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Oral Presentations

O-28

Reconstruction of the mouse uterine tissue using polycaprolacton/ gelatin/ polydimethylsiloxane hybrib scaffolds: In vitro and in vivo study

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Background: Serious endometrial damage in women of fertility age is often associated with the formation of uterine scars and a lack of functional endometrium prone to infertility or miscarriage. Uterine tissue engineering using biological materials and stem cells may replace the need for surrogacy and may prevent the necessary immune suppression therapy. However tissue engineering structures were also used as laboratory models to study the mechanisms of endometrial invasion.

Objective: Reconstruction of the mouse uterine tissue using polycaprolacton/ gelatin/ polydimethylsiloxane hybrib scaffolds (in vitro and in vivo study).

Materials and Methods: In the present study, according to the structure of mouse uterine tissue, a tubular nanofiber scaffold was designed and fabricated. Mouse cells were cultured on target scaffold. 3- (4،5-dimethylthiazoyl-2-yl) 2، 5-diphenyltetrazolium bromide (MTT) test was performed to evaluate cell viability on the scaffold. Hematoxylin and eosin staining examined cell growth and proliferation on the scaffold. Mouse embryos were cultured on the target scaffold and examined with immunofluorescents staining. Finally, a tubular scaffold replaced one of the branches of the rat uterus and was evaluated 30 days after surgery by hematoxylin and eosin staining and immunohistochemistry for tissue formation.

Results: The tubular scaffold designed in this study showed that due to the location of the cells between the scaffold layers, cell infiltration between the nanofibers was good due to the small porosity of nanofibers. It also had a higher performance than similar tubular scaffolds. In the present study, the mouse embryo was hatched on the scaffold and attached to the scaffold. This indicates that the embryo was compatible with the scaffold. Also, after tubular scaffold transplantation instead of the mouse uterine horn, many cells close to the injured site migrate inward and the tubular tissue of the mouse uterus was formed on the scaffold.

Conclusion: In the present study, we developed a scaffold with the standards needed for whole uterine tissue engineering. It also could be useful for multiple tissue engineering applications. In these scaffolds, cell proliferation and migration occured well while enhancing angiogenesis to regenerate new uterine horns. Electrospun polycaprolacton/ gelatin/ polydimethylsiloxane fibrous scaffolds were developed to use as promising uterine tissue engineering.

Key words: *Mouse uterus, Tubular scaffold, Embryo, Nanofiber.*