Teaching Heart-Healthy Habits to High-Risk Children and Families

Icahn School of Medicine at Mount Sinai has received a $3.8 million grant from the American Heart Association (AHA) to promote cardiovascular health through early education and intervention programs targeting high-risk children and their parents in Harlem and the Bronx.

Mount Sinai researchers will study the genes and lifestyles of 600 preschoolers and their parents or guardians who live in these communities, which are associated with high rates of obesity, cardiovascular disease, stroke, and type 2 diabetes. The investigators will track whether the interventions lead to healthier eating habits and additional exercise. They will also examine the participants’ DNA and RNA to understand how genetics plays a role in the development of cardiovascular disease.

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A Life-Saving Collaboration at Mount Sinai

A young woman who underwent a high-stakes liver transplant at The Mount Sinai Hospital in May is now safely back home thanks to an extraordinary collaboration between Stephan Mayer, MD, Director of the Institute for Critical Care Medicine, and Sander Florman, MD, Charles Miller, MD, Professor of Surgery and Director of the Recanati/Miller Transplantation Institute, and their teams.

When Ayana Richardson, 24, arrived at Mount Sinai Urgent Care last spring, she suffered from brain swelling caused by acute liver failure, a condition that carries a high mortality rate. Overnight, Dr. Mayer, an expert in resuscitating patients suffering from massive severe brain injury, and his team kept her alive by cooling her, administering large doses of hypertonic saline, and inserting an intracranial pressure monitor into her brain.

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“A better understanding of the interaction between behavior, environment, and genetics will help us develop more effective techniques to prevent cardiovascular disease,” says the grant’s lead investigator, Valentin Fuster, MD, PhD, Director of Mount Sinai Heart, Physician-in-Chief of The Mount Sinai Hospital, and the Richard Gorlin, MD, Heart Research Foundation Professor. “Our research tests the hypotheses that habits are formed very early in life and that children can help their parents live healthier lives.”

Dr. Fuster has introduced similar preschool programs in Colombia and Spain that use popular characters from Sesame Workshop. Results from these studies show that with education and support from parents and teachers, young children can develop healthy habits.

Principal investigators of the grant include Zahi A. Fayad, PhD, Director of the Translational and Molecular Imaging Institute; and Eric E. Schadt, PhD, Director of the Icahn Institute for Genomics and Multiscale Biology, and the Jean C. and James W. Crystal Professor of Genomics.

In the United States, childhood obesity has more than doubled in children and quadrupled in adolescents in the past 50 years, according to the U.S. Centers for Disease Control and Prevention.

By 2020, the AHA goal is to improve the cardiovascular health of all Americans and reduce deaths from cardiovascular disease and stroke by 20 percent.

The grant calls for Dr. Fayad to focus on the parents or caregivers. “We will measure their cardiovascular risk factors, such as blood pressure and cholesterol, and take an ultrasound of their blood vessels,” Dr. Fayad says. By doing this, the adults will be able to visualize their health problems. “That information is powerful,” he adds. “We think that will help motivate parents to be receptive to the educational materials we provide, which will be reinforced with peer-to-peer support.”

Dr. Schadt’s project will examine the cross-generation genetic and genomic information of the children and their parents, exploring how genes work together in the context of lifestyle habits and behavior. The goal is to identify new approaches to disease treatment and prevention.

Other key members of Mount Sinai’s team include: Roger Hajjar, MD, Director of the Cardiovascular Research Center at Mount Sinai Heart, and the Arthur and Janet C. Ross Professor of Medicine; Annette Gelijns, PhD, Chair of the Department of Health Evidence and Policy, and Edmond A. Guggenheim Professor of Health Policy; Philip J. Landrigan, MD, Dean for Global Health, and the Ethel H. Wise Professor and Chairman, Department of Preventive Medicine; and Roxana Mehran, MD, Professor of Medicine (Cardiology), and Director of Interventional Cardiovascular Research and Clinical Trials.

Mount Sinai was among four major medical centers that received a total of $15 million from the AHA. The other AHA Strategically Focused Prevention Research Network Centers are Northwestern University Feinberg School of Medicine, the University of Texas-Southwestern Medical Center, and Vanderbilt University Medical Center.
New Research Refutes Long-Held Antiviral Theory

A long-standing belief that mammals use the same potent antiviral molecules deployed by plants and invertebrates is being challenged by researchers at Icahn School of Medicine at Mount Sinai.

Their findings, published in the July 10, 2014, issue of Cell Reports, surprised many scientists who assumed that antiviral RNA Interference (RNAi) exists in humans as a natural result of evolution.

Scientists know that human cells, like cells in every living organism with a nucleus, encode and generate small RNAs, which influence our genetics. It is also known that mammals combat viruses with interferons—proteins manufactured by immune cells in response to pathogens.

“If RNAi does exist in mammals, we can conclude that it is unlikely to play a physiological part in how we respond to infection,” says lead researcher Benjamin tenOever, PhD, Irene and Dr. Arthur M. Fishberg Professor in the Department of Microbiology at Icahn School of Medicine at Mount Sinai.

To determine whether any type of RNAi is an actor in the inhibition of viruses, Mount Sinai scientists administered mice with variations of a harmless virus incapable of causing disease in mammals. A version of the virus encoded with the ability to block the interferon response system gained strength, while another variant designed to fight any type of RNAi weakened immediately as a result.

The findings challenge two controversial studies that appeared in the journal Science in 2012, which suggested that mammals utilize RNAi in an antiviral fashion. This new research is expected to have an impact on drug discovery.

Scientists have hailed small RNAs in recent years because of the molecules’ ability to alter an individual’s genetics in any tissue where a gene is problematic. But researchers have been concerned that if small RNAs are part of humans’ viral response, then drugs that use them could indirectly harm patients’ immune systems.

“This finding that RNAi is not part of the interaction of the human host and viruses can be used to create novel therapeutics that express small RNAs to treat cancer and other illnesses,” says Peter Palese, PhD, Professor and Chair of Microbiology at Icahn School of Medicine at Mount Sinai.

Benjamin tenOever, PhD

Icahn School of Medicine at Mount Sinai.

Dr. tenOever says his close collaboration with teams at the Icahn Institute for Genomics and Multiscale Biology, and the Microbiology Department at Icahn School of Medicine at Mount Sinai, helped him advance his research. “Extraordinary claims such as antiviral RNAi in mammals require extraordinary proof,” says Dr. tenOever. “The strong infrastructure we have here at Mount Sinai allowed us to search for signs of this claim, but ultimately it demonstrated what we already knew—it is all about interferon.”

A Life-Saving Collaboration at Mount Sinai

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Dr. Mayer, who joined Icahn School of Medicine at Mount Sinai in February as the Founding Director of the Institute for Critical Care Medicine, helped pioneer the life-saving technique of therapeutic hypothermia in which a patient’s body is cooled to minimize brain injury due to lack of oxygen or severe swelling.

The next morning, Ms. Richardson was in a state that resembled clinical brain death, but Dr. Mayer believed she might still have a chance to recover neurologically. He stayed in close contact with Dr. Florman. Hours later, a CT scan showed no irreversible injury. Preserved blood flow to the brain was documented by ultrasound, and her brain stem reflexes returned after her sedation was stopped. Serendipitously, a donor liver became available.

“There is no question that Stephan’s expertise helped us bridge the gap and for the patient to remain a candidate for liver transplant,” says Dr. Florman. “He was able to use his techniques to treat brain swelling to buy us enough time to find a donor. Luckily, it came a short period of time later, and we were able to save her life.”

Dr. Mayer says, “Great outcomes like this are only possible with teamwork and collaboration. She was as sick as any human being could be, and she was treated in three different departments within Mount Sinai within the span of 36 hours. It’s unbelievably gratifying when things work out.”

Both Dr. Florman and Dr. Mayer commended the outstanding work of the entire medical staff involved in saving Ms. Richardson’s life. “It was a tremendous team effort,” says Dr. Florman, “and it reflects the incredible expertise of Mount Sinai in so many areas.”

Nearly a dozen of Ms. Richardson’s family members waited at Mount Sinai while the transplant took place.

“As the bottom of my heart, I don’t even think there are words that can express how I feel about Mount Sinai,” says Ayana’s mother, Pamela Richardson. “The entire team, up until discharge, was the most professional, caring, and understanding team I have ever met.”

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### Events

#### Healthy Eating and Weight Management Program

This is a free healthy-eating and weight management program for Mount Sinai employees that focuses on general health and weight loss goals, and tailors healthy, mindful-eating habits to a busy lifestyle. No preregistration is required.

**Fridays through October 10**  
**Mount Sinai Hospital Campus**  
**Noon – 1 pm**  
**Guggenheim Pavilion 2A**

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| Grand Rounds Medicine | Jeanine Albu, MD, Associate Professor, Medicine (Endocrinology, Diabetes and Bone Disease), presents “Medical Management of the Obese.”  
**Tuesday, August 12**  
**8:30 – 9:30 am**  
**The Mount Sinai Hospital Campus**  
**Hatch Auditorium** |
| Grand Rounds Anesthesiology | Marc E. Stone, MD, Professor, Anesthesiology, presents “Ventricular Assist Devices.”  
**Wednesday, August 13**  
**6:30 – 8:10 am**  
**The Mount Sinai Hospital Campus**  
**Annenberg 13-01** |
| Grand Rounds Medicine | Carlos Cordon-Cardo, MD, PhD, Professor and Chair, Pathology; Professor, Oncological Sciences, and Genetics and Genomic Sciences, presents “Molecular Oncology.”  
**Tuesday, August 19**  
**8:30 – 9:30 am**  
**The Mount Sinai Hospital Campus**  
**Hatch Auditorium** |
| Grand Rounds Medicine | Andrew B. Leibowitz, MD, Professor and Chair, Anesthesiology, presents “Coagulopathy Management During Liver Transplantation.”  
**Wednesday, August 20**  
**6:30 – 8:10 am**  
**The Mount Sinai Hospital Campus**  
**Annenberg 13-01** |

#### STAT-CHAT: Walk-in Consultation Service

The Center for Biostatistics at Mount Sinai has launched STAT-CHAT, a free walk-in consultation service for faculty, fellows, residents, staff, and medical students who need help with quick statistics-related questions. Two statisticians will be on hand for one hour a week on a first-come, first-served basis. Each consultation should be about 15 minutes.

**Mondays**  
**1 - 2 pm**  
**The Mount Sinai Hospital Campus**  
**Icahn Medical L2-82**

### Education

#### Intensive Review in Gastroenterology and Hepatology 2014

This program is designed for physicians, trainees, and allied health professionals with a strong interest or clinical practice in the fields of gastroenterology and hepatology. This course will serve as an update on the latest diagnostic and therapeutic issues in gastroenterology and hepatology. The program has been developed using a case-based question-and-answer format, designed to replicate clinical scenarios. For information, visit the course website at www.mssm.edu/cme, or call the office of CME at 212-731-7950.

**Thursday, August 14 – Saturday, August 16**  
**The Mount Sinai Hospital Campus**  
**Goldwurm Auditorium**