［最近のトピックス］

Effects of Phosphophoryn derived RGD peptide on dentin regeneration

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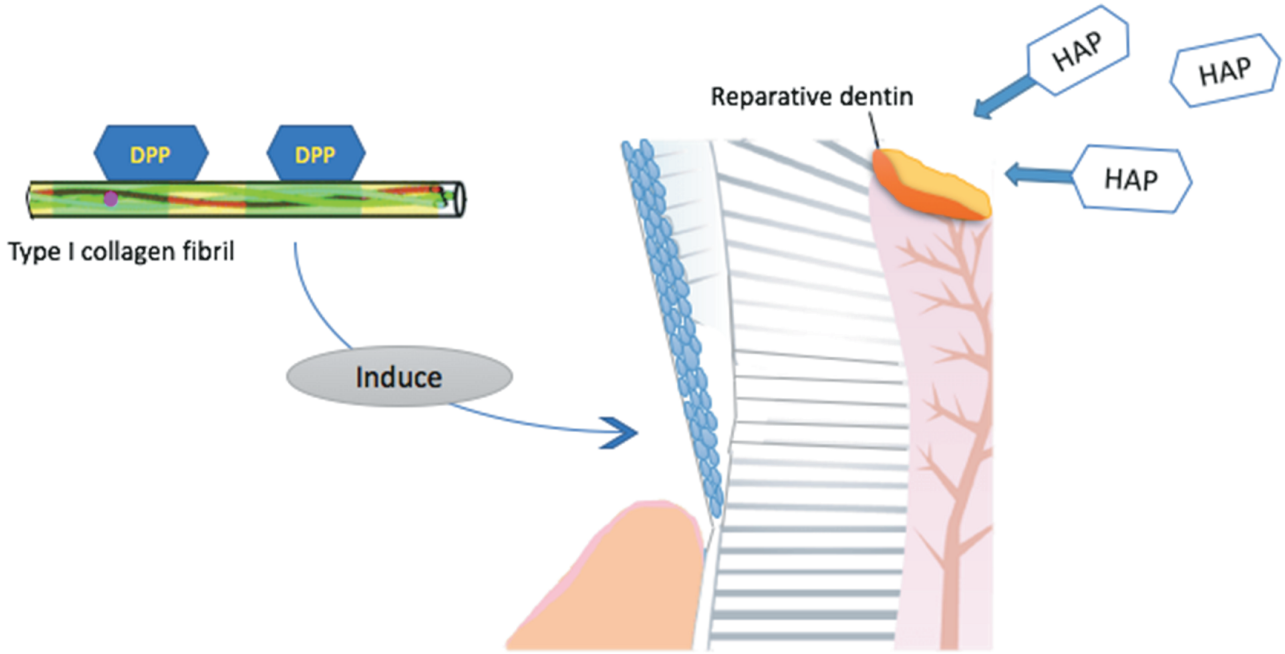
Direct pulp capping is the treatment for reversible pulpitis and calcium hydroxide is the common material of choice. However, there has been reports of inflammatory reaction of pulp tissue (Accorinte et al., 2008). Tunnel defect formation and uneven hard tissue formation has also been observed in some cases (Cox et al., 1996 ; Maria de Lourdes et al., 2008). Mineral Trioxide Aggregate or MTA shows a superior result in sealing ability (Aeinehchi et al., 2003) as direct pulp capping material but long−term follow−up study evidence is limited for this material. Besides, the high cost is a barrier to using MTA in a wide level.

There has been ongoing research to develop a novel pulp capping material with the goal to regenerate dentin of significant quality with novel biocompatibility property. In recent years, it has been focused in the field of tissue engineering and a number of extracellular matrix (ECM) proteins play a vital role in this research focus. Dentin phosphophoryn (DPP) is the most abundant non−collagenous protein in dentin matrix. It is a split product of dentin sialophosphoryn (DSPP). DPP exhibits a characteristic RGD motif and promotes cell migration and differentiation via the RGD motif. RGD peptides support cell attachment when immobilized onto surfaces (Jadlowiec et al., 2004).

Saito et al. (2000) experimented with DPP immobilized to type 1 collagen fibrils and observed that it induces apatite formation, indicating the major role of DPP in dentin calcification.

Yasuda et al. (2008) evaluated the role of DPP in early reparative dentin formation, and reported that DPP has significant effect on human dental pulp cells migration in a concentration dependent manner. This study also found that the Porcine RGD motif of DPP significantly promotes cellular migration.

In the study by Koike et al. (2014), DPP/collagen com-



Koike, T., Polan M. A. A., Izumikawa, M., & Saito, T. (2014). Induction of reparative dentin formation on exposed dental pulp by dentin phosphophoryn/collagen composite. BioMed research international, 2014.

posite was used simultaneously with calcium hydroxide as direct pulp capping material in rodent teeth. It was concluded that DPP/collagen composite promotes reparative dentin formation more rapidly and with better quality than calcium hydroxide in vivo.

Polan et al. (2014) observed the role of DPP in odontoblast differentiation and mineralization and stated that DPP promotes the differentiation and mineralization of mouse dental papilla cell line 23 in vitro. In this study, it was also reported that DPP has the ability to induce mineralization in vivo.

In the study by Tang et al. (2015), the possible functional significance of RGD peptide and its ability to induce proliferation, differentiation and mineralization of odontoblast-like cells were evaluated. RGD peptides were immobilized onto modified tissue culture polystyrene surfaces and mdpc-23 cells were cultured onto the surfaces. It was reported that RGD peptides has significant effect on differentiation and mineralization of the mdpc-23 cells.

From the above discussion, DPP can clearly be a potential agent to formulate a novel pulp capping material. Moreover, If RGD peptides are included in pulp capping materials, that can engage odontoblasts preferentially and improve wound healing process in exposed pulp.

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