



Mount Sinai

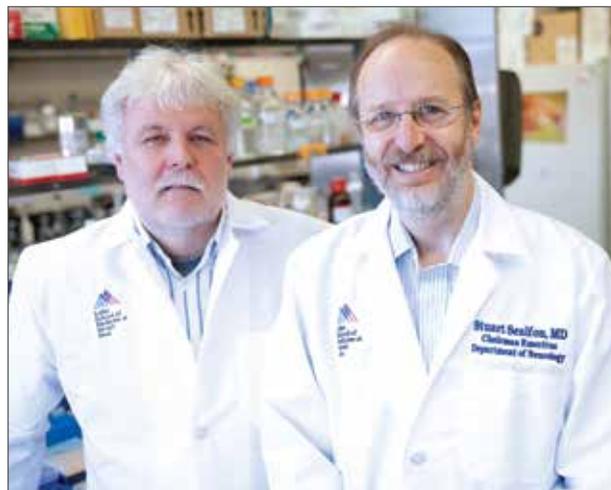
# inside

A PUBLICATION OF THE MOUNT SINAI HEALTH SYSTEM

February 20 - March 5, 2017

## Mount Sinai Launches Groundbreaking Study to Map The Benefits of Exercise on a Molecular Level

Empirical evidence shows that exercise improves and prevents a large number of diseases, but the scientific basis and molecular mechanisms responsible for these beneficial effects are largely unknown. Two researchers at the Icahn School of Medicine at Mount Sinai have been awarded \$15.5 million by the National Institutes of Health (NIH) Common Fund—designated as the Physical Activity Genomics, Epigenomics/transcriptomics Site (PAGES)—to advance this knowledge by mapping the molecular signals between different parts of the body during physical activity.



From left: Martin John Walsh, PhD; and Stuart Sealfon, MD

Stuart Sealfon, MD, the Sara B. and Seth M. Glickenhause Professor of Neurology, Director of the Center for Advanced Research on Diagnostic Assays, and Chairman Emeritus of the Department of

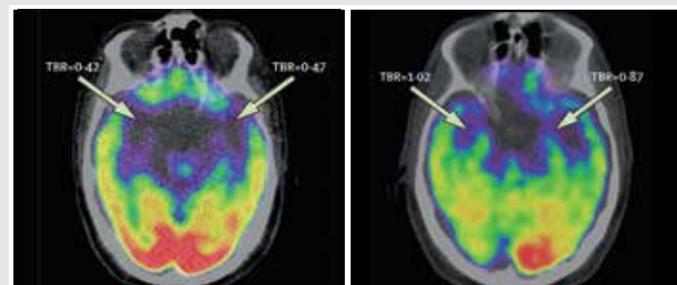
Neurology; and Martin John Walsh, PhD, Director for the Center of RNA Biology and Medicine, and a Professor of Pharmacological Sciences, Genetics and Genomic Sciences, and Pediatrics, will employ the latest genomic technologies in their investigation. They are part of a \$170 million NIH program called the Molecular Transducers of Physical Activity Consortium (MoTrPAC), which involves more than two dozen academic research institutions around the country.

Using various genomic, epigenomic, transcriptomic, proteomic, and metabolomic technologies, Drs. Sealfon and Walsh, together with MoTrPAC, will analyze tissue and blood from 3,000 individuals in diverse racial, ethnic, gender, and age groups, and fitness levels.

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## Study Reveals Path Linking Stress and Heart Health

A Mount Sinai researcher has played a key role in tracing—for the first time—the mechanisms that link stress to cardiovascular events, like heart attack or stroke. Zahi A. Fayad, PhD, Director of the Translational



Patients with more activity (the purple area throughout the image at right) in the brain's center for stress and fear were more likely to have a heart attack or stroke, compared to patients with less activity (at left).

and Molecular Imaging Institute at the Icahn School of Medicine at Mount Sinai, was co-senior author of a paper on the research, which was published January 12, 2017, in *The Lancet*. The work will be expanded in a five-year project, funded by a new \$7 million grant from the National Institutes of Health (NIH).

The research found that people who had more activity in an area of the brain that regulates the body's response to stress and fear, called the amygdala, were more likely to have a heart attack or stroke than those with less activity. The findings “provide more evidence of a heart-brain connection,” Dr. Fayad says. “It may seem obvious, but until now the evidence had not been shown. We had not seen the mechanistic link.”

The *Lancet* paper was based on two complementary studies. One study was led by the first author of the paper, Ahmed A. Tawakol, MD,

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# Mount Sinai Offers 3D Printing and Virtual Modeling Services for Clinicians and Researchers

The Mount Sinai Health System recently launched the Medical Modeling Core, a collaboration led by the Department of Neurosurgery, where Mount Sinai clinicians can order 3D and virtual models that can be used to explain procedures to patients, plan surgeries, and even conduct trial runs.

“Our simulation, prototyping, and 3D printing resources developed here at Mount Sinai are rare for a medical institution,” says Joshua B. Bederson, MD, Professor and Chair of Neurosurgery for the Mount Sinai Health System, and Clinical Director of the Neurosurgery Simulation Core at the Icahn School of Medicine at Mount Sinai. “In conjunction with simulation, they also play an important role in the patient-consultation process.”

The team is led by Anthony B. Costa, PhD, Assistant Professor in the Department of Neurosurgery,

Scientific Director of the Neurosurgery Simulation Core, and Director of the Medical Modeling Core. Dr. Costa has developed digital tools to expedite the process of turning radiological data into 3D models and interactive, virtual modeling. The work is done rapidly—“in days, as opposed to weeks,” Dr. Costa says—and at a significantly lower cost than outside vendors. Recent

models include brain tumors with surrounding vasculature and cranial nerves, spine modeling for the correction of severe scoliosis, and pelvic models for the planning of total hip replacement.

“When patients come in and are told they require a surgical procedure, it is often difficult for them to have a clear picture of what is going on in their own body,” Dr. Costa says. And 3D printing enables patients to pick up a model of the area affected, as the physician explains their condition and how the surgical procedure will work. “This offers patients confidence about what is about to happen to them,” Dr. Costa says. “We have found this to be a very successful approach.”

Mount Sinai clinicians and researchers who are interested in Medical Modeling Core services may visit [icahn.mssm.edu/medicalmodeling](http://icahn.mssm.edu/medicalmodeling) or contact [holly.oemke@mountsinai.org](mailto:holly.oemke@mountsinai.org).



Joshua B. Bederson, MD, with a 3D model and an interactive simulation of the skull of a patient with a large epidermoid tumor—tools he used in planning the patient’s surgery.

## › Groundbreaking Study to Map the Benefits of Exercise *(continued from page 1)*

The samples will identify exercise-related chemical messengers and molecular responses that can provide the scientific basis for developing more effective individualized prescriptions of exercise, as well as the development of new drug therapies.

Where exercise has been studied, the benefits are measured in results such as less body fat, and lower cholesterol, sugar levels, and blood pressure. At molecular dimensions, the links between exercise and health remain mysterious.

“How is physical activity preventing or improving various cancers?” Dr. Sealfon asks. “We really don’t know the mechanisms.” The same holds true for Parkinson’s and Alzheimer’s diseases, depression, and other illnesses that have been shown in clinical studies to respond to exercise.

Based on their future findings, Drs. Sealfon and Walsh can foresee the creation of medications that mimic the signals released by exercising—so-called *exercise mimetics*—that would be particularly beneficial for patients with disorders that prevent or restrain their movement.

According to NIH Director Francis S. Collins, MD, PhD, the current availability of advanced technology has made it possible to launch

this bold new study. “This is the right time to take that technology forward,” he said. “We can now contemplate doing something that even a year ago would have been pretty hard to imagine.”

Physicians nowadays prescribe exercise routinely with particular attention to heart disease, weight control, and stress-related ailments. But, ultimately, the goal is to help them prescribe exercise on an individual basis. Such specificity would be based upon a clear understanding of the physical activity needed to assist each patient, rather than a one-size-fits-all approach.

The information gathered by all of the research sites involved in the consortium will be stored in a publicly accessible database that scientists can use to study almost every organ and tissue in the body.

Says 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: “To fully understand and subsequently transform clinical medicine’s use of physical activity for health management, a large-scale effort like this is imperative. Receiving this award is a testament to our outstanding faculty and our investment in genomics and systems biology research, which have positioned us to be able to contribute to this groundbreaking translational endeavor.”

# Top Honors for Total Hip and Total Knee Replacement

Mount Sinai West and Mount Sinai Beth Israel have earned The Joint Commission's Advanced Certification for Total Hip and Total Knee Replacement, joining an elite group of institutions nationwide that have earned this highest recognition for quality and safety.

The Joint Commission established Advanced Certification for Total Hip and Total Knee Replacement in 2016 in response to growing demand, due to an aging population and expanding clinical indications for the procedure, along with an increased focus by physicians on helping patients manage pain, improve their quality of life, and return to everyday activities. The Advanced Certification is for two years.

Each year, nearly 700,000 total hip and knee replacements are performed in the United States. The surgery is among the most common performed, and the number of procedures is expected to quadruple by 2050, according to The Joint Commission.

"This achievement points out our quality and exceptional orthopedic care," says Leesa M. Galatz, MD, Mount Sinai Professor of Orthopaedics at the Icahn School of Medicine at Mount Sinai and Chair of the Leni and Peter W. May Department of Orthopaedic Surgery. "We are dedicated to giving patients top-level orthopedic care throughout the Mount Sinai Health System."



From left: Peter McCann, MD; Leesa M. Galatz, MD; and Steven F. Harwin, MD

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*"This achievement points out our quality and exceptional orthopedic care."*

– Leesa M. Galatz, MD

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Michael J. Bronson, MD



Evan L. Flatow, MD

The Joint Commission conducted site visits at Mount Sinai West and Mount Sinai Beth Israel that focused on all aspects of the total hip and knee replacement process, including pre-admission testing, operating room holding, the operating room, post-anesthesia care, services in the inpatient rehabilitation unit, and home care arrangements.

To prepare for the visits, the hospitals implemented a vast collaborative effort involving physicians, nursing, physician assistants, social workers, and staff from rehabilitation medicine, the quality improvement subcommittee, food and nutrition, and environmental services.

"Mount Sinai West staff demonstrated exemplary teamwork to showcase our commitment to providing the highest level of care," says Evan L. Flatow, MD, President, Mount Sinai West, and Bernard J. Lasker Professor of Orthopaedic Surgery. "We congratulate all involved in this remarkable achievement and look forward to continuously improving patient safety and quality of care."

Michael J. Bronson, MD, Chair, Orthopaedic Surgery at Mount Sinai West and Mount Sinai St. Luke's, says the certification "shows that Mount Sinai West provides an exceedingly high level of care in every parameter of joint replacement when it comes to positive outcomes, low complication rates, and high patient satisfaction."

"The quality of hip and knee replacement surgeries can vary greatly among hospitals, and our exceptional performance will help us differentiate our program," says Steven F. Harwin, MD, who was Chief of Adult Reconstruction and Total Joint Replacement at Mount Sinai Beth Israel when The Joint Commission conducted the review. Dr. Harwin, Professor of Orthopaedic Surgery, recently joined the Department of Orthopaedic Surgery at Mount Sinai West.

For example, last year at Mount Sinai West and Mount Sinai Beth Israel, the infection rate for total hip replacement and total knee replacement—a key concern for patients—was below the national average.

"The Joint Commission recognizes the outstanding quality of care provided by our entire team of caregivers, from nurses in the operating room to physical therapists, internists, and orthopedic surgeons," adds Peter McCann, MD, Chair of the Department of Orthopaedic Surgery at Mount Sinai Beth Israel and Professor of Orthopaedics.

# Mount Sinai Student Named to *Forbes* 30 Under 30 List

Growing up as an undocumented immigrant in Fremont, California, had a profound impact on Denisse Rojas Marquez and shaped her belief that access to higher education and quality health care should be available to all. In 2012, she gained relief from deportation through President Barack Obama's Deferred Action for Childhood Arrivals program and in 2015 gained acceptance to the Icahn School of Medicine at Mount Sinai. Her achievements earned her the prestigious Paul & Daisy Soros Fellowship for New Americans award.

Now, Ms. Marquez can add another accomplishment to her impressive resume. She was named to the *Forbes* 30 Under 30 list of young achievers, which appeared in the magazine's January 24, 2017, issue. Her work in cofounding Pre-Health Dreamers (PHD), a growing network of more than 800 undocumented students from 42 states who are interested in pursuing careers in science and health care, was cited by *Forbes* in its inclusion of Ms. Marquez. PHD provides resources and advocates for progressive institutional and governmental policies. Ms. Marquez's inspiration for PHD is based on her experiences as a student who had to navigate her own educational and career aspirations with limited resources.

"Denisse embodies all of the best values and highest aspirations of a true physician-advocate," says David Muller, MD, Dean for Medical

Education at the Icahn School of Medicine at Mount Sinai, and the Marietta and Charles C. Morchand Chair for Medical Education. "I have great respect for the work she has done and the lives she's changed as a result of her accomplishments."



Denisse Rojas Marquez

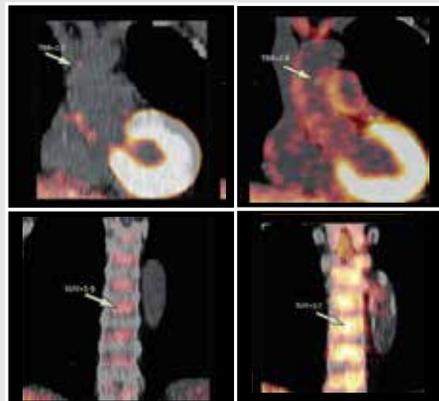
## › Study Reveals Path Linking Stress and Heart Health *(continued from page 1)*



Zahi A. Fayad, PhD  
Co-Director of the Cardiac MR PET CT Program at Massachusetts General Hospital in Boston. The study analyzed data from 293 people who from 2005 to 2008 underwent positron emission tomography-computed tomography (PET/CT) brain imaging, primarily for cancer screening, using a radiopharmaceutical called FDG that measures activity in the brain, vascular system, and bone marrow. Researchers found that over the next four years, 22 of the patients had cardiovascular events. In that group, many patients had initially shown a high level of activity in the amygdala and a greater amount of inflammation in the aorta, and in the bone marrow, where new blood cells are made. The latter two factors can contribute to atherosclerosis, the hardening and narrowing of the arteries, which increases the risk for heart disease. This pathway—from emotional stress to increased white blood cells to inflammation to atherosclerosis—has been identified in animals, but until now, not in humans.

Co-Director of the Cardiac MR PET CT Program at Massachusetts General Hospital in Boston. The study analyzed data from 293 people who from 2005 to 2008 underwent

The second study, conducted by Dr. Fayad's team at the Translational and Molecular Imaging Institute, examined 13 people who were being treated for post-traumatic stress disorder at Mount Sinai's Mood and Anxiety Disorders Program. These patients completed a questionnaire about their perceived stress levels and underwent FDG-PET/MR scans. The team found that the patients' stress levels were linked to increased activity in the



A patient with high activity in the amygdala also showed inflammation in the aorta (top right) and bone marrow in the spinal column (bottom right). Another patient with low activity in the amygdala showed little or no inflammation in the aorta (top left) and bone marrow (bottom left).

amygdala, as well as increased inflammation in the blood vessels.

In the new project, Dr. Fayad—as overall principal investigator—will work with Dr. Tawakol; the leaders of the Mood and Anxiety Disorders Program, 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 Program Director James Murrough, MD, Assistant Professor of Psychiatry, and Neuroscience; and others at Mount Sinai.

The project is seeking to study three groups of patients: 80 who are being treated for PTSD; 80 who are "resilient," with past exposure to trauma but a low perceived level of stress; and 80 who have not been exposed to trauma. It will explore the possibility that alleviating stress could not just improve patients' psychological sense of well-being, but also improve their physical atherosclerotic health. "In the future, chronic stress can be treated as a risk factor for cardiovascular disease," Dr. Fayad says, "so we can screen for it and manage it like other risk factors."

# Around the Health System

## Mount Sinai Celebrates Heart Health Month

### Go Red for Women Day

Thousands of visitors and staff attended health fairs held across the Mount Sinai Health System on Friday, February 3—Go Red for Women Day®—which spotlights cardiovascular disease. “Typically, women overestimate their risk for cancer and underestimate the risk for heart disease,” the leading cause of death for American women, says Mary Ann McLaughlin, MD, Associate Professor of Medicine (Cardiology), Icahn School of Medicine at Mount Sinai. “A shared commitment to the cardiovascular health and well-being of the community has allowed us to offer this event for 14 years in a row,” says Beth Oliver, DNP, RN, Senior Vice President, Cardiac Services, Mount Sinai Health System. The fairs featured free screening for blood pressure, total cholesterol, triglyceride level, and body mass index. Spearheaded by Mount Sinai Heart nurses, the event was a multidisciplinary effort, with the support of the Patricia S. Levinson Center for Community and Multicultural Affairs, the Diabetes and Cardiovascular Alliance, Clinical Nutrition Services, and more.



### Celebrating Multicultural Foods

Mount Sinai Fit’s Wellness Lunch and Learn series, “Mount Sinai Cooks Around the World,” featured advice about mindful, heart-healthy eating, with demonstrations by Mount Sinai Health System officials, from left, Beth Oliver, DNP, RN, Senior Vice President, Cardiac Services; Annapoorna Kini, MD, Director, Cardiac Catheterization Laboratory; Jane Maksoud, RN, MPA, Senior Vice President and Chief Human Resources Officer; and Archimedes Bibiano, Adaptive Yoga and Mindfulness Instructor. During the Wednesday, February 8, event at The Mount Sinai Hospital, Dr. Kini prepared Indian dishes such as gobi masala and yellow dahl, made with lentils and flavored with turmeric and ginger, and Dr. Oliver shared a Mediterranean dish of salmon with broccoli and roasted cherry tomatoes over quinoa. Ms. Maksoud said the event showcased the “rich cultural aspects” of Mount Sinai: “We all came from someplace else at one point. We brought many traditions with us and should celebrate those traditions every day.”

### Valentine’s Day Party for Pediatric Heart Patients

Dozens of pediatric heart patients were treated to an early Valentine’s Day party at The Mount Sinai Hospital on Wednesday, February 8. The children played games, crafted heart-shaped picture frames, and took photos at a selfie station. The event also reunited patients with the staff who cared for them both as inpatients and as outpatients, including Khanh H. Nguyen, MD, Associate Professor and Chief of Pediatric Cardiothoracic Surgery, Icahn School of Medicine at Mount Sinai, shown below with a young patient and her mother.



## Udall Parkinson's Disease Center Conference

All are invited to attend the Udall Parkinson's Disease Center Conference hosted by The Morris K. Udall Center of Excellence for Parkinson's Disease of Harvard Medical School, and the Icahn School of Medicine at Mount Sinai's Department of Neurology. The Conference will feature presentations by Parkinson's disease researchers, including Mount Sinai faculty. For more information, or to register, go to [udallcenter.bwh.harvard.edu/udall-conference-2017](http://udallcenter.bwh.harvard.edu/udall-conference-2017).

Tuesday, February 28  
1 – 6 pm  
Hess Center, Davis Auditorium

## Children's Environmental Health Center: Decade of the Developing Brain Symposium

The Children's Environmental Health Center will host its 10th Annual Winter Symposium, "Decade of the Developing Brain." Physicians and researchers from Icahn School of Medicine at Mount Sinai and the Harvard T.H. Chan School of Public Health will discuss how early life stress can disrupt development and negatively impact long-term health trajectories. The symposium will feature talks on environmental and genetic factors and how they contribute to the etiology of autism and neurodevelopment toxicity associated with environmental chemicals. For additional information, email: [megan.markham@mssm.edu](mailto:megan.markham@mssm.edu).

*Two CME credits will be available at the event.*

Friday, February 24  
8:30 am (Check-in/Breakfast)  
9:30 am – Noon (Program)  
The New York Academy of Medicine  
1216 Fifth Avenue at 103rd Street

## Celebrating Black History Month

The Mount Sinai Health System Office for Diversity and Inclusion presents two events: a screening of the documentary *13th* by Ana DuVernay that examines the 13th Amendment, the U.S. prison system, and the history of racial inequality; and a discussion, titled "Debriefing *13th*," with Ulrick Vieux, DO, Director of the Psychiatry Residency Program, Orange Regional Medical Center, Middletown, New York. To register, call 646-605-8280 or email [diversity@mountsinai.org](mailto:diversity@mountsinai.org).

**Screening**  
Wednesday, February 22  
5:30 – 7:30 pm

**Discussion**  
Thursday, February 23  
5:30 – 6:30 pm

Corporate Services Center  
150 East 42nd Street  
Fourth Floor, Room 4-A.16

## Mount Sinai Transformation update

For the most recent updates on Mount Sinai's downtown transformation, please go to:

<http://www.mountsinaihealth.org/locations/downtown>

## March is Colorectal Cancer Awareness Month

The nurses and staff of The Mount Sinai Hospital's Endoscopy Center are hosting an educational event about preventing colon cancer. Visitors can pick up literature and other giveaways; talk with nurses, physicians, geneticists, nutritionists, and endoscopy staff; and schedule an appointment for a screening colonoscopy.

The Colon Cancer Challenge Foundation will provide a 30-ft. inflatable "Rollin' Colon," a walk-through educational model of a colon. For more information, visit [www.coloncancerchallenge.org](http://www.coloncancerchallenge.org) or call 212-241-6277.

Wednesday, March 1  
9 am – 3 pm  
Guggenheim Pavilion

**Sponsors include:**  
the Colon Cancer Challenge Foundation; Dr. Henry D. Janowitz Division of Gastroenterology and the Endoscopy Center; and the Division of Colon and Rectal Surgery



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