Cell adhesion and morphology on plasma copolymerized PEG-PCL thin films

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Poly (ε-caprolactone)-poly (ethylene glycol) (PCL-PEG) copolymers have great potential applications in the fields of tissue engineering, pharmaceutics and medicinal chemistry. In the present work we have developed, amphiphilic biodegradable PCL-PEG copolymer coatings by catalyst free ROP of ε-caprolactone (ε-CL), in presence of 2-Methoxyethylether (DEGME). A low pressure inductively excited RF (13.56MHz) plasma reactor, designed for the deposition of copolymers [1], [2], was operating in the pulsed mode with Argon as the carrier gas. Experiments were performed at different ε-CL/PEG monomer feed ratio and effective power.

Cellular adhesion tests have been performed using 3 different cell types: human ovarian carcinoma cell line (NIH:OVCAR-3), human bone marrow endothelial cells and human fibroblast (3T3) (see. Fig. 1). Cells were cultured in the RPMI-1640, which was supplemented with 1% (v/v) antibiotics (10,000 U/ml penicillin-G sodium, 10mg/ml streptomycin), 2mM L-glutamine and 10% fetal bovine serum. All cells were expanded by routine cell culture technique in 25 cm^2 cell culture flasks which were incubated in a humidified atmosphere of 95% air and 5% CO_2 at a constant temperature of 37 °C for 24 hours.

The results have shown that it is possible to control and achieve good cellular response for PCL-PEG 33:67.

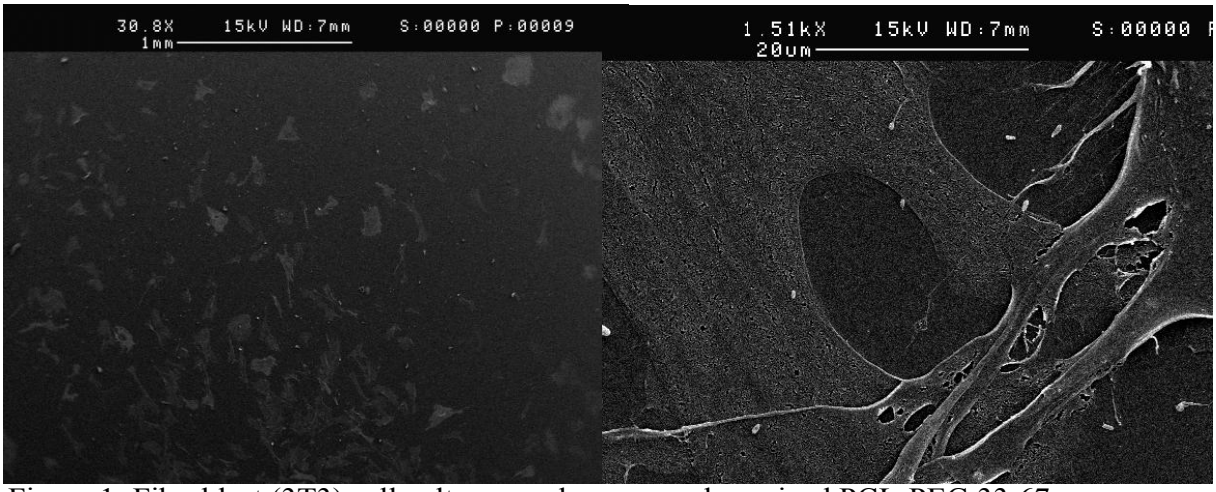

Figure 1: Fibroblast (3T3) cell culture on plasma copolymerized PCL-PEG 33:67.

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References

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