

In-vivo human corpus cavernosum regeneration: fabrication of tissue-engineered corpus cavernosum in rat using the body as a natural bioreactor

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INTRODUCTION: Few researches have been conducted to develop an ideal method for tissue-engineering of corpus cavernosum [1-2]. We produce a decellularized human corpus cavernosum scaffold and investigate the in-vivo cell seeding of the scaffold after transplantation into the rat omentum.

METHODS: Eight adult human male corpus cavernosum were obtained in sterile condition after obtaining ethical committee approval. After dissecting the urethra, corpus cavernosum was decellularized by inserting an 18 gauge needle into the body of the tissue. The gauge was connected to a peristaltic pump to circulate the detergents in the corpus. Histopathological examinations, DNA quantification, scanning electron microscopy (SEM), and tensile test were performed to evaluate the efficacy of decellularization and extracellular matrix (ECM) preservation. A section of decellularized scaffold was washed several times and transplanted into the omentum of 4 male healthy Sprague Dawley rats and located into the scrotum. Biopsies were taken 1, 3 and 6 months after transplantation. Histological examination, SEM, DNA quantification, and immunohistochemical (IHC) staining were performed to assess the efficacy of natural recellularization



Fig 1: Surgical technique of decellularized human corpus cavernosum transplantation

RESULTS: The results of the examinations performed prior to transplantation, revealed a decellularized ECM resembling to the native tissue

with normal pits that may be appropriate for further in-vivo cell seeding. Histopathology examination of the biopsies after transplantations confirmed successful cell seeding with endothelium-like cells in different time-points. CD 34 staining was dominant in the short-time biopsies, while CD31 staining was higher than CD34 in long-term specimens.

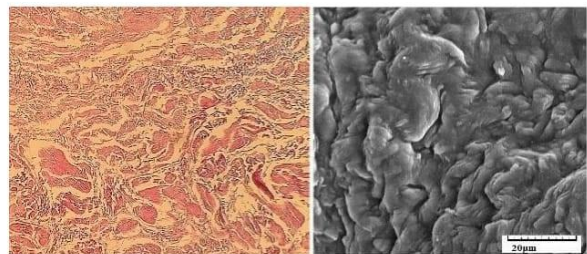


Fig 2: Histological evaluations and SEM analysis of decellularized scaffolds

DISCUSSION & CONCLUSIONS: This study theoretically may pave the road for corpus cavernosum regeneration by transplantation of decellularized scaffolds into the scrotum. The feasibility of natural bioreactor in recellularizing corpus cavernosum was confirmed. This technique may have the potential to facilitate homologous transplantation for repair of corpus defects.

REFERENCES: ¹ C Ji, F Min, W Liang, et al (2011) *BJU Int* **107**: 1638-46. ² G An, C Ji, Z Wei, et al (2013) *Urol* **81**: 424-31.

DISCLOSURE: Authors have nothing to disclose.