

L-CARNITINE IMPROVES BLASTOCYST DEVELOPMENT RATE IN MOUSE 2-CELL EMBRYOS.

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Introduction and Objectives: Human embryos generated from in vitro fertilization (IVF) exhibit varying degrees of cytoplasmic fragmentation, and abundant evidence demonstrates that cytoplasmic fragmentation in human embryos arises from apoptosis. Apoptosis is accompanied with changes in mitochondrial membrane potential and the release of several death-inducing factors. Mitochondrial membrane potential and energy production in preimplantation embryos have recently been the focus of many studies. L-Carnitine (LC) is able to stabilize the mitochondrial membranes and increase the supply of energy to the organelle (lymphoma cells, fibroblasts and embryonic neurons) and protect the cell from apoptotic death. LC has no major side effects, interactions with other drugs or teratogenicity. The aim of our study was to establish the LC concentration in the mouse embryo culture media that is not embryotoxic and study the effect of LC on the embryogenesis.

Methods: A total of 420 2-cell mouse embryos (Embryotech Laboratories, Inc., Wilmington, MA) were incubated in 7 groups: group 1: control (HTF media only); groups 2-7: varying concentrations of LC (0.3, 0.6, 1.25, 2.5, 5 and 10 mg/mL). LC concentrations were based on previous studies using LC in tissue culture media such as, lymphoma cells, fibroblasts and embryonic neurons.

Embryos were incubated at 37°C in 5% CO₂, and assessment of embryos development was done after 72 hours by examining the Blastocyst

Development Rate percent (%BDR). **Results:** Significant improvement in BDR% was seen at LC 0.3 mg/mL compared with the control (%BDR: 100% vs. 83.3%; P = 0.006). No significant difference in %BDR of LC 0.6mg/mL and the control (%BDR: 81.6 versus 83.3%). Significant decrease in % BDR was seen at 1.25, 2.5 and 5 mg/ml concentration of LC (%BDR: 68.3%, 70%, 71.6% versus control 83.3%). However LC at 10 mg/mL was embryotoxic (BDR%: 35 % vs. 83.4%) (P< 0.001). **Conclusions:** LC has dose dependent effect on mouse embryo development. Improvement of %BDR at lower LC concentrations (0.3mg/mL) may be beneficial and may offer a novel approach to improve the embryogenesis in IVF.