

## Pattern and distribution of extracellular matrix proteins in human reparative dentin by an immunohistochemical approach

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Dentin is a large and complex component of the tooth synthesized by odontoblasts during the process of dentinogenesis. Dentin formed, before the completion of root formation, is define primary dentin (PD), while dentin formed after and associated with the normal aging process is designated secondary dentin (SD). Tertiary dentin (TD) is produced in reaction to external noxious stimulus/injury, such as attrition or dental caries, adjacent to the preexisting dentin layer and further classified reparative dentin (RD) (1, 2).

Aim this study was to compare pattern and distribution of extracellular matrix proteins, produced by odontoblast cells during dentin mineralization and during reparative process, in response to stimulus in human sound dentin *vs* human reparative dentin matrix.

Sixteen sound carious human molars were selected, demineralized, fixed in paraformaldehyde and then processed for immunohistochemical approach to detect extracellular matrix proteins. In particular specimens were submitted to an immunolabeling technique by using primary antibodies anti dentin matrix protein 1 (DMP1), dentin

sialophosphoprotein (DSPP), bone sialoprotein (BSP), osteoponti (OPN). Results indicate that the region of the exposed pulp, formed a layer of reparative dentin bridge sealing the communication between the cavity and pulp chamber. In addition results indicate that in RD is present a lower levels of DMP1 and DSP than PD layer, while BSP and OPN are present in RD but absent in PD layer. The expression of BSP and OPN in RD indicates that the odontoblast-like cells were attempting to produce a hard tissue at a very rapid process. In according with previous scientific literature, our results suggested that the deposition of OPN and BSP at the calcification front is essential for the type I collagen secretion by newly differentiated odontoblast-like cells to form reparative dentin during pulpal healing following cavity preparation.

### References

- [1] Nancy A. Dentin-pulp complex. In: Nancy A, editor. Ten Cate's Oral Histology Development, Structure, and Function, 6th edn. St Louis, USA: Mosby; 2003. p. 192-239.
- [2] Tziafas D. The future role of a molecular approach to pulp-dentinal regeneration. Caries Res 2004;38:314-20.

### Keywords

Human reparative dentin, proteoglycans, immunohistochemical technique, scanning electron microscopy