The USA’s Medical Research Agency

Scientific Leadership

The NIH Roadmap for Medical Research

Tracing its roots to 1887, with the creation of the Laboratory of Hygiene at the Marine Hospital in Staten Island, NY, the National Institutes of Health (NIH), a part of the Department of Health and Human Services, is the primary Federal agency for conducting and supporting medical research in the USA.

Composed of 27 Institutes and Centers, the NIH provides leadership and financial support to researchers in every state of USA and throughout the world. With the headquarters in Bethesda, MD, the NIH has more than 17,000 employees on the main campus and at satellite sites across the USA.

The NIH annually invests over $28 billion in medical research. More than 80% of the NIH’s funding is awarded through almost 50,000 competitive grants to more than 212,000 researchers at over 2,800 universities, medical schools, and other research institutions in every state and around the world. About 10% of the NIH’s budget supports projects conducted by nearly 6,000 scientists in its own laboratories, most of which are on the NIH campus in Bethesda, MD.

The NIH is training the current and next generation of researchers to ensure that the capability to advance medical science remains strong. Many of these scientists-in-training will go on to become leading medical researchers and educators at universities; medical, dental, nursing, and pharmacy schools; schools of public health; non-profit health research foundations; and private medical research laboratories.

As a Federal agency, the NIH considers many different perspectives in establishing research priorities. A very competitive peer-review system identifies and funds the most promising and highest quality research to address these priorities. This research includes studies that ultimately touch the lives of all people.

The NIH’s own scientists, and scientists working with support from the NIH grants and contracts, have been responsible for countless medical advances. More than 100 of these scientists have received Nobel Prizes in recognition of their work.

Dr. Elias Zerhouni, director of the National Institutes of Health, is spearheading efforts to speed up the time it takes for laboratory discoveries to be translated into new medical treatments and drugs.

Soon after becoming NIH Director in May 2002, Dr. Zerhouni convened a series of meetings to chart a “roadmap” for medical research in the 21st century—a process that identified major opportunities and gaps in biomedical research that no single institute at NIH could tackle alone, but that the agency still needed to address.

“NIH must lead the way in instituting the changes in medical research necessary to improve the health of all Americans”, HHS Secretary Tommy G. Thompson said. “It is clear that NIH has a compelling vision for the future of medical research and what will have the most profound impact on research and most importantly the health of all Americans”.

“There has been a scientific revolution in the last few years. The opportunities for discoveries have never been greater, but the complexity of biology remains a daunting challenge. With this new strategy for medical research, NIH is uniquely positioned to spark the changes that must be made to transform scientific knowledge into tangible benefits for people”, said Dr. Zerhouni.

Developed with input from more than 300 nationally recognized leaders in academia, industry, government and the public, the NIH Roadmap provides a framework of the strategic investments that NIH needs to make to optimize its entire research portfolio.

The NIH Roadmap builds on the tremendous progress in medical research achieved, in part, through the recent doubling of the NIH budget. In setting forth a high perspective vision for a more efficient and productive system of medical research, the NIH Roadmap focuses on the most compelling opportunities in three main areas: new pathways to discovery, research teams of the future and re-engineering the clinical research enterprise.

To be part of the NIH Roadmap, scientific initiatives had to be deemed of high potential impact, had to enhance the disease and mission-specific activities of all of NIH’s 27 institutes and centers, and had to respond to the needs and concerns of the public. NIH has begun to implement all of the initiatives in fiscal year 2004.
These efforts will cover a broad spectrum of points between the lab and the clinic - from basic biological research, such as determining protein structure, to the front lines of clinical research, such as improving the training of the physicians and nurses who run clinical trials. After an intense process of discussion and scientific review, the directors of NIH's 27 institutes and centers approved an NIH Roadmap strategy that features 28 initiatives to be carried out by nine implementation groups arranged under three main themes.

**New Pathways to Discovery**

With this theme, New Pathways to Discovery, the NIH Roadmap addresses the need to understand complex biological systems. Future progress in medicine will require quantitative knowledge about the many interconnected networks of molecules that comprise cells and tissues, along with improved insights into how these networks are regulated and interact with each other. Researchers predict that more precise knowledge of the combination of molecular events that lead to health or disease will help to revolutionize the practice of medicine in the 21st century.

The scale and complexity of today's biomedical research problems increasingly demand that scientists move beyond the confines of their own discipline and explore new organizational models for team science. For example, imaging research often requires radiologists, physicists, cell biologists and computer programmers to work together on integrated teams. Many scientists will still continue to pursue individual research projects, but they too will be encouraged to make changes in the way they approach the scientific enterprise.

NIH wants to stimulate new ways of combining skills and disciplines in both the physical and biological sciences. A new funding mechanism, the NIH Director's Innovator Award, will encourage investigators to take on creative, unexplored avenues of research that carry a relatively high potential for failure, but also possess a greater chance for truly groundbreaking discoveries. In addition, novel partnerships, such as those between the public and private sectors, will be encouraged to accelerate the movement of scientific discoveries from the bench to the bedside.

Ideally, basic research discoveries are quickly transformed into diagnostics, drugs, treatments or methods for prevention. Such translation lies at the very heart of the NIH's mission. Although biomedical research has succeeded in curing many diseases, and converting many others once considered uniformly lethal into more chronic, treatable conditions, it has become clear to the scientific community that the United States must recast its entire system of clinical research if such efforts are to remain as successful as they have been in the past. Over the years, clinical research has become more difficult to conduct. However, the exciting basic science discoveries currently being made demand that clinical research continue and even expand, while at the same time striving to improve efficiency and better inform basic science efforts. This is undoubtedly the most difficult but most important challenge identified by the NIH Roadmap process.

At the core of this vision is the concept that clinical research needs to develop new partnerships among organized patient communities, community-based physicians and academic researchers. In the past, all research for a clinical trial could be conducted in one academic center; that is unlikely to be true in the future. In these initiatives, NIH will promote the creation of better integrated networks of academic centers that work jointly on clinical trials and that include community-based physicians who care for sufficiently large groups of well-characterized patients. Implementing this vision will require new ways to organize the way clinical research information is recorded, new standards for clinical research protocols, modern information technology, new models of cooperation between NIH and patient advocacy alliances, and new strategies to re-energize the clinical research workforce.

The NIH Roadmap’s theme of Re-engineering the Clinical Research Enterprise is intended to address this crucial area by promoting better integration of existing clinical research networks, encouraging the development of technologies to improve the assessment of clinical outcomes, harmonizing regulatory processes and enhancing training for clinical researchers.

Taken together, the components of the NIH Roadmap initiatives are an integral part of a well-thought-out national portfolio of research to meet the health demands of the 21st century.