



7th Hiroshima Conference on Education and Science in Dentistry



“Diversity in Oral Science Research”



Itsukushima Shrine: Bugaku dancer (Court dance and music)
Photo Courtesy of Hiroshima Prefecture



Hiroshima University School of Dentistry

7th Hiroshima Conference on Education and Science in Dentistry

Program & Abstracts of 7th Hiroshima Conference on Education and Science in Dentistry
March 29-30, 2018, Hiroshima, Japan

Hiroshima University School of Dentistry

Organizing Committee

Chairs

Koichi Kato

Yuji Yoshiko

Kazuhiro Tsuga

Kotaro Tanimoto

Takahiro Satoda

Takashi Kanematsu

Masaru Sugiyama

Hideki Shiba

Makiko Fujii

Katsuyuki Kozai

Conference Secretariat:

Hiroshima University School of Dentistry

1-2-3 Kasumi, Minami-ku, Hiroshima 734-8553, Japan

E-mail: kasumi-soumu@office.hiroshima-u.ac.jp

All rights reserved. No part of this material may be reproduced in any form or by any means without permission in writing from the organizing committee.

Printed in Japan

PREFACE

It is my great pleasure and privilege to welcome all of you attending the 7th Hiroshima Conference on Education and Science in Dentistry, held on March 29-30, 2018 at the Kasumi Campus, Hiroshima University, Japan.

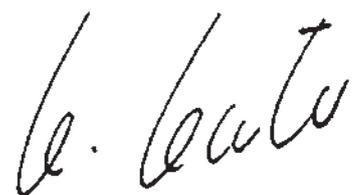
A series of the conference has been organized every two years by the School of Dentistry Hiroshima University. Now we are excited to hold the 7th conference on the basis of our previous achievements gained during preceding conferences. The great successes in the past conferences were primarily due to significant supports by every participant from our sister schools and institutions all over the world as well as industries and authorities.

The priority theme of the 7th conference is "Diversity in Oral Health Science". This is based on our idea that extending diversity in our educational and research activities greatly facilitates to reinforce our functions as well as to enhance our influence over the broad scientific world. I believe that it is about a time for us to broaden our view beyond the conventional bounds of education and research in oral health science.

International partnerships seem to provide practical strategies to diversify, share, and complement research and human resources, further making our endeavor more effective and facilitating to boost the level of our research up to the global standard. In recent years, much attention has been paid to international joint programs at the postgraduate level, such as joint degree programs. In this conference, we will share different experiences and discuss the potentials of such a new framework of international collaboration.

Another important aspects highlighted here is concerned with multidisciplinary approaches that promote to shift the paradigms of dental science and technology, and hence significantly expand our possibilities. In such approaches, conventional dental science research is merged with state-of-the-art knowledge and technologies derived from other diverse areas, such as biotechnology, nanotechnology, bioinspired materials, biosensors, computer science, and information technology. Successful examples we had ever seen include digital dentistry by which classical design and fabrication procedures for dental prostheses have been replaced in part with a novel process, so-called CAD/CAM, having emerged from diverse technologies developed in computer science and mechanical/materials engineering.

On behalf of the organizing committee, I hope that this conference will provide you a significant opportunity for gaining new prospects towards oral health science in the next generation.



Koichi Kato, D.Eng.

Conference President

Dean, Hiroshima University School of Dentistry

Time table

Thursday, March 29, 2018

	12:00	13:00	14:00	15:00	16:00	17:00	18:00	19:00	20:00
Registration				12:00~17:50 Registration					
Cloak				12:00~17:50 Cloak					
Conference Program		13:00~ 13:10 Opening	13:10~14:10 Special Lecture	14:10~15:50 Session I : Joint degree, Sandwich program	15:50~16:30 Coffee Break and Adjustment Time	16:30~17:50 Young Investigator Session I			
Poster Exhibition	12:00~13:00 Poster Preparation		13:00~17:30 Poster Exhibition		15:50~16:30 Poster Discussion	Poster Exhibition			
Reception							17:50~18:30 Registration	18:30~20:00 Welcome Reception	

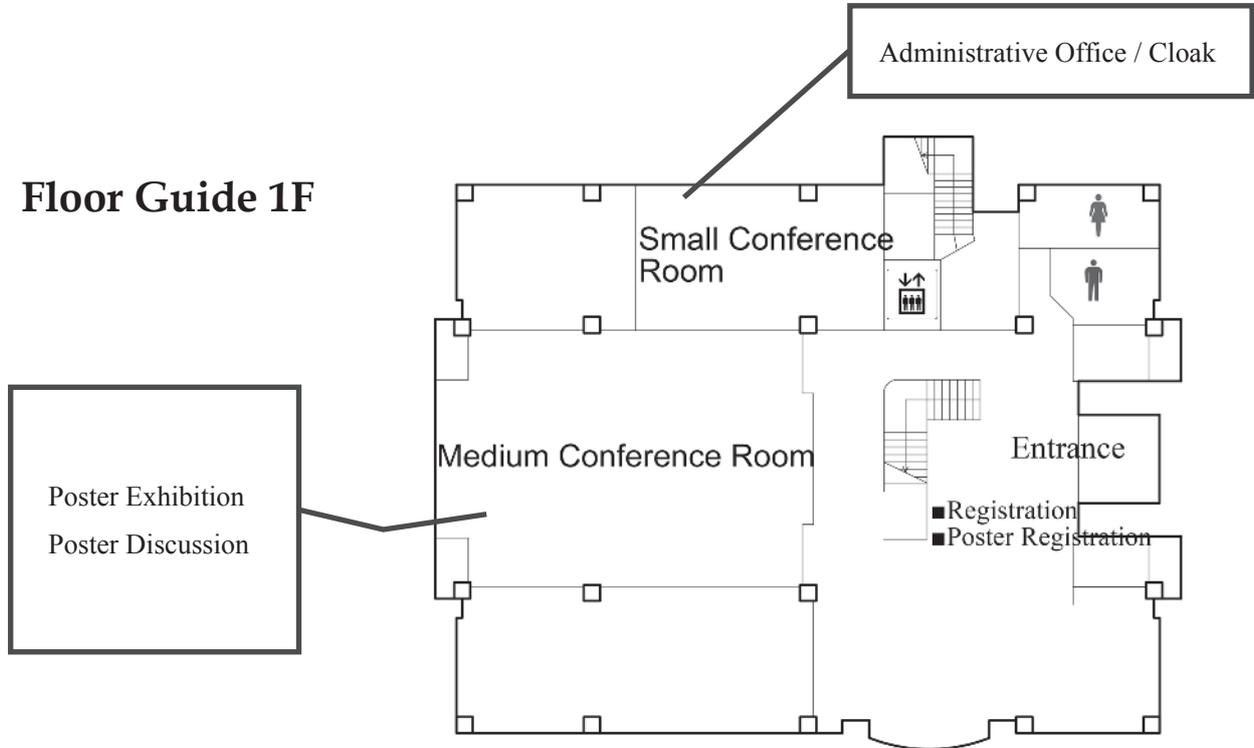
Friday, March 30, 2018

	8:00	9:00	10:00	11:00	12:00	13:00	14:00	15:00	16:00	17:00
Registration						8:30~17:00 Registration				
Cloak						8:30~17:00 Cloak				
Conference Program		9:00~10:30 Session II : Advanced Imaging		10:30~12:00 Session III: Application of Advanced Engineering Technologies		12:00~13:15 Luncheon Seminar	13:15~14:45 Session IV: New Insights into Extracellular Vesicle Biology	14:45~15:20 Coffee Break and Adjustment Time Group Photo	15:20~16:40 Young Investigator Session II	16:40 ~ 17:00 Closing
Poster Exhibition				9:00~16:40 Poster Exhibition				14:45~15:20 Poster Discussion	Poster Exhibition	

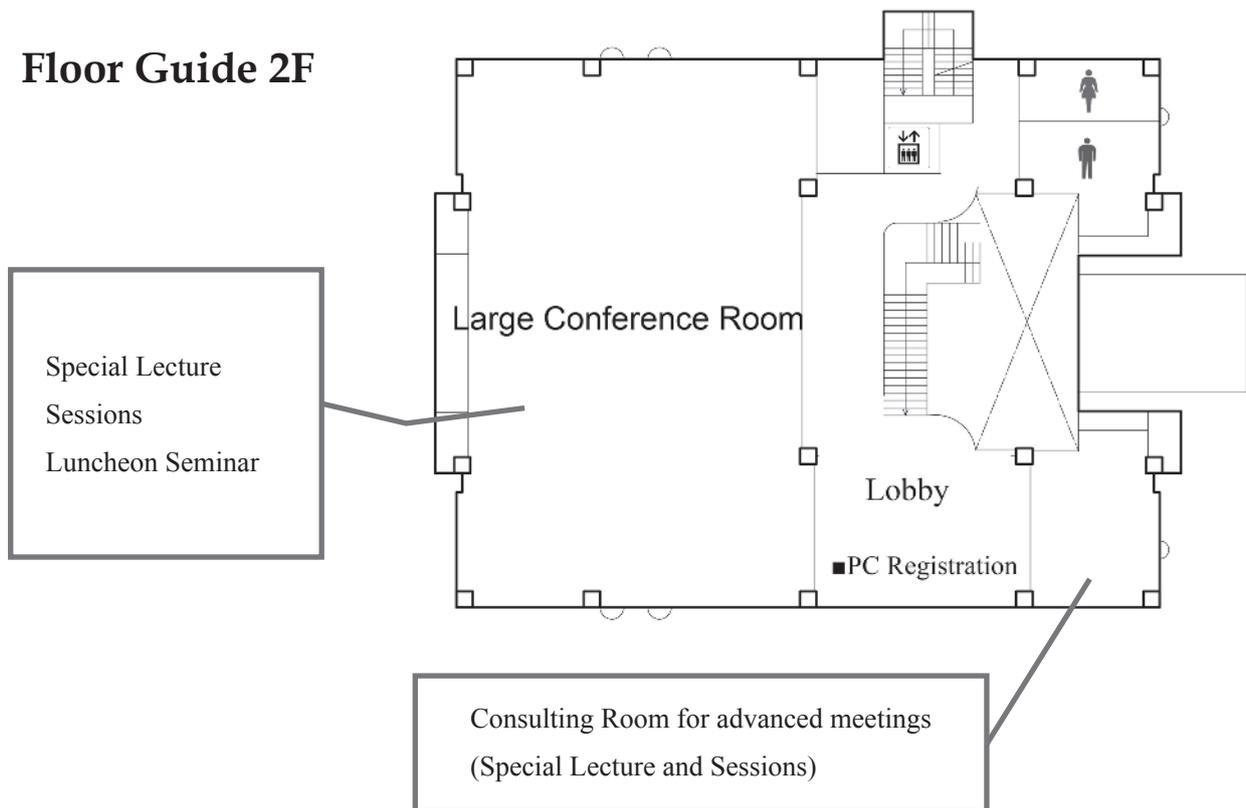
※Venues
 Conference : KOUJIN Conference Hall on Kasumi Campus, Hiroshima University
 Welcome Reception : VIOLA Dining, Kasumi Campus Hiroshima University

Koujin Conference Hall, Kasumi Campus Hiroshima University

Floor Guide 1F



Floor Guide 2F



Schedule

-7th Hiroshima Conference on Education and Science in Dentistry

Thursday, March 29, 2018

12:00-	Registration	Entrance
13:00 - 13:10	Opening Remarks: Dean Koichi Kato	Large Conference Room
13:00 - 17:50	Poster Exhibition	Medium Conference Room
13:10 - 14:10	Special Lecture	Large Conference Room
	“Periodontal precision medicine”	
	Chair: Koichi Kato	
	Speaker: Denis F. Kinane, University of Pennsylvania	
14:10 - 15:50	Session I	Large Conference Room
	“Prospects of International Joint Programs”	
	Chair: Koichi Kato	
	Vo Chi Hung	
	Speaker: Hideki Kasuya, Nagoya University (14:10-14:30)	
	Takashi Ono, Tokyo Medical and Dental University (14:30-14:50)	
	Vo Chi Hung, University of Medicine and Pharmacy at Ho Chi Minh City (14:50-15:05)	
	Darmawan Setijanto, Airlangga University (15:05-15:20)	
	Makiko Fujii, Hiroshima University (15:20-15:30)	
	Panel Discussion (15:30-15:50)	
15:50 - 16:30	Poster Discussion	Medium Conference Room
	Coffee Break	Lobby, 2nd Floor
16:30 - 17:50	Young Investigator Session I	Large Conference Room
	Chair: Katsuyuki Kozai	
	Chisa Shukunami	
	Speaker: Pimrumpai Rochanakit Sindhavajiva	
	Faisal Ahmed	
	Hirotaka Sugino	
	Shinya Sasaki	
	Lisa Amir	
	Agrippine Putricia Asaeli	
	Herrala Maria	
18:30 - 20:00	Welcome Reception	VIOLA Dining, Kasumi Campus

Friday, March 30, 2018

08:30 -	Registration	Entrance
09:00 - 16:40	Poster Exhibition	Medium Conference Room
09:00 - 10:30	Session II	Large Conference Room
	“Advanced Imaging”	
	Chair: Naoya Kakimoto Yuji Yoshiko	
	Speaker: Naoya Kakimoto, Hiroshima University (9:00-9:15) Tomoko Minamizaki, Hiroshima University (9:15-9:40) Iori Sumida, Osaka University (9:40-10:05) Rinus Verdonschot, Hiroshima University (10:05-10:30)	
10:30 - 12:00	Session III	Large Conference Room
	“Application of Advanced Engineering Technologies”	
	Chair: Takeshi Murayama	
	Speaker: Akira Furui, Toshio Tsuji, Hiroshima University (10:30-10:52) Syogo Iwaguro, Hiroshima University Hospital (10:52-11:14) Tomoko Tateyama, Hiroshima Institute of Technology (11:14-11:36) Takuya Kihara, Tsurumi University (11:36-11:58)	
12:00 - 13:15	Luncheon Seminar	Sponsored by Shinhiroshima-Yakult Co.,Ltd Large Conference Room
	Chair: Hiroki Nikawa	
	Speaker: Hirokazu Tsuji, Yakult Central Institute (12:15-13:00)	
13:15 - 14:45	Session IV	Large Conference Room
	“New Insights into Extracellular Vesicle Biology”	
	Chair: Yuji Yoshiko Hideki Shiba	
	Speaker: Shinji Kawai, Amgen Astellas BioPharm (13:20-13:40) Shigeki Suzuki, Hiroshima University (13:40-14:00) Nobuyoshi Kosaka, National Cancer Center Research Institute (14:00-14:20) Eunsoo Kim, Korea Advanced Institute of Science and Technology (14:20-14:40)	
14:45 - 15:20	Poster Discussion	Medium Conference Room
	Coffee Break	Lobby, 2nd Floor
	Group Photo	

15:20 - **Young Investigator Session II** Large Conference Room

Chair: Kazuhiro Tsuga

Takashi Kanematsu

Speaker: Teerasak Damrongrungruang

Regina Purnama Dewi Iskandar

Yasuka Ikura

Madhu Shrestha

Taeko Fukutani

Mirai Higaki

Tzu-Yu Peng

16:40 - 17:00 **Closing Ceremony** Large Conference Room

Excellent Poster Award Ceremony

Comments by Chairperson of the Reviewing Committee: Masaru Sugiyama

Closing Remarks by President and Chairperson of the Conference: Koichi Kato

Yuji Yoshiko

Venues

◆ **Koujin Conference Hall:** Kasumi Campus, Hiroshima University

Main Hall: Large Conference Room 2nd Floor

Poster Exhibition: Medium Conference Room 1st Floor

Reception for participants and Poster Reception: Entrance 1st Floor

PC Reception: Lobby 2nd Floor

◆ **VIOLA Dining:** Kasumi Campus, Hiroshima University

Welcome Reception

Contents

Preface	
<i>K. Kato</i>	i
Special Lecture	
Periodontal Precision Medicine	
<i>Denis F. Kinane</i>	3
Session I	
<i>Prospects of International Joint Programs</i>	
Strengthening International Level Research: Nagoya University Joint Degree	
<i>H. Kasuya</i>	7
Experience, Execution and Elaboration of the Joint Degree Program between Tokyo Medical and Dental University in Japan and Chulalongkorn University in Thailand	
<i>T. Ono</i>	8
Intergration Tendency in Dental Education at Faculty of Odonto-stomatology, University of Medicine and Pharmacy – Ho Chi Minh City	
<i>Chi Hung Vo</i>	9
Prospect for International Join Degree in Indonesia	
<i>Darmawan Setijanto, Udiyanto Tedjosasongko, Anita Yuliati, Devi Rianti, Mega Moeharyono Puteri, H. Oka, Phuong Thao T Nguyen, M. Fujii and K. Kato</i>	10
Perspectives of International Research Collaboration in Hiroshima University, School of Dentistry	
<i>M. Fujii</i>	11
Session II	
<i>Advanced Imaging</i>	
Advanced Imaging in Dentistry	
<i>N. Kakimoto</i>	15
Imaging Mass Spectrometry: A Current Proteomics Approach for Molecular Anatomy	
<i>T. Minamizaki</i>	16
In-vivo Dose Imaging via Measurement-guided Dose Reconstruction for Advanced Radiation Therapy	
<i>I. Sumida</i>	17
Functional Magnetic Resonance Imaging (fMRI) and Perceptual Curiosity.	
<i>Rinus Verdonschot</i>	18
Session III	
<i>Application of Advanced Engineering Technologies</i>	
EMG Interface Technology and Robotic Arm Prostheses	
<i>A. Furui and T. Tsuji</i>	21
Medical Applications of 3D Printing Based on CT and MRI Images in Hiroshima University Hospital	
<i>S. Iwaguro</i>	22

Development of Computer Aided Diagnosis Based on Computer Anatomy and Its Application to Virtual Experience System <i>T. Tateyama</i>	23
Oral Engineering and Digital Dentistry <i>T. Kihara</i>	24
Luncheon Seminar	
YIF-SCAN, A Novel Culture-independent Analytical Method for Detection of Bacteria in the Bloodstream <i>H. Tsuji</i>	27
Session IV	
<i>New Insights into Extracellular Vesicle Biology</i>	
Secretion System of Bone Matrix and Matrix Vesicle by Osteoblast <i>S. Kawai</i>	31
Isolation of Pro-inflammatory Extracellular Vesicles from Human Dental Pulp Cells <i>S. Suzuki</i>	32
Indispensable Roles of Extracellular Vesicles in Cancer Development <i>N. Kosaka</i>	33
Exosome Engineering for Delivery of Therapeutic Proteins: Principles and Applications of EXPLOR Technology <i>Eunsoo Kim</i>	34
Poster Presentation	
Young Investigator Session I	45
Young Investigator Session II	50
A. Natural Substances.....	56
B. Bacteria, Immunology, Inflammation.....	61
C. MSC, Bone Regeneration.....	69
D. Tumor, Pain, etc.....	72
E. Craniomaxillo-face, Bone, Radiological Image. etc.....	77
F. Dental Materials, Techniques, etc.	85
G. Epidemiology, Education, Prevention, etc.	92

Special Lecture

Special Lecture

Periodontal Precision Medicine

University of Pennsylvania
Denis F. Kinane



Periodontal Precision Medicine

Denis F. Kinane

Professor, BDS FDS RCPS PhD-University of Pennsylvania School of Dental Medicine

This talk will address the modern concept of precision medicine in periodontal disease management. Personalized medicine is a medical procedure tailored to an individual based on predicted response or risk. Tailoring treatment specifically to patients is not a new concept and has been with us since Hippocrates. The difference in present times is that we are more capable of tailoring treatments as we have better tools to diagnose, including genetics and molecular profiling and better tools to invoke changes, such as CRISPR to modify the genome. In addition we have advanced molecular tools to directly influence signaling, transcription, epigenetics etc. A further aspect of modern science is the utilization of 'Big data', that is the totality of data related to patient wellbeing and health care. Using big data we can both determine better the risk of disease for patients and populations. Despite our advanced knowledge of risk through big data and our better understanding of how to tailor treatments via precision medicine technology, much of what we are dealing with is fundamentally

unchanged. The Pathology of periodontal disease, risk and susceptibility are still pertinent. Thus the innate and inflammatory host responses to the microbial biofilm that constitutes the subgingival dental plaque are still critical to our understanding of periodontal disease. Furthermore in our determination of which host modifications we can influence in order to treat periodontal disease, a critical element is that the host response to infection draws upon the innate, inflammatory and adaptive immune systems, whose role is to provide the appropriate response to the offending microorganisms. A further complexity, that of epigenetic variation, will also be addressed in this presentation. An understanding of the interaction of structural and defensive host cells with the biofilm is pivotal to understanding periodontal disease etiology and to developing tailored therapeutics. Thus, this talk addresses the precision medicine modification of periodontal disease based on modifying innate and inflammatory and epigenetic and genetic elements of periodontal pathogenesis.

Session I

Prospects of International Joint Programs

Strengthening International Level Research: Nagoya University Joint Degree

Nagoya University

H. Kasuya

Experience, Execution and Elaboration of the Joint Degree Program
between Tokyo Medical and Dental University in Japan and Chulalongkorn University
in Thailand

Tokyo Medical and Dental University

T. Ono

Intergration Tendency in Dental Education at Faculty of Odonto-stomatology,
University of Medicine and Pharmacy – Ho Chi Minh City

University of Medicine and Pharmacy at Ho Chi Minh City

Chi Hung Vo

Prospect for International Joint Degree in Indonesia

Universitas Airlangga, Hiroshima University

Darmawan Setijanto, Udijanto Tedjosongko, Anita Yulianti, Devi Rianti,

Mega Moeharyono Puteri, H. Oka, Phuong Thao T Nguyen,

M. Fujii and K. Kato

Perspectives of International Research Collaboration in Hiroshima University,
School of Dentistry

Hiroshima University

M. Fujii



Strengthening International Level Research: Nagoya University Joint Degree

H. Kasuya

Professor, International Medical Education,
Nagoya University Graduate School of Medicine

We have established Joint degree Program (JDP) with University of Adelaide in 2015 Oct. and with Lund University in 2017 April, and recently we have signed on Agreement of JDP with University of Freiburg in 2017

Nov. Our JDP requires candidates to stay in counter part school at least for 1 year and received SINGLE PhD degree that is approved by combined committee of both schools without student term extension.



Experience, Execution and Elaboration of the Joint Degree Program between Tokyo Medical and Dental University in Japan and Chulalongkorn University in Thailand

T. Ono

Prof., Division of Orthodontic Science, Graduate School of Medical and Dental Sciences, Tokyo Medical and Dental University

Tokyo Medical and Dental University (TMDU) and Chulalongkorn University (CU) in Thailand signed the Memorandum of Understanding (MOU) regarding the establishment of a Joint Degree Course (JD course) in the Graduate School in February 28th, 2014. Since then, we have cooperated to setup Necessary Matters, curriculum, syllabus, etc. In November 26th, 2015, two parties were in

agreement on the details (i.e., 36 items) of the Joint Degree Program (JD program: JDP). Thereafter, we have been discussing many issues including assessment of performance, entrance examination, scoring system. In this lecture, I will introduce what we experienced so far, how we managed the difficulties, and which way we are going in the future.



Intergration Tendency in Dental Education at Faculty of Odonto-stomatology, University of Medicine and Pharmacy —Ho Chi Minh City

Chi Hung Vo

Vice Dean, Faculty of Odonto-Stomatology,
University of Medicine and Pharmacy at Ho Chi Minh City, Vietnam

ABSTRACT

The Faculty of Odonto-stomatology, University of Medicine and Pharmacy at Ho Chi Minh City, Vietnam was established in 1962 and now is one of the most highly ranked and oldest dental schools in Vietnam. The academic program that covers all the different levels and categories of undergraduate and graduate formation is

currently confronting needs for intergration for numerous reasons. Therefore, the faculty is now concentrating in building up intergrated curriculum and comprehensive oral health care in practice for dental students despite lots of challenges. The exchange program between the FOS, UMPH and dental schools oversea, including Dental Faculty, Hiroshima University, Janpan, contributes meaningfully in this process of intergration.



Prospect for International Join Degree in Indonesia

Darmawan Setijanto¹, Udijanto Tedjosasongko¹, Anita Yulianti¹,
Devi Rianti¹, Mega Moeharyono Puteri¹, H. Oka²,
Phuong Thao T Nguyen², M. Fujii² and K. Kato²

¹ Faculty of Dental Medicine Universitas Airlangga, Surabaya-Indonesia

² Faculty of Dentistry Hiroshima University, Hiroshima-Japan

Key words: Join degree, International Dental Course, Universitas Airlangga, Hiroshima University

ABSTRACT

Universitas Airlangga since 2011 in cooperation with Hiroshima University opened the join degree program International Dental Course (IDC). This program is a pioneer program in the field of dentistry both in Indonesia and in Japan. Faculty of Dental Medicine Universitas Airlangga conducted a curriculum workshop related to IDC program which was followed by all departments. The workshop searched and sorted out the lecture materials given at Hiroshima University and mapped in the dental education curriculum of Universitas Airlangga. Every year since 2011 Universitas Airlangga sends students to join IDC program. The benefits of IDC's students are huge, including the opportunity to study in Japan that gives an open minds and socializing experiences with Japanese friends to the students. In addition, the students had the opportunity to study research with the latest facilities. Currently 4

(four) Universitas Airlangga students have graduated from IDC program; so far they have no difficulty in studying after returning from Hiroshima. This indicates that the lecture material given is quite synchronous and can equip the students to continue the study of dental professional education at Universitas Airlangga. Learning from the experience of IDC program implementation, Universitas Airlangga plans to open a double degree S3 education program with Hiroshima University. There is a great opportunity to open the join degree or double degree education program in Indonesia. This is because the Indonesian government through the Directorate General of Higher Education supports and facilitates the program of join degree and double degree especially with universities abroad. With the join degree and double degree education programs are expected to improve the quality of education and competitiveness in the global era.



Perspectives of International Research Collaboration in Hiroshima University, School of Dentistry

M. Fujii

Professor, Chairperson of International Collaboration Development for dentistry, School of Dentistry, Hiroshima University

In an attempt to educate students in the School of Dentistry, Hiroshima University with global talents, the faculty started to accept students (International Dental Course students) for a 4-year period from 3 cooperating universities (Republic of Indonesia: Airlangga University, Socialist Republic of Vietnam: University of Medicine and Pharmacy -Ho Chi Minh City, and Kingdom of Cambodia: University of Health Sciences-Cambodia) since 2011. We further accept many students (8 students average per year), as short-stay 6 months program (8 students average per year) and 10 days

program. With the effort of the staffs conducting all the classes in dual language education that uses both English and Japanese, the students of School of Dentistry, Hiroshima University can learn in the same classes with students from abroad.

Based on this special education system, we have established strong and close relationship with many sister schools in all over the world. To strengthen our research, we are now trying to establish the new system for collaboration with those schools.

Session II

Advanced Imaging

Advanced Imaging in Dentistry

Hiroshima University

N. Kakimoto

Imaging Mass Spectrometry: A Current Proteomics Approach for Molecular Anatomy

Hiroshima University

T. Minamizaki

In-vivo Dose Imaging via Measurement-guided Dose Reconstruction
for Advanced Radiation Therapy

Osaka University

I. Sumida

Functional Magnetic Resonance Imaging (fMRI) and Perceptual Curiosity.

Hiroshima University

Rinus Verdonshot



Advanced Imaging in Dentistry

N. Kakimoto

Department of Oral and Maxillofacial Radiology,
Hiroshima University Graduate School of Biomedical and Health Sciences

In this talk I would like to introduce some advanced imaging options currently available in dentistry and present quantitative evaluation data from an ongoing investigation in our lab. Conventional imaging modalities such as intra-oral radiography, panoramic radiography and extra-oral radiography have been essential imaging and diagnostic tools in dentistry for a long time. However, cone-beam computed tomography (CBCT) is widely and rapidly developing in the dental field in recent years, and has slowly become an vital imaging option in the dental field as well. On the other hand, multi-detector computed tomography (MDCT), magnetic resonance imaging (MRI), positron emission tomography/computed tomography (PET/CT) and ultrasonography (US) are not widely used in the dental field (except for oral surgery) but are indispensable in the medical field. As MDCT and PET/CT typically output quantitative values such as

CT-values or standard uptake values, it is possible to use them in quantitative diagnosis (e.g. when diagnosing calcified tissues or benign or malignant tumors). However, MRI data mainly provides semi-quantitative values (e.g. apparent diffusion coefficients on diffusion weighted imaging and T2-relaxation times on T2-mapping sequences) and are usually better suited for clinical use. Lastly, I present data from an ongoing study in our lab examining T2-relaxation times obtained within the temporomandibular area of temporomandibular disorder patients as well as asymptomatic volunteers. The T2-values of the articular disk were correlated with the morphological findings seen on temporomandibular joint MRI images. I speculate this method has significant diagnostic value even in the stage before morphological changes occur in TMJ.



Imaging Mass Spectrometry: A Current Proteomics Approach for Molecular Anatomy

T. Minamizaki and Y. Yoshiko

Department of Calcified Tissue Biology,
Hiroshima University Graduate School of Biomedical and Health Sciences

Omics approaches have been used to comprehensively assess molecules involved in biological activities and pathogenesis. Among the mass spectrometry (MS), matrix-assisted laser desorption-ionization (MALDI)-MS is widely applicable to massively detect biomolecules. MALDI imaging MS (MALDI-IMS) allows direct measurement of mass spectra in frozen tissue sections, providing that the distribution of biomolecules can be visualized as an image without any labeling technique. This approach, however, cannot detect macromolecules over 25 kDa in size, such as proteins.

To overcome this limitation, we developed an approach to assess proteins by using MALDI-IMS, followed by liquid chromatography tandem MS (LC-MS/MS) analysis of proteolytic digestion in tissue sections. Using this approach, we performed proteomic analysis of kidneys involved in pathogenesis of Klotho-

deficient mice showing premature aging, such as renal dysfunctions. Here, we demonstrate remarkable achievements to identify proteins involved in Klotho deficiency. MS images in tissue sections could be complemented by LC-MS/MS, resulting in the discovery of new proteins that have never been described in Klotho deficiency before. On the other hand, large amounts of hydroxyapatites and collagen fibers, such as bone and tooth samples, made them difficult to identify minor molecules of interest. We then attempted to optimize protocols for fixation, decalcified and proteolytic conditions. These approaches permitted calcified tissues to detect minor molecules in the mouse femoral frozen sections. Although analytical procedures and compositional adjustments of the device still need further development, an IMS approach appears to be a powerful tool to comprehensively analyze spatial arrangements of biomolecules without any labeling.



In-vivo Dose Imaging via Measurement-guided Dose Reconstruction for Advanced Radiation Therapy

I. Sumida

Assistant Prof., Department of Radiation Oncology,
Graduate School of Medicine, Osaka University

Advanced radiation therapy for cancer treatment such as intensity-modulated radiation therapy (IMRT) spares dose to organs at risk while maintaining prescription dose to target. Regarding the IMRT treatment, dose verification before radiation treatment is generally performed to check whether the treatment delivery is in safe and the accuracy of beam delivery would be within the tolerance, which is evaluated the dose difference between planned and measured dose. In recent years, some cautions are given that even the result of dose verification are within the tolerance, there might be occurred significant dose errors in the organs in clinical related dose indices. Especially for the serial organ such as spinal cord and brain stem as a head and neck cancer, we could not ignore the potential dose error. Because these organs have dose constraints leading the severe complication. In terms of the situation, we have developed the novel algorithm named 'measurement-

guided dose reconstruction' (MGDR) approach to solve this problem. The MGDR approach uses the results of dose verification from which the relative dose error distribution is forward projected into the planned dose distribution. According to the approach, the modified dose distribution in the patient could be reconstructed with the information of the potential error for beam delivery. Therefore, it is possible to know the actual dose to the patient which makes us 'real world' instead of 'planned world'. Besides of that, the organ response (tumor control and normal tissue complication) in dose named tumor control probability (TCP) and normal tissue complication probability (NTCP) could be calculated from the reconstructed dose. These indices are useful for a physician to evaluate the organ response in clinical. I will explain the MGDR approach and adaptation in clinical evaluation in this lecture.

Functional Magnetic Resonance Imaging (fMRI) and Perceptual Curiosity.

Rinus Verdonschot

Department of Oral and Maxillofacial Radiology,
Hiroshima University Graduate School of Biomedical and Health Sciences

In this talk, which is not specific to the dentistry field, I will point out some of the basic principles and benefits/pitfalls of functional Magnetic Resonance Imaging (fMRI) which is a technique to measure brain activity by studying changes in the magnetic field which are the result from an underlying connection between neuronal activation and blood flow. I will start out with a basic outline of the principles underlying this technique, explain how it can be used in neurocorrelational investigations to elucidate behavior caused by the brain. I will also attempt to highlight some experimental designs which may be useful for one situation but not for another. I will end my talk by presenting data on a topic *outside the dentistry area*, specifically: a topic related to psychology. I will show fMRI evidence that a strong instigator of human exploratory behavior, namely:

perceptual curiosity, is indeed an aversive state as predicted almost 50 years ago by Daniel Berlyne, and its resolution (e.g. resolving curiosity through discovery) is rewarding and promotes learning. Our fMRI findings show that the induction and resolution of perceptual curiosity activated the anterior insula and the anterior cingulate cortex in the brain (which are involved in arousal), when curiosity is subsequently resolved we show activated regions of the striatum (which are involved in rewarding behavior) and lastly, we show hippocampal activation and enhanced incidental memory. These findings indicate that fMRI, when applied properly, can constitute a viable tool to gain additional information to support (or contradict) theoretical models on human behavior.

Session III

Application of Advanced Engineering Technologies

EMG Interface Technology and Robotic Arm Prostheses

Hiroshima University
A. Furui and T. Tsuji

Medical Applications of 3D Printing Based on CT and MRI Images
in Hiroshima University Hospital

Hiroshima University
S. Iwaguro

Development of Computer Aided Diagnosis Based on Computer Anatomy
and Its Application to Virtual Experience System

Hiroshima Institute of Technology
T. Tateyama

Oral Engineering and Digital Dentistry

Tsurumi University
T. Kihara



EMG Interface Technology and Robotic Arm Prostheses

A. Furui and T. Tsuji

Graduate School of Engineering, Hiroshima University

ABSTRACT

A surface electromyogram (EMG) is a bioelectrical signal generated by muscle contraction and can be noninvasively measured from the skin surface. Many attempts have been made to utilize EMG signals as interface signals for controlling mechanical systems and information devices by extracting user's motion intention from measured EMG signals.

In this talk, we will introduce our research on developing an EMG interface, which consists of four components: EMG measurement, force estimation, machine learning-based motion estimation and biomimetic control, and show some applications such as

a pointing device, an electric wheelchair, and a substitute vocalization system. We will also outline a 3D-printable myoelectric prosthetic hand with five independently driven fingers. The hardware parts of the hand, except for metallic components, are fabricated by a 3D printer, reducing development cost and improving maintainability. Biomimetic impedance control is implemented in the prosthetic hand control system to realize natural finger movements that can be determined from user's EMG signals based on a recurrent probabilistic neural network containing a known stochastic structure suitable for modeling EMG signals. Finally, we will discuss the overall potential of the EMG interface technology and implications for further research.



Medical Applications of 3D Printing Based on CT and MRI Images in Hiroshima University Hospital

S. Iwaguro

Dental Technician, Dental Technicians Section,
Central Clinical Divisions, Hiroshima University Hospital

BACKGROUND

In Hiroshima University Hospital, dental technicians have made graspable three-dimensional objects using a 3D printer since 2012. Graspable 3D objects have been applied for surgical planning, patient-clinician interaction.

METHODS

Graspable 3D objects can be produced based on CT or MRI image, and slice thickness of less than 1 mm is required for the model with a smooth surface. The image data saved in DICOM are transmitted from Division of Radiologic Technologists to Division of Dental Technicians. Using a segmentation tool (ZedView, LEXI Co., Ltd.), 3D visualization on a computer screen is performed by dental technicians. The spatial model data is exported to STL data and sent to the 3D printer (Zprinter450, Z Corp.) for production. The 3D printer is based on binder jetting technique that uses layers of the powder. Although the construction time depend on the

size and complexity, a model can be manufactured in a few hours. Finally, the model is stiffened by use of wax bath.

RESULT

The number of manufacturing requests has increased year by year. Most of the requests are from Department of Oral and Maxillofacial Surgery, and the request of the jawbone models accounted for 80% of the total. Among the requests from the medical departments, the requests from the Department of Urology are the most increasing, and the frequency of producing kidney models is high.

CONCLUSION

Graspable 3D objects are feasible for specialized surgical training and information sharing. It is significant that the process chain from imaging to additive manufacturing runs smoothly with close association and collaboration of radiologists, doctors, dentists, and dental technicians.



Development of Computer Aided Diagnosis Based on Computer Anatomy and Its Application to Virtual Experience System

T. Tateyama

Faculty of Applied information Science, Hiroshima Institute of Technology.
t.tateyama.es@cc.it-hiroshima.ac.jp

In recently years, Medical imaging such as Computer Tomography (CT) and Magnetic Resonance Imaging (MRI) etc., are not only high resolution information which are to observe in vivo in only 1mm or less but also is possible to obtain medical important datasets. Therefore, it can be said that the medical imaging has contributed to clinical progress a lot.

Unfortunately, the information is too huge and complex datasets, it is a time-consuming and labor-intensive task for clinician to understand and observed about what it occurred in patient's body. So that, many clinician are expecting that an effective and reliable medical image visualization systems, that is Computer Assistant Diagnosis (CAD) and Computer Assistant Surgery (CAS), will be established. Computer Anatomy Model is digital human anatomy; the model is one of core technologies for establishing such as above the system.

Construction of Computer Anatomy Model has 3 steps: 1. Segmentation the organ features based on its

voxel intensity, shape and position from a training set (either different individuals (inter-patient variability) or the same individual (intra-patient variability)), 2. applied marching cube algorithm to convert the segmented organ volume to a triangulated mesh surface which containing vertex points, 3. the model is also visualized and applied as a CAD/CAS system. In particular, we adapt to segmentation human organs based on intelligent machine learning (likely Artificial Intelligence (AI)) in 1st step, and then 3rd step is providing an intuitive visualization and interaction to medical images based on Virtual Reality (VR) and Computer Graphics (CG) technology.

In this paper, we discuss about computer anatomy model and our developments 2 intelligent support system based on Computer anatomy model; 1. CAD for Liver Cirrhosis and CAS system planning tool, 2. Real-time touch-less manipulation medical images in surgical room.



Oral Engineering and Digital Dentistry

**T. Kihara¹, T. Ikawa¹, T. Taji², S. Shigemoto¹, T. Murayama³,
H. Nikawa² and T. Ogawa¹**

¹ Department of Fixed Prosthodontics, School of Dental Medicine, Tsurumi University

² Department of Oral Biology & Engineering,
Graduate School of Biomedical and Health Sciences, Hiroshima University

³ Department of Medical System and Biomaterial Engineering,
Graduate School of Biomedical and Health Sciences, Hiroshima University

Recently, digital technologies have been widely available in dentistry. Especially, the dental CAD/CAM system have made remarkable progress in recent year, and now becomes available in the field of dental laboratory technology to fabricate dental prostheses. The dental workflow has changed by a collaboration with information science and engineering. Digital dentistry can provide the useful information that help dentist and dental technician to design the individual treatment plan.

Course of Oral Engineering in Hiroshima University is to cultivate oral engineers who are dental technicians

with a broad range of knowledge extended from engineering to biology, and to carry out clinical research projects on digital dentistry technologies collaborated with other department within the university (pediatric dentistry, orthodontics, prosthetic dentistry, oral and maxillofacial surgery, and medical department). The purpose of this presentation is to introduce the research projects and describe the future of digital dentistry and how it will affect dental practice workflows and diagnostics.

Luncheon Seminar

Luncheon Seminar

YIF-SCAN, A Novel Culture-independent Analytical Method for Detection of Bacteria
in the Bloodstream

Yakult Central Institute
H. Tsuji



YIF-SCAN, A Novel Culture-independent Analytical Method for Detection of Bacteria in the Bloodstream

H. Tsuji

PhD, Manager for Gastrointestinal Microflora Research Laboratory, Basic Research Department, Yakult Central Institute, 5-11 Izumi, Kunitachi-shi, Tokyo 186-8650, Japan. TEL: +81-42-577-8960, FAX: +81-42-577-3020, E-Mail: hirokazu-tsuji@yakult.co.jp

Key words: YIF-SCAN, RT-qPCR, blood, bacteremia, type 2 diabetes

ABSTRACT

To quantify the gut microbiota, we have developed a highly sensitive microbial analytical system (Yakult Intestinal Flora-SCAN; YIF-SCAN), based on reverse-transcription quantitative PCR^{1,2}. Targeting ribosomal RNAs which are present in abundant copy numbers in the bacterial cells, YIF-SCAN is at least several hundred times more sensitive (detection limits: 10²⁻³ cells/g feces, 1 cell/ml blood) than conventional DNA-based molecular methods, and thus enables highly sensitive and precise detection of live bacteria in various types of samples such as feces and blood. Specifically, in comparison with conventional culture methods, this high analytical sensitivity enables more accurate and reliable detection of live bacteria in the blood, in patients with different diseases, such as pediatric patients with febrile neutropenia³ or neonates with clinically diagnosed sepsis⁴.

Recently, we reported a higher detection rate of live gut bacteria in the blood of Japanese patients with type 2 diabetes, compared to those without diabetes⁵. Such detection of bacteremia suggests that bacterial translocation occurs in type 2 diabetes. Therefore, we conducted an interventional randomised control study to investigate whether probiotics could reduce bacterial translocation, and found that the total count of blood bacteria was significantly lower in the probiotic group⁶.

Herein, I review some of the studies supporting the potential application and clinical significance of YIF-SCAN in diagnosing bacteremia in patients with differ-

ence diseases, and discuss the possible contribution of YIF-SCAN technology to the field of oral science.

REFERENCES

1. Matsuda K, Tsuji H, Asahara T, Kado Y, Nomoto K. Sensitive quantitative detection of Commensal Bacteria by rRNA-Targeted Reverse Transcription-PCR. *Appl Environ Microbiol.* 2007; 73 (1): 32-39.
2. Matsuda K, Tsuji H, Asahara T, Matsumoto K, Takada T, Nomoto K. Establishment of an analytical system for the human fecal microbiota, based on reverse transcription-quantitative PCR targeting of multicopy rRNA molecules. *Appl Environ Microbiol.* 2009; 75 (7): 1961-1969.
3. Sakaguchi S, Saito M, Tsuji H, et al. Bacterial rRNA-targeted reverse transcription-PCR used to identify pathogens responsible for fever with neutropenia. *J Clin Microbiol.* 2010; 48 (5): 1624-1628.
4. Fujimori M, Hisata K, Nagata S, et al. Efficacy of bacterial ribosomal RNA-targeted reverse transcription-quantitative PCR for detecting neonatal sepsis: a case control study. *BMC Pediatr.* 2010; 10: 53.
5. Sato J, Kanazawa A, Ikeda F, et al. Gut dysbiosis and detection of "live gut bacteria" in blood of Japanese patients with type 2 diabetes. *Diabetes Care.* 2014; 37 (8): 2343-2350.
6. Sato J, Kanazawa A, Azuma K, et al. Probiotic reduces bacterial translocation in type 2 diabetes mellitus: A randomised controlled study. *Sci Rep.* 2017; 7 (1): 12115.

Session IV

New Insights into Extracellular Vesicle Biology

Secretion System of Bone Matrix and Matrix Vesicle by Osteoblast

Amgen Astellas BioPharm

S. Kawai

Isolation of Pro-inflammatory Extracellular Vesicles from Human Dental Pulp Cells

Hiroshima University

S. Suzuki

Indispensable Roles of Extracellular Vesicles in Cancer Development

National Cancer Center Research Institute

N. Kosaka

Exosome Engineering for Delivery of Therapeutic Proteins: Principles and Applications
of EXPLOR Technology

Korea Advanced Institute of Science and Technology

Eunsoo Kim



Secretion System of Bone Matrix and Matrix Vesicle by Osteoblast

S. Kawai

Amgen Astellas BioPharm

Bone consists of bone matrix such as collagen and hydroxyapatite (calcium and phosphate crystals). As one of the mechanisms of bone mineralization, mineralization starts with matrix vesicles secreted from osteoblasts as nucleus and hydroxyapatite precipitates in the vesicles, crystals in the vesicles gradually grow and spread to collagen fibers secreted from osteoblasts, and mineralization progresses. Osteoblasts secrete matrix vesicles and bone matrix to surface of bone, but genes concerning this secretion are unknown at present. In this study, we aimed to clarify genes involved in regulating secretion of extracellular bone matrix and matrix vesicle in osteoblasts and to elucidate its role. As a preliminary study, comprehensive analysis of genes involved in secretion expressed in osteoblasts revealed that SNARE gene group is highly expressed in osteoblasts. Of SNARE genes, Syntaxin 4a (Stx4a), Snap23, Vamp8 were particularly expressed in osteoblasts. To investigate Stx4a function in osteoblasts, osteoblast specific Stx4a

conditional knockout mice were constructed. Osteoblast specific deficient mice of Stx4a showed osteopenia in dwarf mice, increased X-ray permeability due to low mineralization of skeleton compared with wild type, decreased alizarin red staining, and decreased matrix secretion. BMD by pQCT in Stx4a osteoblast specific deficient mice decreased in cortical and trabecular bone of femoral metaphysis and in cortical bone of femoral diaphysis. Micro-CT analysis showed significant decrease in BV/TV, Tb.Th, and Tb.N, and increase in Tb.Sp, suggesting deterioration in bone structure. Structural bone parameters, OV/BV, OS/BS, O.Th, and Ob.S/BS of tibia morphometry decreased. Kinetic bone parameters, MAR, BFR/BS, MS/BS, dLS/BS, and sLS/BS were reduced. In our study, we elucidated a part of secretion mechanism of matrix vesicles and extracellular bone matrix by osteoblasts, and it is suggested that Stx4a plays an important role in bone production by osteoblasts.



Isolation of Pro-inflammatory Extracellular Vesicles from Human Dental Pulp Cells

S. Suzuki

Department of Biological Endodontics,
Graduate School of Biomedical and Health Sciences, Hiroshima University

Pulpitis is an inflammation of the dental pulp tissue and is caused by several adverse events, such as decay, tooth fracture, tooth preparation during dental procedures, and ascending inflammation from a tooth apex. Irreversible pulpitis is characterized by intense pain and pulpitis is so rapidly transitioned from reversible to irreversible state that antibiotics are not effective to reduce pain and inflammation. Thus, we have thought that some host factors which accelerate the transition to irreversible state must exist. In accordance with this hypothesis, we previously found that macrophages stimulated with the supernatant of dental pulp cells (SupDPC) which had been obtained from both immortalized and primary dental pulp cells drastically secreted pro-inflammatory cytokines such as TNF α , IL-1 β , and MCP-1. By utilizing comprehensive proteomics analyses of SupDPC, we explored the factors in SupDPC, which triggered the secretion of pro-inflammatory cytokines from macrophages, and identified several cytoplasmic proteins which are known

as markers of extracellular vesicles (EVs), such as GAPDH, β -actin, and HSPs in SupDPC. Furthermore, to examine whether EVs were source of pro-inflammatory ability of SupDPC, we excluded the EVs from SupDPC by filtration with different pore sizes and found that SupDPC completely lost its pro-inflammatory ability when treated with the filters whose pore size was smaller than 0.45 μ m. The ability of EVs in SupDPC was then validated by the potent activities of isolated EVs from SupDPC. Searching the receptors of EVs in macrophages by specific inhibitors and siRNAs revealed TLR1/2 complex was the principle acceptor to evoke the intracellular pro-inflammatory signaling such as NF- κ B and JNK signaling. These results suggest that DPC-delivered EVs potentially have pro-inflammatory capability, indicating the inhibition of EVs secretion from DPC may be a new therapeutic frame for preventing the transition to irreversible pulpitis.



Indispensable Roles of Extracellular Vesicles in Cancer Development

N. Kosaka and T. Ochiya

Division of Molecular and Cellular Medicine,
National Cancer Center Research Institute

Key words: Extracellular vesicles, cell-cell communications, cancer cells, microenvironmental cells, microRNA

Extracellular vesicles (EVs) are small membranous vesicles which have been shown for the novel mediator of cell-cell communication, especially, between cancer cells and their microenvironmental cells. We have shown that microRNAs (miRNAs) can be transferred between cells, and those miRNAs are functional in recipient cells (1). In addition to this finding, we also have shown that miRNAs in EVs are one of the key molecules for the interaction between cancer cells and their microenvironmental cells. Indeed, recent findings suggest the indispensable roles of EVs for cancer progression, such as invasion, drug resistance, metastasis, and relapse. For instance, inhibition of EV secretion from cancer cells led to the disruption of cancer metastasis (2). In addition, transfer of miRNAs in EVs from the bone marrow mesenchymal stem cells promoted the breast cancer cell dormancy in a metastatic niche (3). Furthermore, a novel mechanism of brain metastasis mediated by EVs that triggers the destruction of blood-brain barrier (BBB) have been revealed (4). Thus, understanding the molecular mechanisms of EV-mediated cell-cell interaction leads to the novel diagnosis and therapeutics for cancer. In this presentation, we will show some evidences about EV-mediated cancer progression, then we will also pres-

ent our current project regarding the therapy targeting the cancer-specific EV secretion pathway (5).

1. Kosaka N, Iguchi H, Yoshioka Y, Takeshita F, Matsuki Y, Ochiya T. Secretory mechanisms and intercellular transfer of microRNAs in living cells. *J Biol Chem*. 2010
2. Kosaka N, Iguchi H, Hagiwara K, Yoshioka Y, Takeshita F, Ochiya T. Neutral sphingomyelinase 2 (nSMase2)-dependent exosomal transfer of angiogenic microRNAs regulate cancer cell metastasis. *J Biol Chem*. 2013
3. Ono M, Kosaka N, Tominaga N, Yoshioka Y, Takeshita F, Takahashi RU, Yoshida M, Tsuda H, Tamura K, Ochiya T. Exosomes from bone marrow mesenchymal stem cells contain a microRNA that promotes dormancy in metastatic breast cancer cells. *Sci Signal*. 2014
4. Tominaga N, Kosaka N, Ono M, Katsuda T, Yoshioka Y, Tamura K, Lötvall J, Nakagama H, Ochiya T. Brain metastatic cancer cells release microRNA-181c-containing extracellular vesicles capable of destructing blood-brain barrier. *Nat Commun*. 2015
5. Kosaka N, Yoshioka Y, Fujita Y, Ochiya T. Versatile roles of extracellular vesicles in cancer. *J Clin Invest*. 2016



Exosome Engineering for Delivery of Therapeutic Proteins: Principles and Applications of EXPLOR Technology

Eunsoo Kim

Department of Bio and Brain Engineering,
Korea Advanced Institute of Science and Technology (KAIST)

Key words: Exosome, optogenetics, protein drug delivery, biopharmaceutical, protein interaction

BACKGROUND

Recently, as the importance of drug delivery system has increased in biopharmaceuticals, various nanoparticle-mediated drug delivery system has been developed by researchers. Among them, cell-derived exosomes have been highlighted as a promising drug carrier for the *in vivo* drug delivery. In particular, there have been great efforts to deliver protein drugs, which account for the majority of biopharmaceuticals, to specific target cells in the body. However, it has been difficult to encapsulate the biologically active proteins within nanoparticles without any functional loss of the loading proteins.

OBJECTIVES

To address the present limitations of therapeutic protein delivery, we developed an optogenetically engineered exosome system EXPLORs (exosomes for protein loading *via* optically reversible protein-protein interactions) that can deliver soluble proteins into the cytosol *via* controlled, reversible protein-protein interactions (PPIs).

MATERIALS & METHODS

A pair of proteins which reversibly bind to each

other under blue light, Cryptochrome 2 (CRY2) and CRY-interacting basic-helix-loop-helix 1 (CIB1), were used as a PPI module for the exosomal protein loading. CRY2 was conjugated to an intracellular protein drug, and CIB1 (a truncated form of CIB1) was conjugated to CD9 exosome marker. By expressing these engineered proteins in live cells, the intracellular therapeutic protein can be docked into the exosome through the natural process of exosome biogenesis under blue light illumination.

RESULTS

Treatment with protein-loaded EXPLORs was shown to significantly increase intracellular levels of cargo proteins and their function in recipient cells in both a time- and dose-dependent manner.

CONCLUSION

We have shown to delivery mCherry, Cre enzyme, Bax, and Super repressor IκB proteins as functional proteins in the target cells and *in vivo*. As EXPLOR technology overcomes the limitations of previous protein drug delivery methods, it is expected to become a key technology in realizing personalized medicine in the field of biopharmaceuticals in the future.

Poster Presentation

Young Investigator Session I-1~I-7

Young Investigator Session II-1~II-7

A-1~A-10 Natural Substances

B-1~B-13 Bacteria, Immunology, Inflammation

C-1~C-5 MSC, Bone Regeneration

D-1~D-9 Tumor, Pain, etc.

E-1~E-16 Craniomaxillo-face, Bone, Radiological Image. etc.

F-1~F-13 Dental Materials, Techniques, etc.

G-1~G-12 Epidemiology, Education, Prevention, etc.

■ Young Investigator Session I

YSI-1	45
The Influence of Intermittent Compressive Force on Osteogenic Differentiation of Human Mandibular-derived Osteoblast-like Cells	
Pimrumpai Rochanakit Sindhavajiva, Panunn Sastravaha, Mansuang Arksornnukit and Prasit Pavasant	
YSI-2	46
Phytic Acid Has the Potential to Inhibit Ectopic Calcification	
Faisal Ahmed, T. Minamizaki and Y. Yoshiko	
YSI-3	46
Engineering Tissues That Mimic Natural Cartilage Microstructure	
H. Sugino, M. Kanawa, K. Tanimoto and K. Kato	
YSI-4	47
Effects of Brain-derived Neurotrophic Factor (BDNF) as an Adjunct to Non-surgical Periodontal Treatment on Ligature-induced Periodontitis in Dogs	
S. Sasaki, K. Takeda, M. Takewaki, M. Kajiya, S. Matsuda, N. Mizuno, T. Fujita and H. Kurihara	
YSI-5	48
PDL Cell Sheets and Chitosan RGD Peptide for Reconstruction of One-Wall Periodontal Defect	
Lisa Amir, Yuniarti M. Soeroso, Dewi Fatma, Hari Sunarto, Benso Sulijaya, Erik Idrus, Herlis Rahdewati, Angelia, Kenji Izumi and Basril Abbas	
YSI-6	49
Synthesis of Collagen Derived-Chicken Shank and Chitosan Scaffold towards Degradation, Swelling and Water Content Percentage Tests as Biomaterials in Tissue Engineering	
Agrippine Putricia Asaeli, Anita Yuliati, Theresia Indah Budhy, Safira Wilda, Imam Silalahi, Demitria Santoso and Ariyati Retno	

YS I-7	49
Inter- and Intra-individual Variation in Metabolite Profiles of Saliva in Patients with pSS's Syndrome	

**Maria Herrala, Jopi JW Mikkonen, Paula Pesonen, Reijo Lappalainen,
Leo Tjäderhane, Raija Niemelä, Tuula Salo, Sami Myllymaa and Arja M Kullaa**

■ *Young Investigator Session II*

YS II-1	50
Antifungal and Anti-inflammatory Effects of N-glutaroyl Melatonin and N-succinyl Melatonin	

Damrongrungruang T, Somudorn J, Panpitakkul P and Puthongking P

YS II-2	50
The IL-17A, IL-8, Human Beta Defensin-2 Assay for Candidiasis in Immunocompromised Wistar Rat Treated with <i>Camellia sinensis</i> extract.	

Retno Pudji Rahayu and Regina Purnama Dewi Iskandar

YS II-3	51
Phospholipase C-related Catalytically Inactive Protein Protects PI(4,5)P ₂ from Its Metabolic Enzyme and Contributes to Completion of Cytokinesis	

Y. Ikura, S. Asano and T. Kanematsu

YS II-4	52
The Transition of Tissue Inhibitor of Metalloproteinase-1 and -4 Expressions Induces Aggressive Behavior and Poor Patient Survival in Dedifferentiated Liposarcoma via YAP/TAZ Activation	

Madhu Shrestha, T. Ando, Chea chanbora, I. Ogawa, M. Miyauchi and T. Takata

YS II-5	53
Genetic Diagnosis of Neurofibromatosis Type I (von Recklinghausen's Disease) and Establishment of NF1-specific Induced Pluripotent Stem Cells (iPSCs) for the Study of Disease Mechanisms	

**T. Fukutani, A. Hamada, H. Nakatao, F. Obayashi, S. Yamasaki, T. Kanda,
K. Koizumi, S. Toratani and T. Okamoto**

YS II-6	54
Growth Regulation by ED-71 of Human Squamous Cell Carcinoma Cell Lines through Exosomal microRNA Production in Serum-free Culture	

M. Higaki, T. Shintani, A. Hamada, S.N.Z. Rosli, E. Usui and T. Okamoto

YS II-7	55
Fatigue Resistance of Ytria-stabilized Tetragonal Zirconia Polycrystal Clasps for Removable Partial Dentures	

**Tzu-Yu Peng, S. Shimoe, T. Matsui, N. Tanoue, H. Akebono,
T. Murayama and T. Satoda**

■ A. Natural Substances

A-1	56
Mangosteen Peel Extract (<i>Garcinia Mangostana</i> L) as Stem Cell Growth Factor	
Ira Arundina, Theresia Indah Budhy, Maretaningtias Dwi Ariani and Ketut Suardita	
A-2	56
Effects of Date Fruit (<i>Phoenixdactylifera</i> L.) Crude Extracts on Oral Cells: <i>in vitro</i>	
Peerada Weerayuttil, Ramida Wongraweewiwat, Arisa Kotchoom, Ariya Rattanathongkom and Ponlatham Chaiyarit	
A-3	57
<i>The Effects of Pueraria Mirifica</i> Extracts on Human Dental Pulp Cells, <i>in vitro</i> .	
Arayatrakoollikit U, Kawsamer S and Chaiyarit P	
A-4	57
The Potential of Kouboku (<i>Magnolia obovata</i>) to Regulate the Inflammatory Response in Human Gingival Epithelial Cell	
Irma Josefina Savitri, Udijanto Tedjosasongko, Chiquita Prahasanti, K. Ouhara and H. Kurihara	
A-5	58
Potency of Black Tea on Cellular Immunologic as Inhibitory Progression of Oral Mice Tumor Induced Benzopyrene	
Theresia Indah Budhy, Ira Arundina and Istiati Soepribadi	
A-6	58
The Comparison of Cromium Ions Release for Stainless Steel 18-8 between Artificial Saliva and Green Tea Leaves Extracts	
Nety Trisnawaty and Mirna Febriani	
A-7	59
Expression of BMP-2 and bFGF from Combination of Mangosteen Peel Extract and Carbonate Apatite Graft: Potential Strategy for Alveolar Bone Regeneration	
Maretaningtias Dwi Ariani, Andra Rizqiawan, Sherman Salim and Agus Dahlan	
A-8	59
Inhibition Eeffect of <i>Javanese tumeric</i> (<i>Curcuma xanthorrhizol</i> Roxb.) Ethanol Extract on the Development of <i>C. albicans</i> Biofilm	
Nathaniel Melvin, Ria Puspitawati and Dewi F Suniarti	
A-9	60
The Antimicrobial Effects of White Curcuma and Thai Basil Crude Extracts on <i>Streptococcus mutans</i> : An <i>in vitro</i> Study	
Chutikarn Boonnok, Thas Prateepthong, Phetcharat Manatchadsophon, Ariya Rattanathongkom, Jarin Paphangkorakit, Rajda Noisombut and Supanigar Ruangsri	
A-10	60
Lactoferrin Potency in Inhibiting Colonization <i>Streptococcus mutans</i> and <i>Candida Glabrata</i>	
Istiati Soepribadi and Theresia Indah Budi	

■ B. Bacteria, Immunology, Inflammation		
B-1	A Characteristic of Bacterial Colonies from Root Canal Teeth with Chronic Apical Abscess: A Case Report	61
	Yuti Malinda, Diani Prisinda and Yurika Ambar Lita	
B-2	Autoantibodies in Temporomandibular Disorders Patients: The Possibility of a Marker for Chronic Pain	61
	Ji Woon Park	
B-3	Reactive Oxygen Species and Salivary Bacterial Counts in Elderly Patients: A Preliminary Study	62
	N. Nur'aeny, W. Hidayat, I.S. Wahyuni and K. Wahyudi	
B-4	Body Mass Index (BMI) Corelation with Salivary HBD-3 Secretion Levels in Children with Dental Caries and Caries Free	62
	Retno Indrawati, Joseph Leonardo, Afin Aslihatul Umma, Dien Nisa Aulia, Tamima Izzat N, Maretaningtias Dwi Ariani and Seno Pradopo	
B-5	Oral Manifestations Related to Immunosuppression Degree in Pediatric HIV/AIDS Patients in Surabaya, Indonesia; Cross-sectional Research	63
	Mario Powa Mensana, Alexander Patera Nugraha, Diah Savitri Ernawati, Bagus Soebadi, Erwin Asta Triyono, Remita Adya Prasetyo and Sulistyowati Budi	
B-6	High Prevalence of Dental Caries and It's Correlation with CD4+ Level in Children with Perinatal HIV/AIDS Undergoing Antiretroviral Therapy in UPIPI Dr. Soetomo Hospital Surabaya, Indonesia	64
	Alexander Patera Nugraha, Mario Powa Mensana, Diah Savitri Ernawati, Adiastuti Endah Parmadiati, Bagus Soebadi, Erwin Asta Triyono, Remita Adya Prasetyo and Sulistyowati Budi	
B-7	Oral Hairy Leukoplakia and Oral Candidiasis as Predictor-Prognostic HIV/AIDS Infection in Surabaya, Indonesia.	65
	Alexander Patera Nugraha, Diah Savitri Ernawati, Adiastuti Endah Parmadiati, Bagus Soebadi, Erwin Asta Triyono, Remita Adya Prasetyo and Sulistyowati Budi	
B-8	A DNA-protein Crosslink Repair Protease in <i>Candida albicans</i>	66
	Oranart Matangkasombut, Juthamas Kaewsonthi, Aimorn Homchan, Danaya Pakotiprapha and Skorn Mongkolsuk	
B-9	Influence of Different Energy Densities of Low-level Laser on Oral Wound Healing	66
	Dang Thi Tham	

B-10	.....	67
	Elucidation of the Role of NR4A1 in CsA Induced Gingival Overgrowth A. Okanobu, S. Matsuda, S. Hatano, M. Kajiya, T. Fujita and H. Kurihara	
B-11	.....	67
	IL-35 Inhibits IL-6 and CXCL10 Production in TNF- α -stimulated Human Periodontal Ligament Cells S. Shindo and H. Shiba	
B-12	.....	68
	Lipopolysaccharide-Administered Bone Destruction Model of Periodontitis on <i>Rattus Norvegicus</i> Erik Idrus and Awandra Evandy	
B-13	.....	68
	Involvement of C5a in the Progression of Experimental Arthritis in SKG Mice Induced by <i>Porphyromonas gingivalis</i> Infection S. Munenaga, K. Ouhara, M. Kajiya, K. Takeda, N. Mizuno, T. Fujita and H. Kurihara	
■ C. MSC, Bone Regeneration		
C-1	.....	69
	Hypoxic Precondition Induces SDF-1 -CXCR4 Expression in Bone Marrow –Derived Mesenchymal Stem Cells Culture Sri Wigati Mardi Muljani, DiahSavitri Ernawati and EhaRenwi Astuti	
C-2	.....	70
	Mechanotransduction in 3D Culture Clumps of Mesenchymal Stem Cells/Extracellular Matrix Complexes Regulates the Cell Fate N. Komatsu, M. Kajiya, S. Motoike, M. Takewaki, S. Horikoshi, T. Iwata, K. Ouhara, K. Takeda, T. Fujita and H. Kurihara	
C-3	.....	71
	Immobilization of Basic Fibroblast Growth Factor onto Bioengineered Surfaces: A Novel Approach for the Efficient Expansion of Mesenchymal Stem Cells AJAY SHAKYA, I. Hirata and K. Kato	
C-4	.....	71
	Biodegradation and Compressive Strength Test of Chitosan Gelatin and Calcium Carbonate Scaffold with Different Ratio as Biomaterial in Bone Tissue Engineering Prasiddha Mahardhika E.F, Anita Yuliati, Pratiwi Soesilawati and Pradipta Pitaloka	
C-5	.....	72
	The Differences Scaffold Composition in Pore Size and Hydrophobicity Properties as Bone Regeneration Biomaterial Muhammad Dimas Aditya Ari, Anita Yuliati, Retno Pudji Rahayu and Dita Saraswati	

■ D. Tumor, Pain, etc.		
D-1	Nitidine Chloride Acts as an Apoptosis Inducer in Human Oral Squamous Cell Carcinoma via the Inhibition of STAT3	72
	Sung-Dae Cho, Young-Seok Park and Ho-Beom Kwon	
D-2	Potency of Genistein with Nanopartikel Modification of PEG-PLGA Conjugated Anti-IL6 Antibody as Anticancer Agent on OSCC	73
	Azimah Nurin Nafilah and Yolanda Aulia Hapsari	
D-3	Prevalency of Burning Mouth Syndrome in Oral Medicine Departement Patients at Hasan Sadikin Hospital Periode 2012-2015	73
	T Setiani D	
D-4	Modulation of Transient Receptor Potential Vanilloid Subtype 1 by Dexmedetomidine	74
	Gehoon CHUNG, Byeong-Min LEE, Yoonsun JANG, Giyeon PARK, Chae-yun BAEK and Teo Jeon SHIN	
D-5	The Antineuralgic Effect of Botulinum Toxin in Trigeminal Neuralgia Patients: an Open-label Clinical Trial Study.	74
	Thofun Ieamsuwantada, Pimchanok Puttakun, Supisara Sritrakul, Teekayu Plangkoon Jorns, Somsak Tiamkao, Amnat Kitkhuandee and Rajda Noisombut	
D-6	Unusual Radicular Cyst Involving Nasal Cavity: Diagnosed Using CBCT	75
	S Farrah D, L Epsilawati, F Pramanik and RN Firman	
D-7	Reveal Rare Bilateral Keratocystic Odontogenic Tumor in Mandible Paramolar with CBCT 3D Radiograph	75
	A A G Dananjaya A, L Epsilawati and Azhari	
D-8	Prevalence and Risk Factors of Obstructive Sleep Apnea in Edentulism at Faculty of Dentistry, KKU.	76
	S. Ruangsri, W. Tiskratok, C. Norraparn, W. Theprungsirikul, D. Yodsuwan, S. Puasiri and K. Sawanyawisuth	
D-9	Chronic Apical Abscess from Endodontic Aspect	77
	Diani Prisinda, Yuti Malinda and Yurika Ambar Lita	
■ E. Craniomaxillo-face, Bone, Radiological Image. etc.		
E-1	Mesh Diagram Analysis of Soft Tissue Facial Norms for Vietnamesees	77
	Lu Minh Loc and Ngo Thi Quynh Lan	

E-2	78
Cephalic Index among Children of 6-8 Year of Age with Low Body Mass Index in Bandung City, Indonesia	
E Rachmawati, R Saptarini P, I Gunawan and Hilmamanda	
E-3	78
Malocclusion in 7-12 Year Children with Abnormal Swallowing Pattern	
RS Primarti, IS Sasmita, E Riyanti, I Rahmat, Y Zenab and E Rachmawati	
E-4	79
Digital Tracing on Mandibular Landmark Using Lateral Cephalogram for Chronological Age Prediction	
Astika Swastirani, Mieke Sylvia MARS and Daniel Harjono Utomo	
E-5	79
Cervical Vertebrae Maturity Stage as Assessment of Growth Spurt Prediction to Determine Mandibular Length and Chronological Age	
Ariyati Retno Pratiwi, Astika Swastirani and Sari Kurniawati	
E-6	80
Measurements of Bone Density on Panoramic Radiographs with Angle's Malocclusion Classification of Patients Aged 13-30 in Padjadjaran University Dental Hospital	
S Belly, S Suhardjo and L Epsilawati	
E-7	80
Effect of Biostimulation Irradiation of Low Intensity Laser Therapy on the Orthodontic Accelerate of Male Central Incisors Cavia Porcellus	
Ida Bagus Narmada	
E-8	81
Assessment of Sinus Maxillaris Wall Morfotometri between Male and Female Using Panoramic Radiograph	
Azhari, L Epsilawati and L Wei Ken	
E-9	81
Correlation between Bone Density and Mandibular Height in Sundaness Population Aged 5-17 Years in Sekeloa Bandung West Java Indonesia	
Y Hedidjati, R Saptarini, L Epsilawati and F Pramanik	
E-10	82
Measurement of Bone Density and Mandibular Height in Adult Sundaness Population in Bandung West Java Indonesia	
H Polii and L Epsilawati	
E-11	82
Analysis of Bone Density in Malocclusion Patients Using ImageJ Software on Panoramic Radiograph	
Pramanik F, Firman R, Epsilawati L and Cheng L P	

E-12	83
Morfometry Study on Mandible of Elderly Women Population in Sekeloa Bandung West Java Indonesia	
L Epsilawati, F Pramanik, R N Firman, T Seniani and I Sufiani	
E-13	83
Adjunctive Buccal and Palatal Corticotomy for Adult Maxillary Expansion in a Sheep Model	
Le Huy Thuc My	
E-14	84
Radiographic Bone Analysis of Alveolar Bone Assessment on Periapical Lesion: A Systematic Review	
Yurika Ambar Lita, Diani Prisinda and Yuti Malinda	
E-15	84
Evaluation of Periapical Photo Errors Made by Faculty of Dentistry University Prof Dr. Moestopo (B) Pre-clinical Students in 2015	
D Indriastuti	
E-16	85
Cone Beam Computed Tomography Imaging of Temporomandibular Joints of Temporomandibular Disorders Patients at Ho Chi Minh Faculty of Odonto-Stomatology	
Vo Thi Le Nguyen and Nguyen Thi Kim Anh	
■ F. Dental Materials, Techniques, etc.	
F-1	85
Centering Ability of Two Rotary Instruments –WaveOne and Protaper Universal– in Simulated Canal Shaping	
Le Anh Hong and Pham Van Khoa	
F-2	86
Comparison of Physical Properties of the Silicone Rubber for Border Molding Model Combined with Silicone Oil on Different Ratio	
Suwadee Aerarunchot, Korakod Pipisjan, Tanawat Ponggun, Chaivut Prunkngarmpan, Watcharin Hovichitr and Rajda Noisombut	
F-3	86
Comparison Setting Time, Cccuracy and Surface Hardness of Type III Gypsum Product Mixing with Distilled Water, 2% Slurry Water and Slurry Mixture from the Model Trimmer	
Chaivut Prunkngarmpan, Thanarak chaypradab, Supon kamkaew, Suttipan Tumdee and Wilawan Weraarchakul	
F-4	87
The Effect of Disinfectan Immersion on the Alginate Impresion Material Plus Cassava Starch for Dimensional Stability	
M Febriani and L Epsilawati	
F-5	87
The Effect of Hand Mixing, Invented Semiautomatic Machine and Automatic Centrifuge Machine on Air Bubble Formation in Alginate Impression Material.	
P. Hathaidechadussadee, P. Uasuwan, S. Namchaitaharn and S. Aerarunchot	

F-6	88
Synthesis and Characterisation of Nanocomposite with Different Filler Ratio Ca-PSZ, Silika Nanorod, and Metakaolin For Application of Learning Purpose Artificial Tooth	
Vania Christiani	
F-7	88
Effect of Elastin-like Polypeptides Incorporation on the Physical Properties of Calcium Phosphate Cement	
Sun-Young Kim	
F-8	89
Catechol-based Dental Primer	
Jin-Soo Ahn, Young-Seok Park and Ho-Beom Kwon	
F-9	90
Synthesis and Microstructure Analysis of Graphene Oxide for Dental Materials Applications	
Angela Evelynna, Anastasia Alamanda Chakravitha, Stefani Kartika Putri, Tolistya Novitasari Abdullah, Idham Pribadi Mochammad and Bambang Sunendar Purwasasmita	
F-10	90
Incremental Technique on Bulk Fill Composite Resin to Reduce Microleakage in Deep Cavity	
Maria Andisa Mayangsari, M. Mudjiono and Nanik Zubaidah	
F-11	91
Flexural Strength of High Viscosity Bulk Fill Resin Composites	
Kornkamon sukjit, Panithan Rujirasak and Subin Puasiri	
F-12	91
Development of Novel Porous Titanium as Bone Reconstruction Material	
R. Kobatake, K. Doi, Y. Makihara, Y. Oki, T. Kubo, H. Abekura and K. Tsuga	
F-13	92
Effect of Repeated Firing on Dental Zirconia Surface	
CHUNG, Shin Hye	
■ G. Epidemiology, Education, Prevention, etc.	
G-1	92
Caries Risk and Prevention Care Choice of Pre-school Aged Children	
A.A Suwargiani, R Wardani and F Meditia P	
G-2	93
Comperation between Caries and Filling Prevalence at the Age of 8-15 Years in Bandung Indonesia Population	
I Sasmita and L Epsilawati	
G-3	93
Health Seeking Behavior of Solving Dental Problem in Children Aged 9-11 Years Old in District of Sukajadi Bandung City	
Grace Monica, Deborah Cerfina and Shelly Lelyana	

G-4	94
The Effectiveness of Oral Health Education Program for Mentally Retarded Children in Ho Chi Minh City.	
Huynh To Tram	
G-5	95
The Qualitative Study of the Failed Cases from Regular Oral Care Instruction Program: Caregivers with Interesting Feeding Behaviors	
Karawekpanyawong R., Chanchorn W., Suwannasri S., Tantayakorn P. and Radeesujalitkul P.	
G-6	96
Remineralization of Early Enamel Lesions Using Calcium Sodium Phosphosilicate Containing Toothpaste: An in-vitro Study.	
A Pasasuk, K Sukjit, P Niltawee and K Kongraksakiat	
G-7	96
A New Objective Method to Evaluate the Degree of Wear of Worn Toothbrushes	
Y. Kaneyasu, H. Shigeishi, E. Fukada, H. Amano and M. Sugiyama	
G-8	97
A Comparative Study of Shear Bond Strength of Sealant in Acid-Etched and Er:YAG Irradiated Enamel	
Rattanacharoenthum A, Kantrong N and Charoenwong P	
G-9	97
The Efficiency of Oral Health Education Pocket Book to Promote Pregnant Woman Oral Health in Pucang Sewu Community Health Centre (PUSKESMAS)	
Muhammad Yoga Wardhana	
G-10	98
Association of Oral Function with Long-term Participation in Community-based Social Activity in Elderly People	
S. Miyoshi, E. Fukada, H. Shigeishi and M. Sugiyama	
G-11	98
Daily Stress of 5 th Year Dental Students during Training at Khon Kaen University	
A. Rattanathongkom, S. Khimsuksri, B. Pitanuwat, M. Suriyonghanpong, N. Kumpalum, M. Siriteptawee and S. Chatchiwiwatana	
G-12	99
A Comparison of the Dental DVI System among Twelve Countries and Japan	
H. Oka, S. Katsumura, Y. Ohbayashi, E. Kosuge, A. Sakuma, H. Saitoh and A. Kumagai	

YS I-1 The Influence of Intermittent Compressive Force on Osteogenic Differentiation of Human Mandibular-derived Osteoblast-like Cells

Pimrumpai Rochanakit Sindhavajiva^{1,2}, Panunn Sastravaha³, Mansuang Arksornnukit¹ and Prasit Pavasant^{2,4}

¹ Department of Prosthodontics, Faculty of Dentistry, Chulalongkorn University, Bangkok 10330, Thailand

² Mineralized Tissue Research Unit, Faculty of Dentistry, Chulalongkorn University, Bangkok 10330, Thailand

³ Department of Surgery, Faculty of Dentistry, Chulalongkorn University, Bangkok 10330, Thailand

⁴ Department of Anatomy, Faculty of Dentistry, Chulalongkorn University, Bangkok 10330, Thailand

BACKGROUND : Mechanical force can regulate osteoblast differentiation in osteoblasts. Different types of force have different effects on osteoblasts. These effects are associated with the activation of purinergic receptors, especially purinergic 2X7 receptor (P2X7R). However, the molecular response of human osteoblasts to intermittent compressive force (ICF) associated with P2X7 receptors has not been clarified.

OBJECTIVES : In this study, the influence of ICF on human mandibular-derived osteoblast-like cells (hMOBs) was investigated. The role of ICF-induced ATP through P2X7R was examined.

MATERIALS & METHODS : The hMOBs were obtained from non-pathologic mandibular bone. Cells were subjected to ICF for 20 h. The hMOBs were cultured in osteogenic medium in the absence or presence of 0.5-5 μ M 2'(3')-O-(4-benzoyl) benzoyl-ATP (BzATP), a selective P2X7R agonist. The mRNA expression was investigated by quantitative real time polymerase chain reactions. *In vitro* mineral deposition was investigated by Alizarin Red S staining. Transfection of small interfering RNA was performed to confirm the effect of P2X7R activation. WNT/ β -catenin signaling was detected by immunofluorescence staining for β -catenin.

RESULTS : The results demonstrated that ICF increased

the *OSX* and *ALP* mRNA expression and enhanced *in vitro* mineralization. In addition, *WNT3A* mRNA expression and β -catenin nuclear translocation were also increased. These effects were related to ICF-induced ATP. BzATP significantly attenuated *in vitro* mineralization and *RUNX2* and *OSX* mRNA expression in osteogenic medium-induced hMOBs. Knockdown P2X7R expression by siRNA rescued BzATP-inhibited *RUNX2* and *OSX* expression. Interestingly, a reduction of *WNT3A* mRNA expression and blockage of osteogenic medium-induced β -catenin nuclear translocation were also found in BzATP treated group. The addition of recombinant human *WNT3A* abolished the effect of BzATP-reduced osteogenic marker gene expression and *in vitro* mineralization.

CONCLUSION : Our results demonstrated that ICF-induce ATP enhanced osteoblast differentiation and WNT/ β -catenin signaling pathway. P2X7R pathway participates in BzATP-inhibited osteoblast differentiation of hMOBs. This inhibitory effect was associated with inhibition of the WNT/ β -catenin signaling pathway.

Key words : Intermittent compressive force; Adenosine triphosphate; P2X7 receptor; Human osteoblasts; WNT signaling

YS I-2 Phytic Acid Has the Potential to Inhibit Ectopic Calcification

Faisal Ahmed, T. Minamizaki and Y. Yoshiko

Department of Calcified Tissue Biology, Graduate School of Biomedical & Health Sciences, Hiroshima University

BACKGROUND : Ectopic calcification of soft tissues is a complex process leading abnormal calcification in the extracellular matrix, particularly affecting the arterial blood vessels, skin and joints in age-associated disorders, including atherosclerosis, diabetes, chronic kidney disease and so on. Although the mechanisms underlying ectopic calcification remain unclear, some of them like arterial calcification due to hyperphosphatemia mimics bone formation. Not only pyrophosphate, a key inhibitor of mineralization, but also osteogenic pathways (e.g., BMP2 signaling and inorganic phosphate transport) appear to be involved in arterial calcification. Plant seeds are known to store phosphorus as Phytic acid (*myo*-inositol-1,2,3,4,5,6-hexaphosphate, IP6). In humans, IP6 can bind minerals in the gut and influence mineral absorption and digestive enzymes.

OBJECTIVE : We hypothesized the clinical benefits of IP6 for ectopic calcification. To test this hypothesis, we determine the effects of IP6 on several ectopic calcification models with its cellular and molecular events.

MATERIALS & METHODS : We used rodent osteogenic cell cultures and mouse aortic organ cultures. We also used

rodent models including mice implanted with collagen sponges including BMP-2. To evaluate ectopic calcification, we provided micro-CT and calcium contents with histological features. We also used RNA-sequencing and qRT-PCR to identify osteogenic conversion and unique genes involved in the effect of IP6.

RESULTS : IP6 inhibited mineralized bone nodules without any effect on cell proliferation and differentiation. Similarly, IP6 inhibited inorganic phosphate-induced arterial calcification in a mouse organ culture model. In this model, IP6 suppressed the levels of osteoblast markers with changes in unique gene clusters, suggesting that IP6 suppress ectopic calcification through multiple processes. We found that intravenous injection of IP6 inhibited ectopic calcification in several rodent models with no obvious effects on bone parameters.

CONCLUSION : These results suggest that IP6 may belong to a new class of anti-ectopic calcification agents.

Key words : Ectopic calcification, Phytic acid, Vascular calcification, Bone formation, BMP-2

YS I-3 Engineering Tissues That Mimic Natural Cartilage Microstructure

H. Sugino^{1,2}, M. Kanawa³, K. Tanimoto² and K. Kato

¹ Department of Biomaterials, Graduate School of Biomedical & Health Sciences, Hiroshima University

² Department of Orthodontics, Graduate School of Biomedical & Health Sciences, Hiroshima University

³ Natural Science Center for Basic Research and Development, Hiroshima University

BACKGROUND : Further challenges in tissue engineering include methodological developments for constructing tissue grafts that mimic natural tissue microstructure. This is well exemplified in the case of engineered articular cartilage that are absolutely required to have a graded distribution of particular types of cells and extracellular matrices (ECMs) for their functional restoration.

OBJECTIVES : Here we aimed at constructing a tissue graft with a graded distribution of both hyaline and fibrous cartilages in a single tissue graft. Our approach was to separately prepare spherical tissues consisting of hyaline and fibrous cartilages using human bone marrow-derived mesenchymal stem cells (hBMSCs), followed by the interfacial coalescence of these two tissues into a single composite under growth conditions.

MATERIALS AND METHODS : Immortalized hMSCs were subjected to pellet culture in a chondrogenic medium containing growth factors (TGF- β 3, IGF-1, and BMP-2) and ECMs (collagen I and II) alone or in combinations. The formation of hyaline and fibrous cartilages was assessed from the ratio of collagen I and II mRNA expressed in the pellets (col2/col1 ratio). Pellets exhibit-

ing relatively-high col2/col1 ratios were regarded as hyaline cartilage-like pellets, whereas low ratios as fibrous cartilage-like pellets. Hyaline and fibrous cartilage-like pellets were further cultured while stationary contacted each other to combine them into a single aggregate. After 14 days, the expression of collagen I and II was analyzed by immunostaining.

RESULTS : Culture in a medium containing TGF- β 3, IGF-1, and type II collagen showed the highest col2/col1 ratio, while the combination of TGF- β 3 with BMP-2 resulted in the lowest col2/col1 ratio. As a result of the combined culture, a single tissue was formed through interfacial coalescence. Collagen immunostaining revealed that the graded distribution of collagen I and II remained intact even after tissue formation.

CONCLUSION : Hyaline and fibrous cartilage-like pellets could be prepared by culturing hBMSCs under optimized conditions. These pellets could be coalesced, while keeping the graded distribution of collagens within the aggregate.

Key words : hyaline cartilage, fibrous cartilage, growth factor, collagen, mesenchymal stem cell

YS I-4 Effects of Brain-derived Neurotrophic Factor (BDNF) as an Adjunct to Non-surgical Periodontal Treatment on Ligature-induced Periodontitis in Dogs

S. Sasaki, K. Takeda, M. Takewaki, M. Kajiya, S. Matsuda, N. Mizuno, T. Fujita and H. Kurihara

Department of Periodontal Medicine, Graduate School of Biomedical & Health Sciences, Hiroshima University, Japan

BACKGROUND : We have revealed that the application of brain-derived neurotrophic factor (BDNF)/high molecular weight hyaluronic acid (HMW-HA) complex with flap surgery enhanced periodontal tissue regeneration in dogs and monkeys. Moreover, BDNF exerted apoptotic and cytostatic effects in gingival epithelial cells in vitro. These characteristics of BDNF may realize non-surgical regenerative therapy for small periodontal defects.

OBJECTIVES : We investigated the effect of scaling and root planing (SRP) with local application of BDNF/HMW-HA complex on the changes in clinical parameters and histology of periodontal tissue in dogs with ligature-induced periodontitis.

MATERIALS & METHODS : One week after scaling, the clinical parameters of gingival index, clinical attachment level, periodontal pocket depth and bleeding on probing of beagle dogs were recorded by the standardized methods. Thereafter, 3-0 silk ligatures were tied around the cervical region of mandibular second, third and fourth premolars to induce experimental periodontitis. The ligatures were maintained for 5 weeks. One week after

ligature removal, clinical parameters were recorded. Then the dogs were divided into four groups: no-treatment, SRP alone, SRP followed by local application of HMW-HA and SRP followed by local application of recombinant human BDNF (500 µg/ml)/HMW-HA complex. Two weeks after the treatment, clinical parameters were recorded again and anesthetized animals were perfused for histological analysis.

RESULTS : The BDNF/HMW-HA group showed significant improvement of clinical parameters compared to those of the other groups. Histological analysis on the BDNF/HMW-HA group indicated suppression of apical migration of epithelial tissue and milder infiltration of inflammatory cells than the other three groups. Furthermore, new cementum and alveolar bone were regenerated and collagen fibers were inserted into them in the BDNF/HMW-HA group.

CONCLUSION : BDNF as an adjunct to non-surgical periodontal treatment has potential to reduce excess inflammation and to promote periodontal tissue regeneration.

Key words : Periodontal treatment, regeneration therapy, non-surgical cytokine therapy, mild periodontitis, BDNF

YS I-5 PDL Cell Sheets and Chitosan RGD Peptide for Reconstruction of One-Wall Periodontal Defect

Lisa Amir^{1,6}, Yuniarti M. Soeroso², Dewi Fatma¹, Hari Sunarto², Benso Sulijaya², Erik Idrus¹, Herlis Rahdewati³, Angelia³, Kenji Izumi⁴ and Basril Abbas⁵

¹ Department of Oral Biology, Faculty of Dentistry, Universitas Indonesia, Indonesia, Jakarta, 10430, Indonesia

² Department of Periodontology, Faculty of Dentistry, Universitas Indonesia, Indonesia, Jakarta, 10430, Indonesia

³ Periodontology Residency Program, Faculty of Dentistry, Universitas Indonesia, Jakarta, 10430, Indonesia

⁴ Division of Oral Anatomy, Graduate School of Dental and Medical Sciences, Niigata University, Japan

⁵ Tissue Bank, Indonesia National Atomic Energy (BATAN), Indonesia

⁶ Cluster of Oral Epidemiology and Clinical Studies in Dentistry, Faculty of Dentistry, Universitas Indonesia, Jakarta, 10430, Indonesia

INTRODUCTION : Cell sheet application as cytotherapy approach for periodontal regenerative medicine has developed recently. The use of biodegradable support matrices to support cell sheet is still considered necessary in cases of large bone defect such as periodontal one-wall defect case. It is unknown how the combination of periodontal cell sheet and RGD-modified chitosan could improve the regeneration of periodontal tissue in one-wall periodontal defect cases.

OBJECTIVE : to examine the potential of PDL cell sheet seeded in RGD-modified chitosan for periodontal tissue regeneration in one-wall periodontal case in *Macaque nemestrina* model.

METHODS : Formation of one-wall periodontal defect were created in lateral maxillary and mandibular incisors of 4 adult male *Macaque nemestrina*. Following periodontal therapy, regenerative materials were transplanted in the defect area consisted of: chitosan membrane as a control, RGD-modified chitosan membrane, chitosan membrane loaded with PDL cell sheet, RGD-modified chitosan membrane loaded with

PDL cell sheet. Clinical periodontal parameters were measured, gingival crevicular fluid were collected every week and at week 4, radiographic examination were taken followed by biopsies retrieval. CEMP-1 protein expression were detected by ELISA. Periodontal tissue regeneration was examined by uCT and histological analysis.

RESULTS : The lowest value of lost of attachment was found in PDL cell sheet combined with RGD-modified chitosan. Similarly, we found an increase trend of CEMP-1 protein expression in this group and the highest gray scale value from alveolar bone density subtraction.

DISCUSSION : The application of PDL cells seeded in RGD-modified chitosan improved the periodontal regeneration in *Macaque nemestrina*. This strategy could potentially be used for periodontal regeneration in one-wall defect case.

Key words : PDL Cell Sheet, Chitosan, RGD Peptide, One-Wall Periodontal Defect

YS I-6 Synthesis of Collagen Derived-Chicken Shank and Chitosan Scaffold towards Degradation, Swelling and Water Content Percentage Tests as Biomaterials in Tissue Engineering

Agrippine Putricia Asaeli¹, Anita Yuliati², Theresia Indah Budhy³, Safira Wilda¹, Imam Silalahi¹, Demitria Santoso¹ and Ariyati Retno¹

¹ Graduate student of Faculty of Dental Medicine Universitas Airlangga, Surabaya-Indonesia

² Departement of Dental Material Universitas Airlangga, Surabaya-Indonesia

³ Departement of Oral Patology Universitas Airlangga, Surabaya-Indonesia

BACKGROUND : Bone defects caused by periodontal disease, degenerative diseases and trauma are some of the most common complications in the oral cavity. In massive bone defect, spontaneous regeneration is not emerged, hence biodegradable scaffold is needed to facilitates integration between new tissue and host tissue. Collagen-Chitosan scaffold is one of biomaterial that can be used in tissue engineering. Collagen is a major component of extracellular matrix in bone, that could be derived from chicken shank. Chicken shank consist of skin, bone, muscle and collagen protein (22.98%). Chitosan help cell attachment, differentiation and migration.

OBJECTIVE : To discover suitability of collagen derived-chicken shank and chitosan scaffold as biomaterials in tissue engineering based on degradation, swelling and Water Content Percentage (WCP) test results.

MATERIALS & METHODS : Chicken shank are mashed then mixed with trypsin and acetic acid. Afterwards centrifuged

9.000 rpm for 10 minutes. Fluid is collected and centrifuged 9.000 rpm for 10 minutes. Supernatant is collected and dialyzed. Chitosan granules are mixed with acetic acid and sodium hydroxide. Gel Collagen-Chitosan are mixed with a ratio of 1:1 (w/w). The mixture then inserted in mold and freeze-dried for 2x24 hours. The scaffolds are put to degradation, swelling and WCP tests. Degradation test is done by immersion in lysozyme enzyme equivalent to enzyme level in the human body. Swelling and WCP tests are done by immersion in aqua distillate. Degradation, swelling and WCP tests are calculated using formula.

RESULTS : Degradation rate of collagen-chitosan scaffold is 16.10 ± 3.33 , swelling ratio is 6.30 ± 1.27 and WCP is 84.33 ± 2.49 .

CONCLUSION : Based on degradation, swelling and WCP results, collagen derived-chicken shank and chitosan scaffold is suitable as biomaterials in tissue engineering.

Key words : Scaffold, Collagen Derived-Chicken Shank and Chitosan, Degradation test, Swelling test, WCP test

YS I-7 Inter- and Intra-individual Variation in Metabolite Profiles of Saliva in Patients with pSS's Syndrome

Maria Herrala^{1,6,8*}, Jopi JW Mikkonen², Paula Pesonen³, Reijo Lappalainen², Leo Tjäderhane^{3,4,6}, Raija Niemelä⁵, Tuula Salo^{3,4}, Sami Myllymaa² and Arja M Kullaa^{1,6,7}

¹ Institute of Dentistry, University of Eastern Finland

² SIB Labs and Dept. of Applied Physics, University of Eastern Finland

³ Medical Research Center Oulu, Oulu University Hospital and University of Oulu

⁴ Dept. of Oral and Maxillofacial Diseases, University of Helsinki and Helsinki University Hospital

⁵ Dept. of Rheumatology, Oulu University Hospital

⁶ Research Unit of Oral Health Sciences, University of Oulu

⁷ Educational Dental Clinic, Kuopio University Hospital, Finland

⁸ City of Kuopio, Finland

*corresponding author

BACKGROUND : Sjögren's syndrome (SS) is a systemic and slowly progressive autoimmune disease, which mainly affects salivary and lacrimal glands. Patients have presented symptoms for example dry mouth and eyes, for a while and usually many years before receiving diagnosis for SS.

OBJECTIVES : The aim of this study was to assess the inter- and intraindividual variation of metabolite profiles of saliva in patients with primary Sjögren's syndrome (pSS) and to compare the findings with salivary metabolome of control subjects using high-resolution nuclear magnetic resonance spectroscopy.

MATERIALS & METHODS : Stimulated whole-mouth saliva was collected from female pSS patients (n=19) and

from healthy individuals (n=15). Metabolite concentrations in stimulated saliva were measured from each subject during at four different time points (0, 1 week, 10 weeks and 20 weeks).

RESULTS : In our preliminary results that there is difference in pSS versus control group in inter- and intra-individual metabolite profiles. Preliminary data analysis showed that taurine and alanine are highly interesting metabolites.

CONCLUSION : These specific biomarkers for SS could possibly provide pre-indication of the syndrome, and be used to monitor the severity of the disease.

Key words : saliva, metabolomics, NMR-spectroscopy; biomarkers, Sjögren's syndrome

YS II-1 Antifungal and Anti-inflammatory Effects of N-glutaroyl Melatonin and N-succinyl Melatonin

Damrongrungruang T¹, Somudorn J², Panpitakkul P² and Puthongking P³

¹ Associated Professor, Department of Oral diagnosis, Faculty of Dentistry, Khon Kaen University, Khon Kaen, 40002, Thailand, ² Dental student, Faculty of Dentistry, Khon Kaen University, Khon Kaen, 40002, Thailand,

³ Assistant Professor, Department of Pharmaceutical Chemistry, Faculty of Pharmaceutical Science, Khon Kaen University, Khon Kaen, 40002, Thailand

BACKGROUND : Nonimmunosuppressive, anti-inflammatory agent, is emerging as a potential agent for management of immunocompromised geriatric patients who suffered from intra-oral chronic inflammatory disorders.

OBJECTIVES : This study aimed to modify the structure of melatonin, a potent anti-inflammatory hormone, with glutaroyl or succinyl groups and to investigate their antifungal and anti-inflammatory abilities.

MATERIALS & METHODS : After the melatonin derivatives had been synthesized and purified, 1×10^6 *Candida albicans* ATCC MYA-2876 (SC5314) cells in Sabouraud dextrose broth were treated with each agent at concentrations of 500-4,000 μ M for 24 hours (37°C) using 1-64 μ M nystatin as a positive control. The growth of fungal cells was detected by the spectrophotometer at 600 nm, and XTT colorimetric assay. Regarding inflammatory activities, *E. coli* derived lipopolysaccharides activated murine macrophages (RAW 264.7) at 1×10^5 cells/well were cultured in RPMI-1640 media and subsequently treated with each agent in concentrations of 125-2,000 μ M for 24 hours (37°C, 5% CO₂, 95% humidity).

The inflammatory cytokines including nitric oxide (NO), tumor necrotic factor-alpha (TNF- α), interleukin-6 (IL-6) was then measured by the Griess test and the enzyme-linked immunosorbent assay (ELISA).

RESULTS : The result revealed that both derivatives reduced a number of planktonic fungal cells in a dose-dependent manner, and the antifungal ability of both derivatives at 4,000 μ M was approximately equal to 1 μ M of nystatin, but XTT colorimetric assay revealed that they could not exert fungal growth inhibition in biofilm form. Regarding anti-inflammatory effect, they inhibited NO in a dose-dependent manner but not reduced the quantity of TNF- α , that was similar to the melatonin. However, the ability to inhibit IL-6 of the melatonin was higher than both derivatives.

CONCLUSION : N-glutaroyl melatonin and N-succinyl melatonin exhibited the antifungal ability on *C. albicans* and the anti-inflammatory ability on murine macrophages via NO reducing mechanism, in *in vitro* setting.

Key words : Antifungal, Anti-inflammatory, Glutaroyl, Melatonin, Succinyl

YS II-2 The IL-17A, IL-8, Human Beta Defensin-2 Assay for Candidiasis in Immunocompromised Wistar Rat Treated with *Camellia sinensis* extract.

Retno Pudji Rahayu^{1*} and Regina Purnama Dewi Iskandar²

¹ Department of Oral and Maxillofacial Pathology, Faculty of Dentistry, Airlangga University, Indonesia,

² Postgraduate Student of Immunology Department, Airlangga University, Indonesia, * Corresponding Author: Faculty of Dentistry, Universitas Airlangga Surabaya, Indonesia. E-Mail: a-retno-p-r@fkg.uncir.ac.id

BACKGROUND : The immunocompromised is considered as defect in immune system that put patient in high risk of various infections, including fungal infection. Oral candidiasis is one of the most common fungal infections. The immune system is unable to eliminate the adhesion of *C. albicans* to oral mucosa. The infection started locally, then it becomes systemic candidiasis with mortality rate of 60%. Green tea (*Camellia sinensis*) contains potential anti oxidant, immunomodulator, anti cancer, anti fungal, and anti virus agents which are beneficial to reduce the severity.

OBJECTIVES : To invent such herbal-based medicine that act as immunomodulator and anti fungal for immunocompromised patients.

MATERIALS & METHODS : Immunocompromised wistar rats were used. They had been interperitoneally injected with Dexamethasone 0,8 mg/kg and Tetracycline 12 mg/kg for 7 days. *C. albicans* were inoculated from tongue using cotton rolls in all groups for 6 times in day 7-12. Sample groups were administrated with green tea extract

concentration 1.25%, EGCG and EGC concentration 1% in day 4 and 7. The sample were observed with immunohistochemistry (IHC) staining using monoclonal antibody of IL-17A, IL-8 and HBD-2 for 4 and 7 days after treatment. This research was statistically performed using Anova test & Tuckey HSD test.

RESULTS : The expression of IL-17A, IL-8, and HBD-2 were significantly increased (P=0.000) after 7 days of *Camellia sinensis* extract administration. The administration of EGCG and EGC did not mediate significant result (p>0.005) of IL-17A, IL-8, and HBD-2 expression. This shows that the extract of *Camellia sinensis* extracts provide better immunomodulatory effect compared to EGCG and EGC.

CONCLUSION : The *Camellia sinensis* extract could be used to control the severity of Oral Candidiasis through enhancing the expression of IL-17A, IL-18, and HBD-2.

Key words : *Camellia sinensis*, candidiasis, EGCG and EGC, immunocompromised.

YS II-3 Phospholipase C-related Catalytically Inactive Protein Protects PI(4,5)P₂ from Its Metabolic Enzyme and Contributes to Completion of Cytokinesis

Y. Ikura^{1,2}, S. Asano² and T. Kanematsu²

¹ School of Dentistry, Hiroshima University

² Department of Cellular and Molecular Pharmacology, Division of Basic Life Sciences, Institute of Biomedical and Health Sciences, Hiroshima University

BACKGROUND : Cytokinesis is the last step of cell division that physically separates the daughter cells. Phosphatidylinositol 4,5-bisphosphate [PI(4,5)P₂] accumulates at the cleavage furrow and is involved in RhoA-dependent furrow ingression during cytokinesis. Oculocerebrorenal syndrome of Lowe protein 1 (OCRL1), an inositol polyphosphate 5-phosphatase, metabolizes PI(4,5)P₂ during a late step in cytokinesis. PLC-related catalytically inactive protein (PRIP) binds to PI(4,5)P₂ via its PH domain and localizes to the plasma membrane. Recently, we reported that PRIP negatively regulates PI(4,5)P₂ metabolism in cell migration. However, little is known about the involvement of PRIP in PI(4,5)P₂-mediated cytokinetic event.

OBJECTIVES : We examine whether PRIP regulates PI(4,5)P₂ level at cleavage furrow and contributes to cytokinesis progression.

MATERIALS & METHODS : MCF-7 cells, a human breast carcinoma, were stably transfected with EGFP-PRIP1 or an empty vector plasmid. Halo-OCRL1 was transiently transfected to MCF-7 cells. PI(4,5)P₂ in the plasma membrane and exogenously expressed OCRL1 were immunostained with a PI(4,5)P₂ antibody and Halo-specific antibody, respectively. A liposome-sedimentation assay and

living cell imaging were performed to examine the interaction between PI(4,5)P₂ and OCRL1 or PLCδ₁, and to monitor cytokinesis duration, respectively.

RESULTS : PRIP-deficient cells exhibited abnormal cytokinesis and decreased amount of PI(4,5)P₂ at cleavage furrow. Overexpression of PRIP in MCF-7 cells accumulated PI(4,5)P₂ at cleavage furrow and altered the localization of OCRL1. The progression of furrow ingression was slower in Halo-OCRL1-expressed cells than in vector-expressed control cells. However, the coexpression of EGFP-PRIP1 with Halo-OCRL1 enabled to rescue the delay of cytokinesis speed. Liposome-sedimentation assay showed that PRIP inhibits the interaction between PI(4,5)P₂ and OCRL1 or PLCδ₁.

CONCLUSION : These data suggest the suppression control of PRIP in PI(4,5)P₂ metabolism at the cleavage furrow to keep the requisite PI(4,5)P₂ for promoting proper cytokinesis.

Key words : cleavage furrow, cytokinesis, oculocerebrorenal syndrome of Lowe protein 1, phosphatidylinositol 4,5-bisphosphate, PLC-related catalytically inactive protein

YS II-4 The Transition of Tissue Inhibitor of Metalloproteinase-1 and -4 Expressions Induces Aggressive Behavior and Poor Patient Survival in Dedifferentiated Liposarcoma via YAP/TAZ Activation

Madhu Shrestha¹, T. Ando¹, Chea chanbora¹, I. Ogawa², M. Miyauchi¹ and T. Takata¹

¹ Department of Oral and Maxillofacial Pathobiology, Institute of Biomedical and Health Sciences, Hiroshima University

² Center of Oral Clinical Examination, Hiroshima University Hospital

BACKGROUND : Liposarcoma (LS) is the most common soft tissue sarcoma. LS is subclassified into dedifferentiated liposarcoma (DDLs) and well-differentiated liposarcoma (WDLS). DDLs shows more aggressive biological behavior than that of WDLS. Advanced therapeutic strategies are urgently needed for LS, especially for DDLs.

Recently, we clarified that TIMP-1 (a member of tissue inhibitor of metalloproteinases; TIMPs), with its receptor CD63, activated yes-associated protein (YAP) and transcriptional co-activator with PDZ binding motif (TAZ) to promote cancer cell proliferation. Aberrant YAP/TAZ activation in LS is reported, however, the contribution of TIMP-1-YAP/TAZ axis to LS remains unclear. Intriguingly, TIMP-4 is known to share CD63 and is highly expressed in adipocytes, but its function in LS is unknown.

OBJECTIVES : To reveal the roles of TIMP-1 and -4 through YAP/TAZ activation in LS.

MATERIALS & METHODS : Cell lines of WDLS (94T778) and DDLs (SW872) were used for *in vitro* experiments such as Western blotting, RT-PCR, cell proliferation assay, migration assay and apoptosis assay. Stable clones of sh knockdown of TIMP-1 and TIMP-4 were estab-

lished.

RESULTS : (1) Database analysis showed high TIMP-1 expression in DDLs patients correlating with poor prognosis, while high TIMP-4 expression in WDLS patients with better prognosis. (2) Stable TIMP-1 knockdown inactivated YAP/TAZ and inhibited proliferation, migration, anti-apoptosis in DDLs cells, which was rescued by a constitutive active YAP. However, its stable overexpression showed the opposite in WDLS cells. (3) Stable TIMP-4 knockdown activated YAP/TAZ and promoted proliferation, migration, anti-apoptosis in WDLS cells, which was suppressed by YAP/TAZ inhibitor (Verteporfin) or YAP/TAZ knockdown using siRNA. But its overexpression showed opposite results in DDLs cells.

CONCLUSION : These results indicate that dedifferentiation in LS shift the expression of TIMPs from 4 to 1, inducing more aggressive behavior and poor prognosis through YAP/TAZ activation, which can be a therapeutic target for LS patients.

Key words : TIMP-1, TIMP-4, YAP/TAZ, liposarcoma, targeted therapy

YS II-5 Genetic Diagnosis of Neurofibromatosis Type I (von Recklinghausen's Disease) and Establishment of NF1-specific Induced Pluripotent Stem Cells (iPSCs) for the Study of Disease Mechanisms

T. Fukutani¹, A. Hamada¹, H. Nakatao¹, F. Obayashi¹, S. Yamasaki¹, T. Kanda¹, K. Koizumi², S. Toratani² and T. Okamoto^{1,2}

¹ Clinic of Oral and Maxillofacial Surgery, Hiroshima University Hospital, 734-8551, Hiroshima, Japan

² Department of Molecular Oral Medicine and Maxillofacial Surgery, Division of Frontier Medical Science, Graduate School of Biomedical and Health Sciences, Hiroshima University 734-8553, Hiroshima, Japan

BACKGROUND : Neurofibromatosis type I (NF1: von Recklinghausen's disease) is one of the most common onogenic disorders characterized by a wide range of clinical expression symptoms, including skin defects associated with melanocytes, namely café-au-lait and numerous neurofibromas.

OBJECTIVES : [Case 1: NF1-1] A 37 year-old male. He received a diagnosis at the age of 15. He was presented with difficulty in mastication and visited our hospital. After 7 years, abnormal absorption was observed in his jaw bone by orthopantomography.

[Case 2: NF1-2] A 48 year-old female. She received a diagnosis at the age of 24. She had no symptom of the jaw bone in the orthopantomography.

MATERIALS & METHODS : We successfully generated iPSCs from peripheral mononuclear cells (PBMCs) using SeVdp (KOSM) vector in serum- and feeder-free defined culture conditions from two patient with NF1 (NF1-iPSC), and detect a deletion of NF1 gene using by MiSeq next generation sequencers, Comparative Exome Quantification analyzer (CEQer) and Droplet Digital PCR (ddPCR). NF1-iPSC and WT-iPSC were compared using neural cell or cartilage and bone differentiation.

RESULTS : In this system, pluripotent and self-renewing iPSCs could be easily and stably generated and propagated. Deletion of NF1 gene was detected in NF1-1, and gene mutation of exon 40 of NF1 gene (rs137854552 C>T) was detected in NF1-2. This mutation suggested the substitution of the stop codon of arginine.

As a result, S-100 positive cells appeared early in NF1-iPSC by neural cell differentiation. Although there was no difference in induction of MSC, the maturation from cartilage to bone was delayed in NF1-2-iPSC by cartilage and bone differentiation induction.

CONCLUSION : Using this culture system, we have derived disease-specific iPSCs from NF1 patients. NF1-iPSCs are a valuable *in vitro* human model for understanding the mechanisms involving skin pigmentation and tumorigenesis. Further characterization of the cells in the serum-, feeder-, and integration-free culture would be beneficial to clarify the molecular mechanism involved in the disease.

Key words : NF1, von Recklinghausen's disease, iPSC, Serum-and feeder-free defined culture condition

YS II-6 Growth Regulation by ED-71 of Human Squamous Cell Carcinoma Cell Lines through Exosomal microRNA Production in Serum-free Culture

M. Higaki¹, T. Shintani², A. Hamada¹, S.N.Z. Rosli³, E. Usui⁴ and T. Okamoto^{1,4}

¹ Department of Molecular Oral Medicine and Maxillofacial Surgery, Division of Applied Life Sciences, Graduate School of Biomedical Science, Hiroshima University

² Center of Oral Clinical Examination, Hiroshima University Hospital

³ Oral Cancer Research & Coordinating Center, Faculty of Dentistry, University of Malaya, Kuala Lumpur, Malaysia

⁴ Clinic of Oral and Maxillofacial Surgery, Hiroshima University Hospital

BACKGROUND : We have previously reported that Eldecalsitol (ED-71), an analog of $1\alpha,25(\text{OH})_2\text{D}_3$, down-regulated the expression of HBp17/FGFBP-1 and the proliferation of squamous cell carcinoma (SCC) cells *in vitro* and *in vivo* through NF-kb inhibition.

OBJECTIVES : To study whether ED-71 down-regulates the expression of HBp17/FGFBP-1 and inhibit SCC cell growth through regulatory chemical messengers such as exosomal microRNAs.

MATERIALS & METHODS : The cell lines used were OSCC cell lines HO-1-n-1 (NA), KO and Ca 9-22 and an epidermoid carcinoma cell line, A431. All cell lines were cultured in serum-free DF6F medium. We have analyzed exosomal microRNAs from medium conditioned by the SCC cell lines treated with ED-71. We picked up two miRNAs specifically up-regulated in the exosome, and

investigated the molecular and cellular mechanism of the miRNAs in SCC/OSCC cells.

RESULTS : We have identified miR-6887-5p as an ED-71 dependent exosomal miR in A431 cells. Overexpression of miR-6887-5p inhibited the cell proliferation compared with control in SCC cells ($P < 0.05$). Quantitative RT-PCR and western blotting analysis showed that expressions of HBp17 mRNA/protein were significantly down-regulated in miR-6887-5p-transduced SCC/OSCC cells than control cells ($P < 0.05$).

CONCLUSION : Our data suggest that ED-71 downregulates the expression of HBp17/FGFBP-1 and inhibit SCC cell growth through exosomal microRNAs. Thus ED-71 might be a be an effective agent for SCCs.

Key words : VitaminD3, HBp17/FGFBP-1, serum-free culture, exosome, microRNA

YS II-7 Fatigue Resistance of Yttria-stabilized Tetragonal Zirconia Polycrystal Clasps for Removable Partial Dentures

Tzu-Yu Peng¹, S. Shimoe², T. Matsui³, N. Tanoue⁴, H. Akebono⁵, T. Murayama⁶ and T. Satoda²

¹ Oral Health Sciences Major, Hiroshima University Graduate School of Biomedical & Health Sciences, Hiroshima, 734-8553, Japan

² Department of Anatomy and Functional Restorations, Integrated Health Sciences, Hiroshima University Graduate School of Biomedical & Health Sciences, Hiroshima, 734-8553, Japan

³ Heartech Dental Service, Hiroshima, 730-0037, Japan

⁴ Department of Special Care Dentistry, Nagasaki University Hospital, Nagasaki, 852-8501, Japan

⁵ Department of Mechanical Science and Engineering, Hiroshima University Graduate School of Engineering, Higashihiroshima, 739-8527, Japan

⁶ Department of Medical System and Biomaterial Engineering, Integrated Health Sciences, Hiroshima University Graduate School of Biomedical & Health Sciences, Hiroshima, 734-8553, Japan

BACKGROUND : With the rapid development of CAD/CAM systems, zirconia has been widely used in dental restorations. In recent years, the zirconia is also applied to removable partial dentures (RPDs). If ceramics are used as clasps of RPDs, it will be aesthetic without the risk of metal allergy. Nevertheless, the most serious problems of clinical application of zirconia clasps are that the bending properties are inferior to Cobalt-Chromium alloy (Co-Cr).

OBJECTIVES : In this study, we examine the fatigue resistance of yttria-stabilized tetragonal zirconia polycrystal (Y-TZP) clasps for RPDs.

MATERIALS & METHODS : Half oval-shaped Y-TZP rods were prepared by CAD/CAM systems. Specimens were either of semicircular type (width/thickness: 2.0/1.0 mm) or flat type (2.4/0.8 mm) cross-sectional areas with taper ratios of 0.5, 0.75, and 1.0. As a comparison, Co-Cr rods of the same shape as the Y-TZP were prepared. All specimens were subjected to cantilever test and constant displacement fatigue test.

RESULTS : During the cantilever test, the loads of all of the

specimens were bigger than the required retentive force of clasps. Besides, semicircular type showed better fracture loads than the flat type and higher taper ratios were associated with lower displacement. According to fatigue test, fracture did not occur on both of Y-TZP and Co-Cr in the constant deflection. The bending displacement of Y-TZP and Co-Cr had no significant difference and lower taper ratios were associated with larger deformation. However, the semicircular type had bigger bending displacement than flat type in both Y-TZP and Co-Cr.

CONCLUSION : Y-TZP can withstand more than the necessary retentive force of clasps and fracture did not occur in the required undercut. In addition, semicircular type exhibited better fatigue resistance properties than flat type. And the deformation of Y-TZP and Co-Cr had no significant difference, and lower taper ratios were associated with larger deformation.

Key words : Dentistry, Y-TZP, RPDs, Clasps, Fatigue resistance

A-1 Mangosteen Peel Extract (*Garcinia Mangostana* L) as Stem Cell Growth Factor

Ira Arundina¹, Theresia Indah Budhy², Maretaningtias Dwi Ariani³ and Ketut Suardita⁴

¹ Department of Oral Biology, Faculty of Dental Medicine, Airlangga University Surabaya-Indonesia

² Department of Oral Patology and maxillofacial, Faculty of Dental Medicine, Airlangga University Surabaya-Indonesia

³ Department of Prostodontia, Faculty of Dental Medicine, Airlangga University Surabaya-Indonesia

⁴ Department of Conservative Dentistry, Faculty of Dental Medicine, Airlangga University Surabaya-Indonesia

BACKGROUND : Stem cells give new hope to fast healing. Stem cells in the body are very limited so that the growth factors are necessary to enhance stem cells proliferation. Growth factors has been used is still expensive and difficult to obtain. It is necessary to develop an alternative use of growth factors from natural materials that could potentially speed up wound healing. Mangosteen peel extract bioactive compounds, xanthones (i.e. gartanin, α -mangostin, etc) have reported effects Anti-inflammatory, antioxidant and could accelerate the fibroblast proliferation in wound healing process.

OBJECTIVES : The purpose of this study was to determine the effect of mangosteen peel extract on proliferation and differentiation of mesenchymal stem cells (MSC) *in vitro*.

MATERIALS & METHODS : mangosteen peel extract was

made and added to cultures of rat MSC's. FGF-2 also was added to MSC's as control. Proliferation of MSC after addition of mangosteen peel extract and FGF-2 was examined by MTT assay and osteogenic differentiation test

RESULTS : MSC proliferation was increased after mangosteen peel extract addition and positive osteogenic differentiation test

CONCLUSION : The addition of mangosteen peel extract can improve the ability of MSC proliferation. The addition of mangosteen peel extract can improve the ability of MSC differentiation to osteoblasts. Can be used for the treatment of various degenerative disease.

Key words : Mangosteen peel extract, Stem cell, Growth factor, proliferation, differentiation

A-2 Effects of Date Fruit (*Phoenix dactylifera* L.) Crude Extracts on Oral Cells: *in vitro*

Peerada Weerayuttil¹, Ramida Wongraweewiwat¹, Arisa Kotchoom¹, Ariya Rattanathongkom² and Ponglatham Chaiyari³

¹ Dental student, Faculty of Dentistry, KhonKaen University, Thailand

² Associate Professor Dr., Department of Oral Biology, Faculty of Dentistry, KhonKaen University, Thailand

³ Associate Professor Dr., Department of Oral Diagnosis, Faculty of Dentistry, Research Group of Chronic Inflammatory Oral Diseases and Systemic Diseases Associated with Oral Health, KhonKaen University, Thailand

BACKGROUND : Date fruit (*Phoenix dactylifera* L.) has been eaten as food more than 5000 years. Date fruit contains nutrients, dietary fiber, essential minerals and vitamin. Previous studies reported that date fruit provided a variety of health benefits. Over the past five years, date palms have been cultivated throughout the north-eastern regions of Thailand, and date fruit becomes popular for Thai people. However, limited data of date fruit in association with oral health benefits are available.

OBJECTIVES : The purpose of this study was to determine the effects of date fruit extracts on oral cells.

MATERIALS & METHODS : Date fruits derived from three stages including Kimri; Khalal; and Rutab were prepared for crude extraction by ethanol. TPC, TFC and DPPH assay were used to evaluate the phenolic compounds, flavonoid contents, and antioxidant activity in date fruit extracts respectively. Three types of normal oral cells including primary dental pulp cells, fibroblasts, gingival

epithelial cells and 2 oral cancer cell lines including ORL-48T and ORL-136T were used in this study. Cell cytotoxicity and cell viability was determined by MTT assay.

RESULTS : According to analyzing chemical compositions, phenolic compounds and flavonoids were the essential components in date fruit extracts. According to MTT assays, crude extract from date fruit in 3 stages showed no cytotoxic effects on dental pulp cells, fibroblasts, and gingival epithelial cells. However, crude extract from date fruit from 3 stages had inhibitory effects on cell proliferation of two oral cancer cell lines.

CONCLUSION : The present study provides new findings that imply oral health benefits of date fruit in the context of oral cancer prevention.

Key words : Date fruit, Dental pulp cells, Fibroblast cells, Human gingival epithelial cells, Oral cancer cell lines

A-3 The Effects of *Pueraria Mirifica* Extracts on Human Dental Pulp Cells, *in vitro*.

Arayatrakoollikit U^{1,4}, Kawsamer S² and Chaiyarit P^{3,4}

¹ Department of Restorative Dentistry, Khon Kaen University, Amphur Muang, Khon Kaen, Thailand.

² Dental Department, Srisaket Hospital, Amphur muang, Srisaket, Thailand.

³ Department of Oral Diagnosis, Faculty of Dentistry, Khon Kaen University, Amphur muang, Khon Kaen, Thailand.

⁴ Research group of chronic inflammatory oral disease and systematic disease in association with oral health, Faculty of Dentistry, Khon Kaen University, Amphur muang, Khon Kaen, Thailand.

BACKGROUND : *Pueraria mirifica* is a medicinal plant endemic to Thailand. It has been used in Thai folklore medicine for its rejuvenating qualities in aged women and men for nearly one hundred years. Since the *in vitro* and *in vivo* anti-osteoporotic effects of *Pueraria mirifica* (PM) in rodents have been verified.

OBJECTIVES : The aims of this study were to determine the biological effects of *Pueraria mirifica* extracts on the proliferation and mRNA expression of fibronectin, type I and type III collagen in human dental pulp cells, *in vitro*.

MATERIALS & METHODS : Primary-cultured human dental pulp cells were treated with various concentrations (0.1, 0.5, 1, 5, 10, 50, and 100 ng/ml) of *Pueraria mirifica* extracts. Evaluation of cell proliferation and mRNA expression of fibronectin, type I and type III collagen in human dental pulp cells were performed by MTT assay and reverse transcriptase-polymerase chain reaction (RT-PCR) technique, respectively. The data were statistically analyzed by One-Way ANOVA.

RESULTS : This finding reveals that *Pueraria mirifica* extracts at concentrations of 50 and 100 ng/ml significantly reduced the dental pulp cells proliferation ($p < 0.001$), while at the concentrations of 0.5, 1, and 5 ng/ml significantly activated the cell proliferation after 48 and 72 hour incubation ($p < 0.001$). Dental pulp cells treated with 0.5, 1, and 5 ng/ml of *Pueraria mirifica* extracts significantly up regulated the type I and type III collagen mRNA levels compared to the control group ($p < 0.001$ and $p = 0.003$, respectively), while no changes of fibronectin mRNA levels were detected.

CONCLUSION : This study demonstrated that *Pueraria mirifica* extracts up-regulated the proliferation and expression of type I collagen. This event suggests that *Pueraria mirifica* extracts may play an important role in early stage of wound healing of dental pulp.

Key words : *Pueraria mirifica*, human dental pulp cells, proliferation, type I collagen, type III collagen

A-4 The Potential of Kouboku (*Magnolia obovata*) to Regulate the Inflammatory Response in Human Gingival Epithelial Cell

Irma Josefina Savitri¹, Udijanto Tedjosongko², Chiquita Prahasanti¹, K. Ouhara² and H. Kurihara²

¹ Department of Periodontology, Faculty of Dental Medicine, Universitas Airlangga, Surabaya, Indonesia

² Department of Pediatric Dentistry, Faculty of Dental Medicine, Universitas Airlangga, Surabaya, Indonesia

³ Department of Periodontal Medicine, Division of Applied Life Science, Institute of Biomedical and Health Sciences, Hiroshima University, Hiroshima, Japan.

BACKGROUND : Human gingival epithelial cell (HGEC) is the first barrier of periodontal tissue that faces the periodontopathogenic bacteria, such as *Porphyromonas gingivalis* (*P. gingivalis*). It is strong recommendation that regulating the immune response in HGEC may contribute to the prevention of periodontitis. Kouboku, a traditional oriental medicine, use to treat the illness. Some studies show the potential of Kouboku in modern therapy. However, the advantages and mechanism of natural compounds in oral cavity, especially in periodontal tissue, were remained unclear.

OBJECTIVES : The aim of this study was to determine the potential of Kouboku for new preventive medicine by regulating the inflammatory response in human gingival epithelial cell.

MATERIALS & METHODS : Kouboku (registered number: HG06039), provided by Wakunaga Pharmaceutical Co., Ltd., were diluted in Dymethyl Sulfocide up to 10 µg/mL.

OBA-9, an immortalized human gingival epithelial cell line (kindly gifted from Prof. Murakami, Osaka University), was used in this study. Kouboku was added thirty minutes before *P. gingivalis* stimulation in OBA-9. Then, the cells were maintained 12 up to 24 hours. Real-time PCR was performed in OBA-9 stimulated with *P. gingivalis* in the presence or absence of Kouboku to determine IL-8, IL-1β, TNF-α and TLR2 mRNA expression.

RESULTS : The addition of Kouboku suppressed IL-8 and IL-1β mRNA expression ($p < 0.01$) after 12 and 24 hours stimulation. However, the suppressive effect did not shown in TNF-α and TLR2 mRNA expression.

CONCLUSION : This study revealed Kouboku has the potential to regulate the inflammatory response in human gingival epithelial cell by suppressing IL-8 and IL-1β mRNA expression.

Key words : Kouboku, anti-inflammatory agent, HGEC

A-5 Potency of Black Tea on Cellular Immunologic as Inhibitory Progression of Oral Mice Tumor Induced Benzopyrene

Theresia Indah Budhy¹, Ira Arundina² and Istiati Soepribadi³

^{1,3} Oral Pathology and Maxillofacial., ² Oral Immunology/Oral Biology
Faculty of Dental Medicine Airlangga University

BACKGROUND : Black tea extract contains active substance as a potential antimutagenic so it can inhibit cancer progressiveness.

OBJECTIVES : The Objective of this study was to reveal the influence of Black Tea Extract on the increase of cellular immunologic and inhibitor tumor progressiveness on oral mucosa Mice induced by Benzopyrene.

MATERIALS & METHODS : Samples were healthy male Mice, divided into 4 groups. Group 1 (BP) Benzopyrene of 8mg/kgBW; Group 2 (BP+t1) Benzopyrene of 8mg/kgBW and Black Tea extract of 100 mg/kgBW per oral; Group 3 (BP+t2) Benzopyrene of 8mg/kgBW and Black Tea extract of 80mg/kgBW; Group 4 (Placebo) as control.

RESULTS : Results showed there were an increase in cellu-

lar immunologic, active macrophage and active plasma cells variables in BP+t1 group were higher than in BP+t2 and BP groups. The decrease of tumor progressiveness with variable of cancer cell necrosis occurred mostly in BP+t2 group. The decrease of mitosis cancer cells occurred mostly in BP+t1, while the reduction of tumor macroscopic diameter occurred mostly in BP+t1 group.

CONCLUSION : It can be concluded that Black Tea extract can increase cellular immunologic response so that it may inhibit tumor progressiveness on oral mucosa of mice induced by Benzopyrene.

Key words : oral mucosa tumor, immunologic cellular response, necrosis cancer cell, mitosis cancer cell

A-6 The Comparison of Chromium Ions Release for Stainless Steel 18-8 between Artificial Saliva and Green Tea Leaves Extracts

Nety Trisnawaty¹ and Mirna Febriani²

¹ Orthodontic staff, Faculty of Dentistry, University of Prof. Dr. Moestopo (Beragama), Jakarta, Indonesia

² Dental Material staff, Faculty of Dentistry, University of Prof. Dr. Moestopo (Beragama), Jakarta, Indonesia

BACKGROUND : The use of stainless steel wires in the field of dentistry is widely used, especially for orthodontic and prosthodontic treatment using stainless steel wire. The oral cavity is the ideal environment for corrosion, which can be caused by saliva. Prevention of corrosion on stainless steel wires can be done by using organic or non organic corrosion inhibitor. One of the organic inhibitors that can be used to prevent corrosion is green tea leaves extracts.

OBJECTIVES : To explain about the comparison of chromium ions release for stainless steel between artificial saliva and green tea leaves extracts.

MATERIALS & METHODS : In this research we used artificial saliva, green tea leaves extracts, stainless steel wire and using Atomic Absorption Spectrophometric

testing machine. The samples were soaked for 1, 3, 7 and 14 days in the artificial saliva and green tea leaves extracts.

RESULTS : The results showed the difference of chromium ion release soaked in artificial saliva and green tea leaves extracts on days 1, 3, 7 and 14. Statistically calculation with independent T-test with $p < 0,05$ showed significant difference. The longer the duration of days, the more ion chromium were released.

CONCLUSION : The conclusion of this study shows that green tea leaves extracts can inhibit the corrosion rate of stainless steel wires.

Key words : Chromium ion, stainless steel, artificial saliva, green tea leaves extracts

A-7 Expression of BMP-2 and bFGF from Combination of Mangosteen Peel Extract and Carbonate Apatite Graft: Potential Strategy for Alveolar Bone Regeneration

Maretaningtias Dwi Ariani¹, Andra Rizqiawan², Sherman Salim¹ and Agus Dahlan¹

¹ Department of Prosthodontics, Faculty of Dental Medicine, Universitas Airlangga, Surabaya, Indonesia

² Department of Oral and Maxillofacial Surgery, Faculty of Dental Medicine, Universitas Airlangga Surabaya, Indonesia

BACKGROUND : Pathological factors such as root canal treatment (endodontic), periodontitis, facial trauma and aggressive actions during tooth extraction may cause alveolar bone loss. To restore the damaged or missing alveolar bone, a biomaterial is needed that can accelerate the process of new bone formation. A biomaterial used to regenerate bone should have biocompatibility, biodegradability, effective and efficient properties. Currently, the most commonly used bone graft is carbonate apatite. Carbonate apatite is a major mineral component of human bones and teeth. In addition to the pure use of bone graft, the use of herbal medicine as an alternative approach has gained much interest today.

OBJECTIVES : To evaluate the clinical and histopathological effects of graft from a combination of mangosteen peel extract and carbonate apatite as potential strategies for alveolar bone regeneration.

MATERIALS AND METHODS : This research is an experimental research with randomized post-test control group

design. Combination of mangosteen peel extract and carbonate apatite graft were used. *Cavia cabaya* (Guinea pig) with male criterion, body weight 300-350 gram, age 3-3.5 month, healthy and active move were also used.

RESULTS: There was an increase in BMP-2 and bFGF expression due to the application of mangosteen peel extract and carbonate apatite graft loaded on *Cavia cabaya* extraction socket.

CONCLUSION : The combination of mangosteen peel extract and carbonate apatite graft can increase the expression of BMP-2 and bFGF in the *Cavia cabaya* alveolar bone, expected to provide more satisfactory osteoconductivity and graft strength, and also expected to be use for socket preservation after tooth extraction so that the resorbtion of the ridge can be lowered.

Key words : Mangosteen peel extract, carbonate apatite, BMP-2, bFGF, alveolar bone

A-8 Inhibition Effect of Javanese turmeric (*Curcuma xanthorrhizol* Roxb.) Ethanol Extract on the Development of *C. albicans* Biofilm

Nathaniel Melvin, Ria Puspitawati and Dewi F Suniarti

Department of Oral Biology, Faculty of Dentistry, Universitas Indonesia, Indonesia

BACKGROUND : *Javanese turmeric* which contains xanthorrhizol is reported to have eradication effect on *C. albicans* biofilm.

OBJECTIVE : To analyze inhibition effect of *Javanese turmeric* ethanol extract on the various stages of *C. albicans* biofilm.

METHODS : *C. albicans* was isolated from an elderly patient with removable denture. *Javanese turmeric* ethanol extract was incubated for 90 minutes, exposed to Javanese turmeric extract, and further incubated for 1,5 hours (adhesion stage), 6 hours (early stage), 24 hours (intermediate stage), and 48 hours (maturation stage). MTT assay was used to test the viability of *C. albicans*. The percentage of viable cells were then converted into Minimum Biofilm Inhibition percentage (MBIC₅₀) of the extract. For Scanning Electron Microscope (SEM) examination, *C. albicans* biofilm were incubated for 90 minutes in RPMI-1640 before exposed to the extract, and further incubated for reaching the four stages of *C. albicans* biofilm formaton. *C. albicans* biofilms were fixated using 4% paraformaldehyde and 2%

glutaraldehyde, dried using graded series of ethanol, and observed using SEM in 2000x magnification.

RESULTS : The Minimum Inhibitory Concentration (MIC) of *Javanese turmeric* ethanol extract towards planktonic *C. albicans* was 15%. The minimum Biofilm Inhibition Concentration (MBIC₅₀) in the early, intermediate, and maturation stages were consecutively 20%, 30%, and 35%. The SEM images of *C. albicans* biofilm after extract exposure showed decreased number of *C. albicans* cells and biofilm density at all stages. At adhesion and maturation stages, the viable *Candida* cells were still in yeast form. In the proliferation and intermediate biofilms the *C. albicans* cells were mostly had shorter filaments.

CONCLUSION : The exposure of *Javanese turmeric* extract not only results in decreased number of viable *C. albicans* cell, but also lead to inhibition of the hyphal formation and biofilm growth at the adhesion, proliferation, intermediate, and maturation stages.

Key words : *Javanese turmeric* ethanol extract, xanthorrhizol, *C. albicans*, Biofilm, SEM

A-9 The Antimicrobial Effects of White Curcuma and Thai Basil Crude Extracts on *Streptococcus mutans*: An *in vitro* Study

Chutikarn Boonnok¹, Thas Prateepthong¹, Phetcharat Manatchadsophon¹, Ariya Rattanathongkom², Jarin Paphangkorakit², Rajda Noisombut³ and Supanigar Ruangsri⁴

¹ Dental student, Faculty of Dentistry, Khon Kaen University, Thailand

² Associate Professors, Department of Oral Biology, Faculty of Dentistry, Khon Kaen University, Thailand

³ Instructor, Department of Community Dentistry, Faculty of Dentistry, Khon Kaen University, Thailand

⁴ Assistant Professor, Department of Oral Biology, Faculty of Dentistry, Khon Kaen University, Thailand

BACKGROUND : Herbs and medicinal plants have been accepted to use as ingredients for food and medicine due to their antimicrobial effects. As household herbs are generally available to use in daily life, the purpose of this *in vitro* study was to evaluate the efficacy of White curcuma and Thai basil crude extracts against *Streptococcus mutans*.

OBJECTIVE : To evaluate the efficacy of White curcuma and Thai basil crude extracts against *Streptococcus mutans*.

MATERIAL & METHODS : White curcuma and Thai Basil leaves were prepared to obtain ethanol crude extract and dissolved in 1% and 10% DMSO to get a final concentration of 5 mg/ml and 200 mg/ml, respectively.

RESULTS : Minimum inhibitory concentration (MIC) and the minimum bactericidal concentration (MBC) of White curcuma crude extracts were 0.16 mg/ml and 2.5 mg/ml, respectively, and Thai basil crude extracts were 50 mg/

ml and 200 mg/ml, respectively. Time-Kill Assays at the exposure time of 0, 2, 4, 6, 30 mins and 1, 24 hrs revealed that the total inhibition of *Streptococcus mutans* by White curcuma crude extract solution at concentration of 2.5 mg/ml and 5 mg/ml was statistically significant from 24 hrs and 1 hr onwards, respectively and Thai basil crude extract solution at concentration of 200 mg/ml and 400 mg/ml was statistically significant from 24 hrs onwards as compared to control (p-value<0.05).

CONCLUSION : Even though the results of this study have not been proven clinically, we suggest that White curcuma and Thai basil crude extract need at least 1 hr and 24 hrs of contact time to start the antimicrobial effect, respectively. Future clinical studies are suggested for applying to intraoral use.

Key words : White curcuma, Thai basil, *Streptococcus mutans*, Minimum bactericidal concentration, Time kill

A-10 Lactoferrin Potency in Inhibiting Colonization *Streptococcus mutans* and *Candida Glabrata*

Istiaty Soepribadi and Theresia Indah Budi

Dept of Oral Pathology and Maxillofacial

BACKGROUND : Lactoferrin (LF) is a glycoprotein with antibacterial and antifungal activities as cation iron binding. Both activities can be identified through an inhibition test in both Minimal Inhibitory Concentration (MIC) and Minimal Bactericidal Concentration (MBC) methods for antibacterial and Minimal Fungicidal Concentration (MFC) for antifungal. Iron is a very necessary material for bacterial and fungal colonization. This experimental laboratory study was conducted to identify this potential of LF with the post-test only control group design.

For *Streptococcus mutans* culture was done on Brain Heart Infusion Broth (BHIB) medium while for *C. Glabrata* on Saboroud Dextrose Broth (SDB) media with discussion according to Mc. Farland standard 1.5 x 10⁸ CFU/ml at LF concentration 0.15%, 0.3% and 0.6%.

For *Streptococcus mutans* LF use a concentration of 700 mg/ml, 600 mg/ml, 500 mg/ml and 400 mg/ml. The

result of *Streptococcus mutans* bacteria showed that the concentration of 600 mg/ml did not show the growth of *Streptococcus mutans* while potential inhibitory at concentration 500 mg/ml. For growth of *C. Glabrata* using 0.15%, 0.3% and 0.6% concentration with 0.05 ml fungi. *C. Glabrata* seen inhibition occur at concentrations of 0.3% and at concentrations of 0.6% did not occur colonization.

CONCLUSION : 1. Lactoferrin *Streptococcus mutans* occurs at a concentration of 500 mg/ml while MBC at a concentration of 600 mg/ml

2. Lactoferrin to the *C. Glabrata* MIC occurs at a concentration of 0.3% while MFC at a concentration of 0.0%

Key words : lactoferrin, *Streptococcus mutans*, *C. Glabrata*, MIC, MBC and MFC

B-1 A Characteristic of Bacterial Colonies from Root Canal Teeth with Chronic Apical Abscess: A Case Report

Yuti Malinda¹, Diani Prisinda² and Yurika Ambar Lita³

¹ Lecturer in Oral Microbiology Departement, Faculty of Dentistry, Universitas Padjadjaran, Bandung, West Java, Indonesia.

² Lecturer in Conservative Dentistry Departement, Faculty of Dentistry, Universitas Padjadjaran, Bandung, West Java, Indonesia.

³ Lecturer in Oral Maksillofasial Radiology Departement, Faculty of Dentistry, Universitas Padjadjaran, Bandung, West Java, Indonesia.

Chronic apical abscess is an advanced infection of pulp necrosis which the bacterial invasion has reached periapex tissue, accompanied by the formation of an abscess. The Success in treating chronic apical abscess are depends on the clinician's understanding of the disease's etiology and how to treat it properly. Chronic apical abscess is caused by heterogeneous bacteria. bacteria can be easily identified by culture on agar medium. Bacteria grow on solid media as colonies. A colony is illustrated as a visible mass of microorganisms which originating from a single mother cell. Characteristics of the colonies may help to identity of the bacterium.

Microorganism were isolated from the infected root canals of teeth with chronic apical abscess. The root canal reached by an aseptic procedure. The microbial samples were collected with a sterile paper point placed

for 60 second into the full length of the canal. The paper point were pooled in a sterile transport medium tube. The sample were transported to the microbiology laboratory. The endodontic sample were serially diluted, and plated onto blood agar. Bacterial plates were incubated at 37 C. After two days, the colonies were identified using macro microscope.

Each colonies were identified by characteristic such as size, shape, elevation, margin, color and texture. The result, there are a various colonies of bacteria causes chronic apical abscess which can be cultured in media. It's proofed that chronic apical abscess caused by heterogeneous bacteria. This information is needed by the clinician to treat the chronic apical abscess properly.

Key words : Chronic, Apical, Abscess, Bacterial colonies.

B-2 Autoantibodies in Temporomandibular Disorders Patients: The Possibility of a Marker for Chronic Pain

Ji Woon Park

DDS, PhD, Department of Oral Medicine and Oral Diagnosis, School of Dentistry and Dental Research Institute, Seoul National University, Seoul, Korea

BACKGROUND : The role of chronic inflammation and autoimmunity has been investigated in few pain syndromes. Pain patients with an autoimmune disposition may show more pain and higher prevalence of comorbidities.

OBJECTIVES : Investigate the presence of autoantibodies and clinical characteristics in temporomandibular disorders (TMD) patients according to pain disability groups to seek the possible role of autoimmunity in the etiopathogenesis of TMD pain.

MATERIALS & METHODS : Venous blood of 69 female TMD patients in their 20-30s was analyzed for the presence of autoimmune indices (anti-nuclear antibody, rheumatoid factor, ss-DNA, ds-DNA, extracted nuclear antigens [SSA, SSB, Sm, RNP], IgG-anti-beta2-glycoprotein I antibody, IgG- and IgM-anticardiolipin antibody, lupus anticoagulant [LAC], IgA, IgG, IgM and complements 3, 4). Clinical examinations were done following the Research Diagnostic Criteria for TMD (RDC/TMD). Comorbidities were evaluated through comprehensive screening (SCL-90R, Beck's depression index [BDI], Beck's anxiety index[BAI], Epworth sleepiness scale [ESS], Pittsburgh sleep quality index, Composite autonomic symptom score [COMPASS], Fibromyalgia impact questionnaire [FIQ], and widespread

pain index and symptom severity scale). Collected data was statistically compared between high and low disability groups of the Graded Chronic Pain (GCP) scale.

RESULTS : The high disability group showed higher pain levels, widespread pain and more psychological problems. They had significantly higher IgG levels. LAC, complements 3 and 4, IgA, IgG, and IgM levels were also higher ($p > 0.05$). IgG level showed a significant correlation with the number of disability days due to pain ($\gamma = 0.280$, $p < 0.05$), depression ($\gamma = 0.257$, $p < 0.05$), ESS ($\gamma = 0.257$, $p < 0.05$), BDI ($\gamma = 0.302$, $p < 0.05$), BAI ($\gamma = 0.322$, $p < 0.01$), COMPASS ($\gamma = 0.288$, $p < 0.05$), and FIQ ($\gamma = 0.349$, $p < 0.01$) scores.

CONCLUSION : A significantly higher level of IgG was found in TMD patients with a high disability level along with elevated levels of other autoimmune indices. TMD patients with elevated IgG levels may show more pain and higher prevalence of comorbidities (depression, sleep problems, and autonomic symptoms). Elevations of IgG may be considered as a screening test for the detection of TMD patients with poor prognosis.

Key words : Temporomandibular disorders, pain, comorbidity, chronic inflammation, autoimmunity

B-3 Reactive Oxygen Species and Salivary Bacterial Counts in Elderly Patients: A Preliminary Study

N. Nur'aeny¹, W. Hidayat¹, I.S. Wahyuni¹ and K. Wahyudi²

¹ Department of Oral Medicine, Faculty of Dentistry, Universitas Padjadjaran

² Department of Public Health, Faculty of Medicine, Universitas Padjadjaran

E-Mail: nanan.nuraeny@fkg.unpad.ac.id

BACKGROUND : Elderly decreased body function, include in the oral cavity. Coated tongue as common oral mucosal findings can be focal infection and affect the number of oral microbes. Reactive oxygen species (ROS) have an important role in human physiological and pathophysiological processes. ROS level and salivary bacterial counts in elderly is unknown.

OBJECTICE : To investigate the correlation between ROS level and salivary bacterial counts in elderly patients.

MATERIAL AND METHOD : This preliminary study was conducted by cross-sectional observation in August 2017 at Community Health Center Ujung Berung, Bandung. Oral examination include scoring of the tongue was completed by the subjects. saliva in 10 ml phosphate buffer saline and 5 ml blood was also collected. R version 3.4.1 for Windows operating system was used to perform all statistical tests.

RESULT : Twelve elderly were participated (2 male and 10 female). The mean of age was 68,08. There was low positive correlation between ROS and bacterial colony ($r_s = 0.09$, $p = 0.787$). The mean of ROS in elderly with Miyazaki index of 1 was larger than elderly with Miyazaki index of 2 but it was not statistically significant (mean difference = 1.49 IU/mL, $p = 0.210$). Low ROS levels may result in decreased antimicrobial defence, and high level ROS found in chronic inflammation. Positive correlation in ROS and bacterial colony showed that high ROS production reflected inflammation rather than infection.

CONCLUSION : Evaluation of ROS levels in elderly is important to provide more information for optimal health care.

Key words : reactive oxygen species, salivary bacterial count, elderly

B-4 Body Mass Index (BMI) Corelation with Salivary HBD-3 Secretion Levels in Children with Dental Caries and Caries Free

Retno Indrawati¹, Joseph Leonardo², Afin Aslihatul Umma², Dien Nisa Aulia², Tamima Izzat N², Maretaningtias Dwi Ariani³ and Seno Pradopo⁴

¹ Oral Biology departement, Faculty of Dental Medicine, Universitas Airlangga Surabaya, Indonesia

² Undergraduate Student at Faculty of Dental Medicine, Universitas Airlangga Surabaya, Indonesia

³ Prosthodontic department, Faculty of Dental Medicine, Universitas Airlangga Surabaya, Indonesia

⁴ Pediatric Dentistry department, Faculty of Dental Medicine, Universitas Airlangga Surabaya, Indonesia

Correspondence: Retno Indrawati, Oral Biology departement, Faculty of Dental Medicine, Universitas Airlangga Surabaya, Indonesia. E-Mail: retnoindrawati@fkg.unair.ac.id

BACKGROUND : Human Beta Defensin (HBD) has a broad spectrum antimicrobial properties and its more effective in opportunistic bacterial pathogens. HBD exhibit potent chemotactic activity for a variety of innate immune cells and stimulate other cells to secrete cytokinesImmune system is affected by Body Mass Index (BMI), such as nutritional and physical condition. BMI score represents the condition of adipose tissue and blood vessel structures impact the number of immune cells and cytokine production, affect to innate immune system and HBD-3 levels secretion.

OBJECTIVE : Prove Body Mass Index (BMI) corelation with Salivary HBD-3 secretion levels in Children with dental caries and caries free groups in children in two BMI groups.

MATERIALS AND METHODS : This study was passed the ethical test in Faculty of Dentistry Univeritas Airlangga. 5 ml Saliva was collected without stimulation and using passive droll technique from elementary school students

9-10 year old in Pondok Pesantren Qommarudin, Gresik. Base on BMI, devided into four groups: (1) caries-free group BMI ≤ 15 kg/m² (n=14), (2) caries-free group BMI ≥ 16 kg/m² (n=14), (3) caries group BMI ≤ 15 kg/m² (n=17) and (4) caries group BMI ≥ 16 kg/m² (n=17). HBD-3 levels tested by ELISA kit (Bioassay Technology Laboratory according to factory procedures).

RESULTS : The levels HBD-3 in group 1 (mean=3.36 ng/ml, SD=0,89) and group 2 (mean=2,94 ng/ml, SD=0,77) have no significant values ($p > 0.05$) $p = 0.189$. While, in group 3 (mean=3.26 ng/ml, SD=0.74) and group 4 (mean=2.57, SD=0.63) have significant difference levels ($p < 0,05$) $p = 0.007$.

CONCLUSION : The secretion of salivary HBD-3 levels in dental caries group is influenced by the condition of individual BMI.

Key words : Opportunistic bacterial pathogens, innate immunity, Elementary school, ELISA, Saliva

B-5 Oral Manifestations Related to Immunosuppression Degree in Pediatric HIV/AIDS Patients in Surabaya, Indonesia; Cross-sectional Research

Mario Powa Mensana¹, Alexander Patera Nugraha², Diah Savitri Ernawati³, Bagus Soebadi³, Erwin Asta Triyono⁴, Remita Adya Prasetyo⁵ and Sulistyowati Budi⁵

¹ Undergraduate Student, Faculty of Dental Medicine, Universitas Airlangga, Surabaya, Indonesia

² Graduate Student of Immunology, Postgraduate School, Universitas Airlangga, Surabaya, Indonesia

³ Department of Oral Medicine, Faculty of Dental Medicine, Universitas Airlangga, Surabaya, Indonesia

⁴ Department of Internal Medicine, Faculty of Medicine Airlangga University, Surabaya, Indonesia

⁵ Department of Oral Medicine, Dental and Oral Health Instalation, RSUD. Dr. Soetomo, Surabaya, Indonesia

BACKGROUND : United Nations Programme on HIV/AIDS (UNAIDS) estimates that more than 1.8 million infants and children worldwide are vertically infected with human immunodeficiency virus type 1 (HIV-1) from their mothers. Although transmission of HIV from mother to infant is not absolute, mother-to-child-transmission may reach 20-50% in developing countries due to lack access to anti-retroviral therapy. In recent years, the prevalence of HIV-1 infection in the Indonesia's pediatric population has increased exponentially. Oral manifestations related to HIV infection are common findings in pediatric patients and can become useful biomarkers to predict the course of the disease, as well as to estimate patients' degree of immunosuppression, especially in resource-limited settings.

OBJECTIVES : To report the prevalence of oral manifestation related to immunosuppression degree of pediatric HIV/AIDS patients at UPIPI Dr. Soetomo Hospital Surabaya 2017

MATERIALS & METHODS : All pediatric HIV/AIDS patients at UPIPI Dr. Seotomo Hospital that fit the research criterias were examined intraorally to identify any oral manifestation related to HIV infection. Identification of

oral manifestations was based on the European Community Clearinghouse 1993 criterias. CD4 counts within 6 months prior to the intraoral examination were also gathered from patients' medical records and classified based on WHO criterias to determine patients' degree of immunosuppression.

RESULTS : Out of 29 perinatally-infected pediatric HIV/AIDS patients, 58.62% patients presented some type of oral lesions; 55,17% Oral Candidiasis, 20.69% Linear Gingival Erythema (LGE), 6.90% Necrotizing Ulcerative Gingivitis (NUG), and 13.79% Oral Hairy Leukoplakia (OHL). Oral candidiasis and LGE were found in patients with no imunosuppression to severe immunosuppression, while NUG and OHL were only found in patients with severe immunosuppression.

CONCLUSION : The more severe the patient's degree of immunosuppression, the higher the prevalence of oral manifestations found. Presence of NUG and OHL can predict low CD4 count level.

Key words : pediatric HIV/AIDS patients, oral manifestations, degree of immunosuppression

B-6 High Prevalence of Dental Caries and It's Correlation with CD4+ Level in Children with Perinatal HIV/AIDS Undergoing Antiretroviral Therapy in UPIPI Dr. Soetomo Hospital Surabaya, Indonesia

Alexander Patera Nugraha¹, Mario Powa Mensana², Diah Savitri Ernawati³,
Adiastuti Endah Parmadiati³, Bagus Soebadi³, Erwin Asta Triyono⁴,
Remita Adya Prasetyo⁵ and Sulistyowati Budi⁵

¹ Graduate Student of Immunology, Postgraduate School, Universitas Airlangga, Surabaya, Indonesia

² Undergraduate Student, Faculty of Dental Medicine, Universitas Airlangga, Surabaya, Indonesia

³ Department of Oral Medicine, Faculty of Dental Medicine, Universitas Airlangga, Surabaya, Indonesia

⁴ Department of Internal Medicine, Faculty of Medicine Airlangga University, Surabaya, Indonesia

⁵ Department of Oral Medicine, Instalation of Dental and Oral Health, RSUD. Dr. Soetomo, Surabaya, Indonesia

BACKGROUND : Prevalence of HIV/AIDS infection in developing country in South East Asia increase annually such as in Indonesia. An estimated 3200 (2500-4000) children were newly infected with HIV due to mother-to-child transmission in 2016. HIV/AIDS lead to a progressive depletion of CD4+ counts. In children with HIV/AIDS, there is an increase in the prevalence of dental caries, mainly due to the chronic influence of some factors involved in the process of HIV infection. Very few published studies have demonstrated an association between dental caries in children with HIV/AIDS and CD4+ counts.

AIMS : The aim of the present study was to compare the correlation CD4 count with high prevalence of dental caries in HIV-seropositive children receiving antiretroviral therapy (ART) Zidovudine (AZT).

METHODS : An analytical observational research with cross-sectional design. Sampling method using total sampling consisted 29 HIV-positive perinatally-infected children aged 1-12 years at outpatient ward *Unit Perawatan Intermediet dan Penyakit Infeksi* (UPIPI) RSUD Dr. Soetomo Surabaya accordance the inclusion criteria has been agreed to join this study by filled informed

consent. Demographic details and recent CD4 counts were recorded from their medical records, which had been assessed regularly at 6-month intervals. Dental caries examination was performed by a triple examiner. Dental caries was assessed by decayed, missing, filled teeth (dmft) index was used. Data analyzed statistically using SPSS 16.0.

RESULTS : Dental caries prevalence was 86,2% with very high dmft index score 9.07. Kolmogorov-Smirnov test showed data was normally distributed ($p < 0.05$) thus Pearson's correlation was performed. CD4+ count and dmft showed significant correlation ($r = -0.394$, $p < 0.05$). Toothbrushing frequency with dmft showed significant correlation ($r = -0.419$, $p < 0.05$). Age and dmft showed insignificant correlation ($p < 0.05$), AZT therapy and dmft showed insignificant negative correlation ($p < 0.05$).

CONCLUSION : High prevalence of dental caries was found in children with perinatal HIV/AIDS and it's correlated with CD4+ counts

Key words : HIV/AIDS, ARV, Dental Caries, CD4+, Children with Perinatal HIV/AIDS Infection.

B-7 Oral Hairy Leukoplakia and Oral Candidiasis as Predictor-Prognostic HIV/AIDS Infection in Surabaya, Indonesia.

Alexander Patera Nugraha¹, Diah Savitri Ernawati², Adiasuti Endah Parmadiati², Bagus Soebadi², Erwin Asta Triyono³, Remita Adya Prasetyo⁴ and Sulistyowati Budi⁴

¹ Graduate Student of Immunology, Postgraduate School, Universitas Airlangga, Surabaya, Indonesia

² Department of Oral Medicine, Faculty of Dental Medicine, Universitas Airlangga, Surabaya, Indonesia

³ Department of Internal Medicine, Faculty of Medicine Airlangga University, Surabaya, Indonesia

⁴ Department of Oral Medicine, Instalation of Dental and Oral Health, RSUD. Dr. Soetomo, Surabaya, Indonesia

BACKGROUND : Indonesia is the country with the highest HIV/AIDS cases in the South East Asia region. Oral Hairy Leukoplakia and Oral Candidiasis (OHL/OC) are pathognomonic HIV/AIDS oral manifestation. Sparse literature exists from Indonesia on their incidence and impact on HIV-infected patients.

OBJECTIVES : to evaluate if OC/OHL should be considered clinical predictors of immune and virologic failure on HIV/AIDS patients in Indonesian adult.

MATERIALS & METHODS : This an analytical observational research with cross-sectional and total sampling method. All patients has been agreed to join this study by filled informed consent. The samples consisted of 88 patients at UPIPI RSUD Dr. Soetomo Surabaya accordance the inclusion criteria. Diagnose of OHL based on Cytologic scrapings sent for routine Papanicolaou stain (PAP). Diagnose of Candida infection based on mycology test using CHROMagar. All of them under-took oral examination, CD4+ count and viral load (VL) during 6 month from medical record were compared between groups. were obtained in order to assess the accuracy of

using OC and OHL as predictors of immune and virologic failure. Correlation OC, OHL, VL and CD4+ counts was determined using Pearson's test with $p < 0.05$.

RESULTS : 65 OC cases (54.17%) and 15 OHL cases (12.5%) from 120 cases. OHL and OC was found to be significantly correlated with decrease CD4+ counts < 200 cells/mm³ ($p < 0.05$), and high viral load > 100.000 copy r=0.033 ($p < 0.05$). Patients with OC and OHL have CD4+ count lower and mean VL higher ($p < 0.05$). OC had high Predictor prognostic Value (PPV) for immune failure and a moderated PPV for virologic failure. OHL had low PPVs for both measures.

CONCLUSION : The presence of OHL/OC in HIV-infected patients provides important prognostic information, and can be used as a cost-effective tool for screening patients in therapeutic interventions in resource-limited settings in endemic HIV/AIDS and developing country such as Indonesia.

Key words : Oral Candidiasis, Oral Hairy Leukoplakia, HIV/AIDS, Viral Load, CD4+ counts.

B-8 A DNA-protein Crosslink Repair Protease in *Candida albicans*

Oranart Matangkasombut^{1,2*}, Juthamas Kaewsonthi^{2,3}, Aimorn Homchan⁴,
Danaya Pakotiprapha⁴ and Skorn Mongkolsuk²

¹ Department of Microbiology and Research Unit on Oral Microbiology and Immunology, Faculty of Dentistry, Chulalongkorn University, ² Laboratory of Biotechnology, Chulabhorn Research Institute, ³ Chulabhorn Graduate Institute, ⁴ Department of Biochemistry, Faculty of Sciences, Mahidol University, Bangkok, Thailand
*corresponding author: oranart.m@g.chula.edu

BACKGROUND : DNA-protein crosslinks (DPCs) occur when proteins are covalently attached to DNA due to endogenous or exogenous agents, including enzyme trapping and aldehyde exposure. DPCs impede DNA replication and transcription, and need to be repaired. A metalloprotease required for DPC repair (Wss1) was discovered in *Saccharomyces cerevisiae*. *Candida albicans*, an important opportunistic pathogen, likely contains a homologous enzyme.

OBJECTIVES : To identify WSS1 homologue in *Candida albicans* (*CaWSS1*) and examine its function in DPC repair.

MATERIALS & METHODS : The homologue of WSS1 was identified from the genome sequence of *Candida albicans* (SC5314) and cloned into a centromeric yeast vector. Complementation assays were performed in *S. cerevisiae* strains lacking *ScWSS1* and *RAD52*, a gene important for homologous recombination. Plasmids containing wild-type *CaWSS1* and mutants generated by site-directed mutagenesis in the catalytic site, VIM, and SIM domains were transformed into *S. cerevisiae wss1Δ rad52Δ* strain. *ScWSS1* was

used as positive control and empty vector as negative control. The cultures were treated with formaldehyde to induce DPCs, and serial dilutions were spotted on solid media.

RESULTS : The open-reading-frame and domain structure of *CaWSS1* were identified. In complementation assays, wild-type *CaWSS1* rescued the growth of *S. cerevisiae wss1Δ rad52Δ* strain upon formaldehyde exposure to the same level as *ScWSS1*. This indicates that *CaWss1* is capable of repairing DPCs similarly to *ScWss1*. *CaWss1* with mutations in the catalytic site, VIM and both SIM domains, but not a single SIM, failed to complement the function of *ScWss1* upon formaldehyde exposure. This suggests that the catalytic, VIM, and both SIM domains of *CaWss1* are required for DPC repair.

CONCLUSION : *Candida albicans* contains a functional homologue of WSS1 which can repair DNA-protein crosslinks induced by formaldehyde exposure. The role of *CaWss1* in the survival of *C. albicans* warrants further studies.

Key words : *Candida albicans*, DNA-protein crosslinks, protease, *Saccharomyces cerevisiae*, WSS1

B-9 Influence of Different Energy Densities of Low-level Laser on Oral Wound Healing

Dang Thi Tham

Faculty of Dentistry, Hong Bang International University.

BACKGROUND : Oral ulcers are one of the most common complaints involving the oral mucosa and can cause mild to severe pain, related quality of life. Different therapeutic protocols have been tested to accelerate the wound healing process and reduce pain. Low-level Laser (LLL) is being used to create favourable condition and reduce time for soft and bonetissue healing. However, the optimal energy density for wound healing has not agreed.

OBJECTIVES : The purpose of this study was to evaluate effects of different energy densities of LLL on rabbit's dorsum of the tongue mucosa.

MATERIALS & METHODS : Eighteen ulcers were made on the dorsum of the tongue of eighteen male rabbits were allocated into three groups: control group (no irradiation); group 2: treatment 4J/cm²; group 3: treatment 20J/cm².

LLL was applied onto ulcers immediately after wound procedure and once a day for 1, 4 or 7 days. At day 1th, 4th and 7th postoperatively, two rabbits per group were sacrificed to valuate clinical analysis and histomorphology.

RESULTS : LLL has a faster clinical healing effect, reepithelialization, an inflammatory effect in the 4J/cm² group than the control group and the 20J/cm² group.

CONCLUSION : LLL has biostimulative effect on wound healing when irradiation with limited energy density.

Key words : Low-level Laser, wound healing, energy density, inflammation, reepithelialization.

B-10 Elucidation of the Role of NR4A1 in CsA Induced Gingival Overgrowth

A. Okanobu, S. Matsuda, S. Hatano, M. Kajiya, T. Fujita and H. Kurihara

Department of Periodontal Medicine, Graduate school of Biomedical and Health Sciences, Hiroshima University, Hiroshima, JAPAN

BACKGROUND : Drug induced gingival overgrowth (DiGO) is a side effect principally associated with anti-convulsant (e.g. phenytoin), various calcium channel blockers, or immunosuppressant (e.g. CsA: cyclosporine A). We investigated to clarify the mechanism of DiGO, and succeeded to establish CsA induced gingival overgrowth mice model (Okanobu et al., 2017). On the other hand, Orphan nuclear receptor NR4A1 is recently reported that the lack of active NR4A1 lead to persistent activation of TGF- β signaling and tissue fibrosis, and NR4A1 agonist inhibit skin, lung, liver, and kidney fibrosis in mice (Katrin et al., 2015). Therefore, We hypothesized that NR4A1 is involved in DiGO and is a potential target for treatment DiGO.

OBJECTIVES : To elucidate the role of NR4A1 in CsA induced gingival overgrowth mice model

MATERIALS & METHODS : The maxillary second molars of C57BL/6j mice were ligated with 5-0 silk threads and administrated CsA. The degree of gingival overgrowth was assessed by gingival width measurement and histological evaluation. The expressions of *Tgfb*, *Nr4a1*, *Pai1*

and *Col1* mRNA in the mice gingival tissue were analyzed by RT-PCR. To clarify the role of NR4A1, NR4A1 agonist (Cytosporone-B) was applied to CsA induced gingival overgrowth mice model and NR4A1 KO mice were ligated with 5-0 silk threads for 5 weeks.

RESULTS : Ligation alone increased *Tgfb* and *Nr4a1* mRNA expressions, but did not induce gingival overgrowth. CsA inhibited *Nr4a1* mRNA expression, and maintained *Col1* mRNA expression by activated TGF- β signaling. Moreover, Cytosporone-B inhibited CsA induced gingival overgrowth, and NR4A1 KO mice were induced significantly gingival overgrowth.

CONCLUSION : These results were suggested that the reduction of NR4A1 expression by CsA activated TGF- β signaling; thereby increased collagen expression in gingival connective tissue of CsA induced gingival overgrowth.

Key words : Drug induced gingival overgrowth, mice model, CsA, TGF- β , NR4A1

B-11 IL-35 Inhibits IL-6 and CXCL10 Production in TNF- α -stimulated Human Periodontal Ligament Cells

S. Shindo and H. Shiba

Department of Biological Endodontics

BACKGROUND : Periodonal disease is an infectious chronic inflammatory disease induced by periodontal pathogenic bacteria. It has been reported that excessive host immune response elicits the periodontal tissue destruction. IL-6 is well-known to be an activator of osteoclast differentiation. Th1 cells are accumulated by CXCL10. IL-35, which is produced by regulatory T cells, is discovered as an anti-inflammatory cytokine. IL-35 has been recently detected in gingival crevicular fluid. However, the effect of IL-35 on periodontal ligament cells is still unknown.

OBJECTIVES : The aim of this study is to clarify the anti-inflammatory effect of IL-35 on human periodontal ligament cells (HPDLCs).

MATERIALS & METHODS : HPDLCs were obtained from Lonza (Japan). HPDLCs were stimulated with TNF- α in the presence or absence of IL-35, MAPKs inhibitors, and/or an NF- κ B inhibitor for 24 hours. Production of IL-6 and CXCL10 in the culture supernatants was measured with ELISA kits. To examine an effect of IL-35 on the TNF- α -induced phosphorylation of MAPKs and NF- κ B,

HPDLCs were stimulated with TNF- α with or without IL-35. Subsequently, the cells were collected and western blot analysis were performed.

RESULTS : IL-35 treatment significantly inhibited IL-6 and CXCL10 productions from TNF- α -stimulated HPDLCs. Moreover, MAPKs inhibitors and an NF- κ B inhibitor could inhibit IL-6 and CXCL10 productions from TNF- α -stimulated HPDLCs. IL-35 suppressed I κ B- α phosphorylations, but didn't affect MAPKs phosphorylations in TNF- α -stimulated HPDLCs.

CONCLUSION : We found that the inhibition of NF- κ B activation by IL-35 resulted in the decrease in production of IL-6 and CXCL10 from TNF- α -stimulated HPDLCs. Therefore, IL-35 produced from regulatory T cells is possible to prevent bone destruction through inhibition of osteoclast activation and Th1 cells accumulation by suppression of IL-6 and CXCL10 productions in periodontal tissues.

Key words : Periodontal disease, IL-35, IL-6, CXCL10, NF- κ B

B-12 Lipopolysaccharide-Administered Bone Destruction Model of Periodontitis on *Rattus Norvegicus*

Erik Idrus and Awandra Evandy

Department of Oral Biology, Faculty of Dentistry, Universitas Indonesia

BACKGROUND : Periodontitis is a chronic disease of the periodontium tissue, characterized by the irreversible loss of the supporting bone of the teeth. The animal model for the periodontitis have been developed on various methods, ranging from infection to traumatic model, or a combination of both. Here in our research we reported the simple and controllable method to induce alveolar bone loss on the rats (*Rattus Norvegicus*) by administration of lipopolysaccharide (LPS).

OBJECTIVES : To establish the simple and controllable method to induce the uniform alveolar bone loss on the rats by administration of LPS.

MATERIALS & METHODS : LPS (*Escherichia coli*) was administered on the interdental between molar 1 and molar 2 of the mandibular region. As a control (sham), saline water was injected contra laterally on the same animal. Five different LPS concentrations was used (200, 300, 500, 750µg), and observation was performed 7 days. On day 7, rats were sacrificed, the mandibular bone was dissected, and the bone destruction was observed under the ste-

reomicroscope.

RESULTS : All the treated group showed the bone destruction compare to the control group. Level of bone destruction was directly proportional to the level of LPS concentration. In 750µg LPS group, the bone showed severe bone loss, with teeth mobility and crown fracture. In this research we also observed that on the contra lateral side as the control side, there a sign of bone loss.

CONCLUSION : LPS can be efficiently used to enhance the alveolar bone loss on the *Rattus norvegicus* mandibular region. The severity of bone destruction was determined with the level of the LPS concentration. Furthermore, it is suggested to use different animal as a control group, since the LPS could prompt systemic effect and could cause the symmetrical effect on the mandible.

Key words : Alveolar bone loss, Mandibular Posterior, *Rattus norvegicus* (Wistar), Lipopolysaccharide, Periodontitis Model

B-13 Involvement of C5a in the Progression of Experimental Arthritis in SKG Mice Induced by *Porphyromonas gingivalis* Infection

S. Munenaga, K. Ouhara, M. Kajiya, K. Takeda, N. Mizuno, T. Fujita and H. Kurihara

Department of Periodontal Medicine, Graduate School of Biomedical & Health Sciences, Hiroshima University

BACKGROUND : The accumulated epidemiologic evidence has suggested that periodontal disease (PD), chronic inflammation caused by infection of periodontopathic bacteria, is involved in the progression of rheumatoid arthritis (RA). Complement system plays a critical role in immune response. C5a has been implicated in chronic inflammatory diseases including PD and RA. *Porphyromonas gingivalis* (Pg) is the major causative bacteria of PD, and can produce C5a. Therefore, we hypothesized that local Pg infection might cause the progress of RA through C5a activation.

OBJECTIVES : The effect of C5a on the arthritis progression was determined by RA model mice with Pg oral infection.

MATERIALS & METHODS : The analyses of animal experiments: SKG mice were divided into 4 groups (Ctrl group: PBS-administration; Pg group: Pg-inoculation; laminarin (LA) group: LA-injection; Pg/LA group: Pg-inoculation + LA-injection). Arthritis was induced by intraperitoneal injection of LA (10 mg/mouse). Pg W83 (1×10^8 CFU) was inoculated every 3 days. The mice were analyzed after 6 weeks. Arthritis in the ankle joints was clinically and histologically evaluated. The serum C5a level was deter-

mined by ELSIA. The effect of serum C5a on the osteoclast differentiation of bone marrow mononuclear cells was examined. Sera were prepared from mice in each group. The bioactivity of C5a was confirmed by antibody inhibition assay.

The analyses of patients' serum: C5a levels and antibody titers to periodontopathic bacteria in serum from RA patients were measured by ELISA and their correlation was analyzed.

RESULTS : Pg infection accelerated the arthritis and additionally showed the increase of serum C5a in LA induced RA model mice (Pg/LA mice). The highly elevated C5a in the serum from Pg/LA mice strongly promoted the osteoclast differentiation. C5a levels in RA patients' serum showed a positive correlation with antibody titers to Pg.

CONCLUSION : These results suggest Pg infection enhances the progression of RA via C5a.

Key words : *Porphyromonas gingivalis*, Arthritis, C5a, SKG mice, Osteoclast differentiation

C-1 Hypoxic Precondition Induces SDF-1 -CXCR4 Expression in Bone Marrow –Derived Mesenchymal Stem Cells Culture

Sri Wigati Mardi Muljani¹, DiahSavitri Ernawati² and EhaRenwi Astuti¹

¹ Departement of Dentomaxillofacial Radiology

² Departement of Oral Medicine, Faculty of Dentistry Airlangga University, Surabaya-Indonesia, Jl. Prof.Dr. Moestopo 47 Surabaya, E-Mail: swigati.nina@gmail.com

Mesenchymal Stromal Stem Cells (MSCs) constitute a population of adult stem cells that have the ability to transdifferentiate. Stromal Derived-Cell Factor 1 (SDF1) and C-X-C Chemokine Receptor Type 4 (CXCR4) are important factors that influence stem cell capability to migrate into a defective area and play a significant role in regulating the adhesion, expansion, migration and homing of MSCs. CXCR4 and SDF-1 are both strongly expressed in bone marrow MSCs, but are lost upon culturing with a high passage number. Nevertheless, under hypoxic conditions certain cytokines, CXCR4 and SDF-1 expression can be re-established and maintained.

AIM : to examine the effect of hypoxic preconditions on the ability of MSCs culture mediated expression CXCR4 and SDF-1.

METHODS : MSCs was derived from the femurs of 200 gr Wistar male rats. Stem cell culture was performed in hypoxic conditions (1%O₂) and the expression of CXCR4

and SDF-1 measured by using immunocytochemistry, ELISA and immunofluorescence after 48-hour incubation in a low tension oxygen chamber with an internal atmosphere consisting of 95% N₂, 5% CO₂ and 1% O₂. All data were subjected to a normality test and then analyzed by means of Manova statistic (p<0.05).

RESULTS : a hypoxic precondition (1%O₂) in MSCs culture increases CXCR4 and SDF-1 expression more than normoxic condition

CONCLUSION : a hypoxic precondition with 1% O₂ can promote increasing CXCR4 and SDF1 expression that may play an important role in improving MSCs migration into defective areas, proliferation and differentiation into origin-like cells and resident stem cells growth.

Key words : Bone Marrow Stem Cells, Mesenchymal Stem Cells, Hypoxic Precondition, CXCR4, SDF-1, Homing Factors

C-2 Mechanotransduction in 3D Culture Clumps of Mesenchymal Stem Cells/Extracellular Matrix Complexes Regulates the Cell Fate

N. Komatsu, M. Kajiya, S. Motoike, M. Takewaki, S. Horikoshi, T. Iwata, K. Ouhara, K. Takeda, T. Fujita and H. Kurihara

Department of Periodontal Medicine, Graduate school of Biomedical and Health Sciences, Hiroshima University, Japan

BACKGROUND : Three-dimensional floating cultured clumps of mesenchymal stem cells (MSCs)/extracellular matrix (ECM) complexes (C-MSCs) are consisted of the cells and self-produced ECM. We have previously demonstrated that C-MSCs can be transplanted into bone defect without any artificial scaffold to induce bone regeneration. For clinical application of C-MSCs as tissue regenerative therapy with scientific evidence, it is necessary to elucidate the biological capacity of C-MSCs in various microenvironments. It has been uncovered that mechanical cues of C-MSCs, such as ECM stiffness or floating condition, cause mechanotransduction to regulate the transcriptional co-activator YAP/TAZ, which plays a role in the MSCs differentiation.

OBJECTIVES : In this study, we have investigated the role of YAP/TAZ in mechanotransduction that links between microenvironment of C-MSCs and their cellular function.

MATERIALS & METHODS : MSCs were seeded at a density of 2.0×10^5 cells/well into 24-well plates and cultured with growth medium supplemented with L-ascorbic acid for 4 days. To obtain C-MSCs, the cellular sheet composed of confluent cells was detached from the bottom of the plate by scratching sheet edge. The cellular sheet then

curled up and became round clumps of cells in three-dimensional culture. The YAP/TAZ activity, actin cytoskeleton formation, type I collagen (COL1) production and the differentiation potency in C-MSCs cultured with growth medium or osteo-inductive medium were analyzed.

RESULTS : C-MSCs cultured with floating condition lost actin cytoskeleton and phosphorylated LATS1/2 to downregulate YAP/TAZ activity, which regulated cell fates into adipo/chondrogenesis. Meanwhile, C-MSCs cultured with osteo-inductive medium (OIM-C-MSCs) showed abundant COL1 production which facilitated Int β 1-dependent actin fiber formation and YAP/TAZ activity to elevate RUNX2 mRNA expression. More importantly, the elevated YAP/TAZ activity was associated with the COL1 deposition and F-actin integrity, suggesting the positive feedback loop in OIM-C-MSCs.

CONCLUSION : YAP/TAZ are crucial elements that transduce microenvironmental change surrounding C-MSCs into their biological change.

Key words : YAP/TAZ, mechanotransduction, microenvironment, MSC, cell differentiation

C-3 Immobilization of Basic Fibroblast Growth Factor onto Bioengineered Surfaces: A Novel Approach for the Efficient Expansion of Mesenchymal Stem Cells

AJAY SHAKYA, I. Hirata and K. Kato

Department of Biomaterials, Graduate School of Biomedical & Health Sciences, Hiroshima University, 734-8533, Japan

BACKGROUND : Mesenchymal stem cells (MSCs) can differentiate into bones, cartilages, fats and other cells of stromal origin. However, one of the most critical challenges for the wide-spread application of MSCs in regenerative medicine may be to establish an efficient method to expand MSCs. Basic fibroblast growth factor (bFGF) is reported to be effective for the maintenance of MSCs and is routinely added to the culture medium. Here we present the result of our study in which, bFGF was immobilized onto a glass substrate.

OBJECTIVES : To develop a bioengineered culture surface that serves for the selective and rapid proliferation of MSCs, while maintaining their undifferentiated state.

MATERIALS & METHODS : Recombinant bFGF with histidine-tag (bFGF-His) was expressed in *E. coli* and purified. bFGF-His was then immobilized onto the Ni²⁺-chelated glass surface. The immobilization took place through the coordination between Ni²⁺ and His-tag. The bFGF-immobilized surface was exposed to citrate buffer to refold *in situ* the surface-immobilized bFGF. Secondary struc-

ture of immobilized bFGF-His was analysed by solid-phase circular dichroism (CD) spectrometry. Human MSCs were cultured on the bFGF-His-immobilized surface to examine their proliferation.

RESULTS : CD spectroscopy revealed that the immobilized bFGF, initially exhibited secondary structure rich in α -helix and that the spectrum was gradually transformed to exhibit the formation of β -strands upon exposure to citrate buffer, approaching to the spectrum of native bFGF. The rate of MSC proliferation was 1.6-fold higher on day 6 on the bFGF-immobilized surface treated with *in situ* citrate buffer, compared to the untreated surface.

CONCLUSION : It was shown that immobilized bFGF-His treated with citrate buffer *in situ* was biologically active because its secondary structure approaches its natural state. This was well demonstrated by cell culture experiments. Our result showed that immobilization of bFGF on the culture substrate served to enhance proliferation of MSCs.

Key words : Mesenchymal stem cells, Growth factor, Bioengineered surfaces, Surface analysis, Proliferation

C-4 Biodegradation and Compressive Strength Test of Chitosan Gelatin and Calcium Carbonate Scaffold with Different Ratio as Biomaterial in Bone Tissue Engineering

Prasiddha Mahardhika E.F¹, Anita Yuliaty², Pratiwi Soesilawati³ and Pradipta Pitaloka⁴

¹ Graduate Student of Dental Health Science, Faculty of Dental Medicine, Universitas Airlangga, Surabaya, Indonesia

² Departement of Biomaterial, Faculty of Dental Medicine, Universitas Airlangga, Surabaya, Indonesia

³ Departement of Oral Biology, Faculty of Dental Medicine, Universitas Airlangga, Surabaya, Indonesia

⁴ Under Graduate Student, Faculty of Dental Medicine, Universitas Airlangga, Surabaya, Indonesia

BACKGROUND : Bone destruction in the oral cavity due to trauma, chronic infection, congenital malformations, or resection surgery has most often addressed using an autologous bone graft technique. Another solution emerged in network engineering techniques using the scaffold. Calcium carbonate is one of the potent ceramic materials that have osteoconductive properties in the manufacture of a scaffold.

OBJECTIVES : We investigated the comparative value biodegradation and compressive strength of chitosan, gelatin, and calcium carbonate scaffold with different ratio.

MATERIALS & METHODS : Chitosan, gelatin, and calcium carbonate scaffold are made by freeze-drying method. The scaffold degradation test was dissolved with PBS containing 1.6 μ g/ml (112 units/ml) of the lysozyme enzyme. Compressive strength test is done by using autograft tool with load cell compress machine 100 kN.

RESULTS : The chitosan, gelatin, and calcium carbonate scaffold ratio 40:60 had a mean values of 21.8 mg \pm 7.7 on the day 3 and a mean value of 29.3 mg \pm 7.5 on the day 7 had a lower degradation rate than the scaffold with 30:70 ratio. Scaffold ratio 40:60 with a mean value of 3.2 mpa \pm 0.7 had a higher compressive strength mean value compared to a 30:70 ratio scaffold. The data were analyzed by T-test and found significant difference in degradation rate on day 3 and 7 (p <0,05) and compressive strength test (p <0,05).

CONCLUSION : The scaffold ratio 40:60 have better biodegradation and compressive strength properties than scaffold ratio 30:70. The chitosan, gelatin and calcium carbonate scaffold ratio 40:60 have potential as a replacement biomaterial in bone tissue engineering.

Key words : Tissue engineering, Bone, Scaffold, Biodegradation, Compressive strength

C-5 The Differences Scaffold Composition in Pore Size and Hydrophobicity Properties as Bone Regeneration Biomaterial

Muhammad Dimas Aditya Ari¹, Anita Yuliaty², Retno Pudji Rahayu³ and Dita Saraswati⁴

¹ Graduate Student of Dental Health Science, Faculty of Dental Medicine, Universitas Airlangga, Surabaya-Indonesia, 60132.

² Dental Biomaterial Department, Faculty of Dental Medicine, Universitas Airlangga, Surabaya, Indonesia, 60132.

³ Oral and Maxillofacial Pathology Department, Faculty of Dental Medicine, Universitas Airlangga, Surabaya, Indonesia, 60132.

⁴ Under Graduate Student, Faculty of Dental Medicine, Universitas Airlangga, Surabaya, Indonesia, 60132.

BACKGROUND : Surgical procedure using bone replacement materials are still needed to accelerate new bone formation. Tissue engineering concept develop the research in scaffold biomaterial. Chitosan, gelatin and bovine hydroxyapatite combination can be synthesized as an ideal scaffold biomaterial that has a biomimetic properties of bone tissue.

OBJECTIVES : In this study, we investigated to determine pore size and hydrophobicity properties of chitosan-gelatin/bovine hydroxyapatite scaffold at various eligible ratios in bone tissue engineering

MATERIALS AND METHODS : Scaffold chitosan-gelatin/bovine hydroxyapatite with a ratio of 20:80, 30:70 and 40:60 synthesized using freeze dry method. Scaffold on each ratio was tested by pore size examination using Scanning Electron Microscope. The ratio of swelling and water content percentage was done by measuring the ini-

tial weight and final weight after being soaked in distillate water for 1, 3 and 7 days. Data then were collected and analyzed statistically using SPSS software.

RESULT : The smallest pore size was obtained at a 20:80 ratio scaffold with a mean value of $254.44 \pm 37.96 \mu\text{m}$ and the largest on a 40:60 ratio scaffold with a mean value of $423.04 \pm 68.72 \mu\text{m}$. Swelling ratios and water content percentage were highest on the chitosan-gelatin/bovine hydroxyapatite ratio of 40:60 at day 7 ($2,904 \pm 0.531$ and $75.84 \pm 2.6\%$).

CONCLUSION : The pore size and hydrophobicity properties corresponding to bone tissue regeneration biomaterials were obtained on the 20:80 and 30:70 ratios chitosan-gelatin/bovine hydroxyapatite scaffold.

Key words : scaffold, pore size, swelling ratio, water content percentage.

D-1 Nitidine Chloride Acts as an Apoptosis Inducer in Human Oral Squamous Cell Carcinoma via the Inhibition of STAT3

Sung-Dae Cho¹, Young-Seok Park² and Ho-Beom Kwon³

¹ Department of Oral Pathology, School of Dentistry and Dental Research Institute, Seoul National University, Seoul, 03080, Republic of Korea

² Department of Oral Pathology, School of Dentistry and Dental Research Institute, Seoul National University, Seoul, 03080, Republic of Korea

³ Department of Oral Pathology, School of Dentistry and Dental Research Institute, Seoul National University, Seoul, 03080, Republic of Korea

BACKGROUND : Nitidine chloride (NC) is a natural bioactive alkaloid compound isolated from the root of *Zanthoxylum nitidum*, and is known to have anti-cancer, anti-inflammatory and anti-angiogenic activities against various tumors. Recently, NC has attracted great attention as an anticancer drug candidate on the basis of several studies demonstrating that it inhibits cell proliferation and induces apoptosis and cell cycle arrest in several tumor types. However, the pro-apoptotic effects of NC in human oral cancer cells and the underlying molecular mechanisms have not been well established.

OBJECTIVES : In this study, we investigated the effects of NC on growth and signaling pathways in human oral cancer cell lines and a tumor xenograft model.

MATERIALS & METHODS : The apoptotic effects and related molecular targets of NC on human oral cancer were investigated using trypan blue exclusion assay, DAPI staining, Live/Dead assay, Western blotting, Immunohistochemistry/

Immunofluorescence and a nude mouse tumor xenograft.

RESULTS : NC decreased cell viability in HSC3 and HSC4 cells; further analysis demonstrated that cell viability was reduced via apoptosis. STAT3 was hyper-phosphorylated in human oral squamous cell carcinoma (OSCC) compared with normal oral mucosa and dephosphorylation of STAT3 by NC or the potent STAT3 inhibitor, cryptotanshinone decreased cell viability and induced apoptosis. NC also suppressed cell viability and induced apoptosis accompanied by dephosphorylating STAT3 in four other oral cancer cell lines. In a tumor xenograft model bearing HSC3 cell line, NC suppressed tumor growth and induced apoptosis by regulating STAT3 signaling without liver or kidney toxicity.

CONCLUSION : Our findings suggest that NC is a promising chemotherapeutic candidate against human oral cancer. **Key words** : Nitidine chloride, Oral cancer, Apoptosis, STAT3, tumor growth

D-2 Potency of Genistein with Nanopartikel Modification of PEG-PLGA Conjugated Anti-IL6 Antibody as Anticancer Agent on OSCC

Azimah Nurin Nafilah¹ and Yolanda Aulia Hapsari¹

¹ Dentistry Faculty of Brawijaya University, Malang, Indonesia

BACKGROUND : The prevalence of Indonesian smokers increased from 27% in 1995 to 36.3% in 2017. The increase in OSCC is directly proportional to the frequent exposure to risk factors such as cigarette consumption. That is, more than 36.3% of Indonesia's population is threatened by OSCC. The prevalence of Oral Squamous Cell Carcinoma (OSCC) is approximately 82-90% of oral malignancies, and more often in men aged 40-80 years. Currently OSCC treatment includes surgery and radiotherapy, but radiotherapy affects the damage to other healthy cells. Therapeutic innovations need to hinder the development of the OSCC.

OBJECTIVES : Determine the potential genistein by modification of PEG-PLGA nanoparticles conjugated antibody anti-IL6 as anticancer agent in OSCC.

MATERIALS & METHODS : This paper uses data collection method with literature study to know the potential of genistein with nanopartikel modification PEG-PLGA conjugated antibody anti-IL6 as anticancer agent on OSCC. Based on its characteristics, this paper uses descriptive analysis approach.

RESULTS : In OSCC, inflammatory conditions worsen prognosis, in which one of the cytokines in action is IL-6. IL6 inhibits cancer cell apoptosis through inactivation of tumor suppressor genes P53. In addition, IL6 activates MMP-9 which in the protease process will induce VEGF expenditure that plays a role in angiogenesis. Genistein is isoflavone commonly found in soybeans. In vitro and in vivo studies supporting genistein can be considered as chemopreventive agents for the treatment of various cancers including liver cancer, gastric cancer, lung cancer, colorectal cancer and breast cancer. Studies show genistein may have an anticancer effect on OSCC. Genistein in the form PEG-PLGA nanoparticles gives the advantage that drugs are rapidly distributed to target cells, not easily degraded and biodegradable, and have good efficacy.

CONCLUSION : Genistein with modified PEG-PLGA nanoparticles conjugated antibody anti-IL6 potentially as anticancer agent in OSCC.

Key words : Anti-IL6, Anticancer, Genistein, PEG-PLGA Nanoparticles, Oral Squamous Cell Carcinoma (OSCC)

D-3 Prevalency of Burning Mouth Syndrome in Oral Medicine Departement Patients at Hasan Sadikin Hospital Periode 2012-2015

T Setiani D

Departement of Oral Medicine, Faculty of Dentistry, Universitas Padjadjaran, Bandung, Indonesia.
E-Mail: tenny.setiani@fkg.unpad.ac.id

BACKGROUND : Burning Mouth Syndrome was found in patients with several conditions such as dry mouth, pain, itchy, burning, hypo salivation, shooting and numbness with no clinically disorder on the oral mucosa. This condition can give unpleasant sense in some activities such as eating, swallowing, speech, respiration and sleep disorders. In order of time this conditions might be bother systemic condition it becomes malnutrition, decrease the imunne system especially in oral mucosa and its function, which can ended decreased the quality of life.

OBJECTIVE : to know about the prevalency of burning mouth syndrome in oral medicine patients at Hasan Sadikin Hospital periode 2012-2015

MATERIAL AND METHOD : This research was done by

looking on secondary data from Oral Medicine sub-department in Dr Hasan Sadikin Hospital in periode 2012-2015.

RESULT : Data has found that there were 40 patients (4,1%) with Burning Mouth Syndrome from totally 975 patients who came to Oral Medicine department. Mostly, the etiology of the burning or mouth syndrome caused by systemic factors and the other less caused by local factors.

CONCLUSION : Eventhough the prevalency of burning Mouth Syndrome was low, but the conditions most fully detrimental the quality of life.

Key words : Burning Mouth Syndrome, systemic factor, quality of life

D-4 Modulation of Transient Receptor Potential Vanilloid Subtype 1 by Dexmedetomidine

Gehoon CHUNG¹, Byeong-Min LEE¹, Yoonsun JANG¹, Giyeon PARK², Chae-yun BAEK² and Teo Jeon SHIN³

¹ Department of Neurobiology and Physiology, School of Dentistry, Seoul National University, Seoul, Republic of Korea

² Dental Research Institute, Seoul National University, Seoul, Republic of Korea

³ Department of Pediatric Dentistry, School of Dentistry, Seoul National University, Seoul, Republic of Korea

BACKGROUND : Dexmedetomidine, an α_2 adrenergic receptor agonist and novel sedative drug with minimal respiratory suppression, shows anti-nociceptive activity in various pain models by poorly understood mechanisms. Because α_2 adrenergic receptor is up-regulated and co-localized with TRPV1 polymodal nociceptive receptor in neuropathic pain animal models, the analgesic activity might be mediated through inhibition of TRPV1.

OBJECTIVES : This study aims to test whether TRPV1 and α_2 adrenergic receptor are co-expressed and Dexmedetomidine would modulate TRPV1 activity in mice dorsal root ganglion (DRG) neurons.

MATERIALS & METHODS : To test inhibition of TRPV1 activity by dexmedetomidine, we measured the capsaicin-induced increase of intracellular calcium concentration with and without dexmedetomidine pretreatment in

mice primary cultured dorsal root ganglion (DRG) neurons, by fura-2 based intracellular calcium ratiometry. Concentration of capsaicin applied was 400 nM, 3 times that of EC50 concentration.

RESULTS : Dexmedetomidine (2, 10, 50 μ M) significantly reduced capsaicin responses ($P < 0.01$), in dose-dependent manner. RT-PCR analysis revealed expression of TRPV1 and all three subtypes of α_2 adrenergic receptor in mice DRG neurons.

CONCLUSION : In summary, these results suggested that the inhibition of TRPV1 by dexmedetomidine might be a plausible mechanism that contributes to the anti-nociceptive action of the drug.

Key words : TRPV1, dexmedetomidine, analgesic, DRG, pain

D-5 The Antineuralgic Effect of Botulinum Toxin in Trigeminal Neuralgia Patients: an Open-label Clinical Trial Study.

Thofun leamsuwantada¹, Pimchanok Puttakun¹, Supisara Sritrakul¹, Teekayu Plangkoon Jorns¹, Somsak Tiamkao², Amnat Kitkhuandee³ and Rajda Noisombut⁴

¹ Department of Oral Biology, Faculty of Dentistry, Khon Kaen University, Thailand

² Department of Medicine, Faculty of Medicine, Khon Kaen University, Thailand

³ Department of Surgery, Faculty of Medicine, Khon Kaen University, Thailand

⁴ Department of Community Dentistry, Faculty of Dentistry, Khon Kaen University, Thailand

BACKGROUND : Trigeminal neuralgia (TN) is the most common neuropathic pain in the dental practice. Even though medications are the first line management, a large number of patients have difficulty using them due to intolerable side effects and sometime life threatening adverse reactions. A new form of pain relieve medication can be a useful alternative in management this group of patients.

OBJECTIVES : This study aimed to evaluate the antineuralgic effect of botulinum toxin in TN patients.

MATERIAL AND METHODS : A total of 25 units of botulinum toxin (Dysport) was injected into subdermal layer of extraoral area at the trigger point. The effect was investigated by comparing the mean of the severity of pain per day, the frequency of pain per day, and the number of anticonvulsant drug tablets taken per day between 1 week before botulinum toxin injection and 1 week, 2 weeks, 4 weeks, and 6 weeks after injection in the same

patients.

RESULTS : Thirteen trigeminal neuralgia patients who are on their medications were recruited. The severity of pain was significantly decreased in all of the follow up visits ($p < 0.05$) and the frequency of pain was significantly decreased in 4 and 6 weeks of follow up visits ($p = 0.03$). The number of anticonvulsants taken per day was significantly reduced in every follow up time after injection ($p < 0.05$). The satisfaction level of all volunteers was graded moderately to extremely satisfied in 2 weeks, 4 weeks, 6 weeks respectively after the injection. No drug allergies and adverse reactions have been reported.

CONCLUSION : We suggest that taking anticonvulsant drug combined with botulinum toxin injection can be used alternatively in intractable trigeminal neuralgia patients who respond poorly to medication.

Key words : Trigeminal neuralgia, Treatment, Botulinum toxin, Anticonvulsant, Oral Medicine

D-6 Unusual Radicular Cyst Involving Nasal Cavity: Diagnosed Using CBCT

S Farrah D¹, L Epsilawati², F Pramanik² and RN Firman²

¹ Dentomaxillofacial Radiology Department, Faculty of Dentistry, Universitas Gadjah Mada, Yogyakarta, Indonesia

² Dental Radiology Department, Faculty of Dentistry, Universitas Padjadjaran, Bandung, Indonesia
Corresponding author: s.farrah.d@gmail.com

BACKGROUND : Radicular cyst is an odontogenic cysts associated with non-vital teeth. In radiograph, they depict as a radiolucent area, rounded with well-defined cortical boundaries of radiopaque on the non vital tooth apex. Cone Beam Computed Tomography (CBCT) is an extraoral radiographic technique that features 3 dimensions (3D) images, wether anatomical or pathological structures without distortion.

OBJECTIVE : To present a radicular cysts and its expansion effect, seen from CBCT.

CASE AND CASE MANAGMENT : A 32 year-old patient complained about discoloration of her upper anterior teeth and swollen gums. He fell off from his skateboard 15 years ago and hit his incisor. Periapical radiograph for preliminary examination revealed a large radiolucent

area with well-defined cortical border in periapical 21.

RESULT : After endodontic treatment, CBCT examination was performed to determine the extent of cyst lesions. In coronal view, the lesion extends to 22 also causes the destruction of the right and left nasal cavity. In the sagittal view the lesions extend and perforate to the labial cortical bone.

CONCLUSION : In large cysts, CBCT examination is matter to consider. One of the advantages of CBCT is the Multiplanar (MPR) view which can provide information about lesion extension and the various anatomical structures involved in case.

Key words : CBCT, radicular cyst, nasal cavity perforation

D-7 Reveal Rare Bilateral Keratocystic Odontogenic Tumor in Mandible Paramolar with CBCT 3D Radiograph

A A G Dananjaya A¹, L Epsilawati² and Azhari²

¹ Post Graduate Student of Dentomaxillofacial Radiology Department, Faculty of Dentistry, Universitas Padjajaran, Bandung, Indonesia

² Dentomaxillofacial Radiology Department, Faculty of Dentistry, Universitas Padjajaran, Bandung, Indonesia

ABSTRACT : The keratocystic odontogenic tumor is a benign intraosseous neoplasm derived from remnants of the dental lamina and it occurs with high frequency. Paramolar are rare supernumerary structures of maxillofacial complex that occur buccally or lingually near the molar row. CBCT 3D radiography is capable of displaying three-dimensional images

OBJECTIVE : to study case reports of rare cases of bilateral odontogenic keratocyst tumors in mandibular premolar teeth using CBCT 3D radiography.

CASE AND CASE MANAJEMENT : The 19-year-old female patient came to Padjadjaran University dental Hospital Bandung, carrying a consul for a CBCT radiograph in connection with the messy tooth condition. EO examination does not look any swelling, but it hurts on the posterior mandibula sejal 4 months ago. IO examination appears to have redness, slight swelling in

the left and right mandibular mandibular region.

RESULT : In a 3D radiograph of CBCT, bilateral radiopaque lesions resemble implanted tooth seeds with radiolucent round lesions around them. The area of the left lesion is greater than the right lesion with the corrected margin, with scallop borders along the molar and premolar roots. The picture also shows that no massive bone damage laterally will remain more massive in the anteroposterior direction.

CONCLUSION : Based on radiographic description, it is illustrated that the abnormality suffered by the patient is ceratocyst odonto of Tumor type with rare condition that is in premolar teeth and also that the CBCT 3D radiography is a quite sensitive tool to assess this.

Key words : Rare Odontogenic Ceratocyst, 3D CBCT

D-8 Prevalence and Risk Factors of Obstructive Sleep Apnea in Edentulism at Faculty of Dentistry, KKU.

S. Ruangsri^{1,2}, W. Tiskratok³, C. Norraparn⁴, W. Theprungsirikul⁵, D. Yodsuwan⁶, S. Puasiri⁷ and K. Sawanyawisuth⁸

¹ Oral Biology Department, Faculty of Dentistry, Khon Kaen University, THAILAND

² Neuroscience Research and Development Group (NRDG), Khon Kaen University, THAILAND

³ Institute of Dentistry, Suranaree University of Technology, Nakhonratchasima, THAILAND

⁴ Praajanban Tanakaro Hospital, Sakon Nakhon, THAILAND

⁵ Sunpasittiprasong Hospital, Ubonratchathani, THAILAND

⁶ Prosthodontics Department, Faculty of Dentistry, Khon Kaen University, THAILAND

⁷ Community Dentistry Department, Faculty of Dentistry, Khon Kaen University, THAILAND

⁸ Internal Medicine Department, Faculty of Medicine, Khon Kaen University, THAILAND

BACKGROUND : The prevalence of obstructive sleep apnea (OSA) was 3-9% in Thai elderly population and has been increased 2-3 times in patients above 65 years old. Thai elderly people loss 13.38 teeth/person and approximately 7.2% of them are edentulous. The oropharyngeal obstruction due to OSA causes incompetence of breathing inducing arousal to sleep. The consequences of OSA lead to a pathological cascade that is responsible for cerebrovascular and cardiovascular diseases.

OBJECTIVES : This study aimed to investigate the prevalence and risk factors, which may be associated with OSA in edentate patients.

MATERIALS & METHODS : 131 edentate patients previously delivered complete dentures during 2013-2015 at Faculty of Dentistry, KKU were recruited for telephone interview using modified Berlin questionnaire (Thai). Of those, 55 patients were high OSA risk (mean Age 68.35 ±7.7 yrs, mean BMI 23.85 ± 3.0 kg/m²). Twenty subjects in high OSA risk group were randomly selected to have sleep test for further diagnosis of OSA using portable polysomnography. All data including gender, age, neck circumference, BMI, systemic diseases, oropharyngeal space classified by Mallampati's score, lateral pharyngeal

wall, torus palatinus and torus mandibularis, tongue size and tongue position were collected by history taking together with physical and oral examination.

RESULTS : Descriptive statistical analysis revealed that prevalence of OSA was 44.99% in edentulism. The Chi-Square test (P value=0.032) and multiple logistic regression (backward and stepwise) showed that risk factor associated with OSA was only Mallampati's score level 4 (OR=16.00). Gender, age, neck circumference, BMI, systemic diseases, lateral pharyngeal wall, torus palatinus and torus mandibularis, tongue size and tongue position were, however, not correlated with OSA in our sampled edentate patients.

CONCLUSION : Mallampati's score level 4 is an important risk factor of OSA in edentate patients. This oral manifestation can easily be examined and identified during routine dental treatment. Therefore, dentist could be the first health profession to screen, give advice or refer edentate patients who are at risk of OSA to physician

Key words : Obstructive sleep apnea, Edentulous, Risk factors, Prevalence, Mallampati's.

D-9 Chronic Apical Abscess from Endodontic Aspect

Diani Prisinda¹, Yuti Malinda² and Yurika Ambar Lita³

¹ Conservative Dentistry and Endodontic Department, Faculty of Dentistry, Universitas Padjadjaran, Bandung, Indonesia

² Oral Biology Department, Faculty of Dentistry, Universitas Padjadjaran, Bandung, Indonesia

³ Oral Maxillo Facial Radiology Department, Faculty of Dentistry, Universitas Padjadjaran, Bandung, Indonesia

Many attempts have been made over the years to develop classifications of pulpal and periapical disease. However, many studies have shown that there is not a great correlation between clinical signs and symptoms and the histopathology of a given clinical condition. A tooth with a chronic apical abscess will not generally present with clinical symptoms. This tooth will not respond to pulp vitality tests and the radiograph or image will exhibit an apical radiolucency. The tooth is generally not sensitive to biting pressure but can feel different to the patient on percussion. This entity is distinguished from asymptomatic apical periodontitis

because it will exhibit intermittent drainage through an associated sinus tract. The treatment of this diagnose is endodontic treatment, with access of the cavity, instrumentation of the root canals, sterilization with medicament and obturation of the root canals. The main point of this treatment is eliminating the bacteria from the root canals, so that the periapical lesion can be removed.

Key words : Chronic Apical Abscess, Endodontic treatment, Medicament

E-1 Mesh Diagram Analysis of Soft Tissue Facial Norms for Vietnamese

Lu Minh Loc¹ and Ngo Thi Quynh Lan²

¹ Department of Orthodontics, Faculty of Odonto-Stomatology, University of Medicine and Pharmacy, HoChiMinh City, Vietnam.

² Department of Dental Basic Science, Faculty of Odonto-Stomatology, University of Medicine and Pharmacy, HoChi Minh City, Vietnam.

BACKGROUND : The Moorrees mesh diagram analysis has been considered as one of the most useful methods for orthodontic diagnosis in the comparisons with other conventional analyses. Each landmark in a diagram is assessed by its proportionate location in a coordinate system, thus facial profile is evaluated in one single display easily without computation of linear and angular measurements.

OBJECTIVES : The purposes of this study were to investigate the characteristics of soft-tissue facial profile and to establish a standard mesh diagram representing Vietnamese population using mesh analysis.

MATERIALS & METHODS : Lateral cephalometric radiographs of 144 subjects (61 males and 83 females, aged between 16 to 25 years-old) were selected. All subjects met the following criteria: (1) Class I dental and skeletal relationship with minimal crowding (6mm or less), (2) balanced facial profile, (3) no prior orthodontic treatment, (4) lip position to the E-plane: -0.9 ± 1.63 for upper lip and 0.83 ± 1.56 for lower lip. The mesh diagram is constructed on the cephalometric radiograph

oriented in the natural head position due to the individual upper facial height and anterior cranial base. The mean and proportionate location of each landmark in coordinate system were plotted and measured with AutoCAD 2010 software. Normal diagrams were then constructed for both genders. To compare data between males and females, a Student's independent t-test was used.

RESULTS : All of the soft tissue landmarks displayed statistically significant gender differences, except for Nasion and Supramentale position ($p > 0.05$). The nose prominence, bilabial protrusion, and chin thickness were greater in males than females.

CONCLUSION : Our findings show the significant gender differences in soft tissue profile. Therefore, the construction of Vietnamese mesh diagram for each gender can possibly provide a valuable guide for the orthodontic diagnosis and treatment planning.

Key words : Cephalometric radiograph, Mesh diagram, natural head position

E-2 Cephalic Index among Children of 6-8 Year of Age with Low Body Mass Index in Bandung City, Indonesia

E Rachmawati¹, R Saptarini P², I Gunawan² and Hilamanda²

¹ Department of Oral Biology, Faculty of Dentistry, Padjadjaran University, Bandung, Indonesia

² Department of Pediatric Dentistry Faculty of Dentistry, Padjadjaran University, Bandung, Indonesia

E-Mail: emma.rachmawati@fkg.unpad.ac.id

BACKGROUND : The cephalic index (CI) is calculated by measuring two fetal biometric parameters which are the occipitofrontal diameter (OFD) and the biparietal diameter (BPD). This index may gain through determination the ratio of BPD multiplied by 100 and divided by OFD. Cephalic index has tight correlation with growth and development which might be measurable by determining BMI.

OBJECTIVE : the aim of this study is to correlate the BMI and cephalic index among children of 6-8 year of age from several elementary school in Bandung City.

MATERIAL AND METHOD : This research was a cross sectional by using consecutive sample. The research's subjects were 42 students of elementary school in

Bandung City measured their body weight and height for establishing their BMI, subsequently the diameter of occipitofrontal and biparietal were assessed with a view to determines their cephalic index. Correlation analyses were used to assess any significant association between BMI and CI.

RESULT : Research's result shows that there is a negative correlation ($r = -.334$) with $p\text{-value}=0,0153807$ which significantly exhibits a correlation of 11,14%.

CONCLUSION : The research can be concluded that the BMI does not show any significant influence positively on the cephalic index.

Key words : Cephalic index, Body mass index

E-3 Malocclusion in 7-12 Year Children with Abnormal Swallowing Pattern

RS Primarti¹, IS Sasmita¹, E Riyanti¹, I Rahmat², Y Zenab² and E Rachmawati³

¹ Pedodontic Departement, Faculty of Dentistry, University Padjadjan, Bandung, Indonesia

² Ortodontic Departement, Faculty of Dentistry, University Padjadjan, Bandung, Indonesia

³ Oral Biology Departement, Faculty of Dentistry, University Padjadjan, Bandung, Indonesia

BACKGROUND : Malocclusion is developmental problem that started early in life seems to depend strongly on the influences of deviations from normal patterns of oral function, such as abnormal swallowing pattern.

OBJECTIVE : The aim of the study is to describe type of malocclusion in children between ages 7-12 that has abnormal swallowing pattern.

MATERIAL AND METHOD : The research was descriptive with survey technique. Population are elementary school students in Bandung city, West Java, Indonesia. According to criteria 512 children selected and 124 of them have abnormal swallowing pattern, then malocclusion checked by clinical examination based on Angle classification and Proffit-Ackerman classification.

RESULT : 103 children (83.06%) have class I Angle molar relationship, 16 children (12.90%) has class II Angle, and 5 children (4.03%) has class III Angle. Meanwhile in Proffit-Ackermann classification, 23 children (27.38%) observed has increased overjet ($>3\text{mm}$), 19 children (22.62%) have anterior crossbite, 12 children (14.29%) edge to edge, 4 children (4.76%) have posterior crossbite, 2 children (2.38%) have open bite, and 24 children (28.57%) have deep bite. Total 84 of 124 (67.74%) children with abnormal swallowing pattern have malocclusion.

CONCLUSION : abnormal swallowing pattern may contribute to develop malocclusion in children.

Key words : malocclusion, abnormal swallowing pattern, oral function.

E-4 Digital Tracing on Mandibular Landmark Using Lateral Cephalogram for Chronological Age Prediction

Astika Swastirani¹, Mieke Sylvia MARS² and Daniel Harjono Utomo³

¹ Department of Oral Medicine, Faculty of Dentistry Universitas Brawijaya, Malang

² Department of Forensic Odontology, Faculty of Dentistry Airlangga University, Surabaya

³ Department of Forensic Odontology, Faculty of Dentistry Airlangga University, Surabaya

BACKGROUND : Mandibular morphological changes associated with the size and remodeling during growth is a strong indicator of chronological age prediction. These changes can be observed with lateral cephalogram.

OBJECTIVE : The aims of this study to determine, measure and compare various mandibular landmarks in lateral cephalogram for chronological age prediction.

MATERIALS & METHODS : Samples consisted of 100 medical records and 100 lateral cephalograms digital belongs to 50 males and 50 females of Airlangga University hospital of dentistry. Digital tracing on mandibular landmark to determine and measured the Condylion-Gonion (Co-Go) line, Gonion-Gnathion (Go-Gn) line and Condylion-Gnathion (Co-Gn) lines on the digital lateral cephalogram using Autocad 2010 program. The three line variables were entered to a formula from Rai et al methode to calculate chronological age prediction. Data

was analyzed by pair t-test.

RESULT : In male, p-value of the Co-Go line variable, Go-Gn line variable and Co-Gn lines was 0.000 ($p < 0.05$). In female, p-value 0.000 for Co-Go lines variable, p-value 0,040 for Co-Gn lines variable and p-value 0.493 for Go-Gn line variable.

CONCLUSION : In female we can use the Go-Gn lines for chronological age prediction. In male we can not use three line variables for chronological age prediction. So that the formula that adopted from Rai et al methode is usefull to predict chronological age in female using Go-Gn length, but this formula with three line variables not suitable in male. Its better in different population used different formula.

Key words : Chronological Age Prediction, Mandibular Landmark, Lateral Cephalogram

E-5 Cervical Vertebrae Maturity Stage as Assessment of Growth Spurt Prediction to Determine Mandibular Length and Chronological Age

Ariyati Retno Pratiwi¹, Astika Swastirani² and Sari Kurniawati³

¹ Department of Oral Biology, Faculty of Dentistry Universitas Brawijaya, Malang

² Department of Oral Medicine, Faculty of Dentistry Universitas Brawijaya, Malang

³ Department of Orthodontics, Faculty of Dentistry Universitas Brawijaya, Malang

BACKGROUND : Growth stages can be identified by chronological age, sexual maturation characteristics, dental development, bone maturation, and skeletal development. However chronological age is not sufficient for the assessment and prediction skeletal maturation, which is the most important indicator of mandibular growth. Cervical vertebrae have been proposed as a method of determining biologic maturity. Cervical vertebrae maturation method shown to be effective and clinically reliable for the appraisal of mandibular skeletal maturation in growing children.

OBJECTIVE : The purpose of this study is to assess cervical vertebrae maturity stage for determine mandibular length and chronological age of growth spurt.

MATERIALS & METHODS : Cephalometric and panoramic radiograph taken anually from 8 to 20 years old in order to orthodontics diagnose. The cervical vertebrae maturation stage (CVMS) was determined on lateral cephalograms based on a system described by Baccetti et

al, but mandibular length were measured from Condylion to Gnation (Co-Gn) based on Rai et al. The results were statistically analyzed by the Kruskal-Wallis test in order to found the difference between variables.

RESULTS : Based on Kruskall Wallis test showed that $p < 0,005$, suggesting that there was significant differences between mandibular length and chronological age based on cervical vertebrae maturity interpretation.

CONCLUSION : Interpreting cervical vertebrae maturity stage is helpful at mandibular length and chronological age determinations. The morphometric analysis of cervical vertebrae using digital orthopantomogram serves as an important and valuable aid for determine mandibular length and chronological age prediction although social and environmental factor does influence the development and structure of mandible.

Key words : Cervical Vertebrae Maturity Stage, Growth Spurt, Mandibular Length, Chronological Age

E-6 Measurements of Bone Density on Panoramic Radiographs with Angle's Malocclusion Classification of Patients Aged 13-30 in Padjadjaran University Dental Hospital

S Belly, S Suhardjo and L Epsilawati

Dental Radiology Department, Faculty of Dentistry, Universitas Padjadjaran, Bandung, Indonesia

BACKGROUND : Bone density is known as the amount of mineral in bone tissue or bone mineral density, it follows the concept of mass of mineral per volume of bone. Assessment of jaw bone density may be considered useful and necessary in planning of implant, therapeutic evaluation and orthodontic and orthognathic treatments for malocclusion patients.

OBJECTIVE : The purpose of this research is to determine and compare the results of the measurement of jaw bone density on malocclusion patients aged 13-3- years old by using panoramic radiographs.

MATERIAL AND METHOD : This research is done by using Image J software with 40x40 pixels intensity on digital panoramic radiographs. The sample of 62 patients of Angle's Class I malocclusion, 56 patients of Class II malocclusion, and 52 patients of Class III

malocclusion were obtained from Dental Hospital, Padjadjaran University Bandung are collected to be analyzed by using descriptive statistics.

RESULT : The mean trabecular percentage is 25.336% for male and 18.726% for female Class I malocclusion patients, 24.477% for male and 16.804 for female Class II malocclusion patients, 24.364% for male and 15.911% of female Class II malocclusion patients.

CONCLUSION : From the results of the study, it can be concluded that individual with Angle's Class I malocclusion male patients indicates the highest bone density.

Key words : Bone density, Malocclusion, Panoramic radiographs, Trabecular percentage

E-7 Effect of Biostimulation Irradiation of Low Intensity Laser Therapy on the Orthodontic Accelerate of Male Central Incisors *Cavia Porcellus*

Ida Bagus Narmada¹

Department of Orthodontic, Faculty of Dental Medicine, Universitas Airlangga, Surabaya, Indonesia

BACKGROUND : The goal of the orthodontic treatment to align the tooth position into good dental arch, thus achieve efficient masticatory function, dento-facial esthetic and harmony. Orthodontic treatment was needed 2-3 years to be completed. Long duration of orthodontic treatment could increase gingivitis, tooth resorption and dental caries risk. Low Intensity Laser Therapy (LILT) as adjuvant therapy on orthodontic treatment was done to accelerate tooth movement.

AIMS : to know biostimulation irradiation of LILT as adjuvant therapy on orthodontic treatment in cellular and molecular mechanism to accelerate tooth movement.

MATERIALS AND METHOD : an analytical experimental research with post-test only randomized control group design. The sample was consisted 24. Animal model was male marmots (*Cavia Porcellus*), 300-500g, 3-4 month old. The sample was divided into 3 groups (group 1: control, group 2: orthodontic treatment, group 3: orthodontic treatment with LILT). Biostimulation irradiation of LILT was performed on mesial-distal, labial, and palatal of first incisive dextra and sinistra, 3 minutes on every site

with 4 Joule/cm² dose everyday. Animal models were terminated after 2 weeks then Immunohistochemistry (IHC) was performed to examine MMP-8, TGFβ and osteocalcin. Data was analyzed by One Way Anova, student t test and LSD for parametric data, Kruskal Wallis and Mann Whitney for non-parametric data with p<0.05.

RESULT : MMP-8 expression significantly different between group p = 0,001* (p<0.05) on tension and pressure side. MMP-8 expression was decrease on group 3. TGFβ expression were significantly different p = 0,047 (p<0.05) on the tension side but not significantly on the pressure side p = 0,154 (p>0.05) between group. Osteocalcin expression were significantly different p = 0,034* (p<0.05) on the tension side but not significantly on the pressure side p = 1,194 (p>0.05) between group.

CONCLUSION : Biostimulation irradiation of LILT on the orthodontic tooth movement decrease MMP-8 expression and increase TGFβ and osteocalcin expression.

Key words : Accelerate orthodontic movement, Low Intensity Laser Therapy, osteocalcin, MMP-8, TGFβ.

E-8 Assessment of Sinus Maxillaris Wall Morfotmetri between Male and Female Using Panoramic Radiograph

Azhari¹, L Epsilawati¹ and L Wei Ken²

¹ Departement of Dentomaxillofacial Radiology, Faculty of Dentistry, University Padjadjaran, Bandung, Indonesia

² Post Graduate Students, Faculty of Dentistry, University Padjadjaran., Bandung, Indonesia

BACKGROUND : The maxillary sinus is known as the Paranasal sinus, the largest and the first developing. Morphometric in the maxillary sinus is a tool for identification. Some studies of the disaster proved that the zygomatic bone and maxillary sinus remained intact even though the skull and other bones were damaged.

OBJECTIVE : The purpose of this research is to know maxillary sinus morphometric by assessing difference of height and width of maxillary sinus wall between male and female in panoramic photo.

MATERIAL AND METHOD : Research method is descriptive analytic that compares and contrasts with respect to variables in a situation to the sample of population which meet the demand of inclusion criteria. This research examines 50 panoramic radiographs which divided to 2

groups of sex and age of samples fixed at 20-40 years old.

RESULT : The results showed that the average height and width of maxillary and left maxillary sinus wall in men was higher than in women, statistically female compared to men had $26,41 \pm 4,41$ mm difference for right and $26,06 \pm 4,49$ mm to the left. The average sinus width in men was significantly greater than in women with a difference of $24,82 \pm 3,17$ mm for the right side and $24,64 \pm 2,85$ mm for the left side.

CONCLUSION : There is a difference in the height and width of the maxillary sinus wall between men and women, where the value for females is lower.

Key words : Maxillary sinus, gender, panoramic radiograph

E-9 Correlation between Bone Density and Mandibular Height in Sundaness Population Aged 5-17 Years in Sekeloa Bandung West Java Indonesia

Y Hedidjati¹, R Saptarini¹, L Epsilawati² and F Pramanik²

¹ Department of Pedodontic Dentistry, Faculty of Dentistry, Padjadajaran University

² Department of Dentomaxillofacial Radiology, Faculty of Dentistry, Padjadjaran University, Bandung, Indonesia

BACKGROUND : WHO explains that children are classified into ages 5-17 years, and they are the age group of growth. Children have very specific growth patterns; this is because the process of growing and developing is following. Bone density and mandibular bone height is one of the benchmarks that growth goes according to increasing age.

OBJECTIVE : aims to see the alignment between increased density and mandibular bone height against age and to see correlations between density and mandibular bone height.

MATERIALS AND METHODS : This research is a correlative analytic study, where the selected population is all panoramic radiographs aged 5-17 years in Sekeloa Dental Hospital Bandung, west java, Indonesia, from 2015-2017 years; in which the selected sample meets the criteria. The data are then grouped into three groups and from

the selection then collected 50 samples for each group. Each radiograph then measured the value of bone density and measured the height of the mandibular bone. The data is then processed by statistik to find the colletion.

RESULT : The result is seen that in the first age group has the lowest bone density compared to the other two groups. Similarly, the height of the mandible shows the same value. The relationship between height and bone density has a close relationship where the level of confidence given is about 90%.

CONCLUSION : The conclusion can be drawn that bone density and mandibular elevation increases with age, in both showing the corellation

Key words : Group age 5-17 years, bone density, mandibular height.

E-10 Measurement of Bone Density and Mandibular Height in Adult Sundaness Population in Bandung West Java Indonesia

H Polii¹ and L Epsilawati²

¹ Department of Dentomaxillofacial Radiology, Faculty of Dentistry, Maranatha University, Bandung, Indonesia

² Department of Dentomaxillofacial Radiology, Faculty of Dentistry, Padjadjaran University, Bandung, Indonesia

BACKGROUND : Adult age can be regarded as the peak age of all growth and to assess the level of maturity, one of the indicators is the quality of bone. In this study will be assessed bone quality through assessment of the density and height of the mandible.

OBJECTIVE : To assess the bone quality and and the aim of this reserch is to know abaot the density and mandibular bone height in the adolescent population of the sundaness race in Bandung.

MATERIALS AND METHODS : This research is a descrtion analytic study, where the selected population is all panoramic radiographs in adult (18-50 years), in Sekeloa Dental Hospital, from 2015-2017. The data are then grouped into three groups, and then collected 50 samples for each group. Each radiograph and then measured the value of bone density and the height of the

mandibular bone. The data is then processed by statistik to find the relationship between all this things.

RESULT : The results of this study show that the age of the first group shows the highest value in height, different with the density because the highest density value is in the second group. In the third group there was a decrease in the density value, but not in height of the mandible, there no significant change.

CONCLUSION : Based on the results of this study, it can be concluded that there is a correlation between age and bone density, and there no corellation between age and height of the mandible.

Key words : Adult Group (18-50 years), bone density, mandibular height.

E-11 Analysis of Bone Density in Malocclusion Patients Using ImageJ Software on Panoramic Radiograph

Pramanik F¹, Firman R¹, Epsilawati L¹ and Cheng L P²

¹ Dentomaxillofacial Radiology, Faculty of Dentistry, Padjadjaran University, Bandung, West Java, Indonesia

² Student in Faculty of Dentistry, Padjadjaran University, Bandung, West Java, Indonesia

BACKGROUD : Malocclusion can affect bone quality such as bone density. The pressure of chewing force that is channeled to the jaw bone will affect the density. Panoramic radiographs can be used to determine bone density.

OBJECTIVE : The purpose of this study was to determine the bone density of malocclusion patients viewed from panoramic radiographs.

METERIAL AND METHOD : In this study, ninety digital panoramic radiographs of female patients aged 13-30 years old with 30 radiographs representing each of the Angle's malocclusion classes (class I, class II, class III) were used. Bone density was measured by using ImageJ software with 20x20 pixels intensity by using a method

based on the mental index (MI).

RESULT : The results of this study indicate the mean bone density of female patients aged 13-30 years old with Angle's malocclusion of class I was 18.726% of cortical and 81.274% of marrow, class II was 16.804% of cortical and 83.196% of marrow, and class III was 15.911% of cortical and 84.089% of marrow.

CONCLUSION : The bone density of female patients aged 13-30 years old with Angle's class I malocclusion was higher than class II, and class II malocclusion has higher bone density than class III on panoramic radiograph.

Key words : Bone Density, Malocclusion, Panoramic, Radiographs, ImageJ Software

E-12 Morfometry Study on Mandible of Elderly Women Population in Sekeloa Bandung West Java Indonesia

L Epsilawati¹, F Pramanik¹, R N Firman¹, T Seniani² and I Sufiani²

¹ Departement of Dentomaxillofacial Radiology, Faculty of Dentistry, University Padjadjaran, Bandung, Indonesia

² Departemen of Oral Medicine, Faculty of Dentistry, University Padjadjaran., Bandung, Indonesia

BACKGROUND : In elderly person or age around age 55-65 years there are changes in the body. At this time the changes must be occur in bone morphometric, and the mandible is included. The changes mostly seen in women patients.

OBJECTIVE : The aim of this study is to look at the value of mandibular morphometric in elderly female patients, by looking at the correlation between length and width of the ramus and mandibular corpus.

MATERIAL AND METHOD : This research is a correlative analytic research, where the variable is the length and width of the ramus and the length and width of the corpus on the mandible. The population of the study was all panoramic radiograph data of elderly female patients (55-65 years old) with 50 samples. In addition, the control age group is all the panoramic radiograph data

for patients aged 26-54 years.

RESULT : The result is seen that in old age there is significant correlation on the length and width of ramus or corpus in mandibular, also there is significant correlation between corpus and ramus length. This differs in the control group where the results show no correlation until the correlation is low on all measures.

CONCLUSION : The conclusion that can be seen from this research is that there is a change of value between morphometric in old age and control group. In addition there is also a difference in old age there is a tendency reduction of bone morphology balanced between the lengths of ramus to the corpus in the mandible.

Key words : Elderly Patient, Ramus Mandible, Corpus Mandible, Mandible Morphometric

E-13 Adjunctive Buccal and Palatal Corticotomy for Adult Maxillary Expansion in a Sheep Model

Le Huy Thuc My

Faculty of Dentistry, Hong Bang International University

BACKGROUND : Until now, clinicians still face with a dilemma when treating maxillary deficiency for adults. Both non-surgical and surgical approach posed some advantages and disadvantages, therefore the protocol for treatment maxillary deficiencies in adults is still controversial.

OBJECTIVES : The purpose of this study was to explore the usefulness of adjunctive buccal and palatal corticotomy for adult maxillary expansion in a sheep model using cone-beam computed tomography (CBCT).

MATERIALS & METHODS : Twelve adult sheep were randomly divided into two groups (each n=6): a control group, where no treatment was administered, and a treatment group, where buccal and palatal corticotomy-assisted maxillary expansion was performed. CBCT scans were taken before (T1) and after (T2) treatment. Differences in all transverse dental and alveolar dimensions, alveolar width at crest level, hard palate level, horizontal bone loss, interdental cusp width and inter-root apex were assessed using Wilcoxon signed-rank and Mann-Whitney U-tests. Kruskal-Wallis tests and pairwise comparisons were used to detect the significance of

differences among the inter-premolar and inter-molar widths ($p < 0.05$).

RESULTS : CBCT data revealed significant changes in all transverse dental and alveolar dimensions. The mean interpremolar alveolar width showed an increase of 2.29 to 3.62 mm at the hard palate level, 3.89 to 4.38 mm at the alveolar crest level, and 9.17 to 10.42 mm at the buccal cusp level. Dental changes in the vertical dimension were not significant.

CONCLUSION : Our findings based on an adult animal model suggest that adjunctive buccal and palatal corticotomy can allow for both skeletal and dental expansion, with the amount of dental expansion exceeding that of skeletal expansion at the alveolar crest and hard palate levels by two and three folds, respectively. Therefore, this treatment modality is potential to enhance the outcomes of maxillary expansion in adults.

Key words : corticotomy, maxillary expansion, cone beam computed tomography, palatal expander, sheep model

E-14 Radiographic Bone Analysis of Alveolar Bone Assessment on Periapical Lesion: A Systematic Review

Yurika Ambar Lita¹, Diani Prisinda² and Yuti Malinda³

¹ Lecturer in Oral Maxillofacial Radiology Department, Faculty of Dentistry, Universitas Padjadjaran, Bandung, West Java, Indonesia.

² Lecturer in Conservative Dentistry Department, Faculty of Dentistry, Universitas Padjadjaran, Bandung, West Java, Indonesia.

³ Lecturer in Oral Microbiology Department, Faculty of Dentistry, Universitas Padjadjaran, Bandung, West Java, Indonesia.

Correspondent: yurika.lita@fkg.unpad.ac.id

BACKGROUND : Diagnosis can be achieved by subjective, objective examination and radiographic examination. Radiographic features can describe the detailed anatomy of teeth and bones that can help in diagnosing the disease and for the evaluation of periapical lesions. Cone Beam Computed Tomography (CBCT) 3D and periapical radiographic examination of alveolar bone can analyze characteristic periapical lesion which influence treatment planning and outcomes. This systematic review assessed methods of analysis bone density alveolar bone on periapical lesion using CBCT 3D and periapical radiograph.

OBJECTIVE : To summarize the results of most recently cited methods for analysis bone density alveolar bone on

periapical lesion using radiographic examination

MATERIALS & METHODS : Article were searched which objective to evaluate bone density using alveolar bone on chronic abscess periapical using CBCT 3D and periapical radiographic examination. A literature search from several databases was conducted from 2000 to 2017 with previously defined inclusion criteria

CONCLUSION : Based on the findings of this review, it could be possible to suggest the 3D CBCT has been found to be more sensitive than periapical radiographs in detecting periapical lesion treatment outcomes.

Key words : Periapical Lesion, Bone density, CBCT 3D, Periapical Radiograph

E-15 Evaluation of Periapical Photo Errors Made by Faculty of Dentistry University Prof Dr. Moestopo (B) Pre-clinical Students in 2015

D Indriastuti

Dentomaxillofacial Radiology Departement, Faculty of Dentistry, Moestopo Beragama University, Jakarta, Indonesia

E-Mail: diah.manung@gmail.com

BACKGROUD : Student pre clinic faculty of Dentistry University Prof. Dr. Moestopo (B) performs periapical photographs and interpretations. but the periapical photos made by the students are not all interpreted properly.

OBJECTIVE : To see whether there is a difference in ability of pre-clinical student year of 2015 at faculty of Dentistry University Prof. Dr. Moestopo (B) in performing periapical photographs and interpretations

MATERIAL AND METHODS : Descriptive method, used secondary data, The sample size in this research is 638 conventional periapical photo with bisection/short cone technique technique and using manual film processing.

This research is done by the pre-clinical student year 2015, and a dental radiology specialist as a appraiser.

RESULTS : 67% had an error and 33% presented good results. The error is classified as technique (5.95%) and film process (60.61%). The errors that often occur are elongation (26.96%), cone cutting (17.5%), wrong film position (9.1%). The success of periapical photos made by male students (45%) while female students (30.1%)

CONCLUSION : with a 67% error result implying on the use of x-ray device and dental radiology technology

Key words : Dental Radiography, Quality control

E-16 Cone Beam Computed Tomography Imaging of Temporomandibular Joints of Temporomandibular Disorders Patients at Ho Chi Minh Faculty of Odonto-Stomatology

Vo Thi Le Nguyen¹ and Nguyen Thi Kim Anh²

¹ Faculty of Odonto-Stomatology, Hong Bang International University

² Faculty of Odonto-Stomatology, Medicine and Pharmacy University at Ho Chi Minh City

OBJECTIVE : To define the morphology and structure of temporomandibular joints in patients with temporomandibular disorder (TMDs).

METHOD : This cross-sectional study was conducted on a sample of 33 patients (66 temporomandibular joints) treated at Ho Chi Minh Faculty of Odonto-Stomatology. The participants were interviewed and examined to detect the signs and symptoms of TMDs. Cone beam computed tomography (CBCT) of temporomandibular joints were taken. The morphological features of the structures of temporomandibular joints were defined on CBCT images and the correlation between clinical features (pain and joint noise) and CBCT findings (joint spaces, condyle-fossa relationship in maximal intercuspal position, and bone changes) investigated.

RESULTS : The mean values of anterior joint space, superi-

or joint space and posterior joint space were 2.1 ± 0.6 (mm); 2.9 ± 1.0 (mm); and 2.3 ± 1.1 (mm) respectively. The prevalences of abnormal surface of the condylar and glenoid fossa bone were 51.2% and 18.2% respectively. There was significant correlation between abnormal surface of condylar bone and pain (palpation of the temporomandibular joint areas) with OR = 2.6 and jaw movements with OR = 1.6 ($p < 0.05$).

CONCLUSION : The condyle positions were approximately observed at both anterior, centric, and posterior positions in the glenoid fossa. Abnormal morphologies and structures were more often observed in the condyle than that in the glenoid fossa.

Key words : Cone beam computed tomography, CBCT, Temporomandibular joint, Temporomandibular disorders (TMDs).

F-1 Centering Ability of Two Rotary Instruments –WaveOne and Protaper Universal– in Simulated Canal Shaping

Le Anh Hong¹ and Pham Van Khoa²

¹ Faculty of Odonto-Stomatology, Hong Bang International University

² Faculty of Odonto-Stomatology, Medicine and Pharmacy University at Ho Chi Minh City

BACKGROUND : Root canal preparation is essential for success in endodontic therapy. The aim of the process is to clean the canal and establish a continuous tapered shape while maintaining the original path of the canal, this means centering ability.

OBJECTIVES : this study was designed to compare two rotary instruments: WaveOne and ProTaper Universal in regard to centering ability when shaping simulated canals.

MATERIALS AND METHODS : this *in vitro* study used 20 curved L-shaped simulated canals in plastic blocks (EndoTraining Bloc-L, Dentsply-Maillefer, Ballaigues, Switzerland) which were standardized for length, taper and curvature. Two groups of 10 specimens each (group 1-WaveOne, group 2-Protaper Universal rotary system)

were prepared by the same experienced operator according to the manufacturer's instruction. Pre- and post-instrumentation digital images were superimposed to analyze centering ability. Data was statistically analyzed using the Independent-samples T test and Mann-Whitney test.

RESULTS : No statistically significant difference was observed in terms of transportation ($P > 0.05$).

CONCLUSION : Within the limits of this *in vitro* study, it was found that both instruments had the same centering ability when shaping simulated canals.

Key words : cleaning and shaping root canals, endodontic therapy, WaveOne and ProTaper Universal, rotary instruments, centering ability, transportation.

F-2 Comparison of Physical Properties of the Silicone Rubber for Border Molding Model Combined with Silicone Oil on Different Ratio

Suwadee Aerarunchot¹, Korakod Pipisjan², Tanawat Ponggun², Chaivut Prunkngarmpun³, Watcharin Hovichitr³ and Rajda Noisombut⁴

¹ Assistant Professor, Department of Prosthodontics, Faculty of Dentistry, Khon Kaen University.

² 6th year dental student, Faculty of Dentistry, Khon Kaen university.

³ Lecturer, Department of Prosthodontics, Faculty of Dentistry, Khon Kaen University.

⁴ Lecturer, Department of Dental Public Health, Faculty of Dentistry, Khon Kaen University.

BACKGROUND : The instruction media that used in a step of border molding in complete denture laboratory are the study casts. The students cannot practice skills like muscle molding in the patients. Therefore the instruction media consists of a man silicone model, stimulates details of edentulous areas were created. But the elasticity of silicone rubber is more stiff than natural tissue so it cannot represent the same tactile sense as in patient.

OBJECTIVES : This experimental study was designed to compare the physical properties of the silicone rubber combined with silicone oil on various ratio

MATERIALS & METHODS : Silicone oil on various ratio were separated into six groups: a control group is the silicone rubber that not combined with silicone oil and experimental group composed of silicone rubber that combined with silicone oil on 5, 10, 15, 20, 25% by volume respectively and each group contained tensubjects. From the ISO no. 37 regulations, Universal testing machine (LLOYD LR30K, UK) was used to pull the specimens until torn. Tensile strength,

percent elongation at break and modulus of elasticity was selected to explain the physical properties of materials.

RESULTS : The results revealed that tensile strength have sequentially decrease from silicone rubber that combined with silicone oil on 5, 10, 15, 20, 25%. Percent elongation at break of all experimental groups are higher than the control group. Modulus of elasticity of the control groups is the highest, sequentially decrease from silicone rubber that combined with silicone oil on 5, 10, 15, 20% and the lowest is the group of 25%.

CONCLUSION : Conclusion, the group of silicone rubber that combined with silicone oil on 25% will be proper to create the simulate model for practicing border 23 molding of individual tray in complete denture, the laboratory course, because this group has low tensile strength, low modulus of elasticity but has the highest percent elongation at break.

Key words : silicone rubber/silicone oil/tensile strength/percent elongation at break/modulus of elasticity

F-3 Comparison Setting Time, Cccuracy and Surface Hardness of Type III Gypsum Product Mixing with Distilled Water, 2% Slurry Water and Slurry Mixture from the Model Trimmer

Chaivut Prunkngarmpan², Thanarak chaypradab¹, Supon kamkaew¹, Suttipan Tumdee¹ and Wilawan Weraarchakul³

¹ Dental student, Faculty of Dentistry, Khon Kaen University, Thailand

² Instructor, Faculty of Dentistry, Khon Kaen University, Thailand

³ Associated Professor, Faculty of Dentistry, Khon Kaen University, Thailand

BACKGROUND : Gypsum mixed with 2% slurry water was commonly used for reduced setting time. However, the daily life, slurry mixture from the model trimmer was used instead of 2% well prepared with doub of its property.

OBJECTIVES : The objective of this study was to compare setting time, accuracy, and surface hardness of type III gypsum product mixed with distilled water, 2% slurry water and slurry mixture from the model trimmer.

MATERIALS & METHODS : Type III gypsum samples were mixed with distilled water, 2% slurry water and slurry mixture from the model trimmer. Each group were prepared with 20 pieces per solution group. and tested setting time with Modified Vicat apparatus, tested accuracy with Measuring Microscope, tested surface hardness with Vickers Hardness.

RESULTS : Study of setting time showed that each group was statistically significantly different (p-value<0.001). The fastest setting time was gypsum product mixed with slurry mixture from the model trimmer, followed by the second was 2% slurry water and the final was distilled water. Study of accuracy showed that each group was not statistically significantly different (p-value>0.05). Study of surface hardness showed that each group was statistically significantly different (p-value<0.001).

CONCLUSION : The gypsum product mixed with slurry mixture from the model trimmer was fastest setting, hardest on surface and similar in accuracy when compared with gypsum product mixed with 2% slurry water and distilled water.

Key words : setting time/accuracy/surface hardness/gypsum/2% slurry water/slurry mixture from the model trimmer

F-4 The Effect of Disinfectant Immersion on the Alginate Impression Material Plus Cassava Starch for Dimensional Stability

M Febriani¹ and L Epsilawati²

¹ Dental Material Departement, Faculty of Dentistry, Moestopo Beragama University, South Jakarta, Indonesia

² Dentomaxillofacial Radiology Departement, Faculty of Dentistry, University Padjadjaran, Bandung, Indonesia

BACKGROUND : Infection control is an imperative issue in dentistry. Infection can be transferred by saliva, plaque, blood and all of which may carry pathogenic organisms, included impressions material. The one part to limited the infection we can use the disinfectant included used in the immersion and spraying material. Sodium chloride, iodophor, phenol, gutaraldehyde and chlor hexidine usually used for the disinfecting procedure. Disinfectant can be influenced of the surface quality, dimensional stability, wetting, and reproduction detail of gypsum cast.

OBJECTIVE : For analyzed the effect of disinfectant immersions on the alginate impression material plus cassava starch for dimensional stability.

MATERIAL AND METHODS : In this research, when the alginate impression material plus cassava starch specimen has been setting time, we could be tested about dimensional stability before and after 10 minute immersion with iodine, chlorhexidine, sodium

hypochloride, and alcohol.

RESULT : Dimensional stability test results of alginate impression material plus cassava starch before and after 10 minute immersion with iodine 3.700 mm and 3.8612 mm, chlorhexidine 3.7680 mm and 3.6780 mm, sodium hypochloride 3.7340 mm and 3.6380 mm, and alcohol 3.7880 mm and 3.7400 mm. The results is still in ANSI/ADA no 18/92, when the specimen immersion on the chlorhexidine, sodium hypochloride, and alcohol.

CONCLUSION : The alginate impression material plus cassava starch can be immersions with chorhexidine sodium hypochloride and alcohol. The iodine can be made the alginate impression material plus cassava starch imbibition process. We can use disinfectant to protect microorganism pathogen and cross infection for alginate impression material plus cassava starch.

Key words : Disinfectant, alginate, cassava starch

F-5 The Effect of Hand Mixing, Invented Semiautomatic Machine and Automatic Centrifuge Machine on Air Bubble Formation in Alginate Impression Material.

P. Hathaidechadussadee¹, P. Uasuwan¹, S. Namchaitaharn¹ and S. Aerarunchot²

¹ Dental student, Faculty of Dentistry, Khon Kaen University, 40002, Thailand.

² Department of Prosthodontics, Faculty of Dentistry, Khon Kaen University, 40002, Thailand.

BACKGROUND : There were four mixing methods of alginate; Hand mixing, Semiautomatic machine, Centrifuge machine and Vacuum machine. From the study found alginate from machine could improved their mechanical properties and had air bubble formation less than hand mixing. But centrifuge machine caused the heat to alginate which effected their working time and the material often left in mixing bowl. From above, we decided to invent the semiautomatic machine because this machine could improve that weakness.

OBJECTIVES : This study aimed to determine the effect of three mixing methods on air bubble formation in alginate by the term of percent area and number of air bubble.

MATERIALS & METHODS : A total of forty-five samples was divided into three groups by mixing method. The samples were prepared by the specify ratio of the manufacturer. The mixing time of hand mixing and invented semiautomatic machine was 30 seconds, and for the centrifuge machine was 12 seconds. We mixed and loaded each sample to the cylinder mold. Then stored in a set

35-degree Celsius water bath for 3 minutes. We took off and cut a sample into 2-piece by a sharp cutter without a tear-off surface. So, we took pictures of each surface. Then we counted and calculated air bubble by NIS-Element BR program, and analyzed by Kruskal Wallis and Mann Whitney-U test.

RESULTS : In term of percent area of air bubble formation, Kruskal Wallis and Mann Whitney-U test showed statically significant difference between each group (P-value < 0.05). In part of quantity, descriptive statistic showed mean of air bubble formation from hand mixing, invented semiautomatic machine and centrifugemachine: 141.55, 78.20 and 15.58 bubbles/surface area.

CONCLUSION : The invented semiautomatic machine had percent area of air bubble formation and number of air bubble less than hand mixing but more than the group of centrifuge machine.

Key words : Semi-automatic machine/Alginate mixer/air bubble formation/Impression material/Alginate

F-6 Synthesis and Characterisation of Nanocomposite with Different Filler Ratio Ca-PSZ, Silika Nanorod, and Metakaolin For Application of Learning Purpose Artificial Tooth

Vania Christiani

Maranatha Christian University of Dentistry

BACKGROUND : Tooth preparation to get a good restoration is an important and fundamental procedures that need to practice in operative dentistry. It is expected that learning purpose artificial tooth with better mechanical properties can be made locally.

OBJECTIVES : The main object of this research is to synthesize particles of calcium-partially stabilized zirconia (Ca-PSZ), silica nanorod, and metakaolin via sol-gel technique to obtain the nano-sized filler

MATERIALS & METHODS : This experimental laboratory study divided 15 specimens into 3 groups, ie nanocomposite with Ca-PSZ, silica, and metakaolin filler ratio 60:20:20 (group I), 50:20:30 (group II), and 40:20:40 (group III). Statistical analysis method that used in this experiment was one-way ANOVA followed by Tukey LSD.

RESULTS : The result of hardness test of the specimens in group I is 50.7 VHN on top surface and 46.6 VHN on the bottom surface, group II is 39.9 VHN on top surface and

20.1 VHN on the bottom surface, group III is 46.8 VHN on top surface and 15.8 VHN on the bottom surface. The highest hardness number was obtained by the first group. Those numbers exceeded the hardness number of learning-purpose resin artificial tooth, which is 39.8 VHN and was close to dentin hardness, which is 60 VHN. Hardness test results showed an increase of hardness that directly proportional to the increase of zirconia in the specimens.

CONCLUSION : The conclusion of this study is Ca-PSZ, silica, and metakaolin based nanocomposite with hardness degradation can be synthesized via sol-gel technique and its microstructure and mechanical properties is suitable for learning purpose artificial tooth.

Key words : synthesis, nanocomposite, calcium-partially stabilized zirconia, learning purpose artificial tooth, sol-gel techniques

F-7 Effect of Elastin-like Polypeptides Incorporation on the Physical Properties of Calcium Phosphate Cement

Sun-Young Kim

DDS, PhD, Associate Professor, Department of Conservative Dentistry, Seoul National University Dental School

BACKGROUND : Calcium phosphate cements (CPCs) are synthetic bioactive cements that have been widely used as hard tissue substitutes, but there are some critical drawbacks such as poor mechanical properties and poor anti-washout behavior.

OBJECTIVES : The aim of this study is to investigated the effect of genetically engineered elastin-like polypeptides (ELPs) on the physical properties of CPCs.

MATERIALS & METHODS : Two types of ELPs were genetically engineered and purified. 10 wt% of ELP solution was used to mix with CPCs, resulting in CPC-ELP composites. The compressive strength, microhardness, anti-wash out property, and setting time were measured and compared with control group which is CPC mixed with deionized water. Cell attachment and cell viability were observed. SEM and FT-IR were used to analyzed the microstructure.

RESULTS : The incorporation of ELPs increased the microhardness, compressive strength and washout resistance. The biocompatibility of ELP/CPC composites is also comparable to CPC material itself. The CPC-ELP composites showed much denser surface with less pores in SEM observation. On the other hand, supplementing CPC with ELPs functionalized with octagulatamate as a hydroxyapatite binding peptide increased the setting time of the cement.

CONCLUSION : The incorporation of ELPs increased the physical properties of CPC. Efforts might be required to lessen the prolonged setting time of ELP-incorporated CPC for clinical application.

Key words : Calcium Phosphate Cement, Elastin-like Polypeptide, Compressive strength, Microhardness, Wash-out resistance.

F-8 Catechol-based Dental Primer

Jin-Soo Ahn, Young-Seok Park and Ho-Beom Kwon

School of Dentistry and Dental Research Institute, Seoul National University, Seoul, 03080, Korea

BACKGROUND : Marine mussels attach by way of thread-like tethers to rocks on wind- and wave-swept seashores where wave velocities can reach 25 m/s. Plaque of mussel can make strong wet adhesion by using unique adhesive proteins called mussel foot proteins (mfps). It contains large amount of lysine, DOPA and hydroxyproline. It was revealed that DOPA (Catechol) is key factor of adhesion in mfps.

OBJECTIVES : Our goal is to translate catechol adhesion system of mussel to dental adhesion system by synthesizing surface primer using catechol and methacrylate functional groups. And we analyze and evaluate experimental primers with various analyzing tools to clarify performances of the primers.

MATERIALS & METHODS : We synthesized 4 kinds of surface primers inspired by mussel foot proteins. Surface adsorption characteristics were observed with Atomic Force Microscope (AFM) and evaluated by QCM-D studies. Also computational modeling confirmed molecular behavior of synthesized primers. All computational analyses were performed using the last 400 ns time interval of each simulation.

Adhesion energy were measured by using Surface Force Apparatus (SFA) with mica surface and light-activated dental resin. Shear bond tests were conducted on glass and tooth enamel surfaces with universal testing machine.

Silica fillers that were treated with conventional silane coupling agent and catechol-based primer were mixed into experimental dental resin to make dental composite resins. Compressive strength tests were performed to show physical properties of composite resins.

RESULTS : On silicate materials (e.g., mica and silica), the lap shear strength of cured PMA using P1 (oshear, max = 0.4 ± 0.1 and 2.0 ± 0.3 MPa, n = 10; the mean of maximum shear strength on mica and glass, respectively, \pm standard deviation, and the n is number of experiments), P2 (oshear, max = 0.4 ± 0.1 and 2.0 ± 0.3 MPa, n = 10) and

MDP primers (oshear, max = 0.5 ± 0.1 and 1.9 ± 0.3 MPa, n = 10) was similar to that of PMA cured with no primer (oshear, max = 0.4 ± 0.1 and 1.9 ± 0.4 MPa, n = 10) at all.

Indeed, all four values agreed within experimental uncertainty. By contrast, the use of the catecholic primers P3 (oshear, max = 0.8 ± 0.2 and 4.2 ± 0.7 MPa, n = 10), P4 (oshear, max = 0.9 ± 0.1 and 4.5 ± 0.5 MPa, n = 10) doubled the lap shear strength compared with the no-primer case.

In SFA study, compared with plain mica (with no primer), surfaces primed with P1 and P2 showed no increase in adhesion pressure (Pad), whereas P3 (Pad = 201.5 ± 50.2 kPa, n = 5) and P4 (Pad = 81.7 ± 18.5 kPa, n = 5) exhibited a ≈ 10 -fold and approximately fourfold increase in adhesion, respectively.

In compressive test, the silane-treated glass-filled PMA composite exhibited $\approx 50\%$ increase in elastic modulus as compared to the nofiller PMA sample; this enhancement is the rationale for adding fillers into PMA composites.

CONCLUSION : The catecholic surface priming mechanism of mussels was successfully translated to a synthetic system. The bioinspired primer forms a ≈ 1 nm thick self-assembled molecular layer within 30 s. The binding mechanism onto different mineral surfaces was revealed by MD simulations, in combination with AFM and QCM-D. Building on this fundamental understanding of molecular adsorption and adhesion of newly designed catecholic primers, we enhanced the adhesion performance of a PMA resin by up to an order of magnitude on mica, glass, silica, and tooth enamel. The strong and dynamic catecholic binding also led to significant toughness enhancement ($\approx 50\%$) of a highly rigid ($E \approx 3.5$ GPa) polymer resin composite, providing particular promise for use as a structural material, particularly for biomedical applications.

Key words : adhesion, dynamic bonding, mussels, primer, surfaces

F-9 Synthesis and Microstructure Analysis of Graphene Oxide for Dental Materials Applications

Angela Evelyne¹, Anastasia Alamanda Chakravitha², Stefani Kartika Putri², Tolistya Novitasari Abdullah², Idham Pribadi Mochammad² and Bambang Sunendar Purwasasmita³

¹ Dental Materials Department, Faculty of Dentistry, Maranatha Christian University, Bandung, Indonesia

² Faculty of Dentistry, Maranatha Christian University, Bandung, Indonesia

³ Physics Engineering, Advanced Material Processing Laboratory, Faculty of Industrial Technology, Institut Teknologi Bandung, Indonesia

BACKGROUND : Dental composite resin is one of the most commonly used restoration materials in dentistry that fulfills the needs of aesthetics and physical properties. The use of inorganic ceramic nanoparticle filler on dental composite system has provides many advantages. One of the substances that has possibility to enhance mechanical properties of resin composite material is graphene oxide. Graphene oxide is a derivative from graphene, allotrope of carbon. It has been found to increase mechanical properties such as tensile strength, hardness, wear resistance, durability, and fracture strength. Graphene oxide is also assumed to have antibacterial properties, yet is not toxic for human body.

OBJECTIVES : The objective of this study is to synthesis graphene oxide from graphite and characterized its microstructure through X-Ray Diffraction (XRD) and

Fourier Transform Infrared Spectrometer (FTIR).

MATERIALS & METHODS : Graphene oxide was synthesis from graphite using modified hummers method. XRD was selected to measure the crystal structure of graphene oxide. FTIR was used to certify the presence of oxygen containing functional groups of graphene oxide.

RESULTS : In XRD pattern, graphene oxide shows a characteristic peak at $2\theta = 11.49^\circ$ which shows main characteristic of graphene oxide. FTIR pattern shows the peak at 1068 cm^{-1} confirms the presence of C-O functional groups.

CONCLUSION : The XRD and FTIR Characterized that, graphene oxide have been formed using modified Hummers method.

Key words : Graphene oxide, nanocomposite, dental materials, XRD, FTIR

F-10 Incremental Technique on Bulk Fill Composite Resin to Reduce Microleakage in Deep Cavity

Maria Andisa Mayangsari¹, M. Mudjiono² and Nanik Zubaidah²

¹ Undergraduate student, Faculty of Dental Medicine Universitas Airlangga

² Lecturer, Department of Conservative Dentistry, Faculty of Dental Medicine, Universitas Airlangga

BACKGROUND : Composite resin remains as one of the most popular restorative material in dentistry. However, polymerization shrinkage is one major drawback of composite resin, especially methacrylate-based composite resin. Polymerization shrinkage can lead to microleakage and may affect the occurrence of secondary caries. In deep cavity, there are 3 major challenges to create a durable restoration: limited depth of cure, shrinkage, and manipulation of proximal contact to adjacent tooth. Incremental placement technique has been widely suggested as an attempt to minimize polymerization shrinkage. Meanwhile, development in dental material has brought us bulk fill composite resin that indicated for direct restoration up to 4 mm thickness with less polymerization shrinkage compared with conventional composites. The combination of incremental technique and bulk fill composite resin can be a time-saving option for restoration of deep cavities.

OBJECTIVE : This study aimed to investigate the microleakage difference between bulk and incremental technique on bulk fill composite resin.

MATERIALS & METHODS : Samples were 24 human pre-

molars and divided into two groups (group 1 and group 2). Cavity of 4 mm depth with 2 mm diameter was made on every sample. Group 1 used bulk technique composite resin placement (4 mm) and group 2 used the placement technique of incremental 2 layers (each 2 mm) horizontally. The entire samples were immersed in 0.3% methylene blue for 24 hours. Samples were cut in bucco-lingual direction and captured into images using digital microscope. Dye penetration was measured for each sample to semi-quantitatively determine the microleakage according to scoring method. Data were analyzed using Mann-Whitney Test.

RESULTS : There were significant differences between sample groups with p value 0.012 ($p < 0.05$ considered significant). In general, microleakage in incremental technique is smaller than bulk technique.

CONCLUSION : Incremental technique on bulk fill resin composite restoration successfully created less microleakage than bulk technique.

Key words : Bulk fill composite, polymerization shrinkage, incremental technique, bulk technique, microleakage

F-11 Flexural Strength of High Viscosity Bulk Fill Resin Composites

Kornkamon sukjit, Panithan Rujirasak and Subin Puasiri

Faculty of Dentistry, Khon Kaen University

BACKGROUND : Bulk fill resin composites were developed to expedite the restoration process by enabling increments up to 4 mm in thickness to be photo polymerized. However, it has been reported that most bulk fill materials demonstrated lower mechanical properties compared to conventional resin composite. Therefore,

OBJECTIVES : The purpose of this in vitro study was to investigate the flexural strength of high viscosity bulk fill resin composites compared with nanocomposite.

MATERIALS & METHODS : The high viscosity bulk fill resin composites tested were Sonicfill, Tetric N-Ceram bulk fill and X-tra fil. Nanocomposite Z350 XT was used as the control. 10 samples with dimensions of 2×2×25mm were fabricated from each of four composite materials (n=10). Composites were cured for 20s with overlapping irradiation. The samples were polished with SiC papers (600, 1000, 1500 and 2000 grit). The width and

thickness of each specimen were measured and recorded. After that, the samples were stored in 37°C distilled water for 24 hrs. After 24hrs, the samples were subjected to a three-point bending flexion test to evaluate the bending strength. The data were calculated for flexural strength and they were analyzed by using one-way ANOVA.

RESULTS: The flexural strength was as follows: Sonicfill (111.97±12.82), Tetric N-Ceram bulk fill (105.17±11.50), X-tra fil (130.12±7.14) and Z350 XT (112.50±16.10). X-tra fil shows the highest flexural strength (p<0.05).

CONCLUSION : X-tra fil had significantly higher flexural strength than other two bulk fill resin composites and Z350XT (p<0.05).

Key words : flexural strength, three-point bending test, bulk fill resin composites, nanocomposite

F-12 Development of Novel Porous Titanium as Bone Reconstruction Material

R. Kobatake, K. Doi, Y. Makihara, Y. Oki, T. Kubo, H. Abekura and K. Tsuga

Department of Advanced Prosthodontics, Hiroshima University Institute of Biomedical and Health Sciences

BACKGROUND : Porous hydroxyapatite (HA) is often applied for bone reconstruction. However, it is difficult to apply for bone defect under heavy load, because of insufficient mechanical strength. Titanium (Ti) could be applied to such kinds of bone defect, because of its high mechanical strength. However, conventional Ti has a problem of insufficient osteoconduction. The authors thought when Ti made into porous body, it would be good bone reconstruction material with superior mechanical strength and bone conduction.

OBJECTIVES : To develop a novel bone reconstructing porous Ti material with superior mechanical strength and osteoconduction ability.

MATERIALS & METHODS : Porous Ti samples were fabricated by Ti-slurry impregnate to urethane forms of several porosities (High-porosity Ti; 92%, Middle-porosity Ti; 85% and Low-porosity Ti; 65%). Porous HA (porosity; 75%) was used as control. Samples were observed by scanning electron microscopy (SEM), measured porosity, bending strength and cell proliferation assay. Samples were placed in the femur of New Zealand white rabbits (n=4). After 3 weeks, histological observation and mea-

surement of bone formation ratio were performed to evaluate osteoconduction.

RESULTS : Preferable porous three dimensional structure was observed in all samples. The bending strength was significantly higher in the order of porosity (Low-porosity Ti > Middle-porosity Ti > Porous HA > High-porosity Ti, P < 0.05; respectively). Compared with porous Ti group, the higher enhancement of cell proliferation at 10 days were observed in Low and Middle-porosity Ti. Newly formed bone was observed in the central portion of Low and Middle-porosity Ti and Porous HA. High-porosity Ti was mainly occupied by marrow tissue. Bone formation area of Low and Middle-porosity Ti and Porous HA were significantly higher than that of High-porosity Ti (P < 0.05).

CONCLUSION : Developed porous titanium of Low and Middle-porosity Ti could be expected to achieve both superior mechanical strength and osteoconduction.

Key words : Porous titanium, Porosity, Bone reconstruction, Rabbit model, Biomaterial

F-13 Effect of Repeated Firing on Dental Zirconia Surface

CHUNG, Shin Hye

Dept. of Dental Biomaterials Science, School of Dentistry and Dental Research Institute,
Seoul National University

BACKGROUND : To improve esthetic properties of dental zirconia layering porcelain is commonly used in anterior restorations. During layering the porcelain, multiple firing is recommended.

OBJECTIVES : The aim of this study was to evaluate the changes after porcelain firing simulation on the surface and *Streptococcus mutans* adhesion of dental zirconia.

MATERIALS & METHODS : A disc shaped zirconia samples were cut from a yttria-stabilized zirconia ceramic block (Lava Plus HT, 3M ESPE, St. Paul, MN, USA). Each specimen was prepared after the sintering process recommended by the manufacturer and randomly divided into 7 groups. The specimen in group F0 was untreated control. Specimens in group F1 to F6 underwent firing simulation process of one to six times at the temperature of 700~800°C. Average surface

roughness, contact angle, microhardness, and adherence of *S. mutans* were observed after each step of heating process. Average surface roughness was observed under CLSM. The contact angle was measured with contact angle analyzer. Vicker's hardness number (VHN) of the surface was measured using a microhardness tester (HNV-2 Series). *S. mutans* was observed under CLSM after 24 hours of adhesion.

RESULTS : Surface roughness, contact angle, amount of attached *S. mutans* decreased after heat treatment. Tensile bond strength was resulted lowered after firing but it was not found to be significantly different.

CONCLUSION : Repeated firing process affected on the surface characteristics and the adhesion of bacteria on dental zirconia.

G-1 Caries Risk and Prevention Care Choice of Pre-school Aged Children

A.A Suwargiani¹, R Wardani¹ and F Meditia P¹

¹ Department of Community Dentistry Faculty of Dentistry Universitas Padjadjaran, Indonesia
E-Mail: anne.agustina@fkg.unpad.ac.id

INTRODUCTION : Caries risk assessment for children is an effort that can be done to determine the occurrence and the risk factors. The assessment was done by using the official caries risk assessment application established by the Ministry of Health Republic of Indonesia in the Community Dental Health Center.

OBJECTIVE : to determine the caries risk in pre-school aged children.

MATERIAL AND METHODS : This research using quantitative design technique, before and after study, and total sampling method for sampel method. The data was collected by using manual form caries risk from IreneDonut. The study was conducted by Ulul Azmi Kindergarten and Amanah Kindergarten, which will assess the child's habit, education and the parental age.

RESULT : The study found that the highest frequency,

based on interviews was 88.9% in kindergarten, found in children who still drink milk from bottles up to age 4 and many children who eat candy every day. In the study also proved that high-risk caries does not interfere with the growth of children. Treatment options found in the form of children's help to brush their teeth before bed and drink water after eating sweet foods, and daily meals contain vegetables and fruits.

CONCLUSION : It was found that the risk of caries in pre-school age children was high but did not interfere with the growth of children, and more treatment options were aimed at helping children brush their teeth before bed and the urge to drink water after eating sweet foods.

Key words : Caries risk, children, pre-school aged, prevention care, caries treatment

G-2 Comperation between Caries and Filling Prevalence at the Age of 8-15 Years in Bandung Indonesia Population

I Sasmita¹ and L Epsilawati²

¹ Department of Pedodontic Dentistry, Faculty of Dentistry, Padjadjaran University

² Department of Dentomaxillofacial Radiology, Faculty of Dentistry, Padjadjaran University, Bandung, Indonesia

BACKGROUND : The first molar is the first permanent tooth that appears in the mouth. There are many parents who get misconceive, that this tooth is the deciduous teeth, the treatment provided is not maximal. Tooth decay of the first molar is often caused by caries.

OBJECTIVE : to see comparison of caries and filling prevalence in first molar at age 8-15 years in population of Bandung Indonesia, to obtain data about dental treatment especially first molar teeth.

MATERIAL AND METHOD : The method used is a comparative description method. The population in this study was all panoramic radiographs of patients aged 8-15 years from 2010-2017 and selected 300 radiographs. The calculations cover all the first molars in both Maxilla

and the mandible. The data is then calculated the number of prevalence and comparison.

RESULT : The results showed that caries prevalence was about 67% of all populations, while patching showed a lower population of about 57% of all populations. The Comparative Test showed that caries prevalence was significantly higher with a confidence level of 0.5.

CONCLUSIONS : The prevalence of caries is higher than the fillings. This proves that the concern for dental remnants, especially the first molar teeth in this population is still low

Key words : Caries prevalence, Prevalence of Patch, Panoramic Radiograph

G-3 Health Seeking Behavior of Solving Dental Problem in Children Aged 9-11 Years Old in District of Sukajadi Bandung City

Grace Monica¹, Deborah Cerfina² and Shelly Lelyana³

¹ Departement of Dental Public Health, Faculty of Dentistry, Maranatha Christian University, Bandung, Indonesia,

² Dental Student, Faculty of Dentistry, Maranatha Christian University, Bandung, Indonesia,

³ Departement of Oral Medicine, Faculty of Dentistry, Maranatha Christian University, Bandung, Indonesia

BACKGROUND : The children aged 9-11 years begin to care about their bodies and begin to feel independent. At this age the children begin to want making their own choices. Health seeking behavior, especially dental problems should begin to be considered because it will impact on their future.

OBJECTIVES : The purpose of this study is to know the health seeking behavior in children aged 9-11 years while they have toothache.

MATERIALS & METHODS : This is a cross sectional study. A total of 454 children aged 9-11 years in District of Sukajadi, Bandung City were interviewed about how often they felt toothache in the last one year and how often they went to the dentist in the last one year. Interviews were conducted on 226 boys and 228 girls.

RESULTS : Based on the interviews, 15 children (3.3%) who had frequent toothache and 80 children (17.6%) who rarely felt toothache, never or did not go to the dentist in the last one year, while 12 (2.6%) children who have no toothache, go to the dentist more than two times a year. A total of 135 (29.73%) of children did not check their teeth to the dentist for the last one year.

CONCLUSION : It is suggested to do counseling in children aged 9-11 years in District Sukajadi, Bandung City about their health seeking behavior, especially dental problem.

Key words : Health Seeking Behavior, Dental Problem, Children aged 9-11 years old

G-4 The Effectiveness of Oral Health Education Program for Mentally Retarded Children in Ho Chi Minh City.

Huynh To Tram

Faculty of Dentistry, Hong Bang International University

BACKGROUND : Mentally retarded children or children with an intellectual disability (ID) have been recognized to be at risk of receiving inadequate dental care and having poor oral health, partly because of substantial dependence on others for the management of their oral care. The oral health of individuals with intellectual impairment has been reported to be poorer than that of individuals with normal development.

OBJECTIVES : To test the impact of an oral health education program for intellectual disability children by evaluating their efficacy in plaque removal when trained weekly for six months and 6 months after

MATERIALS & METHODS : The sample consisted of 60 children with intellectual impairment, IQ 20 to 70 and aged 6 to 18 years old, who attended a special school in Cu Chi, Ho Chi Minh City. Included group 1 was 21 mild retarded mental children and group 2 was 39 severely retarded mental children. They attended an appropriate oral health education program, during which, for 6 months, they watched a weekly oral health presentation, practiced brushing on model teeth, had their plaque disclosed and recorded by the simplified

oral hygiene index (OHI-S) and then brushed their own teeth under supervision. Plaque evaluation was re conducted 6 months after the training period.

RESULTS : The percentage of subjects with good oral hygiene status increased from 3.3% to 46.7%. The OHI-S before and after training was 2.24 and 0.74 respectively for group 1; 2.43 and 1.15 for group 2. The improvement was statistically significant ($p < 0.001$). The prevalence of good knowledge was 100% for group 1 and 51.3% for group 2; 100% children of group 1 cleaned their teeth well and only 33.3% of group 2.

CONCLUSION : This weekly, school-based oral health program was effective in improving the oral hygiene of children with mild intellectual impairment. However, this program was not effective enough with severely intellectual impairment children, so they need to be given more intensive program. Oral hygiene program for people with intellectual impairment should continue in future.

Key words : Oral health education, mental retardation, intellectual disability, caregiver, oral health status.

G-5 The Qualitative Study of the Failed Cases from Regular Oral Care Instruction Program: Caregivers with Interesting Feeding Behaviors

Karawekpanyawong R¹., Chanchorn W.², Suwannasri S.³,
Tantayakorn P.⁴ and Radeesujalitkul P.⁵

¹ Department of Community Dentistry, Mahidol University, Thailand

² Dental Department, Song Hospittal, Phrae, Thailand

^{3,4,5} Faculty of Dentistry, Mahidol, University, Thailand

BACKGROUND : Feeding behaviors of caregivers can affect child growth and development as it could lead to both over- and under-nutrition. Moreover, inappropriate feeding behavior of sugar-containing foods and beverages is considered one of the causes of early childhood caries (ECC) which could affect children's quality of life. As a result, the Dental Department of Song Hospital (Phrae, Thailand) has established the oral care instruction program which includes caregivers of preschool children who have interesting feeding behavior. The failed cases from the regular oral care instruction program were assigned to the community-based motivational interview program by dental students due to the positive effect of community-based interventions of other health promoting programs as well as the evidence that motivational interview has a superior effect towards behavioral changes compared to the traditional program.

OBJECTIVES : This qualitative study is aimed to explore etiologic factors contributing to the failure of behavioral change from the traditional program and to determine the possibility of the community-based brief motivational interview program by dental students.

MATERIALS & METHODS : Seven preschool children's

caregivers with interesting feeding behavior were screened from the well-baby clinic (WBC) to attend the traditional program. After the program, three caregivers who failed to change feeding behaviors were invited to attend the community-based brief motivational interview program.

RESULTS : Our results show that socio-economic factors, parenting styles, behaviors of caregivers and surrounding people and caregivers' attitude towards behaviors seem to be the major barriers to behavioral changes in these cases. Motivational interviewing by dental students could change the feeding behaviors in short term despite some limitations.

CONCLUSION : This study showed the strong evidence of the superior advantage of community-based MI than hospital-based MI. In spite of uncertain long term outcomes, this method could be useful for caregivers of preschool children to practice complementary feeding before their children attend to the school where environmental factors could be more controllable.

Key words : motivational interview, qualitative study, caregiver, feeding behavior, preschool children

G-6 Remineralization of Early Enamel Lesions Using Calcium Sodium Phosphosilicate Containing Toothpaste: An in-vitro Study.

A Pasasuk¹, K Sukjit¹, P Niltawee² and K Kongraksakiat²

¹ Restorative Dentistry, Khon Kaen University

² Former 6th year student, Dentistry, Khon Kaen University

BACKGROUND : Calcium sodium phosphosilicate (Novamin®; CSP) is an agent that is claimed to release calcium and phosphate ions to help self-repair process to enamel. CSP may enhance remineralization in early enamel caries.

OBJECTIVES : The purpose of this in-vitro study was to evaluate and compare the remineralization potential of toothpaste containing sodium fluoride (NaF) and NaF/CSP on artificial enamel lesions.

MATERIALS & METHODS : 30 extracted sound human upper premolars were decoronated, coated with nail varnish except for a 4mmx4mm window on buccal surface. Artificial enamel caries lesions were created by immersing specimens in demineralizing solution for 96h. Surface microhardness (SMH) of demineralized specimens were measured using Vickers microhardness testing machine. Then, they were randomly divided into 3 groups (n=10); (1) control group: artificial saliva, (2) NaF containing toothpaste, (3) NaF/CSP containing

toothpaste. Specimens were subjected to pH cycling for 10 days, SMH of remineralized specimens were evaluated and calculated for difference of SMH (dSMH). Means dSMH of all groups were statistically analyzed (One-way ANOVA, Bonferroni, $p < 0.05$).

RESULTS : The mean-dSMH of group1, 2 and 3 were -2.32 ± 0.13 , 37.28 ± 11.04 and 38.14 ± 10.02 KgF respectively. The results revealed that mean-dSMH of group2 and 3 were significantly higher than that of group1 ($p < 0.02$), no statistically significant difference was found between group2 and 3 ($p = 0.35$).

CONCLUSION : This in-vitro study concluded that both NaF and NaF/CSP containing toothpastes performed the remineralization potential of initial enamel caries lesion, although no significantly different was found from each other.

Key words : Calcium sodium phosphosilicate, Bioactive glass, Fluoride, Remineralization, Surface hardness

G-7 A New Objective Method to Evaluate the Degree of Wear of Worn Toothbrushes

Y. Kaneyasu¹, H. Shigeishi¹, E. Fukada¹, H. Amano² and M. Sugiyama¹

¹ Department of Public Oral Health, Program of Oral Health Sciences, Graduate School of Biomedical & Health Sciences, Hiroshima University

² Department of Maxillofacial Functional Development, Program of Oral Health Sciences, Graduate School of Biomedical & Health Sciences, Hiroshima University

BACKGROUND : It is supposed that a worn toothbrush may be significantly less effective than a new brush with respect to plaque removal. However, there have been hardly seen objective methods to evaluate the degree of wear of worn toothbrushes.

OBJECTIVES : This study aimed to establish an objective method for evaluating the degree of wear of worn toothbrushes and clarify changes of the degree after use.

MATERIALS & METHODS : Pictures of bristle of a toothbrush were taken using a compact digital camera (EX-Z2000, CASIO) and the area of the bristle was measured with ImageJ (NIH).

80 university students and staffs were recruited. A toothbrush (Tuft24 soft or medium) was randomly assigned to each participant. Then the participants were instructed to use the brush for 2 months, to brush for 3 min twice a day and not to use any other appliances for plaque removal.

Additionally, the participants were categorized into the

following two groups. Group 1 consisted of students and graduates from dental hygienist course, while Group 2 consisted of others.

RESULTS : The mean area of new soft toothbrushes was $83.3 \pm 8.57 \text{ mm}^2$, while that of soft toothbrushes used for a month was $105.8 \pm 25.07 \text{ mm}^2$. There was a significant difference between these two groups. The mean area of new medium toothbrushes was $71.5 \pm 7.1 \text{ mm}^2$, while that of medium toothbrushes used for a month was $87.2 \pm 18.9 \text{ mm}^2$. There was a significant difference between these two groups, too. Additionally, the mean area of both types of toothbrush was significantly larger in Group 2 than in Group 1 after 2-month use.

CONCLUSION : The degree of wear of the worn toothbrushes was successfully evaluated with the newly established method.

Key words : worn toothbrush, degree of wear, objective measurement of bristle's area, ImageJ

G-8 A Comparative Study of Shear Bond Strength of Sealant in Acid-Etched and Er:YAG Irradiated Enamel

Rattanacharoenthum A, Kantrong N and Charoenwong P

Faculty of dentistry, Khon Kaen university

BACKGROUND : Pit and fissure sealants are considered as adjunctive therapy in decreasing occlusal caries onset and progression. Acid etching 37% phosphoric acid is widely used in dental practice for years to enhance retention of sealant materials to teeth. Er:YAG laser has been evaluated as an alternative to acid etching for enamel adhesion. But results to date about bond strength of resin-based materials to laser-irradiated enamel have been controversial.

OBJECTIVES : This study was compared the shear bond strength and mode of failure of sealant material to teeth obtained after enamel using either 37% phosphoric acid or Er:YAG laser etching setting modes.

MATERIALS & METHODS : 120 permanent maxillary premolars were randomly divided into 4 groups (gr. 1 using 37% phosphoric acid, gr. 2 using Er:YAG laser setting of 80mJ/2Hz without water, gr. 3 Er:YAG laser setting of 120mJ/10Hz with water and gr. 4 Er:YAG laser setting of 140mJ/2Hz with water). The application of each sealant followed manufacturer's instruction. All teeth were thermocycled for 500 cycles between 5°C and 55°C. After

thermocycling all teeth were tested in shear bond strength and mode of failure.

RESULTS : The mean shear bond strength for acid-etched enamel (11.029 ± 4.069 MPa) was significant higher ($p < 0.05$) than for laser-irradiated enamel at 80mJ (5.079 ± 2.111 MPa), 120mJ (6.183 ± 2.542 MPa) and 140mJ (5.132 ± 2.654 MPa). The mean shear bond strength in laser-irradiated group were not significantly different ($p > 0.05$). Fracture patterns of sealant materials bonded to all group of treatment revealed a high incidence of adhesive and mixed failures. Scanning electron microscope images of acid-etched enamel showed etching pattern type II while laser-irradiated enamel revealed etching pattern type III.

CONCLUSION : From this study, sealant adhesion to laser-irradiated enamel was significantly inferior to that of acid etching. Er:YAG laser effected on enamel surfaces changes directly affected to bond strength of resin-based material to tooth.

Key words : Sealant, Er:YAG laser, Etched-enamel

G-9 The Efficiency of Oral Health Education Pocket Book to Promote Pregnant Woman Oral Health in Pucang Sewu Community Health Centre (PUSKESMAS)

Muhammad Yoga Wardhana

Airlangga University

BACKGROUND : Recent study showed pregnancy gingivitis, which can be worsened by bad oral hygiene, is a risk factor of preeclampsia. Based on national health survey in 2016, maternal death was 306 per 100.000 births. 27.1 cases were caused by preeclampsia. In Pucang Sewu area, Pregnant women is recommended to undertake Antenatal Care (ANC) in Community Health Centre (PUSKESMAS) to prevent any maternal problem. On the first visit, pregnant women are given Maternal and Child Health (MHC) guidance book. Though the guidance book contains maternal guide, oral health related to pregnancy is not included yet. Thus Oral Health Education Pocket Book was made to complementing ANC in Pucang Sewu PUSKESMAS.

OBJECTIVES : The purpose of this study was to see the efficiency of oral health promotion during pregnancy using pocket book as a complement in ANC.

MATERIAL & METHODS : Oral Health education pocket book contains basic information about oral health related

to pregnancy and was given to 50 pregnant women who attend ANC in Pucang Sewu PUSKESMAS, thus 7 pregnant woman were chosen randomized as a sample. Sample was given 10 variable test before and after read the book to analyze the efficiency of the book

RESULTS : The result show there are some significant differences in knowledge about; relation between maternity and oral health ($P = 0.049$), risk factor of bad oral health to maternal ($P = 0.014$), ideal time for dental treatment during pregnancy ($P = 0.025$), and ideal time in a day to brushing teeth ($P = 0.046$). From overall, there is a significant difference between pretest and posttest given ($P = 0.000$).

CONCLUSION : Oral health education pocket book as a complement book in Community Health Centre ANC is efficient to promote oral health during pregnancy.

Key words : Pregnancy gingivitis, oral health promotion, preeclampsia, Antenatal care, Community Health Centre

G-10 Association of Oral Function with Long-term Participation in Community-based Social Activity in Elderly People

S. Miyoshi^{1,2}, E. Fukada¹, H. Shigeishi¹ and M. Sugiyama¹

¹ Department of Public Oral Health, Program of Oral Health Sciences, Graduate School of Biomedical & Health Sciences, Hiroshima University, Hiroshima, Japan

² Takehara-Toyota Dental Hygienists' Association, Hiroshima, Japan

BACKGROUND : Municipal authorities launched an intervention that is based on the establishment of community-based centers called "community salon" where elderly people can participate in social activities.

OBJECTIVES : The objective of this study was to clarify oral health status and oral function of elderly people (≥ 65) who had been participating in social activities at a community salon.

MATERIALS & METHODS : We enrolled 108 female (mean age; 77.6 ± 5.7) who participated in oral and physical exercise program once a week at community salons in Takehara city on March, 2017. This cross-sectional study was approved by the Ethical Committee of Hiroshima University and informed consent was obtained from all participants. As for assessments of oral function, tongue pressure test, oral diadochokinesis (ODK), repetitive saliva swallowing test (RSST) and oral wetness test were performed.

RESULTS : 70 participants (64.8%) have used full or partial dentures. The mean tongue pressure was 30.5 ± 8.6 kPa. ODK syllables "pa", "ta", "ka" was 5.7 ± 1.0 , 5.6 ± 1.0 , and

5.4 ± 0.9 times/sec, respectively. Mean value of RSST was 3.4 ± 1.2 times/30 sec. The mean oral wetness was $30.4 \pm 2.3\%$. The duration of participation widely ranged from a month to 7 years (median; 2.3 years). Importantly, individuals who had been participating for more than 3 years did not show negative relationship between oral wetness and age (Spearman's rank correlation, $r = 0.19$). Furthermore, they exhibited weaker negative relationship between their oral function and age compared with individuals who had been participating for less than 3 years.

CONCLUSION : Our results suggest that long-term participation in social activities at community salons may suppress the deterioration of oral function in elderly people. Further additional study will be necessary to clarify the significant correlation between oral function and community-based social activities.

Key words : Social activity, elderly people, tongue pressure, oral diadochokinesis, repetitive saliva swallowing

G-11 Daily Stress of 5th Year Dental Students during Training at Khon Kaen University

A. Rattanathongkom, S. Khimsuksri, B. Pitanuwat, M. Suriyonghanpong, N. Kumpalum, M. Siriteptawee and S. Chatchiwatana

Faculty of Dentistry, Khon Kaen University, Khon Kaen, Thailand

BACKGROUND : Dental education is a long-term course and requires knowledge and skills to work. Heavy workload and highly skillful assignments could lead to stress. As a result, dental students might be more stressful than other university students.

OBJECTIVES : To evaluate the daily stress in 5th year dental students and the effect of operative work on their stress levels.

MATERIALS & METHODS : The sample of this study consisted of 40 5th year dental students at Khon Kaen University in academic year 2013. Urine cortisol level (24 hours) was measured with Human Urine Cortisol ELISA Kit, heart rate variability during working time (9 hours) was measured using SEER® Light and SEER Light Extend digital recorders and self-report stress score was evaluated using Suanprung Stress Test-20.

RESULTS : The cortisol level in urine (136.74 ± 67.94 $\mu\text{g}/24$ hours), heart rate variability (sympathetic = 0.66 ± 0.05

parasympathetic = 0.34 ± 0.05 and sympathovagal balance = 2.02 ± 0.47) were in the normal range of healthy subjects and the mean self-report stress score had low to medium stress level (mean = 2.05 ± 0.62). Female students had higher sympathetic, sympathovagal balance and self-report stress score during working in operative clinics (operative, pedodontic, periodontic, prosthodontic and oral surgery) than non-operative clinics (oral diagnosis and orthodontic) ($p < 0.05$) whereas male students had no significant difference ($p > 0.05$).

CONCLUSION : The daily stress of 5th year dental students at Khon Kaen University appeared to be within the normal range. Operative works increased heart rate variability and self-report stress score in females than in males.

Key words : Stress, Dental student, Cortisol, Heart Rate Variability

G-12 A Comparison of the Dental DVI System among Twelve Countries and Japan

H. Oka¹, S. Katsumura², Y. Ohbayashi³, E. Kosuge⁴, A. Sakuma⁵, H. Saitoh⁵ and A. Kumagai⁶

¹ Department of Global Dental Medicine, Graduate School of Biomedical & Health Sciences, Hiroshima University, Hiroshima, Japan

² Department of Forensic Medicine and Dentistry, Tsurumi University School of Dental Medicine Kagawa University, Kanagawa, Japan

³ Department of Oral and Maxillofacial Surgery, Faculty of Medicine, Kagawa University, Kagawa, Japan

⁴ Department of Dentomaxillofacial diagnosis and treatment, Kanagawa Dental University, Kanagawa, Japan

⁵ Department of Legal Medicine, Graduate School of Medicine, Chiba University, Chiba, Japan

⁶ Department of Forensic Science, Iwate Medical University, Iwate, Japan

BACKGROUND : Today, it is not unusual for us to have international victims due to disasters in the world, so that we need to improve disaster countermeasure/disaster victim identification (DVI) in our country and develop international cooperative systems continuously.

OBJECTIVES : In this paper, we studied dental identification systems in twelve countries and compared to that in Japan.

MATERIALS & METHODS : We administered a questionnaire survey about disaster countermeasure, especially DVI systems in the country, to forensic odontologists in the United States (US), Australia, Belgium, Brazil, Finland, Indonesia, Netherland, New Zealand, South Korea, Sweden, Spain, and Saudi Arabia in 2016 and 2017.

RESULTS : In Australia, coroners operated DVI. In the US, the system (medical examiners/ coroners) was different for each state. In many of other countries, police or national organization operated that, and they had national DVI team system. About the dental identification, International Criminal Police Organization (ICPO) dental

chart can be used in almost of the countries (Australia, Belgium, Brazil, Finland, Indonesia, Netherland, New Zealand, South Korea, Sweden and Spain). Some of those countries applied matching softwares for the collation. In the US, they used the dental chart recommended by each state, and applied "paperless" Information Technology for the collation. Moreover, in almost of those countries except Saudi Arabia and Japan, there were rules that only forensic odontologists can do dental identification works (e.g., making dental charts, AM-PM collation, giving experts opinion).

CONCLUSION: Many countries in this study had the national DVI team. They also established forensic odontologists' speciality, and have abilities to correspond to ICPO system. In Japan, despite long-years discussion, we still have various dental charts/matching software/recognitions for dental identification works. These results suggested that DVI including the qualification system in Japan should be unified and improved to better one for the new era.

Key words : DVI, ICPO, dental chart, forensic odontologists

協 力

広島大学歯学会
広島大学歯学部後援会

広島大学緑風会

協 賛

アース製薬株式会社
I L S 株式会社
I G L 医療福祉専門学校
アルファバイオ株式会社
大塚器械株式会社
株式会社ジーシー
株式会社ジェイ・エム・エス
四国乳業株式会社
株式会社松風

新広島ヤクルト販売株式会社
株式会社トミーインターナショナル
広島和光株式会社
株式会社ミクセル
株式会社モリタ
山本薬品株式会社
株式会社ヨシダ
株式会社ラフィーネインターナショナル

謝 辞

第7回ヒロシマカンファレンス（7th Hiroshima Conference on Education and Science in Dentistry）を開催するにあたり、上記の団体・企業から多大なるご支援・ご協力をいただきました。今回のカンファレンスでは、歯学教育・研究における多様性の推進を主眼とし、新たな展望の開拓に向けた議論を展開します。今回の議論を糧として、新たな時代に対応した歯学教育・研究、歯科医療、口腔健康科学の発展に邁進していく所存でございます。ここに厚く御礼申し上げます。

広島大学歯学部長

加藤 功 一

大白歯CAD/CAM冠(健保適用)

セラスマート300はCAD/CAM冠用材料(Ⅱ)として523点を算定できるCAD/CAM冠用ブロックです

300

CAD/CAM用高靱性ハイブリッドブロック

セラスマート[®]

先進医療から保険収載して3年経過
そしてCAD/CAM冠ブロック
「セラスマート」は第3世代へ



Aadv CAD/CAM用 (2年保証サポート対象商品)



UNIVERSAL用

色調 ●3色=A2LT、A3LT、A3・5LT サイズ ●12、14、16 包装 ●5個1函、1個1函(各色各サイズ) 医療機器管理番号 228AABZX00116000

発売元 **株式会社 ジーシー** / 製造販売元 **株式会社 ジーシーデンタルプロダクツ**
東京都文京区本郷3丁目2番14号 愛知県春日井市鳥居松町2丁目285番地

DIC(デンタルインフォメーションセンター) お客様窓口 ☎ 0120-416480 受付時間 9:00a.m.~5:00p.m.(土曜日、日曜日、祭日を除く)
東京都文京区本郷3丁目2番14号 〒113-0033 ※アフターサービスについては、最寄りの営業所へお願いします。 www.gcdental.co.jp/
支店 ●東京 (03)3813-5751 ●大阪 (06)4790-7333 営業所 ●北海道 (011)729-2130 ●東北 (022)207-3370 ●名古屋 (052)757-5722 ●九州 (092)441-1286

※掲載の内容は、2018年1月現在のものです。※色調は印刷のため、現品と若干異なることがあります。

※ 歯周病予防のためのモンダミン

※歯周病は、歯周炎、歯肉炎の総称です。



歯科医院専売モンダミン フロケア 600mL

歯科医院専売

モンダミン

高い殺菌作用で、 口腔内と歯垢に潜む 細菌の増殖を抑える!

歯ぐきからの
出血を防ぐ

TXA^{※1}

※1: トラネキサム酸

歯ぐきのハレと
炎症を防ぐ

GK₂^{※2}

※2: グリチルリチン酸ジカルシウム

口腔内の
原因菌を殺菌

CPC^{※3}

※3: 塩化セチルピリジニウム

オーラルケアは
毎日継続することが重要です
歯科医院専売モンダミンは、ノンアルコール
タイプで刺激が少なく、マイルドな爽快感。
歯周病※予防の効果に加え、毎日続けられる
工夫がされています。※歯周病は、歯周炎、歯肉炎の総称です。

【効果・効能】

歯周炎の予防。歯肉炎の予防。出血を防ぐ。むし歯の発生及び進行の予防。
歯を白くする。口臭の防止。口中を浄化する。口中を爽快にする。



1000mL



専用ポンプ



1リットルサイズ専用ポンプを使えば、
簡単・衛生的にご使用いただけます。

※モンダミン・フロケアは歯科医院専売のため、一般の店舗での取り扱いはありません。ご購入の際は、最寄りの歯科医院へお問い合わせください。

アルファバイオ株式会社

アルファバイオ株式会社は、理化学機器、研究用試薬、
バイオテクノロジー関連機器の販売を通じて、研究者の皆様のお手伝いをさせていただきます。



【事業内容】

理化学機器・医療機器の販売

理化学機器修理

消耗機材・バイオ関連商品の販売

医療品・試薬・臨床検査薬の販売

上記に付属する一切の事業

取扱メーカーは多数ございます。どのような事でもお気軽にお問い合わせください。

<http://www.alpha-bio.jp/>



本社（広島） 〒734-0015 広島市南区宇品御幸3丁目2-1
TEL 082-569-7117 FAX 082-569-7118

岡山営業所 〒700-0952 岡山市北区平田163-107
TEL 086-250-8816 FAX 086-250-8817





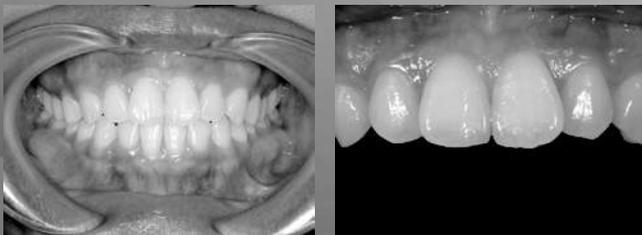
歯科専用設計 だから使いやすい

EyeSpecial C-III



より使いやすく
より高画質に
パワーアップして
新登場!!

◆ 撮影サンプル



デジタル口腔撮影装置

アイスペシャルC-III 1台 ¥250,000

〈内容〉

カメラ本体 1、クローズアップレンズ 1、グレーカード 1、
SDHCカード(4GB) 1、レンズキャップ 1、ストラップ 1、
ビデオケーブル 1、単3形アルカリ乾電池 4

価格は2018年1月現在の標準医院価格(消費税抜き)です。

専用サイト <http://www.shofu.co.jp/eyespecial3/>



世界の歯科医療に貢献する

株式会社 松風

●本社:〒605-0983京都市東山区福福上高松町11・TEL(075)561-1112(代)

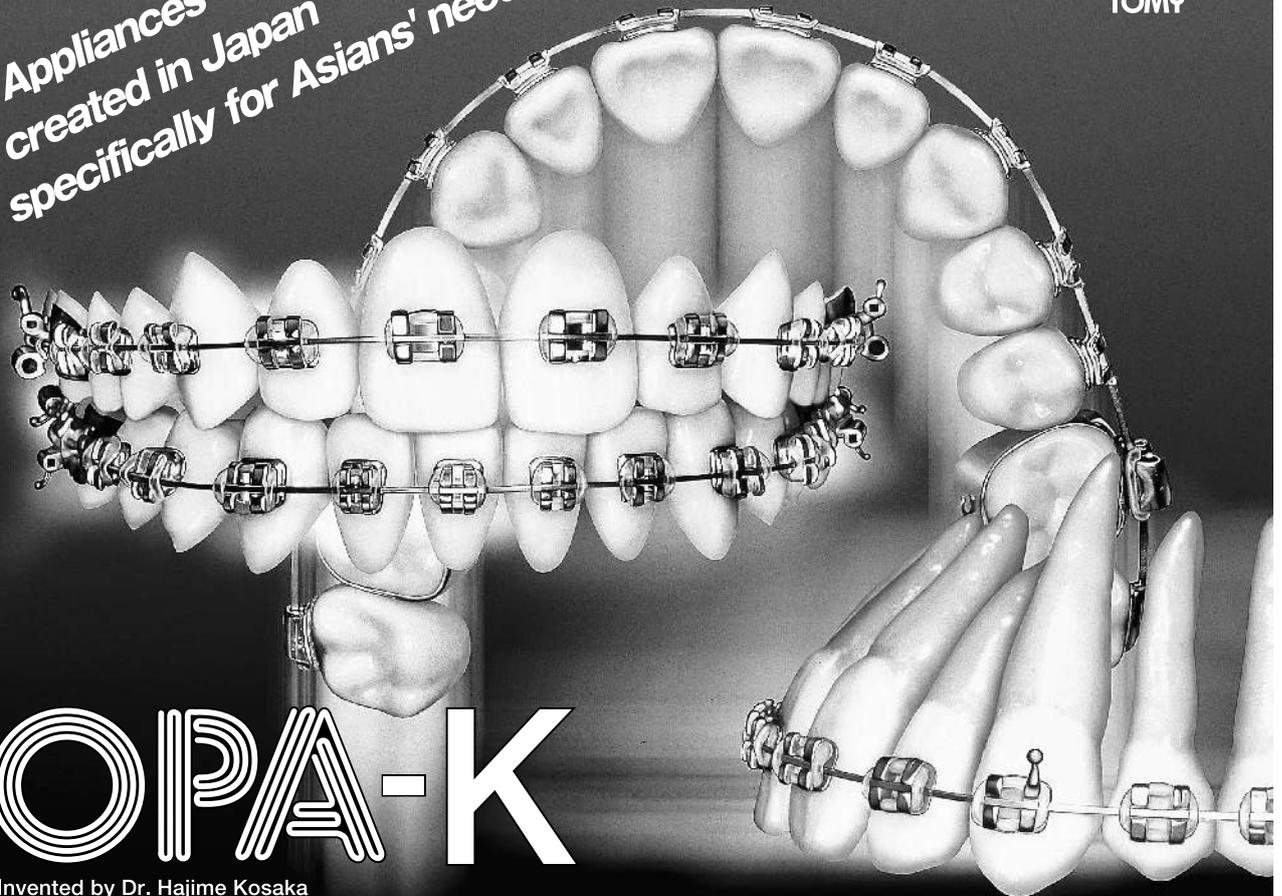
●支社:東京(03)3832-4366 ●営業所:札幌(011)232-1114/仙台(022)713-9301/名古屋(052)709-7688/大阪(06)6330-4182/福岡(092)472-7595

<http://www.shofu.co.jp>

THE ORIENTAL PREADJUSTED APPLIANCE "KOSAKA"



Appliances
created in Japan
specifically for Asians' needs.



OPA-K

Invented by Dr. Hajime Kosaka

Need For An Appliance Intended For The Oriental

Efficient edge wise appliance capable of normal occlusion simply by mounting straight (plain) arch wire were developed in America, and at present have come to be widely used in Japan. However, it is being pointed out that appliances designed for people of the Caucasian race lead to problems when used without modification on Japanese patients.



Treatment results with an appliance intended for Caucasians



Japanese persons with normal occlusion

When we compare the two panoramic X-ray photographs, it will be understood that the angulation as a result of treatment with an appliance made for Caucasians is stronger than that of a Japanese with normal occlusion. This phenomenon is something that is found by many clinicians. There is the need to consider such as torque (inclination) and in-out (prominence) as well as other important factors.

Development Of Appliance Intended For The Oriental And Their Clinical Evaluation

In view of the above, there is the appliance called the "Preadjusted Appliance" developed by Dr. Kosaka in 1984. It is truly an appliance for the Oriental based on data obtained from Japanese people. Now after clinical practice extending for 12 years since then (The clinical results were reported at the '92-'93 Nihon Kyosei Shikagakkai-the Japan Orthodontic Society Annual Meetings as well as the 1997 American Association of Orthodontists) and as a result of various improvements, we have OPA-K; The Oriental Preadjusted Appliance "KOSAKA"

The OPA-K Development Concept

- Stress is placed on objective average data obtained from Japanese with normal occlusion.
- Differences among patients in "designs that resist axiversion and rotation during tooth shifting" and "overcorrection designs" are not emphasized.
- Because of the direct bonding method, there is no concern for lost torque on front teeth, resulting from band removal.
- Universal usability in various treatment system is anticipated.
- Based on mathematical analysis methods, an in-out is adopted that is close to the actual positions of the teeth.



TOMY INTERNATIONAL INC.

HITACHI KANDA BLDG., 11-7, UCHIKANDA 3-CHOME, CHIYODA-KU, TOKYO 101-0047, JAPAN
PHONE (03)3258-2231 FAX (03)3258-2235



はじめよう乳酸菌習慣

L8020

乳酸菌 使用



- お子様
- お年寄
- 妊娠中の方

L8020 乳酸菌入りタブレットで、毎日の「乳酸菌習慣」をはじめましょう。

- 歯科医院専売だから
L8020乳酸菌
2倍*
- 砂糖ゼロ
キシリトール
使用**
- 食べやすい
ヨーグルト
風味

*一般販売品ラクレッシュ比較 **甘味料として

こんなお悩みはありませんか？

1歳半を過ぎたお子様
砂糖をあまりあたえたくない



ご年配の方
ガムを噛むことができない



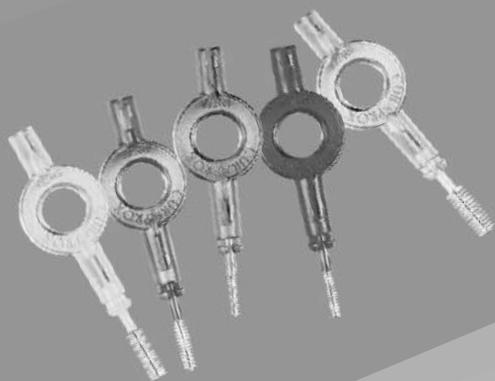
妊娠中の方
糖分を控えたい時の
おやつ代わりに



CURAPROX

SWISS PREMIUM ORAL CARE

昨日まで磨けなかった隙間に、クラブロックス。



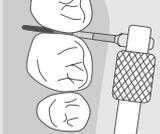
磨けなかった
隙間に届く

Interdental brushes
クラブロックス 歯間ブラシ

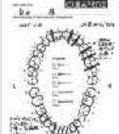
歯にも歯肉にも
すみずみまで、優しく

Toothbrushes
クラブロックス 歯ブラシ





歯間ごとのサイズを
IAPプライムで
適切に把握します。



歯間部サイズを
チェックシートに
色分けして記載します。



クラブロックス歯間ブラシ
各サイズ色の歯間ブラシを
選択します。



クラブロックス歯間ブラシの
正しい使い方を
指導します。



クラブロックス歯ブラシ
口腔内の状況に合わせて
歯ブラシも選択してください。

商品の詳細は
こちらから



GMP対応ペプチド受託合成



ペプチドが医薬品の新たな未来を切り開く

ペプチド性医薬品の研究段階から実生産までトータルでサポート致します

BACHEM

PIONEERING PARTNER FOR PEPTIDES

弊社は、スイスにあります世界最大規模のペプチド受託合成メーカーBachem 社の国内代理店です。

■ カタログペプチド・アミノ酸誘導体

生理活性ペプチドや酵素基質等4,200 種以上カタログペプチド、アミノ酸誘導体、合成用樹脂や試薬等、合計約6,500品目

■ カスタム合成ペプチド

研究用途の他、化粧品や診断薬等の原料として、高品質なカスタムペプチドを供給

■ GMP対応ペプチド

ICH Q7、PIC/Sや各国のGMP基準に対応した高品質なペプチド性医薬品原薬を供給

ILS株式会社

<http://www.ils.co.jp>

〒302-0104 茨城県守谷市久保ヶ丘一丁目2番地1
TEL : 0297-45-6342 FAX : 0297-45-6353
E-mail : peptide@ils.co.jp

ペプチドほっとライン

お問い合わせ先: ILS株式会社

☎ 0297-45-6761



介護福祉学科
2年制



口腔保健学科
3年制



鍼灸学科
3年制



柔整学科
3年制



〒731-3164 広島市安佐南区伴東 1-12-18 ☎ 0120-849-501



IGL 医療福祉専門学校

環境、研究、分析機器すべてOK！
—地球と人を科学の目で見ると—

OK 大塚器械株式会社

URL <http://www.ootsuka.co.jp>



BX3シリーズ
OLYMPUS
Your Vision. Our Future.

ご相談・ご用命は弊社各支店、営業所まで

<input type="checkbox"/> 本社	TEL (082)293-3737	FAX (082)292-6146
<input type="checkbox"/> 西条支店	TEL (082)424-3688	FAX (082)424-3689
<input type="checkbox"/> 福山支店	TEL (084)924-0812	FAX (084)921-7287
<input type="checkbox"/> 呉営業所	TEL (0823)74-3322	FAX (0823)74-1326
<input type="checkbox"/> 三次営業所	TEL (0824)62-3438	FAX (0824)62-3385



はちまるにいまる

8020ヨーグルト

らくれん

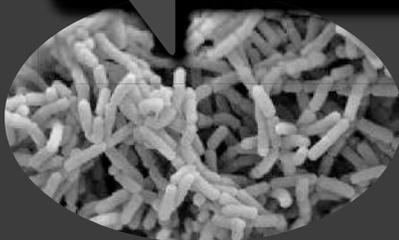
広島大学歯学部との共同研究!



お口の中から発見された乳酸菌

L8020菌

正式名称 / ラクトバチルス・ラムノーザスKO3株



広島大学大学院
医歯薬保健学研究院
二川浩樹教授によって
発見された乳酸菌。

(写真提供) 二川浩樹教授

らくれんは8020運動を応援しています。
8020運動は「80歳になっても20本以上自分の歯を保とう」という運動です。

お客様と明日の 「ワクワク」を共感するため・・・

当社では試薬・理化学機器の販売・保守だけでなく、研究者のトータルパートナーとしての研究支援を目指しております。

日々変化する環境、市場のニーズに対応し、顧客から満足して頂けるサポート体制を目指して前進します。

目標は厳しく、遥かなものがありますが、社員ともども会社一丸となってさらに確実な歩みを重ねてまいります。

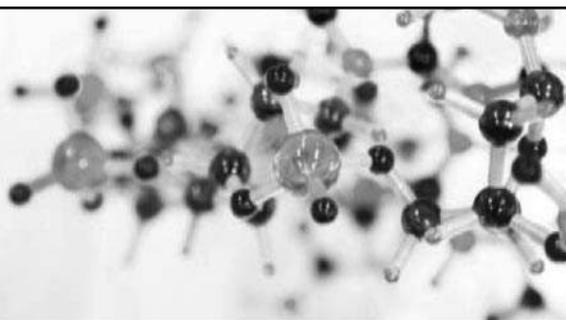
試薬・消耗品・工業薬品・理化学機器販売及び保守修理

広島和光株式会社

Hiroshima wako Co.,Ltd.

本社 TEL:082-285-5155 FAX:082-510-0290
Mail:hiroshima@hiroshima-wako.co.jp

当社では、環境保全活動を推進するため ISO14001を取得しております。



営業所案内

岡山営業所	〒700-0971 岡山県岡山市野田5丁目11-31 TEL:086-241-0771 FAX:086-243-1503
福山営業所	〒721-0926広島県福山市大門町4丁目16-43 TEL:084-943-2720 FAX:084-943-1198
東広島営業所	〒739-0046広島県東広島市鏡山3丁目12-26-101 TEL:082-431-3511 FAX:082-431-3515
広島営業所	〒732-0818広島県広島市段原日出1-1-15 TEL:082-285-6225 FAX:082-285-2505
岩国営業所	〒740-0024山口県岩国市旭町2丁目12-29 TEL:0827-22-0683 FAX:0827-22-0819
徳山営業所	〒745-0801山口県周南市久米字沖角田3039-1 TEL:0834-25-1230 FAX:0834-25-1249
防府営業所	〒747-0825山口県防府市大字新田66-2 TEL:0835-24-5432 FAX:0835-24-5464
宇部営業所	〒755-0008山口県宇部市明神町3丁目3-26 TEL:0836-34-3331 FAX:0836-34-3431
東京営業所	〒141-0001東京都品川区北品川5丁目8-26 TEL:03-5447-6181 FAX:03-3449-7861
千葉営業所	〒290-0056千葉県市原市五井9130 TEL:0436-22-2671 FAX:0436-22-5348
■グループ企業 鳥取サイエンス	〒680-0841鳥取県鳥取市吉方温泉3丁目110 TEL:0857-23-5651 FAX:0857-23-5652

「癌と闘う人を助けたい」
「食物を改良し、餓えから子供を救いたい」

研究者の皆様の夢を、**研究機材の販売を通じ**
全力でサポートいたします。

私たちは、研究者の皆様の夢を理化学機器・試薬といった研究機材の販売を通じてより良い研究環境を提供・サポートするプロフェッショナル集団です。研究者の皆様がより良い成果を作っていただくことが、ひいては科学技術発展への貢献に繋がる、それが私たちミクセルの使命だと考えています。

MIXELL

株式会社ミクセル

■ 本社 〒730-0043 広島市中区富士見町8-7 電話/ 082-546-3939 FAX/ 082-546-3940
■ 東京支店 〒111-0042 東京都台東区寿1丁目-11-6 電話/ 03-5828-3811 FAX/ 03-5828-3812

ミクセルホームページ : <http://mixell.co.jp/>

お問合せ用メールアドレス : info@mixell.co.jp

舌のチカラは食べるチカラ

JMS
人と医療のあいだに...

舌の運動機能は摂食嚥下機能と深く関係しており、安全に食事をするうえで重要な機能です。身体の筋力と同じように舌の筋力も年々低下していきます。「JMS舌圧測定器」で舌圧を測定し「ペコぱんだ」で舌の筋力を鍛えましょう。

Orarizer®

Screening

舌の運動機能を最大舌圧として測定

JMS舌圧測定器

測定値は摂食嚥下機能や構音機能に関する口腔機能検査のスクリーニングの指標となります。(本機器で得られた測定結果のみで、確定診断は行わないでください。)



販売名：JMS舌圧測定器
医療機器承認番号：22200BZX00758000

Training

舌圧トレーニング用具

ペコぱんだ®

硬度は5種類あり、患者さんの状態に合わせて選択できます。

スタート

弱 極めて軟らかめ 軟らかめ やや軟らかめ 普通 硬め 強

“軟らかめ” から始めて筋力UPを目指しましょう！



品名：ペコぱんだ
非医療機器

ブルー (SS)

ピンク (S)

バイオレット (MS)

グリーン (M)

イエロー (H)

Orarizer® (オーラライズ) は株式会社ジェイ・エム・エスが患者様の「口腔機能向上」を願って、「Oral(口腔)」と「Rise(向上)」を合わせて作成した造語です。

製造販売業者

株式会社 ジェイ・エム・エス <http://www.jms.cc>



口腔機能の情報を提供する
学術サイト“お口の情報室
(<http://orarize.com>)”

お問い合わせ先 カスタマーサポートセンター ☎ 0120-200-517
〒730-8652 広島市中区加古町12番17号

2017.10.JMS



Thinking ahead. Focused on life.

Soaric

New PdW Style - Design and Technology that Puts People First

Morita always puts people first when designing dental treatment chairs. The design for the PdW tray and treatment unit combination, based on natural movement and ease-of-use, promotes smooth, effective, and precise treatment. The microscope and root canal measurement instruments offer a compact design with advanced functions. The micromotor and other instruments also contribute to more comfortable treatment sessions. These are just a few of the advanced technologies and refined design concepts of the Soaric treatment unit that create an environment where people come first.

Distributed by

J. MORITA CORPORATION

33-18, 3-Chome, Tarumi-cho Suita City, Osaka, 564-8650 Japan
Tel: +81-6-6380-1521, Fax: +81-6-6380-0585,
<http://asia.morita.com>

J. MORITA USA, Inc.

9 Mason Irvine, CA 92618 U.S.A.
Tel: +1-949-581-9600, Fax: +1-949-465-1095,
<http://www.jmoritausa.com>

J. MORITA EUROPE GMBH

Justus-von-Liebig-Strasse 27A, D-63128 Dietzenbach, Germany
Tel: +49-6074-836-0, Fax: +49-6074-836-299,
<http://www.jmoritaeuropa.com>

J.MORITA Corporation Australia & New Zealand

Suite 2.05, 247 Coward Street, Mascot, NSW 2020, Australia
Tel: +61-2-9667-3555, Fax: +61-2-9667-3577,
<http://oceania.morita.com>

Siamdent Co., Ltd.

71/10 Bangpakong Industrial Park 1, Bangna-Trad KM 52,
Bangpakong, Chachuengsao 24130, Thailand
Tel: +66-3857-3042, Fax: +66-3857-3043,
<http://www.siamdent.com>

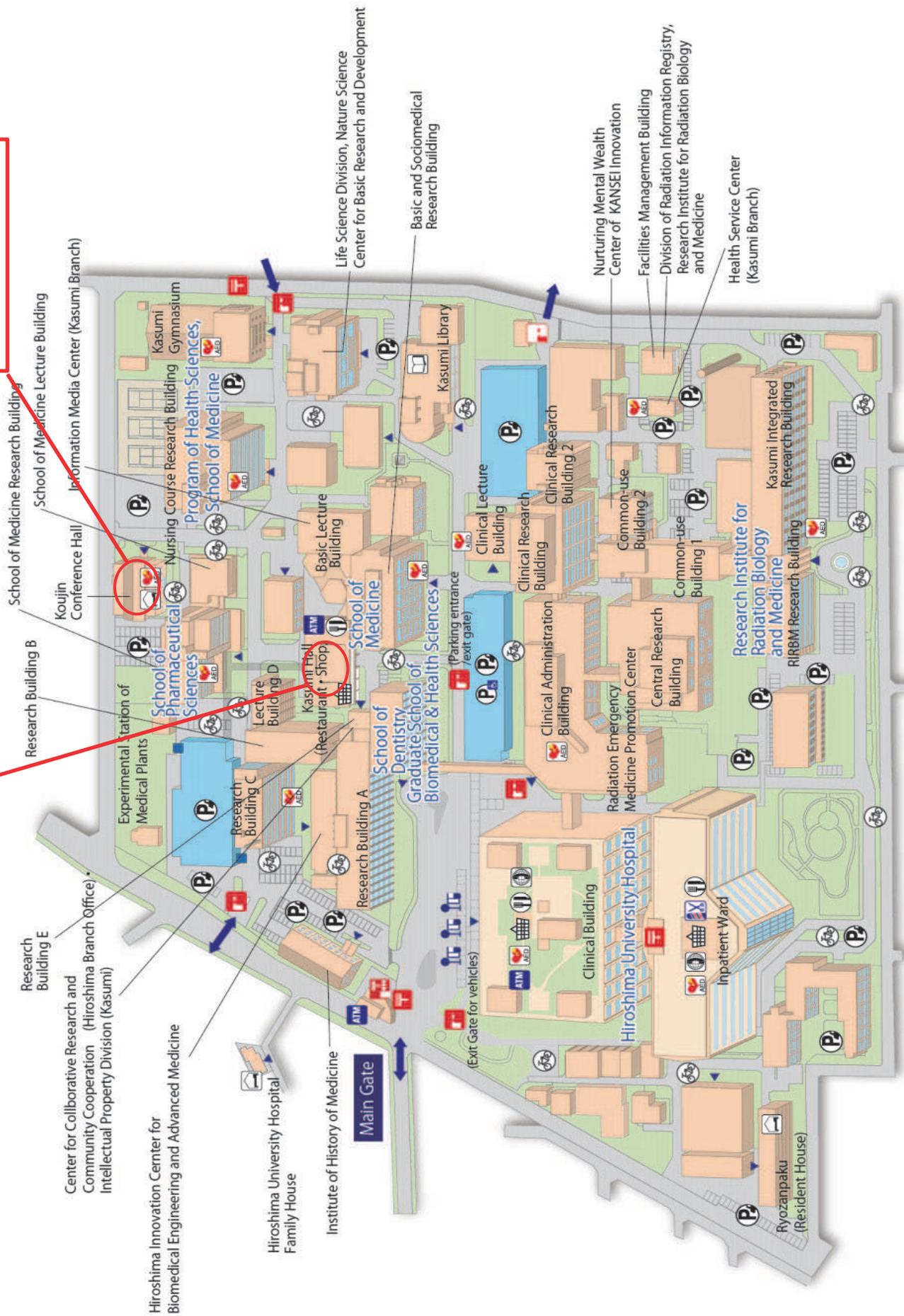
J. MORITA Middle East

Saraya Al Wessam Building, Appt 902 Cross
Roads Tag Al Roasaa & Abu Heif SabaPacha, Alexandria, 21311, Egypt
Tel: +203-58-222-94, Fax: +203-58-222-96,
<http://www.jmoritamiddleeast.com/>

Campus map

Registration
Conference Program
Poster Exhibition

Reception





Hiroshima University



BioDental

Education and Research