MWCNTs addition dispersion part of surface energy increased from 4.5 mm/mJ to 6.9 mm/mJ.

Such PLDLA-based materials modified with CNTs (MWCNTs, SWCNTs) may be an attractive support for adhering cells. SWCNTs were more suitable nanoadditives for PLDLA-matrix membranes than MWCNTs, because such membranes were stronger, hydrophilic and much more bioactive.

[Engineering of Biomaterials, 116-117, (2012), 139-140]

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References

[1] A. Piattelli, A. Scarano, M. Paolantonio, Biomaterials 17 (1996) 1725-1731.
[2] K. Fuijhara, M. Kotaki, S. Ramakrishna, Biomaterials 26 (2005) 4139-4147.
[3] Aslan M. Simsek G. Dayi E. J. Contemp Dent Pract 5 (2004) 1-7.

BIOLOGICAL PROPERTY POLY(ε-CAPROLACTONE) AS POTENTIAL MATERIAL FOR REPRODUCTION DEVICES

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Abstrtact

The main limitation of embryos transfer is the lack of catheters for their obtaining and transferring which would have desirable and confirmed biological properties ensuring high bioconcordance and low toxicity. Catheters used routinely for embryos obtaining and transfer are tools used for insemination, urology and other medical purposes, but their bioconcordance with embryos was never confirmed.

For these reasons in our studies we attempted to develop the modern set of catheters designed for the contact with embryos, based on the biomaterial characterized by good biological and mechanical properties such as with optimal resilience and elastic properties, and capable to be free shaped in the form of a tube of 1–2 mm diameter. The material which hypothetically fulfills biological requirements and at the same time gives possibility of free shaping is resorbable polymer used for the long time in many fields of medicine is poly-ε-caprolactone (PCL). Because of its biological and physical properties it was taken into consideration to use this biomaterial for in vitro embryos culture and for cryoconservation.

The aim of the study was verification of biological properties of poly-ε-caprolactone (PCL) as the material dedicated to biotechnology of animal reproduction and gynecology and evaluation of possibility of poly-ε-caprolactone (PCL) application as a potential material for production of medical devices, as catheters for obtaining and transporting of embryos as well as dishes for embryos culture in vitro and covers for cryoconservation. The possible application of this biomaterial needs verification of its biological properties on embryos culture. The foil discs made of the polycaprolactone, thickness 0.5 mm, diameter 3.5 mm, were prepared in two forms: the reference one (nPCL) and thermally modified by freezing in liquid nitrogen (mPCL). The verification of PCL bioconcordance was performed by evaluation of 102 pig embryos at the development stage of 2 to 4 blastomers. To evaluate poly-ε-caprolactone bioconcordance 5-day long culture of the embryos was performed on the evaluating material, not frozen (nPCL) and frozen in liquid nitrogen (mPCL) and additionally culture after short contact with poly-ε-caprolactone lasting 15 minutes (nPCL-15). In all evaluated study groups the development of embryos was suppressed shortly after transfer to the culture with PCL. In the control group 74-78% of the embryos reached blastocyst stage. Because of cytotoxic influence of polycaprolacton on embryos it cannot be used as the material for catheter production used in biotechnology of animal reproduction and other materials used for in vitro culture and cryoconservation.

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