



Mount Sinai

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Dean's Quarterly

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ACCELERATING SCIENCE — ADVANCING MEDICINE

Mount Sinai's Citywide Campus

Icahn School of Medicine at Mount Sinai occupies a unique place at the heart of the Mount Sinai Health System, the largest health system in New York State, and one of the largest in the nation. With the entire borough of Manhattan and surrounding areas serving as our campus, students at Icahn School of Medicine learn their craft in one of the nation's most diverse and challenging environments.

The Mount Sinai Health System was formed in September 2013, through a combination with Continuum Health Partners, and now includes seven storied hospitals: The Mount Sinai Hospital, Mount Sinai Queens, Mount Sinai Beth Israel, Mount Sinai Beth Israel Brooklyn, Mount Sinai St. Luke's, Mount Sinai Roosevelt, and New York Eye and Ear Infirmary of Mount Sinai.

Our diverse patient population mirrors the changing landscape of New York City and the United States as a whole, including some of the wealthiest neighborhoods and some of the

poorest, many new immigrant groups, along with established ethnic communities, and one of the largest AIDs/HIV populations in the country.

As we move toward complete integration throughout the Mount Sinai Health System, we remain committed to upholding the unique strengths of each hospital, and their collective tradition of teaching and mentoring successive generations of physicians.

Icahn School of Medicine has added 700 faculty members to its roster, and has invited all Health System faculty to participate in course or clerkship teaching opportunities and develop new electives. To maintain the highest teaching standards, faculty will be required to complete online and on-site training. In addition, we anticipate that we will have a significant impact on graduate medical education by serving as one of the largest residency training programs in the United States, with 2,000 residents.



Dennis S. Charney, MD, is the Anne and Joel Ehrenkranz Dean of Icahn School of Medicine at Mount Sinai and President for Academic Affairs, the Mount Sinai Health System.

Our inaugural year will be 2014-2015, with students rotating at Mount Sinai Beth Israel, Mount Sinai Roosevelt, and Mount Sinai St. Luke's for electives and required clerkships in specialties that include: psychiatry, surgery, neurology, medicine/geriatrics, obstetrics and gynecology, and emergency medicine.

INNOVATION IN TECHNOLOGY

Mount Sinai Institute of Technology to Lead in Innovation



Robert K. Steel, New York City's former Deputy Mayor for Economic Development, announced Mount Sinai's \$5 million grant at a press conference late last year.

The Mount Sinai Institute of Technology (MSIT) was established late last year with a \$5 million grant from the New York City Economic Development Corporation (NYCEDC) and a mission to create technology-based solutions that improve human health. As a preeminent center for life sciences innovation, MSIT will serve as an incubator for transformative, cost-effective discoveries.

Through current and future educational

programs—including the recently launched PhD program in Design, Technology, and Entrepreneurship, and new Master's program in Biomedical Informatics—the Institute will focus on areas such as mobile and wireless technology, cloud computing, Big Data, tissue engineering, robotics, mechatronics, drug repurposing and delivery, nanomedicine, and medical devices.

The first programs will begin in the fall 2014. Serving as the primary locus for

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CBS Spotlights the Role of Fruit Flies in Research

Mount Sinai scientist Ross Cagan, PhD, recently shared with television viewers of the *CBS This Morning* show his novel approach of using fruit flies to screen for personalized cancer drugs.

CBS featured Dr. Cagan, Associate Dean of the Graduate School of Biomedical Sciences, at his Icahn School of Medicine at Mount Sinai laboratory where he oversees a team of researchers who replicate a patient's tumor and implant it in a fruit fly. The researchers then test an arsenal of 840 drugs—all approved by the U.S. Food and Drug Administration for other uses—to see whether any shrink the tumor. If they do, additional testing is done.

CBS This Morning interviewed Mark Beeninga, a Mount Sinai patient with medullary thyroid cancer, who had just begun a three-drug treatment regimen that was discovered by Tirtha Das, PhD, an American Cancer Society Fellow and member of Dr. Cagan's lab, using the fruit fly screening method. Mr. Beeninga was tolerating



From left, Ross Cagan, PhD, and Tirtha Das, PhD

the regimen, but it was too early to know if the treatment was working.

Dr. Cagan, also a Professor of Developmental and Regenerative Biology, Oncological Sciences, and Ophthalmology, has long been a proponent of using fruit flies to research human diseases. Given their relative genomic similarity to humans, and their nine-day life cycle, the flies make quick and relatively inexpensive models.

With Mr. Beeninga as the first patient, Dr. Cagan established Mount Sinai's new Center for Personalized Cancer Therapeutics, which will begin screening other patients with medullary thyroid cancer, as well as those with colorectal cancer, and triple-negative breast cancer.

For patient referrals, contact Kathleen Edmondson-Martin, Nurse Coordinator, at kathleen.edmondson-martin@mountsinai.org, or 212-824-8510.

Precision Treatment for Prostate Cancer

The Mount Sinai Health System is taking steps to revolutionize the diagnosis and treatment of prostate cancer through a new multidisciplinary program that combines the best of urology, pathology, and radiology to analyze and inform medical care for each patient.

Under the leadership of Ash Tewari, MBBS, MCh, the Kyung Hyun Kim, MD, Chair in Urology at The Mount Sinai Hospital, and head of the Milton and Carroll Petrie Department of Urology for the Mount Sinai Health System, this precision urology program will combine sophisticated diagnostic imaging with an in-depth genomic analysis of each patient. It is expected to be up and running by this summer.

Dr. Tewari recently joined Mount Sinai from New York-Presbyterian Hospital and Weill Cornell Medical College, where he directed the LeFrak Center for Robotic Surgery, and served as a Professor of Urology and Public Health.

Each hospital within the Mount Sinai Health System will adopt uniform procedures for screening patients and making referrals for those who need more comprehensive testing, which will be done at a newly renovated and expanded central location at 59th Street and Madison Avenue. Testing there will be done in conjunction with Mount Sinai's supercomputer and specialized MRI equipment, so that each patient receives a fully personalized analysis.

Mount Sinai's enhanced ability to analyze the cancer on multiple levels will help direct the patient's treatment and help find cancer that might otherwise go undetected, eliminating the challenge of trying to determine how aggressive a patient's cancer is from a standard biopsy.

"When patients come to our building at 59th and Madison they will receive the highest level of imaging, genomic testing, and DNA analysis. From that, we will recommend a unified plan of action,"



Ash Tewari, MBBS, MCh

says Dr. Tewari. "Sometimes we may decide not to do anything. This will help patients avoid unnecessary biopsies and treatments, yet they will not miss an opportunity for a cure."

For more information, visit www.mountsinai.org/roboticprostate.

Discovering a Key Culprit of Heart Failure

A powerful cellular process responsible for the onset and progression of heart failure has been identified and stopped in its tracks by a team of researchers at Icahn School of Medicine at Mount Sinai; Sanford-Burnham Medical Research Institute; and University of California, San Diego. Their findings appeared in the March 12, 2014, issue of *Nature*.

In the study, the investigators identified a tiny piece of RNA called miR-25 that blocks a gene known as SERCA2a, which regulates the flow of calcium within heart muscle cells. Decreased SERCA2a activity is one of the main causes of poor contraction of the heart and enlargement of heart muscle cells leading to heart failure.

Using a high-throughput functional screening

system developed by researchers at Sanford-Burnham, the team discovered that miR-25 acts pathologically in patients suffering from heart failure, delaying proper calcium uptake in heart muscle cells.

“Heart failure medications do not effectively address the underlying mechanisms that weaken contractile function and lead to the enlargement of heart muscle cells,” says the study’s co-senior author, Roger J. Hajjar, MD, Director of the Cardiovascular Research Center and the Arthur and Janet C. Ross Professor of Medicine at Icahn School of Medicine at Mount Sinai. “Our study provides us with the key evidence we need to begin developing miR-25 as an important new



Roger J. Hajjar, MD

therapeutic target. We will also add our successful technique to block this microRNA to our growing arsenal of promising heart failure therapies that we will further develop and test in clinical trials.”

Currently, Dr. Hajjar’s laboratory is developing novel gene therapies for patients with heart failure. One therapy, currently in phase IIb/III human clinical trials, uses a modified viral vector to deliver a gene that produces SERCA2a, an enzyme found in healthy heart muscle cells. Another therapy, in preclinical development, uses a disabled virus to deliver a gene called SUMO-1, which shrinks enlarged heart muscle cells and improves cardiac function.

New Findings on Ketamine

Ketamine, a drug approved for use as a general anesthetic and sedative, also appears to provide significant relief to patients with major depressive disorder, and those with chronic post-traumatic stress disorder (PTSD), according to two separate studies conducted by researchers at Icahn School of Medicine at Mount Sinai.

In the first study, which appeared online in the April 2, 2014, issue of *Biological Psychiatry*, Mount Sinai researchers found that using an intranasal ketamine spray worked within 24 hours to relieve depressive symptoms in patients previously considered treatment-resistant. Traditional antidepressants, such as selective serotonin reuptake inhibitors (SSRIs) can take weeks or even months to reduce symptoms of depression.

The second study, published online in the April 16, 2014, issue of *JAMA Psychiatry*, showed that an IV infusion of ketamine provided rapid relief to patients with moderate-to-severe PTSD. The low-dose intranasal spray and IV infusions appeared to be safe and well tolerated by patients in the short term.

One of the primary effects of ketamine in the brain is to block the activity of the NMDA (N-methyl-D-aspartate) glutamate receptor. With as many as 40 percent of depressed individuals, or 112 million people worldwide, believed to be resistant to conventional therapies, novel treatments such as ketamine are needed, says James W. Murrough, MD, Assistant Professor of Psychiatry and Neuroscience, and Associate Director of the Mood and Anxiety Disorders Program at Icahn School



Lead authors from Icahn School of Medicine at Mount Sinai: Adriana Feder, MD, Associate Professor of Psychiatry; and James W. Murrough, MD, Assistant Professor of Psychiatry and Neuroscience and Associate Director of the Mood and Anxiety Disorders Program

of Medicine at Mount Sinai, who was the principal investigator of the study on major depression.

Adriana Feder, MD, Associate Professor of Psychiatry at Icahn School of Medicine, and Associate Director for Research, World Trade Center Mental Health Program, and a lead author on the study involving patients with PTSD, says her research should be viewed as a proof-of-concept study. Longer-term clinical trials with ketamine will be required to determine if ketamine will be a clinically useful treatment for PTSD. Mount Sinai’s was the first randomized study to demonstrate the rapid effect of ketamine on patients with PTSD.

In 2000, Dennis S. Charney, MD, Anne and Joel Ehrenkranz Dean, Icahn School of Medicine at Mount Sinai, and President for Academic Affairs, Mount Sinai Health System; and John H. Krystal, MD, Chair of the Department of Psychiatry at the Yale School of Medicine, published the first controlled study showing that intravenous infusions of ketamine produced rapid antidepressant effects.

Dr. Dennis Charney and Icahn School of Medicine at Mount Sinai have been named on a use patent on ketamine for the treatment of depression. The Icahn School of Medicine at Mount Sinai has entered into a licensing agreement for the use of ketamine as therapy for treatment-resistant depression. Dr. Charney and Icahn School of Medicine at Mount Sinai could potentially benefit from the results of the study. In addition, Dr. Charney and Dr. Adriana Feder are named co-inventors on a use patent application filed by Mount Sinai for the use of ketamine as a treatment for PTSD. If ketamine were shown to be effective in the treatment of PTSD and received approval from the U.S. Food and Drug Administration for this indication, Dr. Charney, Dr. Feder, and the Icahn School of Medicine at Mount Sinai could benefit financially.

DISTINGUISHED BY SERVICE

Castle Connolly Honors Susan B. Bressman, MD, as a 'National Physician of the Year'

Susan B. Bressman, MD, a leading researcher, clinician, and educator in movement disorders and neurological conditions, has been named a "National Physician of the Year" for clinical



Susan B. Bressman, MD

excellence by Castle Connolly Medical Ltd., publisher of the annual *America's Top Doctors*® guides. Dr. Bressman is Chair of the Mirken Department of Neurology at Mount Sinai Beth Israel and Chair of Neurology at Mount Sinai Roosevelt and Mount Sinai St. Luke's.

An expert in Parkinson's disease, dystonia, and essential tremor, Dr. Bressman is credited with identifying four genes for dystonia, which is characterized by muscle contractions that cause twisting

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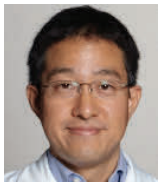
YOUNG PIONEERS



Arvin Dar, PhD,

Assistant Professor in the departments of Oncological Sciences and Structural and Chemical Biology, investigates one

of the most frequently activated pathways in cancer biology: the Ras-Mitogen-Activated Protein Kinase (MAPK) pathway.



Yujin Hoshida, MD,

PhD, Assistant Professor in the Department of Medicine (Division of Liver Diseases), focuses on generating genomic

data of worldwide liver cirrhosis and cancer populations. He has established molecular prognostic indicators that are ready for clinical use, and disseminated the datasets as a public database.

NEW APPOINTMENTS



Raja Flores, MD, has been appointed the founding Chair of the Department of Thoracic Surgery at Icahn School of Medicine at Mount Sinai,

and the Mount Sinai Health System. Dr. Flores, the Steven and Ann Ames Professor of Cardiothoracic Surgery, was recruited to Mount Sinai in 2010 to serve as Chief of the Division of Thoracic Surgery in the Department of Cardiothoracic Surgery.

A pioneer in the treatment of mesothelioma, Dr. Flores is also recognized for establishing VATS lobectomy—a minimally invasive approach using three small incisions—as the gold standard in the surgical treatment of lung cancer.

Dr. Flores is currently Principal Investigator of the Libby Epidemiology Research Program, a \$4.8 million RO1 grant funded by the Centers for Disease Control and Prevention (CDC) and the Agency for Toxic Substances and Disease Registry (ATSDR). This project aims to address questions relating to the health consequences of asbestos exposure.

After earning his medical degree from the Albert Einstein College of Medicine in 1992, Dr. Flores completed his surgical residency and training at Columbia-Presbyterian Medical Center, and a Thoracic Oncology Clinical Research Fellowship at Brigham and Women's Hospital/Dana Farber Cancer Institute/CALGB in Boston. He completed his Cardiothoracic Surgery Residency at Brigham and Women's Hospital at Harvard Medical School. He has more than 100 publications in peer-reviewed journals, and serves on several editorial boards.



Paul J. Kenny, PhD,

a world-renowned researcher in the neurobiology of obesity and drug addiction, has joined Icahn School

of Medicine at Mount Sinai as Chair of the Dorothy H. and Lewis Rosenstiel Department of Pharmacology and Systems Therapeutics. Dr. Kenny also was named Ward-Coleman Chair in Pharmacology and Experimental Therapeutics and Director of the Experimental Therapeutics Institute.

Dr. Kenny has helped advance the understanding of the mechanisms behind addiction-like behaviors, which has led to the development of medications for these behaviors. His multidisciplinary research involves the study of behavioral paradigms, physiological analyses, and the molecular underpinnings of neurobehavioral disorders.

Prior to joining Mount Sinai, Dr. Kenny served as an Associate Professor with Tenure in the departments of Molecular Therapeutics and Neuroscience at Scripps Research Institute in Jupiter, Florida.

Dr. Kenny earned his PhD in neuroscience from King's College London, and completed his postdoctoral work at Scripps Research Institute in La Jolla, California. He is an editor of *The Journal of Neuroscience*, and an editorial board member of *Neuropsychopharmacology*, *Neuropharmacology*, *Frontiers in Behavioral Research*, and *Neuroscience*.



Andrew Leibowitz, MD,

recently was named Chair of the Department of Anesthesiology at Icahn School of Medicine at Mount Sinai. He succeeds David L.

Reich, MD, who is now President of The Mount Sinai Hospital and Mount Sinai Queens.

In his prior role as Executive Vice Chair of Anesthesiology, Dr. Leibowitz helped oversee the deployment of more than 150 staff across The Mount Sinai Hospital and Mount Sinai Queens, and was responsible for authoring and implementing clinical policies and procedures, patient triage, and conflict resolution.

After receiving his medical degree from the Mount Sinai School of Medicine at City University of New York in 1983, Dr. Leibowitz completed training in Internal Medicine, Anesthesiology, and Critical Care Medicine at Montefiore Hospital in the Bronx, where he also served as an attending physician in the Department of Medicine, Emergency Services.

Dr. Leibowitz has authored or co-authored 25 original investigations in peer-reviewed journals and has contributed to more than 30 peer-reviewed publications.

A Transformational Gift for Palliative Care

Benefactors Patty and Jay Baker recently donated \$10 million to establish the Patty and Jay Baker National Palliative Care Center at Mount Sinai, to support public policy, education, training, research, and national outreach to improve the quality of care for seriously ill Americans and their families.

The transformational gift was announced by the Care Center’s Co-Directors Diane E. Meier, MD, and R. Sean Morrison, MD, who said the center’s mission was to “ensure that all patients living with serious illness and their families understand the role of palliative care in improving quality of life and request it; that all clinicians have the knowledge and skills to provide palliative care; and that all health care institutions are equipped to deliver it.”

The Mount Sinai Health System’s Brookdale Department of Geriatrics and Palliative Medicine is a leader in the field, offering clinical, educational, and research programs that serve as national models that are adopted at major medical centers.

Dr. Meier also serves as Director of the Center to Advance Palliative Care (CAPC), and Dr. Morrison serves as Director of the Lilian and Benjamin Hertzberg Palliative Care Institute, and the National Palliative Care Research Center (NPCRC). The new



From left: R. Sean Morrison, MD, and Diane E. Meier, MD, with benefactors Jay and Patty Baker

Patty and Jay Baker National Palliative Care Center will serve as a bridge that advances the field and unites the clinical focus of CAPC and the evidence-based research of NPCRC.

While palliative care is an established medical subspecialty that has been shown to improve quality of care and quality of life for patients and families facing serious illness,

research conducted in 2011 by Public Opinion Strategies in Washington, D.C., concluded that three out of four Americans had minimal to no knowledge of palliative care and its benefits. Furthermore, the poll revealed that more than 90 percent of Americans would want the added layer of support that palliative care provides for themselves and their loved ones if they were seriously ill.

New Global Health Institute

Icahn School of Medicine at Mount Sinai has created The Arnhold Global Health Institute to foster collaboration among Mount Sinai’s scientists, physicians, and students, and those from top international medical centers to prevent disease, provide care, and build health care capacity for the world’s underserved populations.

The Arnhold Global Health Institute was created with generous gifts from The Mulago Foundation and The Arnhold Foundation Inc. The Institute’s interim director will be Philip J. Landrigan, MD, MSc, the Ethel H. Wise Professor of Preventive Medicine; Chair, Department of Preventive Medicine; and Director of the Children’s Environmental Health Center at the Icahn School of Medicine at Mount Sinai.

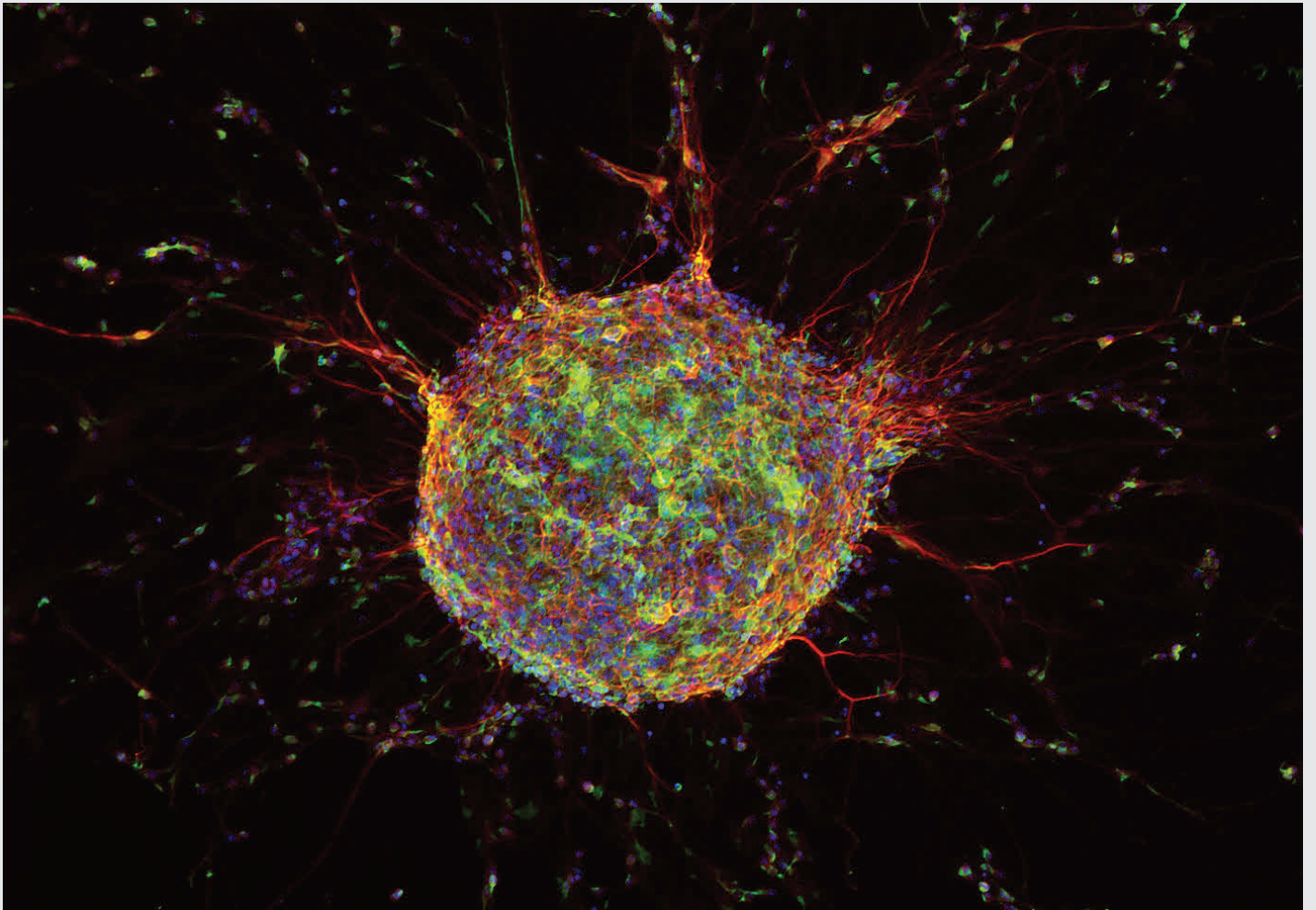
Mount Sinai has many global health programs throughout the world, including Liberia, Haiti, Mozambique, India, the Dominican Republic, the Philippines, Myanmar, and the United States. These programs include mission-driven surgical teams, and teams that provide education to local health care workers.

Support for Skin Cancer Research

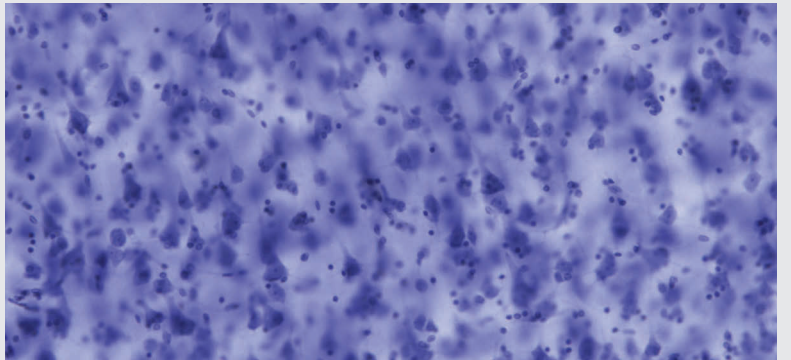
Mount Sinai Health System Trustee Eric Waldman recently pledged \$10 million through The Gaisman Foundation to support melanoma and skin cancer research. In recognition of this gift, Mount Sinai Hospital’s Department of Dermatology will be renamed the Kimberly and Eric J. Waldman Department of Dermatology.

Mr. Waldman has committed more than \$30 million to Mount Sinai through The Gaisman Foundation. He is a nephew of the late Catherine “Kitty” Gaisman, a longtime Mount Sinai Trustee and graduate of Mount Sinai’s School of Nursing.

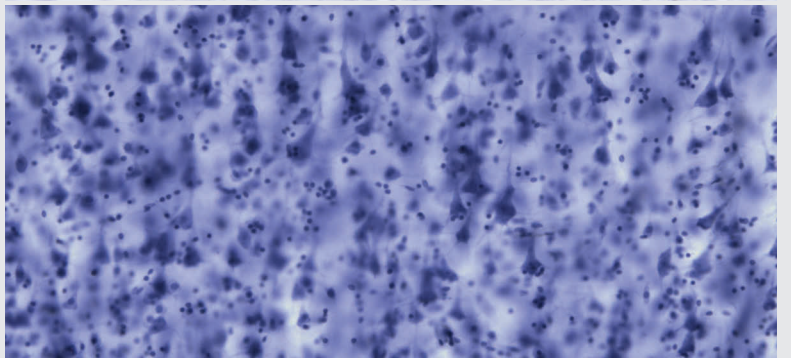
Images from The Friedman Brain Institute at Mount Sinai



Above: Stem cells isolated from a mouse brain aggregate into a spherical structure called a neurosphere when grown in cell culture. The cells are capable of becoming mature neurons, as shown by red labeling. Understanding the differentiation and growth of neural stem cells is being pursued as a repair strategy for spinal cord and brain injuries. Image by Hongyan (Jenny) Zou, MD, PhD (Neurosurgery and Neuroscience)



Right: Images of neurons in the prefrontal cortex, an area responsible for executive functioning, including planning, decision-making, problem-solving, and social behavior. The top panel shows neurons in a typical child, and the bottom in a child with autism. Note the qualitative increase in the number of neurons in the child with autism. Image by Neha Uppal, PhD (Neuroscience and Seaver Autism Center)



› Mount Sinai Institute of Technology to Lead in Innovation

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Mount Sinai's academic partnership with Rensselaer Polytechnic Institute, MSIT will pursue partnerships with pharmaceutical, biotechnology, information technology, and insurance companies; venture capital firms; and organizations such as the National Science Foundation.

Geoffrey Smith, Professor, Department of Health Evidence and Policy at Icahn School of Medicine at Mount Sinai, is the Founding Director of MSIT. The \$5 million grant will be used to establish several facilities at the Icahn School of Medicine campus, including a Rapid Prototyping Center; an Innovation Lab; and a Teaching Facility with electronically enabled classrooms, student meeting spaces, and computer-driven visualization technology.

The creation of the MSIT reflects the NYCEDC's stated mission to promote life sciences and health care innovation in New York City as a means of encouraging investment, generating prosperity, and strengthening the city's competitive position. The Institute will promote the use of innovation to improve patient outcomes and quality of life for people in New York City and worldwide.

ADVANCEMENTS IN ROBOTICS

Robotic Device Helps Patients Walk

A robotic exoskeleton with powered leg attachments that enable paraplegics to stand upright, walk, and climb stairs, is being used by a select group of patients at The Mount Sinai Hospital's Department of Rehabilitation Medicine, one of the first departments in the nation to begin offering these robotic devices.

The ReWalk exoskeleton has an external frame that adjusts to a patient's legs. Motors then power movement at the hips and knees, and a battery-powered computer coordinates that movement into a walking pattern. The patient, who must have use of his or her arms, presses a device worn like a wristwatch in order to stand upright, walk, and climb stairs.

The U.S. Food and Drug Administration (FDA) has approved the ReWalk and a similar device called the Ekso Bionics™ for use in rehabilitation facilities. Patients and their advocates hope that FDA approval will follow for home use, as well.

In addition to improving their independence, patients note other benefits of the device, including improved bowel and bladder functions, improved blood pressure, and a reduction in body fat.

Alan J. Kozlowski, MD, Assistant Professor of Rehabilitation Medicine at Icahn School of Medicine at Mount Sinai, says learning how to use the device can take anywhere from 24 to 70 sessions, three times a week.



Mount Sinai patient Errol Samuels learns to walk again with the help of the ReWalk robotic exoskeleton.

› Castle Connolly Honors Susan B. Bressman, MD, as a 'National Physician of the Year'

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and repetitive motions or abnormal postures. In 2006, she and her colleagues at Albert Einstein College of Medicine reported that a specific gene mutation is a major cause of Parkinson's disease among Jews of Central and Eastern European descent. The results of their research were published that year in *The New England Journal of Medicine*.

Castle Connolly selected seven award recipients from among thousands of nominations that were submitted by physicians and leaders of major medical centers, specialty hospitals, teaching hospitals, and regional

and community medical centers throughout the United States. The award honors dedicated physicians whose skills have improved the lives of countless people throughout the world.

Under her leadership, Mount Sinai Beth Israel has become one of the leading sites for the Michael J. Fox Foundation-sponsored international consortium, which studies the genetics of Parkinson's disease. The Department of Neurology also has one of only 39 National Parkinson Foundation Centers of Excellence.



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**Icahn
School of
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Icahn School of Medicine at Mount Sinai is Home to 21 Multidisciplinary Institutes

THE ARNHOLD GLOBAL HEALTH INSTITUTE

Interim Director:

Philip J. Landrigan, MD, MSc

THE BLACK FAMILY STEM CELL INSTITUTE

Director: Ihor R. Lemischka, PhD

THE CHARLES BRONFMAN INSTITUTE FOR PERSONALIZED MEDICINE

Director: Erwin P. Böttinger, MD

DIABETES, OBESITY AND METABOLISM INSTITUTE

Director: Andrew Fyfe Stewart, MD

EXPERIMENTAL THERAPEUTICS INSTITUTE

Director: Paul J. Kenny, PhD

THE FRIEDMAN BRAIN INSTITUTE

Director: Eric J. Nestler, MD, PhD

GLOBAL HEALTH AND EMERGING PATHOGENS INSTITUTE

Director: Adolfo García-Sastre, PhD

ICAHN INSTITUTE FOR GENOMICS AND MULTISCALE BIOLOGY

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THE MINDICH CHILD HEALTH AND DEVELOPMENT INSTITUTE

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MOUNT SINAI INSTITUTE OF TECHNOLOGY

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