“To help this country compete for new jobs and businesses, we also need to invest in basic research and technology, so the great ideas of the future will be born in our labs and in classrooms like these.”

President Obama
Signing of America Invents Act
Thomas Jefferson High School
September 16, 2011
FY 2013: Budget Highlights

• Funding at same total program level as FY 2012
• Makes tough choices within constraints
• Increases number of new and competing Research Project Grants
• Ramps up Cures Acceleration Network by $40 million
• Provides additional support for Alzheimer’s Disease research from the Public Health and Prevention Fund – $80 million as part of HHS-wide initiative

Extraordinary Scientific Opportunities — FY 2013

• Investing in Basic Research
• Accelerating Discovery Through Technology
• Advancing Translational Science
• New Investigators, New Ideas

Investing in Basic Research

“... the hope of major advances lies in sustaining broad and free-ranging inquiry into all aspects of the phenomena of life, limited only by the criteria of excellence, the scientific importance, and the seriousness and competence of the investigator.”

— James A. Shannon, M.D.
8th Director of NIH

135 NIH grantees/trainees have become Nobel Laureates

Investing in Basic Research

• Unlocking the potential of microRNAs (miRNAs)
• Exploring the microbiome’s role in obesity
• Launching the main National Children’s Study, potential for significant annual cost savings
Accelerating Discovery Through Technology

- Lower DNA sequencing costs will transform efforts to understand, diagnose, treat, and prevent disease
- The Cancer Genome Atlas will chart complex pathways involved in >20 cancer types
- Induced pluripotent stem (iPS) cells will provide new tools for research and therapy

Human iPS Cells: Promise for Research and Therapy

Model disease \textit{in vitro} to screen potential drugs

iPS Models of Disease

- More than 45 diseases to date
- Valuable for conditions affecting the brain
  - Autism spectrum disorders
  - Schizophrenia
  - Alzheimer’s disease

Sequencing Costs Drop Faster than Moore’s Law

Cost per Megabase of DNA Sequence

\begin{center}
\begin{tikzpicture}
\begin{axis}[
    title = {Sequencing Costs Drop Faster than Moore’s Law},
    xlabel = {Moore’s Law Cost per Mb},
    ylabel = {Cost per Megabase of DNA Sequence},
    xmin = 2001, xmax = 2011,
    xticklabels = {Sep-01, Jan-02, May-02, Sep-02, Jan-03, May-03, Sep-03, Jan-04, May-04, Sep-04, Jan-05, May-05, Sep-05, Jan-06, May-06, Sep-06, Jan-07, May-07, Sep-07, Jan-08, May-08, Sep-08, Jan-09, May-09, Sep-09, Jan-10, May-10, Sep-10, Jan-11},
    ytick = {0, 0.01, 0.10, 1.00, 10.00, 100.00, 1000.00, 10000.00},
    yticklabels = {$0.01$, $0.10$, $1.00$, $10.00$, $100.00$, $1000.00$, $10000.00$},
    legend pos = north east,
]
\addplot coordinates {
    (2001, 61500)
    (2002, 10000)
    (2003, 1000)
    (2004, 100)
    (2005, 10)
    (2006, 1)
    (2007, 0.1)
    (2008, 0.01)
    (2009, 0.001)
    (2010, 0.0001)
    (2011, 0.00001)
};
\addplot coordinates {
    (2001, 61500)
    (2002, 10000)
    (2003, 1000)
    (2004, 100)
    (2005, 10)
    (2006, 1)
    (2007, 0.1)
    (2008, 0.01)
    (2009, 0.001)
    (2010, 0.0001)
    (2011, 0.00001)
};
\legend{Moore’s Law, Cost per Mb}
\end{axis}
\end{tikzpicture}
\end{center}
Human iPS Cells: Promise for Research and Therapy

- Model disease in vitro to screen potential drugs
- Facilitate personalized cell therapy

NIH Center for Regenerative Medicine (NIH-CRM)
- New national resource for stem cell science
- Desire to capitalize on NIH Clinical Center’s strengths
- Tap into NIH’s proven ability to assemble interdisciplinary teams, build community resources

Advancing Translational Sciences
- National Center for Advancing Translational Sciences (NCATS) established in FY 2012
  - Tissue Chip for Drug Screening
  - Drug Rescue Pilot Program

Advancing Translational Sciences
- National Center for Advancing Translational Sciences (NCATS) established in FY 2012
  - Tissue Chip for Drug Screening
  - Drug Rescue Pilot Program
  - High priority clinical trials: Universal flu vaccine

Amyloid beta peptides
The Need for a Universal Flu Vaccine

- Up to 50,000 U.S. deaths associated with flu annually
- $87 billion in economic costs
- Protection currently involves getting a flu shot every year
- Vaccine manufacture takes 6 months; requires predicting this year’s flu strain before production

NIH Clinical Center

Lasker-Bloomberg Public Service Award

For serving since its inception as a model research hospital — providing innovative therapy and high-quality patient care, treating rare and severe diseases, and producing outstanding physician-scientists whose collective work has set a standard of excellence in biomedical research.

New Investigators, New Ideas

- NIH-Lasker Clinical Research Scholars
- Transformative R01
- NIH Director’s Pioneer Award
- New Innovator Award
- NIH Director’s Early Independence Awards

New investigators supported at success rates equal to those of established investigators for new RPGs

Greater Diversity in Research Workforce

African Americans, Hispanics, and Native Americans:

- Represent 31% of U.S. college age population but only account for 14% of undergraduates in life sciences
- And even fewer in later stages
Messages about the Importance of NIH

1. Basic Research: If NIH Doesn’t Fund, It Doesn’t Happen
2. Deluge of Discovery: New Opportunities for Translational Partnerships
3. Major Contributor to U.S. Economy and Job Growth
4. Leader in U.S. Global Competitiveness

“If we’re going to create jobs now and in the future, we’re going to have to out-build and out-educate and out-innovate every other country on Earth.”

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NIH...
Turning Discovery Into Health