
Cytotoxicity Analysis of Polystyrene Nanoplastics in the Bronchial Epithelial Cell line BEAS-2B

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Abstract

Micro- and nanoplastics (MNPs) have become a global environmental problem. As plastics degrade, MNPs are released, and due to their small size, they can be taken up by lung cells.

In this study, we investigated the potential impacts of europium-doped model polystyrene particles (PS-Eu) on a non-cancerous human bronchial epithelial cell line called BEAS-2B. We performed cytotoxicity/viability assays and ROS quantification on cells grown under standard submerged conditions and exposed to increasing concentrations of particles for 48 hours.

The results showed that PS-Eu caused a dose-dependent decrease in both the functionality of acidic organelles (Neutral Red Uptake Assay) and the protein content of the sample (Coomassie Brilliant Blue Assay), while it increased mitochondrial activity (Resazurin Assay) and ROS production. In addition, a slight increase in LDH release was observed, which may indicate that PS-Eu promote apoptosis and cell detachment rather than necrosis during the 48-hour treatment.

Overall, our preliminary results indicate that PS nanoparticles can cause acute toxicity in BEAS-2B cells even at low concentrations by affecting metabolic activity and organelle functionality. Further experiments to determine the cytotoxic potential of PS-Eu in more complex lung models will be performed.

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Keywords: Micro and nanoplastics (MNPs), Lung cells, Europium doped polystyrene particles (PS Eu), BEAS 2B cell line, Cytotoxicity, ROS production, Dose dependent effects, Apoptosis, Acute toxicity

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