

# Dentin Phosphophoryn Promotes Odontoblast Differentiation in vitro and Induction of Mineralized Matrix in vivo.


著者	Mohammad Ali Akbor Polan
学位名	博士（歯学）
学位授与機関	北海道医療大学
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学位論文審査並びに最終試験結果報告書

大学院歯学研究科長 殿

主査 安藤 裕  
副査 百瀬 保志  
副査 溝ノ口 列



今般 Mohammad Ali Akbar Polan (モハマド アリアクバール ポラン) にかかわる学位論文審査並びに最終試験を行い下記の結果を得たので報告する。


記

- 1 学位論文題目 Dentin Phosphophoryn Promotes Odontoblast Differentiation *in vitro* and Induction of Mineralized Matrix *in vivo*.
- 2 論文要旨 別添
- 3 学位論文審査の要旨 別添 (様式第12号)
- 4 最終試験の要旨 別添 (様式第13号)

以上の結果 Mohammad Ali Akbar Polan (モハマド アリアクバール ポラン) は博士 (歯学) の学位を授与する資格のあるものと判定する。

学位論文審査の要旨

主査 宇野善裕  
副査 古市淳夫  
副査 溝口 列



氏 名 Mohammad Ali Akbar Polan (モハマド アリアクバール ポラン)

学位論文題目 Dentin Phosphophoryn Promotes Odontoblast Differentiation *in vitro* and Induction of Mineralized Matrix *in vivo*.


Dentin phosphophoryn (DPP) is the most abundant of the non-collagenous polyanionic phospho-proteins in dentin. The purpose of this study was to examine the effects of DPP on differentiation and mineralization of odontoblasts. MDPC-23, a rat odontoblast-like cell line was used in this study *in vitro* and to investigate mineralized-matrix induction ability of DPP *in vivo*. The cells were cultured with DPP at different concentrations (0, 0.1, 1, and 10  $\mu\text{g/ml}$ ). The cell-morphology and proliferation were evaluated. Furthermore, cells were analyzed for mRNA expression of dentin/bone-related proteins by RT-PCR. Moreover, ALPase activity and Alizarin red staining were performed for confirmation of mineralization induced by DPP. The addition of DPP did not affect on proliferation or morphology of MDPC-23. The mRNA expressions of DMP-1 and ALPase were promoted by 0.1, 1 and 10  $\mu\text{g/ml}$  of DPP. The mRNA expressions of Osteorix, BSP and OCN were promoted by 1 and 10  $\mu\text{g/ml}$  of DPP but Runx2 and OPN expressions were prominent in case of 10  $\mu\text{g/ml}$  of DPP. The high ALPase activity in MDPC-23 was induced by 1 and 10  $\mu\text{g/ml}$  of DPP. The number of mineralized nodules was higher by addition of 1 and 10  $\mu\text{g/ml}$  of DPP at 7 days. Mineralized -matrix induction was observed after 14 days of implantation of DPP-collagen and RPCs composites on the dorsal side of rat *in vivo*. This study showed that DPP promotes the differentiation and mineralization of odontoblasts *in vitro* and induction of mineralization *in vivo*. Therefore DPP can be a promising candidate for formulating a new pulp capping material.

It is clear the purpose and scientific interest of this study. The experimental design including materials and methods were appropriate. This study demonstrates that DPP promotes the differentiation and mineralization of odontoblast-like cells, indicating that DPP may be a promising candidate for formulating a new pulp capping material. It is highly valuable as it deals with an important issue in dentin-pulp complex research. The study will contribute to the future development of the dental sciences and is deemed worthy as a PhD (odontology) by the reviewers.

様式第13号

最終試験（学力の確認）の要旨

主査 伊藤 孝裕  
副査 百市 洋志  
副査 溝口 利



氏 名 Mohammad Ali Akbar Polan (モハマド アリ アクバール ポラン)

審査委員会において、最終試験を行い申請者の学力の確認を行ったところ、学位論文に関する十分な知識と研究遂行能力を有するとみとめた。以上の結果、博士（歯学）の学位を授与するに値するものと判定した。