



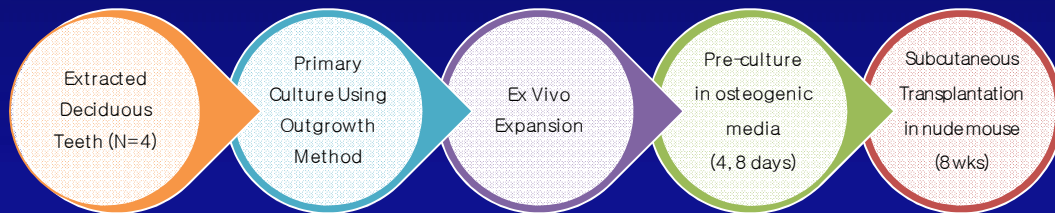
The Effect of In Vitro Osteogenic Induction on In Vivo Hard Tissue Forming Potential of The Dental Pulp Stromal Cells from Deciduous Teeth

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Background and Objective

Previous studies have reported that stem cells from human exfoliated deciduous teeth (SHED) have dentin-like or bone-like hard tissue forming potential when transplanted into immunocompromised mice. This study aimed at investigating the effect of pre-culture in osteogenic media on in vivo hard tissue forming potential of the dental pulp stromal cells from deciduous teeth (DDPSCs).

Design



In Vitro Study
Alkaline Phosphatase (ALP) Staining
Quantitative RT-PCR
(DSPP, Runx2, osteopontin (OPN), osteocalcin (OC))
Composition of Osteogenic Media
α -MEM, 100U/ml penicillin, 100ug/ml streptomycin, 100nM dexamethasone, 50mM L-ascorbic acid 2-phosphate, 2mM β -glycerophosphate

In Vivo Study
Quantitative RT-PCR using the retrieved transplants (DSPP, Runx2, BSP, Col I, OPN, OC)
ALP activity in the retrieved transplants
Histology (HE staining, Masson's trichrome staining)
Immunohistochemistry (DSP, OC staining)

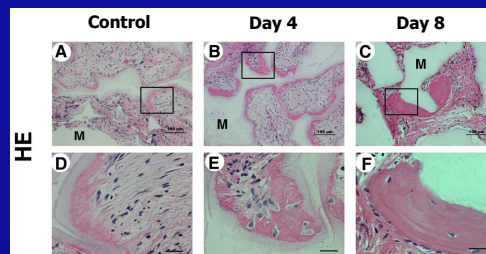
Result

In Vitro Effect of Osteogenic Induction

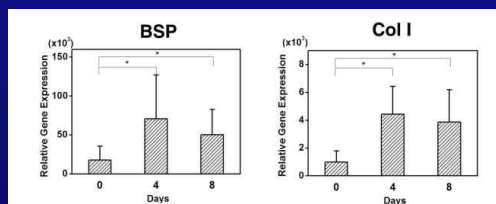
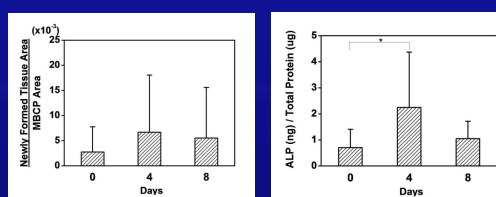


ALP-positive cells were detected in Day 4 and Day 8. (Day 8 > Day 4 > the control)

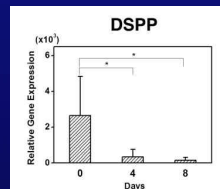
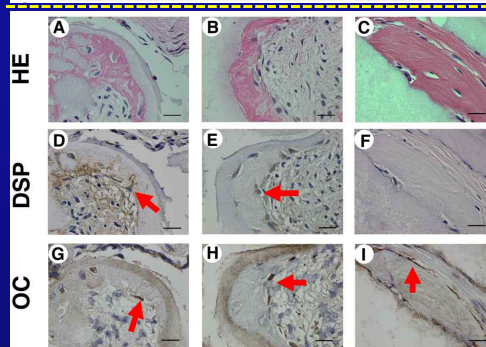
In Vivo Effect of Osteogenic Induction regarding character of the hard tissue



In Vivo Effect of Osteogenic Induction regarding quantity of the hard tissue



Relative amount of the newly formed hard tissue : Day 4 > Day 8 > the control group.



Dentin-like character is most well observed in the control group. The newly formed hard tissue in Day 8 presented most bone-like characters, and the expression of DSPP was significantly reduced.

Conclusion

Pre-culture in osteogenic media enhanced in vivo hard-tissue forming potential of DDPSCs. Short exposure of DDPSCs to osteogenic media was effective regarding the quantity of newly formed hard tissue, while longer exposure led to generation of more bone-like hard tissue. The remaining proliferation potential and the degree of differentiation of DDPSCs at time of in vivo implantation were important determinants for quantity and quality of the newly generated hard tissue.