P17-024
Hope for better survival in rats' pancreatic islet transplantation: Using magnesium oxide nanoparticles

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Islet transplantation is the successful remedy for one of the most prevalent disease, named diabetes. But during this procedure, pancreatic islets may lose their function and face with oxidative stress and apoptotic problems. This study was designed to examine the effects of various concentrations of magnesium oxide nanoparticles (MgO NPs) on viability and function of isolated islets of rat's pancreas. Following laparotomy, pancreases of rats were removed and the islets were isolated. Then, different concentrations of MgO NPs (<10 nm) were added to the islets and incubated for 24 h. After that, the viability of the cells was investigated by MTT assay and flow cytometry. Fluorescent staining was done by DNA-binding dyes and levels of caspase activity and insulin release are also measured by ELISA reader. The microscopic and ELISA results illustrated considerable decrease in the rate of apoptotic cells via inhibiting caspase-9 activity in 100 μg/ml concentration of MgO NPs. Also, that concentration made significant increment in level of insulin. Data of function and apoptosis biomarkers have meaningful correlations with each other. As alluded to above, positive results which have been obtained from this novel approach, support the use of MgO NPs in low concentration (100 μg/ml), as anti-apoptotic and anti diabetic compound in rat pancreatic islets, which shows it can be used in islet transplantation procedures.

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P17-025
Effects of copper oxide nanoparticles on antioxidant enzyme activities in gill and liver tissues of *Oreochromis niloticus*

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Effects of copper oxide nanoparticles (CuO NPs) on superoxide dismutase (SOD), catalase (CAT) and glutathione peroxidase (GPX) activities in gill and liver tissues of *Oreochromis niloticus* was studied after exposing the fish to 20 μg/L Cu over 15 days. Experimental solutions were prepared using CuO nanopowder, (particle size < 50 nm) and enzyme activities in tissues were determined using an Optizen UV 3220 spectrophotometer.

Nanoparticles (NPs) are defined as particles with dimensions between 1 and 100 nm and have unique properties such as high surface area due to their small size. Cu NPs are mainly used in electronic circuits, batteries, gas sensors and wood preservation. Production and use of engineered nanomaterials likely result in their release into aquatic environments and can lead to unexpected hazards on aquatic organisms. Cu NPs are capable of directly induce oxidative stress by catalyzing the production of reactive oxygen species (ROS) via Haber-Weiss and Fenton type reactions which potentially damage biological molecules. Organisms damaging effects of oxidative stress are counteracted by antioxidant enzymes such as SOD, CAT and GPx.

No mortality was observed during the 15 days of experiments. SOD, CAT activities decreased and GPx activity increased in gill and liver tissues when exposed to Cu NPs. CuO NPs are known to cause oxidative stress which may lead to alteration of the antioxidant capacity of cells against ROS generation by either stimulating or inhibiting enzymatic activities.

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P17-026
High dimension biological analysis of carbon nanotube toxicity

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The toxic effects of Multi-walled carbon nanotubes (MWCNTs) are often associated with intracellular oxidative processes related to generation of reactive oxygen species (ROS). The latter is enhanced by metallic impurities, that can be mobilized from the carbon nanotubes to the surrounding biological microenvironment.

The current study aimed at identifying the effects of exposure to purified and unpurified MWCNTs at different levels of biological organization, and at shedding light on the potential mechanism(s) of action. For this purpose, (a) immunological, (b) biochemical, (c) gene expression and (d) biological pathway analyses were carried out, combining human biosamples and in vitro testing. The MWCNTs with higher amount of metallic impurities caused a significant increase in lipid hydroperoxides levels and in the percentage of immune cells with reduced mitochondrial membrane potential as compared to the purified MWCNTs. Analysis of the effects of different types of MWCNTs on gene expression showed that impurities influence significantly the induction of key toxicity pathways such as inflammation mediated by chemokine and cytokine signaling. Pathway analysis showed significant modulation of genes related to the NFkB pathway, after exposure to unpurified MWCNTs, as a result of oxidative stress induction. This may cause a perturbation of the IL-6 pathway that aims to regulate the inflammatory processes and compensate apoptotic changes. Overall the immunological responses related to MWCNT exposure are considered the result of the synergistic effect of systemic (mediated by cells of the exposure routes) and local inflammation (blood cells).

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