications of medicine and technology. Due to its onset, huge varieties of nanoparticles possessing significant characters are synthesized with broad application fields. Even though these particles are infesting our present life; conflictual views regarding their medical and biological effects are debatable. The non biodegradable nature and nanosize are the alarming features of the nanoparticles that confront potential threats to both environment and biomedical field on its expanding usage. NPs synthesized from heavy metals like lead, mercury and tin are proclaimed as stringent and stable compounds for degradation, hence results in environmental biohazards. The extensive applications of silver nanoparticles in biosensing, cosmetics, medical devices, food and clothing products inflates its human exposure and obviously resulted in toxicity (short and long term). In vitro studies revealed various cytotoxic effects in the cells of mammals such as brain, liver, lung, skin, reproductive organs and vascular system. Furthermore, ingestion, inhalation or injection of nanoparticles in intraperitoneal region resulted in toxic effect of multiple organs inclusively brain. Accounting the metal nanoparticles biohazardous effects like ROS (Reactive oxygen species) generation, DNA damage, protein denaturation and lipid peroxidation has been proved on carbon based nanoparticles, organic lipid based nanoparticles, mineral based nanoparticles, nano diamonds, nano composites, etc. Although, nanotechnology has become an advent field of research nowadays, it is importing significant environmental and health hazards thus couldn’t be beneficial to both society and economy.