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Nanoparticles

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**Genotoxic Effects Of Zinc Oxide**

Here we have reported

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cytogenetic and genotoxic effects of ZnO NPs on the root cells of *A. cepa*. The effects of ZnO NPs on the mitotic index (MI), micronuclei index (MN index), chromosomal aberration index, and lipid peroxidation were determined through the hydroponic culturing of *A. cepa*. *A. cepa* roots were treated with the dispersions of ZnO NPs at four different

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concentrations (25, 50, 75, and 100  $\mu\text{g ml}^{-1}$ ).

**Cytogenetic and genotoxic effects of zinc oxide ...**

Genotoxic effects of Zinc oxide nanoparticles. April 2015; Nanoscale 7(19)  
DOI:

10.1039/C5NR01167A.  
... Zinc oxide (ZnO) quantum dot (QD) is a promising inexpensive inorganic

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**(PDF) Genotoxic effects of Zinc oxide nanoparticles**

In summary, genotoxic and cytotoxic effects of ZnO-NP to hMSC were demonstrated in long-term and repetitive exposure. A protective effect was seen after one week of MSC differentiation into osteogenic and adipogenic lineages. Observations over a

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total of six weeks indicate a persisting intracellular accumulation of ZnO-NP and an ongoing toxic effect.

## **Time-Dependent Toxic and Genotoxic Effects of Zinc Oxide**

...

Nanoparticulate zinc oxide (ZnO) may be internalised through ambient air or the topical application of cosmetics, only to



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name a few, with unpredictable health effects. Therefore, we analysed the determinants of ZnO nanoparticle (NP) genotoxicity.

### **Genotoxic effects of zinc oxide nanoparticles - Nanoscale ...**

However, a slow increase of ROS after ZnO NP exposure and reduced but not quashed DSBs after

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NAC-treatment suggest that Zn(2+) may exert genotoxic activities without the necessity of preceding ROS-induction. Our data indicate that ZnO NP toxicity is a result of cellular Zn(2+) intake. Subsequently increased ROS-levels cause DNA damage.

## **[PDF] Genotoxic effects of zinc oxide nanoparticles ...**

The adsorption of

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dissolved zinc ions onto TiO<sub>2</sub>-NPs is discussed as the major antagonistic mechanism. The combination of both metal oxide nanoparticles interferes with the genotoxicity of ZnO-NPs and should be discussed as a reasonable and safe alternative to the sole use of ZnO-NPs in consumer products.

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**Genotoxic effects of  
zinc oxide**

**nanoparticles in  
nasal ...**

NPs reveal various adverse effects at the cellular level, such as oxidative stress and DNA damage (Wang et al., 2007; Falck et al., 2009; Shukla et al., 2011). In mammalian cells, several in vitro studies have demonstrated the genotoxic potential of ZnO NPs, as shown in

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Chinese hamster ovary (CHO) cells by chromosome aberration test (Dufour et al.,

**Genotoxic effects of zinc oxide and titanium dioxide ...**

Zinc oxide (ZnO) NPs are being used worldwide in consumer products and industrial applications. Based on predefined pathways, this study synthesized and characterized the

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nanostructures of ZnO NPs. The genotoxic effects of these nanomaterials were evaluated using a short-term in vivo bioassay, the somatic mu

**Genotoxicity of zinc oxide nanoparticles: an in vivo and ...**

To our knowledge, this is the first study evaluating toxic properties of ZnO-NPs in human nasal mucosa cells. Beside

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cyto- and genotoxic effects, a dose-dependent release of pro-inflammatory IL-8 could be demonstrated. Our results suggest that ZnO-NPs are capable to induce DNA damage and inflammation even in low concentrations.

**Cytotoxic, genotoxic and pro-inflammatory effects of zinc ...**

Micronized zinc oxide

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(188nm effective particle size) found to damage DNA and mitochondria in human (MSTO-211H) and rat (3T3) cells {Brunner, 2006} UV irradiation provoked a sensitivity to the cellular test system and a slight increase in the genotoxic potency of zinc oxide: Dufour E, et al 2006.

**EWG Skin Deep® |  
What is ZINC OXIDE**

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**(sunscreen grade >  
100nm)**  
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Here we have reported cyto-genetic and genotoxic effects of ZnO NPs on the root cells of *A. cepa*. The effects of ZnO NPs on the mitotic index (MI), micronuclei index (MN index), chromosomal aberration index, and lipid peroxidation were determined through the hydroponic culturing of *A. cepa*. *A. cepa* roots were

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treated with the  
dispersions of ZnO NPs  
at four different  
concentrations (25, 50,  
75, and 100  $\mu\text{g ml}^{-1}$ ).

**Cytogenetic and  
genotoxic effects of  
zinc oxide ...**

Genotoxic effects are  
regarded as a  
particularly important  
aspect of NM toxicity,  
as DNA damage can  
lead to mutation and  
potentially to the  
development of cancer

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## Genotoxic Effects Of Zinc Oxide Nanoparticles

and birth defects. DNA damage can occur by direct interaction of NPs with the DNA, or as an indirect effect of the induction of oxidative stress.

### **In vitro genotoxicity testing of four reference metal ...**

The results of the study indicated cytotoxic effects of ZnO-NP beginning at high concentrations of 50  $\mu\text{g}/\text{mL}$  and genotoxic

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effects in hMSC  
exposed to 1 and 10  
 $\mu\text{g/mL}$  ZnO-NP.  
Repetitive exposure  
enhanced cyto- but not  
genotoxicity.  
Intracellular NP  
accumulation was  
observed up to 6  
weeks. The results  
suggest cytotoxic and  
genotoxic potential of  
ZnO-NP.

### **Time-Dependent Toxic and Genotoxic Effects of Zinc Oxide**

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## Genotoxic Effects Of Zinc Oxide

The expanded uses of zinc oxide nanoparticles (ZnO NPs) have grown rapidly in the field of nanotechnology. Thus, rising production of nanoparticles (NPs) increases the possible risks to the environment and occupationally exposed humans. Hence, it is indispensable to appraise the safety toxicity including

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genotoxicity for these  
NPs.

**Genotoxicity  
evaluation of zinc  
oxide nanoparticles  
in ...**

Bai et al revealed  
mitochondrial  
dysfunction leading to  
an increased ROS  
generation and  
consecutive DNA  
damage and cell death.  
53 Another study  
indicated a stimulation  
of ROS production via

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the upregulation of lipooxygenases in neuroblastoma cells. 54 It has been suggested that the dissolution of ZnO NPs into Zn<sup>2+</sup> ions and consecutive ROS generation after incorporation may be responsible for the genotoxic effects. 50,55 This seems to be all the more likely since zinc serves as a component of ...

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**[Full text] Effects of  
Zinc Oxide  
Nanoparticles in  
HUVEC ...**

Zinc-Oxide

Nanoparticles Exhibit  
Genotoxic, Clastogenic,  
Cytotoxic and Actin  
Depolymerization  
Effects by Inducing  
Oxidative Stress

Responses in  
Macrophages and Adult  
Mice Rashmirekha Pati  
, Rashmirekha Pati

**Zinc-Oxide**  
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**Exhibit Genotoxic,  
Clastogenic ...**

Furthermore, possible genotoxic effects and functional impairment caused by ZnO NPs in HUVEC are elucidated. Methods: Thresholds for cytotoxic effects are determined by the 3-(4,5-dimethylthiazol-2-yl)-2,5-diphenyltetrazolium bromide (MTT) and Annexin V assay. To demonstrate DNA damage, single-cell

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nanoparticles  
microgel  
electrophoresis  
(comet) assay is ...

**Effects of Zinc Oxide  
Nanoparticles in  
HUVEC: Cyto- and ...**

No significant  
genotoxic effect was  
observed in <100 nm  
NPs and ionic form,  
while <50 nm IONPs  
showed genotoxicity at  
1 and 10 mM  
concentrations.

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