The Explorer
Journal of Dental Student and Faculty Research


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<table>
<thead>
<tr>
<th>Chapter</th>
<th>Title</th>
<th>Author</th>
</tr>
</thead>
<tbody>
<tr>
<td>03</td>
<td>Letter from Dean Park</td>
<td>Letter from the Editors</td>
</tr>
<tr>
<td>04</td>
<td>Faculty Spotlight</td>
<td>Chantal Hakim ‘18</td>
</tr>
<tr>
<td>05</td>
<td>Dr. Russell Christensen; Extensive Carcinoma Cuniculatum of the Mandible</td>
<td>Robert Lee ‘16</td>
</tr>
<tr>
<td>06</td>
<td>Evaluation of Implant Abutment Platform Switching for the Preservation of Crestal Bone</td>
<td>Sina Banankhah ‘17</td>
</tr>
<tr>
<td>07</td>
<td>Q&amp;A with Orthodontics Resident, Dr. Caroline Girgius</td>
<td>Mahsa Doust ’16</td>
</tr>
<tr>
<td>08</td>
<td>Deleterious Effects of Alcohol on Dental Pulp Stem Cells</td>
<td>Elizabeth Tong ’18</td>
</tr>
<tr>
<td>09</td>
<td>The Role of NELL-1 in Craniofacial Development</td>
<td>Sara Bahmanyar ’18</td>
</tr>
<tr>
<td>10</td>
<td>Student Spotlight</td>
<td>Alan Nguyen ‘17</td>
</tr>
<tr>
<td>11</td>
<td>Nanodiamond-Gutta Percha Composite Biomaterials</td>
<td>increase the success rate of endodontic therapies</td>
</tr>
<tr>
<td>12</td>
<td>Introducing: The UCLA Journal Study Club</td>
<td>by Thomas Lin ’16</td>
</tr>
<tr>
<td>13</td>
<td>The Reasons for and the Ways and Means of Curricular Review in Higher Academia</td>
<td>Shyam Indrakanti ’17</td>
</tr>
<tr>
<td>14</td>
<td>Contributors</td>
<td></td>
</tr>
</tbody>
</table>
Dear Readers,

I will be stepping down as dean on June 30, 2016; and one of my proudest achievements during my tenure has been the exponential growth of the dental school’s research enterprise. It has always been my goal to ensure that our dental students are exposed to a well-rounded training experience and that includes an introduction to research. Over the past several decades, research has truly become a major component of our curriculum and overall dental school experience. Having the opportunity to conduct research under some of the most well-known scientists in the country is one of the many advantages of being a UCLA dental student.

Furthermore, our role is instrumental in the national and international agendas in oral health research. Creating new knowledge and translating the knowledge into clinical applications are among the most valuable services that we provide to the community.

Recently, the School had the opportunity to showcase our research portfolio by holding a special Research Day. More than a dozen of our faculty members and six outside speakers presented their current projects. The event culminated with a poster competition that showcased our student and trainee research for the entire School of Dentistry community to view. I could not have been more proud of the contributions that the School has made to the field of health science research.

One of the most important messages that I can leave for future dentists is that incorporating research into your training will help you become a better dental care provider. Research is at the foundation of clinical advances and new technology that collectively improves the field of dentistry. Therefore, I encourage you to accept new knowledge and to constantly challenge yourself; you will only better yourself and your life’s work.

Sincerely,

No-Hee Park, DMD, PhD
Dean

Letter from the Editors

Dear Readers,

We are thrilled to bring to you the 10th Edition of The Explorer. With a cumulative extramural research funding of $24.3 million in 2015, it comes as no surprise that the UCLA School of Dentistry continues to excel as a national and international leader in dental and oral health research. Research performed at our school by students, residents, and faculty members alike has significant impact and even greater implications. It is through research that we – as clinicians – discover new knowledge and translate it into meaningful clinical applications to improve the oral and systemic health of our communities. We are both excited and honored to share with you The Explorer and highlights of the innovative research that takes place at the UCLA School of Dentistry.

We would like to thank our diligent team of writers, layout editors, and graphic designers who made this issue possible. We would also like to express our heartfelt thanks and sincere appreciation to Dean No-Hee Park for his continued support of The Explorer. Although Dean Park will be returning to teaching and research this year, he has undoubtedly led our school and our commitment to exceptional research to new heights. It is with great enthusiasm that we welcome Dr. Paul Krebsbach to the UCLA community and look forward to our school’s next chapter in outstanding research.

It is our hope that you enjoy learning about the incredible research that takes place within the UCLA School of Dentistry. We could not be more proud of our peers and their inspiring work.

Sincerely,

Robert Lee
Eric Chen
Sina Banankhah
The Explorer Editors-in-Chief
Dr. David Wong
David Wong, D.M.D., D.M.Sc., the Associate Dean for Research at the UCLA School of Dentistry, can attribute his impressive career to three defining moments. The first moment was a time when he “couldn’t even spell research,” he joked. It was his first day of organic chemistry, and his professor drew him into the subject with such finesse that Dr. Wong began working in a lab studying the synthesis of insect pheromones for the last few years of his college career.

“This is why role modeling is so important,” he stresses as he reminisced on how his mentor ignited this first spark that eventually lead to some of dentistry’s important discoveries. Dr. Wong navigated through dental school while simultaneously doing research and upon graduation, sought out graduate programs to earn his Ph.D. It was an extraordinary coincidence that the year that he started at Harvard for his Ph.D. happened to be the same year that the first human cancer gene was developed, and this became his next defining moment. He distinctly remembers when he “read those papers and thought to [himself] ‘If I can spend the next seven years learning the knowledge base, the skill set and the approach of how they did this and can bring this back to dentistry, that’s what I want to do.’ Ever since the discovery of these cancer genes, cancer genetics has become Dr. Wong’s topic of choice.

After finishing his graduate school education, Dr. Wang began considering how to use his training: whether to pursue a career in research or to do something more clinically related to dentistry. He approached Dr. Paul Goldhaber, who at the time was the dean of Harvard School of Dental Medicine, to seek his support in starting his career. Although he fully expected to be turned away because of his lack of experience and funding, Dr. Wong took the chance and asked for the opportunity and in return he received two years of support and half of Dr. Goldhaber’s lab space.

Dr. Wong used those two years as his testing grounds, “I said ‘if things work out good and if not I will do something else.’ After 6 months, my first grant came through and now I’m here,” he says as he gestures to his lab and office at the UCLA School of Dentistry. These points in his life did not fall together simply, as he states, “looking forward, you can never connect the dots but looking back it all makes sense and falls into place,” he says. Those dots were connected through years of hard work and collaboration that enable Dr. Wong and his team to be on the forefront of diagnostics and on their way to fully establishing the emerging concept of a liquid biopsy. With this technology, virtually any human cancer can be detected via cancer signatures in blood and saliva with 100% accuracy. As he looks back on his career, Dr. Wong stays grateful. “There isn’t a day that goes by that I don’t count my blessings. It is truly amazing to be able to do what we do and be supported.”

Dr. Tara Aghaloo
Tara Aghaloo, D.D.S., M.D., Ph.D., has two major goals she hopes to accomplish through her career. Her first is to be an effective clinician scientist, “I want to identify problems in the clinic, design good studies to answer some questions and then be able to bring some of that back,” she says. Her other focus is to help women become more empowered in oral surgery and research together, “There are not a lot of good role models for that,” she laments.

As the Assistant Dean for Clinical Research at the UCLA School of Dentistry and through her prolific work with osteonecrosis of the jaw (ONJ), it seems as though she has already done a tremendous amount in working toward both of those goals; she serves as an exemplary role model not only for women in the specialty but anyone who hopes to be a clinician scientist. Dr. Aghaloo got into research later than most, as her dental school was not very research-oriented at the time. She was not exposed to doing research until her Oral Surgery residency at UCLA. Once she got involved and found how much she enjoyed research she decided to pursue her Ph.D. However, Dr. Aghaloo’s path to study ONJ, her current topic of focus, was actually not a part of her doctorate, but driven by her natural curiosity of the subject. “I was doing my PhD under Dr. Tetradis and he would always get mad at me if I wouldn’t focus on one thing, but I like doing a lot of things. So basically I started doing secret experiments in the lab that I wasn’t telling him about to look at ONJ,” she recalls. This topic came naturally to Dr. Aghaloo as she was seeing patients with this problem regularly in the clinic. After establishing some of the tools to study it she was able to approach her mentor and began delving into the issue enabling her to further the knowledge surrounding ONJ immensely.

It is her self-motivated nature and hunger for knowledge that allow her to be an outstanding clinician scientist and beyond that her giving nature that allows her to connect so well with her patients. She attributes volunteer work to being one of the most important qualities in any clinician and encourages everyone to get involved, “It is important for any kind of dentist to make plans to help people who are less fortunate,” she says.

Dr. Won Moon
To say Won Moon, D.M.D., M.S., is a pioneer in orthodontics would be an understatement. In his career he has challenged the way orthodontic treatment is approached multiple times. “These days, everyone is screaming evidence based dentistry, but in reality how much good evidence is there in dentistry right now? Being in academics, I want to be the one to build the evidence,” he says. Through his extraordinary research, Dr. Moon has already built a lot of evidence, but his passion for research was not always there.

Dr. Moon received his dental education at Harvard School of Dental Medicine, an institution which required him to produce two theses before he could graduate, something he was not particularly happy about. “Originally my background was in mathematics in undergrad and I wasn’t really keen on doing any type of research. I had never done it before,” he says. After several years, through his dental education he managed to get involved in a project and learned the process of writing a proposal, coming up with a hypothesis and producing data, but still he could not say that he enjoyed it; it became something more for his requirements.

In his orthodontic residency at UCLA, he had the opportunity to incorporate his knowledge of mathematics into his dental training by working with a statistic professor and looking into morphometric analysis to quantify skull images. Although Dr. Moon was ready to challenge the way cephalometric landmarks were measured in orthodontics, most were happy with sticking to the status quo, so after finishing his orthodontic training at UCLA, Dr. Moon moved on to a successful career in private practice.

It was not until almost a decade later when Dr. Moon began working as a part time clinical professor in the UCLA Department of Orthodontics that his natural drive to take what already exists and make it better kicked in. It started off with him working in one of the clinic cubicles trying to figure out how to improve on micro-implants when he decided that the current model could be improved upon. This eventually led him to design his own improved version of the micro-implant. His entire career in research has been a result of challenging what already exists and focusing on making it more useful to the field. Given all that he has already accomplished, Dr. Moon shows no indications of slowing down and for that the field of orthodontics has much to look forward to.
Carcinoma curriculatum is a rare, well-differentiated, low-grade variant of squamous cell carcinoma with only 66 documented cases affecting the head and neck since its first documentation in 1977. Histologic diagnosis of carcinoma curriculatum is challenging because it greatly resembles benign cysts and abscesses. Due to the difficulty of diagnosing carcinoma curriculatum, affected patients are often subjected to a long period of misdiagnoses. Recently, a patient affected with carcinoma curriculatum of the mandible was diagnosed and treated by the UCLA Section of Oral and Maxillofacial Pathology in collaboration with the UCLA Department of Head and Neck Surgery. This case was published as a case report entitled "Extensive carcinoma curriculatum of the mandible" in the American Journal of Otolaryngology-Head and Neck Medicine and Surgery in May 2015 and describes the 67th documented case of carcinoma curriculatum as well as its clinical presentation, risk factors, histology, treatment options, and prognosis.

A 58 year-old male was referred to UCLA due to his three-year history of recurrent oral and facial abscesses which had required multiple hospitalizations, the use of broad-spectrum intravenous antibiotics, and extensive infectious disease workups. In addition, this patient underwent multiple tooth extractions, incision and drainages, and mandibular curettage procedures due to a previous, incorrect diagnosis of superinfected odontogenic keratocyst of the left mandible. MRI and CT scans showed a large, destructive heterogeneous mass centered in the left mandible, involving the left parotid gland, extending to the deep parapharyngeal muscles, and obliterating the masticator space (Fig. 1).

Multiple biopsies were initially consistent with odontogenic keratocyst, and misdiagnosis of odontogenic keratocyst, abscess, or osteomyelitis, instead of carcinoma curriculatum, is common. The final biopsy revealed complex and branching networks of crypts lined by well-differentiated, stratified squamous epithelial cells with minimal cytological atypia. The crypts are filled with keratin and contain neutrophil microabscesses. Based on the histology of the final biopsy, carcinoma curriculatum was identified (Fig. 2). This diagnosis was made by the UCLA Section of Oral and Maxillofacial Pathology led by Dr. Russell Christensen. The patient underwent surgery, and to date, the patient is doing well with no evidence of recurrent malignancy.

The UCLA Oral Pathology Diagnostic Laboratory diagnoses hundreds of complicated pathology cases like this carcinoma curriculatum case each year. Dr. Christensen, who reviews cases submitted to the UCLA Oral Pathology Diagnostic laboratory, allows dental students to review and diagnose these cases with him every day from 12 – 1 PM and 4 – 6 PM in what he calls “active learning sessions.” In these sessions, students review real cases that were submitted by practicing dentists to Dr. Christensen. Similar to the case report described above, Dr. Christensen combines radiographs, clinical photos, and histology and explains his process of using all of this information to make an often lifesaving diagnosis for these patients. Everyday there are new cases to analyze, so no active learning session is the same. These sessions significantly help students become better prepared for diagnosing head and neck cancer or lesions that they may eventually see in practice. Dr. Christensen strongly encourages students to attend these sessions more often than the required 20 sessions because he feels that “being able to triage a lesion in a patient is a responsibility shared by every type of dentist and that this is the only opportunity in dental school to acquire this skill.”

Dr. Russell Christensen is an associate professor and chair of the Section of Oral and Maxillofacial Pathology at the UCLA School of Dentistry. He received his DDS from the Medical College of Virginia in 1974 and received his certificate in oral pathology at Indiana University in 1976. He has been a faculty member at UCLA in the Section of Oral & Maxillofacial Pathology since 1976. Dr. Christensen has been heavily involved with research during his time at UCLA and has published over 30 peer-reviewed manuscripts. He also serves on the editorial boards of the Journal of Dental Research and the CDA Journal. In addition to this case report on carcinoma curriculatum, Dr. Christensen has recently published manuscripts that detailed the largest population-based studies of several rare head and neck malignancies and regularly collaborates with UCLA faculty members such as Dr. Reuben Kim and Dr. Sanjay Mallya where he uses his clinical expertise in oral pathology to improve study designs, select cases, and perform histological validations. Dr. Christensen is a strong advocate of performing research and says that besides the often lifesaving diagnoses that he provides for patients, the most exciting parts of his career were discovering new knowledge through research that no one else had performed before. Even when he is not conducting research himself, he vicariously experiences the excitement of discovering knowledge by constantly reading cutting edge research. Dr. Christensen started the UCLA Journal Study Club in 1977 to help dental students also experience the excitement of new discoveries through independent learning. Last year, he helped revive this club after a 10 year hiatus and has mentored all the members of this club to become well versed with the current literature.
Evaluation of Implant Abutment Platform Switching for the Preservation of Crestal Bone

One of the most significant achievements in dentistry came about 40 years ago, when Dr. Per-Ingvar Branemark of Sweden serendipitously discovered that edentulous patients could be dentally rehabilitated by screws made of pure titanium. The introduction of implants has since revolutionized dentistry and many studies have been conducted on ways to improve its outcomes. Many studies have investigated the level of crestal bone loss around dental implants. Some have been suggesting that the shape of dental implant abutments may have a profound impact on the level of crestal bone loss.

Dr. Jeesoo Choe is a chief resident in the section of Periodontics at the UCLA School of Dentistry. A UC Berkeley graduate and UCLA dental alumnus, Dr. Choe believes that platform switching, which is reducing the diameter of the healing abutment compared to the diameter of the implant, preserves crestal bone height. In fact, he has been conducting a prospective cohort clinical study on crestal bone loss after implant placement at the UCLA Postgraduate Periodontics and Implant Surgery Clinic. He follows two aims in his study: to evaluate whether platform switching will reduce crestal bone loss in the early healing period after implant placement in transgingival position, and to evaluate whether changing abutment dimensions will affect bone levels after initial healing.

As part of Dr. Choe’s investigation, a minimum of 30 implants will be inserted at the crest of bone in the posterior mandible or maxilla of subjects in a one-stage surgical approach (healing abutment attached immediately after implant placement). To make the task of data analysis easier, Dr. Choe has divided his study subjects into three groups. Group one consist of patients who received healing abutments that are half platform switched and half straight. Group two patients received healing abutments that are straight, or flush with the implant platform. Group three patients received healing abutments with a circumferential platform switch. Initial healing is investigated for each group after three months of healing. At this point of the study, half of the subjects in each group will continue with the same abutment for three additional months while the other half will get new abutments. The changes for the half that get new abutments is as follows: subjects that started with platform switched abutment will get straight abutments, and vice versa; additionally, subjects with half platform switch/half straight abutments will get new abutments of the same type that have been rotated 180 degrees. Healing for subjects is evaluated through peri-apical radiographs. A stent is made from impression material for each patient to make sure radiographs are taken from the same angle each time. Although the study is still ongoing, preliminary data supports Dr. Choe’s hypothesis that platform switching can preserve crestal bone in dental implant patients.

Seeing himself first and foremost as a clinician, Dr. Choe is dedicating his time to implant research to provide the best outcome for his patients. Although always putting his patients first, Dr. Choe has been able to find a great balance between clinical Periodontics and research. According to Dr. Choe, “Research makes [me] able to think of the relation between bone and implant. It allows [me] to think about the outcome of [my] surgeries instead just placing implants like a robot.” When The Explorer asked about Dr. Choe about his future goals, he said, “my goal is to become a good clinician and surgeon; one that patients find trustworthy and feel comfortable with. Research will always be part of my career as a periodontist, but I will remember that I am a clinician first.”

Figure 1. Radiographic images showing maintenance of bone crestal levels at the height of the implant platform.

Figure 2. Diagram detailing platform switching offset compared to normal implants.
Q & A with Orthodontics Resident, Dr. Caroline Girgius

Q1: Can you tell us a little bit about your background?

A1: I graduated from Ain Shams University- School of Dentistry, Egypt, Cairo in 2010. I ranked second in my class and was assigned as a faculty in the Endodontic department. My interest in orthodontics started when I needed a comprehensive treatment planning for a cleft lip and palate patient and I started to strengthen my resume right after graduation to be able to secure a position in orthodontics. I became licensed as a general dentist in Australia and New Zealand, I also became a Fellow in the Royal College of Dental Surgeons in England.

Q2: What brought you to UCLA?

A2: I wanted to continue my education in the best schools. And in fervent pursuit of more knowledge and experience in Orthodontics, I decided to attend the Advanced Clinical Training Program (ACT) in Orthodontics at UCLA. The diversity of classes and the multidisciplinary approaches taught at UCLA have made me understand how treatment from various dental disciplines must be integrated to provide a comprehensive treatment plan with the most stability post-retention.

Q3: Why did you choose orthodontics and how does it interest you?

A3: I am specifically drawn to orthodontics because of its comprehensiveness, and its interdisciplinary approaches. It offers a wide variety of patients, a mix of common and uncommon problems, and the possibility to make a real difference in the lives of patients and their families. Becoming an orthodontist requires a profound understanding of the functions the biomechanics of the stomatognathic system which make him a great treatment planner.

Q4: Can you describe your research experience at UCLA? What research topic are you currently working on?

A4: I started researching at UCLA Dental and Craniofacial Research Institute as a full time research assistant and lab manager when I first came here as a preceptor. I had the chance to study the combined effect of Human Perivascular stem cells and NELL-1 on regeneration of bone in osteoporotic rats. Now, I am researching the effect of a mini-implant supported palatal expander on the pharyngeal airway as a potential treatment device for the sleep apnea patients with maxillary constriction.

Q5: Do you have any advice for dental students interested in orthodontics?

A5: Different programs look for different things in an applicant. The most important thing is to be a fully oriented applicant in all aspects of dentistry including research. Try to get involved in orthodontics as much as you can but if you couldn’t always try to do your best in what you have in your hands. I was an Endodontist with orthodontics interest and I got into residency. Hard work always pays back. There is no such thing as impossible.

Written by Mahsa Doustl '16
Deleterious Effect of Alcohol on Dental Pulp Stem Cells

Many dental students consume alcohol to mitigate their stresses after an arduous oral pathology exam or a long day of dentures. However, Dr. Michael Hoang’s research, which is conducted under the mentorship of Dr. Yong Kim, professor of Oral Biology and Medicine at the UCLA School of Dentistry, may have dental students second-guessing that third shot of Fireball.

When Dr. Hoang is not in lab, you can find him treating patients at the Orthodontic clinic at UCLA where he is completing his first year of residency. He has been conducting research for Dr. Kim for three years now, ever since his days as a DDS student at UCLA. He has received many accolades for his hard work, which include winning first place at the CDA Table Clinic Competition as well as receiving the Student Choice Award at the ASDA research poster competition.

Dr. Hoang and Dr. Kim explore how alcohol could induce epigenetic changes to dental pulp stem cells (DPSCs). DPSCs are a multipotent stem cell population that have the potential to differentiate into a variety of cell types, including neurocytes, myocytes, osteoblasts, chondrocytes, and adipocytes. In adult teeth, DPSCs reside in the dental pulp and are considered a mesenchymal stem cell population. Epigenetic changes are changes that do not involve the DNA sequence and are essentially a phenotypic change, without an accompanying genotypic change, that is caused by environmental factors, such as alcohol. Unfortunately for many, ethanol is recognized by the body as a toxin and acts as a stressor by creating physiological disturbances that negatively affect stem cell function. Metabolism of ethanol, results in reactive aldehyde byproducts, such as acetaldehyde. These byproducts have been shown to readily react with DNA and proteins within cells, leading to mutagenesis and cell death.

The question Dr. Hoang and Dr. Kim seek to investigate is whether these genome-wide epigenetic changes due to ethanol exposure have molecular effects on the potency of DPSCs. In order to investigate this hypothesis, Dr. Hoang cultured DPSCs and then treated them with ethanol. He found through transcriptome analysis by gene expression microarray that cell cycle genes had the greatest down-regulation, whereas genes related to pathways in cancer were the most upregulated with alcohol. Additionally, in vitro studies further conferred the deleterious effects of alcohol on DPSCs. DPSCs were fed with media containing incremental concentrations of ethanol and the result showed that the levels of osteogenic differentiation were reduced in response to the ethanol. An intriguing gene of interest was KDM6B, whose expression was significantly reduced by ethanol. However, when expression of KDM6B was induced through a retrovirus, Dr. Hoang found that the expression of KDM6B restored osteogenic differentiation in ethanol-treated DPSCs. To further confer these findings, in vivo experiments were conducted. DPSCs were transfected with a small interfering RNA to knockdown KDM6B and implanted into mice. Analogous to the in vitro studies, the osteogenic potency of DPSCs was reduced as visualized by the decrease in connective tissue and mineralized tissue formation.

By studying the effects of epigenetic modifications in response to alcohol, we can have a better grasp on the role of epigenetics in oral cancer. Furthermore, by augmenting our understanding of the regulatory mechanisms controlling DPSCs’ differentiating potential, we can make strides towards manipulating DPSCs to differentiate into bone and teeth.

Figure 1. Gene pathway analysis showing the downregulation of cell cycle genes and upregulation of cancer-causing genes

Written by Elizabeth Tong ’18
The Role of NELL-1 in Craniofacial Development

Written by Sara Bahmanyar ’18

Greg Asatian is a fourth year student at the UCLA School of Dentistry. He was born and raised in Burbank, California, and attended UCLA as an undergraduate student. During his undergraduate career, he researched at the Laboratory of Neuroimaging (LONI), where he conducted projects involving the three-dimensional mapping of the human brain based on MRI’s. He has also recently been offered early admission into UCLA SOD’s prestigious orthodontics post-graduate residency program.

Greg has always had his mind set on research. After receiving his acceptance letter to the UCLA School of Dentistry, he immediately started looking for and contacting research labs. He found the lab of Dr. Kang Ting and began working as a research assistant, part-time at first, followed by a full-time position. His passion for research stems from his desire to oversee a project from beginning to end and being a part of its development. “I enjoyed the problem-solving aspect of research and working as a team to identify problems, strategize on a means to undertake them, and perform studies to assess our hypotheses,” he explained.

Greg will continue to work with Dr. Ting throughout his residency. He is currently working on some major research projects involving the NELL-1 protein. NELL-1 is a naturally occurring molecule with the power to grow new bone. It was first isolated in children with craniosynostosis, a condition in which an infant’s cranial sutures fuse prematurely and lead to abnormal craniofacial development. Greg’s first project involves studying the relationship between NELL-1 and Sca-1+ mesenchymal stem cell populations in both small and large animal models, with the goal of better understanding the mechanism by which NELL-1 promotes bone formation.

Since its discovery, NELL-1’s osteogenicity has been studied in various animal models, with the goal of translating its use to human applications. Increased knowledge about NELL-1’s exact mechanism of action can be used to develop treatments for bone restoration, bone loss prevention, and bone grafting. The team of Dr. Ting and his colleagues, including the lab of Dr. Benjamin Wu (UCLA Bioengineering and Dentistry), is investigating the ideal modality by which they can administer NELL-1 to their rodent models for their upcoming study with NASA to study the prevention of space-borne osteoporosis. The project has received a CASIS (Center for the Advancement of Science in Space) grant to conduct microgravity simulation experiments because bone loss occurs at a significantly faster rate in zero gravity conditions, making it easier to analyze how NELL-1 functions.

Despite the hard work that has gone into ensuring the progression of these projects, Greg is excited about the vast implications that this project has and the opportunity to be involved in such groundbreaking research. “When I was looking for a laboratory to join, I studied the research aims of faculty mentors throughout the school and was interested by the fact that proteins isolated from the head and neck could have such an impact on other loci,” he said.

“Recently published articles at the time demonstrated that NELL-1 could promote bone formation in the spine and femur — however, the systemic potential of NELL-1 was not even considered. As we brainstormed the idea of systemic administration, I was fascinated that it possessed such robust potential for future therapeutics, and this further developed my interest to understand how this molecule worked and better ways to deliver such a biologic.”

The question always remains as to when and how such research projects will have direct effects on the way we practice as dental clinicians. Greg Asatian sees his research as a means to improve upon the current standard of care. As he so aptly put it, “We should never be satisfied with the present biologics, technologies and treatment modalities, but rather always question on how they can be improved. It is only through research that we can achieve this goal.” His belief is that research in general applies to all facets of dentistry, including its future field of orthodontics. “Orthodontics, much like research, involves identifying a problem, developing a plan to address it, and setting forward to accomplish just that,” he remarked.

Greg does not plan to stop doing research once he graduates from UCLA as a dental student. As a UCLA orthodontics resident, he plans on continuing his projects for the next three years. His goals include, transforming his team’s current findings into larger animal models and ultimately providing a therapy to help address osteoporosis, a condition afflicting an estimated 10 million people in the United States alone. When asked if he has any advice for dental students who are interested in pursuing research and/or orthodontics, Greg recommends finding a topic you are passionate about. “It will make the world of difference, and consistently remind you that the hard work you are putting in will benefit not only your future patients, but also generations to come. As for orthodontics, find a niche within the dental school that you really enjoy and do everything you can with it. I really enjoyed academics and teaching, as well as mentoring our junior colleagues. As such, I involved myself with pre-dental outreach, Basic Dental Principles, and the UCLA Academic Track. Being involved with something you are passionate about, be it research or extracurricular clubs and organizations, really makes your time in dental school so much more enjoyable, productive, and beneficial to yourself and those around you.”
“Don’t spread yourself thin.” - Alan Nguyen, a third year dental student at the UCLA School of Dentistry, holds this virtue in high regards as he balances his experiences in research and as a dental student. Renowned as a tech expert and skilled videographer, Alan’s skills come from his initial interest in pursuing a career in technology. Given that his parents are both engineers in Orange County, it is no surprise that Alan possess tremendous talents in these arenas. However, Alan’s pursuit of Bioengineering with a focus on Material Sciences, changed his initial aspirations.

Alan currently conducts research under Dr. Kang Ting in the Section of Orthodontics at UCLA. With a focus on bone tissue engineering, the group studies a variety of growth factor proteins in combination with different scaffold designs in animal models. Alan’s current area of research focuses on biomechanical analysis, such as stress and tension tests, using computer modeling and digital simulation. Replacing physical testing with computer modeling has numerous benefits, such as preserving samples that would traditionally be physically destroyed as well as creating an ideal platform for scaffold or implant designs.

With Alan’s exposure to research, he is able to grasp the bigger picture in terms of product development. This process starts with grant applications, which every researcher must submit in order to have their research funded. Also seeing a product progress from concept, to animal trials, and eventually to human clinical trials places the whole cycle into perspective for Alan. Alan believes that there will be a strong demand in the near future for computer-aided design in dentistry. Already, it is great to see 3D scanning, printing, and milling making their way into dental practices. Alan believes that there is a huge void were we are not fully utilizing the potential of computers to optimize the design of our preparations and restorations for patients on an individual basis. “The physical hardware is readily available; it is just a matter of making such simulation and design software more accessible to practitioners.”

Given such a wide set of skills that Alan demonstrates and executes flawlessly, it is worth exploring the secret to his success. "The most important piece of advice came from my research mentor: "Don’t spread yourself thin.” Over the years, I have made an effort to keep my priority list simple and limit activities that do not contribute to these priorities (i.e. TV and games for me). However, this doesn’t mean to limit oneself to just research and academics. I find time for activities I care about and, in fact, find myself more productive when I do achieve a healthy balance”. In finding ways to balance school, Alan has focused on one task at a time merely avoiding multi-tasking. For Alan, participating in ASDA events, attending national conferences, and teaching in Basic Dental Principles helped drive Alan’s focus and thus found a comfortable rhythm with which he could rotate through school, research, and extracurricular activities. Alan has gained three insights through research:

1. Adapt
   “In my case, this was through adopting new sleep settings. Occasionally, research hours are sporadic, and I find myself finishing scans well past midnight. During my first year, I’ve had a few instances where sleeping overnight in lab made more sense than walking back only to return for morning class a few hours later. I don’t recommend this, despite how comfortable the chairs were, but my takeaway was to be creative and adjust to get done what needs to be done.”

2. Be efficient
   “With only 168 hours in a week, patients to see, and classes and research projects to attend to, it makes sense to automate my more mundane tasks. For me, I save time by preparing my meals in bulk in advance for the week. This may mean eating the same meals day in, day out, but it does ensure I am still eating healthy while not having to worry about what to eat, let alone preparing every day. Optimizing these simple responsibilities has helped free up my time for more important tasks.”

3. Be patient
   “I remember once spending upwards of 40 hours just to learn this one computer program for a specific dataset. One day, our free trial had suddenly expired, meaning I no longer had access to that program. With the deadline approaching, I had to quickly find a new program and re-learn it from scratch. While discouraging at first, I had a much better understanding the second time around, and I was better equipped for when this would happen again the next three times.”
A recent study reports that nanodiamonds (ND) may be used to enhance the current standard of care gutta percha (GP) use for root canal therapy. Antibiotic-linked and ND-embedded GP (NDGP) offers improved mechanical properties, as well as bacterial growth inhibition. GP is currently used in root canal therapy for obturation after the infected pulp tissue is removed and the root canal space is cleaned and shaped. It is a rubber-based filling material that has the advantages of being cost-efficient, easy to remove, malleable, inert, and biocompatible.

Despite GP’s high success rate in RCT, it does have its limitations. “A lot of the times with endodontic treatment, the teeth get re-infected. Maybe it’s because all the bacteria were not killed, or maybe it’s because there wasn’t a perfect seal with the gutta percha,” said A. Nerisa Limansubroto, a current fourth-year UCLA dental student. In addition to having poor mechanical properties, GP’s limitations in RCT may be attributed to the quality of sealing between the GP and the root canal space along the length of the canal. Inadequate bonding may lead to leakage and bacterial re-infection within the root canals, which may result in apical periodontitis and abscess.

In the study, titled “Nanodiamond-Gutta Percha Composite Biomaterials for Root Canal Therapy” and published in ACS Nano in November 2015 by Dr. Dean Ho’s lab at the UCLA School of Dentistry, Limansubroto and her team sought alternative filling materials to address these GP limitations.

Said Limansubroto, “We created a novel material. It is basically gutta percha, but it is infused with nanodiamonds and amoxicillin. It is supposed to be a better version of gutta percha.” Limansubroto and her team chose to explore NDs as a novel endodontic therapy platform due to its advantageous surface chemistry, biocompatibility, ability to confer enhanced mechanical properties for improved ease of handling during obturation, and demonstrated antimicrobial activity. They adsorbed amoxicillin onto its surface and embedded the amoxicillin-linked NDs into GP to create single filler NDGP. Amoxicillin in the GP serves to kill remaining bacteria in the root canals after the canals have been obturated.

“If you add something to the gutta percha, like an antibiotic, you could add an extra layer of protection. In that way, it would prevent re-infection of the root canal treatment, which is a lot of the times why root canal therapy fails,” said Limansubroto.

In the study, they demonstrated that NDGP has improved mechanical properties including a higher elastic modulus, tensile strength, and yield strength compared to unmodified GP. However, the percent elongation was decreased by 11 percent compared to unmodified GP.

In addition to examining mechanical properties, Limansubroto and her team wanted to also investigate the method by which bacterial growth inhibition occurred. They had two theories: 1) bacterial killing through amoxicillin release from NDGP or 2) contact-mediated inhibition. Their agar diffusion test proved that amoxicillin is not freely eluted from the NDGP composite, and that bacterial growth inhibition thus occurred via contact-mediated inhibition upon bacterial deposition onto the NDGP surface. The latter method was desirable due to its potential for reduced antibiotic resistance.

Lastly, to demonstrate its clinical relevance, digital X-ray imaging and micro-computed tomography imaging of extracted human teeth obturated with NDGP using lateral condensation showed no void formation. NDGP’s radiopacity was also verified, suggesting that NDGP is comparable to unmodified GP for conventional RCT.

“We wanted to make sure that [NDGP] looks the same on the radiographs so that dentists can still make proper clinical diagnoses. What’s the point if, for example, the gutta percha is not radiopaque?” asked Limansubroto. “You wouldn’t be able to tell if someone did a root canal.”

The significance of this study lies in its ability to increase the success rate of endodontic therapies by eradicating microbes that remain in the root canal system after therapy and preventing re-infection of the canals. This would benefit patients by reducing the need for additional treatments such as re-treats and apical surgeries.

Future studies are focused on validating the clinical applications of NDGP.
Introducing: the UCLA Journal Study Club

The Journal Study Club (JSC) is a club at the UCLA School of Dentistry in which dental students meet bi-weekly to give brief presentations on research journal articles of their choosing. Co-founded in 2014 by D1 Serena Lee & D4’s Andrew Huang, Bobby Lee, and Thomas Lin, the club’s faculty mentor is Dr. Russell Christensen, Chair of the Section of Oral & Maxillofacial Pathology.

In fact, Dr. Christensen also served as faculty mentor for JSC in its first iteration from 1977 into the 2000’s (fun fact: Dr. Richard G. Stevenson was a JSC member as a student in dental school). Dr. Christensen originally envisioned the club to be a space in which dental students could find safe haven from the mind-numbing rote of many dental school classes and explore a range of interesting topics. Indeed, a significant number of articles presented have nothing to do with dentistry. Former Secretary of JSC Andrew Huang (D4) cites a JAMA article titled The M8M Game (presented by Dr. Christensen himself) as one of his favorite presentations. In this opinion piece, a physician who “values rationality and evidence above all” writes about the existential crisis she grapples with as she battles cancer and her unlikely finding of solace in a game of chance played with colored M&Ms.

Current President Serena Lee (D3) says, “That is what I love so much about JSC – members can read up on original research, cases, and editorials in any journal they’d like.” Serena adds that her vision for the club involves members “carving out time to relax and read something not required for class... to learn about and explore topics they’re interested in on their own.” Over the last year, JSC members have reviewed close to 100 articles, with presentations given on weight loss and protein metabolism, theoretical physics, and the genetic cloning of dogs, among other very interesting topics.

While members present on a wide range of subjects, the dental research that is presented in JSC is often fresh, relevant, and exciting. Articles pertaining to robotic dentistry, the fabrication of dentures with CAD/CAM, new periodontal and oral surgery methodologies, and the use of nanodiamond-gutta percha in endodontic root canal therapy (just to name a few!) have all been discussed. Bobby says that being introduced to cutting-edge dental research “enables members to be early responders to these techniques and technologies, which could lead to improved treatment results.” Bobby himself presented an article exploring the effectiveness of the Waterpik after a patient’s question piqued his curiosity: “is the Waterpik alone comparable to flossing?” It turns out that it may be, due to a study (Effect of a dental water jet with orthodontic tip on plaque and bleeding in adolescent patients with fixed orthodontic appliances) demonstrating significant reductions in bleeding and gingivitis, but further studies are necessary to determine if using the Waterpik can replace flossing completely.

Students will also appreciate that JSC meetings are very relaxed and informal. While most presentations have been given in the typical PowerPoint format, JSC encourages presentations in any format with which the presenter feels comfortable. For example, memorable presentations include those in which presenters had printed out articles for the club and sat down informally amongst the club members to share what had been discovered. Presenters are encouraged to give presentations 5 minutes in length that cover only the most salient points. Because the links to the articles presented are uploaded to the JSC website (https://uclajsc.wordpress.com) shortly after meetings, members are able to explore topics that capture their attention at more depth—an example of self-directed learning guiding more self-directed learning.

One long-time D4 member (who preferred to remain unnamed) reflected on her participation in JSC as part of an overall effort to learn and absorb as much as she can while in dental school: “My best learning moments are when I take the initiative to learn outside of the classroom. Reading on my own, attending active learning sessions and participating in study clubs allow me to integrate what was discussed in the classroom into practical experiences. I benefit tremendously when I reflect, share and apply knowledge or pieces of light that I have gained.” Such is the philosophy toward learning that the Journal Study Club is quietly cultivating at the UCLA School of Dentistry, which is a welcome change from the current culture indeed.

JSC always welcomes new members, so students interested in joining the club can email uclajournalstudyclub@gmail.com to find out about attending their next meeting.
In the field of academics, particularly on the instructional side, there is a certain amount of uncertainty regarding the content of coursework. Through experience and expertise, academicians at UCLA have tailored their curriculum to highlight the most crucial information within their field to students while offering them means to delve deeper should they choose. Yet most conscientious instructors have come to question the efficacy of their compilations, lectures, and curricular activities – especially in regards to how students perceive curriculum. How might one answer these questions? How might both students and faculty work together to further the educational model and assess the need for improvement while recognizing and retaining the effective teaching practices?

One potential solution is opening a dialogue, first among students regarding their opinions – honest and unfiltered – regarding their educational experience. Once this data has been gathered and it can be analyzed and consolidated. Qualitative information cannot be easily converted into quantitative data or proven recommendations, but by analyzing the similarity of comments and perhaps arranging them into themes, the disparate opinions of many could produce generalities. Next, after such an analysis has been performed, the data must be analyzed by students to ensure that the veracity of the content within the report. Simultaneously, the faculty members, the intended audience of the report, must be approached to verify that the tone and content are stated in a concise, articulate and inoffensive manner. This two-stage checking of information and any final revisions should provide a document that is readily accessible and hopefully useful.

The class of 2017 attempted to bridge this gap of information by collecting feedback from students through focus group discussions and questionnaires and analyzing this data qualitatively. Of the class, 74.4% participated, generating 117 unique feedback responses which have been presented in greater detail in a published internal report. Analysis of this data was done by organizing comments into themes and sub themes to make interpretation of the data more approachable. Lastly, once the data was compiled and the analysis was completed, a preliminary version of the report was reviewed by six participants, one member from the class of 2016, and several faculty members to test the validity of the information presented within the report. While minor changes to the format and presentation were made, the data presented did not change significantly throughout the process. While there is much more analysis within the report, a more succinct executive summary with a list of short term and long term recommendations is also included for those wanting a more action oriented approach. Ultimately, this document hopes to provide some insights into how students view the state of the curriculum at UCLA and what they would like to communicate to the faculty and administration. We hope it will be viewed as a professional, qualitatively analytical, and verifiable approach to collecting and presenting feedback. A full report can be provided upon request.

Since this report was made available, it has been presented to various committees and administrative personnel within the UCLA School of Dentistry. The Curriculum Committee, the Committee for the Advancement of Predoctoral Education, the Faculty Executive Committee, the Student Performance Committee, the Curriculum Enhancement Committee are a few entities that have had this document for review. Various assistant deans, department chairs and the Dean of the UCLA School of Dentistry, Dr. No Hee Park, also received copies. Ultimately the content of the report provided recommendations which are currently being reviewed so that they may be incorporated into future curriculum as necessary. Furthermore, the document may prove useful during the UCLA School of Dentistry Accreditation process.

The pillars of higher education know that stasis and an unwillingness to change are anathema to the progress of knowledge and its dissemination. Periodically, reviews such as this must be performed, despite the heavy investment of time required, to provide accurate and tested feedback to academicians. At that point, it is essential that the fruits of such research be considered very carefully and recommendations generated within be incorporated as necessary and appropriate. Having conducted this research and produced the results, it is worth noting that the experience is rewarding, the information is invaluable and the students and faculty have received it well – both working together to achieve academic progress and facilitate a more collegial and productive discussions.

SHORT-TERM RECOMMENDATIONS

In the immediate future, some goals this survey outlined include:

- Didactic courses providing more opportunities to apply knowledge gained – CBLs, Summary questions at the end of lectures, whenever possible
- Improve lecture presentation via proper pacing, offering more targeted highlighting, and explanatory notes as necessary
- Assess the need and scope of current special guest lectures in both didactic and pre-clinical laboratory courses – either to expand or curtail as needed
- Laboratory courses offering more standardized grading and clearer classification of errors for examination and clinical purposes
- More usage of visual elements in laboratory courses (videos and demonstrations) and better integration of available technology/equipment to enhance learning

LONG-TERM RECOMMENDATIONS

On a larger scale, these are some recommendations to enhance the already high academic standards at UCLA and facilitate fruitful student-instructor interactions:

- Establish a forum for open discussions regarding curriculum with course chairs. This would hopefully create the tone of mutual respect that is absolutely necessary in student-instructor interactions
- Arrange for comprehensive student feedback to be gathered and analyzed such that it would be ready for curriculum enhancement purposes
- Work towards incorporating some of the suggestions and recommendations presented here into applicable courses per the discretion of course chairs and section chairs.

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