

Increase of Proliferation and Colonization in Mouse Spermatogonial Stem Cell by Low Intensity Ultrasound

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Background

Spermatogonial stem cells (SSCs) are the foundation of spermatogenesis. Sound wave especially low intensity ultrasound (LIUS) can be effective on increasing the number of cells.

In this study we investigated the effect of LIUS stimulation on mouse SSCs proliferation and colonization.

Methods:

Isolated SSCs from neonate mice cultured in DMEM culture medium with 10% Fetal Bovine Serum. In the first phase of study, temperature controlled and in the second phase, SSCs stimulated by LIUS with 3 different Intensity dose (100, 200 and 300 mW/cm²) for 5 day and SSCs proliferation and colonization assessed at 7th day.

Results:

The LIUS treatment of mouse SSCs increased the proliferation rate and colonization of SSCs in experimental groups compared to the control group. Average of proliferation rate in 100, 200, 300 mW/cm² and control group were 1.96 ± 0.03 , 2.26 ± 0.03 , 1.73 ± 0.03 and 1.66 ± 0.03 , respectively. Average number of colonies in 100, 200, 300 mW/cm² and control group were 45 ± 1.2 , 53 ± 2.4 , 28 ± 1.2 and 20 ± 0.8 , respectively. Average diameters of colonies in 100, 200, 300 mW/cm² and control group were $235.3 \pm 6.8 \mu\text{m}$, $204.6 \pm 12.3 \mu\text{m}$, 203.6 ± 5.6 and $214.3 \pm 9.1 \mu\text{m}$, respectively. Our results showed that there was significant increase in proliferation rate and number of colonies in experimental groups compared to control group ($P < 0.05$), whereas there were not significant differences between groups regarding to diameter of colonies.

Conclusion:

These results suggested that LIUS treatment can be an efficient and cost-effective method to improve proliferation and colonization of SSCs during in vitro culture.

Key words: colonization, proliferation, mouse, Stem Cell, Ultrasound.

Poster Presentation

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