

# SIXTH INTERNATIONAL CONGRESS OF MUCOSAL IMMUNOLOGY

009

ORAL PASSIVE ADMINISTRATION OF HEN EGG YOLK ANTIBODIES AGAINST CELL-ASSOCIATED GLUCOSYLTRANSFERASE OF STREPTOCOCCUS MUTANS INHIBITS DENTAL CARIES IN RATS

Shigeyuki Hamada

Department of Oral Microbiology, Osaka University Faculty of Dentistry, Suita-Osaka, 565 Japan

Ample evidence indicates that dental caries is an infectious disease caused by Streptococcus mutans. Protection against dental caries by immunization with cellular components of S. mutans has been reported in rodents and primates from several laboratories. The ability of S. mutans to adhere firmly to teeth via water-insoluble glucan synthesis from sucrose is an important virulence factor affecting development of caries. We have recently characterized a cell-associated (CA) glucosyltransferase (GTase) of S. mutans MT8148 (serotype c) that synthesizes insoluble glucan from sucrose.

In this study, we have attempted to determine if hen egg yolk IgG antibodies (yAb) to the CA-GTase can inhibit virulence-associated traits in vitro and passive administration of the yAb can confer protection against caries induction in rats. Hens (18 weeks old) were immunized with purified CA-GTase of serotype c S. mutans and Freund complete adjuvant. The egg yolks from eggs of immunized hens were delipidated, and yAb were purified by  $\text{AmSO}_4$  precipitation and DEAE-Sephacel column chromatography. The purified yAb specific for CA-GTase markedly inhibited the synthesis of insoluble glucan from sucrose, while it enhanced the synthesis of water-soluble glucan by cell-free GTase. The adherence of growing cells of S. mutans to a glass surface in sucrose broth was inhibited by the yAb very effectively. SPF Sprague-Dawley rats infected with S. mutans MT8148 and fed diet #2000 induced severe dental caries, while rats fed diet #2000 containing the yAb resulted in statistically significant reduction in dental plaque accumulation and caries development.

Taken these results together, local passive administration of yAb to S. mutans antigens can give protection against plaque accumulation and dental caries formation in S. mutans-infected rats.