国際セッション

（E会場）

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E会場（43+44会議室）
14:20～15:40
Keywords: Probiotic, Biofilm, co-culture, inhibition
This study aims to evaluate potential of probiotic bacteria as bacteriotherapy against the periodontal pathogen, Aggregatibacter actinomycetemcomitans. Probiotic bacteria screened for inhibition activity against A. actinomycetemcomitans via overlay agar method. Probiotic bacteria with inhibition activity was subjected to indirect co-culture with A. actinomycetemcomitans and inhibition was evaluated by measuring the growth reduction after 24 and 48 hour incubation under anaerobic condition at 37°C. Then, inhibition effect on A. actinomycetemcomitans was confirmed for morphological changes using SEM. Later, inhibition activity was tested for biofilm formation of A. actinomycetemcomitans by co-culturing the probiotic bacteria with A. actinomycetemcomitans and evaluate the biofilm formation in comparison with A. actinomycetemcomitans without probiotic. Two out of six probiotic strains subjected for indirect co-culture showed bactericidal effect. They are Lactobacillus plantarum 15891 and Lactobacillus johnsonii 13952 with growth reduction value 4.18 and 4.77 (log CFU/ml) respectively. A. actinomycetemcomitans cells treated with indirect co-culture L. plantarum 15891 and L. johnsonii 13952 appeared collapsed and smaller in size compared to control. Biofilm formation of A. actinomycetemcomitans evaluated up to 3-fold reduction compared to mono-culture. In conclusion, this probiotic strains owns great potential as a candidate for bacteriotherapy in controlling A. actinomycetemcomitans growth in-vitro.

Keywords: mesenchymal stem cell, osteoblast, sphingosine-1-phosphate, Wnt5a
Objective: Recent studies have shown that mesenchymal stem cells (MSC) in periodontal ligament play crucial role in periodontal tissue regeneration. Sphingosine-1-phosphate (SIP) is a signaling molecule which regulates many cellular responses, including cellular differentiation. We previously reported that SIP induces osteogenic differentiation, while inhibits adipogenic differentiation. In this study, we tried to understand the involvement of Wnt signaling in SIP-induced osteogenic differentiation, as it is essential for osteogenic differentiation.

Materials and Methods: C3H10T1/2 cells (mouse MSC cell line) were cultured in osteogenic or adipogenic differentiation medium with or without SIP. The expression levels of osteogenic differentiation-related genes (alkaline phosphatase (ALP), osteocalcin (OC), Wnt5a, low-density lipoprotein receptor-related protein (LRP) 5, LRP6) were examined. Adipogenic differentiation was also monitored.

Results: ALP, OC, Wnt5a, LRP5, LRP6 mRNA expression increased by SIP treatment in C3H10T1/2 cells. The expression of these genes was inhibited by anti-Wnt5a antibodies. Adipogenic differentiation was inhibited by SIP.

Conclusion: The results suggest that SIP up-regulates Wnt5a expression, leading to the induction of LRPCs, thereby promoting MSC differentiation into osteoblast. Thus, SIP may be a favorable reagent for osteogenic induction.

Keywords: Porphyromonas gingivalis. Pan-genome. Comparative genome
Objectives: Porphyromonas gingivalis is a major pathogen of chronic periodontitis, which leads to the destruction of periodontal tissues and finally to tooth loss. The aim of this study was to analyze the pan-genome and comparative genome of P. gingivalis.

Materials and methods: Five clinical strains of P. gingivalis (SJD2, SJD4, SJD5, SJD11, and SJD12) were isolated from subgingival plaque of patients with severe chronic periodontitis in China. The virulent properties of these strains were identified by using mouse subcutaneous soft tissue abscess model. Draft genome of these 5 P. gingivalis strains was sequenced by high-throughput Solexa sequence analyzer and protein-coding sequences of these strains were predicted. The predicted proteins of 11 reference strains and of the 5 newly sequenced strains, were compared against each other, by using the OrthoMCL 5 program. The pan-genome and core-genome analysis were performed with the pan-genomes analysis pipeline.

Results: Using mouse subcutaneous soft tissue abscess model, SJD2 and SJD12 strains showed typical highly-virulent properties, which are comparable to W83 strain. The function of P. gingivalis pan-genome was established as P = 11143 N=946 + 976.1 (R² = 0.999), in which the N denotes the genome number. Further comparative genomic analysis showed that 7 genes appeared to be present in virulent strains, but absent from the less-virulent strains.

Conclusions: Based on these results, the pan-genome of P. gingivalis is defined as open, suggesting that this organism evolved actively with great expansions of the genome. In addition, several genes may directly involve in the virulent properties of P. gingivalis.

Keywords: Aggressive Periodontitis, Prevalence, Alveolar Bone Loss
Objectives: To determine the prevalence of Aggressive Periodontitis (AgP) and the alveolar bone loss (ABL) pattern.

Materials and methods: A retrospective study was done by examining dental records of patients referred to the specialist periodontal clinic at Faculty of Dentistry UiTM Shah Alam from January 2009 until December 2014 for AgP cases based on the 1999 Classification Workshop. A radiographic linear measurement procedure (Planmeca Romexis version 2.9.2 software) was used on their panoramic radiographs (OPGs).

Results: 25% of patients were diagnosed with AgP (13 male and 11 female). ABL% was demonstrated at mesial of maxillary second molar for both quadrant of male (right = 18.50%, left = 17.65%) and female (right = 10.25%, left = 10.24%). For mandibular tooth, ABL% is at the mesial of right mandibular first molar and distal of left mandibular first molar on both male (right = 87.7%, left = 10.08%) and female (right 11.13%, left = 9.27%) patients. Significant correlation was observed between ABL% on both right and left quadrant of maxilla of male patients. However for female patients the correlation is weaker. Percentages of vertical bone defect were found higher at the mesial of maxillary second molar, distal and mesial of mandibular first molar.

Conclusions: Pattern of alveolar bone loss in patients diagnosed with AgP in this study affected the first and second molars, similar to the findings in the literature. ABL showed bilateral or symmetrical pattern. Vertical bone defects was found affecting the molars than the premolars.
Keywords: Dental calculus, periodontitis, IL-1 beta, NLRP3, inflammasome, resveratrol

Objective: Our previous data showed that dental calculus could induce NLRP3 inflammasome-mediated interleukin 1β (IL-1β) secretion in murine macrophages. Recent studies have shown that the polyphenol, resveratrol, found in grape skin and red wine, can reduce NLRP3-derived IL-1β production. This study aimed to explore the inhibitory effect of resveratrol in IL-1β secretion induced by dental calculus.

Materials and methods: Macrophages from C57BL/6 mice were stimulated with dental calculus from periodontitis patients in the presence or absence of resveratrol. To further investigate the effect on crystal stimulation, cells were primed with lipid A to induce pro-IL-1β or left unprimed and stimulated with synthetic hydroxyapatite (HA), in the presence or absence of resveratrol. After 8 hours, IL-1β secretion levels were measured by ELISA.

Results: Dental calculus induced IL-1β in macrophages without priming, suggesting it can stimulate both pro- and mature forms of IL-1β. HA crystals induced IL-1β in lipid A-primed but not unprimed cells. Resveratrol significantly reduced IL-1β secretion in cells stimulated with either dental calculus or HA crystals.

Conclusion: These findings imply that resveratrol can suppress NLRP3 inflammasome-mediated IL-1β secretion at least partially by interfering in crystal stimulation, suggesting a potential anti-inflammatory effect of this natural compound in periodontal disease.

Keywords: mesenchymal stem cells

Aim: Recently, dental mesenchymal stem cells (MSCs) have been identified, and used for periodontal regenerative medicine. These MSCs defined by conventional criteria include a heterogeneous cell population; therefore, it is difficult to summarize the potential of them. We focused dental MSCs are derived from neural crest cells (NCSCs). NCSCs with multi-lineage potential survive as neural crest stem cells (NCSCs) even in adult. Some dental MSCs are with properties that overlapped with those of NCSCs. In this study, our purpose is to clarify the developmental black box of MSCs.

Methods: Human ES cells and iPS cells were induced into NCSCs. To confirm the existence of highly potent purified human MSCs that expressed LNGFR and THY-1, we analyzed cell surface markers using flow cytometry. Sorted LNGFR-THY-1- NCSCs were analyzed in vitro.

Results: Human ES cells and iPS cells condensed and formed neuro-ectoderm spheroids. After that, spheroids attached spontaneously, and NCSCs migrated out. We were able to selectively purify LNGFR-THY-1- cells from NCSCs, and they showed the features of both NCSCs and MSCs.

Discussion: To advance human periodontal stem cell research, additional clarification is needed. Previously, we reported highly potent purified human MSCs that express LNGFR and THY-1, providing purified MSCs from dental tissues. However, they are limited by their small population and minimal proliferative activity. Here, we demonstrate a method which provides a simple way to generate a large amount of developmentally selected MSCs that express LNGFR and THY-1. They will be promising candidates for periodontal regenerative medicine.

Keywords: mechanical complication, biological complication, prosthetics failure, single-tooth dental implants

Objectives: The purpose of this retrospective study was to evaluate the mechanical and biological complication rates of the implant-supported single crowns (ISSCs) with the advanced lateral screw prosthetic (ALS) system in the posterior region and how these complication rates are affected by clinical factors.

Materials and methods: The mechanical complications (i.e., lateral screw loosening (LSL), abutment screw loosening (ASL), lateral screw fracture (LSF), and ceramic fracture (CF)) and biological complications (peri-implant mucositis (PM), peri-implantitis (PI)) were identified by examining the patients’ treatment records, clinical photographs, periapical, panoramic radiographs, and clinical indices. Statistical analyses were performed to identify the relationship between clinical factors and complication rates.

Results: Mechanical and biological complications were present in 27 (67%) of the 73 investigated ISSCs with the ALS system. LSL and PM were the most common complication (15.1%), followed in order by ASL (27%), LSF (1.4%), CF (1.4%), and PI (1.4%). The incidence of mechanical complication was significantly related with gender (P = 0.018). The other clinical factors showed no significant relation regarding the mechanical and biological complication rates.

Conclusions: Within the limitations of this study, the incidence of mechanical and biological complications for ISSCs with the ALS system in the posterior region is relatively low compared with other ISSCs. Also, the ALS system is effective in the prevention and treatment of mechanical and biological complications.