Ecologic effect of casein phosphopeptide amorphous calcium phosphate in dental caries

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Abstract

Aim: Casein phosphopeptides (CPP) stabilize calcium phosphate through the formation of casein phosphopeptide amorphous calcium-phosphate complexes (CPP-CP). Contemporary caries prevention protocols recommend not only effective remineralizing of CPP-ACP but also to reverse the dental plaque dysbiosis responsible for caries. This brief overview aims to propose the mechanisms and the evidence for CPP-ACP effects on the ecology of oral microbiome.

Background: Ideally, casein phosphopeptide amorphous calcium phosphate (CPP-ACP) should be able to influence the cariogenic bacteria responsible for the microbial dental plaque dysbiosis. Some studies showed that fluoride ions can inhibit the acidogenicity, aciduricity and glucan synthesis of cariogenic bacteria. However, it is still unclear the antimicrobial effect of fluoride for caries prevention. The study demonstrated that fluoride containing toothpastes could not sustain anti-acid activity over time. In this regard, new remineralizing technologies promise a beneficial shift in the dental plaque microbiology.

Review Results: CPP-ACP is probably the most studied non-fluoride remineralizing technology. CPP-ACP maintenance the high calcium concentrations in dental plaque may have antibacterial effect. Calcium induces streptococcal membrane permeability and partial lysis. CPP-ACP may possibly have cariostatic action as inhibition of demineralization, enhanced remineralization, reduced bacterial adhesion, buffering action, biofilm disruption and bacteriostatic/bactericidal effects.

Conclusion: The role of CPP-ACP for reducing bacterial counts in dental plaque and saliva needs further elucidation.

Clinical Significance: The current evidence for CPP-ACP effects on the oral microbiome ecology. The use of CPP-ACP offers the control of dental caries process.

Recent Publications

1. Rose R K (2000) Binding characteristics of Streptococcus mutans for calcium and casein phosphopeptide. Caries Research 34(5):427-31.

2. N Philip and L Walsh (2018) The potential ecological effects of casein phosphopeptideamorphous calcium phosphate in dental caries prevention. Aust Dent J.

3. Marıe-Claudtre Ombe, C Orınnec Lavkt and Jean-Mıchemla Nıas (1991) Calcium regulation of growth and differentiation in *Streptococcus pneumoniae.* Journal of General Microbiology 138:77-84.



Biography

Basak Durmus has completed her Graduation at the Marmara University, Dentistry Faculty in 2003; PhD at the same university in Pediatric Dentistry Department in 2010 with the thesis entitled “Clinical, Radiological and Histological Evaluation of diode laser, ferric sulphate and formocresol pulpotomies at primary teeth”. She worked as a Research Assistant from 2010-1016, and got the degree of Associate Professor in 2016. Her research interests are mainly focused on cariology, preventive dentistry, pediatric endodontics and special care dentistry. She has published many international and national publications and scientific reports.

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