Building and Maintaining Greatness: The Mount Sinai Strategic Plan

Dennis S. Charney, M.D.
Dean, Mount Sinai School of Medicine

Inter-Urban Clinical Club, April 1, 2011
Mount Sinai has a rich history of contributions to research & patient-care..............
Mount Sinai’s Contributions
To National and International Healthcare

– BENJAMIN McCREADY, M.D. 1813-1892
HELPED CREATE THE FIELD OF OCCUPATIONAL MEDICINE

– ABRAHAM JACOBI, M.D. 1830-1919
FATHER OF PEDIATRICS IN THE U.S.

– BERNARD SACHS, M.D. 1858-1944
FATHER OF PEDIATRIC NEUROLOGY

– IGNATZ LEO NASCHER, M.D. 1863-1944
CREATED THE SPECIALTY OF GERIATRICS

– IRVING J. SELIKOFF, MD 1915-1992
LED A WORLD WIDE EFFORT TO PREVENT EXPOSURE TO ASBESTOS

– KURT DEUSCHLE, M.D. 1923-2003
FATHER OF COMMUNITY MEDICINE
Mount Sinai’s Discoveries with Worldwide Implications

1908- Ottenberg performs group matched transfusion
1910- Elsberg introduces endotracheal anesthesia
1915- Lewisohn describes blood preservation solution
1919- Rubin develops first test for tubal patency
1928- Shwartzman describes the “Shwartzman phenomenon”
1929- Swick introduces radio-opaque dye
1929- Master develops the stress test
1959- Ornstein and Davis develop gel-electrophoresis
1959- Berson and Yalow develop radio-immunoassay
1969- Kilbourne develops first genetically engineered vaccine
1977- Palese maps first influenza virus genome
1988- First demonstration of how asbestos causes cancerous changes in cellular DNA
1991- Ramirez identifies gene for Marfan Syndrome
1992- Davis et al develop first drugs approved for treatment of Alzheimer’s
2001- Desnick et al formulate enzyme replacement therapy for Fabry’s disease
2003- Sampson et al develop treatment for peanut allergy that raises threshold before allergic response

Accelerating Science
Advancing Medicine

Achieving and Maintaining Greatness
The Challenge: 2004
MSSM Status

Sinai emerging from unsuccessful merger with NYU
Medical School Ranking (US News & World Report) = 32
NIH Funding Rank = 25

Challenges:
1. Funding
   - NIH Budget flat = only strongest proposals funded in zero growth environment
2. Research
   - Complexity has increased and is more resource intensive
   - Major breakthroughs require significant investment
   - NIH cutbacks have increased pressure for results-oriented research
3. Space
   - No new construction since 1997
   - MSSM expected to have the lowest space devoted to research by 2006
   - High correlation between NIH ranking and research space
   - Lack of space impacting ability to:
     • grow
     • offer new programs
     • recruit
MSSM was at a critical junction in its history

- Institution vulnerable to competitive peer pressure and faculty retention challenges

- Inadequate research will impact NIH and Medical School ranking making institution unattractive to outstanding students

- Lack of a strong clinical research will impact ability to attract exceptional clinicians
2005 – Start of Strategic Planning Process
“Going From Very Good to Great”

Charge to 22 Work Groups with >100 Faculty

How can we leverage & nurture Mount Sinai’s culture and history of interlocking relationships between clinicians and researchers to enable new discoveries & cures?
3 Recurring Themes for Research Focus:

1. Basic Science leading to Therapeutic Discoveries in targeted diseases

2. Clinical Research across the life span leveraging Sinai’s patient population and hospital

3. Emphasis on Basic and Clinical research opportunities that can be facilitated by industry partnerships
Despite its moderate size and lack of a strong university affiliation, MSSM is capable of leading the nation in biomedical research resulting in therapeutic breakthroughs.
The Vision
The Basic Principles

MSSM can be World Leader

Funding Opportunity (NIH, Philanthropy)

MSSM Mission

MSSM Biomedical Research
Going from Very Good to Great

Accelerating Science
Advancing Medicine

Achieving and Maintaining Greatness
Identify and recruit research leaders who share this vision and goals

Leaders characterized by great personal drive and will to effect change who can:

- Identify opportunities and target “doable” but important problems
- Recruit exceptional quality scientists across diverse fields
- Facilitate breakthrough research in a nurturing environment
- Facilitate funding and intellectual property

Hollingsworth 2000, 2008
Collins 2001
MSSM Biomedical Research
Going from Very Good to Great

• Build research teams for 21st century science
• Research teams characterized by:
  – Moderate size
  – Multidisciplinary approach
  – Intense and frequent interaction with peers
  – Rockefeller University as a model
    • A “translational Rockefeller”

Hollingsworth 2000, 2008
Collins 2001
2005 Goals

- NIH Funding Rank in Top 20
- Medical School Rank in Top 20

<table>
<thead>
<tr>
<th>Target Ranking</th>
<th>2005 Ranking</th>
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<tbody>
<tr>
<td>NIH = 1-7</td>
<td>NIH - 8-15</td>
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<tr>
<td>Hopkins</td>
<td>Yale</td>
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<td>Wash U</td>
<td>U-Pitt</td>
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<td>U Penn</td>
<td>Baylor</td>
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<td>UCSF</td>
<td>U-Mich</td>
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<td>Duke</td>
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<td>Columbia</td>
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<td>UCLA</td>
<td>UCSD</td>
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<tr>
<td>Med School = 2-11</td>
<td>Med School = 8-16</td>
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<tr>
<td>NIH - 16-23</td>
<td>NIH - 24-31</td>
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<tr>
<td>U-AL</td>
<td>MSSM</td>
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<td>Vanderbilt</td>
<td>Chicago</td>
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<td>WVU</td>
<td>Emory</td>
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<td>UIC</td>
<td>UTSW</td>
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<td>U Chi</td>
<td>U-Nebraska</td>
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<tr>
<td>Med School = 17-30</td>
<td>Med School = 19-38</td>
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<tr>
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<td>MSSM</td>
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<td>UTSW</td>
<td>U-Nebraska</td>
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<tr>
<td>U-Minn</td>
<td>U-Mich</td>
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<tr>
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Med School = 19-38
Achieving and Maintaining Greatness

Basic Principles
Role Model

Research

Rockefeller University

- Founded 1901
- First US Institution devoted solely to biomedical research
- 23 Nobel Prize winners associated with the University
- 20 Lasker Award winners
- 13 National Medal of Science winners
- 35 Members of the National Academy of Sciences
- 14 Members of the Institute of Medicine
Role Model
Research

Rockefeller University

- 69 Laboratories
- 6 Research Areas (biochemistry, structural biology, chemistry; immunology, virology and microbiology; molecular, cell and developmental biology; medical sciences and human genetics; neuroscience; physics and mathematical biology)
- 9 Interdisciplinary Centers (cancer; hepatitis C; physics and biology; immunology and immune diseases; Alzheimer's disease; sensory neuroscience; biochemistry and structural biology; mind, brain and behavior; human genetics)

MSSM Goal:

- Establish world-class interdepartmental, multi-disciplinary research teams
- Provide research environment for breakthrough discovery to improve diagnosis and treatment of human diseases
Characteristics of Scientifically Weak Academic Medical Centers

1. Increased differentiation (silos) and less integration and collaboration

2. More Bureaucracy

3. When research organizations respond to growth by differentiating into new departments and by imposing hierarchical and bureaucratic controls → limiting the process of crossing academic disciplines and a decline in integration and diminished possibility of major discoveries

4. Most medical schools lack flexibility and there is a sharp differentiation between clinical sciences and basic sciences

5. Has resulted in relatively few major discoveries in the 20th century

Hollingsworth, 2000, 2008
Institutional Factors
Facilitating Scientific Creativity & Major Discoveries

1. Nimble administrative structure
2. Rigorous scientific focus
3. Financial discipline regarding scientific investment
4. Facilitate scientific entrepreneurship

Hollingsworth 2000, 2008
1. Recruit great scientists who value scientific diversity

2. An environment that facilitates communication and social integration of scientists from different fields through frequent and intense interaction

3. Leaders who integrate scientific diversity, have the capacity to understand the direction in which scientific research is moving, and provide rigorous criticism in a nurturing environment

Hollingsworth 2000, 2008
Achieving and Maintaining Greatness
The Strategic Plan
The Ingredients needed for: Achieving and Maintaining Greatness

1. Great Administrative Leadership (Dean, CEO)
2. Great Leaders of People (Chairs, Institute Directors)
3. Great Players (Scientists, Physicians)

All 3 are NEEDED.
Value the Tripartite Missions of MSSM

1. Research

2. Education

3. Clinical

Alignment of Research, Education & Clinical missions is critical to the successful implementation of the Strategic Plan.
Institute model reflects Hollingsworth’s findings to leverage:
“high cognitive complexity” that allows successful scientists to see important relationships among disparate fields of knowledge

- Institutes designed to facilitate breakthrough science
  - 7 Disease-Oriented
  - 6 Cores to complement work of Disease-Oriented Institutes
- Carefully selected in areas of research where Sinai excels
- Organization flexibility to quickly respond to scientific advances
- Recruited world-class scientists
- Provided the intellectual freedom and space to pursue their best ideas
Achieving and Maintaining Greatness

Accelerating Science
Advancing Medicine

MSSM Research Institutes

7 Disease-Oriented Institutes & 6 Basic Institutes of Excellence

- Delivering superior care and performing exceptional research
- Conducting multi-disciplinary translational research leading to therapeutic discoveries

We intend to create a research environment that encourages collaboration and rewards work that challenges conventional wisdom

Dennis S. Charney, MD

Fierce Competition
Fierce Cooperation

6-Basic Institutes Nucleus
## Major Recruitments

<table>
<thead>
<tr>
<th>Position</th>
<th>Department/Program</th>
<th>Director/Chief</th>
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</thead>
<tbody>
<tr>
<td>Chair</td>
<td>Health Evidence &amp; Policy</td>
<td>Eric Rose, MD</td>
</tr>
<tr>
<td>Chair</td>
<td>Medicine</td>
<td>Mark Babyatsky, MD</td>
</tr>
<tr>
<td>Chair</td>
<td>Neurology</td>
<td>Stuart Sealfon, MD</td>
</tr>
<tr>
<td>Chair/Director</td>
<td>Neuroscience/Brain Institute</td>
<td>Eric Nestler, MD</td>
</tr>
<tr>
<td>Chair</td>
<td>Pathology</td>
<td>Carlos Cardon-Cardo, MD</td>
</tr>
<tr>
<td>Chair</td>
<td>Pediatrics</td>
<td>Lisa Satlin, MD</td>
</tr>
<tr>
<td>Chair</td>
<td>Psychiatry</td>
<td>Wayne Goodman, MD</td>
</tr>
<tr>
<td>Chair</td>
<td>Radiation Oncology</td>
<td>Kenneth Rosenzweig, MD</td>
</tr>
<tr>
<td>Director</td>
<td>Cancer Institute</td>
<td>Steven Burakoff, MD</td>
</tr>
<tr>
<td>Director</td>
<td>Disease Prevention &amp; Public Health Instt</td>
<td>Paolo Boffetta, MD MPH</td>
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<tr>
<td>Director</td>
<td>Stem Cell Institute</td>
<td>Ihor Lemischka, PhD</td>
</tr>
<tr>
<td>Director</td>
<td>Transplant Institute</td>
<td>Sander Florman, MD</td>
</tr>
<tr>
<td>Chief</td>
<td>Division of HemOnc/DOM</td>
<td>William Oh, MD</td>
</tr>
<tr>
<td>Chief</td>
<td>Division of GI/DOM</td>
<td>Bruce E. Sands, MD MS</td>
</tr>
<tr>
<td>Chief</td>
<td>Breast Surgery</td>
<td>Elisa R. Port, MD FACS</td>
</tr>
<tr>
<td>Chief</td>
<td>Thoracic Surgery</td>
<td>Raja Flores, MD</td>
</tr>
<tr>
<td>Director</td>
<td>Mood &amp; Anxiety Program</td>
<td>Dan Iosifescu, MD</td>
</tr>
<tr>
<td>Director</td>
<td>Multiple Myeloma Program</td>
<td>Sundar Jagannath, MD</td>
</tr>
<tr>
<td>Director</td>
<td>Head &amp; Neck Onc Program</td>
<td>Marshall R. Posner, MD</td>
</tr>
<tr>
<td>Medical Director</td>
<td>Ruttenberg Cancer Center</td>
<td>Randall Holcombe, MD</td>
</tr>
<tr>
<td>Chief Medical Officer</td>
<td>FPA &amp; Mount Sinai Hospital</td>
<td>Mark Callahan, MD</td>
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*Over 350 faculty recruited at all levels*
Research 2010 Results

- MSSM #18 in NIH Funding with >$275M in grants

- AARA Funding Outstanding with over $50M awarded in 2010.

- Efficiency of space utilization is high –
  Compared to peer AMC’s:
    #2 in Grant $ per P.I.
    #3 in Direct Grant $/P.I.

- This increase has enabled us to make major recruitments within our existing space

Center for Science & Medicine
Completion 2012
Teaching tomorrow’s doctors and scientists that:

Science, Service and Advocacy are inextricably related

Our scientific goal is to bridge the gap between Bench-Bedside-Community

Curriculum Reforms in both Medical & Graduate School to seamlessly integrate:

– Clinical relevance into scientific research

&

– Scientific principles into clinical training

To produce leaders in bio-medicine & healthcare

Committed to clinically relevant breakthrough science
**Education Goals**

- Recruitment of outstanding medical and graduate students
- Obtain Independent Degree Granting Status
- Develop unique cutting edge curriculum in medical and graduate school
- Mentorship
Goals of the new Institute:

- Recognition/Reward for Excellence in Education
- Support for Promotion on Educator Track
- Support and development in Teaching/Education
- Support and development of Scholarship
- Create an Educational community
Education: Results – Matriculating Class of 2010

MD Students

- Number of Complete Applications: 4,751
- Number of Interviews (excl EA/MSTP): 784
- Size of Class: 141
- MSTP: 11
- Humanities and Medicine: 28
- NYS State Residents: 32%
- Women: 47.8%
- URM: 19.7%
- Average MCAT: 35.4
- Average GPA: 3.71
- Number of Undergraduate Schools: 59
  (Brown=12, Harvard=10, Columbia=9, Cornell=9, Duke=6, Princeton=6)
**PhD Students**

- Number of Complete Applications: 436
- Size of Class: 39
- NYS State Residents: 28%
- Women: 46%
- URM: 8%
- Average GRE: 1,290
- Median GPA: 3.53
- Number of Undergraduate Schools: 32
  (Columbia 2, Emory 2, Boston College 1, Dartmouth 1, Hopkins 1, NYU 1, Tufts 1, Wash U 1)
**MD/PhD Students**

- Number of complete applications: 256
- Size of class: 11
- NYS State Residents: 54.5%
- Women: 27%
- URM: 0
- Average MCAT: 37
- Median GPA: 3.84
- Number of UG Schools: 11

(Brown U: 1, Bowdoin College: 1, Pomona College: 1, Johns Hopkins: 1, Harvard: 1)
Reinvigorating the Clinical Mission
The Strategic Plan
Mayo Clinic

- The first and largest integrated not for profit medical group practice in the world
- “Mayo Clinic is a collaborative organization, a pliable institution that assembles the expertise needed for individual patients. Once the teams provide the necessary care, they disband and reconfigure to meet the medical needs of other patients. Imagine a huge store that sells everything, with experts in every department who work together to help customers. This is how Mayo Clinic is designed for medical customers. Patients don't get just a doctor; they get, in effect, the ‘whole company.’ The Mayo system of integrated, multi-specialty, outpatient and inpatient medical care doesn't always work as intended. But it does work most of the time and represents Mayo Clinic's most important competitive advantage.”
Mayo Clinic Model of Care

- Principles of Outstanding Patient care
  - Collegial, cooperative, staff teamwork with multispecialty integration. A team of specialists is available and appropriately used.
  - Highest quality patient care provided with compassion and trust.
  - Comprehensive evaluation with timely, efficient assessment and treatment.
  - Availability of the most advanced, innovative diagnostic and therapeutic technology and techniques.
• Mayo Clinic's brand is world-class because it reassures; it evokes confidence in customers who truly need to trust. In the end, great services brands are built on excellent customer experiences, and this is the meta branding lesson the Mayo Clinic teaches.

• Our goal is to establish Mount Sinai as a world class brand of outstanding patient centered clinical care

• When the patient comes to Mount Sinai, they get the entire institution
Clinical-Goals

• Develop a patient-centered, efficiently-run, professionally-managed FPA without losing any of the existing entrepreneurial spirit

• Develop a culture of service, so that our patient satisfaction matches our outstanding quality of patient care

• Improve operational efficiency, such as in the revenue cycle, realizing economies of scale where appropriate

• Continue our practice growth

• Expand primary care on campus and develop strategic alliances to expand our primary care reach
FPA Patient Care Receipts compared to other Top Ranked Schools

2009 - #5
2010 - #4

FPA receipts growth has averaged 12.2% annually over the past 5 years and exceeded $416.1 million in 2011 resulting from new recruits, physician productivity and billing/collection improvement initiatives.
Results

Quality Improvements on all 3 missions

Best Doctors in NY

- 147 FPA Doctors in 49 specialties
  Total 394 in 56 specialties (includes voluntaries, affiliates and non-FPA)

US News & World Report Rankings

- Medical School 2010 #18 (was #32 in 2004)
  Hospital 2010 - “One of the Best Hospitals in US”
  Top 20 in 7 Specialties (up from 6 in 2009)
  Top 50 in 13 Specialties (up from 11 in 2009)
  (out of 4,852 hospitals analyzed)

NIH Funding Rank

- Highest level in Sinai’s history at >$250M

AAMC Rank (unchanged from 2009)

- U.S. Medical Schools (AAMC) 2010 #3 Research Dollars/Principal Investigator
  #2 Research Density

“A” on AMSA Pharmafree Scorecard on COI policies (1 of only 12 in country)
Scientific Innovation in an Age of Uncertainty
Achieving and Maintaining Greatness
Accelerating Science
Advancing Medicine

FDA approved drugs based on Publicly-funded research

High correlation between disease priorities and NIH Institutes’ budgets. However, these priorities are not the same as those of Pharma. Research supported by NIH and other public entities has had a more immediate effect in improving public health than other funding mechanisms.

- In the past 40 years, 153 FDA approved drugs were discovered by institutions.
- FDA approved 1,541 new drug applications.
- 46.2% of publicly funded new drug applications received priority review vs 20% for private-sector.
- Publicly funded research has contributed 9.3%-21.2% of all new drugs involved in new drug applications.

Source: NEJM, Feb 10, 2011

Table 1. Number of Drug Products Approved by the Food and Drug Administration and Originating from Public-Sector Research, According to Therapeutic Area, 1970–2009.

<table>
<thead>
<tr>
<th>Therapeutic Area</th>
<th>Number</th>
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<tbody>
<tr>
<td>Total</td>
<td>153</td>
</tr>
<tr>
<td>Hematology or oncology</td>
<td>40</td>
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<tr>
<td>Infectious disease</td>
<td>36</td>
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<tr>
<td>Cardiology</td>
<td>12</td>
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<tr>
<td>Metabolic disease</td>
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<tr>
<td>Central nervous system</td>
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<td>Dermatology</td>
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<td>Renal disease</td>
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<td>Ophthalmology</td>
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<td>Immunology</td>
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<td>Gastroenterology</td>
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<td>Women's health</td>
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<td>Urology</td>
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<tr>
<td>Anesthesiology</td>
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<tr>
<td>Dental disorders</td>
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</tbody>
</table>
Shift from primary care to specialty care continues

Payer dissatisfaction with high prices for incremental innovations for same diseases

Need to be accountable to payers is shaping discovery & development programs at drug firms

Preference to tackle expensive treatments for chronic conditions

Source: Nature 2011
Shifting Landscape-2

Drug Companies reducing R&D and “out-sourcing” basic research

Susan Desmond-Hellmann

In 2009, Susan Desmond-Hellmann left Genentech, after 5 years as President of Product Development, to become Chancellor at the University of California, San Francisco (UCSF). Since rejoining academia, she has overseen the creation of numerous UCSF–industry alliances, including recent deals with Pfizer, Sanofi–Aventis and Bayer. Similar partnerships, of varying forms, are appearing around the world, as pharmaceutical and biotechnology companies seek new sources of innovation to shore up faltering pipelines. Speaking with Asher Mullard, Desmond-Hellmann discusses the increasing interest in industry–academia collaborations and looks back on the lessons she has learned since leaving Genentech. Nature, March 2011

Basic Science research is expensive but that is where academia excels

Drug Companies reducing their R&D budgets and Basic Science research

Pharma leveraging the high quality of science and depth of knowledge at academia to increase their understanding of drug interactions

Collaborations between academia and Pharma on the rise

Goal is to improve the predictability of outcomes of new drugs.

Pfizer’s Shakeup Means Less Money for Research

The pharmaceutical giant Pfizer has announced it will lay off thousands of workers and cut its research and development budget by between $1.5 billion and $2 billion in 2012. That drastic decrease, industry observers say, reflects uncertainties facing many large drug companies about what role they should play—or even want to play—in basic drug research. Increasingly, they shop for the science they need, when they need it.

Science, February 11, 2011
Mount Sinai’s response-1

Creation of Genomics Institute

To provide the latest Genetic/Genomic Technologies and Computational and Analytical Capabilities for MSSM Investigators
Mount Sinai’s response-2

Creation of Center for Discovery & Innovation

To illuminate new disease targets and the molecules that treat those targets.

This discovery group will identify the most promising research within all of Mount Sinai’s disease-focused institutes.