The interaction between gingival fibroblast and periodontal ligament stem cells on expression of periodontal markers and osteogenic capacity in vitro

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Objectives

Periodontal ligament stem cells (PDLSCs) have the characteristics of mesenchymal stem cells and are a potential source of cells for regeneration of the periodontal tissues. Periodontal regeneration may depend on the interaction of adjacent cell populations within the tissues such as gingival fibroblasts (GFs). The aims of this study were to investigate the effects of PDLSC on expression of periodontal markers and osteogenic differentiation of GFs.

Materials & Method

Primary human PDLSCs isolated from extracted third molars were co-cultured with primary GFs cultures with ratio 1:3, by direct co-culture with subsequent FACS sorting, indirect co-culture using transwell cultures and PDLSC conditioned medium. The expressions of periodontal markers PLAP, Nestin and Periostin were assessed by qPCR. Alkaline phosphatase activity was assessed by para nitrophenol enzymatic assay. Single cultures of PDLSC and GF were used as controls. One-way ANOVA with Bonferroni posthoc was used for statistical analysis.

Results

PDLSCs stimulate expression of periodontal markers and osteogenic capacity of gingival fibroblasts via a mechanism involving paracrine signalling. The results demonstrate that GF contain MSC-like cells which may be recruited for periodontal regeneration by the action of PDLSC cells. Further studies are required to identify specific secreted factors resonsible for this activity.

Conclusion

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