

C21. Induction Of Mesenchymal To Endothelial Transformation Of Adipose-derived Stem Cells

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OBJECTIVES: Adipose-derived stem cells (ADSCs) are currently being investigated as a source of valve interstitial cells. Their capacity to differentiate into endothelial cells has not been sufficiently investigated.

METHODS: Cells were isolated and characterised by immunocytochemistry and flow cytometry. Endothelial differentiation was promoted by culturing confluent cells in the presence of 2% fetal calf serum and 50ng/ml vascular endothelial growth factor. Differentiation was evaluated by immunofluorescence staining for endothelial markers and analysis of acetylated-low density lipoprotein (Ac-LDL) uptake. Assessment of capillary formation was performed using an in vitro angiogenesis assay.

RESULTS: Isolated ADSCs were positive for the mesenchymal markers CD105, CD73, CD29, CD90 and CD44 and negative for hematopoietic and endothelial markers. After 7 days treatment, immunofluorescence showed that approximately 10% expressed the endothelial marker von Willebrand factor. Treated cells also were able to incorporate Ac-LDL as well as form tubular structures on matrigel, unlike control cells.

CONCLUSIONS: Based on these results, we have demonstrated that ADSCs can differentiate into cells with phenotypic and functional features of endothelial cells. These predifferentiated cells provide new options for tissue engineering heart valves based on autologous MSCs.