National Institute of Allergy and Infectious Diseases, NIH

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Frontiers in Research

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Dedication

To the thousands of investigators who, for more than 50 years, have received the support of the National Institute of Allergy and Infectious Diseases (NIAID) and have dedicated their lives and careers to biomedical research.

RESEARCH IS NOT A SYSTEMATIC OCCUPATION
BUT AN INTUITIVE ARTISTIC VOCATION

Albert Szent-Györgyi
For more than 50 years, as part of the National Institutes of Health, the mission of the National Institute of Allergy and Infectious Diseases (NIAID) has been to conduct and support basic and applied research to better understand, treat, and prevent infectious, immunologic, and allergic diseases with the ultimate goal of improving the health of individuals in the United States and around the world.

In recent years, NIAID has responded to new challenges including emerging and re-emerging infectious diseases, potential bioterrorism threats, and an increase in pediatric asthma prevalence. A cornerstone of NIAID-supported research also continues to be the discovery and improvement of vaccines focused on an array of infectious diseases with global public health importance.

As part of its mission to foster biomedical discovery and to reduce the burden of human disease, NIH and NIAID in particular, are committed to encouraging the accelerated translation of biomedical discoveries into effective clinical care and public health practice throughout the world. In pursuit of this goal and its disease-specific scientific objectives, NIAID seeks to broaden research opportunities and collaborations involving scientists and institutions outside the United States.

During 2006, special emphasis was given to fostering scientific collaboration between U.S. researchers and investigators in Central and Eastern Europe, the Baltic Region, Russia, Ukraine, and other newly independent states that were formerly part of the Soviet Union. Although the countries of Central and Eastern Europe have strong traditions in biomedical research, scientists from this region have been less successful than their Western European colleagues in competing for NIAID funding and in forming partnerships with U.S. scientists. To help address this situation, NIAID convened a research conference in Opatija, Croatia (June 24–30, 2006) so that U.S. and European scientists could explore shared research interests with a focus on microbiology and infectious diseases, HIV/AIDS, and basic and clinical immunology.

In the field of microbiology and infectious diseases, major presentations at the conference focused on recent research developments in emerging and re-emerging infections (anthrax and other potential biological weapons, vector-borne infections, tuberculosis, and influenza). A number of presentations discussed ongoing research targeting the development of infectious disease prophylactics and therapeutics.

One of the most serious problems worldwide that confronts efforts to control and treat infectious diseases is the increasing resistance of some pathogens to the current armamentarium of drugs. Microorganisms belonging to all four classes of infectious agents (bacteria, viruses, parasites, and fungi) have developed resistance to previously effective chemotherapeutics, thereby becoming serious threats to individual well-being and international public health. One striking example of drug resistance is the emergence of extensively drug-resistant tuberculosis. Several conference presentations were therefore focused on drug resistance.

HIV/AIDS also remains a major infectious disease research priority and it was well addressed during the conference. Since the start of the HIV/AIDS pandemic in the early 1980s, nearly 20 million people worldwide have died of the disease. According to an estimate issued by the Joint United Nations Programme on HIV/AIDS (UNAIDS) by the end of 2003, about 38 million adults and children were living with HIV/AIDS and in many countries overall prevalence still is rising. Although much progress has been made in the treatment of AIDS and in understanding effective strategies to prevent HIV transmission, research is urgently needed on vaccines, microbicides, therapeutic agents, behavioral prevention strategies, and the management of HIV-related co-morbidities.

NIAID-funded research in basic and clinical immunology has led to significant discoveries that have guided the effective treatment of a host of immunological conditions. For example, “tolerance induction” research has enabled the selective blocking of inappropriate or destructive immune responses while leaving protective immune responses intact. Major presentations at
the conference discussed various topics in immunomodulation, autoimmunity, infections and immunity, and vaccine development.

Finally, two sessions at the research conference were designed to inform participants about NIAID’s research funding mechanisms and the NIH application process.

With more than 100 participants, the 2006 NIAID Research Conference in Croatia clearly demonstrated NIAID’s commitment to a cutting-edge scientific exchange to help generate more research cooperation. Following the meeting, numerous research collaborations have been explored and numerous joint research applications have been prepared and submitted.

NIAID is pleased to have supported this important and unusual meeting and it welcomes publication of the important scientific findings presented there. The future of science lies in cooperation across national borders. Therefore, it is particularly rewarding to see research partnerships grow between scientists from countries previously characterized by a lack of communication and mutual understanding. With a strong research base, talented investigators in the United States and abroad, and the availability of powerful new research tools, NIAID will continue to support scientists in the forefront of basic and applied infectious and immune-mediated disease research.

Vassil St. Georgiev
Bethesda, MD
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The National Institute of Allergy and Infectious Diseases (NIAID) of the U.S. National Institutes of Health (NIH) is within the U.S. Department of Health and Human Services (DHHS; Figure 1). The NIH is the DHHS agency responsible for biomedical research and research training. In the U.S. federal system, health is considered primarily a local and state responsibility, with the federal government providing support and assistance as required. Biomedical research, however, is viewed as a federal responsibility. For that reason, the NIH size and budget have resulted in its becoming the largest of the DHHS agencies.

The NIH consists of 27 institutes and centers, 24 of which carry out and fund biomedical research and three that support the NIH biomedical research endeavor (Figure 2). Each institute consists of two major components: the extramural and the intramural. Intramural programs consist of NIH scientists working in NIH government laboratories. Intramural research constitutes of about 10 to 20% of each institute’s research effort and budget. Intramural researchers select scientists to come to their laboratories for research training and conduct international research using the funding available to their laboratory. The extramural program of each institute is approximately 80 to 90% of its total funding and operates through both unsolicited and solicited research applications for grants, collaborative agreements, and contracts. Applications are submitted to the NIH Center for Scientific Review, which assigns each application to the appropriate initial review group for scientific peer review and to an institute according to the scientific content of the application and the research mission of the institute. NIH is unique among national biomedical research agencies in that nearly one-half of the intramural scientists are not U.S. citizens and that foreign scientists are eligible to apply directly or as a partner in extramural awards.

NIAID is similar in its organization to other NIH institutes in that it has three intramural divisions and five extramural divisions (Figure 3). The Division of Intramural Research heavily emphasizes basic biomedical research, while the Vaccine Research Center’s mission includes the discovery and early development of vaccine products. The Division of Clinical Research was established in 2006 to set up domestic and international sites to carry out human subject studies on new or improved diagnostic tests, drugs, vaccines and other prevention products. The Division of Microbiology and Infectious Diseases is responsible for all infectious and parasitic diseases except for the human acquired immunodeficiency syndrome (AIDS). The Division of AIDS is responsible for AIDS and related conditions. The Division of Allergy, Immunology, and Transplantation is concerned with the human immune system. The Division of Extramural Activities provides support to the other three extramural divisions through NIAID-organized initial review groups, grant and contract management, and award databases.

The NIAID mission is to understand, treat, and ultimately prevent infectious, immunological, and allergic diseases that affect or threaten U.S. populations and hundreds of millions of people worldwide. The major areas of NIAID investigation currently are (in alphabetical order): AIDS; acute respiratory infections, including influenza; antimicrobial drug resistance, asthma and allergic diseases; civilian biodefense; emerging infectious diseases; enteric infections; genetics, transplantation, and immune tolerance; immune disorders; malaria and other tropical diseases; sexually transmitted diseases; tuberculosis, and vaccine development and evaluation.

The evolution of the NIAID budget is summarized in Figure 4. Prior to the recognition of AIDS, NIAID was the seventh largest NIH Institute. As a result of its research responsibilities in infectious diseases and immunology, funding for AIDS and AIDS-related research rose to become one-half of the NIAID budget. Subsequent to the anthrax attacks in 2001, NIAID was given lead responsibility for the U.S. Civilian Biodefense Research Initiative. At the present time, NIAID is the second
largest institute after the National Cancer Institute. NIAID research funding is approximately one-third AIDS, one-third civilian biodefense, and one-third non-AIDS/non-biodefense. Following a Congressional mandate to double the NIH budget in the 1990s, the NIH budget has been flat for the past several years, resulting in overall inflation-adjusted negative growth. During this period, NIAID funding for international research has maintained a slow and steady growth (Figure 5) so that international research now accounts for 10% of the total NIAID budget. This remarkable sustainability is due to the globalization of health problems, the relevance of health conditions globally to domestic U.S. health problems, humanitarian objectives, and the economic development, political stability, and increasing investment in international health on the part of key international partners such as Brazil, China, and India. This sustained interest and growth in international research is not seen across NIH. One major factor that fuels NIAID’s global research activities is that our mission in infectious diseases necessitates that we partner with countries that have heavier burdens of disease and/or different risk factors in the development of clinical sites and the evaluation of new or improved diagnostic tests, treatment modalities, or prevention products.

NIAID operates under five guiding principles in Global Health Research. First, every effort is made to target collaborative research efforts to the needs of the partner country or region. Second, it strives to develop collaborative relationships that begin with collaboration in basic research and discovery so that intellectual property can be shared and proceed through product development, the design of human subject studies, and the conduct of rigorous clinical trials that generate data resulting in approval of the product by regulatory agencies. Third, to achieve multidisciplinary research collaboration, research capacity must be built and sustained in the host country. Fourth, NIAID strives to stimulate scientific collaboration and global multi-sector partnerships. Finally, NIAID international collaboration must develop training, communication, and outreach programs.

NIAID uses six approaches to support its international research. The first is through the NIAID intramural research divisions for pre- and postdoctoral research training. This research training frequently results in sustained collaboration once the visiting scientists have returned to their home countries. Intramural collaboration is limited by the resources available in each laboratory but has the advantages of being
decentralized and scientifically driven, and it provides the opportunity to establish long-term collaboration with the NIAID laboratory and other researchers who have trained there. Because about 50% of NIH intramural scientists are from outside the United States and only 10% of intramural scientists become tenured, the intramural research training experience provides an opportunity to become part of a global network linking trainees and their home institutions with NIAID-tenured scientists, U.S. scientists who take academic or private sector appointments or join other U.S. agencies, and foreign scientists who return home to continue their research careers.

Foreign investigators are encouraged to partner with U.S. extramural investigators in the submission of investigator-initiated research applications or in response to solicited program announcements (PAs) and requests for applications (RFAs). This is how NIAID supports the bulk of its international research. If the collaboration is between U.S. scientists and scientists in another industrialized country, there may be no NIAID funding involved. On the other hand, if the collaborating overseas scientist is from a middle- or lower-income country and/or does not have his or her own funding, NIAID will provide the U.S. investigator with research funds to support the overseas component.

NIH is unique among national domestic research agencies in that foreign investigators are eligible to apply directly for investigator-initiated research awards. Foreign scientists and institutions are also eligible to apply for most solicited grant and collaborative agreement solicitations. There are no international set-aside funds, and foreign investigators must compete against experienced U.S. investigators. All unsolicited foreign applications with a competitive score must also be approved by the National Allergic and Infectious Diseases Council before funding. Because of the intense competition and grantsmanship required, NIAID does not encourage foreign investigators to apply directly unless their ideas are