



Icahn
School of
Medicine at
Mount
Sinai

Mount Sinai Health System:
Establishing a Vast
Geographic Footprint in
Clinical Care and Research

Pamela Sklar, MD, PhD,
Elected to Institute of
Medicine

A Major Gift,
Generous Support

Neurosphere
Consisting of Neural
Progenitor Cells

The Friedman Brain Institute

www.mountsinai.org/fbi

SPRING 2014

Compassionate Care, Pioneering Research

In 2013, the neurosciences at Mount Sinai were greatly enhanced by two developments: the creation of an advanced brain imaging program and the establishment of the new Mount Sinai Health System.

Progress in understanding and treating brain diseases has lagged compared to discoveries in cancer, heart disease, and other medical disciplines, in part because access to the human brain has been a great challenge, making it difficult to establish a diagnosis and elucidate disease mechanisms. Today, however, rapidly evolving tools in brain imaging are now making it possible, for the first time, to study—in humans—how the brain functions normally and malfunctions in disease.

We welcome a world-renowned leader in brain imaging, Rita Z. Goldstein, PhD, as director of Mount Sinai's new brain imaging program.

Last fall, the integration of The Mount Sinai Medical Center and Continuum Health Partners established the Mount Sinai Health System, which now includes seven hospital campuses and the Icahn School of Medicine at Mount Sinai. This new entity has launched a bold new era in

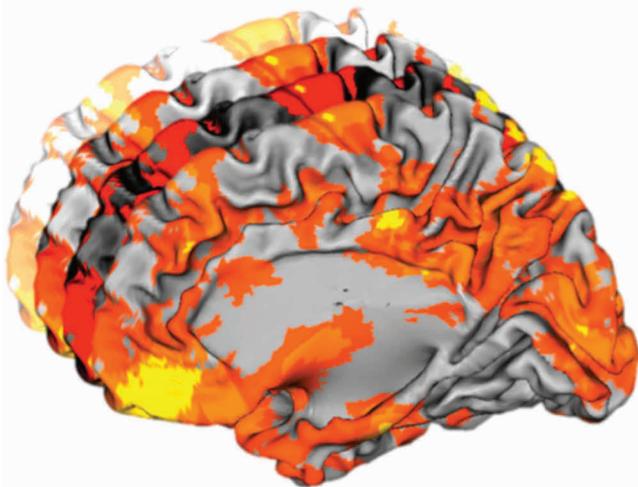
health care and research: it will not only extend Mount Sinai's capacity to offer state-of-the-art clinical care throughout the New York metropolitan area, but also significantly facilitate Mount Sinai's capacity for translational applications of cutting-edge basic and clinical research in neurology, neurosurgery, ophthalmology, psychiatry, and rehabilitation medicine.



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ADVANCING RESEARCH

Using New Imaging Tools to Gain First-Time Insights into the Brain



The Brain Imaging Core (BIC) utilizes high resolution functional magnetic resonance imaging (fMRI) and graph theory methods to identify communication centers in the brain responsible for the efficiency of information flow in health, as well as in neuropsychiatric disease.

New brain imaging resources available at Mount Sinai are allowing an unparalleled glimpse into the structure, functioning, and connectivity of the brain, spanning the human, nonhuman primate, and rodent brains. To further elucidate the workings of the brain, in both health and disease, Mount Sinai recently established the Brain Imaging Core (BIC), which will serve as a bridge between The Friedman Brain Institute (FBI) and the Translational and Molecular Imaging Institute (TMII).

BIC takes advantage of TMII's state-of-the-art imaging resources, a 20,000-square-foot imaging facility located in the newly opened Leon and Norma Hess Center for Science and Medicine. This facility includes numerous research-dedicated instruments: a 7 Tesla MRI (magnetic resonance imaging) scanner for humans and large animals—one of the very few available in the United States—along with a 3 Tesla MRI scanner and a 3 Tesla integrated MRI/PET (positron emission tomography) scanner. MRI scanners (9.4 Tesla and 7 Tesla) for small animals and a 64-channel electroencephalography (EEG) system are also available.

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› Using New Imaging Tools to Gain First-Time Insights into the Brain *(continued from page 1)*

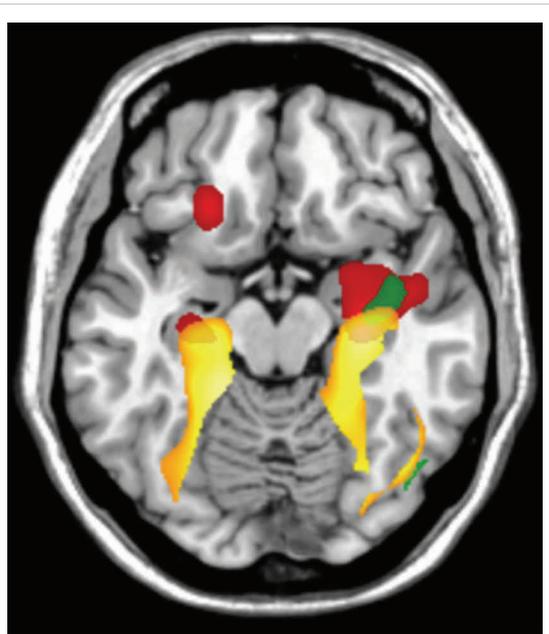
These instruments are now making it possible to study the activity within and between discrete brain regions in subjects at rest and in response to a range of cognitive and emotional tests, as well as to gain an unprecedented appreciation of the ways in which various disease states are associated with abnormal integrity, function, and connectivity of given brain regions.

The high-field 7 Tesla MRI scanner, for example, permits an evaluation of metabolic and neurochemical factors in patients' brains, at a resolution not previously possible. The integrated MRI/PET scanner allows an unprecedented wealth of information on the molecular basis of numerous brain processes in both health and disease. Our facility also has the unique capacity to integrate brain imaging findings with multiple other measures, such as eye tracking, pupillary dilation, skin conductance, and heart rate. It is possible, as well, to use visual, auditory, olfactory, and tactile stimuli to manipulate brain function and connectivity, which is further amenable for purposes of real-time neurofeedback (the use of brain data to change behavior, cognition,

Active brain imaging programs are under way to help scientists understand how the brain “thinks and remembers,” and to study brain abnormalities in a range of diseases, such as schizophrenia, multiple sclerosis, and Alzheimer’s; and movement, addiction, and anger disorders.

and emotion). Evolving capabilities will allow simultaneous brain recordings in interacting individuals to enhance the neuroscience of complex social interactions.

Brain imaging data are particularly complex and require a large team of imagers, cognitive neuroscientists, computer scientists, physicists, engineers, psychologists, psychiatrists, neurologists,



Gray matter decreases associated with lifetime use of cocaine (red), tobacco (green), or alcohol (yellow)

and bioinformaticians to optimally collect and mine the research findings. BIC has established a standardized protocol that offers participating researchers—from Mount Sinai, as well as from other New York City institutions—a straightforward and well-supported protocol for data

collection and analysis of precise structural and functional images of living brains. Affiliated scientists are working to imbue brain imaging findings with genomic data to mine unequalled knowledge about individuals' function and disease risk.

To lead BIC toward achieving these goals, Mount Sinai recruited Rita Z. Goldstein, PhD, Professor of Psychiatry, and

Neuroscience, as BIC's Director. Dr. Goldstein also serves as Director of Neuropsychomaging of Addiction and Related Conditions in Mount Sinai's Department of Psychiatry. She joined Mount Sinai from Brookhaven National Laboratory, where she established a national and international reputation for her neuroimaging and neuropsychological studies of drug addiction. By using advanced MRI and other imaging modalities, Dr. Goldstein and her colleagues have demonstrated compromises in a drug-addicted individual's ability to suppress automatic responses to drugs of abuse. The researchers are now using this knowledge to devise novel methods—based in brain imaging—to help addicted individuals to exert more effective self-control and emotion regulation.

Dr. Goldstein has received a number of awards for her work, among them, the prestigious Joel Elkes Research Award in 2012 from the American College of Neuropsychopharmacology and the Jacob P. Waletzky Award in 2013 from the Society for Neuroscience.

Active brain imaging programs are under way to help scientists understand how the brain “thinks and remembers,” and to study brain abnormalities in a range of diseases, such as schizophrenia, multiple sclerosis, and Alzheimer’s; and movement, addiction, and anger disorders. It also indicates how deep-brain stimulation—mostly used now to treat Parkinson’s disease and other movement disorders but increasingly being applied to psychiatric conditions—exerts its beneficial clinical effects. Such efforts in brain imaging are expected at long last to bring fundamental advances in better understanding, diagnosing, and treating brain diseases.



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Mount Sinai Health System: Establishing a Vast Geographic Footprint in Clinical Care and Research

In September 2013, The Mount Sinai Medical Center combined with Continuum Health Partners to form the Mount Sinai Health System, launching a new era in community-based health care and unprecedented opportunities to excel in research and education. The Health System, with its vast geographic footprint throughout the New York metropolitan area, includes the Icahn School of Medicine at Mount Sinai and seven member hospitals, as well as an extensive network of ambulatory care locations and more than 40 clinical and academic relationships.



Mount Sinai Health System serves the entire New York metropolitan area.

Approximately 6,600 physicians are now part of the Health System. Today, Mount Sinai physicians can be found in more than 200 community locations throughout the New York metropolitan area. We expect to train more than 2,000 residents and fellows at our hospitals. Medical students, as well as students in the Graduate School of Biomedical Sciences, will have dynamic environments in which to learn and conduct research.

The Health System's large and diverse patient population will also be a catalyst to create Clinical Institutes of Excellence across

a spectrum of specialties, and serve as hubs of treatment and translational research.

This is an extraordinary time for The Friedman Brain Institute. Beyond the dramatic expansion of our clinical services in neurology, neurosurgery, ophthalmology, psychiatry, and rehabilitation medicine, the Health System will greatly facilitate our basic and clinical research efforts and help us achieve our goals of fundamental advances in disease diagnosis, treatment, and prevention.

ACHIEVEMENTS

Pamela Sklar, MD, PhD, Elected To Institute of Medicine

Pamela Sklar, MD, PhD, is one of two members of the faculty at Icahn School of Medicine at Mount Sinai recently elected to the Institute of Medicine (IOM) of the National Academy of Sciences, one of the highest honors in the fields of health and medicine. The IOM is a national resource for independent, scientifically informed analysis and recommendations on health issues.



Pamela Sklar, MD, PhD

acclaimed neuroscientist, human geneticist, and psychiatrist investigating the genetic causes of psychiatric disorders, including schizophrenia and bipolar disorder. Her research has widely enhanced our understanding of the role of genetic variants in mental illness.

Dr. Sklar most recently served as co-lead investigator on two studies that helped to identify rare mutations in specific sets of genes that may affect schizophrenia risk. The findings were published in the January 22, 2014, online issue of *Nature*.

The IOM is comprised of 1,753 active members and includes 12 distinguished faculty from Icahn School of Medicine.

Honorees are recognized for outstanding professional achievement and commitment to service. Dr. Sklar is Professor of Psychiatry, Neuroscience, and Genetics and Genomic Sciences, and Founding Chief of the Division of Psychiatric Genomics at the Icahn School of Medicine. She is a highly

A Major Gift, Generous Support

Mount Sinai Health System Emeritus Trustee Alan Mirken has given a \$5 million gift to name The Mirken Family Clinical Neuroscience Institute, which will operate across the entire Health System. This is the first gift to the newly established Health System to help integrate our many clinical neuroscience programs through partnership and collaboration. Mr. Mirken is a retired publisher who was a vice chairman at Random House, president of Crown Publishing, and a partner in Abbeville Press, and is the former Chairman of the Board of Overseers at Beth Israel Medical Center, now part of the Mount Sinai Health System.



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PHOTO ESSAY

Neurosphere Consisting of Neural Progenitor Cells

This image is of a neurosphere consisting of neural progenitor cells derived from human fibroblasts. The cells, stained for the markers NESTIN (red), BIII-tubulin (green), and DAPI (blue), are currently migrating away from the center of the sphere.



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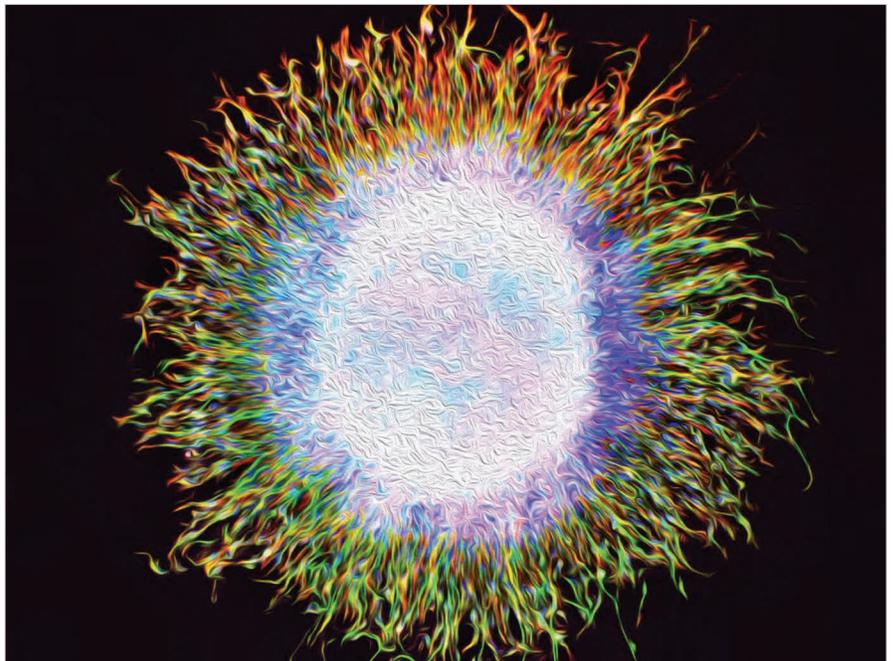


Image by Ngoc Tran from the lab of Kristen Brennand, PhD, Assistant Professor, Psychiatry, and Neuroscience