

# Stem cell biology to assume central role in medicine

The University of Southern California scored a major coup last summer when it lured scientist Andrew McMahon to the Keck School of Medicine from Harvard, where he'd served as professor in the Department of Stem Cell and Regenerative Biology, Department of Molecular and Cellular Biology, and as

the principal faculty member in the Harvard Stem Cell Institute.

Now a Provost Professor and inaugural holder of the W. M. Keck Professorship of Stem Cell Biology and Regenerative Medicine at USC, McMahon also holds an appointment in the Department of Biological Sciences in the Dornsife

College of Letters, Arts and Sciences, serves as chair of the newly created Department of Stem Cell Biology and Regenerative Medicine at the Keck School, and directs the Eli and Edythe Broad Center for Regenerative Medicine and Stem Cell Research at USC.

McMahon received his

bachelor's degree from St. Peter's College, Oxford University, and his Ph.D. from University College in London. He subsequently worked as a postdoctoral fellow at the California Institute of Technology.

At a recent meeting of the Keck School of Medicine of USC Board of Overseers, McMahon spoke with Dean

Carmen A. Puliafito about the future of stem cell research and medicine.

*A longer version of the interview can be read at <http://usc.edu/13h>.*

**Puliafito:** You've talked about the potential central role that stem cell biology and regenerative medicine will occupy in medicine of the future. What is the potential capability of cellular therapies?

**McMahon:** It's very tough. USC is one of three institutions involved in the best first pass test of a new cellular therapy. This is Mark Humayun's study of retinal degeneration. I do think drugs will still serve as a conventional treatment, so that we can now develop new drugs that are going to augment stem cell-based processes.

**Puliafito:** What do we mean by an embryonic stem cell and why are they important and relevant to the issue of cell manufacture?

**McMahon:** The embryonic stem cell comes from an embryo before all of the cell types of our bodies are formed. So it has the potential to give rise to any cell type of the body. Many of our organ systems are maintained daily by specialized stem cells, which don't have the broad potential of the embryonic stem cell to make every type of cell, but they make a broad spectrum of cell types for a certain tissue. A very important development six years ago was that you could take a small number of programming factors, add those to any cell and make them like an embryonic stem cell.

**Puliafito:** What were the factors that they treated them with?

**McMahon:** They're transcriptional regulators, a type of protein that regulates the activity of genes. They can then reprogram a differentiated cell to a state that's like an embryonic stem cell [called an induced pluripotent stem, or IPS, cell]. So now that cell has the potential to generate any cell type.

**Puliafito:** And since they were derived from you, those cells would not have the threat of being rejected

## USC study shows efficacy of Beijing's 2008 anti-smog campaign

By Josh Grossberg

The health of adult Beijing residents improved during the 2008 Beijing Olympic games because of actions taken by the Chinese government to reduce air pollution emissions, according to a report released March 11.

The report funded by the Health Effects Institute (HEI) was a joint effort of United States and Chinese research teams led by by Junfeng "Jim" Zhang, a professor of environmental and global health in the Department of Preventive Medicine at the Keck School of Medicine of USC.

Zhang and colleagues hypothesized

that levels of multiple cardiovascular biomarkers would change significantly during the Olympic air pollution reduction period compared with the pre-Olympics period, and would revert to pre-Olympics levels following relaxation of the air pollution controls after the games.

Zhang and his team measured multiple air pollutants before, during and after the games, and monitored the lung responses of healthy medical residents living close to the hospital in Beijing where the tests were taken.

Investigators found that during the Olympics, concentrations of all

measured pollutants decreased, except ozone, which increased. After the Olympics, when the special controls on emissions were lifted, the observed concentrations of most pollutants went back up.

The HEI Health Review Committee called the study an "important contribution to the literature regarding short-term interventions and their impact on acute health responses."

In addition, the panel called the study one of the first—and one of the most comprehensive—to evaluate changes in biology associated with specific, short-term efforts to reduce air pollution.

## Research Day 2013 celebrates wide variety of scientific investigation

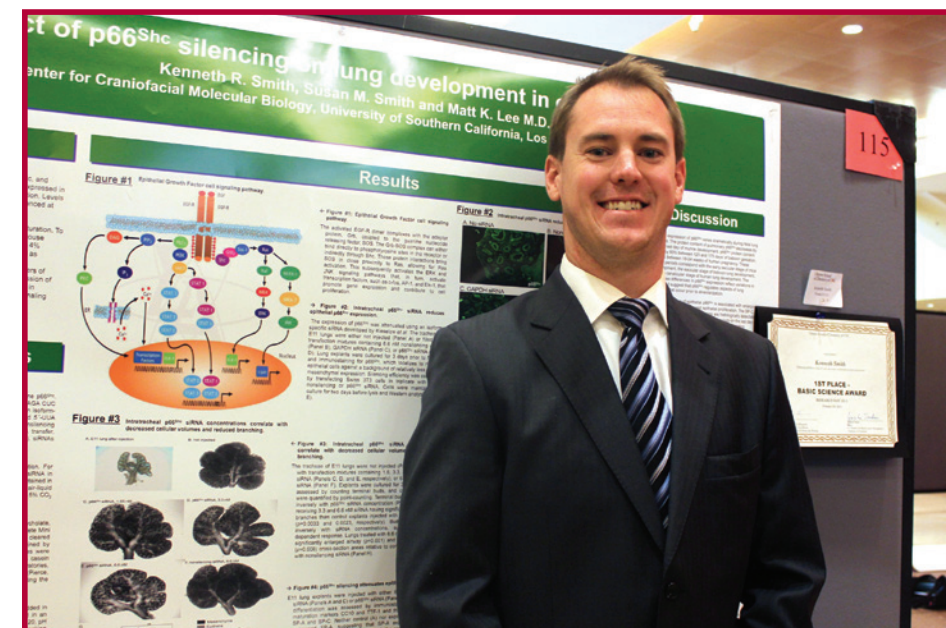
By Beth Newcomb

From understanding the developing human tongue to addressing the challenges facing kids with autism, innovative research was on full display during the Ostrow School of Dentistry of USC Annual Research Day on Feb. 20.

The event celebrated the scientific work of students and faculty from the Ostrow School of Dentistry, as well as the Divisions of Biokinesiology & Physical Therapy and Occupational Science and Occupational Therapy. More than 120 researchers, ranging from undergraduate students to postdoctoral fellows and faculty, shared their work in poster presentations, which were judged by a team of Ostrow faculty.

USC Provost Elizabeth Garrett gave welcoming remarks, noting that the Ostrow Research Day event is unique among USC schools. She also noted that the school's research activity and output is disproportionately large compared to its size.

"The Ostrow School of Dentistry is an



Dental student Kenneth Smith won first place for best undergraduate DDS basic sciences project.

integral part of our university," she said.

Ostrow School of Dentistry Dean Avishai Sadan lauded the scientific success of Ostrow faculty members, as well as the importance of student research.

"Not only am I proud of the scientific success our faculty members have achieved, but it's also exciting to see the very high level of Ostrow student

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## Novel therapies available for sleep apnea, Keck Medical Center speakers report

By Julie Mata

A variety of alternative and novel therapies is available now for treatment of sleep apnea, reported speakers from the Keck Medical Center of USC Sleep Disorders Center at a community forum at Verdugo Hills Hospital.

About 100 guests heard from physicians from the departments of Medicine, Otolaryngology-Head and Neck Surgery, and Surgery and the owner of LA Outback at the Feb. 7 event.

"Now more than ever, we have strong evidence that untreated moderate to severe sleep apnea has significant implications for health and wellness, and more specifically, on heart health," said Terese Hammond, assistant professor and medical director of the Sleep Disorders Center at Keck Medical Center of USC.

"Many people have a negative initial experience with CPAP [continuous positive airway pressure], the usual ini-

tial treatment for sleep apnea, so they decide not to treat their sleep apnea at all," she said. "The message tonight is that there are a number of viable alternatives to CPAP that alone or in combination can significantly improve underlying sleep apnea. Anyone with significant sleep apnea who is currently not receiving treatment for their condition should promptly seek evaluation to see if they may benefit from an

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# Foreign-born scientists play key role in U.S. cancer research

**The study shows the vital role played by immigrant researchers in improving the cancer survival rates experienced by Americans, and stresses the importance of allowing them easier access to green cards in future immigration legislation**

**By Josh Grossberg**

More than 40 percent of researchers at America's top cancer institutes are immigrants, including some at the USC Norris Comprehensive Cancer Center, according to a study released last month.

The report, "The Contributions of Immigrants to Cancer Research in America," looks at both contributions and challenges experienced by even the top cancer researchers.

The Foundation for American Policy, funded by the Kauffman Foundation, analyzed about 1,500 cancer researchers at the top cancer institutes for the report.

Among the findings is the fact that cancer researchers often wait years for permanent residence and endure the same long wait for green cards as other highly skilled immigrants and their employers.

The study shows the vital role played by immigrant researchers in improving the cancer survival rates experienced by Americans, and stresses the importance of allowing them easier access to green cards in future immigration legislation.

The report includes profiles of leading foreign-born researchers, as well as a historical look at the contributions

of immigrants to cancer research.

Immigrant researchers from the USC Norris Comprehensive Cancer Center highlighted in the report include:

- Peter Jones, born in South Africa, who served as director of USC Norris from 1993 to 2011. He is a distinguished professor of urology and biochemistry & molecular biology at the Keck School of Medicine of USC and the H. Leslie Hoffman and Elaine S. Hoffman Chair in Cancer Research.

- Graham Casey, born in the United Kingdom, professor of preventive medicine and co-director of the cancer epidemiology program.

- Gerhard Coetzee, a native of South Africa, professor of urology, preventive medicine and microbiology. He is the co-leader of the genitourinary cancers program.

- Yves DeClerck, a native of Belgium, director of the Saban Research Institute of Children's Hospital Los Angeles and a professor of pediatrics, biochemistry and molecular biology at the Keck School.

- Martin Kast, a native of the Netherlands, professor of molecular microbiology & immunology and obstetrics & gynecology. He currently holds the Walter A. Richter Cancer

Research Chair.

- Heinz-Josef Lenz, a German native, associate director for clinical research. Lenz, who holds the Kathryn M. Balakrishnan Chair in Cancer Research, oversees the programmatic activities of the gastrointestinal cancers program.

- Jacek Pinski, born in Poland, associate professor of medicine and a research-oriented medical oncologist.

- David Quinn, born in Australia, medical director of the USC Norris Comprehensive Cancer Center and Hospital. He co-leads the genitourinary cancers program, and is an associate professor of medicine in the division of cancer medicine and blood diseases at the Keck School.

- Duncan Thomas, a native of the United Kingdom, professor of preventive medicine, director of the biostatistics division, and Verna R. Richter Chair in Cancer Research at the Keck School.

As one of the largest foundations in the United States with an asset base of approximately \$2 billion, the Kauffman Foundation supports the improvement of K-12 education, as well as the advancement of entrepreneurship and innovation, especially in the areas of science and technology.

## APNEA: Keck Medical Center physicians offer new strategies to combat sleep disorder

Continued from Page 1  
alternative therapy."

Hammond described advanced pressure therapies, such as auto-titrating bipap, adaptive servo ventilation and PROVENT, to improve airflow without the discomfort of CPAP. She encouraged attendees to speak to their health care providers about these alternatives.

Namir Katkhouda, professor of surgery at the Keck School of Medicine of USC and chief of metabolic and bariatric surgery at Keck Medical Center, addressed obesity's role in sleep apnea. He stressed the importance of healthy weight in helping to alleviate sleep apnea and



Explaining various therapies for sleep apnea at a Feb. 7 community forum at Verdugo Hills Hospital were (from left): Barry Martin, co-owner of LA Outback, and Keck Medical Center of USC physicians Terese Hammond, Namir Katkhouda and Uttam Sinha.

other medical conditions such as hypertension and diabetes.

Uttam K. Sinha, chief and residency program director of Otolaryngology—Head

and Neck Surgery, discussed TransOral Robotic Surgery, which can address tongue base level obstruction that contributes to obstruction of the airway. Sinha said that the pain associated with the surgery is comparable to that of a severe sore throat. For most patients, pain decreases within three to four days after surgery.

Barry Martin, co-owner of LA Outback, performed and discussed how use of the didgeridoo creates circulatory breathing that can help relieve sleep apnea

and snoring. The didgeridoo is a wind instrument developed by indigenous Australians.

Hammond agreed that playing the didgeridoo might be recommended to "non-obese or mildly obese patients with mild to moderate sleep apnea without risk factors for heart disease who would like to try a program of weight loss, diet and avoidance of sleeping on the back, combined with respiratory muscle training, before they pursued CPAP."

## MCMAHON: Stem cell research offers powerful new tools to tackle diseases

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immunologically. So IPS has tremendous potential therapeutic implications, but it also has another important implication, which is what you might call the "disease in a dish" concept.

**McMahon:** Let's say a drug company has developed a drug that has efficacy in being able to treat something, but it has a toxic side effect that in a certain subset of the population causes liver disease. So let's say we took a thousand people who represented the genetic diversity of the human population. And we made IPS cells from them and then we differentiated in a dish liver cells— hepatocytes. Now we have a thousand different types of hepatocytes that represent

the diversity of the human population. We take that drug and test to see whether it causes toxicity in those hepatocytes in a dish. We can see whether we could alter the drug so it still has efficacy but doesn't have toxicity.

**Puliafito:** It's very exciting.

**McMahon:** Now people are starting to think, is there a small cocktail of these transcriptional regulators that can program any cell type? In principle, if you could just go into your freezer and take these particular four transcriptional regulators and put those into a skin cell, you could directly make any cell type without even having to go back to an IPS cell.

The Weekly

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**Executive Director of Communications:** Ina Fried

**Assistant Director of Publications:** Sara Reeve

**Editor:** Jon Nalick

**Contributors:** Ryan Ball, Eva Blaauw, Tania Chatila, Josh Grossberg, Amy E. Hamaker, Carol Matthieu, Julie Mata, Beth Newcomb, Leslie Ridgeway, and Alison Trinidad

**Senior Vice President, University Relations:** Tom Sayles

**Vice President, Public Relations and Marketing:** Brenda Maceo

Phone: (323) 442-2830 Fax: (323) 442-2832  
Email: hscwkly@usc.edu Web: theweekly.usc.edu

## USC, Verdugo Hills Hospital agree to establish affiliation

USC and Verdugo Hills Hospital have signed an agreement with the intent to create an affiliation that will serve the needs of patients in Los Angeles County's Foothills communities.

The partnership positions the Keck Medical Center of USC and Verdugo Hills Hospital to better meet the challenges and opportunities created by health care reform and will expand access to world-class health care services in the community.

With this joint signing, the agreement will be submitted to the California attorney general for review.

"We're delighted to partner with Verdugo Hills Hospital to provide high-quality health care services to the Foothills communities," said Thomas E. Jackiewicz, senior vice president and CEO of USC Health, which oversees the Keck Medical Center. "Verdugo Hills Hospital's long history of delivering excellent services will be complemented by USC's renowned specialty services in medical fields."

The hospital provides a 24-hour emergency department, stroke, maternity/labor and delivery, cardiac rehabilitation, and imaging and diagnostic services.

"This is an exciting time for all of us, and both sides are looking forward to the opportunity to join forces in creating something special in the Foothills communities," said Len LaBella, president and CEO of Verdugo Hills Hospital. "With this affiliation, the community's health care choices just got better."



Gus Ruelas

**AMERICAN LUNG ASSOCIATION MEETS AT USC NORRIS**—Members of the American Lung Association in California (ALA) spent the day at the USC Norris Comprehensive Cancer Center on Feb. 23 for a board meeting. The ALA members were greeted by cancer center Director Stephen B. Gruber, who also introduced the USC Norris lung cancer research team. The researchers presented updates on their current work at the cancer center, and the ALA presented USC Norris with a special plaque in appreciation for the outstanding lung cancer research being conducted there. Pictured are (first row, from left) Jane Warner, president and CEO of ALA; Eric Chang, professor and chair of the Department of Radiation Oncology at the Keck School of Medicine of USC; Ram Subramanyan, assistant professor of surgery; Muller Fabbri, assistant professor of pediatrics and molecular biology and immunology; Marsha Ramos, chair of ALA; (second row, from left) Daniel S. Oh, assistant professor of surgery; Robert Ladner, assistant professor of research pathology; Ite Laird-Offringa, associate professor of biochemistry and molecular biology; Emil Kartalov, assistant professor of pathology; and Parkash Gill, professor of medicine.

## The Weekly NEWSMAKERS

A March 12 article in the *Los Angeles Times* featured running tips from Keck Medical Center of USC physicians **Sharon Orrange**, assistant professor of clinical medicine at the Keck School of Medicine, and **Seth Gamradt**, associate professor of clinical orthopaedic surgery at the Keck School, from an interactive video chat the paper hosted prior to the Los Angeles Marathon.

A March 12 article in *Healio* quoted **Anne Peters**, professor of clinical medicine at the Keck School of Medicine and director of the USC Westside Center for Diabetes, about treating patients with diabetes.

A March 11 story in *Becker's Hospital Review* named Keck Hospital of USC as one of its "100 Hospitals with Great Neurosurgery and Spine Programs."

A March 11 article in *Healthline News* quoted **Regina Berkovich**, assistant professor of clinical neurology at the Keck School of Medicine, about her research on multiple sclerosis hormone therapy.

## RESEARCH: Special day highlights wide range of studies

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involvement in research," he said. "Taking part in research enriches a student's education in a way no other activity can."

Yang Chai, associate dean of research for the Ostrow School, said strength in research and innovation will become more crucial than ever in order to compete in the global environment. He also urged his fellow faculty to open up their research projects to more students looking for research experience.

"We all started from somewhere without much experience," he said. "Someone provided us mentorship."

Following judging,

participants and guests enjoyed lunch and two keynote scientific lectures. Christopher Fox, executive director of the International and American Associations for Dental Research, spoke of the importance of increasing research and advocacy in order to solve the United States' dramatic dental health disparities.

Cheryl Mattingly, professor in the Division of Occupational Science and Occupational Therapy, as well as USC Dornsife's Department of Anthropology, spoke about the narrative techniques that doctors and therapists use to communicate with patients about their illnesses, illustrating her points with

poignant patient stories.

Dental student Ronald Chung was part of a two-person team that won first place for the best clinical sciences project by a doctoral dental student. He and dental student Peter Lee studied how certain concentrations of bisphosphonate drugs—medicines used to treat osteoporosis that can accumulate and stay in the body—correlate with the death of jawbone tissue.

"Research adds another dimension to my dental school education," said Chung, who is also a member of the school's Student Research Group and editor-in-chief of the group's award-winning annual magazine, *The Explorer*.

USC Civic Engagement

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- Keck Medical Center of USC (marketplace, hospital and clinic entrances)

### Wish List



See the complete book wish list online.

# Calendar of Events

## Monday, Mar. 18

**Noon.** KSOM Research Seminar. “Discovery of the Extra Cellular Role for Heat Shock Protein-90 (Hsp90) in Wound Healing and Tumor Progression,” Wei Li, USC. NRT Aresty Auditorium. Info: (323) 442-2722

## Tuesday, Mar. 19

**10:30 a.m.** Keck Hospital of USC Guild Speaker and Luncheon Series. “Regenerative Medicine – Science and Medicine: It Takes a Village,” David Warburton, CHLA/USC. Saban Institute, Room G-12. CHLA. 10:30 a.m. coffee; 11 a.m. speaker; noon luncheon. Speaker series is free, luncheon is \$25. Info: (323) 254-0600

## Wednesday, Mar. 20

**8:30 a.m.** USC Division of Cardiovascular Medicine. “Approach to 12-Lead Electrocardiogram Analysis,” Jerold Shinbane, USC. IRD 732-734. Info: (323) 226-7923

## Thursday, Mar. 21

**3 p.m.** LA Chapter of Oxbridge Biotech Roundtable. “How Do We Make Los Angeles a Better Biotech Hub?” Various speakers. NRT Aresty Auditorium. Info: (323) 442-4352 or is.gd/labiotech

**4 p.m.** The 2013 Donald I. Feinstein Distinguished Lectureship. “Hematologic Disorders of ER to Golgi Transport,” David Ginsburg, University of Michigan. NRT LG 503/504. Info: (323) 865-3913

## Friday, Mar. 22

**8:30 a.m.** Surgical Grand Rounds. “History of Parathyroid Surgery for Sporadic Primary Hyperparathyroidism: Re-Examination of the 85%/15% Rule,” Melanie Goldfarb, USC. DOH 100. Info: (323) 442-9064

**Noon.** Physical Sciences in Oncology Center Seminar. “Manipulating and Measuring Cell Mechanics for Medicine,” Dino Di Carlo, UCLA. CSC 250. Info: (323) 442-3849

**Noon.** The 2013 Donald I. Feinstein Distinguished Lectureship. “Identifying Novel Genetic Determinants of Hemostatic Balance,” David Ginsburg, University of Michigan. LAC+USC IPT 2nd Floor C2J104, Conference Room B. Info: (323) 865-3913

## Tuesday, Mar. 26

**Noon.** Global Health Lecture. “From Policy to Implementation – Challenges in the Field,” Joel Lamstein, John Snow, Inc. UPC: TCC 450. Info: (323) 865-0419

**4 p.m.–5 p.m.** Diabetes & Obesity Research Institute Seminar. “Adipose Tissue Cells in Pathology and Approaches to their Targeting,” Mikhail Kolonin, University of Texas Health Science Center at Houston. CSC 250. Info: (323) 442-2500

## Thursday, Mar. 28

**8:30 a.m.** Research Seminar. “Mechanisms Regulating Lung Injury Repair and Lung Tumor-Propagating Cells,” Carla Kim, Children’s Hospital Boston. IRD 732-734. Info: (323) 226-7923

**Noon.** Cellular Homeostasis Lecture. “Nitric Oxide (Synthesis) Regulation of Mitochondrial Functions,” Cecilia Giulivi, UC Davis. MCH 156. Info: (323) 442-3121

**6:30 p.m.–8 p.m.** Health Matters: USC physicians discuss health topics you care about. “Lung Cancer in 2013: New Hope for Those at Risk,” various speakers. University Club of Pasadena, 175 North Oakland Ave., Pasadena, CA 91101. For more info and to RSVP, log on to [usc.edu/esvp](http://usc.edu/esvp) (code: HEALTHMATTERS3) or call 323-442-2805.

## Friday, Mar. 29

**8 a.m.** Pathology and Laboratory Medicine Grand Rounds. “Clinical Microbiology in the Molecular Era: A New Age in Rapid Diagnostics,” Rosemary She, USC. NOR 7409. Info: (323) 442-1180

**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 *The Weekly*, KAM 400 or fax to (323) 442-2832, or email to [ebalauw@usc.edu](mailto:ebalauw@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.

## Community prevention mindset is key in public health

By Amy E. Hamaker

Robert Ross, president and chief executive officer for The California Endowment, remembers the exact moment he chose to work in public health. In December 1986, Ross was working as a physician in Camden, Pa., when he examined three children who had missed several regular appointments.

“The dad told me that his wife had gotten hooked on crack cocaine. She had sold the kids’ Christmas presents to buy crack, so there wasn’t the money or time for regular appointments,” he continued. “Nothing in my training prepared me for what I dealt with in that community. People in a poor community who have no sense of future or hope get a \$5 passport from reality with crack. What prescription could I possibly write to treat hopelessness and poverty?”

This introduction to what Ross calls “the social determinants of health” led to his belief that health care needs to move from a framework of the individual as the patient to the community as the patient. It was a message that Ross shared with Keck School of Medicine of USC students on Feb. 14 at Aresty Auditorium during his lecture “Cultivation: Closing the gap in disparities among African American young men and vulnerable youth” as part of the Keck School’s Black History Month celebration week.

### Grants of up to \$100,000 available for diabetes studies

The USC Diabetes & Obesity Research Institute (DORI) will award up to \$100,000 for pilot research or the development of new research resources. Proposals are being accepted through May 3.

Funds may be split among two to four research projects, which must focus on key aspects of diabetes and obesity, including: adipose tissue biology, insulin resistance, maternal/child health, community health and nutrition, beta-cell biology, or neuroscience and obesity.

For application information, contact Michael I. Goran, co-director, USC Diabetes & Obesity Research Institute, at [goran@usc.edu](mailto:goran@usc.edu).



Amy Hamaker

The California Endowment President Robert Ross gave a lecture to Keck School of Medicine of USC students as part of Black History Month, hosted by the Student National Medical Association (SNMA). From left are: Henri Ford, vice dean of medical education for the Keck School, who introduced Ross; Miriam Lassiter, second-year Keck School medical student and SNMA co-president; Ross; and Edwin Kulubya, second-year medical student at the Keck School and SNMA co-president.

“We need to have a prevention mindset at the community level,” he said. “And now you have the opportunity to start not where the health care delivery system starts, but to start where the needs really are.”

In particular, Ross spoke about the need to have black and Latino young men be an integral part of any solution. “Of 100 black babies in the United States, one in three will end up in prison,” he said. “In any other country, this would be unacceptable.”

During a recent sabbatical, Ross spoke with nearly 70 individuals who work with young people, including researchers and justice department personnel, asking them about the cause for these higher incarceration rates. “Their answers came down to first, crack cocaine and the war on drugs, and second, the Columbine high school shooting and zero tolerance,” he said.

Ross noted that if the war on drugs were a health care

response, there would have been a massive increase in drug treatment programs. “Instead, we took a path of suppression and punitive behavior that opened the floodgates into prisons,” he explained. “The same mentality went into the schools as ‘zero tolerance,’ and it shows up as an epidemic of suspensions and expulsions—800,000 students were suspended last year in California alone. This culture needs to be dismantled and reinvented.”

Ross suggested a system that intercedes at what he calls “intervention points,” such as third grade (where reading becomes a learning tool) and chronic absence (which can indicate possible drug problems). “We have a system for reporting communicable diseases that serves the community interest,” he said. “Now, we need health and public health leaders to think about a smart, effective response to this problem as well.”

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