



# Scoop

Jan. 27, 2006

THE UNIVERSITY OF TEXAS MEDICAL SCHOOL AT HOUSTON

## Events to Know

### January

#### 28 4th Annual Texas Med 5K Fun Run.

7:55 a.m., Ben Taub General Hospital. Proceeds benefit the Hospital District's Mammography Services. Contact Lacey Benbrook at 713.566.6409. Entry deadline: TODAY!

### February

#### 4 16th Preventive Cardiology Forum. 8

a.m.-1:05 p.m., MSB 3.001. To register, visit [www.UTcme.com](http://www.UTcme.com).

#### 8 MSRDP Annual Board Meeting. 4

p.m.-6 p.m., MSB 2.103. All members invited.

#### 11 18th Annual Epilepsy Update. 7 a.m.-

5 p.m., Hotel Derek in the Houston Galleria area. To register, visit [www.UTcme.com](http://www.UTcme.com).

## DARKNESS UNVEILS VITAL METABOLIC SWITCH BETWEEN SUGAR, FAT

Constant darkness throws a molecular switch in mammals that shifts the body's fuel consumption from glucose to fat and induces a state of torpor in mice, a research team led by scientists at the Medical School reports in the Jan. 19 edition of *Nature*.

While their findings could provide new insight into mammalian hibernation, researchers note that the pivotal metabolic signal that emerged from the dark presents a new target for obesity and type 2 diabetes research, as well as a new potential method for swiftly reducing body temperature. A series of experiments pinpointed 5-prime adenosine monophosphate (5'-AMP) as the key molecular mediator of the constant darkness effect, switching mice from a glucose-burning, fat-storing state to a fat-burning, glucose-conserving lethargy.

Active mammals – a bear foraging for food or a human running a marathon – undergo a similar switch, burning glucose first then switching to fat after blood sugar is consumed.

"How does the body know when to switch? 5'-AMP is the signal. I believe it's the same metabolic system, whether we are talking about hibernation or not," said senior author **Cheng Chi Lee, Ph.D.**, professor of biochemistry.

The team started with a basic question: What actually sets off hibernation? "These animals dig deep burrows," said Lee, an expert in circadian rhythms. (Cont'd. on back)



Cheng Chi Lee, Ph.D.

## STUDENTS HONOR FIRST PATIENTS THROUGH MEMORIAL SERVICE

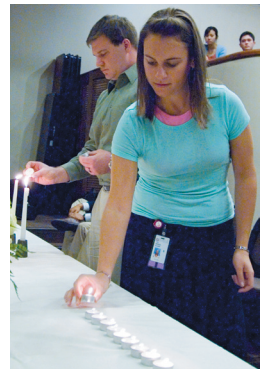
The class of 2009 upheld a unique Medical School tradition Jan. 13 by honoring those who gave their bodies for the benefits of science and education. The Gross Anatomy Cadaver Memorial Service took place in the Fifth Floor Gallery and included musical tributes, poetry, and a candlelight vigil.

Taken during the first year of medical school, the gross anatomy lab is a time marked by some students as their official step to becoming doctors. Although the students never knew their first patients, the cadavers, this ceremony is a way to remember them.

**Michael Soileau** represented the students and noted the memorial service was a time for them to show respect, as they reflected on the experiences of their first year.

"As soon as we began dissecting, I felt very humbled," Soileau said of his gross anatomy experience, adding that it was a moment he would not forget.

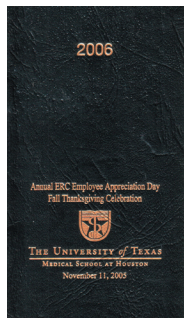
**Dr. Len Cleary**, director of the gross anatomy course, encouraged students to be thankful for the opportunities provided to them by their patients. "Learn as much as you can to become a skillful practitioner," he said.



Students light candles in honor of their first patients – the cadavers.

(Cont'd. on back)

Several 2006 planners from the Employee Appreciation/Thanksgiving Celebration are still available in the Office of Finance and Administration, G.150. (Planners are located in a box next to the courier's stand.)



## UTMost Interest

**David Eagleman, Ph.D.**, assistant professor of neurobiology and anatomy, was quoted in the Dec. 13, 2005, issue of the *Houston Chronicle* about synesthesia, a merging of the senses.

**Giuseppe Colasurdo, M.D.**, chair of pediatrics, was quoted in the Dec. 15, 2005, issue of the *Houston Chronicle* about respiratory syncytial virus, the most common cause of bronchitis and pneumonia among children 1 and younger.

**Kevin Pereira, M.D.**, professor of otolaryngology and pediatrics, was quoted in the Dec. 22, 2005, issue of the *Houston Chronicle* about the dangers of children swallowing button batteries.



THE UNIVERSITY  
of TEXAS

MEDICAL SCHOOL  
AT HOUSTON

A part of The University of Texas  
Health Science Center at Houston

Stanley Schultz, M.D., Dean  
Darla Brown, Director  
Camille Webb, Editor  
e-mail: [scoop@uth.tmc.edu](mailto:scoop@uth.tmc.edu)  
Phone: 713-500-5114; FAX: 713-500-5533  
E-Scoop online: [med.uth.tmc.edu/comm](http://med.uth.tmc.edu/comm)

Produced weekly by the Office of Communications



*Darkness as metabolic switch, cont'd.*

not darkness as a switch?"

Mice do not hibernate, but they can slip into a similar short-term state of torpor. Lee and colleagues started with a microarray analysis of gene expression in the livers of mice subject to the usual light-dark cycle and those kept in the dark for 48 hours.

One gene fired up in the dark – procolipase, which produces an enzyme (CLPS) required for degrading dietary fat. Expression of the gene previously was thought to be restricted to the pancreas and gastrointestinal tract. Yet messenger RNA for CLPS (mClps) was found in the livers of mice exposed to prolonged dark, an unexpected finding.

They repeated the experiment in mice with natural, or "wild type," genomes and three strains of mutant mice with impaired circadian rhythms. Mice exposed to regular light-dark cycles showed no sign of the gene's expression in their livers – it remained in the pancreas and stomach. All four genotypes of mouse kept in constant darkness had mClps expressed not only in their livers but in all peripheral tissue except the brain and kidneys.

"This is the first example of a gene that is turned on by darkness, where darkness itself is a signal," Lee said. "Twelve hours of darkness didn't do the job; it had to be at least 48 hours."

Findings suggested the gene's expression was mediated by something in the blood. Tests showed elevated levels of 5'-AMP in the blood of mice exposed to constant darkness compared to those kept in the regular light-dark cycle.

To confirm the connection, the team injected 5'-AMP into mice exposed to a regular light-dark cycle. Three to four hours after injection, mClps was expressed in the livers of these mice and further tests showed expression in all tissues except the brain.

Core body temperature dropped swiftly in mice injected with 5'-AMP, leaving them in a temporary state of torpor. Mice kept in constant dark also ate less, lost weight, and showed evidence of increased fat consumption, all hallmarks of hibernation in larger mammals.

The authors note that 5'-AMP previously has been shown to regulate enzyme activity for glucose usage and production. The brain requires glucose to function. By switching the primary source of energy in other organs from glucose to fat, 5'-AMP conserves glucose for brain function, the paper notes.

"5'-AMP is a pivotal metabolic signal whose circulatory level determines the balance of the peripheral organ energy supply between glucose, glycogen and fat," the authors conclude. This raises the longer-term possibility of 5'-AMP based therapies for obesity or type 2 diabetes. And the molecule's ability to rapidly drop body temperature could be a useful tool during surgery or emergency trauma care, when lower temperatures are desired.

Injecting mice with 5'-AMP's more glamorous molecular cousins – adenosine triphosphate (ATP), adenosine diphosphate (ADP), both vital to providing energy to cells, and the signaling molecule cyclic AMP – did not produce the same effects.

Study co-authors are **Michael Blackburn, Ph.D.**, associate professor of biochemistry and an expert in adenosine signaling; first author **Jianfa Zhang**, a postdoctoral fellow in biochemistry; and **Krista Kaasik**, now at the Institute of Molecular and Cell Biology at Tartu University in Estonia.

-S. Merville

To send a news tip or event for Scoop, e-mail  
[Scoop@uth.tmc.edu](mailto:Scoop@uth.tmc.edu).

**Preventive Cardiology Forum Set Feb. 4**

The Medical School will host its 16th Preventive Cardiology Forum from 8 a.m.-1:05 p.m. Feb. 4 in MSB 3.001.

The free conference, co-sponsored by the American Heart Association, will focus on heart failure prevention in children and adults.

This continuing medical education program is intended for the community and health-care providers and will offer current information regarding the techniques and therapies for the diagnosis, treatment, and prevention of cardiovascular disease.

**Francisco Fuentes, M.D.**, professor of medicine, will host panel discussions. Guest presenters will include physicians from the Medical School, Baylor College of Medicine, Texas Heart Institute, The University of Texas M. D. Anderson Cancer Center, and Texas Children's Hospital.

To register, visit [www.UTcme.com](http://www.UTcme.com). For information, call **Sandra Vick** at 713.500.6576.

**NIH GRANTS.GOV TRAINING NOW ARCHIVED**

For those unable to attend the **NIH Grants.gov VideoCast** training sessions, both sessions are archived on the National Institutes of Health Web site at <http://videocast.nih.gov>. (RealPlayer is required to play the VideoCasts and can be downloaded free of charge from the same Web site.) Click Past Events, and then click Special. Handouts also are available at <http://era.nih.gov/Training/ElectronicSubmission/>.

Questions about Grants.gov can be sent to [Johnna.K.Kincaid@uth.tmc.edu](mailto:Johnna.K.Kincaid@uth.tmc.edu) or to the Office of Sponsored Projects at [osp@uth.tmc.edu](mailto:osp@uth.tmc.edu).

*Cadaver memorial, cont'd.*

Before the candlelight vigil, student **T.J. Seiter** read an excerpt from "Auguries of Innocence," a poem by William Blake. The Keytones, a student-led band with **Ken Estrera**, **Scott Tolan**, and **Thomas O'Neill**, also performed a musical tribute of "Amazing Grace/Fields of Gold."

Students then lit candles in honor and in memory of each body that was given to advance their medical education and training, accompanied by music from students **Richard Wu** and **Audrey Nath**.

**Dr. Henry Strobel**, assistant dean for Student Affairs, posed a question to the students: "How can we remember someone we did not know?"

"Maybe we can call them *gift, person who is a teacher, light*," he continued. "Let that light increase...the light of their gift. Live out and through that gift – by giving forward. As we do that, the light increases."

The cadavers for the gross anatomy laboratory course are donated through the Willed Body Program. More information can be found at <http://nba.uth.tmc.edu/willedbody/index.htm>.

-C. Webb



The Cadaver Memorial Service is organized annually by first-year students.