

GÜLBİKE DEMİREL, DDS, PHD, ASSOC. PROF

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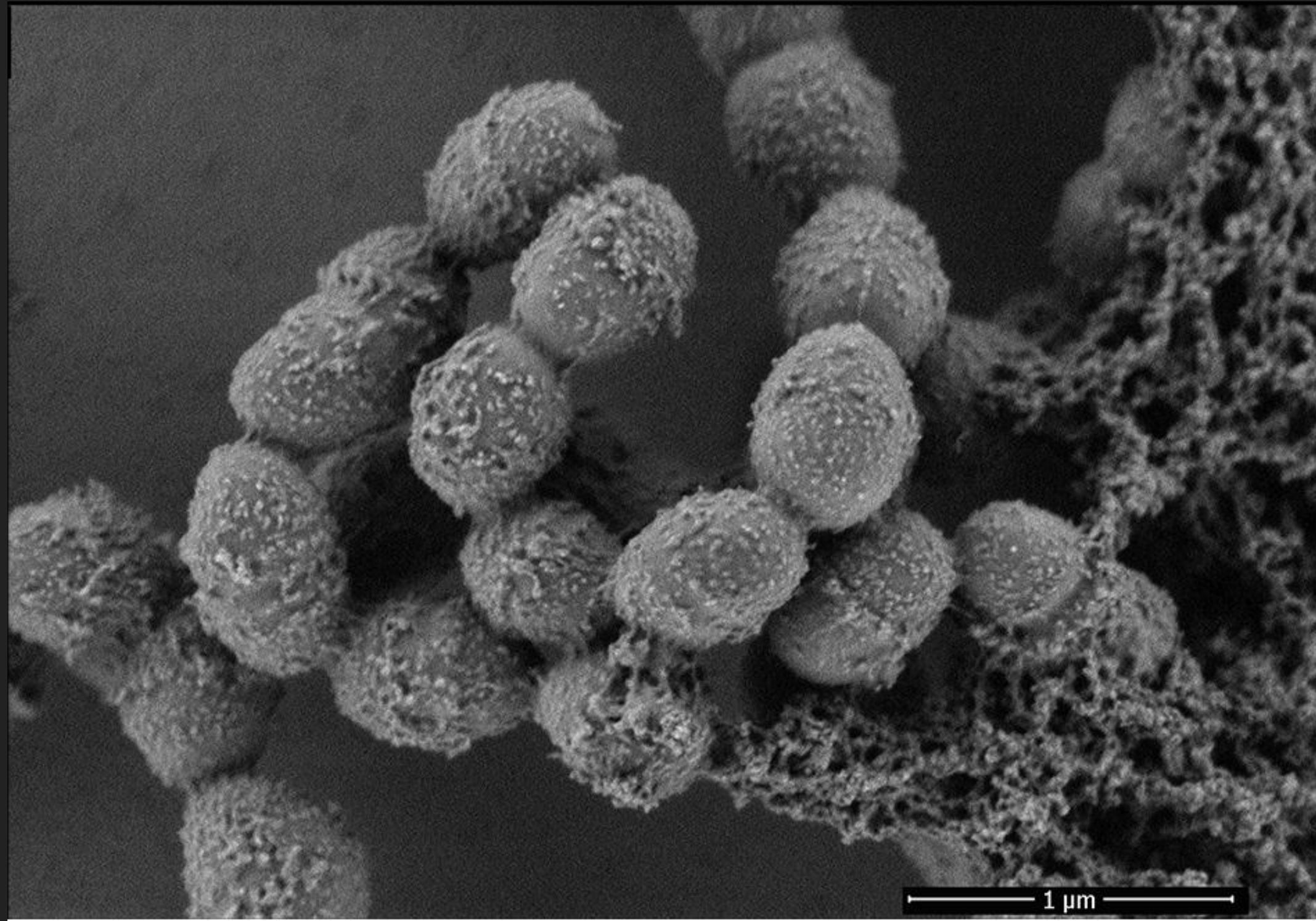
# ROLE OF MUTANT STREPTOCOCCI IN DENTAL CARIES

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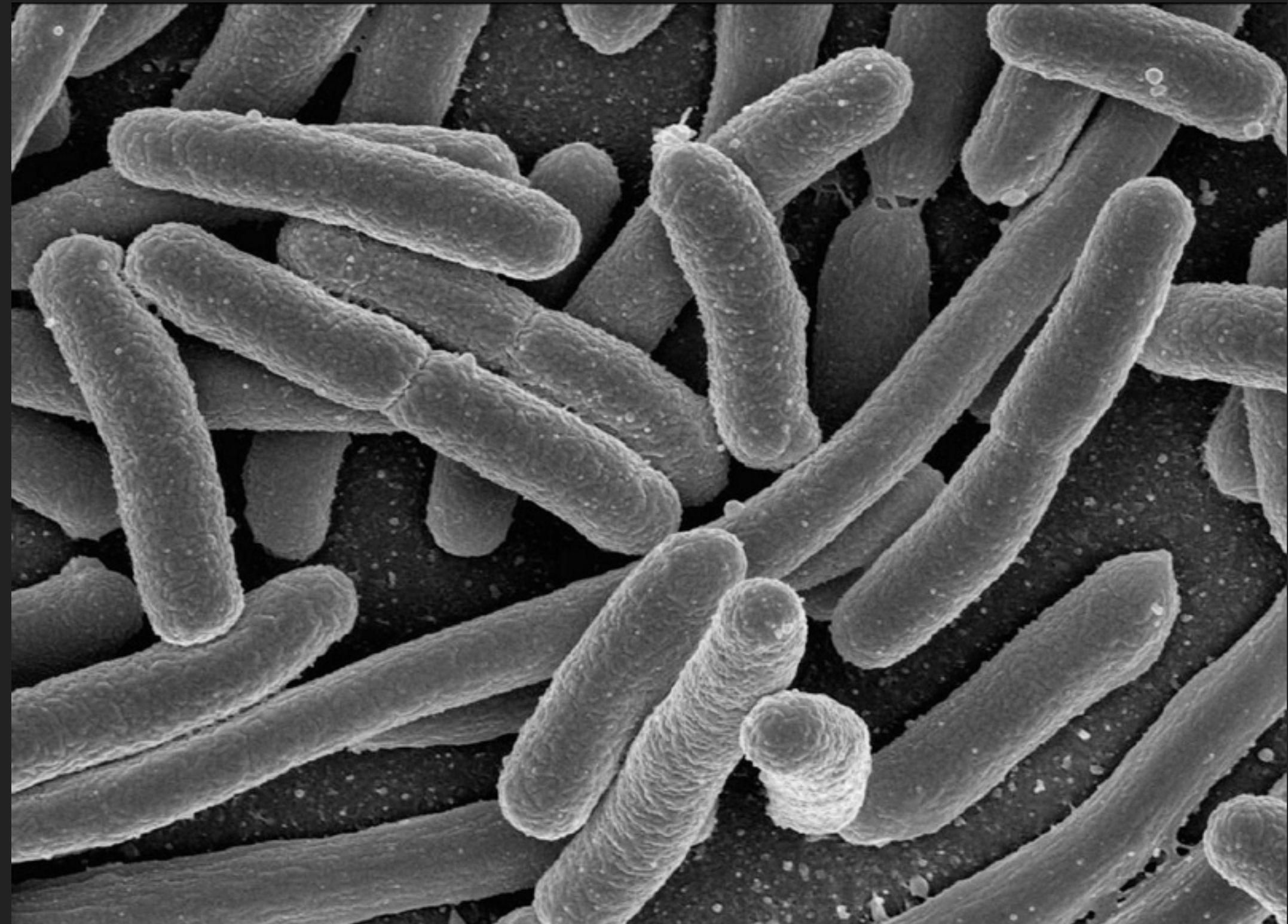
Group	Genera and/or species commonly found
Gram - positive facultative cocci (28.8 %)	Staphylococci Enterococci Streptococcus mutans Streptococcus sanguis Streptococcus mitis
Gram - positive anaerobic cocci (7.4% )	Peptostreptococcus
Gram - positive facultative rods (15.3% )	Corynebacterium Lactobacillus Nocardia Odontomyces viscosus Bacterionema matruchotii
Gram - positive anaerobic rods (20.2%)	Actinomyces bifidus Actinomyces israelii Actinomyces naeslundii Actinomyces odontolyticus Propionibacterium acnes Leptotrichia buccalis Corynebacterium
Gram -negative facultative cocci (0.4%)	Neisseria
Gram -negative anaerobic cocci (10.7%)	Veillonella alcalescens Veillonella parvula
Gram -negative facultative rods (1.2%)	--
Gram -negative anaerobic rods (16.1%)	Bacteroides melanogenicus Bacteroides oralis Vibrio sputorum Fusobacterium nucleatum Selenomonas sputigena
Spiral organisms (1 to 3)	Treponema denticola Treponema oralis Treponema macrodentium Borellia vincenti

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*S. mutans*



*L. acidophilus*



**'DENTAL CARIES IS AN INFECTIOUS AND TRANSMITTABLE DISEASE'**

**IS IT SO?**

## ROLE OF MUTANT STREPTOCOCCI IN DENTAL CARIES

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- ▶ Mutans streptococci are part of the resident flora, but are in very low numbers in most caries free individuals.
- ▶ Streptococcus mutans is often found at higher concentrations in plaque covering white spot lesions.
- ▶ However, there is no association between approximal caries lesions and the presence/absence of S. mutans or the total mutans counts in a biofilm and the plaque pH response in children.
- ▶ Children with increased numbers of caries cavities exhibit a higher number of salivary mutans counts but subgrouping of children based on different levels salivary mutans counts does not allow a distinction between high or low caries experience in children.

## ROLE OF MUTANT STREPTOCOCCI IN DENTAL CARIES

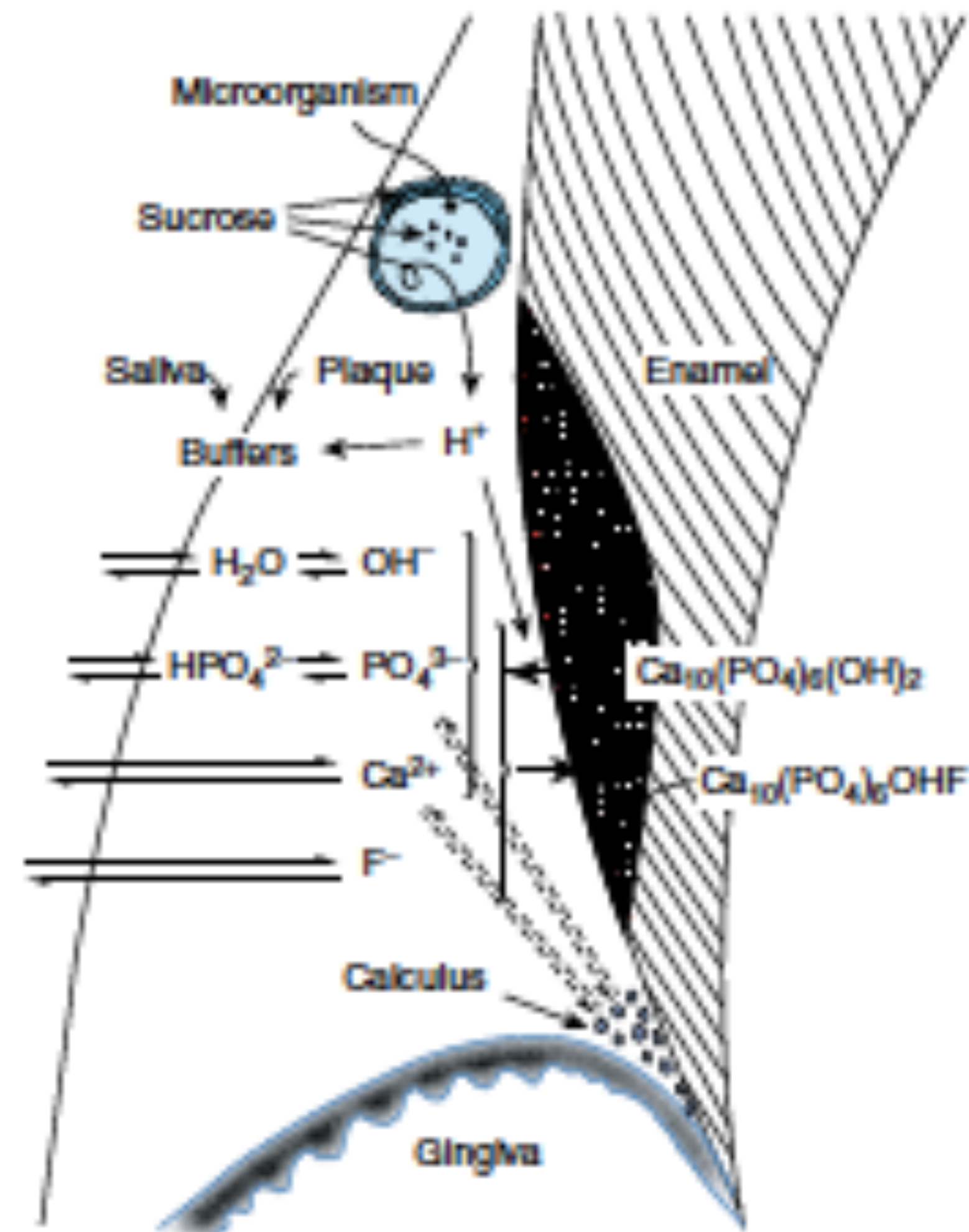
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- ▶ The number of *S. mutans* or lactobacilli in dental biofilms does not explain the variation in caries experience. Indeed, high number of these microorganisms may be found at sites without signs of demineralization.
- ▶ A dramatic decline in dental caries has been observed in well-conducted trials in populations followed over a short period of time, without apparent concomitant changes recorded in salivary *mutans* levels in the populations.
- ▶ There are many acid-producing microorganisms in addition to *Streptococcus mutans* and lactobacilli.
- ▶ A thorough review of the extensive literature concludes that no single type of microorganism can be claimed to be the primary cause of either root or enamel caries.



- ▶ There is an intensive metabolism constantly going on in any dental biofilm resulting in minute pH fluctuations at the tooth surface. **Acidogenic/ aciduric** microorganisms constitute a small proportion of most biofilms and, in an oral environment with a neutral pH, these microorganisms are weakly competitive and constitute only a minor fraction of the total microbial mass. Introducing mutants streptococci experimentally in such an ecosystem in physiological balance does not result in caries lesion development.

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**Figure 2.11** Drawing indicating the principal chemical events that lead to a subsurface enamel caries lesion. In the pH range of 5.5–4.5, saliva will be undersaturated with respect to hydroxyapatite, while supersaturated with respect to fluoridated apatite. Therefore, hydroxyapatite will dissolve from the enamel interior while fluoridated apatite will deposit in the surface enamel. The end result is the subsurface enamel caries lesion.

— = Surface Zone

Caries being an infectious and transmittable disease



Caries being a biofilm induced disease—the biofilm being composed of the resident microflora which is in a dynamic equilibrium with the oral environment



## FOR NEXT WEEK- FOR CARIOLOGY

- ▶ Chapter 2 between pages 58 to 60 (up to Clinical Characteristics of the Caries Lesion) Sturdevant's Art and Science of Operative Dentistry
- ▶ Chapter 1 between pages 2 to 6 (only enamel section) Sturdevant's Art and Science of Operative Dentistry

## FOR NEXT WEEK-DENTAL MATERIALS

- ▶ Chapter 13 Phillips' Science of Dental Materials - Saunders; 12 edition
- ▶ **Today's dental materials lesson (between 14:30 to 15:30) postponed to next week**