

# GUT FEELING

Whether it's butterflies before a big meeting or an anxious rumbling that signals stress, our stomachs and our brains are in constant dialogue.



A publication of  
UCLA Health and  
David Geffen School of Medicine at UCLA

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## Share Your Thoughts with Us

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## Forward Thinking

Changing our culture and making tough choices will be difficult, but it is essential as we prepare to meet the demands of the future.

**With new leadership in place,** UCLA Health and the David Geffen School of Medicine at UCLA have begun a formidable but important task: reassessing our vision, goals and strategies as we move into the future with our missions of clinical care, teaching, research and community engagement. Our goal is straightforward but ambitious: to be *the* role model for enabling an academic medical center to truly deliver patient-centered integrated care, leading-edge research and multidisciplinary teaching – all connected with our communities.

It has been six years since UCLA Health and the David Geffen School of Medicine at UCLA developed a strategic plan. Now, guided by the principles of integration, collaboration, effectiveness, efficiency and transparency, we are examining what we need to place us at the forefront of healthcare delivery and innovation. To be great, we have to be a unified, integrated operation, one that puts patients, students and faculty at the center of our efforts and operates as more than just a collection of departments and research units.

Placing patients at the center of our thinking requires an integration of our clinical operations. Rather than our current, often confusing matrixed system in which a patient must visit different settings to receive his or her care, we want to create an efficient and cost-effective care-delivery environment in which everything that a patient needs surrounds him or her. This has not been done in academic medicine; the first one to do it will be the role model for the rest of the country, perhaps for the world. I want UCLA to be that role model.

Achieving this goal requires us to come together in a way that values the whole more than its constituent parts. This will require a cultural change, which will be complex and difficult, but it will make us stronger and move us to a level that we can't achieve in our current, siloed environment.

Our new Institute for Precision Health is an important example of how our research missions can integrate with this core focus on patient care. It brings together scientists from across the medical school and UCLA campus to collaborate to deliver therapies tailored to individual patients to combat their disease. We also wish to strengthen the medical school's alliances with the other Health Sciences schools to give our students broader exposure to all facets of healthcare and build their capacity to meet higher standards for quality of care.

In administration, we need to address overlapping and redundant functions in such areas as finance, data, recruitment, retention, IT and leadership. This will lead to greater efficiency and effectiveness.

This refocusing on what is truly important brings us to transparency, which I believe is the fulcrum for all that we hope to achieve. We must be open about what we are trying to do and about the fact that we must make difficult choices. We must listen to the input of all our constituents and communities. It won't be an easy exercise. Not only must we decide which things are most important, but we also must decide what is less important. That will be challenging. But as the famous Harvard Business School professor Michael Porter said, "The essence of strategy is choosing what not to do."

The process is just beginning. I am hopeful that within six months, we will have our plan developed, and we will start to execute on what we've put forward.

Stay tuned.

**John C. Mazziotta, MD (RES '81, FEL '83), PhD**

Vice Chancellor, UCLA Health Sciences  
CEO, UCLA Health

# Experimental Implant Returns Hand Movement to Quadriplegic

UCLA doctors have implanted a spinal stimulator that is showing early promise in returning hand strength and movement to a California man, who broke his neck in a dirt-biking accident five years ago. Brian Gomez became one of the world's first patients to undergo surgery for the experimental device in June 2016 at Ronald Reagan UCLA Medical Center. UCLA scientists positioned the 32-electrode stimulator below the site of Gomez's spinal-cord injury, near the C-5 vertebra in the middle of his neck. That's the area most commonly associated with quadriplegia — the loss of function and feeling in all four limbs.

"The spinal cord contains alternate pathways that it can use to bypass the injury and get messages from the brain to the limbs," says Daniel Chia-Hsing Lu, MD, PhD, director of the UCLA Neuroplasticity and Repair Laboratory and the UCLA Neuromotor Recovery and Rehabilitation Center. "Electrical stimulation trains the spinal cord to find and use these pathways."

While other devices have shown promise in treating paralysis, these approaches involved animals or relied on robotic arms. This approach is unique because the device is implanted in the spine instead of the brain and is designed to boost patients' abilities to move their own hands. Dr. Lu likened the approach to a commute on a busy freeway. "If there

is an accident on the freeway, traffic comes to a standstill, but there are any number of side streets you can use to detour the accident and get where you are going," he says. "It's the same with the spinal cord."

In addition to the stimulator, doctors implant a small battery pack and processing unit under the skin of the patient's lower back. Small enough to fit in the palm of a hand, the implant is paired with a remote control that patients and doctors use to regulate the frequency and intensity of the stimulation. "It is an ongoing process that retrains the spinal cord and, over time, allows patients to strengthen their grip and regain mobility in their hands," Dr. Lu says.

The UCLA team performed the world's first implant surgeries of this kind on two cervical spinal-cord-injury patients prior to Gomez. Dr. Lu and his colleagues saw an increase in finger mobility and grip strength of up to 300 percent. Dr. Lu is working with UCLA neuroscientist Reggie Edgerton, PhD, to build upon the success of their previous findings in patients with lumbar spinal-cord injuries. Their research already has made a huge difference for Gomez, who owns a coffee-roasting business in his hometown of San Dimas, California.

"I use an industrial roaster that heats up to 450 degrees, and just a few months ago, I reached up to pull a lever to empty a batch of beans after they'd finished roasting. But because I didn't have the arm





**Top:** Brian Gomez works on building his arm strength during a therapy session at Ronald Reagan UCLA Medical Center. **Bottom Left:** Gomez roasts coffee beans at his home business in San Dimas, California. **Bottom Middle:** Since undergoing an experimental spinal-stimulation surgery at Ronald Reagan UCLA Medical Center, Gomez has experienced significant increase in the function of his hands. **Bottom Right:** Dr. Daniel Lu checks the grip of Gomez's hands and fingers.

Photos: Clark Powell/MediaSource

or core strength, I burned myself," he says, revealing the scar on his forearm. "That doesn't happen anymore because of the strength and dexterity I've developed."

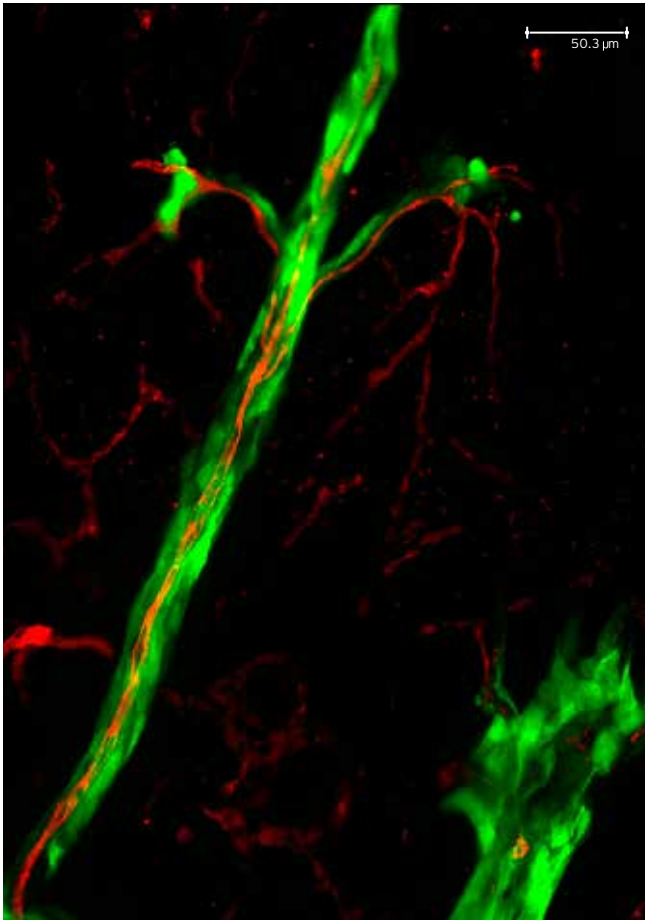
People who suffer spinal-cord injuries usually have a window of only a few months to get the rehabilitation they need to maintain at least partial use of their hands, making Gomez's improvements especially

encouraging. Gomez visits a UCLA laboratory several times a week for rehabilitation exercises and to help scientists fine-tune the stimulator. The UCLA team's goal is to improve hand function enough to allow patients to perform everyday tasks. As the technology develops, patients might expect further improvements.

# An Alternative Theory of Tumor Metastasis

Scientists at the California NanoSystems Institute at UCLA have taken a major step toward confirming an unusual theory of how some cancer cells metastasize. Their findings may lead to new strategies for keeping melanoma from spreading.

A commonly held theory about how cancer spreads is that tumor cells break off from the primary tumor and travel through the bloodstream to reach other organs, where they attach and grow into new tumors. But questions about that process have remained because circulating tumor cells in the blood sometimes have a short lifespan and because of a lack of knowledge about how the cells leave the bloodstream and attach to organs.



A technique called confocal fluorescence microscopy produced 3D images of melanoma cells (green) spreading along the external surfaces of blood vessels (red).

Image: Courtesy of Drs. Laurent Bentolila, Roshini Prakash, Raymond Barnhill and Claire Lugassy

The research team was led by Laurent Bentolila, PhD, director of UCLA's Advanced Light Microscopy/Spectroscopy lab, and included Claire Lugassy, MD, and Raymond Barnhill, MD, formerly of UCLA and now of France's Institut Curie. They theorized that — in addition to the prevailing belief about how cancer spreads — tumor cells could spread through the body by a mechanism called angiotropism, meaning they could travel along the outside of blood vessels without entering into the bloodstream.

Over the past decade, Drs. Lugassy and Barnhill gathered proof that tumor cells, especially those of the deadly skin cancer melanoma, creep along the outside of blood vessels to spread cancer. They also found that the migrating cancer cells mimicked pericytes — cells that line the capillary blood vessels — which prevented the cancer cells from being killed by the human immune system. The research by Dr. Bentolila's team marks the first time that these migrating cells have been imaged in 3D.

To do the imaging, the scientists infused blood vessels with red fluorescent dye, while human melanoma cells, which were dyed green, were injected into the brain of a mouse. They used a microscopic technique called confocal fluorescence microscopy, which provides true three-dimensional optical resolution, to create 3D images in which the dyed tumor cells and the vessels glowed under specific light. The images showed the cells begin to grow as a primary tumor at the injection site. Soon, the researchers observed the green cells spreading from the tumor and migrating along the outer surfaces of the red-dyed blood vessels.

The research by Drs. Lugassy and Barnhill on angiotropism “has questioned the assumption that all metastatic tumor cells break off and flow through the bloodstream to spread disease,” Dr. Bentolila says. If tumor cells are found circulating in the bloodstream, Dr. Bentolila says, doctors might prescribe chemotherapy. “But if the metastasizing cells are on the outside of the blood vessels,” he says, “they escape exposure to the treatment and continue to spread cancer.” The findings will enable researchers to seek new targets for deadly cancers such as glioma, glioblastoma, pancreatic cancer, prostate cancer and gynecological carcinosarcomas.



“Imaging of Angiotropism/Vascular Co-option in a Murine Model of Brain Melanoma: Implications for Melanoma Progression along Extravascular Pathways,” *Nature Scientific Reports*, April 6, 2016

# Different Types of Autism-spectrum Disorders Share Abnormal Pattern of Brain Cells

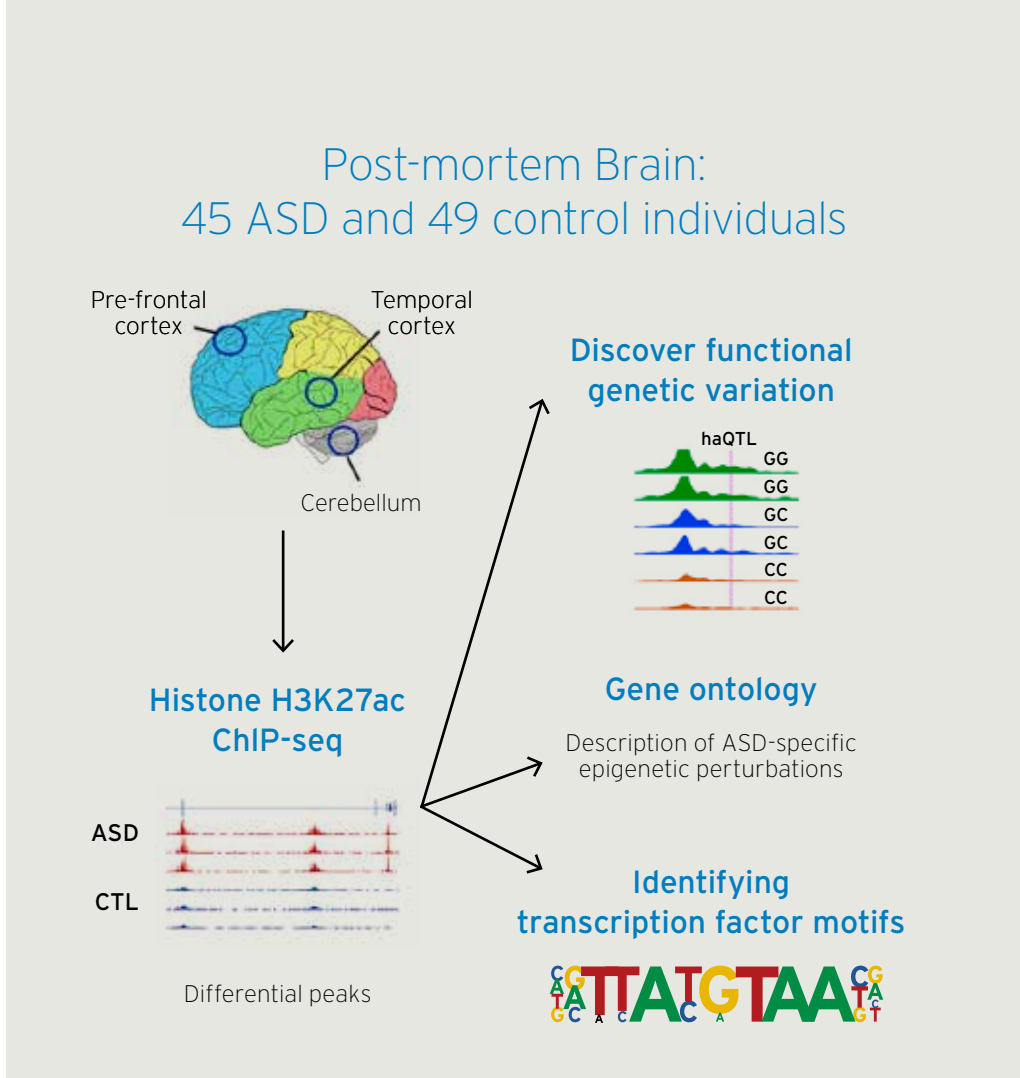
UCLA scientists and their colleagues have found evidence that an abnormal pattern of brain cells is common in people with different types of autism-spectrum disorders. The abnormal pattern discovered in the study concerns a certain type of “epigenetic mark,” a chemical modification that occurs frequently on chromosomes and helps regulate the activity of nearby genes.

The findings suggest that although autism-spectrum disorders have multiple causes, they mostly involve problems in a common set of biological pathways, which are actions among certain molecules within a cell that lead to specific changes such as turning genes on or off or assembling new molecules. The findings may lead to a better understanding of how autism-spectrum disorders arise and perhaps one day to the development of drugs that target some of these irregular pathways.

“The uniformity of this abnormal pattern in the autism samples was surprising, given that these samples were from people whose autism was known to have different causes,” says Daniel Geschwind, MD (RES '95, FEL '97), PhD, Gordon and Virginia MacDonald Distinguished Chair in Human Genetics. “It suggests the possibility that different factors can cause autism-spectrum disorders through a set of common pathways.”

Dr. Geschwind and his colleagues, including Shyam Prabhakar, PhD, of the Genome Institute of Singapore, evaluated brain tissue of 45 people who had autism-spectrum disorders and 49 who did not. The team mapped one specific type of epigenetic mark called “histone acetylation.” Epigenetic abnormalities are certainly plausible suspects in autism disorders, says Dr. Geschwind, who also is professor of neurology and psychiatry and biobehavioral sciences. They are not only extremely common — occurring in about one-in-68 American children — but also have no known cause in most cases.

In the study, the mapping of histone acetylation marks revealed the same broad pattern or “signature” of abnormality in more than 80 percent of the samples from the cerebral cortexes of the autism cases compared to the non-autism cases. The cortex, the most advanced



Changes in epigenetic marks (H3K27) in three brain regions from patients with ASD-revealed shared molecular and cellular pathways.

Graphic: Courtesy of Drs. Daniel Geschwind and Shyam Prabhakar

brain region, is the one that appears to be most affected in autism-spectrum disorders. The abnormal pattern, which did not appear in samples from other parts of the brain, involved changes at more than 5,000 locations on the human genome. These changes mirrored findings from the team’s earlier studies. Connecting these different levels of analysis is one of the next challenges facing the researchers.

Scientists have only recently begun to conduct systematic investigations of epigenetic abnormalities in people, but they have already found that these abnormal chemical modifications contribute to cancers and other diseases. This study was the first to map this type of epigenetic mark across the genome in a human brain disease.

The team now hopes to determine which of the many epigenetic abnormalities uncovered in the study are true causes of autism behaviors — and therefore could be potential targets for future autism drugs. Drugs that affect histone acetylation have already been developed as potential cancer treatments, and some older psychiatric drugs also influence histone acetylation; however, knowing which changes are the key to target still represents a formidable challenge.

📖 “Histone Acetylome-wide Association Study of Autism Spectrum Disorder,” *Cell*, November 17, 2016



# Combating the Cellular Damage of Aging

Researchers from UCLA and the California Institute of Technology have made discoveries that might help slow, and potentially reverse, the process of aging in cells. The scientists generated new methods that allow the identification of factors that selectively remove damaged mitochondrial DNA, which will affect the process of aging at the cellular level. Aging is, in part, due to changes in mitochondria, the energy-providing powerhouses of the cell.

Mitochondria contain their own DNA, and the accumulation of mutations of mitochondrial DNA throughout a lifetime contributes to aging. There are two strategies for combating age-related diseases. One way is to fight the individual disease, and the other aims to delay the aging process to prevent or delay the onset of age-related diseases.

Mitochondria provide most of the energy for cellular operations. Cumulative damage to mitochondrial DNA contributes to age-related disorders such as Parkinson's disease, Alzheimer's disease, heart disease and muscle wasting and frailty. One key goal to delay or reverse aging is to reduce the ratio of damaged-to-normal mitochondrial DNA. Inherited defects in mitochondrial

DNA also cause a number of devastating childhood diseases, including strokes and muscle diseases.

"We showed that we could selectively cleanse the damaged mitochondrial DNA, effectively rejuvenating them and improving mitochondrial quality," says Ming Guo, MD (RES '01, FEL '02), PhD, P. Gene & Elaine Smith Chair in Alzheimer's Disease Research and professor of neurology and pharmacology. "This strategy might someday prove useful in treating or preventing age-related diseases, as well as the general declines in cognitive function and mobility that occur with aging."

The researchers found that by activating cellular processes known as "autophagy," it was possible to remove 95 percent of the damaged mitochondrial DNA. In addition, Dr. Guo's team found the activation of pathways that are crucial in preventing Parkinson's disease also dramatically cleansed damaged mitochondrial DNA.

Studying the role that these DNA mutations have in disease hasn't been easy, in part because of the lack of good laboratory models. For the study, Dr. Guo and her laboratory teamed up with the lab of Bruce Hay, PhD, professor of biology and biological engineering at Caltech, to create a model of mitochondrial DNA using the fruit fly *Drosophila*. Fruit flies are an effective system in which to study fundamental biological processes and how the breakdown of these processes leads to human diseases. Eighty percent of human-disease genes have counterparts in fruit flies. This new fly model mimics aging in young animals.

The findings demonstrate that the level of damaged mitochondrial DNA can be reduced in cells simply by boosting the body's natural quality-control processes. Drs. Guo and Hay now plan to use the model to screen for potential drugs that have a similar impact — drugs that might rejuvenate mitochondria to improve overall cellular health.


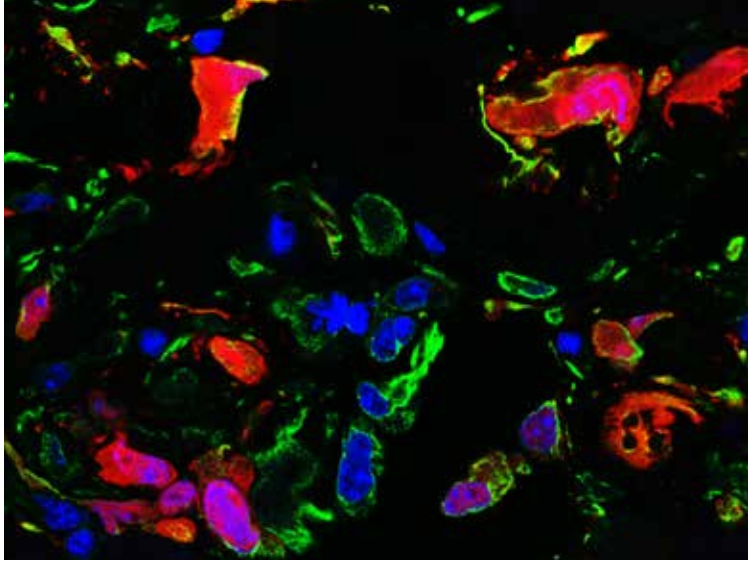
 "Selective Removal of Deletion-bearing Mitochondrial DNA in Heteroplasmic *Drosophila*," *Nature Communications*, November 14, 2016

Illustration: Maja Moden







A microscope image of cardiac calcification in a mouse showing cardiac fibroblasts (red) expressing the ENPP1 protein (green and yellow).

Image: Courtesy of UCLA Broad Stem Cell Research Center/Cell Stem Cell

## Researchers Uncover How to Prevent Calcification of Heart Tissue


UCLA researchers have discovered that calcification of heart-muscle tissue is caused when a type of cell called cardiac fibroblasts goes awry. The scientists also found that blocking a molecular pathway in cardiac fibroblasts prevents heart calcification in mice.

In bones, cells called osteoblasts create a strong, dense matrix out of calcium and phosphate. The calcification of soft tissues — known as ectopic calcification — is abnormal and occurs with common diseases such as diabetes and chronic kidney disease, as well as with aging. But soft tissues don't have osteoblasts, and scientists have for years sought to understand which type of cells contribute to ectopic calcification.

Researchers at the Eli and Edythe Broad Center of Regenerative Medicine and Stem Cell Research at UCLA genetically labeled cardiac fibroblasts, the most plentiful type of cell in the heart, with a fluorescent red dye and followed the cells in mice after a heart injury. When calcification began one-to-four weeks later, the fibroblasts had clustered at the spots where calcification was occurring. The cells adopted characteristics of cardiac-tissue stem cells that then created bone-forming osteoblasts. The researchers transplanted some of these fibroblasts into healthy mice and observed calcium deposits forming around the clumps of cells.

Scientists compared the genes of mice that were prone to ectopic calcification with those that didn't get it. They discovered that the levels of a protein called ENPP1 were especially high in fibroblasts during calcification. And when they blocked ENPP1 with a drug, they were able to prevent heart calcification.

The study, led by Arjun Deb, MD, associate professor of cardiology and of molecular, cell and developmental biology, identifies for the first time both a cell type and a molecular pathway linked to heart calcification. If the findings hold true in humans, they could lead to a pharmaceutical treatment for ectopic calcification. The researchers are collaborating with other UCLA scientists to study whether or not other types of ectopic calcification can be treated in this manner. Their findings also may help advance the understanding of other types of ectopic calcification.

 "Cardiac Fibroblasts Adopt Osteogenic Fates and Can Be Targeted to Attenuate Pathological Heart Calcification," *Cell Stem Cell*, November 17, 2016

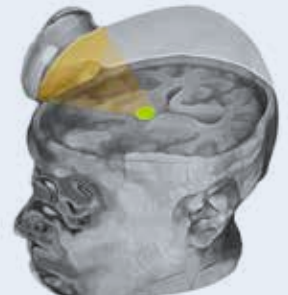
## Giving a Jump-start to the Brain

A 25-year-old man recovering from a coma has made remarkable progress following a treatment at UCLA to jump-start his brain using ultrasound. The technique uses sonic stimulation to excite the neurons in the thalamus, an egg-shaped structure that serves as the brain's central hub for processing information.

"It's almost as if we were jump-starting the neurons back into function," says Martin Monti, PhD, associate professor of psychology and neurosurgery. "Until now, the only way to achieve this was a surgical procedure known as deep-brain stimulation, in which electrodes are implanted directly inside the thalamus."

This is the first time the approach has been used to treat severe brain injury. Dr. Monti says the researchers expected the positive result, but he cautions that the procedure requires further study before they determine if it could be used consistently to help others recovering from comas.

The technique, called low-intensity focused ultrasound pulsation, was pioneered by Alexander Bystritsky, MD (FEL '87), professor of psychiatry and biobehavioral sciences. The device used in the study is about the size of a coffee-cup saucer and creates a small sphere of acoustic energy that can




The researchers targeted the thalamus with low-intensity focused ultrasound pulsation.

Image: Courtesy of Dr. Martin Monti

be aimed at different regions of the brain to excite brain tissue. Researchers placed the device by the side of the man's head and activated it 10 times for 30 seconds each during a 10-minute period. Dr. Monti says the device is safe because it emits only a small amount of energy — less than a conventional Doppler ultrasound.

Three days after the procedure, the patient had regained full consciousness and full language comprehension, and he could reliably communicate by nodding his head "yes" or shaking his head "no." He even made a fist-bump gesture to say goodbye to one of his doctors.

If the technology helps other people recovering from a coma, Dr. Monti says, it could eventually be used to build a portable device — perhaps incorporated into a helmet — as a low-cost way to help "wake up" patients, perhaps even those who are in a vegetative or minimally conscious state.

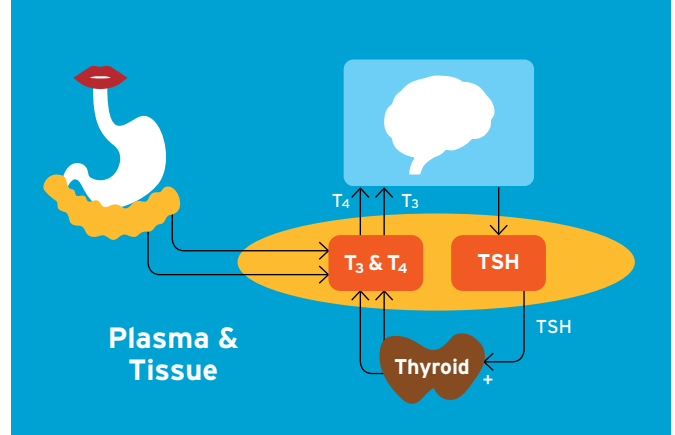
 "Non-invasive Ultrasonic Thalamic Stimulation in Disorders of Consciousness after Severe Brain Injury: A First-in-Man Report," *Brain Stimulation*, July 22, 2016

## UCLA Researchers Develop Open-source Program for Analyzing Thyroid Health

UCLA researchers have developed a software program that simulates the response of the human thyroid hormone-regulation system to a variety of treatments and diseases. The open-source program, THYROSIM, can be used by clinicians, researchers and educators to accurately gauge the impacts of thyroid treatments and develop more effective remedies for thyroid problems.

Joseph DiStefano III, PhD, distinguished professor of computer science and medicine and chair of the UCLA Computational and Systems Biology Interdepartmental Program, developed the technology based on 50 years of research with his students. “THYROSIM offers an easy-to-use interface for a sophisticated, mathematical model of the short-term and long-term impact of thyroid diseases, treatments, hormone supplements and other interventions,” Dr. DiStefano says. “This will benefit clinical and research endocrinologists and teachers, and it could result in positive changes in the use or regulation of available remedies.”

The thyroid gland, located in the front of the neck, is the largest regulator of hormones in the human body. Thyroid hormones control growth, development and metabolism. Maladies associated with abnormal thyroid function include hypothyroidism, or underproduction of hormones; hyperthyroidism, or overproduction of hormones; Graves’ disease, an autoimmune form of hyperthyroidism; and thyroid cancer.



This section of the opening screen of the online app THYROSIM depicts the mathematical model imbedded in this simulator, which visualizes thyroid-hormone responses over time, following user-specified oral and other thyroid-hormone treatments.

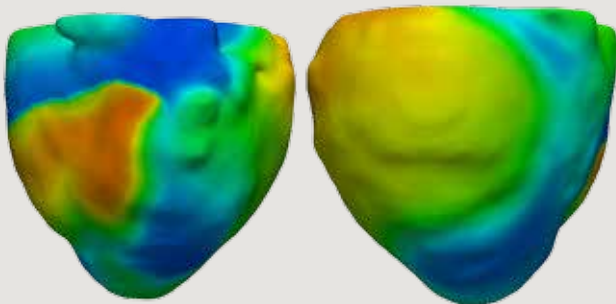
Image: Courtesy of Dr. Joseph DiStefano III

The THYROSIM program works on all common browsers. Researchers and clinicians can enter data — on shifts in the body’s hormonal production or absorption rates or changes in the dosages of hormone treatments — with the user-friendly, animated interface. THYROSIM software, which relies on a mathematical model based on comprehensive clinical data, then simulates likely responses.

The system can examine multiple sets of data at the same time for comparative analysis. It can also project the long-term impacts — up to 100 days — of individual treatment programs. Because THYROSIM is open source, researchers can adapt it for their own projects. In testing the system, researchers analyzed the impact of several over-the-counter thyroid supplements. Their findings suggest that the use of some of these products could increase the presence of hormones in blood to toxic levels — potentially causing serious harm.

“Components of THYROSIM are distributed over two computers: the client-user machine accessible via a web browser and a remote server at UCLA where the simulation computations are run,” says Simon Han, a former graduate-student researcher in Dr. DiStefano’s lab who is now a doctoral candidate in bioengineering and radiology at UCLA. “By making the open-source software fully accessible, we hope to encourage others to improve it or expand its use.”

 “THYROSIM App for Education and Research Predicts Potential Health Risks of Over-the-counter Thyroid Supplements,” *Thyroid*, April 20, 2016



Two views of a heart model showing electrical activity during ventricular fibrillation, a condition in which the heart’s ability to pump blood becomes fragmented and disorganized.

Image: Courtesy of Dr. Alan Garfinkel

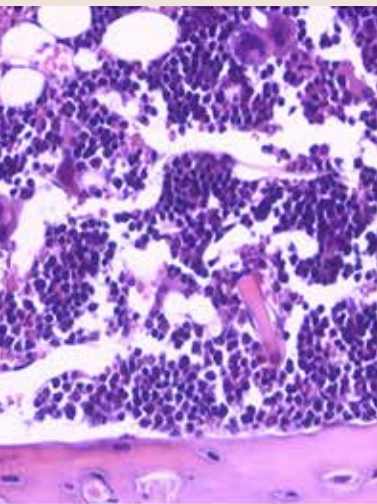
## Cutting-edge Model of Heart Helps Scientists Study New Therapies

A team of UCLA doctors, scientists and engineers has created a detailed computer model that shows how the heart’s electrical signals are affected by congestive heart failure. The “virtual heart” will help medical researchers study new drug therapies that could treat heart failure. One of the senior authors of the paper was William Klug, PhD, a UCLA mechanical and aerospace engineering professor, who was killed by a gunman in his office on June 1, 2016.

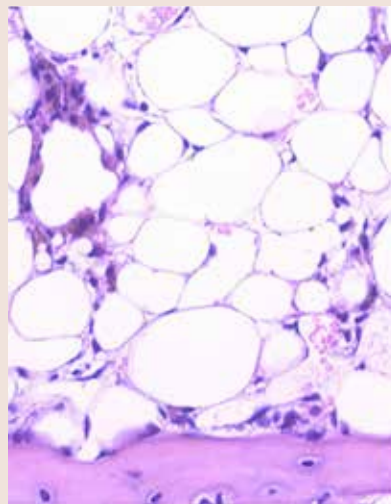


# Genetic Factors Control Regenerative Properties of Blood-forming Stem Cells

**Dkk1**



**Saline**



After radiation, blood cells (purple) regenerated in bone marrow in mice that were given Dkk1 intravenously (left), but not in those that received saline solution (right).

Image: Courtesy of UCLA Broad Stem Cell Research Center/Nature Medicine

**UCLA researchers have defined how key genetic factors affect blood-forming stem cells by either accelerating or hindering the cells' regenerative properties. The findings could one day lead to improved treatments for people undergoing common therapies for cancer such as chemotherapy and radiation.**

Blood-forming stem cells, or hematopoietic stem cells, are found in the bone marrow. These cells can self-renew and, through a process called differentiation, form any type of blood cell. A healthy immune system depends on the regenerative abilities of hematopoietic stem cells.

Common cancer therapies such as chemotherapy and radiation can eliminate cancer by killing cancer cells. But these treatments also damage hematopoietic stem cells, which can impede the cells' ability to regenerate blood, slowing the immune system and resulting in a longer, more complicated recovery for people with cancer. Previous research indicated that certain genes may alter hematopoietic stem cells' regenerative capacity by either accelerating or hindering the cells' ability to restore the immune system, but more research was needed to pinpoint the specific genetic activity and effects.

Researchers from the UCLA Division of Hematology Oncology and the Eli and Edythe Broad Center of Regenerative Medicine and Stem Cell Research at UCLA published their findings in two studies. One of the studies focused on a gene called *Grb10* that is expressed by hematopoietic stem cells. *Grb10*'s function was previously not known, so to better understand its role, the scientists deleted *Grb10* from hematopoietic stem cells in lab dishes and in mice that had received radiation. They found that deleting *Grb10* strongly promotes hematopoietic stem cell self-renewal and differentiation.

In the other study, researchers analyzed a protein called Dickkopf 1 (*Dkk1*). *Dkk1* is produced by a gene expressed by a specific "bone progenitor" cell that is present in the "niche," or cellular environment, that surrounds the hematopoietic stem cell. Typically, bone progenitor cells regenerate bone, but scientists had previously hypothesized that these cells also play an important role in regulating hematopoietic stem cells' ability to self-renew and differentiate into other blood cells.

"The cellular niche is like the soil that surrounds the stem cell 'seed' and helps it grow and proliferate," says John Chute, MD, professor of medicine in the Division of Hematology Oncology. "Our hypothesis was that the bone progenitor cell in the niche may promote hematopoietic stem cell regeneration after injury."

The researchers showed that adding *Dkk1* to hematopoietic stem cells in lab dishes and mice that had received radiation produced a cascade effect within the cell niche that greatly enhanced hematopoietic stem cells' ability to self-renew and differentiate into other blood cells. Taken together, the studies uncovered two molecular mechanisms that could potentially be manipulated to increase the regenerative properties of hematopoietic stem cells and improve cancer therapy. Scientists can now test drugs that inhibit *Grb10* or test the effectiveness of administering *Dkk1* intravenously to promote immune regeneration in people who have received chemotherapy and radiation or those undergoing bone-marrow transplants.



"Dickkopf-1 Promotes Hematopoietic Regeneration via Direct and Niche-mediated Mechanisms," *Nature Medicine*, December 5, 2016

"Deletion of the Imprinted Gene *Grb10* Promotes Hematopoietic Stem Cell Self-renewal and Regeneration," *Cell Reports*, November 1, 2016





## Brain-wave Measurements Predict Response to Antidepressants

A study by researchers at UCLA has found a new, noninvasive way to predict which individuals will respond favorably to the most commonly used medications to treat depression: brain-wave recordings.

Depression is a major public-health problem and leading cause of disability that affects 17-million people in the U.S. every year. Fewer than one-third of people with the disorder find relief from depression with the first antidepressant that is prescribed for them — and patients must wait weeks-to-months to see if the antidepressant will be effective. Some people also stop taking antidepressants because of the medications' side effects.

Researchers at the Jane and Terry Semel Institute for Neuroscience and Human Behavior at UCLA report that a simple biomarker — a pair of brain-wave recordings, or electroencephalograms, that can be performed in a doctor's office in about 10 minutes — can predict if the person will enter remission after just one week. "Knowing whether or not a medication is going to work could eliminate weeks of waiting by the patient and get them on effective treatment more quickly," says Andrew Leuchter, MD (RES '84, FEL '86), professor of psychiatry and biobehavioral sciences.


The researchers used the electroencephalogram recordings to predict recovery from depression in those taking escitalopram, a common antidepressant sold under the brand name Lexapro. Escitalopram works by increasing the levels of serotonin, a chemical messenger or neurotransmitter in the brain that helps to regulate mood. Serotonin levels in the brain also maintain the ratio between slow brain waves (so-called delta-theta activity) and faster "alpha" brain waves. The brain uses this ratio between fast and slow waves to form chemical or electrical networks that support normal mood and thinking.

Dr. Leuchter, who also is director of the Semel Institute's Neuromodulation Division, and his colleagues reasoned that

the effect of escitalopram in shifting the balance between delta-theta and alpha activity would predict the effectiveness of the drug in relieving symptoms of depression. The researchers tested if brain-wave recordings in the first week of treatment would show that the antidepressant (as compared with a placebo) corrected the frequency imbalance — and predict a beneficial effect of medication on an individual's depression after seven weeks.

Researchers analyzed data from 194 people, 18-to-70 years old, with major depressive disorder. The individuals fell into three groups: two comprised of 70 and 76 patients, each treated with escitalopram for seven weeks, and a third group of 48 patients treated with a placebo (the groups receiving escitalopram were part of separate studies evaluating the effectiveness of escitalopram compared with other types of antidepressants). All of the patients were given an electroencephalogram before starting and after one week.

Subjects who showed a large shift toward producing more delta-theta waves after one week were less likely to enter remission with escitalopram treatment. Conversely, those who shifted toward producing more alpha oscillations after one week with escitalopram treatment were significantly more likely to find relief from their depression. Brain-wave shifts did not predict treatment outcomes in patients given a placebo. The researchers next plan to use brain-wave recordings to evaluate other antidepressant medications, as well as cutting-edge, non-medication treatments such as transcranial magnetic stimulation, a magnetic method used to stimulate small areas of the brain.

 "Escitalopram but Not Placebo Modulates Brain Rhythmic Oscillatory Activity in the First Week of Treatment of Major Depressive Disorder," *Journal of Psychiatric Research*, October 7, 2016

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**Top Right:** Dr. Jennifer Chang offers support to a patient. **Bottom Left:** Dr. Ardis Moe (left) reviews a chart with Dr. Chang. **Bottom Right:** (From left) Drs. Margrit Carlson, Ronald Mitsuyasu, Moe and Alen Voskanian.

Photos: Courtesy of Robert Hernandez/UCLA Health Marketing





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# Inspired to Serve

*Kelsey C. Martin, MD, PhD, has dedicated her career to solving scientific problems. Now her energy and expertise are focused as dean on guiding the David Geffen School of Medicine at UCLA to greater heights.*

**Kelsey C. Martin, MD, PhD**  
Dean, David Geffen School  
of Medicine at UCLA

Kelsey C. Martin, MD, PhD, the new dean of the David Geffen School of Medicine at UCLA, didn't set out to become a physician. Driven by her interest in human behavior, she studied English and American language and literature as an undergraduate at Harvard. It wasn't until she was serving as a Peace Corps volunteer in Central Africa that her passion for medicine was ignited. There, she organized an outreach program and wrote grants to fund measles vaccinations, which led to a dramatic reduction in the disease in the village where she was working.

It was a profound turning point, one that led her to medical school, in a joint MD/PhD program at Yale, and postdoctoral work in neuroscience at Columbia. She came to UCLA in 1999 as assistant professor in psychiatry and biological chemistry and became chair of the Department of Biological Chemistry. Her research focuses on how the brain stores memories.

After a number of senior administrative roles, Dr. Martin was named interim dean in 2015 and assumed the role of dean in July 2016. "I view this role almost as a service," she says. "UCLA is my community. The faculty are my colleagues. The students are my colleagues and trainees. I really care about this school, and I want to do what I can to make sure that it continues to thrive."

Dr. Martin, who recently was elected to the National Academy of Medicine, is the first woman dean of UCLA's medical school, and she is among only a handful of women to lead a medical school in the United States. Of the 120 campuses that responded to a recent survey by the Association of American Medical Colleges, just 19 (three of them in the University of California — UCLA, UC Riverside and UC Davis) had women deans. Dr. Martin spoke with *U Magazine* editor David Greenwald.

**As we begin our discussion about the future, let's start with a look at the past. In 2016, we lost Dr. Sherman M. Mellinkoff, who was the second dean of the school of medicine. What have you learned from those deans who have come before you, and how has it informed your vision for the future?**

**Dr. Kelsey C. Martin:** I never had the pleasure of meeting Dean Mellinkoff, but I was incredibly lucky to have been able to read a 1,000-page transcript of an oral history that he gave in the early 2000s. I feel that I learned a lot about what it meant to be a dean. He was very honest about the things that were frustrating to him, the things that were fun, the things that he cared about. When you start in





Dr. Kelsey C. Martin

Photography: Ann Johansson

this role, you feel like there's so much to do. And then you read what someone like Dean Mellinkoff accomplished over a quarter-of-a-century, and you see that he did it step-by-step and that he was guided by important principles. There was a lot of principle and a lot of idealism in what drove him, and I found that very inspiring. And when I was recruited to UCLA, in 1999, Dr. Gerald Levey was dean. He built so much of the physical structure of who we are right now — Ronald Reagan UCLA Medical Center, the biomedical-research science building, the Gonda (Goldschmied) Neuroscience and Genetics Research Center. I was appointed chair of biological chemistry under Dr. Levey's leadership, and I also worked with Dr. Alan Robinson, who was associate dean, and I learned a lot about the UC, about teaching, about utilization of space. Under Dr. Eugene Washington, I was a basic-science chair. Dr. Washington was unperturbed by any challenge. There were occasions when I might get frustrated with something, and he always took the long view; I think I learned a lot from him about working effectively in those situations.

**What have been pivotal moments in your life and your career that have prepared you for this role?**

**Dr. Martin:** Different parts of my life have prepared me in different ways. As a Peace Corps volunteer, for example, I had to go into a village where there was no infrastructure, no institutions, and figure out on my own how to do the job I came to do, to set up a public-health program. I had a motorcycle to get around, but there were no repair shops, so I had to learn how to do motorcycle repair. I think that experience of being 21 years old and figuring out how to solve problems, that helped prepare me for this new role. As a faculty member, I'm a basic scientist, and basic science is about problem solving. It's about gaining as much information as one can about any question and then synthesizing that information in a way that allows one to understand a path forward. That's a great model for the role I'm now in, dealing with a large, complex organization of people. In addition, I was involved in running the MD/PhD program for eight years, and I learned a

“As a faculty member, I'm a basic scientist, and basic science is about problem solving. ... That's a great model for the role I'm now in.”

“It is important that we focus a lot of our energy on social medicine — the interplay between economic conditions and health and healthcare — and the social aspects of clinical medicine.”

lot from that about how to work with students who have very different needs and desires and goals and also how to work with the faculty. As a chair, I learned more about how UCLA works as an academic organization.

**You have mentioned your background in basic science, and that is an important priority for you now as dean.**

**Dr. Martin:** I am inspired that we are at a place that puts a priority on basic science as well as clinical care. I deeply believe that they inform each other. In order to develop transformative new clinical care, we need to invest in basic discovery science. It’s important for us to have the whole spectrum of research activities — from the purely investigational, which provide the early seeds of discovery that are essential to future advances, to the translational. And it is important to have our basic scientists communicate with clinicians, because then they become aware of all of the biological problems that might underlie disease, and they might become inspired to identify a cure or a solution.

**In what other areas do we need to put our focus?**

**Dr. Martin:** It is important that we focus a lot of our energy on social medicine — the interplay between economic conditions and health and healthcare — and the social aspects of clinical medicine. We’re very lucky that we’re on this campus that has social scientists, anthropologists, historians, health economists. If we’re really aiming to improve the health and well-being of our community, then it is a part of our mission, and our responsibility, to understand that community and to understand all

the social determinants of health. Our students are very focused on getting through school, but they also come in with incredible passion for serving the community. We must make sure that we give them those opportunities and that we maintain that humanitarian mission that they have. Our *raison d’être* will, of course, always be to provide outstanding care to our patients, and so the training and support of outstanding physicians always will be a major priority for the medical school.

**Each new dean comes in with a vision for the school. What is yours?**

**Dr. Martin:** I want for us to focus on the highest quality scholarship in every arena that we work in. There are a few areas that I feel are critically important for us, and those are in what’s called precision health. How do we, in this modern world where we have tools and technologies that allow us to gain so much information about individuals and about populations, leverage that to tailor healthcare to individual patients? How do we make sense of all that information so that we can really develop a new kind of medicine? It brings together a lot of people who are here, and it’s a burgeoning field that is attracting a lot of young scholars. We’ve launched an interdisciplinary Institute for Precision Health, headed by Dr. Daniel Geschwind, with the goal of bringing together many different parts of this campus and many different departments in the medical school. That’s a unifying principle that isn’t just UCLA; it also connects us to the other UC campuses because we share electronic medical records, and precision health is largely based on data from large populations, which we can achieve when



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# “I want for us to focus on the highest quality scholarship in every arena that we work in.”

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we come together as a system. I also believe we can build strength by partnering with other schools on this campus, including with our other health schools — public health, nursing, dentistry. It is one of my goals to increase our inter-professional training. We all have the same goal, to improve health, so it would be wonderful to join forces so that we can accomplish the most that’s possible, for our students and for the people we serve.

**The David Geffen School of Medicine at UCLA is among the best medical schools in the country. Where do you see opportunities for us to reach greater levels of achievement?**

**Dr. Martin:** One thing to do is continue to recruit the best people possible — both faculty and students. To do that, we need to get better at telling our story, about how we talk about our science, about how we advance our faculty and the recognitions that they receive. I would like to create an environment here in which there is a real concentrated sense of excellence. For the medical school, that means focusing more on our research mission. I think we need to nurture the basic-research part of our mission more.

**Dr. John C. Mazziotta, vice chancellor for UCLA Health Sciences and CEO of UCLA Health, has identified six research themes around which to organize our efforts: cancer; cardiovascular medicine; metabolism; immunity, inflammation, infection and transplantation; neuroscience; and regenerative medicine. Talk some about the theme you know best, neuroscience.**

**Dr. Martin:** There will be a floor in our new South Tower of the Center for the Health Sciences that will be exclusively for neuroscience — psychiatry,

neurology, neurosurgery, neurobiology — that will enable all the outstanding elements to be clustered together as a strong, unified group that will inspire each other by their thinking and their research. The goal is to break down the boundaries and allow knowledge to flow and encourage more cross-fertilization. The results of this kind of interlocking research will, I believe, be extraordinary. The brain is an organ, and I think that until we start looking at it as an organ system in a more integrated, unified way, we’re not going to make the kinds of advances that are necessary to move clinical neuroscience forward in the future.

**You begin your deanship as the school of medicine opens a new, state-of-the-art student-education facility, Geffen Hall. How do you envision the impact that Geffen Hall will have on the school’s educational mission?**

**Dr. Martin:** The opening of Geffen Hall is very exciting. It really will provide a heart, a center, for our students. Before this new building, our training program was distributed across a number of locations. Now, Geffen Hall will be an academic home for our students, a home that is focused on medical education. It is a very communal, open space, with lots of areas for sitting and working and eating and interacting among students and faculty. The classrooms and lecture halls are designed as active-learning spaces, with stations for students to work together in small groups and lots of new technology for simulation and virtual-reality-type learning. It really is designed and set up for this new generation of students. It also is situated right at the southern portal of the university, and I think that’s a wonderful opening to the campus.

“I ... believe we can build strength by partnering with other schools on this campus, including with our other health schools. ... We all have the same goal, to improve health, so it would be wonderful to join forces so that we can accomplish the most that’s possible, for our students and for the people we serve.”



# Gut





# Feeling

By Dan Gordon · Illustration by Mark McGinnis

Recent advances are helping scientists to better understand the constant dialogue that goes on between our head and our gut and its influence on both our emotional and physical states.

Just past midnight on September 26, 1983, Lt. Colonel Stanislav Petrov, a member of the Soviet Air Defense Forces serving as the command-center duty officer for a nuclear early-warning system, faced a decision with unimaginable consequences. Cold War tensions were running hot. Barely more than three weeks earlier, the Soviet Union had shot down Korean Air Lines Flight 007 as it was en route from Anchorage, Alaska, to Seoul, South Korea, killing all 269 passengers and crew aboard the Boeing 747. They claimed that the plane was on a spy mission and represented a deliberate provocation by the United States. And now, in the bunker outside of Moscow where Petrov was stationed, alarm bells blared as Soviet satellites detected five U.S. ballistic missiles heading toward the USSR. Was this a real nuclear attack warranting retaliation? Or was it a false alarm? Millions of lives potentially hung in the balance, as Petrov gazed at a screen that ominously flashed “launch” “launch” “launch.” He had only minutes to decide.

Thirty years later, long after the Cold War had ended and the incident was declassified, Petrov reflected on his fateful decision to ignore the signal coming from the

satellite detection system — which, of course, had turned out to be erroneous. The launch-detection system was new and prone to error, Petrov recalled. And if the U.S. were launching an attack, why would it send only five missiles? While he couldn’t know for sure, Petrov said, he ultimately made the decision based on “a funny feeling in my gut.”

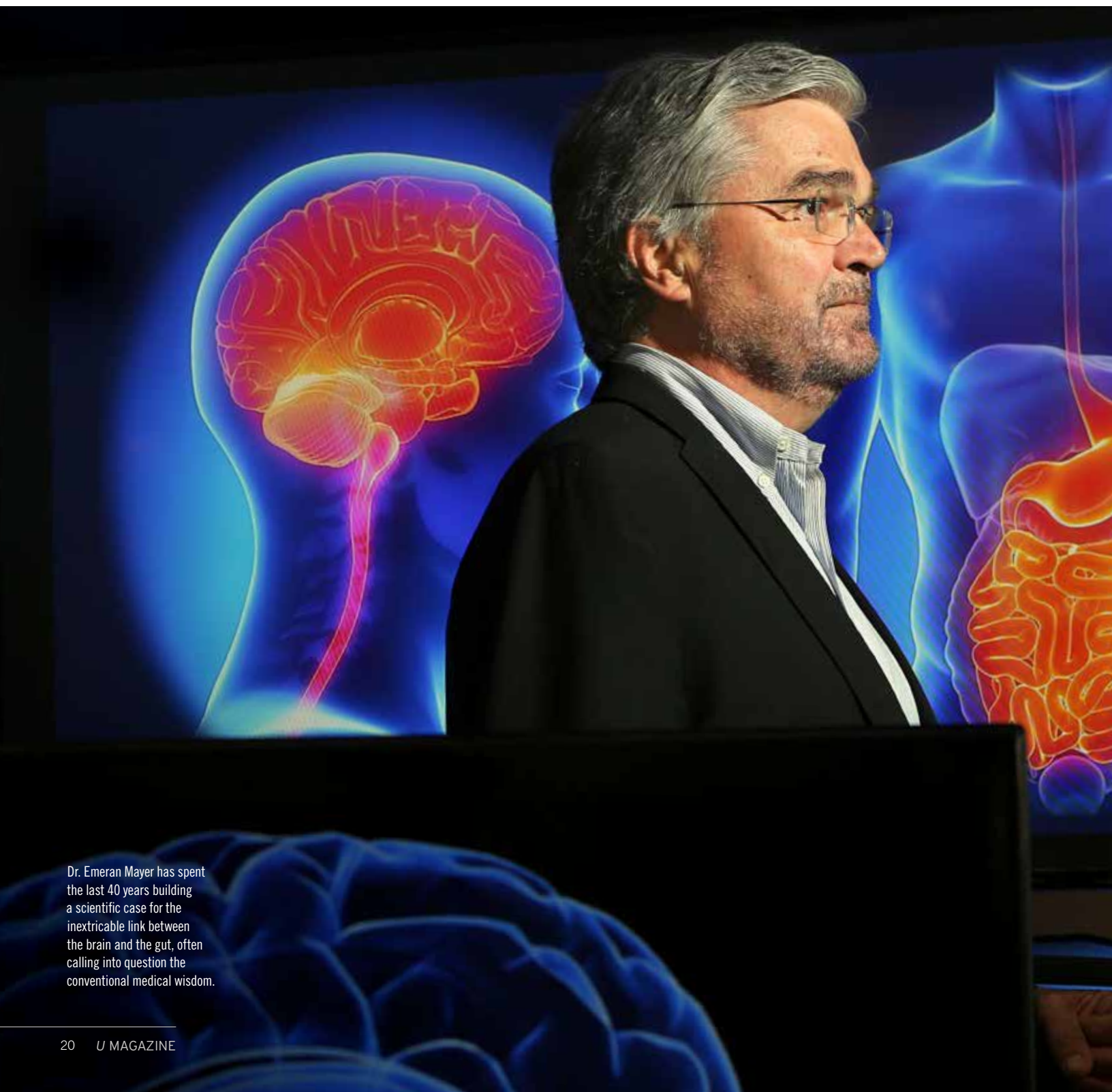
In his book *The Mind-Gut Connection: How the Hidden Conversation Within Our Bodies Impacts Our Mood, Our Choices, and Our Overall Health* (Harper Collins, 2016), Emeran A. Mayer, MD, retells Petrov’s story, and he notes how many historic and present-day decision-makers have cited unspecified feelings in their gut as tipping the balance on a difficult call. To many of us, these “gut feelings” leading to “gut decisions” represent instincts with no basis in reasoned thought. But Dr. Mayer, professor of medicine, physiology and psychiatry and biobehavioral sciences and director of the UCLA Oppenheimer Center for Neurobiology of Stress and Resilience, has other ideas. Acting on his own inclinations developed as a medical student, he has spent the last 40 years building a scientific case for the inextricable link between the brain and the gut, often calling into question the conventional medical wisdom.

**"THE GUT," DR. MAYER SAYS, "CONVERSES WITH THE BRAIN LIKE NO OTHER ORGAN.**

When people talk about going with their gut feelings on an important decision, what they're referring to is an intuitive knowledge based on the close relationship between our emotions and the

sensations and feelings in the gastrointestinal (GI) tract."

These gut sensations go in both directions. "When you eat too much or have certain fatty foods, the changes in your gut can affect your mental state," Dr. Mayer notes. "And when you feel 'butterflies' or



Dr. Emeran Mayer has spent the last 40 years building a scientific case for the inextricable link between the brain and the gut, often calling into question the conventional medical wisdom.

a rumbling in your stomach when you're nervous, or knots in your stomach when you're angry, your mental state is affecting your gut."

Dr. Mayer and the growing number of colleagues at UCLA and around the world who are interested in the mind-gut connection have been buoyed by



the emerging evidence coming from studies of the gut microbiome — the 100-trillion-or-so bacteria and other microbes that make their home in our intestines. Research (mostly in the laboratory, but some in humans) suggests that emotions can affect the gut microbiota, and that, conversely, certain gut microbes can be mind-altering.

Yes, the gut has its essential roles to play in digestion and metabolism. But as Dr. Mayer suggested in an interview with *Scientific American* in 2010: "The system is way too complicated to have evolved only to make sure things move out of your colon."

Dr. Mayer is convinced that the brain-gut axis isn't a linear system, as it is often still viewed, but a circular-feedback loop operating through multiple communication channels. One of the most common channels is via activation of the vagus nerve, which extends from the gut lining to the brain stem. But interactions also can occur between the brain and the immune system (the gut hosts the majority of the body's immune cells) and between the brain and the endocrine system. When the communication channels go awry for one of a variety of reasons — including poor diet, stress or illness — the result can be physical-health problems such as digestive disorders and obesity or mental-health issues such as anxiety or depression. It's no coincidence, Dr. Mayer notes, that most patients with anxiety or depression also have abnormal gastrointestinal function.

#### DR. MAYER'S INFLUENCE IN SHEDDING LIGHT ON THE MIND-GUT CONNECTION

extends well beyond his own work; he has consulted with researchers looking at the relationship from a variety of vantage points. "Emeran has a unique ability to communicate across different levels of analysis — from the cellular to the physiological to the psychological to the behavioral," says Nancy Zucker, PhD, director of the Center for Eating Disorders at Duke University. "That enables researchers to better see the clinical and translational implications of our studies."

Dr. Zucker has sought Dr. Mayer's counsel on studies of the impact of gut-brain interactions on people with eating disorders and has collaborated with his group in studies of patients with anorexia nervosa. She is pursuing the hypothesis that a hypersensitivity to gut sensations fuels the disorder. "The widely accepted narrative is that these are individuals with a biological vulnerability, and

"The gut converses with the brain like no other organ. When people talk about going with their gut feelings on an important decision, what they're referring to is an intuitive knowledge based on the close relationship between our emotions and the sensations and feelings in the gastrointestinal tract."



“Emeran has a unique ability to communicate across different levels of analysis — from the cellular to the physiological to the psychological to the behavioral. That enables researchers to better see the clinical and translational implications of our studies.”

the environment brings it out,” Dr. Zucker says. “We believe that this vulnerability starts below the neck, and that it is neurological.”

Well before the current “decade of the microbiome,” Michael D. Gershon, MD, broke new ground with his book *The Second Brain* (Harper, 1998), referring to the collection of approximately 100-million neurons in the gut that constitute the enteric nervous system and act both independently and interdependently with the brain in our head. While it’s no help in matters of philosophy, poetry and other forms of deep thought, Dr. Gershon noted, this second brain and how it interacts with the first one is a key factor in our physical and mental well-being.

The gut remains an underappreciated organ even by many scientists and physicians — perhaps because it isn’t pleasant to look at or think about, suggests Dr. Gershon, who continues to serve as chairman of the Department of Anatomy and Cell Biology at Columbia University. “What Emeran Mayer and others are finding is that there is a whole world of microorganisms that live in the gut,” he says, “and that they are not just evil bacteria but are companions in life.”

**WHEN DR. MAYER WAS AN MD/PHD STUDENT IN THE 1970S** in Germany, he began to wonder if there was more to the brain-gut connection than was commonly believed. While participating in hospital rounds, he saw patients for whom extensive diagnostic testing had failed to reveal a cause of their chronic pain. Conditions characterized by chronic diarrhea, constipation, nausea and vomiting were common then and now, but rarely was the brain suspected as a factor under a prevailing view that the body consisted of independently operating parts. “I had always been very interested in psychology,” Dr. Mayer says. “Seeing these patients further enhanced my interest in the possibility of a mind/body connection.”

Finding a sponsor for such ideas wasn’t easy. The resistance was such that Dr. Mayer initially had a hard time finding a laboratory and mentor for his dissertation, until finally he was taken in by a cardiovascular physiologist interested in the impact of mental stress on blood flow to the heart. Convinced by that experience that his theories could be studied scientifically, Dr. Mayer switched to the GI tract —

and to the most obvious chronic disorder for his research, irritable bowel syndrome (IBS). An estimated one-in-seven people are believed to have IBS, which causes symptoms that can include abdominal pain, bloating, gas, constipation and diarrhea. Today, there is an evolving consensus that a brain-gut disorder is at play, but that was far from the mainstream opinion when Dr. Mayer was starting his career.

Over the next several decades, Dr. Mayer’s research group became a leader in the use of brain imaging in human volunteer subjects to delineate the interactions between the mind and the gut in IBS and other brain-gut disorders (commonly referred to as functional gastrointestinal disorders), never losing sight of the big picture. “There are now more than 30 classified syndromes, and although the symptoms are different depending on what part of the gastrointestinal tract is affected by the dysregulation, the underlying mechanism is probably the same in all of them,” Dr. Mayer says.

“Emeran’s group was the first to use imaging to show that people with IBS are hyper-vigilant to the signaling coming from the gut, which makes them more susceptible to pain,” says Yvette Taché, PhD, professor of medicine, co-director of the UCLA Oppenheimer Center for Neurobiology of Stress and Resilience and associate director of the CURE: Digestive Diseases Research Center at UCLA.

“It was the first recognition that there was a brain component to this disease state.”

Dr. Taché also has been a pioneer in unraveling brain-gut interactions in gastrointestinal disorders — in her case, through laboratory studies beginning in the 1980s that contributed to a new understanding of how stress can lead to gut dysfunction. Dr. Taché’s group was the first to establish the importance of corticotropin-releasing factor in stress-related gut-function alterations. That finding was followed by the discovery of other peptides involved in transmitting information between the gut and the brain in a way that affects neurobehavioral and digestive functions.

“There wasn’t even a descriptor for brain-gut interactions at the American Gastroenterology Association annual meeting when we were contributing those initial findings,” Dr. Taché notes. “Now, it’s widely recognized, and as the new kid on the block, the gut microbiome is taking this field of study to a new level.”

**DR. MAYER SPLITS HIS TIME BETWEEN RESEARCH AND A CLINICAL PRACTICE**

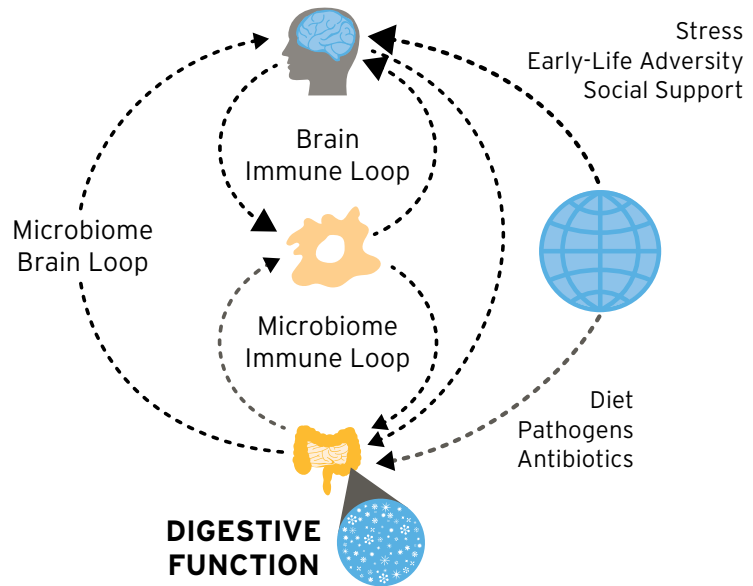
in which he has seen thousands of patients with various brain-gut disorders. He notes that emotions can have a profound effect on how the GI tract handles incoming food. “The setting of the table in your gut is different if you’re angry vs. if you’re happy vs. if you’re anxious,” he says.

For people whose brain-gut axis is chronically off-kilter, the problem extends both top-down and bottom-up. On the one hand, reactions to stress and emotions are supercharged. At the same time, these individuals are typically more sensitive to gut-generated signals, whether from food sensations or from feelings in their stomach and intestines. Dr. Mayer and his colleagues have found that the programming for this dysfunction occurs early in life. “We feel pretty strong, based on our clinical and research experience, that people who have a genetic predisposition, have been given antibiotics or have experienced adverse life events during their first few years, when the microbiome is being established and the brain is developing, are more vulnerable to the development of IBS symptoms under stress or following a GI infection later in life,” Dr. Mayer says.

Even today, Dr. Mayer encounters resistance among other medical professionals to the notion that the mind and the gut are so interconnected. He believes this is driven, in part, by the way the healthcare system is structured. “I have patients referred to me who have undergone extensive repeated diagnostic evaluations with every possible technology, when what you really need to do is spend an hour talking with the patient to understand that it’s most likely a brain-gut disorder, and we’re better off trying integrative therapeutic interventions rather than wasting time and money on additional invasive procedures,” he says.

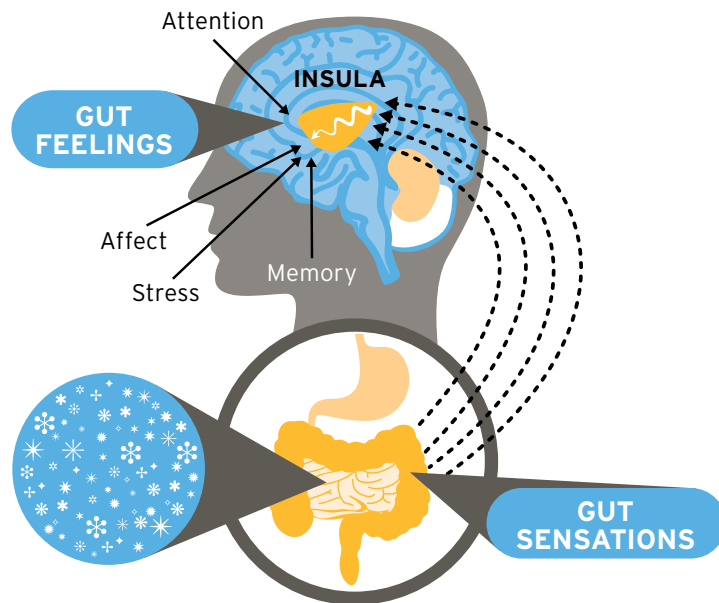
Over the years, plenty of patients complaining of chronic pain that defies diagnosis have heard some variation of “it’s in your head.” As it turns out, the location wasn’t off, even if there was a fundamental misunderstanding of the underpinnings. “A big portion of the pathophysiology is in the brain — but the proper focus should be on the mechanisms, not the psychology,” Dr. Mayer says. “When you explain it to patients that way, they get it. It’s not the same as hearing a frustrated gastroenterologist tell them, ‘I’ve done all the tests and I think it’s in your head.’”

**GUT FEELINGS, EMOTIONS, COGNITIONS**



The gut-brain axis not only involves regulatory loops within the body (immune and endocrine systems), but it is also closely linked to the world around us.

Illustrations: Jon Lee



In response to stress, the brain mounts a coordinated response that is aimed at optimizing the organism’s well-being and survival. The release of corticotropin-releasing factor sets this stress response in motion, resulting in nerve signals to the gastrointestinal tract, generating a distinct gut reaction.

Illustrations: Jon Lee

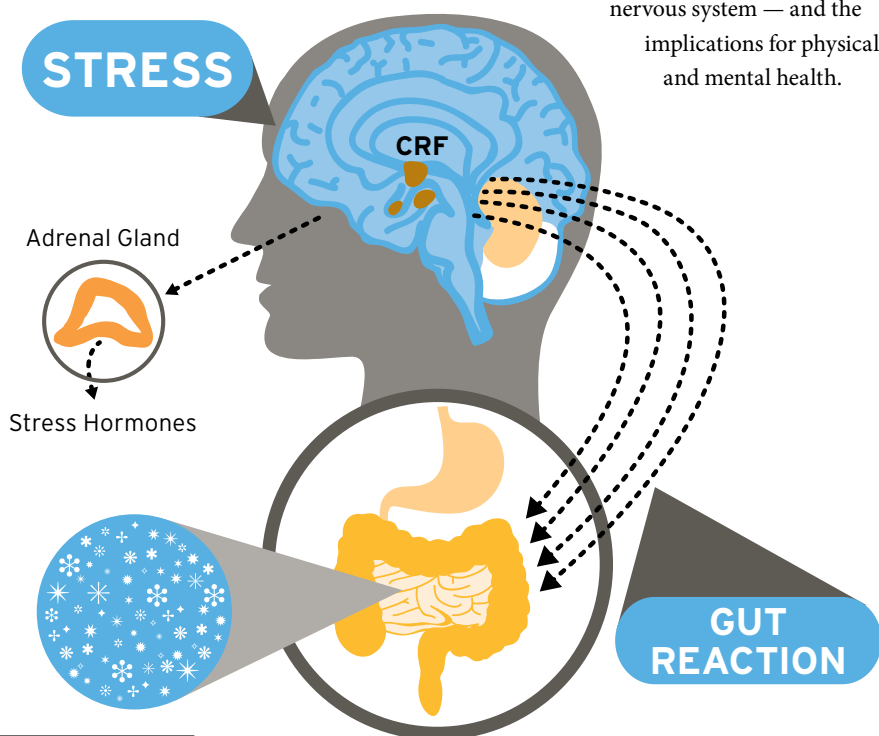
Accordingly, mental-health professionals have an important — and underutilized — role to play in helping these patients. “We know from the imaging studies that there is a failure of the brain’s cortico-limbic control mechanisms to restrain the stress-response and emotional-arousal systems, and cognitive behavioral therapy can retrain the prefrontal cortex to strengthen these inhibitory influences,” Dr. Mayer says. “It’s certainly not a miracle cure, but it has been shown in well-controlled studies to be superior to any medication that’s currently available.” Variants such as mindfulness-based stress reduction also have proven effective, says Dr. Mayer, with some imaging studies showing structural and functional changes in the brain as patients symptomatically improve.

Signals arising from the gut and its microbiome, including chemical, immune and mechanical signals, are encoded by a vast array of receptors in the gut wall and sent to the brain via nerve pathways (in particular the vagus nerve) and via the bloodstream. Even though they originate in the gut, gut feelings are created from the integration of many other influences, including memory, attention, and affect.

Illustration: Jon Lee

### EVEN AS HE WAS FOCUSED ON BRAIN-GUT DISORDERS SUCH AS IBS,

Dr. Mayer always had an eye on the broader implications of brain-gut communications. The new frontier of microbiome research has fundamentally reset the brain-gut-research equation and shifted his attention to bigger-picture questions. With the aid of advanced mathematical modeling, systems biology and the most powerful tools of molecular biology, Dr. Mayer and investigators at the Oppenheimer Center are just beginning to understand the interactions between the body’s two main regulatory organs — the gut microbiome and the central nervous system — and the implications for physical and mental health.



The study of gut microbiota has introduced a new dimension to scientists’ understanding of the mind-gut link. “You could almost say the microbes sit at the interface between the brain and the gut, and anything that goes on in our brain will influence their behavior,” Dr. Mayer says. “On the other hand, the microbes also respond to what we eat. So now we have to think about an integration of food-related metabolites and emotional- and stress-related behavior changes in microbes, resulting in a mix of metabolites and signaling molecules that in turn influence the nervous system.” Now, for example, in addition to studying the brains of people with brain-gut disorders who undergo cognitive behavioral therapy, Dr. Mayer and his group are looking at whether or not the same individuals show a corresponding change in their gut microbiome.

“We have been cohabiting with these bacteria for hundreds of thousands of years, and we have developed a relationship we haven’t even started to understand,” observes Claudia Sanmiguel, MD (FEL ’14), program director of the Ingestive Behavior and Obesity Program in the UCLA Vatche and Tamar Manoukian Division of Digestive Diseases. In that role, she studies the relation of brain-gut interactions in the development of obesity. Inspired by Dr. Mayer’s imaging studies showing brain differences in GI disorders, Dr. Sanmiguel is conducting studies of patients both before and after weight-loss surgery in an effort to better understand the impact of changes in the gut microbiome on eating behaviors and the ability to lose weight. “We are seeing that the connections between changes in gut-microbiome metabolites and changes in the brain in obese people are quite significant,” she says. “Our hope is that learning more about the type of gut microbiota and the related metabolites that are conducive to weight loss could lead to better nonsurgical treatments for obesity than the field has been able to develop up to this point.”

While little has come out of gut-microbiome research in the way of therapies thus far, much intrigue surrounds the growing number of animal studies suggesting that manipulating the composition of bacteria in the gut could affect brain health and disease. “In animal models, we’re seeing that changing the microbiome can produce substantial effects on their behavior, as well as differences in the structure and activity of brain cells,” says Elaine Hsiao, PhD, assistant





The gut and the brain are closely linked through bidirectional signaling pathways that include nerves, hormones, and inflammatory molecules. The close interactions of these pathways play a crucial role in the generation of emotions and in optimal gut function.

Illustration: Jon Lee

professor of medicine and integrative biology and physiology. “That is inspiring a great deal of effort to better understand what it is that bacteria or other microbes are doing to affect the brain and how they communicate with each other.”

While at Caltech in 2013, Dr. Hsiao and her colleagues contributed to the intrigue with research showing that autism-like behavior could be produced in the offspring of mice they treated with a viral mimic during pregnancy. These offspring, which were found to have altered gut bacteria, showed reduced autism-like behaviors when treated with a health-promoting bacterium. Dr. Hsiao’s UCLA lab continues to follow up on those findings with studies of the impact of microbiome changes on behaviors related to autism and other neurological disorders, including depression and epilepsy. “The promise in all of this research is that we are learning that microbes are part of normal human biology,” Dr. Hsiao says. “Although we have a long way to go, the possibility of developing microbe-based therapeutics for mental and physiological disorders is exciting.”

The same year that Dr. Hsiao and colleagues were attracting attention in the scientific community with their autism findings, Dr. Mayer and Kirsten Tillisch, MD ’97 (RES ’99, FEL ’04), associate professor of medicine, made their own

headlines with the first evidence that beneficial bacteria ingested in food could affect human brain function. In an early proof-of-concept study of healthy women, they found that those who regularly consumed probiotics through yogurt showed changes in the brain’s responsiveness to an emotional attention task. Dr. Mayer remains skeptical that this will any time soon lead to certain diets being prescribed as primary brain therapy, but he believes a better understanding of the impact of the interactions between gut bacteria and the brain could lead to dietary and other interventions early in life — perhaps even during development in the womb — when the gut microbiome is under construction.

#### WITH THE CAVEAT THAT MUCH MORE REMAINS TO BE LEARNED,

Dr. Mayer does offer several practical recommendations in his book. These include getting in touch with one’s gut feelings, engaging in mindfulness-based anxiety-reduction strategies and adopting a largely plant-based, whole-foods diet. He also advises steps for managing pre- and postnatal stress, along with early-childhood nutritional interventions to head off mind-gut-axis disorders and build/preserve microbiome diversity in children.

Dr. Mayer also offers a possible explanation for what might be the biological basis of gut-based decisions — those hard-to-pinpoint instincts we learn to trust. The Portugal-born neuroscientist Antonio Damasio, MD, has advanced the somatic-marker hypothesis, in which emotional experiences beginning early in life are associated with certain body responses that are stored in the brain as somatic markers. “Because the GI tract is so prominent, we know that the gut microbiome is a big part of encoding these experiences,” Dr. Mayer says. “It may be that the brain acts like a supercomputer, with access to millions, or billions, of gut reactions that we’ve had from the day we were born, and draws from those experiences to tell us within milliseconds what decision is most likely to suit us.”

This theory of instinctive decision-making will be difficult to prove, Dr. Mayer acknowledges. But his gut tells him it’s the most likely candidate.

**Dan Gordon** is a regular contributor to *U Magazine*.

“Our hope is that learning more about the type of gut microbiota and the related metabolites that are conducive to weight loss could lead to better nonsurgical treatments for obesity than the field has been able to develop up to this point.”

# THE FIRST R

BY DAVID GEFFNER • PHOTOGRAPHY BY PETE BOHLER





# ESPONDERS

The Paramedic Program in the David Geffen School of Medicine at UCLA is one of the toughest in the nation, and the instructors training the next generation of lifesavers wouldn't have it any other way.





There's a moment in his riveting memoir *Lights & Sirens — The Education of a Paramedic* (Berkley Books, 2015) when Kevin Grange, about to begin clinical rotations in a busy emergency room, wonders if he has what it takes to complete paramedic school. UCLA instructor Nanci Medina tells him everyone knows that “paramedic school goes from hard to harder to hardest.” A few pages later, Grange is challenged to insert his first IV line on a patient with HIV, perform his first intubation on a malnourished homeless woman, and not only ventilate a 7-month-old baby with a Do-Not-Resuscitate (DNR) order, but also assess why an infant would have a DNR in place. When the medic who brings the baby in says “history of brittle-bone disease,” Grange writes, referencing the hundreds of classroom hours he received at UCLA, “the DNR made sense. [The baby] had ... a congenital bone disorder ... his shortness of breath was likely caused by underdeveloped lungs, and ... chest compressions would shatter the precious boy to pieces.”

Few professions demand such diverse skills — in life-and-death scenarios — as those required of

a paramedic, who often is a patient's first entry point into a vast, intimidating healthcare system. And since 1970, when Daniel Freeman Memorial Hospital, in Inglewood, California, implemented the first nationally accredited training program for paramedics, UCLA has been at the forefront of educating and training in prehospital care.

In fact, UCLA's EMS (Emergency Medical Services) providers began getting emergency medical training on campus in the late 1970s. A decade later, the UCLA Center for Prehospital Care (CPC), which now is part of the David Geffen School of Medicine at UCLA, was established. Developed at little or no cost to the university, the CPC became the broad-leafed tree from which UCLA's Paramedic Program (which is completely self-funded) would branch out.

“In 1999, Daniel Freeman Hospital's program was closing, due to budgetary issues,” explains Heather Davis, director of UCLA's Paramedic Program since 2008 and former education-program director for the L.A. County Fire Department. “UCLA agreed to supply the curriculum and educators, and [Freeman] would provide the building. [In 2015] we moved into a new facility near LAX.”

Davis was the program's first clinical coordinator and an instructor, working under the leadership of Baxter Larmon, PhD, one of the program's founders. (Bill Dunne, the current director of emergency preparedness, safety and security for UCLA Health, was the program's first director.) Davis, who was National EMS Educator of the Year in 2006 and California EMS Authority Educator of the Year in 2010, says many people don't understand the difference between an EMT (emergency medical technician) and a paramedic. “Most EMTs receive less than 200 hours of training,” she explains, “and none inside a hospital. They're considered basic-life-support providers who can do things like CPR, AED, oxygen administration, hemorrhage control and the care of patients with medication if it's already present.”

In contrast, UCLA paramedics train for at least 1,200 hours, including more than 200 hours inside a hospital, where, Davis notes, “Students do high-risk procedures such as intubation and have supervised bedside encounters in the ER, OR, pediatrics, labor and delivery, cadaver lab and preschool. California requires a minimum of 480 hours in the field,” she continues, “so UCLA paramedic students will



**Above and Page 26:** In these simulations of common medical emergencies, intern Matthew Knowles and graduate Missy Boswell minister to a victim of trauma.

manage approximately 100 real-life emergency incidents before graduation and lead 50 Advanced Life Support calls. The paramedic is typically considered the medical authority on scene.”

Gregory Hendey, MD (RES '93), chair of the UCLA Department of Emergency Medicine, trained with Los Angeles County/City medics during his residency in emergency medicine at UCLA, and he spent 15 years, while chief of emergency medicine at UC San Francisco-Fresno, as medical director for American Ambulance. Dr. Hendey says most doctors and nurses don't fully understand the challenges paramedics face. “What paramedics encounter on a day-to-day basis is far beyond what we are accustomed to, even in the emergency department,” he says. “They face situations where their own safety is threatened and often encounter uncooperative patients.” Dr. Hendey notes that other societal changes have affected the paramedic's work in the field. “The medics used to take photos at the scene of a car crash and show them to us in the ED, which helped us to understand the accident,” he says. “But concerns about privacy have changed that. We are well-aware of the many challenges paramedics deal with, and we are very grateful for what they do before the patient reaches our doors.

Mark Morocco, MD (RES '02), a UCLA ER physician and clinical professor, says his residency training helped clarify the scope of a paramedic's challenges in the field. “My first ride-along was at County 1, in East L.A., to assess an unconscious patient,” says Dr. Morocco, whose own life-threatening car accident in 1988 and subsequent treatment fixed his path into emergency medicine. “I followed the medics through a maze of different dwellings where there was food cooking, music playing and pets running around. Eventually, we came upon this 80-year-old man, nonresponsive on his bed in a small back room. I looked around and saw this collection of little tequila bottles lined up on every wall of the room; after we got him to the hospital, I went to the paramedic and said: ‘I never realized how deeply into the fabric of people's lives you go. You're practicing medicine in places most doctors never get to see.’”

**UCLA'S PARAMEDIC PROGRAM IS NOT FOR THE FAINT OF HEART.** (All L.A. City firefighters who become medics go through it.)

Students are challenged by daily quizzes in physiology,



Instructors Senay Teklu and Jesse Peri attend to a man experiencing cardiac arrest.

pathophysiology and pharmacology, as well as eight major block exams, where expulsion is a real possibility. Two failed exams, failure on a retaken exam, failure on the final exam or failing any skill three times or seven different skills one time all will result in termination. Grange writes that it's like “college finals week that lasts for nine months.”

Critical thinking is at the core of the program, which culminates in an internship of 20 shifts, each lasting 24 hours, with preceptors (typically with a fire department squad or rescue ambulance) who grade students on everything from determining the mental status of a gunshot victim to the cleanliness of the department's ambulance after a day of lifesaving.

Steven Rottman, MD, a UCLA emergency-medicine physician and a CPC co-founder, says the academic foundation is what sets UCLA's program apart. “While it may have been easier to train people in a skill set with algorithms to follow when evaluating a patient, our focus has been exclusively on education,” he says. “With that comes the science and literature to support it to empower our paramedics with a broader knowledge base and the ability to critically think in any situation.”

Severo Rodriguez, PhD, executive director and CEO for the National Registry of EMTs, agrees with UCLA's approach. The 12,000 paramedics who gain national certification through his organization each year must take a two-part test: computer-based cognitive tasks and hands-on psychomotor tasks. “When we look at the performance of UCLA students on the cognitive exam, it's obvious how robust their program is,” Dr. Rodriguez states. “But what really stands out is the psychomotor portion and how well UCLA students understand when and why a skill is done, and how to troubleshoot the many different

“When we look at the performance of UCLA students on the cognitive exam, it's obvious how robust their program is.”

“Our program’s not for everybody. But with a completion rate of 90 percent, and a greater-than-90-percent pass rate on the national licensing exam, the added rigor is clearly worth it.”

responses to an intervention. Bottom line: UCLA paramedic students are incredibly well-prepared.”

Ask any graduate about the beating heart of that preparation, and they’ll point to longtime faculty leader Brian Wheeler, who mixes humor, passion and personal experience to make each moment relevant for students from diverse backgrounds. L.A. Fire Department medic Senay Teklu, a program graduate, recalls a lecture given by Wheeler that focused on specific environmental emergencies, like drowning or hypothermia. “He deferred to students who had lifeguard experience to talk about what they’ve seen and experienced,” Teklu recalls. “I’m from a hot, humid state [where such emergencies are common], and he referenced my own background. Because Mr. Wheeler made the subject matter so personal, it made me want to be the best medic that I could be.”

Grange cites specific calls (in the five years since he’s left paramedic school) that were successful because of Wheeler’s lectures. “I’ve caught a heart attack in a diabetic woman with vague, nonspecific symptoms and an epidural brain bleed in a patient who was initially fully alert and oriented and prevented more than a few very sick kids from falling into decompensated shock,” he says. “On some of these emergencies, I’ve caught subtle — yet critical — symptoms that weren’t picked up by other paramedics on-scene who had not been trained by Mr. Wheeler.”

Key Wheeler phrases that UCLA graduates say still guide them today include: “If you don’t have an airway, you have nothing;” “If you’re not two steps ahead with a pediatric [patient], you’re eight steps behind;” and, perhaps the most meaningful of all, encouraging human compassion for every patient, “The paramedic badge means we don’t judge.”

### SADLY, THAT LAST AXIOM HAS BEEN PUT TO THE TEST IN RECENT YEARS

as demands on prehospital-care workers have grown more complex. From Sandy Hook to Orlando, Dallas and San Bernardino, paramedics have increasingly responded to “mass-casualty events,” sometimes even having to save the life of a perpetrator. Dr. Morocco recalls a mass shooting, two decades ago at a Jewish seniors facility in the North San Fernando Valley, where police kept medics from entering the area. “Our former chair [of UCLA Emergency Medicine] Marshall Morgan said it was

unconscionable that the medics weren’t allowed to assist the shooter, who was wounded by police and who ultimately bled to death,” Dr. Morocco recounts. “[Morgan] got a lot of pushback for his comments at that time; but not from anyone in emergency medicine. We all understand the job of the medic is totally binary. They want to extract the patient to get the best care — on their rig or in our hospital — as soon as possible. They don’t care if you’re a good or a bad guy.”

Joshua Binder, a former clinical coordinator for UCLA’s Paramedic Program and now an L.A. County fire captain based in Hawthorne, explains that the approach to such mass-casualty events was formalized in the 1980s. “Never become part of the incident,” Binder says. “As we saw with Columbine in the 1990s, first-responder medics were kept behind a perimeter in ... the ‘cold zone.’ Patients who might have been saved bled to death.”

Now, Binder says, “Once the police have cleared areas, medics are brought into the ‘warm zone’ for immediate lifesaving measures and removal to triage, even though the shooters may not have been neutralized. The job’s always been inherently dangerous ... but this is another level of risk. Paramedic educators don’t shield students from what could await them.”

Dr. Larmon says that UCLA has been working with the State of California to pilot the expansion of the paramedics’ scope of practice and their locations to help fill gaps in the healthcare system. “This initiative is known as Community Paramedic and/or Mobile Integrated Healthcare Delivery,” Dr. Larmon explains. “UCLA delivered the education program to support all 13 pilot programs operating throughout the state and is testing two pilots in our community. The plan is to decrease the burden on 9-1-1 providers and impacted emergency departments, while improving the experience of patients by decreasing wait times in EDs and improving the total cost of healthcare.”

Dr. Hendey says UCLA paramedics are a true “extension” of the emergency department out into the community. “One of the best examples,” he says, “is a patient having a cardiac arrest. If that person is 10 minutes from our hospital, and they get no care in the field, their chance of survival is very slim. But if they’re lucky enough to have a trained paramedic arrive on the scene within a few minutes and perform CPR and defibrillation, that life will be



saved. The same is true with anaphylactic reactions or severe asthma attacks, particularly with very young children. We see patients already improving as they arrive in the ED because of the treatment that medics gave in the field.”

**WHILE EMERGENCY PHYSICIANS LIKE DRs. HENDEY AND MOROCCO WILL GO INTO A NURSE’S BASE STATION** in the hospital to communicate directly with medics on their trucks, that wasn’t always the case. Dr. Larmon remembers a time when paramedics could only ask doctors or nurses for treatment protocols at one of the 37 different base stations in L.A. County that received emergency calls, resulting in 37 different protocols. “In 1988, L.A. County went to a single protocol [the focus of Dr. Larmon’s master’s degree],” he recalls. “From there, Standing Field Treatment Protocols were developed that relied on evidence-based medicine, and paramedics could begin to care for patients without making base-station contact.”

Program director Davis says UCLA paramedic students have experiences that are unique to being trained at a top teaching hospital — such as attending Grand Rounds or observing a full human-anatomy dissection. “Within the first four weeks of their training, our students put their hands into a human chest cavity [to better understand blood dumps from a catastrophic injury or how the vessels get constricted, leading to lack of a radial pulse],” Atilla Uner, MD (RES ’97, FEL ’99), CPC associate medical director, says. “Our program’s not for everybody. But with a completion rate of 90 percent, and a greater-than-90-percent pass rate on the national licensing exam, the added rigor is clearly worth it.”

Dr. Hendey notes that many paramedic-training programs do not have such advantages. “They can’t get inside an operating room, learn hands-on in a Simulation Lab or shadow faculty and residents of the exceptional quality we have here,” Dr. Hendey says. “In many places, paramedics have traditionally been an afterthought. But here, they’re part of our department, with great educators like Baxter Larmon and Steve Rottman who have made a career out of teaching pre-hospital care.”

And, as the profession has evolved, UCLA educators have helped lead their students into sub-specialties, like critical, hazmat, aeromedical, tactical, wilderness and event care. Another area,

community paramedicine, “includes paramedics as educators” to train the next generations of paramedics, Dr. Larmon explains. That program was pioneered at UCLA.

Davis, a former snowboarder from Colorado who worked in high-altitude rescue and emergency care, says friends have asked why she gave up her passion for saving lives in the field to come work at UCLA. Her answer is always that L.A. County paramedics take care of 14-million people, “and each class of 42 students that leaves UCLA has the opportunity for an enormous impact on their different communities,” she says with obvious pride. “Sure, I could go back to the truck, but then my numbers would be much more limited. The reach and potential to better how prehospital care is delivered is so much greater teaching at UCLA.”

UCLA-trained L.A. County firefighter Pat Hanrahan is proof of that. He once responded to a 9-1-1 call and found an infant not breathing and the family saying the baby was choking. Finding a clear airway, Hanrahan asked to see what the infant had choked on. He was shown a medication patch for fentanyl, a powerful narcotic that was not routinely used in L.A. County at the time, and the effect of which might have been unfamiliar to a non-UCLA-trained paramedic. “Pat realized the medication had been absorbed by the baby’s mucous membranes and that he was in respiratory arrest, not choking,” Davis recounts. “Pat called for Narcan [the antidote to fentanyl], and by the time they got to the hospital, the baby was breathing and fine. The family thanked the physician at the hospital for saving their baby, and he said: “I didn’t save your baby. The paramedics did!”

*David Geffner is a magazine editor and freelance writer in Los Angeles. This article has been adapted and printed with permission from UCLA Magazine, where it was published in the October 2016 issue.*

Student Konrad Kryzwilcki and instructor Peri treat a victim for blood loss after a skateboard accident.



## On Track

By Robin Keats



Dr. Joaquin Fuster's love of trains has been intertwined with his scientific life throughout his academic career.

Photo: Ann Johansson

As a puffy cloud of vapor streams from its smokestack and its whistle sounds, the gleaming, miniaturized locomotive chugging along the track recalls an era that is nearly a hundred years in the past. A scaled-down version of a historic train that once traveled along the Rhine River from Holland to Switzerland, it rolls through a tabletop landscape that fills an upstairs room in the home of Joaquin Fuster, MD, PhD. Instead of the strict timetable of its heyday, this downsized facsimile operates on a haphazard schedule that accommodates his need for playful diversion.

Most diverting of all, Dr. Fuster admits, with a mischievous smile, are train-wreck moments. Like when the locomotive and its luxury passenger cars derail while exiting from a papier-mâché-mountain tunnel into a make-believe Tyrolean world. "I've seen plenty of crashes, especially in tunnels," he says as he reaches across an idyllic mock-Alpine scene to right the train. His movements are very deliberate, to avoid knocking over a plastic marching band and dozens of would-be passenger figurines that are posed to board.

"This requires steely nerves," says Dr. Fuster, who knows a thing or two about nerves. He is among the

world's foremost authorities on the brain, memory and the workings of the prefrontal cortex. "One little thing goes haywire, like a bad neuron might, and it throws the whole thing off."

Dr. Fuster easily identifies links between his scientific passion — he trained in his native Spain and since 1960 has been at UCLA, where he now is emeritus distinguished professor of psychiatry and biobehavioral sciences with a raft of publications that include a half-dozen books and scores of influential academic papers — and his lifelong enthusiasm for trains. Trains figure in his past, and they serve to reflect the science to which he devotes his life. "Trains and the brain both work with conditional codes, the confluences of many factors that all must work fluidly together," he says.

As he fiddles with switches that can send a model diesel train whizzing past an electric one, he analyzes what is literally at play before him: a transport system that has all its requisite lights, bells and whistles flashing, ringing and warning in sequence. "It's a system. It works like a brain," he says. "There has to be order for it to work right."

Both brains and trains have fascinated him for decades, and he wistfully confides, with the twinkling eyes of a child showing off what might be the greatest Christmas present ever, that, "I was always in love with model trains, since I was a little boy." His uncle Joseph was an engineer for the national railroad after the Spanish Civil War and helped foster his hobby. "I was already interested in trains. When I was 19 and still in medical school, I would go to see the trains at the station in Barcelona. I will never forget the mist in winter months, the mixture of smoke and fog and those trains coming in very slowly, majestically," he says.

His father was a psychiatrist (and a medic on the Republican side in the Spanish Civil War), and he operated a small private psychiatric hospital in the large home that the family rented on the outskirts of Barcelona. "My family is steeped in medicine," Dr. Fuster says. "I have lost count of the number of physicians in our last four generations — somewhere between 15 and 20, several in academia. Included in the list are my grandfathers, my father, my brother and my son. I have often told my psychiatry residents that I started my own residency at an early age and under a superb attending physician. Indeed, my father, who in due time became university chairman (at the University of Barcelona), was widely reputed to be one of the best teachers of psychiatry in Spain."

Dr. Fuster's own interest in cognition began after he graduated from medical school and was continuing his training in Innsbruck, Austria. It was there, he says, that the "brain bug bit me hard." His newfound enthusiasm "piggybacked on my learning of English" as he practiced by reading issues of the *Journal of Neurophysiology* and came across the papers of such world-renowned neuroscientists as H.W. Magoun. "I was utterly fascinated by the subject," he says. The connection between his budding interest in brain science and his love of trains was bolstered further by the nightly passage of the fabled Orient Express, which he could hear from his bedroom window.

Trains also hold significance for him because of their connection to geography. "They link countries together, and my wife and I have a love of different countries, cultures and languages." That love is so deep that they speak a different language with one another each weekday: Italian on Monday, French on Tuesday, Spanish on Wednesday, German on

Thursday and English on Friday. On weekends, they converse in Catalan. "That's when we fight, in our native tongue, of course!" he brightly chimes.

All these activities are taking place in the area of his brain in which he is a leading expert, the prefrontal cortex. "It's really the vanguard of evolution," he says of this portion of the brain. "It is really what makes us human. It is what opens us to our future — purpose, intention, creation and freedom. All these things are the prerogative of the human."

The overturned train now righted and set securely back on the track, Dr. Fuster starts it rolling again on its fantasy journey. "It's got a built-in program for lights and switches. But this all requires human intervention," he says, with an all-too-human expression of bemused chagrin as, a moment later, the train derails one more time.

**Robin Keats** is a freelance writer in Los Angeles.



The tabletop landscape and its tableaux of Tyrolean life through which Dr. Fuster's trains run occupy most of an upstairs room in his home.

Photos: Ann Johansson

## Awards & Honors

**Dr. Anne L. Coleman**, Fran and Ray Stark Foundation Professor of Ophthalmology, and **Dr. Kelsey C. Martin**, dean of the David Geffen School of Medicine at UCLA, were elected to the National Academy of Medicine.

**Dr. Stanley Frencher**, assistant professor-in-residence in the Department of Urology, won the Herbert W. Nickens Faculty Fellowship from the American Association of Medical Colleges.

**Dr. Michael Green**, professor-in-residence of psychiatry and biobehavioral sciences, and **Dr. Stephen Marder**, professor-in-residence of psychiatry and biobehavioral sciences, received the Lieber Prize for Outstanding Achievement in Schizophrenia Research from the Brain and Behavior Research Foundation.

**Dr. Elissa Hallem**, associate professor of microbiology, immunology and molecular genetics, and **Dr. Kathrin Plath**, professor of biological chemistry, were named

Howard Hughes Medical Institute Faculty Scholars.

**Dr. William Horan**, research psychologist in the Department of Psychiatry and Biobehavioral Sciences, and **Dr. Amanda McCleery**, assistant research psychologist in the Department of Psychiatry and Biobehavioral Sciences, received the Maltz Prize for Innovative and Promising Schizophrenia Research from the Brain and Behavior Research Foundation.

**Dr. Thomas Klitzner**, Jack H. Skirball Professor of Pediatrics, received the Calvin C.J. Sia Community Pediatrics Medical Home Leadership and Advocacy Award from the American Academy of Pediatrics.

**Dr. Gary W. Mathern**, neurosurgical director of pediatric epilepsy surgery and Dr. Alfonsina Q. Davies Endowed Chair for Epilepsy Research in Honor of Paul Crandall, MD, received the William G. Lennox Award for

lifetime accomplishment from the American Epilepsy Society.

**Dr. James McCracken**, Joseph Campbell Professor of Child Psychiatry, received the George Tarjan, MD, Award for Contributions in Developmental Disabilities from the American Academy of Child and Adolescent Psychiatry.

**Dr. Sherie Morrison**, Distinguished Professor of Microbiology, Immunology and Molecular Genetics, received the David Geffen School of Medicine at UCLA's 2016 Immunology, Inflammation, Infection and Transplantation Excellence in Research Award.

**Dr. Owen Witte**, David Saxon Presidential Chair in Developmental Immunology, Microbiology, Immunology and Molecular Genetics and founding director of the Eli and Edythe Broad Center of Regenerative Medicine and Stem Cell Research at UCLA, received the Award for Distinguished Research in Biomedical Sciences from the American Association of Medical Colleges.

## In Memoriam

**Dr. Carmine D. Clemente**, a dedicated educator who taught anatomy for 60 years, died November 11, 2016. He was 88 years old. Dr. Clemente was Distinguished Professor Emeritus of Neurobiology. He joined the newly established UCLA School of Medicine in 1952 as an instructor in anatomy. Following a postdoctoral fellowship, he returned to UCLA as assistant professor of anatomy. His tenure included stints as a chair and director of the Brain Research Institute. Among his many publications are *Anatomy: A Regional Atlas of the Human Body*, as well as an extensive revision of the 30th American Edition of *Gray's Anatomy*.

**Dr. Ronald M. Reisner (MD '56, RES '60)**, chief of dermatology for 20 years at UCLA, until 1992, died January 13, 2017. He was 87 years old. Dr. Reisner also served as chief of dermatology at Harbor-UCLA Medical Center and at the West Los Angeles VA Medical Center. He was an author

on more than 120 academic publications. As chief of dermatology, he built a small residency program into one of the nation's most prominent. The division's Ronald Reisner Outstanding Resident award was named in his honor.

**Dr. Irwin Ziment**, professor emeritus of clinical medicine, died August 4, 2016. He was 80 years old. Dr. Ziment came to UCLA in 1968 as assistant professor of medicine, and he served as chief of medicine and chief of the pulmonology division at Olive View-UCLA Medical Center from 1975 to 2001. Dr. Ziment earned his MD from Cambridge University and Guy Hospital in London. He authored *Respiratory Pharmacology and Therapeutics* and was co-author of *Evidence-Based Herbal Medicine*.



## Reflections: Shirah Vollmer, MD '86 (RES '90, FEL '91)



Dr. Shirah Vollmer teaching at Loyola Marymount University.

Photo: Courtesy of Dr. Shirah Vollmer

**Shirah Vollmer, MD '86 (RES '90, FEL '91)**, is a psychoanalyst and a board-certified child and adult psychiatrist. She has been a faculty member at the David Geffen School of Medicine at UCLA and is a faculty member of the New Center for Psychoanalysis, the Los Angeles Institute and Society for Psychoanalytic Studies and Loyola Marymount University (LMU). She also is an instructor at UCLA Extension, where she teaches continuing-education courses to psychologists, social workers and family therapists. She serves on the mental-health advisory board of the Venice Family Clinic and has a private practice as a child, adolescent and adult psychiatrist and psychoanalyst.

I have spent most of my adult life learning at UCLA. It started when I was a freshman and has continued through 25 years of teaching UCLA family-medicine residents about biobehavioral aspects of primary care. I have come to find that my experience is broad and deep, enabling me to share with my students a perspective that they value tremendously. Many are not familiar with developmental disabilities and the nuances of autism, for

example, and they may mistake children with anxiety as having autism. Clarifying the differences is critical to the well-being of the child and his or her family. Without all of my rotations in community settings, the Veterans Health Administration and in private and tertiary-care hospitals, I could not offer the understanding of how populations can differ, not just in economic opportunities, but also in mental-health issues. How do I express gratitude for this training? I teach. I pay it forward.

The Marital and Family Therapy Department at LMU offers students a program that leads to a Master of Arts degree in marital and family therapy with specialized training in clinical art therapy. Students are trained to integrate their visual-art backgrounds with psychotherapeutic skills as they work with a variety of clients, including children, adolescents, adults and families. The training fully prepares students to become practicing marital and family therapists committed to utilizing art processes in their work as psychotherapists. Some of these patients are on medication, or need to be on medication, so the students also need to understand which patients to refer for psychotropic medication and how to communicate with the prescribing physician about the impact of the medication on the art, therapy and mental apparatus of the patient. That is where I enter in the curriculum. It is my job to help them understand the armamentarium of drugs that we use to help people with their mental distress.

“Do psychotropics change the art?” I question my students as I teach them about psychopharmacology. “What about the clock test for dementia?” I ask, wondering if they can decipher how one’s brain deteriorates as evidenced by the deterioration in their clock drawing, a cognitive-screening instrument. It is my privilege to ask these questions of eager student artists, who want to coach artistic output in their patients in order to ameliorate the suffering they see in children, adolescents and adults, many of whom are underprivileged and have little access to mental-health interventions.

The students, endlessly interesting themselves, seek the inner world of their patients through an artistic expression, allowing a springboard to deeper exploration and mental healing. As a psychoanalyst, I would say that these therapists are bypassing the conscious and heading toward unconscious thought processes through artistic expression. They will learn that drugs can change the art, and art can change how the drugs are perceived. I am thrilled to be a part of their education.



Dr. Erick Madrigal (left) during a patient examination at Living Water Clinic.

Photo: Courtesy of Living Water Clinic

## The Power of Faith in Healing

**Erick Madrigal, MD '08**, is board-certified in family medicine. He completed his residency at White Memorial Medical Center in East Los Angeles before returning to his hometown of Porterville, California. He serves as a mentor for the Porterville Unified School District Academy of Health Sciences and the Porterville College Chicanos/Latinos for Community Medicine organization. He also provides job-shadowing and volunteer opportunities for students interested in careers in medicine. Dr. Madrigal is a preceptor for physician-assistant and nurse-practitioner programs across the country, and he also is a preceptor for family-medicine residents. In 2013, he joined forces with two fellow Bruins, Luis Ontiveros, MD '06, and Joel Ramirez, MD '08, to open Living Water Clinic. Dr. Madrigal's goal and passion are to give back, serve and become a champion for faith-based organizations.

Since our clinic's inception, our mission has been a Biblical one — “do to others what you would have them do to you.”

What initially began as a personal spiritual journey blossomed into an entire community's voyage. With four sites in the Central Valley, I can honestly say that without our patients' support and prayers, any success would have been difficult to achieve. Patients comment on “feeling something different” from the minute they walk into our offices, and they have said, “I love coming here, not because I like being sick, but because I feel comforted by the atmosphere.” In spite of the challenges all small-group private practices face, both at the individual level and at the corporate level, it is our greatest passion to uphold our mission unconditionally with every patient, co-worker, friend and family member. Although I welcome the discussion of faith and healing with every encounter, my hope is that compassion and love are at the root of every interaction.

The expression of our Biblical foundation is soft, subtle and gentle, and it can be felt by patients the moment they enter our waiting rooms. Our decor may contain Scripture, the music played throughout the clinics is Christian and books offered in the lobbies focus on health and faith. All of this sends a message to patients that they are welcome to discuss how their faith and spirituality affect their health decisions. We want to incorporate as many resources as possible in their healing. Mind, body and spirit are commonly referenced in the mainstream, but what people often forget is that no one lives in a vacuum — we all have an impact on others and others have an impact on us, even if it is indirect. For this reason, we try to touch on our patients' close interpersonal relationships or how their social or spiritual community — or lack thereof — affects their health. When we ask them about their support system, they usually tell us it is family and church, and so we try to build on that. Our aim with every patient encounter is to live and breathe our slogan: “Where Love is Healthcare.” But the bottom line is to promote healing in any way we can, even if it's not through medical interventions.

In the moments when the seriousness of working in a private practice recedes, it is a true blessing and pleasure to be working with my UCLA Bruin family united in a common vision — something I began appreciating while volunteering with Patrick Dowling, MD, MPH, and Michelle Bholat, MD (RES '95, FEL '96), MPH, through the UCLA International Medical Graduate program. I also had the pleasure of working with another Bruin classmate, Felipe Sanchez, MD '09 (RES '12), who recently served as medical director for the Emergency Department at Sierra View Medical Center in Porterville. Porterville is Bruin strong — even our clinic manager is a UCLA Bruin!

# Honoring the Philanthropy of the Manoukians

On November 10, 2016, UCLA Chancellor Gene D. Block welcomed more than 60 family members and friends of **Tamar and Vatche Manoukian**, along with UCLA faculty and staff, to a celebration of the Manoukians' generous philanthropy. The evening honored the couple's landmark gift to the Division of Digestive Diseases in the David Geffen School of Medicine at UCLA that will provide unrestricted funds to accelerate research, innovative clinical care and educational priorities. In recognition of their leadership philanthropy, the division was named the UCLA Vatche and Tamar Manoukian Division of Digestive Diseases, making this the first division naming in the David Geffen School of Medicine at UCLA. Also in honor of the Manoukians, the university named 100 UCLA Medical Plaza the Vatche and Tamar Manoukian Medical Building.

"We have come to give our deepest thanks to two visionaries, Tamar and Vatche, both extraordinary people," Chancellor Block said. He explained that UCLA's significant accomplishments require the support of the community, and "this event is the latest example of the unbreakable bonds we have with our friends."

Chancellor Block then introduced Dr. John C. Mazziotta (RES '81, FEL '83), vice chancellor of UCLA Health Sciences and CEO of UCLA Health, who added his thanks to the Manoukians for their gift. "It is so important to us, and it has more meaning than

just a name on a building," Dr. Mazziotta said. "It is part of what we want to build here, the future of medicine. It's a wonderful opportunity for us to take your generosity and turn it into ideas, actions and plans that will help thousands and millions of people, because the research that is done at UCLA is transmitted throughout the world."

Dr. Eric Esrailian (FEL '06), co-chief of the Vatche and Tamar Manoukian Division of Digestive Diseases and Lincy Foundation Chair in Clinical Gastroenterology in the David Geffen School of Medicine at UCLA, followed Dr. Mazziotta and thanked Dr. Gary Gitnick, co-chief of the Vatche and Tamar Manoukian Division of Digestive Diseases and The Fran and Ray Stark Foundation Chair in Digestive Diseases; UCLA faculty; UCLA's leadership team; and the Manoukians. "It's unbelievable to have a family like this give such an endorsement to a public university. I can't express how grateful I am to them," Dr. Esrailian said.

The evening concluded with a special performance of Armenian music by the VEM Quartet and mezzo-soprano Danielle Bayne, all students in the UCLA Herb Alpert School of Music.



For more information, contact Laurel Zeno at:  
(310) 825-1980





**Top:** (From left) Aram Manoukian, Siran Manoukian, Vatche Manoukian, Tamar Manoukian and Karnig Manoukian in front of the newly named building. **Middle:** (From left) UCLA Chancellor Gene D. Block, Cindy Crawford, Dr. John C. Mazziotta and Dr. Eric Esrailian. **Bottom Left:** Dr. Ray and Ghada Irani. **Bottom Right:** (From left) Maurice Marciano, Mareva Marciano and Paul Marciano.

Photos: Todd Cheney/UCLA Photography

# UCLA Neurology Celebrates the Silton Family's Philanthropy and the Inaugural Silton Chair Holder



To be “as useful as possible in helping to solve the problems associated with Parkinson’s disease,” **Fred Silton** made a pledge to the Department of Neurology in the David Geffen School of Medicine at UCLA to establish the Fred Silton Family Chair in Movement Disorders. During a special ceremony on January 9, 2017, at the UCLA Meyer & Renee Luskin Conference Center, the department celebrated the Silton family’s gift and the appointment of Dr. Jeff M. Bronstein (MD ’88, PhD ’88, RES ’92), professor of neurology and director of the Movement Disorders Program, as the inaugural chair holder. Silton and Dr. Bronstein, along with their families and friends, attended the event.

Silton, who has lived with Parkinson’s for 17 years, shared his faith in Dr. Bronstein, saying, “He is a doctor with a heart and a mission who gives his patients relief now and hope for the future.” The Silton family also expressed their confidence in Dr. Bronstein to “continue to make scientific breakthroughs as a result of this gift.”

The chair will support Dr. Bronstein’s research into Parkinson’s disease, its genetic and environmental causes and the development of more effective treatments for this and other movement disorders. “The vision that Fred had in making this incredible donation allows me the long-term ability to take risks,” said Dr. Bronstein. “This bonds us forever in our efforts to find a solution to Parkinson’s.”



For more information, contact [Pamela Thompson](#) at: (310) 267-1837

**Top:** (From left) Dr. S. Thomas Carmichael (FEL ’01), chair of the UCLA Department of Neurology; Dr. Jeff. M. Bronstein; and Dr. Kelsey C. Martin, dean of the David Geffen School of Medicine at UCLA. **Bottom:** Inaugural Silton Family Chair holder Dr. Jeff M. Bronstein (left) and Fred Silton.

Photos: Todd Cheney/UCLA Photography



# Cardiovascular Leadership Sponsors Symposium, Educates the Community

Continuing its mission of education and community outreach, **UCLA's cardiovascular leadership** held three events in fall 2016. Dr. Kelsey C. Martin, dean of the David Geffen School of Medicine at UCLA, along with the cardiovascular leadership team, welcomed 125 community members and faculty to Rhythm of the Heart, a reception and dinner on September 1, 2016, held at the UCLA Meyer & Renee Luskin Conference Center. UCLA rolled out its theme concept of six interdisciplinary research priorities of the David Geffen School of Medicine at UCLA. The mission of the Cardiovascular Theme at UCLA is to pioneer innovation and discovery to prevent, detect and cure cardiovascular disease — the No. 1 killer in the United States. Following dinner, BPM, a rock-blues-jazz band whose members are UCLA cardiologists, led by Dr. James N. Weiss (FEL '81), chief of the Division of Cardiology and Chizuko and Nobuyuki Kawata Chair in Cardiology, provided heart-pounding music.

The following day, nearly 400 scientists, physicians and students from across the country attended the inaugural UCLA Cardiovascular Symposium at the Luskin Center. The intensive, one-day symposium, organized by UCLA Drs. Reza Ardehali and Luisa Iruela-Arispe, featured preeminent U.S. cardiologist-scientists and introduced the Cardiovascular Theme to attendees. The event included an overview of UCLA cardiovascular medicine and research and presentations covering leading-edge scientific discoveries by nine global leaders in the field. Ninety-five graduate students, postdoctoral fellows, clinical residents, clinical fellows, project scientists and early-career faculty participated in a poster session during the symposium to present their research.

On September 14, UCLA invited the public to learn about the groundbreaking discoveries in cardiovascular research at the introductory UCLA Innovations in Cardiovascular Research Community Update. Held in the newly renovated South Tower research space of the UCLA Center for the Health Sciences (CHS), Dr. Stephen Smale, vice dean of medical research in the David Geffen School of Medicine at UCLA, as well as the Cardiovascular Theme leadership team, led by Dr. Yibin Wang, professor of anesthesiology, physiology and medicine, and Dr. James N. Weiss, welcomed 60 guests. The new Cardiovascular Theme space in the South Tower in CHS will feature eight state-of-the-art research laboratories. UCLA faculty Drs. Ira Hofer; Richard Shemin, Robert and Kelly Day Chair in Cardiothoracic Surgery; Karol Watson (RES '92, FEL '97, PHD '98) and Thomas Vondriska covered various topics, including "Revolutionizing Medicine through Big Data" and "Personalized Medicine and Discovery Science at the Frontier of Cardiovascular Health."



**Top:** The band BPM entertained guests after dinner. (From left) UCLA Drs. Nicholas Wisniewski and James N. Weiss; vocalists Teresa Sanchez, Sasha Weiss, Tricia Dooly; guest guitarist Dr. Donald Heistad, from the Carver College of Medicine at the University of Iowa; and Dr. Hrayr S. Karagueuzian, UCLA professor of cardiology. **Bottom:** UCLA graduate student Jennifer Chyu describes her research project to UCLA Cardiovascular Symposium 2016 attendees.

Photos: Julianne Backman



For more information about the Cardiovascular Theme, contact Gina Weitzel at: (310) 267-2112



For more information about the community update series, contact Michelle Jacobson at: (310) 267-1213



# Honoring Hope and Courage

Photography by Vince Bucci Photography



Left: Event Co-Chairs Edie Baskin Bronson (left) and Susan Dolgen. Right: Dr. Linda M. Liu (left) and Ted Gagliano, who presented her with the Medical Visionary Award.

Attendees at the **2016 Visionary Ball**, held at the Beverly Wilshire Hotel on October 27, 2016, helped raise more than \$1.2 million to benefit the Department of Neurosurgery in the David Geffen School of Medicine at UCLA. Hosted by Emmy Award-winning television personality Larry Wilmore, the event supports the department's crucial research initiatives.

"We are excited to celebrate our amazing honorees and raise funds to advance the most sophisticated neurosurgical treatments in the nation," said Dr. Neil A. Martin, former chair of the UCLA Department of Neurosurgery and

W. Eugene Stern Chair in Neurosurgery, who left UCLA at the end of 2016. "Our joint efforts will further our ability to help more patients and their family members with some of the most complicated neurological disorders."

Edie Baskin Bronson and Susan Dolgen, longtime supporters of the Department of Neurosurgery, served as event co-chairs. Mark Burnett and Roma Downey, honored last year with the Visionary Award, returned to serve as honorary co-chairs. Guests enjoyed dinner, award presentations, patient testimonials and a performance by UCLA graduate and contestant on *The Voice* India Carney.



**Top Left:** Courage Award recipient Donald Bellisario and his wife Vivienne. **Top Center:** UCLA Neurosurgery Board member Jack Simon and his wife Maggie. **Top Right:** Honorary Co-Chairs Roma Downey (left) and Mark Burnett. **Bottom Left:** Rodney Dangerfield's widow Joan Dangerfield (left) with Jon Lovitz, who received the Rodney Respect Award. **Bottom Right:** Singer India Carney.

The Visionary Award went to Michael V. Lewis, CEO and co-founder of RealD. Lewis's leading-edge advances in visual technology have been used for robotic medical procedures and to pilot the Mars Rover and pioneer digital 3-D cinema.

Dr. Linda M. Liau (RES '97, FEL '98), director of the UCLA Brain Tumor Program, vice chair of research and professor and interim chair of the Department of Neurosurgery, was honored with the Medical Visionary Award. Dr. Liau and her research team have developed the first personalized brain-cancer vaccine in the United States, made by isolating a specific immune cell in the patient and combining it with the patient's own tumor tissue.

Writer, producer and director Donald P. Bellisario received the Courage Award. Bellisario created/produced a number of television series, including *Magnum P.I.* and *NCIS*, and is the recipient of a star on the Hollywood Walk of Fame. The Rodney Respect Award went to Emmy Award-winning comedian Jon Lovitz. His television and film credits include *The Wedding Singer*, *Saturday Night Live* and *The Simpsons*.



For more information, contact Victoria Medford at: (310) 267-9475



For more information about the Visionary Ball, go to: [visionaryball.org](http://visionaryball.org)



# Party on the Pier Benefits Children

More than 2,000 guests enjoyed a fun-filled day celebrating the **17th Annual Mattel Party on the Pier** on September 25, 2016, at the Santa Monica Pier. Benefiting UCLA Mattel Children's Hospital, the event is an ongoing partnership with Mattel Inc. and highlights its commitment to improving the lives of children.

Attendees were treated to unlimited rides, and game booths were filled with Mattel toys donated by the company. New event highlights included a Kid's Fun Lounge with performances by the BeatBuds, complimentary glitter tattoos by Skechers and a cookie-decorating station sponsored by Ralphs. The VIP area, hosted by the Toys "R" Us Foundation, served a lunch donated by Wolfgang Puck Catering and featured music, dance contests and exclusive giveaways. Celebrity guests included Brooke Burke, Tom Arnold, Dodger alumni, actress Ava Kolker and the cast of *Girl Meets World*, Rico Rodriguez of *Modern Family* and many others who greeted fans, volunteered at the game booths and posed for photos at the new interactive selfie station.

"Mattel Party on the Pier is an annual, signature fundraising event and a truly special day for the children who experience our care, their families and all who attend," said Dr. Sherin U. Devaskar, physician-in-chief of UCLA Mattel Children's Hospital and Mattel Executive Endowed Chair in Pediatrics. "For the past 16 years, the proceeds from Mattel Party on the Pier have generously supported—and made a real difference in—our ability to provide world-class care for children treated at UCLA and around the world. We are grateful to our event committee, hosts and sponsors for all their hard work and dedication."



For more information, contact Molly Moursi:  
(310) 267-1826

**Row 1:** (From left) Dr. Devaskar with Party on the Pier committee members Masha Chase, Hillary Milken, Loris Lunsford, Mia Janick, Jeanie Bertman, Melissa Mitchell and Stephanie Sandler (front). **Row 2 Left:** Johnese Spisso, president of UCLA Health and CEO of the UCLA Hospital System (left), and Richard Dickson, chief brands officer at Mattel Inc. **Row 2 Right:** Bob Goodwin, executive director, Mattel Children's Foundation, director, Mattel Corporate Affairs (left) and Hillary Milken, Mattel Party on the Pier event chair. **Row 3:** (From left) Actresses Riele Downs, Hana Heyes and Reiya Downs played games with guests at the Mini Hoops Booth. **Row 4 Left:** Party on the Pier attendee with Mattel's life-size Blaze truck model. **Row 4 Right:** (From left) Former Major League Baseball players Lee Lacy, Billy Ashley and Dennis Powell. **Row 5:** Actresses Olivia Rodrigo (left) and Madison Hu played a round at the Top Glow Booth.

Photos: (rows 1, 2, and 4) Vince Buccì; (rows 3 and 5) Rachel Murray/Getty Images for UCLA Mattel Children's Hospital





# UCLA Cancer Researcher Recognized for Exceptional Advancements

On September 27, 2016, Revlon held its annual philanthropic luncheon in support of the **Revlon Women's Health Mission** at the Chateau Marmont Hotel in Hollywood. The celebrity-attended event honored Dr. Dennis J. Slamon (FEL '82) for his outstanding achievements in cancer research. Dr. Slamon serves as director of the Revlon/UCLA Women's Cancer Research Program and director of Clinical/Translational Research at the UCLA Jonsson Comprehensive Cancer Center. He is professor of medicine, chief of the Division of Hematology-Oncology, executive vice chair for research for UCLA's Department of

Medicine and the Bowyer Professor of Medical Oncology in the David Geffen School of Medicine at UCLA. Revlon Chairman Ronald O. Perelman and Revlon CEO and President Fabian Garcia presented Dr. Slamon with a \$1-million contribution for the Revlon/UCLA Women's Cancer Research Program to advance its groundbreaking efforts toward eradicating cancer.

 For more information, contact Margaret Steele at: (310) 794-5244



**Top Left:** (From left) Ronald O. Perelman, chairman of Revlon; Dr. Dennis J. Slamon and Fabian Garcia, CEO and president of Revlon. **Right:** Model Elaine Irwin (left) and breast-cancer survivor Kara Dolce, who spoke at the event. **Bottom Left:** (From left) Academy Award-winners Jennifer Hudson and Halle Berry and Grammy Award-winner Ciara.

Photo: Courtesy of Getty Images for Revlon

# UCLA Health System Board Meeting Delves into Precision Health



**Top Left:** Drs. Daniel Geschwind (left) and John C. Mazziotta. **Top Inside Left:** (From left) Arline, Henry and Tracey Gluck. **Top Inside Right:** Peter Darley Miller (left) and Dr. Clara Lajonchere. **Top Right:** (From left) Eric Schiffer; Johnese Spisso, president of UCLA Health and CEO of the UCLA Hospital System; and Jonathan Roth. **Bottom Left:** Health System Board member Victoria Murray at the precision-health consent stand. **Bottom Inside Left:** (From left) Tracey Gluck, Lynn Wiesner, John O'Reilly, retired California Gov. Gray Davis and Sharon Davis. **Bottom Inside Right:** Delphine Lee (left) and Dr. Yibin Wang, UCLA Cardiovascular Theme Chair and professor of Anesthesiology, Physiology and Medicine. **Bottom Right:** (From left) Susan Horan, Mark Fleischer and Bob Beitcher.

Photos: Vince Buccì

**UCLA Health System** Board members and guests convened at Ronald Reagan UCLA Medical Center on November 9, 2016, for the board's fifth annual meeting. Hosted by Dr. John C. Mazziotta (RES '81, FEL '83), vice chancellor of UCLA Health Sciences and CEO of UCLA Health, and Henry Gluck, chairman of the UCLA Health System Board, the meeting featured a program on the power of precision health to transform patient care. Following opening remarks by Dr. Mazziotta and Gluck, Dr. Clara Lajonchere, deputy director of the newly founded UCLA Institute for Precision Health, spoke about goals for the interdisciplinary institute and how collaboration between the David Geffen School of Medicine at UCLA and UCLA Health will open new frontiers in how UCLA cares for patients and the community. Advancing the university's patient-centric precision-health initiative requires a database that integrates enormous amounts of information about such areas as lifestyle, environment,

genomics and medical histories. This will enable researchers to identify disease patterns that will lead to more personalized approaches in clinical care.

Dr. Daniel Geschwind (RES '95, FEL '97), senior associate dean and associate vice chancellor of precision health, presented his vision for the institute, collaborative agendas at UCLA and the institute's potential for finding treatments and cures for a wide range of diseases by "providing the right treatment, for the right patient, every time."

Volunteers from UCLA's People-Animal Connection greeted guests at the reception following the event, and guests were invited to participate in the precision-health initiative by registering for the database at one of the mobile consent stands.



For more information, contact Nora Bok at:  
(310) 267-0050



# Chairs of Distinction: UCLA Neurologists Named as Wilstein Chairs



In 2013, longtime UCLA friends **Susan and David Wilstein** contributed the first gift to benefit the new California Rehabilitation Institute — now open and located on the site of the former Century City Hospital. At the time, David Wilstein, a partner in the company that owns the building, said, “This property will be used to introduce some of the nation’s best medical-rehabilitation

programs, right in our backyard.” The Wilsteins’ commitment to neurologic rehabilitation expanded to include the endowment of two chairs to support teaching, research and clinical activities in rehabilitation medicine. Now, UCLA neuro-rehabilitation faculty members Drs. Bruce Dobkin (RES ’77) and David Alexander have been named the Susan and David Wilstein Chair in Medicine and the Susan and David Wilstein Chair in Rehabilitation Medicine, respectively.

Dr. Dobkin, founder and director of the UCLA Neurological Rehabilitation and Research Program, professor of neurology in the David Geffen School of Medicine at UCLA and co-director of the UCLA Stroke Program, is one of the preeminent specialists in the field of neuro-rehabilitation. He recently collaborated with the UCLA engineering faculty to develop wearable sensors to remotely monitor the quality of arm and walking/cycling activities of patients following stroke. At the California Rehabilitation Institute, he continues his translational work to test pharmacologic interventions that may enhance skills learning during motor



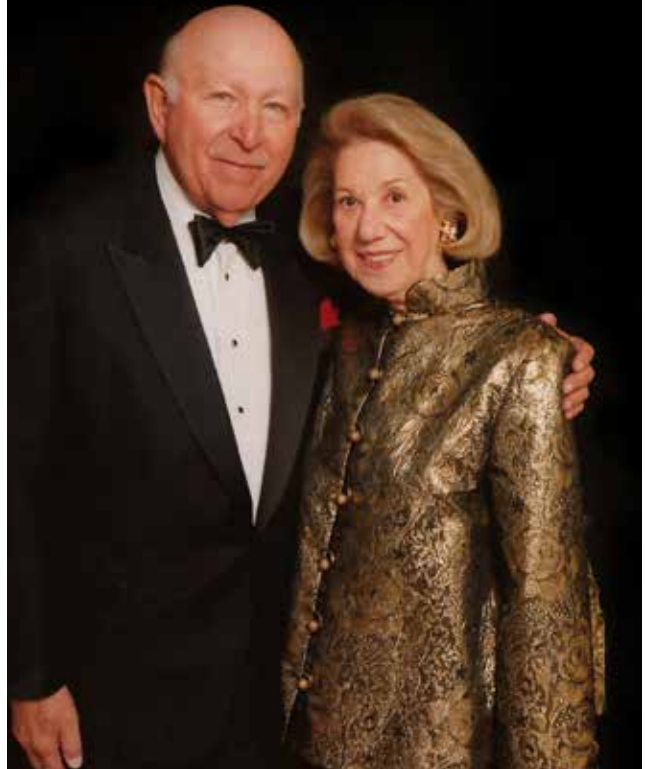
Dr. Bruce Dobkin, Susan and David Wilstein Chair in Medicine.

Photo: UCLA Photography



Dr. David Alexander, Susan and David Wilstein Chair in Rehabilitation Medicine.

Photo: UCLA Photography



David and Susan Wilstein.

Photo: Courtesy of the Wilsteins

and cognitive practice, as well as the application of cellular interventions to augment recovery in highly impaired persons.

“I look forward to using the funding provided by the generosity of the Wilsteins to continue to train outstanding researchers and clinicians and to fund outside-the-box pilot studies in an ongoing effort to improve outcomes for those who are disabled by devastating brain and spinal cord diseases,” Dr. Dobkin said.

Dr. Alexander is a professor in the Department of Neurology at the David Geffen School of Medicine at UCLA and served as the medical director for UCLA’s Neurological Rehabilitation and Research Unit from 2008 until 2016, when he transitioned to become the medical director of the California Rehabilitation Institute. In this role, he formulates and implements policies for the treatment of patients, as well as for the hospital’s quality-assurance and risk-management programs. He also is engaged in the development of national performance measures for hospitals and physicians, with the goal of reducing the gap between evidence-based practice and actual practice. Dr. Alexander co-authored one of the first data-based analyses of scientific evidence, “Post-Stroke Clinical Practice Guideline,” which ushered in the modern era of evidence-based medicine, and has authored multiple national clinical-practice guidelines on stroke and stroke rehabilitation. “It is an honor to receive the Susan and David Wilstein Chair in Rehabilitation Medicine, which will enhance the vital work we are doing at the institute,” he said.



For more information, contact Pamela Thompson at: (310) 267-1837



## UCLA Launches UCLA National Clinician Scholars Program

On September 23, 2016, UCLA celebrated four decades of success in training clinicians to improve health and health services for local and national communities through the **Robert Wood Johnson (RWJ) Clinical Scholars Program** and formally launched the new interprofessional UCLA National Clinician Scholars Program (NCSP) that succeeds it. The NCSP, made possible by support from numerous campus and community partners, including a lead \$5-million gift from an anonymous philanthropist, is in its inaugural year of training early-career physicians and nurses through a highly customized, two-year program that places them directly in community settings to mitigate health disparities and address healthcare challenges in Southern California.

Dr. John C. Mazziotta (RES '81, FEL '83), vice chancellor of UCLA Health Sciences and CEO of UCLA Health, served as emcee for the event, which included a symposium, an awards dinner with



The inaugural UCLA National Clinician Scholars Program Cohort 2016-18, early-career physicians and nurses with Dr. Brook, (back, from left), Dr. Jamal Nabhani, Dr. Andrew Wilson, Dr. Robert H. Brook, Kia Skrine Jeffers, Dr. Carl Berdahl and Dr. Jason Ahn. (Front, from left) Dr. Brandon Yarns, Maria Yefimova, Dr. Angela Venegas-Murillo and Dr. Andrea Garcia.

Photo: Victor Cartagena

entertainment from Tony Galla and an alumni picnic the following day. UCLA Chancellor Gene D. Block presented Dr. Robert H. Brook, professor of medicine and health services at UCLA and founding director of the RWJ Clinical Scholars Program at UCLA, with an award for his more than 40 years of service. The evening also honored Dr. Stuart Gilman, director of Advanced Fellowships and Professional Development at the Veterans Affairs Office of Academic Affiliations; Loretta Jones, founder and CEO of Healthy African American Families; and Dr. Martin Shapiro (RES '78), retired, former professor of medicine and chief of the Division of General Internal Medicine and Health Services Research in the David Geffen School of Medicine at UCLA, for their roles in the RWJ Clinical Scholars Program legacy.



For more information, contact [Laura Pescatore](#) at: (310) 825-1288

## Celebrating UCLA's Leaders of Tomorrow Scholars

On November 7, 2016, faculty leaders from the David Geffen School of Medicine at UCLA joined **UCLA Leaders of Tomorrow Scholarship recipients** at an annual dinner. The event provided an opportunity for the scholars to share their medical-school experiences, career goals, aspirations and the overall impact this scholarship has had on their lives.

The UCLA Leaders of Tomorrow Scholarship, a full-tuition, merit-based award, has empowered 40 aspiring physicians and scientists to pursue careers aligned with their personal passions, unburdened by debt, and has helped enhance the school's reputation and competitiveness. Since its establishment in 2012 by an anonymous donor, the UCLA Leaders of Tomorrow Scholarship has inspired additional giving to medical-student scholarships. In 2016, in an effort to increase student support, the anonymous donor committed to matching donations made to any medical scholarship with a special gift of equal size, up to a total of \$1 million, to the UCLA Leaders of Tomorrow Scholarship. This matching campaign surpassed its goal by raising \$1.2 million for the next generation of medical students.



UCLA Leaders of Tomorrow Scholars with faculty leadership, Drs. Kelsey C. Martin (back row, sixth from left), dean of the David Geffen School of Medicine at UCLA; Clarence Braddock (back row, far right), vice dean for education and Maxine and Eugene Rosenfeld Chair in Medical Education; Linda Baum (front row, second from right); and Eric Esrailian (FEL '06) (front row, far right), co-chief of the UCLA Vatche and Tamar Manoukian Division of Digestive Diseases and Lincy Foundation Chair in Clinical Gastroenterology.

Photo: Todd Cheney/UCLA Photography



For more information, contact [Chelsea Bollea](#) at: (310) 825-5328

# Class of '76 Alumni Celebrate 40th Reunion, Raise Money for Medical Scholarships

On October 22, 2016, the **David Geffen School of Medicine at UCLA Class of 1976** celebrated its 40th reunion with a weekend of activities, including a private tour of UCLA's new medical-education building, Geffen Hall, a meet-and-greet with current medical students and a lecture by Dr. Kenneth Kizer, distinguished professor at the UC Davis School of Medicine and the Betty Irene Moore School of Nursing at UC Davis and director of the Institute for Population Health Improvement at UC Davis Health System. Alumni gathered for dinner at the LUXE Hotel and took a tour of the J. Paul Getty Museum.

In the months leading up to the reunion, classmates raised more than \$55,000 for the Medical Alumni Association (MAA) Class of 1976 Scholarship — established in recognition of the class's efforts that have raised more than \$226,000 for student support since graduation. At the reunion, class leader Dr. Steven Jobst spoke about the shared commitment among their classmates to support the next generation of UCLA medical students. "Thank you to the many classmates who have



Alumni from the Class of 1976 gathered at the LUXE Hotel to celebrate their 40th class reunion.

Photo: Chelsea Bollea

contributed," Dr. Jobst said. "We hope year by year to significantly raise the level of the Class of 1976 Scholarship Fund."

Class leader Dr. Vena Ricketts also spoke, saying, "To whom much is given, much will be required. UCLA has left an indelible footprint on our lives, and I believe it is imperative that the Class of 1976 demonstrate, through our actions, the importance of giving back and making a difference in the lives of future generations of medical students attending the David Geffen School of Medicine at UCLA."



For more information, contact Chelsea Bollea at: (310) 825-5328



(From left) Pancreatic-cancer survivors Lupe Romero, Thom Mrozek and Frida Vasquez-Hallen enjoyed the LACC as an opportunity to connect with families and friends touched by the disease.

Photo: Angela Daves-Haley

## Running for Research

The **19th Annual LA Cancer Challenge** kicked off Halloween celebrations on Sunday, October 30, 2016, on the UCLA campus. Proceeds from the 5K and 10K walk/run, sponsored by the Hirshberg Foundation for Pancreatic Cancer Research, benefit the UCLA Agi Hirshberg Center for Pancreatic Diseases.

The event featured a Fit Family Expo with a Halloween Kids Zone, including a bounce house and pumpkin arts and crafts. Attendees enjoyed music and

entertainment, food and beverages, as well as health and fitness booths. First-, second- and third-place finishers in each age category received a medal and a Big 5 Sporting Goods gift card. The organizers encouraged children to participate by holding the "Kids Can Cure Fun Run" for children ages 2 to 7, and a children's costume parade.

Since 1998, the LA Cancer Challenge has raised more than \$7.3 million for pancreatic-cancer research. The 20th annual event will be held on Sunday, October 29, 2017, at UCLA.



For more information, contact Gretchen McGarry at: (310) 794-4746

## Switzer Prize Will Recognize Excellence in Research

The David Geffen School of Medicine at UCLA has established the **Switzer Prize**, an international award that recognizes excellence in basic-science research. The prize is named in honor of Irma and Norman Switzer, who made a landmark bequest of \$50 million to the David Geffen School of Medicine at UCLA in 2014. The school created a fund to advance medicine and health, and as a tribute to the Switzers, the UCLA Center for the Health Sciences Plaza was renamed the Irma and Norman Switzer Plaza.

The Switzer Prize honors scientists who have made revolutionary discoveries in the basic biological and biomedical sciences that have the potential to transform the understanding of health and disease. Nominations are open to national and international candidates from any institution and may be made



Norman and Irma Switzer.

Photo: Courtesy of the Switzer estate

by individuals or institutions. “I am delighted to institute the Switzer Prize because basic biomedical research is critical to the mission of the David Geffen School of Medicine at UCLA,” said Dr. Kelsey C. Martin, dean of the David Geffen School of Medicine at UCLA. Dr. Kathrin Plath, professor of biological chemistry, will chair the Switzer Prize selection committee. The recipient of the 2017 Switzer Prize, to be named in spring 2017, will receive a \$25,000 honorarium and deliver the first annual Switzer Prize lecture at the David Geffen School of Medicine at UCLA in fall 2017.



For more information, contact Chelsea Bollea at: (310) 825-5328

## High School Seniors Honor Loved Ones with Cakes for Cancer



Ruby Garland (left) and Abby Nathanson.

Photo: Audra Nathanson

Facing the death of a loved one is never easy, and for Marymount High School senior Abby Nathanson, losing her beloved aunt Jodi to non-small-cell lung cancer was very difficult. After 18 months of fighting the disease, Jodi, known for her love of creating sweet treats and for her warrior-like attitude and determination to beat one of the deadliest cancers in the world, lost her life at the age of 53, leaving behind a son and daughter. To cope with the loss, Abby Nathanson decided that the best way to honor her aunt’s memory was to

continue her aunt’s passion of baking cakes. Nathanson founded **Cakes for Cancer** and donates proceeds from the sale of the cakes to the UCLA Jonsson Comprehensive Cancer Center (JCCC) to benefit lung-cancer research.

“I watched my aunt go through the cancer fight for more than a year, and I don’t want other people to go through that,” said Nathanson. “My hope is that all the money raised will help doctors find a cure for this horrible disease.”

Nathanson asked her friend Ruby Garland to help launch Cakes for Cancer by starting a club at their high school to recruit fellow students. The teenagers were amazed when 116 girls volunteered. “When Abby told me about the fundraiser, I immediately wanted to help,” said Garland, vice president of the Cakes for Cancer school club. “I’ve experienced a similar loss of a family member to bone cancer.”

Most of the cakes have a variety of designs on them and the slogan Cakes for Cancer written on the top with frosting. The teens sell the cakes at school or the Pacific Palisades Farmers Market. In less than a year, the girls raised more than \$10,000.

Nathanson’s passion for her fundraiser has grown stronger in the past few months, following her grandmother’s late-stage lung-cancer diagnosis. “My grandmother’s heart-wrenching diagnosis emphasizes the importance of funding cancer research, so that doctors can find a cure,” Nathanson said.

The money raised from Cakes for Cancer helps fund early experimental research and ideas that might not otherwise be supported through traditional sources. Nathanson, Garland and the Cakes for Cancer club are making a difference — or, as they say, “Baking a Difference!”



For more information, contact Margaret Steele at: (310) 794-5244



## Gifts

The David Geffen School of Medicine at UCLA has received an estate gift that will enhance its ability to recruit and retain exceptional medical students. The **Barbara M. Rodgers Endowment** will provide scholarships for students from disadvantaged communities with significant financial need who plan to return to work in their own communities. Such support allows medical students to pursue their passions and become world leaders in health and science.

**Maxine** and **Eugene Rosenfeld** have continued their support of medical education by making a gift of \$1 million to advance simulation training at the David Geffen School of Medicine at UCLA. UCLA was among the first institutions to integrate simulation technology into the curriculum. Such training is now a standard in medical education, as well as a standard in surgical and healthcare-team training. The Rosenfelds' gift enables UCLA to remain a leader in the field and incorporate emerging technologies into the educational experience, enhancing patient safety and improving team-based performance. The Rosenfelds also contributed \$500,000 to support the UCLA Eating Disorders Program under the direction of Dr. Anna-Barbara Moscicki, division chief of Adolescent and Young Adult Medicine.

For more than 60 years, the names **Ralph** and **Shirley Shapiro** have been synonymous with philanthropy at UCLA. They recently continued their commitment with a gift that will benefit the UCLA Neuroscience Research and Education Fund in the David Geffen School of Medicine at

UCLA. This fund, under the leadership of Dr. S. Lawrence Zipursky, has advanced the research of UCLA neuroscientists, who have uncovered a fundamental principle of how neurons in a growing brain are organized, identified risk genes for autism, revealed how memory is stored in the brain and defined proteins that play a role in Alzheimer's, Parkinson's and many other diseases. The Shapiros' contribution to the fund also will support the recruitment of the brightest and best students who will engage in investigations that will help advance genetic studies to uncover the cause of brain diseases and deepen the understanding of the brain's process of learning and memory.

The **Vance Wall Foundation** has made a commitment of \$1 million to the Jonsson Cancer Center Foundation to establish The Carol Vance Wall Program for New Frontiers in Breast Cancer Research: A Focus on Lobular Breast Cancer, under the direction of Dr. Dennis J. Slamon (FEL '82), chief of the Division of Hematology-Oncology, director of Clinical/Translational Research, director of the Revlon/UCLA Women's Cancer Program and Bowyer Professor of Medical Oncology. This innovative effort will harness existing research platforms within the Jonsson Comprehensive Cancer Center to develop new strategies for understanding and treating lobular breast cancer, which represents approximately 10 percent of invasive breast-cancer cases.

**Dr. Ruth P. Walter** has expanded her commitment to UCLA through a gift of \$1 million to establish the Richard D. and Ruth P. Walter Chair in Psychiatry in

the Jane and Terry Semel Institute for Neuroscience and Human Behavior at UCLA. The Walter Chair will support a distinguished neuroscientist whose clinical expertise, research and teaching will focus on the areas where psychiatry, general medicine and neurology intersect.

**Judy** and **Bob Winston** have continued their commitment to UCLA with a gift of \$250,000 to further support the Judith and Robert Winston Chair in Pediatric Urology in the UCLA Department of Urology. The Winston Chair will enable a distinguished faculty member to accelerate his or her teaching, research, training and clinical activities, which will foster advancement in the field and strengthen UCLA's world-class Pediatric Urology Program.

The Jonsson Cancer Center Foundation has received a new pledge from the **Wolfen Family Foundation** to continue its support of the Wolfen Family Lung Cancer Clinical/Translational Research Program under the direction of Dr. Dennis J. Slamon (FEL '82). Founded by Mimi and Werner Wolfen, the Wolfen Family Foundation is a long-standing philanthropic partner in Dr. Slamon's efforts to advance the development of new treatments for lung cancer. This powerful relationship honors the memory of Larry Wolfen, who lost his own brief battle with lung cancer in 1994 at the age of 28, and provides hope to others affected by the disease.



For more information, contact  
Health Sciences Development at:  
(844) 474-4387

## In Memoriam



Frank M. Fenton

Photo: Courtesy of Judie Fenton

**Frank M. Fenton**, former mayor of Beverly Hills, passed away August 4, 2016, after a long and courageous battle with Parkinson's disease. Fenton was an active community leader, civic activist and successful finance professional. He and his wife Judie were longtime supporters of UCLA and generous donors. In 2010, the Fentons helped establish the Fenton Family Clinical Coordinator in the UCLA Department of Neurology to help patients and their caregivers to cope with the challenges of chronic neurological diseases. Judie, an experienced fundraiser

and political-campaign strategist, organized an annual fundraiser to support the Fenton Coordinator position, which remains a valuable resource for patients with Parkinson's disease and their families and caregivers. "Frank was an amazing person," said Dr. Jeff M. Bronstein, Fred Silton Family Chair in Movement Disorders and director of the Movement Disorders Program at UCLA. "He and Judie have helped so many by sponsoring this critical patient-advocate position." Together, the Fentons created a legacy of service to their community. Their impact at UCLA endures, as family and friends continue to show their love and support with gifts in his memory. Fenton leaves behind his beloved wife, children, and grandchildren and his dedicated caregiver Daisy Soto and her family.



Norman Lapin

Photo: Kerry Corcoran/  
David Michael Photography

**Norman C. Lapin**, a longtime friend of the UCLA Department of Neurology, passed away on October 29, 2016. He was 63 years old. Lapin was born in Baltimore, Maryland, and had more than three decades of experience in the healthcare industry. Notably, he was a founding principal of Physicians Surgery Centers, LLC (PSC). During his tenure, Lapin was involved in the development of more than 18 surgery-center ventures with physicians, and he subsequently managed the centers' business operations. Prior to PSC, Lapin held a senior financial-executive position with BMJ Medical Management, Inc., where he

developed new relationships with medical groups and managed their business operations. Lapin was a mathematics and accounting genius who enjoyed playing poker, vacationing in Cabo San Lucas, Mexico, watching college football and helping other people. He provided significant support for UCLA Neurology's ataxia research, directed by Dr. Susan Perlman (RES '79, FEL '80). He is survived by many loving family members and friends.

# A Memorable Healer and a Challenging Case

By E. Richard Stiehm, MD

**We lost a giant of medicine last year**, a healer who was not a physician but whose work has saved countless lives. Paul Terasaki, PhD, was a pioneer in transplant medicine and the father of tissue typing. He was 86 years old when he died. His legacy continues in the lives of the patients now and in the future who are touched by his innovation and brilliance.

Among those patients was a child whose case was one of the most challenging of my career. I first met Dr. Terasaki in 1970, when 3-month-old Maurice Elias came to UCLA following oral thrush — a common fungal infection — that developed into pneumonia, but which, in spite of antibiotics, would not resolve. Our X-ray and biopsy studies revealed that the child had *Pneumocystis carinii*, a rare fungus that causes pneumonia only in immunocompromised patients. Further studies showed a small thymus gland, low gamma globulin levels and poorly functioning lymphocytes, all indicating that the child had no immunity — severe combined immunodeficiency (SCID), better known as “baby-in-the-bubble syndrome.”



Left: Dr. Paul Terasaki working with a student in his lab in 1970. Right: Dr. Terasaki in 2010 outside the Terasaki Life Science Building.

Photos: (1970) Courtesy of One Lambda; (2010) Leslie Barton

A dramatic bone marrow transplant saves a doomed baby boy

## Gift of Life from a Big Sister



The night before she gave some of her bone marrow to her baby brother—and with it, gave him a chance of a normal life—Carol Elias, Maurice's older sister, cradled in her bed at the UCLA Medical Center.

Little Maurice Elias of Woodland Hills, Calif., is only a year old but he has already spent more than half his life in hospitals. He has already died at least three times. Last August, his parents, Louis and Carol Elias, first brought him to the UCLA Medical Center with a “bad cold” and a persistent infection around his mouth. “He had a cold and I just couldn’t see him,” recalls Carol Elias. The UCLA doctors, headed by Dr. E. Richard Stiehm, associate professor of pediatrics, diagnosed Maurice’s illness as serious pneumonia plus a common fungus, in-

fection called thrush. However, when their powerful drugs could not save him either, they began to get suspicious. They ran tests and discovered something terrible: Maurice had been born with a rare genetic disease called “agammaglobulinemia.” He had virtually no immunological defense system.

Maurice’s body produced no antibodies against invading bacteria and other infections. Some of the white blood cells he had did not work properly. His body was so unprotected that even a skin graft from another person

Maurice Elias and his bone-marrow transplant at UCLA was featured in the May 28, 1971, issue of *LIFE* magazine.

A bone-marrow transplant was the only hope for Maurice, but the procedure had only been done successfully in a SCID patient once before. For it to be successful, we needed a donor with lymphocytes that exactly matched Maurice’s cells. Unlike red blood cells, however, for which there are only four types, lymphocytes — known as human leukocyte antigen (HLA) types — have several thousand variations. Our best chance of finding a perfect match would be from a sibling with common parents.

Enter Dr. Terasaki. At UCLA, he pioneered HLA typing, establishing a typing laboratory here in 1969. When I contacted him about Maurice, he told me to bring blood samples from the child, his parents and his four siblings. I hand-delivered samples to his laboratory because I wanted to meet him in person.

Dr. Terasaki, a bespectacled, soft-spoken man, greeted me warmly. Before telling him about Maurice, I asked about his own background — he was born and grew up in the Boyle Heights area of Los Angeles and during World War II was interned for three years with his family in Arizona’s Gila River Relocation Camp — and how he ended up, with a PhD in zoology from UCLA but no medical degree, as a professor in the Department of Surgery. He was hired by the department, he told me, to study ways to prevent graft rejection of kidney transplants. Following a postdoctoral year in London with Sir Peter Medawar, who shared the 1960 Nobel Prize in Physiology or Medicine for identifying HLA, Dr. Terasaki returned to UCLA to develop methods for HLA typing.



...did not have straight off. Until recently, children  
 Maurice's condition (initially associated to some  
 at the age of a year or so. Maurice nearly died  
 pneumonia last fall, and barely survived a second crisi  
 of New Year's. Now, with all other options closed,  
 UCLA doctors decided to try a new procedure pro-  
 posed by Professor Robert A. Good (page 54) of the  
 University of Minnesota. They would try to give Maurice  
 a new immune system by means of a transplant  
 from marrow, a viscous red fluid containing precen-

...that "stem cells" able to mature into the types of normal  
 white blood cells he so desperately needed.  
 Fortunately for Maurice, he is one of a large and lov-  
 ing family. He has three older sisters and a brother, all of  
 them eager to donate some of his or her marrow to save  
 their baby brother. The one whose tissues matched Mau-  
 rice's the most closely turned out to be 13-year-old  
 Tami. By the beginning of February, Maurice seemed  
 well enough to withstand the strain of the operation,  
 and accordingly, Tami was admitted into the hospital.

...but before his transplant,  
 Maurice Elias, weighing  
 only 24 pounds, clung to his  
 mother's shoulder. The lab  
 into his arm was so small  
 that his father was so embar-  
 ased by a tongue protrude that  
 he could not see the needle.

Dr. Terasaki initially said he was optimistic about finding a matched donor among Maurice's four siblings, but repeated typing resulted in three different results, none matching his parents or siblings. "It's never happened before," he said. "Don't do a transplant."

I delivered the sad news to the parents and sent the child home on antibiotics, antifungals and weekly gamma globulin injections. Maurice remained sickly, and he was back in the hospital at nine months of age with persistent vomiting. The fungal infection had extended down his esophagus, preventing him from swallowing. I called Dr. Terasaki again about finding a donor. He requested more blood, so we sent him three more small samples. He typed Maurice repeatedly, and up to 16 different types showed up (a normal result has only four: two from each parent). After comparing all these results, Dr. Terasaki noted that three types showed up repeatedly, and that these were identical to those of his 13-year-old sister Tami.

**"I think Tami might be a match,"** Dr. Terasaki told me. "We can test that by mixing their bloods together to see if Tami's cells recognize Maurice's cells as being foreign." One week later, he said, "I think Tami is a perfect match. But I can't be 100 percent sure."

Maurice's parents agreed to go forward with the transplant. The child's father, a Hollywood actor and stuntman, had kept his

co-workers informed about his child's illness, and now one co-worker told a *LIFE* magazine reporter of the proposed transplant, and *LIFE* contacted the parents to see if they would agree to a story about Maurice before, during and after the procedure. So with a *LIFE* photographer present, Tami was admitted to the hospital, where a hematologist used a large-bore needle to extract four ounces of marrow from her hip and breast bones. The cells were taken to Maurice's crib and injected into his abdominal cavity, from where they would migrate to the liver, spleen and bone marrow.

Two weeks passed, and the candida in the child's mouth spontaneously disappeared. Then, a crash, as Maurice developed signs of graft-versus-host reaction. But two weeks later, after various rounds of therapy, he improved, and follow-up tests showed that the graft had taken. We sent Maurice home, apparently cured.

What a milestone this case would be. Maurice's transplant was the first of more than 4,000 similar transplants to be done at UCLA for children and adults, and the procedure, which today is known as stem-cell transplant, also is used in other diseases, including leukemia, lymphoma and genetic diseases such as sickle cell anemia. The UCLA tissue-typing laboratory founded by Dr. Terasaki is busier than ever.

Dr. Terasaki retired from UCLA in 1999. Fifteen years earlier, he and eight of his former students founded One Lambda, which developed tissue-typing trays and reagents for other transplant units. Not long after he retired, Dr. Terasaki established the Terasaki Foundation Laboratory to study and solve the problem of organ-transplant rejection and failure. And there's also the Terasaki Center for Japanese Studies and an endowed chair in the UCLA Department of Surgery. The Terasaki Life Science Building, for which he and his wife were major contributors, is named in his honor.

He was a man of great vision, warmth and generosity. Maurice and all the patients who have benefited from his contributions owe him a deep debt of gratitude, and we, his colleagues and friends, owe him our deepest respect.



**Dr. E. Richard Stiehm** is professor emeritus of pediatrics in the Division of Allergy, Immunology and Rheumatology. He has been on faculty at UCLA since 1969.

Photo: Courtesy of Dr. E. Richard Stiehm



To read the *LIFE* magazine article about Maurice Elias and his transplant, click on the link to this article at: [magazine.uclahealth.org](http://magazine.uclahealth.org)





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*U.S. News & World Report's*  
Best Hospital Survey ranks  
UCLA No. 1 in Los Angeles,  
No. 1 in California and  
No. 5 in the nation.



Photo: Ann Johansson

In her research, Dr. Kelsey C. Martin, the new dean of the David Geffen School of Medicine at UCLA, explores the process of plasticity: how networks of brain cells store memories about experiences and, in turn, how those experiences rewire the brain.