

OBESITY INDUCED CHANGES IN OOCYTES AND ITS IMPACT ON THE DEVELOPMENTAL POTENTIAL OF PREIMPLANTATION STAGE EMBRYOS

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Abstract Body

Obesity is a major health issue and is associated with various pathologies including infertility. Abnormal lipid metabolism/ obesity can disrupt the hypothalamo-pituitary-gonadal axis and can have adverse effects on follicular microenvironment. The present study was aimed at correlating the cytoplasmic changes in the oocytes with developmental potential of embryos in obesity. Female Swiss albino mice (3 weeks) were fed with normal diet or high fat diet (HFD) for 8 weeks after which the mice were assessed for estrus cycling by vaginal cytology and biochemical analysis. The germinal vesicle (GV) stage oocytes were subjected to *in vitro* maturation (IVM) and intracellular ROS level (DCHFDA staining), lipid accumulation (Nile red staining), XBP1 expression (immunofluorescence) were assessed. To assess the developmental potential, *in vitro* fertilization was performed and embryos were cultured till blastocyst stage. Fertilization rate, blastocyst rate and DNA integrity in blastocyst (TUNEL assay) were assessed. The GV oocytes collected from HFD fed female mice exhibited poor *in vitro* maturation potential ($p < 0.01$) and high lipid accumulation ($p < 0.05$). Increased intracellular ROS level ($p < 0.01$) and moderate increase in XBP1 expression in these oocytes indicated that oocytes from HFD group have high intracellular oxidative and ER stress. Further, fertilization ($p < 0.001$) and blastocyst rate ($p < 0.0001$) was significantly lower while, DNA damage in blastocysts was significantly higher ($p < 0.001$) when compared to control. In conclusion, the diet induced obesity results in subtle cytoplasmic changes in oocytes which contributes to poor developmental potential of embryos.