

## A Novel Co-Culture System for the Cementoblastic Differentiation of SHED

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**Abstract :** Endodontic furcal perforation remains both an endodontic and a periodontal problem. Regeneration of cementum is very essential for the perforation repair. The aim of this study was to investigate the role of Hertwig's epithelial root sheath (HERS) cells on the cementogenic differentiation of stem cells derived from human exfoliated deciduous teeth (SHED) in the presence of chitosan scaffold-TGF $\beta$ 1. HERS cells were isolated and characterized then co-cultured with SHED with/without chitosan scaffold-TGF $\beta$ 1. SHED proliferation was assessed by PrestoBlue. Alkaline phosphatase activity, mineralization behaviour and gene/protein expression of cemento/osteoblast phenotype of SHED were evaluated. Results of the present study showed that HERS cells in association with chitosan-TGF $\beta$ 1 enhanced proliferation and cemento/osteogenic differentiation of SHED. Our novel co-culture system confirmed the potential effect of HERS cells to stimulate the differentiation of SHED along the cementoblastic lineage which was triggered in the presence of chitosan-TGF $\beta$ 1. This approach possesses a novel therapeutic strategy for future endodontic perforation and periodontitis.

**Keywords :** cementogenesis, co-culture system, HERS, SHED

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