Plaque Encyclopedia Article

Plaque

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Plaque

Plaque is the diverse community of **microorganisms**, mainly **bacteria**, which develops naturally on the surface of teeth. The microbes are cocooned in a network of sugary polymers produced by the bacteria, and by host products, such as saliva, epithelial and other host cells, and inorganic compounds such as calcium. The surface-adherent, enmeshed community of plaque represents a biofilm.

Plaque is important for two reasons, one beneficial and one detrimental. The beneficial aspect of dental plaque is that the coverage of the tooth surface by microbes that are normally resident in the host can exclude the colonization of the tooth by extraneous bacteria that might be harmful. This phenomenon is known as competitive exclusion. However, despite this benefit, the plaque can position acid-producing bacteria near the tooth and protect those bacteria from attempts to kill or remove them. Plaque can become extremely hard, as the constituent inorganic components create a crystalline barrier. Protected inside the plaque, the acid-producing bacteria can dissolve the tooth enamel, which can lead to the production of a cavity.

A plaque is a complex community, consisting of hundreds of species of bacteria. Plaque formation generally begins with the adherence of certain bacteria, such as *Streptococcus sanguis*, *Streptococcus mutans*, and *Actinomyces viscosus*. Then, so-called secondary colonizers become established. Examples include *Fusobacterium nucleatum* and *Prevotella intermedia*. As the plaque matures, a varied variety of other bacteria can colonize the tooth surface.

Maturation of the plaque is associated with a shift in the type of bacteria that are predominant. Gram-positive bacteria that can exist in the presence or absence of oxygen give way to gram negative bacteria that require the absence of oxygen.

Depending on how the community evolves, the plaque can become problematic in terms of a cavity. Even within the plaque, there are variations in the structure and bacterial composition. Thus, even though one region of the plaque is relatively benign is no guarantee that another region will house detrimental bacteria.

The prevalence of acid-producing bacteria is related to the diet. A diet that is elevated in the types of sugar typically found in colas and candy bars will lower the **pH** in the plaque. The lowered pH is harsh on all organisms except the acid-producing bacteria. Most dentists assert that a diet that contains less of these sugars, combined with good oral **hygiene**, will greatly minimize the threat posed by plaque and will emphasize the benefit of the plaque's presence.