

# Icahn School of Medicine at Mount Sinai

## 2017 Strategic Plan

Board of Trustees Presentation  
February 13, 2017

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1. Established world-class interdepartmental, multi-disciplinary research teams
2. Developed a new model of research structure by creating 19 Research Institutes:
  - Arnhold Global Health Institute
  - Black Family Stem Cell Institute
  - Charles Bronfman Institute for Personalized Medicine
  - Conduits – Institutes for Translational Sciences
  - Friedman Brain Institute
  - Icahn Institute for Genomics and Multiscale Biology
  - Institute for Health Care Delivery Science
  - Institute for Medical Education
  - Institute for Next Generation Health Care
  - Mindich Child Health and Development Institute
  - Mount Sinai Diabetes, Obesity, and Metabolism Institute
  - Mount Sinai Drug Discovery Institute
  - Mount Sinai Global Health and Emerging Pathogens Institute
  - Mount Sinai Immunology Institute
  - Mount Sinai Institute for Systems Biomedicine
  - Mount Sinai Institute for Translational Epidemiology
  - Mount Sinai Translational and Molecular Imaging Institute
  - Tisch Cancer Institute
  - Zena and Michael A. Wiener Cardiovascular Institute

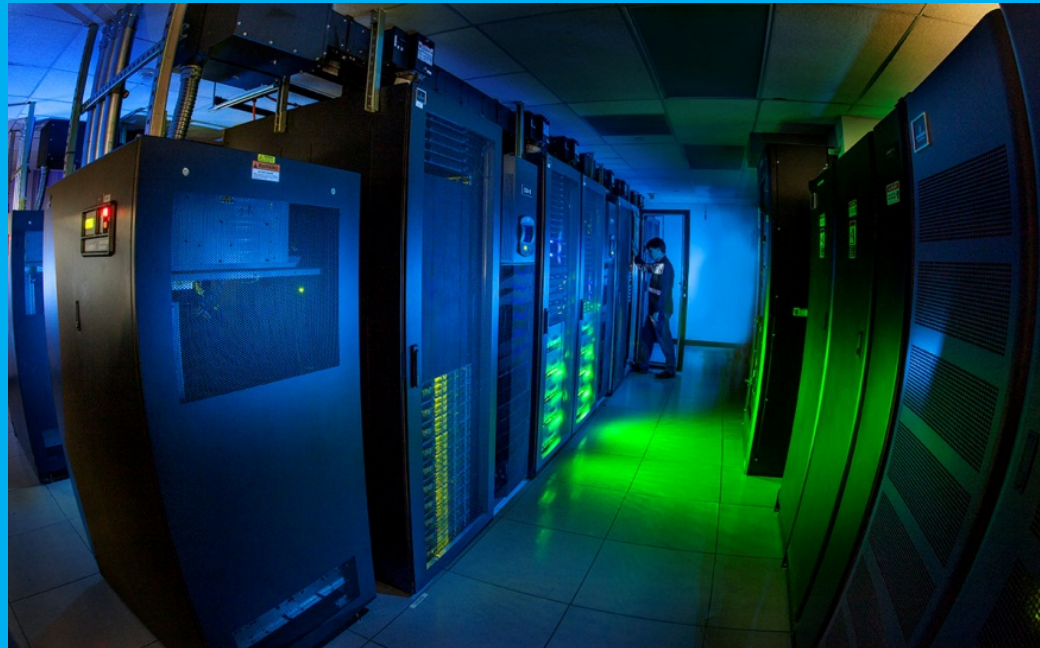
# Strategic Plan 2006

## How Did We Achieve Success?

3. Built Hess Center for Science & Medicine
4. Renovated existing buildings to modernize outdated spaces



5. Invested heavily in Tisch Cancer Institute  
Result: - 2015 NCI Designation
  
6. Invested heavily in High Performance Computing and Genomics and Multi-Scale Biology – the largest high performance computing cluster in Academic Medicine  
Result: - Genetics NIH Funding Rank increased from #32 to #4  
- Creation of new companies, eg Sema4



7. Created a culture of innovation and entrepreneurship from training to start-up:

Result: - More Patents & Start-Ups

- 549 inventors and 205 patents in 2015

- \$300M deal between Mount Sinai (and three other NCI-designated Cancer Centers) and Celgene to advance novel therapies for cancer

**SINA***Innovations*

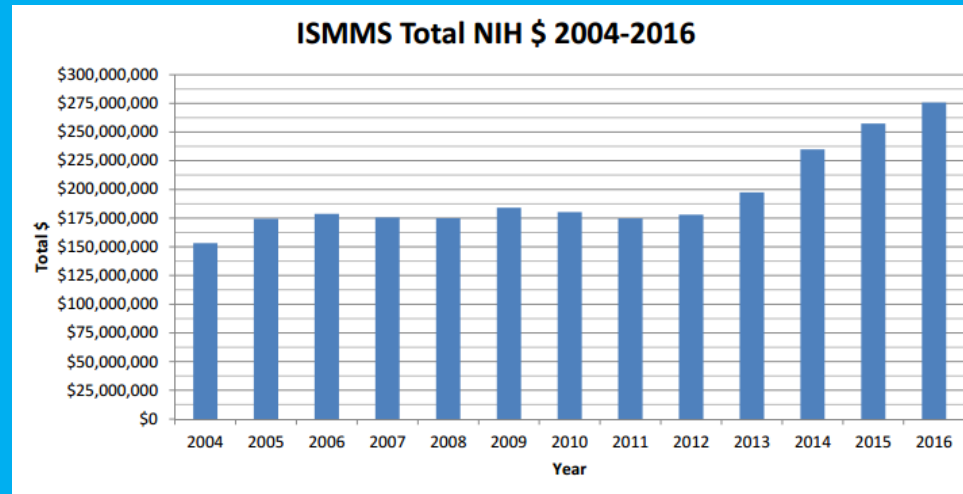
8. Examples of top discoveries that make a difference for our patients:
- Development of ketamine as a novel, rapidly acting antidepressant (Charney)
  - Identification of the first genetic risk factors for neuropsychiatric disorders (schizophrenia, bipolar disorder, autism, Alzheimer's, and Parkinson's) (Buxbaum, Sklar, Goate, Roussos)
  - Combination therapy for multiple myeloma (Jaganath, Barlogie)
  - New immunotherapy for malignant melanoma (Bhardwaj)
  - Launch of first human artificial pancreas in NYC (Stewart)
  - Identification of de novo mutations that cause congenital heart abnormalities and development of treatments to counteract those abnormalities (Gelb)
  - Characterization of the human gut microbiome and its influence on ulcerative colitis and Crohn's disease (Cho, Dubinsky, Schadt)
  - First time reconstruction of an extinct organism: the 1918 pandemic influenza virus (Palese, Garcia-Sastre)
  - Vaccine against avian influenza (bird flu) (Palese, Garcia-Sastre)

# Strategic Plan 2006 – A Success Story

Objective Metrics-2004 vs 2006 vs 2016:

NIH Funding: from \$153M to \$178M to \$290M

NIH Ranking: from #25 to #18 to #13



Basic Science Department NIH Funding Rank-2006 vs 2016:

Genetics from #30 to #4

Microbiology from #14 to #4

Neurosciences from #16 to #2

Pharmacology from #27 to #3

# Strategic Plan 2006 – A Success Story

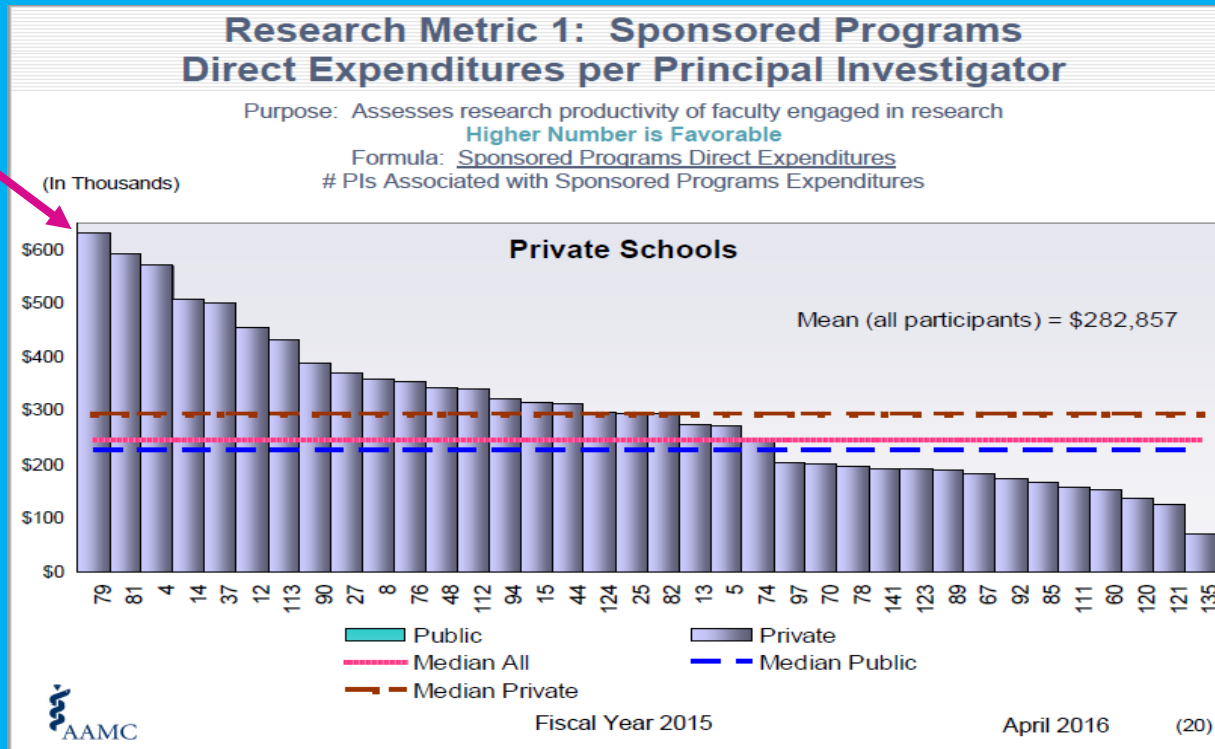
Recruited ~150 Academic Track faculty

Number of NIH funded faculty increased: from 276 to 337

Number of National Academy of Medicine members increased: from 8 to 18

Mount Sinai is #1 nationally in Research \$s/Investigator (AAMC)

Mount  
Sinai





### Philanthropic Results of Campaign for Mount Sinai

- Total needed to fund strategic priorities: \$2.3 Billion
- Amount committed by ISMMS: \$1.3 Billion
- Philanthropic goal for Campaign: \$1 Billion
  
- Total funds raised during Campaign: \$1.504 Billion
- Amount given/pledged by Trustees: \$704.3 Million

*Due to the generosity and commitment of Mount Sinai's Trustees, the 2006 Strategic Plan was implemented with great success.*

# Strategic Plan 2017 - Process

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37 Work Groups involving >200 Mount Sinai Faculty

37 External Advisory Boards comprising 135 world experts

22 members of Mount Sinai Strategic Plan Council

Worked closely with Development from the beginning

Begin Process: November 2015

End Process: November 2016

12-month course resulted in a transparent process with bottom-up and top-down recommendations on which there was universal consensus.

### Guiding Principles

1. Take advantage of the size and excellence of the Mount Sinai Health System
2. Establish unrivaled excellence in medical and graduate education
3. Anticipate and fund new areas of research that will result in discovery of novel approaches to disease diagnosis and treatment
4. Invest further in current areas of excellence
5. Power an “Engine of Discovery” to create more IP, more collaborations with Industry, and more Mount Sinai companies

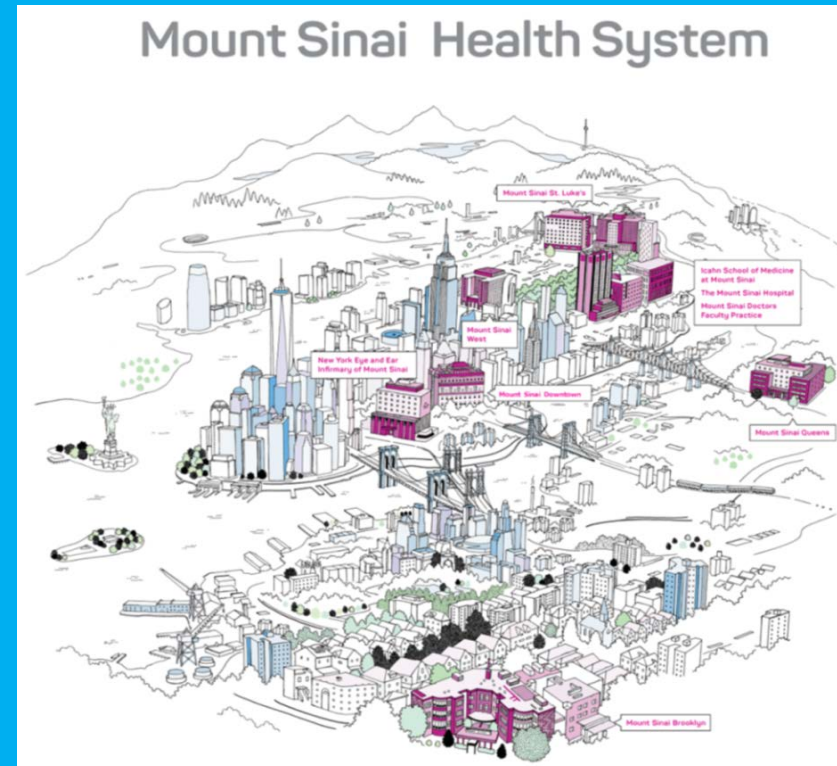
# Taking Advantage of the Health System (MSHS)

## 1. Establish the following new Research Institutes:

- Addiction Institute at Mount Sinai
- Adolescent Health Research Institute
- Exposome Institute
- Institute for Transformative Clinical Trials
- Women's Health Research Institute

## 2. Expand the scope of research to additional disease areas:

- Diabetes/Obesity
- GI
- Kidney
- Pulmonary
- Pediatrics
- Others



# Taking Advantage of the Health System (MSHS)

## 3. Invest in Surgical and Rehabilitation Innovations

- Simulations to guide surgeons
- Exoskeletons - helping people regain use of their limbs

## 4. New Academic Department: Health System Design & Global Health

- Transformation strategies for optimized healthcare in our local communities and globally
- Next generation care models to pioneer innovative approaches to healthcare

## 5. Institute for Next Generation Health Care



# Unrivaled Excellence in Medical Education

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Diversity of thought, experience and demographics is the key to progress and innovation in medical education, patient care, and biomedical research. It is critically important for creating an environment of learning and discovery that challenges convention and offers every student the opportunity to achieve their fullest potential to impact the health of the world.



# Unrivaled Excellence in Medical Education

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**Center for Learning and Development.** Creating an environment of learning and discovery that allows students from diverse cultural, socioeconomic, professional, and educational backgrounds to maximize their potential

**The Institute for Medical Education.** Recruiting, promoting, and retaining the best educators who are key drivers of institutional success. The IME allows our faculty to improve the quality of their teaching, disseminate their innovations, generate grant support for their research, and enhance the reputation of the Icahn School of Medicine

# Unrivaled Excellence in Medical Education

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**Scholarship support.** Setting a new standard by providing more scholarship support to our students to reduce the profound impact that debt has had on healthcare in the United States.

**Space:** Our goal is to double the footprint of Education at Icahn School of Medicine, creating a vertical campus that will bring the Medical and Graduate Schools together for the first time in our history, aligning our teaching, and enhancing the learning resources for our students. This expanded space will include new classrooms and lecture halls, a home for the Center for Learning and Development, and a state-of-the-art Simulation and Standardized Patient Training Center



# Unparalleled Excellence in Graduate Education

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- Spearhead a pedagogical shift to transform biomedical research and its translation into precision medicine.
- Reaffirm Mount Sinai as a leading choice for world-class graduate scientists who will innovate and make breakthrough discoveries that lead to better patient outcomes.
- Curriculum reform that will empower graduate and post-graduate trainees with the necessary skills to break down current barriers and achieve interdisciplinary innovation.

# Anticipate & Fund New Areas of Research

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## Major Investment in Precision Medicine

Precision Medicine is an innovative model of healthcare that customizes diagnosis and treatment for individual patients, based not only on our DNA, but also on everything else in our medical history, lifestyle, and environment.

Precision Medicine promises to yield dramatic advances in diagnosis, treatment, and prevention.

Precision Medicine is a major initiative of the National Institutes of Health and Mount Sinai will lead the way.

# Anticipate & Fund New Areas of Research

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## Major Investment in Precision Medicine

Mount Sinai is uniquely poised to lead Precision Medicine efforts nationally:

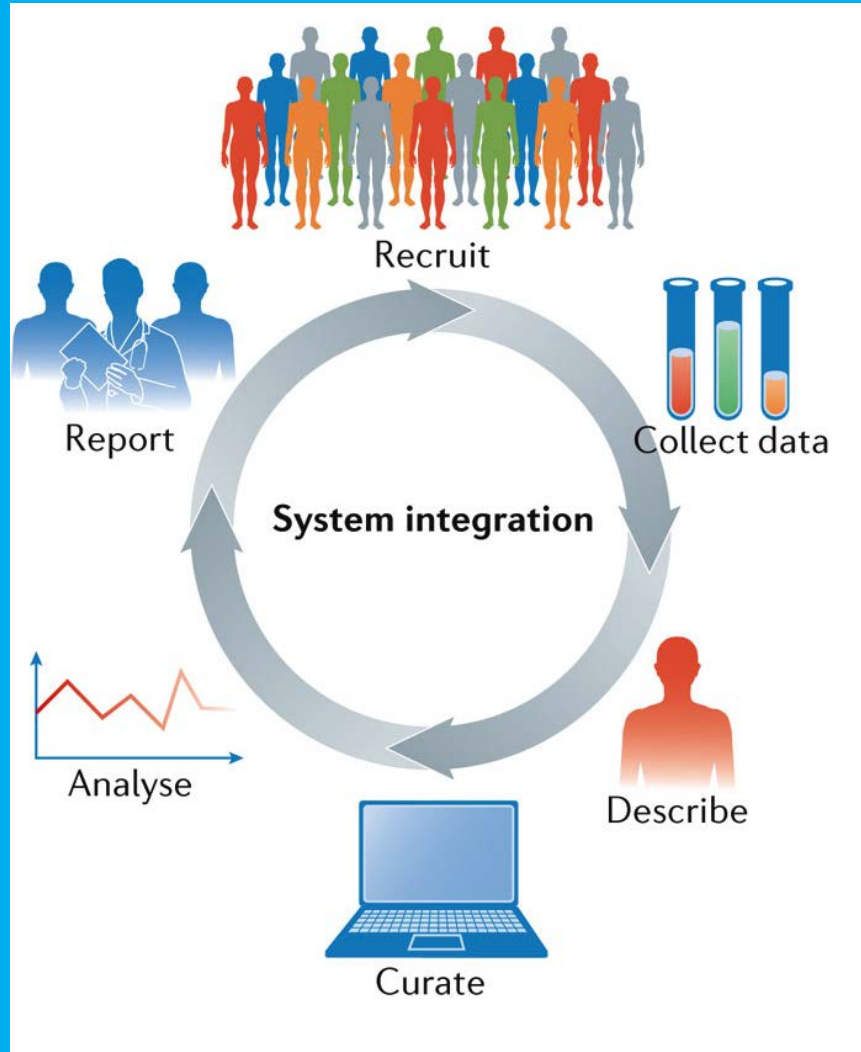
- Large and diverse patient population
- World class interdisciplinary expertise in genomics, big data, supercomputing, and bioinformatics
- Ability to translate from lab directly to the clinic

Precision medicine will transform healthcare delivery:

- Patients are more in control and have better outcomes
- Reduced costs and side effects with more accurate treatments
- Mount Sinai will be the leading institution in promoting wellness.

# Anticipate & Fund New Areas of Research

## Precision Medicine – The Future of Healthcare



Genetic Vulnerabilities  
Medical History  
Laboratory Tests  
Life History &  
Environmental Influences

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Data Science

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Assessment of Risk  
More Accurate Diagnosis

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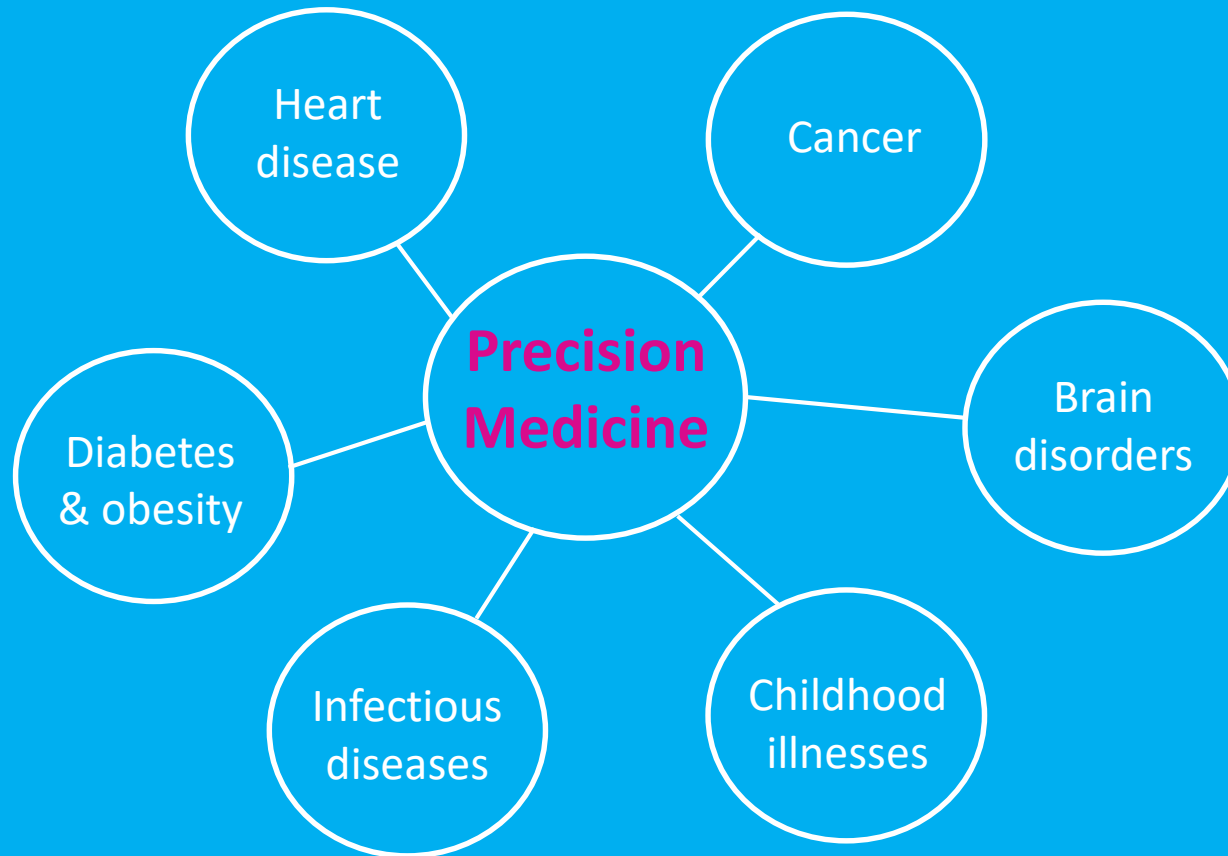
Tailored Treatments  
and Cures

Ultimately: Disease Prevention

# Anticipate & Fund New Areas of Research

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Precision Medicine – A New Model of Discovery to Transform Healthcare

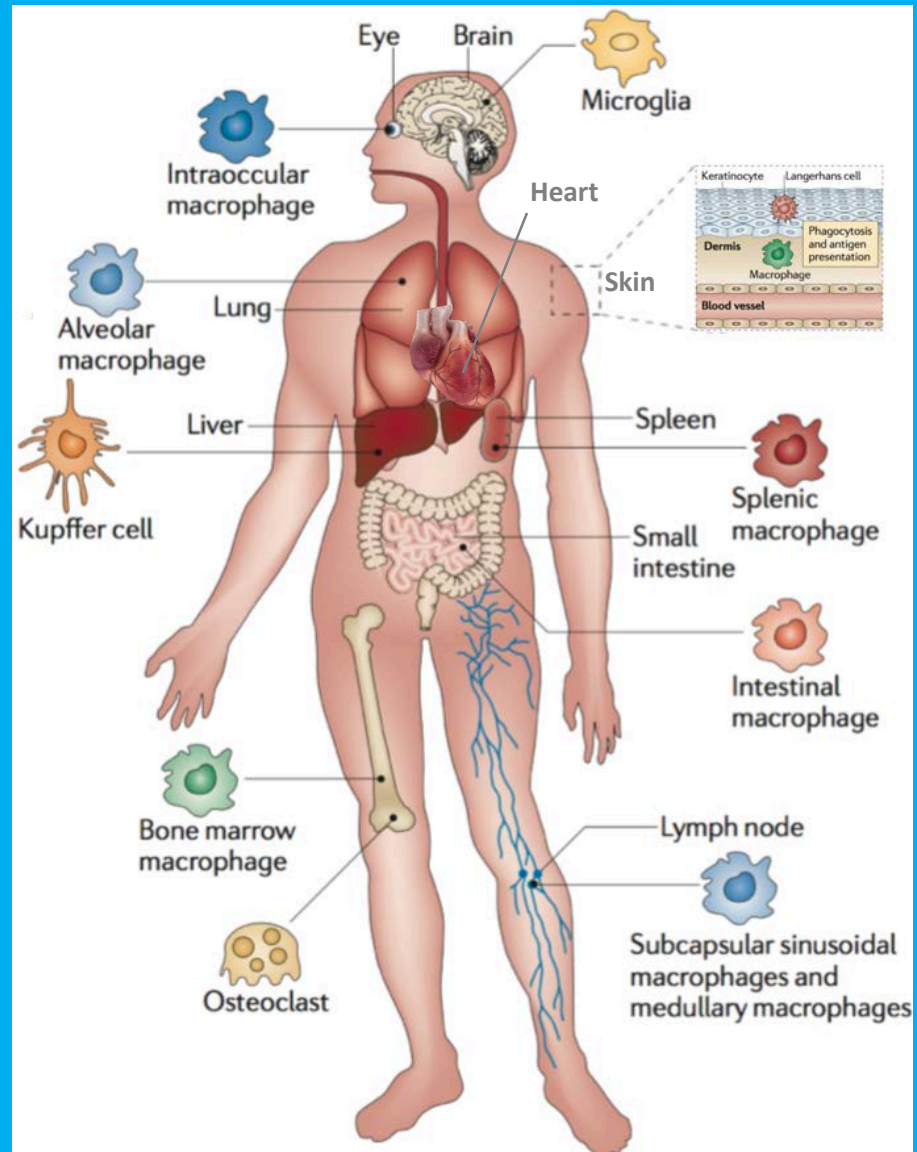


Driving advances in all areas of healthcare...

# Anticipate & Fund New Areas of Research

## Major Investment in Immunology

Cells of the immune system are present in every organ, influence all disease states, and represent a path toward unprecedented, targeted intervention to treat human illness.



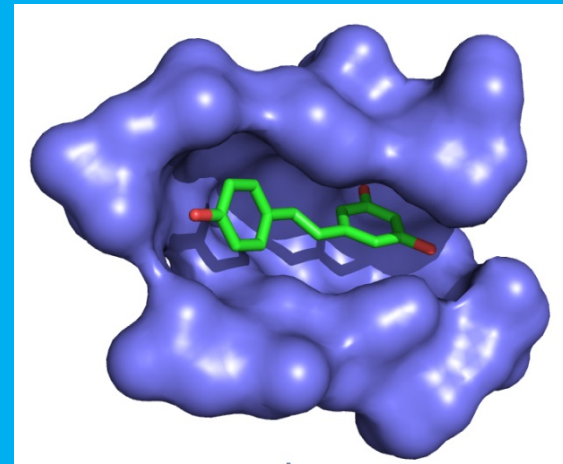
# Powering the Engine of Discovery

## Mount Sinai Drug Discovery Institute

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Establish Centers of Excellence in areas of greatest potential:

1. Neuro-Therapeutics, focused on developing novel therapeutics for brain disorders
2. Discovery Medicine, which will leverage novel insights in human genetics and genomics to develop “precision medicines”
3. Immuno-Therapeutics, to develop human therapeutic antibodies and vaccines that target cancer, heart disease, diabetes, brain disorders, and others
4. Genome Editing, capturing the power of CRISPR-base high-throughput genomic screens to develop innovative therapeutics.



Led by Mount Sinai Innovation Partners (MSIP), this investment will solidify Mount Sinai's position as a leading innovator in healthcare/life sciences on par with other elite institutions:

- Reinforces Mount Sinai's position as a leader in healthcare innovation
- Accelerates the development of commercially relevant Mount Sinai technologies
- Increases the number and value of *license-ready* Mount Sinai technologies
- Increases financial return from commercialization of Mount Sinai technologies
- Recruits and retains innovation-driven investigators
- Enhances Mount Sinai's reputation as a leader in "Bench-to-Bedside" translational research

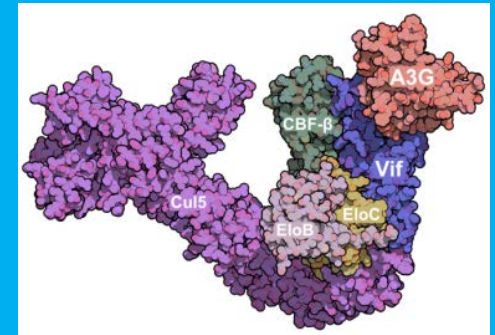
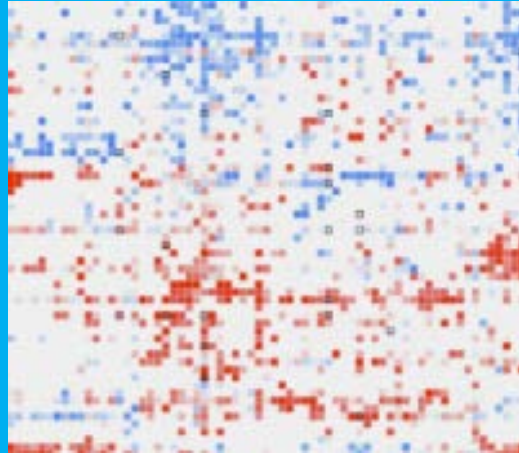
The Accelerator Program will attract additional funding for translational research, new IP, and new company creation.



# Invest Further in Current Areas of Excellence

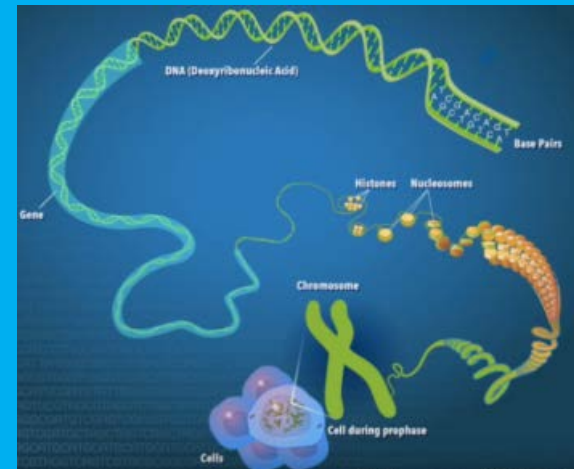
## Clinical Sciences:

1. Brain
2. Cancer
3. Diabetes
4. Geriatrics
5. Heart
6. Infectious Disease
7. Others



## And the Discovery & Translational Sciences that underpin them:

1. Cell & Developmental Biology (including Stem Cells)
2. Genetics and Genomic Sciences
3. Microbiology (including microbiome)
4. Neuroscience
5. Pharmacological Sciences
6. Others

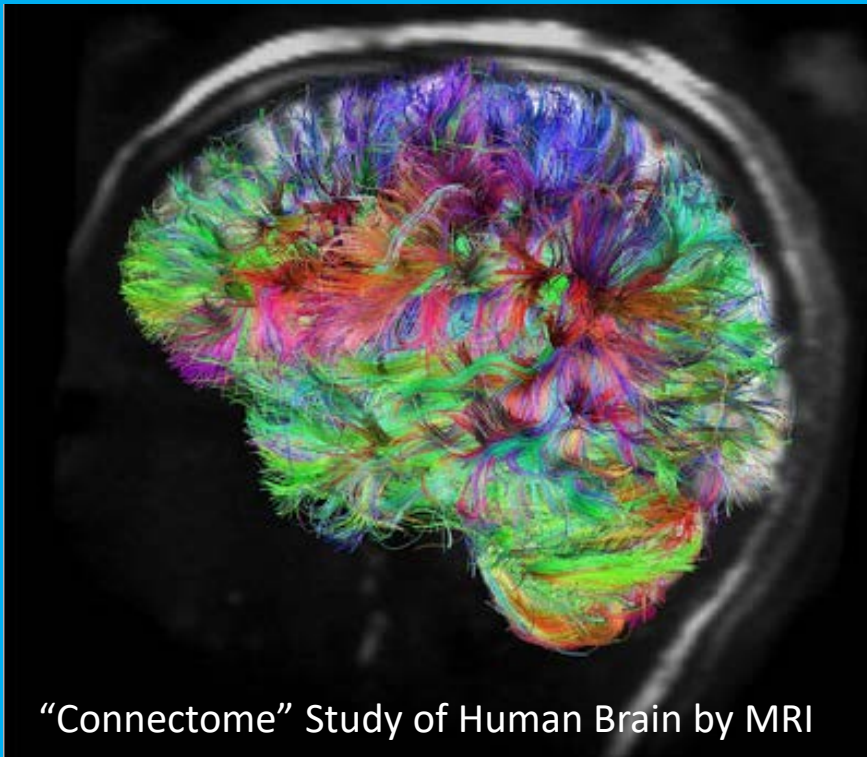


# Invest Further in Current Areas of Excellence

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## Transformational Exploration of the Brain

A single human brain is composed of 100 billion nerve cells which organize into 100 trillion connections (synapses). Plus 100 billion glial cells which control and modulate the nerve circuitry.



We now have the power to define microcircuits in the brain and, in laboratory animals, establish the precise behavioral function served by each circuit.

These approaches immediately inform deep brain stimulation treatments for Parkinson's disease and other disorders and dramatically advance our understanding of the brain—the last frontier of modern medicine.

# Strategic Plan 2017 – Recruit New Faculty

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The goals of the 2006 strategic plan were achieved through the recruitment of 150 faculty in targeted areas.

To achieve the goals of the 2017 Strategic Plan, we anticipate that we will need to recruit a similar number of Discovery, Translational, and Computational research faculty.

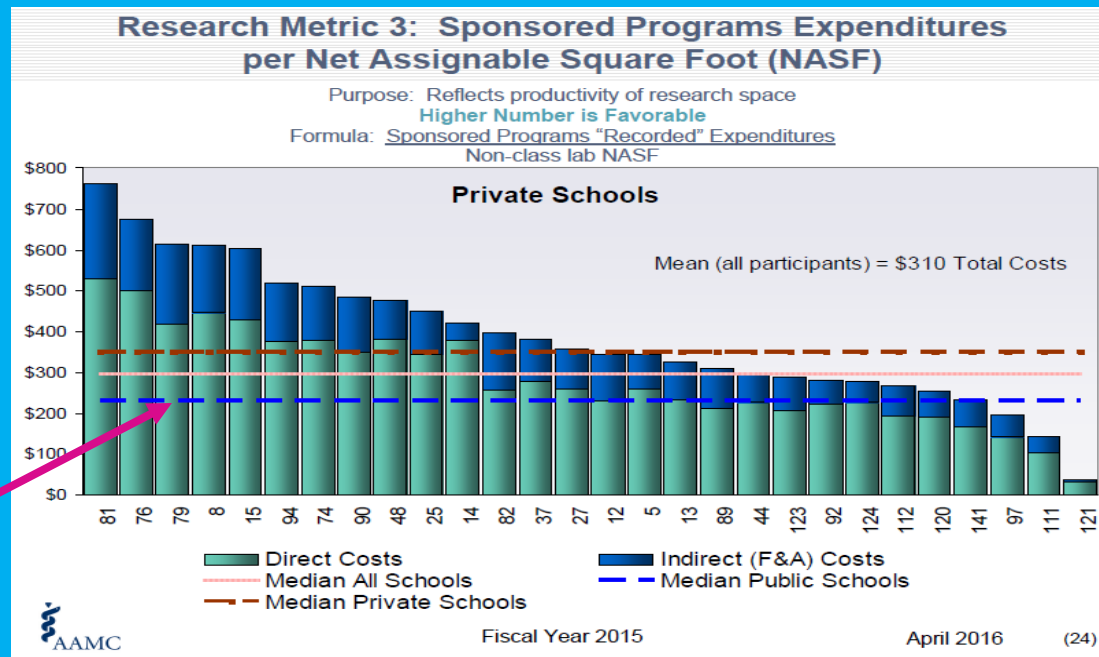
	<u>2017 Plan</u>
Discovery Science Lab-based research	90
Translational Science Patient-oriented research	50 (>50% research effort)
Computational Science Big data integration (laboratory testing, electronic medical records, etc.)	35

# Strategic Plan 2017 – Need for New Space

Mount Sinai is currently #3 in Research \$s/SF

Lack of space inhibits growth of programs and recruitment

Jeopardizes Mount Sinai's current upward trajectory



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# Strategic Plan 2017 – Space Needs

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A new research building, comparable in size to the Hess Center, is needed to accomplish the Strategic Plan goals.

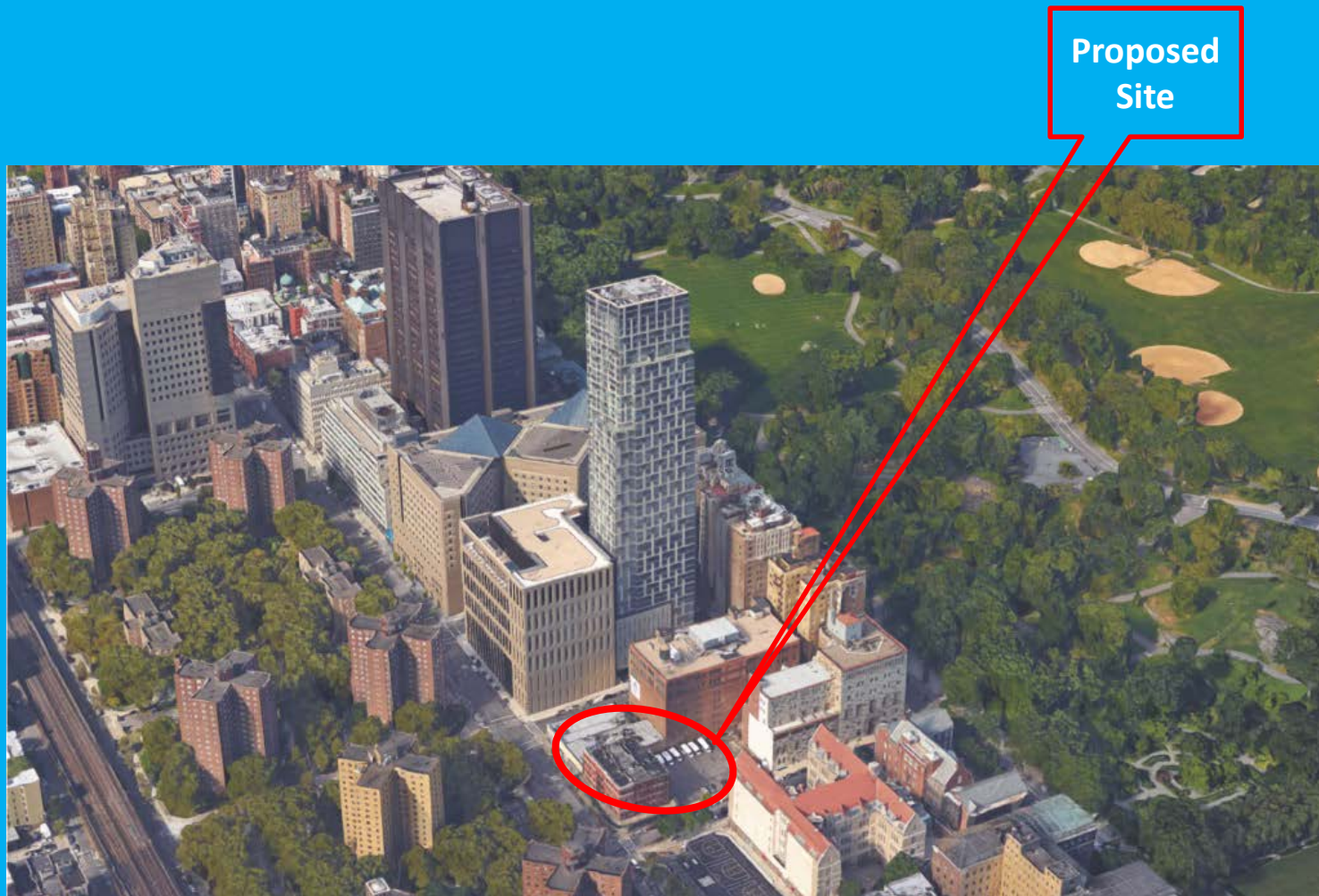
Discovery Science	180,000 nsf (includes vivarium)
Translational Science	20,000 nsf
Computational Science	20,000 nsf
Public & Meeting space	10,000 nsf
Clinical Space*	TBD
Incubator space**	TBD

\* Clinical Space to be determined based on MSHS masterplan

\*\* Incubator space to be determined in collaboration with venture partner

# Strategic Plan 2017 - Proposal

## New Life Science Center at 102-103 St and Madison Ave



# Ultimate Outcomes

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## Measures of Success for the Strategic Plan:

1. Outstanding publications
2. Increased NIH funding / Higher NIH Ranking
3. More IP, more collaborations with industry, more Sinai companies formed
4. **MOST IMPORTANT:** Discoveries that make the Mount Sinai Health System the nation's best, and improve the lives of our patients, both locally and around the world



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