



DEAN'S MESSAGE: What's On My Mind

Dear Colleagues:

On December 18, 1807, the Maryland General Assembly signed into law "An Act for Founding a Medical College in the City or Precincts of Baltimore for the Instruction of Students in the Different Branches of Medicine," and the University of Maryland School of Medicine was born.

This medical school's evolution into a top-tier biomedical enterprise would not have been possible without the partnership of the Maryland General Assembly. This 200-year-old relationship reflects our bicentennial theme, "The Enduring Power of Leadership," and promises to take our institution's limitless potential to new heights in the decades ahead.

To express our appreciation for this important partnership, we hosted a bicentennial kick-off breakfast for the General Assembly on January 30 in Annapolis. House Speaker Michael E. Busch and Senate President Thomas V. "Mike" Miller, Jr., were our honored guests, and both spoke eloquently about the School of Medicine and our two centuries of discoveries, breakthroughs and contributions to the state and nation.

After the breakfast, President Ramsay and I were invited to the floors of the House of Delegates and the Senate, where both legislative chambers delivered proclamations honoring the School of Medicine. Their resolutions honored us on the "200th anniversary of the legislature's charter, which created the nation's oldest public medical school" and recognized our "rich legacy of education, research, patient care and service."

Immediately following the ceremonies on the House and Senate floors, medical students and faculty members met with delegates and senators from their districts to ask for their support to ensure that medical education remains of the highest caliber. Specifically, they asked legislators to support the governor's budget for expenditures related to the University of Maryland, Baltimore, and to identify funds to enhance our programs and scholarships. They also discussed Medical Assistance reimbursement rates, which must be increased to correct significant inequities in physician reimbursement, particularly in pediatrics and OB/GYN.

Even more importantly, the students told their representatives their personal stories. Matthew Dunn, an Eastern Shore native and former nurse who is now a fourth-year medical student, acknowledged the lack of physicians on the Eastern Shore. He told legislators from that area that he plans to return home to provide care to its citizens after residency. He also emphasized the need for increased funding for scholarships to recruit talented students, particularly those who would not otherwise be able to afford a medical education.

The School of Medicine's advocacy day in Annapolis was just the beginning. It was an opportunity for us to showcase our two-centuries-old partnership with the General Assembly, but even more importantly, it was the first of many advocacy days in the years ahead as we position this medical school for the next two centuries.

In his remarks at the breakfast, Speaker Busch reminded us that while the legislative session is only 90 days long, our legislators represent their constituents 365 days of the year. He exhorted us to get to know the representatives from our own districts. They have more time to pay attention to our issues and concerns when the General Assembly is not in session. So pick up the phone, write a letter or make a visit to your representatives' offices. Please be certain to coordinate your efforts with Barbara Klein in the UMB Office

of Government & Community Affairs or Claudia Baquet, MD, MPH, in the School of Medicine's Office of Policy & Planning. They can help guide you in your interactions with public officials. Additionally, if you are called upon by public officials to represent the campus on an issue, please be sure to work with these offices to ensure we are consistent with official campus positions on any and all issues.

On my mind this month is the notion that it is up to each of us to enhance our existing partnership with the state legislature by forming new, individual relationships with those who represent us. By so doing, we create limitless opportunities to advance our agenda to provide unequalled medical education to our students, first-rate health care to our patients, and make life-changing discoveries in our labs.

In the relentless pursuit of excellence, I am
Sincerely yours,

E. Albert Reece, MD, PhD, MBA
Vice President for Medical Affairs, University of Maryland
John Z. and Akiko K. Bowers Distinguished Professor and
Dean, School of Medicine



L-R: Speaker of the House Michael E. Busch, Delegate Melvin Stukes, UMB President David Ramsay, Dean Reece, Delegate Ruth Kirk, and Delegate Keith Haynes with the School of Medicine resolution on the floor of the House of Delegates.



State Senator Ulysses Currie and Dean Reece chat during the bicentennial kick-off breakfast for the Maryland General Assembly.

"What Do We Do?"

ANATOMICAL SERVICES

Each year, freshmen medical students at the School of Medicine endure a rite of passage shared by medical students across the country—gross anatomy lab.

The careful dissection of a cadaver is a valuable tool in their journey to become physicians. The Anatomical Services Division at the School of Medicine handles the preparation of those bodies. Additionally, it administers the state of Maryland's Body Donor Program and provides specimens for surgical and resident training for faculty, paramedics, emergency medical technicians (EMT) and physicians from around the country and the world.

"Our multidisciplinary mission is to provide human specimens for research, teaching and training," says Ronn Wade, head of the division, and director of the State Anatomy Board.

Those specimens come through the body donor program in Maryland, a unit of the Department of Health and Mental Hygiene. The majority of the 70,000 donors on file are people who have registered prior to their death. Unclaimed bodies in the state are turned over to the board after efforts to identify and track down family have been exhausted.

Approximately 1,400 bodies each year are triaged to determine how they can best be used—for gross anatomy, paramedic and EMT training, hands-on surgical practice, or for certain health care certification training courses. Afterwards, the remains are cremated and returned to the family for burial.

Cadaver dissection has long been a core part of medical school education and has endured the advent of computer programs and other technologies that simulate the process. According to Wade, who is trained as a military medic and is a licensed mortician, nothing can compare to the hands-on experience of dissecting a human cadaver. "It's one thing to view a human heart on a computer screen and something else entirely to hold one in your hands," he says. "It's the students' first experience with a patient. Anatomy lab and the services we provide allow students the opportunity to see and feel the intricacies of the human body and all of its complicated systems."

Anatomical Services has become the surgical training center for the state of Maryland. "The program started out internally, but word got around that we could provide the resources physicians needed for hands-on practice," says Wade. "We not only have the facilities to support and provide unique anatomical services, but the resources provided through the body donor program."

On any given day, the division's three training rooms are used by School of Medicine faculty or physicians from other institutions

to practice new surgical techniques. EMT and paramedic certifications require life support training with human specimens, so those groups routinely use the division's resources as do many allied health professionals who need to practice their skills.

Wade and two administrative assistants staff the donor program while an account clerk and office assistant handle the division's business. Four technicians aid in the preparation of bodies and set-up for the training seminars.

"The advances in medical education and surgical methods will present greater challenges to the division and our ability to meet the ongoing study needs of the medical and allied health fields and the overall public health interest," says Wade. "We are ready for those challenges. We take seriously our obligation to the deceased: to honor their wishes for their bodies to be used for the greater good."



(L-R) Rita M. Gross, administrative assistant II; Lynda R. Yangsomcheep, administrative assistant I; Mary Angel, account clerk II; Concetta Dutcher, office assistant. (L-R, back row) Ronn S. Wade, director; Jason Wise, lab helper; Anthony D. Pleasant, lab manager; Shanequa A. Thompson, anatomical service technician; Juan Ortega, lab helper.

Researchers Develop Marker That Identifies Energy-producing Centers in Nerve Cells

A protein that causes coral to glow is helping researchers at the School of Medicine to light up brain cells that are critical for the proper functioning of the central nervous system. This fluorescent marker protein may shed light on brain cell defects believed to play a role in various neurological diseases. The researchers described how this marker works in mice in a recent issue of *The Journal of Neuroscience*.

The marker gives scientists the first-ever opportunity to distinguish between energy-producing structures, called mitochondria, in neurons from mitochondria in other brain cells, called glia. Defects in mitochondria may be part of the process that leads to Alzheimer's and Parkinson's disease, as well as changes in the brain associated with stroke and aging.

"Prior to the development of this marker, we had no way to identify the mitochondria in neuronal cells from those in glial cells," says the study's principal investigator, Krish Chandrasekaran, PhD, assistant professor, Department of Anesthesiology. "Using this tool, we, and other investigators, can answer certain questions, such as to what extent does neuronal mitochondrial dysfunction contribute to Parkinson's or Alzheimer's. And, in a general way, we could look into whether there are changes in neuronal mitochondria as we age."

Using advanced genetic techniques, the researchers have produced mice with fluorescent protein markers that identify only the mitochondria in neurons. These structures light up with a greenish-yellow glow when the scientists look at the brains of these mice through a fluorescent microscope. The researchers have determined that the expression of the fluorescent protein does not interfere with the normal functions of mitochondria.


Neurons conduct and generate electro-chemical impulses or nerve signals, which carry information from one part of the brain to another. Mitochondria in the neurons function like cellular powerhouses to produce those

impulses through a metabolic process that combines oxygen with food calories. It is these nerve signals that cause muscles to move and thoughts to be processed. Dr. Chandrasekaran says the fluorescent marker system may make it possible to explore how neuronal activity and the mitochondrial energy-producing system are coordinated and how the interrelationship works.

The researchers say the establishment of the fluorescent marker in mice could unravel the mysteries of some of the most debilitating neurodegenerative diseases. The study's senior author, Tibor Kristian, PhD, assistant professor, Department of Anesthesiology, says there are animal models for several of these diseases including Parkinson's, Alzheimer's, amyotrophic lateral sclerosis (also known as ALS) and Huntington's disease. "The mice we have developed with the fluorescent protein could be bred with mouse models of various neurological diseases, so we could apply the ability to see mitochondria in neurons to the research of those diseases," says Dr. Kristian.

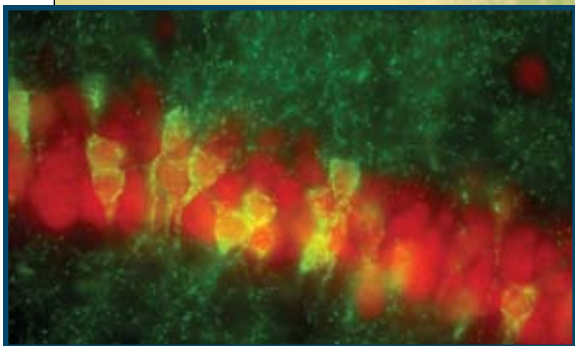
This mouse model also could be used to study the role of neuronal mitochondria in stroke and traumatic brain injury, according to Dr. Kristian. He says his investigators are developing a similar marker for glial cells in the brain.

The team included research assistants Julie Hazelton and Yu Wang, and Gary Fiskum, PhD, professor and vice chair of research in the Department of Anesthesiology.

The National Institutes of Health supported this work with a two-year \$400,000 grant. 



(L-R standing) Tibor Kristian, PhD, Gary Fiskum, PhD, and Krish Chandrasekaran, PhD; (seated) Julie L. Hazelton, MS



Mitochondrial-targeted eYFP (green) is shown in CA1 pyramidal cells whose cell bodies were labeled with anti-NeuN antibodies.



James B. Kaper, PhD

Kaper Named Chair of Microbiology & Immunology

James B. Kaper, PhD, has been appointed chair of the Department of Microbiology & Immunology at the School of Medicine. Dr. Kaper has been at the School of Medicine since 1981, and has served as a professor of microbiology & immunology and medicine, associate director for laboratory research and chief of the bacteri-

al genetics section in the Center for Vaccine Development, and co-course director for the Host Defenses and Infectious Diseases medical student course.

"Dr. Kaper is a scholar who has made international contributions to the world's vaccine development program. He developed the first genetically engineered bacterial vaccine licensed for human use," says Dean E. Albert Reece, MD, PhD, MBA. "He is one of the nation's leading investigators in his discipline and one of the School of Medicine's top researchers in terms of federal funding."

Dr. Kaper earned his undergraduate and doctoral degrees from the University of Maryland College Park. He completed post-doctoral work at the University of Washington, Seattle in the Department of Microbiology & Immunology.


Dr. Kaper's research focuses on the molecular pathogenesis of enteropathogenic and enterohemorrhagic *Escherichia coli* infections, the development of live oral cholera vaccines and the molecular pathogenesis of *Vibrio cholerae*. He has published more than 266 peer-reviewed journal articles, six books and 63 book chapters. He serves as an editor for the journal *Infection and Immunity*, associate editor for the *International Journal of Medical Microbiology* and as co-editor-in-chief for *EcoSal: Escherichia coli*

and *Salmonella Cellular and Molecular Biology*. Dr. Kaper's work on cholera vaccines and *E. coli* has earned him five patents from the United States Patent Office and multiple international patents.

He has been funded continuously by the National Institutes of Health (NIH) as a principal investigator since 1982. He is the recipient of an NIH Method to Extend Research in Time (MERIT) Award, a program designed to provide long-term support to investigators whose research competence and productivity are distinctly superior. Dr. Kaper's MERIT award funds his research on the pathogenic mechanisms by which enteropathogenic *E. coli* cause infant diarrhea. He is a fellow of the American Academy of Microbiology and the American Association for the Advancement of Science.

"The School of Medicine has long been known for its strength in the area of infectious diseases, and there is tremendous potential to develop an outstanding basic science program in pathogen-host interactions," says Dr. Kaper. "My goal is to build on the Department of Microbiology & Immunology's existing strengths to raise it into the top 20 microbiology and immunology departments in research while maintaining our strong teaching program in medical and graduate student education."

"I expect that Dr. Kaper will further propel an already strong department to significantly greater heights through major program development and collaborative relationships with other nationally recognized School of Medicine programs such as the Center for Vaccine Development, the Insti-

tute of Human Virology and the Department of Medicine's Division of Infectious Diseases," says Dean Reece. "I look forward to working closely with him to elevate the department into the top-tier of basic science departments." 

“Dr. Kaper is a scholar who has made international contributions to the world's vaccine development program. He developed the first genetically engineered bacterial vaccine licensed for human use...”

Simple Diagnostic Test Detects Genetic Signs of Lung Cancer in a Patient's Sputum

DNA coughed up along with phlegm could point to lung cancer, say researchers from the Department of Pathology, who are developing an inexpensive and non-invasive gene probe to help diagnose early stage lung cancer in current and former smokers.

In a recent issue of the journal *Clinical Cancer Research*, the researchers report that their fledgling test, designed to check whether two genes believed to be tumor suppressors are deleted in cells found in sputum, identified 76 percent of stage I lung cancer patients whose tumors also showed the same genetic loss. Existing sputum "cytology" tests, which look for changes in cell structure, identified only 47 percent of the patients, they say.



Feng Jiang, MD, PhD

While no other simple sputum analysis has found such a high correlation with lung cancer, it is not yet good enough for the clinic, researchers say, and so they are now expanding their test to screen for up to eight genes.

"There is an urgent need to develop reliable early diagnostic biomarkers for lung cancer that can be detected non-invasively, and these two genes look to be great candidate markers for such a test," says Feng Jiang, MD, PhD, assistant professor, Department of Pathology. "We need to validate our findings, of course, but we have shown that the genetic aberrations seen in sputum reflect the same genetic aberrations found in lung tumors, and that these molecular changes occur before any morphological changes can be seen in a cytology test."

Sputum cytology is still used in some clinics, but has largely been found to be insensitive, says Dr. Jiang. For that reason, he and his collaborators have been working for years on a simple, effective way to detect changes in the genes of cells in the bronchial airway that signify early cancer is developing somewhere in the lung system. Many cells within the airway exhibit a similar pattern of genetic abnormalities that leads to lung cancer development, the researchers say, but the challenge is to find altered genes that are only predictive of cancer, and not just of general cellular damage from smoking.

"Most heavy smokers never develop lung cancer, even though cells in their airways show genetic damage," says Dr. Jiang. "The trick is to find the genes that are only cancer related."

Dr. Jiang's research group had previously identified a set of genes that were deleted in lung cancer tumors, and in this study, they tested three of them (HYAL2, FHIT, and SFTPC) in sputum samples taken from 38 patients with stage 1 non-small cell lung cancer, 36 cancer-free smokers and 28 healthy nonsmokers.


Given that sputum contains expectorated airway cells, the researchers asked each of the participants to cough into a cup first thing in the morning for three days. Investigators then examined the sputum with both traditional cytology and with fluorescent *in situ* hybridization (FISH). The FISH technique uses fluorescently labeled single-strand DNA probes to bind to the complementary strand of a specific gene. The presence, or absence, of a fluorescent signal produced when the strands bind can be detected and scored with use of a special microscope.

"As a diagnostic tool to identify early stage lung cancer patients who would then benefit most from curative therapies, FISH is very cheap and convenient," says Dr. Jiang. "The technique may be also useful in monitoring lung cancer patients for response to treatment, disease progression and early evidence of relapse in the future."

They found that FISH could not detect deletions in the SFTPC gene in sputum, although it was absent in 71 percent of tumors. But the loss of HYAL2 and FHIT in a patient's tumor could be detected in that person's sputum. The investigators specifically found that HYAL2 and FHIT were deleted in 84 percent and 79 percent of tumors and in 45 percent and 40 percent of matched sputum, respectively. Combining both HYAL2 and FHIT deletions increased sensitivity to 76 percent (compared to 46 percent for

cytology tests) and the combined probe had a specificity of 92 percent.

The false positive rate of about eight percent occurred because HYAL2 was found in sputum of four cancer-free smokers and FHIT deletions was found in three cancer-free smokers. However, the deletions were not found in the sputum of healthy non-smokers. "Those deletions in cancer-free smokers could represent an early indication that lung cancer is developing that has not yet been detected, but we won't know that without longer follow-up study," says Dr. Jiang.

The study was funded by the National Cancer Institute. A researcher from the University of Texas M. D. Anderson Cancer Center participated with School of Medicine investigators in the study. 

Reception Welcomes Rock and Stewart as New Department Chairs



Peter Rock, MD, MBA (left), and David Stewart, MD, MPH (far right), flank Dean E. Albert Reece, MD, PhD, MBA (second from left), and President and CEO of the University of Maryland Medical Center Jeffrey Rivest (second from right) at a January 17 reception to welcome them as the new chairs of their respective departments. Dr. Rock, a nationally known expert in anesthesiology and critical care medicine, is the Dr. Martin Helrich Professor and Chair of the Department of Anesthesiology. Dr. Stewart, a board-certified family medicine physician with a particular interest in public health, including hypertension and diabetes in African Americans, is the new chair of the Department of Family & Community Medicine.

East Meets West:

**Integrative
Medicine and Shock
Trauma Partner
to Investigate
Acupuncture as
Potential Benefit
for Trauma
Patients**

The R Adams Cowley Shock Trauma Center, world-renowned for cutting-edge research and medicine, often uses high-tech equipment and the latest medical technology to advance trauma care. But now School of Medicine investigators will be looking to an ancient therapy to see if they can improve the care of 21st century trauma patients.

Researchers from the Center for Integrative Medicine and the Shock Trauma Center are collaborating to investigate if acupuncture can lower pain scores, decrease the narcotic-based medication required by patients, reduce inflammatory cytokines and stress hormones, and increase beta-endorphins in post-operative trauma patients. Through randomized controlled clinical trials, the team will apply the most rigorous scientific methods of Western medicine to the Eastern tradition of acupuncture.

"Shock Trauma patients who have received acupuncture treatments as part of their pain management have reported significant drops in their pain scores. Now we want to see if we can quantify that while investigating if neurotransmitters or other chemicals may also be affected in the body," explains principal investigator Lixing Lao, MD, PhD, LAC, associate professor, Department of Family & Community Medicine, and director of the Traditional Chinese Medicine Research Program.

As part of the pilot project that should start this spring, 30 patients will be selected randomly to receive acupuncture, in addition to their conventional care, on three consecutive days following surgery. The main measure for researchers will be how much pain medicine these patients require in the first three days after surgery compared to 30 other patients with similar injuries, selected randomly to receive only conventional care

after surgery. The patients' pain scores and blood samples also will be compared.


"We're interested in trying to figure out how to define these brain-body connections and quantify them," says co-investigator Rick Dutton, MD, associate professor, Department of Anesthesiology, and chief of trauma anesthesiology. "We want to know if there is something different about the patient's chemistry with the use of acupuncture and we need to be able to measure those changes."

The investigators plan to track biomarkers for pain and inflammation. These chemical measurements will include inflammatory cytokines, stress hormones such as cortisol and neurotransmitters such as beta-endorphins. By tracking these biomarkers, the research team also hopes to learn more about the mechanisms involved in acupuncture's action.

Eventually, they hope the scientific evidence can be translated into other ways to help patients.

"Caring for critically ill patients goes beyond just managing their pain, we also want to help them get back to a normal life," says Thomas Scalea, MD, professor, Department of Surgery, and director of the Program in Trauma. "The partnership with the Center for Integrative Medicine reinforces our commitment to get the best care possible for our trauma patients."

"The collaboration between Shock Trauma and the Center for Integrative Medicine presents an intriguing opportunity to examine the potential benefit of ancient therapies as part of some of the most technically-advanced medical care in the world," says Brian Berman, MD, professor, Department of Family & Community Medicine, and director of the Center for Integrative Medicine.

If this pilot project proves successful, the researchers plan to seek funding to conduct a larger study. 

In Their Own Words:

Medical Students Talk to Maryland Legislators

The first event of the University of Maryland School of Medicine's bicentennial year took place in Annapolis, where students and faculty met with state representatives to celebrate our school's milestone anniversary. It was an opportunity to educate legislators about the nation's oldest public medical school, which, in collaboration with the University of Maryland Medical Center, educates and trains more than half of the state's practicing physicians.

House Speaker Michael E. Busch and Senate President Thomas V. "Mike" Miller Jr., were the honored guests during a morning breakfast with state lawmakers. Dean E. Albert Reece, UMB President David J. Ramsay and University System of Maryland Chancellor William E. "Brit" Kirwan also spoke to the audience of lawmakers, medical students and faculty. Following the breakfast, students were given the opportunity to meet privately with legislators.

Senator Andy Harris was looking very much forward to speaking with them. "I'm the only physician in the Senate. I'm an anesthesiologist and I still practice medicine when I'm not in the legislature," he explained. "So I realize the importance of the University of Maryland in providing training to practitioners, many of whom stay in Maryland to practice medicine." Unlike other public medical schools around the country, the University of Maryland School of Medicine receives only


five percent of its total budget from the state.

The need for funding was a primary message the students hoped to send. "My message is two-fold—talking to them about the curriculum at Maryland as well as talking about the financial aspect of med school," said fourth-year student Mark Shimko. "The

school does a great service to the state, it trains over half the physicians in Maryland and, through the curriculum, really encourages us to get involved in the community. I was out in Garrett County for a month as part of my training. I had a great time, and I think it's important to continue to support programs like that. If the school wants to continue to recruit students who will stay in Maryland to practice, it needs the money to give those students the incentive to come here versus other medical schools that might have more scholarship opportunities."

Funding was also on the agenda of Victoria Shaah, a third-year student. "Student debt is an issue that is important to me and many of my classmates," she admitted. She also had another topic on her mind. "I want to discuss student diversity. The University of Maryland School of Medicine is one of the most diverse medical schools I've seen, and I visited quite a few, but I think even more can be done."

Amir Abdel-Waheb, a second-year student agreed. "I hope to spread the word about what the school needs to do to attract more diverse students," he said. "I hope they can continue to obtain the funding necessary to do more recruiting in underserved areas and with underrepresented students in order to bring more of them to this medical school."

Matthew Dunn, a former registered nurse who is now a fourth-year medical student and from an underserved area of the Eastern Shore, also was anxious to spread the word about where Maryland needs doctors most. "I decided to go back to school and study medicine because of the lack of physicians on the Eastern Shore," he explained. "I applied to the University of Maryland School of Medicine, because it is a great school. If you're studying medicine in Maryland, Baltimore is pretty much it. I hope to spread the word that we need increased funding, scholarship funding especially, so the school will be able to recruit talented students and those who wouldn't be able to otherwise go to medical school." 



(L-R) Bruce Jarrell, MD, vice dean for Research & Academic Affairs, Casey Rice, MSI, and Stephenie Fleegle, MSIII, confer with Delegate David Rudolph.



Medical students in Annapolis to speak to lawmakers about the importance of the School of Medicine to Maryland.

SOMnews

UNIVERSITY OF MARYLAND SCHOOL OF MEDICINE MARCH 2007 VOL. 8 NO. 7

SOMnews is produced by the University of Maryland School of Medicine, Office of Public Affairs ▶ E. Albert Reece, MD, PhD, MBA, Vice President for Medical Affairs, University of Maryland, and Dean, School of Medicine ▶ Jennifer Litchman, Executive Editor ▶ Heather Graham, Managing Editor ▶ Becky Cerant, Caelie Haines, Jo Martin, Sharon Boston and Bill Seiler, Contributors ▶ Brushwood Graphics Design Group, Design ▶ Submitting information to SOMnews. Please email your submission six weeks prior to the month you wish to see your submission included to Jennifer Litchman, Assistant Dean for Public Affairs, at jltchman@som.umaryland.edu.

Mark Your Calendars!

The 2007 annual University of Maryland
State of the School of Medicine Address

will take place on

Tuesday, April 24, 2007, at 3:00 PM

in MSTF Auditorium.



An hors d'oeuvre reception will follow immediately in MSTF Atrium.
All faculty, staff and students are encouraged to attend.

