

The National Center for Research Resources



a c c e l e r a t i n g

and enhancing research from basic

discovery to improved patient care



**National Center for
Research Resources**

**NATIONAL INSTITUTES OF HEALTH
U.S. DEPARTMENT OF HEALTH AND
HUMAN SERVICES**

NCRR connects researchers with one another, and with patients and communities across the nation.



The National Center for Research Resources (NCRR) provides laboratory scientists and clinical researchers with the environments and tools they need to understand, detect, treat, and prevent a wide range of diseases. With this support, scientists make biomedical discoveries, translate these findings to animal-based studies, and then apply them to patient-oriented research. Ultimately, these advances result in cures and treatments for both common and rare diseases.

NCRR connects researchers with one another, and with patients and communities across the nation. These connections bring together innovative research teams and the power of shared resources, multiplying the opportunities to improve human health. Together, NCRR's four integrated and complementary divisions accelerate and enhance research along the entire continuum of biomedical science.

BIOMEDICAL TECHNOLOGY

Stimulates basic research to develop versatile new technologies and methods that help researchers who are studying virtually every human disease.

Provides access to state-of-the-art technologies and instruments that enable both basic biomedical research and clinical investigations of a multitude of health issues.

www.ncrr.nih.gov/bt

Advances in technology are the underlying force that drives innovation and rapid progress in science at all stages of biomedical research—from studies of molecules and cells to whole organisms—both animal and human. The Division of Biomedical Technology (BT) supports a broad spectrum of technologies, techniques, and methods through BT Resource Centers at academic and other research institutions nationwide.

At the BT Resource Centers, researchers:

- develop more sophisticated and powerful magnetic resonance imaging tools and techniques that help investigators study both the structure and the function of the brain, lungs, heart, and other organs.

- examine the structure and dynamics of biomolecules, cells, and tissues, using a variety of laser-based spectroscopic techniques. Research at these centers aids development of minimally invasive procedures for diagnosing diseases, including cancer and atherosclerosis.
- integrate diverse technologies in pursuit of a particular research goal, such as developing novel approaches for processing brain images in order to identify changes in the brain over time.
- study molecular structures and the design of novel drugs by developing and disseminating several technologies—including synchrotron X-rays, mass spectrometry, and precision microscopy. By examining the detailed shapes of molecules in the body, scientists

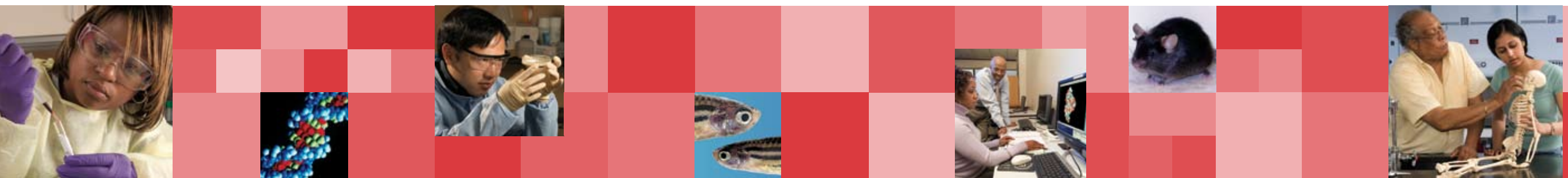
can better understand the underlying causes of disease and develop effective therapies based on these discoveries.

- employ simulation and computation tools to visualize electric fields emanating from the heart and brain, identify genetic components that underlie disease susceptibility, and model structural changes in proteins and nucleic acids.
- gain unique insights into human metabolism and scrutinize the atomic-scale details of biomolecules through use of magnetic resonance spectroscopy. Examining proteins and other complex molecules in their native environment offers otherwise-unattainable insights into the maneuvering of disease-related molecules in the body.

- bring together expertise in biology, analytical chemistry, and informatics to study proteomics and glycomics. A better understanding of these protein and carbohydrate molecules—how they work and how changes in these structures cause illness or are affected by medicines—could lead to new treatments for a multitude of diseases.

For more information, visit www.ncrr.nih.gov/BTCenters.

NCCR also funds instrumentation grants to allow groups of NIH-supported investigators to obtain commercially available equipment. The grants are funded through a two-tiered approach: Shared Instrumentation Grants and High-End Instrumentation Grants. For more information, visit www.ncrr.nih.gov/BTInstruments.



COMPARATIVE MEDICINE

Develops and provides access to animal models, which offer essential clues to human disorders, such as AIDS, Parkinson's disease, and diabetes.

Trains veterinarians in translational research to enhance the country's ability to respond to the emergence and spread of potentially deadly human diseases, such as SARS, influenza, and hepatitis.

www.ncrr.nih.gov/cm

Serving as a critical part of the biomedical research continuum, animal models are the bridge between basic science and human medicine, with discoveries in one species enhancing understanding of another. Because many diseases that afflict humans also occur in animals, researchers can learn a great deal using animal models that mimic these human conditions. In fact, virtually every major medical advance of the last century was the result of research involving animals.

The Division of Comparative Medicine (CM) provides scientists with essential resources—including specialized laboratory animals, research facilities, and training—that enable health-related discoveries.

The CM division:

- ensures the availability of a full array of high-quality, disease-free animals—including nonhuman primates, mice, fish, and lower animals such as fruit flies—to gain understanding of human genetics, disease mechanisms, and health.
- provides funding to develop, characterize, and improve mammalian animal models needed to investigate human diseases, as well as to study, diagnose, and control the diseases and improve the welfare of laboratory animals.
- enables researchers to develop, disseminate, and study a wide variety of nonmammalian models—including fish, insects, and worms.

- oversees a network of eight National Primate Research Centers, highly specialized facilities that foster the development of animal models such as monkeys and baboons, facilitating research into diseases including HIV/AIDS, hepatitis, and cancer.
- coordinates the creation and distribution of more than 13,000 strains of genetically altered mice that are used by scientists to learn more about diseases such as diabetes and heart disease.
- encourages the development of nonbiological systems, such as mathematical and computer modeling, that can aid understanding of human health.

- supports long-term, cost-effective housing and maintenance of chimpanzees used in research through the NIH Chimpanzee Management Program.
- funds research training and career development grants to support specialized training in laboratory animal science, comparative medicine, pathology, genetics, and molecular biology. This funding is critical due to the shortage of veterinary investigators needed to carry out research studies across the nation.

RESEARCH INFRASTRUCTURE

Funds development programs to enhance the competitiveness of investigators in underserved states and institutions.

Provides funding to expand, remodel, and renovate or alter existing research facilities or construct new research facilities.

www.ncrr.nih.gov/ri

Developing and invigorating the nation's research capacity and infrastructure at all stages of research—from basic discoveries in the laboratory to advanced treatments for patients—is the goal of the Division of Research Infrastructure (RI).

The Research Centers in Minority Institutions (RCMI) Program provides grants to institutions that award doctoral degrees in health-related fields and that have a 50 percent or greater enrollment of students from minority communities underrepresented in the biomedical sciences. These communities include African Americans, Hispanics, American Indians, Alaska Natives, Native Hawaiians, and Pacific Islanders. Because many RCMI investigators study diseases

that disproportionately affect minority populations—such as a variety of cancers, diabetes, AIDS, and cardiovascular diseases—the program serves the dual purpose of increasing the number of minority scientists engaged in biomedical research and enhancing studies on minority health.

Specifically, the RCMI program:

- supports faculty development and provides resources to acquire advanced instrumentation, modify laboratories for competitive research, and support core research facilities.
- expands the capacity for clinical research in RCMI institutions that have affiliated medical schools through the Clinical Research Infrastructure Initiative. This

program encourages minority scientists to participate in clinical investigations and increases volunteer participation by minorities in clinical research studies.

For more information, visit www.ncrr.nih.gov/RIrcmi.

Through the Institutional Development Award (IDeA) Program, NCCRR fosters health-related research and improves the competitiveness of investigators in states that historically have not received significant levels of competitive research funding from NIH. The IDeA program supports multidisciplinary centers or collaborative partnerships that increase an institution's capacity to conduct cutting-edge biomedical research. Specifically, the IDeA program:

- establishes Centers of Biomedical Research Excellence (COBRE) within an institution to explore multidisciplinary research themes and foster mentoring opportunities.
- creates networks within a state that share multidisciplinary, thematic scientific goals. Funding for these IDeA Networks of Biomedical Research Excellence (INBRE) supports statewide partnerships that include undergraduate and graduate/professional institutions.

For more information, visit www.ncrr.nih.gov/RIidea.

The Research Facilities Improvement Program increases the nation's ability to conduct state-of-the-art research by providing competitive funding to modernize and construct research facilities that support basic and/or clinical investigations. Funding has supported the construction of cancer laboratories; improved research imaging capabilities; created facilities for research animals; and much more.

For more information, visit www.ncrr.nih.gov/RIfacilities.



CLINICAL RESEARCH RESOURCES

Provides clinical research environments and resources that enable studies of the full range of human disorders.

Funds career development programs that attract talented medical students, physicians, and dentists to the challenge of clinical research careers.

Increases the public's understanding of medical research, and delivers information about healthy living and career opportunities in science to children and the general public.

www.ncrr.nih.gov/cr

Clinical research is the final step in translating basic scientific discoveries into better care for the nation. Patient-oriented research and clinical trials allow scientists to evaluate promising therapies and disease prevention strategies in humans. The Division for Clinical Research Resources (CR) is taking a lead in NIH efforts to re-engineer the clinical research enterprise by helping institutions create a new integrated discipline of clinical and translational sciences.

The CR division:

- invigorates and speeds the process by which biomedical discoveries are translated into effective medical care for patients through a new NIH Roadmap for Medical Research initiative—the Clinical and Translational Science Awards, or CTSA. These awards

will help institutions nationwide create an academic home for clinical and translational research, develop novel approaches, enhance informatics, and improve training and mentoring to ensure that new investigators can navigate increasingly complex research systems. For more information, visit www.ncrr.nih.gov/CRctsa.

- provides effective settings for medical investigators to conduct safe, controlled, state-of-the-art, patient-oriented studies of both children and adults through a national network of General Clinical Research Centers (GCRCs). The GCRC network will gradually be transformed under the new CTSA program, described above.
- encourages the development of gene therapies for diseases such as cancer and HIV/AIDS by

supporting the National Gene Vector Laboratories.

- enhances efforts to free diabetics from the burden of insulin injections by supporting Islet Cell Resource Centers that optimize the viability and availability of human pancreatic islets for transplantation and basic research studies.
- increases collaboration and resource sharing related to diagnosing and treating rare diseases through the Rare Diseases Clinical Research Network.
- develops shared informatics resources such as the National Electronic Clinical Trials and Research network, called NECTAR. An NIH Roadmap effort, NECTAR's goal is to create an informatics platform that will allow complex research programs to benefit from a common infrastructure.

- supports a multi-center procurement network called the Human Tissues and Organs Resource that annually provides more than 7,000 specimens to researchers.
- funds career development programs that attract talented medical students, physicians, and dentists to the challenge of clinical research careers.
- supports research investigating inherited genes that increase susceptibility for disease through a national genotyping center.
- improves the nation's science literacy through Science Education Partnership Awards (SEPA) that bring together researchers, educators, museums, and other organizations to create and disseminate innovative educational programs.

The three interconnecting elements of NCCR's logo represent basic discovery, translational science, and clinical research—the critical components of NCCR's biomedical research support. The logo's sense of forward movement conveys that NCCR is a dynamic organization, ready to respond to the changing needs of the scientific community.



As part of its efforts to speed discoveries across the biomedical continuum, the National Center for Research Resources (NCRR) is working to better connect scientists with one another, as well as with patients and communities across the nation. These connections bring together innovative research teams and the power of shared resources, multiplying the opportunities to improve human health.

Through the Biomedical Informatics Research Network (BIRN), NCRR supports the integration of data, expertise, and unique technologies to spur scientific advances that would be difficult or impossible in the context of individual laboratories. BIRN—a consortium of more than 28 universities and 37 research groups—is leveraging and sharing distributed tools, software applications, techniques, data, and expertise to encourage large-scale, multi-site research. This major

NCRR initiative is initially concentrating on projects involving neuroimaging, but the tools and technologies developed will ultimately be applicable to other disciplines. For more information, visit www.nbirn.net.

NCRR is using the latest information technology advances to expand opportunities for research collaboration and to promote greater inclusion of under-represented minority and rural populations in research. This national effort, called IDeANet, will provide researchers with broad bandwidth Internet connections so that they can access advanced Internet applications such as virtual laboratories, digital libraries, distance education, and advanced networking systems. This effort is part of the Institutional Development Award (IDeA) Program and will expand to include NCRR's Research Centers in Minority Institutions (RCMI) Program. More information is available at www.ncrr.nih.gov/RIdeanet.

www.ncrr.nih.gov