9th Yazd International Congress and Student Award on Reproductive Medicine with 4th Congress of Reproductive Genetics

Poster Presentations

P-87

Engineering biomimetic Polycaprolactone /Gelatin based nanostructure, promise for human spermatogonial stem cells culture

Zahiri M[1, 2], Bashiri Z[3, 4], Allahyari H[5], Esmaeilzade B[5].

1. *The Persian Gulf Marine Biotechnology Research Center, The Persian Gulf Biomedical Sciences Research Institute, Bushehr University of Medical Sciences, Bushehr, Iran.*
2. *Department of Anatomical Sciences, School of Medical Sciences, Bushehr University of Medical Sciences, Bushehr, Iran.*
3. *Department of Anatomical Sciences, School of Medical Sciences, Iran University of Medical Sciences, Tehran, Iran.*
4. *Stem Cell and Regenerative Medicine Research Center, Iran University of Medical Sciences, Tehran, Iran.*
5. *Department of Anatomical Sciences, School of Medical Sciences, Bushehr University of Medical Sciences, Bushehr, Iran.*

Email: m.zahiri@bpums.ac.ir

Background: Improvement of the culture system and increasing the proliferation of spermatogonia stem cells (SSCs) in vitro is essential as a treatment for infertility before autologous transplantation.

Objective: In this study, the proliferation of human SSCs on the electrospun polycaprolactone-gelatin nanocomposite was evaluated.

Materials and Methods: For this purpose, nanofiber porous scaffolds were prepared using the electrospinning method and their structure was confirmed using scanning electron microscope. After swelling and biodegradability tests, human SSCs were cultured on scaffolds, and survival status evaluated using the MTT assay, and their proliferation during two weeks of culture was assessed using immunocytochemistry, flow cytometry, and Real-time polymerase chain reaction techniques compared with the control group.

Results: Scanning electron microscope images showed the presence of fibers with suitable diameter and arrangement and sufficient porosity in nanocomposite scaffolds and showed good biocompatibility and biodegradability. Results showed a significant increase in the number of SSCs in the cultured group on scaffold compared with the control group ($p < 0.05$). The results showed that the expression of promyelocytic leukemia zinc finger *(Plzf), Integrin a6* and, *β1* gene using Real-time polymerase chain reaction in nanofiber scaffolds was significantly higher than the control group ($p > 0.05$). Flow cytometry analysis also showed that the number of Plzf-positive cells in nanofiber porous scaffolds was significantly higher than the control group ($p > 0.05$). Immunocytochemistry findings also confirmed the presence of human spermatogonia stem cell colonies.

Conclusion: In general, it seems that the designed nanocomposite scaffold provides a suitable capacity for self-renewal of human SSCs that can have a good application potential for use in research and reconstructive medicine in the field of male infertility.

Key words: *Spermatogonia stem cells, Polycaprolactone, Gelatin, Electrospinning, Proliferation.*