Q1: How would you describe your role at the UCLA school of Dentistry?
I was trained as a dentist and had the opportunity to become a dental scientist. At this great university, I am involved in advancing the research portfolio of the school and working with individuals who are the best in the country. My goal is to impart in our trainees, the value of another facet of dental education, which is research, the method by which we can substantiate our profession with scientific credibility. I am a faculty, a training grant director, and a scientist. These are privileges that I have never taken for granted.

Q2: What made you pursue a career in research?
In my sophomore undergraduate year, Professor Keith Slessor, my organic chemistry professor, took me under his wings in research. For the next three summers I found myself working in his lab, synthesizing insect pheromones... (Continued on pg 2)
RESEARCH AT THE UCLA SCHOOL OF DENTISTRY

(Continued from pg 1)

...This was before I entered dental school, which was in 1975. This was a very defining experience for me. It introduced to me what research is like and set the stage for who I am now. In my third year, instead of graduating and opening a practice like my classmates, I went into a research program.

I feel it is very important for educational systems to provide role models for students. Students need people who can introduce them to facets of their profession that they may not have thought existed. There could be a fire in some of us that can be nurtured with proper connections, role models, and environment, to develop the next generation of dental scientists. One of my major roles here at UCLA is to sustain the pipeline of dental scientists for the advancements for dentistry. Dentistry is great and all these specialty trainings are wonderful! But there is another facet to our profession that may appeal certainly to the minority.

Q3. What do you think is the biggest achievement in research at the UCLA School of Dentistry?

In the past twenty years, UCLA has escalated from an excellent dental school to an excellent research intensive institution. Out of 54 dental schools across the states, UCLA ranks in the top five in NIH funding. Our Dean No-Hee Park, being a scientist himself, has set a great tone in the school to make this possible.

Q4. What do you think is the future challenge that we face in dental research?

The main challenge is to sustain the pipeline of advancing oral health research, doing impactful science that can advance our profession, and in training competent scientists. These challenges will always be there; but I think this school is poised to sustain the momentum. UCLA faculty leaders are not just stellar clinicians but also top tier scientists in the nation.

UCLA researchers have found that dental restoration material containing (HEMA) 2-hydroxyethyl methacrylate inhibits the migration of stem cells (DPSC) that may help revitalize the teeth, in vitro.

HEMA comprises 30-50% of dentin adhesives used in dental restorations and acts to increase bond strength of dental composite materials. Studies, however, suggest that HEMA may adversely affect the repair capacity of pulpal wounds, resulting from defects that may occur from caries extending deep into the tooth. Pulpal wound healing is a multi-step process involving DPSC migration into the injured region, repopulation, and mineralization.

Although there are numerous in vitro studies demonstrating HEMA at cytotoxic levels to result in various adverse effects, the effects of DPSC migration during wound healing were lacking. D2 Drake Williams aimed to investigate this.

“We wanted to see, if HEMA at a non-cytotoxic level will affect the ability of dental pulp cells to migrate,” said Williams.

To assess DPSC migration, Williams and his research group performed a wound scratch assay, a technique in which a scratch is made in a near-confluent layer of DPSCs growing in media containing non-cytotoxic levels of HEMA. Cell migration was found to significantly decrease in a dose-dependent manner. A more stringent test, the transwell migration test, was performed afterwards to validate the data.

“You put the cells on top of a filter that the cells can fit through, but in order to get to the other side of the filter, they have to actually move. This eliminates potential proliferative effects that may skew the scratch assay data,” said Williams. “We saw that there’s actually a very obvious difference between the control levels versus even the lowest level of HEMA.”

(D2 Student Drake Williams: Non-cytotoxic Levels of HEMA Suppresses Dental Pulp Stem Cell Migration by Serena Ann Lee (’17))
In subsequent molecular studies, Williams et al. found that the migration deficiencies were associated with decreased phosphorylation levels of focal adhesion protein (FAK) and p38, proteins both known to be involved in cell migration. To evaluate p38’s role in inhibiting DPSC migration, the transwell migration assay was repeated using a p38 inhibitor.

Williams et al. found the p38 inhibitor-treated DPSCs to also exhibit a decrease in migration in a dose-dependent manner. It demonstrated that a decrease in phosphorylated p38 may partly mediate the reduction in migration observed in HEMA-treated DPSCs.

The significance of this study lies in dental patients with pulpal wounds. Although many patients prefer composite restorations to amalgam restorations for esthetic reasons, individuals who have pulp exposure may want to re-consider using composite in their restorations.

Williams states, “If the wounded pulp area doesn’t heal, the patient may have intermittent pain in their tooth.

Future studies are focused on improving pulpal wound healing in the presence of dental restoration materials containing HEMA.

“The ultimate goal would be to figure out if there is a component we can add to this dental restoration material that would mitigate the adverse effects that HEMA has on DPSCs. Iatrogenic or pathologic pulp exposures do happen, and when they do, the dentist should not have to worry about the components of the restoration preventing the pulp from healing,” said Williams.

When asked why he got involved with research, he said, “I think it’s a mystery. You never know what you’re going to find. Oftentimes you think you’re going to see one thing, and you find another,” said Williams.

After Williams entered college, he was interested in performing further research on virology. As a freshman at UCLA, he emailed multiple professors in the field of virology before finally starting research in Dr. Reuben Kim’s lab in the Division of Restorative Dentistry at the UCLA School of Dentistry.

“None of [the professors] wanted a first-year undergraduate student, so I expanded my scope to the medical and dental schools. Dr. Kim was the first one to respond positively,” said Williams.

Although Williams took on a small project in virology when he first joined the lab, he later became involved in the HEMA project when Dr. Kim’s research focus shifted from HIV to restorative materials.

After successfully carrying out the HEMA project, Williams and his research team published their findings. This became William’s proudest research related achievement.

“Working in Dr. Kim’s lab solidified my desire to [pursue research]. I had a very interesting experience in that Dr. Kim is a very young professor, and he had just finished his PhD when I [had] joined. I got to see how he transitioned from a young scientist to a successful professor,” said Williams.

Initially, Williams was solely considering going into research. However, through his multiple interactions with the dental students, master’s students, and a DDS/PhD student, Williams decided to pursue dental school in addition to research.

One aspect Williams dislikes about research is the speed of progression. “It can be very slow at times. It can be very frustrating because you may be doing exactly what the protocol says to do or what other people have done before, and it’s not working out. It definitely requires a lot of patience,” said Williams. However, the satisfaction that comes from solving complex puzzles outweighs the cons for Williams. In his remaining time as a dental student at UCLA, Williams hopes to advance in his research projects.

Williams is currently embarking on an eight-year DDS/PhD track at UCLA. The majority of DDS/PhD students complete the DDS degree first, followed by the PhD degree. An alternative model begins with three years of the DDS program followed by five years, which is split between 20% DDS and 80% PhD work.

In whichever order Williams decides to complete his dual degrees, he hopes to eventually follow Dr. Kim’s footsteps.

“Dr. Reuben Kim has been a great mentor for me. He’s been very forthcoming with answering any questions I have, or giving me advice about things that he would’ve done differently,” said Williams. “My current goal is modeled after Dr. Kim’s career, where he teaches once a week for a day or half a day and sees patients for about a full day. The rest of the time is devoted to research.”
“This is a picture of osteoclast cultures. The green color represents actin rings. This is done by phalloidin stain, which stains actin. As you can see from the picture, osteoclasts are multinucleated giant cells. DAPI stain is used to stain the nuclei blue. DAPI binds to DNA and is a commonly used nuclear stain.”

**Dr. Yi-Ling Lin, D.D.S., D.M.Sc.** is an assistant professor in the Section of Oral and Maxillofacial Pathology in the Division of Diagnostic and Surgical Sciences at the UCLA School of Dentistry. Dr. Yi-Ling Lin’s research focuses on transcription regulation during osteoclast differentiation. Dr. Lin’s lab is aiming at developing therapeutic strategies to inhibit osteoclast activity for osteolytic diseases such as periodontitis and cancer bone metastasis.
“The top image shows a carcinogen-induced neoplasm on the dorsum of a mouse tongue. The bottom image shows the H&E stained section from that same specimen demonstrating the invasive nature of the squamous cell carcinoma.”

Sanjay M. Mallya, B.D.S., M.D.S., Ph.D is an assistant professor in the Section of Oral and Maxillofacial Radiology in the Division of Diagnostic and Surgical Sciences at the UCLA School of Dentistry. He is a board-certified Oral and Maxillofacial Radiologist. His research focuses on the molecular mechanisms of oral cancer and parathyroid neoplasia.
Determinants of Utilization of Preventive Medical and Dental Care in Children with Special Health Care Needs

By Michael Hoang ('15)

Preventive medical and dental care visits are important components of comprehensive health care, especially in children. These visits enable the detection and diagnosis of health problems before they become serious, and potentially reduce the likelihood of hospitalization and emergency visits, especially for children with special health care needs.

Children with special health care needs (CSHCN), as defined by the federal Maternal and Child Health Bureau (MCHB), are those who require more health care-related services for chronic physical, developmental, behavioral or emotional conditions than that required by children generally. According to the 2009-2010 National Survey of Children with Special Health Care Needs, approximately 11.2 million children ages 0-17 in the US have special health care needs. Some specific health issues that CSHCN experience include: asthma, allergies, ADD/ADHD, behavioral problems, and Down syndrome, with asthma and/or allergies being the most commonly reported.

In a study, led by Dr. Marvin Marcus, Distinguished Professor Emeritus in the division of Public Health and Community Dentistry at UCLA, and Dr. Carl Maida, professor of Public Health at UCLA School of Dentistry, the characteristics of CSHCN and their use of preventive medical and dental care were examined. Identifying characteristics of CSHCN that influence their utilization of preventive care can aid policy makers develop better, more tailored systems of care.

“The nature of the care provided to children with special needs is an increasing problem that dentists will need to be more cognizant of; [our research] provides insights, on a national level, of the characteristics of these children and their families...These insights will enable general and pediatric dentists to reduce disparities and provide more preventively oriented dental care to these children.”

–Marvin Marcus, D.D.S., M.P.H.

Parents were asked if their child had any one of the following five conditions for at least 12 months:

1. Need for prescribed medicines
2. Need for specialized therapies
3. Need for more medical, mental health, or educational services than is usual for most children of the same age and/or
4. Emotional, developmental, or behavioral problem requiring treatment or counseling.

Children were classified into categories based on the severity of their condition. Children who answered no to all conditions were classified as non-CSHCN, while...

(Continued on pg 7)
... children answering yes to 4 or more of the conditions were classified as the most severe. Once CSHCN status was established, the study assessed their level of access to preventive medical and/or dental care. Covariates incorporated into the study included, but were not limited to, age, gender, ethnicity, household income, type of health insurance, condition of teeth, and unmet health need. To analyze the effects of these factors on CSHCN, univariate, bivariate, and multivariate analyses were performed.

Preventive dental care is underused compared to preventive medical care in CSHCN. Preventive dental visits would be beneficial for CSHCN because they often take medications that predispose them to oral health conditions, such as xerostomia. However the study does indicate that CSHCN are more likely to receive preventive medical and dental care than those who do not have special health care needs. This may be attributed to co-management of their chronic health conditions. In addition, children experiencing a higher CSHCN Screener score have been found to have poorer medical and dental health status and more unmet healthcare needs. This may be because preventive health care may become secondary in priority compared to competing chronic health care needs.

Other authors of the study include third year UCLA dental students, Laura Van and David Lee. The study was supported by an NIH/NCRR/NCATS UCLA CTSI Grant. Special acknowledgements to: Dean No-Hee Park of the UCLA School of Dentistry for funding this study, Yan Wang for her statistical support, and Dr. Carl A. Maida and Dr. Marvin Marcus for their continual support and guidance.

Most recently, our hard work caught the attention of the SRG’s national leadership, who will be holding one of their off-site meetings at UCLA. For this upcoming year, we hope to continue motivating students to get involved in research projects while in dental school. We have 2 main objectives that we want to consistently achieve including:

- Monthly meetings aimed at assigning students to researchers
- Quarterly newsletter

This, combined with several other smaller projects, will culminate and make this club bigger and stronger.

Sincerely,
Adrien Hamedi-Sangsari (‘15)
UCLA NSRG President

Hello, my name is Adrien Hamedi-Sangsari and I will be serving as the UCLA AADR Student Research Group (SRG) President for the 2014-2015 school year. I am thrilled to be guiding this emerging club into its 2nd year. Our 1st year was marked with several challenges but also several successes. As with any new club, attracting members and putting together a dedicated board were challenges that needed to be addressed. We successfully established the club, held preliminary meetings geared towards helping pre-doctoral students find research, and even won several awards in the process. Our mentor, Associate Dean of Research at UCLA School of Dentistry Dr. David Wong, won the AADR SRG Mentor of the Year Award, and I was fortunately honored with the AADR Student Advocate of the Year Award.

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Sincerely,
Adrien Hamedi-Sangsari (‘15)
UCLA NSRG President

Message from the Editors... The goal of the UCLA NSRG Journal is to create a local platform for the UCLA School of Dentistry (SOD) faculty and student researchers to engage in scientific communication. This journal allows UCLA researchers to connect with researchers from other dental institutions. All researchers and research enthusiasts affiliated with the UCLA SOD – faculty, PhD and MA candidates, residents, and students – are highly encouraged to publish in our journal. If you are interested in submitting an article and/or have any questions, please contact us at nsrgucla@gmail.com. Thank you for reading!

- Yoonah Danskin (‘16) & Sue Vin Kim (‘16)
Editors of UCLA NSRG Journal