NIH in the Post Doubling Era: Realities and Strategies for the Future

Elias A. Zerhouni, M.D.
Director
National Institutes of Health

Competition for funds from the NIH and other sponsors, intensifying year by year, now stands at an unprecedented level, and shows no sign of abating. Never before have so many established investigators faced so much uncertainty about their longevity as active scientists. Never before have so many novices faced so many disincentives to entering or continuing a research career.

Dr. William F. Raub, Former Deputy Director NIH

1982

The Apparent Paradox:

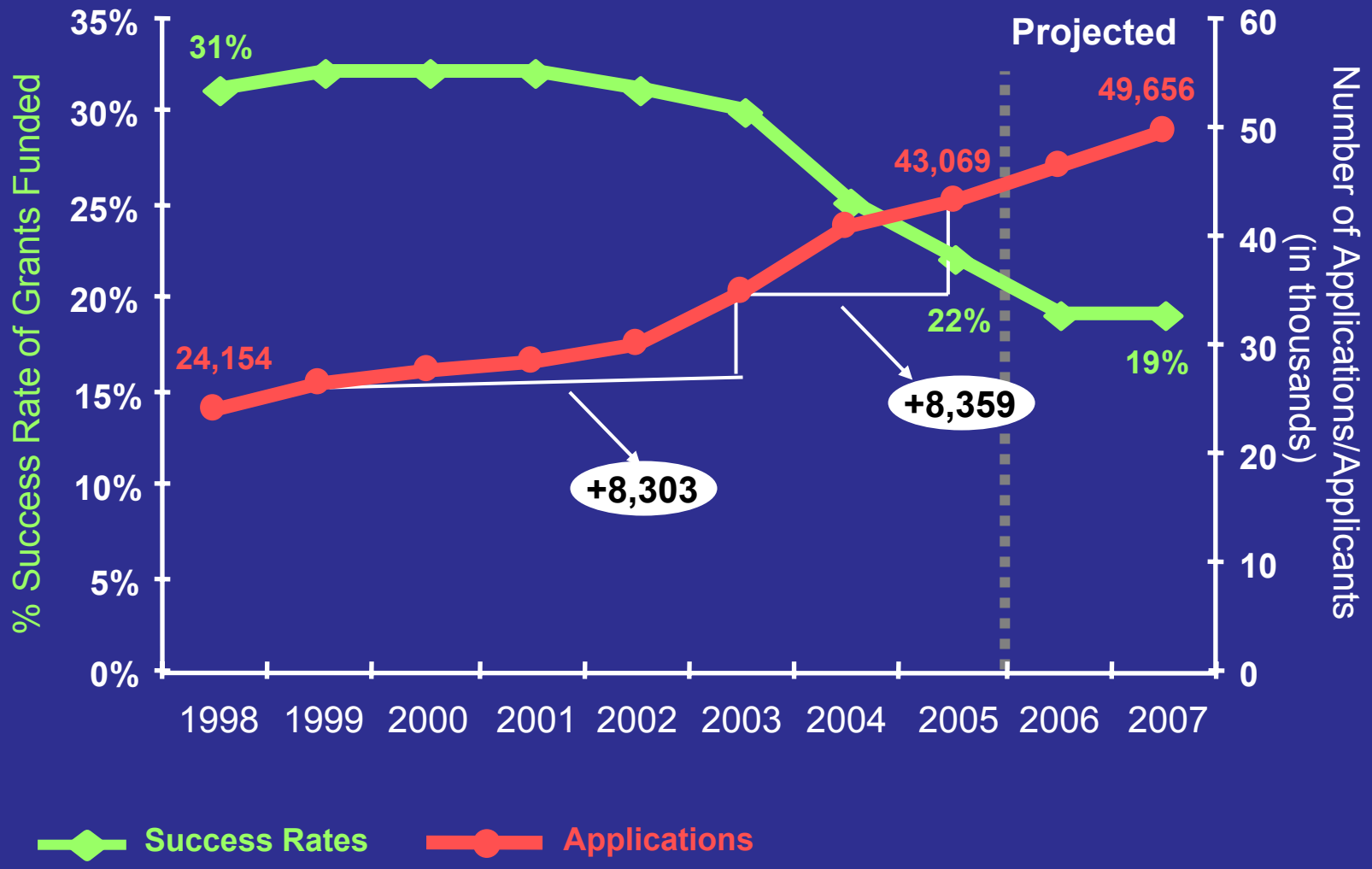
The budget of NIH has doubled

- but -

Success rates have dropped by a third

What is happening?

National Research Capacity and Demand for Grants Surges at End of Doubling Period, Success Rates Fall



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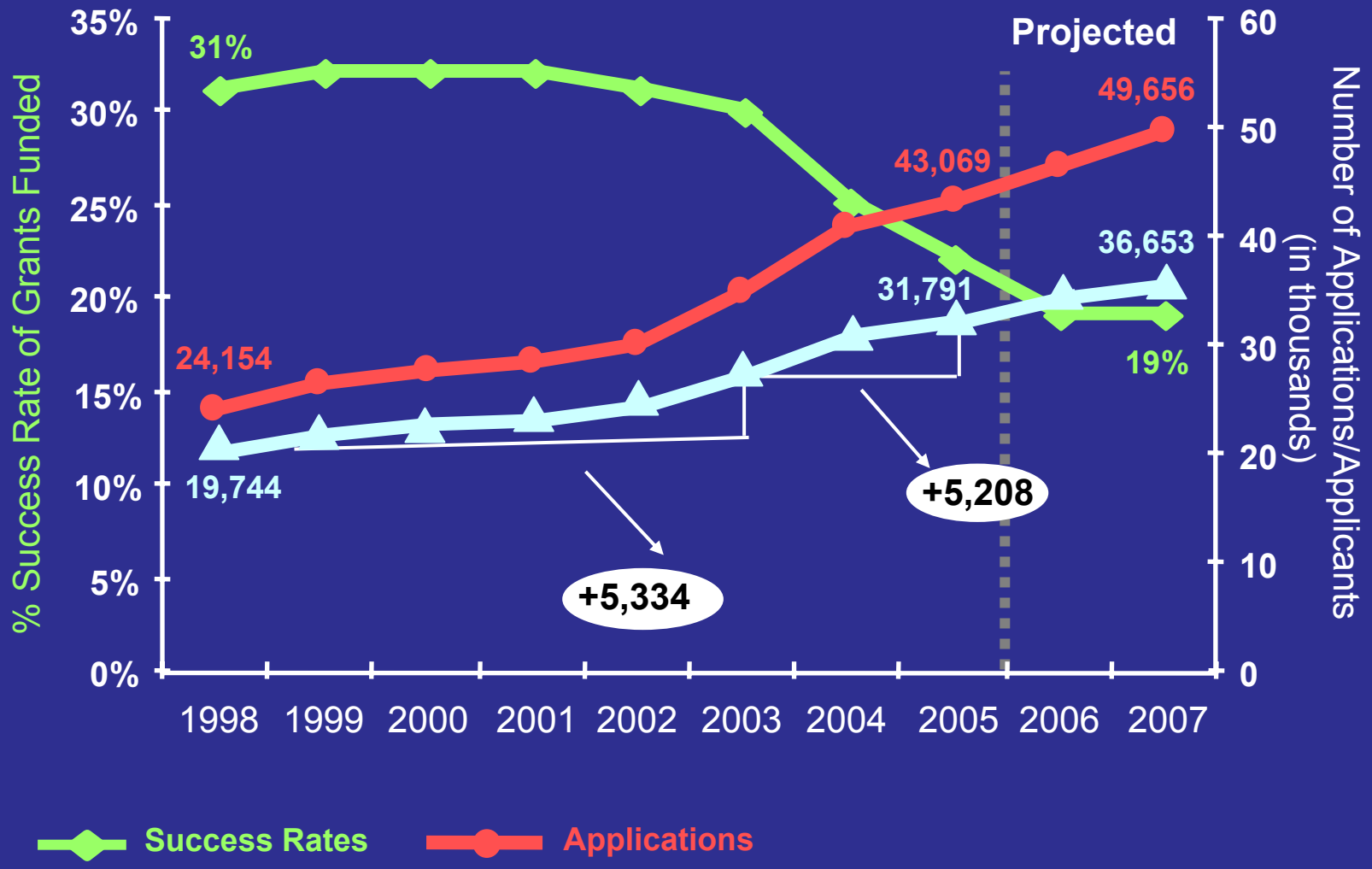
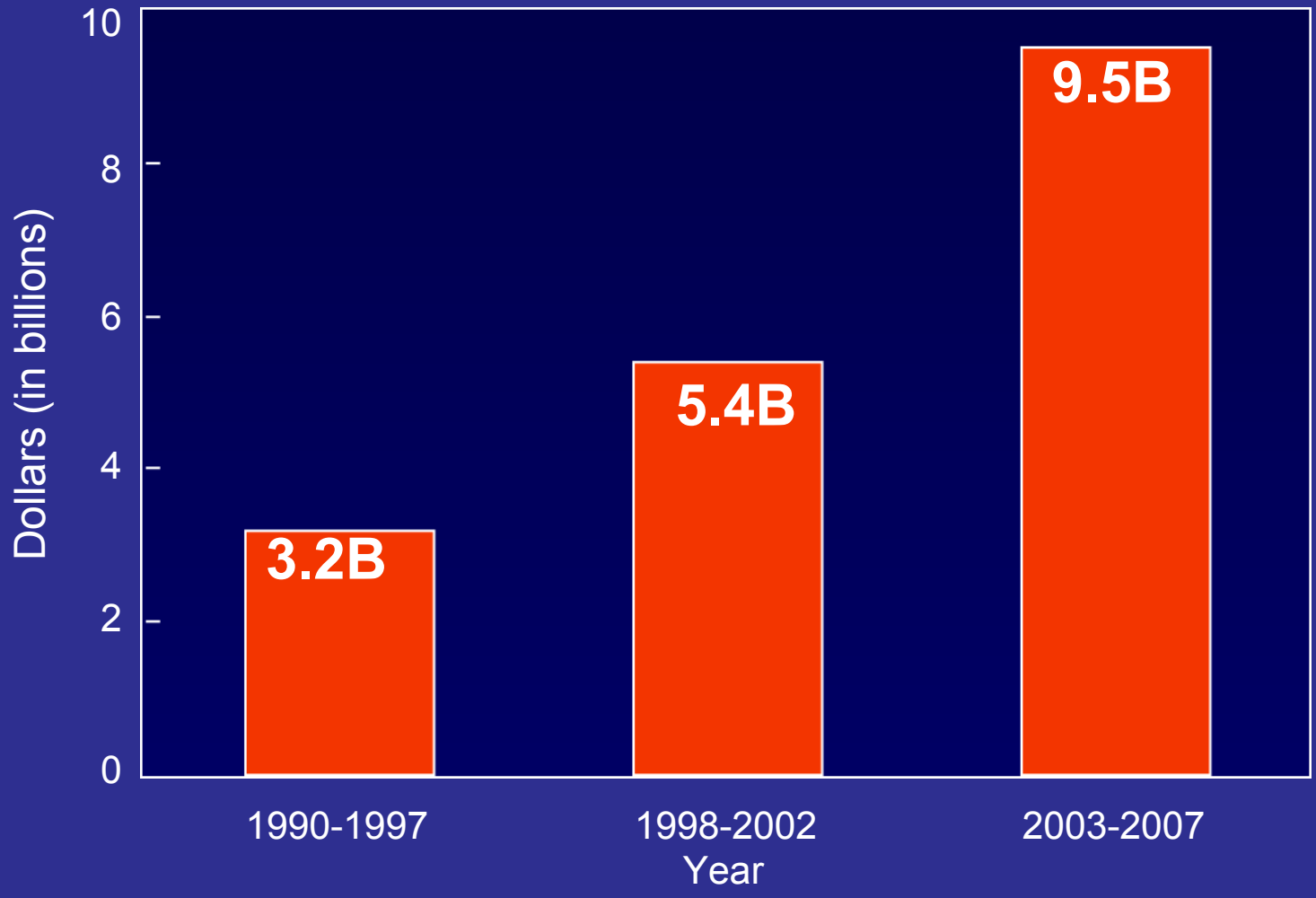


Investment in Research Facilities at U.S. Medical Schools

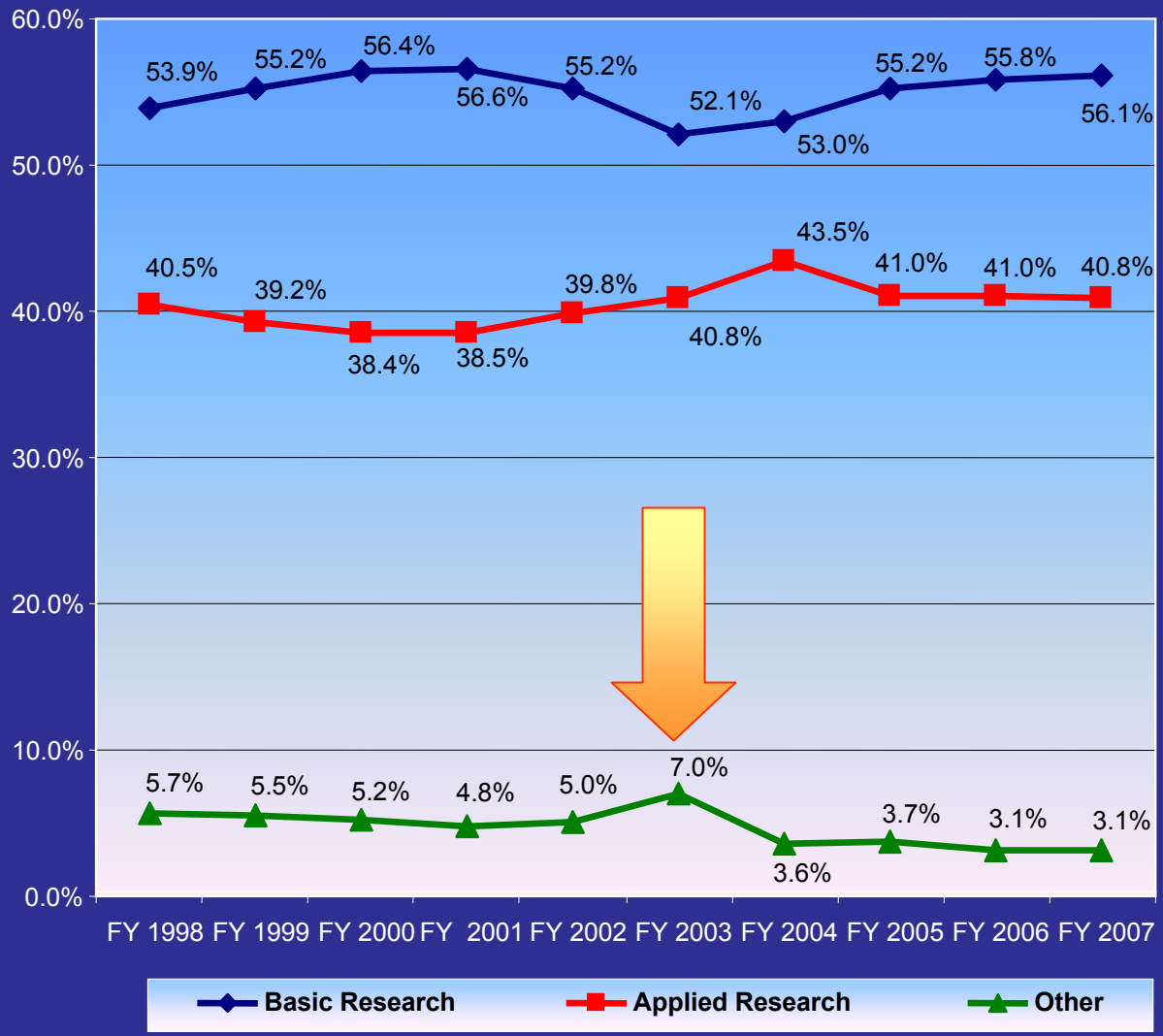


AAMC – Survey of Research Facility Investments (99 of 125 AAMC Member Schools)

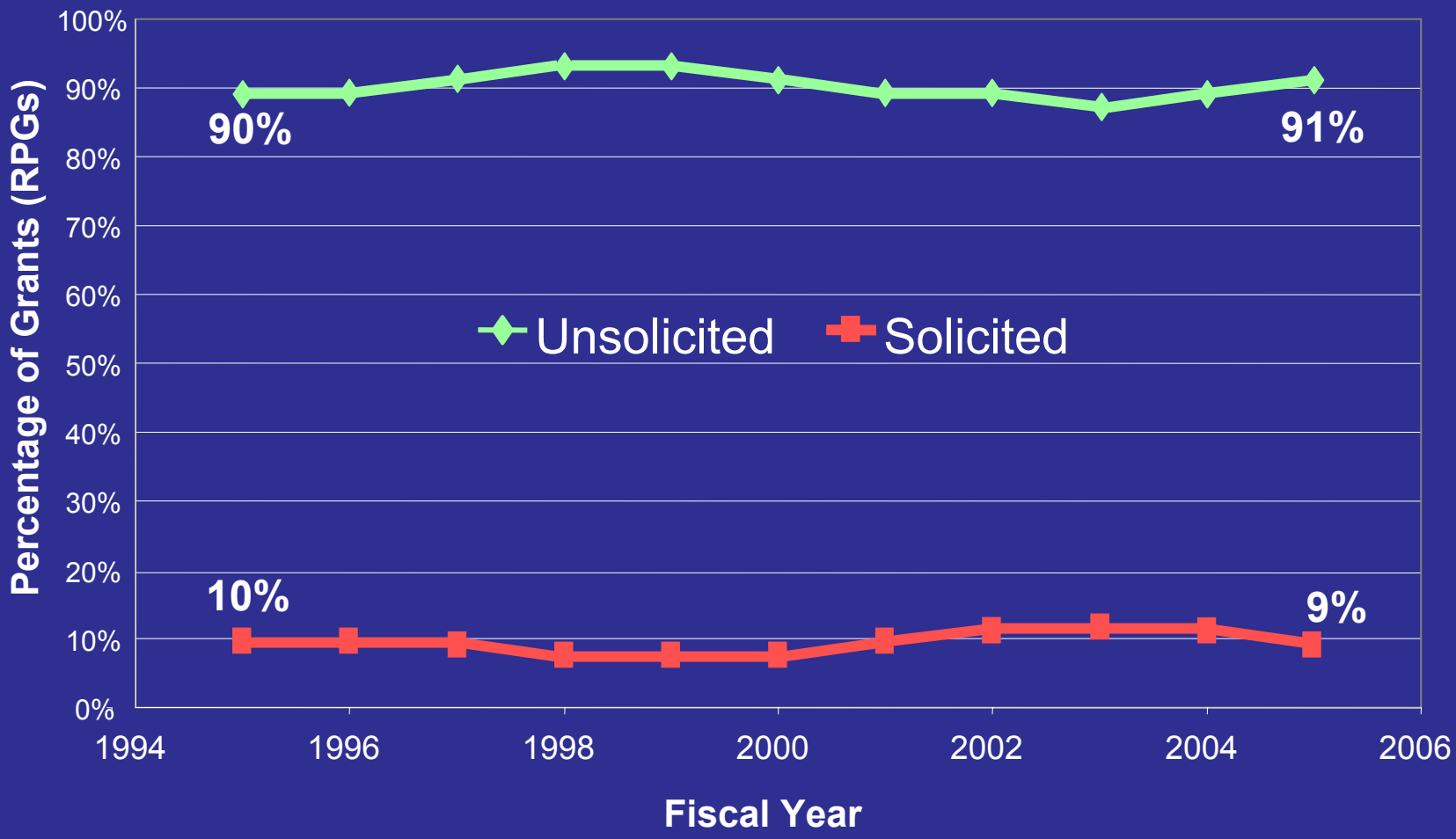
* Data Based on AAMC Faculty Roster

Common Misperceptions

Common Misperception 1:
NIH is Over-emphasizing Applied Research

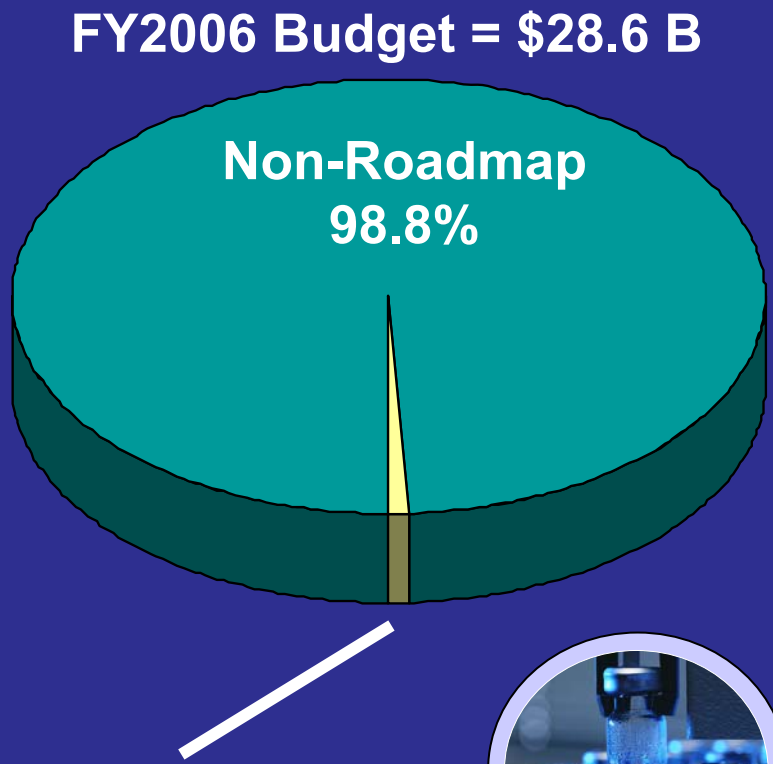


Common Misperception 2:
NIH is Shifting Towards Solicited Research



Common Misperception 3:

NIH Roadmap is Shifting Funds Away from Grant Pool



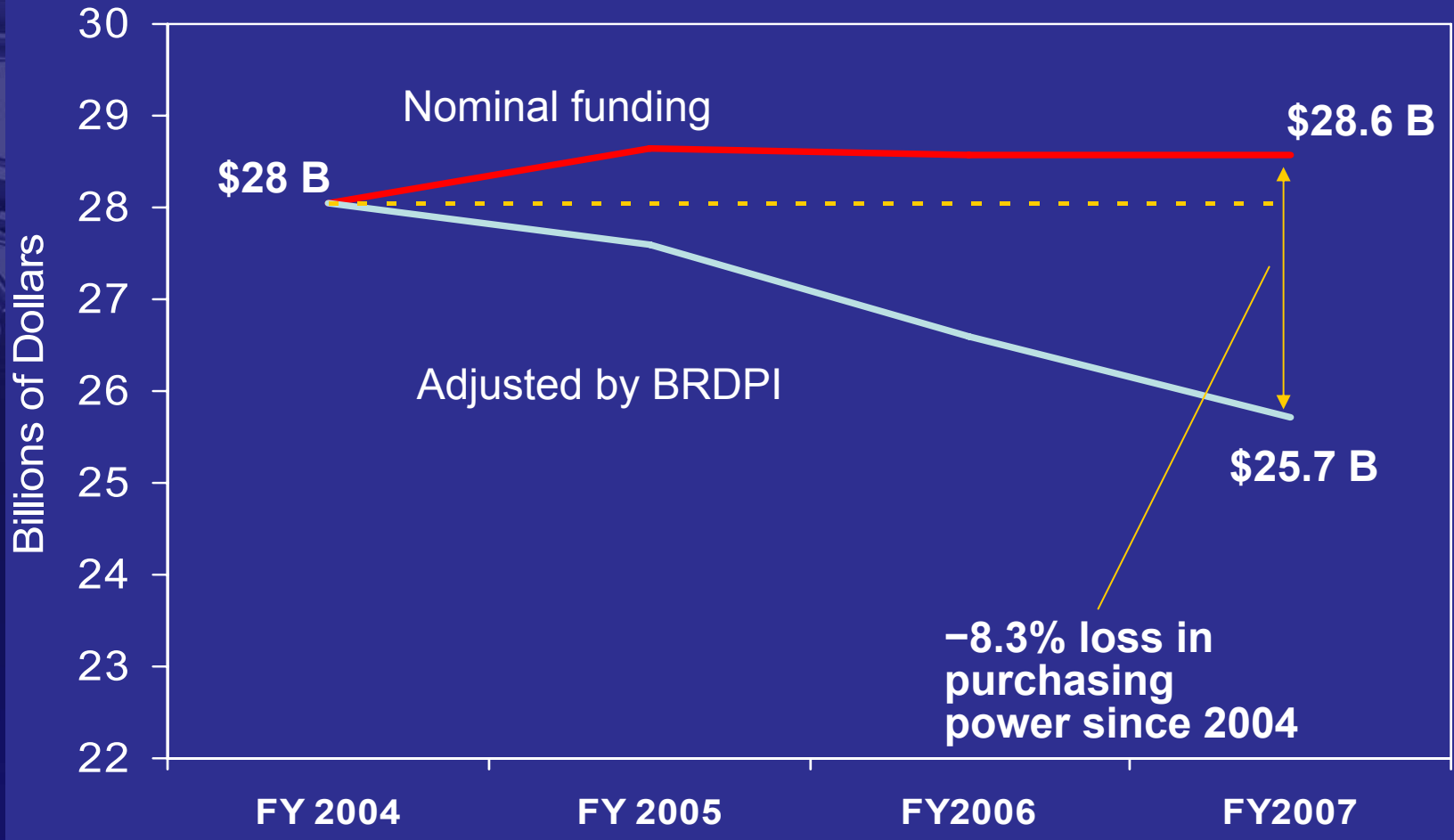
- Developed to increase synergy across NIH
- Not a single initiative but over 345 individual awards in FY 2005, 133 institutions, 33 states
- Estimated FY04-09
  - 40% basic
  - 40% translational
  - 20% high risk

The Bottom Line:

Demand for Grants "Took Off" Just as NIH Budget Was "Landing"!

- **Post doubling "surge" in applications has led to a *supply/demand imbalance***
- **Success rate drop is due to**
  - **Near 100% increased demand for grants**
  - **80% increase in number of applicants**
  - **Near 40% increased costs of grants since 1998**
  - **5% Decrease in inflation adjusted budget since 2003**

NIH's Challenge: Maintain Research Enterprise Vitality in Light of Reduced Purchasing Power and Increased Demand



Note: BRDPI is the Biomedical Research and Development Price Index

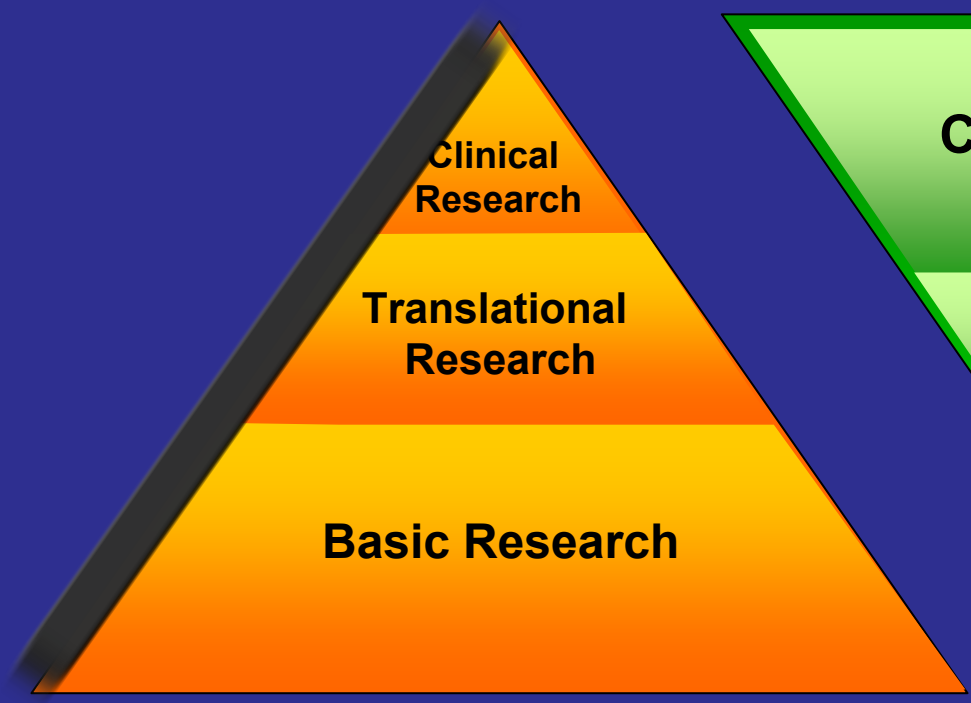
Where Do We Go From Here?

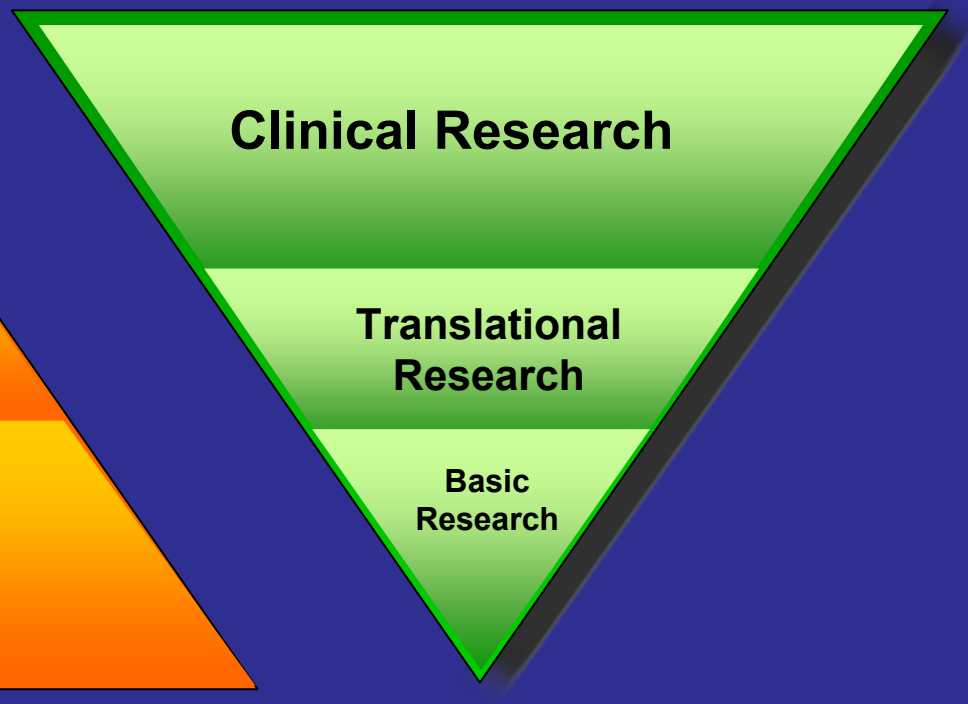
Adaptive Strategies Based on Key Principles

Principle 1:
Protect Core Values and Mission

Discovery and Generation of New Knowledge

Maintain a Balanced National Biomedical Research Portfolio





NIH - $28B

Private Sector - $59B

The Greatest Risk to Science is to Stop Taking Risk!

11/35 Pioneer Awards to Neuroscience

- Math modeling of neural networks (Larry Abbott)
- Architecture/plasticity of brain circuits (Hollis Cline)
- Evolutionary/computational approaches to motivation (Leda Cosmides)
- Large-scale, systematic mapping of neural circuit dynamics (Karl Deisseroth)
- Glycobiology of neural stem cells (Rosalind Segal)
- Vocal learning (Erich Jarvis)
- Sleep/synaptic homeostasis (Giulio Tononi)
- Detection/removal of neurotoxic proteins (Junying Yuan)
- "Neurogrid" hardware cortical simulation platform (Kwabena Boahen)
- Atomic-level study of neurodegeneration proteins (Gary Pielak)
- Nanotechnological detection of Alzheimer's biomarker in CSF (Chad Mirkin)

Responding to the Changing Needs of the Scientific Community

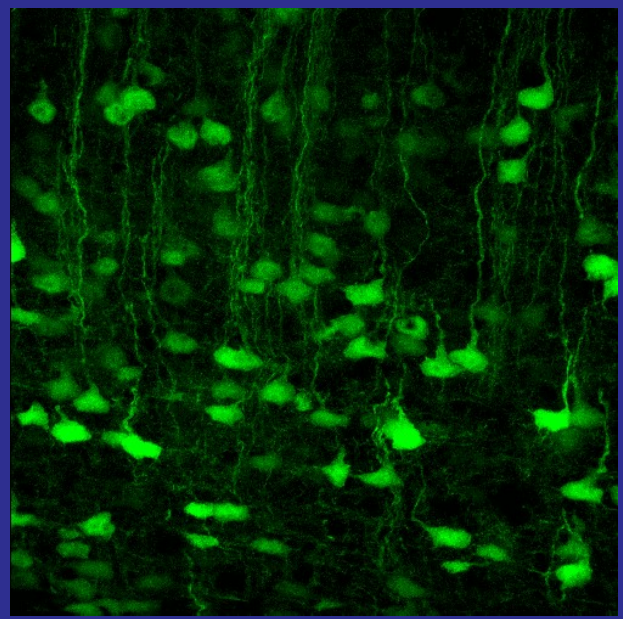
- Catalyze change – Facilitate interdisciplinary research
- Stimulate the transformation of clinical and translational science into a new intellectual discipline
- Integrate resources and training and **early independence** for a new generation of scientists
- Promote maximum flexibility for science and reduce artificial barriers to research

Today, A Fundamental Scientific Barrier is our Limited Ability to Study Complex and Dynamic Biological Systems in Health or Disease!

Biological Data of the Future

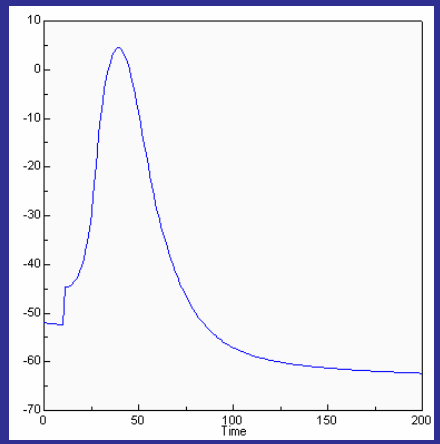
Current	Future
Destructive	Non-Destructive
Qualitative	Quantitative
Uni-Dimensional	Multi-Dimensional
Low Temporal Resolution	High Temporal Resolution
Non-localized	Spatially resolved
Low data density	High data density
Variable standards	Common standards
Non-Cumulative	Cumulative

NIH Blueprint: Resources for Neuroscientists

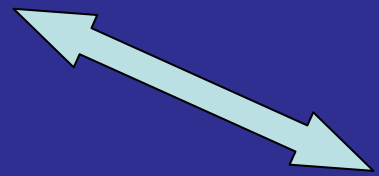


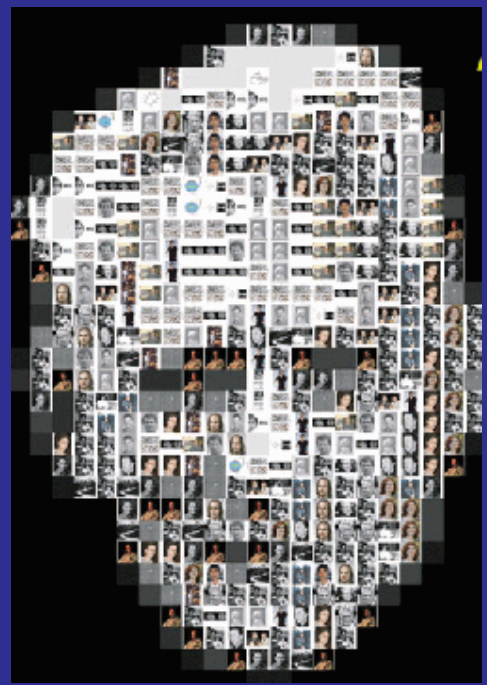
- GENSAT
- Mouse Archiving and Central Distribution
- NIH Neuroscience Microarray Consortium
- Neuroimaging Informatics Tools

Hodgkin-Huxley … Computational Neuroscience



" … collaboration between experimentalists and theoreticians is thriving." --Floyd Bloom, Oct. 6 *Science*





Neuroscience Database Gateway
http://ndg.sfn.org/

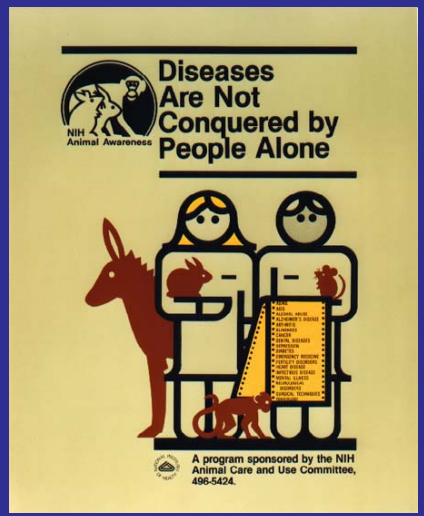
The Genetic Association Information Network (GAIN)

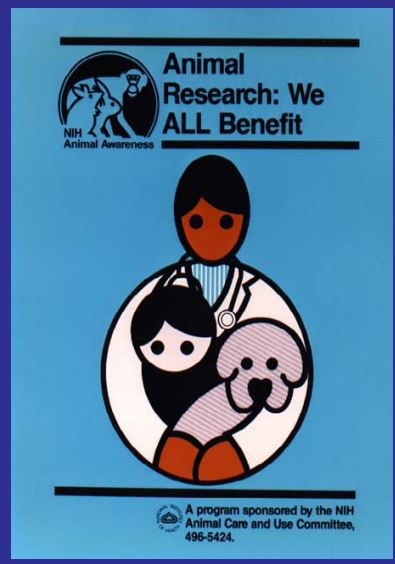
- The first six studies were selected out of nearly three dozen applications:

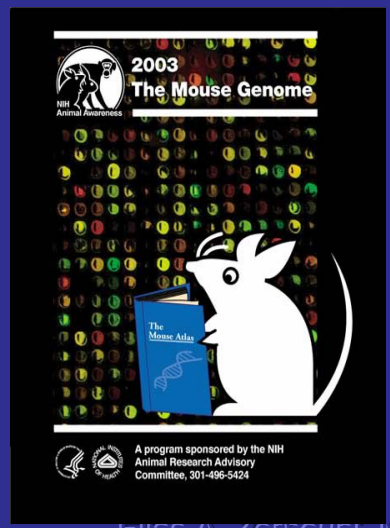
Psoriasis	University of Michigan
ADHD	State University of New York-Upstate Medical University
Schizophrenia	Evanston Northwestern Healthcare Research Institute
Bipolar Disorder	University of California San Diego
Major Depression	University of North Carolina
Diabetic Nephropathy	Joslin Diabetes Center

Promote the Value of Ethical Animal Research for the Benefit of Humans and Animals.

Stand by our Scientists







Principle 2:

Protect the Future: New Investigators!

Pathway to Independence Award

- Five years of support consisting of two phases
- Phase I provides 1-2 years of mentored support for advanced post doctoral fellows- 90k per year
- Phase II provides up to 3 years of independent RO1 equivalent research support- 250k per year
- NIH aiming for 150-200 awards per year
  - Received ~700 applications so far
  - First award announcements this Fall

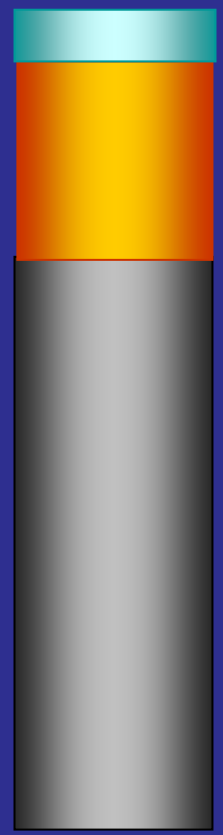
http://grants1.nih.gov/grants/new_investigators/index.htm

Principle 3
Focus on Balancing Supply/Demand and Scientific Priorities

- Actively manage supply/demand imbalance by adjusting programs
- Prioritize projects to maintain reasonable investigator-initiated success rates
- Maximize research and development over non core activities across all portfolios
- Facilitate peer-review processes to reduce need for multiple applications

Some Good News: Budget Recycling Phenomenon Will Provide Some Relief

What Funds are Available in any One Year?



Budget Increase

Uncommitted Funds

Committed Funds

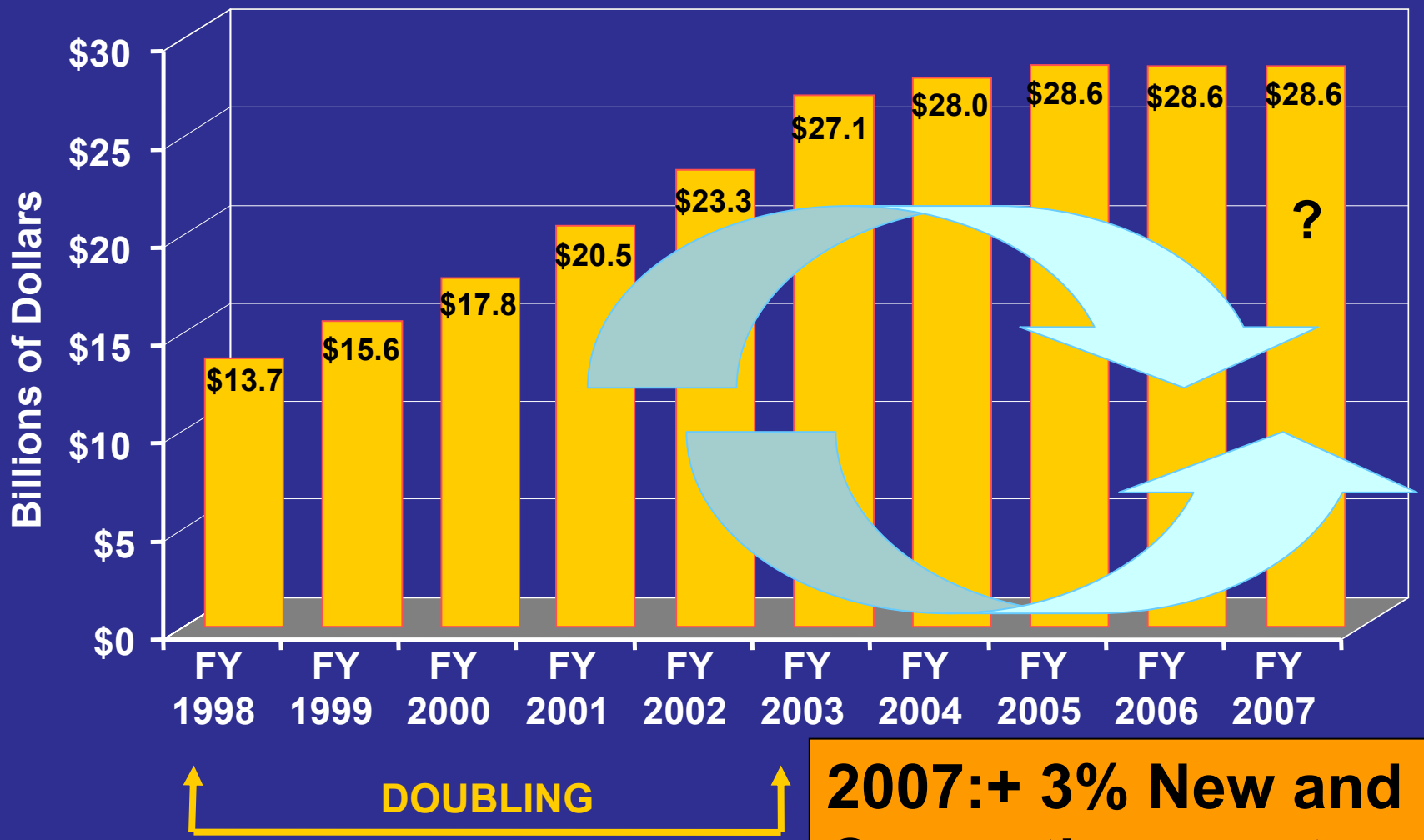
From current year to previous year

From ending grants started 4-5 years ago

Continuing grants

NIH Appropriations

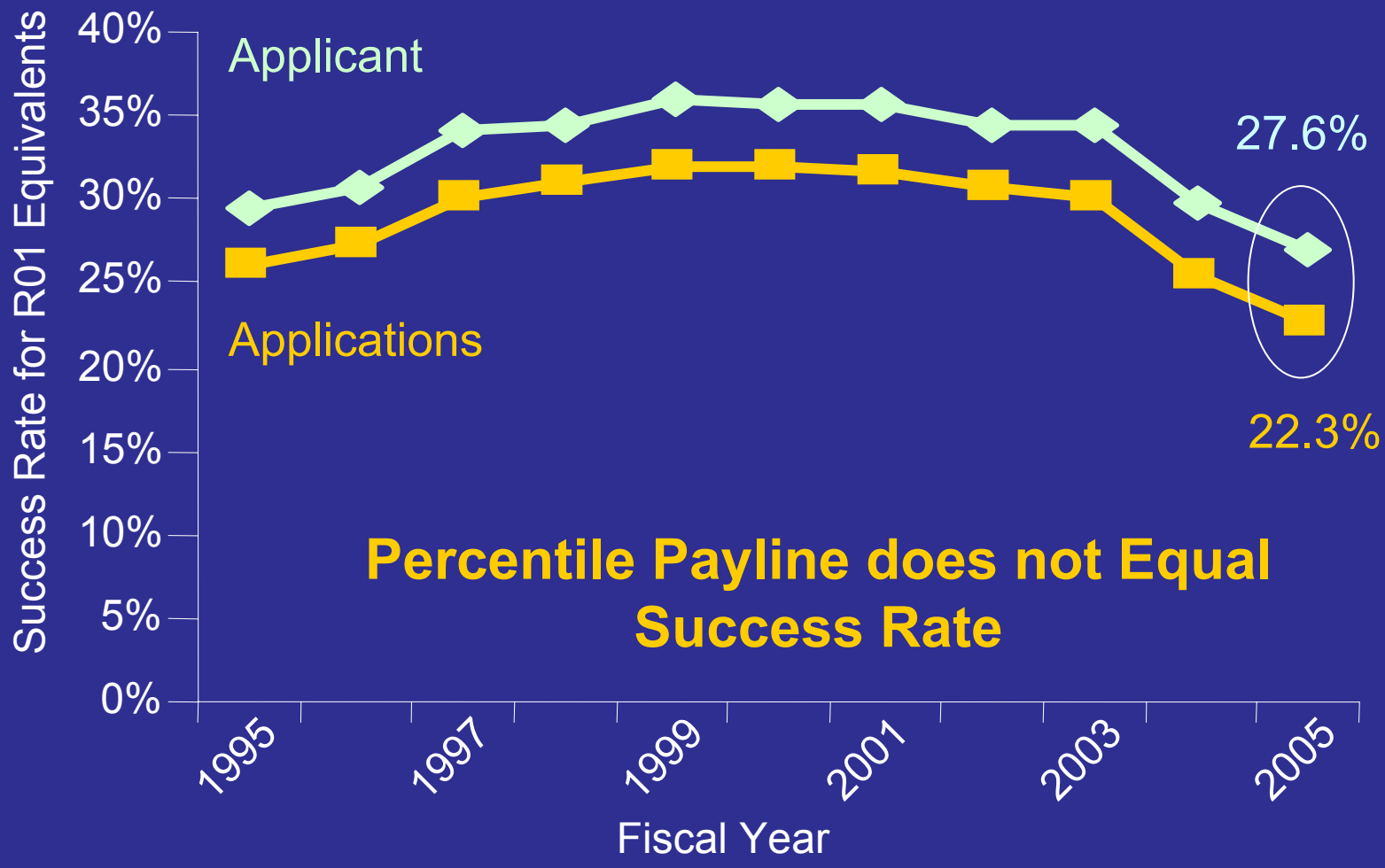
NIH Congressional Appropriations



2007:+ 3% New and Competing grants

What are My Chances of Being Funded?

Success Rate per Application Understates Funding Rate per Applicant



Percentile Payline does not Equal Success Rate

Success Rate files as of May 3, 2006. Program srf_indiv_060103_rfm
Individuals are determined using the pi_profile_person_id in IMPAC-II

Principle 4:
Proactive Communication about Investment in NIH

We need your help to:

- Increase awareness of the benefits every American receives from public investment in biomedical research
- Convey to all audiences the role research will play in transforming medicine in the 21st century
- Educate the public and private sectors of the importance of sustaining momentum in advancing knowledge and discovery

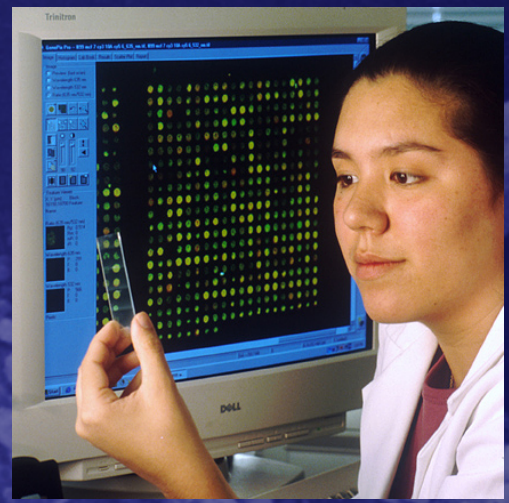
Research Results for the Public



- **NIH Homepage**
  - More than 40 Fact Sheets
  - State-by-state Funding Data
  - Newsletter from NIH Director
  - Percent of public that knows about NIH's role doubled from 6% to 12% since 2003
  - Less than a third know role of federal govt in medical research
  - NOT ENOUGH!

http://www.nih.gov/about/researchresultsforthepublic/index.htm

Principle 5:
Promote NIH's Vision for the Future



Predictive ⟷ Personalized ⟷ Preemptive

Participatory

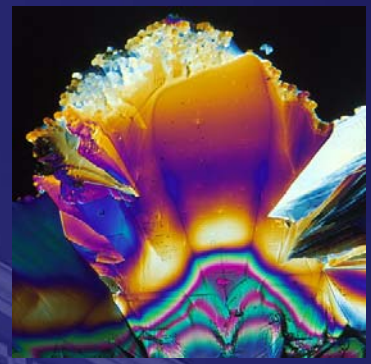
A Final Tribute to a True Neuroscience Humanist

“All one has to do is walk through a downtown area to appreciate that the availability of adequate treatment for patients with schizophrenia and other mental illnesses is a serious problem in this country.

We wouldn't let our 80-year-old mother with Alzheimer's live on a grate. Why is it all right for a 30-year-old daughter with schizophrenia?"

— Dr. Wayne Fenton, 1953-2006






NIH

Transforming medicine and health through discovery