

# Open Wide and Trek Inside

## About the National Institutes of Health

The National Institutes of Health (NIH), the world's top medical research center, is charged with addressing the health concerns of the nation. The NIH is the largest U.S. governmental sponsor of health studies conducted nationwide.

Simply described, the NIH's goal is to acquire new knowledge to help prevent, detect, diagnose, and treat disease and disability, from the rarest genetic disorder to the common cold. The NIH works toward that goal by conducting research in its own laboratories in Bethesda, Maryland and at several other locations throughout the United States; supporting the research of nonfederal scientists throughout the country and abroad; helping to train research investigators; and fostering communication of medical information to the public.

### The NIH Supports Research

A principal concern of the NIH is to invest wisely the tax dollars entrusted to it for the support and conduct of medical research. Approximately 82 percent of the investment is made through grants and contracts supporting research and training in more than 2,000 universities, medical schools, hospitals, and research institutions throughout the United States and abroad.

Approximately 10 percent of the budget goes to more than 2,000 projects conducted mainly in NIH laboratories. About 80 percent covers support costs of research conducted both within and outside the NIH.

### NIH Research Grants

To apply for a research grant, an individual scientist must submit an idea in a written application. Each application undergoes a peer review process. A panel of scientific experts, who are active researchers in the medical sciences, first evaluates the scientific merit of the application. Then, a national advisory council or board, composed of eminent scientists as well as members of the public who are interested in health issues or the medical sciences, determines the project's overall merit and priority. Because funds are limited, the process is very competitive.

### The Nobelists

The rosters of those who have conducted research, or who have received NIH support over the years, include some of the world's most illustrious scientists and physicians. Among them are 101 scientists who have

## About the National Institute of Dental and Craniofacial Research

The National Institute of Dental and Craniofacial Research (NIDCR)\* is one of the three oldest Institutes of the NIH and the nation's primary sponsor of oral health research. The legislation enacted by Congress in 1948 to establish NIDCR entrusted it with national leadership in dental research, the conduct and support of research and training, and the timely transfer of research findings and information.

The impetus for the creation of NIDCR was World War II with its devastating revelation that rampant tooth decay was compromising our military preparedness: close to 10 percent of Army recruits were rejected because of missing teeth. It was a shock that so little was known about the cause of oral diseases. Thus, the Institute's research initially focused on dental caries (tooth decay) and studies showing the effectiveness of fluoride in preventing this disease. The discovery of fluoride was soon complemented by research that showed that both tooth decay and periodontal (gum) diseases were bacterial infections that could be prevented by a combination of individual, community, and professional actions.

Now, half a century later, we are realizing the benefits of our Federal investment in oral health research. The achievements of NIDCR have transformed dental practice, saved billions in the cost of dental care, and improved the oral health of the nation. Despite the many advances in oral health research, there is still much work to be done. Today, NIDCR research is directed toward resolving a wide array of oral diseases and disorders and addressing disparities in oral health status that continue to exist in our nation.

In addition to supporting research projects at institutions throughout the United States and in foreign countries, the NIDCR supports training and career development, works with voluntary organizations and patient groups, sponsors activities such as conferences and workshops for health professionals, and supports health education and health promotion activities. NIDCR's own

won Nobel Prizes for achievements as diverse as deciphering the genetic code and learning what causes hepatitis.

Five Nobelists made their prize-winning discoveries in NIH laboratories: Doctors Christian B. Anfinsen, Julius Axelrod, D. Carleton Gajdusek, Marshall W. Nirenberg, and Martin Rodbell.

### Impact of the NIH on the Nation's Health

The research programs of the NIH have been remarkably successful during the past 50 years. NIH-funded scientists have made substantial progress in understanding the basic mechanisms of disease and have vastly improved the preventive, diagnostic, and therapeutic options available.

During the past few decades, NIH research played a major role in making possible achievements like these:

- Mortality from heart disease, the number one killer in the United States, dropped by 36 percent between 1977 and 1999.
- Improved treatments and detection methods increased the relative five-year survival rate for people with cancer to 60 percent.
- With effective medications and psychotherapy, the 19 million Americans who suffer from depression can now look forward to a better, more productive future.
- Vaccines protect against infectious diseases that once killed and disabled millions of children and adults.
- In 1990, NIH researchers performed the first trial of gene therapy in humans. Scientists are increasingly able to locate, identify, and describe the functions of many of the genes in the human genome. The ultimate goal is to develop screening tools and gene therapies for the general population for cancer and many other diseases.

### Educational and Training Opportunities at the NIH

The NIH offers myriad opportunities including summer research positions for students. For details, visit <http://science-education.nih.gov/students>.

For more information about the NIH, visit <http://www.nih.gov>.

### The NIH Office of Science Education

The NIH Office of Science Education (OSE) is bringing exciting new resources free of charge to science teachers of grades kindergarten through 12. OSE learning tools support teachers in training the next generation of scientists and scientifically literate citizens. These materials cover information not available in standard textbooks and allow students to explore biological concepts using real world examples. In addition to the curriculum supplements, OSE provides a host of valuable resources accessible through the OSE Web site (<http://science-education.nih.gov>), such as:

- **Snapshots of Science and Medicine.**<sup>2</sup> This online magazine—plus interactive learning tools—is designed for ease of use in high school science classrooms. Three issues, available for free, are published during the school year. Each focuses on a new area of research and includes four professionally written articles on findings, historical background, related ethical questions, and profiles of people working in the field. Also included are a teaching guide, classroom activities, handouts, and more. (<http://science-education.nih.gov/snapshots>)
- **Women Are Scientists Video and Poster Series.**<sup>3</sup> This series provides teachers and guidance

investigators conduct basic laboratory and clinical research at facilities located on the campus of the National Institutes of Health. Examples of research areas include the molecular biology, biochemistry, structure, function, and development of bones, teeth, salivary glands and connective tissues; the role of viruses, bacteria, and yeast in disease; complex human genetic disorders; cancers of the head and neck; cause and treatment of acute and chronic pain; and the development of new methods to diagnose and treat disease using bioengineering approaches. For more information about NIDCR, visit our Web site at <http://www.nidcr.nih.gov>.

\*Originally named the National Institute of Dental Research, the Institute's name was changed in 1998.

counselors with free tools to encourage young women to pursue careers in the medical field. The informative, fullcolor video and poster sets focus on some of the careers in which women are currently underrepresented. Three video and poster sets are now available: *Women are Surgeons*, *Women are Pathologists*, and *Women are Researchers*. (<http://science-education.nih.gov/women>)

- **Internship Programs.** Visit the OSE Web site to obtain information on a variety of NIH programs open to teachers and students. (<http://scienceeducation.nih.gov/students>)
- **National Science Teacher Conferences.** Thousands of copies of NIH materials are distributed to teachers for free at the OSE exhibit booth at conferences of the National Science Teachers Association and the National Association of Biology Teachers. OSE also offers teacher-training workshops at many conferences. (<http://science-education.nih.gov/exhibits>)

In the development of learning tools, OSE supports science education reform as outlined in the *National Science Education Standards* and related guidelines.

We welcome your comments about existing resources and suggestions about how we may best meet your needs. Feel free to send your comments to us at <http://science-education.nih.gov/feedback>.

<sup>2,3</sup>These projects are collaborative efforts between OSE and the NIH Office of Research on Women's Health.

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