

Reendothelization of porcine heart valve scaffolds with WJ-MSC: a new approach in the heart valve tissue engineering.

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Heart valve substitution, based on biosynthetic or mechanical prosthesis replacement, is one of the most frequent surgical approach to treat heart valve diseases. Even if the prosthesis implantation gives a good life quality for patients, there are many long-term disadvantages related to the substitution, such as structural deterioration, non-structural dysfunction and re-intervention. The heart valve tissue engineering (HVTE), a novel branch of regenerative medicine, is developing innovative models and testing new methods to overcome the above reported limitations. In the present study, we investigated the possibility to reendothelize a porcine heart valve scaffold, previously decellularized, by using two cell types: Wharton's Jelly mesenchymal stem cells (WJ-MSC) and human umbilical vein endothelial cells (HUVEC), the last used as control cells for the reendothelialization process. Both cell types showed, by fluorescence microscopy, that they were able to reconstitute a valid and functional monolayer of neo-endothelium, characterized by the surface expression of typical endothelial markers (i.e. CD144 and CD146). All together, these data suggest that both HUVEC and WJ-MSC are suitable for in vitro autologous endothelium regeneration, opening new perspectives in the field of HVTE.

Keywords

Heart valve diseases, endothelium, heart valve tissue engineering, WJ-MSC, HUVEC.