国際セッション口演

（C会場）

5月30日（土） C会場　 9：00～10：20

IO-01

Autophagy promotes MSC-mediated vascularization in cutaneous wound healing via regulation of VEGF secretion

Ying An

Keywords: MSCs, autophagy, paracrine, VEGF

Vascularization deficiency caused a lot of diseases, such as diabetes ulcer and myocardial infarction. Mesenchymal stem cells (MSCs), with the self-renewal and multipotent differentiation capacities, have been used for many diseases treatment through regulation microenvironment. Numerous studies reported that MSCs transplantation could largely improve cutaneous wound healing via paracrine secretion of growth factors. However, whether MSCs take part in the angiogenesis process directly remains elusive. Previous study proved that autophagy inhibited immunosuppressive function of MSCs and prevented the degradation of MSCs function in inflammatory and senescent microenvironment. Here, we proved that autophagy determines the therapeutic effect of MSCs in cutaneous wound healing through promoting endothelial cells angiogenesis and demonstrated that the paracrine of vascular endothelial growth factor (VEGF) in MSCs was required in wound site. We further revealed that autophagy enhanced the VEGF secretion from MSCs through ERK phosphorylation directly. Collectively, we put forward that autophagy mediated paracrine of VEGF plays a central role in MSCs cured cutaneous wound healing and may provide a new therapeutic method for angiogenesis-related diseases.

IO-02

An overview of gingival and periodontal status in Nepalese adolescent population: A nation-wide study

Asmita Dawadi

Keywords: Adolescent, Gingival, Nepalese, Periodontal

Background: Periodontal diseases are known to affect large number of Nepalese populations. However, there are no nation-wide studies reflecting the periodontal health in adolescent population. The aim of this study was to assess the gingival and periodontal status in adolescent population of Nepal.

Materials and methods: A descriptive, nation-wide study was conducted among 15-year-old high school students throughout Nepal. 18 districts of 77 districts of Nepal were selected based on geographical distribution as the study area. Two schools from each candidate districts, one from urban area and other from rural area were selected. Details about the oral health practice and community periodontal index (CPI) were recorded. Data was analyzed using SPSS 20 and chi-square test was applied to test the significance.

Results: Among 383 study population, 72.3% (n=277) had CPI score of 2. For brushing habit, 72.6% (n=278) brushed once daily followed by 21.1% (n=81) brushed twice daily. In gender wise distribution of periodontal diseases 18.8% of males (n=39) and 20.6% of female (n=36) had CPI score of 1. 53.8% of males (n=149) and 73.1% of females (n=128) had CPI score of 2 and 9.6% of males (n=20) and 5.7% of females (n=10) female had CPI score of 3; however, the difference was not significant. The CPI score was related with brushing frequency. Among patients with CPI score of 3, 80% were those who brushed once daily.

Conclusion: This nation-wide study clearly indicates high prevalence of periodontal diseases among Nepalese adolescents. This study recommends the necessity of community oriented oral health activities and awareness program.

IO-03

Histologic Analyses of Immediate Implant Placement in Infected and Noninfected Sockets: An Experimental Pilot Study in Beagle Dogs

Jungwon Lee

Purpose: To investigate the histologic differences between immediate implants placed in chronically infected sites and noninfected sites in a canine model. The histologic results of immediate implant placement also were evaluated on the basis of healing time and implant surface modification.

Materials and Methods: Chronic endodontic-periodontic combined lesions were induced on the second, third, and fourth premolars of the hemimandible in six dogs, with the contralateral teeth as controls. Implants were immediately placed following the infected and noninfected tooth extractions using implants with a machined surface, sandblasted with alumina and acid-etched surface, and chemically modified sandblasted with alumina and acid-etched with calcium solution surface. After 1 and 3 months, three dogs were euthanized and the bone-to-implant contact, bone area fraction occupied, buccal and lingual first bone-to-implant contact from the implant platform, and buccal and lingual marginal bone loss were calculated.

Results: On histologic evaluation, no inflammation was observed around implants placed in the infected or noninfected sockets. At 1 month, statistically significant differences were observed between the infected and noninfected sockets in buccal marginal bone loss in the machined implant group ($P = .046$), lingual first bone-to-implant contact from the implant in the sandblasted with alumina and acid-etched group ($P = .046$), lingual marginal bone loss in the sandblasted with alumina and acid-etched implant group ($P = .028$), buccal first bone-to-implant contact from the implant platform in the chemically modified sandblasted with alumina and acid-etched with calcium solution group ($P = .028$), and lingual first bone-to-implant contact from the implant platform in the chemically modified sandblasted with alumina and acid-etched with calcium solution group ($P = .046$). At 3 months, no statistically significant differences were observed in parameters between the infected and noninfected sockets for three implant surfaces. Differences between the infected and noninfected sockets were observed between the machined and sandblasted with alumina and acid-etched implant at 1 month ($P = .023$).

Conclusion: Immediate implant placement in an infected socket did not lead to any differences compared with placement in a noninfected socket when sufficient healing time was provided.

IO-04

Comparison of Human Palatal and Tuberosity Mucosa as Donor Sites for Soft Tissue Augmentation Around Dental Implants

Alexandra Athanasiou Tsigarida

Keywords: Soft Tissue, Augmentation, Dental implant, Palate, Tuberosity

Introduction: Emerging evidence, seems to suggest that soft tissue harvested from the tuberosity and used for localized ridge augmentation, tends to progressively show a hyperplastic reaction. The primary aim of the present study is to compare the palatal and maxillary tuberosity mucosa as donor sites for soft tissue augmentation around dental implants, after a 1-year clinical follow-up period.

M & M: 20 patients in need for single dental implant treatment and soft tissue augmentation in the edentulous site were recruited. 10 patients were treated with dental implant and SCTG harvested from the tuberosity and 10 patients had the same procedure done with SCTG harvested from the palate. Peri-implant soft tissue and bone level changes, pink esthetic score , patient satisfaction and postoperative pain levels were assessed and compared between the two groups at 1 week, 2 weeks, 2 months, 6 months and 1 year post surgery.

Results: Differences were recorded between the two different grafts in regards to soft tissue thickness and pink esthetic score. No differences were seen at the bone level changes, patient satisfaction or postoperative pain at any of the time points of evaluation.

Conclusions: SCTG from the tuberosity and the palate represent effective and successful approaches for soft tissue grafting around dental implants.

IO-05

PPARG is required for periodontal ligament cells to retain differentiation capacity of hard-tissue formation

Yuan Hang

Keywords: periodontal ligament cell, Peroxisome proliferator-activated receptor gamma;, Hard-tissue formation

Background: Peroxisome proliferator-activated receptor γ (PPARG) is known as a key nuclear receptor for adipocyte differentiation and glucose homeostasis. Many researches illustrate that PPARG acts as an inhibitor of osteogenesis. However, neither functions of PPARG in periodontal tissue homeostasis nor periodontal ligament (PDL) cell differentiation have been investigated. In this study we focus on investigating the effects of PPARG for periodontal homeostasis and regeneration.
Methods: 1) PDL cells were transfected with PPARG specific siRNA then cultured with mineralization medium. 2) PDL cells were cultured in mineralization medium with thiazolidines, PPARG exogenous activator or inhibitors of lipoxygenase (an endogenous enzyme catalyzing the synthesis of PPARG endogenous ligands, which have ability to bind allosteric side of PPARG). Cell differentiation ability was reflected by Alkaline activity and Alizarin red staining. 3) Paraffin sections of mice maxillula molars and surrounding periodontal tissue were used for hematoxylin and eosin (HE) staining or performed immunohistochemistry (IHC) with anti-PPARG and anti-phospho-PPARG.
Results: 1) Inhibition of PPARG resulted in suppressed differentiation of PDL cell in contrast to MSC cells in which osteogenic ability was increased. 2) Thiazolidines showed variety effects on PDL cell differentiation, mineralization and proliferation. The inhibitors of lipoxygenase significantly suppressed PDL cell differentiation. 3) PPARG and phosphor-PPARγ were identified in PDL cell by IHC.
Conclusion: PPARG is critical for PDL cell differentiation for hard-tissue forming cells. Endogenous ligands binding to allosteric site of PPARG may shift PPARG regulated-transcription during PDL cell differentiation.

IO-06

Dynamic microstructural changes in alveolar bone in ligature-induced experimental periodontitis part II

Ya-Hsin Wu

Keyword: Experimental periodontitis

Objective: We used a ligature-induced experimental periodontitis model to observe the kinetic process of microstructural changes in alveolar bone, and introduced the star volume analysis to assess periodontal disease process.
Material and Methods: To induce experimental periodontitis, ligatures were placed around maxillary first molar. Thirty Wistar rats were euthanized on days 0, 1, 7, 14, and 28 after ligature placement. In addition to using H-E staining, TRAP/ALP doubling staining and micro-computed tomography analyses was performed for analysis the bone remodeling.
Result: From day 0 to day 7, the model showed predominant inflammation with the number of TRAP-positive cells increasing, while ALP expression decreased. In contrast, from day 14 to day 28, inflammatory processes and TRAP-positive cells decreased, whereas ALP expression recovered and was similar to day 0. Regarding microstructure parameters, from day 0 to day 7, bone volume fraction, bone mineral density, trabecular thickness and star volume of the trabeculae decreased significantly, whereas trabecular separation and star volume of the marrow space increased significantly, indicating that bone resorption occurred. From day 14 to day 28, ligature-induced deteriorative microstructure parameters were reversed, indicating that bone formation occurred.
Conclusion: This study is helpful for selecting the appropriate time periods for different research purposes. Furthermore, we assessed the potential for using star volume analysis, as a new sensitive tool, to present more closely the microstructural changes of alveolar bone in this model.

IO-07

Long-term follow-up of successful therapeutic measures for a peri-implantitis patient with a history of generalized chronic periodontitis: A case report

Eiji Ichimaru

Keywords: peri-implantitis, implant therapy, risk factor, long term follow up, successful therapy

Introduction: The aim of this case report is to assess therapeutic measures of peri-implantitis in the long term.
Case Presentation: 62 years old, female patient with generalized chronic periodontitis (stage 3, grade B) received regular implant therapy, including placement at 47, 46, 44, 35, and 37 sites and interim prosthesis with cementation and definitive prosthesis with screw retention, after periodontitis was stabilized with periodontal initial therapy. Supportive periodontal and implant therapy (SPIT) was then initiated. Peri-implantitis was developed in 47, 46 and 37 sites two years after the initiation. Since she was periodontally healthy at that time, preventive measures were continued. Therapies for peri-implantitis were performed: reinforcing self-oral hygiene measure, nonsurgical debridement for implant, removing residual luting cement, modifying prosthesis to improve hygiene and resective surgery. SPIT was then resumed. Peri-implant inflammatory symptoms improved. The progressive bone loss has ceased, with some recovery, at 47, 46 and 37 sites, for 4 years and 7 months after SPIT had resumed, although small amount of suppuration/exudate was occasionally observed at 37.
Conclusion: Those consecutive therapies to reduce risk factors were effective to resolve peri-implantitis. Small amount of suppuration/exudate observed even after ceasing progressive bone loss indicated that the goal for therapy of peri-implantitis should be established with definitive diagnostic criteria.

IO-08

Comprehensive and sequential gene expression analysis of bone healing process following Er:YAG laser ablation

Tsuyoshi Shimohira

Keywords: Er:YAG laser, bone ablation, bone healing, mechanotransduction, microarray, gene expression

Objectives: Er:YAG laser irradiation has shown positive effects on bone healing. However, the cellular mechanism and the biological responses that occur during bone healing remain unclear. This study was performed to evaluate comprehensive and sequential gene expression in laser-ablated bone compared to that in non-treated control bone.
Materials and methods: The calvarial bone of Wistar rats was ablated by Er:YAG laser under water spray. Gene expression in the laser-ablated bone and non-treated control bone were evaluated at 6, 24, and 72 h by microarray analysis.
Results: Gene expression of BCAR1/p130cas, a mechanotransducer, was upregulated at 6 h. Additionally, upstream of the hippo signaling pathway was enriched according to KEGG pathway analysis at 6 h, however, it was not significantly enriched at 24 h. This may have regulated the translocation of YAP/TAZ, which is also one of the mechanotransducers. Enrichment of bone formation-related GO terms was observed from the early stage, whereas inflammation-related GO terms were gradually enriched after 24 h. In the gene set enrichment analysis, no inflammation-related gene sets were identified at 6 h; however, these gene sets were enriched at 24 and 72 h.
Conclusion: Er:YAG laser irradiation regulates mechanotransduction via BCAR1/p130cas and the hippo signaling pathway in the bone tissue. In addition, the laser ablation influences the cells related to bone formation immediately after irradiation. These mechanical stress and the biological effects caused by Er:YAG laser irradiation may contribute to wound healing in the laser-ablated bone tissue.