NIH Peer Review and How the Stars of U.S. Science and Health Are Born

Richard Nakamura, Ph.D.
CSR Director
Don Lucket
CSR Communications Director

NIH...Turning Discovery Into Health

NIH’s mission is to seek fundamental knowledge about the nature and behavior of living systems and the application of that knowledge to enhance health, lengthen life, and reduce illness and disability.

NIH receives over 80,000 grant applications a year, but it can only fund a fraction of them. NIH peer reviews help NIH find the best, and taxpayer support allows NIH to fund many of them. These grants build the foundation for future advances in science and health.

Who Sets NIH Priorities?

NIH sets its priorities based on input from the scientific community and Congress, as well as advocacy, public, and patient representatives.

How NIH Peer-Reviewed Research Pays Off

Economic Benefits

NIH Supports 4% Higher Education Institutions across the U.S. and many of them help foster the development of local biotech companies. NIH funds over 1,000 of these companies.

United Medical Research reported that NIH-external funding generated $127 billion in U.S. economic activity nationwide in 2011—a $5.10 increase in public basic research expenditures in additional $3.36 of industry R&D investment after 8 years, and a $5.00 increase in public clinical research expenditures an additional $2.35 of industry R&D investment after 3 years.

Scientific and Health Advances

The Benefits of Biomedical and Public Health Advances

U.S. Life Expectancy

NIH-funded research:

Blockbuster drugs

Microscopy Breakthrough Found in Diapers

NIH Peer Review Process

NIH has a two-stage review process powered by the input of multiple external experts and other stakeholders.

Stage One: Evaluation for Scientific Merit by external scientific experts from academia and industry.

Stage Two: Evaluation for Reference to Research Priorities by the relevant NIH Institute or Center, which consults more senior scientific experts, patients and patient advocates on its Advisory Council.

NIH Peer Review Scoring Correlated with Better Research Outcomes

Researchers from Harvard and Boston Universities recently reported in Science magazine® that better peer review scores were consistently associated with better research outcomes, after examining over 130,000 NIH grants awarded between 1980 and 2008. Reviewers appear to be able to make fairly direct findings that cannot otherwise be explained by the investigator's publication history, grant history, institutional donations, career stage, and degree type.

Taking Risks and Discovering Great Possibilities

Scientific and health breakthroughs are heralded in the press almost every day. And you often can trace them back—directly or indirectly—to one or thousands of NIH peer review groups that found great promise in an application.

Importance of Taking Risks: As with small businesses and even large corporations, researchers and NIH need to take risks to advance science and health. Advising ideas to compete and succeed often can be messy at times. But it is essential to a robust and dynamic research enterprise.

Placing a Bet on the Lively Flatworm Transforms Regeneration Research

The only individual studying flatworms in 1987 were kids who watched them regenerate themselves from bona fide in biology class. This was the year a new investigator, Dr. Sánchez Alvarado, at Sloane Institute in Kansas City, Missouri, sent NIH a boot application to develop the molecular and genetic tools to study regeneration in flatworms. Researchers saw the promise and NIH funded his research, which has reignited the field of regeneration research.

Genetic Advances Autism and Schizophrenia Research

NIH Pioneer Award Winner Dr. Ed Boyden at MIT was frustrated by the limits of light microscopy. They cannot bring key molecular structures into focus because they lack enough light to cast the larger cell context. He turned to a polymer gel to retain water in diapers. He hopped pergls he wanted to study with fluorescent antibodies that bind to the protein and the polymer. When it expanded in water, Dr. Boyden was able to see the detail he couldn’t see before. Expansion microscopy holds the promise of helping him and other researchers learn more about the abnormal biochemistry of disease and come up with new targets for drug design.

The Bottom Lines

NIH Does What Industry Cannot

NIH plays a dominant role in supporting basic biomedical and behavioral research in the U.S. that lays the ground work for transformative research— the precision medicine— which will change the way we detect and treat diseases. NIH grants are key because the private sector is unwilling to wait 20-30 years for it to pay off. So public investments are crucial for the U.S. to maintain its lead in science and health research.

Learn More

www.csr.nih.gov

References


Blockbuster drugs were indeed built on the efforts of large numbers of scientists by researchers using new methods that were developed in the 1960s in San Francisco. 1

75% of major drugs were developed or made possible by NIH-funded research: 2000 congressional report: The Benefits of Medical Research and the Role of the NIH.

Image caption: R.S. Williams et al. at the Gladstone Institute show the development of the drug (gammahem) — the first new enzyme therapy that indicates sustained clinical remissions in patients with previously intractable cancers.

Big Advances Are Built on Lots of Unheralded NIH Reviews and Grants

Blockbuster drugs were indeed built on the efforts of large numbers of scientists by researchers using new methods that were developed in the 1960s in San Francisco. 1