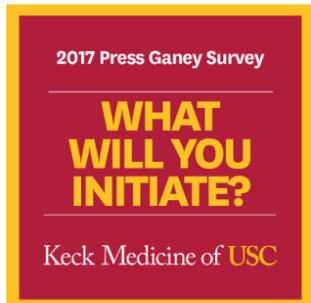


Opinions sought during Press Ganey survey



The 2017 Press Ganey employee and physician surveys will be open to all Keck Medicine of USC physicians and staff from Feb. 13 through March 3. The link to the confidential survey will be sent via an email from Press Ganey.

Keck Medicine leaders

want to hear the thoughts and ideas from as many physicians and staff as possible to get a clear understanding of the health system's strengths and weaknesses.

"Your input gives great information on how to take the best actions for improving our organization," said Matt

McElrath, chief human resources officer. "Our goal is to have 80 percent of our physicians and staff complete the survey."

The online survey may be completed during work hours. It also is important to note that the survey is completely confidential and cannot be

tracked back to the individual responding.

"The physician and staff surveys are different and focus on partnership questions for each group," McElrath said.

This year's survey will include USC Verdugo Hills Hospital physicians and staff for the first time.

Students realize 'pluripotential' at Stem Cell Day

By Cristy Lytal

You can be anything you want — just like a stem cell. This was a key lesson for the 500 middle and high school students who attended the USC Stem Cell Day of Discovery on Feb. 4 at the Keck School of Medicine of USC on the Health Sciences Campus.

"It was a true joy to welcome the middle and high school students from our neighboring communities in Boyle Heights, El Sereno, Lincoln Heights, the San Gabriel Valley and throughout Los Angeles," said Rohit Varma, MD, MPH, dean of the Keck School and director of the USC Gayle and Edward Roski Eye Institute. "This bright young generation brings tremendous potential to their future pursuits in biotechnology and beyond."

Hosted by USC Civic Engagement and USC Stem Cell, the event introduced the students to stem cell scientists.

"Don't be shy," said Andy McMahon, PhD, director of the Eli and Edythe Broad Center for Regenerative Medicine and Stem Cell Research at the Keck School of Medicine of USC. "Ask our scientists questions. Ask them about their science, but also ask them about their personal journeys that led to



Left: Students from Orthopaedic Hospital Medical Magnet High School practice using pipettes to handle small amounts of liquid.

Right: Master's student Varsha Samararatne shows students how cells are held in long-term cold storage tanks at -195 degrees Celsius.



Photos by David Sprague

where they are."

The students followed McMahon's advice as they engaged in fun activities and lively conversations. They ventured into labs to get hands-on with microscopes and pipettes. They competed as contestants in the Stem Cell Edition of Family Feud, viewed

colorful microscopy at a 3D computer station, and attended a research poster session and resource fair. They also toured the USC Norris Comprehensive Cancer Center and Keck Hospital of USC.

"California currently has biotechnology as the biggest growing

sector," said junior Richard Coca from Reseda High School. "It's really important that students are visiting labs and learning more about the industry, so they can potentially see where they're going with their lives and careers."

Earlier in the day, the students

See **DAY**, page 3



Ricardo Carrasco III

7T MRI MACHINE INSTALLED: On Feb. 4, a 7T magnetic resonance imaging (MRI) machine was installed at USC Stevens Hall for Neuroimaging, home to the USC Mark and Mary Stevens Neuroimaging and Informatics Institute. To accommodate the machine's magnet, which measures 27 cubic feet and weighs 22 tons (roughly the size of 30 elephants), a crane carefully lowered the magnet through a hatch in the imaging room roof. This is the only 7T MRI machine of its kind in the world. With it, researchers can capture enhanced images of brain function and disease, allowing for cutting-edge science in Alzheimer's disease, autism and epilepsy research.

Inderbir Gill named Distinguished Professor

Inderbir S. Gill, MD, chair of Urology at the Keck School of Medicine of USC, has been named a Distinguished Professor by USC President C. L. Max Nikias.

USC Provost Michael Quick, PhD, announced the appointment Feb. 6 in a memo to faculty and staff. Also announced were the appointments of English professor Aimee Bender, MFA, as Distinguished Professor, and Seeley G. Mudd Professor of Engineering Shangua Teng, PhD, as University Professor.

"These exceptional faculty members have brought immense honor to the university," Quick said. "Please join me in congratulating them on their appointments."

In addition to his role as associate dean (clinical innovation) at the Keck School, Gill is the Hanson-White Chair in Medical Research and chair of the Catherine and Joseph Aresty Department of Urology and the executive director of the USC Institute of Urology.



Inderbir S. Gill

An internationally recognized leader in the field of robotic and laparoscopic surgery for urologic cancers, Gill and his team are the world leaders in robotic partial nephrectomy for kidney cancer and have among the world's largest experience in robotic surgery for prostate and bladder cancer. He and his team have performed these procedures in more than 13,000 patients to date.

His awards include the Dr. B.C. See **GILL**, page 3

Van Urfalian

Bone defects inspire uncommon collaborations

By Cristy Lytal

As chair of the Department of Orthopaedic Surgery at the Keck School of Medicine of USC, Jay R. Lieberman, MD, regularly sees patients with bone defects too severe to heal. This unmet clinical need inspired him to team up with two stem cell biologists, Gage Crump, PhD, and Francesca Mariani, PhD, to find new solutions.

"I was treating patients with large bone defects associated with revision total hip and knee replacement," Lieberman said. "Another group that we have seen more recently are soldiers, who unfortunately sustained high-energy injuries from explosive devices or gunshot wounds. And our hope with our research is to develop solutions for these problems."

Lieberman, Crump and Mariani kicked off their collaboration in 2013, when they received a \$400,000 grant from the Regenerative Medicine Initiative, funded by the Keck School's dean. This enabled the team to explore potential ways to repair human bones through lessons learned from two not-so-distant relatives: zebrafish and mice.

"A great benefit of the Regenerative Medicine Initiative is that basic biologists are encouraged to work with clinicians to understand pressing challenges," said Crump, associate professor of stem cell and regenerative medicine.

The project also attracted support from

the National Institutes of Health (NIH).

In 2013, Mariani, assistant professor of cell and neurobiology, received an NIH grant to develop a new bone regeneration model in mice. In 2014, Crump secured an additional NIH grant, advancing these investigations in zebrafish.

By studying zebrafish jaw repair, the team discovered that a special type of repair cell, called an "ossifying chondrocyte," is necessary for effectively healing bone. The Crump and Mariani labs published these findings in the journal *Development*.

The team found that similar repair cells also enable mice to heal large-scale rib injuries. To study these injuries further, Mariani recently secured a new \$2.4 million NIH grant.

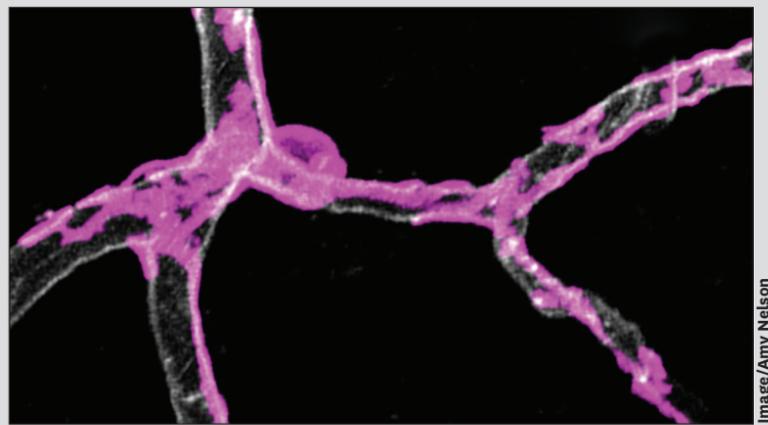
"By using our new bone regeneration model, we can identify the stem cells needed for successful bone healing," Mariani said. "We are investigating a promising biological factor that stimulates these cells to mediate repair."

Lieberman and Crump will remain key collaborators as they advance their findings.

"Collaborative clinician-scientists such as Dr. Lieberman contribute exponentially to the success of any basic research effort," said Andy McMahon, PhD, director of the Eli and Edythe Broad Center for Regenerative Medicine and Stem Cell Research at USC.



One winning team brings together Jay R. Lieberman, center, a clinical orthopaedic surgeon and chair of the Department of Orthopaedic Surgery, and two researchers within the Eli and Edythe Broad Center for Regenerative Medicine and Stem Cell Research — Gage Crump and Francesca Mariani.



Pericytes, or gatekeeper cells, are wrapped around capillaries in the cortex of a mouse brain.

Image/Amy Nelson

Study: 'Gatekeeper cells' glitch slowly suffocates the brain

By Zen Vuong

Abnormality with special cells that wrap around blood vessels in the brain leads to neuron deterioration, possibly affecting the development of Alzheimer's disease, a USC-led study reveals.

"Gatekeeper cells" called pericytes surround blood vessels, contracting and dilating to control blood flow to active parts of the brain.

"Pericyte degeneration may be ground zero for neurodegenerative disorders like Alzheimer's disease, ALS and possibly others," said Berislav Zlokovic, MD, PhD, chair and professor of physiology and biophysics and Mary Hayley and Selim Zilkha Chair in Alzheimer's Disease Research at the Keck School of Medicine of USC, and senior author of the study. "A glitch with gatekeeper cells that surround capillaries may restrict blood and oxygen supply to active areas of the brain, gradually causing neuron loss that might have important implications for Alzheimer's disease."

Published on Jan. 30 in *Nature Neuroscience*, this was the first study to use a pericyte-deficient mouse model to test how blood flow is regulated in the brain. The goal was to identify whether pericytes could be an important

new therapeutic target for treating neuron deterioration.

"Vascular problems increase the risk of cognitive impairment in many types of dementia, including Alzheimer's disease," said Cassandra Kisler, PhD, co-first author and a research associate at the Zilkha Neurogenetic Institute. "Pericytes play an important part in keeping your brain healthy."

Pericyte dysfunction suffocates the brain, leading to metabolic stress, accelerated neuronal damage and neuron loss, said Zlokovic, director of the Zilkha Neurogenetic Institute.

"We now understand the function of blood vessel gatekeeper cells is to ensure adequate oxygen and energy supply to brain cells," said Amy Nelson, PhD, co-first author and a postdoctoral scholar at the Zilkha Neurogenetic Institute. "Prior to our study, scientists knew patients with Alzheimer's disease, ALS and other neurodegenerative disorders experience changes to the blood flow and oxygen being supplied to the brain and that pericytes die. Our study adds a new piece of information: Loss of these gatekeeper cells leads to impaired blood flow and insufficient oxygen delivery to the brain. The big mystery now is: What kills pericytes in Alzheimer's disease?"

Calendar of Events

Tuesday, Feb. 14

9 a.m.-7 p.m. USC Institute for Global Health. "2017 USC Global Health Case Competition." Soto I. Info: Mia Poynor, (415) 879-6542, mpoynor@usc.edu, <http://bit.ly/2k227G1>

Wednesday, Feb. 15

Noon. The Saban Research Institute Seminar. "Cardiovascular Development and Regeneration — Zebrafish, Neonatal Mouse and Beyond," Ching-Ling (Ellen) Lien, PhD. Saban Research Building Auditorium, 4661 Sunset Blvd. Info: Sandy Wang, (323) 361-7489, tecpad@chla.usc.edu, <http://chla.org/tecpad>

Thursday, Feb. 16

Noon-1 p.m. The Survivor Art Series. "Exhibit Opening and Art Talk," Philip Lindquist. The Jennifer Diamond Cancer Resource Library, Harlyne J. Norris Research Tower. Info: (323) 442-7805. A light lunch will be served, no RSVP necessary.

Noon. The Southern California Research Center for ALPD & Cirrhosis Seminar. "Cellular Homeostasis Lecture Series: Dealing with Hunger: How Cancer Cells Adapt to Glutamine Deprivation," Mei Kong, PhD, City

of Hope. McKibben Lecture Hall, MCH 156. Info: Asma Deras, (323) 442-3121, asmadera@usc.edu. Please contact host/moderator, Keane Lai, keanelai@usc.edu, for meeting requests.

5 p.m. USC Women in Management. "WIM Poets Tea at HSC." Norris Medical Library West Conference Room. Info and RSVP: Ginger Mayerson, (323) 384-6049, <http://uscwim.org/calendar.asp>. WIM members free; non-members \$10. Please RSVP for payment.

Friday, Feb. 17

6:30 a.m. Department of Anesthesiology Grand Rounds. "Evolution of Cardiac Over Time," Nicolas D'Attellis, MD, Cedars Sinai. McKibben Lecture Hall Room 256. Info: Renee Meadows, (323) 409-6856, rmeadows@usc.edu

8:30 a.m. Hastings Center for Pulmonary Research Seminar. "Exosomes & OSA Morbidity: New Directions," David Gozal, MD, University of Chicago. IRD 734. Info: Elva Rubio, (323) 409-7184, elvarubi@usc.edu

Saturday, Feb. 18

8:30 a.m.-5 p.m. Educational Affairs, Office

of Diversity Continuing Medical Education. "2017 Southern California LGBTQIA+ Health Conference." UCLA. Info: Olga Rios, (323) 442-1050, orios@usc.edu, <http://www.socalgbthhealthconference.org>. Conference Theme is "Queering Wellness: Healing as a Community."

Tuesday, Feb. 21

5 p.m. USC Institute for Global Health, USC Program on Global Health & Human Rights and USC Suzanne Dworak-Peck School of Social Work. "Developing a Human Rights Approach to Strengthen Practice: Implications for Medicine, Public Health & Social Work," Jane McPherson, PhD, MSW, MPH, University of Georgia. UPC Montgomery Ross Fisher Building (MRF) Room 102. Info: Larissa Puro, (323) 442-7233, global.health@usc.edu, <https://globalhealth.usc.edu/developing-rights-approach/>

Wednesday, Feb. 22

Noon. The Saban Research Institute. "Research Seminar: Systems-based Analysis of Multiomic Data to Improve Understanding of Development and Disease," Bruce J. Aronow, PhD, University of Cincinnati. Saban Research Building Auditorium, 4661 Sunset Blvd.

Info: Sandy Wang, (323) 361-7489, tecpad@chla.usc.edu, <http://chla.org/tecpad>

Thursday, Feb. 23

Noon-1:30 p.m. HTE@USC Discussion. "Inaugural Biotech Entrepreneurship Seminar Series," Steve Fiocco, PhD, EvoRX. Eli and Edythe Broad CIRM Center Auditorium, BCC 101. Info: Nadine Afari, (310) 999-4029, <https://biotechconnection-losangeles.org>

Noon. The Southern California Research Center for ALPD & Cirrhosis Seminar. "Cellular Homeostasis Lecture Series: Signaling in the Tumor Microenvironment of Breast Cancer," Gustavo W. Leone, PhD, The Ohio State University. McKibben Lecture Hall, MCH 156. Info: Asma Deras, (323) 442-3121, asmadera@usc.edu. Please contact host/moderator, Kinji Asahina, asahina@usc.edu, for meeting requests.

Friday, Feb. 24-Saturday, Feb. 25

10 a.m.-4:15 p.m. Department of Medical Education Conference. "Innovations in Medical Education." Hilton Los Angeles/San Gabriel. Info: Chelsea Michel, (323) 442-2555, uscme@usc.edu, <https://cmetracker.net/KECKUSC/Catalog>

Notice: Calendar items are due at least 10 days before publication date. Timely submission does not guarantee publication in print. See more calendar entries at hscnews.usc.edu/calendar-of-events. Submit items at tinyurl.com/calendar-hsc. Include day, date, time, title of talk, first and last name of speaker, affiliation of speaker, location and a phone number/email address.

Neurosurgery junior faculty see boost in support

By Hope Hamashige

For a small department, the Department of Neurological Surgery at the Keck School of Medicine of USC seems to have an oversized profile, at least when it comes to securing funding for its young clinician-scientists. Most of the recent faculty members to join the department have received career development funds, also known as K awards, from the National Institutes of Health (NIH) for their research.

What may appear to be a stroke of good luck is the culmination of years of planning, said Steven Giannotta, MD, professor and chair of the department. Giannotta credits his predecessor, Martin Weiss, for building a team of top surgeons across several subspecialties, earning the department national recognition.

“Frankly, you must have a strong department that can attract junior

faculty capable of getting a K award,” said Giannotta, noting there is stiff competition for the top talent, which requires finding creative ways to support their research.

The department leadership guarantees clinician-scientists time to devote to research. Department leaders connect the clinician-scientists with faculty outside the department, while administrators scour the budget for extra financial assistance for research and purchase equipment to show the department is serious about supporting research.

Giannotta said he also heavily relies on crucial support from the top brass at Keck Medicine of USC and the Keck School.

“It takes enlightened leadership who recognize that physician-scientists are integral to the success of our department,” Giannotta said.

Bill Mack, MD, associate professor of

neurological surgery (clinical scholar), was the first junior faculty member to receive a career development award from NIH-funded Southern California Clinical and Translational Institute for his research on the role of air pollution and inflammation on stroke and brain vascular disease.

“I was encouraged to do research and got time away from the clinic to be successful,” Mack said. “My research has really advanced because I got to work with the top scientists from across this university — at the Zilkha Neurogenetic Institute, the USC Davis School of Gerontology and the USC Viterbi School of Engineering.”

The initial grant and the mentorship also helped Mack secure additional NIH funding for his research (R01) and for the residency training program (R25) that is being used to develop more talented clinician-scientists in neurosurgery.



Steven Giannotta

“The goal of this whole effort is to build the complement of young researchers and it comes from the people at the top instilling a culture that values clinician-scientists and promotes faculty research,” Mack said.

Ricardo Carrasco III



Courtesy Keck School of Medicine of USC

KNOW THE SIGNS: Volunteers from the Keck School of Medicine of USC division of neurocritical care and stroke participated in the 2017 Skid Row Carnival of Love recently. The annual event provides members of the Los Angeles homeless community with access to a wide range of services, with volunteers providing education about stroke and free blood pressure screenings to more than 175 Skid Row residents.

Rene Sotelo named medical director of international medicine

By Douglas Morino

René Sotelo, MD, has been named medical director of international medicine of Keck Medicine of USC, effective Feb. 1.

In his new role, Sotelo will chair the International Medicine Faculty Steering Committee, collaborate with other Keck Medicine leaders to monitor and evaluate international patient volumes, and provide medical oversight to the patient services team, along with providing strategic guidance on international patient care.

“This highly visible role will lead our enterprise initiatives both regionally and internationally as we continue to attract patients with complex care needs,” said Tom Jackiewicz, senior vice president and CEO of Keck Medicine of USC.

A pioneering robotic and laparoscopic surgeon, Sotelo has more than 20 years of experience practicing medicine in Latin America. He joined the Keck Medicine staff in 2015 as professor of clinical urology at the Keck School of Medicine of USC.

He is an international leader in the field of robotic surgery to treat



René Sotelo

urologic cancers and has published more than 50 peer-reviewed scientific papers. Sotelo's work at Keck Medicine has led to referrals from patients across Central and South America, including Mexico, Panama, Venezuela, Colombia, Ecuador and Costa Rica.

“René is an outspoken promoter of innovative surgical techniques to help heal patients, regardless of the country they call home,” Jackiewicz added.

Ricardo Carrasco III

GILL: Recognition includes St. Paul's Medal

Continued from page 1

Roy National Award for Eminent Medical Person, the first time a physician living outside of India was recognized with this esteemed national award. Gill also was awarded the St. Paul's Medal by the British Association of Urological Surgeons, the highest honor bestowed by the organization. He has published over 700 peer-reviewed scientific papers, with more than 26,000 citations, and eight textbooks. Gill is the PI/Co-PI in three grants from the National Institutes of Health and his H-index is 92, making him the second-highest cited urologist in active surgical practice in the world.

Gill joins fellow Keck School Distinguished Professors Jae Jung, PhD, Distinguished Professor and Chair of Molecular Microbiology and Immunology, and Fletcher Jones

Foundation Chair in Molecular Microbiology and Immunology; Francine Ratner Kaufman, MD, Distinguished Professor Emerita of Pediatrics; Michael M.C. Lai, MD, PhD, Distinguished Professor Emeritus of Molecular Microbiology and Immunology and Neurology; Alexandra M. Levine, MD, Distinguished Professor Emerita of Medicine; Shahbudin H. Rahimtoola, MD, Distinguished Professor of Medicine and holder of the George C. Griffith Chair in Cardiology; Jonathan Samet, MD, MS, Distinguished Professor and Chair of Preventive Medicine and holder of the Flora L. Thornton Chair of Preventive Medicine; and Vaughn Starnes, MD, Distinguished Professor and Chair of Surgery and holder of the H. Russell Smith Foundation Chair for Stem Cell and Cardiovascular Thoracic Research.



Marina Gomez watches her daughter Arizbel Gomez view worms under a microscope that is part of a stem cell video game during at the Stem Cell Day of Discovery.

David Sprague

DAY: Faculty, fellows volunteered at event

Continued from page 1

enjoyed hearing from Senta Georgia, PhD, a USC Stem Cell researcher with a lab at Children's Hospital Los Angeles, who is seeking stem cell-based treatments for diabetes. Ismael Fernández-Hernández, PhD, a postdoctoral fellow at USC's stem cell research center from Guadalajara, Mexico, also gave a talk about how stem cell technology could offer ways to counteract brain degeneration from disease, aging or injury.

Throughout the festivities, Felipe Osorno, MS, associate administrator of performance management for Keck Medicine of USC, served as a lively Master of Ceremonies.

“The exposure to the Keck School of Medicine of USC is invaluable for the students,” said Maria Elena Kennedy, a

consultant to the Bassett Unified School District. “Our students come from a Title I School District, and they don't often have the opportunity to come to a campus like the Keck School.”

In addition to students, teachers and parents, the event welcomed leaders from the community, business and biotech sector, and local government.

Together with these partners, USC will continue to build the future of Los Angeles as an incubator for the biosciences and world leader in stem cell research.

“As USC continues the important work of expanding our biomedical research, we will not walk this path alone,” said Earl C. Paysinger, vice president of USC Civic Engagement. “We will do so in collaboration and with the strong support of the people in our communities.”

HSC Newsmakers

A roundup of news items related to Keck Medicine of USC, which may include philanthropic donations, research grants, publication in academic journals and mentions in the news media:



Courtesy INSP

Jonathan Samet was honored by the Institute of Public Health in Mexico as part of its 30-year anniversary commemoration Jan. 27.

Mexico public health institute honors Jonathan Samet

THE INSTITUTE OF PUBLIC HEALTH IN MEXICO (INSP) celebrated the career of Jonathan Samet, MD, Distinguished Professor, Flora L. Thornton Chair in Preventive Medicine and director of the USC Institute for Global Health, as part of its 30-year anniversary commemoration recently. The institute on Jan. 27 awarded Samet an honorary doctorate degree for his contributions to the field of public health. “I’m honored to be a part of this celebration to mark INSP’s decades-long commitment to public health in Mexico and to receive this very high recognition,” Samet said. “I look forward to continuing our partnership for many years to come.” — Larissa Puro



Courtesy Ashley Wysong

Ashley Wysong, second from right, recently was named “Iron Surgeon” during the 10th annual American Society of Dermatological Surgery meeting, held Nov. 10 in New Orleans.

Wysong named ‘Iron Surgeon’

ASHLEY WYSONG, MD, ASSISTANT PROFESSOR of clinical dermatology at the Keck School of Medicine of USC, was named “Iron Surgeon” by the American Society of Dermatology Surgery (ASDS). The Iron Surgeon national competition, which was held Nov. 10 in New Orleans during the 10th annual ASDS meeting, is the largest event of the weekend-long conference and features two physicians presenting a personalized approach to a complex surgical case. Wysong, director of procedural dermatology and Mohs micrographic surgery, is the youngest surgeon to win the Iron Surgeon award in the society’s history.



George Hartmann

Frank Stanczyk receives an alumni achievement award from Western Illinois University on Dec. 17.

Alma mater honors Stanczyk

FRANK STANCZYK, PHD, RESEARCH PROFESSOR of obstetrics and gynecology at the Keck School of Medicine of USC, recently was awarded the 2016 Western Illinois University Alumni Achievement Award, presented to individuals in recognition of outstanding accomplishment in one’s chosen field. Stanczyk, a biological sciences graduate of the university, was on hand to receive the award at its December commencement ceremony. Stanczyk’s laboratory is recognized internationally for its expertise in the measurement of steroid, peptide and protein hormones in blood and tissues, and has been recognized by the International Menopause Society.

Alzheimer’s research discussed at USC ATRI Partnership Meeting

The USC Alzheimer’s Therapeutic Research Institute (USC ATRI) held its second annual Partnership Meeting in San Diego recently.

The meeting, which was attended by 125 clinical trial protocol investigators and other trial staff who work closely with USC ATRI, brought together top researchers from around the country to collaborate and discuss methods for finding effective treatments and ultimately, a cure for Alzheimer’s disease (AD).

The event included a reception and dinner at the U.S. Grant on Jan. 26, followed by the Partnership Meeting on Jan. 27 at the Westin San Diego.

Paul Aisen, MD, professor of neurology and director and founder of USC ATRI at the Keck School of Medicine of USC, presented and spoke about his vision for the



Steve Cohn

USC Vice President of Research Randolph Hall, left, joins Paul Aisen, director of the USC Alzheimer’s Therapeutic Research Institute, during the second annual partnership meeting, held Jan. 26-27 in San Diego.

organization, which includes developing and implementing innovative trial designs and research strategies that incorporate the sharing of data, software and instruments across the AD community.

Others presenters included Reisa Sperling, MD, MMSc, from Harvard Medical School; Paul Newhouse, MD, from

Vanderbilt University; and Jeffrey Cummings, MD, ScD, of the Global Alzheimer’s Platform Foundation.

Since its founding in June 2015, USC ATRI has grown from a team of 30 to more than 100 faculty and staff.

For more information, go to <http://keck.usc.edu/atri/>.

Study: Air pollution may lead to dementia in older women

By Zen Vuong

Tiny particles that pollute the air — the kind that come mainly from power plants and automobiles — may greatly increase the chance of dementia, including dementia caused by Alzheimer’s disease, according to USC-led research.

Scientists and engineers found that older women who live in places with fine particulate matter exceeding the U.S. Environmental Protection Agency’s standard are 81 percent more at risk for global cognitive decline and 92 percent more likely to develop dementia, including Alzheimer’s.

If their findings hold up in the general population, air pollution could be responsible for about 21 percent of dementia cases, according to the study.

“Microscopic particles generated by fossil fuels get into our body directly through the nose into the brain,” said University Professor Caleb Finch, PhD, at the USC Leonard Davis School of Gerontology and co-senior author of the study. “Cells in the brain treat these particles as invaders and react with inflammatory responses, which over the course of time, appear to exacerbate and promote Alzheimer’s disease.”

“Although the link between air pollution and Alzheimer’s disease is a new scientific frontier, we now have evidence that air pollution, like tobacco, is dangerous to the aging brain.”

The adverse effects were stronger in women who had the APOE4 gene, a genetic variation that increases the risk for Alzheimer’s.

“Our study — the first of its kind conducted in the U.S. — provides the inaugural scientific evidence of a critical Alzheimer’s risk gene possibly

interacting with air particles to accelerate brain aging,” said Jiu-Chiuan Chen, MD, ScD, associate professor of preventive medicine at the Keck School of Medicine of USC and co-senior author of the study. “The experimental data showed that exposure of mice to air particles collected on the edge of USC damaged neurons in the hippocampus, the memory center that is vulnerable to both brain aging and Alzheimer’s disease.”

Their study, published Jan. 31 in the *Nature* journal

Translational Psychiatry, adds to an emerging body of research from around the world that links air pollution to dementia. The offending pollutants — known as PM2.5 — are fine, inhalable particles with diameters 2.5 micrometers or smaller. A human hair is about 70 micrometers in diameter, making it 30 times larger than the largest PM2.5.

The research was a collaboration between the Keck School, USC Davis and the USC Viterbi School of Engineering.

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