Boston University Henry M. Goldman
School of Dental Medicine

SCIENCE DAY 2011 | MARCH 24

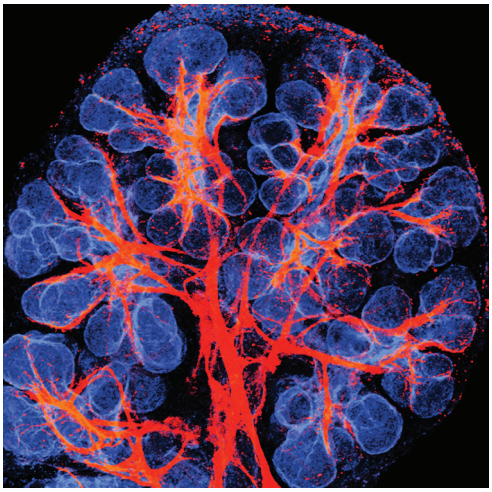


Image: Close association of the parasympathetic nerves (red) with the branching salivary gland epithelium (blue) during glandular development. The image is a projection of a stack of confocal images. Courtesy of Dr. Matthew P. Hoffman.

"Salivary Gland Development Provides a Rationale for Glandular Regeneration"

Dr. Matthew P. Hoffman, chief of the Matrix and Morphogenesis Unit in the Laboratory of Cell and Developmental Biology at the National Institute of Dental and Craniofacial Research at the National Institutes of Health.

1 to 2 p.m.
670 Albany Street
BU Medical Campus

9 a.m. to 4 p.m.

vendor exhibition

100 East Newton Street, first floor hallway and cafeteria

3M ESPE
A-Dec
Arcari Dental Laboratories
Colgate Oral Pharmaceuticals
Dentsply North America
Designs for Vision, Inc.
Door to Door Dental
Eastern Dentists Insurance Company
GlaxoSmithKline
Henry Schein Dental
Hu-Friedy
Johnson and Johnson
Medical Protective
Patterson Dental
Procter & Gamble Professional Oral Health (Crest OralB)
Shofu Dental
Sirona Dental Systems, LLC
Surgitel
Treloar & Heisel, Inc.

1 to 2 p.m.

keynote research presentation

670 Albany Street, auditorium

Dr. Matthew P. Hoffman, chief of the Matrix and Morphogenesis Unit in the Laboratory of Cell and Developmental Biology at the National Institute of Dental and Craniofacial Research at the National Institutes of Health

"Salivary Gland Development Provides a Rationale for Glandular Regeneration"

Matthew P. Hoffman received his dental degree from the Otago University Dental School in New Zealand. He received a Fullbright Scholarship for PhD training in the United States and completed his degree in microbiology and immunology at the University of Rochester in New York. He did his postdoctoral training with Dr. Hynda Kleinman in the Laboratory of Cell and Developmental Biology at the National Institute of Dental and Craniofacial Research, National Institutes of Health. In 2004, Dr. Hoffman became a tenure track Investigator and head of the Matrix and Morphogenesis Unit there. His laboratory aims to understand the diverse regulatory inputs that drive salivary gland development from the earliest stages of cell commitment, progenitor cell maintenance, and differentiation, to growth and morphogenesis, culminating in the formation of a functional salivary gland. Elucidating how cells are directed along a series of cell fate decisions to form a functional salivary gland is critical to understand organogenesis and provides a template for future regenerative therapy. His lab investigates interactions among the various cell types and their stem/progenitor cells, including the epithelial, neuronal, and mesenchymal cells, and their extracellular matrix (ECM) microenvironment, or niche.

9 a.m. to 4:30 p.m.

poster presentations

670 Albany Street, first floor hallways

Predoctoral Students

Ilya Garibyan, Michelle Henshaw. Department of Health Policy & Health Services Research: "Assessing the oral health needs of public housing residents."

Mahesh Sadhnani, Paula Friedman. Department of General Dentistry: "Oral health care disparities and access to care among older adults."

Giuseppina Verde, Souichiro Oda, R. Matthew Miner, Kazuhito Arai, Leslie A. Will. Department of Orthodontics: "Dental and basal arch form relationship using distances between FA and WALA points: review of the literature."

Europa Yang, Amitha Palamakumbura, Philip Trackman: Department of Periodontology & Oral Biology: "Inhibition of the migration of human oral squamous cell carcinoma by lysyl oxidase pro-peptide."

Insun Yoon, Mey Al-Habib, George T. J. Huang. Department of Endodontics: "3D model of dental stem cell attachment to MTA."

Postdoctoral Students

Mohamed Bamashmous, Ana Karina Mascarenhas. Department of Health Policy & Health Services Research: "School lunch program status a marker for high risk caries?"

Claire Chang, Russell Giordano: "Flexural strength of lithium disilicate ceramic with various sintering and finishing procedures."

Renato de Luna, Martha Becker, Jennifer Soncini, Wendy Cheney. Department of Pediatric Dentistry: "Orthodontic treatment needs in children with autistic spectrum disorders."

Martin F-Feo, Maram Zamakhchari, Guoxian Wei, Frank G. Oppenheim, Eva J. Helmerhorst. Department of Periodontology & Oral Biology: "Screening of oral microorganisms for gliadin-degrading activities."

Glena Millan, Moaz Attar, Dan Nathanson. Department of Restorative Sciences/Biomaterials: "Primer and aging effect on resin cements bond to zirconia."

Na Tian, Guoxian Wei, Detlef Schuppan, Frank G. Oppenheim, Eva J. Helmerhorst. Department of Periodontology & Oral Biology: "Proteolytic degradation of immunogenic 33-mer and 26-mer gliadin-derived peptides by oral bacteria reduces tissue transglutaminase recognition in vitro."

Chaimongkon Peampring, Russell Giordano, Richard Pober. Department of Restorative Sciences/Biomaterials: "Flexural strength of resin-infused interpenetrating phase ceramics."

Mariana Velazquez, Sarah Naghibi, Ty Eriks, Richard D'Innocenzo, David Cottrell. Department of Oral & Maxillofacial Surgery: "A retrospective analysis on implant outcomes in patients taking oral bisphosphonates."

Postdoctoral Fellows

Siddiqa S Sume, Manish Bais, Philip C. Trackman. Department of Periodontology & Oral Biology: "CCN2/CTGF regulation of collagen deposition in human gingival fibroblasts."

Andras Szabó, Katalin Zboray, David Héja, David Szakács, Gabor Pál, Miklos Sahin-Tóth. Department of Molecular & Cell Biology: "Selective, high-affinity inhibitors of human chymotrypsin C (CTRC)."

2 to 4:30 P.M.

oral presentations

670 Albany Street, rooms 107 and 108

Predoctoral Students

Kimberley Chan, James Liao, Xing Yan, Haiyan Qin (USC), Songtao Shi (USC), George T.-J. Huang. Department of Endodontics: "Characterization of iPS cells with BCOR mutation."

Sonia Kim, Henry Margolis, Seo-Young Kwak. Department of Biomineralization, The Forsyth Institute: "Protein-mediated biomineralization: The role of amelogenin in dental enamel formation."

Sultan Muhammad, Pritam K. Sengupta, Basem Jamal, Meghan P. Bouchie, Maria A. Kukuruzinska. Department of Molecular & Cell Biology: "P120 and localization of E-cadherin in oral cancer."

Postdoctoral Students

Mey Alhabib, Sonia Kim, George T.-J. Huang. Department of Endodontics: "Enhancement of dental pulp stem cell stemness using small molecules."

Mohammed Fahmi, Russell Giordano. Department of Restorative Sciences/Biomaterials: "Effect of aging on veneer porcelain bond strength to zirconia."

Maram Zamakhchari, Guoxian Wei, F Dewhirst, Frank G. Oppenheim, Eva J. Helmerhorst. Department of Periodontology & Oral Biology: "Fragmentation of immunogenic gluten domains by oral microorganisms."

Science Day 2011 Abstracts
Thursday, 3/24/2011

Assessing the Oral Health Needs of Public Housing Residents

Ilya Garibyan Michelle Henshaw
Department of Health Policy and Health Services Research

Objectives: “Tooth Smart Healthy Start” is a randomized clinical trial which aims to reduce the incidence of early childhood caries (ECC) in Boston public housing residents as part of the NIH funded Northeast Center for Research to Evaluate and Eliminate Dental Disparities. The purpose of this project was to assess public housing stakeholders' perception of the oral health needs of public housing residents and their interest in replicating “Tooth Smart Healthy Start” in other public housing sites across the nation. **Methods**: The target population was the 180 attendees of the 2010 meeting of the Health Care for Residents of Public Housing National Conference. A ten question survey which assessed conference attendees' beliefs about oral health and its importance to public housing residents was distributed. Data was analyzed using SAS 9.1. Descriptive statistics were calculated for each variable and results were stratified by participants' roles. **Results**: Thirty percent of conference attendees completed the survey. The participants consisted of residents, agency representatives, and housing authority personnel. When asked to rank health issues facing public housing residents, oral health was rated as most important (42%) or top three (16%) by residents. The agency representatives and housing authority personnel rated oral health among the top three (33% and 58% respectively) and top five (36% and 25% respectively). When participants ranked the three greatest resident health needs out of eight choices, oral health was the most common response. Majority of the participants expressed interest in replicating the “Tooth Smart Healthy Start” program at their sites. **Conclusion**: All stakeholder groups identified oral health as one of the greatest health needs of residents in public housing. Furthermore, if shown to reduce ECC, there is significant interest in implementing the program amongst key public housing stakeholders across the nation.
Supported by NIDCR U54 DE019275 and K24 DE000419

Oral health care disparities and access to care among older adults

Mahesh Sadhnani, Paula Friedman.
Department of General Dentistry

Abstract: The number of older adults in America has increased substantially over the years. According to CDC, by the year 2030, there will be about 71 million American older adults (roughly 20% of the US population). This demographic shift is likely to increase the nation's health care spending by 25%. The growing size of the aging population is one of the greatest public health challenges of the 21st century in terms of access to care as well as equity in the provision of care. CDC states that although overall health of older American adults has improved over the years, not all are being benefitted equally because of factors such as economic status, race, gender and education.

Good oral health care should be a lifetime commitment. Research has proven that oral health is related to an individual's systemic health. Its neglect can have a deleterious effect on the overall health of an individual. A special report by 'Oral Health America' in 2003 states that "poor elderly have a higher percentage of untreated decayed teeth and the members of racial and ethnic groups experience a higher level of oral health problems." The poster outlines this problem and certain recommendations that will help in improved provision of care among older adults as well as reducing the oral health disparities among older Americans.

Objectives: 1. Discuss the problem and the implications of oral health care disparities among older adults. 2. Evaluate the need to consider older adults in developing public policy. Keywords: Older adults, health disparities, oral health, access to care.

Dental and basal arch form relationship using distances between FA and WALA points: review of the literature

Giuseppina Verde, Souichiro Oda, R. Matthew Miner, Kazuhito Arai and Leslie A. Will
Department of Orthodontics

Objectives: In clinical orthodontics, dental arch forms are important for diagnosis and treatment planning. The relationship between the dental and basal arch forms of untreated subjects has been evaluated in several studies. The aim of this review was to compare the horizontal relationship between the reference points on the tooth crown surface (FA) and the landmarks representing the alveolar process of the mandibular basal arch (WALA) in Class I subjects. **Methods**: An electronic search was conducted using keywords FA and WALA. Articles that provided information about the distances between the FA and WALA points were evaluated. **Results**: A total of 6 studies were found from the keywords used. Five studies out of 6 were found where the distance between FA and WALA points were measured and the values were presented to evaluate their horizontal relationship. Two studies found that the WALA points are consistently positioned buccally to the FA points, while the other three studies found that the WALA points were more lingually positioned than the FA points in the anterior segment. All of the 5 studies showed that the values of the distance tended to progressively increase from the first premolar to the first molar, indicating that the width of the dental arch is increasingly narrower than the bony arch going posteriorly. Two studies found similar values for all the teeth in the arch. The distance between the FA and WALA points at the first molars showed the least amount of variation among the studies. **Conclusions**: Inconsistent results were found among the studies, which may have been due to differences in measurement techniques.

Inhibition of the Migration of Human Oral Squamous Cell Carcinoma by Lysyl Oxidase Pro-peptide

Europa Yang, Amitha Palamakumbura and Philip Trackman
Department of Periodontology and Oral Biology

Oral cancer is currently the 6th most common form of cancer for both men and women. Lysyl oxidase is an enzyme that catalyzes the final cross-linking step of the biosynthesis of collagens and elastin. Lysyl oxidase is synthesized as a 50kDA pro-enzyme and secreted into the extracellular environment where it is cleaved to a functional 30kDA enzyme and an 18 kDA propeptide. The propeptide portion of lysyl oxidase (LOX-PP) has been shown to inhibit the growth and proliferation of several types of cancer cells. This study investigates the effects of LOX-PP on the migration of human oral squamous cell carcinoma (SCC) from the tongue using two cell lines, SCC 9 and SCC 25. A cell migration assay was performed using SCC 25 and the number of migrated cells was quantified by measuring DNA concentration with the Cyquant assay. The optimal time point for serum-induced cell migration in trans-wells was found to be 20 hours. At this time point, both trials exhibited a trend of inhibition of SCC 25 migration by LOX-PP, demonstrating that LOX-PP has an inhibitory effect on oral cancer cell migration. The second part of the study aims to determine the molecular mechanism for how LOX-PP inhibits SCC migration. Previous research suggests that the expression of FAK (a non-receptor focal adhesion tyrosine kinase) regulates cell migration. It was also previously shown that LOX-PP inhibits the RAS-dependant signaling pathway in tumor cells. Since oral cancer cells produce a significant amount of RAS, we hypothesized that LOX-PP inhibits serum-induced SCC 9 cell migration via a RAS dependant pathway: RAS-RAF-MEK-ERK1/2-FAK. Western blotting was performed to evaluate the effect of LOX-PP on serum-induced FAK and ERK phosphorylation. As seen by the Western blots, LOX-PP inhibits both serum-induced ERK and FAK phosphorylation. This observation supports the hypothesis that LOX-PP inhibits SCC migration via the proposed RAS dependant pathway.

3D model of dental stem cell attachment to MTA

Insun Yoon, Mey Al-Habib, George T. J. Huang
Department of Endodontics

The long term goal of this study is to understand the interaction of dental stem cells and the cement mineral trioxide aggregate (MTA) used for various dental reparative procedures including direct pulp capping. Cell direct contact with MTA has been investigated in vitro, however, there has been a lack of a 3D model to study the interactions between cells and MTA in vitro that mimics in vivo cell-MTA contact. In this study, the attachment and growth of dental stem cells on a 3D scaffold/MTA construct was investigated. Polylactic acid (PLA) scaffolds were mounted onto MTA cement and formed a 3D construct. Human stem cells from the apical papilla (SCAP) were isolated from the apical papillas of extracted immature 3rd molars. At passage 3, they were seeded onto the 3D PLA/MTA construct and cultured in vitro for 4 weeks. The cell/construct was then fixated for scanning electron microscope analysis. SCAP attached well onto the PLA scaffolds and appeared to have populated in the inner scaffold space of the 3D PLA/MTA construct. SCAP were also observed at the junction of the PLA/MTA indicating that this 3D model may allow cells to interact with MTA and may eventually differentiate into odontoblastic lineages. SCAP were able to attach and grow on 3D PLA/MTA. The in vitro 3D model may serve as a good study system for SCAP growth and differentiation against the MTA surface.

School lunch program status a marker for high risk caries?

Mohamed Bamashmous and Ana Karina Mascarenhas
Department of Health Policy and Health Services Research

Dental caries is concentrated in a small proportion of children in the United States. Previous studies evaluating dental caries distribution in the U.S school children reported that 75% of the caries is in 25% of the children. However, markers to easily identify these children have not been identified. **Aim**: To analyze the distribution of dental caries among school children in the Commonwealth of Massachusetts, and find markers for policy makers to identify these children and target them with prevention. **Methods**: Data from the Massachusetts Oral Health Survey funded by DentaQuest Institute was used. The study sample was 5547 school children from kindergarten, grades 3 and 6, and selected using a complex survey sampling method. The sample was selected independently from each stratum, as defined by county and clustering was done based on schools and classrooms. We used Cumulative Percent Distribution Curves to examine dental caries distribution and using GIS mapping, we examined and evaluated sociodemographic and geographic variables, which are easily available to identify children at high risk for dental caries. **Results**: We found that 75 percent of the dental caries experience is found in 15 percent of the 6^{th} grade children, 19 percent of the 3^{rd} grade children and 13 percent of kindergarten children. Mapping dental caries and sociodemographic variables, we found that National School Lunch Program status of the child was the best identifier of high caries risk and closely mirrored the cumulative distribution of dental caries in the Commonwealth of Massachusetts. **Conclusion**: Dental caries in Massachusetts is concentrated in fewer children than nationally. Using the National School Lunch Status, policy makers can identify children at high risk for caries, and target children and distribute prevention program where needed more efficiently.

Flexural strength of lithium disilicate ceramic with various sintering and finishing procedures

Claire Chang and Russell Giordano
Department of Restorative Sciences/Biomaterials

Objective: Evaluate the effect of various firing cycles and surface finish on lithium disilicate glass-ceramic (LDGC) flexural strength. **Methods**: IPS e.max CAD blocks (Ivoclar Vivadent AG, Schaan, Liechtenstein) of types HT, LT, and MO were sectioned into bars (2 mm x 3 mm x 12 mm) using a Buehler ISOMET saw and randomly divided equally into groups of 16 specimens each subjected to various heat treatments in an Ivoclar Programat CS furnace and a Vita Vacumat 6000M furnace with the following cycles: standard (IP1), fast (IP3), or superfast (IP5). Half of the specimens from each group were polished on one side (Ecomet 3, Buehler Ltd) starting with bonded diamond grits of 45 and 15 μm followed by 6 and 1 μm diamond suspensions at 100 rpm and 20 psi. The control was not fired or polished. Flexural strength was determined using a three-point bend test (10 mm span) on an Instron universal testing machine at a crosshead speed of 0.5mm/min. Color spectrophotometry readings were performed on samples fired in Ivolar furnace using a spectrophotometer (Gretag-Macbeth) and an Easyshade device (Vita Zahnfabrik, Bad Sackingen Germany). Two-way ANOVA and Tukey statistical analyses at $p = 0.05$ was performed. **Results**: Regardless of which furnace was used, Ivoclar or Vita, All non-polished groups had generally higher flexural strengths than polished groups. The choice of furnace, firing cycle, and block type had no significant effect on the flexural strength of the material. Visual observation of LT sample fired by the IP5 cycle demonstrated a color difference as compared to the other two cycles. **Conclusion**: Flexural strength is significantly lowered by polishing.

Orthodontic treatment needs in children with autistic spectrum disorders

Renato de Luna, Martha Becker, Jennifer Soncini, Wendy Cheney
Department of Pediatric Dentistry

Purpose: The purpose of this pilot study was to determine the orthodontic treatment needs of children with Autistic Spectrum Disorder (ASD). **Methods**: Demographic information of 25 children with ASD undergoing oral rehabilitation under general anesthesia was obtained. Impressions were taken in the operating room and casts were analyzed using the Dental Health Component (DHC) of the Index of Orthodontic Treatment Need (IOTN). Regression analyses was used to describe the dental and demographic features of the sample population. **Results**: Twenty-four casts were analyzed. The mean age of the sample was 10 yrs (range 6-16) and 67% (n=16) were male. The most common malocclusion determined by the IOTN was increased overjet and cross-bites (21% each). Half (52%) of the study sample required orthodontic treatment of which 26% had moderate need. Borderline need was observed in 26% of the subjects. Regression analysis revealed a significant association ($p<.05$) between age and IOTN score. All other demographic features show no statistical significance to IOTN score. **Conclusions**: Children with ASD may have greater orthodontic treatment need compared to well children. The results in this study shed some light on the pattern of malocclusion seen in children with ASD. However, the sample was small and large-scale studies are required.

Screening of oral microorganisms for gliadin-degrading activities

Martin F-Feo, Maram Zamakhchari, Guoxian Wei, Frank G. Oppenheim, Eva J. Helmerhorst
Department of Periodontology and Oral Biology

Martin Fernandez-Feo, Maram Zamakhchari, Guoxian Wei, Frank G. Oppenheim, Eva J. Helmerhorst Gluten proteins are prominent constituents of the Western diet. Certain genetically predisposed individuals will develop celiac disease after ingestion of gluten. Some gluten domains are resistant to proteolysis by the three major digestive enzymes trypsin, chymotrypsin and pepsin. It has been shown that microorganisms in whole saliva and dental plaque produce enzymes that are capable of degrading digestion-resistant gliadins. **Objectives**: To identify and characterize the oral microorganisms producing gliadin-degrading enzymes. **Methods**: Aliquots of whole saliva and dental plaque suspension were cultured on gluten-limited agar plates. Suspensions of selected bacterial strains were evaluated for gliadin degradation by zymography. The same strains were tested for hydrolysis of five gliadin-derived synthetic enzyme substrates: Z-YPQ-pNA, Z-QQP-pNA, Z-PPF-pNA, Z-PFP-pNA and Z-LPY-pNA which was assessed macroscopically over a 48 hr time interval. **Results**: Oral microorganisms were identified that showed an active enzyme band at ~75kD and cleaved Z-YPQ-pNA and Z-LPY-pNA. Furthermore, gliadins in solution were degraded as well as peptides comprising immunogenic gliadin domains. **Conclusions**: Culturing of dental plaque on gluten agar selected for bacteria capable of degrading gliadin and/or cleaving synthetic gliadin enzyme substrates. These strains are excellent candidates for further tests and studies to determine their role in gluten digesting in vivo, as well further clinical exploitation. Supported by NIH grants DE18132 and AI087803.

Primer and aging effect on resin cements bond to zirconia

Glena Millan, Moaz Attar and Dan Nathanson
Department of Prostodontics

The smooth inner aspects and low surface energy of zirconia restorations cause insufficient cement adhesion for effective retention. **Objective**s: To compare the effectiveness of two new zirconia primers: Z-Prime Bisco (ZP) and Clearfil Ceramic Primer, Kuraray (CCP), on the bond strength of resin cements to dental zirconia, and to assess the effect of thermocycling on bond strength. **Methods**: One conventional and two self-adhesive resin cements were tested: DL (Duo-Link, Bisco); RXU (RelyX Unicem Aplicap, 3M-ESPE); SC2 (SmartCem2, Dentsply). Zirconia specimens were sectioned from In-Ceram YZ blocks (Vita) in a circular saw, and were sintered per instructions. Surfaces were polished with 70 then 45 micron discs. After primer application, resin cements were applied to specimens through the cylindrical opening of an Ultradent jig. All cements were allowed to set for 20 minutes under a 90gm load. Thermocycled specimens were exposed to 5,000 cycles (5^0C - 50^0C, 30 sec dwell times). Non-thermocycled specimens were water stored for equivalent time (5.5 days). Bonds were tested in shear mode in an Instron testing machine at 0.5 mm/min. **Results**: Mean Shear Bond Strengths (MSBS), in MPa (SDs), of all groups (n=8/group) are presented below:

	Primer	Cement		
		DL	RXU	SC2
Water Storage	None	2.81 (0.71)	5.17 (1.38)	3.64 (1.00)
	ZP	12.69 (2.57)	6.35 (0.91)	6.18 (1.19)
	CCP	9.09 (2.16)	8.97 (2.17)	5.78 (1.42)
Thermocycled	None	Debonded	3.12 (1.90)	Debonded
	ZP	4.54 (2.40)	3.45 (1.67)	0.93 (0.28)
	CCP	3.64 (0.77)	3.88 (1.28)	0.29 (0.19)

Conclusions: Two way ANOVA showed primers affecting significant increases in MSBS in both aging protocols ($p<0.05$). Thermocycling affected significant decreases in MSBS versus water storage both with and without a primer. Keywords: Adhesion, Cements, Ceramics, Dental materials and Primers.

Characterization of Human Mesenchymal Cells in Inflamed Periapical Tissue

James Liao, BS[1], Mohammed Al Shahrani, BDS[1], Mey Al-Habib, BDS[1], Toshinori Tanaka, DDS[2], and George T.-J. Huang, DDS, MSD, DSc[1,2]

1. Boston University, Henry M. Goldman School of Dental Medicine, Department of Endodontics, Boston, MA 02118
2. Columbia University, College of Dental Medicine, Section of Oral and Diagnostic Sciences, Division of Endodontics, New York, NY 10032

We previously reported the presence of mesenchymal stem/progenitor cells (MSCs) in inflamed pulp tissue. Here we asked whether MSCs also exist in inflamed periapical tissues resulting from endodontic infection. **Objectives**: To detect the expression of MSC markers in periapical inflammatory tissues and to characterize isolated cells from these tissues. **Methods**: Human periapical inflammatory tissues were collected during apicoectomy. Immunohistochemical staining for MSC markers was performed. Cells were isolated and passaged at subconfluence. At various passages, cells were tested for cell surface marker expression using flow cytometry and examined for multiple differentiation potential into osteogenic and adipogenic pathways. **Results**: Immunohistochemistry showed positive staining for MSC markers Stro-1, CD90 and CD146. Isolated cells at passaged 0 appeared as typical fibroblastic cells and a few cells formed colony formation unit-fibroblasts (CFU-Fs). After passaging the CFU-F forming ability diminished dramatically. The population doubling was only up to 9, suggesting a lack of or poor self-renewal property. Flow cytometry data showed that these cells at passage 2 expressed low levels of Stro-1 and CD146 and moderate to high levels of CD90, CD73 and CD105. At passage 6, Stro-1 and CD146 expression was negligible whereas CD90, CD73 and CD105 remained at moderate to high levels. At both passages, CD34 and CD45 were negative. When incubated in specific differentiation medium, cells demonstrated a strong osteogenic but weak adipogenic capacity. **Conclusion**: Human periapical inflammatory tissues expressed MSC markers suggesting the presence of MSCs. Isolated cells exhibited typical mesenchymal cell immunophenotype, however, they lack typical MSC multipotent differentiation capacity.

Proteolytic degradation of immunogenic 33-mer and 26-mer gliadin-derived peptides by oral bacteria reduces tissue transglutaminase recognition in vitro

Na Tian, Guoxian Wei, Detlef Schuppan, Frank G. Oppenheim and Eva J. Helmerhorst
Department of Periodonhtology and Oral Biology

Introduction: Celiac disease is a T cell mediated-inflammatory enteropathy. It is triggered by gluten-derived peptides that are highly resistant to mammalian gastrointestinal proteases. The recognition of these peptides by CD4+ T cells requires deamidation by tissue transglutaminase (tTG). Our previous studies have shown that the alpha-gliadin-derived 33-mer and gamma-gliadin-derived 26-mer are rapidly hydrolyzed by enzymes produced by oral microorganisms. **Aim**: To study how the hydrolysis of these peptides by a selected oral strain, WSA-2B, impacts substrate recognition by human and porcine tTG. **Materials and methods**: 33-mer or 26-mer peptides were added (final concentration of 250 µg/ml) to a suspension of WSA-2B (OD620 1.2) in a buffer mimicking the ion composition of saliva. After incubation at 37C for various time intervals, 100 µl aliquots were removed, boiled and filtered. Degradation of the peptides was investigated by RP-HPLC. Recognition of the peptides in the degradation mixture by tTG (human or porcine derived) was determined by assessing cross-linking of the peptide fragments into monodansyl cadaverine (MDC) as a measure for tTG-catalyzed deamidation of peptides. **Results**: Human tTG preferentially deamidated the 33-mer while porcine tTG was more active towards the 26-mer, indicating differing substrate specificities depending on the species. The 26-mer and 33-mer incubated with WSA-2B cells were almost completely degraded into smaller fragments after 30 minutes and 8 hours respectively. A perfect correlation was observed between degradation and loss of cross-linking, showing 50% reductions after 10.5 and 10.2 minutes, respectively, for the 26-mer and 4.9 and 4.3 hours, respectively, for the 33-mer. **Conclusion**: WSA-2B cleavage of the 26-mer and 33-mer results in peptide mixtures that show overall low propensity to serve as substrates for tTG. Elimination of tTG-mediated deamidation is a first indication that oral proteases may reduce the immunogenicity of the 33-mer and 26-mer. Supported by NIH grants DE18132, AI087803, DE05672 and DE07652.

Flexural strength of resin-infused interpenetrating phase ceramics

Chaimongkon Peampring, Russell Giordano, Richard Pober
Department of Restorative Sciences/Biomaterials

Objectives: The objectives of this study were to study the sintering behavior of two different ceramic powders, experimental low-fusing porcelain powder (RIC) and commercial feldspathic porcelain powder (MK) and to investigate the flexural strength of resin-infused interpenetrating phase ceramics fabricated from those two different powder. **Materials and methods**: Die-pressed porous ceramic blocks were prepared by using two different ceramic powders, RIC and MK powder. The blocks were sintered at different temperatures in order to get the varied percent of the ceramic phase of the porous block. The porous ceramic blocks were silanized and infused with UDMA (Urethane dimethacrylate) resin under vacuum condition. The infused blocks were polymerized at 90oC for 10 hours under isostatic pressure. The polymerized resin-infused ceramic blocks were cut into bar-shaped specimens according to ISO 6872 (15 x 2 x 4 mm3) and subjected to three-point bending flexural strength test. Specimens were categorized into two main groups (RIC and MK) and 4 subgroups according to the percent of the ceramic phase (60, 65, 70, and 75%). The fully dense RIC and MK were considered as control groups. The data were analyzed by using one-way ANOVA and Tukey multiple comparisons. **Results**: MK powder required higher sintering temperature in order to get the same percent of ceramic phase as RIC powder. Resin-infused ceramic groups had significantly higher flexural strength than the fully dense ceramic groups and the flexural strength increased as the percent ceramic phase decreased. The MK group had significantly higher flexural strength than RIC group regardless of percent ceramic phase. **Conclusions**: Resin-infused interpenetrating phase ceramics showed the significant higher flexural strength compare to fully dense ceramics.

A retrospective analysis on implant outcomes in patients taking oral bisphosphonates

Mariana Velazquez, Sarah Naghibi, Ty Eriks, Richard D'Innocenzo and David Cottrell.
Department of Oral and Maxillofacial Surgery

Purpose: Bisphosphonates are a class of medications that act upon osteoclasts to halt bone resorption. Oral bisphosphonates are typically prescribed to treat osteoporosis and other related disorders of bone resorption. Osteonecrosis of the jaws related to oral bisphosphonate use has been presented in the literature; however the overall risk of developing osteonecrosis when taking oral bisphosphonates has been reported to be relatively low. To date few studies exist in the literature investigating the implant success rate or the development of osteonecrosis in patients on these medications. We performed a retrospective chart review on patients who underwent implant placement while taking oral bisphosphonates in which the success rate of the implants and development of necrosis was evaluated. **Methods**: A retrospective chart review was performed on all implant patients treated by the same clinician from January 1998 through June 2009. All patients who were taking oral bisphosphonates were evaluated for the following: Age and gender, type of oral bisphosphonate taken, number of implants placed, site of implant placement, duration of bisphosphonate therapy, whether the patient had undergone a drug holiday, co-morbidities, length of follow up, implant success, and the development of Bisphosphonate Related Osteonecrosis of the Jaws (BRONJ). **Results**: A total of 21 patients were found to have taken oral bisphosphonates and 52 implants were placed. All were women with ages ranging between 47 and 98 years, with a mean age of 65.9 years. Twenty of the patients were taking Fosamax, while one was on Actonel. The duration of bisphosphonate therapy ranged from 1 to 20 years. Eight patients had undergone a drug holiday for approximately 6 months (three months prior to the procedure and three months following). Follow-up examination ranged from 3 months to 8 years. One maxillary posterior implant failed secondary to infection; no patient developed BRONJ. **Conclusion**: The development of BRONJ while taking oral bisphosphonates is reported to be a rare occurrence. The few studies in the literature regarding oral bisphosphonate therapy with implant placement, reported therapy neither affected implant success nor resulted in BRONJ. While the results of our study support these findings, the small sample size could bias the results obtained. The results of this study demonstrate that for all follow-up periods on patients with or without bisphosphonate drug holidays, there was no negative impact on healing or implant success rates. A recommendation for continual follow up of those patients who are taking oral bisphosphonates should be considered.

CCN2/CTGF regulation of collagen deposition in human gingival fibroblasts.

Siddiqa S Sume, Manish Bais and Philip C. Trackman
Department of Periodontology and Oral Biology

Connective tissue growth factor (CCN2/CTGF) has an important role in the production and maintenance of fibrotic lesions. Increased collagen deposition and accumulation is a common feature of fibrotic tissues. Elevated levels of CCN2/CTGF were found in the phenytoin-induced gingival overgrowth which is the most fibrotic form of drug-induced gingival fibrosis. The mechanisms by which CCN2/CTGF contributes to fibrosis are not well understood. Previous studies in cultured gingival fibroblasts showed that CCN2/CTGF stimulates collagen deposition but not collagen synthesis by binding to á6â1 integrin. To identify the molecular mechanism by which CCN2/CTGF stimulated collagen deposition we evaluated MAP Kinase pathway. We used an inhibitory peptide which inhibits CCN2/CTGF stimulated collagen accumulation by gingival fibroblasts and that we suspect acts as a competitive inhibitor for CCN2/CTGF-á6â1 interaction. Human primary gingival fibroblasts treated with vehicle, CCN2/CTGF and CCN2/CTGF with peptide and protein samples were collected to analyze by Western blotting. While CCN2/CTGF activates the phosphorylation of JNK MAP Kinase ($p<0.0001$), addition of inhibitory peptide reduced CCN2/CTGF-induced phosphorylation of JNK ($p<0.0001$). In contrast to JNK activation, inhibitory peptide did not change the activation of ERK and p38 MAP Kinases. To examine the role of JNK in stimulating CCN2/CTGF-induced collagen deposition, we chose to utilize a dominant negative JNK (DN-JNK) adenovirus and a pharmacological inhibitor of JNK MAP Kinase. Human gingival fibroblasts infected with DN-JNK expressing adenovirus resulted in decrease by 50% ($p<0.05$) in CCN2/CTGF-induced JNK phosphorylation. While CCN2/CTGF activates the phosphorylation of JNK MAP Kinase ($p<0.05$), pharmacological inhibitor of JNK caused 50% decrease in JNK phosphorylation ($p<0.0001$) and also reduced CCN2/CTGF-stimulated collagen deposition by 50% ($p<0.0001$) in human gingival fibroblasts. Thus, the data suggest that CCN2/CTGF induces collagen deposition through the activation of JNK MAP Kinase. This is very significant finding to provide insight into potential therapeutic strategies to treat gingival fibrosis by inhibition of JNK phosphorylation.

Selective, high-affinity inhibitors of human chymotrypsin C (CTRC)

Andras Szabó, Katalin Zboray, David Héja, David Szakács, Gabor Pál, Miklos Sahin-Tóth
Department of Molecular and Cell Biology

Background and aims: The digestive enzyme chymotrypsin C (CTRC) proteolytically regulates activation and degradation of human cationic trypsinogen. Mutations in CTRC are risk factors for chronic pancreatitis. The aim of the present work was to develop selective peptide-inhibitors against CTRC. **Methods**: A chymotrypsin inhibitor from the desert locust Schistocerca gregaria served as the parent molecule for an inhibitor library displayed on M13 phage. Amino acids of the reactive loop of the inhibitor are numbered as P4-P3-P2-P1-P1'-P2'-P3'-P4'. The P1 amino-acid of the inhibitor interacts with the primary specificity pocket of CTRC. Positions P4, P2, P1, P1', P2' and P4' of the reactive loop were randomized and phages binding to CTRC were selected. A consensus reactive sequence was deduced after DNA-sequencing 25 phage clones. The newly identified inhibitors were recombinantly expressed, purified and tested against human chymotrypsin B1, B2, and C; elastase 2A, 3A and 3B; and chymotrypsin-like enzyme 1. **Results**: The best CTRC inhibitor exhibited a KD of 60 pM and a selectivity of 300-200,000-fold over other pancreatic proteases. A Leu at the P1 position and acidic residues (Asp or Glu) at the P4' position were important for high affinity binding, whereas an Asp residue at the P2' position increased selectivity. **Conclusions**: Novel inhibitors against CTRC will be useful reagents to study the role of CTRC in cellular and animal models of pancreatitis.

Characterization of iPS cells with BCOR mutation

Kimberley Chan, James Liao, Xing Yan, Haiyan Qin (USC), Songtao Shi (USC) and George T.-J. Huang. Department of Endodontics

Oculofacialcardiodental (OFCD) syndrome is a genetic disorder caused by mutations in the BCL-6 co-repressor (BCOR) gene. OFCD is characterized by canine teeth with extremely long roots, congenital cataracts, craniofacial defects, and congenital heart disease. Stem cells from the apical papilla (SCAP) from an OFCD patient were reprogrammed into induced pluripotent stem (iPS) cells to establish a disease study model. **Objectives**: The purpose of this study is to compare the differentiation of iPS cells from OFCD cells with iPS cells from normal cells. **Methods**: SCAP obtained from an OFCD patient (SCAPOFCD) and SCAP from normal individuals (SCAPWT) were reprogrammed into iPS cells using viral vector transduction with four factors: Lin28/Nanog/Oct4/Sox2. iPS cells were examined for embryonic stem (ES) cell-associated gene expression, embryoid body (EB) formation, and pluripotent differentiation potential. EB-mediated differentiation into neural lineages was determined by immunocytofluorescence staining with the neural marker Tuj1. **Results**: SCAPOFCD-iPS and SCAPWT-iPS cells expressed ALP and hES cell-associated markers SSEA-4, TRA-1-60, TRA-1-80, Nanog, Oct4 and Sox2. They formed EBs similar to that of hES cells and differentiated into cells expressing markers representing ectoderm (β-tubulin), mesoderm (desmin, vimentin, α-SMA) and endoderm (α-fetoprotein). Histological analysis of EBs from SCAPOFCD-iPS, SCAPWT-iPS and hES cells revealed the formation of various primitive tissues. EB-mediated differentiation showed SCAPOFCD-iPS cells to be more potent in neurogenic differentiation than SCAPWT-iPS cells or hES cells. **Conclusions**: BCOR mutation may cause a shift in the differentiation pathway of cells towards neurogenesis. The examination of SCAPOFCD-iPS cells may be a useful tool in the study of aberrant gene regulation during cell differentiation in vitro and may unravel the dysregulated gene expression sequence resulting from BCOR mutation during organ development. (Supported in part by grants from NIH R01 DE019156 and RO1 DE17449) 1Columbia University, College of Dental Medicine, Division of Endodontics, New York, NY 10032. 2University of Maryland, College of Dental Surgery, Dental School, Department of Endodontics, Prosthodontics and Operative Dentistry, Baltimore, MD 21201. 3Cartilage Biology and Orthopaedics Branch, National Institute of Arthritis, and Musculoskeletal & Skin Diseases, National Institutes of Health, Department of Health and Human Services, Bethesda, MD 20892-8022. 4University of Southern California School of Dentistry, Center for Craniofacial Molecular Biology, Los Angeles, CA 90033. 5Eli and Edythe Broad Center for Regenerative Medicine and Stem Cell Research, Keck School of Medicine, University of Southern California, Los Angeles, CA 90033, USA

Protein-mediated biomineralization: The role of amelogenin in dental enamel formation

Sonia Kim, Henry Margolis and Seo-Young Kwak
Department of Biomineralization at Forsyth

While the presence of amelogenin as the predominant extracellular matrix protein in developing enamel has been known, how amelogenin guides enamel formation is still poorly understood. To elucidate the role of amelogenin in developing enamel formation, biomimetic mineralization in the presence of P173 concentrations from 0.2 – 2.0 mg/mL were conducted using spontaneous calcium phosphate precipitation method for up to 48 hours. The onset and rate of mineralization was assessed by monitoring pH change. The transformation of initially formed ACP nanoparticles to HA crystals was characterized with transmission electron microscopy (TEM), Fourier-transform infrared spectroscopy (FT-IR), and selected area electron diffraction (SAED). Comparative studies under the same conditions were conducted with truncated recombinant amelogenin (rP147), a recombinant form of an amelogenin cleavage product lacking the hydrophilic C-terminus, and without any protein as control. The presence of P173 was observed to delay mineralization depending on its concentration, and ordered bundles of HA crystals were observed at low concentration (~ 0.4 mg/mL) within the experimental time frame. On the other hand, in the presence of rP147 the results demonstrated accelerated mineralization without significant effect on the formed HA crystal compared with control. These results suggest that the full-length molecule regulates premature mineralization of HA crystals in forming enamel and that the hydrophilic C-terminus plays an important role in HA organization. Appropriate kinetic conditions could be identified for this experimental design.

p120 and E-cadherin localization in oral cancer

Sultan Muhammed, Pritam Gupta, Basem Jamal, Meghan P. Bouchie and Maria Kukuruzinska

Department of Molecular and Cell Biology

E-cadherin is the principal epithelial N-glycoprotein cell-cell adhesion receptor with key roles in tissue morphogenesis and tumor suppression. The strength of E-cadherin-mediated cell-cell adhesion depends on its ability to organize protein scaffolds, known as adherens junctions (AJs), which is regulated by its N-glycosylation status. Extensive N-glycosylation of E-cadherin with complex N-glycans results in weak intercellular adhesion, whereas reduced N-glycosylation of E-cadherin drives stable adhesion. The N-glycosylation status of E-cadherin is regulated by the first N-glycosylation gene, DPAGT1. Accordingly, overexpression of DPAGT1 is a feature of a subset of human oral squamous cell carcinomas (OSCCs) and is associated with compromised E-cadherin adhesion. Overexpression of DPAGT1 in OSCC has been linked with aberrant activation of canonical Wnt signaling due to reduced levels of a Wnt inhibitor, Dickkopf-1. The adhesive function of E-cadherin is also regulated by p120 catenin, which binds to its juxtamembrane domain and controls the abundance of its surface pool. Since carcinoma cell lines deficient in p120 display poor cell-cell adhesion, I investigated whether increased N-glycosylation and decreased E-cadherin adhesion in OSCC were associated with lesser interaction between E-cadherin and p120. Immunoprecipitation of E-cadherin from tumor specimens and control adjacent epithelia showed that while tumor samples displayed diminished localization of E-cadherin to cell-cell borders, this appeared not to be unrelated to the association between E-cadherin and p120 catenin. Thus, my results suggested that changes in E-cadherin localization in OSCC were not due to the loss of p120 catenin from AJs. In addition, they suggested that N-glycosylation of E-cadherin does not interfere with its association with p120 catenin and does not affect its endocytosis. Supported by grant NIH RO1 DE015304-5.

Enhancement of dental pulp stem cell stemness using small molecules

Mey Alhabib, Sonia Kim, and GeorgeT Huang
Department of Endodontics

Advancements in stem cell biology have enhanced our understanding of tissue homeostasis, especially its repair and regeneration potential. One fundamental issue regarding stem cell biology is the maintenance of stem cell stemness. Certain small molecules have been used to maintain or enhance the stemness of embryonic stem (ES) cells or adult stem cells in vitro. Here we ask whether these molecules can perform the mentioned function for human dental pulp stem cells (hDPSCs). **Objectives**: Identification of the effect of small molecules (Pluripotin (SC1), GSK-3 inhibitor IX (BIO) and Rapamycin) on the maintenance of hDPSC stemness. **Methods**: Human dental pulps were extracted from teeth of healthy subjects aged 16–25 years. hDPSCs at passages 3 to 8 were first treated with various concentrations of SC1, BIO, or Rapamycin to test their cell toxicity. Cells were then treated with the optimal concentrations of these small molecules for two weeks. Subsequently, the hDPSCs were subjected to immunocytostaining, flow cytometry analysis and RT-PCR for the detection and measurement of the following marker expression: Oct4, Nanog, Sox2, Stro-1, CD73, CD90, CD105 and CD146. **Results**: hDPSC were Stro-1+, CD73+, CD90+, CD105+ and CD146+. Flow cytometry analysis showed that cells treated by SC1, BIO and Rapamycin expressed higher levels of Stro-1, Oct4, Nanog and Sox2 than the non-treated control groups. RT-PCR revealed that the expression of Oct4, Nanog and Sox2 was increased in SC1, BIO and Rapamycin treated cells compared to the controls. **Conclusion**: Small molecules (SC1, BIO and Rapamycin) appear to enhance the stemness of cultured hDPSCs evidenced by the increased expression of ES stem cell markers Oct4, Nanog and Sox2, and the MSC marker Stro-1 that appear to be associated with stemness. Research supported in part by a grant from the AAE Foundation and from NIH R01 DE019156.

Effect of aging on veneer porcelain bond strength to zirconia

Mohammed Fahmi and Russell Giordano
Department of Restorative Sciences/Biomaterials

Objective: Evaluate the effect of aging in water on porcelain shear bond strength to yttria partially stabilized zirconia (YTZP) with various surface treatments.

Methods: YTZP blocks (Vita Zahnfabrik, Bad Sackingen, Germany) were sectioned into slabs approximately 2 mm x 14 mm x 15 mm using a Buehler Ecomet diamond saw and sintered according to the manufacturer's instructions in a Vita Zyrcomat furnace. Two hundred and ten (210) specimens were randomly divided equally into three groups. (1)No surface treatment (2)Grinding using a 120 grit resin bonded diamond disc (Struers) with a 0.0034 kg/mm^2 load (3)Grinding followed by a recommended heat treatment, 1000°C for 15 minutes.. A water/powder slurry of Vita VM9 porcelain was condensed into a mold on top of the zirconia and fired according to the manufacturer's recommendations to produce "buttons", 3 mm high x 4 mm diameter. The final specimens were stored in 40 ml of deionized water at 37'Cº. Porcelain shear bond testing, using a half- circle shaped cavity tool applied at the porcelain/zirconia interface, was performed with an Instron at a crosshead speed of 0.5 mm/min for specimens at baseline and then each succeeding year for each group, n=10.

Results:
Shear Bond Strength (MPa) of Veneer Porcelain to YTZP with Various Surface Treatments.

Group	No treatment	Grinding	Grinding and heat treatment
Base line	64.73±19.57	76.38±26.34	97.7 ± 27.58
1 year with dH2O	60.15±10.17	58.69 ±16.02	50.38±16.34
1 year dry	62.07±23.38	58.84± 29.49	64.96±32.37
2 years with dH2O	49.09±24.49	47.94±29.66	47.99±22.07
2 years dry	51.97±14	50.03±19.61	51.71±5.23
3 years with dH2O	41.42±19.52	40.04±15.7	39.50±21.07
3 years dry	42.83±17.87	42.25±12.64	45.37 ±18.68

ANOVA and Tukey statistical analysis showed a significant difference between groups.
Conclusion: The shear bond strength significantly decreased from baseline and year 1 measurements to the measurements recorded at year three.

Fragmentation of immunogenic gluten domains by oral microorganisms

Maram Zamakhchari, Guoxian Wei, F Dewhirst, Frank G. Oppenheim and Eva Helmerhorst
Department of Periodonhtology and Oral Biology

Dietary gluten are proteins that are difficult to digest and in genetically predisposed subjects can cause celiac disease. Certain immunogenic gluten domains are completely resistant to the major human digestive enzymes trypsin, chymotrypsin and pepsin. We recently demonstrated that oral microorganisms in dental plaque produce gluten-degrading enzymes. **Objectives**: to characterize these enzymes with respect to activity and cleavage site specificity. **Methods**: Aliquots of suspensions of whole saliva and dental plaque were cultured on wheat gluten-limited agar plates. Individual colonies were sub-cultured on Brucella agar plates to purity. Suspensions of selected pure bacterial strains (OD620=1.2) were evaluated for gliadin degradation in-solution and in-gel (zymography), and for enzymatic activities directed at the immunogenic gliadin domains (33-mer and 26-mer, 250 µg/ml). Protease specificities were assessed by sequencing the proteolytic fragments by LC-ESI-MS/MS and by measuring hydrolysis of gliadin sequence-mimicking synthetic enzyme substrates: Z-YPQ-pNA, Z-QQP-pNA, Z-PPF-pNA, Z-PFP-pNA and Z-LPY-pNA **Results**: With the selective plating strategy employed several pure oral microbial strains were obtained that were capable of growth on gluten-limited agar. Gliadin zymography of selected strains showed enzymatic activities in the 70-75 kD region. The 33-mer and 26-mer domains were degraded completely in 5h. Structural analysis of the fragments generated indicated prominent cleavage activities after YPQ and LPY, consistent with hydrolysis of the corresponding synthetic substrates Z-YPQ-pNA and Z-LPY-pNA. **Conclusions**: While the human digestive enzyme system seemingly lacks the capacity to neutralize immunogenic gluten domains implicated in celiac disease, such activities are present in the oral microbial proteasome. The role of gluten-degrading bacteria in the digestion of wheat products will be further explored from a clinical and therapeutic perspective. Supported by NIH grants DE18132, AI087803, DE05672 and DE07652.

Science Day 2011 Winners

1st Place Winner Predoctoral Student Poster
Insun Yoon, Mey Al-Habib, George T. J. Huang**.** Department of Endodontics: "3D model of dental stem cell attachment to MTA."

1st Place Winner Postdoctoral Student Poster
Glena Millan, Moaz Attar and Dan Nathanson. Department of Restorative Sciences/Biomaterials: "Primer and aging effect on resin cements bond to zirconia."

1st Place Winner Postdoctoral Fellow Poster
Siddiqa S Sume, Manish Bais and Philip C. Trackman. Department of Periodontology and Oral Biology: "CCN2/CTGF regulation of collagen deposition in human gingival fibroblasts."

1st Place Winner Predoctoral Student Oral Presentation
Sonia Kim, Henry Margolis and Seo-Young Kwak. Department of Biomineralization at Forsyth: "Protein-mediated biomineralization: The role of amelogenin in dental enamel formation."

1st Place Winner Postedoctoral Student Oral Presentation
Maram Zamakhchari, Guoxian Wei, F Dewhirst, Frank G. Oppenheim and Eva Helmerhorst. Department of Periodonhtology and Oral Biology: "Fragmentation of immunogenic gluten domains by oral microorganisms."

ADA/Dentsply Award
Mahesh Sadhnani, Paula Friedman. Department of General Dentistry:" Oral health care disparities and access to care among older adults."

Acknowlegement of Other Award Winners

The First 2011 AADR Sjögren's Syndrome Foundation Student Fellowship
Sheede Khalil, Denise Faustman, and Maria A. Kukuruzinska. Department of Molecular and Cell Biology: "Role of E-cadherin Junctions in Sjögren's Disease."

Science & Engineering Day 2011 Dean's Award Winner
Na Tian, Guoxian Wei, Detlef Schuppan, Frank G. Oppenheim, Eva J. Helmerhorst. Department of Periodontology and Oral Biology: "Proteolytic degradation of immunogenic 33-mer and 26-mer gliadin-derived peptides by oral bacteria reduces tissue transglutaminase recognition in vitro."

YDC36 Postdoctoral Student Winner
Abdulelah Binmahfooz, Gurkan Goktug. Department of Restorative Sciences/Biomaterials: "Fabrication of Screw-Retained, Metal-Acrylic Resin, Implant-Supported Complete Denture by Using CAD/CAM Technology."

Hatton Award Competitors:

Sahar Abtahi, Yael Houri-Haddad, Taisuke Ohira, Alpdogan Kantarci, and Thomas Van Dyke. Department of Periodontology and Oral Biology: “Resolvin E1 Enhances *P. Gingivalis* Phagocytosis by PMN.”

Mohamed Bamashmous and Ana Karina Mascarenhas. Department of Health Policy and Health Services Research: “School lunch program status a marker for high risk caries?”

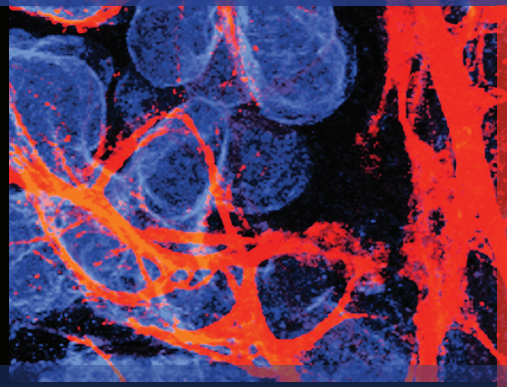
Boston University Henry M. Goldman
School of Dental Medicine

BOSTON
UNIVERSITY

Science Day 2011 Awards Luncheon

WEDNESDAY, APRIL 6 in HIEBERT LOUNGE

Presented by Dean Jeffrey W. Hutter and Associate Dean for Research Maria Kukuruzinska



The image shows the close association of the parasympathetic nerves (red) with the branching salivary gland epithelium (blue) during glandular development. The image is a projection of a stack of confocal images. Courtesy of Dr. Matthew P. Hoffman.

PROGRAM

INTRODUCTION

Maria Kukuruzinska
Associate Dean for Research
Professor of Molecular and Cell Biology

Jeffrey W. Hutter
Dean and Spencer N. Frankl Professor in Dental Medicine

GSDM SCIENCE DAY 2011 AWARDS

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ACKNOWLEDGEMENT OF OTHER AWARD WINNERS

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Khalil S, Larsen M, Jensen J, Kukuruzinska MA. "Examining the molecular genetic changes in the etiology of Sjögren's Syndrome."

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