

Characterization of the Decellularized Male Rabbit Kidney as a Three- Dimensional Natural Scaffold for Tissue Engineering- A Histological Study

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Introduction:

Renal transplantation is the only curative treatment of End stage renal disease. Shortage of donated organs is one of many obstacles facing renal transplantation. Whole organ decellularization could offer a natural scaffold for engineering an immune-compatible kidney ready for transplantation. This study aimed to characterize the decellularized male rabbit kidney by evaluation of the structural integrity of extracellular matrix (ECM) components as a natural scaffold for tissue engineering.

Materials and Methods:

Kidneys were harvested from ten male New Zealand White Rabbits (NZWR) of an average weight (1000-1500 gm). Group I: the control group included the ten right kidneys; processed immediately for histological, immunohistochemical and electron microscopic examinations. Group II: the decellularization group included the ten left kidneys; harvested carefully after cannulation under anaesthesia and kept frozen until decellularization. At decellularization, kidneys were thawed, perfused with 0.5% Sodium dodecyl sulfate (SDS) for 5-6 hours at room temperature until kidneys were completely white. Decellularized kidneys were processed for histological, immunohistochemical and electron microscopic examinations.

Results:

Decellularized kidney Scaffolds were entirely decellularized. The integrity of different extracellular matrix components, the ultrastructure and the three-dimensional (3D) structure of decellularized kidneys were generally preserved. However, the mean optical density of collagen type IV in kidney medulla and the thickness of Glomerular basement membranes were significantly affected.

Conclusion:

The presented protocol demonstrated an efficient decellularization of male rabbit kidney. These results can pave the road for further investigations to move to the next step "recellularization".

Key Words: Kidney, Rabbit, Decellularization, Sodium dodecyl sulfate.