

Cementogenic potential of multipotential mesenchymal stem cells purified from the human periodontal ligament

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Abstrak

The periodontal ligament (PDL) consists of a group of specialized connective tissue fibers embedded in the alveolar bone and cementum that are believed to contain progenitors for mineralized tissue-forming cell lineages. These progenitors may contribute to regenerative cell therapy or tissue engineering methods aimed at recovery of tissue formation and functions lost in periodontal degenerative changes. Some reports using immortal clonal cell lines of cementoblasts, which are cells containing mineralized tissue-forming cell lineages, have shown that their phenotypic alteration and gene expression are associated with mineralization. Immortal, multipotential PDL-derived cell lines may be useful biological tools for evaluating differentiation-inducing agents. In this study, we confirmed the gene expression and mineralization potential of primary and immortal human PDL cells and characterized their immunophenotype. Following incubation with mineralization induction medium containing β -glycerophosphate, ascorbic acid, and dexamethasone, normal human PDL (Pel) cells and an immortal derivative line (Pelt) cells showed higher levels of mineralization compared with cells grown in normal growth medium. Both cell types were positive for putative surface antigens of mesenchymal cells (CD44, CD73, CD90, and CD105). They were also positive for stage-specific embryonic antigen-3, a marker of multipotential stem cells. Furthermore, PDL cells expressed cementum attachment protein and cementum protein 1 when cultured with recombinant human bone morphogenetic protein-2 or -7. The results suggest that normal and immortal human PDL cells contain multipotential mesenchymal stem cells with cementogenic potential.