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# Genotoxic Effects Of Zinc Oxide Nanoparticles

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

Genotoxic effects of zinc oxide nanoparticles - Nanoscale ...

In vitro genotoxic effects of ZnO nanomaterials in human ...

(PDF) Genotoxic effects of Zinc oxide nanoparticles

Time-Dependent Toxic and Genotoxic Effects of Zinc Oxide ...

Zinc-Oxide Nanoparticles Exhibit Genotoxic, Clastogenic ...

Current investigations into the genotoxicity of zinc oxide ...

Genotoxic effects of zinc oxide nanoparticles in nasal ...

Genotoxic Effects Of Zinc Oxide

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

Genotoxic and oxidative stress potential of nanosized and ...

Cytogenetic and genotoxic effects of zinc oxide ...

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

Genotoxic effects of zinc oxide and titanium dioxide ...

Cytogenetic and genotoxic effects of zinc oxide ...

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Nanoparticles

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*Genotoxic Effects Of Zinc Oxide Nanoparticles*

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**LAWRENCE WHITEHEAD**

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**[PDF] Genotoxic effects of zinc oxide nanoparticles ... The wonders of Zinc Oxide! (Acne, redness, oil control, sunscreen!)**

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**Powders: Titanium**

**Dioxide, Zinc Oxide,**

**Sericite Mica, Kaolin**

**Clay, and Starch 7**

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**Zinc For Men:**

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*More Mod-01 Lec-01  
Lecture-01-Introduction  
to  
Biomaterials*Genotoxic  
Effects Of Zinc OxideIn  
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  
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 ...Here we  
have reported  
cytogenetic and  
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ZnO NPs on the root  
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effects of ZnO NPs on  
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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  
concentrations (25, 50,  
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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)  
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 promising inexpensive  
 inorganic  
 nanomaterials, of  
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 genotoxicity.[PDF]  
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 effects of zinc oxide  
 nanoparticles -  
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 adsorption of dissolved  
 zinc ions onto TiO<sub>2</sub>-  
 NPs is discussed as the  
 major antagonistic  
 mechanism. The  
 combination of both  
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 genotoxicity of ZnO-  
 NPs and should be  
 discussed as a  
 reasonable and safe  
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 consumer  
 products. Genotoxic  
 effects of zinc oxide  
 nanoparticles in nasal  
 ...The results of the  
 study indicated  
 cytotoxic effects of  
 ZnO-NP beginning at

high concentrations of 50 µg/mL and genotoxic effects in hMSC exposed to 1 and 10 µg/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 ... Here we have reported 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 concentrations (25, 50, 75, and 100 µg ml<sup>-1</sup>). Cytogenetic and genotoxic effects of zinc oxide ... Other cellular responses may be induced and give rise to genotoxicity, such as oxidative stress induction, inflammatory response, and aberrant signaling responses (Figure 3). 1,35,97 Moreover, putative mechanisms underlying the detrimental effects of ZnO and silica NPs are proposed (Figure 4). Figure 3. Current investigations into the genotoxicity of zinc oxide ... To our knowledge, this is the first study evaluating toxic properties of ZnO-NPs in human

nasal mucosa cells. Beside 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 ... Genotoxic effects of zinc oxide and titanium dioxide nanoparticles on root meristem cells of *Allium cepa* by comet assay Eşref DEMİR, Nuray KAYA\*, Bülent KAYA Department of Biology, Faculty of Sciences, Akdeniz University, Antalya, Turkey \*

Correspondence: nkaya@akdeniz.edu.tr

1. Introduction

Industrial applications of nanotechnology are rapidly Genotoxic effects of zinc oxide and titanium dioxide ... The overall data suggest that the potential genotoxicity of ZnONP in *Drosophila* can be considered weak according to the lack of mutagenic and recombinogenic effects and the induction of primary DNA damage only at high toxic doses of ZnONP. Genotoxic and oxidative stress potential of nanosized and ... In this study, possible genotoxic effects of zinc oxide (ZnO) nanoparticles were investigated in cultured human peripheral lymphocytes by using chromosome aberrations and micronucleus assays (MN). For this purpose, the cells were treated



with ZnO (1, 2, 5, 10, 15 and 20 µg/mL) for 24 and 48 h. In this research, four types of chromosome aberrations were observed as chromatid and chromosome breaks, fragment and dicentric chromosomes. In vitro genotoxic effects of ZnO nanomaterials in human ...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 Nanoparticles Exhibit Genotoxic, Clastogenic ...Genotoxic effects of zinc oxide and titanium dioxide nanoparticles on root meristem cells of *Allium cepa* by

comet assay Eşref DEMİR, Nuray KAYA\*, Bülent KAYA  
Department of Biology, Faculty of Sciences, Akdeniz University, Antalya, Turkey \*  
Correspondence: nkaya@akdenizedutr 1  
Introduction Industrial applications of nanotechnology are rapidly ...[EPUB]  
Genotoxic Effects Of Zinc Oxide Nanoparticles Zinc oxide (ZnO) NPs are being used worldwide in consumer products and industrial applications. Based on predefined pathways, this study synthesized and characterized the nanostructures of ZnO NPs. The genotoxic effects of these nanomaterials were evaluated using a short-term in vivo bioassay, the somatic mutation and

recombination test (SMART) in *Drosophila melanogaster*. Genotoxicity of zinc oxide nanoparticles: an in vivo and ... 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 the upregulation of lipoxygenases 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 ... [Full text] Effects of Zinc

Oxide Nanoparticles in HUVEC ... (2006) Clastogenicity, photoclastogenicity or pseudo-photoclastogenicity: genotoxic effects of zinc oxide in the dark, in pre-irradiated or simultaneously irradiated Chinese hamster ovary cells. Mutation Research/Genetic Toxicology and Environmental Mutagenesis 607(2): 215 - 224 . The results of the study indicated cytotoxic effects of ZnO-NP beginning at high concentrations of 50 µg/mL and genotoxic effects in hMSC exposed to 1 and 10 µg/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.

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

Genotoxic effects of zinc oxide and titanium dioxide nanoparticles on root meristem cells of *Allium cepa* by comet assay Eşref DEMİR, Nuray KAYA\*, Bülent KAYA  
Department of Biology,  
Faculty of Sciences,  
Akdeniz University,  
Antalya, Turkey \*

Correspondence:  
nkaya@akdenizedutr 1  
Introduction Industrial applications of nanotechnology are rapidly ...

**In vitro genotoxic effects of ZnO nanomaterials in human ...**

The adsorption of

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

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

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

Zinc oxide (ZnO) NPs are being used worldwide in consumer products and industrial applications. Based on predefined pathways, this study synthesized and characterized the nanostructures of ZnO NPs. The genotoxic effects of these nanomaterials were evaluated using a short-term in vivo bioassay, the somatic mutation and recombination test (SMART) in *Drosophila melanogaster*.

### **Zinc-Oxide Nanoparticles**

### **Exhibit Genotoxic, Clastogenic ...**

In this study, possible genotoxic effects of zinc oxide (ZnO) nanoparticles were investigated in cultured human peripheral lymphocytes by using chromosome aberrations and micronucleus assays (MN). For this purpose, the cells were treated with ZnO (1, 2, 5, 10, 15 and 20  $\mu\text{g/mL}$ ) for 24 and 48 h. In this research, four types of chromosome aberrations were observed as chromatid and chromosome breaks, fragment and dicentric chromosomes.

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**Genotoxic effects of  
zinc oxide  
nanoparticles in  
nasal ...**  
Genotoxic effects of  
zinc oxide and titanium  
dioxide nanoparticles

on root meristem cells  
of *Allium cepa* by  
comet assay Eşref  
DEMİR, Nuray KAYA\*,  
Bülent KAYA  
Department of Biology,  
Faculty of Sciences,  
Akdeniz University,  
Antalya, Turkey \*  
Correspondence:  
nkaya@akdeniz.edu.tr  
1. Introduction  
Industrial applications  
of nanotechnology are  
rapidly  
Genotoxic Effects Of  
Zinc Oxide  
Nanoparticulate zinc  
oxide (ZnO) may be  
internalised through  
ambient air or the  
topical application of  
cosmetics, only to  
name a few, with  
unpredictable health  
effects. Therefore, we  
analysed the  
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*[Full text] Effects of  
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Other cellular responses may be induced and give rise to genotoxicity, such as oxidative stress induction, inflammatory response, and aberrant signaling responses (Figure 3).<sup>1,35,97</sup> Moreover, putative mechanisms underlying the detrimental effects of ZnO and silica NPs are proposed (Figure 4).  
Figure 3.

*Genotoxic and  
oxidative stress  
potential of nanosized  
and ...*

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 nanomaterials, of ...

Cytogenetic and genotoxic effects of zinc oxide ...

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

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

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 the upregulation of lipoxygenases in neuroblastoma cells.

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### [EPUB] Genotoxic Effects Of Zinc Oxide Nanoparticles

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



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(2006) Clastogenicity, photo-clastogenicity or pseudo-photo-clastogenicity: genotoxic effects of zinc oxide in the dark, in pre-irradiated or simultaneously irradiated Chinese hamster ovary cells. Mutation Research/Genetic Toxicology and Environmental Mutagenesis 607(2): 215 - 224 .

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

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

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  
The overall data suggest that the potential genotoxicity of ZnONP in Drosophila can be considered weak according to the lack of mutagenic and recombinogenic effects and the induction of primary DNA damage only at high toxic doses of ZnONP.

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