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The Comparative Study of the Mouse Osteoblast Response to Two Different Platelet-rich Fibrins with Low Speed Centrifugation Concept

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Abstract

Objectives: To compare the response of mouse osteoblast (MC3T3-E1 cells) to advanced platelet-rich fibrin (APRF) and advanced platelet-rich fibrin plus (APRF+).

Methods: Blood was collected from eight volunteers, 25 - 38 years of age (four males and four females) to prepare platelet concentrates APRF (1,300 rpm, 14 minutes), APRF+ (1,300 rpm, 8 minutes). The exudates were collected from both platelet concentrates at day 1, 3, 7 and 14. The level of TGF- β 1 from exudates were quantified using an ELISA. MC3T3-E1 cells were cultured with the exudates. The cultured cells were tested with MTT assays, alkaline phosphatase (ALP) staining and mineralization, which were analyzed on day 7 and again on day 14.

Results: APRF and APRF+ continuously released TGF- β 1 during 14-days period. Only exudates collected at day 1 showed significantly difference of ALP staining between APRF and APRF+ group on day 14 of observation. On day 7 of mineralization assays, cells treated with exudates from APRF+ collected at day 14 resulted in the highest level of mineralization within APRF+ group. On day 14 of mineralization assays, cells treated with exudates from APRF collected at day 7 showed the highest level of mineralization within APRF group.

Conclusions: APRF+ released TGF- β 1 at day 14 significantly higher than day 1. On day 14 of mineralization, cells treated with exudates from APRF+ collected at day 14 showed significantly higher mineralization than APRF collected at the same time point.

Keywords: advanced platelet-rich fibrin, advanced platelet-rich fibrin plus, low speed centrifugation concept, mineralization, platelet concentrates