

This Week's Citation Classic

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Carlsson J. Presence of various types of non-haemolytic streptococci in dental plaque and in other sites of the oral cavity in man. *Odontol. Revy* 18:55-74, 1967. [Depts. Oral Microbiology and Periodontology, Sch. Dentistry, Univ. Lund, Malmö, Sweden]

The paper describes the streptococcal flora in various sites of the oral cavity of four subjects. In all, 243 streptococcal isolates are studied. The tooth surface is shown to be a most favorable habitat of the extracellular polysaccharide-producing streptococci, *Streptococcus sanguis* and *Streptococcus mutans*. [The SCI[®] indicates that this paper has been cited over 185 times since 1967.]

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"In the early-1960s it was generally recognized that periodontal disease was caused by the bacteria accumulating along the gingival margin of the teeth. At that time Hilding Björn, department of periodontology, School of Dentistry, University of Lund, initiated my studies on dietary components which may influence the amount of bacteria accumulating on the teeth. Methods of evaluating the bacterial accumulation were developed and in cooperation with Jan Egelberg it was demonstrated that sucrose was a key component of diet in facilitating accumulation of bacteria on the teeth.¹ My attention was then focused on the capabilities of the bacteria on the teeth in utilizing sucrose. It was found that *S. sanguis* was among the predominant bacteria on the teeth.² This organism was known to produce copious amounts of extracellular polysaccharides from sucrose, but not from other sugars, and it was suggested that these

polysaccharides may serve as a glue for the accumulation of bacteria on the teeth.

"At that time, Bo Krasse, department of cariology, School of Dentistry, University of Lund, had spent a sabbatical year at the laboratory of R. J. Fitzgerald and P. H. Keyes, National Institute of Dental Research, National Institutes of Health, Bethesda, Maryland. In 1960, Fitzgerald and Keyes had demonstrated that certain streptococci induce caries in hamsters³ and Krasse, during his stay in their laboratory, had shown that sucrose was much more potent than glucose in inducing caries in hamsters infected with the 'caries-inducing streptococci'.⁴ These findings indicated a significant role for streptococci and sucrose in the microbial ecology of the oral cavity and in the publication cited above the characteristics of streptococci from various sites of the human oral cavity were studied.

"The reason why this publication has been cited may be that it demonstrated the tooth surface as the most favorable habitat of *S. sanguis* and *S. mutans*. It also showed that streptococci with the characteristics of the 'caries-inducing streptococci' were similar to *S. mutans*. A review of this field was recently published in *Microbiological Reviews*.⁵

"It is worth noticing that the studies aimed at elucidation mechanisms in the pathogenesis of periodontal disease did not give any clue, but they appear to have contributed to the understanding of the other major disease of the oral cavity, dental caries. Sucrose and streptococci have in numerous studies since then been shown to play a role in the accumulation of bacteria on the teeth and in the initiation of dental caries, while there is no evidence whatsoever that streptococci or sucrose have any effect on the development of periodontal disease in man.

"In recognition of my work in this area I received the C. V. Black Prize, 1970 (Swedish Dental Association) and the Science Award, 1972 (International Association for Dental Research)."

1. Carlsson J & Egelberg J. Effect of diet on early plaque formation in man. *Odontol. Revy* 16:112-25, 1965.
2. Carlsson J. Zooglea-forming streptococci, resembling *Streptococcus sanguis*, isolated from dental plaque in man. *Odontol. Revy* 16:348-58, 1965.
3. Fitzgerald R J & Keyes P H. Demonstration of the etiologic role of streptococci in experimental caries in the hamster. *J. Amer. Dent. Ass.* 61:9-19, 1960. [Citation Classic. *Current Contents/Clinical Practice* 8(38):16, 22 September 1980.]
4. Krasse B. The effect of caries-inducing streptococci in hamsters fed diets of sucrose or glucose. *Arch. Oral Biol.* 10:223-6, 1965.
5. Hamada S & Slade H D. Biology, immunology, and cariogenicity of *Streptococcus mutans*. *Microbiol. Rev.* 44:331-84, 1980.