

ASIA-PACIFIC CONFERENCE in FUKUOKA 2015

International Symposium on Oral Education and Research in Kitakyushu



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Venue: Kyushu Dental University, Kitakyushu Japan

Asia-Pacific Conference in Fukuoka 2015

*International Symposium on Oral Education and Research in
Kitakyushu*

Kyushu Dental University, Kitakyushu, Japan
Jan 24th 2015

Organizing Committee:

Tatsuji Nishihara, President
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Organized by Kyushu Dental University
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Welcome message



Tatsuji Nishihara, D.D.S., Ph.D.
Chairman and President
Kyushu Dental University

Welcome to Asia-Pacific Conference in Fukuoka 2015. It is our great honor and pleasure to invite you to attend the International Symposium on Oral Education and Research in Kitakyushu, Japan, January 24th, 2015. I am inviting you to participate in this exciting project that successfully started last year to obtain valuable information on Oral Education and Research of foreign countries.

In this conference, we are delighted to announce two special lectures. Present state of dental education in Thailand will be introduced by the invited speaker, Dr. Suchada Vuddhakanok, Dean, Faculty of Dental Medicine, Rangsit University from that has the developed system for dental education. The other invited speaker, Dr. Lakshman Samaranayake, Head of School, School of Dentistry, The University of Queensland will introduce the outcome-based dental education in Australia, providing us an opportunity to examine by comparing it with the cases in the University of Hong Kong. We are expecting to have active discussions on a new style of dental education.

Moreover, we are planning to have a session for presentations and invigorating discussions about the achievement of education and scientific research in distinguished collaboration between dentistry, medicine and biotechnology in Kitakyushu city. It is our wish to flash an innovative idea into your mind to build true partnership with another country.

We thank you in advance for your interest and active participation and look forward to welcoming you to the Asia-Pacific Conference in Fukuoka 2015.

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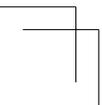
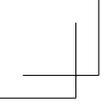
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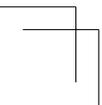
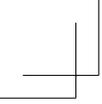
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Program



13:00 Registration

13:20 Welcome Address and Opening Remarks

Prof. Tatsuji Nishihara (President of Kyushu Dental University)

13:30 - 16:00 Plenary Lectures

“Outcome-based Dental Education”

Chair: Ryuji Hosokawa

Prof. Lakshman Samaranayake (School of Dentistry, The University of Queensland)

“Outcome based education: an Australasian Perspective”

Prof. Suchada Vuddhakanok (Faculty of Dental Medicine, Rangsit University)

“New Approach in Dental Curriculum: Rangsit Model ”

Assoc. Prof. Naoki Kakudate (Kyushu Dental University)

**“Essential competencies for the new Japanese dentists
: toward outcome based dental education”**

Coffee Break

16:15-17:30 Poster Sessions

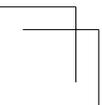
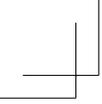
16:15- 17:10 Best Poster Award Competition

17:35-17:45 Award Ceremony

17:50- Closing Remarks

Prof. Shin-ichi Masumi (Vice-President of Kyushu Dental University)

18:30 Banquet



Plenary Lectures



Outcome Based Dental Education: An Australasian Perspective

Lakshman Samaranayake DSc, DDS, FRCPath

Head, School of Dentistry Professor of Oral Microbiomics
and Infection

University of Queensland, Brisbane, Australia

An outcome is a culminating demonstration of learning. It is what the student should be able to do at the end of a course. Outcome-based education is an approach to education in which decisions about the curriculum are driven by the exit learning outcomes that the students should display at the end of the course. In outcome-based education product defines process. Outcome-based education is the opposite of input-based education where the emphasis is on the educational process and where we are happy to accept whatever is the result. A total of five role-based exit outcomes have been identified for trainee dental clinicians: self-directed learners, collaborative workers, complex thinkers, community contributors, and quality producers.

Outcome based education synergises well with the current pedagogy of transformative learning and problem based learning that leads and includes confronting confusion and dilemma; critical self-reflection; examination of assumptions; exploration of options for new roles, relationships, and action; planning a course of action; acquiring new knowledge, skills and attitudes.

The question then is whether the current pedagogy of dental schools permits such outcome based education. Clearly, the traditional, didactic, teacher-centered and essentially non-contextualized rote learning we see in a vast majority of dental schools in Asia is not conducive for outcome based education. Arguably, the problem based learning which is learner centered goes some way to fulfill the ethos of outcome based education. Advantages and disadvantages of outcome based education from a perspective of a dental dean with experience in Asia and Australia over a decade will be discussed in this presentation.

Brief CV

Professor Lakshman Samaranayake

Hon DSc, Hon FDSRCSE, DDS, BDS, FRCPath, FRACDS, FCDSHK,
HKAM(Path), FHKAM(DSurg), FHKCPath, FICD

Professor Samaranayake is the Head, and Professor of Oral Microbiomics and Infection at the University of Queensland, School of Dentistry. He held the position of the Dean and, Chair of Oral Microbiology at the Faculty of Dentistry and Tam Wah-Ching Professor of Dental Sciences at the University of Hong Kong, as well as the Director of the Prince Philip Dental Hospital from 2004-2013. He has held teaching and consultant positions at the University of Glasgow, UK, University of Alberta, Canada and the University of Peradeniya, Sri Lanka. He has also served as a Director of the FDI World Dental Federation and the Chairman of its Science Commission. The author of over 400 research articles, and with an *h*-factor of 61, Professor Samaranayake has been cited in the international literature, over 12,000 times. He is the first from Asia to receive the IADR *Distinguished Scientist Award* in Oral Medicine and Pathology as well as the *King James IV Professorship* of the Royal College of Surgeons of Edinburgh, UK. He has lectured in all five continents, and is the Editor-in-Chief of the *Journal of Investigative and Clinical Dentistry* and, a World Bank Consultant on problem based learning.



New Approach in Dental Curriculum: Rangsit Model

RADM. Suchada Vuddhakanok RTN

Faculty of Dental Medicine, Rangsit University
THAILAND

In 2005 Faculty of Dental Medicine was established in Rangsit University not far from Bangkok, Thailand. The goal is to produce not only competent dentists but also the new kind of dentists. The kind that has good heart, good knowledge and good hand skills. In order to achieve this goal we combine the Transformative Learning philosophy to the curriculum. The reasons behind this strategy is also because we are dealing living in the 21th century. The Dental School must gear forward to accommodate the 21th century students.

The presenter will use Faculty of Dental Medicine, Rangsit University as a model to show the modified traditional dental curriculum in used.

Brief CV

Professor RADM Suchada Vuddhakanok RTN

Professor Vuddhakanok is the Dean of Faculty of Dental Medicine, Rangsit University, Thailand.

She is also the President Elect of Thai Association of Periodontology.

She got Bachelor of Science and Doctor of Dental Surgery from Chulalongkorn University, Master's degree of Science and certificate in Periodontics from The Ohio State University, and Diplomate from Thai Board of Periodontology.

She earned the "Dr. Issara Yukthnandana Honorary Award from Thai" in 2007, Honorable Alumni Award from Wattana Wittaya Academy Alumni Association, in 2008, and Rangsit University Best Employee Award in 2012.

To date, she has actively lectured in many Asian countries.



Essential competencies for the new Japanese dentists: toward outcome based dental education

Naoki Kakudate

Educational Cooperation Center, Kyushu Dental University

The introduction of outcome-based dental education requires that the competencies for new dental graduates be sufficiently discussed and enumerated, and that these enumerated competencies then be used as the basis for the new curriculum. This process is fundamental to the development of outcome-based dental education.

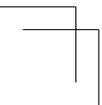
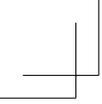
In the United States, “seven domains” of “competencies for the new general dentist defined by the American Dental Education Association (ADEA)” have been established, consisting of “Critical Thinking”, “Professionalism”, “Communication and Interpersonal Skills”, “Health Promotion”, “Practice Management and Informatics”, “Patient Care: A. Assessment, Diagnosis, and Treatment Planning”, and “Patient Care: B. Establishment and Maintenance of Oral Health”. Europe has also adopted “seven domains” of “competencies for the new general dentist defined by the Association for Dental Education in Europe (ADEE),” consisting of “Professionalism”, “Interpersonal, Communication and Social Skills”, “Knowledge Base, Information and Information Literacy”, “Clinical Information Gathering”, “Diagnosis and Treatment Planning”, “Therapy: Establishing and Maintaining Oral Health”, and “Prevention and Health Promotion”. To date, however, no such defined competencies have yet been established for Japanese dental education.

Against this background, the Kyushu Dental University Centennial Dental Education Conference (KDU-CDEC) was held on Sunday, May 11, 2014, the day following the Kyushu Dental University 100th Anniversary, as a colloquium of international dental education professionals who participated in the centennial anniversary from home and abroad. In this conference, the participants discussed the theme “What is the Competency for New Dental Graduates?”. At the conclusion of the conference, we extracted two new competencies in addition to the competencies defined by ADEA and ADEE, namely “Global mind” and “Dentistry in an aged society” as specific domains in Japanese dental education. I hope that these findings will be of use to dental educational professionals and will lead to the establishment of outcome-based dental education in Japan.

Brief CV

Dr. Naoki Kakudate

Dr. Kakudate is an associate professor at the Educational Cooperation Center of the Kyushu Dental University. He received his DDS and PhD from the University of Hokkaido and the Master of Public Health from the Kyoto University, School of Medicine and Public Health. He has worked in a Japanese dental office as an assistant director. After that, he joined the faculty at Health Sciences University of Hokkaido and then at Kyoto University Graduate School of Medicine and Public Health. He has also worked as a visiting associate professor at Stanford Prevention Research Center, Stanford University School of Medicine.



Poster Presentations

***Best Poster Award Competition**

Poster Number 1 - 9

P-1 Assessment of anterior mandibular positioning device for obstructive sleep apnea patients

Eri Makihara, Toshihiro Kawano, Shin-ich Masumi

Division of Occlusion & Maxillofacial Reconstruction, Department of Oral Function,
School of Dentistry, Kyushu Dental University

Objectives: The purpose of this study was to investigate usability of anterior mandibular positioning (AMP) device for OSA (Obstructive sleep apnea) patients and to treatment effects of AMP devices.

Methods: 135 patients with OSA who received the AMP device were mailed to determine whether they were still using the AMP device. If yes, they were asked whether their subjective symptoms were improved by treatment. If not, they were asked why they stopped using it. Overnight PSG at pre- and post-treatment was recorded.

Results: Of the 48 responding patients, 33 patients were still using the AMP device. 30 patients had improved subjective symptoms; snore (n=32), apnea (n=21), daytime sleepiness (n=11), morning awakeness (n=10). The most common compliance was excessive salivation (n=10). AI**, AHI** at pre-treatment were significantly lower than that at post- treatment ($p=0.0353$, $p=0.0118$). The lowest SpO2 ** at pre- treatment was significantly higher than that post-treatment in the still using group ($p=0.0272$) (*: $p<0.001$, **: $p<0.05$). However, arousal index did not differ between pre- and post-treatment ($p=0.3244$).

Of the 15 patients stopped using the AMP device, the primary reason for stopped using the device was “no treatment effect” (n=5). No index from PSG recording did not differ between pre- and post-treatment in the stopped using group($p=0.1501$, $p=0.0743$, $p=0.4159$, $p=0.5879$).

Conclusions: This result suggested that both the subjective symptoms and the parameters from PSG recording were improved with using the AMP device in the still using group. However, the patients stopped using the device had no subjective symptoms and no different sleep qualities between pre and post treatment. It was necessary to improve device to get more treatment effect and acceptable to use it.

P-2 Effects of anti-cancer drugs on oral ulcer-induced pain in rat model

Kiichiro Yamaguchi^{1,2}, Suzuro Hitomi¹, Kentaro Ono¹, Nozomu Harano²,
Teppei Sago², Seiji Watanabe² and Kiyotoshi Inenaga¹

¹Division of Physiology, ²Division of Dental Anesthesiology,
Kyushu Dental University

Oral mucositis is frequently caused in cancer patients with chemo-radiotherapy and, in many cases, its intractable severe pain forces to interrupt the anti-cancer therapy. However, it has not well studied mechanism underlying oral mucositis-associated pain. In this study, we investigated effects of two representative anti-cancer drugs, 5-fluorouracil and cisplatin, on oral ulcer-induced pain in rats using our recently-developed methods. 5-fluorouracil and cisplatin were intraperitoneally administrated at 40 mg/kg, 3 times at 1 day resting, and 4 mg/kg, 2 times at 4 days resting, respectively. The regimens induced body weight loss, anorexia and leucopenia, with anti-cancer effects. After the anti-cancer treatments, ulcer was developed on the oral mucosa of the submaxillary labial fornix by topical acetic acid treatment. The both 5-fluorouracil- and cisplatin-received rats failed to induce leukocytosis following ulcer development and showed cure delay, long-lastingly and slightly, respectively. Ulcer-induced spontaneous, capsaicin-evoked pain-related behaviors and mechanical allodynia were exaggerated in 5-fluorouracil-received rats and the enhanced hyperreactivities were inhibited by systemic pre-treatment of anti-bacterial agents. However, cisplatin-received rats showed no spontaneous and capsaicin-evoked pain-related behaviors after ulcer development, likely the anti-bacterial treatment. Furthermore, mechanical allodynia was systemically induced by cisplatin itself and it in the oral mucosa was further exacerbated by ulcer development. These results demonstrate different mechanisms underlying serious oral pain after anti-cancer therapies; aggravative mucositis due to strong immunosuppression in 5-fluorouracil treatment and accumulation of ulcer-induced hypersensitivity on systemically-induced mechanical allodynia, but with mucositis relief by anti-bacterial effect, in cisplatin treatment.

P-3 Novel induction of oral bisphosphonate-induced osteonecrosis in ovariectomized rats

Junpei Tanaka

Department of Science of Physical Function, Division of Maxillofacial Surgery,
Kyushu Dental University

The purpose of this study was to develop a model of osteonecrosis of the mandible and femur using oral bisphosphonate (BP) treatment in osteoporotic rats induced by ovariectomy (OVX). Thirty-three female Wistar rats, aged 8 weeks, were subjected to OVX or sham surgery. After 8 weeks, rats were administered with oral alendronate (ALN, 1.0 mg/kg) or saline once a week for 4 weeks. Twenty-four animals were divided into two groups—lipopolysaccharide (LPS) or saline—and the bone marrow cavities on both sides of the mandible and femurs were filled. Blood samples were collected from the remaining nine rats at the same time. Four weeks later, all animals were euthanized. The development of osteonecrosis was evaluated by histomorphometry and the level of serum C-telopeptide cross-linked collagen type I (CTX) was analyzed by enzyme-linked immunosorbent assay. Extensive osteonecrosis was observed in the mandibles and femurs of OVX and sham rats administered ALN plus LPS. In the mandibles, significantly higher osteonecrosis was observed in the sham-operated rats as compared with the OVX rats following ALN plus LPS treatment. In rats administered ALN, the CTX level of sham groups was significantly lower than that of the OVX groups. Using LPS, we successfully developed a novel model of oral BP-induced osteonecrosis. The results of this study suggest the likely increased risk of BP-related osteonecrosis of the jaw in cases when BPs are administrated too early in patients with osteoporosis.

P-4 The action of the ethanol metabolite acetaldehyde on water and salt intake in rats

Izumi Ujihara^{1,2}, Suzuro Hitomi¹, Kentaro Ono¹, Yasuaki Kakinoki² and Kiyotoshi Inenaga¹

¹Division of Physiology, ²Division of Special Needs and Geriatric Dentistry, Kyushu Dental University

In hangover, people frequently experience heavy thirst as well as headache, nausea, vomiting and dizziness. It has been thought that the latter symptoms are elicited by the ethanol (EtOH) metabolite acetaldehyde (ACD), while thirst sensation is elicited by EtOH-induced urination. ACD has never been considered to be a thirst inducing factor in hangover. Studies have reported that ACD causes suppression of blood pressure and stretch receptors in afferent arterioles of the kidney are stimulated by the pressure drop, and then renin is secreted from the juxtaglomerular cells of the kidney. We hypothesized that ACD is a factor inducing thirst sensation in hangover. Male Wistar rats were used in the present study. Intraperitoneal injection of EtOH significantly increased water intake. Coadministration of the aldehyde dehydrogenase inhibitor cyanamide with EtOH increased both water and salt intake further and earlier. ACD with cyanamide more rapidly elicited water and salt intake. The elicited water and salt intake was suppressed by intraperitoneal and intracerebroventricular injections of AT1 antagonist candesartan. Plasma renin activity was increased after ACD while plasma osmolality and Na⁺ concentration were not changed. Urination was less found in the early stage even in the administration of ACD. When rats were allowed to drink water and salt solution, urine volume was increased only after drinking, suggesting that urination is not a main trigger for initiation of drinking behavior induced by ACD. Immunohistochemical study showed that ACD increased the number of c-Fos immunopositive neurons in the brain regions of thirst center. The increased number of immunopositive cells was suppressed by candesartan. Taken together, thirst sensation by ACD may be mediated through the renin-angiotensin system and induced by activation of the thirst center of rat brain. The present study suggests that ACD causes heavy thirst sensation in hangover.

P-5 Effect of proinflammatory cytokines on the expression of DMP-1 in odontoblast-like cells

Aika Nakagawa^{1,2}, Toshinori Okinaga¹, Wataru Ariyoshi¹, Takahiko Morotomi²,
Chiaki Kitamura² and Tatsuji Nishihara¹

¹Division of Infections and Molecular Biology, ²Division of Endodontics and Restorative Dentistry, Kyushu Dental University

Pulp inflammatory lesions are characterized by a strong increase of the production of proinflammatory cytokines, including IL-1 β , IFN- γ , and IL-6.

Dentinogenesis is reported to be regulated by cytokines and growth factors, and modulated by alterations in the extracellular environment. Dental Matrix Protein-1(DMP-1), which is predominantly expressed in odontoblasts, is required in the early and late stages of odontogenesis. In the present study, we examined the involvement of proinflammatory cytokines in the expression of odontogenesis marker in rat odontoblast-like cell line, KN-3 cells. First, we investigated the expression and phosphorylation of p38 and Extracellular Signal-regulated Kinase(ERK) in proinflammatory cytokines-treated KN-3 cells using Western blotting analysis. Phosphorylation of p38 and ERK was induced by IL-1 β and INF- γ for 1 h, respectively. Unphosphorylated of p38 and ERK were constantly expressed in IL-1 β and IFN- γ -treated KN-3 cells. We confirmed the protein expression of DMP-1 by Western blotting analysis. The DMP-1 expression was upregulated in proinflammatory cytokines-treated KN-3 cells for 6 h. Interestingly, DMP-1 protein was degraded in IFN- γ -treated KN-3 cells for 48 h, not in IL-1 β -treated KN-3 cells. We found the enhancement of degradation of DMP-1 by co-treatment of IL-1 β and IFN- γ for 48 h in KN-3 cells. These results indicated that expression of DMP-1 was upregulated by the treatment of proinflammatory cytokines for short-term treatment, followed by the degradation of DMP-1 in INF- γ for long-term treatment, suggesting the possible involvement of INF- γ in the regulation of tooth mineralization. Further work is needed to determine the role of proinflammatory cytokines, especially INF- γ , in the induction of mineral deposition of the dental pulp.

P-6 The role of lysophosphatidylcholine acyltransferase 3 in the induction of M1/M2 macrophage polarization

Kosuke Taniguchi^{1,2}, Hisako Hikiji^{3*}, Toshinori Okinaga¹, Wataru Ariyoshi¹,
Kazuhiro Tominaga² and Tatsuji Nishihara¹

¹Division of Infections and Molecular Biology, Department of Health Promotion, Kyushu Dental University, ²Division of oral and Maxillofacial Surgery, Department of Science of Physical Function, Kyushu Dental University, ³Department of Oral Functional Management, Kyushu Dental University

Lysophosphatidylcholine acyltransferases (LPCATs) take a role in diversifying the fatty acid composition in biological membranes and effect on inflammation. M1 macrophages are known to be responsible for inflammation. In contrast, M2 macrophages are anti-inflammatory and involved in wound healing. We investigated the involvement of LPCAT3, one of LPCATs, in the induction of M1/M2-macrophage polarization. Lipopolysaccharide (LPS) changed the shape of PMA-treated U937 cells and increased the mRNA and protein expression of the M1 macrophage marker CXCL10. In contrast, interleukin-4 (IL-4) did not change the shape of these cells and increased expression of the M2 macrophage marker CD206 in these cells. We showed that LPS and IL-4 stimulate the differentiation of PMA-treated U937 cells into M1- and M2-polarized macrophages, respectively. The expression of LPCAT3 was significantly reduced by LPS. LPCAT enzyme activities toward linoleoyl-CoA and arachidonoyl-CoA were decreased in LPS-activated U937 cells. Moreover, LPCAT3-knockdown macrophages were spindle-shaped like M1-polarized macrophages, and had increased secretion of CXCL10 and decreased the protein expression of CD206 in IL-4-activated U937 cells. These results suggest that knockdown of LPCAT3 shifts PMA-treated U937 cells from M2- to M1-polarized macrophages. We have shown here that LPCAT3 has an essential role for M1/M2-macrophage polarization and that it would be a new therapeutic target for the regulation of immune and inflammatory disorders.

P-7 Mechanical stress suppresses the osteoclastogenesis in RAW264.7 cells through IL-33 secretion in MC3T3-E1 cells

Hiroyasu Kiyomiya,^{1,2} Wataru Ariyoshi,¹ Toshinori Okinaga,¹ Takeshi Kaneuji,³ Sho Mitsugi,² Takuma Sakurai,^{1,2} Manabu Habu,² Izumi Yoshioka,³ Kazuhiro Tominaga,² and Tatsuji Nishihara¹

¹ Division of Infections and Molecular Biology, Department of Health Promotion,

² Division of Oral and Maxillofacial Surgery, Department of Science of Physical Functions, ³ Division of Oral Medicine, Department of Science of Physical Functions, Kyushu Dental University

Although mechanical stress is known to be important for the regulation of bone turnover, though the detailed mechanisms are not fully understood. In the present study, we examined the effect of mechanical stress on osteoblasts using a novel compression model. Mouse osteoblastic MC3T3-E1 cells were embedded in three-dimensional (3D) gels and cultured with continuous compressive force (0-10.0 g/cm²) for 48 h. We found that MC3T3-E1 subjected to mechanical stress produced IL-33 in the conditioned medium. We examined the effect of IL-33 on receptor activator of NF-κB ligand (RANKL)-induced osteoclast differentiation in the murine monocyte/macrophage cell line RAW264.7. IL-33 suppressed RANKL-induced osteoclast formation in a dose-dependent manner. IL-33 also inhibited the expression of RANKL-induced nuclear factor of activated T-cell cytoplasmic 1 (NFATc1), thereby decreasing the expression of osteoclastogenesis-related marker genes, including *Cathepsin K*, *Osteoclast stimulatory transmembrane protein (Oc-stamp)* and *Tartrate-resistant acid phosphatase (Trap)*. Blockage of IL-33-ST2 binding using an anti-ST2 monoclonal antibody suppressed the IL-33-mediated inhibition of NFATc1. IL-33 inhibited NFATc1 autoamplification induced by RANKL, but had no effect on the activation of the c-jun, c-fos, and NF-κB signaling pathways. RANKL-induced B-lymphocyte-induced maturation protein-1 (Blimp-1) expression was also suppressed by IL-33, which was followed by the stimulation of anti-osteoclastic genes such as interferon regulatory factor-8 (IRF-8). These results suggest that IL-33-ST2 interactions down-regulate both RANKL-induced NFATc1 activation and osteoclast differentiation via the regulation of Blimp-1 and IRF-8 expression.

P-8 Involvement of mitogen-activated protein kinases as an indicator of inflammation in interleukin-17-treated synovial cells

Takuma Sakurai^{1,2}, Daigo Yoshiga², Wataru Ariyoshi¹, Toshinori Okinaga¹, Hiroyasu Kiyomioya^{1,2}, Junya Furuta^{1,2}, Izumi Yoshioka³, Kazuhiro Tominaga² and Tatsuji Nishihara¹

¹Division of Infections and Molecular Biology, Department of Health Promotion,

²Division of Oral and Maxillofacial Surgery, Department of Science of Physical Functions, ³Division of Oral Medicine, Department of Science of Physical Functions, Kyushu Dental University

Aggrecan is a major component of the articular cartilage extracellular matrix (ECM) and its degradation is an important manifestation of osteoarthritis (OA). Matrix metallo-proteinases (MMPs) are zinc-dependent endopeptidase found in most living organisms and act mainly by degrading ECM components. Proinflammatory cytokine Interleukin-17 (IL-17) is considered to be an important agent concerning the initiation and promotion local inflammation and joint destruction. However, less attention has been paid to the effects of IL-17 on ECM degradation. The aim of this study was to elucidate the mechanisms underlying IL-17A-induced MMP-3 expression in the human synovial cell line HS-SY-II. The protein expression of IL-17 receptor in HS-SY-II was detected by western blotting analysis and immunofluorescence microscopy. HS-SY-II cells were cultured with 10 ng/ml of IL-17 and the expressions of MMP-3 mRNA and protein were monitored by real time RT-PCR and western blotting analysis, respectively. IL-17 enhanced both mRNA and protein expression of MMP-3. Western blotting analysis revealed that IL-17 induced phosphorylation of extracellular signal-regulated kinase 1/2 (ERK1/2), p38 mitogen-activated protein kinases (p38 MAPK) and c-Jun NH₂-terminal kinase (JNK). IL-17A stimulation resulted in the phosphorylation of c-Fos and c-Jun, the major components of the AP-1 transcription factor complex. Pre-treatment of the cells with inhibitors of ERK1/2, p38 MAPK, and JNK attenuated the IL-17A-induced AP-1 activation and the expression of MMP-3 mRNA. Our results indicate an essential role for MAPKs in the induction of MMP-3 in synovial cells, through AP-1 activation. IL-17A measurement may aid in the diagnosis of OA, and the targeting of this proinflammatory cytokine may contribute to the treatment of OA and other inflammatory diseases.

P-9 Osteocalcin modifies insulin-induced glucose-uptake in cultured myotube

Shintaro Tsuka^{1,2}, Fumiko Aonuma^{1,2}, Sen Higashi¹, Tomoko Ohsumi¹,
Ryuji Hosokawa², Masato Hirata³, Hiroshi Takeuchi¹

¹Div. Appl. Pharmacol., Kyushu Dental University

²Dept. Oral Reconstruction and Rehabilitation, Kyushu Dental University

³Lab. Mol. Cell. Biochem., Dept. Dentistry, Kyushu University

A close relationship between bone and systemic glucose metabolism has been studied extensively and uncarboxylated form (ucOC), but not the γ -carboxylated form (GlaOC), of the bone-derived protein osteocalcin was recently shown to play an essential role in energy metabolism. However, the understanding the actions of ucOC over a whole energy metabolism requires the examinations using a variety of organs as well as pancreatic β -cells. In this study, we examined the effect of OC on skeletal muscle to clarify how OC regulates energy metabolism. Mouse and myoblast cell lines, C2C12 cells, were grown to confluence in Dulbecco's modified Eagle medium (DMEM) supplemented with 10% fetal bovine serum, then induced differentiation to myotubes by culturing in DMEM containing 2% horse serum for 48hr, followed by replacement of the medium with DMEM containing 1% bovine serum albumin every 48hr. At 120hr post induction, the cells were subjected to the experiments. Insulin stimulated glucose uptake of the cells was measured by a modified method using 2-deoxyglucose. Phosphorylation of the signaling molecule was analyzed by Western blotting. ucOC, but not GlaOC, promoted insulin-induced glucose uptake of myotubes. However, insulin stimulated phosphorylation of Akt, a major regulator of glucose uptake, was not affected by ucOC treatment of the cells. On the other hand, ucOC induced phosphorylation of Erk with the maximum effect at the concentration between 5 and 10ng/ml. Inhibition of Erk phosphorylation by a MEK inhibitor (U0126), suppressed the effect of ucOC on glucose uptake. These results suggested that ucOC up-regulates insulin-induced glucose uptake in myotubes probably by activating Erk pathway.

P-10 Relations of posture change to occlusal contact area and chewing ability.

Ayako Sugiyama, Kazumasa Morikawa, Yuko Fujita, Maika Hotta, and Kenshi Maki

Division of Developmental Stomatognathic Function Science, Department of Health Promotion, Kyushu Dental University

We investigated the influence of head posture to maximal contact area and chewing ability in this study. The subjects were 24 healthy adults of mean age 25.8 years old. Maximal contact area was examined by means of electrically conductive film (T-Scan3), and chewing ability was by means of counting a grain of the silverberry jelly (Kamuzoukun) after having chewed for one minute, with three head postures: presence of plantar grounding, absence of plantar grounding and vorlage. The results were as follows; 1. Maximal contact area and chewing ability in presence of plantar grounding showed significantly higher than in vorlage. 2. Maximal contact area in presence of plantar grounding showed significantly higher than in absence of plantar grounding, while chewing ability showed no difference. 3. There were no difference of maximal contact area and chewing ability between in vorlage and in absence of plantar grounding. It was suggested that head posture was a significant factor for the difference of contact area and chewing ability. Thus it was important to establish and maintain right posture when we fed.

P-11 A case of lower removable partial denture with dental magnetic attachments

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A 67-year-old female patient was provided a non-metal clasp lower partial denture for the edentulous region of no.34, 35, 36, 46, and 47 from a certain dental clinic. But she couldn't wear it for the gingival inflammation that was caused by the clasps of the denture cut into her gingiva. She visited our clinic to be fabricated another esthetic removal partial denture on April 17, 2014.

As no.45 and no.37 of direct abutment teeth were non-vital, no.37 was designed as magno-telescopic crown and no.45 was designed as a root cap of short coping type. As no.33 of direct abutment tooth was vital, this tooth was designed as a resin-facing crown with an extracoronal dental magnetic attachment. Dental magnetic attachment (GIGAUS C600®; GC Corporation, Tokyo, Japan) were used as retainer in all three abutments.

After fixed an inner crown of no.37 and a root cap of no.45 with an adhesive resin cement, a removable partial denture was fabricated by conventional method.

Because the finished denture was good esthetically, and putting on and taking off and the cleaning were easy, went to the satisfaction to a patient. From the post evaluation, it was able to confirm improvement of the oral QOL concerned.

P-12 Prevalence and imaging characteristics of detectable tonsilloliths
on CT

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Recent studies suggest that tonsilloliths should be clinically related to halitosis and tonsillar abscess. Based on our empirical knowledge, tonsilloliths are reported to be relative commonly encountered in daily clinical practice. It has been reported that the detection rate of tonsilloliths was under 15% based on previous reports, although experience suggests otherwise. The purpose of the study was to evaluate the prevalence and the characteristics of tonsilloliths using computed tomography (CT). 482 CT images were retrospectively assessed with respect to the presence and characteristics of tonsilloliths. The detection rate of tonsilloliths was 46.1% using CT scans, unlikely the previous reports. The characteristics of tonsillolith were dot-like figure with about 300~500 Hounsfields unit within the palatine tonsil under the soft palate. The most common length of tonsilloliths was about 3 or 4 mm. As the subjects aged, the detection rate increased gradually. A significant difference in the tonsillolith detection rate was found between the over and under 40-year-old groups ($p < 0.0001$). The present results suggest that tonsilloliths are relatively more common than previously suggested.

P-13 Evaluation of Gelatin and Bioglass Sponge Composites Capable of Fibroblast Growth Factor 2 Release for Dentin and Pulp Regeneration

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Biodegradable bioglass-contained gelatin sponges incorporating FGF-2 were prepared to evaluate the properties as the scaffold for the regeneration of highly-calcified dentin-pulp complex. The gelatin sponges containing various amounts of bioglass were fabricated by dehydrothermal crosslinking of gelatin for varied time periods, followed by impregnating fibroblast growth factor (FGF)-2 into them. The pore size of gelatin sponges containing bioglass was adjusted at 100–250 μm since it is recognized that the pore size suitable for osteogenic cells infiltration and ingrowth is larger than 100 μm . The compression modules of sponges increased with the amount of bioglass contained. The gelatin sponges containing bioglass were in vitro degraded faster than those without bioglass, when dehydrothermally treated at 140 °C for 24, 48, and 72 hr. In addition, the in vitro release test revealed that FGF-2 was released at a similar time profile to the sponges degradation. The time profile of sponges degradation and FGF-2 release were changed by their cross-linking conditions. It is concluded that the gelatin sponges containing bioglass are promising as the scaffold to release growth factor. Thus, the degradation of bioglass-contained sponges incorporating FGF-2 and their FGF-2 release could be changed by the crosslinking conditions in preparation.

P-14 The functional analysis of *Mash1* in mouse taste bud cell differentiation using Cre-loxP system.

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The gustatory cells in taste buds have been identified as paraneuron, they possess characteristics of both neuronal and epithelial cells. Like neurons, they form synapses, store and release transmitters, and are capable of generating an action potential. Like epithelial cells, taste cells have a limited life span and are regularly replaced throughout life. However, little is known about the molecular mechanisms that regulate taste cell genesis and differentiation. In the present study, to begin to understand the mechanisms that regulate taste bud cell differentiation, we have investigated the role of *Mash1* in regulating taste bud cell differentiation in *Mash1* conditional knockout mice (CKO) using Cre-loxP system. We found that amino acid decarboxylase-immunoreactive (AADC-IR) cells and carbonic anhydrase 4-immunoreactive (CA4-IR) cells were significantly reduced in the circumvallate papilla epithelia of *Mash1* CKO mice. In *Mash1* CKO/GAD67-GFP mice, GFP-positive (GAD67 expression type III cell) cells were also reduced in the taste papilla epithelia. However gustducin, a marker of type II taste bud cells, was expressed in taste buds in the soft palates of *Mash1* CKO mice. These results suggest that *Mash1* could play an important role of differentiation of the type III cells in the taste bud.

P-15 Study of interaction between MH1 domain of Smad4 and TA2 domain of NF- κ B, p65 subunit

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Bone morphogenic proteins (BMPs) are essential for bone formation *in vivo* and osteoblast differentiation *in vitro* via a Smad signaling pathway. The transcription factor NF- κ B plays a key role in immune and inflammatory responses, proliferation and tumorigenesis. Recent findings revealed the importance of NF- κ B in osteoblast differentiation and bone formation. We also showed that NF- κ B inhibits BMP-induced osteoblast differentiation via interaction between MH1 domain (MH1) of Smad4 and TA2 domain (TA2) of NF- κ B, p65 subunit. To identify the binding site between Smad4-MH1 and p65-TA2, we investigated interaction of these molecules using purified recombinant proteins of Smad4-MH1 and p65-TA2.

GST-pull down experiment using recombinant GST-TA2 and his-tagged (His-) MH1 (WT) showed the direct binding of these proteins. In addition, we examined the effect of deletion mutant of His-MH1(19-105, 19-68) on this binding. GST-TA2 bound to His-MH1(19-105) as much as WT, but His-MH1(19-68) didn't. Inhibition of BMP-induced Id-1 luciferase activity by p65 was restored by transfection of WT or MH1(19-105), but not MH1(19-68). These results suggest that Smad4-MH1 and p65-TA2 is directly bound within narrow amino sequences containing from Pro-69 to His-105, and the interaction site might be critical for inhibition of Smad signaling by p65. Thus, the interaction site of Smad4 and p65 would be a novel therapeutic target for diseases accompanied by bone loss, which needs BMP-inducing high bone mass.

P-16 Platelet rich plasma induces differentiation of odontoblast-like cells

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Objective: Platelet rich plasma (PRP) contains various growth factors and is expected to be utilized to regenerate a variety of tissues including dental/pulp complex. However, the effects of PRP on odontoblast differentiation remain unclear. The aim of this study was to investigate the effects of PRP on odontoblast differentiation using pulp progenitor cell lines from dental papilla cells of rat incisor.

Materials and Methods: Monolayer cultures of odontoblastic lineage KN-3 cells were incubated with PRP for various time periods. The expression of dentin sialophosphoprotein (DSPP) and dentin matrix protein-1 (DMP-1) was determined using real-time reverse transcription polymerase chain reaction (RT-PCR) and Western blotting analysis. To further clarify the role of PRP in odontogenesis, KN-3 cells were stimulated with PRP in the presence of the ascorbic acid and β -glycerophosphate. The cells were stained for alkaline phosphatase (ALP) and ALP activity in the cell lysates was also quantified. Furthermore, the formation of mineralized nodules was assessed using alizarin red staining.

Results: PRP increased the mRNA and protein expressions of odontoblastic markers, such as DSPP and DMP-1. Furthermore PRP stimulated the ALP activity and the formation of mineralized nodules induced by ascorbic acid and β -glycerophosphate in a time dependent manner.

Conclusion: PRP enhanced odontoblastic differentiation in KN-3 cells. These results indicate that PRP could be a potential candidate for the regeneration of dentin/pulp complex.

P-17 Tyrosinase-dependent skin dopamine mediates heat pain sensitivity

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Pain sensitivity differences are present among different strains of mice. These strains also have varying tyrosinase activity, which controls melanin production that causes pigmentation in the skin. Tyrosinase also produces L-dopa that is converted into dopamine. Dopamine has been detected in the skin of black C57BL/6 (B6) mice, but not albino mice. In this study we hypothesized that peripheral dopamine mediates baseline pain sensitivity in mice. We investigated the effect of local dopamine injection on nociceptive behavioral responses and nociceptive receptor expression levels on primary sensory neurons in black B6 and albino tyrosinase-mutated B6 (B6(Cg)-Tyr^{c-2}J). In the hind paw and whisker pad, black B6 showed significantly lower mechanical and higher thermal sensitivities than albino B6. Subcutaneous injection of dopamine produced sustained hyposensitivity to mechanical stimulation and hypersensitivity to thermal stimulation. The same sustained changes in mechanical and thermal sensitivity was seen after injection of L-dopa or D1 agonist SKF38393, but not injection of catecholamines or other dopamine receptor subtype agonists. Conversely, the tyrosinase inhibitor kojic acid and the D1 antagonist SCH23390 reversed the strain differences in mechanical and thermal sensitivities. Injection of dopamine and SKF38393 into the whisker pad also downregulated mRNA expression of the mechano-sensitive receptor Piezo2, and upregulated mRNA expression of the heat-sensitive receptor Trpv1, in the associated trigeminal ganglia. These results suggest tyrosinase-dependent dopamine production mediates expression levels of nociceptive receptors in sensory neurons via D1 activation.

P-18 The relationship between morphological characteristics of face and occlusal force in dental students

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Occlusal force is one of the risk factors for periodontal disease, as the excessive force accelerates periodontal destruction. Very few researches investigate the relationship between morphological characteristics of face and occlusal force, although it is generally speaking that a person with a squarish face has greater occlusal force compared with an oval face. The aim of present study was to determine the relationship between morphological facial characteristics and occlusal force. Fifty dental students in Kyushu Dental University were participated (60 males and 40 females, 23.1 ± 2.99 years of age) in the present study. Photographs of their face were taken with a digital camera and occlusal forces were measured with Occuluser FDP707 (GC Corp. JAPAN). Facial images were then incorporated in a computer, and evaluated with Image J software (NIH, USA). The length and width of face, the width of the lower jaw, the area of face, the gonial angle, and the angle of convexity were measured on the incorporated image. The occlusal force showed positive correlations with the width of the lower jaw and the gonial angle, the width of the lower jaw, the zygomatic diameter and the area of face, however, a negative correlation with the gonial angle. Furthermore, a multiple regression analysis was performed after adding (the length of face/the width of the lower jaw) and (the width of the lower jaw/the width of the lower jaw) as the explanation variables. It is suggested that sex and (the width of the lower jaw/the width of the lower jaw) had a significant influence on the occlusal force ($R^2 = 0.21$, $p < 0.001$). These results suggest that occlusal force can be predicted by sex and morphological characteristics of face.

P-19 TLE3 regulates the differentiation of Mesenchymal stem cells

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Osteoblasts, adipocytes and myoblasts are all derived from a common mesenchymal stem cells precursor. The Groucho/TLE family member are transcriptional cofactor proteins that do not bind DNA directly, but are recruited by transcription factors, and play critical roles during development and cell differentiation events. We recently reported that TLE3, a Groucho/TLE family member, induces adipogenesis and suppresses osteoblastogenesis of bone-marrow mesenchymal stem cells. TLE3 performs these functions by acting on PPAR γ and Runx2, which are master regulators of adipogenesis and osteoblastogenesis, respectively. Thus it is natural that our interest shifts to the role of TLE3 in myogenesis. In this study, we demonstrate that TLE3 represses transcriptional activity of MyoD, one of myogenic regulatory factors, which is a master regulator of myogenesis, thereby suppressing myoblast differentiation in vitro.

We first examined whether TLE3 interacts with MyoD, master regulator of myogenesis. Immunoprecipitation assay revealed that TLE3 interacted with MyoD in 10T1/2 cells. Next we determined the effect of TLE3 on transcriptional activity of MyoD assessed by myogenin luciferase (MyoG-luc) activity. Over-expression of TLE3 repressed MyoG-luc activity induced by transfection of MyoD in 10T1/2 fibroblasts. However, the deletion mutant of WD domain also suppressed this luc activity, suggesting that WD domain is not important for suppressive effect of TLE3 on MyoD transcription. Over-expression TLE3 suppressed mRNA levels of myogenin and myosin heavy chain 14 induced by MyoD while these mRNA levels were elevated in the TLE3 knocked down cells by using shRNA against TLE3. TLE3 also reduced the protein levels of myogenin and myosin heavy chain.

We identify TLE3 as a transcriptional regulator of MyoD in vitro. These data also suggests that TLE3 may transcriptionally control the global cell fate of mesenchymal stem cells across all three potential lineages of osteoblast, adipocyte and myoblast by simultaneously regulating MyoD, PPAR γ and Runx2.

P-20 Dental epidemiology and biostatistics course at Meiji Gakuen High School

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The Ministry of Education, Culture, Sports, Science and Technology, Japan (MEXT) initiated its Super Global High School (SGH) program in 2014. This program aims to help senior high school students acquire communication abilities and international acculturation, in addition to social awareness and a more in-depth education. The program ultimately aims to enable students to become global leaders in a rapidly globalizing future.

As a part of this effort, Kyushu Dental University has provided a dental epidemiology and biostatistics course for senior high school students at Meiji Gakuen High School. In fiscal year 2014, 12 first grade students and 6 second grade students selected this elective course. Epidemiology is the field of study that aims to prevent people from contracting diseases. It seeks to improve health by understanding a health-related phenomenon's frequency or distribution in a group of humans, and by making the cause of the health phenomenon clear.

The classes consisted of lectures and practice focused on designing research, data collection, data analysis, and data presentation. The students developed research designs based on their own research questions and questionnaires, and analyzed the data. The data were collected from first grade students at Meiji Gakuen High School using both dental examinations and questionnaires. It will enhance not only the problem finding and problem solving abilities of students, but also their logical and critical thinking ability.

**P-21 Analgesic effect of Hangeshashinto, a traditional Japanese medicine,
on oral ulcer-induced pain in rats**

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It is well known that oral pain in head and neck cancer patients treated with chemo-radiotherapy is persistent and intractable, resulting under-nutrition and low quality of life. Recently, it has clinically reported that hangeshashinto (HST), a traditional Japanese medicine, is effective on the oral pain. However, mechanism of the analgesic effect has not been well known. In this study, we investigated the oral ulcer-induced pain and efficacy of HST to the pain in rats using new technique to apply direct stimulations in the oral mucosa. Treatment with acetic acid in the labial fornix region of the inferior incisors developed obvious oral ulcer. Application of HST to oral ulcer region did not change pain-related grooming behavior, suggesting that HST does not have pungent effects. Head withdrawal threshold to mechanical stimulation to the oral mucosa was decreased by oral ulcer development compared to naive. The decrement of mechanical threshold was recovered to naive level from 30 min to 60 min after topical application of HST to the oral ulcer region. These results support that HST is a useful drug to inhibit oral ulcer-induced pain in patients with chemo-radiotherapy.

P-22 A case report of the eruption disturbance of the mandibular second premolar by the ectopic position of the tooth germ
—radiographic observation—

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The eruption disturbances which described were various types and affected different teeth. It is extremely important to diagnose and manage any eruption disturbances that may occur during the transition from the primary to permanent dentition.

We experienced a case of a eruption disturbances of the mandibular right second premolar caused by abnormal inclination of the tooth germs in a 9-year 2-month old boy. At 9 years 9 months of age, we extracted the mandibular right second primary molar. At 11 years 1 months of age, we applied marsupialization and traction treatment. The mandibular right second premolar erupted at 11 years 9 months of age, and the root formation was good.

If a predecessor is extracted at an early stage of tooth germ formation, long-term space maintenance is required. It was concluded that in cases with a markedly severe distal inclination, eruption disturbance of the mandibular second premolar should be treated after the root formation of its tooth germ is initiated.

P-23 Study of the Root Canal Observation by Multi-Fiber Endoscopy with the Intraoral Camera, SOPRO Care

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Diagnostic accuracy in the recent dental treatment has been improved by dental microscopy and cone beam CT. However, detection of the inside of the root canal remains difficult. In the present study, we have developed novel real-time diagnostic devices with high resolution to detect fine inside structures of the root canal, as well as periapical tissue and subgingival calculus. Single-fiber endoscopy consists of a single image fiber, and multi-fiber endoscopy consists of several optical fibers and an image fiber. These image fiber endoscopies have 0.6 mm of probe tip diameter, and can detect a fine structure of the root fracture as well as the root apex. Furthermore, the multi-fiber endoscopy probe was connected with a commercialized intra oral camera, SOPRO care (Acteon, France), with lens and several optical parts, and examined whether images of plane samples and the root canal of the extracted tooth were captured by SOPRO Imaging software. As a result, we found that the resolution of the device was 20 μm , and that an image of a fracture line at the surface of root canal was clearly captured. These results suggest that a multi-fiber endoscopy probe with SOPRO care may be a useful device for the observation of the root canal.

P-24 Comparison of cytological findings of inflammatory lesion with squamous cell carcinoma of the gingiva in oral exfoliative cytology

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Exfoliative cytology of the oral mucosa is a quick and simple procedure; however, the process of reaching a diagnosis is frequently complicated. Particularly, the gingival lesions generally consist of highly reactive atypical cells exhibiting inflammation. The present study compared the cytological findings of inflammatory lesions with squamous cell carcinomas (SCCs) of the gingiva using the scoring system of atypical squamous epithelial cells of the lung. The present study assessed 21 cases of gingival inflammatory lesions (including epulis) and 20 cases of SCC of the gingiva. Cellular evaluation of the squamous epithelium was performed, which further facilitated in dividing these into superficial cells and basal to intermediate cells. The scores for atypical cytological grade included cytoplasmic staining (0, 1, 2), nuclear/ cytoplasmic (N/C) ratio (0, 1, 2), irregular nuclear membrane (0, 1), irregular chromatin distribution (0, 0.5, 1, 1.5, 2), and pleomorphic cells (0, 1). The average total score for superficial cells was 2.2 for gingival lesion and 4.2 for SCC, and that for basal to intermediate cells was 2.2 and 4.3, respectively. The average score of each cytological atypical grade was as follows: cytoplasmic staining (gingival lesion superficial cells, 0.9 • basal to intermediate cells, 0.5/ SCC superficial cells, 1.5 • basal to intermediate cells, 0.8), nuclear/ cytoplasmic (N/C) ratio (0.3 • 1.0/1.0 • 1.6), irregular nuclear membrane (0.6 • 0.4/0.8 • 0.8), irregular chromatin distribution (0.4 • 0.3/0.9 • 1.2), and pleomorphic cells were not found. The findings of the present study suggest that the scoring system of atypical squamous epithelial cells of the lung is useful in identifying differences between SCC and inflammatory lesions of the gingiva. In addition, N/C ratio and irregular chromatin distribution were determined to be more important cytological findings.

P-25 The educational effect of “Oral Implantology”
-Evaluation for three school years-

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The course of “Oral implantology” for 4th year undergraduates has begun in 2011 at Kyushu Dental University. The course was consisted with anatomy, biochemistry, oral radiology, periodontology, oral surgery and prosthodontics related to oral implants. In the present study, we evaluated the educational effects of a newly created class on implant treatment, “Oral Implantology,” for the class of 2014, 2015 and 2016. For that purpose we compared the test scores of the students who took “Oral Implantology” (4th year group: learned group: LG) and those who upper-class students (6th year group: class of 2012, 2013 and 2014: UC). The average test score in LG was significantly higher than that in UC when we first started “Oral Implantology” in 2011. However, the test scores in UC showed significantly higher than LG for the next two school years ($p < 0.05$). Follow-up research was conducted for the class of 2014 revealed that only slight correlation was found between LG and UC (correlation coefficient = 0.309). The score increase in UC might suggest certain positive effect by “Oral Implantology”. However, we only evaluated knowledge related to implant dentistry in the present study. The evaluation of the practical training will be necessary for fully understanding the educational effect of the course.

P-26 Kyushu Dental University Global Scholarly Exchange (KDU-GSE)
2014 Program (Trial) Report

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To train resources of dental specialists who can take active roles in the world, Kyushu Dental University (KDU) has established agreements about the exchange of human resources and research with educational institutions of dentistry in other countries, particularly, Asia. This is the Kyushu Dental University Global Scholarly Exchange (KDU-GSE) program. To cooperate with Kaohsiung Medical University (KMU), one of the partner universities overseas, in Taiwan, KDU sent dental hygiene students to KMU from 16th to 21st, September, 2014, as part of the KDU-GSE program.

The purpose to send the dental hygiene students overseas is to give the students the opportunity to have their future images as the dental hygienists who correspond to global changes. Students were selected as the members by the academic records, attendance, scholastic situation and the interest for the international exchange. These students visited KMU, the general dental clinics and the institution for handicapped people.

Student's comments after returning to Japan were "I have had an opportunity to think about the difference between Taiwan and Japan in dental hygiene.", and "I want to be a dental hygienist who can correspond to global exchange" These comments suggest that students are able to understand the necessity of the worldwide viewpoint and also to depict their future images. This outcome indicates that the KDU-GSE is the useful program.

We are now planning to perform the pre- and the ex-post survey in the KDU-GSE program of 2015 to objectively evaluate the outcome.

P-27 Online live distance lectures for the clinical research design

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Kyushu Dental University signed a credit transfer agreement with the Kyushu Institute of Technology, The University of Kitakyushu, and the University of Occupational and Environmental Health on June 7, 2013. It is based on a cooperative project for developing human resources that support the continuity of manufacturing skills and expertise through regional partnerships chosen as one of the projects in the "2012 Program for Promoting Inter-University Collaborative Education" of the Ministry of Education, Culture, Sports, Science and Technology, Japan.

Through this agreement, the four universities has been working together to promote the development of professionals with an interdisciplinary perspective to respond to the needs of the region, by taking full advantage of each university's strengths and expertise when supplementing, expanding, and enhancing the contents of study. The four universities started to accept students from each partner university from April 1, 2014.

We are currently providing the "Clinical Research Design and Practice I & II" to the the Kyushu Institute of Technology and The University of Kitakyushu through online live lecture via online live distance lecture system, Skype[®]. It is useful for the students to take lectures from their own universities. In the class of "Clinical Research Design and Practice I", we are teaching how to "formulate their clinical questions", "search literature", and "do critical appraisal in the research articles according to the study design". On the other hand, in the class of "Clinical Research Design and Practice II", we are teaching how to "make a research clinical research protocol based on each student's clinical question". In this this presentation, we will introduce the online live distance lecture system and give an overview of this course.

P-28 Approaches for medical, dental, and engineering collaborative education from engineering site

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Based on the Cooperative project for development of human resources related to “Monodukuri” as a manufacturing technology by inheritance support based on a regional partnership, we have been developing the education curriculum for students of medical and dental areas. We construct physical chemistry for medical and dental students because of the increasing impotence dissection based on physical chemistry in medical and dental areas. Understanding of life is now required to thermodynamics and dynamics aspect and to quantitative discussion. Disease and disorder should be discussed in abnormality of life mechanism. In the dental area, students are better to understand mechanics, especially to understand bone or tooth strength.

Furthermore, we have been focusing international education through invited foreign researchers working in this cutting-edge area. Last year, we organized the 7th International Symposium on Nanomedicine (ISNM2013), which is to provide a platform on which to discuss the future prospects for these science-technologies and construct an international human network in the fields of Nano-Bio-Medicine and (2) to foster excellent young generation researchers in these fields based on this network, which is in agreement with the purpose of this program. In this symposium, we arranged the special session “Brain Nanomedicine,” which is not also important for medical, but also dental areas. In this year, we organized the 41st International Symposium on Nucleic Acids Chemistry (ISNAC2014), which covers diverse aspects of genetic technology, molecular biology, nanobiotechnology, and the therapeutic and diagnostic applications of this field as well as nucleic acids chemistry. In this symposium, we arranged the special session of DNA sensor and the related technologies for the researchers or students contributing in this program.

We believe that these symposiums provide fruits for international and interdisciplinary studies for teachers and students concerned with this program based on medical, dental, and engineering collaborative education from engineering site.

P-29 Beyond the Glass-Wall between Engineering and Medical or Dental Practice

Kazuo Sakurai

The University of Kitakyushu

Modern therapy and medical or dental practices profoundly rely on high-tech engineering based on physics, chemistry, and material science. It is obvious and clear for everyone that practicing doctors or dentists need to know or at least have some idea for the fundamental concepts used in their daily using instruments or technology. Unfortunately, this is not the case, because of clashed programs in medical and dental schools. On the other hand, engineering majors who might work to design instruments use at hospital need to know how their instruments might be used in practice. Again, unfortunately, this is not either.

The cooperative educational projected at the Kita-kyushu area aims to exchange classes for graduate students between medical and dental schools and engineering schools. The University of Kitakyushu provided two classes (biopolymers and cellular culturing) to both Kyushu Dental University and the University of Occupational and Environmental Health. Many graduate students in our university took classes at both.

Throughout this program, several research collaborations have been started, including new cancer therapy and controlling the differentiation of osteoblast-like cells.

P-30 Development of the educational program about aging and work for human resource cultivation in different academic fields.

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The region cooperative project for development of human resources related to technical tradition about manufacturing technologies is under way in Kitakyushu city. The main purpose of this project is to help the university students in different academic fields in acquiring knowledge about aging and work. Based on this project, we are trying to create educational program about aging and work from the viewpoint of occupational health.

First, we have been interested in making the educational materials. So, we started to prepare the materials for understanding the effect of aging on work. Physiological aging in human and structure of work ability are the first issues for learning fundamental knowledge of aging and work. After that we have been collecting the information about policy of aging and work in western countries, such as EU and US. We have also been collecting the information about Japanese company policy and current state of aging and work. We are making the educational materials to understand the policy for aging and work.

Second, we have been making effort to give the students the opportunities to participate in discussion about the policy of aging and work. We organized the 19th Annual Meeting of Society for Occupational Safety, Health and Ergonomics, which intensely focused on the issue of how to support elderly workers. In this meeting, three symposiums and three special lectures related to aging and work were held for students to observe debate among researchers.

We believe that this program would be helpful for students to become knowledgeable about occupational health.

P-31 Kyushu Dental University Global Scholarly Exchange (KDU-GSE)
program (trial) 2014 student report
-Srinakharinwirot University, Thailand -

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This report describes the Kyushu Dental University Global Scholarly Exchange (KDU-GSE) program on Srinakharinwirot University, Faculty of Dentistry, Thailand, in September 2014. The KDU-GSE program is to broaden perspectives for students who can broadly understand the field of dentistry. Study in the program aims to help students incorporate the knowledge, skills and attitudes needed to be able to understand other countries or cultures. This short-term study abroad trial program 2014 enabled forth-year dental students. A cooperative agreement of the international exchange between the Kyushu Dental University and Srinakharinwirot University is that has been in effect since 2013. Through this exchange program, dental students have a chance to visit Srinakharinwirot University during the summer vacation. The program's seminars and other interactive activities are meant to encourage future dreams and deepen mutual understanding in students as the dental professions.

P-32 Influence of differences in the hardness and calcium content of diets on the growth of craniofacial bone in rats

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We examined the effects of a soft diet and a low-calcium diet on the craniofacial growth and bone architectures of the maxilla and mandible. Male rats ($n = 20$, 3 weeks old) were divided into four groups ($n = 5$ each). Ten rats were given a normal-calcium diet and the other rats were given a low-calcium diet. Each group was then divided into two subgroups, which were fed a hard or a soft diet. After 4 weeks, craniofacial growth and architecture in maxillary and mandibular bone were analysed using cephalometry, micro-computed tomography, and histopathologically. The low-calcium diet had the greatest effect on craniofacial bone growth, while a soft diet affected the growth of several bone sites that are attached to the masseter muscle. A low-calcium diet resulted in the deterioration of the connectivity of the trabeculae in the total tissue area of the furcation region in the maxillary and mandibular first molar, while a soft diet resulted in the diffuse disappearance of trabeculae in the central part of the furcation regions. In the midpalatal suture, a low-calcium diet resulted in inhibition of cartilaginous ossification, although the midpalatal suture had a normal cartilaginous structure. A soft diet resulted in narrower cartilage cell layers in the midpalatal suture. Thus, we demonstrated that a low-calcium diet and a soft diet resulted in an increase in bone loss, and a deterioration of bone structures in both the maxilla and in the mandible; however, the mechanisms underlying these effects differed between diets.

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