

Differentiation of Adipose-Derived Mesenchymal Stem Cells into the Tenocyte by Platelet-Derived Growth Factor-BB

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"Background: The potential use of stem cell-based therapies for the repair and regeneration of various tissues, in particular tendon, offers a paradigm shift in plastic and reconstructive surgery. We characterized the differentiation of Adipose -derived Mesenchymal Stem cells (AMSCs) into tenocyte-like cells in response to Platelet-Derived Growth Factor-BB (PDGF.)

Materials and Methods: AMSCs were isolated and expanded with basic culture medium, containing DMEM, 10% fetal bovine serum, 1% penicillin/streptomycin. The cells after five passages (P%), were treated for 14 days with supplemented medium containing PDGF-BB (20 ng/ml), L-Proline and Ascorbic Acid (AA) to differentiate to tenocytes. The cells in control group, was cultured with basic culture medium. At the end (14th day), Sirius Red staining was used to assess Col3A1 production. The absorbance was measured at 540 nm and data are presented as mean \pm SD (n = 3). In order to assess morphology, H&E staining was performed .

Results: With the addition of PDGF, an increase in tenocyte-like elongated morphology was observed in AMSC compared to control cells after 3 days. The OD (Optical density) study showed that the degree of differentiation to tenocytes has increased over time. Accordingly, AD-MSCs differentiation into tenocytes using TDM (tendon differentiation medium) was investigated. A t-test analysis revealed that the amount of collagen production is not significantly different between treated and control groups (p=0.05.)

Conclusion: Our results indicated that hPDGF-BB may be of benefit in the differentiation of AMSCs toward tenocytes. In addition, tenogenic effects of PDGF may introduce it as a suitable growth factor for neo-tendon formation as well as promotion of tendon regeneration. "

Keywords: Human, Tenocyte Differentiation, Mesenchymal Stem Cells, PDGF_BB.