

Molecular toxicity of nano-graphene using peripheral blood mononuclear cells, spleenocytes and apoptotic biomarker

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The toxicological aspect of Nano-graphene (NG) is an inadequately explored region. Most of the applications involve contact of the NG with blood. So it is important to rule any possible toxicity that can be caused by NG. To assess this, MTT assay was carried out in L929 cells with varying concentrations of NG. Cytotoxicity was shown at a dose of 600 µg. Chromosomal aberration was evaluated in human Peripheral blood mononuclear cells (PBMNCs). The results were comparable to that of control. DCFH-DA was used to detect ROS generation in NG treated PBMNCs. Increase in fluorescence of DCF is directly proportional to the amount of ROS generated. Production of ROS followed in a dose dependent manner in NG treated cells. Annexin V/Propidium Iodide (PI) staining was used to analyze induction of apoptosis in PBMNCs exposed to NG. Annexin V, a protein that binds specifically to phosphatidyl serine in the cell membrane, is a biomarker for the detection of early apoptosis. Induction of apoptosis was seen to elevate with increase in concentration of NG. Proliferation capacity of mice spleenocyte was evaluated by the incorporation of tritiated thymidine into cells. It was shown to follow a dose dependent pattern. From the results, it is seen that NG is a safe material at a cellular level in lower concentrations. Although a dose dependent increase in cytotoxicity, apoptosis and ROS generation was seen. Spleenocyte proliferation also was hindered at higher concentrations of NG. NG did not induce chromosome breaks or gaps in a significant level.

Biography

Reshma S. Cherian is currently doing her Ph.D. in Toxicology from Sree Chitra Tirunal Institute for Medical Sciences and Technology (Govt. of India), Trivandrum, Kerala, India. She completed her Post graduation in Biotechnology from Cochin University of Science and Technology, India.

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