

NATIONAL INSTITUTE OF ALLERGY AND INFECTIOUS DISEASES

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Mission:

The National Institute of Allergy and Infectious Diseases (NIAID) conducts and supports research that strives to understand, treat and prevent the myriad infectious, immunologic, and allergic diseases that threaten hundreds of millions of people worldwide. Among the Institute's high priority research areas are the acquired immunodeficiency syndrome (AIDS), emerging and reemerging infectious diseases (including those that represent bioterrorism threats), asthma and allergic diseases, autoimmune disorders, respiratory infections, sexually transmitted diseases, tropical diseases, tuberculosis, vaccine development, and immune-mediated rejection of transplanted solid organs, tissues, and cells.

Selected Achievements and Initiatives:

Biodefense: NIAID continues to expand basic research on microbial agents of bioterror and host responses to them, as well as applied research to develop improved diagnostics, therapeutics, and vaccines. For example, NIAID supported creation of a 3-D map of the anthrax protein binding to human cells using novel X-ray beam technology and thereby produced new strategies to develop vaccines and therapeutics against anthrax. Development of facilities and resources to build research capacity and infrastructure is another NIAID priority. Two National and nine Regional Biocontainment Laboratories that are currently under construction will provide increased capacity for biodefense research. The recently established Biodefense and Emerging Infections Research Resources Repository makes pathogens and related reagents available to scientists for research and product development. Eight Regional Centers of Excellence provide a comprehensive approach to combat bioterrorism and naturally occurring emerging and re-emerging diseases by coordinating resources from academia, government, biotech companies and the pharmaceutical industry.

Vaccine Development: Vaccines that eliminated smallpox, relegated polio to near extinction, and protected hundreds of millions of people from the devastation of typhus, measles, pertussis, diphtheria, tetanus, hepatitis B, Haemophilus influenzae type b, and other infections are proven weapons in the global fight against infectious disease. NIAID continues to sponsor efforts to develop vaccines against diseases with worldwide distribution, such as AIDS, malaria, tuberculosis, viral hemorrhagic fevers, childhood respiratory infections, chlamydia, hepatitis C and E, Lyme disease, rabies, and genital herpes. New knowledge of the molecular and immunologic basis of disease and improved tools to analyze viral structure and measure immune responses provide a basis for novel vaccination strategies to combat HIV/AIDS. NIAID scientists developed the first multigene, multiclade HIV vaccine to enter human trials, marking a milestone in the search for a vaccine that targets U.S. subtypes of HIV as well as subtypes that contribute to the global epidemic. Clinical trials are underway for a candidate vaccine against tuberculosis that showed promise in animal models. A candidate vaccine based on an adenoviral vector protected monkeys from infection with the Ebola virus.

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NIAID-supported scientists engineered by reverse genetics a candidate influenza vaccine, setting a new standard for efficiency in responding to emerging influenza pandemics. And, progress continues in the development of candidate vaccines for West Nile virus and the SARS coronavirus.

HIV Mother-to-Child Transmission (MTCT): Over 2 million HIV-positive women world-wide give birth each year and greater than 700,000 infants are infected with HIV before and during birth or through breastfeeding. Safe, affordable and convenient treatments to interrupt MTCT are particularly important in developing and resource-poor nations. NIAID-funded research demonstrated the effectiveness of zidovudine in reducing mother to infant transmission particularly in the U.S. and other industrialized nations. Subsequent research determined that a single dose to mother and infant of nevirapine was also highly effective in preventing MTCT of HIV at birth and during breastfeeding. This approach has global implications due to low cost and ease of administration.

Genomics: Genomic information contributes greatly to our understanding of both human genetic-disease-susceptibility as well as the biology of pathogens including their disease-causing mechanisms. NIAID's comprehensive genomics program builds research capacity and infrastructure by producing reagents, developing emerging technologies, generating extensive genomic data rapidly, and making these available to scientists worldwide. Components include: the Pathogen Functional Genomics Resource Center, Microbial Sequencing Centers, Bioinformatics Resource Centers, and Proteomics Research Centers. NIAID-supported researchers made publicly available the sequenced genomes of six strains of *Bacillus anthracis* and identified detailed phylogenetic lineages. These data contributed to a comparative genomic analysis that produced a new bacterial typing system for screening anthrax strains. NIAID-funded scientists sequenced genomes of two strains of a common waterborne protozoan, *Cryptosporidium parvum*, providing a basis to develop therapeutics to combat a pathogen for which no drugs are currently available. NIAID funded research may help to predict and prevent cholera outbreaks by providing new techniques to study cholera gene expression that could explain the link between seasonal cholera outbreaks and marine zooplankton blooms. NIAID has made a significant investment in large-scale sequencing of other organisms.

Appropriations History

(\$ in thousands)

| | |
|---------|----------------------|
| FY 2001 | \$2,041,698 (+14.8%) |
| FY 2002 | \$2,342,313 (+14.7%) |
| FY 2003 | \$3,606,789 (+54.0%) |
| FY 2004 | \$4,155,447 (+15.2%) |
| FY 2005 | \$4,303,641 (+3.6%) |

Extramural Research Project Grants

(Includes SBIR/STTRs)

| | |
|---------|-------|
| FY 2001 | 3,519 |
| FY 2002 | 3,721 |
| FY 2003 | 4,216 |
| FY 2004 | 4,382 |
| FY 2005 | 4,470 |

Success Rate — Research Project Grants

| | |
|---------|-----|
| FY 2001 | 38% |
| FY 2002 | 38% |
| FY 2003 | 35% |
| FY 2004 | 24% |
| FY 2005 | 22% |

Research Training Positions Supported

| | |
|---------|-------|
| FY 2001 | 1,069 |
| FY 2002 | 1,072 |
| FY 2003 | 1,200 |
| FY 2004 | 1,286 |
| FY 2005 | 1,344 |

Research Centers

| | |
|---------|----|
| FY 2001 | 23 |
| FY 2002 | 23 |
| FY 2003 | 33 |
| FY 2004 | 35 |
| FY 2005 | 39 |