

Asia-Pacific Conference in Fukuoka 2018

**International Symposium
on Oral Education and Research
in Kitakyushu**



Date: May 11th 2018 (Fri)

Venue: Kyushu Dental University, Kitakyushu, Japan

Organized by Kyushu Dental University

Asia-Pacific Conference in Fukuoka 2018

International Symposium on Oral Education and Research in Kitakyushu

Kyushu Dental University, Kitakyushu, Japan
May 11th, 2018

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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 2018. It is our great honor and pleasure to inform the International Symposium on Oral Education and Research in Kitakyushu. I am inviting you to participate in this exciting conference with valuable information on Oral Education and Research of Asia-Pacific countries.

We are delighted to announce the special lectures in this conference. Present state of dental education in Asian countries as well as Myanmar will be introduced by the invited distinguished speaker, Professor Dr. Paing Soe, M.D., Ph.D., President of Myanmar Dental Council, The Republic of the Union of Myanmar. We are also very happy to hear on dental education system in Europe from Dr. Heikki Murtomaa, D.D.S., Ph.D., M.P.H., the Past President of the Association for Dental Education in Europe.

We are planning to have a session for poster presentation and invigorating discussion about the achievement of education and scientific research in the distinguished collaboration between dentistry, medicine and biotechnology in Kitakyushu and an international exchange program among Asian countries. This time, we introduce Super Global High School Program in Japan in this conference. Also, we are planning special events such as Japan, Myanmar Culture Exchange Festival and Myanmar Night Festival. We look forward to your participation in the events. It is our wish to flash an innovative idea into your mind to build true worldwide partnership.

We thank you in advance for your interest and active participation, and look forward to welcoming you to the Asia-Pacific Conference in Fukuoka 2018.

Program

-First Part-

9:50 Registration

10:00 Japan, Myanmar Culture Exchange Program

<Main hall>.2nd Floor

[Planning and Direction]

- 1) APC practice commission (Faculties of Kyushu Dental University)
- 2) Ms. Sein Mar (Postgraduate Student, Faculty of Agriculture, Kyushu University) and other Myanmar students
- 3) Students of Kyushu Dental University, Seinan Jo Gakuin University, Nishinippon Institute of Technology, and other universities and career colleges in Kitakyushu area

-Second Part-

12:40 Registration

13:00 International symposium on oral education and research in Kitakyushu

[Planning and Direction]

- 1) APC practice commission (Faculties of Kyushu Dental University)
- 2) Students of Kyushu Dental University

[Welcome Messages]

Dr. Tatsuji Nishihara, President of Kyushu Dental University

[Special Speech]

Chair: Dr. Hiroshi Takeuchi and Dr. Ryo Hasegawa

Dr. Thet Khaing Win, Permanent Secretary, Ministry of Health and Sports, Myanmar

Mr. Thurain Thant Zin, Ambassador, Embassy of Myanmar, Tokyo

[Congratulatory Speeches by Guests of Honor]

Mr. Kozo Yamamoto, Member of the House of Representatives, ex-Minister of State

[Keynote Lecture 1]

Dr. Paing Soe, President of Myanmar Dental Council (keynote lecture), Myanmar

Chari: Dr. Keisuke Nakashima

[Keynote Lecture 2]

Dr. Heikki Murtomaa, Professor emeritus of University of Helsinki, Finland

Chari: Dr. Naoki Kakudate

[Keynote Lecture 3]

Dr. Tatsuji Nishihara, President of Kyushu Dental University

Chari: Dr. Heikki Murtomaa

15:55-16:50 Poster Sessions

15:55-16:40 Young Investigator Award Competition

16:50-17:00 Award Ceremony

17:00 Closing Remarks

Prof. Katsumi Hidaka (Vice-President of Kyushu Dental University)

-Third Part-

16:50 Resitration

17:00-19:00 Myanmar Night Festival

<Dining room, 1st Floor>

[Planning and Direction]

- 1) APC practice commission (Faculties of Kyushu Dental University)
- 2) Ms. Sein Mar and other Myanmar students
- 3) Students of Kyushu Dental University, Seinan Jo Gakuin University, Nishinippon Institute of Technology, and other universities and career colleges in Kitakyushu area

Special Speech



Address and Speech on Interaction between Myanmar and Japan

Professor Thet Khaing Win

M.B., B.S., M. Med Sc. (Int Med),
MRCP(UK), FRCP (Edin), Dip (Med Edu)
Permanent Secretary for Health and Sports, MYANMAR

Brief CV

Professor Thet Khaing Win, Permanent Secretary for Health and Sports, is the most senior executive and key coordinator of all Government staff from various departments under the Ministry of Health and Sports including medical services, public health, Human Resource for Health, Food and drug administration, medical research, Traditional medicine, and, Sports and Physical Education. He is also the leading member of National Health Plan formulation and implementation committees as policy making and implementing roles of Health and sports.

He graduated from University of Medicine 1, Yangon in 1986 and attained his master degree in Internal Medicine in 1993. He went to UK for postgraduate training for Internal Medicine, became a Member of Royal Colleges of Physicians (MRCP) in 1996 and then he was becoming a fellow of Royal College of Physicians of Edinburgh in 2004.

He is a former Rector of University of Medicine.1, Yangon, during the tenure of 2013-2015. Prior to this post, he was professor of medicine at University of Medicine 1, Yangon since 2008 and served as undergraduate and postgraduate trainer of Internal Medicine. He involved in the review and updating processes of graduate and post graduate curriculum and also in research supervision and ethical review committee of faculty of Medicine, University of Medicine 1, Yangon. He pursued as Senior Consultant Physician since 1998 at General Medical Unit of Yangon General Hospital, the biggest hospital and highest referral point of Myanmar Health Care System, and also as an enthusiastic and active member of Myanmar Academy of Medical Science.

Special Speech



Adress and Speech on Interaction between Myanmar and Japan

Mr. Thurain Thant Zin

Ambassador, Embassy of Myanmar, Tokyo

Brief CV

Graduated from Defense Services Academy in 1980. Got a master's degree in national defense at the academy in 2006. Served as a chief of protocol, Ministry of Foreign Affairs from 2012 to 2015. Assumed an ambassador to Japan in 2015.

Congratulatory Speeches by Guests of Honor



Mr.Kozo Yamamoto,

Member of the House of Representatives,
ex-Minister of State

Birth: 8 Aug 1948, Kitakyushu City
Member, House of Representatives
Elected 8 Times / Fukuoka 10th District
Party Affiliation: Liberal Democratic Party(LDP)

Present Posts

Acting Chairman, Administrative Reform Promotion Headquarters
Deputy Chairman, Research Commission on the Tax System, LDP
Chairman of the Subcommittee on Cultural Assets and Shrines & Temples Tourism, LDP

Education

Graduated from University of Tokyo, Faculty of Economics
Graduate School of Management, Cornell University
Visiting Scholar, Harvard University's Center for International Affairs (U.S.-Japan Program)

Career

1971 Entered Ministry of Finance
1987 Personal Secretary to Minister of Finance
1991 Lecturer, Kyusyu International University
1993 Elected to the House of Representatives

Past Posts

House

2008 Chairman, Standing Committee on Judicial Affairs
2013 Chairman, Special Committee on Consumer Affairs
2016 Chairman of the Special Committee for Regional Revitalization

Administration

2006 Senior Vice-Minister of Economy, Trade and Industry
2016 Minister of State, in charge of Regional Revitalization, Deregulation, etc.

Party

2013 Chairman, Research Commission on Tourism Nation, LDP

In 2007, he became Secretary General of the Japan Myanmar Parliamentary Friendship Association. Since then, he has visited Myanmar almost every year and actively contributed to enhance the relationship between Japan and Myanmar.

He has initiated to start the legislative regular meeting between Japan and Myanmar. He has also proposed the Japan Myanmar Vocational Technical Institute Aung San Project and finally succeeded to realize it under Japanese Official Development Aid .

He has graduated from university of Tokyo and earned MBA at Cornell University and did research work as Visiting Scholar at Harvard University . He has been elected to the House of Representatives eight times from 1993. In 2006, he was appointed as Deputy Minister of Economy, Trade and Industry . From 2016 to 2017, He served as Minister of State for Regional Revitalization.

Keynote Lecture 1



Dentistry in Myanmar and Our Perspective on ASEAN MRA

Dr. Paing Soe

President of Myanmar Dental Council,
The Republic of the Union of the Myanmar

The vision of every professional dental regulatory authority PDRA is availability of safe, effective and up to date dental care for the population. Following decades of closed door policy the challenges faced by the dental community in Myanmar, and of the ways and means used by various sectors to overcome the pitfalls are presented. Now the change in our government with democratic rule and open door policy has played a vital role thus allowing local, regional and international partners to lend a helping hand. Myanmar being an Asean Member State AMS is a signatory of free mobility of Health service providers. The four modes of services in AMS is also included in this presentation and for MRA the minimum competency standards which a dental graduate must possess is also stated. The aim of this presentation is to seek cooperation, assistance and advice from the future partners of this region.

Brief CV

Graduated in year 1970 as a Stomatologist from Higher Institute of Medicine, Sofia, Bulgaria. Joined the Faculty of Dental College in Myanmar as a Demonstrator and got promoted to become Assistant Lecturer, Lecturer, Professor and finally Rector in 1997. Led the Yangon Dental University for seven years as Rector till retirement age of 60 in 2004.

From 1988 to 1990 Studied for three years in the United Kingdom and graduated for the Doctor of Philosophy Ph. D. from the Victoria University Manchester. From 1994 to 1996 studied in the Technical University TU, as a Oral Surgery trainee for two years in the Klinikum Rechts der Isar, Munich.

Founded the Dental Faculty in the Defense Services Medical Academy DSMA in 2004, and till now serving as Dean. Presently holding office as Vice President of the Myanmar Academy of Medical Science and President of the Myanmar Dental Council.

Keynote Lecture 2



Designated Comment and Speech from an International Perspective on Dental Education

Dr. Heikki Murtomaa

Professor emeritus, University of Helsinki, Finland

Brief CV

Dr. Murtomaa is Professor emeritus of Oral Public Health and the former dean of Institute of Dentistry, University of Helsinki, Finland. He received his DDS in 1972 and PhD in 1977 from the University of Helsinki and Master of Public Health from the Harvard School of Public Health in 1978. He received his specialist degree in Dental Public Health in 1980 and in Clinical Dentistry in 1983. He has supervised many PhD theses and is the author of several text books in dentistry. Dr. Murtomaa has served in different academic positions in Finland and has worked as a WHO consultant on several occasions. Dr. Murtomaa has served as Professor in Oral Public Health since 1986 and worked as Dean of the Institute of Dentistry in 1993-1998. Dr. Murtomaa has presented in several continuing education and postgraduate courses and lectured on various dental and public health related subjects, both nationally and internationally. He is the Past President of the Association for Dental Education in Europe and a Board Member of International Federation of Dental Educators and Associations. He is also a visiting professor in Tehran University of Medical and Health Sciences in Iran and at the Kyushu Dental University.

Keynote Lecture 3



Community-based Research on Periodontal Disease and Hepatitis in Myanmar

Tatsuji Nishihara, D.D.S., Ph.D.

Chairman and President
Kyushu Dental University

Developments in molecular biology in the last decade of the 20th century further advanced periodontal research. With new detection methods using specific antibodies, synthesized oligoDNA probes, polymerase chain reaction, and specific substrates, researchers can find periodontopathic bacteria and specific virulence factors with high sensitivity. It is possible to determine the number of certain periodontopathic bacteria as well as the properties of toxin and tissue degradation enzymes. Many periodontal researches believe that the methods based on bio-microsensing technology appear to be useful in a clinical examination for the diagnosis, treatment, and estimation of future risks on physical condition. In this presentation, I would like to discuss on the notable conclusion about “Periodontal medicine” and its new diagnostic methods for the prevention and treatment which are developed throughout this research project.

It was reported that periodontopathic bacteria in biofilm can act as reservoirs for medically important pathogens that cause systemic disorders. Unknown virulence factors of periodontopathic bacteria may induce not only periodontal diseases but also general disorders, such as systemic infectious diseases, cardiovascular diseases, respiratory diseases, diabetes mellitus, adverse pregnancy outcomes, osteoporosis, and hepatitis. Increased knowledge of the virulence factors of periodontopathic bacteria may provide insights into the mechanisms by which they cause systemic disorders. Among these systemic diseases, I will talk about the correlation between periodontitis and hepatitis.

Recently we have developed a new method to detect hepatitis B virus (HBV) antigen using saliva instead of blood as a specimen material. Based on our ongoing project, this new HBV-detection system has very high sensitivity and specificity, indicating an effective and accurate screening test for hepatitis B. In particular, this detection system would be easy and attractive alternative because blood sample could be replaced by saliva sample as a specimen material. It may be very useful to detect HBV-carrier patients in epidemiological setting as a screening test. Additionally, hepatitis B is an important occupational hazard for dental health care workers. Therefore, screening of HBV-carrier patients at dental offices by this kit can play a role in improvement the working environment of dental professionals.

In this presentation, I focus on possibility on the application of new periodontal diagnostics and HBV detection kit in the context of evidence-based dentistry.

Brief CV

Professor Tatsuji Nishihara

EDUCATION

1975-1981 School of Dentistry, Kyushu Dental College, Kitakyushu, Japan.
Received D.D.S.

1982-1986 Graduate School, School of Dentistry, Tokyo Medical and Dental University,
Tokyo, Japan. Received Ph.D.

EMPLOYMENT

1986-1990 Researcher, Department of Dental Research, National Institute of Health,
Tokyo

1990-1992 Senior Researcher, Department of Dental Research, National Institute of
Health, Japan

1990-1992 Postdoctoral fellow at the Department of Medicine, Division of Endocrinology
and Metabolism, The University of Texas Health Science Center at San
Antonio, Texas, USA

1993-1997 Laboratory Chief, Laboratory of Periodontology, Department of Oral Science,
National Institute of Health, Tokyo

1997-1999 Laboratory Chief, Laboratory of Periodontology, Department of Oral Science,
National Institute of Infectious Diseases, Tokyo

1999-2004 Chairman and Professor, Department of Oral Microbiology, Kyushu Dental
College

2004-present Chairman and Professor, Department of Health Promotion, Division of
Infections and Molecular Biology, Kyushu Dental College

2006-2012 Dean, School of Dentistry, Kyushu Dental College

2012-2013 Chairman and President, Kyushu Dental College

2012-present Chairman and President, Kyushu Dental University

Partnership Activities of Kyushu Dental University with Universities in Myanmar

Partnerships with universities

1. March 22, 2013:

Concluded partnership agreements with two dental universities; University of Dental Medicine, Yangon, and University of Dental Medicine, Mandalay.

2. May 11, 2014:

Presidents of the University of Dental Medicine, Yangon, and University of Dental Medicine, Mandalay, and the Director General of the Ministry of Health, Myanmar, joined in the centenary celebration of the founding of Kyushu Dental University as guests.

3. The following professors from Myanmar were invited to speak at the Asia-Pacific Conference hosted by Kyushu Dental University.

2013: Prof. Shwe Toe (Rector, University of Dental Medicine, Mandalay).

2016: Prof. Thein Kyu (Rector, University of Dental Medicine, Yangon), “Dental Education and Clinical Training for Dentistry in Myanmar”.

2017: Dr. Khin Maung (Ministry of Health and Sports, Myanmar).

2017: Prof. Sun Sun Win (Rector, University of Dental Medicine, Mandalay, Myanmar).

2017: Prof. Shwe Toe (Rector, University of Dental Medicine, Yangon, Myanmar).

4. Student and Teaching Staff Exchange

2016: Prof. Thein Kyu assumed the post of Special Visiting Professor at Kyushu Dental University.

2016: President Nishihara of Kyushu Dental University assumed the position of Visiting Professor at the University of Dental Medicine, Yangon, and University of Dental Medicine, Mandalay.

Exchanges with Ministry of Health and Sports, Myanmar

1. Visited offices of Ministry of Health (presently Ministry of Health and Sports) in Nay Pyi Daw and met with the vice minister (November 2013).

2. Jointly performed dental checkups with the Ministry of Health, Myanmar (December 2014).

3. Jointly conducted dental checkups with the Ministry of Health, Myanmar (March and August 2016).

4. Concluded tripartite partnership agreements with the Ministry of Health, Myanmar, and Association of Dental Volunteers of Japan (NPO) (May 2016).

5. Jointly conducted dental checkups with the Ministry of Health, Myanmar (August 2016)
6. Concluded partnership agreements with the Ministry of Health and Sports, Myanmar (August 2017).
7. Completed screening by the Ethical Review Board, Myanmar, for the project titled "Investigation and Research regarding Hepatitis B and Periodontal Diseases (March 2018).

Social Activities in Myanmar

1. 2012:

Visit to charity organizations in Yangon and Mandalay for surveys and donations.

2. 2013:

Donation of dental instrumentation to Kawa Township Hospital.

Oral health care activities in Kawa Township joint elementary junior high school.

Participated in birthday celebration for Ms. Aung San Suu Kyi in Yangon.

3. 2014:

Lecture at 50th anniversary of University of Dental Medicine, Yangon.

4. 2015:

Speech by president of Kyushu Dental University at meeting of Myanmar Dental Association.

Exchanged opinions regarding grass-roots activities at office of Japan International Cooperation Agency in Myanmar.

Exchanged opinions regarding oral health care activities at the Japanese Embassy in Myanmar.

5. 2016:

Oral health care activities at kindergartens and primary schools in Nay Pyi Daw.

Meeting with Ms. Aung San Suu Kyi and Minister of Health, Myanmar, regarding oral health care activities.

6. 2017:

Participated in 69th independence ceremony of Union of Myanmar.

Conducted dental seminars for government dentists (February 27 to March 2).

Held meeting regarding oral health care activities in office of The Nippon Foundation office in Yangon.

7. 2018:

Participated in 70th independence ceremony of Union of Myanmar.

Poster Presentations

***Young Investigator Award Competition**

#1*

Kyushu Dental University Global Scholarly Exchange 2017 Short-Term Visiting Program Report-Srinakharinwirot University, Thailand

Sakiko Rikimaru, Ayaka Wakasugi, Kana Furukawa, Kazuki Maruyama

Kyushu Dental University

We joined the Kyushu Dental University (KDU) Global Scholarly Exchange short-term visiting program to visit Srinakharinwirot University (SWU), Thailand from September 10 to 16, 2017. The aim of the program is to broaden our horizons and acquire global communication skills.

We had a lot of experience in this program. First, we visited a museum in SWU and had a lecture entitled “Dental education, health insurance and public health in Thailand”. We have learned the history of SWU and current dental situation in Thailand.

Second, we gave a presentation to SWU fifth grade students in English. In the presentation, we introduced ourselves, KDU and Japanese culture. After our presentation, SWU-students also gave us a similar presentation. Their English was so natural, correct and clear to impress us deeply. We fully realized the differences in the learning level of English speaking.

Third, we visited many departments specialized in different fields of dentistry, for instance oral medicine, oral surgery, conservative dentistry, and so on. SWU-students should plan the treatment for their patients, prepare technical materials and treat their patients by themselves.

This program gave us the opportunity to think about our future vision. We will make an effort to be ideal dentists who can embody the concept of “Think globally, act locally”.

#2*

Effect of polyunsaturated fatty acids on macrophage polarization

Aki Kawano¹, Toshinori Okinaga¹, Wataru Ariyoshi¹,

Hisako Hikiji² and Tatsuji Nishihara¹

¹ Division of Infections and Molecular Biology, Department of Health Promotion,
Kyushu Dental University, Kitakyushu, Fukuoka, Japan

² School of Oral Health Sciences, Kyushu Dental University, Kitakyushu, Fukuoka, Japan

Macrophage, a critical modulator of immune response, is classified into various phenotypes, such as M1 macrophage and M2 macrophage. M1 macrophages are responsible for host defense against infection and promote inflammation, while M2 macrophages are associated with responses to anti-inflammatory reactions and tissue remodeling. Recently, polyunsaturated fatty acids (PUFAs) play important roles in the regulation of inflammation. However, the role of PUFAs on M2 macrophage polarization has not been clarified. In the present study, we examined the effects of PUFAs on monocytes/macrophages polarization.

Human myeloid leukemia cell line, U937 cells were seeded into 6-well culture plates with RPMI1640 medium containing 5% fetal bovine serum. U937 cells have been used as the experimental model to elucidate mechanisms of monocyte and macrophage polarization. U937 cells were incubated with IL-4 for induction of M2 macrophage polarization. Docosahexaenoic acid (DHA) was used as one of PUFAs. The expression of M2 macrophage marker was examined by real-time RT-PCR, western blot analysis, and flow cytometry analysis.

We confirmed that DHA induced the expression of CD206, which is representative M2 macrophage marker, on the mRNA and protein level in U937 cells. DHA enhanced the expression of CD206 in a time dependent manner. To investigate the mechanism by which DHA regulate CD206 expression in U937 cells, we focused on the transcriptional factors, signal transducer and activator of transcription (STAT) 6, peroxisome proliferator activated receptor (PPAR) α ; and Krüppel-like factor (KLF) 4. DHA only enhanced the expression of KLF4, which is critical regulator of M2 macrophage polarization, but not phosphorylation of STAT6 and PPAR α .

These results indicate that DHA has an anti-inflammatory effect through the promoting of macrophage polarization toward an M2 phenotype, suggesting that KLF4 might be involved in the transcriptional control of M2 macrophage polarization.

#3*

Effect of β -glucan and dectin-1 binding on periodontopathic bacteria-invaded macrophages

Maki Inoue^{1,2}, Toshinori Okinaga¹, Wataru Ariyoshi¹, Masaki Morishita²,
Michihiko Usui², Keisuke Nakashima² and Tatsuji Nishihara¹

¹Division of Infections and Molecular Biology, Kyushu Dental University

²Division of Periodontology, Kyushu Dental University

It is well known that β -glucan is the abundant cell wall of microbial pathogens such as fungi and yeast. Recently, it has been reported that dectin-1, which is known as β -glucan receptor, plays an important regulatory role in natural immunity of host defense system. In the present study, we investigated the effect of β -glucan on periodontopathic bacteria-invaded macrophages. Constitutive expression of dectin-1 prevented cell death induced by *Aggregatibacter actinomycetemcomitans* invasion. Flow cytometric analysis revealed that there was a steady decline of viable cells in dectin-1-overexpressed macrophages when the cells were invaded with *A. actinomycetemcomitans*. Pyroptosis associated proteins, such as caspase-11, gasdermin D (Gsdmd) and NACHT, LRR and PYD domains-containing protein 3 (NALP3;cryopyrin), were clearly detected in *A. actinomycetemcomitans*-invaded macrophages by Western blotting analysis. Constitutive dectin-1 on macrophages upregulated the expression of activated caspase-1 and NAIP when the cells were invaded with *A. actinomycetemcomitans*. We also examined the effect of *Porphyromonas gingivalis* invasion on the induction of cell death in macrophages, and found that *P. gingivalis* invasion showed pyroptotic activity similar to *A. actinomycetemcomitans* invasion in macrophages. These findings indicate that dectin-1 on macrophages regulates phagocytosis of *A. actinomycetemcomitans* and the induction of pyroptotic cell death of macrophage invaded with periodontopathic bacteria, suggesting that dectin-1 may suppress the inflammatory reaction in periodontitis induced by periodontopathic bacteria, such as *A. actinomycetemcomitans* and *P. gingivalis*.

#4*

Effect of extracellular glucose concentration on macrophage polarization

Takahiro Kudo^{1,2}, Michihiko Usui¹, Sen Higashi²,
Tomoko Ohsumi², Keisuke Nakashima¹, Hiroshi Takeuchi²

¹ Division of Periodontology, Department of Oral Function, Kyushu Dental University

² Division of Applied Pharmacology, Department of Health Promotion, Kyushu Dental University

It has been widely accepted that metabolic syndrome including type-2 diabetes are closely associated with a mild chronic inflammation. Macrophages are polarized to a state called pro-inflammatory M1 or anti-inflammatory M2 and are involved in the induction of tissue injury and insulin resistance, or restoration of disordered tissues and maintenance of metabolic homeostasis, respectively. Elucidating the mechanism how macrophages determining polarity would help understanding the pathological condition caused by metabolic syndrome and the development of new treatment methods of type-2 diabetes and related periodontal diseases. Here we examined the effect of extracellular glucose concentration on M1/M2 polarization of macrophages.

Macrophage-like mouse cell line Raw 264.7 cells were cultured in medium containing 4.5 g/L and 1 g/L glucose as high and low glucose medium. Differentiation into M1/M2 was induced by IL-4 and LPS, then was examined by RT-PCR as an index of increased mRNA expression of Arg1 and NOS2. Activation of intracellular signaling molecules involved in energy metabolism was monitored by western blotting.

In Raw 264.7 cells, IL-4-induced mRNA expression of Arg1 was higher in the low glucose medium compared with that in the high glucose medium, while LPS-induced mRNA expression of NOS2 was lower in the low glucose medium, suggesting that M2 polarization was promoted in the lower glucose medium. Low glucose environment was mimicked by treating the cells with AICAR, which directly activates AMPK, also enhanced the M2 polarization of the cells.

The results suggest that glucose concentration affects the polarity of macrophages via AMPK and drugs targeting AMPK would provide beneficial effect on the treatment of periodontal disease in diabetic patients by increasing anti-inflammatory M2 macrophages.

#5*

Modulation of TRPV4 channel activity by acetaminophen

Fumio Nakagawa^{1,2}, Sen Higashi², Tomoko Ohsumi²,
Seiji Watanabe¹, Hiroshi Takeuchi²

¹ Division of Dental Anesthesiology, Department of Control of Physical Functions, Kyushu Dental University

² Division of Applied Pharmacology, Department of Health Promotion, Kyushu Dental University

N-acetyl-p-aminophenol (APAP/acetaminophen) is a widely used analgesic/antipyretic with weak inhibitory effects on cyclooxygenase compared to non-steroidal anti-inflammatory drugs. The effect of APAP is mediated by its metabolite, N-arachidonoyl-phenolamine (AM404), that activates transient receptor potential channels, including transient receptor potential vanilloid 1 (TRPV1) and TRP ankyrin 1 (TRPA1) or the cannabinoid receptor type 1. However, the exact molecular mechanism underlying the cellular actions of APAP remains unclear. As we have recently found that APAP promotes cell migration through TRPV4, the effect of APAP on Ca²⁺-channel activity of TRPV4 was examined in this study.

In the rat pheochromocytoma cell line, PC12 cells, mRNA expressions of TRPV1, TRPV2 and TRPV4, but not TRPA1, were detected. Treatment of PC12 cells with APAP or its metabolite AM404 alone did not affect intracellular Ca²⁺ concentration measured by using a Ca²⁺ indicator acetoxymethyl ester form of fura-2. However, both APAP and AM404 inhibited the increase of intracellular Ca²⁺ induced by TRPV4-specific agonist GSK1016790A. The results suggest that TRPV4 is another target molecule for both APAP and AM404, while the effect of the compounds on TRPV4 was opposite to that on TRPV1 and TRPA1, i.e., AM404 activates TRPV1 and TRPA1, but TRPV4 was inhibited by both APAP and AM404. These findings provide new insight for better understanding of the molecular mechanism of action of APAP.

#6*

Effect of MDP contained primer on adhesive bonding for alumina air-abraded Ag-Pd-Cu-Au alloy

Hirotake Miyahara^{1,2}, Hiroshi Ikeda², Shinji Yoshii¹,
Yuki Nagamatsu², Chiaki Kitamura¹ and Hiroshi Shimizu²

¹ Division of Endodontics and Restorative Dentistry, Kyushu Dental University

² Division of Biomaterials, Kyushu Dental University

An alumina air-abrasion is one of the indispensable pretreatments used to make a significant improvement in bond strength between restorative materials and adhesive resin. In our previous studies, it was found that the alumina air-abrasion for the Ag–Pd–Cu–Au alloy surface had not only a mechanical roughening effect but also chemical effects. Due to the chemical effects, a 10-methacryloxydecyl dihydrogen phosphate (MDP) did work with the alumina air-abraded alloy. The purpose of the present study is to clarify a mechanism why MDP works with the alumina air-abraded Ag-Pd-Cu-Au alloy. The casted Ag-Pd-Cu-Au alloy was polished with 600-grit silicon-carbide abrasive paper and cleaned by an ultrasonication. The alloy was subjected to an air-abrasion by using alumina particles (mean diameter of 50- μ m) for 20 s with pressure of 0.6 MPa. The air-abraded alloy was immersed into hydrochloric acid for an hour in order to eliminate an oxide layer on the alloy surface. The alloy surface was observed by means of a scanning electron microscope (SEM) with energy dispersive X-ray spectroscopy (EDX). For a shear-bond strength test, a MDP-contained primer was applied onto the alloy surface, followed by piling up MMA/TBB resin cement by means of a brush-dip technique. The shear-bond strength test was carried out by using a universal testing machine. The results of the SEM observations and EDX analysis suggested that considerable amount of alumina particles remained on the alumina air-abraded surface even after hydrochloric acid treatment. For the alumina air-abraded alloy without the oxide layer, the bond strength was 7 MPa. Meanwhile, the bond strength of the alumina air-abraded alloy with oxide layer gave 25 MPa. These results imply that MDP worked to the oxide layer on the alloy surface rather than the remained alumina particles.

#7*

Expression of vesicular nucleotide transporter in compressed human periodontal ligament cells

Masahiro Mizuhara¹, Kaori K. Gunjigake¹, Kayoko N. Kuroishi¹, Takashi Toyono²,
Asako Inoue¹, Yoshikazu Manabe¹, Momotoshi Shiga¹, Yuji Seta² and Tatsuo Kawamoto¹

¹ Division of Orofacial Functions and Orthodontics, Kyushu Dental University

² Division of Anatomy, Kyushu Dental University

Objective: Adenosine triphosphate (ATP) is an important and ubiquitous extracellular messenger. ATP is also a regulator of bone homeostasis and pain transmission. In human periodontal ligament (HPDL) cells, mechanical stress promotes ATP release. Connexin 43 (Cx43) hemichannels and Pannexin 1 (Px1) channels have been shown to be involved in ATP release. Recently, vesicular nucleotide transporter (VNUT) has been identified to play a key role in vesicular storage of ATP. Subsequently, VNUT has been found in various kinds of tissues. However, expression of VNUT has not been reported in HPDL cells. The objective of the present study was to examine whether VNUT was involved in signaling through ATP release of HPDL cells.

Materials & Methods: HPDL cells were purchased from Lonza Japan Ltd. We applied mechanical force via centrifugation to HPDL cells at 40, 90, and 135 g for 12, 24, 36, and 48 hours. Centrifugal force (CF)-induced cell damage was measured based on the activity of lactic dehydrogenase (LDH) released from the cells. Expression and changes of VNUT, Cx43, and Px1 were examined by reverse transcription (RT)-polymerase chain reaction (PCR) and real-time PCR.

Results: Expression of VNUT in HPDL cells was confirmed by RT-PCR. Cell damage was increased significantly at CF of 135g after 24 hours. Expression of VNUT was increased most significantly by CF compared with that of Cx43 and Px1. These results indicated an increase in expression of VNUT in mechanically stimulated HPDL cells, and that the released ATP plays an important role in alveolar bone resorption and pain transmission on the compressive side of orthodontic tooth movement.

Conclusions: Expression and changes of VNUT were clarified in HPDL cells subjected to mechanical stimulation by CF. The results suggested that VNUT might be related to ATP release in HPDL cells.

#8*

Comparison of the effects of newly developed tetraplex DNA binders on cancer cell growth

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Telomerase is an enzyme which elongates telomere repeat sequence to the chromosomal ends and is overexpressed in more than 80% of cancer cell types. This telomere repeat sequence form tetraplex structure even in cell and therefore various tetraplex DNA ligands have been developed expecting to inhibit telomerase activity as candidates for anti-cancer drugs. However, these ligands bound to double-stranded DNA resulting in serious side-effects on normal cells. We synthesized a series of cyclic naphthalene diimide (cNDI) and cyclic anthraquinone (cAQ) derivatives with different linker chains to improve specific binding for unique G-quadruplex structure which is formed by telomeric DNA sequences. In this study, we evaluated the growth inhibitory effects of these ligands in various human cell lines derived from oral squamous cell carcinoma.

We first examined the expression levels of mRNA of TERT as a constituent of the active site of telomerase, for oral cancer cell lines (SAS, Ca9-22, HSC-2, KB) or immortalized human cell lines (HaCaT and HEK293) with quantitative PCR. Then the effects of the ligands on cell proliferation were tested using WST-8-based colorimetric assay. All of the ligands effectively suppressed cell proliferation in a dose-dependent manner, with ID50 ranging from 0.04 to 3 μ for cNDI derivatives and from 0.1 to 8 μ for cAQ derivatives, depending on the difference of cell-lines. About 100-times differences in ID50 values of the ligands were observed depending on the kinds of the linker chains. The ID50 values of each ligand for the cells were approximately correlated with mRNA expression level of TERT gene in each cell line. The results suggest that the newly synthesized compounds were effective to suppress cancer cell proliferation, and that devising the side chains of both cNDI and cAQ was effective to improve specificity of anti-proliferative effect on cancer cells with higher telomerase activity.

#9*

An etiological model of dental fear including sensory processing factor in female students

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Dental fear, which results in avoiding dental treatment, is seen in 5-10 % of the general population. At times, we find fearful patients to be hypersensitivity to the sight of a needle, sensation of the drill, taste of medicines, and bright dental lights. Individuals show different sensory processing patterns, which provide different responses to stimulation. We investigated the relationship between dental fear and sensory processing patterns in female students and furthermore created an etiological model which demonstrates this relationship.

The participants included 322 students from the department of Nutrition. We measured dental fear using the Dental Fear Survey and sensory processing was measured using the Japanese Adolescent/Adult Sensory Profile. Sensory processing patterns were categorized into four quadrants: sensory sensitivity, sensory avoidant, low registration and sensation seeking. The participants answered 197 questions which included questions evaluating already known 14 risk factors which contribute to dental fear. The Generalized Estimation Equation (GEE) model was used for multivariate analysis to reveal whether sensory processing patterns were connected to dental fear. A hypothetical model was created using latent variables namely, psychological traits, experiences, sociodemographics, all of which were etiological factors contributing to dental fear. The structural equation modeling (SEM) was utilized to test the aforementioned hypothetical model.

Sensory sensitivity and sensory avoidance significantly contributed to dental fear after controlling other risk factors (GEE). The hypothetical model correlated well with our data (CFI = 0.98, RMSEA = 0.027, SEM). Both the psychological traits factor and the experiences factor correlated with a low threshold sensory processing pattern. Furthermore, the low threshold sensory processing factor and the experiences factor significantly contributed to dental fear.

Among the female students we surveyed, sensory sensitivity and sensory avoidance contributed to dental fear. The new etiological model we constructed may suggest new approaches in the treatment for fearful patients.

#10*

**The Glycyrrhiza ingredient isoliquiritigenin alleviates acute pain
by ion channel inhibition.**

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The traditional Japanese herbal medicine (Kampo) hangeshashinto, consisted with seven herbal extracts, inhibits oral ulcer-induced pain. Isoliquiritigenin (ILG), an ingredient in Glycyrrhiza, has been reported to suppress voltage-dependent ion channels. In this study, to clarify the analgesic mechanism of ILG, we investigated effects of ILG on voltage-dependent ion channels in vitro and on pain-related behaviors in vivo. In automated patch-clamp for expression system using Chinese hamster ovary cells, ILG exhibited strong antagonistic effects on pain-related sodium channels (Nav1.1, Nav1.3, Nav1.6, Nav1.7 and Nav1.8) and calcium channel (Cav2.2). In patch-clamp recordings for cultured trigeminal ganglion neurons of rats, ILG inhibited voltage-step-activated inward and outward currents, resulting in suppressing action potential generation in many neurons. Pain-related behaviors following subcutaneous injections of TRPV1, TRPA1 and TRPV4 agonists and formalin into the hind paw of naive rats were inhibited by co-injection of ILG. In oral ulcer pain model of rats (as a pre-clinical acute pain model), induced mechanical allodynia and spontaneous pain were significantly suppressed by swab application of ILG to the ulcer region. However, in chronic pain models by complete Freund's adjuvant (inflammation) or partial sciatic nerve transection (neuropathy), induced mechanical allodynia was not changed by injection of ILG. These findings suggest that ILG suppress acute pain induction by blocking pain-related ion channels.

#11*

TRPA1 and TRPV4 mediate tooth movement-induced pain

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During orthodontic treatment, patients experience pain with the process of tooth movement. Such pain can deteriorate patient's quality of life and lead to discontinuing treatment. In the present study, we examined a possibility of involving TRPA1 and TRPV4, which are mechanically-activated ion channels, in orthodontic pain using an experimental tooth movement model.

TRP channel expression in the periodontal ligament in tissue sections was evaluated by immunofluorescence using anti-TRPA1 and anti-TRPV4 antibodies with a nerve fiber marker PGP9.5. Under anesthesia with mixed anesthetic agents, a fixed Ni-Ti alloy closed-coil spring appliance (50 g) was connected between a maxillary first molar and the ipsilateral upper incisor. Sham rats received the same procedure with the experimental rats without any pressure. Face-grooming activities (mouth rubbing and facial wiping) were measured as an orofacial nociceptive behavior on days after the treatment. TRP channel antagonists were intraperitoneally administered 1 hr before behavioral observations.

In the periodontal ligament of rats, TRPA1 and TRPV4 immunoreactivities were overlapped with PGP9.5-immunoreactive fibers. The experimental tooth movement model showed significant increases in the face grooming behaviors as a peak on day 1 compared with sham rats. The TRPA1 antagonist, HC-030031, and the TRPV4 antagonist, RN-1734, significantly reduced the face grooming activities on day 1 after the orthodontic treatment. These findings suggest that TRPA1 and TRPV4 are involved in pain sensation induced by tooth movement.

#12*

Characteristics of gubernaculum tracts on radiological examinations

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Purpose: To elucidate characteristics of gubernaculum tracts (GTs) on radiological examinations.

Material and Methods: This study was conducted using pairs of radiological examinations such as panoramic radiographs and CT scans that were obtained at the Division of Oral and Maxillofacial Radiology in Kyushu Dental University Hospital from children with oral and maxillofacial diseases.

Results: GTs of the all teeth were all visualized on axial images of CT, but not panoramic radiographs. GTs of the molar teeth were visualized as a rectangle an oblong shape contiguous with the dental follicle of unerupted molars on panoramic CT images, but not panoramic radiographs. However, the both of GTs of maxillary central supernumerary tooth with normal eruption and inverse were not seen in the sagittal image. The GTs for maxillary central incisors, lateral incisors, canine, and molar were identified in almost all subjects with normal unerupted teeth, but in premolar relatively lower. The GTs for the mandibular central incisors, lateral incisors, canine, and molar were identified in almost all subjects with normal unerupted teeth.

Conclusions: The GTs of the permanent teeth in children were clearly identified on CT, but not in panoramic radiographs.

#13*

Relationship between occlusal support and total dietary fiber intake

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Previous studies have revealed that reconstruction of occlusal support enhanced chewing ability, resulted in improvement of the nutritional status, however, most of these studies evaluated nutritional status by body mass index, energy intake or serum albumin level. In this study, we aimed to clarify the detailed relationship between occlusal support of molar teeth and ingested food and nutrients. Subjects were formed by patients who visited Kyushu dental university hospital (9 men, 24 women, average age 57.0 years). They were classified into two groups depending on occlusal support of molar teeth: Normal group (occlusal support of molar teeth was maintained on both sides, 5 men and 17 women, mean age 57.8 years) and Defective group (occlusal support of molar teeth was lost on one side or both sides, 4 males and 7 females, mean age 55.5 years). Occlusal support by dental prostheses such as removable or fixed denture was equated with occlusion support by natural teeth. Ingested foods and nutrients were evaluated using brief-type self-administered diet history questionnaire. Mann-Whitney's U test was used for statistical analysis. As results, the amount of intake energy, carbohydrate, protein and lipid intake were comparable in both groups. Total dietary fiber intake was significantly lower in the Defective group ($p=0.023$), and both soluble and insoluble dietary fiber intake were significantly lower in the Defective group. Regarding the sources of dietary fiber, there was no significant difference in dietary fiber intake from cereals, green and yellow vegetables, beans and fruits in both groups, on the other hand, the dietary fiber intake from other vegetables ($p=0.008$) and potatoes ($p=0.046$) were significantly less in the Defective group. In conclusion, total dietary fiber intake decreases in subjects who lost posterior occlusal support, and it might be derived by the change of food ingestion habits.

#14*

Apoptosis-inducible factors for the salivary glands in periodontitis model of rats

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Reduction of salivary secretion is known as a risk factor for periodontitis. However, accumulated recent evidences using rat periodontitis models demonstrate that periodontitis leads salivary gland atrophy by apoptosis induction, suggesting lower salivary secretion following periodontitis. In some previous studies in vitro, salivary gland apoptosis has been reported to be caused by B-cell invasion into the salivary gland or extracellular application of TNF- α . However, the mechanism underlying salivary apoptosis following periodontitis remains to be revealed. The purpose of this study is to identify apoptosis-related factors in the salivary gland of periodontitis model of rats.

In 6-week old Wistar male rats, the unilateral second maxillary molars were tied with silk ligatures for 1 or 4 weeks to induce periodontitis (experimental group), and the ligature was removed just after the ligation (control group). Three major salivary glands (parotid, submandibular and sublingual glands) were weighted, followed by quantitative RT-PCR and fluorescent immunostaining.

The gland weights of the experimental group were significantly lower on 4 weeks (not on 1 week) than those of the control group. mRNA level and immunoreactive cells for CD19, a marker of B-cells, were significantly increased in the salivary glands, particularly in the parotid gland. In the blood, TNF- α was significantly higher in the experimental group than in the control group, but IL-1 β and IL-6 were not. mRNAs of TNF- α and its receptors in the salivary glands were not changed by experimental periodontitis. These results suggest that B-cell invasion and blood-borne TNF- α lead salivary apoptosis following chronic periodontitis.

#15*

**Analysis of gene-environmental interaction
during mouse palate development**

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Non syndromic cleft palate are among the most common craniofacial anomalies in humans. Gene-environmental multifactorial threshold theory has been proposed as etiology for birth defects. Among genetic risk factors, the *Msx1* gene encodes a homeobox type transcription factor and is responsible for facial clefts and tooth agenesis in both humans and mice. Hypoxic stress, which can be induced by smoking, arrhythmia, and uptake of medicine, is known as one of environmental risk factors during pregnancy. In this study we establish a novel combinatorial experimental model using *Msx1* mutant mice and hypoxic stress. In situ hybridization analysis revealed that *Msx1* mRNA was strongly expressed in the anterior region of palatal shelf mesenchyme at embryonic day (E) 12 and E13. *Msx1* expression at E12 was more intense than that at E13. Next, pregnant wild-type female mice mated with *Msx1*^{+/-} males were treated by two different methods to cause hypoxia. One was intraperitoneal injection of phenytoin, an anti-epileptic drug and a known arrhythmia inducer, at E11-12 or 12-13, and the other was a hypoxic chamber in which the oxygen level was kept at 10% from E11 to E15. In both cases, pregnant mice were dissected at E17 for sampling. In E11-12 phenytoin experiment, cleft palate was identified in *Msx1*^{+/-} embryos significantly higher than in wild-type. There was no statistical significance of cleft palate occurrence between *Msx1*^{+/-} and wild-type in E12-13 phenytoin experiment. Neither *Msx1*^{+/-} nor wild-type embryos exhibited cleft palate in hypoxic chamber experiment. Our data indicate that cleft palate can be caused by the combination of *Msx1* mutation and hypoxic stress, suggesting that *Msx1* may play a role to resist hypoxic stress in developing palatal shelves. Moreover, we revealed that hypoxic stress was more teratogenic in the earlier stage of palatal development than in the later stage.

#16*

The Role of Motor Protein Kif1c in Osteoclast Actin Ring Formation

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The process of osteoclastic bone resorption consists of two steps. First, is the differentiation of mononuclear precursors into osteoclasts. The second step is bone resorption by mature osteoclasts following recognition and attachment to bone surfaces. Loss of function experiments show that the tyrosine kinase Src and its adaptor protein, Crk-associated substrate (Cas) play important roles in osteoclastic bone resorption. However, the molecular mechanism by which Src and Cas regulate bone resorption remains to be elucidated. In this study, we tried to identify the signaling molecule(s) downstream of Src and Cas in the regulation of bone resorption by osteoclasts. We prepared spleen cells from wild-type (WT), Src, or Cas-deficient mice and then treated with macrophage colony stimulating factor (M-CSF) and receptor activator NF- κ B (RANKL) to induce osteoclast differentiation. Furthermore, we undertook comparative microarray screens of osteoclasts from WT and from Src or Cas-deficient mice. We focused on the kinesin super family protein Kif1c because its expression was down-regulated in osteoclasts from both Src and Cas deficient mice, and it was a molecule regulating actin cytoskeleton similar to Src and Cas. We next examined the expression of Kif1c in osteoclasts and observed that Kif1c was increased during osteoclastic differentiation in vitro. To examine the function of Kif1c in osteoclasts, we knocked down Kif1c using shRNA, and found that actin ring formation, a process necessary for bone resorption, was suppressed. These data suggest that Kif1c play an essential role in osteoclastic bone resorption as a downstream effector of Src-Cas axis.

#17

Kyushu Dental University Global Scholarly Exchange program 2017 student report in Taiwan

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Kyushu Dental University (KDU) has established agreement about the exchange of fostering human resources with educational institutions of dentistry in other countries, particularly, Asia. Based on this agreement, the Kyushu Dental University Global Scholarly Exchange (KDU-GSE) program has been conducted from 2015.

We participated in the KDU-GSE program on Kaohsiung Medical University (KMU), School of Oral Health Sciences, Taiwan, in September 8th to 15th, 2017.

We attended The Conference of Taiwan Association of Disabilities and Oral Health. Subsequently, to inspect a present state of oral hygienist in Taiwan, we visited elderly facility, elementary school and KMU, School of Oral Health Sciences, outpatient dental clinic of University Hospital and private dental clinics.

We received a lot of stimulation from interaction with KMU students, and further more knowledge and clinical training should be done from now on.

We recognized that dental hygienist played a very important role on Taiwan dentistry despite absent of national qualification for dental hygienist. As with Japan, clinical field to use the skill of dental hygienist will probably continue to grow more and more in the future.

As a result, the KDU-GSE program is helpful to make us to expand our worldwide viewing and draw out our future image as dental hygienist.

#18

Availability of Quantitative Light-induced Fluorescence in Detecting Plaque Adhesion and Demineralized Lesion

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Objectives: To assess availability of Quantitative Light-induced Fluorescence - Digital (QLF-D) in detection of plaque adhesion and demineralized lesion, three experiments were carried out.

Methods: #1. Demineralized lesion in the early stage in the upper and lower incisors and canines were inspected by visual inspection and QLF-D. The visual inspection was carried out by three dentists who had more than three years of clinical experience. The number of the tooth planes which were determined to have early demineralized lesion was compared between the methods. #2. Approximal demineralized lesion in molars were assessed by visual inspection, X-ray, and QLF-D. The number of the tooth planes which were determined to have demineralized lesion was compared among the methods. #3. Plaque adhesion was evaluated by QLF-D and traditional staining method. The ratio of the diameter of plaque to tooth crown in the tooth axis direction in each method was calculated. The result was evaluated by Pearson's coefficient of correlation and Bland-Altman Plot.

Results: #1. QLF-D found more tooth planes with early demineralized lesion in the upper and lower incisors and canines than the three dentists did. #2. QLF-D found more tooth planes with approximal demineralized lesion than visual inspection out of the tooth planes in which x-ray examination found the lesion. #3. Pearson's coefficient of correlation analysis showed strong correlation between QLF-D and traditional staining method in the evaluation of plaque adhesion. Bland-Altman Plot found no systematic error between the two methods.

Conclusion: It was concluded that QLF-D was available means of detecting plaque adhesion and demineralized lesion.

#19

Differences of aquaporin3 antigen recognition and their expressions in oral squamous cell carcinoma

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Background: Aquaporin3 (AQP3) serves as a water and glycerol transporter facilitating epithelial cells hydration. Recently, involvement of AQP3 in cancers has been reported. However, immunohistochemical expression patterns of AQP3 in carcinomas remain controversial. We hypothesized that the differences of AQP3 antigen recognition (AQP3 AR) may influence their expressions. Thus, the aim of this study was to investigate the immunostaining patterns of the three different AQP3 ARs in oral squamous cell carcinoma (OSCC), comparing to the adjacent high-grade (moderate to severe) epithelial dysplasia (HG-ED) and normal oral mucosa (NOM).

Methods: Tissue sections of OSCC (n=51) with simultaneous areas of HG-ED (n=12) and NOM (n=51) were stained with anti-AQP3 antibodies (AR at amino-acid (AA) 250-C terminal, AA180-228, and N terminal AA1-80) by immunohistochemistry.

Results: For AQP3 AR at AA250-C terminal and AA180-228, diffuse and strong membranous immunostaining was observed in 51/51 cases (100%) in the NOM for both ARs. AQP3 immunostaining weakened in 12/12 cases (100%) in the HG-ED for both ARs. In the invasive front of OSCC, reduced expression of AQP3 was detected in 42/51 cases (82.4%) and 47/51 cases (92.2%) respectively. In contrast to AQP3 AR at N terminal AA1-80, cytoplasmic immunostaining, when present, was limited to the cells of basal and parabasal layers in 51/51 cases (100%) in the NOM. Increased expression of AQP3 was found in 12/12 cases (100%) in the HG-ED. In the invasive front of OSCC, AQP3 immunostaining was enhanced in 46/51 cases (90.2%).

Conclusion: AQP3 could be used as a novel biomarker for detecting malignant transformation. Our results showed that the differences of AQP3 AR affected their immunohistochemical expressions in OSCC.

#20

Super Global High School (SGH) program 2017 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 course on dentistry and globalization for senior high school students at Meiji Gakuen High School.

In the last academic year, 2017, eight second grade students took this elective course. The students' purpose was to learn dentistry, develop their global view, and compare Japan with Thailand based on what they learned through this course. First, they got basic dental knowledge through the lectures of the professor. Second, they learned about dentistry, global views and so on through the lectures of the university president and vice chairman. Third, they learned about the cultures, education, dental circumstances in Thailand through the lectures of the international graduate students from Thailand. Then, the eight students compared Thailand with Japan in several aspects. Finally, the students reviewed what they learned and expressed their ideas with their own words. This process enhanced not only the students' global perspectives, but also their logical and critical thinking abilities.

#21

A case report of multiple static bone depressions attached to the major salivary glands

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The so-called “Stafne bone defect” is a static bone depression in the mandible that is commonly observed in cortical bone near the mandibular angle. Herein, we present a rare case in which static bone depressions attached to the three major salivary glands were observed on panoramic radiograph and CT. The three static bone depressions in the mandible were visualized on the panoramic radiograph and CT as oval radiolucent masses in a 68-year-old male. The CT numbers in the bone depressions ranged from 10 to 50 HU, and they were located close to those of the respective salivary glands. Based on the CT numbers, the areas in the bone depressions were determined to be a normal parotid gland, a sublingual gland, and a submandibular gland. Therefore this case got a follow-up examination, and there was no consult from the patient after then.

#22

Antibacterial Effects of Gypsum Model Coated with Photocatalyst

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Some infection diseases can cause by gypsum models contaminated with pathogenic microbes if they are used without appropriate preventions. In the present study, applicability of photocatalysts exhibiting catalytic activities in UV or visible light region to an antibacterial coating material was examined.

Specimens (2 mm diameter, 7 mm thickness) were prepared by pouring the mixture of dental stone powder and water into each alginate impression mold. The specimens were treated by coating with anatase TiO₂ or WO₃ dispersed in a commercial dental stone hardener (SH). After contamination by dropping of 0.3 ml of the bacteria solution (*Staphylococcus aureus* NBRC 12732, 5.0×10⁷ /ml), the specimens coated with TiO₂/SH were irradiated with UV and those coated with WO₃/SH were irradiated with visible light for 0 or 24 hr at 25±2°C. The numbers of the surviving bacteria attached to specimens were examined by agar pour plate method after wash method for capturing the bacteria. In the same way, the surviving bacteria numbers in the specimens without coating and those coated with only SH were also examined.

The surviving bacteria remained in the specimens without coating were decreased from 2×10⁷ to 2×10⁶ by 24-hr UV irradiation. The level of 10⁵ surviving bacteria still remained in the specimens coated with SH. Meanwhile, no surviving bacteria were detected in the specimens coated with TiO₂/SH after the irradiation (p<0.05). After 24-hr visible light irradiation, the level of 10⁷ surviving bacteria remained in the specimens without coating and those coated with SH. The coating treatment with WO₃/SH reduced in the surviving bacteria numbers; however, the level of 10⁶ surviving bacteria still remained.

It suggested that anatase TiO₂ dispersed in the commercial dental stone hardener was applicable to an antibacterial coating material for gypsum model.

#23

**Development of self-screening system for oral cancer using
electrochemical telomerase assay; An optimal method
for self-collection of exfoliative cells.**

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In our prior studies we confirmed that the electrochemical telomerase assay (ECTA) developed in Kyushu Institute of Technology could detect oral cancer by a very few numbers of cancer cells. Additionally ECTA was sensitive enough to find oral cancer from the exfoliative cells obtained by scratching the whole oral cavity. However, we did not examine the optimal method for collection of exfoliative cells. In the present study we examined optimal method for self-collection of exfoliative cells.

Interdental brush used for oral cytology, silicon brush for uterocervical cytology, newly developed silicon brush for oral cytology, and sponge brush we used in our prior studies were tested for scratching. Additionally cells included rinsing solution with saline was also examined.

Initially to control examiner difference, oral exfoliative cells from three healthy volunteers were collected by one examiner (MH) with same manner. It revealed that sponge brush collected significantly largest number of cells. Secondary exfoliative cells were collected by volunteer themselves using four brushes. The collected cells were stained by papanicolau staining. It also resulted that sponge brush collected the largest number of cells from every layer of epithelium without individual variations. Rinsing solution was not included enough number and quality of cells. Finally to mimic self-examination for oral cancer, another ten healthy volunteers were asked to collect exfoliative cells from their whole oral cavity with sponge brush following the protocol we made. Every subject could collect enough number of exfoliative cells compare to conventional cell collection method for oral cytology. The proposed method for cell collection from whole oral cavity with sponge brush worked well for self-collection of oral exfoliative cells.

We concluded that self-screening system for detection of oral cancer using ECTA with this cell collection protocol could be promising.

#24

BMP-3b suppresses the myogenic differentiation of skeletal muscle satellite cells

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Skeletal muscle atrophy is characterized by a regenerative impairment and/or decreased muscle protein that contributes to physical incapacitation. Satellite cells (SCs) are skeletal muscle stem cells that provide regenerative capacity to skeletal muscle. BMP-3b (GDF10) is a member of the TGF- β super family. Unlike other BMPs, BMP-3b stimulates Smad2/3 signaling in a manner similar to TGF- β , Activin, and Myostatin. Although Smad2/3 signaling is considered to be a negative regulator of myogenesis, the effect of BMP-3b on myogenesis is completely unknown. Real time PCR analysis revealed that BMP-3b mRNA is abundantly expressed in skeletal muscle tissue. Recombinant rat (rr) BMP-3b derived from CHO cells increased CAGA-luciferase activity as well as the expression levels of PAI-1, a Smad2/3 target gene. Treatment of C2C12 cells, a SC cell line, with rrBMP-3b suppressed the expression of myogenic marker genes such as myogenin and myosin heavy chain. Furthermore, treatment of C2C12 cells with SB431542, kinase inhibitor of ALK4, 5 and 7, rescued the suppressive effect of BMP-3b on myogenesis. We next examined the effect of BMP-3b on the myogenesis of primary SCs harvested from the extensor digitorum longus muscle of male mice. The expression levels of BMP-3b decreased with myogenesis of primary SCs. Moreover, rrBMP-3b also suppressed myogenesis in primary SCs. Treatment of primary SCs with a neutralizing antibody to BMP-3b also enhanced the myogenesis of SCs, suggesting that endogenous BMP-3b expressed by SCs physiologically regulates myogenesis.

#25

Survey on peak mandibular growth and related factors

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Purpose Evaluation of maxillofacial growth and development in orthodontic treatment plays an important role in diagnosis and treatment planning. To predict the growth of the mandible, peak height increase, development of the sesamoid bone (SB) and cervical vertebral maturation (CVM) are used. In this presentation, we examined the relationship between the peak increase in mandible length and the following factors in Japanese participants: height, CVM, SB and sex. The usefulness of these factors in predicting the growth of the mandible was investigated.

Materials

Thirty males and 23 females were extracted from the participants in past studies of growth and development. The survey collected data at seven points every two years from elementary school entrance to the first grade in males and females who had not undergone orthodontic treatment from 1955 to 1993.

Method

Mandibular ramus height, mandibular total length and mandibular body length were measured on lateral cephalometric radiographs and the increments were calculated. The stages of CVM (CS 1 to CS 6), increase in height every two years, and time of SB expression were investigated. Correlation coefficients and multiple regression analysis were used to evaluate the relationship between peak mandibular length increase, peak height increase, CVM, SB expression and sex.

Results and Discussion

Multiple regression analysis showed that peak height increase was significantly associated with mandibular total length and mandibular body length. SB expression was significantly related to all studied variables.

Conclusion

In this study, peak mandibular length increase correlated with peak height increase, SB expression and sex. In addition, many confounding factors appeared to be involved in growth and development.

#26

Protein Bif-1 that interact with p130Cas are associated with a bone homeostasis.

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An osteoclast is the pleocaryocyte that occur bone resorption.

Because the genetic defect mouse of tyrosine kinase c-Src and downstream molecule p130Cas presented with the bone osteopetrosis that we could not absorb while an osteoclast was present, it was found that these molecules were important to the bone absorptivity due to the osteoclast.

We searched the protein which interacted with p130Cas from an osteoclast by a mass spectrometry for the purpose of identifying a molecule about bone resorption in a downstream of c-Src-p130Cas axis and performed analysis of the primary structure of protein and a search from literatures.

As a result, we found functional unknown molecular Bif-1 as p130Cas and the molecule which associated. In this study, we investigated the role of Bif-1 in bone resorption by osteoclasts.

As a result of obtaining a wild-type mouse bone marrow cell of 4-8 weeks of age, and stimulating it in M-CSF and RANKL, and making an osteoclast differentiate, and having examined the change of the expression level of Bif-1 by Real-time PCR and Western Blot , expression levels of Bif-1 increased with the differentiation of the osteoclast.

Then, after knocking down Bif-1 in osteoclast progenitor using shRNA to examine a function of Bif-1 in the osteoclast, the formation of the actin ring which was important to the bone resorption of the osteoclast was inhibited.

Furthermore, as a result of having analyzed the femora of the Bif-1 knock-out mouse in CT and pQCT, as for the femora of the Bif-1 knock-out mouse, bone densities increased as compared with a wild type mouse, and an osteoclast was present in more histologic analysis.

In Bif-1, it was suggested that it was important to the bone resorption of the osteoclast as a downstream molecule of c-Src-p130Cas axis than the above-mentioned results.

#27

Effect of silane treatment on adhesive bonding of CAD/CAM composite resin

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In recent years, composite resins for a computer-aided design/computer-aided manufacturing (CAD/CAM) system have been widely used for indirect restorative materials. However, CAD/CAM composite resin is one of the dental materials which is difficult to bond. This unfavorable property of composite resin leads to a clinical problem of an early debonding of the material within several months. In order to overcome the serious problem, this study aims to clarify the bonding mechanism of CAD/CAM composite resin to a resin cement with a silane coupling agent. Six types of commercially-available CAD/CAM composite resin blocks were used; CERASMART 270 (GC), ESTELITE BLOCK (Tokuyama Dental), KATANA AVENCIA Block (Kuraray Noritake Dental), KZR-CAD HR 2, (YAMAKIN), SHOFU BLOCK HC (SHOFU), and VITA ENAMIC (VITA Zahnfabrik). All blocks were cut into a plate with 1 mm thickness by using a diamond wheel saw. The plate was polished by using # 1000 abrasive paper and then cleaned by an ultrasonication. A silane coupling agent (Porcelain Primer, SHOFU) was applied to each polished plate, followed by cementing by using ResiCem (SHOFU). After keeping the cemented samples at 37°C for 24 h, shear bond strength tests were carried out by means of a mechanical testing machine. The fine structures of the composite resins were observed by means of a scanning electron microscope (SEM) with energy dispersive X-ray spectroscopy (EDX). The shear bond strength for the VITA ENAMIC exhibited the highest value among examined samples. This result suggested that the silane coupling agent was most effective to the bonding of VITA ENAMIC. The results of the SEM-EDX observations revealed that VITA ENAMIC has the dual-network structure while the other composite resin have filler dispersed structure. It is considered that the bonding property of the CAD/CAM composite resins depend on their fine structures.

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The effect of periodontal ligament cell spheroids on osteogenesis of mouse calvarial bone defect model

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The periodontal ligament cells (PDL) are reported to be responsible for homeostasis and regeneration of periodontal tissue. Although PDL are commonly cultured in monolayers, monolayer cultures have been reported as inferior to three-dimensional cultures such as spheroids, which are spherical clusters of cells formed by self-assembly. The aim of this study was to examine the osteogenic potential of PDL spheroids with transplantation assay in a mouse calvarial defect model.

Spheroids were formed using microwell chips that were tagged with polyethylene glycol. Six-week-old female C57BL/6N mice were anesthetized with an intraperitoneal injection. A calvarial bone defect on the right side, 3 mm in diameter, was created in the dorsal fragment of the parietal bone using a trephine bur. The mice were divided into 4 groups, and bone regeneration was evaluated at 2 and 4 weeks after implantation. Defects were (1) left unfilled (sham operation, served as the surgical controls; 2 weeks n=5, 4 weeks n=6); (2) filled with MatrigelTM (Corning; 2 weeks n=5, 4 weeks n=5); (3) filled with monolayer-cultured PDL (3.0×10^4 cells), combined with MatrigelTM (2 weeks n=6, 4 weeks n=6); (4) filled with 15 PDL spheroids (2.0×10^3 cells/spheroid) combined with MatrigelTM (2 weeks n=6, 4 weeks n=7). After 2 or 4 weeks, the operation sites were collected and performed with radiological analysis and histological analysis.

X-ray examination revealed that treatment with PDL spheroids generated significantly more new bone compared with monolayer-cultured PDL. Histological analysis showed that treatment with PDL spheroids significantly enhanced both defect closure and newly formed bone area formation compared with monolayer-cultured PDL. Spheroid culture of PDL may be a novel tool in regenerative medicine.

#29

**p130Cas is Involved in Morphological Change, Migration,
and Invasion Ability in Oral Squamous Cell Carcinoma
by TGF- β Smad2/3 signaling**

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Oral squamous cell carcinoma (OSCC) frequently invades the mandible or maxilla. This invasion is associated with a worse prognosis. Epithelial-mesenchymal transition (EMT) is the process by which cells lose epithelial characteristics and acquire mesenchymal phenotypes. This process is associated with the invasion and metastasis of many kinds of carcinoma including OSCC. TGF- β 1, one of the TGF- β super family members, phosphorylates Smad2/3 and in turn, activates target genes following binding its type I and type II receptors. The activation of this TGF- β Smad2/3 signaling has been widely recognized as major EMT inducer. The expression and activation of p130Cas, which regulates cytoskeleton, increase in various cancers, indicating that p130Cas may be involved in EMT. In this study, we first examined the expression and activation of p130Cas in the OSCC sample excised by actual surgery and the relation with EMT by immunohistochemistry. Phosphorylated (activated) p130Cas was expressed in almost all of the cells, which expressed phosphorylated Smad3. We next examine the effect of p130Cas on EMT induced by TGF- β 1 by using murine squamous cell carcinoma cell line, SCC7. The treatment of TGF- β 1 induced the morphological change of the cells into mesenchymal cell-like shapes. In the cells stably expressed shRNA against p130Cas, cell proliferation and invasion ability induced by TGF- β 1 were decreased. Gelatin zymography and invasion assay revealed that the ability of cell migration and invasion were decreased in p130Cas knocked down cells. These data suggested that p130Cas may be essential for EMT of squamous cell carcinoma induced by TGF- β Smad2/3 signaling.

#30

Evaluation of general health using tongue diagnosis

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Tongue diagnosis is a noninvasive method used in oriental medicine to examine an individual's health. However, understanding tongue diagnosis is necessary not only for skilled experts but also for clinicians and patients. This report describes a new system of tongue image analysis for scoring an individual's health which may aid in routine and preventive health examinations. A total of 22 patients with oral symptoms treated at a certain hospital and 21 young healthy participants were included in the study. Objective and quantitative image analysis of characteristics such as color, size, and shape of the tongue was conducted. These results were examined and their relation to the physical condition of participant was investigated. In this system, the tongue image was divided into 6 sections and then scored. The general health of the participant, using tongue analysis, was evaluated as a health level value; the smaller the value, the healthier the individual. The average health level values, using this system, were 13.0 (N= 22) for the patients and 9.81 (N= 21) for young healthy participants. Our study suggests that poor health level values may indicate health problems. Therefore, it may be possible to determine the general health of an individual using tongue image analysis only. In the future, we intend to quantitate the relationship between other elements of tongue diagnosis and an individual's physical health.

#31

PPP1r18 regulates osteoclastic terminal differentiation.

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Bone metabolic disorders like osteoporosis or periodontitis will be taken in case of accentuation of osteoclast activity. Thus, to understand the mechanism of osteoclastic bone resorption is important and will expand therapeutic approach to bone metabolic disorders, fractures and surgery for implantation, orthodontic treatment, and so on. Osteoclasts are differentiated from hematopoietic stem cells, attached to bone matrix, and then resorb bone matrix. A tyrosine kinase c-Src is one of the key molecule to regulate bone resorption through promoting attachment of osteoclasts to bone matrix. We identified an Protein phosphatase 1 binding protein, PPP1r18 as c-Src binding protein by mass spectrum analysis. We revealed PPP1r18 negatively regulated c-Src activity and bone resorption in previous study. However, PPP1r18 looks affect not only bone resorption but also differentiation of osteoclasts. In this study, we examined the role of PPP1r18 in osteoclastic differentiation. Expression level of PPP1r18 was decreased along with osteoclast differentiation although PPP1r18 was expressed in osteoclasts. We next examined the PPP1r18 function in terminal differentiation of osteoclasts by using shRNA. The size of osteoclasts and number of osteoclasts were increased by downregulation of PPP1r18 in immature osteoclasts though number of osteoclasts were not affected. Moreover, the expression of NFATc1, a master regulator of differentiation of osteoclasts and Dc-stamp that regulates fusion of osteoclasts. On the other hand, overexpression of PPP1r18 decreased osteoclast size and containing nuclear. These results suggest that PPP1r18 negatively regulates terminal differentiation of osteoclasts.w

#32

The effects of ultrasonic cutting instrument on the neurosensory disturbance after bilateral sagittal split osteotomy

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Abstract

Purpose: According to the literature, ultrasonic surgery reduces the incidence of neurosensory disturbance (NSD) of the inferior alveolar nerve (IFAN) after bilateral sagittal split osteotomy (BSSO). The purpose of the present study was to evaluate the effects of ultrasonic surgery and the anatomical position of the IFAN canal on NSD after BSSO.

Patients and methods: This retrospective cohort study included skeletal mandibular prognathism cases operated using an ultrasonic bone scalpel or a reciprocating saw. The primary predictor variable was osteotomy technique (ultrasonic or conventional surgery). The primary outcome variable was NSD. Other variables included age, sex, operator, degree of setback, surgical duration, blood loss, and the position of the IFAN. A regression model was used to examine the relationship between presence or absence of NSD and other variables. The level of significance was set at $p < 0.05$.

Results: The ultrasonic group was composed of 35 patients, while the conventional group was composed of 32 patients. Three months after surgery, NSD was observed on 16 (22.9%) of 70 sides in the ultrasonic group and 28 (43.8%) of 64 sides in the conventional group; this difference was significant. Furthermore, recovery from NSD at 3 months after BSSO was significantly more common in the ultrasonic group than in the conventional group. In the ultrasonic group, even when the distance from the buccal aspect of the IFAN canal to the outer buccal cortical margin was shorter, NSD of the IFAN was less frequent.

Conclusion: Ultrasonic surgery may be an effective technique to reduce the incidence of NSD after BSSO, and it contributed to recovery from NSD. The use of an ultrasonic device for BSSO is recommended when the distance from the buccal aspect of the IFAN canal to the outer buccal cortical margin is shorter on CT.