研究題目: 全長 16S rRNA 遺伝子配列解析を用いた重度歯周病患者の歯肉 縁下プラークと舌苔の共有菌の解析

目 的:

Subgingival plaque (SUBP) and tongue coating (TC) are both anaerobic environment in the oral cavity and these two microbiotas possibly link with each other. The present study aimed to analyze the sharing of bacteria between SUBP and TC from severe periodontitis patients.

対象および方法:

SUBP and TC samples were collected from 39 severe periodontitis patients with $\geq 20\%$ of probing sites with probing depth ≥ 4 mm. We determined the bacterial composition of each sample by using PacBio long-read sequencing of the full-length 16S rRNA gene and the amplicon sequence variant (ASV) approach.



Fig. 1 Research workflow.

study subjects

結果および考察:

The demographic information of these subjects was presented in Table 1. Periodontal inflammation was severe in this study group and was more prevalent in women. Observed number of ASVs, Shannon index and phylogenetic diversity were significantly higher in TC (Fig. 2). Top 11 genera with a mean relative abundance $\geq 5\%$ within each of the 2 niches are shown. The bacterial composition of SUBP and TC was significantly different (Fig. 3). The bacterial composition in SUBP-TC pairs were significantly similar compared to the unrelated pairs (Fig. 4). Dominant bacteria with a mean relative abundance $\geq 0.5\%$ in SUBP were clustered separately. A suspected periodontopathic bacteria cluster was detected (Fig. 5). R.

mucilaginosa and famous periodontal pathogens of *P. gingivalis* and *F. alocis* in TC linked with periodontopathic bacteria cluster in SUBP (Fig. 6). Finally, we calculated a sharing index for each species by dividing the number of SUBP-TC pairs with shared ASVs by the union of the number of SUBP and TC with the species. *P. endodontalis*, *P. gingivalis*, *F. alocis*, *P.* [XI] [G-9] brachy, *P. micra* and *T. forsythia* displayed a high sharing index (Fig. 7).

These results demonstrate the highly shared periodontopathic bacteria between SUBP and TC samples of severe periodontitis patients and suggest the importance of tongue coating cleaning during periodontal treatment and maintenance.



Fig. 2 Alpha diversity comparisons between SUBP and TC using Mann-Whitney U test.



Fig. 3 Mean and individual relative abundance of bacterial genera in both SUBP and TC.



Fig. 4 Bray-Curtis distances of SUBP-TC pairs and unrelated pairs.



Fig. 5 Co-occurrence network of dominant bacteria in SUBP.



Fig. 6 Link between SUBP suspected periodontopathogens with bacteria in TC.



Fig. 7 Sharing index of SUBP suspected periodontopathogens.

成果発表:(予定を含めて口頭発表、学術雑誌など)

- 1. 第96回日本細菌学会総会(2023年3月16日~3月18日、姫路)
- 2. (予定) 第72回日本口腔衛生学会学術大会(2023年5月19日~5月21日、大阪)