



**PROBIOTIC BIOTHERAPY IN ORAL HEALTH**

**Dr. Deepika Sugumaran\***

Postgraduate, Department of Oral Medicine and Radiology, Sree Balaji Dental College and Hospital, Bharath Institute of Higher Education and Research, Chennai.

**\*Corresponding Author: Dr. Deepika Sugumaran**

Postgraduate, Department of Oral Medicine and Radiology, Sree Balaji Dental College and Hospital, Bharath Institute of Higher Education and Research, Chennai.

Article Received on 11/07/2022

Article Revised on 01/08/2022

Article Accepted on 21/08/2022

**ABSTRACT**

It's the apt time to shift the archetype of treatment from specific bacteria to amend the bacterial bionomics by using probiotics. Probiotics are health beneficiary bacteria, which benefit the host's health. They are dietary supplements which help in provoking health promoting flora and suppressing pathogenic flora. This article aims to understand the mechanism of action of probiotics in the oral cavity and compile the assorted applications in the field of dentistry.

**KEYWORDS:** Oral diseases, Oral health, Probiotics.

**INTRODUCTION**

The term Probiotic is derived from greek language meaning 'for life'. According to WHO (2002), Probiotics are "live microorganisms which, when administered in adequate amounts confer a health benefit on the host". Probiotics have been used to improve gastrointestinal health for quite some time and their popularity has increased interest for their role in promotion of oral health. The most common species belong to the genera *Lactobacillus* and *Bifidobacterium*. They are generally regarded as safe because they can dwell in the human body causing no harm. They also serve as the key microorganisms in milk fermentation and food preservation.

**Mechanism of Probiotics in Oral Health**

The mechanism of action of probiotics can be divided into three main categories as follows:

- Normalization of oral microbiota is supported by the ecological plaque hypothesis which suggests that selective pressure in environmental conditions can change the balance between oral health and disease. Bacteria administered in food could influence relatively stable oral microbiota.<sup>[1]</sup>
- Immunomodulation - Several probiotics have been demonstrated to alter the ability of pathogens to adhere or to invade colonic epithelial cells. Probiotics could sequester essential nutrients from invading pathogens and impair their colonization ability and may alter the gene expression program of pathogens in such a way to inhibit the expression of virulence functions.
- Metabolic effects - Probiotics may conceive an unfavorable ambiance for pathogen colonization by

altering pH, mucus layer, and other factors in the local surroundings.

**Dental Caries**

The introduction of mutated *gtfC* (Glucosyltransferase-SI precursor) gene that affects the ability of *S. mutans* to produce extracellular glucans which promotes adhesion and colonization of cariogenic organisms. Bacteria administered as probiotics compete with cariogenic microbes for adhesion sites as well as for nutrients and growth factors leading to abridged levels of *S. mutans*. Several studies suggest that consumption of products containing probiotic lactobacilli or bifidobacteria could reduce the number of *S. mutans* in saliva.<sup>[2]</sup>

**Periodontal Disease**

The waning off of gingival bleeding and reduced gingivitis has been noted on application of *L. reuteri*. Periodontal dressings with probiotic strains at optimal concentration were shown to diminish the number of most frequently isolated periodontal pathogens. Periobalance (mixture of two strains of *L. reuteri*) is a chewing gum specifically formulated to fight periodontal disease also decreased levels of pro-inflammatory cytokines in GCF (Gingival crevicular fluid).<sup>[3]</sup> *L. brevis* showed decreased MMP collagenase activity and other inflammatory markers in saliva. Tablets containing *L. salivarius* has been shown to decrease gingival pocket depth, particularly in high-risk groups such as smokers.

**Halitosis**

Ingestion of *Weissella cibaria* shows definite inhibitory effect on the production of volatile sulfur compounds by *F. nucleatum*. Gargling with a solution containing

W.cibaria was associated with a reduction in H<sub>2</sub>S production and consequently reduction in bad breath. *S. salivarius* K12 produces salivaricin, antibiotic with inhibitory activity towards most *Streptococcus pyogenes*.<sup>[4]</sup>

### Oral Candidiasis

A reduction in the prevalence of *C. Albicans* was noted in the elderly after consumption of probiotic cheese containing *L. rhamnosus* and *propionibacterium*.<sup>[5]</sup> Reduced hyposalivation is notorious by the intake of *L. rhamnosus* GG containing cheese associated with control of oral Candidiasis.

### HIV Infections

Recently it has been postulated that the probiotic bacteria may mitigate AIDS progression.

Some *Lactobacillus* strains produce proteins capable of binding mannose sugar. One strain of *lactobacillus* secreted abundant mannose-binding protein particles released into its surroundings thereby neutralizing HIV infection. They also observed that immune cells trapped by *lactobacilli* formed a clump. This configuration would immobilize any immune cells harboring HIV and prevent them from infecting other cells.<sup>[6]</sup>

### Orthodontic Treatment

Evidence of growth of *S.mutans* is noted due to intricate design of orthodontic bands and brackets. Probiotic yoghurt help to reduce the levels of *S. mutans* in the saliva and plaque in children undergoing interceptive fixed orthodontic therapy. Daily consumption of fruit yogurt with *Bifidobacterium animalis* subsp. *Lactis* DN - 173010 could curtail the salivary levels of *S.mutans* in orthodontic patients with fixed appliances.<sup>[7]</sup>

### Oral Cancer

Evidence is cropping up that probiotics can interfere at various stages of cancer process, more so by interference with chromosomal and DNA damage. However, more research is required to develop specific regulations on their consumption.<sup>[8]</sup>

### CONCLUSION

The oral cavity with a well maintained harmonisation of the species and species interactions acts as a likely origin of health-promoting probiotic bacteria. Daily consumption of probiotic supplements may control common oral and dental infections. Probiotics crop up as alluring field in oral medicine. This notion prompts a new scope on the relationship between diet and oral health.

### REFERENCES

1. Haukioja A Probiotics and Oral Health. *European Journal of Dentistry*, 2010; 4: 348-355.
2. Ahola AJ, Yli-Knuutila H, Suomalainen T, Poussa T, Ahlstrom A, et al. Short term consumption of probiotic-containing cheese and its effect on dental

caries risk factors. *Arch Oral Biol*, 2002; 47: 799-804.

3. Twetman S, Derawi B, Keller M, Ekstrand K, Yucel-Lindberg T, Steckslen-Blicks C. Short-term effect of chewing gums containing probiotic *Lactobacillus reuteri* on the levels of inflammatory mediators in gingival crevicular fluid. *Acta Odontol Scand*, 2009; 67: 19-24.
4. Sterer N, Rosenberg M. *Streptococcus salivarius* promotes mucin putrefaction and malodor production by *Porphyromonas gingivalis*. *J Dent Res.*, 2006; 85: 910-4.
5. Hatakka K, Ahola AJ, Yli-Knuutila H, Richardson M, Poussa T, Meurman JH, et al. Probiotics reduce the prevalence of oral candida in the elderly-a randomized controlled trial. *J Dent Res.*, 2007; 86: 125-130.
6. Lin T. *Current opinion in HIV and AIDS*, 2008; 3: 599-602.
7. Cildir SK, Germec D, Sandalli N, Ozdemir FI, Arun T, et al., Reduction of salivary mutans streptococci in orthodontic patients during daily consumption of yogurt containing probiotic bacteria. *Eur J Orthod*, 2009; 31: 407-411.
8. Salminen MK, Tynkkynen S, Rautelin H, Saxelin M, Vaara M, et al. *Lactobacillus* bacterium during a rapid increase in probiotic use of *L.Rhamnosus* GG in Finland. *CID*, 2002; 35: 1155-1160.