Platelet-rich Plasma affects Vitality, Differentiation and Gene Expression of Adipose-derived Stem Cells in vitro

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Platelet-rich plasma (PRP) is a source of concentrated autologous platelets. The growth factors and cytokines that are released by the platelets can facilitate the regeneration of soft and bony tissues, making PRP a promising candidate for future therapies. Numerous clinical studies on the regeneration potential of PRP have been conducted, including the treatment of injured nerves, tendons, cardiac muscle, and bone, amongst others. However, the results are inconsistent. This might be due to the fact that a broad variability in the techniques of PRP production exists, affecting the outcome. The simultaneous use of adipose-derived stem cells (ASCs) might improve the regeneration potential of PRP. However, the optimal ratio has yet to be elucidated. Here, we tested the effects of different PRP concentrations on ASCs in vitro. Cell vitality increases with the PRP-concentrations up to a concentration of 10% to 20%. With a PRP concentration of 30% the cell vitality declines. Adipogenic marker genes are not induced by PRP. Interestingly, receptors for growth factors known to be enriched in PRP were not upregulated, too. Whereas PRP had no influence on the expression of mesenchymal stem cell marker CD73, CD105 was downregulated with low PRP concentrations but showed a normal expression with high PRP concentrations.