HUMAN EMBRYO DEVELOPMENT IN MELATONIN SUPPLEMENTED CULTURE MEDIUM

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Abstract Body

Introduction:
Following retrieval, the micro-environment that gametes and embryos are cultured in is an essential determinant of subsequent fertilization and implantation success. Protecting embryos against oxidative stress during in vitro culture has been proposed as one of the key steps to improving embryo development and quality. Melatonin is widely known as an antioxidant with multi-faceted ways to counteract the oxidative stress. Many investigators have studied the impact of melatonin supplementation of culture medium in porcine, murine, and bovine embryo development, overall demonstrating a beneficial effect. The present work investigated effects of different melatonin concentrations added to culture medium on human embryo development competency and embryo quality.

Materials and methods:
In this prospective sibling-split study 2488 two-pronuclear stage embryos from 241 patients were randomly divided and cultured to the blastocyst stage in 20µl individual droplets of culture medium supplemented with different melatonin concentrations (0-control group, 10^{-9}M,10^{-6}M,10^{-4}M – treatment groups). Students t-test was performed to compare embryo development among groups in terms of embryo quality and blastocyst formation rates.

Results:
Supplementing culture medium with 10^{-4}M melatonin resulted in higher proportion of compacted embryos on day 4 (45,9% ± 2,5% in treatment group vs. 39,1% ± 2,5% in contol; p< 0,005), higher percentage of good quality blastocysts on day 5 (23,9% ± 1,7% in treatment group vs. 19,6% ± 1,2% in contol; p< 0,005) together with higher blastocyst formation rate (41,4% ± 2,7% in treatment group vs. 35,9% ± 2,8% in contol; p< 0,005). Effects observed in the presence of melatonin at concentrations lower than 10^{-4}M were not statistically significant.

Conclusion:
The beneficial effect of melatonin on embryo quality is highlighted by the enchanced post fertilization embryo development, especially in terms of superior quality blastocysts and blastocyst formation rate.

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