Fibrin glue as matrix for cultured autologous urothelial cells in urethral reconstruction.

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Abstract:

In the present study, we have established a technique to create an artificial urethra in a rat animal model by transplantation of in vitro-expanded urothelial cells onto an in vivo-prefabricated tube formation using tissue engineering methods. Urothelial cells from isogenic rats were harvested for culture. A silicon catheter was used to induce a connective tissue capsule-tube formation underneath the abdominal skin. Two weeks later, the cultivated urothelial cells were seeded onto the lumen of this tube using fibrin glue as delivery matrix. The histomorphological and immunohistochemical studies revealed a viable multilayered urothelium, lining the inner surface of the prior formed connective tissue tube-formation 4 weeks after grafting the cells. We have shown that cultured and in vitro-expanded urothelial cells can be successfully reimplanted onto a prefabricated tube-like structure using fibrin glue as a delivery matrix and native cell expansion vehicle. The results suggest that the creation of an artificial urethra may be achieved in vivo using tissue engineering methods, showing potential for urethral reconstruction and providing autologous urothelium for reconstructive surgery in the genitourinary tract.