Seminar

Institute for Plasma Research

Title : Effect of Iron Content Titanium Dioxide Nanoparticles on Potential of Mitochondrial System

Speaker: Dr. Tejal Barkhade
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Date : 10th September 2021 (Friday)

Time : 03.30 PM

Venue : Online - Join the talk:
https://meet.ipr.res.in/Dr.TejalBarkhade_PDFTalk

Abstract :

In present study, synthesis of TiO_2 and Fe content TiO_2 nanoparticles was done by sol-gel process. The characterization data of synthesized nanoparticles was carried out by XRD, XPS, FTIR, Raman microscopy, DRS, HR-TEM, PL Spectroscopy, and AFM. Further, the effect of synthesized nanoparticles on mitochondria were studied using many spectroscpic and microscopic methods. The interaction of TiO_2 nanoparticles with the mitochondrial membrane leads to the overproduction of ROS by disturbing membrane homeostasis which is the main cause of toxicity. The results of flow cytometry and confocal imaging confirmed that mitochondrial membrane potential (MMP) was altered and damaged in isolated mitochondria over TiO_2 exposure. The other studies such as swelling of mitochondria, surface-enhanced activity, membrane fluidity, membrane protein denaturation, AFM for mitochondrial morphological analysis and complex II activity were taken into consideration for toxicological assessment. TiO_2 induces mitochondrial swelling via a decrease in absorbance at 540 nm, promoting membrane fluidity. This affected the activity of complex II and increases the ROS generation via a non-specific approach instead of a definite one in a dose-dependent manner. While Fe incorporation helps to reduces the toxicity of parent TiO_2 NPs on mitochondrial system.