Title: Efficacy of L-Carnitine in reversing the antiproliferative effects of TNF-a on mouse embryos in vitro.
Objective: TNF-a levels are elevated in the serum, follicular fluid and peritoneal fluid of infertile women with endometriosis and PCOS. Elevated levels of TNF-a have been reported to restrict inner cell mass proliferation in the mouse blastocyst. This leads to retardation of embryo development, reduced embryo viability and embryonic death. L-Carnitine (LC) has been reported to decrease the elevated serum level of TNF-a in certain tumors and inflammatory diseases. Reports on the role of LC as an anti-TNF-a agent in in-vitro culture of embryos are lacking. Our objective was to investigate the role of LC in antagonizing the inhibition of cell proliferation effects of TNF-a on the mouse embryo development.

Design: Prospective in vitro experiment

Materials and Methods: A total of 100 two cell mouse embryos were divided into 4 groups: group 1: control (HTF media only); groups 2: (TNF-a 500ng); and group 3-4: TNF-a 500ng + LC (0.3 and 0.6 mg/mL). Results of our pilot study have shown that LC is not embryotoxic at concentrations of 0.3 and 0.6 mg/mL. Embryos were incubated at 37°C in 5% CO₂. Assessment of embryo development was done after 72 hours by examining the percentage blastocyst development rate (%BDR). Detection of apoptosis was done after TUNEL staining and by measuring the percentage of damaged blastomeres using confocal microscopy.

Results: Comparison of %BDR and apoptosis between control, TNF-a alone, and TNF-a + Carnitine are shown in the table.

Conclusions: TNF-a reduces the blastocyst development rate in mouse embryos. L-Carnitine could reverse the TNF-a induced inhibition in BDR. The lack of any significant effect on DNA damage by TNF-a suggests its antiproliferative effect on developing mouse embryos. Inclusion of L-carnitine in culture media may help in antagonizing the antiproliferative action of TNF-a thereby improving embryo development.

Support: None