

Genetic Variability of *Streptococcus mutans* and Their Association with Caries

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ABSTRACT

Streptococcus mutans, one of the most widely distributed bacteria in the world, are considered significant contributors to the development of dental caries, by attaching to the tooth surfaces and forming biofilms. They can tolerate and adapt to the harsh and rapidly changing physiological conditions of the oral cavity such as extreme acidity, fluctuation of nutrients, reactive oxygen species, and other environmental stresses. In the last two decades, the increase in population genetics studies has contributed to elucidating important questions about the evolution of the pathogenesis of bacteria with clinical interest.

Genetic studies carried out on *Streptococcus mutans* combined with new knowledge of the structure of biofilm open new research areas regarding the prevention and treatment of dental caries, and the prophylaxis of systemic diseases such as infective endocarditis.

The objective of this study is to revise and update the knowledge of the last fifteen years regarding the genetic variability of *Streptococcus mutans* and their association with dental caries. This research shows the results of numerous studies carried out in various countries that, using molecular and biochemical methods, revealed associations between different serotypes and caries activity.

In addition, it is reported that the genetics structure of *Streptococcus mutans* in Argentina is highly recombinant, which reflects the largest waves of human immigration that occurred in the 19th and 20th centuries. On the other hand, demographic analysis suggests that these bacteria experienced a population expansion that coincided with the beginning of agricultural development.

This situation requires attention and several challenges must be addressed to ensure accurate and quality diagnostics. In this sense, it is important to instruct and educate future health professionals about these types of techniques, indicating their advantages and limitations. The idea is to promote the development of interdisciplinary teams that, in the future, can design, implement, standardize, control, and interpret these diagnostic tools.

Keywords: *Streptococcus Mutans*, Dental Caries, Serotype, Genetics, Population, Emigration and Immigration, Argentina

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