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Oral Presentations

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In vitro cytotoxicity of zinc oxide nanoparticles in mouse ovarian germ cells

Saber M¹, Hayaei Tehrani RS¹, Mokhtari S², Hoorzad P¹, Esfandiari F¹.

1. Department of Stem Cells and Developmental Biology, Cell Science Research Center, Royan Institute for Stem Cell Biology and Technology, ACECR, Tehran, Iran.

2. Department of Stem Cells and Developmental Biology, Cell Science Research Center, Royan Institute for Stem Cell Biology and Technology, ACECR, Tehran, Iran.

3. Department of Physics, Shahid Beheshti University, Tehran, Iran.

4. Department of Stem Cells and Developmental Biology, Cell Science Research Center, Royan Institute for Stem Cell Biology and Technology, ACECR, Tehran, Iran.

5. Department of Stem Cells and Developmental Biology, Cell Science Research Center, Royan Institute for Stem Cell Biology and Technology, ACECR, Tehran, Iran.

Email: fereshtehesfandiari@royaninstitute.org

Background: Recently, metal oxide nanoparticles such as zinc oxide nanoparticles (ZnO-NPs) have received considerable attention and humans are exposed to them in everyday life. The increasing use of ZnO-NPs may lead to human health issues. However, little is known about their effects on female reproductive systems, particularly on female germ cells. Germ cells differentiation is a complex biological process that is sensitive to environmental insults and any negative effect on germ cells development may inhibit fertility.

Objective: The purpose of this study was to assess the effects of ZnO-NPs on mouse ovarian germ cells (OGCs) as an in vitro model for the assessment of

nanotoxicity in the OGCs. To the best of our knowledge, no study has been conducted to determine the effects of ZnO-NPs on female OGCs. Our study provides a sensitive in vitro model to assess the toxic effects of ZnO-NPs and other NPs in the female OGCs. This study aimed to determine the impact of ZnO-NPs on mouse OGCs in an in vitro system.

Materials and Methods: Briefly, after isolation and culture of OGCs, the effects of ZnO-NPs on these cells were evaluated using light microscopy, cell proliferation assessment, reactive oxygen species (ROS) level determination, standard cytotoxicity assessment (cell viability assessed by PI staining) and gene expression analysis.

Results: Our results demonstrated that ZnO-NPs have cytotoxic effects in a concentration- and time-dependent manner in mouse OGCs. Exposure of cells to ZnO-NPs concentration-dependently enhanced ROS generation. Furthermore, molecular analysis of ZnO-NPs-treated cells showed a significant increase in expression of premeiotic germ cells markers but a decrease in meiotic and post-meiotic markers compared to un-treated cells.

Conclusion: Our data provides a preliminary insight into possible adverse effects of ZnO-NPs on mouse OGCs differentiation even at low concentrations.

Key words: Nanoparticle, Zinc oxide, Ovarian germ cell, Infertility.

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