

In vitro effects of silicon and a platelet rich plasma preparation

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Cells, growth factors and scaffolds represent the key elements in tissue engineering strategies. Platelet concentrates are blood derivatives, prepared from patient's own blood, containing autologous platelets, growth factors and cytokines (1). The use of these autologous preparations, like CGF (Concentrated Growth Factor), represents a promising approach in tissue regeneration and some clinical applications have already been made. Some evidences suggest a pivotal role of trace elements in tissue regeneration (2); in particular Silicon plays an important role in bone homeostasis and regeneration (3); so Silicon and CGF could represent an innovative approach for tissue regeneration. In this study, the *in vitro* effects of Silicon (Sodium Orthosilicate) and CGF, on the proliferation of three different human cell lines (endothelial cells, fibroblasts and osteoblasts) were investigated. Cells were treated with Sodium Orthosilicate and CGF for 24, 48 and 72 hours respectively. After each incubation period, cell proliferation was evaluated, using the Scepter cell counter; some proliferation markers (Collagen type I, Osteopontin) were evaluated using immunohistochemical methods. In addition we examined the influence of Sodium Orthosilicate and CGF on osteoblasts differentiation. Human osteoblasts were grown until confluence in complete growth medium. After 24-72 hours cell confluency, the medium was replaced with osteoblast mineralization medium for 14 days and the osteoblasts differentiation was quantitatively evaluated by immunohistochemistry, using Osteocalcin and ALP, and by Alizarin and Von Kossa stainings. Treatment with Silicon and CGF increases proliferation of all cell lines and promotes osteoblasts differentiation. So, these data could represent a potential and innovative tool for tissue regeneration.

References

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Keywords

Tissue regeneration; growth factors; scaffolds; Silicon; CGF.