1478 Adsorption Effect of Hydroxyapatite to Oral Streptococci

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Objectives: Hydroxyapatite (HA) is a component of biological hard tissue, including tooth surface enamel, and has high ability to adsorb oral streptococci. To investigate whether HA is a useful agent for Dental Drug Delivery System (3DS), a new system for specifically removing oral streptococci from the oral cavity, the relationship between bacterial adsorption and crystal growth of HA heated at different temperatures (0, 200, 800, and 1200 °C) was analyzed by in vitro assay using 550 nm light absorbance.

Methods: Oral streptococci (Streptococcus mutans, S. sobrinus, S. sanguis, S. mitis, S. salivarius, S. anginosus) mixed with HA or saliva-coated HA (s-HA) in PBS were incubated for 90 min at 37 °C. After standing of the mixtures at room temperature, the supernatants were analyzed for the difference in optical densities before and after the application of HA or s-HA, to assess bacterial adsorption levels. The bacterial adsorption to HA was also observed by SEM. Results: Non- and 200 °C-heated HA and s-HA showed strong adsorption to all streptococci in comparison with high heat-treated (800 °C and 1200 °C) HA and s-HA. Interestingly, s-HA heated at 800 °C showed a high property of adsorption to S. mutans and S. mitis (more than 80%) and low property to S. and S. salivarius (less than 20%). Moreover, SEM observation indicated that the adsorption levels were dependent on crystal size of HA. Conclusions: These results suggested that non- or lower heat-treated forms of HA might be useful as agents for 3DS.