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HSC News

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Keck Medicine of USC performs world's 1st epilepsy treatment implant

By Alison Trinidad

On Dec. 18, 2013, Keck Medicine of USC became the world's first medical center to surgically implant a responsive brain device newly approved by the U.S. Food and Drug Administration (FDA) to treat epilepsy, with the potential to help millions of people worldwide.

The device, manufactured by NeuroPace Inc., detects and then directly responds to abnormal brain activity to prevent seizures before they occur. In a three-hour surgery, USC faculty physicians implanted the device in a 28-year-old Lakewood, Calif., woman who was diagnosed with epilepsy in 2004.

Kathleen Rivas, an aspiring journalist who sought care from the university's student health center in 2009 while earning her master's degree elected to have the implant because medication had not fully controlled her seizures. Over the next few months, her doctors will program the device to detect specific brain activity indicative of a seizure's onset.

"I'm just so lucky to be here at USC," said Rivas. "Without faith and trust in my neurologist and neurosurgeon, I don't know where I'd be. My life is in their hands."

Epilepsy affects approximately 65 million people worldwide, including nearly 3 million in the United States. Those who can tolerate medication and whose seizures are completely controlled usually lead a normal life, but the disease can be devastating for the up to 40 percent who experience uncontrolled seizures.

Ted Pang

USC neurosurgeons Charles Liu, MD, PhD, and Christianne Heck, MD, MMM, respond to questions at a press conference held on Dec. 19, 2013, covering the first implant after FDA approval of the NeuroPace responsive neurostimulation device for epilepsy treatment.

The device is the world's only responsive neurostimulation (RNS) system approved for clinical use. USC physicians have been studying the technology since 2006 and are among the first authorized to prescribe its use since FDA approval on Nov. 14, 2013.

"This has the potential to be a game-changer for patients with epilepsy," said Christianne Heck, MD, MMM, associate professor of neurology at the Keck School of Medicine of USC, medical director of the USC Comprehensive Epilepsy Program and principal investigator of the device's clinical study at USC. "Unlike other neurostimulators on the market, this system looks for just the right circumstances to stop a person's seizure from happening."

Most people with epilepsy gain complete or partial control of their seizures through medicine or surgery. USC's surgical epilepsy program has had an 80 percent cure rate among patients who do not respond to anti-seizure medications. RNS may help the remaining 20 percent.

"We have become very good at surgically removing the areas of the brain where these seizures start, but we have limited options when a person's seizures begin in critical

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Thomas Buchanan named Mayo H. Soley Award winner

By Amy E. Hamaker

Thomas A. Buchanan, MD, vice dean for research and professor of medicine at the Keck School of Medicine of USC, has recently been named as the recipient of the Mayo H. Soley Award by the Western Society for Clinical Investigation (WSCI).

The award, given to recognize outstanding research, is named after Mayo H. Soley, a co-founder of WSCI who was recognized by his peers as a distinguished clinical scientist and also as a generous mentor to aspiring colleagues. The annual award honors the lifetime achievement of outstanding medical researchers who are devoted to training junior investigators.

"Just being able to spend most of my professional life working on interesting problems with colleagues I really like is ample reward for the long hours and hard work that a research career demands," said Buchanan, who is also chief of the division of endocrinology and diabetes. "Receiving the recognition of my peers for the contributions my group has made to research is icing on the cake, and I truly appreciate it."

The Western Society for Clinical Investigation was founded to cultivate and enrich medical research in the western United States and western Canada. Its goal is to enhance the culture of academic medical research by encouraging promising young researchers and scientists to pursue careers in academic medicine.

Thomas A. Buchanan, MD, received the Mayo H. Soley Award for his dedication to research in diabetes and endocrinology.

Welcome to the first issue of *HSC News*!
Although it has a new name, you'll find the same Health Sciences Campus news and information you've come to depend on from *The Weekly*.

We're building a more mobile-friendly website and e-newsletter.
During the transition, you can still find news online at theweekly.usc.edu.

Keck Medicine announces new Center for Neurorestoration

By Alison Trinidad

Patients who suffer from uncontrolled epilepsy now have new treatment options at Keck Medicine of USC, thanks to the recent founding of the USC Center for Neurorestoration.

The center proposes to physically test innovative neural engineering and basic neuroscience to restore neurological circuitry and function within the human brain.

Christianne Heck, MD, MMM, associate professor of neurology at the Keck School of Medicine of USC, medical director of the USC Comprehensive Epilepsy Program, and Charles Liu, MD, PhD, professor of neurosurgery and neurology at the Keck School, surgical director of the USC Comprehensive Epilepsy Program, are co-directors of the new center. Heck and Liu worked extensively over the last three years to build USC's Level 4 epilepsy program.

"Thanks to Dr. Heck and Dr. Liu's innovation and perseverance, Keck Medicine of USC has a Level 4 epilepsy center, the highest level of medical and surgical evaluation and treatment available for patients with complex epilepsy," said Scott Evans, PharmD, MHA, CEO of Keck Hospital of USC and USC Norris Cancer Hospital. "The addition of this groundbreaking therapy to our arsenal is testament to our team's dedication to improving the quality of patients' lives."

The approach relies on mapping, decoding and repairing basic neural circuitry in the brain. It represents a fundamental departure from current best practices in neurorehabilitation, which rely on pharmacological modulation, external prostheses,

See **CENTER**, page 3

USC and CHLA launch imaging lab for translational research

By Ellin Kavanagh and Cristy Lytal

With the launch of the Translational Biomedical Imaging Laboratory (TBIL), investigators at USC and The Saban Research Institute of Children's Hospital Los Angeles moved medical science closer to a day when diseases can be detected before symptoms appear.

TBIL is a unique, interdisciplinary collaboration that combines dynamic equipment, including state-of-the-art microscopes for imaging living specimens and whole organs, with an intellectual infrastructure of optical physicists, computer scientists, translational researchers and clinicians.

USC Provost Elizabeth Garrett, JD, underscored the importance of cross-campus collaborations such as TBIL at the launch event held at The Saban Research Institute on Nov. 13, 2013.

"Reaching across campuses, we continue to invest in the intellectual convergence of medicine, chemistry and engineering to improve clinical care for children in our community," Garrett said. "USC and Children's Hospital Los Angeles are committed to developing world-class research facilities such as TBIL that provide flexibility for our faculty to collaborate as they address complex health problems."

Carmen A. Puliafito, MD, MBA, dean of the Keck School of Medicine of USC, voiced his commitment to maximizing the impact of this important collaboration. "My mission is to let all our faculty, our medical students and our postdocs know about this wonderful resource that has been created," he said. "Imaging at every level is a reinforced theme at USC, with leaders such as TBIL co-director Scott Fraser, Andy McMahon from USC Stem Cell and, of course, Arthur Toga and Paul Thompson of the USC Institute for Neuroimaging and Informatics."

Cristy Lytal

Thai Truong, PhD, demonstrates high-speed volumetric imaging at the launch of the Translational Biomedical Imaging Lab.

With TBIL resources, investigators can follow the cells of developing organs and see when and how birth defects and other diseases occur — one day providing an early opportunity to intervene and change the outcome before symptoms appear.

Attendees witnessed these capabilities during a tour, which included stops at the "collaboratory" meeting space with high-resolution video and video conferencing; the live imaging lab with a multispectral, multiphoton microscope for living specimens; the high-speed microscopy lab offering rapid, volumetric imaging; the extended-volume imaging lab with an integrated microtome and laser-scanning microscope for large specimens; and the quantitative image analysis and visualization suite with high-resolution workstations for image processing and analysis.

"Imaging has become the Rosetta Stone of research by allowing investigators access to disease at the most basic, molecular level," said Scott Fraser, PhD, TBIL co-director, provost professor of biological sciences, biomedical engineering and pediatrics, and principal investigator with USC Stem Cell. "TBIL provides equipment and trained talent to accelerate the trajectory of scientific discovery from the bench to the bassinette to the bedside."

Fraser shares co-directing responsibilities with Rex Moats, PhD, of The Saban Research Institute.

"With the joint recruitment of Dr. Scott Fraser to Children's Hospital and USC, we have been able to put this amazing imaging resource in place," said Brent Polk, MD, director of The Saban Research Institute, chairman of pediatrics and vice dean for child health at the Keck School, and executive committee member of USC Stem Cell. "TBIL will help accelerate both the diagnosis and treatment of health issues that have significant impact on children and the adults they will become."

EPILEPSY: New device provides options for patients who have uncontrolled seizures

Continued from Page 1

zones, such as those that affect speech or movement," said Charles Liu, MD, PhD, professor of neurosurgery and neurology at the Keck School, surgical director of the USC Comprehensive Epilepsy Program and co-director of the new USC Center for Neurorestoration with Heck. "Devices like this provide an option for patients who live with uncontrollable seizures because no available treatment works for them."

FDA approval of the RNS device came after a randomized clinical trial of 191 patients with drug-resistant epilepsy across 32 clinical sites. The study showed that, by three months after the device was turned on, patients experienced a nearly 38 percent reduction in monthly seizures, compared to a roughly 17 percent reduction among patients who had the implant turned off. Two years post implant, 55 percent of patients experienced a 50 percent or greater reduction in seizures.

"Academic medical centers are centers of innovation and education that directly contribute to the medical breakthroughs that continue to redefine health care," remarked Tom Jackiewicz, MPH, senior vice president and CEO of USC Health. "Drs. Liu and Heck are blazing a trail in neurological research and care that ultimately will change people's lives for the better. Keck Medicine of USC is proud to serve as a keystone for their efforts."

HSC News **Next Issue: Jan. 24**

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Courtesy Keck Medical Center of USC

BOXES OF LOVE Members of the Keck Medical Center of USC community demonstrated a generous holiday spirit as they donated food for needy families in east Los Angeles. The medical center partnered with Canning Hunger for its annual Boxes of Love event as the medical center's first Thanksgiving food drive. In two weeks, USC filled 585 boxes. "Staff members were recruiting their family and neighbors to help fill boxes," said Sevanne Sarkis, administrative director for Keck Hospital of USC. "It's a tangible demonstration that a big part of our culture is giving, sharing and partnering with the community."

Air pollution and genetics combine to increase risk for autism

By Alison Trinidad

Exposure to air pollution appears to increase the risk for autism spectrum disorder (ASD) among people who carry a genetic disposition for the disorder, according to newly published research led by scientists at the Keck School of Medicine of USC.

"Our research shows that children with both the risk genotype and exposure to high air pollutant levels were at increased risk of autism spectrum disorder compared to those without the risk genotype and lower air pollution exposure," said the study's first author, Heather E. Volk, PhD, MPH, assistant professor of research in preventive medicine and pediatrics at the Keck School and principal investigator at The Saban Research Institute of Children's Hospital Los Angeles.

The study, "Autism spectrum disorder: Interaction of air pollution with the MET receptor tyrosine kinase gene," appeared in the January 2014 issue of *Epidemiology*.

ASD is a lifelong neurodevelopmental disability characterized by problems with social interaction, communication and repetitive behaviors. The U.S. Centers for Disease Control and Prevention estimates that one in 88 children in the United States has an ASD.

ASD is highly heritable, suggesting that genetics are an important contributing factor, but many questions about its causes remain. There currently is no cure.

"Although gene-environment interactions are widely believed to contribute to autism risk, this is the first demonstration of a specific interaction between a well-established genetic risk factor and an environmental factor that independently contribute to autism risk," said Daniel B. Campbell, PhD, assistant professor of psychiatry and the behavioral sciences at the Keck School and the study's senior author. "The MET gene variant has been associated with autism in multiple studies, controls expression of MET protein in both the brain and the immune system, and predicts altered brain structure and function. It will be important to replicate this finding and to determine the mechanisms by which these genetic and environmental factors interact to increase the risk for autism."

Independent studies by Volk and Campbell have previously reported associations between autism and air pollution exposure and between autism and a variant in the MET gene. The current study suggests that air pollution exposure and the genetic variant interact to augment the risk of ASD.

Campbell and Volk's team studied 408 children between 2 and 5 years of age from the Childhood Autism Risks From Genetics and the Environment Study, a population-based, case-controlled study of preschool children from California. Of those, 252 met the criteria for ASD. Air pollution exposure was determined based on the past residences of the children and their mothers, local traffic-related sources, and regional air quality measures. MET genotype was determined through blood sampling.

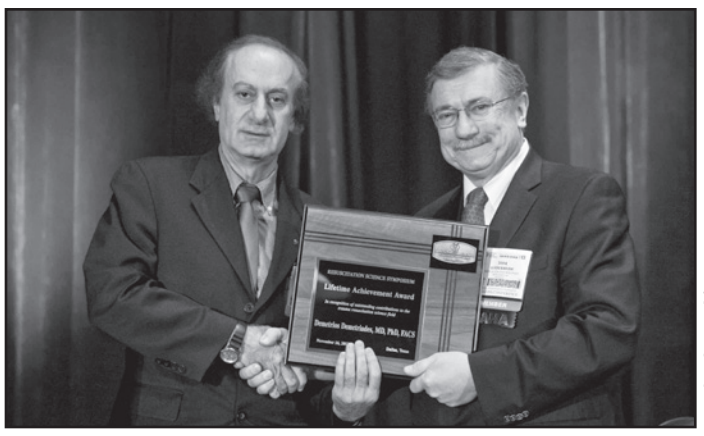
Campbell and Volk continue their work in studying the interaction of air pollution exposure and the MET genotype in mothers during pregnancy. Their work was supported by grants from the National Institute of Environmental Health Sciences (grant numbers ES019002, ES013578, ES007048, ES11269, ES015359, ES016535, ES011627, EPA Star-R, 823392, 833292), the MIND Institute, and Autism Speaks.

AHA honors USC's Demetriades for a lifetime of dedication

By Sara Reeve

Demetrios Demetriades, MD, PhD, professor of surgery and chief of the division of trauma & critical care at the Keck School of Medicine of USC's Department of Surgery, was recently honored with the American Heart Association's 2013 Lifetime Achievement Award in Trauma Resuscitation Science. The award, presented at the 11th annual Resuscitation Science Symposium in Dallas on Nov. 16, 2013, recognized Demetriades for his leadership, service and contributions to trauma resuscitation science.

Since 1992, Demetriades has served as director of the USC Division of Trauma and Surgical Intensive Care Unit at Keck Hospital of USC, one of the largest trauma programs in the country. He is one of the most published trauma surgeons in the United States and is a member of editorial boards for eight journals.



AHA/Rodney White

Pictured here with Demetrios Demetriades, MD (left), is Tom Aufderheide, MD, professor of emergency medicine at the Medical College of Wisconsin.

OFFERING CAREER ADVICE

Graciela Medina

Neurosurgeon Frank Acosta, MD, associate professor of clinical medicine at the Keck School of Medicine of USC, recently shared images of spinal disorders or abnormalities with Latino middle and high school boys as part of a career and personal growth event. More than 1,200 boys attended the second annual Adelante Young Men Conference 2013 on Nov. 9, 2013, at Pasadena City College. Attendees hailed from 72 schools and nine organizations from various counties. Latino professionals presented more than 80 workshops on career and education options and self-development skills.

CENTER: Bridging the science/medicine gap

Continued from Page 1

compensatory strategies and limited intrinsic neural plasticity. It also represents an alternative to cell-based strategies for regenerative medicine, where success in the brain will be ultimately limited by the ability to restore neural circuitry. The proposed multidisciplinary work will lead to functional maps of the nervous system, highly congruent with the Presidential Brain Mapping Initiative.

Keck Medicine of USC will serve as the keystone for these efforts, working closely with multiple scientific and engineering sites to direct all future USC human applications in the restoration of neural circuits. One of the center's current projects includes improving upon the RNS system by testing different levels of electrical stimulation on brain samples in the lab to determine the most effective level for seizure prevention.

"Our faculty physicians and scientists are constantly striving to discover new solutions to the most complex diseases, conditions and disorders," added Carmen A. Puliafito, MD, MBA, dean of the Keck School. "The USC Center for Neurorestoration is a prime example of that pioneering approach — proposing a fundamental departure from current best practices in neurorehabilitation and bridging the gap between science and medicine."

HSC News ETCETERA

Kathleen Page, MD, chair of the Maternal-Child Health Section at the USC Diabetes and Obesity Research Institute and assistant professor of Medicine at the Keck School of Medicine of USC, recently received a prestigious Pathway to Stop Diabetes award from the American Diabetes Association. The Diabetes Research Accelerator award helps support exceptional early career researchers who intend to continue their careers in diabetes research.

Stacy Bratcher has been promoted to the newly created position of deputy general council. She will be second-in-command of the Office of the General Counsel and responsible for university-wide legal issues. Bratcher previously served as associate general council for health sciences, and she will continue to oversee the legal services provided to the Health Sciences Campus.

P. Michael McFadden, MD, professor of cardiothoracic surgery, is looking for individuals for a clinical trial. The purpose of the research study is to evaluate the safety and effectiveness of the PulmonX Endobronchial Valve (EBV) in emphysema and chronic obstructive pulmonary disease treatment.

The device is a one-way valve that prevents inspired air from inflating the more diseased areas of the lung and redirects the air to better functional lung. The EBV also allows decompression of the hyperinflated lung resulting in lung volume reduction and better diaphragm muscle function and breathing. The EBV has been approved by the Federal Drug Administration (FDA) for investigational use only in this study and is not available commercially.

Individuals who have clinical and radiological evidence of emphysema or COPD and are able to participate in an exercise program are encouraged to call Amelia Weldon, research coordinator, at (323) 442-5763.

Calendar of Events

Monday, Jan. 13

Noon – 1 p.m. Keck School of Medicine Research Seminar Series. "Designing Vaccines: Differentiation and Regulation of Follicular Helper CD4 T Cells," Shane Crotty, La Jolla Institute for Allergy & Immunology. Aresty Auditorium. Info: (323) 442-7732

3 – 5 p.m. Southern California Clinical and Translational Science Institute Career Development Seminar. "Mentoring Workshop for Mentees," Emil Bogenmann, USC. Aresty Auditorium. RSVP: http://j.mp/18BmBdF

Tuesday, Jan. 14

Noon. Eli and Edythe Broad Center for Regenerative Medicine and Stem Cell Research at USC. "Epigenetic Regulation of Stem Cells and Development by Tet Enzymes," Meelad Dawlaty, Whitehead Institute for Biomedical Research/MIT. Broad CIRM Center Seminar Room. Into: (323) 442-8084

2 – 3 p.m. Monthly Breast Cancer Educational Forum. "Density and Breast Imaging Techniques: What Is It and Why Do We Care?" Pulin Sheth, USC. Jennifer Diamond Cancer Resource Library, NRT G-501. RSVP: (323) 442-7808, zsurani@usc.edu

Wednesday, Jan. 15

4:30 p.m. KSOM Dean's Distinguished Lecture Series. "A Conversation with David B. Agus, MD," David Agus, USC. Mayer Auditorium. Register at www.usc.edu/esvp (code: Agus) Info: (323) 442-1900, deanksom@med.usc.edu

6 – 7 p.m. Orthopaedic Surgery Grand Rounds. "Oncology in General Orthopaedic Practice (The Accidental Oncologist)," Lawrence Menendez, USC. Reception from 5:30 – 6 p.m. Aresty Auditorium. Info/RSVP: (323) 226-7204, sylsua@usc.edu

Tuesday, Jan. 21

Noon – 1 p.m. Psychiatry Grand Rounds. "Recent Clues From Environmental Risk Factor Research in Autism Spectrum Disorder," Heather Volk, USC. ZNI Room 112. Info: (323) 442-4065

Thursday, Jan. 23

9:30 a.m. – 3:30 p.m. Southern California Clinical and Translational Science Institute. "REDCap Database Solutions Workshop: Research Electronic Data Capture." Soto Building, Room SSB 105. Register at https://redcap.sc-ctsi.org/surveys/?s=Y6WHknh4rR

Monday, Jan. 27

3 p.m. – 5 p.m. Southern California Clinical and Translational Science Institute. "Academic Advancement and Promotion," Judy Garner, USC. Aresty Auditorium. RSVP: ecde@sc-ctsi.org

Tuesday, Jan. 28

Noon – 1 p.m. Faculty Development Seminar. "Promoting & Assessing Professionalism," Julie Nyquist, Stephanie Zia, USC. Norris Medical Library West Conference Room. Info: (323) 442-2746, meded@med.usc.edu

Noon – 1 p.m. Psychiatry Grand Rounds. "Acceptance and Change in Couple Therapy," Andrew Christensen, UCLA. ZNI Room 112. Info: (323) 442-4065

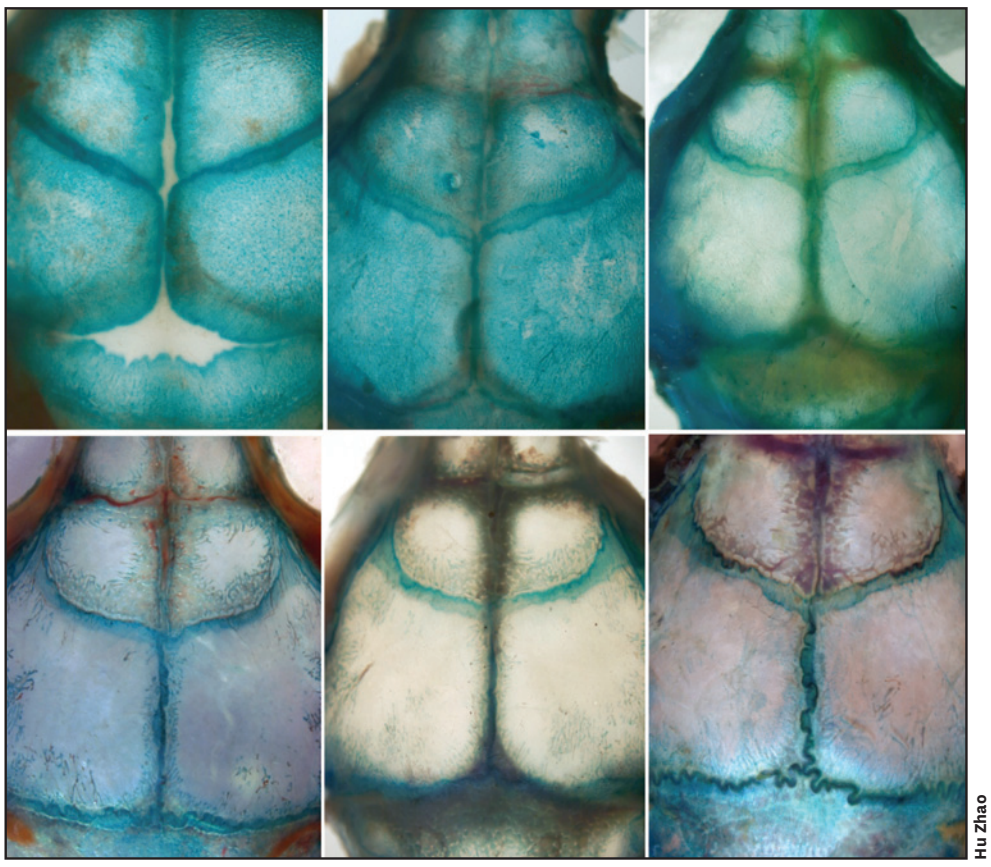
Wednesday, Jan. 29

11:30 a.m. – 2 p.m. USC Health Systems Improvement Collaborative, USC Stevens Center for Innovation, USC/CHLA Medical Innovation Program. "Can We Master Patient Safety? Tools, Trends and Technologies," various speakers, lunch provided. Broad CIRM Center 1st Floor Seminar Room. RSVP: https://uscpatientsafety012914.eventbrite.com

Noon – 1 p.m. Faculty Development Seminar. "Teaching in the Clinical Setting," Win May, Tatum Korin, USC. Norris Medical Library West Conference Room. Info: (323) 442-2746, meded@med.usc.edu

Notice: Deadline for calendar submission is 4 p.m. Monday to be considered for that week's issue—although three weeks' advance notice of events is recommended. Please note that timely submission does not guarantee an item will be printed. Send calendar items to *HSC News*, KAM 400 or fax to (323) 442-2832, or email to hscwkly@usc.edu. Entries must include day, date, time, title of talk, first and last name of speaker, affiliation of speaker, location and a phone number for information.

Stem cell image of the month: A good head start



Hu Zhao

This colorful series of mouse skulls reveals stem cells, labeled with the protein Gli1, in the sutures between the calvaria bones in the upper part of the cranium. Among other things, these stem cells support the postnatal turnover and injury repair of the calvaria bones. Hu Zhao, DDS, PhD, a research associate in the lab of Yang Chai, DDS, PhD, in the Center for Craniofacial Molecular Biology at the Ostrow School of Dentistry of USC, produced the image, which won the December 2013 USC Stem Cell Image of the Month Contest. The contest invites USC stem cell researchers to submit high-resolution images or artistic renditions that showcase the scientific excellence and creativity of the university's research enterprise. Submit images, one-sentence informative captions, names and laboratory affiliations to Seth Ruffins, PhD, at ruffins@usc.edu by the last day of each month to enter.

Keck School alumnus helps bring $1 million gift to Keck Medicine

By Amy E. Hamaker

The strength of a university can often be measured by the commitment of its alumni. Nowhere is that more apparent than at the Keck School of Medicine of USC, where alumnus Tony Alamo ('91), MD, recently helped bring a gift of $1 million to the school from a family friend.

At a lunch between Alamo, Keck School Dean Carmen A. Puliafito, MD, MBA, and Mike Ensign, retired chairman of the board of directors/CEO of Mandalay Resort Group, Alamo suggested a gift to benefit physicians, Keck Hospital of USC and Keck School students.

Alamo, founder and medical director of Alamo Medical Clinic in Henderson, Nev., was born and raised in Las Vegas alongside Ensign's family. "They're like my second set of parents," he said. "My father worked with Mike all through his career for all but a few years, and I'd spend summers at his house."

Alamo knew the Ensigns' interest in philanthropy, and described the resources that are available to the community and to future physicians through research, education and clinical care at Keck Medicine of USC. "After he saw what was available at USC, he knew any gift here would keep on giving," explained Alamo. "He's a very philanthropic man."

Alamo believes that USC alumni are the best ambassadors for Keck Medicine. "Once you make that connection, that handshake, they make the connection on their own — they see it," he said. "The Ensigns could have given anywhere. I explained that USC is where they could get the most bang for their buck, where it would make the most difference. Through their hard work and good fortune, this is a way for them to be able to give back."

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Visit the USC Web: http://emergency.usc.edu This page will be activated in case of an emergency. Backup Web servers on the East Coast will function if the USC servers are incapacitated.