

Gene called 'noggin' sheds new light on skin growth

A transgenic mouse designed to grow more hair than other mice has provided USC researchers with some surprising results—and insight into the development and regulation of growth in epithelial organs that extend beyond skin and hair.

In an upcoming paper in the *American Journal of Pathology*—now available online—Cheng-Ming Chuong, professor of pathology at the Keck School of Medicine of USC, and his colleagues describe the creation of a mouse in which a particular gene—called *noggin*—is over-expressed in the skin.

Noggin works by suppressing the action of a protein called bone morphogenic protein, or BMP, which has a key role in a number of developmental pathways in mice and humans alike.

Because of the role that *noggin* appears to play in the development of integument (skin and associated features), Chuong and his Keck School colleagues expected to see an increase in the number of hair follicles in the skin of the genetically modified mouse. And that is, indeed, what they saw. Not only was the fur of these mice thicker, with hair follicle density increasing by as much as 80 percent in the transgenic mice, but the transgenic mice also grew more whiskers than normal mice, with several whiskers sprouting from each follicle.

That, however, was only the beginning. The over expression of the *noggin* gene also led to some unusual and unexpected changes in the mice.

For instance, the meibomian glands in the eyes of the transgenic mice were transformed into follicles with small hairs “pointing inward toward the cornea,” Chuong explained. (Meibomian glands are the oil-producing glands that lubricate the eyelids in humans, as well as mice.)

As if hairy eyes were not enough, the sweat glands on the footpads of the mice's paws turned into hair-sprouting follicles as well. And some of them sported misshapen claws, or were missing claws altogether.

Then, while doing physical exams

on the mice, Maksim Plikus, a graduate student in Chuong's lab, noticed one more unusual change in the transgenic mice: Their external genitalia were significantly larger than those of normal mice. “We now think that *noggin* plays a role in regulating the size of penile and clitoral tissues in mice, and that it can disrupt the balanced growth of these structures and result in their overgrowth,” Chuong said.

The changes in the genitalia are not limited to size, however. The surface of the normal mouse penis has well-differentiated microappendages called “hairy spines,” but the transgenic mouse's penis is smoother and less bumpy. “We don't know whether this affects sensation,” said Chuong. “But we do know that they have the ability to reproduce.”

The researchers also considered whether or not these changes are physical variations or actual pathologies—disease states brought on by the genetic tinkering done on these mice.

See **MOUSE**, page 2



Jon Nalick

COME DANCING—First-year medical student Candice Taylor, right, dances to the beat of drummer Fred Jones as part of a Black History Month celebration in the HSC Quad on Feb. 18.

Blood shortage continues to curtail surgeries

The operating room should have been buzzing with the sounds of technicians wheeling in carts and turning on equipment. Instruments should have been carefully laid on a sterile table. Monitors should have been blinking.

A flurry of activity should have surrounded the patient, who needed an important liver surgery at USC

University Hospital. But the room was empty, and the patient was still waiting—because the donated blood that was needed for transfusion during the procedure was not yet available.

The same scene has played out across the country at countless hospitals and medical centers, which all must deal with a critically low blood supply.

Certain blood types are nearly depleted.

“For the last few weeks, we've had some disruption in the operating rooms because of a lack of blood: Several procedures had to be postponed,” said Nicolas Jabbour, associate director of liver transplantation surgery at University Hospital and associate professor of surgery at the

Keck School of Medicine of USC.

Even a liver transplant had to be cancelled when too little blood was on hand for the procedure, he added; the donated liver was diverted to another medical center instead. Another operation involving a liver from a living donor was delayed by three hours until back-up blood arrived from San Bernardino.

Noted Gary Zeger, medical director of the USC Blood Center: “This is the worst shortage I've seen.”

Yet on the same day in January that an elective liver surgery was cancelled, Jabbour and his hepatobiliary surgery colleagues went ahead with another scheduled liver transplant: surgery to remove part of a liver from a living Dallas man and implant the partial liver in the man's son.

The transplant from father to son proceeded because the pair, members of the religious sect known as Jehovah's Witnesses, wanted a
See **BLOODLESS**, page 3

Trick to mask blood type may someday end need for exact matches

While the current blood shortage has hospitals scrambling for alternative ways to help those who need blood transfusions, new findings from two Keck School of Medicine researchers suggest one potential alternative may do more harm than good.

Jonathan Armstrong, assistant professor of physiology and biophysics, and Timothy Fisher, associate professor of physiology and biophysics, developed a method for turning Type A, B and AB positive blood into the universal Type O negative blood that can be given to almost anyone. Their trick: to coat the red blood cells with poly-

ethylene glycol (PEG), a polymer coating that hides the blood group antigens, so that the recipient's immune system cannot recognize the foreign blood cells.

The PEG coating is analogous to a hydrogel — the substance used to make soft contact lenses. Its role is to perform a barrier function — hiding the blood's “type” — while at the same time allowing oxygen and small molecules to diffuse in and out of the cells, so the normal function and metabolism of the cells are unaltered.

About 14 million units of blood are transfused each

See **BLOODTYPE**, page 2

Newsmakers



James Gauderman

A front-page *Pasadena Star-News* story on Feb. 23 highlighted the adverse affects of smog on children's lungs.

The story quoted environmental health researcher **James Gauderman** and also cited USC's long-term Children's Health Study. The story also ran in the *Miami Herald*, *LA Daily*

News, *Whittier Daily News*, *San Gabriel Valley Tribune* and appeared on KTTV-TV's 10 p.m. newscast.

A Feb. 23 *LA Daily News* story focused on women's stroke risks. The story quoted neurologist **Gene Sung** and neurointerventional radiologist **George Teitelbaum**. The story also ran in the *Inland Valley Daily Bulletin*, the *San Bernardino County Sun* and the *Pasadena Star-News*.

On Feb. 23, biokinesiologist **Carolee Winstein** interviewed with *Newsweek* magazine for an upcoming story on stroke therapy.

On Feb. 23, the Lifetime TV show, "Speaking of Women's Health" interviewed dermatologist

David Sawcer for an upcoming segment on skin cancer.

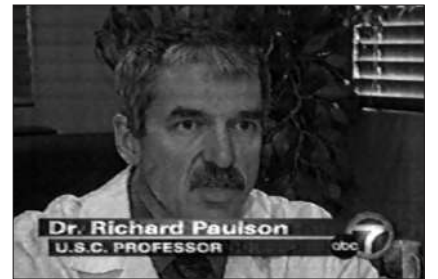
On Feb. 18, CNN ran a story on mixing drugs and included informatin from by pharmacist **Peggy Han**.

A Feb. 16 *Los Angeles Times* story looked at the dangers of a common heart drug. The story quoted cardiologist **Uri Elkayam**.

A Feb. 12 *Maryland Gazette* story examined the possibility of life on Mars and quoted neurobiologist and former NASA scientist **Joseph Miller**.

A Feb. 12 story on WCAU-TV in Philadelphia highlighted ways to improve memory. The story

included neurologist **Jeff Victoroff** and also appeared on television stations in Charlotte, N.C., Austin, Te and Columbia, S.C.



Richard Paulson

On Feb. 12, fertility expert **Richard Paulson** appeared on KABC-TV's 5 p.m. news for a story on human cloning.

BLOODTYPE: Masking technique's shortcomings limit effectiveness

Continued from page 1

year in the United States, and a universal blood type would dispense with shortages of certain blood groups, significantly improve the logistics associated with the blood supply and abolish the need for storing frozen units of rare blood types and time-consuming cross-matching.

That is because the two main blood groups (ABO and Rh) are classified according to the different antigens on the surface of red blood cells. Simply put, in transfusions the recipient's blood group must be compatible with the donor's blood or there could be a fatal reaction.

There are several major problems with the blood supply, noted Armstrong, beyond a shortage of O negative blood. "The donor pools and recipient pools often do not match, so blood has to shipped between hospitals, cities and states, which is a costly and logistical nightmare and means common blood types are often left unused," he said. "Also, there is a rare blood type registry and frozen stocks of blood for patient's who require these rare types—a costly supply. Converting all blood to, essentially, O negative blood would overcome all of the above problems overnight—it's certainly something that the American Red Cross would welcome."

"Unfortunately, we're quite a long way from

being able to achieve that."

Indeed, in a presentation and two posters last December at the American Society of Hematology annual meeting, Armstrong and Fisher noted that further research on plasma samples from 350 normal, healthy subjects showed an antibody to PEG occurred in about 25 percent of normal donors. A Swedish study in the 1980s, said Armstrong, suggested the antibody showed up in about one out of 500 samples (0.2 percent), "but we found the antibody rates were much, much higher. The reason for this increase since the early 80s may be due to our exposure to this polymer, since PEG and PEG-related compounds are widely used in everything from foods to cosmetics and pharmaceuticals."

For those with the antibody, the transfused blood becomes toxic. "It means the use of the polymer coating to turn all blood into a universal blood type is not realistic," said Armstrong.

Armstrong noted it would still be possible to use the coated blood for 75 percent of the population if a hospital performed a "cross-match" compatibility test prior to infusion. But such tests can take more than 45 minutes, and "it negates the advantages of a universal blood for those instances where you would most need it,

such as emergency rooms and trauma centers."

Armstrong also said that the research has potentially larger implications, since PEG-conjugated drugs are becoming commonplace. "In some chemotherapies, for example, the drug is highly toxic anyway. PEG-conjugation reduces the toxicity and keeps the drug from being cleared rapidly. In patients with an antibody to PEG, the role of PEG to 'mask' the drug may still be true," he said. "But it's something that drug companies within this field should be looking into."

There may well be what Armstrong calls "niche" applications for the PEG-treated blood in autoimmune hemolytic anemia and diseases such as sickle cell anemia where chronic transfusion therapy is a mainstay in the management of the disease. "Because there are literally hundreds of antigens in each person's blood, there is a risk that a the patient will develop an antibody (alloantibody) to the donor's blood, which may mean that you can't give someone a transfusion from the same blood source more than once, or they could potentially have a fatal reaction," he said. "With PEG-treated red cells, you can reduce the dangers of blood group incompatibility."

—Monika Guttman

MOUSE: Transgenic mouse offers clues to skin, hair growth

Continued from page 1

"Some of the features, like the complete loss of claws or hair growth in the eyelids, are definitely pathological," Chuong admitted. "But some of the others, like the increase in size in the genitalia or the increased thickness of the fur, may be variations that might not be negative, particularly when the environment changes. For instance, too many hairs on a

human would be considered abnormal. But when it occurred in the mammoth 30,000 years ago, it was considered an advantage.

"This makes one ponder the border between normal and abnormal," Chuong added.

Aside from providing a fascinating look at how the unexpected plays out in science, this transgenic mouse will have more concrete applications, said Chuong. "In the era of tissue engineering," he and his colleagues wrote in their paper, "one may want to modulate the number, size or the differentiation status of some ectodermal organs in humans or animals for various medical, agricultural and industrial reasons. The newly made transgenic mouse can be a useful animal model and tissue source for these analyses and evaluations."

Maksim Plikus, Wen Pin Wang, Jian Liu, Xia Wang, Ting-Xin Jiang, and Cheng-Ming Chuong, "Morpho-Regulation of Ectodermal Organs: Integument Pathology and Phenotypic Variations in K14-Noggin Engineered Mice through Modulation of Bone Morphogenic Protein Pathway." *American Journal of Pathology*, 2004 164: 1099-1114.

—Lori Oliwenstein

Save the Date

The USC Research Center for Liver Diseases will host its ninth annual symposium on March 6, featuring distinguished lecturers covering a variety of topics in liver pathology and molecular biology. The program runs from 8:30 a.m. to 6 p.m. at Hastings Auditorium in the Hoffman Building, 1441 Eastlake Ave., Los Angeles. For more information, call (323) 442-5571.

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• Emergency Information Phone: (213) 740-9233

The emergency telephone system can handle 1,400 simultaneous calls. It also has a backup system on the East Coast.

HSC Weekly

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USC gynecologist spearheads crucial health program in El Salvador

As a fourth-year medical student, Miriam Cremer could not believe what the local health-care worker was telling her.

It was 1999, and Cremer was a University of Wisconsin student learning firsthand about community health in a small rural town in El Salvador. That is when a lay health practitioner approached her with a crisis: Many young women in the village were dying of cervical cancer.

Cervical cancer: the same disease that has all but been snuffed out in the United States.

So Cremer sped to the only pay telephone in town, called a family doctor back home and pleaded: "We need to get these women Pap tests."

Five years later, Cremer is a Keck School of Medicine of USC gynecology fellow at LAC+USC Medical Center, but she is still advocating for the women of El Salvador. She founded an organization called Basic Health: El Salvador, which creates sustainable health care for the people of the Central American nation.

And she has gathered growing numbers of believers in the cause. About 20 physicians, a dozen students and numerous other health professionals recently accompanied her on the group's biggest mission yet. They returned from the mountain town of San Sebastián in late January, after providing hundreds of gynecological exams, pediatric office visits and other much-needed services.

"Dr. Cremer really outdid herself this time," said Juan Felix, professor

of obstetrics and gynecology and pathology at the Keck School, who participated in the mission.

Rates of cervical cancer and deaths from the disease have declined in the industrialized world, where screening is routine and advanced treatments are available. Worldwide, though, cervical cancer remains the third-most-common cancer.

Cervical cancer has become the leading cause of cancer deaths among women in developing nations, mostly because they cannot get adequate screening. Many countries simply lack the expensive labs and highly trained technicians needed to analyze test samples, just for starters.

"The fact that these women are still dying of cervical cancer is a civil rights violation—this is a preventable disease," Cremer said. "There is no excuse for women dying of this disease."

Cremer shaped a research component for the latest trip, evaluating screening techniques that could be used in developing nations.

"The idea was to figure out screening strategies for El Salvador: to screen for cervical cancer, but without an enormous infrastructure," Felix said.

Currently, groups such as the Pan American Health Organization favor a simple visual inspection test that is inexpensive and convenient. While a woman reclines on

a table, a health professional inserts a speculum in the vagina and the cervix is visualized using a special light source. The health worker swabs

the cervix with vinegar, which turns potentially abnormal cells white. White patches seen on the cervix might mean cancer or precancerous lesions.

The problem is that some white areas turn out to be perfectly healthy.

Cremer turned to Johns Hopkins University gynecologist Paul Blumenthal, a screening expert, for other ideas. Blumenthal suggested using a digital camera to take an image of the cervix. Technicians can then enlarge images on a television screen to look at them more closely.

So Cremer and her fellow gynecologists enrolled 526 San Sebastián women in a pilot study of the screening methods. Each woman had a lengthy informed consent beforehand. For each participant, they took a Pap smear, performed a visual inspection and snapped a digital image. All of the women also underwent colposcopy and cervical biopsy.

The team shipped the slides and tissue samples back to Los Angeles. The PathNet Esoteric Laboratory Institute is reading all samples without charge, Cremer said. Cremer and her colleagues plan to evaluate the effectiveness of screening methods and determine whether digital imaging could be adopted as an affordable, sustainable screening method.

In April, a small team of gynecologists will return to the town to treat the women who were found to have cancerous or precancerous lesions.

Not all the patients were women seeking cervical cancer testing, Cremer noted. Twice as many patients flocked to the clinic for help with colds, coughs, aches and pains, and volunteers from pediatrics, family



Jennifer Rupert

Above, LAC+USC Medical Center research nurse Blanca Ovalle (right) informs a patient about cervical cancer screening. Right, patients wait to see visiting physicians.



medicine, internal medicine and other disciplines treated them. They also gave vision exams and glasses.

Fernando Cortez, a Red Cross physician in San Sebastián, headed an effort to create a makeshift clinic for the visiting physicians in a church courtyard. "He promoted this event prior to our arrival and had it incredibly organized," Felix enthused. "Without the Red Cross, this project would never have taken place."

Besides Cremer and Felix, USC participants also included Women's and Children's Hospital research nurses Blanca Ovalle and Claudia Sanchez and Keck School gynecologic oncologist Laila Muderspach. Obstetrics and gynecology fellows Ann Steiner and Marie Soleil Wagner also participated.

Physicians spanning from New

York to Oregon volunteered. Students in the program came from Hampshire College (Smith College and Mt. Holyoke College), Cremer's undergraduate alma mater.

Eventually, Cremer would like to turn the burgeoning program into a non-governmental organization. But for now, it remains a grass-roots group with projects funded through grants from groups such as the Einhorn Family Charitable Trust and the Buffett Foundation, donations from companies such as Cytyc Corp. and the support of friends.

For information on Basic Health: El Salvador, or to help with donations of medications, eyeglasses or other supplies, contact Cremer at cremer@usc.edu.

—Alicia Di Rado

BLOODLESS: Innovative surgery eliminates need for blood transfusions

Continued from page 1

"bloodless surgery"—a highly planned procedure that requires no blood from donors. USC surgeons have championed such procedures, performing 21 adult bloodless liver transplants since 1999. Every donor and recipient in these procedures has survived.

"We are very pleased with the outcomes for patients undergoing transfusion-free surgeries. Through careful and thoughtful management, the surgeons have really elevated the quality of care," said Randy Henderson, director of transfusion-free medicine at University Hospital.

The surgeries were originally created to serve the needs of Jehovah's Witnesses who, because of religious beliefs, do not accept transfusion of blood or blood products. But Jabbour believes that more widespread adoption of the techniques involved in bloodless surgery can help lighten the load on the nation's and world's blood supply, which is expected to continue straining under the weight of increasing demands.

"A lot of scientific papers and established blood bankers have been predicting a blood shortage in the future, but the shortage is happening faster than expected," he said.

With sharpening expertise in bloodless surgery at USC, he said, "the usage of blood in cadaveric transplants has been steadily decreasing, despite the fact that more patients who are receiving transplants these days are sicker and would tend to need more blood."

Here is how transfusion-free surgery works:

First, physicians prepare the patient before surgery by administering drugs that boost the number of red cells in the blood.

Next, at the beginning of the procedure, they remove one to four units of blood from the patient, but leave it connected to the patient. Intravenous fluid is infused into the patient, diluting the remaining blood. Any blood lost during the surgery, then, contains fewer red blood cells, but it is still salvaged and conserved for the patient as well. The removed blood is reinfused into the patient after surgery.

Afterward, physicians remove blood for testing only when absolutely necessary.

Jabbour said that because the blood is always connected to the patient, patients face no risk of mismatched blood due to clerical error—a small but acknowledged risk in other transfusions.

He advocates the technique, as well, because repeated transfusions may increase the risk of infection and potentially suppress the immune system of the patient. Many patients who require liver transplants have hepatitis C, which they contracted from long-ago blood transfusions, he said. The techniques may lower costs associated with dependence on a donated blood supply—the cost of empty operating rooms, treatment of infections and potential side effects, he suggested.

Jabbour takes a global approach when describing the world's looming blood shortage, likening blood to a precious resource: oil. "The public sees oil as plentiful, inexpensive and safe, so little interest or effort is paid toward the

conservation, improvement or development of alternatives to dependence on oil.

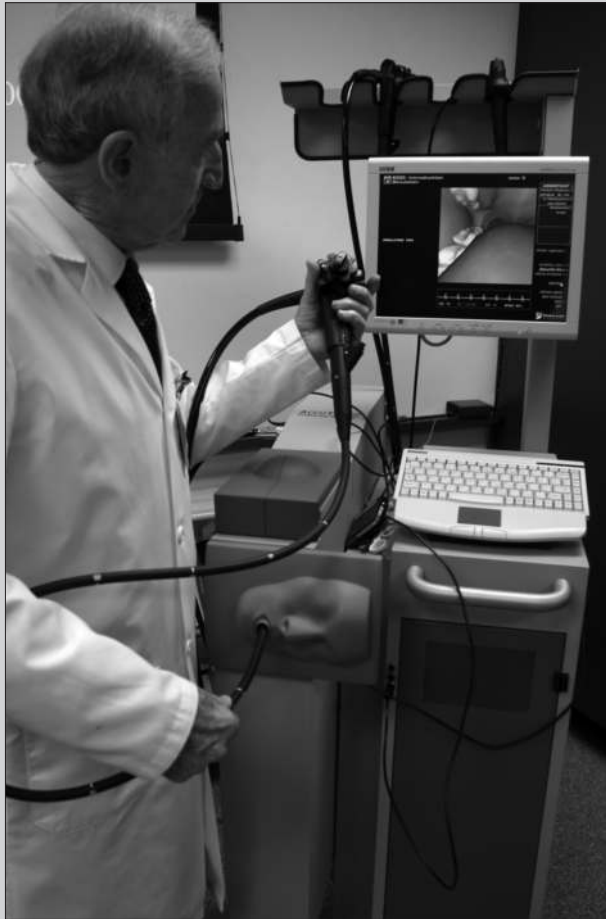
"In the same way as blood, though, oil is a limited resource, is expensive and carries significant health risks."

USC surgeons and physicians are known pioneers in transfusion-free techniques, which are now used not only for liver, pancreas and the biliary tree, but in cardiac, orthopaedic, vascular, thoracic and plastic surgery and neurosurgery. Jabbour is editing a key textbook on transfusion-free surgical techniques and has spoken about the process in Belgium, France and China, where physicians and the public are particularly aware of risks from HIV and SARS. The program's surgeons also have authored numerous papers about their results in peer-reviewed journals.

"In the future, we see bloodless surgery as the standard of care for patients," said Jabbour. "Avoiding blood loss and using blood products judiciously just makes for a better surgery."

—Alicia Di Rado

Calendar



Jon Nalick

ENHANCING SKILLS—

Members of the USC University Hospital Guild toured the USC Surgical Skills Center on Feb. 17 and saw the state-of-the-art surgical simulator they recently donated in action. Top, Cedric Bremner, professor of surgery, demonstrates the endoscopic simulator that is used to train physicians in a setting that precisely mimics actual procedures—complete with three-dimensional images presented on screen from inside the simulated patient. Above, Bremner discusses how the simulator is used and its medical applications.



Volunteers needed for community health fair

USC Civic and Community Relations is seeking volunteers to staff a community health fair on March 6 at the East Los Angeles Occupational Center.

Volunteers are needed to help set up and clean up, register exhibitors and attendees and to translate for members of the community.

Funded by a USC Neighborhood Outreach Grant, the event runs from 9 a.m. to 2 p.m. at the Occupational Center, 2100 Marengo St., between Soto and Chicago Street, and is sponsored by USC Civic and Community Relations, Los Angeles City Councilmember Antonio Villaraigosa, and the Occupational Center.

Volunteers are needed during the entire timespan of the fair.

The fair brings together Health Sciences Campus departments, students and local community health organizations to provide free preventive health screenings and information to residents of the community adjacent to the Health Sciences Campus.

The health fair will include these services: blood pressure screenings, breast exams, cancer information and prevention education, cholesterol screenings, dental screenings, diabetes and glucose screenings, disability services, flexibility exams for children, flu shots, immunizations, Medi-Cal application assistance, substance abuse information and vision screenings.

In addition to the free services and screenings, the event also will feature entertainment, raffles as well as giveaways.

To volunteer, or for more information, call the HSC Community Outreach Office at (323) 442-3572.

Tuesday, March 2

Noon. "Finding Their Way: How Cells Change Direction During Chemotaxis," Richard Firtel, UCSD. CHLA, Saban Research Bldg. Info: 669-4110

4 p.m. "Wiring the Brain: The Logic and Molecular mechanism of Axon Guidance and Regeneration," Marc Tessier, Genentech. Hedco Aud., UPC. Info: (213) 740-9176

6:30 p.m. – 10 p.m. Continuing Education Seminar. Common Problems in Primary Care. "Evolutionary Basis of Obesity in Children," Francine Kaufman, USC; and "Pediatric Orthopaedics," Vernon Tolo, USC. DEI 3rd Floor Conf. Ctr. Info: 442-1313

Wednesday, March 3

7 a.m. Dept. of Medicine Grand Rounds. "Novel Insights into Preeclampsia," Gaurav Sukhatme, USC. GNH 1645. Info: 226-7591

Thursday, March 4

Noon. "Virtual Reality: New Tools to Address Assessment and Rehabilitation Across the Lifespan," Albert Rizzo, USC. Gerontology Aud., UPC. Info: (213) 740-9819

Noon. "Beta-Catenin is Critical for Dendritic Morphogenesis," Xiang Yu, Stanford Univ. Zilkha Aud. Info: 442-4401

Friday, March 5

1:30 p.m. IPR Seminar. "West Africa Medical Missions," Kathryn Challoner, USC. 1000 S. Fremont, Room 7059. Info: (626) 457-4055

Tuesday, March 9

6:30 p.m. – 10 p.m. Continuing Education Seminar. Common Problems in Primary Care. "Radiation Oncology: What the Primary Care Physician Needs to Know," Parvesh Kumar, USC; "Avoiding Medication Errors," Joseph Scherger, UCSD, and "Top 10 New Drugs for 2004 and Offshore Medicines," Gregory Thompson, USC. DEI 3rd Floor Conf. Ctr. Info: 442-1313

Friday, March 12

Noon. Pharmacy Seminar. "Micro/Nano Technologies for Bio-Medical Analysis," Chih-Ming Ho, UCLA. PSC 104. Info: 224-7473

1:30 p.m. IPR Seminar. "Environmental Influences on Food Choices and Physical Activity," Simone French, Univ. of Minn. HSA, 1000 S. Fremont, Room 7059. Info: (626) 457-4055

Tuesday, March 16

Noon. Faculty Development Series. "Delivering a Formal Presentation,"

Vanessa Herrera, USC. KAM 505. Info: 442-2372

6:30 p.m. – 10 p.m. Continuing Education Seminar. Common Problems in Primary Care. "New Therapies for Sexual Dysfunction in Men and Women," David Ginsberg; "Hormone Replacement Therapy," Susana Gonzalez, and "Dysfunctional Uterine Bleeding," Charles Ballard, USC. DEI 3rd Floor Conf. Ctr. Info: 442-1313

Tuesday, March 23

6:30 p.m. – 10 p.m. Continuing Education Seminar. Common Problems in Primary Care. "Differential Diagnosis of Peripheral Neuropathy," Said Beydoun; "Rheumatoid Arthritis, Fibromyalgia and Joint Injections," Daniel Arkfeld, and "Hepatitis C," Sumita Verma, USC. DEI 3rd Floor Conf. Ctr. Info: 442-1313

Friday, March 26

1:30 p.m. IPR Seminar. "Prevention Diffusion Trials: Illustration from STEP," Mary Ann Pentz, USC. 1000 S. Fremont, Room 7059. Info: (626) 457-4055

Monday, March 29

Noon. Craniofacial Molecular Biology Seminar. "Protein Misfolding and Protein Quality Control: Modulators of Neurodegenerative Diseases and Aging," Richard Morimoto, Northwestern Univ.

Norris Tower 7th Floor Conf. Ctr. Info: 442-1145

Tuesday, March 30

6:30 p.m. – 10 p.m. Continuing Education Seminar. Common Problems in Primary Care. "Prostate Cancer," Eila Skinner; "Diagnosis and Treatment of Alzheimer's and Geriatrics: Ethical Dilemmas and Issues Including End of Life Care," Karen Josephson, USC. DEI 3rd Floor Conf. Ctr. Info: 442-1313

Tuesday, April 6

6:30 p.m. – 10 p.m. Continuing Education Seminar. Common Problems in Primary Care. "Pharmacology of Addiction Medicine – Outpatient Management," Gary Jaeger, Kaiser Hospital; and "Dermatology for Primary Care: Update on Skin Cancers," David Sawcer, USC. DEI 3rd Floor Conf. Ctr. Info: 442-1313

Tuesday, April 13

6:30 p.m. – 10 p.m. Continuing Education Seminar. Common Problems in Primary Care. "Irritable and Inflammatory Bowel Disease and Diarrhea," Russell Yang, USC; and "Cosmetic Skin Surgery for Primary Care: Botox, Microdermabrasion and Chemical Peels," Robert Kotler, UCLA. DEI 3rd Floor Conf. Ctr. Info: 442-1313

Notice: **Deadline for calendar submission is 4 p.m. Tuesday** 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 Weekly, DEI 2510 or fax to (323) 442-2832, or e-mail to lpatt@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.

The HSC Calendar is online at
<http://www.usc.edu/hsccalendar>

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