



Effect of silver nanoparticles on apoptosis and steroid hormone production of mouse ovarian granulosa cells

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Description: Exposure of human to silver nanoparticles (SNP) has been increased during the past decade, but there is no enough information about the adverse effect of those on normal cells of various tissues such as reproductive tissues. In the present study the effect of different concentrations of SNP on production of steroid hormones and apoptosis markers of mouse granulosa cells was studied.

Method: Granulosa cells were isolated from ovary of adult mice. Cells were cultured in DMEM medium and exposed to 10-15 nm SNP at various concentrations (100-1000 μ M) for 24 and 48 h. After that cell toxicity was assayed using MTT method, estradiol (E2) and progesterone (P4) was measured by Radioimmunoassay, some apoptotic markers such as DNA fragmentation and Caspase-3 activity were determined using TUNEL assay and ELISA, respectively.

Results: Based on MTT assay, IC₅₀ of SNP in mouse granulosa cells was 200 μ M. Maximal TUNEL⁺ cells (46.64%) were observed after 48 h exposure of cells to 500 μ M of SNP when compared with control cells (7.21%). Caspase-3 activity was increased in a dose dependent manner. E2/P4 ratio as a marker of apoptosis in granulosa cells was dose dependently increased in treated cells. The highest effect of SNP on steroid hormone production was observed at dose of 300 μ M 48 h after exposure.

Discussion: Our findings demonstrated that SNP in a dose dependent manner could induce apoptosis and change the hormonal secretion pattern of mouse granulosa cells. The data suggest that exposure of human to SNP may have adverse effect on function and vitality of ovarian cells.