

Development of “peptide” pulp capping agent promoting wound healing process of pulp tissue

Principal Investigator

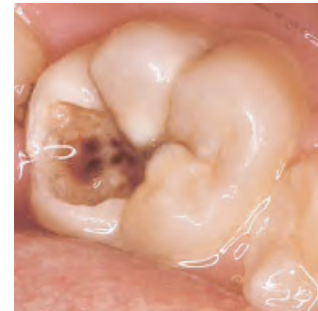
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Project Outline

Dental caries is still spread world wide and pulp tissue is often removed when becoming severe. Once pulp tissue is lost, longevity of the tooth must be shorter. To conserve this tissue, pulp capping procedure is performed and the current success rate is around 60% using conventional materials which were not developed upon the mechanism of wound healing process of pulp.

We have performed our research to investigate the pulpal wound healing process and we could identify a critical protein which promoted pulpal repair. In this project, we focus to develop a “peptide” structured pulp capping materials based on the functional domain from the above mentioned protein to enable higher success rate of pulp capping procedure.

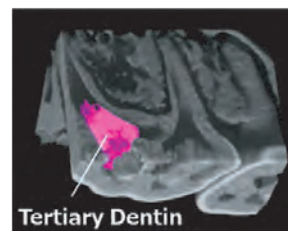


40% of Japanese people have untreated caries.



Currently used materials (CaOH, MTA…) : As source of Ca, P

- Expect wound healing by inducing inflammatory reaction
- Around 60% success rate
- Tertiary dentin formation (Thin, w/defect)



Current pulp capping material have limitations

Currently used pulp capping materials consist of inorganic substances (eg. Ca, P) and success rate of pulp capping procedure is around 60%. Protein S100A7 which we discovered induced tertiary dentin with higher volume and better quality. Peptide structure derived from this protein can show much higher success rate with safer and cheaper compared with the recombinant proteins. This peptide enables to develop a novel biological evidence based pulp capping agent.

Formation of high quality tertiary dentin after pulp capping with Protein S100A7

(Left: micro CT image, Right: HE staining image)



Newly developed peptide based materials : Wound healing effect of pulp tissue

- Focused on wound healing process of pulp tissue
- Application of materials to promote pulpal repair
- Tertiary dentin formation (Thick, w/o defect)
- Lead to higher success rate than current materials

Peptide materials based on the wound healing process enable higher success rate of pulp capping

This project aims to develop a novel biological pulp capping agent which can be a next generation Mineral Trioxide Aggregate (MTA) and other calcium silicate cements. We have finished to determine a basic structure of the critical peptide and already applied a patent, now searching for an optimal structure of this peptide. We would like to find a company to collaborate with us to develop this agent.