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Effect of bovine lactoferrin on enamel demineralization and acid fermentation by *Streptococcus mutans*

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Abstract The purpose of this study was to evaluate the effects of bovine lactoferrin on acid fermentation and enamel demineralization using *Streptococcus mutans* in a culture system and an artificial mouth model system. The antibacterial activity of bovine lactoferrin (bLF) against *S. mutans* was analyzed by a radial diffusion assay. In the culture system, the effect of bLF on the synthesis and adherence of water insoluble glucan (WIG) and the adherence of *S. mutans* to a glass surface was examined by a batch culture. In the artificial mouth model system, cell suspension of *S. mutans*, heart infusion broth supplemented with sucrose, and PBS or lactoferrin solution were supplied separately and constantly for 21 hours. The following parameters were determined for evaluation: the amount of artificial biofilm, the changes in pH underneath the biofilm; and the changes in enamel microhardness measured by a Vicker's hardness tester. The antibacterial activity of bLF against *S. mutans* was observed. The amounts of bacterial cells in the total adherent fractions were inhibited by bLF in a dose dependent manner. The amounts of WIG in a firm-adherent fraction were significantly inhibited by 0.1-1.0% bLF. The changes in microhardness on enamel slabs in the bLF group (2.4 ± 0.8) showed significantly less hardness reduction than those in the control group (22.3 ± 2.5) ($P < 0.001$). The artificial biofilm accumulation was not reduced by bLF. The results of this study suggest that bLF might have inhibitory effects against acid fermentation and demineralization of enamel by *S. mutans*.

Key words Artificial mouth model system, Bovine lactoferrin, Enamel demineralization, *Streptococcus mutans*

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