

Asia-Pacific Conference in Fukuoka 2019

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



**May 10<sup>th</sup>, 2019 (Fri)  
Kyushu Dental University, Kitakyushu, Japan**

**Organized by Kyushu Dental University**

# **Asia-Pacific Conference in Fukuoka 2019**

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

Kyushu Dental University, Kitakyushu, Japan  
May 10<sup>th</sup>, 2019

### **Organizing Committee:**

Tatsuji Nishihara , President

Kenshi Maki

Hisako Hikiji

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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 2019. It is our great honor and pleasure to invite you to attend the International Symposium on Oral Education and Research in Kitakyushu, Japan, May 10th, 2019. I am inviting you to participate in this exciting project to obtain valuable information on main theme, role of the oral health team in the transformation of dental treatments

In this conference, we are delighted to announce two special lectures. Perspective health and welfare in Taiwan and Japan will be introduced by the invited speaker, Dr. Shih-Chung Chen, Minister, Health and Welfare of Taiwan, Mr. Pierre C. C. Chen, Consul General, Taipei Economic and Cultural Office in Fukuoka, and Dr. Nobuhiro Taguchi, Director of Dental Health Division, Ministry of Health, Labour and Welfare. In addition, current status of dental education in Taiwan and Japan will be introduced by the invited speaker, Dr. Tzer-Min Lee, Dean, College of Dental Medicine, Kaohsiung Medical University, Dr. Hsin-Chung Cheng, Dean, College of Oral Medicine, Taipei Medical University, and Dr. Yasuaki Kakinoki, Professor, Kyushu Dental University.

The other invited speaker, Dr. Noriko Takei, President, Japan Dental Hygienists' Association, Ms. Shino Yamaguchi, Dental Hygienist, Kyushu Dental University Hospital, and Ms. Yasuna Myose, Dental Hygienist, Bee Brand Medico Dental. Co., Ltd. will introduce presence and future status of dental hygienist in Japan. We are expecting to have active discussions on a new style of dental education of dental hygienists.

We are planning to have a session for presentations and invigorating discussions about the achievement of education and scientific research in oral bioscience. Moreover, we will offer "Taiwan night festival" to enjoy informal conversation between the undergraduate and graduate students in Taiwan and Japan while they will attend at a special banquet in the afternoon. It is our wish to flash an innovative idea into your mind to build true partnership with each 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 2019.

# **Asia Pacific Conference 2019**

## **Main theme: Role of the oral health team in the transformation of dental treatments**

### **Program**

#### **-First Part-**

**(1) Welcome message      13:00-13:10**

Dr. Tatsuji Nishihara, Chairman and President, Kyushu Dental University

**(2) Congratulatory Speeches by Guests of Honor 13:10-13:30**

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

Dr. Shih-Chung Chen, Minister, Health and Welfare of Taiwan

Dr. Nathawut Kaewsutha, Dean, Srinakharinwirot University

**(3) Keynote Lecture**

**Perspective health and welfare in Taiwan and Japan      13:30-14:30**

Chair: Dr. Tatsuji Nishihara

1. Dr. Shih-Chung Chen, Minister, Health and Welfare of Taiwan
2. Mr. Pierre C. C. Chen, Consul General, Taipei Economic and Cultural Office in Fukuoka
3. Dr. Nobuhiro Taguchi, Director of Dental Health Division, Health Policy Bureau, Ministry of Health, Labour and Welfare

**Current status of dental education in Taiwan and Japan      14:30-15:30**

Chair: Dr. Shun-Te Huang

1. Dr. Tzer-Min Lee, Dean, College of Dental Medicine, Kaohsiung Medical University
2. Dr. Hsin-Chung Cheng, Dean, College of Oral Medicine, Taipei Medical University
3. Dr. Yasuaki Kakinoki, Professor, Kyushu Dental University

**(4) Special Lecture**

**Present status of oral health promotion**

**by dentist and dental hygienist 15:30-15:50**

Chair: Dr. Katsumi Hidaka

1. Dr. Noriko Takei, President, Japan Dental Hygienists' Association

**Future mission imposed on oral health team**

**for the people of Japan 15:50-16:20**

-Message on oral health project from Japan to Taiwan-

Chair: Dr. Hisako Hikiji

1. Ms. Shino Yamaguchi, Dental Hygienist, Staff of Kyushu Dental University Hospital
2. Ms. Yasuna Myose, Dental Hygienist, Staff of Bee Brand Medico Dental.Co.,Ltd.

**Poster Sessions 16:20-17:10**

**Award Ceremony 17:10-17:20**

**Closing Remarks 17:20**

Prof. Kenshi Maki (Vice President of Kyushu Dental University)

**-Second Part- Taiwan Night Festival**

**Japan, Taiwan Culture Exchange Program 17:20-17:50**

<Main hall, 2nd Floor>

**Registration 17:50**

**Taiwan Night Festival 18:00-19:30**

<Dining room, 1st Floor>

[Planning and Direction]

- 1) APC practice commission
- 2) Students from Taiwan
- 3) Students of Kyushu Dental University

## 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, LD

## Congratulatory Speeches by Guests of Honor



Dr. Shih-Chung Chen

Minister of Health and Welfare of Taiwan

### Brief CV

#### EDUCATION

1971-1977 D.D.S, School of Dentistry, Taipei Medical College

#### EMPLOYMENT

2017.02.08- Minister of Health and Welfare

2016-2017.02 National Policy Advisor to the President

2004-2017.02 Director, Taipei Medical University

1999-2017.02 Consultant, Taiwan Dental Association

1995-2017.02 Consultant, Taipei City Dentists Association

2005-2008 Deputy Minister, Department of Health, Executive Yuan

1999-2005 Executive director, chief executive officer, Taiwan Dental Association

1996-1999 Commissioner, National Health Insurance Supervisory Committee, DOH

1996-1999 Commissioner, National Health Insurance Medical Expenditure Negotiation Committee, DOH

1995-1999 President, Taiwan Dental Association

1995-1999 Commissioner, Dentist Advisory Committee, DOH

1995-1996 Commissioner, medical review committee, Taipei City Health Department

1993-1995 President, Taipei City Dentists Association

1991-1993 Executive director, Taipei City Dentists Association

1987-1990 Director, Taipei City Dentists Association

## Congratulatory Speeches by Guests of Honor



Dr. Nathawut Kaewsutha

Dean, Srinakharinwirot University

### Brief CV

- |      |   |
|------|---|
| 2015 | Doctor of Philosophy (PHD) in Applied Behavioral Science Research, Behavioral Science Research Institute, Srinakharinwirot University |
| 2006 | Master of Public Health (MPH), Mahidol University   |
| 200  | Doctor of Dental surgery (DDS) 2nd Honors, Srinakharinwirot University  |

### EMPLOYMENT

- |                |  |
|----------------|--|
| 2017- present  | Dean   |
| 2012 –2017     | Associate Dean for Administrative Affairs, Faculty of Dentistry, Srinakharinwirot University |
| 2009 – present | Head of Dental Public Health Division, Faculty of Dentistry, Srinakharinwirot University     |
| 2009 – 2012    | Associate Dean for Students Affairs, Faculty of Dentistry, Srinakharinwirot University       |
| 2009           | Assistant Dean for Students Affairs, Faculty of Dentistry, Srinakharinwirot University       |

### REWARD

- |      |   |
|------|---|
| 2015 | Distinguished Dentist Award from Thai Dental Council                                |
| 2014 | Distinguished Lecturer Award from Faculty of Dentistry, Srinakharinwirot University |
| 2012 | Distinguished Alumni Award from Alumni Society, Srinakharinwirot University         |

## **Keynote Lecture**

### Perspective health and welfare in Taiwan and Japan



#### Perspective Health and Welfare Policy in Taiwan

Dr. Shih-Chung Chen

Minister of Health and Welfare of Taiwan

To promote population health and well-being by providing comprehensive and integrated services, the Ministry of Health and Welfare's policies focus on women and children's health, creating child- and elder-friendly environments, preventing disease and ensuring healthy foods and medicines. Our policies promote international cooperation and participation as well as quality long-term care and health equity, and seek to improve social welfare services and the medical environment.

The Ministry has been implementing the National Health Insurance global budgeting system of dental care for many years. Because population aging is among Taiwan's major challenges, and chronic and oral diseases rise in incidence with age, we promote the Long-term Care 2.0 plan which covers these medical services. The global budgeting system funds oral and periodontal disease care and encourages dental institutions to provide home dental care services.

Furthermore, the Ministry provides pediatric dental services include fluoride application and fissure sealing as well as promotion of fluoridated salt and fluoride mouthwashes. Oral care quality also has been improved by increasing dental specialization areas from 3 to 10. The Ministry promotes special-needs dental care services and general medical training within dental education programs. International medical cooperation focuses on New Southbound Policy strategies to promote oral health in other countries by sharing Taiwan's advanced techniques and specialty training.

Our Ministry will continue to address Taiwan's diverse and changing social needs. By promoting innovation, globalization and localization, we seek to provide optimal and comprehensive health and welfare services.

## **Keynote Lecture**

### Perspective health and welfare in Taiwan and Japan



The current relations between Taiwan and Japan

Mr. Pierre C. C. Chen,

Consul General, Taipei Economic and Cultural Office in  
Fukuoka

“ Taiwan and Japan are in their highest level of relations, which can be the model for the world and provide the corner stone of stability in East Asia. “--according to Frank Hsieh, Taiwan’s representative to Japan.

“ Japan is Taiwan’s true friend, a friend in need.”—according to Tsai Ing-wen, President of Taiwan.

Taiwan and Japan enjoy very cordial bilateral relations. It is clearly reflected in various aspects. Economically, Japan is Taiwan’s third largest trading partner. And Taiwan is Japan’s fourth largest trading partner. Take tourists for example. Last year almost 4.6 million Taiwanese visited Japan-its 2nd place foreign tourists. On the other hand, nearly 2 million Japanese visited Taiwan-its 3rd place foreign tourists. That is to say, among 23 millionth populations of Taiwan, one of five visited Japan last year. Not to mention very intense exchanges in areas such as sports, culture, art, music, education, science and technology.

Thanks to great amount of contributions from Japan in its infrastructure, medical welfare, education etc., Taiwan achieves its latest modern development. Japan’s contributions to Taiwan are well remembered by Taiwanese people.

Based on the above- mentioned sound foundations, the future relations between Japan and Taiwan are going to grow closer and closer furthermore.

## *Brief CV*

### EDUCATION

- BA, Dept. of Diplomacy, National Chengchi University, R.O.C. (Taiwan)
- MA, Graduate Institute of East Asian Studies, NCC, R.O.C. (Taiwan)

### EMPLOYMENT

- Officer, Department of East Asian and Pacific Affairs, Ministry of Foreign Affairs (MOFA) (July 1990 - March 1992)
- Officer, Department of Personnel, Ministry of Foreign Affairs (MOFA) (March 1993 - March 1994)
- Third Secretary/Second Secretary, Taipei Economic and Cultural Representative Office in Japan (March 1994 - January 2000)
- Secretary on Home Assignment, Department of African Affairs, MOFA (January 2000 – July 2001)
- Section Chief, Department of International Organizations, MOFA (July 2001 – July 2003)
- Secretary, Taipei Representative Office in Denmark (August 2003 – July 2009 )
- Secretary on Home Assignment, Department of International Organizations, MOFA (July 2009 – July 2011)
- Section Chief, General Affairs Division, Bureau of Consular Affairs, MOFA (July 2011 – May 2013)
- Deputy Director, Authentication Division, Bureau of Consular Affairs, MOFA (May 2013- July 2014)
- Deputy Director, General Division, Taipei Economic and Cultural Office in Japan (July 2014 – September 2016)
- Director, General Division, Taipei Economic and Cultural Office in Japan (September 2016 – July 2018)
- Consul General of Taiwan Economic and Cultural office in Fukuoka (July 2018-)

## **Keynote Lecture**

### Perspective health and welfare in Taiwan and Japan



The vision of social security and the direction of oral health and medical care of Japan

Dr. Nobuhiro Taguchi,

Director of Dental Health Division, Health Policy Bureau,  
Ministry of Health, Labour and Welfare

The government of Japan is aiming to extend people's healthy life expectancy for more than three years, as a foundation for encouraging to maintain the dynamism of society as a whole, toward the year 2040, when the elderly population is expected to reach a peak. Aiming to achieve this extension of healthy lifespans, with the following two pillars: "promoting prevention and health including among the apathetic toward health", and "eliminating regional healthy disparities", the government indicates the promotions of "primary prevention and prevention of progression" and "countermeasures against long-term care and frailty". Furthermore, the "Basic Policy on Economic and Fiscal Management and Reform 2018" mentions that "the government will work to enhance oral health and medical care through a variety of initiatives. These include enhancing dental exams throughout one's lifetime...". In addition, the "interim review of the economic policy direction" presented by the "Council on Investments for the Future" suggest that "...consideration will be given to the measures for expanding opportunities to receive dental examinations and enhancing oral health guidance..." These various initiatives in the dental field have been proposed.

The environment surrounding oral health and medical care has been changing extremely rapidly. This is attributable to the following backdrop: shift in dental disease structure such as decrease in the number of dental caries, transformation in the background of patients who visit dental clinics, alteration in the contents of dental treatments and diversification of the patient needs.

Due to increase in the significance of dental oral health as mentioned above, effective dental oral health policy is necessitated to achieve the target goals of the "Basic Matters regarding the Advancement of Dental and Oral Health" in accordance with the "Act on Advancement of Dental and Oral Health" and to focus on extension of healthy life expectancy and reduction of health disparity.

In this session, I will present about the vision of social security and the direction of oral health and medical care of Japan

**Brief CV**

EDUCATION

March 1989 Graduated from Nagasaki University School of Dentistry

EMPLOYMENT

April 1989 Teaching Associate, Department of Preventive Dentistry, Nagasaki University School of Dentistry

April 1994 Joined the Ministry of Health and Welfare (present the Ministry of Health, Labor and Welfare)

Main job careers in MHLW

Assistant Director, Dental Health Division, Health Policy Bureau

Assistant Director, Medical Economics Division, Health Insurance Bureau

Dental Officer, Social Insurance Medical Fee Payment Fund or Health Insurance Claims Review & Reimbursement services

Dental Medical Economics Counselor, Health Insurance Bureau

April 2016 Director, Dental Health Division, Health Policy Bureau, Ministry of Health, Labor and Welfare

## Keynote Lecture

### Current status of dental education in Taiwan and Japan



How to help student for better future in KMUD.

Dr. Tzer-Min Lee,

Dean, College of Dental Medicine, Kaohsiung Medical University

With the advent of the 21st century, the new technology change the dental education from passive to active. For example, the digital image, CAD/CAM, artificial intelligence (AI) will significantly change the clinical practice. The new courses, especial in digital course, will be dissimilar between different schools and countries. How to make sure the consistent requirement in basic knowledge and skill is very important in now and future. The 21st century students also grow up with internet. They will search information and learn from internet. The big data and non-textbook learning will help student, but we are also concerning about the lack of fundamental knowledge in clinical practice. Most of dental students come from the rich family, and they will lack the social responsibility and loss the self-contribution to society. The student will choose the clinical practice than academic career in most of developed country. The dental school will lack of teacher in future.

In Taiwan, we have the same challenge in dental education. For example, Kaohsiung Medical University (KMU) invest many budget in digital equipment, but we can't immediately setup all digital equipment for dental education. For digital course, all dental schools discuss and arrange the common course. The attitude will determine the future development of dentist. KMUD invite the international, professional and famous person to teach our students in classroom. We also invite the young and international winner dentists to teach our student about the modern and professional life after graduation. For social responsibility, KMUD re-organize the student activity and go to high mountain area. For example, dental students take long-distance bus and teach popular science to indigenous children. We hope that more community service can help student to understand the real dental requirement in Taiwan. It is my important job to create research culture for KMUD undergraduate student. We have invited and encouraged freshman to join Lab meeting and do research. Our students show their academic talent and win many research award in National and international conferences, and some of my students published journal papers in academic journal. We hope that those students can choose the academic career.

## **Brief CV**

### EDUCATION

- 1987 – 1991 Bachelor Materials Science and Engineering, National Cheng Kung University  
1991 – 1993 Master Materials Science and Engineering, National Cheng Kung University  
1993 – 1998 Ph.D. Materials Science and Engineering, National Cheng Kung University

### EMPLOYMENT

- 2003 Assistant Professor, Institute of Oral Medicine, National Cheng Kung University, Taiwan  
2006 Associate Professor, Institute of Oral Medicine, National Cheng Kung University, Taiwan  
2008 Associate Professor, Institute of Biomedical Engineering, National Cheng Kung University, Taiwan  
2010 Professor, Institute of Oral Medicine, National Cheng Kung University, Taiwan  
2010 Professor, Institute of Biomedical Engineering, National Cheng Kung University, Taiwan  
2012 Vice Dean, College of Medicine, National Cheng Kung University, Taiwan  
2012 Deputy Director, Medical Device Innovation Center (MOE University Advancement), National Cheng Kung University, Taiwan  
2013 Member, Advisory Board, National Applied Research Laboratories, MOST, Taiwan  
2015 Professor, School of Dentistry, Kaohsiung Medical University, Taiwan  
2015 Dean, College of Dental Medicine, Kaohsiung Medical University, Taiwan  
2017 Member, Council of Medical Education, Ministry of Education (MOE), Taiwan

### AWARDS

- 2005 Young Investigator Research Award, College of Medicine, National Cheng Kung University  
2006 Best Paper Award, Cheng Kung Medicine Foundation for Education (7 times since 2006)  
2008 Ta-You Wu Award (CAREER Award), Ministry of Science and Technology (MOST), Taiwan  
2010 Annual Excellent Paper, Journal of Medical and Biological Engineering (SCI)  
2012 Excellent Teacher, Teaching innovation, College of Medicine, National Cheng Kung University  
2012 Golden Medal, Geneva International Exhibition of Inventions  
2013 Excellent Teacher, School of Medicine, National Cheng Kung University, Taiwan  
2016 Excellent Achievement Award, Industry-Academia Cooperation, MOST, Taiwan

## Keynote Lecture

### Current status of dental education in Taiwan and Japan



#### Current status of dental education in Taipei Medical University

Dr. Hsin-Chung Cheng,

Dean, College of Oral Medicine, Taipei Medical University

School of Dentistry (SOD) was established at the same time as Taipei Medical College (TMC) was founded on June 1, 1960. In 2000, TMC was upgraded to Taipei Medical University (TMU). In 2001, COM was established and was composed of SOD, School of Oral Hygiene, and Graduate Institute of Oral Science (GIOS) featuring biomedical and basic sciences research. In 2002, SOD and GIOS were combined as one continued education program that included DDS and MSD. In 2004, PhD programs in SOD was established. School of Dental Technology was also established in 2007 and master program established in 2017. At present, there are a total 966 students and over 200 full time and part time faculties in COM. The education objective of undergraduates is to train the dental students to become an excellent dentist that acquire outstanding dental knowledge, skills with artistic characteristic and a global vision. To fulfill this objectives, the course curriculum places emphasize on humanity, excellence, international vision, and academia. In the curriculum system, SOD has ten departments including prosthodontics, periodontics, orthodontics, pedodontics, endodontics, operative dentistry and dental material, craniofacial development, oral hygiene and dentistry humanities. For the training system, SOD carried out Digital Dental Systems, Interactive Response System (IRS), PBL educational system, traditional OSCE, Group OSCE, Informatics OSCE, Team Resource Management (TRM)..., etc. The education objective of the master program is to train a dentist to become a skillful specialist and evidence-based researcher, the combination of clinical special training system and research program is developed. The education of the PhD program is to train an excellent researcher with the global view and international cooperation ability, the dual program with SOD's sister abroad schools is designed. Through all these efforts, we move forward to establish the first-class brand of SOD in the world and to cultivate the next generation of outstanding dental professions and researcher.

## **Brief CV**

Hsin-Chung Cheng, D.D.S, MSD, Ph D.

Dean and Professor, College of Oral Medicine;

Director, Department of Orthodontics, Taipei Medical University Hospital, Taipei, Taiwan.

Immediate Past President, Taiwan Association of Orthodontists (2017-18)

Past Chair, School of Dentistry, Taipei Medical University, Taipei, Taiwan.

Professor Cheng is the current Dean of College of Medicine, Taipei Medical University. He has been the president of Taiwan Association of Orthodontists (TAO) (2017-2018) and the chairman and editor in chief of TAO Journal Committee (2013-2016). He graduated from school of dentistry, Taipei Medical University in 1983 and got Master and PhD degree from the same university in 1995 and 2008, respectively. He practiced in orthodontic department at his hospital and also engaged in teaching and research in his school of dentistry for over 25 years. His major researches were surface treatment of orthodontic TADs and high molecular orthodontic material, esthetic smile in orthodontics, efficient orthodontic treatment of anterior cross-bite, evidence based in orthodontics..., etc. He has published over 300 different kinds of academic and clinical papers and been also invited to make lectures about his associated researches around the Asian countries and got an enthusiastic response.

## Keynote Lecture

### Current status of dental education in Taiwan and Japan



#### Education on Special Needs and Geriatric Dentistry in Japan

Yasuaki Kakinoki

Division of Special Needs and Geriatric Dentistry  
Department of Physical Functions  
Kyushu Dental University

Aging rate of Japan is the top in the world, and the elderly people who need care and disabled people are also increasing. Also, aging is also progressing in Asian countries as well. In Japan, the national exam question standard for dentists and dental hygienists include Special needs dentistry and Geriatric dentistry, the education about these subjects are provided at each university and vocational school.

This time, we will report on the current state of education on Special Needs and Geriatric Dentistry in Japan.

#### Brief CV

##### EDUCATION

B.S. degree Kyushu Dental College, Kitakyushu, Japan (1980)  
Ph.D. degree Kyushu Dental College (2004)

##### EMPLOYMENT

Professor, Kyushu Dental University (2005-present)  
Vice President of Kyushu Dental University (2013-2016)  
Director of Kyushu Dental University Hospital (2013-2016)  
Director of School of Oral Health Sciences (2010-2013)

Director of Dental division, National Minami-Fukuoka Chest Hospital. Fukuoka (1981-2004)

Dental resident of Oral surgery, Hospital of University of Occupational and Environmental Health, Kitakyushu, Japan, (1980-1981)

##### PROFESSIONAL SOCIETIES

Japan Society for Disability and Oral Health (JSDH)  
Director (1990-present)  
Vice president (2011-2013)  
The Japanese Society of Oral Care (JSOC)  
Director (2005-present)  
Japan Dental Society of Oriental Medicine (JDSON).  
Director (2014-present)  
Vice president (2016-present)

## Special Lecture

### Present status of oral health promotion by dentist and dental hygienist



#### Adapting to changes in the environment surrounding dental hygienists in Japan

Dr. Noriko Takei,

President, Japan Dental Hygienists' Association

The dental hygienist profession was established approximately 70 years ago in Japan. Over the past 50 years, the number of employed dental hygienists has increased by about 44 times, with the number in Japan recently surpassed only by those in the United States. Presently, more than 90% of employed dental hygienists are working at dental offices, though major changes are underway. More than 40% of patients who visit dental offices are aged 65 years or older, for whom knowledge and skills related to whole body management, as well as cooperation with medical and dental professionals are necessary. Furthermore, even though local nursing care systems have only recently been established, dental hygienists are being asked to go into the community to exercise their expertise in collaboration with other medical professionals. For future success, it will be important for hygienists to receive training in the field of oral health management in order to help with oral feeding of patients receiving care at home.

This fiscal year, the Japan Dental Hygienists' Association will begin implementation of e-learning programs for lifelong training that any hygienist can participate in at any time and any place. Additionally, as a next step, a training course for strengthening the expertise of hygienists will be provided for those who participate in their local programs, with credit given for completion. Presently, the Association provides several authorized training courses, including lifestyle-related disease prevention, dysphagia rehabilitation, home care instruction, cooperation with medical and dental professionals, and diabetes prevention. In the future, members of the Association, dental hygienists ourselves, will continue endeavors to protect general health by use of oral care and provide support for the pleasure of eating by providing a variety of relevant training courses.

## *Brief CV*

### EDUCATION

- 1980 - Graduated from School of Dental Hygienists affiliated with Tokyo Medical and Dental University, Faculty of Dentistry
- 1980 to 1994 - Lion Corporation, Dept. of Oral Hygiene
- 1994 to present - Lion Foundation for Dental Health
- 2001 - Graduated from Faculty of Liberal Arts, Open University of Japan
- 2005 - Completed graduate course conducted by Niigata University Graduate School of Medical and Dental Sciences

### EMPLOYMENT

- Laboratory of Research and Development, Lion Foundation for Dental Health (public interest incorporated organization)
- President, Japan Dental Hygienists' Association (public interest incorporated organization)
- Doctor of Medical Dentistry
- Member of Board of Directors, Japanese Society for Oral Health
- Administration officer, Japan Academy of Esthetic Dentistry
- Representative, Japanese Society of Gerodontology

## Special Lecture

### Future mission imposed on oral health team for the people of Japan



#### Message on oral health project from Japan to Taiwan Part 1

Ms. Shino Yamaguchi,

Dental Hygienist, Staff of Kyushu Dental University Hospital

Dental hygienists in Japan are certified by the Ministry of Health and Welfare in Japan. It is necessary for high-school students who want to be dental hygienists to enter the authorized training schools for the certification. The establishment of a predecessor training school of dental hygiene in Kyushu Dental University can be traced to 1950, and then, dental hygiene education in this university has about 70 years of history. The School of Oral Health Sciences, Faculty of Dentistry at Kyushu Dental University was established in 2010 as a 4-year course school and 9 years have passed since then.

Four-year education provides more intensive and extensive course contents than possible with 3 years of education provided by many other 3-year course training schools. The School of Oral Health Sciences provides extensive clinical education to train dental hygienists in cooperation with the School of Dentistry. The number of graduates from the School of Oral Health Sciences is about 150. These graduates are now working in various fields as members of the elite.

I have been working at Kyushu Dental University Hospital for 5 years. The number of dental hygienists increased from 9 to 15 for 5 years. The increase of dental hygienists in the hospital meet the demands of the present age.

The content of their work in the hospital, of course, involves 3 major responsibilities; administering preventive treatment for dental caries and periodontal disease, operator assistance during dental treatment, and dental health education. In addition, dental hygienists in our University Hospital train dental hygiene students, manage dental instruments, and improve the environment of the hospital. Furthermore, they are engaged in perioperative oral management, home-visit dental treatment, and care of oral hypofunction.

In order to provide these practices, we are now devoting ourselves to our studies as professionals. I will present here how the dental hygienists in the hospital are practicing the dental hygiene jobs as professionals.

#### **Brief CV**

##### EDUCATION

2011-2015 Kyushu Dental University, Japan

##### EMPLOYMENT

2015-present Kyushu Dental University Hospital

##### AWARDS

2015 Japan Dental Hygienists Association student award

## Special Lecture

### Future mission imposed on oral health team for the people of Japan



#### Message on oral health project from Japan to Taiwan Part 2

Ms. Yasuna Myose,

Dental Hygienist, Staff of Bee Brand Medico Dental.Co.,Ltd.

The Graduate School of Kyushu Dental University offers a masters' degree program in Oral Health Sciences since 2014. After completing the 2-year program for master's degree, the degree in oral health sciences is awarded to students. The program consists of, for example, the advanced oral health care, the contribution to community health, or basic research of oral health sciences.

I graduated from the master course of this university, and obtained the master degree with the basic research concerning the immunological response to the intraepithelial injury caused by oral health care equipment. Two-year master course gave me a profound insight for oral health sciences and indicate my future path.

Dental hygienists can work at many workplaces including dental clinics and hospitals, social welfare facilities, public health centers, training institutions, and companies. However, more than 95% of employed dental hygienists work in hospitals or dental clinics, and less than 1% of them work in companies. I have been working at Bee Brand Medico Dental. Co.,Ltd., a drug manufacturer, for 1 year after graduation. The reason why I work now in the company is because I can contribute to the oral health care of more people in a sales activity.

The content of work in my company involves the information transmission of drugs to healthcare workers, promoting exhibitions at the conference, and holding seminars for healthcare workers.

I would like to continue this work, and develop the new product in the future. I will present here how the dental hygienists in the company are practicing the dental hygiene jobs as professionals.

#### Brief CV

##### EDUCATION

2012-2016 Kyushu Dental University, Japan

2016-2018 Graduate School, Kyushu Dental University

##### EMPLOYMENT

2018- Bee Brand Medico Dental. Co.,Ltd

# Poster Presentations

## \*Young Investigator Award Competition

#1\*

### **BMP-3b regulates regeneration of skeletal muscle**

Aki Miyawaki<sup>1,2</sup>, William N. Addison<sup>2</sup>, Takuma Matsubara<sup>2</sup>,  
Manabu Habu<sup>1</sup>, Sho Mitsugi<sup>1</sup>, Kazuhiro Tominaga<sup>1</sup>, Shoichiro Kokabu<sup>2</sup>

<sup>1</sup>Division of Maxillofacial Surgery, Department of Science of Physical Functions, Kyushu Dental University

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In cachexia associated with the terminal stage of cancer, atrophy occurs due to accelerated degradation and regeneration ability of skeletal muscle, leading to a decrease in patients' quality of life and poor prognosis. The pathological mechanism of this cancer cachexia involves the activation of Smad2 / 3 signaling by TGF- $\beta$ , Activin, and Myostatin. However, the role of BMP-3b on the skeletal muscle atrophy although completely remains unknown although BMP-3 modulates Smad2 / 3 signaling. So we focused on BMP-3b and analyzed the role of BMP-3b in skeletal muscle regeneration.

Overexpression of BMP-3b suppressed myogenic differentiation of primary cultured murine satellite cells (SCs) and C2C12 murine myoblasts in vitro. BMP-3 also repressed the transactivation of MyoD, master regulator of myogenesis, in C3H10T1/2 murine fibroblasts. In contrast, the SCs in which endogenous BMP-3b is knocked down by introducing siRNA, increased the capacity of myogenic differentiation. Moreover, over-expression of BMP-3b suppressed the cardiotoxin-induced regeneration of tibial anterior muscle in vivo, suggesting BMP-3b may be involved in skeletal muscle atrophy of cachexia.

#2\*

## Glucan from baker's yeast suppresses osteoclast differentiation

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Several immuno-receptors expressed on the cell surface are reported to be associated with osteoclastogenesis. Dectin 1, a lectin receptor for  $\beta$ -glucan, is found predominantly on cells of the myeloid lineage. In this study, we examined the effect of the dectin 1 agonist Glucan from baker's yeast on osteoclastogenesis. In mouse bone marrow cells Glucan from baker's yeast suppressed receptor activator of NF- $\kappa$ B ligand (RANKL)-induced osteoclast differentiation in a dose-dependent manner. This was achieved within non-growth inhibitory concentrations at the early stage. Furthermore, Glucan from baker's yeast inhibited RANKL-induced nuclear factor of activated T cell cytoplasmic 1 (NFATc1) expression, thereby decreasing osteoclastogenesis-related marker gene expression, including tartrate-resistant acid phosphatase (TRAP) and osteoclast stimulatory transmembrane protein (Oc-stamp). Glucan from baker's yeast inhibited RANKL-induced c-fos expression, followed by suppression of NFATc1 autoamplification, without significantly affecting the Mitogen-activated Protein Kinase (MAPK) signaling pathway. We also observed that B-lymphocyte-induced maturation protein-1 (Blimp1), a transcriptional repressor of negative regulators of osteoclastogenesis, was also downregulated by Glucan from baker's yeast, resulting in the elevated expression of v-maf musculoaponeurotic fibrosarcoma oncogene family, protein B (MafB) and interferon regulatory factor-8 (Irf8) in dectin 1-overexpressing RAW 264.7 cells (d-RAWs). In the future, further analysis is planned on the molecular mechanism of the inhibition of osteoclast differentiation via dectin-1 by Glucan from baker's yeast.

### #3\*

## **Role of omega-3 fatty acid on inflammasome activity in *Aggregatibacter actinomycetemcomitans*-invaded macrophages**

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Macrophages are crucial modulator of the immune responses. Inflammation is the important response to bacterial infection and mediated primarily by macrophages and initiated by pattern-recognition receptors. We reported that gram-negative bacteria, *Aggregatibacter actinomycetemcomitans*, invasion induced pyroptosis in macrophages. Recently, omega-3 fatty acids including docosahexaenoic acid (DHA) and Eicosapentaenoic acid (EPA) have been shown to play important roles in the improvement of chronic inflammatory diseases. In the present study, we clarified the effect of omega-3 fatty acids in inflammasome activity, especially gasdermin D, induced by *A. actinomycetemcomitans*-invasion in macrophages. *A. actinomycetemcomitans*-invasion induced NLRP3 inflammasome activity and gasdermin D in THP-1 cells, concurrently with cell death. NLRP3 inflammasome activity induced by *A. actinomycetemcomitans*-invasion was regulated by caspase-4 and cadpase-1 activity. DHA and EPA downregulated in flammasome activity and pyroptosis in *A. actinomycetemcomitans*-invaded THP-1 cells. Especially, DHA downregulated the expression of inflammasome-related protein, ASC and gasdermin D, induced by *A. actinomycetemcomitans*-invasion in THP-1 cells. Depletion of ASC, caspase-4 and gasdermin D downregulated the secretion of IL-1 in *A. actinomycetemcomitans*-invaded THP-1 cells. These results indicate that omega-3 fatty acid, particularly DHA, downregulated the inflammasome activity in THP-1 cells induced by *A. actinomycetemcomitans* through the downregulation of noncanonical NLRP3 inflammasome activation.

## #4\*

### **Slitrk1, an integral membrane protein, regulates osteoblast differentiation**

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#### Objective:

Slit and Trk-like protein 1 (Slitrk1) is a member of the SLITRK family of integral membrane proteins known to regulate neurodendrite elongation in the nervous system. Slitrk1 is associated with Tourette syndrome. Patients exhibit delayed bone formation and increased bone fracture tendency. However, the role of Slitrk1 in bone homeostasis is completely unknown. Here, we examined the role of Slitrk1 in osteoblastogenesis.

#### Methods:

Murine femoral bone was immunostained with Slitrk1 antibody. Osteoblast differentiation was induced in osteoblast lineage cell cultures such as MC3T3-E1 cells, primary murine bone marrow stromal cells (BMSCs), and primary murine calvarial osteoblasts by treatment with ascorbic acid and  $\beta$ -glycerophosphate, or recombinant human (rh) bone morphogenetic protein 2 (BMP2). For formation of ectopic bone, collagen pellets soaked with 2  $\mu$ g of rhBMP2 were implanted beneath the fascia of 8 weeks-old male mice. 10T1/2 cells were transfected with runt-related transcription factor 2 (Runx2) along with or without Slitrk1 expression vectors using lipofection methods. Endogenous Slitrk1 in MC3T3-E1 cells was knocked down by siRNA. Femoral bone volume of 6 month-old Slitrk1 null mice was assessed by micro CT.

#### Results:

Slitrk1 was strongly expressed by osteoblasts in murine femoral bone. The expression levels of Slitrk1 increased with osteoblast differentiation in osteoblast lineage cells. Alkaline phosphatase (ALP) activity was decreased in Slitrk1 knock-down cells or BMSCs isolated from Slitrk1 null mice. In contrast, overexpression of Slitrk1 in C3H10T1/2 cells, which do not express Slitrk1 endogenously, led to increased mRNA levels of ALP and osteocalcin induced by Runx2. BMP2-induced ectopic bone formed in Slitrk1 null mice was smaller than in wild-type littermates. Femoral bone volume of Slitrk1 null mice showed a decreased tendency compared to control mice.

#### Conclusions:

Taken together, these data suggest that Slitrk1 is expressed in osteoblast cells where it enhances osteoblast differentiation.

## #5\*

### **Antinociceptive effects of isoliquiritigenin, a bioactive component of Glycyrrhiza, by blocking voltage-gated sodium channels**

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Many traditional Japanese medicine for treatment of pain include Glycyrrhiza. However, it is not clear the mechanism of Glycyrrhiza for pain relief. Isoliquiritigenin (ILG), a bioactive ingredient in Glycyrrhiza, has been reported to inhibit pain-related voltage-gated sodium channel (Nav)1.8. Therefore, we examined the effect of ILG on channels in vitro and nociception in vivo. We found inhibitory effects of ILG on other Nav channels Nav1.1, Nav1.3, Nav1.6 and Nav1.7 induced currents in expression cell system, as the same as lidocaine. Similarly, ILG suppressed TTX-sensitive and -resistant Nav currents in dissociated sensory neurons of rats. In 16 of 25 neurons, inward and outward currents and action potential generation were inhibited by ILG. Conversely, in remained neurons, ILG inhibited only outward current and facilitated action potential generation. On a rat oral ulcer model, swab application of ILG inhibited pain-related behaviors. TRPV1, TRPA1, and TRPV4 agonists-induced acute pain in the hind paw was inhibited by ILG co-injection. ILG showed no effects on chronic pain (chronic inflammation and neuropathic pain). Different from lidocaine, a single injection of ILG into the hind paw did not change mechanical threshold. These finding suggests that ILG elicits peripheral anti-nociception via inhibition of action potential generation by blocking Nav channels. No anesthetic effect of ILG on healthy skin may be caused by excitable action potential generation in a part of neurons.

#6\*

**Tooth movement-induced pain is mediated via TRP channels  
by mechanical or ROS stimulation via.**

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The majority of orthodontic patients experience discomfort and pain during the process of tooth movement. Continuous orthodontic force on the tooth induces mechanical compression in the periodontal ligament (PDL), resulting ROS reactive oxygen species production. Transient receptor potential vanilloid receptor 1 (TRPV1), TRP ankyrin 1 (TRPA1) and TRP vanilloid 4 (TRPV4) contribute to the transduction of mechanical and ROS stimuli. In this study, we examined the contribution of TRPV1, TRPA1 and TRPV4 with tooth movement-induced pain, using behavioral, immunohistological and molecular biological techniques. TRPV1 mRNA level in human dorsal root ganglion was higher than that of the other cells. TRPA1 mRNA level in periodontal ligament cells was equivalent or very lower than that of the dorsal root ganglion. TRPV4 mRNA level in periodontal ligament cells was higher than that of the dorsal root ganglion. Under anesthesia, male Wistar rats were connected with a closed-coil spring (50g force) between the right maxillary first molar and the ipsilateral upper incisor. Facial grooming-like behavior, which is a sign of an intraoral nociception, was prolonged at peak day 1 after experimental tooth movement, and then gradually decreased. The prolonged facial grooming-like behavior was reduced by administration of SB-366791 (TRPV1 antagonist), HC-030031 (TRPA1 antagonist), RN-1734 (TRPV4 antagonist), TEMPOL (superoxide selective scavenger), and PBN (non-specific ROS scavenger). PGP9.5 (neural marker)-immunoreactive nerve fibers in the periodontal ligament were overlapped with TRPV1, TRPA1 or TRPV4 localities. These results suggest that tooth movement-induced pain is mediated via TRP channels by mechanical or ROS stimulation.

## #7\*

### **Effects of highly-residual ointments with medicines on oral ulcerative mucositis**

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There are differences in adhesiveness and residual property in the oral cavity among available ointments. In this study, we compared the physical and sensory properties of various ointment bases (vaseline, plastibase, traful ointment [TO] base and traful ointment pro-quick [TOPQ] base) in a rheometer and investigated effects of the highly-residual ointment with medicines on severity and pain of oral ulcerative mucositis (OUM). TO and TOPQ showed higher adhesiveness and residue than vaseline and plastibase in human sensory evaluation. Based on these results, we used the TO base as highly-residual ointment for the following animal experiments and applied it with the steroid triamcinolone acetonide (Tmc) or the antimicrobial agent cetylpyridinium chloride (CPC). In rats, OUM was developed in the inferior labial fornix region by soaking in 50% acetic acid under anesthesia. Ointments were applied twice a day. On day 2, prolonged facial grooming behavior (a sign of spontaneous pain) was shortened by Tmc-containing TO, compared with non-treatment group. In Tmc group, mRNA level of the glucocorticoid receptor target gene GILZ was increased while TNF- $\alpha$  and COX2 mRNA levels were decreased. On day 5, CPC-containing TO group accelerated healing. These results suggest that Tmc and CPC in the highly-residual ointments are effective for pain relief and OUM healing, respectively.

**#8\***

## **Comparison of the effects of newly developed tetraplex DNA binders on normal and 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. Since guanine-rich telomeric repeat sequence is known to form unique four-stranded DNA structure, it is expected as a target for anticancer drug development. Among the novel compounds with improved binding specificity to the four-stranded DNA structure, we investigated the growth inhibitory effects of cyclic naphthalene diimide (cNDI) and cyclic anthraquinone (cAQ) on various cultured cells derived from cancer and normal tissues in this study.

Human cancer cell line Ca9-22, SAS, HSC-2, KB, and human normal keratinocytes, bone marrow cells prepared from mouse femurs were used. Cell proliferation test was performed by direct measurement with a hemocytometer and WST-8 method. The expression of the gene was analyzed by PCR and real-time PCR with total RNA prepared from each cell was reverse transcribed.

Both cNDI and cAQ inhibited cell growth in a dose-dependent manner, and tended to correlate with the mRNA expression level of the TERT gene. In addition, these compounds showed a strong inhibitory effect against cell growth of cancer-derived cell lines compared to the cells from normal tissues, i.e., mouse bone marrow cells and human normal epidermal keratinocytes.

These results indicated that cNDI and cAQ are effective to improve specificity of anti-proliferative effect on cancer cells with higher telomerase activity.

## #9\*

### Usefulness of DNA chip “Genopal” for clinical diagnosis of periodontal diseases

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#### <Objective>

This study aimed to verify whether DNA chip “Genopal”, which can quantitatively evaluate twelve species of oral bacteria including bacteria causing periodontal disease was useful for clinical diagnosis, and whether the difference of species of bacteria in the subgingival plaque influenced the periodontal health state.

#### <Methods>

Subgingival plaques were collected from two sites of each subject in 14 patients (mean± SD: 63.9 ± 9.7; 14 males, 9 females) who attend Kyushu Dental University Hospital. Probing periodontal pocket (PPD), clinical attachment loss (CAL) and bleeding on probing (BOP) of same sites at the same time were examined.

The quantitative analyses of twelve bacterial species, such as *P. gingivalis* (Pg), *T. forsythia* (Tf), *T. denticola* (Td), *C. rectus* (Cr), *F. nucleatum* (Fn), *P. intermedia* (Pi), *P. nigrescens* (Pn), *A. actinomycetemcomitans* (Aa), *C. gingivalis* (Cg), *S. gordonii* (Sg), *S. intermedius* (Si), *S. mutans* (Sm), in the samples were performed using DNA chip Genopal® (Oral Care Chip, Mitsubishi Chemical).

#### <Results>

Td and Pn were detected at a significantly higher rate at sites of PPD  $\geq 4$  mm. The proportion of Sg was significantly higher at sites of PPD  $< 4$ mm compared with  $\geq 4$  mm. Additionally, there were significant positive correlations between total proportion of Pg, Tf and Td, including red complex regarded to causative bacteria of chronic periodontitis, and PPD, and significant negative correlation between the proportion of Sg and PPD, and CAL. In the relationship between bacterial species, the proportion of Sg was significantly correlated with that of Pg.

#### <Conclusion>

The results of this study showed that difference in bacteria detected by the DNA chip in the subgingival plaque was related to that in periodontal health state. Although further studies are need, it is suggested the usefulness of DNA chip Genopal® for an evaluation of periodontal diseases.

## **#10**

### **Kyushu Dental University Global Scholarly Exchange Program 2018 student report in Taiwan**

Anna Sano, Nozomi Yasumura

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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. The aim of this program is to expand the scope of the students and to enhance their communicative competence.

We, the third-year students, participated in the KDU-GSE program on School of Oral Health Science, Kaohsiung Medical University (KMU) and Taipei Medical University (TMU), Taiwan, in September 15th to 22nd, 2018. We visited an elderly facility, a clinic on a remote island, a university hospital, an outpatient dental clinic affiliated to the university hospital and private dental clinics as part of this program.

We had a relationship with students at KMU and those at TMU. We were impressed by these students in Taiwan with the high consciousness to be medical practitioners and their dedication to study. We were aware of common or different points between Japan and Taiwan dental hygiene systems. We also realized that dental hygienists are needed globally.

Consequently, we could have a more positive self-images as dental hygienists in future. We will try our hardest to be the ideal dental hygienists who can think globally, act locally.

## #11

### **Kyushu Dental University Global Scholarly Exchange 2018 Short-Time Visiting Program Report in Srinakharinwirot University, Thailand**

Hikari Ohnaka , Mizuna Nakada, Miharuru Honjyo, Mone Nakashima

Kyushu Dental University

We joined the Kyushu Dental University Global Scholarly Exchange short term visiting program to visit a faculty of Dentistry, Srinakharinwirot University (SWU), Bangkok, Thailand from September 2 to 8, 2018.

The aim of the program is to broaden our horizons and acquire global communication skills. We had a lot of experiences in this program.

First, we visited many treatment rooms in a dental hospital. The hospital had various dental fields such as oral medicine, oral surgery, conservative dentistry, and so on. Dental students in SWU had to make treatment plans for their patients before dental treatments. After the plan was permitted by faculty staff, they could start to treat their patients by themselves under instructions from faculty staff.

Second, we participated in pharmacology and oral histology class. We made a chlorhexidine-containing mouthwash solution using chemical substances in pharmacology class. Then, we observed tooth structures using microscope in oral histology.

Third, we took part in a case-presentation seminar of department of Conservative. Post graduate students made presentations about an endodontic treatment. They discussed about it using English only. So, we deeply realized that dental students and postgraduate students in SWU had a high English speaking ability.

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

## #12

### **The important role of cytolinker protein Plectin1 acts as scaffold of actin ring regulation in osteoclasts**

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Osteoclasts are major player of bone resorption and regulates bone homeostasis. Bone metabolic disorders like osteoporosis or periodontitis will be taken in case of acceleration 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 Src is one of the key molecules to regulate bone resorption through promoting attachment of osteoclasts to bone matrix. We identified a cytolinker protein Plectin1 as Src binding protein by mass spectrum analysis. Plectin1, especially Plectin1D isoform involving in actin organization was highly expressed in osteoclasts compared with muscle. To examine the role of Plectin1 in osteoclast, we stably transfected Plectin1 shRNA in RAW264.7 cells, osteoclast precursor cell line to inhibit Plectin1 expression. Plectin1 knocked down RAW264.7 cells were differentiated to TRAP positive multinuclear cells (TRAP(+)MNCs) by RANKL stimulation. However, the Plectin1 knocked down TRAP(+)MNCs were larger than control cells. Moreover, the Plectin1 knocked down TRAP(+)MNCs did not form actin ring, the important actin structure in osteoclasts for bone resorption. These results suggest that Plectin1 is important in osteoclast polarization.

## #13

### **Utilization of neutral electrolyzed water for prevention of infection via gypsum model**

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Several types of electrolyzed water have been widely used in clinical dentistry because of their strong bactericidal activities and low running cost. We reported that they showed high bactericidal efficacies for disinfection of impressions, dental instruments, and removable dentures. No or insufficient disinfection treatment of impressions can cause some infection diseases via gypsum models contaminated with pathogenic microbes moving from them. We focus on the use of neutral electrolyzed water (NW) as a disinfection water of impression and dental gypsum model. Effective treatment conditions for alginate impressions and dental stone models with NW were examined in this study.

Alginate impressions were prepared by impression taking of a disk-shaped metal (2 mm diameter, 7 mm thickness). Dental stone models were also prepared along to an ordinal method with the impressions contaminated with staphylococcus aureus ( $5.0 \times 10^7$  /ml, 0.3 ml). Two types of specimen, alginate impressions and dental stone models, were immersed in running NW. Before and after immersion treatment, the numbers of the surviving bacteria attached to each specimen were examined by agar pour plate method after extraction by swabbing method. In the same way, the surviving bacteria numbers in the specimens without treatment using NW were also examined.

Immersion treatment in running NW for 30 s showed sufficient disinfection effects remaining no or little bacteria on the alginate impressions. No bacteria were detected on the dental stone models made from these treated alginate impressions after 30-s immersion treatment in NW. In the cases of the dental stone models contaminated with bacteria, same treatment also showed effective bactericidal activities removing almost all surviving bacteria on their surface.

It suggested that only 30-s treatment in running neutral electrolyzed water is effective to prevent the infection via gypsum models.

## #14

### **Zfp423 regulates skeletal muscle regeneration**

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Satellite cells are skeletal muscle stem cells that proliferate in response to injury and provide myogenic precursors for growth and repair. *zfp423* is a transcriptional factor expressed in multiple immature cell populations, such as mesenchymal stem cells and preadipocytes, where it regulates lineage allocation, proliferation, and differentiation. In this study, we demonstrate that *zfp423* regulates myogenesis during skeletal muscle regeneration. *Zfp423* is undetectable in quiescent satellite cells but becomes expressed during satellite cell activation. After expansion, *zfp423* is gradually downregulated as committed satellite cells terminally differentiate. Mice with satellite-cell-specific *zfp423* deletion exhibit severely impaired muscle regeneration following injury, with aberrant satellite cell expansion, defective cell cycle exit, and failure to transition efficiently from the proliferative stage toward commitment. Consistent with a cell-autonomous role of *zfp423*, shRNA-mediated knockdown of *zfp423* in myoblasts inhibits differentiation. Surprisingly, forced expression of *zfp423* in myoblasts induces differentiation into adipocytes and arrests myogenesis. Affinity purification of *zfp423* in myoblasts identified *Satb2* as a nuclear partner of *zfp423* that cooperatively enhances *zfp423* transcriptional activity, which in turn affects myoblast differentiation. In conclusion, by controlling satellite cell expansion and proliferation, *zfp423* is essential for muscle regeneration. Tight regulation of *zfp423* expression is essential for normal progression of muscle progenitors from proliferation to differentiation.

## #15

### **The role of p130Cas in cell morphological change, mobility, and invasion ability of oral squamous cell carcinoma by TGF- $\beta$ stimulation**

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Oral squamous cell carcinoma (OSCC) frequently invades the mandible or maxilla bone, which associated with a worse prognosis. Epithelial-mesenchymal transition (EMT) is the process by which cells lose epithelial characteristics and acquire mesenchymal cell-like shapes, migration and invasion capacity. The EMT process is associated with the invasion and metastasis of several kinds of carcinoma including OSCC. The expression of p130Cas, a regulator of the cytoskeleton, increases in various cancers. The relationship between p130Cas and EMT in OSCC has not been elucidated. Immunohistochemistry revealed that phosphorylated p130Cas was colocalized with Smad3 in surgically excised OSCC human samples. We next examine the effect of p130Cas on TGF- $\beta$  induced EMT using a murine squamous cell carcinoma cell line, SCCVII and a human squamous cell carcinoma cell line, HSC-2. In SCCVII, cells stably expressing shRNA against p130Cas showed decreased cell migration, decreased invasion ability and reduced morphological changes compared to cells expressing scrambled shRNA. Finally we examined the effect of p130Cas on a murine bone destruction model. p130Cas knockdown SCCIIV cells had little effect on bone destruction compared to scramble shRNA cells, suggesting that p130Cas is involved in morphological changes, mobility, and invasion ability during bone invasion by OSCC.

## #16

### **Preparation and characterization of silica based nanocomposite with compatible hardness to human enamel**

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Dental organic-inorganic composites have been developed for computer-aided design/computer-aided manufacturing (CAD/CAM) systems over the last decade. The dental CAD/CAM composites can be divided roughly into two groups in terms of their microstructures: dispersed filler (DF) structure and polymer infiltrated ceramic network (PICN) structure. The composite with the DF structure is composed of resin matrix with dispersed inorganic fillers. This structure has been widely adapted for conventional composites. On the other hand, the PICN structure has dual-networks of ceramic skeleton and infiltrated polymer phase. Recently many researches have reported that the dental composites with PICN structure give similar mechanical properties to human enamel. However, materials variations of the PICN structural composite have been limited in micro-structural types. In this study, a nano-structural PICN composite of silica-poly(methyl methacrylate) (SiO<sub>2</sub>-PMMA) are prepared and characterized for bi o-compatible to human enamel.

A porous silica monolith was fabricated by sintering a precursor consisted with silica nanoparticles and an organic binder. The fabricated porous silica monolith was immersed in a methyl methacrylate (MMA) with benzoyl peroxide for adequate time. The infiltrated silica monolith was subjected to thermal treatment above 60°C. Consequently, a transparent SiO<sub>2</sub>-PMMA composite was obtained. The resulting composite was characterized by structural characterizations and the mechanical tests.

The nitrogen sorption porosimetry and the FE-SEM observations revealed that the SiO<sub>2</sub>-PMMA composite had a nano-dual-network structure composed of silica skeleton and an infiltrated PMMA phase. The results of Vickers hardness indicated that the SiO<sub>2</sub>-PMMA composite had comparable hardness to human enamel. Meanwhile the elastic modulus of the composite was quite lower than that of human enamel. In summary, the nano-dual network structure of SiO<sub>2</sub>-PMMA composite with a compatible hardness to enamel can be prepared successfully.

## #17

### Super Global High School (SGH) program 2018 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, 2018, eight second grade students took this elective course. The students' purposes were to: (1) become dental professionals in the future, (2) understand the importance of dentistry and teeth and (3) acquire global perspectives through this course. In order to achieve the purposes above, they went through some stages. 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.

## #18

### **The level of IL-10 in gingival crevicular fluid of mobile teeth related to periodontal healing after initial periodontal treatment**

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Present literature suggests that gingival crevicular fluid (GCF) analysis is useful for evaluating the current periodontal condition and the effect of initial periodontal treatment. In this study, we investigated whether cytokine levels in GCF are related to the clinical improvement of mobile teeth after initial periodontal treatment. Clinical parameters such as probing pocket depth (PPD), periodontal epithelium surface area (PESA), and the tooth mobility according to Miller's classification and multiple cytokine levels in GCF using membrane antibody array for 20 mobile teeth were measured at four time points during initial periodontal treatment: before initial periodontal treatment (baseline), after supragingival scaling, after occlusal adjustment, and after scaling and root planing (SRP). The levels of Eotaxin and Eotaxin-2 were significantly lower than those at baseline after SRP. Then, we divided all test teeth into two groups based on whether clinical parameters were improved or not. The levels of interleukin (IL)-10 at baseline were significantly higher in the patients whose PESA was substantially improved to healthy levels after SRP compared with those in whom PESA was not improved. In addition, the levels of IL-7, IL-11, and IL-12p40 at baseline were significantly lower in patients whose tooth mobility was decreased after occlusal adjustment compared with those in whom tooth mobility was not changed. In conclusion, the low levels of IL-7, IL-11, and IL-12p40 in GCF at baseline may suggest the improvement of tooth mobility is likely to occur, while high levels of IL-10 in GCF at baseline probably are associated with good therapeutic response to initial periodontal treatment. These results suggest that GCF analysis can be a useful tool to infer the prognosis of initial periodontal treatment.

## #19

### **Co-cultured spheroids of human periodontal ligament mesenchymal stem cells and vascular endothelial cells enhance periodontal tissue regeneration**

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Human periodontal ligament mesenchymal stem cells (hPDLMSCs) are reported to be responsible for homeostasis and regeneration of periodontal tissue. Additionally, spheroids - spherical clusters of cells formed by three-dimensionally self-aggregation - are superior to monolayer-cultured cells. We investigated the characteristics and potential of periodontal tissue regeneration in co-cultured spheroids of hPDLMSCs and human umbilical vein endothelial cells (HUVECs) *in vitro* and *in vivo*. Co-cultured spheroids were prepared with cell ratios of hPDLMSCs : HUVECs = 1:1, 1:2, and 2:1, using microwell chips that were tagged with polyethylene glycol. Quantitative real-time polymerase chain reaction (PCR) analysis revealed that the expression levels of stemness markers, vascular endothelial growth factor (VEGF), and osteogenesis-related genes were up-regulated in co-cultured spheroids, compared with monolayer and spheroid cultures of hPDLMSCs. The nodule formation was increased in co-cultured spheroids, compared with monolayer and spheroid-cultured hPDLMSCs. Periodontal tissue defects were prepared in the maxillary first molars of rats and subjected to transplantation assay. The sites of the surgery were evaluated by 3D micro X-Ray computerized tomography (3D  $\mu$ CT) and histological analysis. Treatment with co-cultured spheroids enhanced new cementum formation after 4 or 8 weeks of transplantation, although there was no significant difference in the new bone formation between co-cultured spheroids and hPDLMSC spheroids. Sharpey's fibers were observed in the hPDLMSC spheroid groups and co-cultured spheroid groups, and the rate of new cementum length in the co-cultured spheroid groups was significantly higher than hPDLMSC spheroid groups. These data suggest that co-cultured spheroids enhance the periodontal tissue regeneration. Co-cultured spheroids of hPDLMSCs and HUVECs may be useful therapy for periodontal tissue regeneration.

## #20

### **Electron carriers increase electricity production in methane microbial fuel cells that reverse methanogenesis**

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The microbial fuel cell (MFC) is a device that utilizes microorganisms to convert the chemical energy of organic matter into electric energy. We previously reversed methanogenesis in MFC to produce electricity for the first time from methane by combining an engineered archaeal strain that produces methyl-coenzyme M reductase from unculturable anaerobic methanotrophs (to capture methane and secrete acetate) with *Geobacter sulfurreducens* (to produce electrons from the generated acetate) and methane-acclimated sludge (to provide electron shuttles). However, obtained electricity was not so high.

Here, we focused on improving electricity generation in a methane MFC. By varying reactor conditions including the medium, consortial members, electron carriers, cathode size, and inoculation order, we determined that electron carriers limit the current density and power generation and that the order of strain addition to the anode compartment is important. As a result, the power density in MFCs was increased 77-fold to 5216 mW/m<sup>2</sup> and the current density in MFCs was increased 73-fold to 7.3 A/m<sup>2</sup> by reducing the surface area of the cathode (to make reasonable comparisons to other MFCs), by changing the order the strains of the consortium were added to the anode compartment, and by adding additional electron carriers (e.g., humic acids and cytochrome C).

This power density and current density are comparable to the best for any MFC, including those with *Shewanella* and *Geobacter* spp. that utilize non-gaseous substrates. In addition, we demonstrate the methane MFC may be used to power a fan by storing the energy in a capacitor. Hence, MFCs that convert methane to electricity are limited by electron carriers.

## #21

### **Tas1r3 regulates osteoblast proliferation and differentiation**

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Osteoporosis, which is one of the most abundant bone-related diseases, is characterized by low bone mass and micro-architectural deterioration of bone tissue that results in increased bone fragility and susceptibility to fracture. The most commonly prescribed therapeutics are antiresorptives, such as calcitonin, estrogen, and bisphosphonates, that block osteoclast activity as a means to stabilize bone architecture. Recent data on the importance of continuous bone remodeling suggest that overuse of antiresorptives could lead to MRONJ and fracture in some patients. Thus, development of new, effective therapies that target enhancing bone formation by stimulating osteoblast proliferation and differentiation is required.

The taste receptor type 1 (Tas1R) family participates in monitoring energy and nutrient status. Tas1r3 is a bi-functional protein that recognizes amino acids such as L-glycine and L-glutamate or sweet molecules such as sucrose and fructose when dimerized with Tas1r1 or Tas1r2, respectively.

Although these functions were originally described in gustatory tissue, Tas1R family members are expressed in numerous non-gustatory tissues and are now viewed as nutrient sensors that play important roles in monitoring global glucose and amino acid status. Tas1R were originally discovered in gustatory tissue and recognize umami sensations and are also expressed in a wide variety of tissues and cell types such as bone. In this study we examine the role of Tas1r3 expressed by osteoblast lineage cells in osteoblastogenesis.

The mRNA levels of Tas1r3 of murine bone marrow stromal cells (BMSCs) increased with their osteoblast differentiation. We used Tas1r3 flox mice. BMSCs, which are infected with Cre recombinase for knocking-out their endogenous Tas1r3, decreased ALP activity and the intensity of alizarin stain. When Tas1r3 of the cells were knocked-down by introducing siRNA, the cell proliferation and osteoblast differentiation induced by BMP-4 were decreased in MC3T3-E1 cells. Our data suggested that Tas1r3 expressed by osteoblasts regulates bone formation.

**#22**

**Characteristic findings on ultrasonography for the stitch abscess  
after surgery with oral cancer**

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**Objectives:** To elucidate the clinical significance of imaging modalities for detection of stitch abscess after surgery in patients with oral squamous cell carcinoma (SCC).

**Methods:** In patients with oral SCC suspected of having lymph node metastasis, local recurrence of tumor, or stitch abscess after surgery, the characteristic imaging findings related to lymph node metastasis, local recurrence of tumor, and stitch abscess on ultrasonography (US), computed tomography (CT), magnetic resonance (MR), and 18fluorodeoxyglucose (18-FDG)-positron emission tomography (PET) images were identified and analyzed.

**Results:** In all six patients with stitch abscess, characteristic findings were demonstrated on US, but not to those of metastatic lymph nodes and local recurrence on CT, MRI, and 18FDG-PET images.

**Conclusions:** Our results suggest that ultrasonography may be a very useful tool for diagnosis of postoperative stitch abscess and may help in improving quality of life in cancer patient in oral SCC patients.

**#23**

## **Vesicular Nucleotide Transporter Mediates Pain during Orthodontic Tooth Movement**

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**Objectives:** Pain management is an imperative aspect of orthodontic treatment. Mechanical stress to the periodontal ligament during application of orthodontic force has been suggested to cause tooth movement-induced pain. Adenosine triphosphate (ATP) is an important mediator released from human periodontal ligament (HPDL) cells, which excites nociceptive nerve fibers via P2X3 channels. Because vesicular nucleotide transporter (VNUT) is known to participate in ATP uptake into secretory granules, VNUT may mediate tooth movement-induced pain. In the present study, we examined whether VNUT in HPDL cells participates in tooth movement-induced pain.

**Methods:** In vitro study, we applied mechanical force via centrifugation to HPDL cells. Centrifugation induced ATP release was measured using ATP bioluminescence assay. Expressions and change of VNUT, Connexin43 hemichannel, and Pannexin1 channel were examined by reverse transcription-polymerase chain reaction (RT-PCR) and real-time polymerase chain reaction (real-time PCR). The inhibitors were used to evaluate ATP pathway. In vivo study, male Wistar rats weighing 250&#8211;350 g were used in rat tooth movement experiments. Face-grooming behaviors were measured to evaluate spontaneous pain after experimental tooth movement, and the effects of drugs for pain.

**Result:** We found that mechanical stimulation by centrifugation of HPDL cells induced ATP release. By real-time PCR, we also demonstrated that, after the centrifugation of HPDL cells, the expression of VNUT gene was increased in relation to the increase in ATP release. We further demonstrated that clodronate, a VNUT inhibitor, reduced ATP release from HPDL cells after centrifugation. Face-grooming behaviors were decreased significantly after the rats were administered a low concentration of clodronate as well as 2,4,6-trinitrophenol-ATP.

**Conclusion:** Our results indicated that the released ATP from HPDL cells by means of VNUT is important in nociceptive transduction during orthodontic treatment. Thus, the clodronate, a VNUT inhibitor, may serve well as a novel analgesic drug in patients undergoing orthodontic treatment.

## #24

### **Netrins regulate the proliferation of B16 murine melanoma cells**

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Netrins were originally founded as axon guidance factors in nerve tissue. Recently netrins are known to be expressed by many kinds of cells and have a multifunction in physiological and pathological conditions. In this study, we show that netrin-1 and netrin-4, two of the secretory netrins, regulate the proliferation of murine melanoma B16 cells. Database analysis revealed that the melanoma patients with high expression of netrin-1 or netrin-4 tend to have a low survival rate. Over-expression of netrin-1 and netrin-4 increased the number of B16 cells in dose dependent manner. The treatment of murine netrin-1 and netrin-4 also increased the expression levels of cell cycle related genes such as cyclinA2 and cyclinD2. In conclusion, netrin-1 and netrin-4 increase the proliferation of B16 cells.

## #25

### **Evaluation of 3D spheroid culture models of ATDC5 cells in comparison to 2D monolayer cultures**

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Because of their sensitivity and responsibility to changes in their extensive extracellular matrix, articular chondrocytes are known to be phenotypically unstable in culture. In two-dimensional (2D) monolayer cultures, chondrocytes dedifferentiate into a fibroblast-like cell type. To overcome this loss of chondrogenic state of the chondrocytes, several methods of culture in three-dimensional (3D) systems have been developed. In this study, we introduced a microfabricated chip that enables spheroid size control, immobilization at a defined location, and use in molecular biological analysis to estimate differentiation status of chondrocyte.

ATDC5 cells cultured in these devices spontaneously aggregated in the medium and generated a single spheroid per well within 1 day. Although the diameter of ATDC5 spheroids gradually decreased over time, the circular shape with smooth surface was maintained up to 14-days of culture. Cell viability assay revealed that most cells were viable in ATDC5 spheroids. Strong hypoxic signal was detected in whole lesion of the ATDC5 spheroids. To examine the chondrogenic potential, ATDC5 cells were cultured in monolayer or fabricated devices in the presence or absence of differentiation medium (50 ng/mL ascorbic acid and 1% insulin-transferrin-selenium). In chondrogenic conditions, the mRNA expression of chondrogenic differentiation markers in ATDC5 spheroids was significantly increased in comparison with monolayer cultures. To further determine the role of spheroid culture in chondrogenesis, we investigated activation of signaling molecules in ATDC5 cells by Western blotting. The phosphorylation of Akt protein induced by chondrogenic conditions was significantly enhanced in ATDC5 cells cultured in spheroid device.

These results suggested that spheroid cultures of ATDC5 cells using our devices might be a novel and useful tool to understand the mechanisms underlining chondrogenesis.

## #26

### **Possibility of oral care with tongue cleaning to influence the plasma ghrelin concentrations in very elderly people**

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Ghrelin is a peptide hormone secreted mainly from the stomach and increases food appetite. It is reported that functional oral care improved the plasma ghrelin dynamics in elderly people and furthermore, oral care with tongue cleaning improved lung function evaluated by measuring peak expiratory flow (PEF). Then, we investigated whether oral care with tongue cleaning improves the plasma ghrelin concentrations in very elderly individuals living in geriatric care facilities. Participants were randomly assigned to routine oral care group (24 subjects, mean age 88.8 years old) and oral care with tongue cleaning (24 subjects, mean age 88.0 years old) and after 4 weeks, PEF measurements and blood collections were conducted. Comparison between measured values before and after was evaluated by paired t-test and linear correlation of two measured values was tested by Pearson correlation coefficient (SPSS 17.0). In oral care with tongue cleaning group, PEF increased significantly ( $1.68 \pm 0.89$  L/s to  $2.11 \pm 1.11$  L/s,  $p < 0.05$ ), but in routine oral care group, PEF did not change ( $1.76 \pm 1.08$  L/s to  $1.51 \pm 0.64$  L/s, ns). Plasma ghrelin concentrations in oral care with tongue cleaning group did not change ( $178.2 \pm 104.3$  fmol/ml to  $175.1 \pm 101.3$  fmol/ml, ns), but that in routine oral care group decreased significantly ( $171.8 \pm 114.5$  fmol/ml to  $143.8 \pm 69.2$  fmol/ml,  $p < 0.05$ ). Next, we investigated the correlation coefficient between PEF and plasma ghrelin concentrations in each group, but there was no significant correlation. As a result, plasma ghrelin concentrations intrinsically decrease in very elderly people, however, tongue cleaning at the oral care accompanied with improvement of lung function seemed to have the effects of maintaining plasma ghrelin concentrations.