SinaInnovations Spotlights a New Era of Discovery

“We have learned that the impossible is possible, and advances are being made that we could not have imagined just a few years ago,” said 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, at the conclusion of the school’s third annual SinaInnovations conference in November.

The conference, which took place on campus Tuesday and Wednesday, November 18 and 19, respectively, focused on breakthroughs in medicine and engineering that improve human health and was sponsored jointly with Mount Sinai’s academic affiliate Rensselaer Polytechnic Institute (RPI).

Among the leaders from academia and industry who shared their thoughts and discoveries was keynote speaker Eric J. Topol, MD, Director of the Scripps Translational Science Institute, and Andrew Conrad, PhD, Director of Google X.

Department of Pharmacology and Systems Therapeutics Awarded More Than $31 Million in NIH Grants

Researchers at the Icahn School of Medicine at Mount Sinai have received more than $31 million from the National Institutes of Health (NIH) to create three new centers that will study how drugs interact with human cells to increase their effectiveness and decrease side effects.

A new Drug Toxicity Signature Center will be run by Ravi Iyengar, PhD, Dorothy H. and Lewis Rosenstiel Professor, Department of Pharmacology and Systems Therapeutics, who has received a grant totaling $11.6 million from the NIH. By leveraging the U.S. Food and Drug Administration’s (FDA) Adverse Event Reporting System database, the center will develop cell signatures that can be used to predict the effects of certain drugs and drug combinations.

Mount Sinai was one of five U.S. research institutions chosen to develop centers.
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Science Institute in La Jolla, California, and a best-selling author. Dr. Topol said the wireless digital world and the world of genomics are beginning to converge and will lead to a transformation in the way health care is practiced and the way disease is diagnosed and treated.

Andrew Conrad, PhD, Director of Google X, Google’s innovation laboratory, was also a keynote speaker. He said in today’s medical environment there is so much we still do not know about the human body. But the future will rest on knowing far more about what is going on in a patient’s body at the cellular level. Google X is studying the use of nanoparticles, he said. With enhanced nanotechnology and personalized information, physicians will be able to penetrate the patient’s body and gather more detailed information.

Angela Belcher, PhD, Chair of the Department of Biological Engineering at Massachusetts Institute of Technology, said her laboratory is building new imaging tools to help surgeons locate small cancerous tumors that are not visible to the eye. The probes are currently being tested in mice. Her goal, she said, is “to develop inexpensive, minimally invasive technology to track single cells.”

Miguel A. Nicolelis, MD, PhD, Professor in Neuroscience and Co-Director of the Center for Neuroengineering at Duke University Medical Center highlighted the progress his lab has made in using brain power to control body movement.

“The age of brain-activating technology is here now,” said Dr. Nicolelis, who told the audience that as a young doctor in the late 1980s, he was frustrated by his inability to treat the conditions he could diagnose.

The latest breakthrough, he said, was seen throughout the world in June, when his patient, 29-year-old paraplegic Juliano Pinto, was able to kick a soccer ball at the opening ceremony of the 2014 World Cup in Brazil. Mr. Pinto’s movements were guided by his brain waves through electrodes, sensors, and a robotic exoskeleton worn as a vest. The new technology holds significant promise for improving the psychological and physiological outcomes of patients with spinal cord injuries.

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Gordana Vunjak-Novakovic, PhD
Mikati Foundation Professor, Department of Biomedical Engineering, Columbia University

“At SinaInnovations, we have seen exceptional discoveries that integrate medicine and engineering. The breadth of development in areas such as nanotechnology, imaging, and brain plasticity is astonishing and points to today’s need for multidisciplinary science.”

Scott L. Friedman, MD
Dean for Therapeutic Discovery; Fishberg Professor of Medicine; Professor of Pharmacology and Systems Therapeutics; Chief, Division of Liver Diseases, Icahn School of Medicine at Mount Sinai

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“Medicine, today, increasingly rests on a multiplicity of disciplines, including nanotechnology, data science, high-performance computing, advanced modeling and simulation, and the entire range of biotechnology and engineering disciplines. The possibilities are inspiring, but will only be realized fully when we use these advanced technologies to enable collaborations on a grand scale.”

Shirley Jackson, PhD
President, Rensselaer Polytechnic Institute

To see videos of the conference, visit http://icahn.mssm.edu/sinainnovations/videos/2014-videos
that contribute to the second phase of the NIH Common Fund project, known as the Library of Integrated Network-based Cellular Signatures (LINCS).

In a separate-but-related grant, the NIH has awarded $19.8 million to Principal Investigator Avi Ma’ayan, PhD, Associate Professor in Mount Sinai's Department of Pharmacology and Systems Therapeutics to coordinate and integrate the data generated by Dr. Iyengar's new center and the other research centers. Dr. Ma’ayan's computational team, along with teams at the University of Miami and the University of Cincinnati, will design new ways to analyze and visualize the data so that it serves as a national and international resource. Dr. Ma’ayan received his PhD from the Icahn School of Medicine in Dr. Iyengar's laboratory.

Dr. Iyengar's center will focus on three serious side effects of drugs: heart failure, liver damage, and peripheral neuropathy.

“We are developing heart, liver, and nerve cells from stem cells for normal adult subjects and will be studying how these cells react to drugs to accelerate the discovery of new therapies and create predictive computer models to improve treatment,” he says.

Along with Dr. Iyengar, the principal investigators of the center grant are Eric Sobie, PhD, BSE, Associate Professor of Pharmacology and Systems Therapeutics; and Marc Birtwistle, PhD, BS, Assistant Professor of Pharmacology and Systems Therapeutics.

“Can we develop drugs and drug combinations to effectively treat and mitigate risks and side effects for patients with progressive diseases such as cancer and heart disease?” asks Dr. Iyengar. “Can we develop computational models that will allow us to understand cellular functions in different tissues in response to drugs? This center will enable us to answer those questions to improve current therapies and create new ones.”

Says Dr. Ma’ayan, “We have much work to do in harmonizing, analyzing, and visualizing the masses of data collected by so many NIH-funded centers, but the combined effort promises to drive synergistic discovery.”

Dr. Ma’ayan and Joel Dudley, PhD, Assistant Professor of Genetics and Genomic Sciences, and Director of Biomedical Informatics at the Icahn School of Medicine at Mount Sinai, received a separate grant of $1.2 million from the NIH to spur drug discovery. They will build The Knowledge Management Center for Illuminating the Druggable Genome that assembles, organizes, and visualizes data collected from protein kinases, nuclear receptors, ion channels, and G-protein-coupled receptors.

Using Music to Heal

The Louis Armstrong Center for Music and Medicine at Mount Sinai Beth Israel has received a pledge of $100,000 from Music Never Stops: The Tyler Seaman Foundation, in honor of Tyler Seaman, who passed away at the age of 18 from clival chordoma, a rare type of spinal cancer.

Tyler had a passion for music, and his family felt that helping other teens ill with cancer or other serious disease was a fitting way to honor him.

Tyler attended his first concert at the age of 8, he played the drums, and he filled his life with music, even as he endured three years of surgery, chemotherapy, radiation, and other treatments. He was thrilled when the Make-A-Wish Foundation gave him tickets for 10 Allman Brothers concerts, which he attended with family and friends.

The Center is creating a new teen and young adult music therapy program and purchasing studio recording and DJ equipment. It has also renovated its music therapy suite, renaming it “Tyler’s Room,” and creating a warm environment for patients to create, record, and share their music.

“We hope that Tyler’s Room becomes a favorite place for the Louis Armstrong Center music therapy staff and its teen patient population,” says Diane Seaman, Tyler's mother. “Our family wants to share Tyler’s story and his love of music, and we hope that it brings happiness, respite from illness, and healing.”
Honoring World AIDS Day

The Mount Sinai Health System’s Institute for Advanced Medicine sponsored several activities to commemorate World AIDS Day, Monday, December 1. The events included educational presentations, the distribution of AIDS ribbons, and rapid HIV-testing. Among the highlights:

- A “Memory Tree” at the Jack Martin Fund Clinic, where patients paid respects to family and friends lost to HIV/AIDS;
- A poster display by the Young Adult Program, a psychosocial support program for HIV-positive youth at the Spencer Cox Center for Health Clinic at Mount Sinai Roosevelt;
- Discussions on HIV infection rates and new interventions at the Mount Sinai Comprehensive Health Program-Downtown; and
- A timeline documenting major events in HIV/AIDS history at the Peter Krueger Clinic, Mount Sinai Beth Israel.

New York City Kidney Walk

“Team Mount Sinai” recently participated in the 2014 National Kidney Foundation’s New York City Kidney Walk, raising $52,726, more than tripling the team’s goal and repeating as the No. 1 corporate fundraising team. The annual event raises awareness and funds for lifesaving programs that educate and support patients, their families, and others at risk of kidney disease.

Memory Screenings at 92nd Street Y

Experts from Mount Sinai’s Alzheimer’s Disease Research Center provided free, confidential memory screenings on Tuesday, November 18, National Memory Screening Day, at the 92nd Street Y and at Linkage House, a Mount Sinai-affiliated residence for East Harlem elderly. National Memory Screening Day, spearheaded by the Alzheimer’s Foundation of America, promotes the early detection of memory problems, Alzheimer’s disease, and related illnesses, and encourages appropriate intervention.

Learning About Stroke

In Herald Square, on Wednesday, October 29—World Stroke Day—staff from The Mount Sinai Hospital, World Stroke Organization, and Covidien provided free blood pressure screenings, answered questions about stroke, and helped launch a global “Take 2...Tell 2” campaign. “This initiative encourages people to educate themselves and others by taking two minutes to learn about stroke risk factors, warning signs, and symptoms, and spending two minutes sharing that information,” says Stephan A. Mayer, MD, Founding Director, Institute for Critical Care Medicine, Icahn School of Medicine at Mount Sinai.
While competing in a 1,500-meter triathlon swim in the Hudson River in August, Chris LaPak, 52, experienced sudden cardiac arrest. A Herculean rescue effort ensued, with first responders moving him quickly from a surfboard to a jet ski to a boat and finally to a pier. Attempts at cardiopulmonary resuscitation (CPR) failed, leaving Mr. LaPak—the president of a pharmaceutical printing company—without a pulse for at least nine minutes before he was finally resuscitated with an automated-external defibrillator.

Upon arrival at Mount Sinai St. Luke's Cardiac Care Unit, Mr. LaPak had been given a 5 percent chance of survival and worse odds in regaining normal brain function. But under the supervision of Eyal Herzog, MD, Director of the Cardiac Care Unit and Echocardiography Laboratories, he underwent a life-saving treatment called therapeutic hypothermia. With this procedure, the patient's body is cooled to preserve brain function and protect other vital organs.

Just hours after the three-day treatment was completed, Mr. LaPak awoke with normal brain function. He recalls being able to count backward from 100 by sevens after he came to.

“I have never received such care as I did at St. Luke’s. It was amazing,” he says. “It was almost like I had my own team supporting me to keep me alive. I won’t go anywhere but there now.”

Therapeutic hypothermia is a complicated therapy that requires continuous attention to detail and well-integrated collaboration across disciplines. Stephan Danik, MD, MSc, Director of the Electrophysiology Laboratory, also cared for Mr. LaPak, as well as the team that performed a double coronary artery bypass graft through open heart surgery, and placed an implantable cardioverter-defibrillator to prevent his heart from stopping again.

“Had Chris had this event ten years ago, no one would have provided this therapy,” says Dr. Herzog, who is also Associate Professor of Medicine at Icahn School of Medicine at Mount Sinai. “He benefited from the expertise we obtained over the years that extended to an even rarer arrhythmia known as asystole that he experienced.”

On Sunday, November 9, Mr. LaPak, his wife, and their two grown children, reunited with the first responders, doctors, and medical staff who helped save his life at a celebration at Mount Sinai St. Luke's. Now back to his normal exercise routine of running and swimming each week, he says his sights are set on participating in the 2015 Chicago and New York marathons.

“I feel great,” says Mr. LaPak. “I’m negotiating with my wife and Dr. Herzog to compete in a triathlon. I’m not going to stop now.”

A Leading Breast Cancer Researcher and Clinician Joins Mount Sinai

Charles L. Shapiro, MD, a renowned breast cancer researcher and clinician, has been named Co-Director of the Dubin Breast Center, Director of Translational Breast Cancer Research for the Mount Sinai Health System, and Director of Survivorship Programs at The Tisch Cancer Institute at Mount Sinai.

“Dr. Shapiro’s research interest spans the whole patient,” says William Oh, MD, Associate Director of Clinical Research at The Tisch Cancer Institute, Chief of the Division of Hematology/Medical Oncology, and the Ezra M. Greenspan, MD, Professor in Clinical Cancer Therapeutics. “It begins with understanding the molecular drivers of cancer and treating cancers more effectively, and then monitoring the side effects of treatment.”

Dr. Shapiro will establish a large unified breast cancer research program across the Health System, which will include innovative clinical trials and the collection of breast tissues for a central breast tissue biorepository. “Mount Sinai has exceptional basic and population scientists devoted to breast cancer, and within the Health System there are outstanding breast cancer clinical researchers,” says Dr. Shapiro. “I intend to facilitate more interactions and collaborations between these two groups to hasten discoveries into the clinic for women with breast cancer.”
EVENT

Film Screening and Discussion


Sponsored by Geriatrics and Palliative Medicine, The Arnhold Global Health Institute, and the Palliative Care Interest Group.

Tuesday, January 6
6:30 pm
The Mount Sinai Hospital Campus
Hess Center Davis Auditorium

“Top Performer” Hospitals

The Joint Commission, the leading accreditor of health care organizations in the United States, has designated Mount Sinai Beth Israel, Mount Sinai St. Luke’s, and Mount Sinai Roosevelt as “Top Performers on Key Quality Measures,” based on data from 2015.

The “Top Performer” program recognizes institutions for improving performance on evidence-based interventions that increase the likelihood of good medical outcomes for patients with certain conditions. As “Top Performers,” the hospitals will be included in The Joint Commission’s America’s Hospitals: Improving Quality and Safety, an online annual report found at http://bit.ly/1xMz5qM and also on The Joint Commission’s Quality Check® website.

The Commission found that the hospitals attained and sustained excellence in several accountability measures for heart attack, heart failure, pneumonia, and surgical care.

ANNOUNCEMENT

Calling all Staff Musicians!

The Louis Armstrong Center for Music and Medicine at Mount Sinai Beth Israel invites staff who play music to join its Visiting Artists Series—musicians who play every morning and afternoon for patients and their families in lobbies and entrances at Mount Sinai Beth Israel and at Mount Sinai Roosevelt. Contact Tammy Takaishi at ttakaishi@chpnet.org for more information.

Seminar Series / Developmental and Regenerative Biology

Bruce Gelb, MD, Director, The Mindich Child Health and Development Institute, presents “Noonan Syndrome and Related RASopathies: Whispers Heard Along the RASpY Pathway.”

Thursday, December 18
Noon – 1 pm
The Mount Sinai Hospital Campus
Annenberg 25-51 Conference Room

Grand Rounds / Neurology

Mark J. Kupersmith, MD, Director, Neuro-Ophthalmology, New York Eye and Ear Infirmary of Mount Sinai, presents “NIH-Sponsored Idiopathic Intracranial Hypertension Treatment Trial Results.”

Friday, December 19
1 – 2 pm
Mount Sinai Beth Israel, Phillips Ambulatory Care Center

Grand Rounds / Cardiology

Jan Sloves, RVT, RCS, FASE, Technical Director, Cardiac and Vascular Ultrasound, Non-Invasive Vascular Laboratory, New York Cardiovascular Associates, presents “Atlas and Selected Topics in Non-Invasive Vascular Imaging.”

Monday, December 22
8 – 9 am
Mount Sinai Beth Israel, Podell Conference Room A

Grand Rounds / Neurosurgery

Saadi Ghatan, MD, FAANS, Director, Pediatric Neurosurgery, Mount Sinai Health System, presents “Quality Assurance: The Mount Sinai Hospital and Affiliates.”

Wednesday, January 7
7 – 8 am
The Mount Sinai Hospital Campus
Annenberg Fifth Floor Board Room