

Genetic Susceptibility to Dental Caries by Inherited Biological Variation Affecting Tooth Enamel

Dental caries are one of the most prevalent chronic dental diseases worldwide, despite major advances in preventative dental and oral healthcare. The formation of cavities has been connected to environmental factors such as sugar intake, oral hygiene practices, and fluoride exposure, but does not explain that inherited biological variations play a role in the susceptibility to tooth erosion and decay. In further understanding the role of genetics in oral diseases, it is most important to analyze the dental health patterns between individuals with similar environmental exposures. This critical review investigates the relationship between genetic variation and susceptibility to dental caries. Many of the studies include the genes involved with the formation of enamel, olfactory system genes, salivary composition, immune system regulation, and the oral microbiome's composition, all explaining the correlation of inherited traits and development of dental caries. Variations in genes regulating the mineralization of the enamel, dietary behaviors, and immune system regulation/function provide support for a genetic cause of dental caries formation. While many studies demonstrate the influence of environmental factors, genetic variation is also linked to the development of dental caries. Overall, the reviewed literature expresses that the development of dental caries is a combination of interactions between environmental influences and genetically inherited risks. Future research on gene-environment interactions will improve the understanding of susceptibility to dental caries, providing support for more accessible preventative dental care.