



How does biomedical research funding work in the U.S.?

Photo by [ThisisEngineering](#) on [Unsplash](#)

Learning Objectives

By the end of this lesson you will be able to...

- Describe the landscape of R&D (specifically biomedical) funding in the U.S. and in our local context
- Identify examples of federally-funded research
- Outline common steps in the grant review process

Research & Development (R&D) funding, historically speaking

In the 1870s, Alexander Graham Bell developed the telephone with funding from the wealthy father of one of his students.

There was a huge explosion of government funding for research after World War II.

Since then, the proportion of R&D supported by federal funding has decreased slightly...

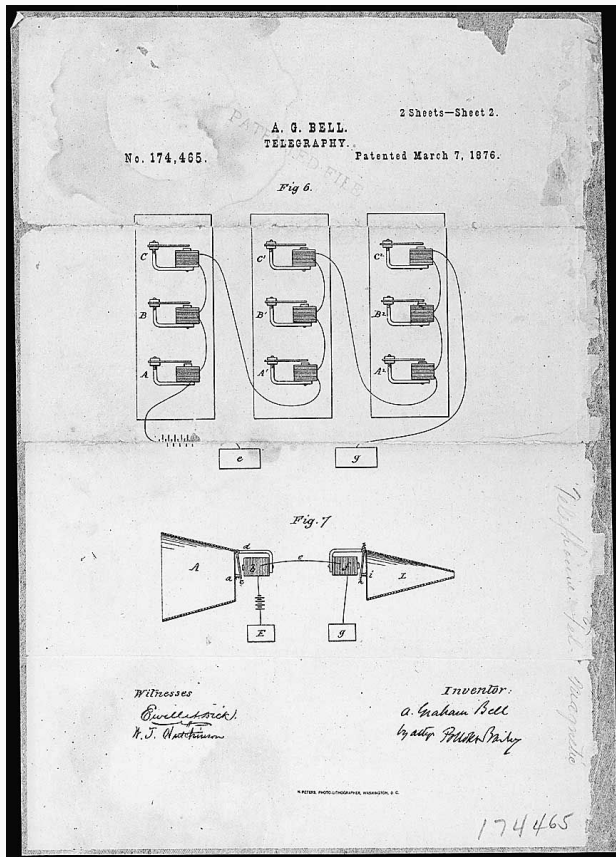
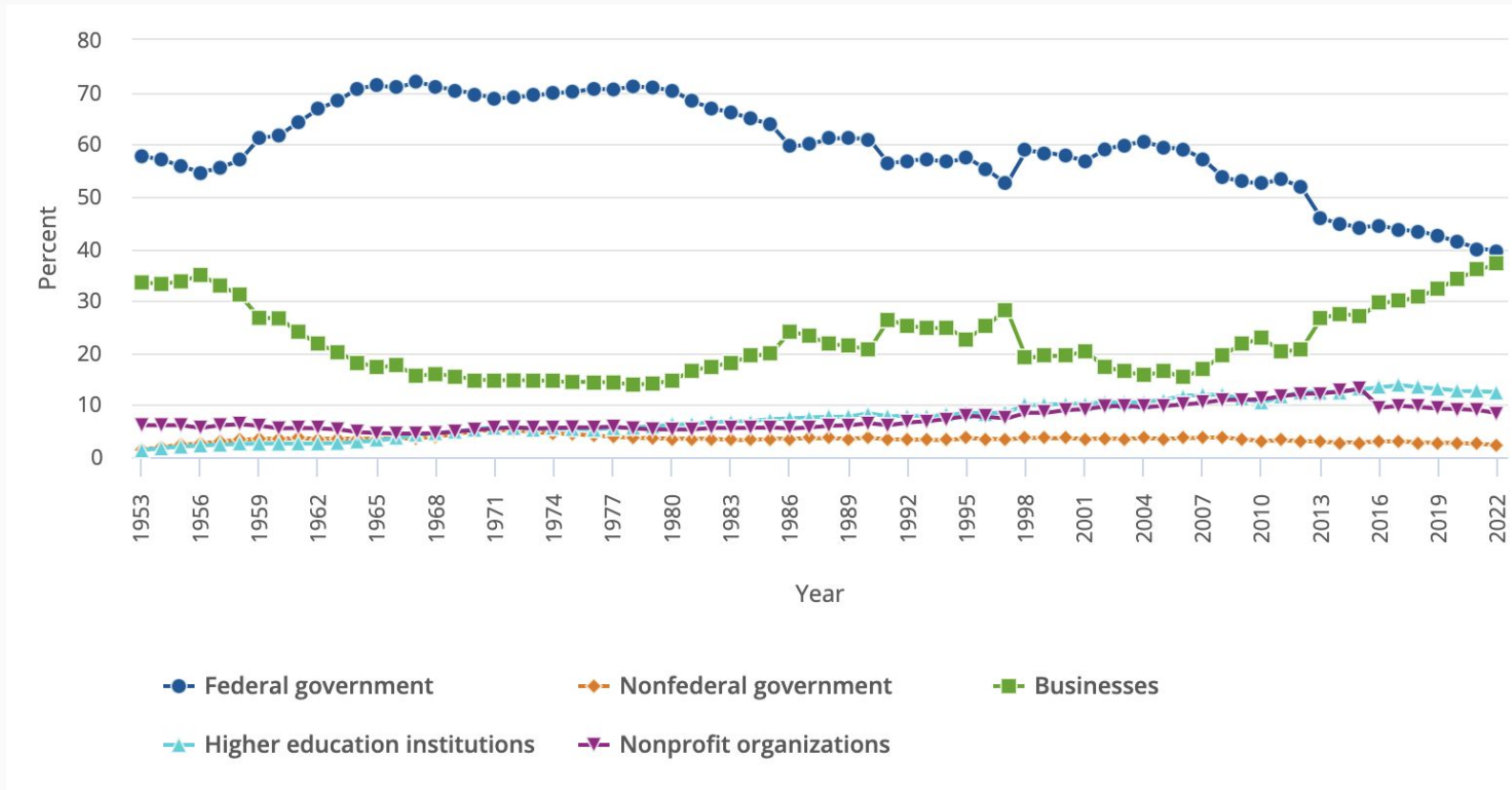


Image: [Wikipedia](#)

In the past ~70 years, the share of research funded by the federal government has decreased



Source: <https://nces.nsf.gov/pubs/nsf24332>

Research costs money.

How does a typical
(neuroscience) research lab
pay their bills? 🤔



Center for Neural Circuits & Behavior @ UCSD

Lab budget breakdowns



52 labs

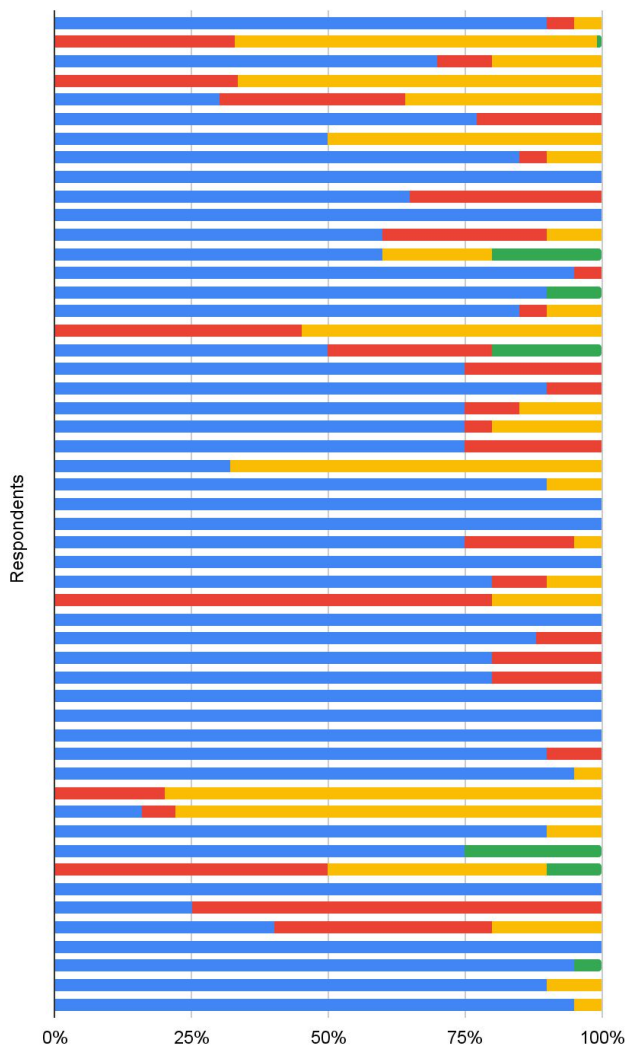
89% R1 institutions

85% neuroscience

25% biology

21% psychology

Other = foundation funding or discretionary funds from university



Federal sources
(e.g., NIH, NSF)
Private sources
Startup funds
Other

[Bsky post & link to survey](#)

The federal government supports R&D through various agencies

- Government agencies are funded with taxpayer dollars
- The NIH represents about one-fifth of total federal R&D funding and close to half of all federal R&D spending outside of the Department of Defense

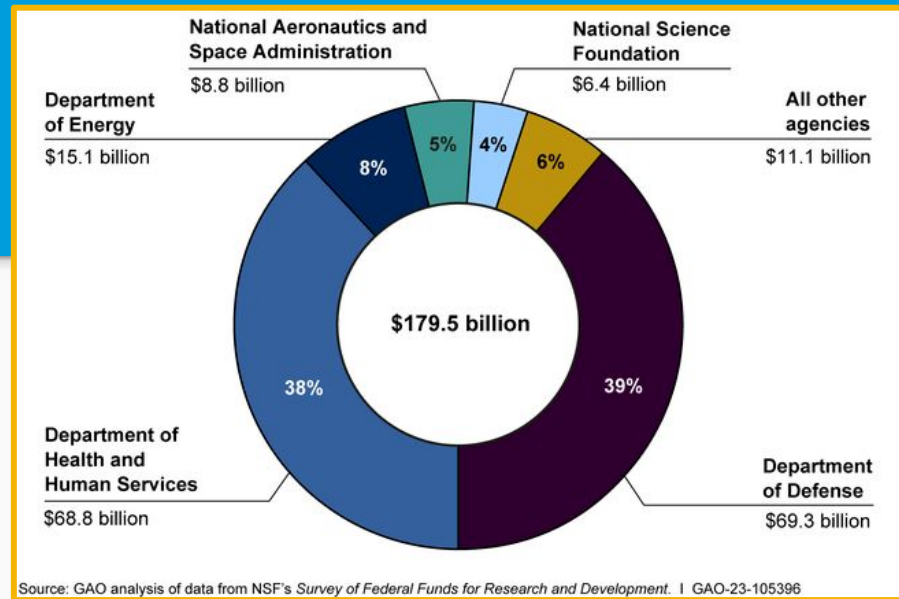


Image: [Federal Research and Development: Funding Has Grown since 2012 and Is Concentrated within a Few Agencies | U.S. GAO](#)

Look at this over time instead: [Federal R&D Budget Dashboard | \(AAAS\)](#)

The **National Institutes of Health** (NIH)

is the primary funding agency for biomedical research in the U.S.
(and the *largest funder of biomedical research in the world*)

- The NIH 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.”
- Began as a one-room “Laboratory of Hygiene” in 1887
- Housed under the U.S. Department of Health & Human Services, along with the Centers for Disease Control (CDC) the Food & Drug Administration (FDA), and many other agencies
- Supports **intramural** funding for its own NIH-operated research facilities as well as **extramural** funding to others

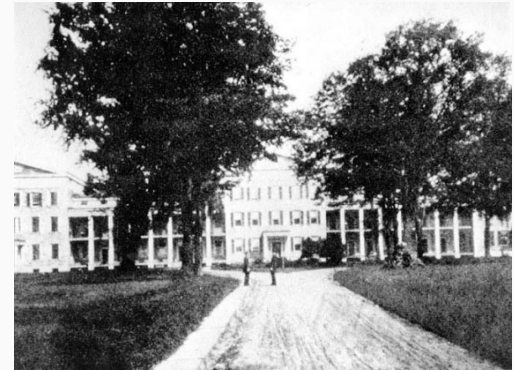


Image: NIH

The NIH has 27 different institutes & centers

Highlighted
institutes support
neuroscience
research

[National Cancer Institute \(NCI\)](#) — Est. 1937

[National Eye Institute \(NEI\)](#) — Est. 1968

[National Heart, Lung, and Blood Institute \(NHLBI\)](#) — Est. 1948

[National Human Genome Research Institute \(NHGRI\)](#) — Est. 1989

[National Institute on Aging \(NIA\)](#) — Est. 1974

[National Institute on Alcohol Abuse and Alcoholism \(NIAAA\)](#) — Est. 1970

[National Institute of Allergy and Infectious Diseases \(NIAID\)](#) — Est. 1948

[National Institute of Arthritis and Musculoskeletal and Skin Diseases \(NIAMS\)](#) — Est. 1986

[National Institute of Biomedical Imaging and Bioengineering \(NIBIB\)](#) — Est. 2000

[Eunice Kennedy Shriver National Institute of Child Health and Human Development \(NICHD\)](#) — Est. 1962

[National Institute on Deafness and Other Communication Disorders \(NIDCD\)](#) — Est. 1988

[National Institute of Dental and Craniofacial Research \(NIDCR\)](#) — Est. 1948

[National Institute of Diabetes and Digestive and Kidney Diseases \(NIDDK\)](#) — Est. 1950

[National Institute on Drug Abuse \(NIDA\)](#) — Est. 1974

[National Institute of Environmental Health Sciences \(NIEHS\)](#) — Est. 1969

[National Institute of General Medical Sciences \(NIGMS\)](#) — Est. 1962

[National Institute of Mental Health \(NIMH\)](#) — Est. 1949

[National Institute on Minority Health and Health Disparities \(NIMHD\)](#) — Est. in 1993

[National Institute of Neurological Disorders and Stroke \(NINDS\)](#) — Est. 1950

[National Institute of Nursing Research \(NINR\)](#) — Est. 1986

[National Library of Medicine \(NLM\)](#) — Est. 1956

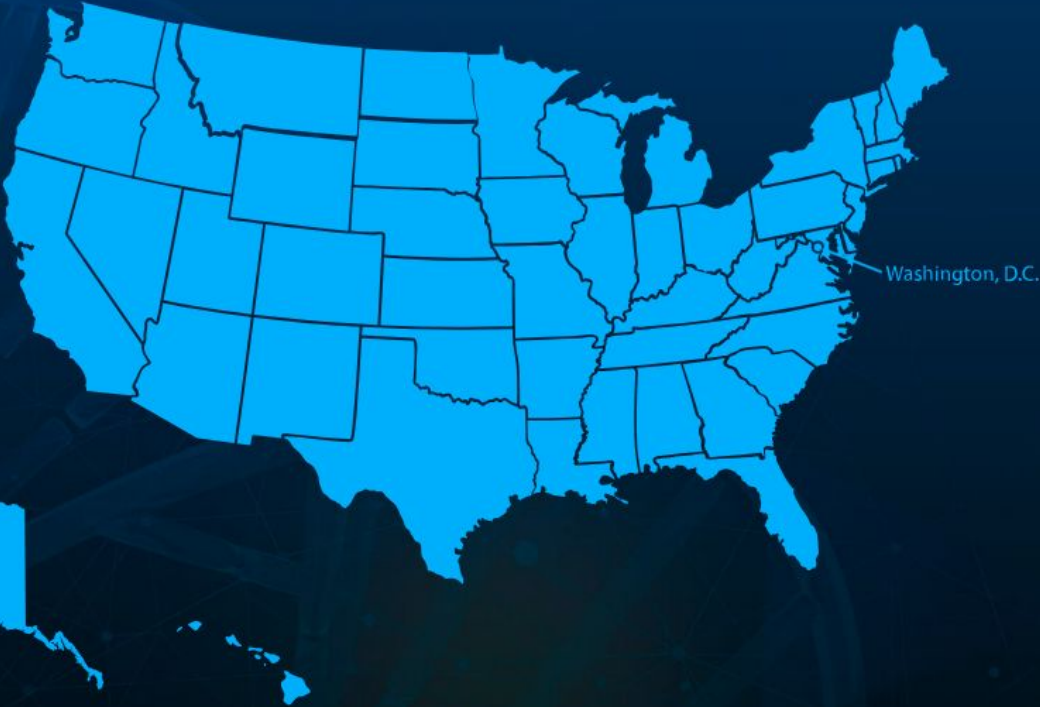
What was the
annual budget for
the NIH in 2024?



- I. \$47,000
- II. \$47 million
- III. \$47 billion
- IV. \$47 trillion

NIH IN YOUR STATE

Select a state on the map to see the impact of NIH funding across America.

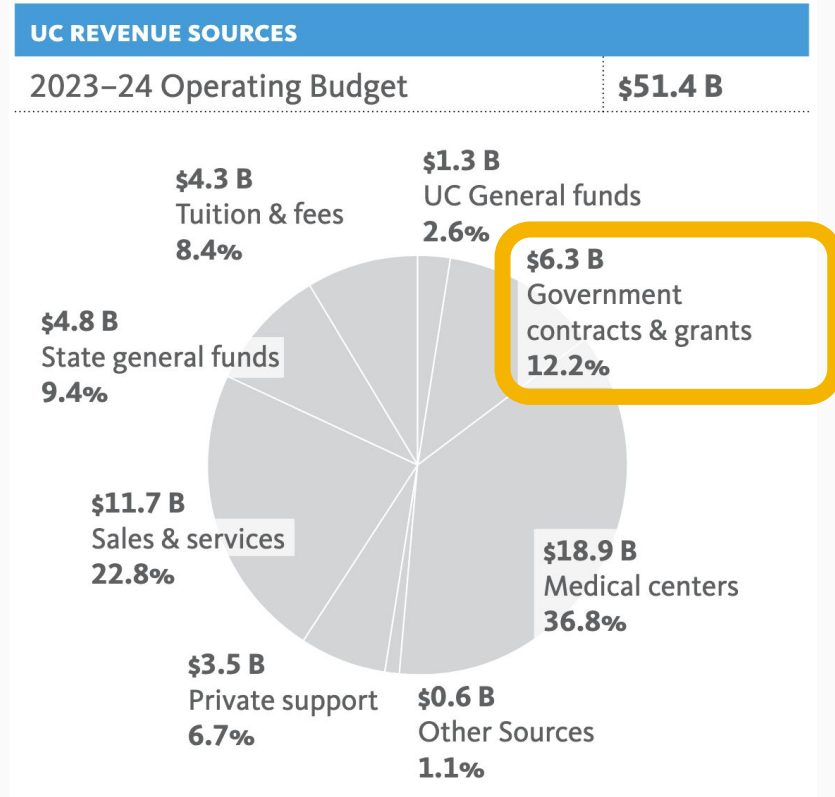


Let's see how NIH
funding has
impacted our state



[https://www.unitedformedicalresearch.org/
nih-in-your-state/](https://www.unitedformedicalresearch.org/nih-in-your-state/)

How is the University of California system funded?



How is the University of California system funded?

More than half of UC research funding is from federal sources ([UC Report, 2023](#))

Many grant mechanisms pay **indirect** costs to universities

RESEARCH IMPACT	
Inventions per day (avg.)	4
Inventions disclosed (FY2022)	1,570
Startups from UC intellectual property/technology (THRU FY2022)	1,590
Active US and foreign patents (THRU FY2022)	13,702

MANY OF CALIFORNIA'S LEADING INDUSTRIES GREW FROM UC RESEARCH, INCLUDING BIOTECHNOLOGY, COMPUTING, SEMICONDUCTORS, TELECOMMUNICATIONS AND AGRICULTURE.

RESEARCH FUNDING	
Research awards	\$7.40 B
Federal research awards	\$4.08 B
Federal research contracts/grants	7,116

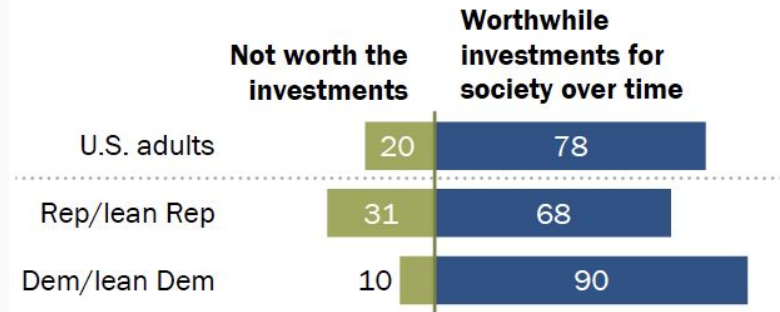
UC IS AWARDED MORE NIH AND NSF FUNDING THAN ANY OTHER INSTITUTION IN THE COUNTRY.

How do people generally feel about investments in science?

Most U.S. adults believe investments are worthwhile, but there are differences across political parties and educational levels

78% say U.S. government investments in scientific research are worthwhile

% of U.S. adults who say government investments in scientific research aimed at advancing knowledge are usually ...

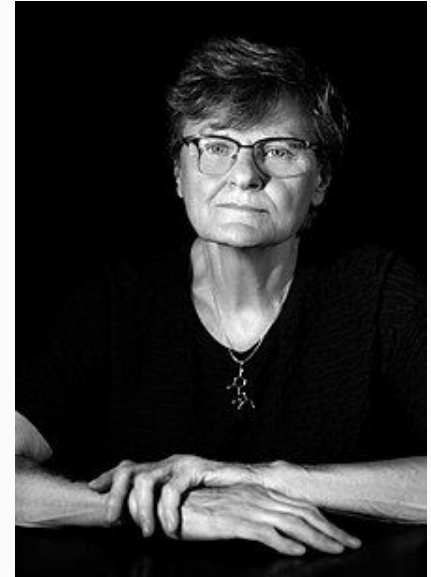


Note: Respondents who did not give an answer are not shown.
Source: Survey of U.S. adults conducted Sept. 25-Oct. 1, 2023. "Americans' Trust in Scientists, Positive Views of Science Continue to Decline"

PEW RESEARCH CENTER

The NIH funds an extensive portfolio of biomedical research

- The NIH is the primary supporter of **basic biomedical research**, helping us understand how the body works across many different levels
- 174 NIH-funded researchers have received Nobel Prizes for their work
- NIH-funded research was behind *every single new drug* approved by the FDA from 2010-2016 (Galkina et al., 2018)
- Such advances have been credited with helping increase life expectancy and prevent millions of deaths

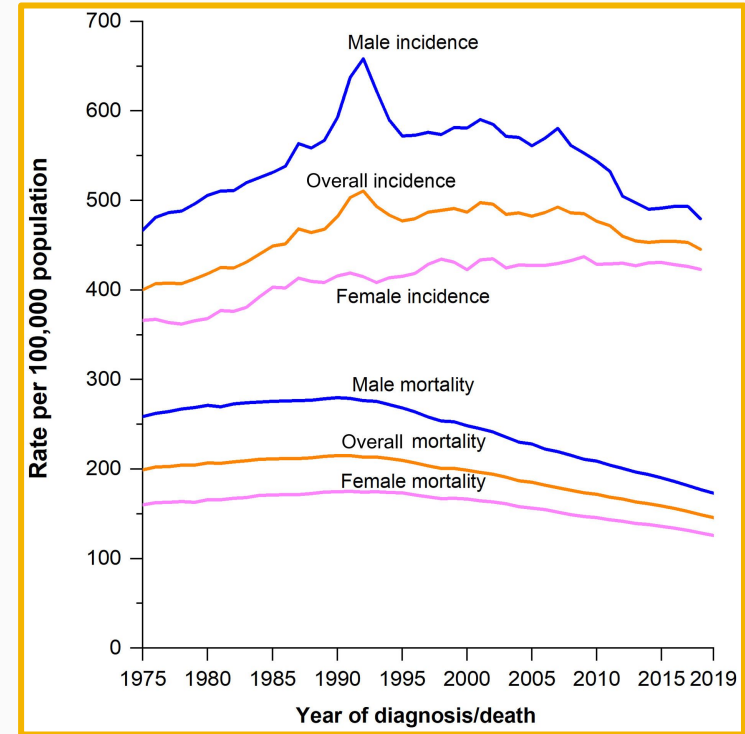


Katalin Karikó, biochemist whose NIH-funded work was the foundation for mRNA-based vaccines (e.g., Moderna COVID19 vaccine)

Image: [Wikipedia](#)

Case study: Impact of NIH funding on cancer

- The [American Cancer Society](#) estimates that **4.1 million cancer deaths** were averted from 1991 to 2024 by improvements in cancer treatment, detection, and prevention
- NIH-funded research has helped to identify major cancer subtypes and led to development of new, often tailored treatments for a variety of cancers



[Siegel et al., 2022](#)

Other examples of the power of **basic** science

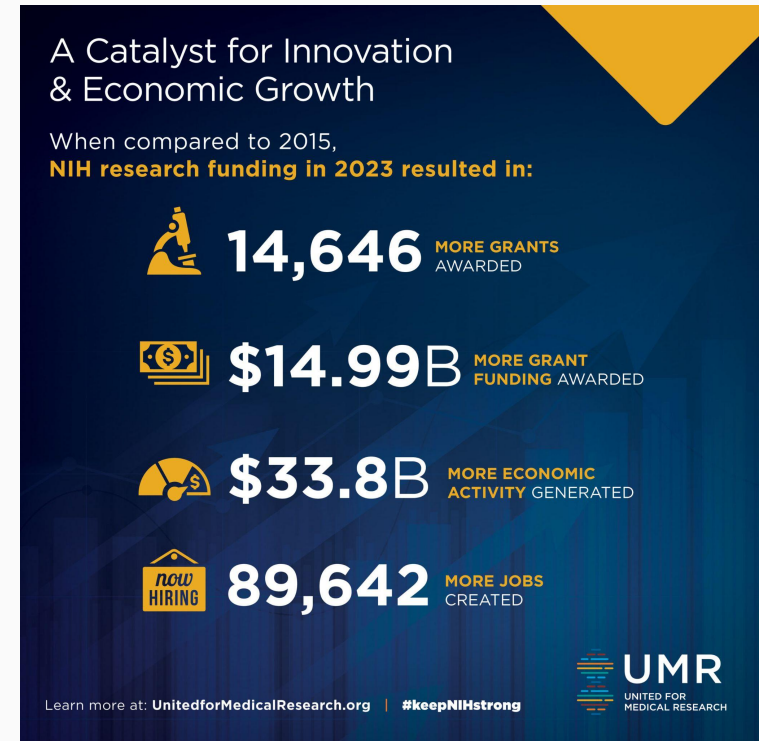
- Retroviruses before the discovery of HIV
- Light-sensitive proteins in algae, now used in optogenetic biotechnology
- Parasitic snail venom, which helps treat pain
- Venom from Gila monsters, which contains GLP-1 agonists, used for weight loss
- Narcoleptic dogs helped us discover the sleep drug suvorexant



Image: Getty

There are also direct **economic** impacts of NIH activity

- NIH spending results in \$2.46 in economic activity for every \$1 spent (United for Medical Research FY2023 report)
- The NIH alone supports more than 400,000 jobs nationwide
 - Supports 300,000 scientists and research personnel working at over 2,500 institutions across the U.S. and abroad (CRS 2025)





A community initiative that delivers standardized & shared infrastructure to report the impact of funded research publications

Let's look at what the NIH has funded lately 🙌

<https://www.sensusimpact.com/funders/nih>

Information for
Funders



Information for
Publishers



You also can see all NIH-funded research projects on report.nih.gov

The screenshot shows the NIH RePORT website homepage. At the top, there is a navigation menu with links for Research, Organizations, Workforce, Funding, Reports, Links and Data, About, Contact, and FAQ. The main header features the NIH logo and the text "RePORT Research Portfolio Online Reporting Tools". Below this, the word "RePORTER" is prominently displayed and underlined. To the right of "RePORTER" is a search bar labeled "RePORTER Quick Search..." with a "Search" button. A paragraph of text explains that the RePORTER module allows users to search a repository of NIH-funded research projects and access publications and patents. Below the text are two buttons: "RePORTER Home" and "Advanced Search". At the bottom, there is a row of five icons with corresponding labels: "RePORTER" (magnifying glass), "Matchmaker" (network diagram), "Awards by Location" (globe), "Categorical Spending" (dollar sign with arrow), and "NIH Data Book" (document with magnifying glass).

Research Organizations Workforce Funding Reports Links and Data About Contact FAQ

NIH RePORT
Research Portfolio Online Reporting Tools

RePORTER

RePORTER Quick Search... Search

The RePORT Expenditures and Results (RePORTER) module allows users to search a repository of NIH-funded research projects and access publications and patents resulting from NIH funding. Enter just about anything in the RePORTER Quick Search box above (text, PI names, project numbers, fiscal year, agency) or launch the Advanced Search to precisely configure searches using separate search fields.

RePORTER Home Advanced Search

RePORTER Matchmaker Awards by Location Categorical Spending NIH Data Book

Primary NIH grant: R01

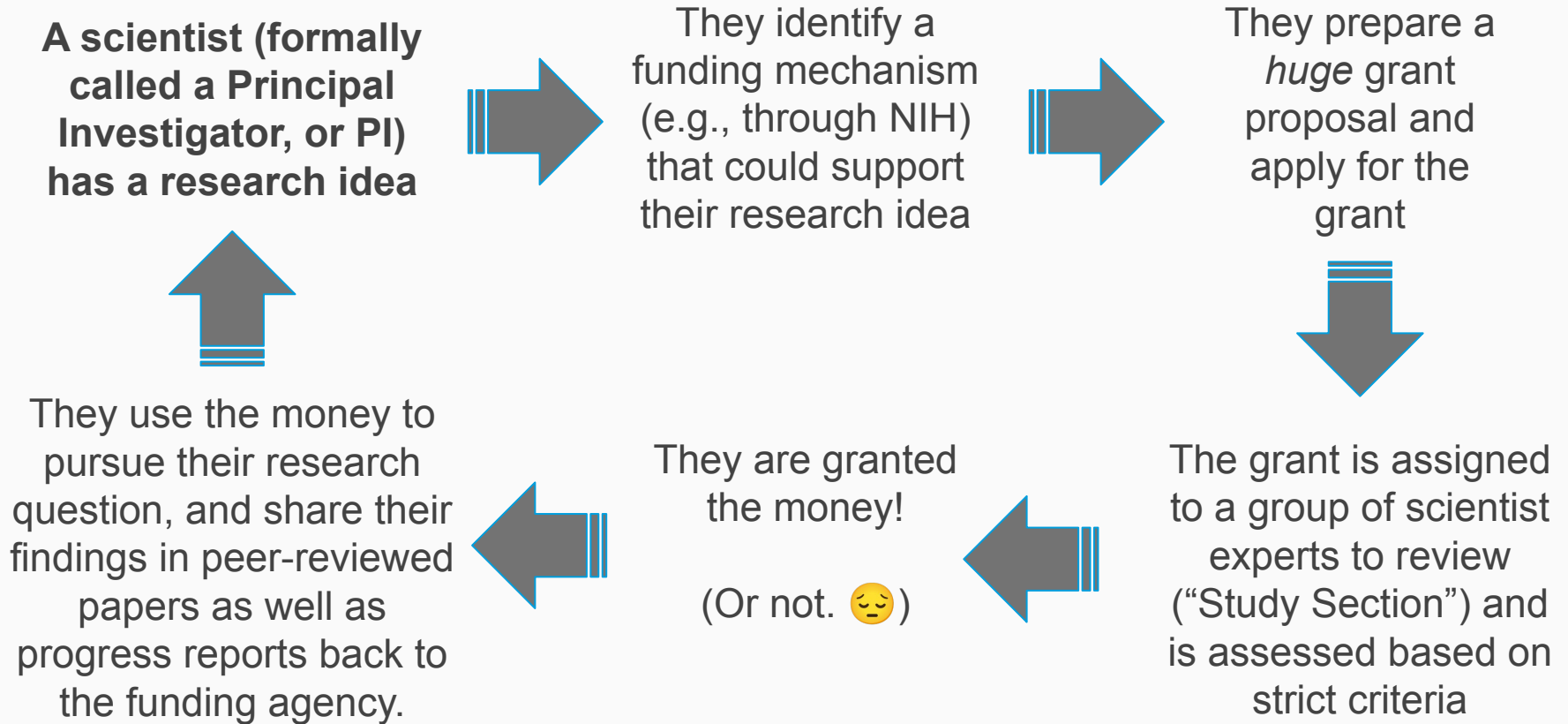
- “To support a discrete, specified, circumscribed project to be performed by the named investigator(s) in an area representing his or her specific interest and competencies.” ([NIH Website](#))
- NIH's most commonly used grant program for independent projects
- No specific dollar limit unless specified ([typically ~\\$500,000](#))
- Generally awarded for 3 to 5 years of work
- Scored using [very rigid, prescribed system](#)
- Some of the money granted goes to the institution/university itself — **“indirect” costs**

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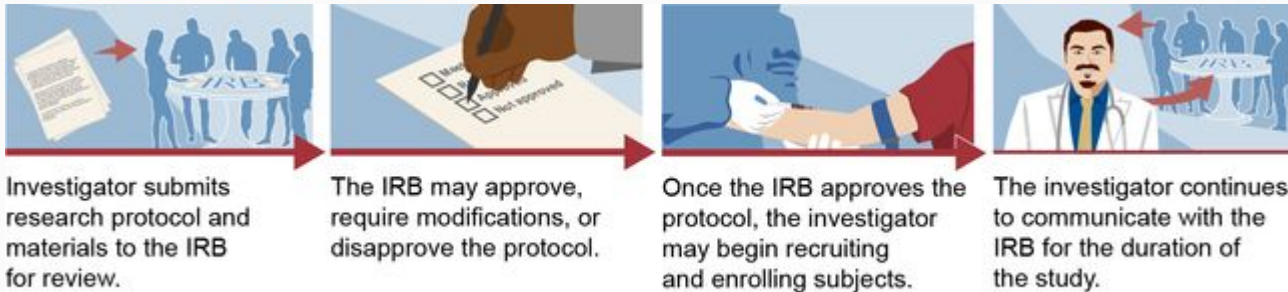
How do scientists obtain research funding?



Ethics Review Process

Grants and the research that they support also undergo ethics review:

- The Institutional Animal Care and Use Committee is responsible for oversight of the animal care
- Institutional Review Boards (IRBs) assess the ethics and safety of research studies involving human subjects, such as behavioral studies or clinical trials for new drugs or medical devices

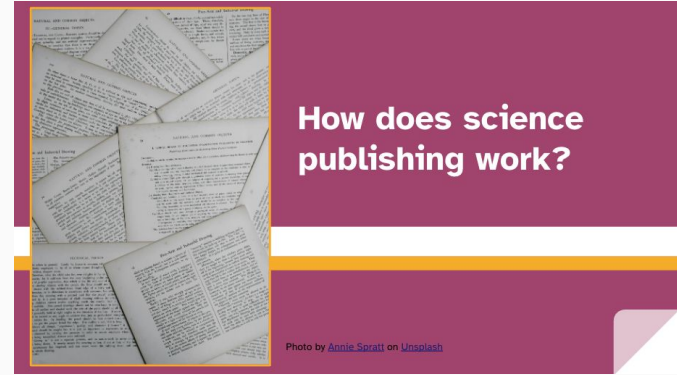


Source: GAO analysis of Department of Health and Human Services information. | GAO-23-104721

Image Source:
<https://www.gao.gov/products/gao-23-104721>

Additional Resources

- The history and future of scientific funding
<https://www.bu.edu/articles/2015/funding-for-scientific-research/>
- NSF study on Science and Technology: Public Attitudes, Knowledge, and Interest:
<https://ncses.nsf.gov/pubs/nsb20207/executive-summary>
- A list of books related to obtaining government funding:
<https://libguides.wpi.edu/funding/books>
- The impact of the human genome project:
<https://doe-humangenomeproject.ornl.gov/economic-impact/>
- Learn more about the NIH & its impact:
<https://www.actfor.nih.org/10-things-you-need-to-know-about-the-n/>
- For educators (how to teach about science funding!):
<https://www.thetransmitter.org/how-to-teach-this-paper/how-to-teach-students-about-science-funding/>
- <https://www.coalitionforlifesciences.org/>



[Another open slide deck on science publishing!](#)

Many thanks to many people on Bsky who ([in response to this post](#)) provided useful references and ideas for this slide deck.