

IMPROVEMENT IN BLASTOCYST DEVELOPMENT RATE IN MOUSE EMBRYOS AFTER IN VITRO SUPPLEMENTATION WITH L CARNITINE (LC)

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Introduction: Embryo fragmentation, oxidative stress and high concentration of tumor necrosis factor (TNF- α) may affect the in vitro embryogenesis. L-Carnitine protects cell membrane and DNA against damage induced by free oxygen radicals and has a pivotal role in mitochondrial oxidation of long chain fatty acids which increase energy supply to the cell. L-Carnitine also has an antioxidant and anti-apoptotic effect. **Objective:** To optimize the L Carnitine (LC) concentration as a supplement in the embryos culture media and to investigate the effect of LC on the developing embryos.

Methods: To optimize the LC concentration, we divided 420 mouse embryos into 7 groups and incubated them with different LC concentrations (0, 0.3, 0.6, 1.2, 2.5, 5.0, and 10 mg/mL). To investigate the effect of LC on the developing embryos 500 mouse embryos were divided into three groups and incubated with either Actinomycin-D (AD) (5 ng/mL), hydrogen peroxide H₂O₂ (500 μ M), or TNF- α , (500ng) with and without LC 0.3 or 0.6 mg/mL. Blastocyst development rate (%BDR) and DNA damage were examined for all groups.

Results: Significant improvement in %BDR was seen at LC 0.3 mg/mL compared with the control ($p = 0.006$). LC 0.3 and 0.6 mg/mL significantly reduced the blocking effect of AD, H₂O₂ and TNF- α and significantly decreased the level of DNA damage.

Conclusions: L Carnitine can improve the embryo development in vitro through its multiple protective effects. Supplementation of embryo culture media with LC may be a novel and a cost effective technique to improve the embryogenesis of cultured embryos. This may be beneficial in improving the in vitro fertilization (IVF) outcome.