Probiotics to Control Oral Microbiome, Resulting in Gut Microbiome

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Opinion

In the worldwide, approximately 20 to 50% of populations suffer from periodontal diseases [1]. According to NHIS (2017), 7.38 million people experienced medical treatment because of periodontitis in 2009 and 14.19 million people in 2016 in South Korea, which was increased by 92.3% in only 5 years [2]. The major oral pathogenic bacteria that occur periodontitis are Porphyromonas gingivalis, Prevotella intermedia and Fusobacterium nucleatum by disruption of alveolar bone and inflammation disperse [3,4]. Periodontitis is well-known for a risk of many other diseases such as cardiovascular disease, type 2 diabetes, non-alcoholic fatty liver, and rheumatic arthritis [3,15]. It is important that a treatment of periodontitis can protect various diseases, and thus, prevention of oral pathogens is necessary.

The treatment of periodontal diseases is based on removing bacterial plaque and preventing bacterial growth, and several drugs such as ascorbic acid, antibacterials, antibiotics and etc. have been used for the treatment. However, ascorbic acid has little therapeutic effect, and antibacterials and antibiotics have a limitation for a fundamental treatment of periodontal diseases. Tetracycline and metronidazole have been primarily used for periodontal disease, but the antibiotics can occur side effects such as the emergence of stomach disorder, type 2 diabetes, non-alcoholic fatty liver, and rheumatic arthritis [1,15]. It is important that a treatment of periodontitis can protect various diseases, and thus, prevention of oral pathogens is necessary.

Lactobacillus is one of the major probiotics that decreased growth of P. gingivalis and P. intermedia by 82% and 65%, respectively[14], and Lactobacillus reuteri can decrease bleeding and inflammation of gums [15,16]. Also, sterilized gauze inoculated with probiotics has antibacterial effects on oral pathogens such as Bacteroides, Actinomyces, Streptococcus intermedius, and Candida albicans [17]. Through some researches, probiotics that have antibacterial effects can be used for the treatment of periodontitis, and furthermore, it can be useful for improvement of oral microbiome.

Previously, probiotics are generally used to improve gut health. However, it was hypothesized that oral microbiome changed by probiotics may affect gut microbiome [18,19]. The compositions of oral microbiome between the healthy group and periodontitis patients were different. In healthy group, Neisseria lactamica consisted 8.8% in oral microbiome, but the periodontitis patients had 24.5%. Regarding Streptococcus sanguinis, causing inflammation in gum, healthy group had 2.9% composition, but the patients had 13.5% composition [20]. When P. gingivalis was orally gavaged in the mouse model, the gut microbiome composition of Firmicutes and Bacteroidetes was changed from 55.4% and 38.7% to 72.8% and 17%, respectively [21]. Oral microbiome change caused even allergy response such as atopic dermatitis because gut microbiome was influenced and immunity system was unbalanced [22,23].

In conclusion, future studies to evaluate the correlation between oral and gut microbiome, are necessary, and thus, studies to develop to control oral microbiome, resulting in improved gut microbiome need to be conducted.

References


