Commemoration of Okayama University 60th Anniversary
The Second International Symposium of Medical and Dental Education in Okayama

Contents

This symposium is supported by "Support Program for Improving Graduate School of Education awarded to Okayama University Graduate School of Medicine, Dentistry and Pharmaceutical Sciences (C014, 2007-2009; Program Chair: Prof. Takuo Kuboki) by Ministry of Education, Culture, Sports, Science and Technology-Japan"

Welcome to the Second International Symposium of Medical and Dental Education in Okayama at our special 60th anniversary of Okayama University!

Prof. Kyozo CHIBA
President of the National University Corporation
Okayama University

Okayama University Graduate School of Medicine, Dentistry and Pharmaceutical Sciences has been awarded several educational grant-in-aids by Ministry of Education, Culture, Sports, Science and Technology-Japan. One of those has been gifted to develop “Advanced Clinical Expert Training Course in the Medical and Dental Graduate Schools”. As you may know, in dental and medical education, after six-year undergraduate education, those who pass the national board must attend Graduate Clinical Training Course currently in Japan. The initial role of this course was absolutely to produce medical and dental doctors with primary care knowledge, however, since they need 7 to 8 years to finish both the undergraduate and clinical training courses after they enter the university, it has been concerned that the number of students attending the doctorate course would decrease at the graduate school and education for research-minded clinical specialists may possibly became insufficient. Therefore, since 2007, Okayama University Graduate School of Medicine, Dentistry and Pharmaceutical Sciences has devoted to divide the classical 4 year doctor course into “Clinical Specialist Course” where the students learn clinical and diagnostic art and science as a specialist in each clinical field, and “Basic Scientist Course” where the students can be trained as basic researchers with international excellence. The objectives of the division were to optimize two diverse courses according to their different mission. For example, the objective of the Clinical Specialist Course is to improve clinically inevitable knowledge, skill, behavior during the doctorate course in order to guaranty the quality of the medical and dental care that general patients are expecting.

This year, the 3rd year of this project, is namely the final year. It is a great honor for this University to be able to display the progress of this project through this symposium. Also, in this 60th anniversary year of the foundation of Okayama University, I am very grateful for the chance to gather so many people from different countries to make a profound and significant discussion. Consequently, it will be a great pleasure for us, as a host, if all of you gathered in this symposium would start executing new initiatives in your respective university, according to assembled suggestions to improve the quality of medical and dental care. Finally, I sincerely pray for the success of this event, and as the president of Okayama University, I pray for everyone`s continuous health and success.

ようこそ，岡山大学創立60周年記念，第二回岡山医療教育国際シンポジウムへ！

岡山大学　学長
千葉喬三

岡山大学大学院医歯薬学総合研究科では，平成19年度大学院教育改革支援プログラム（組織的な大学院教育改革推進プログラム）を複数採択させていただいております．そのうち1件は，本シンポジウムに関係した「医療系大学院高度臨床専門医養成コース」であります．ご存知の通り，医科も歯科も6年の卒前教育が終わった後に，国家試験に合格したものは，卒後臨床研修制度を受けなくてはなりません．本卒後臨床研修制度は，プライマリケア医学を研鑽した医師・歯科医師を輩出するために一役買っていることは間違いありませんが，この時点ですでに7年～8年を要していることから，医療系大学院博士課程に入学する学生が減少し，研究マインドを持った臨床専門医の教育が手薄になる可能性が指摘されてきました．そこで，岡山大学大学院医歯薬学総合研究科では，平成19年度より，4年生の博士課程一般コースを，臨床技術や臨床決断能力を教育し，臨床を真剣に科学する「臨床専門医コース」と，優れた国際レベルの基礎研究者を養成する「一般コース」に分割し，各々のコースの目的にしたがって大学院の実質化を進めることとなりました．このうち，臨床専門医コースは，各学会の専門医制度と同調しながら，学生の臨床能力（知識，技術，態度）を博士（医学・歯学）にふさわしいレベルにまで向上させ，国民が求める医療の質を担保することが目的であります．

本年は，本取り組みの3年目，すなわち，最終年度にあたります．本取り組み成果をこのようなシンポジウムを介してご披露できることは岡山大学にとっても大変光栄であります．また，本年は岡山大学創立60周年にあたり，このようなタイミングでたくさんの国々からお客様をお呼びして，有意義な議論を行うことができることは大変有り難く存じます．その結果，本シンポジウムにご参集の皆様が，医療や歯科医療の質を向上させる何らかのヒントを得ていただき，各大学で新しい試みを実行頂ければ，本シンポジウムを企画した岡山大学にとっても大変な成果と言えるでしょう．本イベントの成功を心から祈念いたしますとともに，岡山大学学長として，皆様の益々のご健勝をお祈りいたします．

Greetings for the Second International Symposium of Medical and Dental Education in Okayama

Prof. Hirofumi MAKINO
Dean
Okayama University Graduate School of Medicine,
Dentistry and Pharmaceutical Sciences

“Clinical Specialist Course” was established at Okayama University Graduate School of Medicine, Dentistry and Pharmaceutical Sciences through cooperation of dental and medical graduate schools in 2007. The “Clinical Specialist Course” aims to develop excellent research-minded clinical specialists. It is very happy that the course has been financially supported by the Support Program for Improving Graduate School Education (year 2007-2009) titled "Advanced Clinical Expert Training Course in Medical and Dental Graduate School". Currently we have two different courses; Clinical Specialist Course and Basic Scientist Course for training excellent basic researchers.

The development of these advanced clinical specialists requires education of the ability to understand clinical evidence, the ability to design an excellent clinical research and transmit evidence from a clinical question, the ability to link basic research to a clinic setting, as well as the humanity to understand patient suffering, the humanity to put together the medical staffs as a team, and to have international sense and versatility.

For that reason, it is being implemented EBM workshops, super clinical clerkship through medical teams of cooperated satellite hospitals, researches that bridge clinical medicine and basic medicine and a project of an electronic portfolio system specific for Okayama University.

Particularly in the dental field, great effort in many sides has been made to create an attractive educational scenario for training Advanced Clinical Specialists. These activities cross over many divergences like completion of basic dental research, completion of clinic-aimed bridge research, improvement of clinical dental education, improvement of the dental treatment quality, international career path and international cooperation.

Regarding this Second Okayama International Symposium of Medical and Dental Education in Okayama, I think that discussion should be directed to resolution policies of confronted problems that dental education is facing, future trends in dental science, and regarding the clinical specialist course, to understand without stirring the whole results cultivated. I hope that it will be a fruitful symposium, and that all the participants have a pleasant stay during the 2 days at the Okayama University.

岡山医療教育国際シンポジウム開催にあたって

岡山大学大学院医歯薬学総合研究科　研究科長
槇野博史

岡山大学大学院医歯薬学総合研究科では，平成 19 年度から医学系と歯学系が協力して，「臨床専門医養成コース」が開設されました．これによりすぐれた基礎研究者を養成する「一般コース」と二本立てとなりました．平成 19-21 年度大学院教育改革支援プログラム「医療系大学院高度臨床専門医養成コース」が採択され，この新設コースの充実が図られています．臨床専門医養成コースは研究マインドをもつ優れた臨床専門医を養成することを目的としております．このような高度臨床専門医の育成には，臨床エビデンスを理解し駆使する能力，臨床的な疑問から臨床研究をデザインしエビデンスを発信する能力，基礎研究の成果を臨床につなげる能力，さらには患者の苦悩を理解する人間性，チーム医療のスタッフをまとめる人間性，国際的なセンスなど多面的な教育が必要です．そのために EBM ワークショップ，連携サテライト病院の医療チームによるスーパークリニカルクラークシップ，基礎医学と臨床医学の橋渡し研究の実践などを行っておりますが，それを実現するものとして，Web サーバーを用いた電子ポートフォリオシステムが構築されるなど岡山大学独自の取り組みがなされております．

特に歯科系におきましては，高度臨床専門医養成を魅力的な教育現場とするために，多方面の努力がなされてきました．その活動は歯科基礎研究の充実，臨床への橋渡し研究の充実，臨床歯学教育の改革，歯科医療の質の向上，国際キャリアパスと国際協力など多岐にわたります．

第二回岡山医療教育国際シンポジウムにおいては，臨床専門医養成コースによって培われた成果の全貌がいながらにして把握できるとともに，歯科医学のサイエンスの今後の動向や、歯科教育が直面している問題を解決する方策が議論されると思います．参加される方々には岡山大学に集って充実した2日間を過ごしていただき，実りあるシンポジウムになることを祈念いたします．

Greetings for the Second International Symposium of Medical and Dental Education in Okayama from Dean of the Dental School

Prof. Ryuji MATSUO
Dean
Okayama University Dental School

Welcome to the 60th foundation anniversary of Okayama University and the Second International Symposium of Medical and Dental Education in Okayama.

For the establishment of this symposium, the report of the Central Council for Education in 2005 “New Era for Graduate School Education – Ways of constructing an internationally attractive Graduate School Education", and then “the Principle Policy for Promotion of Graduate School Education in 2006”, and “Revision of the Established Standards for Graduate Schools in 2007” are deeply interconnected. These policies aim to systematically enhance Graduate School Education, expand it internationally and improve its reliability. I think there may be many different approaches to achieve these goals, however Okayama University Graduate School of Medicine, Dentistry and Pharmaceutical Sciences focused on two points: "clarification of the goals to develop human abilities" and "flexibility in the curriculum formation". Putting in perspective the new goals to develop human abilities as advanced specialized professionals (medical specialists), a course for clinical specialists was opened in the graduate school in 2007. Particularly, in the Graduate School of Dentistry, flexible classes that combine lectures and clinical practice were created, and advanced technical skill can be learned.

In this clinical specialist course, evidence-based medicine (EBM) seminars were held since the first year. The purpose was to gain knowledge of advanced clinical expertise and ability to acquire practical understanding of clinical research, as well as capability to see and treat the patient as a whole and ability to make clinical research with international amplitude. Through the seminar, the importance of clinical research and the challenge in the rationale of the educational system emerged.

Under these circumstances, the support program for improving graduate school education "advanced clinical expert training course in medical and dental graduate schools" was adopted and it obtains heavy support from the Ministry of Education, Culture, Sports, Science and Technology, promoting several projects such as international symposiums.

How Dental Schools and Graduate Schools of Dentistry in Japan will develop excellent dentists (advanced specialized professionals), in other words, it is being tested the power level that education has at the university. In this international symposium, I am looking forward to enjoying together with you all and to seeing the next power level of education.

岡山医療教育国際シンポジウム　ご挨拶

岡山大学歯学部長
松尾龍二

岡山大学創立 60 周年記念-第二回岡山医療教育国際シンポジウムの開催にあたりご挨拶申し上げます.

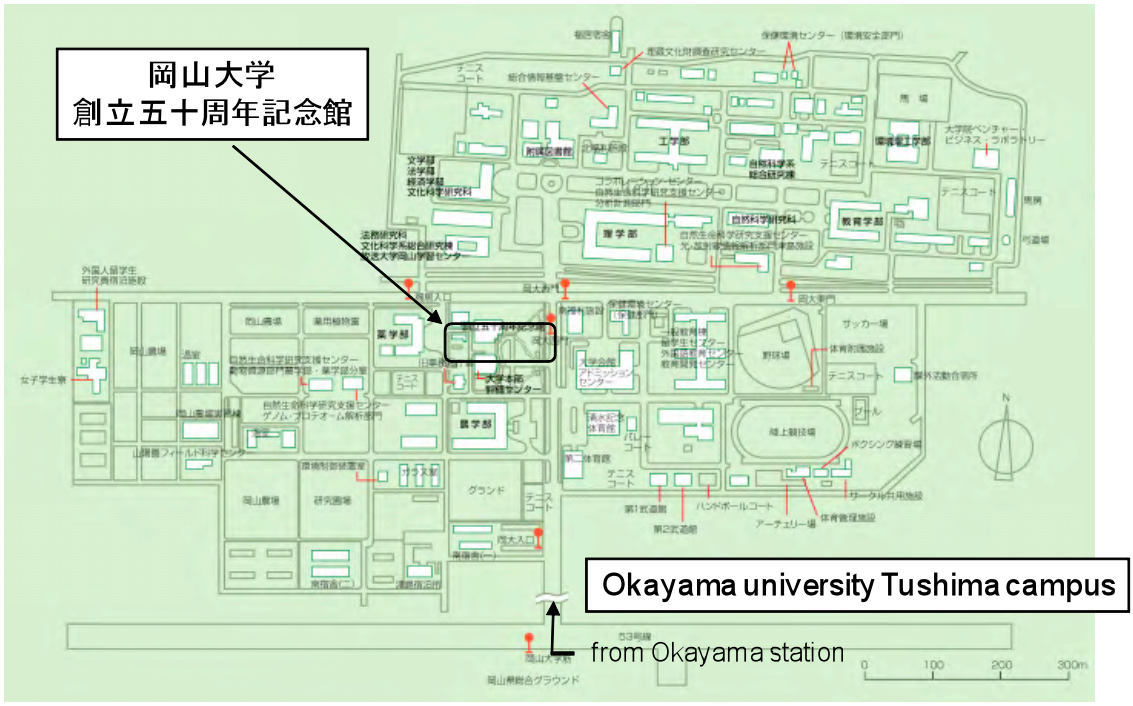
このシンポジウムの誕生には，平成 17 年度の中央教育審議会答申「新時代の大学院教育-国際的に魅力ある大学院教育の構築に向けて-」を出発点に，その後の大学院教育振興施策要綱（平成 18 年度），大学院設置基準の改正（平成 19 年度）が大きく係わっています．これら施策の目的は，大学院教育を組織的に強化し，国際的な通用性と信頼性をアップさせることにあります．これを実現するには様々な手法があると思いますが，岡山大学大学院医歯薬学総合研究科では「人材養成目的の明確化」と「教育課程の編成の柔軟化」という 2 点に着目しました．新たな人材養成目的として高度専門職業人（専門医）を視野に入れて，平成 19 年度から大学院に臨床専門医コースを開設しました．とくに歯学系大学院では，このコースに講義と臨床実習を組み合わせた柔軟な授業科目も設定し，高度な専門的技術を修得できるようにしました.

臨床専門医コースでは，初年度から EBM セミナーを開催しました．この目的は，高度な専門的臨床能力を習得するとともに，臨床研究を理解し実践できる能力を身につけること，また全人的な視野を持った患者診療ならびに国際的視野を持った臨床研究が行える能力を身につけることです．セミナーを通して，臨床研究の重要性，教育体制の合理化という課題も浮上してきました.

このような背景の中で，文部科学省の重点的な支援を受けた大学院教育改革支援プログラム「医療系大学院高度臨床専門医養成コース」が採択され，国際シンポジウム等の様々な事業を推し進めることとなりました.

我が国の歯学部および大学院では，いかに優秀な歯科医師（高度専門職業人）を養成するか，言い換えると大学にどの程度の教育力があるかが試されています．今回の国際シンポジウムを皆さんと共にエンジョイし，教育力のレベルアップに繋がることを期待しています.

会　場　案　内



●岡山駅西口から岡電バス「岡山理科大学」行に乗車，「岡大西門」で下車，徒歩約１分.
●岡山駅西口からタクシーで約７分.
●ＪＲ津山線「法界院」駅で下車して徒歩約１０分.

誠に申し訳ありませんが，利用者用駐車場がございませんので，公共交通機関を利用してお越しください。（友野印刷に地図作成を依頼中です）

Program (5/16 Saturday)

13:30-13:40 Opening Remarks for Pre-Symposium Meeting at Okayama University Dental School

13:40-15:40 Pre-Symposium Meeting (Meeting Room 1 of the Dental School, 2nd Floor)

15:40-16:00 Introduction of Okayama University Medical and Dental school

16:00-17:00 Meeting for Simultaneous Interpretation

Program (5/17 Sunday)

13:00-13:20 Opening Remarks

1. *Prof. Kyozo CHIBA*
   President of the National University Corporation, Okayama University
2. *Prof. Hirofumi MAKINO*
   Dean of Okayama University Graduate School of Medicine, Dentistry and Pharmaceutical Sciences
3. *Prof. Ryuji MATSUO*
   Dean of Okayama University Dental School

13:30-14:30 Session 1: Advanced Educational Activities of Okayama University Graduate School of Medicine, Dentistry and Pharmaceutical Sciences
Session Chairs: Prof. Yasuhiro TORII and Prof. Toshio YAMAMOTO (Okayama University Graduate School of Medicine, Dentistry and Pharmaceutical Sciences)

1. *Why do we need a clinical specialist course in medical and dental graduate schools?*
   Prof. Takuo KUBOKI
   Okayama University Graduate School of Medicine, Dentistry and Pharmaceutical Sciences (Dental, Oral Rehabilitation and Regenerative Medicine)
2. *Strategic Plan for Strengthening Educational Capacity in Public Health*
   Prof. Hiroyuki DOI
   Okayama University Graduate School of Medicine, Dentistry and Pharmaceutical Sciences (Medical, Epidemiology)

14:45-16:15 Session 2: Educational Connection among Asian Dental Schools – How can we collaborate with the dental schools in Asian countries
Session Chairs: Prof. Hitoshi NAGATSUKA and Prof. Shogo MINAGI (Okayama University Graduate School of Medicine, Dentistry and Pharmaceutical Sciences)

1. *Prof. Hitoshi NAGATSUKA*
   Okayama University Graduate School of Medicine, Dentistry and Pharmaceutical Sciences (Japan)
2. *Prof. Bazar AMARSAIKHAN*
   School of Dentistry, Health Sciences University of Mongolia (Mongolia)
3. *Prof. Lu Zhen FU and Prof. Yaping PAN*
   China Medical University (China)
4. *Prof. Jae il LEE*
   School of Dentistry, Seoul National University (Korea)
5. *Prof. Thuc PHAM VAN and Dr. Lieu PHAM VAN*

Rector of Hai Phong Medical University, Head of Haiphong Dental Faculty (Vietnam)

6. *Prof. N. Sridhar SHETTY*
   Shetty Memorial Institute of Dental Sciences (India)
7. *Prof. Mohammad Amirul ISLAM*
   Bangladesh Dental College (Bangladesh)
8. *Prof. Bahruddin TALIB*
   Faculty of Dentistry, Hasanuddin University (Indonesia)

16:30-18:00 Session 3: Special Lectures on Translational Research in Dentistry – Dental Science and Regenerative Medicine
Session Chairs: Prof. Masaharu TAKIGAWA and Prof. Takashi YAMASHIRO (Okayama University Graduate School of Medicine, Dentistry and Pharmaceutical Sciences)

1. *Mesenchymal Stem Cells: Diseases and Cure*
   Assoc. Prof. Songtao SHI
   Center for Craniofacial Molecular Biology, University of Southern California School of Dentistry (USA)
2. *Tooth Regenerative Therapy as a Future Organ Replacement Regenerative Therapy*
   Prof. Takashi TSUJI
   Research Institute for Science and Technology, Tokyo University of Science (Japan)

19:00-21:00 Commemoration Ceremony of Okayama University 60th anniversary
(HOTEL GRANVIA OKAYAMA)
http://www.granvia-oka.co.jp/english/index.html

Program (5/18 Monday)

9:00-11:00 Session 4: Basic Dental Sciences and Future - Research Direction that Activates Basic Dento-medical Sciences in Post-genomic Era
Session Chairs: Prof. Shigeo KITAYAMA and Assoc. Prof. Satoshi KUBOTA (Okayama University Graduate School of Medicine, Dentistry and Pharmaceutical Sciences)

1. *CCN Family Proteins and Micro RNAs: Extracellular and Intracellular Conductors of Molecular Networks.*
   Assoc. Prof. Satoshi KUBOTA
   Oral Biochemistry, Okayama University Graduate School of Medicine, Dentistry and Pharmaceutical Sciences (Japan)
2. *Regulation of Bone-Morphogenetic-Protein (BMP) Signalling by Proteins of the Chordin Family*
   Prof. Walter SEBALD
   Physiological Chemistry II, Biocenter, University of Wuerzburg (Germany)
3. *MicroRNAs; Biogenesis and Functions*
   Assoc. Prof. Mikiko SIOMI
   Keio University School of Medicine (Japan)
4. *Role of Cellular MicroRNAs in HIV-1 Latency*
   Assoc. Prof. Hui ZHANG
   Center for Human Virology, Division of Infectious Diseases, Department of Medicine, Thomas Jefferson University (USA)

11:15-12:15 Session 5: NIDCR (NIH) Director Special Lecture

Session Chairs: Prof. Ryuji MATSUO and Prof. Shogo TAKASHIBA (Okayama University Graduate School of Medicine, Dentistry and Pharmaceutical Sciences)
Lecture Title: "Perspectives of Dental Education and Research"
Dr. Lawrence A. TABAK
National Institute of Dental and Craniofacial Research (NIDCR),
National Institutes of Health (NIH) (USA)

12:15-13:00 Lunch Break

All Domestic Dental School Meeting to Improve Dental Education, International Reviewer Meeting to Explain How to Estimate this Trial, Poster Session

13:00-15:00 Session 6: Urgent Discussion on Dental Education - How to Improve Quality of Dental Treatment? -In Response to the First Report of the Ad Hoc Committee to Discuss about Revolution and Improvement of Dental Education
Session Chair: Prof. Kazuhiro ETO
Vice Chairman, Common Achievement Tests Organization
Professor emeritus, Tokyo Medical and Dental University
Visiting Professor, School of Life Dentistry, The Nippon Dental University
President, Japanese Association for Dental Science

1. *To Improve Quality of Dental Management - In Response to the First Report from the Ad Hoc Committee to Discuss about Revolution and Improvement of Dental Education*
   Mr. Kazuhiro ARAKI
   Director, Medical Education Division, Ministry of Education, Culture, Sports, Science and Technology-Japan
2. *Counter-measures Necessary to Secure Quality of Dental and Medical Treatment through Education Improvement/Completion*
   Prof. Shiro MATAKI
   Graduate School of Tokyo Medical and Dental University
3. *Current Problems of Postgraduate Dental Education and their Measures: Towards the Improvement of Quality of Dental Management*
   Prof. Kiyoshi KOYANO
   Faculty of Dental Science, Kyushu University

15:00-17:00 Session 7: International Career Pathways for Japanese-trained Dentists

Session Chairs: Prof. Kazuomi SUZUKI and Prof. Manabu MORITA (Okayama University Graduate School of Medicine, Dentistry and Pharmaceutical Sciences)

1. *Translational Research in the Field of Adhesive Dentistry*
   Dr. Atsushi MINE
   Leuven BIOMAT Research Cluster, Department of Conservative Dentistry
   School of Dentistry, Oral Pathology and Maxillo-Facial Surgery, Catholic University of Leuven (Belgium)
2. *Salivary Gland Stem Cell Research and Career Pathways for Woman Scientists*
   Dr. Sayuri YOSHIZAWA
   Craniofacial and Skeletal Diseases Branch, National Institute of Dental and Craniofacial Research, National Institutes of Health (USA)

(to be continued to the next page)

3. What I have done, what I should have done, and what I will do in the future
Assoc. Prof. Eiki KOYAMA
Department of Orthopaedic Surgery
Thomas Jefferson University Jefferson Medical College (USA)

4. Practice Dentistry in North America for Foreign Trained Dentists
Dr. Hiroshi TAKAGI
General Practitioner, Coldwater Dental Practice
Empress Walk Dental Practice (Canada)

17:00 Closing Remark
Prof. Akira SASAKI
Chief, Associate Dean (Dental Section), Okayama University Hospital

プログラム：5 月 16 日（土）

13:30−13:40 プレシンポジウムミーティングの開会式
13:40−15:40 プレシンポジウムミーティング
15:40−16:00 岡山大学医学部，歯学部の紹介
16:00−17:00 同時通訳打ち合わせ

プログラム：5 月 17 日（日）

13:00-13:20 開会式
学長挨拶　　岡山大学　学長　千葉喬三教授
研究科長挨拶　岡山大学大学院医歯薬学総合研究科　研究科長　槇野博史教授
歯学部長挨拶　岡山大学歯学部　学部長　松尾龍二教授

13:30-14:30 セッション1：岡山大学医療系大学院の教育改革の取り組み
座長：鳥井康弘教授，山本敏男教授（岡山大学大学院医歯薬学総合研究科）
1. なぜ臨床専門医コースが必要か
大学院 GP「医療系大学院高度臨床専門医養成コース」
取り組み実施責任者　窪木拓男教授（岡山大学大学院医歯薬学総合研究科）
2. 公衆衛生人材育成戦略
大学院 GP「ユニット教育による国際保健実践の人材育成」
取り組み実施責任者　土居弘幸教授（岡山大学大学院医歯薬学総合研究科）

14:45-16:15 セッション2：アジア教育連携シンポジウム
―アジアの時代にいかに岡山大学歯学部が貢献するか
座長：長塚　仁教授，皆木省吾教授（岡山大学大学院医歯薬学総合研究科）
1. Prof. Hitoshi NAGATSUKA（長塚　仁教授）
Okayama University Graduate School of Medicine, Dentistry and Pharmaceutical Sciences（日本）
2. Prof. Bazar AMARSAIKHAN (モンゴル)
School of Dentistry, Health Sciences University of Mongolia
3. Prof. Lu Zhen FU and Prof. Yaping PAN
China Medical University (中国)
4. Prof. Jae il LEE (韓国)
School of Dentistry, Seoul National University
5. Prof. Thuc PHAM VAN and Dr. Lieu PHAM VAN (ベトナム)
Hai Phong Medical University and Head of Haiphong Dental Faculty
6. Prof. N. Sridhar SHETTY (インド)
Shetty Memorial Institute of Dental Sciences
7. Prof. Mohammad Amirul ISLAM (バングラデシュ)
Bangladesh Dental College
8. Prof. Bahruddin TALIB (インドネシア)
Faculty of Dentistry, Hasanuddin University

16:30-18:00 セッション3：歯学トランスレーショナル研究シンポジウム

ー再生医学の進歩と歯科医学

座長：滝川正春教授，山城 隆教授（岡山大学大学院医歯薬学総合研究科）

1. Mesenchymal Stem Cells: Diseases and Cure

（間葉系幹細胞：疾患と治療）

Prof. Songtao SHI

Center for Craniofacial Molecular Biology (CCMB), University of Southern California (USC) School of Dentistry（米国）

2. Tooth Regenerative Therapy as a Future Organ Replacement Regenerative Therapy（歯の再生治療：将来の臓器置換型再生医療に向けて）

Prof. Takashi TSUJI（辻 孝教授）

Research Institute for Science and Technology, Tokyo University of Science（日本）

19:00-21:00 岡山大学創立60周年記念式典（医歯薬学総合研究科歯学系，歯学部主催）

（ホテルグランヴィア岡山）

http://www.granvia-oka.co.jp/

プログラム：5 月 18 日（月）

9:00-11:00 セッション4：基礎歯科医学サミット

ーポストゲノムの時代に歯科基礎医学を活性化するための方向性

座長：北山滋雄教授，久保田聡准教授（岡山大学大学院医歯薬学総合研究科）

1. CCN Family Proteins and MicroRNAs: Extracellular and Intracellular Conductors of Molecular Networks

（CCN ファミリー蛋白とマイクロ RNA：細胞内外の分子ネットワークの調節因子）

Assoc. Prof. Satoshi KUBOTA（久保田聡准教授）

岡山大学大学院医歯薬学総合研究科 口腔生化学分野（日本）

2. Regulation of Bone-Morphogenetic-Protein (BMP) Signaling by Proteins of the Chordin Family（Chordin ファミリー蛋白による骨形成因子シグナルの伝達調節）

Prof. Walter SEBALD

Physiological Chemistry II, Biocenter, University of Wuerzburg（ドイツ）

3. MicroRNAs; Biogenesis and Functions

（マイクロ RNA；合成と機能）

Assoc. Prof. Mikiko SIOMI（塩見美喜子准教授）

慶應大学医学部（日本）

4. Role of Cellular MicroRNAs in HIV-1 Latency

（HIV-1 の潜伏に関わるマイクロ RNA の役割）

Assoc. Prof. Hui ZHANG

Center for Human Virology, Division of Infectious Diseases, Department of Medicine, Thomas Jefferson University（米国）

11:15-12:15 セッション5：NIDCR (NIH) Director 特別講演

座長：松尾龍二教授，高柴正悟教授（岡山大学大学院医歯薬学総合研究科）

Perspectives of Dental Education and Research

（歯学教育と研究の将来展望）

Dr. Lawrence A. TABAK

National Institute of Dental and Craniofacial Research (NIDCR),

National Institutes of Health（米国）

12:15-13:00 昼休み（全国歯科大学教育連携会議，国際評価委員評価説明会議）

ポスターセッション

13:00-15:00 セッション6：緊急歯学教育シンポジウム

一歯科医療の質をいかに高めるか

座長 江藤一洋教授（医療系大学間共用試験実施評価機構副理事，東京医科歯科大学名誉教授，日本歯科大学生命歯学部教授，日本歯科医学会会長）

1. 歯科医療の質をいかに高めるか一歯学教育の改善・充実に関する調査研究協力者会議の第一次答申を受けて

   文部科学省高等教育局医学教育課長

   新木一弘先生

2. 歯学教育の改善・充実を通して歯科医療の質を担保するために必要とされる対策

   東京医科歯科大学大学院 医歯学総合研究科

   俣木志朗教授

3. 卒後教育の改善・充実を通して歯科医療の質を担保するために必要とされる対策

   九州大学大学院 歯学研究院

   古谷野潔教授

15:00-17:00 セッション7：歯科医学研究者や臨床家のための国際キャリアパス

座長：鈴木一臣教授，森田 学教授（岡山大学大学院医歯薬学総合研究科）

1. Translational Research in the Field of Adhesive Dentistry

   （接着歯学におけるトランスレーショナル・リサーチ）

   Dr. Atsushi MINE（峯 篤史先生）

   Leuven BIOMAT Research Cluster, Department of Conservative Dentistry School of Dentistry, Oral Pathology and Maxillo-Facial Surgery, Catholic University of Leuven（ベルギー）

2. Salivary Gland Stem Cell Research and Career Pathways for Woman Scientists

   （ヒト唾液腺幹細胞研究と女性研究者のキャリアパス）

   Dr. Sayuri YOSHIZAWA（吉澤さゆり先生）

   Craniofacial and Skeletal Diseases Branch, National Institute of Dental and Craniofacial Research, National Institutes of Health（米国）

3. What I have done, what I should have done, and what I will do in the future

   （自分は何ができたか，自分は何をすべきであったか，そしてこれから自分は何をしたいのか）

   Assoc. Prof. Eiki KOYAMA（小山英樹准教授）

   Department of Orthopaedic Surgery

Thomas Jefferson University Jefferson Medical College（米国）

4. Practice Dentistry in North America for Foreign Trained Dentists
（外国で教育を受けた歯科医師による北米での歯科診療の実際）
Dr. Hiroshi TAKAGI（高木洋志先生）
General Practitioner, Coldwater Dental Practice
Empress Walk Dental Practice（カナダ）

17:00 閉会式
歯科系代表副病院長挨拶
佐々木朗教授（岡山大学病院　歯科系代表副病院長）

Poster Presentation Program

1. Introducing a portfolio system: POSGRA as a tool for student-teacher-administrator communication in postgraduate education.

   ○Nakanoda S[1], Kimura A[2], Kuboki T[2]

   [1]Insidefield Co. Ltd., [2]Oral Rehabilitation and Regenerative Medicine, Okayama University Graduate School of Medicine, Dentistry and Pharmaceutical Sciences

2. Survey of infection control knowledge, practice and perceptions in post-graduate dental training and sixth-year dental students for educational program.

   ○Satoh N[1, 2], Watanabe A[1] , Kokeguchi S[1]

   [1]Oral Microbiology, Graduate School of Medicine, Dentistry and Pharmaceutical Sciences, Okayama University, [2]Social Health View Study

3. Smad2 reduces gingival epithelial cell migration**.**

   ○Shimoe M, Shiomi N, Tomikawa K, Mineshiba J, Yamaguchi T, Maeda H, Takashiba S

   Pathophysiology - Periodontal Science, Okayama University Graduate School of Medicine, Dentistry and Pharmaceutical Sciences

4. Distribution, gene expression, and functional role of EphA4 during ossification.

   ○Kuroda C[1, 2], Kubota S[1], Kawata K[1, 2], Aoyama E[3], Sumiyoshi K[1], Oka M[2], Minagi S[2], Takigawa M[1]

   [1]Biochemistry and Molecular Dentistry, Okayama University Graduate School of Medicine, Dentistry and Pharmaceutical Sciences, [2]Occlusal and Oral Functional Rehabilitation, Okayama University Dental School, Okayama University Graduate School of Medicine, Dentistry, and Pharmaceutical Sciences, Okayama, [3]Biodental Research Center, Okayama University Dental School

5. Is repair of DNA damage associated with hypoxia-induced cisplatin resistance in squamous cell carcinoma.

   ○Umehara A[1], Mese H[1] , Yao M[1],Hassan NMM[1] and Sasaki A[1]

   [1]Oral and Maxillofacial Surgery, Okayama University Graduate School of Medicine, Dentistry and Pharmaceutical Sciences

6. Bone formation in a rat carvarial defect model after transplanting autogenous bone marrow with beta-tricalcium phosphate.

   ○Shirasu N, Ueno T, Wakimoto M, Hirata A, Sawaki M, Kanou M,

   Yamachika E

   Oral and Maxillofacial Reconstructive Surgery, Okayama University Graduate School of Medicine, Dentistry and Pharmaceutical Sciences

7. The regulation of *Ccn2/Ctgf* gene via micro RNA 18a, which suppresses chondrocytes differentiation.

○Ohgawara T[1, 2, 3], Kubota S[1] , Kawaki H[1], Kondo S[1], Eguchi T[1], Sasaki A[2], Takigawa M[1]

[1]Biochemistry and Molecular Dentistry, Okayama University Graduate School of Medicine, Dentistry, and Pharmaceutical Sciences, [2]Oral and Maxillofacial Surgery and Biopathological Science, Okayama University Graduate School of Medicine, Dentistry, and Pharmaceutical Sciences, [3]Oral and Maxillofacial Surgery, Mitoyo General Hospital

8. Anti-osteoclastogenic effects of novel focal adhesion kinase inhibitor TAE226 in osteolytic metastasis of breast cancer.

○ Kurio N[1], Shimo T[1], Takaoka M[2], Okui T[1], Yoshioka N[1], Hassan N[1], Hatakeyama S[3], Naomoto Y[2] , Sasaki A[1]

[1]Oral and Maxillofacial Surgery, Okayama University Graduate School of Medicine, Dentistry and Pharmaceutical Sciences, [2]Gastroenterological Surgery, Transplant, and Surgical Oncology, Okayama University Graduate School of Medicine, Dentistry and Pharmaceutical Sciences, [3]Novartis Institutes for BioMedical Research

9. A basic study: bond strengths and bio-compatibility of experimental mineralization accelerating adhesives containing collagen-immobilized poly ethylene-co-vinyl alcohol (EVA+C).

○Hoshika T, Nishitani Y, Shinno Y, Omae M, Kishimoto M, Anabuki Y, Takahashi K, Yamaji K, Yoshiyama M

Operative Dentistry, Okayama University Graduate School of Medicine, Dentistry and Pharmaceutical Sciences

10. Chondrocyte-haemopoietic cell interaction that induces CCN2 and its physiological significance.

○Sumiyoshi K[1, 2],Kubota K[1], Furuta R[3], Kawaki H[1], Aoyama K[4], Kawata K[1], Ohgawara T[1], Yamashiro T[2] and Takigawa M[1, 4]

[1]Biochemistry and Molecular Dentistry, Okayama University Graduate School of Medicine, Dentistry, and Pharmaceutical Sciences, [2]Orthodontics, Okayama University Graduate School of Medicine, Dentistry and Pharmaceutical Sciences, [3]Osaka Red Cross Blood Center and [4]Biodental Research Center, Okayama University Dental School

11. CCN family 2/connective tissue growth factor modulates BMP signaling as a signal conductor, which action regulates the proliferation and differentiation of chondrocytes.

○Maeda A[1, 2], Nishida T[1], Aoyama E[3], Kubota S[1], Kuboki T[2], Lyons KM[4], Takigawa M[1]

[1]Biochemistry and Molecular Dentistry, Okayama University Graduate School of Medicine, Dentistry and Pharmaceutical Sciences, [2]Oral Rehabilitation and Regenerative Medicine, Okayama University Graduate School of Medicine, Dentistry and Pharmaceutical Sciences, [3]Biodental Research Center, Okayama University Dental School and [4]Orthopaedic Surgery, University of California Los Angeles

12. Identification of transcription-regulating genes expressed during murine molar development.

○Uchibe K[1, 2], Shimizu H[2], Yokoyama S[2], Sonoyama W[1], Kuboki T[1], Asahara H[2]

[1]Oral Rehabilitation and Regenerative Medicine, Okayama University Graduate School of Medicine, Dentistry and Pharmaceutical Sciences, [2]Systems Biomedicine, National Research Institute for Child Health and Development

13. Analysis of transgenic mice overexpressing *ccn2/ctgf* in chondrocytes.

○Tomita N[1, 2], Hattori T[2], Ito S[1, 2], Aoyama E[1, 3], Yao M[1], Yamashiro T[2], Takigawa M[1]

[1]Biochemistry and Molecular Dentistry, Okayama University Graduate School of Medicine, Dentistry and Pharmaceutical Sciences, [2]Orthodontics and Dentofacial Orthopedics, Okayama University Graduate School of Medicine, Dentistry and Pharmaceutical Sciences, [3]Biodental Research Center, Okayama University Graduate School of Medicine, Dentistry and Pharmaceutical Sciences

14. Role of the low-density lipoprotein receptor-related protein-1 in regulation of chondrocyte differentiation.

○Kawata K[1, 2], Kubota S[1], Eguchi T[1], Moritani NH[3], Kondo S[3], Nishida S[1], Minagi S[2], Takigawa M[1]

[1]Biochemistry and Molecular Dentistry, Okayama University Graduate School of Medicine, Dentistry and Pharmaceutical Sciences, [2]Occlusal and Oral Functional Rehabilitation, Okayama University Graduate School of Medicine, Dentistry and Pharmaceutical Sciences, [3]Oral and Maxillofacial Reconstructive Surgery, Okayama University Graduate School of Medicine, Dentistry and Pharmaceutical Sciences

15. Vitamin C intake reduces the degree of experimental atherosclerosis induced by periodontitis in a rat model.

○Irie K[1], Ekuni D[1], Tomofuji T[1], Sanbe T[1], Azuma T[1], Maruyama T[1], Tamaki N[1], Murakami J[2], Kokeguchi S[3], Yamamoto T[1], Morita M[1]

[1]Preventive Dentistry, Okayama University Graduate School of Medicine, Dentistry and Pharmaceutical Sciences, [2]Oral and Maxillofacial Radiology, Okayama University Graduate School of Medicine, Dentistry and Pharmaceutical Sciences, [3]Oral Microbiology, Okayama University Graduate School of Medicine, Dentistry and Pharmaceutical Sciences

16. The formation mechanism of the biomaterial-tooth interface by functional phosphoric acid ester monomers.

    ○Yoshihara K[1], Yoshida Y[2], Nagaoka N[3], Hayakawa S[4], Mine A[5], Van Meerbeek B[5], Osaka A[4], Suzuki K[2], Minagi S[1]

    [1]Occlusal and Oral Functional Rehabilitation, Okayama University Graduate School of Medicine, Dentistry and Pharmaceutical Sciences, [2]Biomaterials, Okayama University Graduate School of Medicine, Dentistry and Pharmaceutical Sciences, [3]Laboratory for Electron Microscopy, Okayama University Graduate School of Medicine, Dentistry and Pharmaceutical Sciences, [4]Biomaterials Laboratory, Graduate School of Natural Science and Technology, Okayama University, [5]Leuven BIOMAT Research Cluster, Conservative Dentistry, Catholic University of Leuven

17. Vitamin D3 modulates the expression of CCN4/WISP-1 in osteogenic cells.

    ○Oida Y[1, 2)], Ono M[1, 2)], Sonoyama W[1)], Inkson C[2)], Kuboki T[1)], Young M[2)]

    [1]Oral Rehabilitation and Regenerative Medicine, Okayama University Graduate School Medicine, Dentistry and Pharmaceutical Sciences, [2]Molecular Biology of Bones and Teeth Section, Craniofacial and Skeletal Diseases Branch, National Institute of Dental and Craniofacial Research, National Institutes of Health

18. Human eosinophil cationic protein enhances the growth of human gingival fibroblast.

    ○Sato T[1], Soga Y[1] , Yamaguchi T[1], Maeda H[1], Otani T[2], Seno M[2], Takashiba S[1]

    [1]Pathophysiology - Periodontal Science, Okayama University Graduate School of Medicine, Dentistry and Pharmaceutical Sciences, [2]Medical and Bioengineering Science, Okayama University Graduate School of Natural Science and Technology

19. Aggravating factor evaluation of self-estimated trapezius muscle pain in an adolescent population.

    ○Kawakami A, Minakuchi H, Sakaguchi C, Kuroi R, Maekawa K, Matsuka Y, Kuboki T.

    Oral Rehabilitation and Regenerative Medicine, Okayama University Graduate School of Medicine, Dentistry and Pharmaceutical Sciences

20. Botulinum toxin blocks neurotransmitter release and alleviates neuropathy

symptoms

○Kumada A[1], Kitamura Y[1], Matsuka Y[1] , Spigelman I[2], Ishihara Y[3], Yamamoto Y[4], Hikasa T[1], Sonoyama W[1], Kamioka H[3] , Yamashiro T[3] , Kuboki T[1], Oguma K[4]

[1]Oral Rehabilitation and Regenerative Medicine, Okayama University Graduate School of Medicine, Dentistry and Pharmaceutical Sciences, [2]Oral Biology & Medicine, School of Dentistry, University of California, Los Angeles, [3]Orthodontics and Dentofacial Orthopedics, Okayama University Graduate School of Medicine, Dentistry and Pharmaceutical Sciences, [4]Bacteriology, Okayama University Graduate School of Medicine, Dentistry and Pharmaceutical Sciences

21. Clinical evaluation of rhBMP-2 for alveolar augmentation in the atrophic maxilla.

○Wakimoto M[1], Ueno T[2], Yamada T[1], Matsumura T[1], ShirasuN[1], Sawaki M[1], Aghaloo T[4], Moy PK[5]

[1]Oral and Maxillofacial Reconstructive Surgery, Okayama University Graduate School of Medicine, Dentistry and Pharmaceutical Sciences, [2]Oral and Maxillofacial Surgery, Fukui University Medical School, [3]Oral and Maxillofacial Surgery, University of California, Los Angeles, School of Dentistry, [4]Dental Implant Center, University of California, Los Angeles

22. Myoblast graft effect on scar formation and muscle regeneration in cleft lip.

○Janune D[1], Yamada T[1] , Mishima K[1], Matsumura T[1], Moritani N[1], Sugahara T[1]

[1]Oral and Maxillofacial Reconstructive Surgery, Okayama University Graduate School of Medicine, Dentistry and Pharmaceutical Sciences

23. Remaining teeth status of implant-supported fixed partial denture patients with unilateral mandibular free-end edentulism.

○Yamazaki S[1], Arakawa H[1], Noda K[1], Kimura A[1], Matsuka Y[1], Kuboki T[1]

[1]Oral Rehabilitation and Regenerative Medicine, Okayama University Graduate School of Medicine, Dentistry and Pharmaceutical Sciences

24. Which treatment, implant supported fixed partial denture or removable partial denture, promotes oral health related quality of life in patients with free-end edentulism better?

○Kimura A, Arakawa H, Noda K, Yamazaki S, Matsuka Y, Kuboki T

Oral Rehabilitation and Regenerative Medicine, Okayama University Graduate School of Medicine, Dentistry and Pharmaceutical Sciences

25. The role of Sulf, a heparan sulfate 6-O-endosulfatase, in tooth development.

○Hayano S[1], Kurosaka H[1], Kalus I[2], Dierks T[2], Yamashiro T[1]

[1]Orthodontics and Dentfacial Orthopedics, Okayama University Graduate School of Medicine, Dentistry and Pharmaceutical Sciences, [2]Chemistry, Biochemistry I, Bielefeld University

26. Experience of emergency medical practice in Wahidin Hospital at Hasanuddin University in Indonesia for one month.

○Yumoto T, Ujike Y

Emergency and Critical Care Medicine, Okayama University Graduate School of Medicine, Dentistry and Pharmaceutical Sciences

27. Exchange Fellowship at Leiden University Medical Center.

○Saiga K, Abe N, Ozaki T

Orthopaedic Surgery, Okayama University Graduate School of Medicine, Dentistry, and Pharmaceutical Sciences

Abstracts

抄録集

13:30-14:30 Session 1: Advanced Educational Activities of Okayama University Graduate School of Medicine, Dentistry and Pharmaceutical Sciences
Session Chairs: Prof. Yasuhiro TORII and Prof. Toshio YAMAMOTO (Okayama University Graduate School of Medicine, Dentistry and Pharmaceutical Sciences)

1. Why do we need clinical specialist course in medical and dental graduate schools?

Prof. Takuo KUBOKI
Okayama University Graduate School of Medicine, Dentistry and Pharmaceutical Sciences (Dental, Oral Rehabilitation and Regenerative Medicine)

Graduate schools in medical and dental fields hold diverse missions. Since 2007, Okayama University Graduate School of Medicine, Dentistry and Pharmaceutical Sciences has devoted to divide the classical 4 year doctor course into “Clinical Specialist Course” where the students learn clinical and diagnostic art and science as a specialist in each clinical field, and “Basic Scientist Course” where the students can be trained as basic researchers with international excellence. The objectives of the division were to optimize two diverse courses according to their different mission. For example, the objective of the Clinical Specialist Course is to improve clinically inevitable knowledge, skill, behavior during the doctorate course in order to guaranty the quality of the medical and dental care that general patients are expecting. In addition, the clinical specialist course has another mission to clarify the current limits of medical and dental treatment, to pioneer new policies to break-down these limits and further to clarify its effectiveness and validity. Henceforth, it is obviously necessary to reform clinical science learning starting from the viewpoint of clinical epidemiology, as well as to promote connection between the clinical and basic sciences to clarify pathophysiology (with specific molecular events) of each disorder and develop a new treatment strategy.

This challenge needs to be promoted in accordance to world standards. To attain this, international exchanges of educational stuffs and students are indispensable. Fortunately, Okayama University Graduate School of Medicine, Dentistry and Pharmaceutical Sciences has been awarded an educational grant-in-aid by Ministry of Education, Culture, Sports, Science and Technology-Japan to further develop the “Advanced Clinical Expert Training Course”. Such the economic support that enabled to bear the expenses of this meeting is really a great fortune. In this symposium, while following the loci of our activities, I would like to report the present status of this Clinical Specialist Course in this University.

13:30-14:30　セッション1：岡山大学医療系大学院の教育改革の取り組み
座長：鳥井康弘教授，山本敏男教授（岡山大学大学院医歯薬学総合研究科）

1．なぜ臨床専門医コースが必要か

大学院 GP「医療系大学院高度臨床専門医養成コース」 取り組み実施責任者
岡山大学大学院医歯薬学総合研究科　インプラント再生補綴学分野
窪木拓男教授

医療系大学院は，複数の大きなミッションを背負っている．岡山大学大学院医歯薬学総合研究科では，平成１９年度より，４年生の博士課程一般コースを，臨床技術や臨床決断能力を教育し，臨床を真剣に科学する「臨床専門医コース」と，優れた国際レベルの基礎研究者を養成する「一般コース」に分割し，各々のコースの目的にしたがって大学院の実質化を進めることとなった．このうち，臨床専門医コースは，各学会の専門医制度と同調しながら，学生の臨床能力（知識，技術，態度）を博士（医学・歯学）にふさわしいレベルにまで向上させ，国民が求める医療の質を担保することが目的である．また，現在の医療の限界を明らかにし，この限界を打破する新たな方策を開拓し，その有効性を明らかにすることも更なる目的であろう．このためには，臨床疫学的な観点から臨床を科学し直す必要があるのはもちろんのこと，基礎研究部門と共同し，病態の解明や戦略的治療法の開発を進める必要がある．これらは，全世界的に進んでいる医療のグローバル化に伴って，世界的なスタンダードに則って進められる必要があり，教官・大学院生レベルでの国際交流が不可欠である．幸い，本取り組みの内容が文部科学省により大学院GP（医療系大学院高度臨床専門医養成コース）として認められ，これらに費やすことができる経済的なサポートを頂いたことは本学にとって大変な幸運である．本講演では，我々の活動の軌跡をたどりながら，本学の臨床専門医コースの現状について報告したい．

Academic Carrier：

2009-present：Deputy Director, Okayama University Graduate School of Medicine, Dentistry and Pharmaceutical Sciences
2007-2009：Deputy Director, Okayama University Medical and Dental Hospital
2003-present：Chair and Professor, Oral Rehabilitation and Regenerative Medicine, Okayama University Graduate School of Medicine, Dentistry and Pharmaceutical Sciences
2001-2003：Associate Professor, Oral Rehabilitation and Regenerative Medicine, Okayama University Graduate School of Medicine and Dentistry
1994-1995：Visiting Scholar, University of California, Los Angeles
1991-2000：Assistant Professor, Fixed Prosthodontics, Okayama University Dental School

13:30-14:30 Session 1: Advanced Educational Activities of Okayama University Graduate School of Medicine, Dentistry and Pharmaceutical Sciences
Session Chairs: Prof. Yasuhiro TORII and Prof. Toshio YAMAMOTO (Okayama University Graduate School of Medicine, Dentistry and Pharmaceutical Sciences)

2. Strategic Plan for Strengthening Educational Capacity in Public Health

Prof. Hiroyuki DOI
Okayama University Graduate School of Medicine, Dentistry and Pharmaceutical Sciences (Medical, Epidemiology)

The field of public health is inherently multi-disciplinary. So, too, are the interests and expertise of the School's faculty and students, which extend across the biological, quantitative, and social sciences. We are able to confront the global issues—climate change, emerging & re-emerging infectious diseases, and emergency relief—by adding to our knowledge of their underlying structure and function. Core quantitative disciplines like epidemiology and biostatistics are fundamental to analyzing the broad impact of health problems, allowing us to look beyond individuals to entire populations.

And, we are promoting the establishment of International School of Public Health with Asian Universities, we also pursue the social sciences to better understand health-related behaviors and their societal influences—critical elements in educating and empowering people to make healthier lifestyle choices.

From advancing scientific discovery to training national and international leaders, the Okayama School of Public Health Course will be at the forefront of efforts to benefit the health of populations worldwide.

Academic Carrier：

2007-present: Professor, Department of Epidemiology, Okayama University Graduate School of Medicine, Dentistry, Pharmaceutical Sciences
2002-2007: Executive Adviser & General Director, Shizuoka Prefectural Government
2001-2002: General Director, Shizuoka Prefecture Government
1994-1997: Senior Adviser, GPV/VSQ, World Health Organization
1990-1994: Deputy Director, Ministry of Health and Welfare
1987-1989: JICA Expert on North Sumatra Community Health Project

13:30-14:30　セッション1：岡山大学医療系大学院の教育改革の取り組み
座長：鳥井康弘教授，山本敏男教授（岡山大学大学院医歯薬学総合研究科）

2. 公衆衛生人材育成戦略

大学院 GP「ユニット教育による国際保健実践の人材育成」 取り組み実施責任者
岡山大学大学院医歯薬学総合研究科　疫学・衛生学分野
土居弘幸教授

公衆衛生学は本質的に学際的な分野である．生物学，定量科学，そして社会科学にまで広がる大学教員や学生の興味や専門的知識も同様である．われわれは，気候変動，新興・再興感染症，緊急援助といった世界的な問題に，それらの問題の根本にある構造や機能を理解することにより立ち向かう．そして，個人を超えて全人口を調査することを許される疫学および生物統計学といった学問分野は，健康問題が及ぼす広範囲にわたるインパクトを分析する基盤となっている．

われわれはアジア諸国の大学とともに，国際公衆衛生大学院の設立を推進している．そして，健康行動やその社会的影響をより深く理解するための社会科学の探求も続けている．これは，健康に関する教育や啓発において非常に重要である．

このような先端科学的発見から，国際的リーダーの教育に及ぶ，岡山大学公衆衛生学コースの活動は，世界の人々の健康に利益をもたらす取り組みの最前線に立つと言えるであろう．

ご略歴:

2007-現在：岡山大学大学院医歯薬学総合研究科教授
2002-2007：静岡県理事
2001-2002：平成 13 年静岡県健康福祉部技監
1997-2001：厚生省健康政策局指導課課長補佐
1994-1997：世界保健機関（WHO）Global Program on Vaccine/VSQ
　　専門監（P5）
1992-1994：厚生省大臣官房国際課課長補佐
1990-1994：厚生省保健医療局企画課課長補佐
1987-1989：国際力事業団（JICA）専門家としてインドネシア地域保健対策プロジェクトに従事

14:45-16:15 Session 2: Educational Connection among Asian Dental Schools – How can we Collaborate with the Dental Schools in Asian Countries

Session Chairs: Prof. Hitoshi NAGATSUKA and Prof. Shogo MINAGI (Okayama University Graduate School of Medicine, Dentistry and Pharmaceutical Sciences)

1. Promotion of International Exchange Programs of Undergraduate and Postgraduate Students and Teachers in Okayama University Dental School

Prof. Hitoshi NAGATSUKA
Chairman of Oral Pathology
Okayama University Graduate School of Medicine, Dentistry and Pharmaceutical Sciences
(Japan)

Okayama University Dental School has actively accepted foreign undergraduate and graduate students from many Asian countries, and provided adequate support for them. Currently, the Asian students are drawing attention of many Japanese and Western universities as an outstanding human resource. Considering such circumstances, we need to activate human exchanges and strengthen the relationship with Asian countries in order to contribute to the improvement of dental education and researches in Asia.

In this symposium, we invited leading authorities of dental education and requested them to give lectures on cutting-edge activities of dental educations in Asian countries, including Mongolia, China, South Korea, Vietnam, India, Bangladesh and Indonesia. Thus, the symposium aims at not only introducing the Japanese accumulated educational programs into the Asian countries, but also developing constructive human resources who will circumvent the difficulties in Asian dental educations.

For that purpose, it is necessary to understand the present conditions and to establish a new Asian educational network under the deeper mutual understanding. Okayama University would play a key role of establishing such educational network that cultivates leading human resources with international point of view.

Academic Carrier:

2008-present: Professor and Chairman, Oral Pathology and Medicine, Okayama University Graduate School of Medicine, Dentistry and Pharmaceutical Sciences
2005-2007: Associate Professor, Oral Pathology and Medicine, Okayama University Graduate School of Medicine, Dentistry and Pharmaceutical Sciences
2001-2005: Associate Professor, Oral Pathology and Medicine, Okayama University Graduate School of Medicine and Dentistry
1998-1999: Visiting research associate, Calcium Phosphate Laboratory, College of Dentistry, New York University

14:45-16:15　セッション2：アジア教育連携シンポジウム
ーアジアの時代にいかに岡山大学歯学部が貢献するかー
座長：長塚　仁教授，皆木省吾教授（岡山大学大学院医歯薬学総合研究科）

1．岡山大学歯学部の卒前・卒後における国際交流システムについて

岡山大学大学院医歯薬学総合研究科　口腔病理学分野
長塚　仁教授

岡山大学歯学部はアジア各国から学部学生を含む留学生を積極的に受け入れてきた．しかし，日本のみでなく世界，特に欧米の大学がアジアに注目している現在，必ずしもアジア各国との十分な連携が行われているとはいえないのが現状である．そのような観点から，より活発な人的交流をすすめ，アジアにおける歯学教育・研究に貢献していく必要がある．

そこで本シンポジウムでは，岡山大学の先端的歯学教育の国際展開策の一環として，モンゴル，中国，韓国，ベトナム，インド，バングラデシュ，インドネシアのアジア7カ国から歯学教育を担う第一人者をお迎えし，アジア各国における歯学教育への取り組みについてご講演いただく。本シンポジウムの意義は，単に，日本の培ってきた歯学教育のカリキュラムを，アジアの各国へ配信するのではなく，アジア地域の歯学の発展やアジア地域が抱える課題の解決に繋がる有益な人材輩出機能の構築を目指すことにある．そのためには，アジア各国の歯学教育の現状を理解し，相互理解の上で新たなアジア歯学教育ネットワークの創設を図る必要がある．すなわち，岡山大学が中心的役割を果たし，アジアにおける国際的な視野を有する人材を育成するための教育制度にまで発展させる足がかりとしたい．

ご略歴:
2008：　岡山大学大学院医歯薬学総合研究科　教授
2007：　岡山大学大学院医歯薬学総合研究科　准教授
2001：　岡山大学大学院医歯学総合研究科　助教授
1998：　文部省在外研究員としてニューヨーク大学歯学部にて硬組織細胞の分化に関する研究
1993：　岡山大学歯学部助教授（口腔病理学講座）
1991：　岡山大学大学院歯学研究科　修了　同年岡山大学助手（口腔病理学講座）
1989：　国際共同研究のためトロント大学（口腔病理学）へ留学
1987：　岡山大学歯学部歯学科卒業　岡山大学大学院歯学研究科（口腔病理学講座）　入学

14:45-16:15 Session 2: Educational Connection among Asian Dental Schools – How can we Collaborate with the Dental Schools in Asian Countries
Session Chairs: Prof. Hitoshi NAGATSUKA and Prof. Shogo MINAGI (Okayama University Graduate School of Medicine, Dentistry and Pharmaceutical Sciences)

2. Dental Education and International Student/Teacher Exchange Program in Mongolia

Prof. Bazar AMARSAIKHAN
Dean, School of Dentistry
Health Sciences University of Mongolia (Mongolia)

Education and Academic Carrier:

2004-present: Dean of School of Dentistry, Health Sciences University of Mongolia

2003-2004: Dean of Graduate Studies of Health Sciences University of Mongolia (Since June 2003, National Medical University of Mongolia became Health Sciences University of Mongolia)

2002-2003: Senior Lecturer of Department of Prosthodontics and Chairman of International Relationship, School of Dentistry of Mongolian National Medical University

1993-1997: Assistant professor, Department of Prosthodontics, and School of Dentistry of Mongolian National Medical University

1991-1993: Instructor, Department of Prosthodontics, School of Dentistry, Mongolian National Medical University

1997-2002: PhD: Received from Graduate School, Tokyo Medical and Dental University

1985-1991: DDS: Graduated from Faculty of Dentistry, Havana Medical University, Cuba

14:45-16:15 Session 2: Educational Connection among Asian Dental Schools – How can we Collaborate with the Dental Schools in Asian Countries

Session Chairs: Prof. Hitoshi NAGATSUKA and Prof. Shogo MINAGI (Okayama University Graduate School of Medicine, Dentistry and Pharmaceutical Sciences)

3. Dental Education and International Student/Teacher Exchange Program in China

Prof. Lu Zhen FU

Director, China Medical University (China)

ご略歴：

2004-現在: 中国医科大学口腔医学院　院長

2000-現在: 衛生部中国医科大学日本語養成センター主任

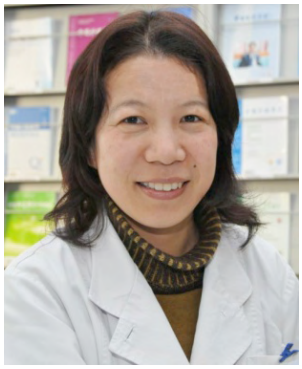
1999-現在: 中国医科大学口腔医学院　教授

1993-現在: 中国医科大学中日センター部長，日本医学教育研究所長

1992-1993: 慶応義塾大学および国立病院管理研究所において研修

1987-1991: 中国医科大学中日医学教育センター部長

1978-1985: 中国医科大学口腔医学院医師，教務課副課長



Prof. Yaping PAN

Director, China Medical University (China)

Education and Academic Carrier:

2006-2007: Co-investigator, School of Dental Medicine,
State University of New York

2001-2002: Visiting Associate Professor,
Dental School of Minnesota University

2001-present: Director and Professor, China Medical University

1999-2001: Visiting Scientist, Dental School of Alabama University at Birmingham

1996-2000: Associate Professor, China Medical University

1992-1996: Assistant Professor, China Medical University

1991-1994: PhD: Stomatological School of West China
University of Medical Sciences

1986-1989: Master: China Medical University

1981-1986: DDS: China Medical University

14:45-16:15 Session 2: Educational Connection among Asian Dental Schools – How can we Collaborate with the Dental Schools in Asian Countries
Session Chairs: Prof. Hitoshi NAGATSUKA and Prof. Shogo MINAGI (Okayama University Graduate School of Medicine, Dentistry and Pharmaceutical Sciences)

4. Dental Education and International Student/Teacher Exchange Program in Korea

Prof. Jae il LEE
Chairman of Oral Pathology, School of Dentistry
Seoul National University (Korea)

Education and Academic Carrier:

2009-Present: Chairman, Department of Oral Pathology, School of Dentistry, Seoul National University

2005-Present: Vice President, Center for Interoperable Electronic Health Record Research and Development, Ministry of Health and Welfare

2001-Present: Secretary of Committee, Institutional Review Board, Seoul National University Dental Hospital

2006-Present: Professor, School of Dentistry, Seoul National University

2000-2006: Associate Professor (Tenure), College of Dentistry, Seoul National University

1996-2000: Assistant Professor, College of Dentistry, Seoul National University

1991-1994: PhD: Graduate School, Seoul National University

1986-1988: MSD: Graduate School, Seoul National University

1981-1985: DDS: College of Dentistry, Seoul National University

14:45-16:15 Session 2: Educational Connection among Asian Dental Schools – How can we Collaborate with the Dental Schools in Asian Countries

Session Chairs: Prof. Hitoshi NAGATSUKA and Prof. Shogo MINAGI (Okayama University Graduate School of Medicine, Dentistry and Pharmaceutical Sciences)

5. Dental Education and International Student/Teacher Exchange Program in Vietnam

Prof. Thuc PHAM VAN

Rector of Hai Phong Medical University (Vietnam)

Prof. Lieu PHAM VAN

Head of Hai Phong Dental Faculty

Hai Phong Medical University (Vietnam)

Education and Academic Carrier (Prof. Thuc PHAM VAN):

Conferred the Associate Professor Title of Medicine in 2003

Doctor of Philosophy in Medicine in 1993

Resident Doctor and Master in Science granted by Ha Noi Medical University in 1985

Lecturer of the Department of Pathophysiology, Immunology and Allergy of Hai Phong Medical University since 1985

Medicine Doctor granted by Ha Noi Medical University in 1982

Education and Academic Carrier (Dr. Lieu PHAM VAN):

Doctor of Philosophy in Medicine in 2008

Doctor degree of level II Specialty by Ha Noi Medical University in 1996

Doctor degree of level I Specialty by Ha Noi Medical University in 1990

Degree granted by Ha Noi Medical University in 1984

Lecturer of the Odonto Stomatology Faculty at Hai Phong Medical University since 1984

14:45-16:15 Session 2: Educational Connection among Asian Dental Schools – How can we Collaborate with the Dental Schools in Asian Countries
Session Chairs: Prof. Hitoshi NAGATSUKA and Prof. Shogo MINAGI (Okayama University Graduate School of Medicine, Dentistry and Pharmaceutical Sciences)

6. Dental Education and International Student/Teacher Exchange Program in India

Prof. N. Sridhar SHETTY
Director, Shetty Memorial Institute of Dental Sciences (India)

Education and Academic Carrier:

He completed Bachelor's degree in Dental Surgery at the Government Dental College, Bangalore, then under the Bangalore University. In 1965 he took up the post of lecturer in the Government Dental College at Bangalore. On completion of his Master's degree in Dental Surgery from the Government Dental College, Mumbai under the Mumbai University, he was promoted to the post of Assistant professor at the Government Dental College, Bangalore where he became one of the most popular teachers, and worked there till December, 1978. He then went onto work at the Nairobi University, Kenya, where he was appointed as the Head and Senior Lecturer of the Department, for one year, and then moved to the Khartoum University, Sudan where he worked an additional 5 years. In 1985, Dr. Shetty returned to Mangalore, India, where he presently resides; to take up the post of the Founder Dean at A.B. Shetty Memorial Institute of Dental Sciences. He worked ardently at this post till 2007, when he retired from being the Dean, yet continues to work as the Director, Professor (Undergraduate and Postgraduate) and Ph.D. guide.

14:45-16:15 Session 2: Educational Connection among Asian Dental Schools – How can we Collaborate with the Dental Schools in Asian Countries

Session Chairs: Prof. Hitoshi NAGATSUKA and Prof. Shogo MINAGI (Okayama University Graduate School of Medicine, Dentistry and Pharmaceutical Sciences)

7. Dental Education and International Student/Teacher Exchange Program in Bangladesh

Prof. Mohammad Amirul ISLAM
Principal, Bangladesh Dental College (Bangladesh)

Education:

FICD: 1995 (USA)

PDT: 1979

PhD: 1978 (Moscow, USSR)

MS: 1976 (Moscow, USSR)

BDS: 1972 (Dhaka)

Academic Carrier:

2000-present: Professor & Principal, Bangladesh Dental College and Professor of Dentistry, Bangladesh Medical College, Dhaka

1997-2000: Associate Professor & Vice Principal, Bangladesh Dental College and Associate Professor of Dentistry, Bangladesh Medical College, Dhaka

1993-1997: Associate Professor of Dentistry, Bangladesh Medical College, Dhaka

1983-1991: Associate Professor, Bangladesh Institute of Child Health, Dhaka

1973-1980: Post graduate studies in Moscow (Govt. Scholarship)

1973-1983: Assistant Professor of dentistry Rajshahi Medical College

1972-1973: Lecturer, Dhaka Dental College, Dhaka

14:45-16:15 Session 2: Educational Connection among Asian Dental Schools – How can we Collaborate with the Dental Schools in Asian Countries
Session Chairs: Prof. Hitoshi NAGATSUKA and Prof. Shogo MINAGI (Okayama University Graduate School of Medicine, Dentistry and Pharmaceutical Sciences)

8. Dental Education and International Student/Teacher Exchange Program in Indonesia

Prof. Bahruddin TALIB
Vice Dean, Faculty of Dentistry, Hasanuddin University
(Indonesia)

Education:

1. Dental degree, Faculty of Dentistry in Hasanuddin University,Makassar, 1990
2. Master of health, in Postgraduate of Airlangga University, Surabaya, 1994
3. Doctor, in Postgraduate of Hasanuddin Unversity, Makassar, 2007

Academic Carrier:

1. Secretary in Department of Prostodonsi
2. Vise Dean (III) of Student Field, Periode 2003 - 2007
3. Vise Dean (I) of Academic Field, Periode 2008 - Now

Organization:

1. Chairman of Branch of Makassar, Association of Dentistry Indonesia periode 2008-2011
2. Members of the Association Prostodonsi Indonesia

16:30-18:00 Session 3: Special Lectures on Translational Research in Dentistry – Dental Science and Regenerative Medicine
Session Chairs: Prof. Masaharu TAKIGAWA and Prof. Takashi YAMASHIRO (Okayama University Graduate School of Medicine, Dentistry and Pharmaceutical Sciences)

1. Mesenchymal Stem Cells: Diseases and Cure

Assoc. Prof. Songtao SHI
Center for Craniofacial Molecular Biology (CCMB)
University of Southern California, School of Dentistry
(USA)

Mesenchymal stem cells (MSCs) are a population of hierarchical postnatal stem cells with the potential to differentiate into mesodermal lineage-derived cells including osteoblasts, chondrocytes, adipocytes, cardiomyocytes, myoblasts and non-mesodermal lineage-derived cells such as neural cells. We found disorder of MSCs contributes to the development of a variety of diseases including systemic lupus erythematosus (SLE), bone necrosis, and osteoporosis. In order to understand potential of using MSCs for clinical therapies, we used autologous or allogenic MSCs to cure SLE, periodontitis, and bone necrosis in animal models and patients. Our data indicate a great potential of using MSCs to cure a variety of disorders and re-establish healthy tissue homeostasis.

Academic Carrier:

2008-present: Associate Professor, Center for Craniofacial Molecular Biology, School of Dentistry, University of Southern California; 2006-2008: Assistant Professor, Center for Craniofacial Molecular Biology, School of Dentistry, University of Southern California; 2003-2006: Section Chief, Dental Biology Section, Craniofacial and Skeletal Diseases Branch, NIDCR/NIH; 1999-2002: Clinical Fellow, Skeletal Biology Section, Craniofacial and Skeletal Diseases Branch, NIDCR/NIH; 1998-1999: Dentist, private practice, S&S Best Dental Center, Los Angeles; 1997-1998: Contractor and IRTA fellow, Skeletal Biology Section, Craniofacial and Skeletal Diseases Branch, NIDCR/NIH; 1994-1997: Postdoctoral Fellow, University of California at San Francisco; 1989-1994: PhD candidate, University of Southern California, Doheny Eye Institute Dr. Isaac Bekhor's Laboratory; 1986-1989: Assistant Professor, Department of Pediatric Dentistry, Beijing University, School of Stomatology

16:30-18:00　セッション3：歯学トランスレーショナル研究シンポジウム
ー再生医学の進歩と歯科医学
座長：滝川正春教授，山城　隆教授（岡山大学大学院医歯薬学総合研究科）

1. Mesenchymal Stem Cells: Diseases and Cure
（間葉系幹細胞：疾患と治療）

Prof. Songtao SHI
Center for Craniofacial Molecular Biology (CCMB)
University of Southern California (USC) School of Dentistry（米国）

間葉系幹細胞とはその分化度から見ると階層性を持った細胞集団であって，骨芽細胞，軟骨細胞，脂肪細胞，心筋細胞，筋芽細胞などの中胚葉由来細胞のみならず，神経系細胞に代表される非中胚葉由来細胞にも分化することができる．

我々は，間葉系幹細胞におけるなんらかの障害が，全身性エリテマトーシスや骨壊死，骨粗鬆症などの様々な疾患の発症に繋がりうることを見出した．そして，間葉系幹細胞の臨床応用の可能性を探るため，全身性エリテマトーシスや歯周病，骨壊死の治療への自家移植，同種移植の効果を動物モデルや臨床研究で検討した．その結果，間葉系幹細胞は様々な疾患の治療に応用しうること，また一度破綻した組織の恒常性を再構築しうることが示唆された．

ご略歴:
2008-present: 准教授，Center for Craniofacial Molecular Biology, School of Dentistry, University of Southern California
2006-2008: 助教授，Center for Craniofacial Molecular Biology, School of Dentistry, University of Southern California;
2003-2006: セクションチーフ, Dental Biology Section, Craniofacial and Skeletal Diseases Branch, NIDCR/NIH
1999-2002: クリニカルフェロー，Skeletal Biology Section, Craniofacial and Skeletal Diseases Branch, NIDCR/NIH
1998-1999: 開業歯科医, S&S Best Dental Center, Los Angeles
1997-1998: Contractor and IRTA fellow, Skeletal Biology Section, Craniofacial and Skeletal Diseases Branch, NIDCR/NIH
1994-1997: Postdoctoral Fellow, University of California at San Francisco.
1989-1994: PhD candidate, University of Southern California, Doheny Eye Institute Dr. Isaac Bekhor's Laboratory
1986-1989: 助教授，Department of Pediatric Dentistry, Beijing University, School of Stomatology

16:30-18:00 Session 3: Special Lectures on Translational Research in Dentistry – Dental Science and Regenerative Medicine

Session Chairs: Prof. Masaharu TAKIGAWA and Prof. Takashi YAMASHIRO (Okayama University Graduate School of Medicine, Dentistry and Pharmaceutical Sciences)

2. Tooth Regenerative Therapy as a Future Organ Replacement Regenerative Therapy

Prof. Takashi TSUJI

Research Institute for Science and Technology

Tokyo University of Science (Japan)

Current approaches to the development of regenerative therapies have been influenced by our understanding of embryonic development, stem cell biology, and tissue engineering technology.

The ultimate goal of regenerative therapy is to develop fully functioning bioengineered organs which work in cooperation with surrounding tissues to replace organs that were lost or damaged organs as a result of disease, injury, or aging. Almost all organs including tooth arise from the organ germs, which are induced by the reciprocal epithelial-mesenchymal interactions in the developing embryo.

It has been proposed a novel concept for a bioengineered organ development that to properly reproduce the developmental process of organogenesis. To demonstrate the possibility of this concept, we attempted to develop a tooth regenerative therapy for lost tooth, which were challenged from the transplantation of a bioengineered tooth germ in adult oral environment as a model of a future organ replacement therapy.

Previously, we developed a three-dimensional organ-germ culture method for the reconstitution a bioengineered organ germ in the early developmental stages (*Nature Methods* **4**:227-230, 2007; *Expert Opinion on Biological Therapy* **8**:1-10, 2008). The regeneration of tooth and periodontal tissues into a functional tooth unit is a critical issue for achieving proper oral function, including mastication.

Recently, we report a successful fully functioning tooth replacement in an adult mouse achieved through the transplantation of bioengineered tooth germ into the alveolar bone in the lost tooth region. The bioengineered tooth, which was erupted and occluded, had the correct tooth structure, hardness of mineralized tissues for mastication, and response to noxious stimulations such as the mechanical stress and pain in cooperation with other oral and maxillofacial tissues.

These studies represent a substantial advance and emphasize the potential for bioengineered organ replacement in future regenerative therapies.

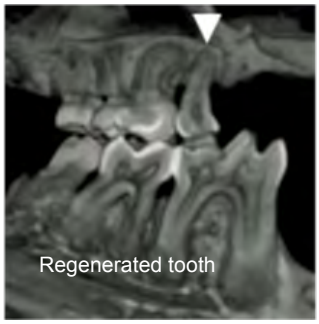


Figure: Micro-CT analysis of a bioengineered tooth erupted in adult oral environment at 50days after transplantation. Arrow-head indicates the bioengineered tooth.

16:30-18:00　セッション3：歯学トランスレーショナル研究シンポジウム
ー再生医学の進歩と歯科医学
座長：滝川正春教授，山城　隆教授（岡山大学大学院医歯薬学総合研究科）

2．臓器置換再生医療としての「歯の再生」

東京理科大学・総合研究機構
辻　　孝教授

現在，再生医療は，発生生物学や幹細胞生物学，組織工学的なアプローチから臨床研究が進められている．再生医療における最終的なゴールは，疾患や傷害を受けた臓器や器官を，生体外で人工的に作製した器官と置換する「臓器置換再生医療」である．

臓器・器官は，胎児期の上皮・間葉相互作用によって誘導された器官原基から発生する．現在，臓器や器官を人為的に再構築する技術開発はされておらず，臓器・器官を再生するには，人為的な細胞操作によって器官原基を再構築し，生物の発生システムを利用して再生臓器を作り出すアプローチが考えられている．私たちは，この臓器置換再生医療のモデルとして「第三の歯」を再生するための「歯の再生」の研究を進めている．

私たちは，2007 年に，正常な構造を有した再生歯を高頻度で発生させることを可能とする「器官原基法」を確立し，人為的な三次元的な細胞操作によって器官原基を再構築可能であることを示した（*Nature Methods* **4**:227-230，2007; *Expert Opinion on Biological Therapy* **8**:1-10，2008）．最近，成体マウスの歯喪失モデルを開発し，再生臼歯歯胚から発生した再生歯が萌出し，対合歯と咬合することを明らかにした．さらに再生歯の硬度は正常な歯と同等な硬度を有しており，歯根膜を介する骨のリモデリング能，並びに再生歯に侵入した神経線維は矯正や露髄による侵害刺激を中枢に伝達することが判明した．これらのことから再生歯胚移植による歯科再生医療は実現可能性を有すると考えられる．

本講演では，器官原基法の開発を中心として，最近の私たちの研究成果の進展を紹介すると共に，歯科再生医療の可能性について考察したい．

ご略歴：
2007-現在: 東京理科大学基礎工学部生物工学科　教授
2001-2007: 東京理科大学基礎工学部生物工学科　助教授
1994-2001: 日本たばこ産業（株）医薬探索研究所主任研究員
1991-1992: 日本学術振興会特別研究員（DC）
1986-1989: 山之内製薬（当時）研究員
1992: 九州大学大学院理学研究科博士後期課程　満期退学
1986: 新潟大学大学院理学研究科修士課程　修了

9:00-11:00 Session 4: Basic Dental Sciences and Future - Research Direction that Activates Basic Dento-medical Sciences in Post-genomic Era

Session Chairs: Prof. Shigeo KITAYAMA and Assoc. Prof. Satoshi KUBOTA (Okayama University Graduate School of Medicine, Dentistry and Pharmaceutical Sciences)

1. CCN Family Proteins and MicroRNAs: Extracellular and Intracellular Conductors of Molecular Networks.

Assoc. Prof. Satoshi KUBOTA

Oral Biochemistry, Okayama University Graduate School of Medicine, Dentistry and Pharmaceutical Sciences (Japan)

In the post-genomic era, a vast amount of biological information concerning the canonical functions of biomolecules has been accumulating by classical and high-throughput experimental strategies. However, for the comprehensive understanding of every biological event occurring in a tissue microenvironment, the function of each molecule has to be reevaluated in the context of multiple molecular interaction networks. No molecules may stand alone in performing their jobs. Similar viewpoint is required to understand the events occurring inside the cells. Extracellular signals are transmitted into the nucleus to drive target genes through molecular signal transduction cascades. Through this process, final signals to the nucleus are determined, not by a single straight pathway, but by a collaboration of several pathways via molecular crosstalk. Even after gene expression, the fate of mRNAs is under the post-transcriptional control of the web of regulatory molecules. Therefore, even an apparently simple biological outcome triggered by a particular molecule is realized through quite complex molecular networks. Such systems-biological point of view is a key to explore a new research field in post-genomic era.

Based on this idea, here we provide basic knowledge and recent findings on two novel classes of molecules that regulate a vast number of extracellular and intracellular molecules through networks. One is CCN family, a conductor of extracellular signaling molecules; and the other is micro RNA, a genome-wide regulator of gene expression. We hope the stories of these molecules would stimulate the young dento-medical researchers to find out novel research directions towards their future research.

Academic Carrier:

2004-present: Associate Professor; 2001-2004: Assistant Professor, Okayama University Graduate School of Medicine, Dentistry and Pharmaceutical Sciences; 1999-present: Adjunct Research Assistant Professor, The Dorrence H. Hamilton Laboratories, Thomas Jefferson University; 1991-1993: Instructor, Institute for Virus Research, Kyoto University

9:00-11:00 セッション4： 基礎歯科医学サミット
ーポストゲノムの時代に歯科基礎医学を活性化するための方向性
座長：北山滋雄教授，久保田聡准教授（岡山大学大学院医歯薬学総合研究科）

1. CCN Family Proteins and MicroRNAs: Extracellular and Intracellular Conductors of Molecular Networks
（CCN ファミリー蛋白とマイクロ RNA：細胞内外の分子ネットワークの調節因子）

岡山大学大学院医歯薬学総合研究科
口腔生化学分野
久保田聡准教授

ポストゲノム時代を迎えた今，ハイスループット的手法により産み出された，ありとあらゆる生体分子の「主たる機能」に関して情報が集積され続けている．しかしながら，組織微細環境において起こる生物学的現象を包括的に理解するためには，そこにいるひとつひとつの分子の機能を，それを取り巻く複雑な分子ネットワークの中で捉え直す必要がある。そもそも孤立したスタンドアローン状態で機能する分子など，あるはずもないからである．同様に細胞内で起こるイベントもこういった視点から眺めねばならない．細胞外より伝わったシグナルは，細胞内シグナル伝達系に受け渡されて細胞核に到達し，標的遺伝子を動かす．この過程でも最終的に核に伝わるシグナルは，単一の伝達系ではなく，複数の経路を担う多数の分子の共同作業により決定される．そして遺伝情報が転写された後でさえ，メッセンジャーRNA の運命は，転写後調節因子からなる「蜘蛛の糸」によって操られている．つまるところ，あるきっかけで産み出された一見単純な生物学的結果も，実はきわめて複雑な分子ネットワークを通じ具現化されている，と言っていいだろう．この「システムバイオロジー」的視点こそが，ポストゲノム時代の研究を活性化するカギである．
以上の観点から，本セッションでは細胞内外の分子ネットワークで「核」ないしは「ハブ」の役割を果たす2種類の分子群につき，基本的知見と最新の研究成果を呈示する．1つめは細胞外シグナルコンダクターとも呼ばれる CCN ファミリータンパク質であり，いま1つはゲノムに散らばる遺伝子群を「一対千」で制御するマイクロ RNA である。本日紹介するこの分子たちの様態が，若い世代の医歯学研究者を刺激し，将来に向けて新たな研究の方向性を見出す一助となることを願ってやまない．

略歴：
2004–現在: 岡山大学大学院医歯薬学総合研究科准教授; 2001–2004: 岡山大学大学院医歯学総合研究科　助手; 1999–現在: Thomas Jefferson University 医学部研究助教授; 1991–1993: 京都大学ウイルス研究所　助手

9:00-11:00 Session 4: Basic Dental Sciences and Future - Research Direction that Activates Basic Dento-medical Sciences in Post-genomic Era

Session Chairs: Prof. Shigeo KITAYAMA and Assoc. Prof. Satoshi KUBOTA (Okayama University Graduate School of Medicine, Dentistry and Pharmaceutical Sciences)

2. Regulation of Bone-Morphogenetic-Protein (BMP) Signalling by Proteins of the Chordin Family

Prof. Walter SEBALD

Physiological Chemistry II

Biocenter, University of Wuerzburg(Germany)

Bone morphogenetic proteins (BMPs) are powerful signalling proteins in the extracellular compartment which determine proliferation, maintenance and differentiation of cells. Most importantly, BMP-2 and a few other BMPs can induce new bone formation at orthotopic and ectopic sites.

BMPs signal into receptive cells by binding to type I and type II receptors. In addition BMPs interact with proteoglycans (heparinic sites) and a large variety of BMP modulators which depending on the context can inhibit or stimulate BMP signalling. Many BMP modulator proteins belong to the Chordin family and carry typically one or several VWC domains. Chordin, Chordin-like 2, crossveinless-2 and CTGF are crucial regulators of the formation of organs and the skeletal system during development. Also in the adult organism they are involved in the regeneration of tissues and the pathophysiology of diseases. It is therefore of practical and fundamental interest to understand the structure and function of these proteins as basis for the design and development of drugs and tools in the field of regenerative medicine.

Education and Academic Carrier:

2006-present: Running a research laboratory after retirement; 1986-2006: Professor and Chairman of Physiological Chemistry at the University of Würzburg; 1978-1986: Research Associate at the Gesellschaft für Biotechnologische Forschung (GBF) in Braunschweig; 1968-1978: Assistant Professor at the Institute for Physiological Chemistry of the University of München; 1967: Degree in Chemistry

Publications

Keller et al. (2004) Nat Struct Mol Biol 11, 481-488; Sebald et al. (2004) Biol Chem 385, 697-710; Weber et al. (2007) BMC Struct Biol 7, 6; Zhang et al. (2007). J Biol Chem 282, 20002-20014; Zhang et al. (2008). Dev Cell 14, 739-750.

9:00-11:00　セッション4：基礎歯科医学サミット
ーポストゲノムの時代に歯科基礎医学を活性化するための方向性
座長：北山滋雄教授，久保田聡准教授（岡山大学大学院医歯薬学総合研究科）

2. Chordin ファミリータンパクによる BMP シグナル伝達の制御

Prof. Walter SEBALD
Physiologische Chemie II
Theodor-Boveri-Institut (Biozentrum)
der Universität Wuerzburg（ドイツ）

BMP は細胞の増殖・表現系の維持・分化を決定する強力なシグナル伝達タンパク質であり，BMP-2 をはじめいくつかの BMP は同所性あるいは異所性骨形成誘導能を持つ．

BMP は I 型と II 型の受容体に結合することによりそのシグナルが細胞内へと伝えられる．また，BMP はプロテオグリカン(特にヘパリン)や様々な BMP 調節因子と相互作用をすることによってそのシグナルが制御されている．これら BMP 調節因子の多くは Chordin ファミリーに属しており，その特徴として 1 つないし複数の VWC ドメインを持っている．Chordin，Chordin-like 2，crossveinless-2，CTGF は発生過程での器官形成や骨格形成において重要な調節因子である．また成体組織においても，組織再生や疾病の病態形成に関与している．したがって，これらのタンパク質の立体構造や機能を明らかにすることは，創薬における薬剤設計あるいは再生医療分野での新たな手段として非常に興味深いものである．

興味のある領域: Molecular recognition and drug development in cytokine and BMP receptor systems.

論文発表：
Keller et al. (2004) Nat Struct Mol Biol 11, 481-488; Sebald et al. (2004) Biol Chem 385, 697-710; Weber et al. (2007) BMC Struct Biol 7, 6; Zhang et al. (2007). J Biol Chem 282, 20002-20014; Zhang et al. (2008). Dev Cell 14, 739-750.

9:00-11:00 Session 4: Basic Dental Sciences and Future - Research Direction that Activates Basic Dento-medical Sciences in Post-genomic Era
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3. MicroRNAs; Biogenesis and Functions

Assoc. Prof. Mikiko SIOMI
Keio University School of Medicine (Japan)

Small RNAs of 20-30 nucleotides can target both chromatin and transcripts, and thereby keep both the genome and the transcriptome under extensive surveillance. Recent progress in deep-sequencing has uncovered an astounding landscape of small RNAs in eukaryotic cells. Various small RNAs of distinctive characteristics have been found and can be classified into three classes based on their biogenesis mechanism and the type of Argonaute protein that they are associated with: microRNAs (miRNAs), endogenous small interfering RNAs (endo-siRNAs or esiRNAs) and Piwi-interacting RNAs (piRNAs). At this meeting, I will present knowledge of how these intriguing molecules, especially miRNAs, are generated in *Drosophila* cells. Other aspects of miRNAs, such as their sequence variation and their functional differences, will also be discussed.

Education and Academic Carrier:

2008-present: Associate Professor at Keio University School of Medicine
2002-2008: Associate Professor at the Institute for Genome Research, University of Tokushima
2003: Obtained PhD in the Medical Science, University of Tokushima
1999-2002: Assistant Professor at the Institute for Genome Research, University of Tokushima
1994: Obtained PhD in the Agricultural Chemistry, Kyoto University
1986-1988: Graduate Student in the Faculty of Agriculture, Kyoto University, Obtained M.Ag.
1980-1984: Faculty of Agriculture, Gifu University, Obtained B.Ag.

9:00-11:00　セッション4：基礎歯科医学サミット
ーポストゲノムの時代に歯科基礎医学を活性化するための方向性
座長：北山滋雄教授，久保田聡准教授（岡山大学大学院医歯薬学総合研究科）

3. microRNAs；生合成と機能

慶応大学医学部
塩見美喜子准教授

20 から 30 塩基で構成される small RNA はクロマチンとトランスクリプトの両方を標的とし，それにより広範囲の監督下でゲノムとトランスクリプトームの両方を維持するこができる．

最近の詳細なシークエンスの進展により真核生物における非常に多くの small RNA の存在が解明され始めた．さまざまな特徴を有する small RNA が発見され，それらは生合成メカニズムと small RNA を構成しているアルゴンプロテインで 3 群に分類することができる．その3群とは，microRNAs (miRNA), endogeneous small interfering RNAs (endo-siRNAs or esiRNAs) と Piwi-interacting RNAs (piRNAs)と呼ばれるものである．本講演では，ショウジョウバエの small RNA の分子の発生についての知見を miRNA を中心に発表する．また，miRNA のシークエンスのバリエーションや機能的な違いについても考察したい．

ご略歴:
2008-present: 准教授，慶應大学医学部
2002-2008: 准教授，徳島大学ゲノム研究所
2003: 徳島大学医学部（医学博士取得）
1999-2002: 講師，徳島大学ゲノム研究所
1994: 京都大学農芸化学（農学博士取得）
1986-1988: 京都大学農学部（農学修士取得）
1980-1984: 岐阜大学農学部（農学士取得）

9:00-11:00 Session 4: Basic Dental Sciences and Future - Research Direction that Activates Basic Dento-medical Sciences in Post-genomic Era

Session Chairs: Prof. Shigeo KITAYAMA and Assoc. Prof. Satoshi KUBOTA (Okayama University Graduate School of Medicine, Dentistry and Pharmaceutical Sciences)

4. Role of Cellular MicroRNAs in HIV-1 Latency

Assoc. Prof. Hui ZHANG
Center for Human Virology, Division of Infectious Diseases
Department of Medicine
Thomas Jefferson University (USA)

The latency of human immunodeficiency virus-type 1 (HIV-1) in resting primary CD4+ T-cells is the major barrier for viral eradication in patients on suppressive highly active antiretroviral therapy (HAART). Even with optimal HAART treatment, replication-competent HIV-1 still exists in resting primary CD4+ T cells. Multiple restriction factors on various steps of the viral life cycle could contribute to the viral latency. Here, we show that cellular microRNAs (miRNAs) potently inhibit HIV-1 production in resting primary CD4+ T cells. We have identified that the 3'-termini of HIV-1 mRNAs are the targeting site of a cluster of cellular miRNAs including mir-28, mir-125b, mir-150, mir-223, and mir-382, which is enriched in the resting CD4+ T cells rather than in activated CD4+ cells. The specific inhibitors of these miRNAs can significantly counteract the inhibitory effects of their corresponding miRNAs upon either HIV-1 protein translation in the resting CD4 T-cells transfected with HIV-1 infectious clone, or HIV-1 production from the resting CD4+ T-cells isolated from HIV-1-infected individuals receiving suppressive HAART. Our data indicate that cellular miRNAs play a pivotal role in HIV-1 latency, and suggest that manipulation of cellular miRNAs could be a novel approach to purge the HIV-1 reservoir.

Academic Carrier:

2001-present: Associate Professor (tenure-track). Department of Medicine.
PhD Program in Immunology & Microbial Pathogenesis. Thomas Jefferson University.

1997-2001: Assistant Professor (tenure-track). Division of Infectious Diseases, Department of Medicine, Thomas Jefferson University.

1994: PhD degree; Department of Microbiology/Immunology, State University of New York, Upstate Medical Center

1988: MS degree; Sun Yatsen University, College of Graduate Studies

1982: Sun Yatsen University, Medical College

9:00-11:00　セッション4：基礎歯科医学サミット
ーポストゲノムの時代に歯科基礎医学を活性化するための方向性ー
座長：北山滋雄教授，久保田聡准教授（岡山大学大学院医歯薬学総合研究科）

4. HIV-1 潜伏における細胞内 micro RNA の役割

Assoc. Prof. Hui ZHANG
Center for Human Virology, Division of Infectious Diseases
Department of Medicine
Thomas Jefferson University (米国)

静止期 CD4 陽性 T 細胞へ 1 型ヒト免疫不全ウイルス（human immunodeficiency virus-type 1; HIV-1）が潜伏することは，エイズ発症を抑え込むための highly active antiretroviral therapy（HAART 療法; 高活性抗レトロウイルス療法，いわゆる多剤併用療法）を受けている患者でも，ウイルスを完全に消失させられない大きな要因である．すなわち，HAART 療法が理想的に行われた場合にでさえ，自己複製能を持つ HIV-1 が静止期 CD4 陽性 T 細胞には残存しているのである．このウイルスの潜伏は，ウイルスのライフサイクルの様々な段階を抑制する複数の因子により維持されている可能性がある．このような中，我々は，細胞内 micro RNA（miRNAs）が，静止期 CD4 陽性 T 細胞内での HIV-1 産生を強力に抑制することを見いだした．まず我々は，mir-28，mir-125b，mir-150，mir-223，および mir-382 などの miRNA の標的サイトが HIV-1 ウイルス mRNA の 3’端末に存在すること，これらの miRNA は活性型よりも静止期 CD4 陽性 T 細胞で濃度の高いことを確認した．これらの miRNA は，HIV-1 の感染性クローンを導入した静止期 CD4 陽性 T 細胞における HIV-1 ウイルスタンパク産生と，suppressive HAART 療法を受けている HIV 感染患者から分離した静止期 CD4 陽性 T 細胞における HIV-1 複製を抑制するが，それぞれの miRNA の特異的阻害剤は，この抑制作用を明らかに消失させた．これらの結果は，細胞内 miRNA は HIV-1 の潜伏においてきわめて重要な役割を果たしていることを示しており，miRNA 操作することで潜伏した HIV-1 ウイルスを除去できる新たな可能性が提示された．

11:15-12:15 Session 5: NIDCR (NIH) Director Special Lecture

Session Chairs: Prof. Ryuji MATSUO and Prof. Shogo TAKASHIBA (Okayama University Graduate School of Medicine, Dentistry and Pharmaceutical Sciences)

Perspectives of Dental Education and Research

Dr. Lawrence A. TABAK

Director, National Institute of Dental and Craniofacial Research (NIDCR), National Institutes of Health, USA

Dentistry in the 21st century must embrace a new role by integrating into the primary health care network of medicine. We must achieve greater interaction and collaboration with the educators, nurses, physicians, pharmacists, psychologists and researchers that make up the larger biomedical community. Expanding the traditional boundaries of our profession will enable us to tackle the more complex diseases and conditions that contribute greatly to both the burden of illness and ever- increasing health care costs.

New strategies will be required for the development of the next generation of diagnostics that will enable detection of disease at its earliest inception. There is an increasing imperative for low-cost, easily dispensed interventions that will either prevent or reverse the earliest stages of disease. A new generation of biomaterials, termed theranostics, will provide “smart materials’ that can diagnose and treat a problem early in its progression. Advances in genetics and genomics will make “personalized” therapies a reality, provided that these can be achieved in a cost-efficient manner. Existing disease burden will be addressed by advances in tissue engineering in which smart scaffolds will be built that will instruct stem cells to recapitulate form and function.

To achieve these goals, our profession will need to rethink its current approach to education and training. While we should remain proud of our rich traditions, steeped in prevention and linking clinical practice to research, our future efforts must be flexible enough to embrace the new strategies that will be required to deliver the best possible care to our patients.

Dr. Lawrence A. Tabak was appointed as the seventh director of the NIDCR in September 2000. In November 2008, Dr. Tabak was appointed as acting principal deputy director of the NIH. While serving in this capacity, Dr. Tabak continues as NIDCR director.

11:15-12:15　セッション5：NIDCR (NIH) Director 特別講演
座長：松尾龍二教授，高柴正悟教授（岡山大学大学院医歯薬学総合研究科）

Perspectives of Dental Education and Research
（歯学教育と研究の将来展望）

Dr. Lawrence A. TABAK
Director, National Institute of Dental and Craniofacial Research (NIDCR)
National Institutes of Health（米国）

21 世紀の歯科医師は，医科のプライマリ・ヘルス・ケアネットワークと統合することにより，新しい役割を受け入れなくてはならない．我々は，教育者，看護師，医師，薬剤師，心理学者および研究者といった大きい生物医学共同体を構成している人々と，これまで以上の大きい相互交流と共同作業ができるようにならなくてはならない．私たちのこれまでの専門分野の境界を広げることによって，疾病による負担と絶えず増加する医療費の双方に多大な原因となる，より複雑な疾病や疾患に立ち向かうことが可能になる．

新しい戦略には，最初期での疾病の検出を可能にする次世代の診断方法の発展が求められる．また，疾病の発生を防ぐ，もしくは最初期の段階に戻すことが，安価で容易にできる治療法を増やすことは不可欠なことである．「theranostics（治療的診断法）」と呼ばれる新世代の生体材料（バイオマーカー）は，早期の進行性の疾患の診断や治療を行うことができる「高性能の材料（バイオマーカー）」を提供している．遺伝学とゲノム解析による進歩によって費用効果の点が解決されれば，「個体」医療は現実のものになる．また，幹細胞により形態と機能を再生させる高性能の足場（スキャフォールド）を構築する再生医療工学の発展によって，現在の疾病による苦痛は，改善が期待されている．

これらの目標を達成するため，私たちの専門領域は現在の教育と指導の方法について再考する必要がある．我々は，これまでの豊かな伝統を誇りに思い，予防に専念し，臨床と研究を結び付けるべきである．その一方で，未来への取り組みとして，考えうる最良の医療を我々の患者に提供するために必要な新しい戦略を受け入れる，十分な順応性を示さなくてはならない．

Tabak 先生は，2000 年9月，7代目の NIDCR の代表となられました．次いで，2008 年の 11 月には NIH の副局長に就任されておられます．NIH の副局長になられたあとも，NIDCR の代表として継続して貢献されておられます．

13:00-15:00 Session 6: Urgent Discussion on Japanese Dental Education -How to Improve Quality of Dental Treatment? -In Response to the First Report of the Ad Hoc Committee to Discuss about Revolution and Improvement of Dental Education
Session Chair: Prof. Kazuhiro ETO (Vice Chairman, Common Achievement Tests Organization, Professor emeritus, Tokyo Medical and Dental University)

Message from the Session Chair

How to Improve the Quality of Dental Treatment in Response to the First “Policies for Training Dentists to be Endowed with Reliable Clinical Ability"

Session Chair: Prof. Kazuhiro ETO
Vice Chairman, Common Achievement Tests Organization
Professor emeritus, Tokyo Medical and Dental University
Visiting Professor, School of Life Dentistry, The Nippon Dental University
President, Japanese Association for Dental Science (Japan)

This symposium will advance discussion on the following first report "Policies to train dentists to be endowed with reliable clinical ability". It was predicted that in 2009 the number of applicants for Faculty of Dental Science/School of Dentistry at public universities would reduce 15% in the first half of the program, compared to the last year, while at private universities the percentage would represent a large scale of approximately 40%. Moreover, the amount of universities with applicants number below available quota has increased much more compared to the last year. Quoted causes are shrinking of 18-years-old population and excess of dentists. Expansion of Faculty of Dental Science/School of Dentistry since 1965 was due to demand for dentists in Japan. The mission of Faculty of Dental Science/School of Dentistry is to train high-qualified dentists. To respond to the committed public nation, we owe the duty to improve the quality of the dentists coming to society. Surely, to ensure improvement of dentists’ quality, and to find the way out to overcome this crisis, Faculty of Dental Science/School of Dentistry may say that it is now being tested its own confronting self-control skills.

13:00-15:00　セッション6：緊急歯学教育シンポジウム
ー歯科医療の質をいかに高めるかー
座長　江藤一洋教授（医療系大学間共用試験実施評価機構副理事，東京医科歯科大学名誉教授，日本歯科大学生命歯学部客員教授，日本歯科医学会会長）

座長からのメッセージ
歯科医療の質をいかに高めるか−歯学教育の改善・充実に関する調査研究協力者会議の第一次答申を受けて

東京医科歯科大学名誉教授
(社)医療系大学間共用試験実施評価機構副理事長
日本歯科大学生命歯学部客員教授
日本歯科医学会会長
江藤一洋教授

本シンポジウムは上記第1次報告「確かな臨床能力を備えた歯科医師養成方策」を中心に討論が進められる．予測されていたことではあるが，2009 年度の歯科大学・歯学部への志願者は，国立大学の前期日程で前年度比 15%減，私立大学は約 40%の大幅減であった．また定員割れした大学は昨年よりさらに増加した．原因としては，18 才人口減とともに歯科医師の過剰が指摘されている．昭和 40 年代から始まった歯科大学・歯学部の増設は歯科界内部からの要求によるものであり，いわば歯科界自らがまねいたことでもあった．歯科大学・歯学部の使命は質の高い歯科医師の養成にある．国民からの付託に応えるためには，社会に送り出す歯科医師の質を向上させる責務を負っている．今まさに歯科大学・歯学部は歯科医師の質の向上の担保のために，この危機をいかに克服するか，自らの自己管理能力が試練に直面させられていると言えよう．

ご略歴
2006：日本歯科医学会会長　現在に至る
2001：東京医科歯科大学副学長
1997：東京医科歯科大学歯学部長
1992：東京医科歯科大学学生部長
1978：東京医科歯科大学歯学部教授
1973：米国立衛生研究所（NIH）客員研究員
1971：東京医科歯科大学歯学部助手
1971：東京医科歯科大学大学院修了（歯学博士）
1967：東京医科歯科大学歯学部卒業

13:00-15:00 Session 6: Urgent Discussion on Japanese Dental Education -How to Improve Quality of Dental Treatment? -In Response to the First Report of the Ad Hoc Committee to Discuss about Revolution and Improvement of Dental Education
Session Chair: Prof. Kazuhiro ETO (Vice Chairman, Common Achievement Tests Organization, Professor emeritus, Tokyo Medical and Dental University)

1. To Improve Quality of Dental Management - in Response to the First “Policies for Training Dentists to be Endowed with Reliable Clinical Ability" –

Mr. Kazuhiro ARAKI
Director, Medical Education Division
Ministry of Education, Culture, Sports, Science and Technology-Japan

Regarding Dental Education, for dental treatment advancement and specialization, it was identified that it is necessary to increase educational contents and difficult level of dental national board in order to promote diversification of dental treatment needs.

Meanwhile, regarding the decrease in number of patients and change in patients’ awareness in university dental hospitals, difficult situations that may rise in clinical practice are particularly important cores of dental education to ensure the quality of dental education.

In addition, alarming situation of the quality of education are, for example, dental schools with less quotas for admission and dental schools with extremely low rate of success in the national board.

Therefore, at the Ministry of Education, the "Cooperative conference of an investigative study on dental education improvement/completion" was established on July of the last year, and from January of this year, the Ministry of Education will report its contents according to the first “Policies for training dentists to be endowed with reliable clinical ability".

Academic Carrier:

2008: Director - Medical Education Division, Ministry of Education, Culture, Sports, Science and Technology
2006: Director - Research and Development Division, Ministry of health, Welfare and Labor
1985: Ministry of health and welfare

13:00-15:00　セッション6：緊急歯学教育シンポジウム
ー歯科医療の質をいかに高めるかー
座長　江藤一洋教授（医療系大学間共用試験実施評価機構副理事，東京医科歯科大学名誉教授，日本歯科大学生命歯学部客員教授，日本歯科医学会会長）

1．歯科医療の質をいかに高めるか
―歯学教育の改善・充実に関する調査研究協力者会議の第一次答申を受けて―

文部科学省高等教育局
医学教育課長
新木一弘先生

歯学教育については，歯科医療の高度化や専門分化，歯科医療ニーズの多様化の進展によって教育内容が増大するとともに，歯科医師国家試験の難化が指摘されている．一方，大学病院の歯科の患者数の減少や患者の意識の変化により，歯学教育の質を確保していくために特に重要といわれ歯学教育のコアとなる臨床実習に支障が生じかねない状況にある．さらに，大学入学の募集定員に満たない歯学部や国会試験合格率が極端に低い歯学部の存在など，教育の質について憂慮すべき状況にある．

このため，文部科学省では「歯学教育の改善・充実に関する調査研究協力者会議」を昨年７月設置し，本年１月に，第1次報告として「確かな臨床能力を備えた歯科医師養成方策」をとりまとめたので，その内容を報告する．

ご略歴:
平成 20 年：文部科学省高等教育局医学教育課長
平成 18 年：厚生労働省医政局研究開発振興課長
昭和 60 年：厚生省入省

13:00-15:00 Session 6: Urgent Discussion on Japanese Dental Education -How to Improve Quality of Dental Treatment? -In Response to the First Report of the Ad Hoc Committee to Discuss about Revolution and Improvement of Dental Education
Session Chair: Prof. Kazuhiro ETO (Vice Chairman, Common Achievement Tests Organization, Professor emeritus, Tokyo Medical and Dental University)

2. Counter-measures Necessary to Secure Quality of Dental and Medical Treatment through Education Improvement/Completion

Prof. Shiro MATAKI
Graduate School of Tokyo Medical and Dental University (Japan)

The efforts to be made in order to solve the urgent problems faced by dental education in Japan are mentioned in the “the conference of the persons concerned with an investigative study on dental education” the first report -policies for training dentists to be endowed with reliable clinical abilities-. One of the efforts disclosed is the introduction of the third party accreditation in order to fulfill the fundamental mission of training excellent dentists to be trusted by the public nation, and to ensure the quality of dental education degree at each university and with international validity. At this time, as a committee member to implement the committed project for university assessment study (fiscal year 2008) "Investigative study on trusted third party accreditation system to improve and ensure the quality of dental education", I visited universities and accredit certification organizations in US, UK and the Netherlands whose the third party accreditation system have solid accomplishments, and made personal interviews with the responsible persons and gathered latest news. In this symposium, I would like to report these results, as well as to propose the construction of an evaluation system by the third party accreditation regarding the dental education in Japan.

Academic Carrier:

1999-present: Professor, Graduate School of Tokyo Medical and Dental University
1995-1999: Associate Professor, Tokyo Medical and Dental University, Faculty of Dentistry
1990-1995: Associate Professor, Nagasaki University, School of Dentistry
1985-1987: Bern University Pathophysiologisches Institut (Research worker abroad offered by ministry of education, culture, sports, Science & Technology-Japan)
1982: Research Associate, Tokyo Medical and Dental University, Faculty of Dentistry

13:00-15:00　セッション6：緊急歯学教育シンポジウム
ー歯科医療の質をいかに高めるかー
座長　江藤一洋教授（医療系大学間共用試験実施評価機構副理事，東京医科歯科大学名誉教授，日本歯科大学生命歯学部客員教授，日本歯科医学会会長）

2．歯学教育の改善・充実を通して歯科医療の質を担保するために必要とされる対策

東京医科歯科大学大学院　医歯学総合研究科教授
俣木志朗教授

「歯学教育の改善・充実に関する調査研究協力者会議」第一次報告～確かな臨床能力を備えた歯科医師養成方策～では，現在我が国の歯学教育が抱える喫緊の問題に対して，なされるべき取り組みが述べられている．その中のひとつとして，国民から信頼される優れた歯科医師の養成という基本的使命を果たし，国際的通用性を持った歯学教育の学位の質を保証するためには，各大学の歯学教育の質を保証するための第三者評価の仕組みの導入が挙げられている．このたび，平成20年度大学評価研究委託事業「歯学教育の質の保証と向上のための第三者評価システムに関する調査研究」の事業推進委員として，歯学教育の第三者認証評価システムで実績のある米国，英国，オランダの大学および認証機関を訪問して，直接担当者に面談して，最新の情報を収集する機会を得た．本シンポジウムでは，その成果について報告するとともに，我が国における歯学教育の第三者機関による評価システムの構築について提案したい．

ご略歴：
1999-現在：東京医科歯科大学大学院　医歯学総合研究科教授現在に至る
1995-1999：東京医科歯科大学歯学部　助教授
1990-1995：長崎大学歯学部助教授
1985-1987：ベルン大学病態生理学研究所研究員（文部省在外研究員）
1982：東京医科歯科大学歯学部　講師
1982：東京医科歯科大学歯学部　助手
1982：東京医科歯科大学大学院歯学研究科修了（歯学博士）
1978：東京医科歯科大学歯学部歯学科卒業

13:00-15:00 Session 6: Urgent Discussion on Japanese Dental Education -How to Improve Quality of Dental Treatment? -In Response to the First Report of the Ad Hoc Committee to Discuss about Revolution and Improvement of Dental Education
Session Chair: Prof. Kazuhiro ETO (Vice Chairman, Common Achievement Tests Organization, Professor emeritus, Tokyo Medical and Dental University)

3. Current Problems of Postgraduate Dental Education and their Measures: Towards the Improvement of Quality of Dental Management

Prof. Kiyoshi KOYANO
Faculty of Dental Science, Kyushu University

In recent years, innovations in dental education system were made in Japan in order to improve dentists' quality such as an establishment of model core curriculum, an implementation of achievement test and a new dental residency system. However, after the completion of this residency program, the steps in dentists' career path to reach standard clinical abilities are not clear. On the other hand, the enhancement of medical and dental specialists system is claimed with the background of advancements and diversification in dental treatment and patient' needs. At every scientific society of specialists, they will create their specialists. However, considering the whole dental field, it is not clear how general practitioners and specialists will share dental treatments. It is required to establish measures in order to clearly show the public nation where and how they can receive dental treatment by reliable dentists. Then, it is also required to establish a carrier path leading to reliable dentists as well as to enrich educational systems regarding the respective paths.

Academic Carrier:
2003-2008: Vice-director, Kyushu University Hospital
1999-2002: Assistant President, Kyushu University
1997-present: Professor and Chairman, Department of Removable Prosthodontics, Faculty of Dental Science, Kyushu University
1991-1993: Visiting Associate Professor, UCLA School of Dentistry
1987-1993: Research Associate, Faculty of Dentistry, Kyushu University
1976-1983: Faculty of Dentistry, Kyushu University (Awarded the degree of DDS)

13:00-15:00　セッション6：緊急歯学教育シンポジウム
ー歯科医療の質をいかに高めるかー
座長　江藤一洋教授（医療系大学間共用試験実施評価機構副理事，東京医科歯科大学名誉教授，日本歯科大学生命歯学部客員教授，日本歯科医学会会長）

3．卒後教育の改善・充実を通して歯科医療の質を担保するために必要とされる対策

九州大学　歯学部
古谷野潔教授

近年，歯科医師の資質向上を目指し，モデル・コア・カリキュラムの確立，共用試験の実施，新歯科医師臨床研修制度の開始などの歯学教育改革がなされた．しかし，臨床研修修了後，どのようなステップ，期間を経て，一定の臨床能力を持った歯科医師に至るかという歯科医師のキャリアパスは明確ではない．また，歯科医療および患者ニーズの高度化，多様化を背景に専門医制度の充実が叫ばれている．専門学会ごとに設定した専門医は存在するが，歯科界全体として，一般医と専門医がどのように歯科医療を分担するのかは明らかではない．どこに行けばどのような歯科医療を，信頼できる歯科医師によって受けられるかについて，国民から見て明確にわかるようなグランドデザインを確立し，その上で，そうした信頼される歯科医師に至るキャリアパスを確立するとともに，それぞれのパスにおける教育を充実させる必要がある．

ご略歴：
2003-2008: 九州大学歯学部附属病院長（九州大学病院副病院長）
1999-2002: 九州大学総長補佐
1997-現在: 九州大学歯学部教授
1991-1993: 文部省在外研究員（米国　UCLA 客員助教授）
1987-1993: 九州大学歯学部附属病院助手
1983: 九州大学歯学部　卒業

15:00-17:00 Session 7: International Career Pathways for Japanese-trained Dentists
Session Chairs: Prof. Kazuomi SUZUKI and Prof. Manabu MORITA (Okayama University Graduate School of Medicine, Dentistry and Pharmaceutical Sciences)

Message from Session Chairs

International career pathways for Japanese-trained Dentists

Session Chairs: Prof. Kazuomi SUZUKI and Prof. Manabu MORITA
Session Coordinator: Assoc. Prof. Yasuhiro YOSHIDA
Okayama University Graduate School of Medicine, Dentistry and Pharmaceutical Sciences

This symposium will focus on international career pathways for Japanese-trained dentists, including careers as dental scientists and clinicians. Over the last two decades, the situation for dentists has significantly changed in Japan. Japanese dentistry faces several serious issues, such as a surplus of dentists, and a decrease in the number of students in dental schools. Moreover, the circumstances in dental schools have also changed, as the number of faculty has decreased year by year. However, despite these negative aspects, there have been positive changes as well. The number of female students in dental schools has increased considerably, and nowadays, more than half of the students are women. Dentistry is an attractive educational opportunity, especially for female students, in that it offers many opportunities of promotion, and opens up several career opportunities. From this point of view, we would like to re-consider “international career pathways”. This international symposium will feature three researchers and one clinician, who graduated from Okayama University and now working abroad. Details of their lectures in the symposium and their backgrounds are clearly described in their abstracts. We hope that faculty staff and students will have the opportunity to know how to pursue international career pathways.

15:00-17:00 セッション7：歯科医学研究者や臨床家のための国際キャリアパス
座長：鈴木一臣教授，森田　学教授（岡山大学大学院医歯薬学総合研究科）

座長からのメッセージ
歯科医学研究者や臨床家のための国際キャリアパス

岡山大学大学院医歯薬学総合研究科
座長：鈴木一臣教授，森田　学教授
コーディネーター：吉田靖弘准教授

過去 20 年間の間に歯科医師を取り巻く環境は大きく変化し，国内の歯科医師過剰，それに伴う歯学部生の定員削減など重大な諸問題を抱えるに至っている．また，歯学部自体も大きく様変わりした．教員の定員は年々削減され，入学者層も以前は歯学部生の大半が男性であったものが，現在では男女がほぼ同数となった。このことは女性の社会進出という観点から一連の評価を受けているものの，歯学部教育においては従来と異なる対応が求められるようになり，教員の意識改革を迫られた．また大学院教育においても，今や女性の大学院生確保は必須であり，それにつながる女性研究者や臨床家の育成は大学院における重要課題の1つとなっている．このような状況の下，岡山大学歯学部からも，海外で歯学研究者や歯科臨床家として第一線で活躍するものが出てきた．本シンポジウムでは，ますます国際化が求められている昨今，国際キャリアパス，すなわち海外の研究や臨床施設で研究員や臨床家として活躍し，国際貢献をどのように果たしていくかについて焦点を当ててみたい．具体的には，海外ですでに活躍されている研究者や臨床家からその実際をお話し頂き，これから海外に進出しようとしている教員や大学院生等に，国際的活躍の機会をどのように得て，どのように実現していくのかを認識して頂くきっかけとしたい．

15:00-17:00 Session 7: International Career Pathways for Japanese-trained Dentists

Session Chairs: Prof. Kazuomi SUZUKI and Prof. Manabu MORITA (Okayama University Graduate School of Medicine, Dentistry and Pharmaceutical Sciences)

1. Translational research in the field of adhesive dentistry

Dr. Atsushi MINE
Leuven BIOMAT Research Cluster
Department of Conservative Dentistry
School of Dentistry, Oral Pathology and Maxillo-Facial
Surgery, Catholic University of Leuven (Belgium)

Although decayed/fractured teeth can be reconstructed minimal-invasively and nearly invisibly using adhesive technology, the clinical longevity of composite restorations is not sufficient. This forces the dentist to replace restorations after a few years, leading with each new intervention to further weakening of the patient's tooth, and naturally also to higher public health costs.

Nowadays, many studies on dental adhesive technology are empirical, basically testing the bond strength of different cocktails of adhesive solutions to enamel and dentin in the laboratory. Much knowledge on the underlying mechanisms of adhesion to enamel and dentin has been provided by numerously imaging adhesive-tooth interfaces with all sorts of microscopes. The adhesive formulation that scores best in bond strength studies commonly makes it rapidly to the market, after which the superior laboratory performance of the product is hopefully confirmed in independent randomized controlled clinical trials. The clinically first breakthrough involved the introduction of 'multi-step adhesive systems', that made use of phosphoric acid and were developed and marketed since the mid-1990's. Still today, these adhesives are the gold-standard, despite the further rapid market-driven evolution towards more simple-to-use 'one-step' adhesives. These latest generation of 'one-bottle' adhesives, unfortunately, are also today less effective in laboratory as well as clinical research.

"**Translational research**" has been introduced as a new concept in an attempt to bridge basic research with applied research, particularly in the medical domain. The objective of this lecture is to discuss the basic mechanisms of today's adhesive approaches and to present the latest projects of our team with regard to translational research. Especially the influence of my stay at the 'Leuven BIOMAT Research Cluster' on my personal life and career and future prospective will be focused on.

15:00-17:00 セッション7：歯科医学研究者や臨床家のための国際キャリアパス
座長：鈴木一臣教授，森田　学教授（岡山大学大学院医歯薬学総合研究科）

1. Translational Research in the Field of Adhesive Dentistry
（接着歯学におけるトランスレーショナル・リサーチ）

Dr. Atsushi MINE（峯　篤史先生）
Leuven BIOMAT Research Cluster
Department of Conservative Dentistry, School of Dentistry
Oral Pathology and Maxillo-Facial Surgery, Catholic University of Leuven（ベルギー）

現在，接着技法によって非侵襲で審美的な欠損歯質の再建が可能になったが，臨床の場において永久的な再建と言えるには及んでいない．このことは数年後に再治療を要することを意味しており，これはすなわち歯質の崩壊および医療費増加に加担していることになる．

接着歯学の分野では，様々な溶液を混合した接着材と歯質を用いた多くの接着試験が行われる．また種々の顕微鏡等で表面・界面を分析することによって，接着メカニズムが解る．現在のところ，接着試験で良好な結果をもたらした接着材は直ちに市販され，臨床研究（ランダム化比較試験）が必ず行われるとは限らない．この状況の中，90 年代中頃に発売されたリン酸使用のマルチステップの接着材は臨床的に始めて大きな成功を収めたと言うことができる．この種の接着材は今日でもゴールデン・スタンダードと認識されており，市場の要求に応えるように簡便化されたワンステップ，さらにはワンボトルになった最新世代の接着材は，残念ながら実験的にも臨床的にも劣っていると言わざるをえない．

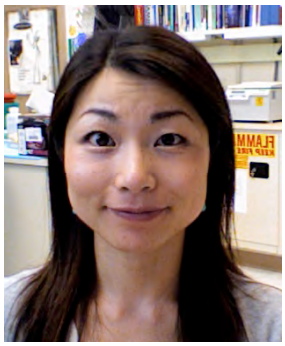
一方近年，トランスレーショナル・リサーチという言葉をよく耳にするようになった．この言葉は「基礎（実験）研究と臨床（応用，実用）研究とを結ぶ架け橋」と表現されることが多い．本講演ではこのトランスレーショナル・リサーチをキーワードとし，まず接着技法の基礎メカニズムを確認した後に，我々の新しい試みを紹介したい．そして，それらと共に私の留学の意義と将来の夢や希望についてもお話したい．

ご略歴：
2007–2010：ポストドクトラルリサーチャー，ルーベン・カトリック大学
2006–2007：ベルギー王国フランダース政府　奨学生（ルーベン・カトリック大学）
2004–2006：岡山大学医学部・歯学部附属病院　補綴科（クラウン・ブリッジ）　助手
2003–2004：岡山大学医学部・歯学部附属病院　補綴科（クラウン・ブリッジ）　医員
2003：岡山大学大学院医歯学総合研究科　卒業
1999：岡山大学歯学部　卒業

15:00-17:00 Session 7: International Career Pathways for Japanese-trained Dentists

Session Chairs: Prof. Kazuomi SUZUKI and Prof. Manabu MORITA (Okayama University Graduate School of Medicine, Dentistry and Pharmaceutical Sciences)

2. Salivary gland stem cell research and career pathways for woman scientists



Dr. Sayuri YOSHIZAWA

Craniofacial and Skeletal Diseases Branch, National Institute of Dental and Craniofacial Research, National Institutes of Health (USA)

I have worked as a visiting fellow at the National Institutes of Health for two years in order to gain advanced training in basic science. I have learned a great deal about science, as well about possible career pathways for women in science.

I am studying adult human salivary gland stem/progenitor cells (SGSC). Saliva is important for the innate host defense in the oral cavity. Loss of saliva causes significant morbidity and there is no conventional treatment for irreversible gland loss. The purpose of this study was to identify and isolate potential stem/progenitor cells from adult human salivary glands. And to compare the characterization of the cells to immortalized human salivary cell lines in vitro and in vivo. We established adult human salivary gland stem progenitor cells by cloning individual cells from enzymatically dispersed human submandibular glands. Cells were characterized by immunocytochemistry, and compared to human salivary gland cell lines. We also transplanted these cells subcutaneously, or into surgically created injuries in the salivary glands of immunocompromised mice. As results, SGSC expressed mesenchymal and epithelial markers, and both acinar and ductal markers stronger than salivary gland cell lines. After transplantation, SGSC formed duct- and acinar-like structures, while salivary gland cell lines formed carcinoma- like masses of cells. In conclusion, cells obtained from enzymatically dispersed human submandibular glands appear to include progenitors, a subset of which may be able to form both ductal and acinar phenotypes.

Based on my experiences, as well as the mentorship of our Branch Chief Dr. P. G. Robey, I decided to pursue a career as a scientist. Over past ten years, about half of the students in the Okayama University Dental School have been women. I hope that more female dentists will have the opportunity to explore science, and will choose it as a career path.

15:00-17:00 セッション7：歯科医学研究者や臨床家のための国際キャリアパス
座長：鈴木一臣教授，森田　学教授（岡山大学大学院医歯薬学総合研究科）

2. Salivary Gland Stem Cell Research and Career Pathways for Woman Scientists
（ヒト唾液腺幹細胞研究と女性研究者のキャリアパス）

Dr. Sayuri YOSHIZAWA（吉澤さゆり先生）
Craniofacial and Skeletal Diseases Branch, National Institute of Dental and Craniofacial Research, National Institutes of Health（米国）

基礎生物学の先進的な研究を学ぶため，visiting fellow として米国国立衛生研究所に留学して２年になる。ここでは科学についてはもちろん，科学分野での女性のキャリアパスウェイの可能性についても学んでいる．

私はヒト成人唾液腺幹細胞／前駆細胞（SGSC）の研究を主にしている．唾液腺の主要な働きは，口腔内の宿主防衛機構に不可欠な唾液を産生することである．臨床的には頭頸部腫瘍に対する放射線治療が唾液腺の機能不全を引き起こすことが多く，唾液腺の機能不全は様々な障害を引き起こすが，確定的な治療法は未だ確立されていない．この研究の目的は成人ヒト唾液腺から幹細胞／前駆細胞を樹立し，その特徴を解析することである．私たちは成人ヒト顎下腺を酵素的に分解することで細胞を単離し，また単一細胞からクローン細胞を樹立して成人唾液腺幹細胞／前駆細胞（SGSC）として用いた．細胞免疫染色で SGSC の特徴を解析し，ヒト唾液腺の細胞株と比較した．また，これらの細胞を免疫不全マウスの皮下および部分的に切除した唾液腺に移植した．結果として，SGSC は唾液腺細胞株と比較して，上皮系および間葉系のマーカーと腺房および導管のマーカーを共に強く発現していることがわかった．また，マウスに移植された SGSC は腺房または導管様の構造を形成し，細胞株は腫瘍様の構造を形成した．結論として，酵素的に分解されたヒト顎下腺細胞は腺房および導管様形態を形成しうる前駆細胞を含むことが示唆された．

これらの経験から，また部門長の Dr．パメラ•ロビーによる指導から，私は科学者としてのキャリアを遂行したいと考えている．この１０年余り，岡山大学歯学部の学生の半数以上が女性となっている。この発表が，より多くの女性歯科医師が研究者としてのキャリアに注目していただくよい機会になることを願う．

Academic Carrier:

2007-present: Visiting Fellow, Craniofacial and Skeletal Disease Branch, National Institutes of Dental and Craniofacial Research, National Institutes of Health
2003-2007: PhD; Okayama University Graduate School of Medicine and Dentistry
1997-2003: DDS; Okayama University Dental School

15:00-17:00 Session 7: International Career Pathways for Japanese-trained Dentists
Session Chairs: Prof. Kazuomi SUZUKI and Prof. Manabu MORITA (Okayama University Graduate School of Medicine, Dentistry and Pharmaceutical Sciences)

3. What I have done, what I should have done, and what I will do in the future

Assoc. Prof. Eiki KOYAMA
Department of Orthopaedic Surgery
Thomas Jefferson University, Jefferson Medical College (USA)


Eiki Koyama

I initiated my career on basic research when developmental biologists started to discuss developmental processes in organs with molecular levels. Since then I have investigated early pattern formation and morphogenesis, cell-cell and cell-tissue interactions in numerous developing organs. For instance, I have studied the pattern formation of developing limbs and investigated the roles of Hox genes and retinoic acid. Soon after, I have studied the odontogenesis and functions of hedgehog on tooth morphogenesis and ameloblast and odontoblast differentiation. Now, I focus on mechanisms controlling skeletal development and growth in fetal and postnatal life, including long bones, cranial base synchondroses and TMJ. Emphasis is on identification of molecular regulators acting at the nuclear level that direct commitment, determination and differentiation of progenitor skeletal cells. When these factors escape skeletal tissues and diffuse into adjacent non-skeletal tissues due to failure of restraining topographical mechanisms, they can trigger pathologies, including multiple exostosis syndrome.

I have been in the USA since 1993 and have worked at the University of Pennsylvania and Thomas Jefferson University. I have received many post-doctoral fellows from numerous Universities, including Okayama University, Tokyo Dental College, Asahi University, and Matsumoto Dental College. The experience I have gained from working with the students, doctors and scientists is invaluable and priceless. I have developed a strong relationship among my peers and students. I admire their perseverance and effort they portray in order to be successful in the laboratory. This is why I could and also want to continue to do research in the biomedical field in the USA. This opportunity to speak with you all has allowed me to reflect back to what I have done, what I should have done, and what I will do in the future.

15:00-17:00 セッション7：歯科医学研究者や臨床家のための国際キャリアパス
座長：鈴木一臣教授，森田　学教授（岡山大学大学院医歯薬学総合研究科）

3. What I have done, what I should have done, and what I will do in the future
（自分は何ができたか，自分は何をすべきであったか，そしてこれから自分は何をしたいのか）

Assoc. Prof. Eiki KOYAMA（小山英樹准教授）
Department of Orthopaedic Surgery
Thomas Jefferson University, Jefferson Medical College（米国）

発生生物学者が器官発生の過程を分子レベルで論じ始めた頃，私は基礎研究者としてのキャリアをスタートした．それ以来，数多くの器官の発生過程における初期発生時のパターン形成や形態形成，細胞同士や細胞と組織の相互作用を研究の対象としてきた．例えば，これまでには，四肢発生における初期パターン形成を研究対象とし，Hox 遺伝子およびレチノイン酸の役割を解析した．次には，歯の形成を研究対象として，ヘッジホッグ遺伝子の歯の形態形成や，エナメル芽細胞と象牙芽細胞分化の分化に与える影響を解析した．そして現在は，骨格形成や胎生期・出生後の発育のメカニズムに焦点をあて，長管骨や頭蓋底の軟骨結合，顎関節などの研究を行っている．これらの研究の目的は，骨格系前駆細胞のコミットメントや運命決定，分化を核内レベルで制御する因子を発見することである．これらの因子が，局所に留まる事ができず骨格系組織から周囲の非骨格系組織に波及した場合，多発性外骨腫症などを引き起こす可能性がある．

私は 1993 に渡米して以来，ペンシルヴァニア大学とトマス・ジェファーソン大学で研究を行ってきた．そして私の研究室では，これまでに岡山大学，東京歯科大学，朝日大学，松本歯科大学をはじめとした，多くの大学から博士研究員を受け入れてきた．たくさんの学生や研究者と共に仕事をしてきた経験は何物にも代え難く，彼らとは強い関係を築く事ができた．彼らが研究室で成功するために見せる努力には敬服させられ，それこそ私がアメリカで生物医学分野の研究を続けてこられた，そして今後も続けていきたいと考える理由である．今回は，私がこれまでに何をしてきたのか，何をするべきだったか，そして今後何をしていくのかをお話しする予定である．

Academic Carrier:

1986-1992: Assistant, Clinic of Dental Anesthesiology, Okayama University Dental Hospital
1993-2002: Postdoctoral Researcher/Research Associate/Assistant Professor Department of Anatomy and Histology, School of Dental Medicine, University of Pennsylvania
2003- present: Associate Professor, Department of Orthopaedic Surgery, Thomas Jefferson University, Jefferson Medical College

15:00-17:00 Session 7: International Career Pathways for Japanese-trained Dentists

Session Chairs: Prof. Kazuomi SUZUKI and Prof. Manabu MORITA (Okayama University Graduate School of Medicine, Dentistry and Pharmaceutical Sciences)

4. Practice Dentistry in North America for Foreign Trained Dentists

Dr. Hiroshi Takagi
General Practitioner, Coldwater Dental Practice
Empress Walk Dental Practice (Canada)

A growing number of foreign trained dentists are coming to North America to pursue their dental careers from all over the world. In order to practice dentistry in North America, there are numbers of bridges that they have to cross, which may include immigration processes, relocations, language and cultural barriers, applying to and graduating dental schools, board exams, licensure procedures, financial concerns, career opportunities and so on. This presentation is one of the many examples of how a foreign-trained dentist obtained a dental licensure and practice dentistry in North America.

Academic Carrier:
Okayama University, DDS
University of Western Ontario, DDS

15:00-17:00 セッション7：歯科医学研究者や臨床家のための国際キャリアパス
座長：鈴木一臣教授，森田　学教授（岡山大学大学院医歯薬学総合研究科）

4. Practice Dentistry in North America for Foreign Trained Dentists
（外国で教育を受けた歯科医師による北米での歯科診療の実際）

Dr. Hiroshi TAKAGI（高木洋志先生）
General Practitioner
Coldwater Dental Practice
Empress Walk Dental Practice（カナダ）

世界各国よりキャリアアップのため，北アメリカにやってくる外国人歯科医師が増えてきている．北アメリカで臨床をするには，移住や移転の手続き，言葉の壁や文化の違い，歯科大学への入学と卒業，資格試験と手続き，経済的な問題，就職活動などいくつかの難関をクリアしなければならない．そこで本講演では，北アメリカにおいて外国人歯科医師がどのように歯科医師認定をうけ，臨床を行っているかについて焦点を当ててお話する．

ご略歴：
岡山大学歯学部卒業
Western Ontario 大学歯学部卒業

Poster Presentation
Abstracts

1. Introducing Portfolio called POSGRA as a tool for Student-teacher-administration Communication in Postgraduate Education.

○Nakanoda S[1], Kimura A[2], Kuboki T[2]

[1]Insidefield Co. Ltd. [2]Oral Rehabilitation and Regenerative Medicine, Okayama University Graduate School of Medicine, Dentistry and Pharmaceutical Sciences

This project was tried towards the contentment in the domain of medical/dental postgraduate education in our country. This report describes development of the interactive communication tool available to the clinical-based education for specialist/expert training.

There is wide variation in how portfolios are utilized within Japanese postgraduate education programs. It can be used to document scholarly activity and teaching/learning and to prepare for periodic evaluations. Many members use it to assist them in managing their careers and to reflect on activities. And the portfolio is of value for both graduate student and mentor. Interactions between graduate students and mentor are crucial opportunities for clinical learning. Success of this learning partnership is predicated on excellent communication, negotiation, and shared goal setting but these elements are often difficult to achieve. Portfolio offers a solution to this issue.

This new communication tool called POSGRA is accessed by members and it is used for (1) enhance communication between graduate students and the mentor; (2) provide a quick reference for the confirmation and planning of learning progress; and (3) offer a brief record of clinical case file.

It was suggested that the POSGRA provided a framework for students to initiate and support their clinical learning in partnership with clinicians. Further studies should focus on the effectiveness and user-friendliness of the POSGRA. As the portfolio is further incorporated into the educational program, we believe that many students will discover new tools to craft a career of genuine self-directed learning.

2. Survey of infection control knowledge, practice and perceptions in post-graduate dental training and sixth-year dental students for educational program.

○Satoh N [1, 2], Watanabe A [1] , Kokeguchi S[1]

[1]Oral Microbiology, Graduate School of Medicine, Dentistry and Pharmaceutical Sciences, Okayama University, [2]Social Health View Study

Purpose: We investigated the awareness of infection control among dentists receiving post-graduate dental training and sixth-year dental students to improve the future infection control ***curriculum*** based on the data obtained.

Methods: We conducted a questionnaire survey regarding awareness of infection control and preventive actions among 103 dentists and 154 students receiving clinical training. A series of questions was as follows: Have you been trained in infection control?; Do you know “standard precaution”?; Do you use the protective eyewear, mask and gloves in your practice on the regular basis and change them for each patient?; Have you had needle-stick injury accident? etc.

Results: The 86 dentists were combined with 129 students making a total of 21 5 subjects (83.7%) who responded to the questionnaire. Almost dentists and stu dents trained in infection control (78.1%) and knew “standard precaution” (94.9%). All of them wore mask and gloves in their practice and changed gloves for eac h patient. But, 30.2% of them wore protective eyewear. 2.3% had needle stick inj ury accident. Among the main findings, almost all dentists and students (89.3%) had touched a clean area with dirty gloves. Many of them also indicated that th ere was less attention paid to infection control when they were being hurried by t heir teachers or patients (34.1%). They also indicated that when their teachers d id not pay attention to infection control, they cannot protest or even comment on that conduct (58.3%).

Conclusion: These findings indicated that dentists undergoing post-graduate dental training and sixth-year dental students who receiving clinical training did not pay adequate attention to infection control. It suggested that their teachers also need to be educated on infection control. We consider that it is necessary to develop infection control education curricula that includes environmental improvement at the worksite as well as basic education on this issue.

3. Smad2 reduces gingival epithelial cell migration.

○Shimoe M, Shiomi N, Tomikawa K, Mineshiba J, Yamaguchi T, Maeda H, Takashiba S

Pathophysiology - Periodontal Science, Okayama University Graduate School of Medicine, Dentistry and Pharmaceutical Sciences

Introduction: The ratio of successful periodontal regeneration is not always high because of incomplete control of epitherial down-growth along root surfaces in the regeneration process. Recently, members of transforming growth factor-b (TGF-β) superfamily are known as crucial regulators for epithelial growth. Transduction of TGF-β signaling depends on the phosphorylation and activation of Smad proteins. Currently, a transgenic mouse strain was established, overexpressing Smad2 specifically in epidermis driven by *keratin 14* promoter (K14-Smad2 transgenic mice: TG). These mice were characterized with delayed skin wound healing. Therefore, it may be important to regulate *smad2* expression in gingival epithelium during periodontal regeneration. In our previous study, gingival epithelial cells were successfully isolated. Then we demonstrated that the cells from TG reduced cell proliferation by BrdU analysis and MTS assay *in vitro*.

Purpose: The purpose of this study was to examine whether overexpression of Smad2 reduces gingival epithelial cell migration.

Methods: TG were genotyped as previously described (Ito et al., *Dev Biol. 2001*). Palatal gingiva was extracted and gingival epithelial cells were isolated from 3-4 week-old wild type mice (WT) and TG. Scratch Assay were performed to assess cell migration. Briefly, the cells from TG and WT were scratched using a sterile 200-μL pipette tip. The progress of cell migration was photographed at 0, 24, and 48 hours. The cell migration was quantified with Image J software (version 1.61) by measuring the area of cells that moved beyond the reference line. The results from two groups (WT and TG) were compared using Student's *t*-test.

Results: The smaller migration area was observed in TG than WT at both 24 and 48 hours after scratching.

Conclusion: This result provides the evidence that TG epithelial cells had reduced cell migration. This result suggests that Smad2 may have an important role to regulate gingival epithelial cell migration.

4. Distribution, gene expression, and functional role of EphA4 during ossification

○Kuroda C[1, 2], Kubota S[1] , Kawata K[1, 2], Aoyama E[3], Sumiyoshi K[1], Oka M[2], Minagi S[2], Takigawa M[1]

[1]Biochemistry and Molecular Dentistry, Okayama University Graduate School of Medicine, Dentistry and Pharmaceutical Sciences, [2]Occlusal and Oral Functional Rehabilitation, Okayama University Graduate School of Medicine, Dentistry, and Pharmaceutical Sciences, [3]Biodental Research Center, Okayama University Dental School

Purpose: The long bone develops from the cartilage anlage and grows through the endochondral ossification to form a skeleton, while the marrow develops as the hematopoietic organ. In this process, mesenchymal and hematopoietic cells exchange information through various cytokines and growth factors via those receptors. In our previous study, we detected EphA4, which was the one of the tyrosine kinase type receptors in a human chondrocytic cell line, HCS-2/8 and mouse growth plate. Here, we aimed to obtain new findings concerning the function and subcellular behavior of EphA4 in osteogenic cells.

Methods: In order to confirm that *ephA4* was expressed at a late stage of chondrocyte differentiation, we isolated MGC cells from normal mice and maintained them under differentiation-inducing conditions in long-term cultures. Human osteoblastic SaOS-2 and chondrocytic HCS-2/8 cells were also utilized. Immunofluorescence technique was employed for the analysis of subcellular localization of EphA4. The effect of EphA4 knock-down in SaOS-2 cells was analyzed by RNA silencing with siRNAs to evaluate the function of EphA4.

Results: In vitro evaluation revealed that *ephA4* expression was elevated upon hypertrophic differentiation of chondrocytes and that markedly stronger expression was observed in osteoblastic SaOS-2 than chondrocytic HCS-2/8 cells. Of note, RNAi-mediated silencing of *ephA4* in SaOS-2 cells resulted in the repression of osteocalcin gene expression and alkaline phosphatase activity. Interestingly, confocal laser-scanning microscopic analysis revealed the presence of EphA4 molecules in the nucleus as well as on the surface of SaOS-2 cells.

Conclusion: These findings are the first indication of a critical role of EphA4 in ossification, especially at the final stage in which osteoblasts and hypertrophic chondrocytes play major roles.

5. Is repair of DNA damage associated with hypoxia-induced cisplatin resistance in squamous cell carcinoma

○Umehara A [1], Mese H [1] , Yao M [1],Hassan NMM[1]and Sasaki A[1]

[1]Oral and Maxillofacial Surgery, Okayama University Graduate School of Medicine, Dentistry and Pharmaceutical Sciences

Introduction: The transcriptional factor hypoxia-inducible factor-1a (HIF-1α) plays an important role in solid tumor. Overexpression of HIF-1α predicts a poor response to chemotherapy. Cisplatin (*cis-diamminedichloroplatinum(II)*, CDDP) is one of the most important anticancer drugs for the malignant solid tumors. Repair of DNA damage is related with CDDP resistance. However, the effectiveness of CDDP in the treatment of recurrent tumor is limited because of its acquired or intrinsic resistance. The mechanism of resistance to CDDP is still controversial, although several kinds of processes has been proposed.

Purpose: To understand the possible mechanism of hypoxic induced CDDP resistance in human squamous cell carcinomas.

Methods: We used A431 (human squamous cell carcinoma) and CDDP-resistant subline A431/CDDP2 established from A431. MTT cell viability assay was performed where various concentration of CDDP was added to the medium at the following dosages (0.005, 0.01, 0.05, 0.1, 0.5 and1.0 mg/ml). After an additional 3 days of culture under normoxia (O_2 20%) and hypoxia (O_2 1%), each cell survival was determined. Absorbance values were expressed as percentages in relation to the untreated controls, and the concentrations resulting in 50% inhibition of cell growth (IC_{50} values) were calculated. Western blotting analysis and real-time PCR analysis were carried out to measure the expression level of HIF-1α and DNA damage repair factors.

Results: Both A431 and A431/CDDP2 had become more resistant to CDDP under hypoxic condition. In A431/CDDP2 subline, the expression of mRNA (DNA-PKcs and ERCC1) was increased under hypoxia condition in comparison with A431. Under hypoxic condition, the expression and activity of DNA-PKcs and ERCC1 were related with an increase of HIF-1α expression.

Conclusion: The correlation of DNA-PKcs and ERCC1 with HIF-1α could contribute to CDDP resistance in squamous cell carcinomas.

6. Bone formation in a rat carvarial defect model after transplanting autgenous bone marrow with beta-tricalcium phosphate

○Shirasu N, Ueno T, Wakimoto M, Hirata A, Sawaki M, Kanou M, Yamachika E
Oral and Maxillofacial Reconstructive Surgery, Graduate School of Medicine, Dentistry and Pharmaceutical Sciences

Purpose: A bone marrow graft could be expected to be suitable material for bone and cartilage repair. Bone marrow is known to be a rich source of osteogenic, chondrogenic, and angiogenic cells. In the present study, we evaluated the osteogenic potential of an autogenous bone marrow graft combined with beta-tricalcium phosphate (beta-TCP) in the rat calvarial bone defect model.

Methods: Sprague-Dawley rats were randomly divided into the following 4 treatment groups: beta-TCP/ bone marrow graft (TBG): beta-TCP only graft (TG): bone marrow graft (BG): control. Specimens were taken at 10, 20, and 30 days after grafting. We observed the process of bone formation by histology, enzyme histochemistry and immunohistochemistry. Sections were examined under light microscopy.

Results: At 10 days after surgery, active Runx2, osteopontin (OPN), and TRAP-positive cells appeared in the BTG and BG groups. New bone formation started in the defect in both the BTG and BG groups. At 30 days after grafting, the BTG group showed new bone development and replacement of beta-TCP to fill the bone defect. They showed bone marrow like structure in the defect. In the group of BG, new bone with bone marrow structure appeared in the defect. The defect was not filled with new bone. In the group of TG and the control group, no new bone formation in the defect was seen.

Conclusion: The combination graft of bone marrow with beta-TCP showed marked bone formation in rat calvarial defect. Our result indicated that combination graft of bone marrow with beta-TCP might be an effective technique for repairing bone defect.

7. The regulation of *Ccn2/Ctgf* gene via micro RNA 18a, which suppresses chondrocytes differentiation

○Ohgawara T[1, 2, 3], Kubota S[1] , Kawaki H[1], Kondo S[1], Eguchi T[1], Sasaki A[2], Takigawa M[1]

[1]Biochemistry and Molecular Dentistry, Okayama University Graduate School of Medicine, Dentistry, and Pharmaceutical Sciences, [2]Oral and Maxillofacial Surgery and Biopathological Science, Okayama University Graduate School of Medicine, Dentistry, and Pharmaceutical Sciences, [3]Oral and Maxillofacial Surgery, Mitoyo General Hospital

Purpose: Micro RNA (miRNA) is a major class of non-coding RNAs, which is involved in a variety of biological events including development of a number of tissues and organs in higher eukaryotes. In order to identify miRNAs that regulate endochondral ossification, we searched for and functionally characterized a miRNA that was down-regulated in chondrocytic cells and was predicted to target CCN2 family protein 2/connective tissue growth factor (CCN2/CTGF), which has been known to promote endochondral ossification and cartilage regeneration.

Methods: Screening of miRNA was performed by a microarray technique. In silico prediction and experimental demonstration of miRNA targets were carried out by an on line program and a luciferase assay system, respectively. We analyzed biological function of synthesized miR-18a by transfecting it to the human chondrosarcoma-derived chondrocytic cell line HCS-2/8. The mRNA and protein were quantitatively analyzed by real-time RT-PCR and ELISA systems, respectively.

Results: Five miRNAs were predicited to target the *Ccn2* 3'-untranslated region (UTR). Among those candidates, expression of miR-18a was found to be the most strongly repressed in chondrocytic cells. By reporter gene assay, we experimentally confirmed a miR-18a target in the same region in *Ccn2* mRNA as predicted *in silico*. Also, the introduction of the miR-18a duplex efficiently repressed the production of CCN2 in those cells. Interestingly, this *Ccn2* silencing was conferred entirely at a translation stage without affecting the steady-state mRNA level in chondrocytic HCS-2/8 cells; whereas accelerated degradation of *Ccn2* mRNA has been observed in human breast cancer MDA-231 cells. Finally, transfected miR-18a duplex significantly caused the repression of the mature chondrocytic phenotype.

Conclusion: Our present study revealed a regulatory role of miR-18a in chondrocytic differentiation through CCN2 and a variable mode of post-transcriptional regulation of the same miRNA, which was dependent on the cellular background.

8. Anti-osteoclastogenic Effects of Novel Focal Adhesion Kinase Inhibitor TAE226 in Osteolytic Metastasis of Breast Cancer

○ Kurio N[1], Shimo T[1], Takaoka M[2], Okui T[1], Yoshioka N[1], Hassan N[1], Hatakeyama S[3], Naomoto Y[2], Sasaki A[1]

[1]Oral and Maxillofacial Surgery and [2]Gastroenterological Surgery, Transplant, and Surgical Oncology, Okayama University Graduate School of Medicine, Dentistry and Pharmaceutical Sciences, [3]Novartis Institutes for BioMedical Research

Introduction: Focal adhesion kinase, FAK is a 125-kDa non-receptor type tyrosine kinase that localizes to focal adhesions. FAK overexpression is frequently foundin invasive and matastatic cancers of breast, colon, thyroid, prostate, and oral[1, 2], but its role in osteolytic metastasis has not been evaluated. Using both *in vivo* and *in vitro* approaches, we investigated whether/how inhibition of FAK autophosphorylation prevented bone metastasis by using novel FAK (FAK^{397}) inhibitor TAE226[3].

Methods: A mouse model of bone metastasis was prepared by inoculating mice with tumor cell suspensions of breast cancer cell line MDA-231 cells via the left cardiac ventricle, as described previously[4, 5]. Oral administration of TAE226 was carried out at a dose of 30 mg/kg every day, starting on 0 day of tumor inoculation and continued throughout the experiment. Osteolytic bone metastases were assessed by radiographs and tartrate-resistant acid phosphatase (TRAP) staining.The expression of FAK related signals were confirmed by Western blot analysis. To evaluate the effects of TAE226 on osteoclastogenesis *in vitro,* [^{3}H] thymidine incorporation assay, migration assay, adhesion assay, and osteoclast formation assay were done. Furthermore, to investigate the effects of TAE226 on the function of osteoclasts, we performed actin ring formation assay and pit formation assay.

Results: Treatment of mice with a TAE226 greatly decreased osteolytic bone metastasis and osteoclasts involved. TAE226 treatment increased the survival rate of mice in bone metastasis model. TAE226 also suppressed the growth of subcutaneous tumor *in vivo* and proliferation and migration of MDA-231 cells *in vitro*. TAE226 inhibited the osteoclast formation in murine pre-osteoclastic RAW264.7 cells, and actin ring and pit formation in mature osteoclasts.

Discussion: FAK was critically involved in osteolytic metastasis and was activated in tumor and osteoclast formation. Thus, novel FAK inhibitor, TAE226, can be effectively used in anti-osteolytic therapy.

9. A basic study: Bond strengths and bio-compatibility of experimental mineralization accelerating adhesives containing collagen-immobilized poly ethylene-co-vinyl alcohol (EVA+C)

○Hoshika T, Nishitani Y, Shinno Y, Omae M, Kishimoto M, Anabuki Y, Takahashi K, Yamaji K, Yoshiyama M

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Purpose: To develop the dentine regeneration therapy, we made experimental adhesive (Modified Super Bond: MSB) which contained collagen-immobilized poly ethylene-co-vinyl al cohol (EVA+C) to Super Bond C&B, and did the following fundamental studies.

Method: We tested four kinds of adhesives which were changed the addition ratio of Super Bond C&B (Sun medical: SB), MSB-6P (SB powder/EVA+C=60wt%/40wt%: 6P), MSB-7P (SB powder/EVA+C=40wt%/60wt%: 7P), and MSB-8P (SB powder/EVA+C=20wt%/80wt%: 8P), and two tooth surface conditioners: the Green Activator (10% citrate -3% ferric chloride, water: Green) and the experimental self-etching primer (4-MET and the dimethacrylate, water, and the acetone and others: SBP30). The micro tensile bond strengths (MTBS) to the extracted human teeth dentin of these materials were measured. Mouse odontoblast-like cells (MDPC-23) were adjusted to become 1.0×10^5cells/ml to the α-MEM medium, and divided into each 1ml in 12 × micro plate. We tested five groups that consisted of the control group (culture it only with the medium) and the groups that had the disk of SB and MSB (6P, 7P, 8P) (6mm in the diameter ×2mm in height) in the medium. The cell population of five groups was measured after 1,2,4 and 7days.

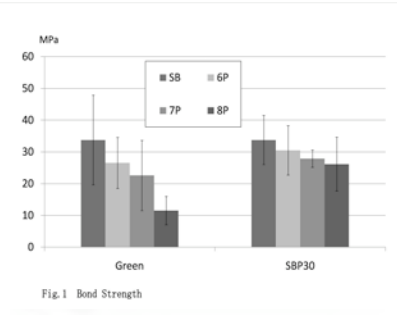

Fig. 1 Bond Strength

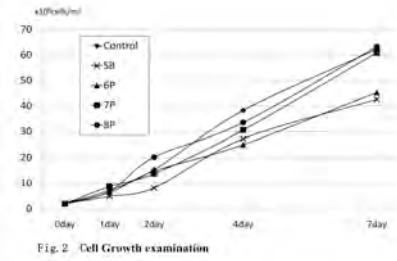

Fig. 2 Cell Growth examination

Result: Figure 1 shows the result of the bond MTBS. MTBS tended to decrease because of an increase in the EVA+C addition ratio, except when SBP30 was used.

Figure 2 shows the result of the cell growth examination. The proliferation tendency similar to the control group was shown, and three groups of MSB proliferation potency were higher than S B group in the first stage. However, the proliferation potency of SB and 6P on the cultured after 7days were lower than that of the other three groups.

Conclusion: It was suggested that the addition of EVA+C into SB could produce excellent MTBS and bio-compatibility when SBP30 was used.

10. Chondrocyte-haemopoietic cell interaction that induces CCN2 and its physiological significance

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Purpose: CCN2 plays a central role in development and growth of mesenchymal tissue and promotes the regeneration of cartilage in vivo. In recent years, we have shown that CCN2 is accumulated in hypertrophic chondrocytes. Recently, we have investigated the molecular mechanism of the hypertrophic chondrocyte-specific CCN2 gene expression; however, extracellular signals that induce it remain to be clarified. It is also known that CCN2 is abundantly present in platelets. In this study, we investigated possible haemopoietic-mesenchymal interaction that may cause this stage-specific CCN2 induction in growth plate chondrocytes and CCN2 accumulation in platelets.

Methods: Platelets are produced by megakaryocytes, and thus we employed megakaryocytic CMK cells, or megakaryocytes differentiated from human haemopoietic stem cells to evaluate chondrocyte-haematopoietic cell interaction. Human chondrocytic HCS-2/8 cells were cultured with the conditioned medium from those cells. Gene expression and production of CCN2 were monitored by RT-PCR and ELISA, respectively. Human platelets were concentrated from cord blood, added with CCN2 and analyzed for CCN2 uptake by Western blotting.

Results: Gene expression and production of CCN2 were detectable neither in CMK cells nor megakaryocyte progenitors. However, CCN2 production by HCS-2/8 was significantly enhanced by the conditioned medium produced from the progenitors. Finally, CCN2 in human platelets increased as time goes after the addition of CCN2 to the platelet suspension.

Conclusion: These results indicate that megakaryocytes themselves do not produce CCN2 and also suggest possible chondrocyte-haematopoietic cell interaction to supply CCN2. It is supposed that megakaryocytes secrete soluble factor(s) during differentiation, which stimulates the chondrocytes facing to the marrow to produce CCN2. During bone growth, such hemopoietic-mesenchymal interaction may contribute to the hypertrophic chondrocyte-specific accumulation of CCN2 that conduct endochondral ossification. This interaction can be cell physiologically important, not only for endochondral ossification, but also for the accumulation of CCN2 in platelets.

11. CCN family 2/connective tissue growth factor modulates BMP signaling as a signal conductor, which action regulates the proliferation and differentiation of chondrocytes

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Purpose: Both CCN family 2/connective tissue growth factor (CCN2/CTGF; CCN2) and bone morphogenetic protein (BMP)-2 play an important role in cartilage metabolism. We evaluated whether or not CCN2 would interact with BMP-2, and examined the combination effect of CCN2 with BMP-2 (CCN2-BMP-2) on the proliferation and differentiation of chondrocytes.

Methods: To investigate whether CCN2 directly interact with BMP-2, we performed Immunoprecipitation-Western blot analysis, solid-phase binding assay and surface plasmon resonance (SPR) spectroscopy. Localization of CCN2 and BMP-2 *in vivo* was examined by immunohistochemistry of E18.5 wild type and *Ccn2* deficient mouse growth plate. Then, we analyzed the combinational effect of CCN2 with BMP-2 on the BMP-2 signaling pathway, and chondrocyte proliferation and differentiation was investigated using Western blot analysis, MTT assay, Northern blot analysis, and proteoglycan synthesis.

Results: Immunoprecipitation-Western blotting analysis, solid-phase binding assay, and SPR spectroscopy showed that CCN2 directly interacted with BMP-2 with a dissociation constant of 0.77 nM as evaluated by SPR. An *in vivo* study revealed that CCN2 was co-localized with BMP-2 at the pre-hypertrophic region in the E18.5 mouse growth plate. Interestingly, CCN2-BMP-2 did not affect the BMP-2-induced phosphorylation of p38 MAPK but decreased phosphorylation of ERK1/2 in cultured chondrocytes. Consistent with these results, cell proliferation assay showed that CCN2-BMP-2 stimulated cell growth to a lesser degree than by either CCN2 or BMP-2 alone, whereas the expression of chondrocyte marker genes and proteoglycan synthesis, representing the mature chondrocytic phenotype, was increased collaboratively by CCN2-BMP-2 treatment in cultured chondrocytes.

Conclusion: These findings suggest that CCN2 may regulate the proliferating and differentiation of chondrocytes by forming a complex with BMP-2 as a novel modulator of BMP signaling.

12. Identification of transcription-regulating genes expressed during murine molar development

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Purpose: The aim of this study is to identify undiscovered transcription-regulating genes implicated in tooth development in order to gain more insight into the developmental mechanism of tooth.

Methods: The initial screening was performed by carefully evaluating the data deposited in the gene expression database “EMBRYS” with regard to the gene expression in the maxillary and/or mandibular processes. To examine whether the selected candidates are expressed in the developing molar tooth, *in situ* hybridization was performed with frontal sections of the bud and cap stages of lower first molar. The expression of genes newly found to be expressed in the tooth germ were also examined at embryonic day 16.5 and 18.5.

Results: As the result of the initial screening, 162 genes were selected as the candidate genes involved in tooth development. Among 162 candidates analyzed, 28 genes showed localized expression in the developing molar at bud and/or cap stages. These 28 genes include 15 transcription factors that have DNA-binding domain and 13 of other transcription-regulating genes such as transcription co-factors.

Conclusion: The functions of newly found 28 genes in tooth development are not clear yet, however, the expression patterns suggest their potential roles in tooth development. Also, the results indicate that there are still numbers of unidentified genes associated with tooth development. These results would contribute not only to elucidating the developmental mechanism of tooth but also to improvement of techniques of tooth regeneration.

13. Analysis of transgenic mice overexpressing *ccn2/ctgf* in chondrocytes

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Objective: CCN2/CTGF highly expresses in prehypertrophic chondrocytes, and our *in vitro* studies of chondrocytes and analysis of *ccn2*-deficient mice showed that it promotes proliferation, differentiation, and maturaration of cultured chondrocytes. For understanding the functions of CCN2 *in vivo*, we generated transgenic mice (tg) overexpressing the *ccn2* gene in cartilage under the control of the type 2 collagen promoter.

Methods: HA-tagged *ccn2/ctgf* cDNA was inserted to downstream of 6 kb-Col2a1-enhancer/promoter followed by IRES-LacZ. X-gal staining was performed for the location of the overexpressed gene, and the overexpressed *ccn2* mRNA and protein in cartilage were analysed by Northern and Western blot. Changes in morphology and matrix accumulation were investigated by histochemically. Gene expression was monitored by real time PCR. Bone density and thickness of bone were measured by quantitative computed tomography analysis. Micromass culture of limb buds was done to examine the effects on chondrogenesis.

Results: X-gal staining of new born mice showed transgene expression in all cartilage and overexpressed *ccn2* mRNA and protein were also detected. Tg mice showed increased body size resulting from prolonged bones. Immunohistochemical analysis of tibia from 17.5E and P1 showed accumulation of proteoglycans and type II collagen in cartilage, while type X collagen-positive hypertrophic zone was shortened. The length of tibia was prolonged depending on the overexpression level of *ccn2* mRNA. Cell proliferation was accelerated in the resting zone in addition to the growth cartilage. Apoptosis was accelerated in cartilage-bone transition. Bone density of cancellous bone and thickness of cortical bone were increased. Cultured chondrocytes from Tg mice showed enhanced expression of *IGF-I* and *II* mRNA in additon to cartilage matrix genes, and enhanced accumulation of proteoglycans. Furthermore, expression of vascular invasion factors were also enhanced. Micromass culture showed accelerated chondrogenesis.

Conclusion: Overexpression of CCN2 in cartilage promotes endochondral ossification, resulting in prolonged long bones.

14. Role of the low-density lipoprotein receptor-related protein-1 in regulation of chondrocyte differentiation

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Purpose: The low-density lipoprotein receptor-related protein 1 (LRP1) is known as an endocytic and signal transmission receptor. We formerly reported the gene expression and the localization of LRP1 in cartilage tissue and chondrocytes. In this study, we investigated its roles in the differentiation of chondrocytes.

Methods & Results: We employed RNAi strategy to knockdown *lrp1* in chondrocytic HCS-2/8 cells. As a result of *lrp1* knockdown, *aggrecan* and *col2a1* mRNA levels were decreased. However, that of *col10a1* or *mmp13* mRNA was rather increased. Under this condition, we performed a promoter assay for Axin2, which is known to be induced by activation of the WNT/b-catenin signaling pathway. We found that Axin2 promoter activity was enhanced in the *lrp1* knockdown cells thereby. Furthermore, when the WNT/b–catenin pathway was activated in chondrocytes by WNT3a or SB216763, which inhibits the phosphorylation of GSK3b, the mRNA levels of *aggrecan* and *col2a1* were decreased, whereas that of *mmp13* was increased. Additionally, the phosphorylation level of PKCz was also decreased in the *lrp1* knockdown cells. When the phosphorylation of PKCz was selectively inhibited, *aggrecan* and *col2a1* mRNA levels decreased, whereas the *mmp13* mRNA level increased. Moreover, we exogenously added recombinant CCN family 2/CTGF (CCN2/CTGF), which is one of ligands of LRP1 and a critical factor in endochondral ossification, to the *lrp1* knocked-down cells. As a result, the amount of a total binding, internalization and recycling of CCN2/CTGF were all decreased in the *lrp1* knocked-down cells.

Conclusion: These data demonstrate that LRP1 exerts remarkable effects to retain the mature phenotype of chondrocytes as a critical mediator of cell signaling. Our findings also indicate that the onset of hypertrophy during endochondral ossification appears to be dependent on the WNT and PKC signaling, as well as the regulation of CCN2/CTGF amount and localization by LRP1.

15. Vitamin C intake reduces the degree of experimental atherosclerosis induced by periodontitis in a rat model

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Purpose: A number of studies have suggested that there is an association between caridiovascular disease and periodontitis. We have reported that lipid peroxidation is involved in the initiation of atherosclerosis induced by periodontitis in a rat model and that oxidative stress induced by periodontitis may be an important factor in the pathogenesis of atherosclerosis. Since vitamin C has been suggested to limit oxidative damage, we hypothesized that vitamin C intake may reduce endothelial oxidative stress induced by periodontitis in the aorta. The purpose of this study was to investigate the effects of vitamin C intake on the initiation of atherosclerosis in a rat periodontitis model.

Methods: Eighteen 8-wk old male Wistar rats were divided into three groups of six rats and all rats received daily fresh water and powdered food through out the 6-wk study. In the vitamin C and periodontitis groups, periodontitis was ligature-induced for the first 4-wks. In the vitamin C groups, rats were given distilled water containing 1g/L vitamin C for the 2-wks after removing the ligature.

Results: In the periodontitis group, there was lipid deposition in the descending aorta and significant increases of serum level of hexanoyl-lysine (HEL) (16.3±1.1ng/mL), and aortic levels of nitrotyrosine expression (7.7±3.7%), HEL expression (6.8±3.2%) and 8-hydroxydeoxyguanosine (8-OHdG) (0.69±0.11ng/mg mt DNA) compared to the control group. Vitamin C intake significantly increased plasma vitamin C level and GSH:GSSG ratio(178% and 123%, respectively), and decreased level of serum HEL and aortic levels of nitrotyrosine, HEL and 8-OHdG(23%, 87%, 84%, 38%, respectively) compared to the periodontitis group.

Conclusion: Vitamin C intake reduced the level of serum HEL, the degree of lipid deposition, nitrotyrosine, HEL and 8-OHdG formation in the aorta and improved plasma GSH:GSSG ratio of periodontitis group. Vitamin C may atteonuate the degree of experimental atherosclerosis by decreasing oxidative stress.

16. The formation mechanism of the biomaterial-tooth interface by functional phosphoric acid ester monomers

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Purpose: Studies on adhesive technology have been achieved empirically to some extent so far with limited understanding of the mechanisms involved, thus delaying the development of theoretically designed materials with long-lasting adhesive potential. We therefore examined the molecular interaction with synthetic hydroxyapatite (HAp) of the functional monomer phenyl-P (2-methacryloxyethyl phenyl hydrogen phosphate), which from laboratory bond-strength measurements appeared less effective, with that of the highly effective monomer 10-MDP (10-methacryloyloxydecyl dihydrogen phosphate) reported by Inoue (2005).

Methods: We examined the chemical interaction of functional phosphoric acid monomers (phenyl-P, 10-MDP) and a hydroxyapatite particle used for XRD and solid-state NMR. Following adhesive treatment, the resin-bonded dentin specimens were processed for TEM. Sections were cut using a diamond knife in an ultramicrotome, and observed unstained and positively stained using TEM.

Results: XRD revealed that dicalciumphosphate dihydrate or DCPD (CaHPO4.2H2O) was readily formed when phenyl-P interacted with HAp for only 5min, after which this calcium-salt deposition gradually increased Ionic bonding of phenyl-P to HAp was hardly detected, even after 24h interaction. On the contrary, 10-MDP bonded to HAp, which was already weakly detectable after 5min and clearly intense after 1h and 24h exposure. The three detected peaks should be ascribed to a crystalline phase constituted of a layered structure, similar to the layered structure of the calcium salt of 10-MDP. DCPD was only clearly detectable after the 24h exposure. NMR observation was consistent with the XRD data.TEM of adhesive-dentin interfaces produced by the phenyl-P-based adhesive (Clearfil Liner Bond II) disclosed that almost all the apatite around collagen was demineralized, while the 10-MDP-based adhesive (Clearfil SE) only partially demineralized dentin, leaving abundant apatite crystals around the collagen within the submicron hybrid layer.

Conclusion: This is the key mechanism why the bonding effectiveness of a phenyl-P-based adhesive is less durable than that of an MDP-based adhesive.

17. Vitamin D3 modulates the expression of CCN4/WISP-1 in osteogenic cells

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Purpose: Vitamin D3 (VD3) regulates bone formation and resorption through calcium metabolism. CCN4/WISP-1 is reported to accelerate bone formation, and is known to have VD3 responsive elements in its promoter region.

However, to date, the interaction between VD3 and CCN4/WISP-1 is not fully elucidated. In this study, therefore, the effects of VD3 on the gene expression and protein production of CCN4/WISP-1 in osteogenic cells were investigated.

Methods: Human bone marrow stromal cells (BMSCs) and mouse calvarial osteoblasts were cultured in the αMEM containing the 20% and 15% FBS, respectively. These cells were treated with different doses of the active form of vitamin D3 (1,25-dihydroxy vitamin D3) ranging from 1 to 100 nM for 1, 4 or 7 days of culture. Then, the mRNA expression level of CCN4/WISP-1 was quantified by real-time RT-PCR, and the protein production was analyzed by western blotting. For mRNA analysis oligonucleotides were designed specifically for either human or mouse forms of CCN4/WISP-1, and the relative mRNA levels were normalized using oligonucleotides toward the ribosomal protein S29. For western blotting, an antibody was made that reacted with the CT region of CCN4/WISP-1.

Results: Stimulation with 10 nM VD3 for 1 day accelerated the mRNA expression of CCN4/WISP-1 in human BMSCs up to 145% compared to untreated cells. Protein production in human BMSCs was accelerated to 160%, as well, but not with 1 nM VD3 stimulation for 4 days. In mouse osteoblasts stimulated with 1 nM VD3 for 3 days, CCN4/WISP-1 mRNA expression was increased to 167% compared to untreated cells. However, interestingly, CCN4/WISP-1 mRNA expression in mouse osteoblasts was suppressed to 10% of controls levels under the stimulation with 1 nM VD3 for 7 days.

Conclusion: These results suggest that VD3 might have dose and differentiation stage-specific effects on the expression of CCN4/WISP-1 in osteogenic cells.

18. Human eosinophil cationic protein enhances the growth of human gingival fibroblast

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Purpose: Eosinophil cationic protein (ECP) is one of the secretion proteins produced in eosinophilic leukocyto. ECP is known to have both antimicrobial and cytotoxic activity (Venge P, 1999). The cytotoxic effects of ECP quite differ with the target cell types (Maeda T, 2002). The purpose of this study is to investigate the effects of ECP on gingival fibroblast for future application of ECP as an antibiotic agent in oral cavity.

Methods: Recombinant human ECP (hrECP) was prepared according to the previous description (Mallorquí-Fernández, 2000). Briefly, cDNA fragment of human ECP was inserted to the plasmid pBO107, and *Escherichia coli* BL21 (DE3) was transformed by the vector. The transformant *E. coli* was cultivated in LBbroth under induced condition with 1mM isopropyl β-D-1-thiogalactopyranoside. Harvested cells were sonicated, and the hrECP was purified from the insoluble fraction by using cation exchange and reverse phase HPLC. The purified hrECP was subjected to SDS-PAGE (SDS-polyacrylamide gel electrophoresis) analysis prior to the use for biological assay. Human gingival fibroblast was stimulated by hrECP (0-10 μg/ml) for 24 h, and 3- (4, 5-dimethylthiazol- 2- thiazoyl)- diphenyl- tetrazolium bromide (MTT) assay was performed. Microscopic observation was performed for the stimulated cells.

Results: SDS-PAGE of obtained hrECP showed single clear band with the estimated molecular mass of 15kDa. MTT assay for ECP-stimulated gingival fibroblast showed significantly high absorbance (1-1000 ng/ml) as compared to the control (without stimulation). Microscopic observation demonstrated that the growth rate of gingival fibroblast was not influenced by the stimulation of ECP.

Conclusion: Human ECP was not toxic to gingival fibroblast. It may enhance (induce?) the growth of human gingival fibroblast and may have the potential to be an antibiotic agent against the pathogens of oral cavity.

19. Aggravating factor evaluation of self-estimated trapezius muscle pain in an adolescent population

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Objectives: This study aimed to evaluate risk factors exaggerating trapezius muscle pain in an adolescent population.

Methods: A group of high school students in Okayama were performed the questionnaire-based survey twice with 2-year interval. The inclusion criteria were subjects who willing to participate and completely fulfilled the questionnaires at both survey. Intensity of trapezius muscle (TM) pain was assessed by a self-estimated 10-grade verbal rating scale (VRS). The candidate risk factors were the gender, clenching habit, sleep disturbance, depression and stress at the first survey which were assessed by dichotomous questionnaires. The subjects were classified into risk factor “presence” or “absence” group, and alteration of mean VRS was compared by two-way repeated measures ANOVA respectively.Furthermore, the significant factors have been performed the multiple linear regression analysis. This study protocol was approved by the Ethical Committee for Human Research in Okayama University (#69, #173).

Results: Among 195 students participated at the first survey, 79 subjects (male/female: 30/49, mean age: 17.3+/-0.5, mean VRS at the first survey: 3.3/4.1) were eligible. The prevalence of clenching habit, sleep disturbance, depression and stress were 10.1, 22.8, 29.1 and 38.0%, respectively. The mean VRS of the TM pain in presence/absence of these groups were 3.6/3.8 (clenching habit), 3.8/3.8 (sleep disturbance), 4.0/3.7 (depression) and 4.2/3.5 (stress). The group of female, presence of depression, and stress showed the significant aggravation of TM pain (p=0.04, 0.02, 0.02), whereas the others showed no significant alteration (p=0.81, 0.87). The results of further analysis (ANOVA) indicated both gender and stress were significantly related to the aggravation of the TM pain (p=0.03, 0.01, R2=0.18).

Conclusion: These results suggested that the female and presence of stress would be the aggravating risk factors of the TM pain even in an adolescent population.

20. Botulinum toxin blocks neurotransmitter release and alleviates neuropathy symptoms

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Purpose: Many patients with trigeminal neuropathies and aggressive cancer invasion suffer severe chronic pain which is occasionally alleviated with centrally-acting drugs. These drugs also possess severe side effects making compliance difficult. One strategy is to develop new treatments without central side effects by targeting peripheral sensory neurons, since sensory neuron excitability and neurotransmitter release increase in chronic pain states. Such treatments may include the highly purified Botulinum toxin type A 150 kDa (BoNT/A) which reportedly blocks vesicular neurotransmitter release.

Methods: We set out to determine if experimental trigeminal neuropathy induced by infraorbital nerve constriction (IoNC) in rats could alter neurotransmitter release from somata of trigeminal sensory neurons and if it could be attenuated by BoNT/A. Thus, we monitored the secretory activity of acutely dissociated trigeminal ganglion (TRG) neurons from IoNC rats by measuring the fluorescence intensity of the membrane-uptake marker FM4-64. FM4-64 staining showed that neurons possess a pool of recycled vesicles which could be released by high KCl (75 mM) application.

Results: TRG neurons from IoNC rats exhibited significantly faster release of FM4-64 than naive controls. BoNT/A pre-treatment of acutely dissociated TRG neurons significantly reduced the rate of FM4-64 dye release. IoNC also produced long-lasting ipsilateral tactile allodynia, measured as large decreases of withdrawal thresholds to mechanical stimulation ($p<0.05$, two-way repeated measure ANOVA). Intradermal injection of BoNT/A in the area of infraodbital nerve innervation alleviated IoNC-induced mechanical allodynia (n = 6) ($p<0.05$) and reduced the exaggerated FM4-64 release in TRG neurons from these rats ($p<0.05$).

Conclusion: These results suggest that BoNT/A decreases neuropathic pain symptoms and decreased the exaggerated neurotransmitter release from TRG sensory neurons.

21. Clinical evaluation of rhBMP-2 for alveolar augmentation in the atrophic maxilla

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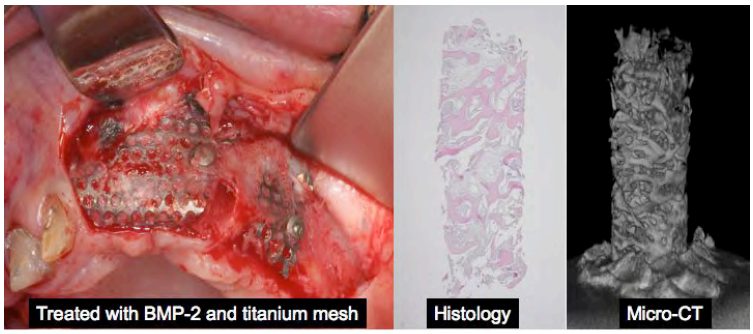
Purpose: In the present study, we evaluated the efficacy of recombinant human bone morphogenetic protein-2 (rhBMP-2) for the alveolar bone augmentation in the dental implant treatment.

Material and Methods: Ten patients were treated with rhBMP-2 (INFUSE®, Medtronic, Kentucky, USA.) with an absorbable collagen sponge. Twenty-four implants were placed at 6 or 8 months after surgery. The survival rate of placed implants (the average observed period of loaded implants was 15.8 months) was evaluated. The treated bone was harvested in the implant placed area with small trephine bar at 4 or 5 months after surgery for the micro Computer Scanning (CT) and light microscopic observation.

Result: In all cases, clinically, newly formed bone was seen in the alveolar bone treated with BMP-2 when implants were placed. No implant was lost. The survival rate of implants was 100%. Micro CT examination showed clear 3-dimensional trabecular bone structure formation (Bone volume = 54.2% in average). Histological observation showed new bone formation and bone marrow structure in the observed area. Osteoblastic cells existed along new bone involving osteocytes. In the connective tissue around new bone, CD34 + blood vessels cells were present. Few TRAP positive osteoclastic cells were seen at this stage.

Conclusion: The application of rhBMP-2 with ACS induced new bone in the atrophied alveolar bone and the placed implant showed acceptable clinical results. This suggested that rhBMP-2 is capable for implant treatment in the atrophied maxilla with alveolar bone augmentation.



22. Myoblast graft effect on scar formation and muscle regeneration in cleft lip

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Purpose: Cleft lip is the most common abnormality of orofacial region. The repair of cleft lip is obviously necessary and is done as soon as possible. However, closure of cleft lip fastens orbicularis oris muscle, results in scar formation and jeopardizes maxillary bones growth. Myoblasts have been expanded in culture to further implantation and has shown the ability, among others, to reduce scar tissue formation. Our purpose was to assay the ability of autologous myoblasts in reducing scar formation and generating new muscle tissue in the lip of Sprague Dawley rats.

Methods: Bilateral cleft-like defect was surgically created in the lips of 9 rats by removing skin and muscle, but sparing, the labial mucosa and the periosteum. In the right side, collagen gel with myoblasts was implanted (test side) and, in the left side, only collagen gel (control side). Two months after surgery, animals were killed, lip and nose were removed as a whole piece and processed for Masson-Goldner staining. Neo-formed muscle and fibrotic tissue were assayed quantitatively by differential point counting volumetry.

Results: Macroscopically, the naturally existing median gap in the rats' lip showed an increase in its borders' distance. The control side showed a muco-cutaneous oriented constriction, in the defect region, apparently greater in control side than in the test side. Microscopically, new muscle tissue showed an uneven distribution pattern along the defect length and there was difference in muscle volume between test and control sides. However, according to Mann-Whitney U Test, this difference was not great enough to reach statiscal significance.

Conclusion: Combining microscopical and macroscopical findings with the result from statistical analisys, it could be concluded that the test side group had a tendency in having a greater muscle volume than the control side.

23. Remaining Teeth Status of Implant-Supported Fixed Partial Denture Patients with Unilateral Mandibular Free-End Edentulism

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Purpose: Implant-supported fixed partial dentures (IFDs) have a possibility to reduce mechanical stress to the patient's remaining teeth. However, there are few studies to investigate survival of the remaining teeth in the IFD patients. The purpose of this study was to compare trouble rates of the remaining teeth between the IFDs patients and the removable partial dentures (RPDs) patients with unilateral mandibular free-end edentulism.

Methods: The sample patients had received prosthodontic care for their unilateral mandibular free-end edentulism (from 1 to 3 missing units) at Okayama University Hospital. The IFDs were installed from 1992 to 2002. The RPDs were inserted from 1997 to 2005. The RPD group was selected by matching age, sex, and functional duration with the IFD group. The final sample sizes of the IFD and RPD groups were 32 (mean age 53.6+/-11.9) and 41 (mean age 55.3+/-9.3), respectively. The remaining teeth location was classified into five categories in relation to their missing portion: adjacent teeth of the missing portion (AD), the contralateral posterior teeth in the lower jaw (CPL) and in the upper jaw (CPU), the opposing posterior teeth (OP), anterior teeth (AN). The outcome was incidence of the remaining teeth troubles, e.g., extraction, acute marginal periodontitis and falling of prosthesis. Non-trouble (survival) curves were compared between the two groups by Kaplan-Meier analysis.

Results: There was significant difference in the 6-year non-trouble curves of their remaining teeth between the IFD (65.6 %) and the RPD (27.2 %) groups (p = 0.014). Moreover, the cumulative non-trouble rate in the IFD group was significantly higher than the RPD group only in the AN area (IFD group: 100%; RPD group: 64.6%) (p = 0.038).

Conclusion: This study suggested that IFDs have an ability to protect anterior teeth in patients with unilateral mandibular free-end edentulism.

24. Which treatment, implant supported fixed partial denture or removable partial denture, promotes oral health related quality of life in patients with free-end edentulism better?

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Purpose: In patients with free-end edentulism, two major dental treatment options, e.g., implant-supported fixed partial denture (IFD) or removable partial denture (RPD) can be applied to promote their oral-health-related quality of life (OHRQOL). However, there has been no rigorous clinical follow-up study comparing the effectiveness of the two treatment options controlling number and portion of their missing teeth. Thus the purpose of this study was to compare OHRQOL change before and after treatment between the IFD and RPD groups with almost identical free-end edentulism.

Methods: Patients with free-end edentulism attending Prosthodontic Clinic of Okayama University Hospital were invited to participate in this study. Inclusion criteria were 1) patients having less than 4 teeth missing in their free-end edentulism; 2) patients who answered self-administered OHRQOL questionnaires (total score range: 0-108, high scores indicated poor OHRQOL) before and after treatment. The median difference in the OHRQOL total scores before and after treatment and the OHRQOL change score difference between the IFD and the RPD groups were analyzed by Wilcoxon analysis and Mann-Whitney U test, respectively.

Results: The questionnaire was completely answered by 29 IFD and 13 RPD patients. There were no significant differences between the IFD and the FPD groups in terms of age (p=0.293), gender (p=0.140), the number of missing teeth (p=0.224). The baseline OHRQOL levels of the groups had no significant difference (p=0.310). Median (95% confidence interval) of the OHRQOL total score before/after treatment were 32(24-40)/20(14-26) and 17(11-23)/25(18-39) in the IFD and the RPD groups, respectively. Significant decrease in the OHRQOL total score was observed only in the IFD group (p=0.038). Median (95% confidence interval) of the OHRQOL change scores of the IFD and the RPD groups were -12 (-22 - -2) and 4 (-5 - 13) without any significant difference (p=0.090).

Conclusion: IFD significantly promoted OHRQOL of the patients with free-end edentulism, while RPD did not.

25. The role of Sulf, a heparan sulfate 6-O-endosulfatase, in tooth development

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Purpose: It is well known that epithelial-mesenchymal interaction plays an important role during tooth development. Many growth hormones and signaling molecules are used for the signal transduction. And it is also known that the signal transduction is controlled by the basal membrane which contains rich collagens and proteoglycans including perlecan which GAG chain is heparan sulfate. In the present study, we focused on Sulf genes, a heparan sulfate 6-O-endosulfatase, in tooth development.

Methods: To investigate the expression pattern of Sulf1 and Sulf2 during mouse tooth development, we performed *in situ hybridization* using the antisense probe of Sulf1 and Sulf2. Also to analyze the function of Sulf1 and Sulf2 on tooth development, we performed micro-computed tomography(micro-CT) scanning analysis using P28 Sulf1 single KO, Sulf2 single KO and Sulf1,Sulf2 double KO mouse and measured the length of first molar's root and thickness of dentin.

Results: From the result of *in situ hybridization,* Sulf1 mRNA expression could detect at the cervical loop of the E14.5 first molar and at Hertwig sheath at P10 mouse first molar. On the other hand, the expression of Sulf2 was detected at the mesenchyme region at E14.5 and in pulp at P10 mouse first molar. Micro-computed tomography (micro-CT) scanning analysis revealed that Sulf1, Sulf2 double KO mouse had a significantly shorter root and thinner dentin compared to wild type mouse, although there were no significant difference between Sulf1 or Sulf2 single KO mouse and wild type mouse.

Conclusion: The expression pattern of Sulf1, 2 mRNA and phenotype of KO mice suggest that, Sulf genes are playing an important role during tooth root development and odontoblast differentiation.

26. Experience of emergency medical practice in Wahidin Hospital at Hasanuddin University in Indonesia for one month

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An interuniversity corporation agreement was signed between Okayama University and Hasanuddin University in 2007. Under the system of good practice in postgraduate school, the author visited the department of anesthesiology in Wahidin Hospital, which is a leading hospital in the area, at Hasanuddin University in Indonesia for one month. As Indonesia is a developing country, emergency medical system in the region is not well established compared to Japan. There is no emergency physician in the hospital, therefore each specialist such as orthopedist or cardiologist provides medical care in the ER. Approximately a hundred patients were transported or visited the ER in a day. More than half of the cases were traumatic injuries, among them traumatic brain injuries were very common due to motor vehicle accident. In addition, Southeast Asia, including the region the author visited, is at high risk from large-scale natural disasters like Sumatra Earthquake in 2004 which is still a fresh memory.The author participated in clinical practice under such an environment as quite different medical circumstance from Japan and limited medical resources. Also a lecture regarding emergency medicine or traumatology was provided to the resident, which would be really educational for them. On the other hand, it was extremely a good experience for me to have been under such a medical resource-limited environment as five senses are fully required to use. Furthermore, engaging in the local medical practice was really significant from the viewpoint of disaster medicine whether it is in Indonesia or in Japan. It is important to share these experiences with others. In conclusion, it is considered that the further reinforcement of mutual relationship is important for the international contribution.

27. Exchange Fellowship at Leiden University Medical Center

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I had a good opportunity to be an exchange fellow at Leiden University Medical Center (LUMC) in Netherlands from October 27th to November 28th, 2008.

○Clinical field

I experienced special cases which I had never seen in Japan.

1. Operations
2. Shoulder reconstruction for winged scapula
3. Shoulder arthrodesis for brachial plexus injury
4. Usage of bone and tendon allograft for osteosynthesis
5. Kinematic analysis for total knee arthroplasty with
   Roentgen stereophotogrammetric methods
6. Outpatient clinic (speciality)
7. Brachial plexus injury
8. Diabetic foot
9. Others
10. Workshop for surgical approach to hip joint disorder with cadavers –hands on-

○Culture

I was really impressed about hospitality and gentle manner of medical staffs to patients. They tried to make a good relationship by handshake and hug.

○Future expectation

This experience motivated me to learn much more to be a better surgeon than before.

I am really grateful to Dr. Abe, Dr. Nelissen, Dr. Ozaki, and Dr. Kuboki for giving me a chance to study a lot of valuable things in Leiden.