

BURROUGHS
WELLCOME
FUND 

2001
ANNUAL REPORT



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*Depicted in BWF's logo, the eye of the
ancient god Horus is considered a symbol of health.*

ABOUT THE BURROUGHS WELLCOME FUND



The Burroughs Wellcome Fund is an independent private foundation dedicated to advancing the medical sciences by supporting research and other scientific and educational activities. Within this broad mission, we seek to accomplish two primary goals—to help scientists early in their careers develop as independent investigators, and to advance fields in the basic medical sciences that are undervalued or in need of particular encouragement.

BWF has an endowment of about \$600 million, and we award approximately \$35 million in grants annually in the United States and Canada. We channel our financial support primarily through competitive peer-reviewed award programs, which encompass five major categories—basic biomedical sciences, infectious diseases, interfaces in science, translational research, and science education. BWF makes grants primarily to degree-granting institutions on behalf of individual researchers, who must be nominated by their institutions. To complement these competitive award programs, we also make grants to nonprofit organizations conducting activities intended to improve the general environment for science.

The Burroughs Wellcome Fund was founded in 1955 as the corporate foundation of Burroughs Wellcome Co., the U.S. branch of the Wellcome pharmaceutical enterprise, based in the United Kingdom. The Wellcome enterprise was started in 1880 by two young American pharmacists, Henry Wellcome and Silas Burroughs, who had moved to London to manufacture and sell “compressed medicines”—that is, pills—which the pair believed could replace the potions and powders of the day.

Their firm prospered. After Silas Burroughs died in 1895, Henry Wellcome directed the growth of the company into an international network with subsidiaries in numerous countries on several continents. As the business grew, Henry Wellcome held firm to his strong belief that research was fundamental to the development of excellent pharmaceutical products—a belief he put into practice by establishing the industry’s first research laboratories.

When Henry Wellcome died in 1936, his will vested all of the corporate shares in a new organization—the Wellcome Trust—devoted to supporting research in medicine and allied sciences and to maintaining museums and libraries dedicated to these fields. Over the decades, the Trust grew to become the world’s largest charitable foundation devoted exclusively to the biomedical sciences.

In 1955, leaders at the Wellcome Trust and Burroughs Wellcome Co.-USA envisioned an extension of this effort in the United States—and so was born the Burroughs Wellcome Fund. After nearly four decades as a corporate foundation, BWF in 1993 received from the Trust a \$400 million gift that enabled us to become a completely independent foundation. With this increase in assets, BWF has been able to play a larger role in funding biomedical research, including extending our support into Canada. In carrying out this work, BWF is governed by a Board of Directors composed of distinguished scientists and business leaders, and our competitive award programs are guided by advisory committees composed of leading researchers and educators.

The importance of curiosity-driven research, as endorsed by Henry Wellcome, continues as our guide. Thus, more than a century after two enterprising American pharmacists set in motion their pioneering partnership, the Burroughs Wellcome Fund remains committed to the belief that fostering research by the best and brightest scientists offers the fullest promise for improving human health.

REPORT FROM THE PRESIDENT:

Building on the Past, Investing in the Future

By *Enriqueta C. Bond, Ph.D.*

The year 2001 was one of transition and reflection for the Burroughs Wellcome Fund. As the Fund began the process of implementing the restructured programs that resulted from our evaluation in 2000, we reflected on the accomplishments of our long-standing programs and reaffirmed the core principles that provide our distinctive mark as a foundation dedicated to advancing the medical sciences:

- By providing biomedical scientists support that bridges the postdoctoral and early faculty years, BWF fills an unmet need for “risk capital” at a transition point when traditional funding generally is not available. Such funding gives scientists the freedom and flexibility to choose their own research directions and provides them with a stable source of funding while they demonstrate the promise of those new directions to prospective employers and funding agencies. This approach has been shown to have a tremendous impact on the career development of scientists early in their careers. As part of our restructuring, we have made certain that all our programs contain a career development component.
- BWF can help accelerate the development of new directions in science by supporting scientists early in their careers and providing these young scientific leaders with seed capital just as a new field is beginning to emerge. In this way, BWF can have an impact on their individual career development as well as help propel emerging science, particularly in scientific areas that are undervalued or in need of encouragement.

By focusing on these core principles, the Fund is able to leverage our grant dollars and fill a unique niche: opening doors to new areas of research that are considered too risky for public funding agencies.

Such has been our role from the beginning of our 46-year history. Our programs in pharmacology and toxicology reflected both our roots in the pharmaceutical industry and our desire to help build an academic infrastructure for study of the effects of therapeutic drugs and toxic substances in people. As these were nascent fields only 20 years ago, it was with great pleasure that we reflected on the growth and maturation of the pharmacological and toxicological sciences since the Fund first began targeted support to nurture them in their early days.

Now firmly ensconced as distinct scientific disciplines, both pharmacology and toxicology are poised to take full advantage of the dramatic advances in genomic science that are rapidly changing the biomedical research landscape. Our Innovation Awards in Functional Genomics, awarded in 2000, provide nearly \$3 million for research that defines the functions of genes and shows how genes interact within the context of the whole organism. We made 11 awards to scientists or teams of scientists in the United States and Canada to help jump-start the emerging field and encourage novel approaches that have the potential for high impact but might not have been funded through traditional means. These special commemorative awards will not be offered again. However, we recognize that genomic approaches will soon permeate science, and we hope to see proposals that incorporate genomics in our ongoing award programs.

BWF has likewise responded to the emerging opportunities afforded by advancements in interdisciplinary work that combines the physical, computational, and biological sciences. Our Institutional Awards at the Scientific Interface (see grants awarded on p. 41) are helping train the next generation of scientists who will develop novel imaging tools or biosensors, apply nanotechnology to manipulate cellular systems, and apply genomic information to drug development. Since 1996, this program has made 10 awards to colleges and universities that are creating the prototypes for a new kind of graduate and postdoctoral training, one that crosses departmental boundaries and provides much-needed bridges among scientific disciplines.

We enjoyed seeing our investments in the field of malaria research come to fruition in 2001, as scientists agreed that the genome sequence of the malaria parasite, *Plasmodium falciparum*, is complete enough to warrant publication of the data, which is expected in 2002. The BWF-supported PlasmoDB, the malaria sequencing project database, continues to make this resource accessible to researchers who want to access the genomic information. PlasmoDB now includes a database of scientific papers focused on *Plasmodium*. Tools for access to data, including an improved search function, have been installed. A text-searchable database comprising all genes found in the *Plasmodium* sequence also makes it easier for bench scientists to use PlasmoDB and to immediately find genes of interest. A truly international resource, PlasmoDB has already been visited by researchers from more than 60 countries.

While 2001 marked the last year of support for BWF's New Initiatives in Malaria Research Awards, Scholar Awards and New Investigator Awards in Molecular Parasitology, and Scholar Awards and New Investigator Awards in Molecular Pathogenic Mycology, once again our focus is toward the future. Our new program, Investigators in Pathogenesis of Infectious Disease, will encompass our historical interest in supporting underfunded areas of science and our desire to help jump-start promising new avenues of research in host-pathogen interactions (see article on p. 7 for more details).

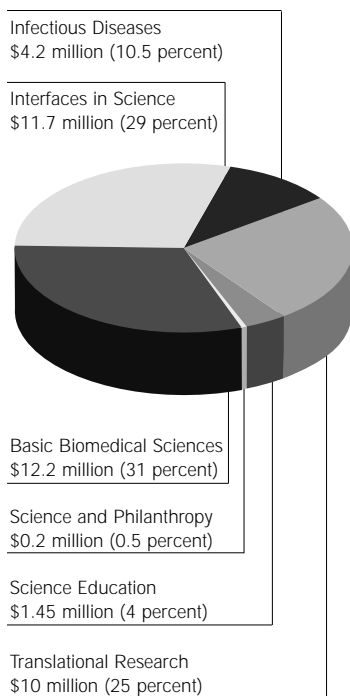
The ongoing Wellcome Trust-Burroughs Wellcome Fund Infectious Diseases Initiative made six awards in 2001 for a total investment of \$6 million in global collaborative research projects in tropical infectious diseases. Launched in 1998, the initiative was established to support trilateral international collaborations among researchers in the United States, the United Kingdom, and developing countries.

Three of the six funded projects propose to study human parasitic worms, another will target drug-resistant tuberculosis, and the others will focus on the role of infectious agents in common intestinal and diarrheal diseases in children. A significant component of the selection process was a demonstrated commitment by the investigators to train scientists on-site in the developing country, increasing the research capacity of scientists in the countries most affected by tropical infectious diseases.

BWF has always believed that to maintain the strength of the biomedical research enterprise, we must build for the future by investing in people. Our longtime board members Drs. George Hitchings and Gertrude Elion, who shared the Nobel Prize in Physiology or Medicine in 1988, maintained that a small amount of money given at the right time to young researchers can have a catalytic effect on their scientific productivity and their careers.

In 2001, we announced Career Awards in the Biomedical Sciences to universities to support 23 women and men who will be among the next generation of scientists to chart the course to a healthier nation and world. Entering its seventh year in 2002, this career awards program has established a reputation for helping scientists early in their careers develop as independent academic research scientists. Our philosophy is that we are funding a person, not just a project. To support this philosophy, BWF's commitment to fostering the careers of our awardees extends well beyond the grant support provided.

**BWF GRANTS APPROVED IN
FISCAL 2001, BY FOCUS AREA
TOTAL = \$39.8 MILLION**



In talking to our awardees, we have found that many are lacking key information about how to handle critical issues as their careers progress. By convening awardees—as we did at our summer 2001 career awards meeting at our headquarters in Research Triangle Park, North Carolina, and our new investigators meeting in Coronado, California—we provide an opportunity to build a network of professional connections that can provide support, advice, and scientific collaborations. In addition, our convocations have as an integral component career sessions, developed with the advice of our awardees, that focus on topics such as negotiating a faculty position, managing a laboratory, setting up a collaboration with another research group, or working with industry.

We have found that career support is critical, in particular, for physician-scientists, given their many clinical obligations that create a real test of commitment to find time for basic or clinical research. The continued decline in the number of physicians who list research as their primary career has prompted several private biomedical research funders, including the Burroughs Wellcome Fund, to seek new avenues, beyond providing grant dollars, to support the clinical research enterprise. In 2001, we redoubled our efforts to support clinical investigators through several venues. We supported Clinical Research 2001, the first joint meeting of the American Federation for Medical Research, the General Clinical Research Center Directors' Association, and the Association for Patient-Oriented Research. We brought together a group of five foundations to provide collaborative support for this meeting.

The Fund also organized, in collaboration with the Juvenile Diabetes Research Foundation International, an informal association of 11 private foundations that have a common interest in strengthening the career development opportunities for physicians interested in pursuing patient-oriented research. We believe that an important role for foundations is to make clear the importance of maintaining both private and public financial support for the career development of patient-oriented researchers. One of the group's first actions was to gather data on the level of commitment made by private funders to the training of clinical investigators in the past five years. That data, shown in the table on page 6, indicated that the level of investment of private foundations in young clinical investigators had tripled since 1997. This information prompted the group to ask the federal funding agencies to provide another critical incentive for new clinical investigators: repayment of their medical school loans.

In addition, I am serving as cochair of the Institute of Medicine's Clinical Research Roundtable, which provides a forum and sponsors workshops for discussion of approaches to resolution of both acute and long-term issues affecting clinical research. Two of the key issues the Roundtable has addressed include: the ability of academic health centers to conduct clinical research and training and the timely incorporation of new research findings into clinical practice.

Just as we have been shaping our role in the biomedical research arena, we have also been increasing our involvement in science education in our home state of North Carolina. Engaging students in hands-on science inquiry has been the primary focus of the BWF science education program since the Fund became an independent private foundation in 1994. During this period, the state has made clear improvements in K-12 education. Yet more can be done, and a number of educational advisers who work with the Fund have pointed to the need for a science, mathematics, and technology champion in North Carolina. In recognition of the neutral role we can play as a convener and galvanizer of people toward a common goal, we took the first steps toward establishing a new organization, which will be a separate, distinct nonprofit entity from the Fund. Its mission will be to improve K-12 performance in science, mathematics, and technology as a means of providing all children in North Carolina with the skills to have successful careers, be good citizens, and advance the economy of the state.

As we look forward to 2002, we will be moving toward a steady state in our grant programs, thereby reaching a more mature phase of our development as an organization. In addition, our endowment was reduced slightly by the worldwide economic downturn in 2001. This overall leveling off means that our staff will be refocusing their efforts toward broadening the range of support we offer our existing awardees. In addition, we will be evaluating the effectiveness of our grants to ensure we are making the best use of limited grant dollars. We will be looking forward to the opportunity to having a more open dialogue with our awardees, to learn of their struggles and accomplishments, and to seek new ways to help them succeed. By learning from those who are on the front lines in biomedical research, we can then help pave the way for laboratory and clinical advances that will ultimately improve human health and the quality of our lives.

Collective Investment of 11 Private Organizations² in the Training and Career Development of Physician-Scientists in Clinical Research¹

CAREER LEVEL	Number of new awards made annually	Total number of individuals supported 1997-2001	Annual financial commitment (in millions)	Total financial commitment 1997-2001 (in millions)
Medical Students				
Prior to 1997	100		\$ 3.4	
Since 1997	43		\$ 1.5	
Subtotal	143	530	\$ 4.9	\$ 18.9
Fellows and Residents				
Prior to 1997	153		\$ 20.1	
Since 1997	5		\$ 3.0	
Subtotal	158	574	\$ 23.1	\$ 64.1
New Investigators				
Prior to 1997	61		\$ 9.5	
Since 1997	92		\$ 20.2	
Subtotal	153	361	\$ 29.7	\$ 82.6
Mid-Career Investigators				
Prior to 1997	10		\$ 4.0	
Since 1997	20		\$ 16.8	
Subtotal	30	113	\$ 20.8	\$ 79.1
TOTALS	484	1578	\$ 78.5	\$ 244.7

¹ Organization staff provided data on support for clinical research award programs at each career level. Programs shown include only those that are considered responsive to the CRP definition of "clinical research," and do not include all of the programs in the organizations' portfolios. Data considered accurate as of July 12, 2001.

² Participating organizations include: American Cancer Society, American Diabetes Association, American Heart Association, Arthritis Foundation, Burroughs Wellcome Fund, Damon Runyon-Walter Winchell Cancer Research Fund, Doris Duke Charitable Foundation, Howard Hughes Medical Institute, Juvenile Diabetes Research Foundation International, Leukemia and Lymphoma Society, and Robert Wood Johnson Foundation.

TAKING A LONGER VIEW:

Reorienting the Fund's Investments in Infectious Diseases

By Victoria McGovern, Ph.D., program officer for infectious diseases

Sir Henry Wellcome, who cofounded the pharmaceutical enterprise that ultimately gave rise to the Burroughs Wellcome Fund, had a passionate interest in the infectious diseases, especially those of the tropics. He acted on it. His concern with easing human suffering led him to finance laboratories in Africa and Great Britain dedicated to the study of tropical infectious diseases. Building on Sir Henry's interests, BWF has long focused significant resources on understanding the inner workings of the organisms that infect humans. So far, the Fund has invested more than \$20 million in this critical research area.

From the mid-1950s through the 1960s, BWF provided grants to the American Foundation for Tropical Medicine to support research at the Liberian Institute, in Harbel, Liberia, West Africa. These grants were targeted toward achieving a better understanding of river blindness, a debilitating disease that today is well controlled. Other BWF grants supported the institute's work on malaria, schistosomiasis, trypanosomiasis, and filariasis. In the same period, BWF supported training for medical students in pathology and parasitology, providing opportunities for them to study parasitic diseases in the Caribbean, Africa, India, South America, and Taiwan. BWF also supported, later in our history, programs to bring medical care to regions where tropical diseases are endemic. At the same time, we sponsored externally managed programs including the Burroughs Wellcome Fund Fellowships in Infectious Diseases, which supported young physicians, and the New Investigator in Virology awards, which supported basic research by assistant professors.

This work, like much of the historical work on the infectious diseases, was largely phenomenological—that is, describing the nature of diseases rather than exploring specific biological questions. The molecular biology revolution of the late 1970s changed research in infectious diseases, enabling scientists to understand at the molecular level how disease-causing processes work.

As we entered the 1980s, the Fund evaluated progress in molecular approaches to research and decided to ramp up our investment in infectious diseases research. Studies of the difficult to manipulate eukaryote pathogens—the parasites and fungi—lagged behind work in the more easily propagated bacteria and viruses. The slow start of molecular biology in the parasites was especially troubling, since parasitic infections such as malaria, leishmaniasis, and Chagas' disease—all of them disproportionately infecting poorer geographic regions—are among the world's most deadly and debilitating diseases. For this reason, the Fund's internally managed infectious diseases program, launched in 1981, was fully focused on one thing: attracting visionary researchers with excellent skills to bring the then-new molecular biology to the study of the tropical diseases that had so moved Henry Wellcome when he witnessed their human toll. At launch, the BWF Scholar Awards in Molecular Parasitology program supported senior researchers with five-year grants of \$250,000—nearly \$500,000 in 2001 dollars.

Twenty years later, a new revolution is dramatically changing science's capacity to understand how disease works. In 2001, the sequencing of the human genome was completed, bringing researchers much closer to reading the rules by which our bodies operate. But scientists still are far from understanding these rules. Genomic sequencing and the approaches to understanding gene function that derive from it are changing how science approaches questions central to understanding sickness and health. It is becoming possible to study the whole of human health in ways not dreamed of even a decade ago. Over the next few years, genomic and post-genomic experiments that discover genes, match them to their protein products, and match these products to the mechanics of living organisms will dramatically shift the "starting line" for understanding what goes wrong when we get sick and for unraveling the mysteries of how infectious agents exploit our bodies for their own ends.

As these new approaches develop, they will affect the spectrum of human health, but understanding the entities that cause infection must remain a top priority. Infectious diseases kill more than 13 million people worldwide each year, half of them children younger than five years old. Curing, controlling, or eliminating deadly acute infections will dramatically improve the lives of countless people. In recent years, research has shown new links between infectious agents and maladies such as cancer, peptic ulcer, and neuromuscular and heart diseases, which in earlier days were thought to arise from lifestyle factors and metabolic aberrations. In addition, a better understanding of infectious diseases is now seen as central to approaching other chronic health problems that have not yet been linked to infectious agents.

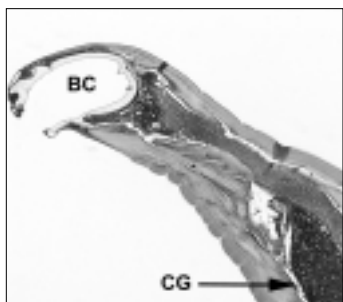
New challenges beckon, but some older ones remain. Antibiotic resistance is on the rise among infectious organisms of all kinds, threatening to wipe out the previous generation's advances against disease. Developing new antibiotics, new vaccine strategies, new drug targets, and new insights into how to keep people from getting sick in the first place has become more important than ever.

The Fund's philosophy has always been that the most effective use of our limited grant dollars is to use them as a catalyst that will open up new routes to innovation. In 2001, we have reoriented our spending in infectious diseases to better meet this goal.

BWF's approach in infectious diseases has been oriented toward helping strengthen the careers of scientists within specific, limited fields (first in parasitology, and then later in mycology) and toward recruiting strong researchers from other areas to bring new insights and new approaches to studying these pathogens. Going forward, we will use the career development approach to encourage the development of researchers at the interface between human and pathogen biology.

Investigators in Pathogenesis of Infectious Disease, a new program launched in 2001, is a career development program that will encourage investigators early in their careers to pursue emerging avenues of research. To take advantage of recent developments in genomics, immunology, and other areas, the program will provide researchers at the assistant professor level an opportunity to bring aggressive, multidisciplinary approaches to investigating infectious disease.

The program will sponsor work focused on the host, as well as the host-pathogen interaction in viral, bacterial, fungal, or parasite systems, in an effort to understand how these organisms interact with the host. Awards in this program will give recipients the freedom and flexibility to pursue new avenues of inquiry and higher-risk research projects that hold potential for bringing about significant advances in the biochemical, pharmacological, immunological, and molecular biological understanding of how infectious agents and the human body interact.



Giving hookworms the hook

Hookworm infection is a major cause of anemia and malnutrition in many developing nations, with global estimates of infection at 1 billion people. Dr. Michael Cappello of Yale University School of Medicine, a 1999 New Investigator in Molecular Parasitology, is working to uncover the chemical and biological factors that enable the hookworm to cause anemia. Using models of animal and human hookworms of the genus *Ancylostoma*, shown here, he is working to develop a vaccine that will prevent anemia and growth delay in children and adults with chronic infection.

Work in this area can take many forms, but some potential frameworks for proposals include:

- Studies of cell-pathogen interactions. This may include studies of host cell responses at the cell surface, cell signaling in response to infection, microbial persistence in host cells, and other processes occurring at the level of the host cell.
- Studies of host-pathogen interactions. This may include studies of how the host's genes influence resistance to and susceptibility to infectious disease, as well as studies of innate and adaptive immune responses to infectious agents and pathogen modulation of the immune system.
- Studies of novel routes to disease causation in humans. These may include studies of the role of infectious agents in causing chronic diseases (e.g., heart disease) and as triggers of immunologic and autoimmune disease.

Studies of what makes humans susceptible to particular diseases will fit into this program, as will studies of human resistance to diseases. In keeping with the Fund's interest in concentrating our support on research in underserved fields, the program will have a particular interest in work on under-studied infectious diseases, including those caused by pathogenic fungi, metazoan parasites, and emerging virus pathogens.

The Investigators in Pathogenesis of Infectious Disease program is now the only BWF competitive award program specifically focused on funding investigator-initiated research in infectious disease. It supersedes several programs, including the New Investigator and Scholar Awards in Molecular Pathogenic Mycology, New Investigator and Scholar Awards in Molecular Parasitology, and New Initiatives in Malaria Research awards. It does not replace these programs so much as it helps to move them forward, closer to the ultimate goal of understanding how humans and their pathogens coexist, in hope of some day eliminating the effects of infectious diseases.

The program is intended to help shed light on the overarching issues of how the human host handles infectious challenges. And, of course, the program has an important second goal: to foster and build the careers of researchers who will move infectious disease research toward Henry Wellcome's goal of alleviating human suffering.

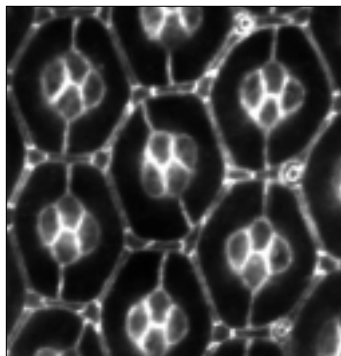
OVERVIEW OF BWF PROGRAMS

In fiscal 2001, the Burroughs Wellcome Fund approved \$39.8 million in new grants and paid out \$34 million in new and continuing grants. We supported a total of more than 600 grants at 170 academic and other nonprofit institutions across the United States and Canada. More than 90 percent of these grants are intended to support the research of scientists who were nominated by their institutions, which receive and administer the grants.

"It's very competitive out there; good faculty positions are few and far between. This award gives me a lot of negotiating possibilities."

— Bryan Sutton, Ph.D.,

2000 Career Award in the Biomedical Sciences recipient



In a fly's eye

Using time-lapse microscopy, Dr. Carrie Baker Brachmann of University of Washington School of Medicine, a 2001 Career Awardee in the Biomedical Sciences, studies the mechanism by which a fly's cells form and then selectively die off, creating the precise patterning of the adult fly's eye. The fly is a good model for understanding how many tissues in developing organisms are shaped by the programmed death of unnecessary cells.

Basic Biomedical Sciences

Encouraging academic research careers

Creating confidence. Encouraging freedom of exploration. Boosting career prospects. These are the goals of the Career Awards in the Biomedical Sciences program.

Launched in 1995, the career awards program seeks to identify highly talented biomedical scientists during their formative periods and provide them the support they need to become independent investigators. To date, we have awarded more than \$70 million to support 148 U.S. and Canadian scientists.

BWF's career awards are made in honor of Dr. Gertrude B. Elion (1918-99) and Dr. George H. Hitchings (1905-98), two pioneering scientists who played major roles in the Fund's history. Dr. Elion served on our Board of Directors from 1991 to 1999, and Dr. Hitchings served as our president from 1974 to 1990. Among their numerous professional honors, Dr. Elion and Dr. Hitchings shared the 1988 Nobel Prize in Physiology or Medicine for a series of scientific breakthroughs that revolutionized the world of drug design.

The grants offers five years of salary and research support for biomedical scientists during their advanced postdoctoral training and initial faculty years. Each year, we award 20 or more grants of \$500,000 each to degree-granting institutions in the United States and Canada on behalf of individual scientists. Complete program information can be found on our Web site at www.bwfund.org.

The 23 grantees who received career awards in 2001 are working across a broad range of disciplines. For example, Stanford University's Karen Guillemin, Ph.D., is conducting experiments on the bacterium *Helicobacter pylori*, which has been linked to stomach ulcers and stomach cancer, the second leading cause of cancer deaths worldwide, while Kathleen Caron, Ph.D., of the University of North Carolina-Chapel Hill, will examine the role of a protein, adrenomedullin, that has been found in high levels in patients with cardiovascular disease resulting in high blood pressure.

After six years of funding the research of scientists as they make the transition from postdoctoral fellow to assistant professor, the Fund has gathered enough data to begin to evaluate the impact of this popular competitive award program. We are proud of the fact that virtually all awardees who have become eligible for faculty appointments have received tenure-track or equivalent positions, with start-up packages averaging just over \$450,000 for those obtaining faculty positions in 2000.

Surveys of awardees show that most say their career award helped "a great deal" in obtaining and shortening the time to a faculty position, increasing subsequent success in obtaining grant support, and increasing their independence and ability to do "higher-risk" research.

As shown on this page, career awardees have been successful in obtaining follow-on support for their work. However, the evaluation data, which will be published in their entirety in 2002, do not indicate how awardees fare in relation to those applicants who did not get an award. To address this issue, in 2002 the Fund will undertake a controlled study of selected outcomes that compares those who received an award to those who applied, but did not receive an award. These data, which BWF intends to publish, will be used to help determine if we are doing a good job in selecting grant recipients. It will be one of the first such comparative studies carried out by a private funding agency, and its results will guide BWF's future selection processes.

Our evaluation program is simply an extension of the Fund's philosophy that fostering the careers of our awardees extends well beyond the grant support provided. In addition to providing funds, we seek to provide opportunities, such as awardee meetings, to help build a network of professional connections that can provide support, advice, and opportunities for scientific collaboration. All but three of the 48 award recipients in 2000 and 2001 attended the 2001 career awardee meeting, held at BWF headquarters in Research Triangle Park, North Carolina, along with several BWF board members, staff, and former career awardees. The awardees gathered to present their BWF-sponsored work and to network with each other, the board, and staff. The two-day meeting provided a chance to explore critical career development topics, such as how to negotiate a faculty position, lab management, dual-career couples, and seeking federal grant support.

The Fund also awarded BWF Research Travel Grants to 39 U.S. and Canadian researchers to enable them to visit colleagues in the United Kingdom or Ireland for shorter periods (two weeks to six months). The grants support collaboration on research projects or the learning of new research techniques. This round of grants, awarded in February 2001, was the last BWF will make in this program.

Infectious Diseases

Building a stronger scientific base

Five BWF programs in infectious diseases—Scholar and New Investigator Awards in Molecular Parasitology, Scholar and New Investigator Awards in Molecular Pathogenic Mycology, and New Initiatives in Malaria Research—ran their final award cycles in 2001. These programs have focused on establishing a foundation of knowledge that will shift the balance toward more effective treatments for endemic and epidemic infectious diseases.

In 2001, BWF made two scholar awards and three new investigator awards to scientists working in molecular parasitology, and one scholar award and three new investigator awards to scientists working in molecular pathogenic mycology. The awards are intended to encourage scientists to use modern techniques from molecular biology, biochemistry, immunology, pharmacology, and genetics to advance fundamental knowledge of virulent disease-causing parasites and fungi.

The New Initiatives in Malaria Research awards are intended to attract investigators, often from other fields, to work on malaria, encouraging them to bring novel approaches to the study of the disease and the vectors that spread it. This year, seven researchers shared six awards.

Additional Research Funding Obtained by Career Awardees in Faculty Positions* (Total annual direct costs in FY 2000)

Median	\$183,995
Mean	\$212,725
Range	\$13,200-\$635,000
Respondents	46

*Includes awardees who were in faculty positions for seven or more months.

NIH Grants of Career Awardees in Faculty Positions* (Awardees with one or more R01 or R29 grants)

	Total		
	N	%	N
PH.D. only	12	33	36
M.D. & M.D.-Ph.D.	14	56	25
Total	26	43	61

*Includes awardees who were in faculty positions for seven or more months.

"No amount of reading or course work can replace working side-by-side with biologists."

— Stephen Kron, M.D., Ph.D.,
program director,
Cross-Disciplinary Training Program
in Biophysical Dynamics,
University of Chicago

BWF continues to support two training courses, conducted at the Marine Biological Laboratory in Woods Hole, Massachusetts, that are focused on training researchers to work in parasitology and mycology. The courses are tailored to provide advanced independent investigators, graduate students, and postdoctoral fellows with practical laboratory skills, pedagogical lectures, research seminars, and informal interactions with top researchers in these fields.

The international effort to sequence the genome of *Plasmodium falciparum*, the most dangerous form of the parasite that causes malaria, has made large strides, with completion of the genome expected by 2002, one year earlier than predicted in last year's annual report. The project is supported by BWF, the Wellcome Trust, the National Institute of Allergy and Infectious Diseases, the Department of Defense, and the World Health Organization. Another BWF investment supports the development of the project's database, PlasmoDB, which brings together all of the information generated by the project and provides the research community with on-line tools for analyzing the data.

Interfaces in Science

Erasing boundary lines among disciplines

Young, talented, and ambitious scientists from many physical science disciplines and mathematics are being drawn into biology by the prospect of unraveling, understanding, and predicting the design and behavior of living systems. Scientists from these theory-rich areas are beginning to realize that the opportunity to make a significant contribution to a new frontier of science is well within their reach.

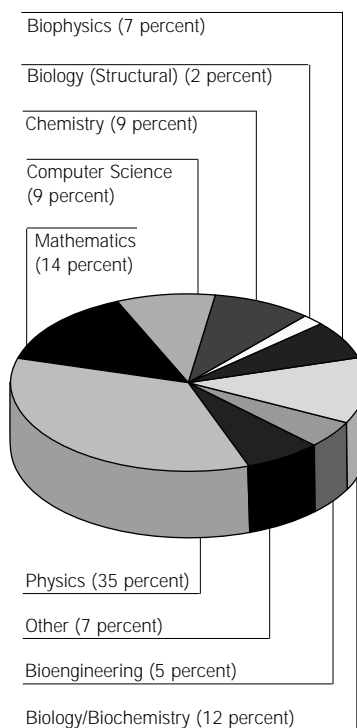
BWF recognizes that in order for these scientists to make the transition to studying biological systems, a new type of training must be available to them. Since 1996, BWF has committed \$24 million to our Institutional Awards at the Scientific Interface program. The only organizational requirement imposed by BWF is that programs are to be directed by pairs of scientists, one with a background in biology and one with a background in a physical, theoretical, or computational discipline. None of the 10 currently funded programs is organized in precisely the same way, but rather each capitalizes on its own unique scientific strengths, institutional capabilities, and inter-institutional connections.

In 2001, four awards were made: Boston University, which received \$1.75 million; and Princeton University, the University of Chicago, and the University of California-San Francisco, which each received \$2.5 million.

The training program at Princeton University is directed by John Hopfield, Ph.D., professor of molecular biology, and Simon Levin, Ph.D., George M. Moffett Professor of Biology. This program, which exemplifies the type of research funded by the interfaces institutional awards, will challenge physical scientists to apply their training in complex system modeling to understand the behavior of biological systems. The program will offer graduate students the opportunity to receive training in the emerging field of biological dynamics.

In 2001, BWF launched a new individual award program to complement our institutional award program: Career Awards at the Scientific Interface. This program will provide each award recipient with up to \$538,000 over five years to support up to two years of advanced postdoctoral training and the first three years of a faculty appointment. Modeled after our Career Awards in the Biomedical Sciences, these awards

PH.D. BACKGROUND OF POSTDOCTORAL TRAINEES (from six BWF Interfaces training programs awarded in 1996 and 1998)



are open to scientists who have earned a doctoral degree in one of the physical sciences and are working on biological research problems. We believe that by offering these uniquely trained individuals independent funding during their postdoctoral training, their value will be affirmed and they will be more attractive to future employers. Indeed, many top-tier research universities are actively recruiting faculty with interdisciplinary credentials.

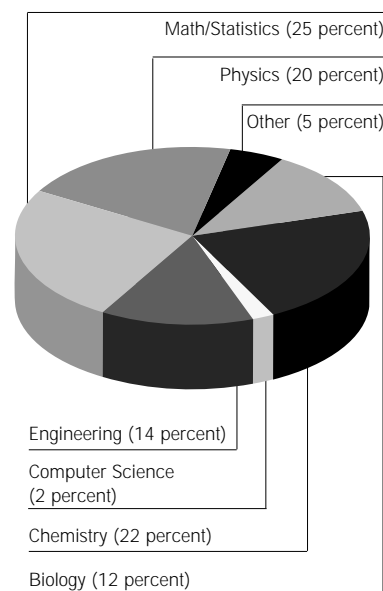
As part of BWF's increased emphasis on evaluation of our programs, we have implemented a yearly on-line progress-reporting system and anonymous on-line survey of trainees in the interfaces programs. We designed the trainee survey to be anonymous so that people would feel free to be completely open and honest about the quality of their training experience. We liken the survey to an "electronic interview," in which we can gather information and feedback for course and program directors that will help ensure continual improvement of this entirely new type of interdisciplinary training. In July 2001, we surveyed 100 pre- and postdoctoral trainees now enrolled in the interfaces programs. The figures on pages 12 and 13 are based on these surveys and show the distribution of academic backgrounds of the trainees who received support in 2001.

We found that many of the trainees, who as mathematicians or computer scientists had never done an experiment, valued the opportunity to work in a laboratory alongside biologists. In the words of one trainee from the Computational Molecular Biology program at the California Institute of Technology, "The program gave me the chance to walk into a biology lab, with almost no background, and start doing experiments immediately."

Trainees said they feel that they are not only learning to understand biology, but also learning how to identify important questions in biology. BWF fellows in these programs are given many opportunities to present their work, both orally and in writing, and thus are developing the communication skills needed to succeed as interdisciplinary researchers. Fully 75 percent of these fellows report that they intend to pursue careers in academia, and the early indications are that they have no problem landing faculty positions in top research universities. Of the program "alumni" who were supported as postdoctoral fellows during the past four years, 37 percent are already in tenure-track positions. In some cases, fellows move directly from graduate school into faculty positions because their talent is so rare.

One trainee from the La Jolla Interfaces in Science Training Program summed up his experience this way: "My willingness to pursue interactions with and training in a biological field was one of the aspects of my work that seemed to most impress interviewers during my job interviews. This focus on 'interdisciplinary' may have been the deciding factor for the institutions for which I received job offers."

UNDERGRADUATE DEGREES OF PREDOCTORAL TRAINEES
(from six BWF Interfaces training programs awarded in 1996 and 1998)



Translational Research

Advancing medicine in the lab and at the bedside

From our genesis as a corporate philanthropy, BWF has made support of physician-scientists a cornerstone of our grant-making strategy. Our long-standing commitment to experimental therapeutics and to clinical pharmacology has matured into our current emphasis on bolstering the careers of clinical investigators in a variety of fields. The Fund has been at the forefront both in drawing attention to the specific needs of the patient-oriented researcher and in providing direct financial support for established clinical investigators through our Clinical Scientist Awards in Translational Research program.

Over its four-year history, this program has undergone a steady evolution as the scientific advisory committee has honed its vision of what can be considered “translational research.” The program now targets investigators who are on the brink of translating basic science findings into a potential clinical application, as well as those whose clinical insight invites laboratory investigation of potential therapeutic avenues. Despite the critical contribution to medicine of these types of investigations, there are few nonprofit sources of support for translational research. Many physician-scientists recognize that a more straightforward path to a successful career can be had if their research is confined to the laboratory, where significant research results are not as hard-won as they are in the clinic. Those who wish to pursue patient-oriented research face many disincentives in academic health centers, and as a result fewer new graduating medical students are interested in these careers.

This is one of the reasons that BWF’s awards are targeted at the mid-career, rather than new investigator level. In addition to promoting scientific excellence, BWF seeks to identify the “mentor phenotype,” or those investigators who have a track record of attracting young talent into their laboratories. These awards are designed to increase the capacity of these proven, enthusiastic mentors, so that the careers of more physician-scientists may be directed into patient-oriented research. With the addition of the latest cohort of awardees in 2001, BWF currently supports 39 investigators who are collectively mentoring more than 125 physician-scientists at various training levels.

BWF has become more active during the past year in initiating discussions among a group of 11 private organizations whose interests in the career development of patient-oriented researchers overlap with our own, as highlighted in this year’s president’s message (see p. 5). The sharing of program data and strategies among the group has enabled the organizations to better target their initiatives to the needs of young clinical investigators, and has engendered a fuller commitment to collaboration without sacrificing each organization’s distinctive mission.

Five of the organizations in the group collaborated to fund Clinical Research 2001, a joint meeting organized by the American Federation for Medical Research, the Association for Patient-Oriented Research, and the General Clinical Research Center Program Directors’ Association. Held in Washington, D.C., in March 2001, the meeting attracted more than 300 participants, including 53 trainees from institutions across the United States and Canada. This foundation-catalyzed association of five professional societies is now well positioned to make a greater collective impact on the issues that prevent potential clinical researchers from entering these careers. In the coming year, BWF looks forward to working to strengthen this alliance of associations and foundations.

“I think is very important that we as researchers realize that the work that we are doing goes beyond our own ego and has potential application to real human problems.”

— Joyce Slingerland, M.D., Ph.D.,
assistant professor of medicine,
University of Toronto Faculty
of Medicine, and 1998
Clinical Scientist Award in
Translational Research recipient

BWF's current focus on translational research builds on our strong tradition of supporting the fields of toxicology and pharmacology, dating back to our origins as a corporate foundation. In recent years, more and more of the Fund's support of these areas has gone to researchers working in areas that integrate biology with the physical sciences. Recognizing the shift in scientific focus taking place, the Fund decided to shift resources from the New Investigator Awards in the Pharmacological and Toxicological Sciences into the Fund's Interfaces programs, which directly target physical scientists and encourage them to work on biological problems. This year, 10 basic scientists at the beginning stages of their faculty careers received the final BWF New Investigator Awards in the Pharmacological or Toxicological Sciences.

Science Education

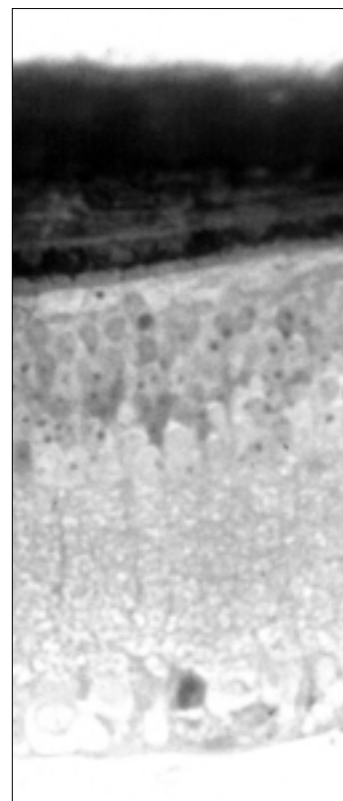
Reaching out to students, teachers, and policymakers

Scientific discovery and technology innovations are needed to solve many of the world's problems, such as feeding and providing energy to a growing population, improving human health, and protecting the environment. Technological innovation as the engine of economic growth creates jobs, builds new industries, and improves people's standard of living. These innovations affect everyone's daily lives in ways that we now take for granted, such as banking or grocery shopping.

BWF believes that in order for students to realize their full potential within a technological society, they must possess the knowledge and skills needed to prepare for the high-technology jobs of the future, to become leaders in scientific research, and to participate in the global economy.

Although the issues are global, the Fund has chosen to focus our efforts in science education in our home state of North Carolina. We first established the Student Science Enrichment Program (SSEP) in 1994 to provide middle school and high school students with science-rich activities outside the traditional classroom environment. BWF has invested more than \$7 million through the SSEP, reaching more than 23,000 students through programs offered by 36 different organizations. SSEP's goals are to nurture students' enthusiasm for science, improve their competence in science, and encourage them to pursue careers in research or other science-related disciplines. In 2001, BWF awarded \$1.1 million to nine organizations across the state that will offer activities centered around solving problems, thinking critically, learning the scientific method through hands-on science inquiry, and using technology.

Recognizing the need to do more to improve the way science, mathematics, and technology are taught and learned in North Carolina, BWF partnered with the North Carolina Public School Forum to establish an Institute for Educational Policymakers in 1996. The goal of the institute is to build the capacity of and relationships among legislators, State Board of Education members, K-12 education leaders, business leaders, and members of the media who cover education. The institute has exposed education policymakers to a wide array of educational "best practices," and this exposure has translated in several instances into new initiatives. In addition, there has been a dramatic improvement in working relationships among education policymakers from differing political parties and those individuals serving in various legislative branches or appointed governing boards. Local capacity-building programs for school board members have been modeled after the institute and are now running in the state's largest school systems. A reference manual developed by the institute, *Primer on Educational Policy* (collaboration among the Forum, East Carolina University, and McGraw Hill Publishers), will soon be published as a textbook for use in Schools of Education at North Carolina universities. Other states, most notably Georgia and Kentucky, have examined the institute's work and are beginning similar programs.



Seeing the light

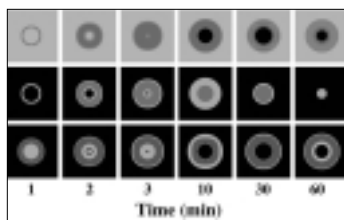
Retinitis pigmentosa (RP) is an inherited disease in which the light-sensitive portion of the eye, the retina, slowly degenerates, leading to blindness. One in 80 Americans is a carrier for RP. Dr. Stephen Tsang, of the Jules Stein Eye Institute at the University of California-Los Angeles School of Medicine, studies defects within a mouse's eye (shown here). Dr. Tsang, a 2001 Career Award in the Biomedical Sciences recipient, hopes that his studies, conducted in Dr. Debora Farber's laboratory, will provide clues to new therapies for RP, macular degeneration, and other degenerative diseases of the retina.

In 2001, an international exchange program developed by the institute enabled education leaders to travel to the Netherlands to visit schools, meet students, and converse with teachers and administrators. The primary purpose of the trip was to review methods and practices used in science and mathematics education in order to better understand the reasons students in other countries, including the Netherlands, consistently score better on performance tests than do U.S. students.

When scientists are asked where they first became interested in science, many say it happened while visiting museums as children. Thus, reaching the museum community is an important goal for BWF. In 2000, the Fund provided a grant to the science museum community in North Carolina to establish the Grassroots Science Museum Collaborative, which is the first such collaborative in the United States. The collaborative coordinates the activities of 19 science museums across the state and integrates these efforts with school activities to better reach not only children, but also teachers, parents, and grandparents.

In 1995, the North Carolina Public School Forum published a report titled “The State of Disconnectedness: An Examination of Mathematics and Science Instruction in the North Carolina Public Schools,” which showed that poor communication and disconnected, isolated science education initiatives hamper efforts to improve science, mathematics, and technology education in the state. In 2001, BWF responded by establishing a neutral, nonprofit entity to function as a science, mathematics, and technology education champion for North Carolina. By developing collaborative partnerships among those responsible for and interested in promoting science education, BWF hopes to move the state from isolated model programs to an integrated strategy that will provide high-quality science education for all of the state’s students.

In a world filled with products of scientific inquiry, scientific literacy has become a necessity for everyone. We all need to be able to use scientific information to make choices that arise on a daily basis. At the Fund, we believe everyone deserves to share in the excitement and personal fulfillment that can come from understanding and learning about the natural world, and we hope that through our efforts, we will help make science literacy a reality for all students.



Math test

Cells are highly regulated subunits of every tissue in the human body. One of the ways that cells communicate is by direct contact, in a so-called synaptic junction. Dr. Jay Groves of the University of California-Berkeley, a 2000 BWF Career Award in the Biomedical Sciences recipient, is studying the physical patterns of proteins at the synaptic junction between two immune system cells as they communicate, shown here as a visual representation of a mathematical model.

REPORT ON FINANCE

The Burroughs Wellcome Fund's investments totaled \$639.6 million at August 31, 2001, the end of our fiscal year. BWF's primary financial goal is to pursue an investment strategy that will support annual spending needs and maintain a constant real level of assets over the long term. To achieve this goal, a very high percentage of our investments is placed in strategies that derive the bulk of their returns from exposure to U.S. and international capital markets. Hence, fluctuations in BWF's investment results will be due largely to variability in capital market returns.

BWF's investment policies are developed with the recommendations and review of the Investment Committee, which is appointed by and reports to BWF's Board of Directors. The committee, which meets three times a year, has seven voting members, including four representatives from outside BWF and three representatives of our board. The board's chair, BWF's president, and BWF's vice president for finance also serve on the committee as nonvoting members.

As part of BWF's investment strategy, we have established "allocation targets"—that is, percentages of our total assets to be invested in particular asset classes. Investment managers hired by BWF pursue more focused mandates within each sector. As of the end of the fiscal year, BWF's asset mix and market values were:

- U.S. large capitalization equity assets had a market value of \$179.9 million. The sector's target allocation was 31 percent, and actual holdings stood at 28.1 percent.
- U.S. small capitalization equity assets had a market value of \$91.5 million. The sector's target allocation was 14 percent, and actual holdings stood at 14.3 percent.
- International equity assets had a market value of \$160.9 million. The sector's target allocation was 30 percent, and actual holdings stood at 25.2 percent.
- Fixed income assets had a market value of \$158.3 million. The sector's target allocation was 22 percent, and actual holdings stood at 24.7 percent.
- Cash equivalent assets had a market value of \$10.9 million. The sector's target allocation was 3 percent, and actual holdings stood at 1.7 percent.
- Alternative assets had a market value of \$38.1 million. The sector did not have a target allocation, and actual holdings stood at 6 percent. The maximum permitted allocation to alternative assets stood at 8 percent.

The total market value of BWF's investments decreased by \$124.1 million, or 16.2 percent, from the end of the previous fiscal year. This large decrease in assets was due primarily to poor returns in world equity markets over the course of the fiscal year. BWF's total investment return for the fiscal year was -11 percent. The two sectors that drove this result were the international equity sector, which posted a return of -25.4 percent for the fiscal year, and the U.S. large capitalization equity sector, which had a -17.1 percent return. U.S. small capitalization equities had an -8.2 percent return, while fixed income produced a 13.7 percent result.

As of August 31, 2001, BWF employed 11 investment managers. In the U.S. large capitalization equity sector, the managers were Independence Investment Associates; Westpeak Investment Advisors; and Cohen, Klingenstein and Marks. Credit Suisse Asset Management; Kennedy Capital Management; and Scudder Kemper Investments managed U.S. small capitalization equities. Pacific Investment Management Company and Smith Breeden Associates were the fixed income managers. Capital Guardian Trust Company and Hansberger Global Investors managed international equities. State Street Global Advisors managed a hedge fund. BWF also held investments in six venture capital funds: Intersouth Partners IV and V, the Spray Venture Fund, Mission Ventures II, the North Carolina Bioscience Investment Fund, and Tech Amp II.

Finally, the increase in the allocation to alternative investments from that of August 2000 was mainly the result of a December 2000 investment in a fund of approximately 20 alternative investment strategies overseen by Quellos Capital Management. This fund expects to generate equity-like returns over time without systematic exposure to returns in world capital markets. To the extent this strategy helps reduce the variability of BWF's investment returns through time, year-to-year grant and operating expense payout will be easier for BWF to manage.

FINANCIAL STATEMENTS AND ADDITIONAL INFORMATION

Report of Independent Accountants

To the Board of Directors of
The Burroughs Wellcome Fund

In our opinion, the accompanying statements of financial position and the related statements of activities and of cash flows present fairly, in all material respects, the financial position of The Burroughs Wellcome Fund (the "Fund") at August 31, 2001 and 2000, and the changes in its net assets and its cash flows for the years then ended in conformity with accounting principles generally accepted in the United States of America. These financial statements are the responsibility of the Fund's management; our responsibility is to express an opinion on these financial statements based on our audits. We conducted our audits of these statements in accordance with auditing standards generally accepted in the United States of America, which require that we plan and perform the audit to obtain reasonable assurance about whether the financial statements are free of material misstatement. An audit includes examining, on a test basis, evidence supporting the amounts and disclosures in the financial statements, assessing the accounting principles used and significant estimates made by management, and evaluating the overall financial statement presentation. We believe that our audits provide a reasonable basis for the opinion expressed.

Our 2001 audit was conducted for the purpose of forming an opinion on the basic financial statements taken as a whole. The information presented in Schedule I is presented for purposes of additional analysis and is not a required part of the basic financial statements. Such information has been subjected to the auditing procedures applied in the audit of the basic financial statements and, in our opinion, is fairly stated in all material respects in relation to the basic financial statements taken as a whole.

PricewaterhouseCoopers LLP

Raleigh, North Carolina
October 5, 2001

Statements of Financial Position

August 31, 2001 and 2000

(All dollar amounts presented in thousands)

	<u>2001</u>	<u>2000</u>
ASSETS		
Cash and cash equivalents	\$ 44,825	\$ 33,473
Marketable securities	635,880	781,162
Accrued interest and dividends receivable	2,156	2,480
Federal excise tax receivable	1,403	-
Other assets	<u>22</u>	<u>31</u>
Total current assets	684,286	817,146
Property and equipment, net	<u>14,590</u>	<u>14,999</u>
Total assets	<u>\$ 698,876</u>	<u>\$ 832,145</u>
LIABILITIES AND NET ASSETS		
Transactions payable, net	\$ 42,544	\$ 52,425
Accounts payable and other liabilities	960	1,064
Unpaid awards	78,888	70,028
Deferred federal excise tax liability	<u>-</u>	<u>1,985</u>
Total liabilities	122,392	125,502
Commitments and contingencies (Note 6)		
Unrestricted net assets	<u>576,484</u>	<u>706,643</u>
Total liabilities and net assets	<u>\$ 698,876</u>	<u>\$ 832,145</u>

The accompanying notes are an integral part of these financial statements.

Statements of Activities

Years Ended August 31, 2001 and 2000

(All dollar amounts presented in thousands)

	<u>2001</u>	<u>2000</u>
Revenues:		
Interest and dividends, less investment expenses of \$4,254 and \$3,627 in 2001 and 2000, respectively	\$ 14,848	\$ 16,423
Net realized gain on sales of marketable securities	3,654	99,422
Total revenues	<u>18,502</u>	<u>115,845</u>
Expenses:		
Program services	42,655	39,223
Management and general	4,960	4,799
Total expenses before federal excise tax	<u>47,615</u>	<u>44,022</u>
Net unrealized (depreciation) appreciation of marketable securities, net of (benefit from) provision for deferred federal excise taxes of \$(1,985) and \$406 in 2001 and 2000, respectively	(102,449)	19,805
Federal excise tax benefit (expense)	<u>1,403</u>	<u>(2,155)</u>
Total net (depreciation) appreciation and federal excise tax benefit (expense)	(101,046)	17,650
Change in net assets	(130,159)	89,473
Net assets at beginning of year	<u>706,643</u>	<u>617,170</u>
Net assets at end of year	<u>\$ 576,484</u>	<u>\$ 706,643</u>

The accompanying notes are an integral part of these financial statements.

Statements of Cash Flows

Years Ended August 31, 2001 and 2000

(All dollar amounts presented in thousands)

	<u>2001</u>	<u>2000</u>
Cash flows from operating activities:		
Change in net assets	\$ (130,159)	\$ 89,473
Adjustments to reconcile change in net assets to net cash (used in) provided by operating activities:		
Depreciation	730	517
Net realized gain on sales of marketable securities	(3,654)	(99,422)
Net unrealized depreciation (appreciation) of marketable securities	104,434	(20,211)
(Benefit from) provision for deferred federal excise taxes	(1,985)	406
Awards granted, net of cancellations and change in unamortized discount	42,943	39,453
Award payments made	(34,083)	(32,820)
Changes in operating assets and liabilities:		
Decrease (increase) in transactions payable, net	(9,881)	40,704
Decrease in accrued interest and dividends receivable	324	318
Increase in federal excise tax receivable	(1,403)	-
Decrease in other assets	9	21
Decrease in accounts payable and other liabilities	(104)	(91)
Net cash (used in) provided by operating activities	<u>(32,829)</u>	<u>18,348</u>
Cash flows from investing activities:		
Purchases of marketable securities	(1,434,649)	(1,547,198)
Proceeds from sales of marketable securities	1,479,151	1,529,008
Purchase of property and equipment	(321)	(3,518)
Net cash provided by (used in) investing activities	<u>44,181</u>	<u>(21,708)</u>
Net increase (decrease) in cash and cash equivalents	11,352	(3,360)
Cash and cash equivalents at beginning of year	<u>33,473</u>	<u>36,833</u>
Cash and cash equivalents at end of year	<u>\$ 44,825</u>	<u>\$ 33,473</u>
Supplemental disclosure of cash flow information:		
Cash paid during the year for federal excise taxes	<u>\$ -</u>	<u>\$ 2,155</u>

The accompanying notes are an integral part of these financial statements.

Notes to Financial Statements

Years Ended August 31, 2001 and 2000

(All dollar amounts presented in thousands)

1. Organization and Summary of Significant Accounting Policies

The Burroughs Wellcome Fund (the "Fund") is a private foundation established to advance the medical sciences by supporting research and other scientific and educational activities.

Cash equivalents

Cash equivalents are short-term, highly liquid investments that are readily convertible to known amounts of cash and have a maturity of three months or less at the time of purchase.

Forward currency contracts

The Fund enters into financial instruments with off-balance sheet risk in the normal course of its investment activity, primarily forward contracts, to reduce the Fund's exposure to fluctuations in foreign currency exchange rates. These contracts are for delivery or sale of a specified amount of foreign currency at a fixed future date and a fixed exchange rate. Gains or losses on these contracts occur due to fluctuations in exchange rates between the commencement date and the settlement date. Gains and losses on settled contracts are included within "net realized gains or losses on sales of marketable securities," and the changes in market value of open contracts is included within "net unrealized appreciation (depreciation) of marketable securities" in the accompanying statements of activities. It is the Fund's policy to utilize forward contracts to reduce foreign exchange rate risk when foreign-based investment purchases or sales are anticipated.

The contract amount of these forward currency contracts totaled \$5,152 and \$2,676 at August 31, 2001 and 2000, respectively. Realized gain (loss) on forward currency contracts totaled \$669 and (\$608) in 2001 and 2000, respectively. The market value of open forward currency contracts at August 31, 2001 and 2000 was \$298 and \$317, respectively. The market value is recorded as an asset in the Fund's financial statements. The average market value of open foreign currency contracts totaled \$233 and (\$238) for the years ending August 31, 2001 and 2000, respectively.

Futures contracts

The Fund enters into futures contracts in the normal course of its investment activity to manage the exposure to interest rate risk associated with bonds and mortgage backed securities. The Fund is required to pledge collateral to enter into these contracts. The amounts pledged for futures contracts at August 31, 2001 and 2000 were \$1,777 and \$235, respectively. It is the Fund's intention to terminate these contracts prior to final settlement. Gains and losses on the contracts are settled on a daily basis. Included in transactions payable at August 31, 2001 and 2000 is the net settlement relating to these contracts of \$11 and \$0, respectively.

Options

The Fund utilizes options to manage the exposure to interest rate risk associated with mortgage backed securities. The market value of these options totaled \$1,504 and \$23 at August 31, 2001 and 2000, respectively, which is recorded as an asset in the Fund's financial statements. The average fair value of open contracts totaled \$610 and (\$816) for the years ending August 31, 2001 and 2000. Realized losses on options totaled \$214 and \$2,450 for the years ending August 31, 2001 and 2000, respectively.

Marketable securities

Marketable securities are carried at estimated market values based on quoted prices. Gains and losses from sales of securities are determined on an average cost basis and are recognized when realized. Changes in the estimated market value of securities are reflected as unrealized appreciation or depreciation in the accompanying statements of activities. The Fund has investment advisors which manage its portfolio of marketable securities. The Fund's management critically evaluates investment advisor performance and compliance with established diversification and investment policies.

Property and Equipment

Property and equipment is primarily comprised of a building, furniture, and computer equipment which are stated at cost less accumulated depreciation and are being depreciated over their estimated useful lives using the straight-line method. Ordinary maintenance and repair costs are expensed as incurred.

Building	40 years
Furniture and Fixtures	7 years
Computer Equipment	3 years

Transactions receivable and transactions payable, net

These amounts represent the net receivable or payable resulting from investment transactions with trade dates prior to August 31 and settlement dates subsequent to August 31.

Awards granted and unpaid awards

Grants are expensed at their fair value in the year in which the award is granted. Grants payable over several years are expensed, and carried on the statements of financial position, at the present value of their estimated future cash flows, using a risk free discount rate determined at the time the award is granted.

Functional allocation of expenses

Costs of the Fund’s operations and activities have been summarized on a functional basis in the statement of activities.

Estimated fair value of financial instruments

Financial instruments include cash and cash equivalents, marketable securities, accrued interest and dividends receivable, accounts payable, and unpaid awards. All financial instruments are reported at their estimated fair value. The carrying values of accrued interest and dividends receivable, accounts payable, and unpaid awards approximate fair values based upon the timing of future expected cash flows. The estimated fair value of marketable securities is determined based upon the latest quoted sales price for such securities as of the balance sheet date. The Fund’s remaining assets and liabilities are not considered financial instruments.

Use of Estimates

The preparation of financial statements in conformity with generally accepted accounting principles requires management to make estimates and assumptions that affect the reported amounts of assets and liabilities and disclosure of contingent assets and liabilities at the date of the financial statements and the reported amounts of revenues and expenses during the reporting period. Actual results could differ from those estimates.

Market Risk

Market risk represents the risk of changes in value of a financial instrument, derivative or non-derivative, caused by fluctuations in interest rates, foreign exchange rates and equity prices. The Fund manages these risks by using derivative financial instruments in accordance with established policies and procedures.

Reclassifications

Certain reclassifications were made to the August 31, 2000 financial statements to conform them to the August 31, 2001 presentation.

2. Property and Equipment

The Fund’s property and equipment consisted of the following:

	<u>2001</u>	<u>2000</u>
Building	\$ 13,451	\$ 13,361
Furniture and Fixtures	1,717	1,540
Computer Equipment	669	615
	<u>15,837</u>	<u>15,516</u>
Less: accumulated depreciation	<u>(1,247)</u>	<u>(517)</u>
	<u>\$ 14,590</u>	<u>\$ 14,999</u>

3. Federal Excise Taxes

The Fund is exempt from federal income taxes under Section 501(c)(3) of the Internal Revenue Code. However, since the Fund meets the definition of a private foundation under the Internal Revenue code, it is subject to federal excise tax on its annual net investment income. The federal excise tax receivable at August 31, 2001 represents an overpayment in fiscal 2000 due to the Fund qualifying at a 1% tax rate rather than the normal 2% tax rate.

Deferred federal excise taxes represent the tax liability on unrealized appreciation of marketable securities. At August 31, 2001, the Fund is in a net unrealized depreciation position. Management has not recorded a deferred tax asset as there could be no reasonable assurance of its realization.

4. Unpaid Awards

Unpaid awards as of August 31 are scheduled for payment as follows:

	<u>2001</u>	<u>2000</u>
Payable in less than one year	\$ 34,409	\$ 28,710
Payable in one to five years	<u>47,852</u>	<u>47,833</u>
	82,261	76,543
Unamortized discount	<u>(3,373)</u>	<u>(6,515)</u>
Total	<u>\$ 78,888</u>	<u>\$ 70,028</u>

The expected future liability to the Fund has been calculated based on discount rates ranging from 2.56% to 6.70%.

5. Marketable Securities

The cost and estimated market values of marketable securities at August 31 are as follows:

	<u>2001</u>		<u>2000</u>	
	Cost	Estimated Market Value	Cost	Estimated Market Value
U.S. and foreign governmental obligations	\$ 110,968	\$ 113,972	\$ 136,483	\$ 136,430
Corporate bonds	61,631	63,747	75,516	74,840
Common and preferred stocks	263,449	268,273	288,352	345,847
Foreign stocks and foreign equity fund	167,815	151,230	174,302	217,033
Option and forward foreign currency investments	6,148	6,077	68	136
Venture capital investments	11,369	11,230	6,876	6,876
Mutual fund	<u>20,000</u>	<u>21,351</u>	<u>-</u>	<u>-</u>
	<u>\$ 641,380</u>	<u>\$ 635,880</u>	<u>\$ 681,597</u>	<u>\$ 781,162</u>

6. Commitments

The Fund leased office space under an operating lease until December 1999. Rental expense for this lease was \$0 and \$41 in fiscal 2001 and 2000, respectively.

7. Employee Benefit and Retirement Plans

The Fund provides medical insurance to all employees working at least thirty hours per week. Coverage extends to each employee's spouse and dependent children, if applicable. The expense for this employee benefit was \$88 and \$99 during fiscal 2001 and 2000, respectively.

The Fund has a defined-contribution retirement plan covering all employees working at least twenty hours per week. Under the terms of the plan, the Fund matches 50% of all employees' contributions up to 6% of the employee's annual compensation. Employees are 100% vested in employee and employer contributions immediately. The Fund also has a defined-contribution retirement plan funded solely through employer contributions. Under the terms of the plan, the Fund contributes 10% of the employee's annual compensation. This plan covers all employees and vesting in contributions is immediate. The expense for these retirement plans was \$40 and \$148 in fiscal 2001 and \$37 and \$136 in fiscal 2000.

8. Classification of Expenses

During the years ended August 31, expenses were classified as follows:

	2001		2000	
	Program Services	Management and General	Program Services	Management and General
Awards granted, net of cancellations and refunds of \$6,221 and \$6,770 in 2001 and 2000, respectively	\$ 42,655	\$ -	\$ 39,223	\$ -
Salaries and other employee expenses	-	2,171	-	1,960
Depreciation expense	-	729	-	517
Travel and entertainment	-	749	-	595
Maintenance and supplies	-	616	-	764
Honoraria	-	323	-	351
Professional fees	-	178	-	313
Printing and design costs	-	89	-	144
Rent	-	-	-	41
Miscellaneous	-	105	-	114
Total expenses	\$ 42,655	\$ 4,960	\$ 39,223	\$ 4,799

Schedule I: Statement of Awards Granted

Year Ended August 31, 2001

Schedule I information is included in the "Grants Index" beginning on page 26. The dollar amounts listed in the schedule reflect the actual dollar amounts (not rounded to thousands) approved and paid to awardees.

GRANTS INDEX

Program Summary

	Approved	Paid	Transferred/ Cancelled*
BASIC BIOMEDICAL SCIENCES			
Career Awards in the Biomedical Sciences	\$ 14,949,046	\$ 9,641,446	\$ 4,554,500
Career Awards Collaborative Grant	68,564	-	-
Hitchings-Elion Fellowships	914,509	558,384	751,350
Life Sciences Research Fellowships	369,000	328,000	-
Obstetrics and Gynecology Research Fellowships	153,000	184,000	-
History of Medicine Travel Grants	5,524	5,524	-
BWF Research Travel Grants	274,837	299,013	7,024
Other Grants	727,000	615,500	-
TOTAL	\$ 17,461,480	\$ 11,631,867	\$ 5,312,874
INFECTIOUS DISEASES			
Scholar Awards in Molecular Parasitology	\$ 1,275,000	\$ 1,072,500	\$ 382,500
New Investigator Awards in Molecular Parasitology	630,000	617,500	-
Scholar Awards in Molecular Pathogenic Mycology	425,000	1,082,500	-
New Investigator Awards in Molecular Pathogenic Mycology	630,000	795,000	-
New Initiatives in Malaria Research	1,300,000	1,430,000	-
Other Grants	563,072	1,102,731	213,372
TOTAL	\$ 4,823,072	\$ 6,100,231	\$ 595,872
INTERFACES IN SCIENCE			
Institutional Awards at the Scientific Interface	\$ 11,250,000	\$ 4,446,406	\$ -
Innovation Awards in Functional Genomics	-	889,583	-
Other Grants	490,384	190,384	-
TOTAL	\$ 11,740,384	\$ 5,526,373	\$ -
TRANSLATIONAL RESEARCH			
Clinical Scientist Awards in Translational Research	\$ 7,500,000	\$ 5,100,000	\$ -
New Investigator Awards in the Pharmacological or Toxicological Sciences	2,100,000	2,215,000	-
Other Grants	417,700	887,700	-
TOTAL	\$ 10,017,700	\$ 8,202,700	\$ -

	Approved	Paid	Transferred/ Cancelled*
SCIENCE EDUCATION			
Student Science Enrichment Program	\$ 1,133,036	\$ 1,135,068	\$ 24,403
BWF Visiting Professorships in the Basic Medical Sciences	165,000	160,000	-
BWF Visiting Professorships in the Microbiological Sciences	55,000	55,000	-
Other Grants	98,317	894,148	-
TOTAL	\$ 1,451,353	\$ 2,244,216	\$ 24,403
SCIENCE AND PHILANTHROPY			
General	\$ 162,300	\$ 162,300	\$ -
Communications	46,000	46,000	-
History of Medicine	15,000	-	-
Science Policy	17,500	192,500	-
TOTAL	\$ 240,800	\$ 400,800	\$ -
TOTALS	\$ 45,734,789	\$ 34,106,187	\$ 5,933,149

GRAND TOTALS[†] Approved \$ 39,801,640 Paid \$ 34,106,187

* The “Transferred/Cancelled” totals reflect grants made to award recipients who changed institutions, modified the terms of their grant at their current institution, or both changed institutions and modified their grant. In these cases, BWF’s policy has been to cancel the remaining portion of the original grant and, as necessary, approve a new grant. When the award recipient has changed institutions, the new grant is made to the new institution; when the award recipient has not moved but has modified the terms, the new grant is made to the current institution.

[†] To more accurately reflect the total amount that BWF approved in actual “new” dollars during this fiscal year, the “Transferred/Cancelled” total must be deducted from the “Approved” total.

Key to Grants Index—BWF makes all grants to nonprofit organizations. For most of the programs listed in the following sections, the name of the individual on whose behalf the grant is made is listed first, the title of the award recipient’s project is listed second, and the name of the organization that received the money is listed third. For programs that may have coaward recipients, the award recipients and their organizations are listed first, followed by the project title. For grants made directly to organizations and not on behalf of an individual, the name of the organization is listed first, followed by the title of the project or a brief description of the activity being supported.

Basic Biomedical Sciences

TOTALS: Approved \$17,461,480 Paid \$11,631,867 Transferred/Cancelled \$5,312,874

Career Awards in the Biomedical Sciences

Career awards are postdoctoral-faculty bridging awards. During the fiscal year, some award recipients change institutions, modify the terms of their award at their current institution, or both change institutions and modify their award. In these cases, BWF's policy has been to cancel the remaining portion of the original award and, as necessary, approve a new award. When the award recipient has changed institutions, the new award is made to the new institution; when the award recipient has not moved but has modified the terms, the new award is made to the current institution. In the following descriptions, the name of the award recipient is listed first, the title of the project is listed second, the award recipient's current institution is listed third, and the amount approved or paid to the institution is listed fourth. For award recipients who either changed institutions or modified their award, the portion of the award paid to the original institution, as well as any portion that was transferred or cancelled, is listed last, in parentheses. For new award recipients still in the postdoctoral period, the portion of the award intended to cover a future faculty appointment is listed last, in parentheses.

Matthew L. Albert, M.D., Ph.D.

Tumor immunity versus tumor-mediated immunosuppression: characterizing the cellular and molecular mechanism of cross-priming and cross-tolerance
Rockefeller University
Approved \$122,000 Paid \$29,500
(\$386,000 approved for future faculty appointment)

Ravi Allada, M.D.

Molecular and genetic analysis of the circadian rhythm gene *Clock* in *Drosophila*
Northwestern University
Approved \$403,146 Paid \$210,146
(\$386,000 of original award to Brandeis University was transferred/cancelled)

Matthew P. Anderson, M.D., Ph.D.

Role of T-type calcium channels in thalamic and hippocampal rhythmic activity
Massachusetts Institute of Technology
Paid \$61,000

Oscar M. Aparicio, Ph.D.

Understanding the relationship of DNA replication to cell cycle control of cellular proliferation and chromosomal organization
University of Southern California
Paid \$127,500

Nenad Ban, Ph.D.

Determination of the high resolution structure of the large ribosomal subunit
(\$314,000 of original award to Yale University was transferred/cancelled)

Jody L. Baron, M.D., Ph.D.

Role of the innate immune system in acute and chronic hepatitis B: studies in a novel transgenic mouse model of primary HBV infection
University of California-San Francisco School of Medicine
Paid \$61,000

Greg J. Bashaw, Ph.D.

Molecular mechanisms of attractive and repulsive axon guidance at the midline of *Drosophila*
University of California-Berkeley
Paid \$29,500

Gregory J. Beitel, Ph.D.

Mechanisms that control and execute the cell movements and shape changes underlying metazoan morphogenesis
Northwestern University
Paid \$115,500

Leonardo Belluscio, Ph.D.

Learning and memory in the mouse olfactory bulb
Duke University Medical Center
Paid \$61,000

Guoqiang Bi, Ph.D.

Spatio-temporal specificity of synaptic plasticity at single synaptic contacts
University of Pittsburgh School of Medicine
Paid \$131,000
(\$29,500 of original award to the University of California-San Diego was transferred/cancelled)

David Bilder, Ph.D.

Genetic analysis of epithelial cell architecture
Harvard Medical School
Approved \$59,000 Paid \$29,500
(\$386,000 approved for future faculty appointment)

Mark Bix, Ph.D.

Effector CD4+ T-cell development: evidence for the stochastic generation and clonal distribution of a combinatorial cytokine repertoire
University of Washington School of Medicine
Paid \$118,250

Azad Bonni, M.D., Ph.D.

Regulation of glial fate specification in the central nervous system
Harvard Medical School
Paid \$124,000

Carrie B. Brachmann, Ph.D.

Using *Drosophila* as a tool for the study of apoptotic regulation
Washington University School of Medicine
Approved \$122,000 Paid \$29,500
(\$386,000 approved for future faculty appointment)

Edward S. Brodtkin, M.D.

Genetic analysis of anxiety-related behaviors in mice
Princeton University
Paid \$30,800

Chester W. Brown, M.D., Ph.D.

Understanding the reproductive roles of the activins using an activin
beta B knock-in model
Baylor College of Medicine
Paid \$95,000

Michael D. Bulger, Ph.D.

Relationship between organization and function at the mammalian
beta-globin locus
University of Washington School of Medicine
Paid \$61,000

Walter R. Burack, M.D., Ph.D.

Analysis of the immunological synapse: a membrane-associated
machine
Washington University School of Medicine
Paid \$61,000

Kathleen M. Caron, Ph.D.

Reproductive and cardiovascular effects of the adrenomedullin system
University of North Carolina-Chapel Hill School of Medicine
Approved \$122,000 Paid \$29,500
(\$386,000 approved for future faculty appointment)

David C. Chan, M.D., Ph.D.

Structural and mechanistic studies of virus-mediated membrane fusion
California Institute of Technology
Paid \$115,500

Michael K. Cooper, M.D.

Modulation of sonic hedgehog signal transduction by cholesterol
homeostasis
Johns Hopkins University School of Medicine
Paid \$64,500

John D. Crispino, Ph.D.

Functional characterization of hematopoietic transcription factor
complexes
University of Chicago
Paid \$193,000

David E. Cummings, M.D.

Studies of spermatogenesis and metabolism using mutant mice
University of Washington School of Medicine
Paid \$118,250

George Q. Daley, M.D., Ph.D.

Probing the pathogenesis of chronic myelogenous leukemia
Massachusetts Institute of Technology
Paid \$60,500

Gregory C. DeAngelis, Ph.D.

Neural mechanisms underlying perceptual feature binding
Washington University School of Medicine
Paid \$118,250

Paul De Koninck, Ph.D.

Decoding rhythms in the nervous system
University of Laval
Approved \$386,000 Paid \$65,500
(\$31,500 of original award to Stanford University Medical Center was
paid; \$386,000 of original award to Stanford University Medical
Center was transferred/canceled)

Abby F. Dernburg, Ph.D.

Chromosome architecture and the fidelity of meiotic segregation
University of California-Berkeley
Paid \$65,500

Aaron DiAntonio, M.D., Ph.D.

Genetic analysis of synapse formation, growth, and plasticity
Washington University School of Medicine
Paid \$118,250

Ricardo E. Dolmetsch, Ph.D.

Voltage-gated calcium channel signaling in the nucleus
Harvard Medical School
Approved \$122,000 Paid \$29,500
(\$386,000 approved for future faculty appointment)

Kelly S. Doran, Ph.D.

Penetration of the blood-brain barrier in GBS meningitis
University of California-San Diego
Paid \$29,500

Charles G. Eberhart, M.D., Ph.D.

Analysis of medulloblastoma pathobiology and response to novel
therapies using murine transgenic models
Johns Hopkins University School of Medicine
Approved \$59,000 Paid \$29,500
(\$386,000 approved for future faculty appointment)

Peter J. Espenshade, Ph.D.

Molecular mechanism of cholesterol homeostasis in mammalian cells
University of Texas Southwestern Medical Center-Dallas
Approved \$122,000 Paid \$29,500
(\$386,000 approved for future faculty appointment)

Miguel Estevez, M.D., Ph.D.

Investigation of a calcium channel related to migraine and epilepsy in both an invertebrate and a mouse model
University of Pittsburgh Medical Center
Approved \$122,000 Paid \$29,500
(\$386,000 approved for future faculty appointment)

Guowei Fang, Ph.D.

Mechanism of spindle assembly checkpoint control
Stanford University Medical Center
Paid \$115,500

Kathryn M. Ferguson, Ph.D.

Structural basis for erbB receptor activation by epidermal growth factor agonists and neuregulin
University of Pennsylvania School of Medicine
Approved \$122,000 Paid \$29,500
(\$386,000 approved for future faculty appointment)

Elizabeth A. Finch, Ph.D.

Postsynaptic calcium signaling by inositol trisphosphate in neuronal dendrites
Emory University School of Medicine
Paid \$193,000

Reiko Maki Fitzsimonds, Ph.D.

Distributed properties of synaptic plasticity in neural networks
Yale University School of Medicine
Paid \$60,500

Robert C. Flaumenhaft, M.D., Ph.D.

SNARE proteins in platelet alpha-granule secretion
Harvard Medical School
Paid \$127,500

Nicholas R. Gaiano, Ph.D.

Neural stem cells in the mammalian forebrain: the roles of Notch and FGF signaling
New York University School of Medicine
Approved \$59,000 Paid \$29,500
(\$386,000 approved for future faculty appointment)

Timothy P. Galitski, Ph.D.

Genetic networks
Massachusetts Institute of Technology
Approved \$63,000

Jeffrey S. Glenn, M.D., Ph.D.

Prenylation and viral assembly
Stanford University School of Medicine
Paid \$118,250

Joshua I. Gold, Ph.D.

Neural basis of perceptual-decision formation
University of Washington School of Medicine
Approved \$59,000 Paid \$29,500
(\$386,000 approved for future faculty appointment)

Patrick A. Grant, Ph.D.

Analysis of histone acetyltransferase/transcriptional adaptor complexes in the regulation of gene expression
University of Virginia Health Sciences Center
Paid \$124,000

Michael Graziano, Ph.D.

From eye to hand: sensory-motor integration in the primate brain
Princeton University
Paid \$97,000

Matthias Gromeier, M.D.

Principles of polio neuropathies: exploiting poliovirus of brain cancer
Duke University Medical Center
Paid \$124,000

Jay T. Groves, Ph.D.

Studies of cell recognition and signaling with micropatterned lipid membranes
University of California-Berkeley
Paid \$29,500

Karen J. Guillemin, Ph.D.

Genetic and cellular basis of *Helicobacter pylori*-associated malignancies
University of Oregon
Approved \$386,000 Paid \$65,500

Carrie Haskell-Luevano, Ph.D.

Determination of the physiological and pharmacological role of the brain-specific agouti-related transcript
University of Florida College of Pharmacy
Paid \$121,000

Zhigang He, M.D., Ph.D.

Signaling mechanisms mediating the repulsive effects on developing and regenerating axons
Harvard Medical School
Paid \$127,500

Victoria G. Herman, Ph.D.

Defining the molecular code for synaptic target selection
University of California-Los Angeles School of Medicine
Approved \$122,000 Paid \$29,500
(\$386,000 approved for future faculty appointment)

Joel N. Hirschhorn, M.D., Ph.D.

Genetic analysis of complex endocrine disorders
Harvard Medical School
Approved \$59,000 Paid \$29,500
(\$386,000 approved for future faculty appointment)

Michael D. Hogarty, M.D.

BIN1: a *MYCN* interacting neuroblastoma suppressor
University of Pennsylvania School of Medicine
Paid \$29,500

Lora V. Hooper, Ph.D.

Molecular analysis of commensal host-microbial interactions in the intestine
Washington University School of Medicine
Paid \$61,000

Jennifer S. Hovis, Ph.D.

Understanding lipid and protein interactions at the molecular level in model cell membranes
Stanford University
Approved \$122,000 Paid \$29,500
(\$386,000 approved for future faculty appointment)

Xianxin Hua, M.D., Ph.D.

Identification and characterization of novel components in the TGF- β signaling pathway
University of Pennsylvania Health System
Approved \$357,500 Paid \$178,750
(\$419,100 of original award to the Massachusetts Institute of Technology was transferred/cancelled)

Alan J. Hunt, Ph.D.

Role of microtubule dynamics in mitotic chromosome movement
University of Michigan Health System
Paid \$60,500

Jeffrey S. Isaacson, Ph.D.

Biophysical properties of presynaptic terminals in the central nervous system
University of California-San Diego School of Medicine
Paid \$89,100

Akiko Iwasaki, Ph.D.

Defining the mechanism of immune induction and effector function in the female genital mucosa
Yale University School of Medicine
Paid \$127,500

Ursula H. Jakob, Ph.D.

Structural and functional characterization of new heat shock proteins
University of Michigan Health System
Paid \$29,500

James D. Jontes, Ph.D.

Role of protocadherins in neural development studied in living zebra fish embryos
Stanford University
Approved \$122,000 Paid \$29,500
(\$386,000 approved for future faculty appointment)

David K. R. Karalolis, Ph.D.

Pathogenicity islands in the emergence of epidemic and pandemic cholera
University of Maryland-Baltimore School of Medicine
Paid \$118,250

Suzanne L. Kirby, M.D., Ph.D.

Proliferative advantage for therapeutic bone marrow
University of North Carolina-Chapel Hill School of Medicine
Paid \$60,500

Laura J. Knoll, Ph.D.

Molecular genetic approaches to investigate developmental regulation in *Toxoplasma gondii*
Stanford University Medical Center
Paid \$31,500

William R. Kobertz, Ph.D.

Molecular interactions of the lipid-exposed surfaces of integral membrane proteins
University of Massachusetts Medical School
Approved \$59,000 Paid \$29,500
(\$386,000 approved for future faculty appointment)

Scott C. Kogan, M.D.

Use of a transgenic mouse model of acute promyelocytic leukemia to elucidate disease pathogenesis and to improve therapy
University of California-San Francisco School of Medicine
Paid \$118,250

William L. Kraus, Ph.D.

Biochemical analysis of estrogen receptor activity with chromatin templates
Cornell University
Paid \$121,000

Bruce T. Lahn, Ph.D.

Systematic investigation of mammalian spermatogenesis
University of Chicago
Paid \$127,500

Benhur Lee, M.D.

HIV-1 coreceptors and their role in HIV-associated hematopoietic dysfunction
University of California-Los Angeles
Approved \$29,500 Paid \$160,500
(\$29,500 of original award to the University of Pennsylvania School of Medicine was transferred/cancelled)

Jeh-Ping Liu, Ph.D.

Molecular mechanisms in neural crest specification
University of Virginia Health System
Approved \$357,500 Paid \$121,000
(\$357,500 of original award to the Columbia University College of Physicians and Surgeons was transferred/cancelled)

Hiten D. Madhani, M.D., Ph.D.

Specificity of signal transduction during dimorphic development of yeast
University of California-San Francisco
Paid \$118,250

Mala S. Mahendroo, Ph.D.

Characterization of fecundity and parturition defects in mice deficient in steroid 5 alpha-reductase type 1
University of Texas Southwestern Medical Center-Dallas
Paid \$118,250

Zachary F. Mainen, Ph.D.

Optical studies of synaptic plasticity mechanisms
Cold Spring Harbor Laboratory
Paid \$118,250

Kelsey C. Martin, M.D., Ph.D.

Communication between the synapse and the nucleus during long-lasting synaptic plasticity
University of California-Los Angeles School of Medicine
Paid \$118,250

Robert Menard, M.D., Ph.D.

Genetic analysis of malaria sporozoite virulence
(\$121,000 of award to New York University Medical Center was transferred/cancelled)

Chandra Mohan, M.D., Ph.D.

B-cell tolerance and humoral autoimmunity
University of Texas Southwestern Medical Center-Dallas
Paid \$121,000

Kelle H. Moley, M.D.

Glucose transport and apoptosis in blastocysts from diabetic mice
Washington University School of Medicine
Paid \$115,500

Inke S. Nathke, Ph.D.

Role of APC/catenin complexes in colon cancer
University of Dundee
Paid \$60,500

James M. Olson, M.D., Ph.D.

NeuroD abrogation in neuroblastoma
University of Washington School of Medicine
Paid \$178,750

Karen M. Ottemann, Ph.D.

Chemotaxis in *Helicobacter pylori* and its role in pathogenesis
University of California-Santa Cruz
Paid \$178,750

Martin S. Pavelka Jr., Ph.D.

Biosynthesis of the mycobacterial cell wall
University of Rochester
Paid \$121,000

Thomas T. Perkins, Ph.D.

Measurements of single DNA-based molecular motors
Stanford University
Paid \$31,500

Samuel J. Pleasure, M.D., Ph.D.

Molecular control of cell fate in the dentate gyrus
University of California-San Francisco School of Medicine
Paid \$127,500

Salman T. Qureshi, M.D.

Genetic analysis of innate resistance to bacterial pathogens
Yale University School of Medicine
Approved \$477,400 Paid \$89,100
(\$477,400 of original award to the McGill University Faculty of Medicine was transferred/cancelled)

Jill Rafael, Ph.D.

Role of muscle proteins in synaptic structure and neuromuscular disease
Ohio State University School of Medicine
Paid \$127,500

Matthew Redinbo, Ph.D.

Structural and functional characterization of human topoisomerase I and the Werner syndrome helicase
University of North Carolina-Chapel Hill
Paid \$127,500

David J. Robbins, Ph.D.

Dissecting the hedgehog signal transduction pathway
University of Cincinnati College of Medicine
Paid \$60,500

Douglas N. Robinson, Ph.D.

Studies of the mechanisms of cytokinesis using *Dictyostelium*
Stanford University School of Medicine
Paid \$61,000

Aimee K. Ryan, Ph.D.

Analysis of inductive events responsible for specification and differentiation of the anterior pituitary gland
McGill University
Approved \$357,500 Paid \$178,750
(\$357,500 of original award to the University of California-San Diego was transferred/cancelled)

Bernardo L. Sabatini, M.D., Ph.D.

Role of localized biochemical signaling in the regulation of synaptic function and spine morphogenesis
Cold Spring Harbor Laboratory
Approved \$59,000 Paid \$29,500
(\$386,000 approved for future faculty appointment)

Maria A. Schumacher, Ph.D.

Structural biology of cell growth, development, and regulation
Oregon Health Sciences University
Approved \$63,000 Paid \$63,000

Nirao M. Shah, Ph.D.

Genetic analysis of neural circuits mediating sexually dimorphic behaviors in mammals
Columbia University College of Physicians and Surgeons
Paid \$61,000

Krishna V. Shenoy, Ph.D.

Early reach plans in posterior parietal cortex
California Institute of Technology
Paid \$31,500
Stanford University
Paid \$65,500

Elaine K. Sia, Ph.D.

Analysis of yeast mutants with altered simple repeat stability
University of Rochester
Paid \$115,500

Upinder Singh, M.D.

Transcriptional control in *Entamoeba histolytica*
Stanford University School of Medicine
Paid \$91,300

Barry P. Sleckman, M.D., Ph.D.

Lineage-specific regulation of T cell receptor beta rearrangement
Washington University School of Medicine
Paid \$60,500

Douglas E. Smith, Ph.D.

Single molecular studies of viral DNA packaging
University of California-Berkeley
Approved \$122,000 Paid \$29,500
(\$386,000 approved for future faculty appointment)

Leonidas Stefanis, M.D.

Proteases in neuronal cell death
Columbia University College of Physicians and Surgeons
Paid \$60,500

Theodore S. Steiner, M.D.

Isolation and characterization of an interleukin 8 releasing protein from enteroaggregative *Escherichia coli*
University of British Columbia Faculty of Medicine
Approved \$386,000 Paid \$131,000
(\$483,500 of original award to the University of Virginia Health Sciences Center was transferred/cancelled)

Xin Sun, Ph.D.

Understanding the endoderm in organogenesis and regeneration
University of California-San Francisco
Approved \$59,000 Paid \$29,500
(\$386,000 approved for future faculty appointment)

Surachai Supattapone, M.D., D.Phil.

Structure and biology of a soluble prion
Dartmouth Medical School
Approved \$357,500 Paid \$60,500
(\$357,500 of original award to the University of California-San Francisco School of Medicine was transferred/cancelled)

Roger B. Sutton, Ph.D.

Biophysical and structural investigation of Ca^{+2} in neurotransmitter release
Stanford University
Paid \$90,500

Suzanne J. Szabo, Ph.D.

T-bet, a novel t-box transcription factor that directs T-helper cell type 1 lineage commitment
Harvard School of Public Health
Paid \$61,000

Sarah A. Tishkoff, Ph.D.

Molecular sequence variation in G6PD and its role in malarial resistance
University of Maryland-College Park
Approved \$357,500 Paid \$178,750
(\$357,500 of original award to Pennsylvania State University was transferred/cancelled)

Heidi A. Tissenbaum, Ph.D.

Genetic and molecular analysis of genes controlling longevity in *Caenorhabditis elegans*
University of Massachusetts Medical School
Approved \$386,000 Paid \$65,500

Stephen H. Tsang, M.D., Ph.D.

Unraveling genetic pathways leading to cell death in mice lacking the gamma subunit of the cGMP phosphodiesterase
University of California-Los Angeles School of Medicine
Approved \$122,000 Paid \$29,500
(\$386,000 approved for future faculty appointment)

Katharine S. Ullman, Ph.D.

Biochemical dissection of RNA export using in vitro nuclear reconstitution
University of Utah
Paid \$60,500

James A. Waddle, Ph.D.

Generation of markers and methods to study asymmetric cell divisions in living *Caenorhabditis elegans* embryos
University of Texas Southwestern Medical Center-Dallas
Paid \$60,500

Johannes Walter, Ph.D.

Characterization of eukaryotic replication initiation factors using a soluble, cell-free system
Harvard Medical School
Paid \$118,250

Michael M. Wang, M.D., Ph.D.

Estrogen receptors and neuroprotection against excitotoxic injury
Johns Hopkins University School of Medicine
Paid \$61,000

William A. Weiss, M.D., Ph.D.

Transgenic model for neuroblastoma
University of California-San Francisco School of Medicine
Paid \$60,500

Anthony P. West, Ph.D.

Identification of the natural ligand of methuselah, a *Drosophila* GPCR associated with extended lifespan
California Institute of Technology
Approved \$122,000 Paid \$29,500
(\$386,000 approved for future faculty appointment)

Carmen J. Williams, M.D., Ph.D.

Signal transduction mechanisms during mouse egg activation
University of Pennsylvania School of Medicine
Paid \$118,250

Michael B. Yaffe, M.D., Ph.D.

Scaffolding and chaperone proteins in signal transduction: 14-3-3 regulation of mitosis and programmed cell death
Massachusetts Institute of Technology
Approved \$386,000 Paid \$131,000
Harvard Medical School
Approved \$31,500 Paid \$31,500
(\$386,000 of original award to Harvard Medical School was transferred/cancelled)

Cassian Yee, M.D.

Adoptive immunotherapy of melanoma using T cells specific for potential tumor rejection antigens
University of Washington School of Medicine
Paid \$60,500

Deborah L. Yelon, Ph.D.

Patterning during organogenesis: genetic analysis of cardiac chamber formation
New York University School of Medicine
Paid \$127,500

Yanping Zhang, Ph.D.

ARF-MDM-p53 tumor suppression pathway
(\$92,500 of original award to the University of North Carolina-Chapel Hill School of Medicine was transferred/cancelled)

SUBTOTALS: Approved \$14,949,046
Paid \$9,641,446
Transferred/Cancelled \$4,554,500

Career Awards Collaborative Grant**Louis J. Muglia, M.D., Ph.D.**

Glucocorticoid effects of T cell development
Washington University School of Medicine
Approved \$24,044

Matthew Redinbo, Ph.D.

Structural genomics: high-throughput methods and human nuclear receptors
University of North Carolina-Chapel Hill
Approved \$19,520

Upinder Singh, M.D.

Genomic approaches to investigating *Entamoeba histolytica* pathogenesis
Stanford University School of Medicine
Approved \$25,000

SUBTOTALS: Approved \$68,564

Hitchings-Elion Fellowships

Michael W. Black, Ph.D.

Secretion-dependent regulation of ribosome synthesis
in *Saccharomyces cerevisiae*
Medical Research Council
Paid \$32,250

Tamara Caspary, Ph.D.

Identification and characterization of novel genes involved
in mammalian sex determination
Memorial Sloan-Kettering Cancer Center
Approved \$122,246 Paid \$62,246
(\$288,000 of original grant to the National Institute for Medical
Research was transferred/cancelled)
(\$168,000 approved for future faculty appointment)

John W. R. Copeland, Ph.D.

Activation of SRF actin remodeling proteins
Imperial Cancer Research Fund
Paid \$59,000

Aaron R. Dinner, Ph.D.

Molecular mechanism of free radical oxidative DNA damage
University of Oxford
Paid \$23,125
University of California-Berkeley
Paid \$27,750

Francine Durocher, Ph.D.

Identifying common low-penetrance genes and gene-environment
interactions in breast cancer
University of Cambridge
Approved \$27,500

John T. Finn, Ph.D.

Cell-cycle control of cell number in the retina
(\$44,100 of original award to the University College London School
of Medicine was transferred/cancelled)

Reuben S. Harris, Ph.D.

Delineation of the mechanisms of immunoglobulin gene hypermutation
Medical Research Council
Paid \$60,000

Alan J. Herr, Ph.D.

Probing the pathway of RNA-mediated defense with viral suppressor
genes
Sainsbury Laboratory
Paid \$54,500

Susan C. Hockings, Ph.D.

Biochemical and biophysical properties of an RNA binding protein
from *Drosophila*
Washington University School of Medicine
Approved \$58,713 Paid \$34,213

Steven L. Kazmirski, Ph.D.

Structural and dynamical characterization of the folding pathway
of the oligomerization domain of p53
University of Cambridge
Approved \$12,000 Paid \$12,000
(\$223,500 of original award to the University of Cambridge was
transferred/cancelled)

Steven L. Kazmirski, Ph.D.

Computational analysis of ATP-dependent motor proteins that are
involved in the loading of DNA polymerase clamps onto DNA during
DNA replication
Rockefeller University
Approved \$55,500 Paid \$27,750
(\$168,000 approved for future faculty appointment)

Kenro Kusumi, Ph.D.

Notch pathway patterning of the mammalian brain and skeleton
University of Pennsylvania School of Medicine
Approved \$195,750 Paid \$27,750
(\$195,750 of original award to the National Institute for Medical
Research was transferred/cancelled)

David J. Rossi, Ph.D.

Mechanisms of ischemia-induced excitotoxicity
University College London
Paid \$55,500

Kristin C. Scott, Ph.D.

Ectopic silencing in fission yeast
Case Western Reserve University
Approved \$51,700 Paid \$51,700

Dean G. Tang, M.D., Ph.D.

Role of cell-cycle components in timing the oligodendrocyte precursor
cell differentiation and senescence
University of Texas M. D. Anderson Cancer Center
Approved \$51,500 Paid \$27,000
University College London
Approved \$3,600 Paid \$3,600

**SUBTOTALS: Approved \$914,509
Paid \$558,384
Transferred/Cancelled \$751,350**

Life Sciences Research Fellowships

These fellowships are administered in partnership with the Life Sciences Research Foundation. BWF awards the primary grant to the foundation, which distributes the funds to the individual awardees.

Ryan B. Case, Ph.D.

Biophysical analysis of 13S *Xenopus* condensin
University of California-Berkeley
Paid \$41,000

Su L. Chiang, Ph.D.

Genetic approaches to identifying mycobacterial virulence genes
Harvard School of Public Health
Paid \$41,000

Douglas J. Guarnieri, Ph.D.

Characterization of a *Drosophila* neuropeptide receptor involved
in ethanol-induced behavior
University of California-San Francisco
Paid \$41,000

Chau V. Huynh, Ph.D.

Intracellular interaction of *Leishmania amazonensis* with host
histocompatibility complex (MHC) class II molecules
Yale University School of Medicine
Paid \$41,000

Diane McFadden, Ph.D.

Characterization of *O*-acetylated carbohydrate epitopes
on *Cryptococcus neoformans*
Albert Einstein College of Medicine
Approved \$123,000 Paid \$41,000

Peri Tate, Ph.D.

Heterochromatin proteins old and new
University of California-Berkeley
Paid \$41,000

Scott T. Walsh, Ph.D.

Molecular recognition studies of human placental lactogen
University of Chicago
Approved \$123,000 Paid \$41,000

Robert T. Wheeler, Ph.D.

Creating a diversity of cell surface adhesin molecules in fungal
pathogenesis
Massachusetts Institute of Technology
Approved \$123,000 Paid \$41,000

**SUBTOTALS: Approved \$369,000
Paid \$328,000**

Obstetrics and Gynecology Research Fellowships

Angeles A. Alvarez, M.D.

Duke University Medical Center
Regulation of angiogenesis in ovarian cancer and development
of antiangiogenesis therapy
Approved \$153,000 Paid \$51,000

Oliver Dorigo, M.D.

University of California-Los Angeles School of Medicine
Development of a novel gene transfer system using gutless hybrid
adeno-Epstein-Barr virus for prolonged transgene expression
Paid \$61,000

Karen H. Lu, M.D.

Harvard Medical School
Genetic alterations in ovarian cancers associated with germ line
BRCA1 mutations
Paid \$48,000

Douglas A. Woelkers, M.D.

University of Pittsburgh School of Medicine
Oxidative stress and preeclampsia
Paid \$24,000

**SUBTOTALS: Approved \$153,000
Paid \$184,000**

History of Medicine Travel Grants

Jake W. Spidle, Ph.D.

Take two aspirin and call me in the morning: a survey history of aspirin

University of New Mexico

Approved \$4,224 Paid \$4,224

Bruce H. Weber, Ph.D.

A biography of Dr. Peter Dennis Mitchell (1920-92), Nobel Laureate (1978)

California State University-Fullerton

Approved \$1,300 Paid \$1,300

SUBTOTALS: Approved \$5,524

Paid \$5,524

BWF Research Travel Grants

**Grants are related to history of medicine.*

Nancy Anderson

Drawing, photography, and the microscope in 19th century studies of the cell

University of Michigan-Ann Arbor

Approved \$2,075 Paid \$2,075

Bryan R. Cullen, Ph.D.

Design and analysis of improved gene therapy vectors based on foamy virus

Duke University Medical Center

Approved \$9,454 Paid \$9,454

Kathryn H. Arehart, Ph.D.

Models and auditory perception in listeners with cochlear hearing loss: theoretical development and clinical applications

University of Colorado-Boulder

Approved \$5,770 Paid \$5,770

Elisabeth M. Fine, Ph.D.

Concurrent recording of retinal and eye location in patients with age-related macular degeneration

Harvard Medical School

Approved \$4,400 Paid \$4,400

Robert J. Brown

Britain and the Spanish influenza epidemic of 1918-19

Syracuse University

Approved \$4,000 Paid \$4,000

Darrell R. Galloway, Ph.D.

Development of a DNA-based vaccine against anthrax

Ohio State University

Approved \$6,750 Paid \$6,750

Jaime Caro, M.D.

Angiogenic and oncogenic roles of HIF-1 activation

Thomas Jefferson University Jefferson Medical College

Approved \$14,800 Paid \$14,800

Ellen L. Goode, Ph.D.

Impact of estrogen metabolism and DNA repair polymorphisms on survival in a population-based sample of breast cancer patients

University of Washington School of Public Health and Community Medicine

Approved \$10,000 Paid \$10,000

John R. G. Challis, Ph.D., D.Sc.

Effects of glucocorticoids on placental and fetal development: implications for adult disease

University of Toronto Faculty of Medicine

Approved \$7,600 Paid \$7,600

Jacqueline M. Hibbert, Ph.D.

Stable isotope method to measure hemoglobin synthesis rate

Morehouse School of Medicine

Approved \$5,630 Paid \$5,630

Estelle Cohen, Ph.D.

Reproduction and the state in Britain 1850-1930, with particular reference to the work of Frances Hoggan, M.D. (1843-1927)

Harvard University

Approved \$3,000

David L. Hurley, Ph.D.

Developmental characterization of pituitary-specific transcription factors in the growth hormone-deficient dwarf rat

Tulane University

Approved \$12,543 Paid \$12,543

Brant E. Isakson

Mechanisms of peptide inhibition of gap junctional intercellular communication

University of Wyoming

Approved \$4,400 Paid \$4,400

Mei-ling A. Joiner, Ph.D.

Behavioral analysis of *Drosophila* mutants with altered electroretinograms

University of Iowa

Approved \$10,640 Paid \$10,640

Bernadette Kalman, M.D., Ph.D.

Genetics of multiple sclerosis

MCP Hahnemann University School of Medicine

Approved \$12,974 Paid \$12,974

Mark S. Kindy, Ph.D.

Identification of the serum amyloid A receptor: role in inflammation

University of Kentucky School of Medicine

Approved \$9,480

Anjan Kowluru, Ph.D.

Novel roles for G-proteins in the apoptotic demise of the pancreatic beta cell: relevance to the pathophysiology of diabetes

Wayne State University

Approved \$4,750 Paid \$4,750

May H. Lesser

Study of the surgeon who performed the first liver transplantation in the United Kingdom

Tulane University School of Medicine

Approved \$700 Paid \$700

Stephen R. Lyle, M.D., Ph.D.

Role of MLK-3 in the proliferative potential of human hair follicle stem cells

Harvard Medical School

Paid \$5,800

Elias R. Melhem, M.D.

In vivo study of white matter fiber tract myelination and orientation in neonatal brain using diffusion tensor magnetic resonance imaging

Johns Hopkins University School of Medicine

Approved \$7,180 Paid \$7,180

Morton W. Miller, Ph.D.

Ultrasound-induced hyperthermic teratogenesis

University of Rochester School of Medicine and Dentistry

Paid \$3,335

Robert V. Miller, Ph.D.

Exploring the molecular biology and ecology of antibiotic resistance in Antarctic bacteria

Oklahoma State University

Approved \$14,000 Paid \$14,000

Ravi Murthy, M.D.

Subintimal angioplasty: application to critical ischemia in limb salvage in the end-stage renal disease population

University of Maryland Medical Center

Paid \$2,600

Felicia V. Nowak, M.D., Ph.D.

Subcellular localization of the preoptic regulatory peptides

(\$7,024 of original award to Saint Louis University Health Sciences Center was transferred/cancelled)

Ike S. Okosun, Ph.D.

Intrauterine factors and adult diseases

Mercer University School of Medicine

Approved \$5,300 Paid \$5,300

Robert C. Olby, Ph.D.

Crick's Cambridge years

University of Pittsburgh

Approved \$2,000 Paid \$2,000

Michael B. A. Oldstone, M.D.

Molecular anatomy of the interaction of viral glycoprotein with its receptor

Scripps Research Institute

Approved \$13,500 Paid \$13,500

Stephen M. Patterson, Ph.D.

Influence of multiple risk factors for hypertension and fluid hydration on hemorheology reactivity

Ohio University

Paid \$3,416

Samuel L. Perkins

Expression of C1fB on the surface of *Staphylococcus aureus*

Texas A&M University

Approved \$3,900 Paid \$3,900

Carol J. Phelps, Ph.D.

Differentiation of pituitary-regulation neurons in rodent models of hypothalamic or pituitary growth hormone deficiency

Tulane University School of Medicine

Approved \$12,543 Paid \$12,543

Carla M. Pugh, M.D.

Biomedical computations for a simulation tool: indications for skills assessment and the training of health care professionals

Stanford University

Approved \$4,800 Paid \$4,800

David B. Sacks, M.B., Ch.B.

Role of IQGAP1 and calmodulin in regulating the function of the Rho GTPases
Harvard Medical School
Approved \$12,000 Paid \$12,000

Jason K. Sello

Understanding the regulation of morphological differentiation and antibiotic biosynthesis in *Streptomyces* species
Harvard University
Approved \$5,200 Paid \$5,200

Thomas N. Seyfried, Ph.D.

In utero therapy for ganglioside storage disease
Boston College
Paid \$5,100

L. David Sibley, Ph.D.

Genetic mapping in *Toxoplasma*
Washington University School of Medicine
Paid \$4,125

Shanthi K. Sinniah, Ph.D.

Using chemical force microscopy to study receptor-ligand binding model systems
Calvin College
Approved \$13,500 Paid \$13,500

Patrick J. Skelly, Ph.D.

Inhibition of protease gene expression in schistosomes by RNA-mediated interference
Harvard School of Public Health
Approved \$7,800 Paid \$7,800

Philip D. Sloane, M.D.

Behavior mapping as a quality of life indicator for Alzheimer's disease
University of North Carolina-Chapel Hill School of Medicine
Approved \$3,350 Paid \$3,350

Stephen D. Smith

Perception without awareness in depressed populations: an fMRI study
University of Waterloo
Approved \$6,000 Paid \$6,000

Donald J. Tipper, Ph.D.

Translocation of the receptor for pathogenic *Escherichia coli* to host cells
University of Massachusetts Medical School
Paid \$12,280

Sandor Vajda, Ph.D.

Iterative approach to protein-protein docking
Boston University
Approved \$6,078 Paid \$6,078

Geoffrey B. West, Ph.D.

Universal scaling laws in biology
University of New Mexico
Approved \$10,000 Paid \$10,000

John A. White, Ph.D.

Effects of molecular fluctuations on analog and digital signaling pathways in the nervous system
Boston University
Approved \$10,520 Paid \$10,520

Michael M. Zeineh

Visualizing the activity of the human hippocampus during memory experiments
University of California-Los Angeles School of Medicine
Approved \$4,850 Paid \$4,850

Sheryl S. Zimmerman, Ph.D.

Behavior mapping as a quality of life indicator for Alzheimer's disease
University of North Carolina-Chapel Hill School of Medicine
Approved \$3,350 Paid \$3,350

**SUBTOTALS: Approved \$274,837
Paid \$299,013
Transferred/Cancelled \$7,024**

Other Grants

In addition to making competitive awards, BWF makes noncompetitive grants for activities that are closely related to our major focus areas. These grants are intended to enhance the general environment for research in the targeted areas.

American Association for the Advancement of Science

Support for a Web-based program to help young research scientists improve their interviewing skills
Approved \$5,000 Paid \$5,000

American Association for the Advancement of Science

Support for the Career Development Center, a Web site for young research scientists
Approved \$147,000 Paid \$147,000

American Association for the Advancement of Science

Support for Next Wave Web site promotions
Approved \$30,000 Paid \$30,000

American Association of Obstetricians and Gynecologists Foundation

Support for evaluating and restructuring a foundation fellowship program
Approved \$20,000 Paid \$20,000

American Society of Andrology

Support for postdoctoral travel awards to the seventh International Congress of Andrology
Approved \$3,000 Paid \$3,000

Association of American Medical Colleges

Support for postdoctoral fellows to attend a meeting of the association's Group on Graduate Research, Education, and Training
Paid \$11,500

Commission on Professionals in Science and Technology

Support for general activities
Approved \$1,000 Paid \$1,000

Marine Biological Laboratory

Support for the course titled "Frontiers in Reproduction"
Approved \$384,375 Paid \$164,125

National Academy of Sciences

Support for a convocation on enhancing the postdoctoral experience
Approved \$20,000 Paid \$20,000

Society for the Study of Reproduction

Support for postdoctoral trainees to attend the society's annual meetings
Approved \$5,000 Paid \$11,000

University of California-San Francisco School of Medicine

Support for the Reproductive Scientist Development Program
Paid \$160,000

University of North Carolina-Chapel Hill School of Medicine

Support for travel of speakers attending the University of North Carolina Postdoc Association meeting
Approved \$1,000 Paid \$1,000

University of Pennsylvania School of Medicine

Support for planning and administering the "Frontiers in Reproduction" course
Approved \$110,625 Paid \$41,875

**SUBTOTALS: Approved \$727,000
 Paid \$615,500**

Infectious Diseases

TOTALS: Approved \$4,823,072 Paid \$6,100,231 Transferred/Cancelled \$595,872

Scholar Awards in Molecular Parasitology

Alan A. Aderem, Ph.D.

Macrophage responses to *Leishmania* infection
University of Washington School of Medicine
Approved \$425,000 Paid \$127,500
(\$382,500 of original award to the University of Washington School of Medicine was transferred/cancelled)

Norma W. Andrews, Ph.D.

Role of lysosome exocytosis in the cell invasion mechanism of *Trypanosoma cruzi*
Yale University School of Medicine
Paid \$80,000

Paul J. Brindley, Ph.D.

Schistosome transgenesis
Tulane University School of Public Health and Tropical Medicine
Approved \$425,000 Paid \$42,500

Daniel E. Goldberg, M.D., Ph.D.

Hemoglobin metabolism in *Plasmodium falciparum*
Washington University School of Medicine
Paid \$80,000

Patricia J. Johnson, Ph.D.

Investigation of potential chemotherapeutic targets and the pathogenesis of the human-infective parasite *Trichomonas vaginalis*
University of California-Los Angeles School of Medicine
Paid \$80,000

Scott M. Landfear, Ph.D.

Biology of membrane transporters in *Leishmania* parasites
Oregon Health Sciences University School of Medicine
Paid \$80,000

James H. McKerrow, M.D., Ph.D.

Parasite proteases: analysis of structure-function relationships and structure-based drug design
University of California-San Francisco School of Medicine
Paid \$60,000

Marc Ouellette, Ph.D.

Functional genomics of drug resistance in *Leishmania*
Laval University Faculty of Medicine
Approved \$425,000 Paid \$42,500

Edward J. Pearce, Ph.D.

Role of the TGF-beta superfamily in host signaling to schistosomes
Cornell University College of Veterinary Medicine
Paid \$85,000

William Petri Jr., M.D., Ph.D.

Adherence and cytolysis by *Entamoeba histolytica*
University of Virginia Health Sciences Center
Paid \$60,000

Margaret A. Phillips, Ph.D.

Design of inhibitors for *Trypanosoma brucei* ornithine decarboxylase using a combination of structure-based approaches and combinatorial chemistry
University of Texas Southwestern Medical Center-Dallas
Paid \$85,000

David S. Roos, Ph.D.

Exploring the function of the apicomplexan plastid
University of Pennsylvania
Paid \$20,000

L. David Sibley, Ph.D.

Molecular pathogenesis in toxoplasmosis
Washington University School of Medicine
Paid \$85,000

Samuel L. Stanley, M.D.

Pathways for amebic induction of inflammation and programmed cell death
Washington University School of Medicine
Paid \$85,000

Elisabetta Ullu, Ph.D.

Molecular analysis of the nucleus in *Trypanosoma brucei*
Yale University School of Medicine
Paid \$60,000

**SUBTOTALS: Approved \$1,275,000
Paid \$1,072,500
Transferred/Cancelled \$382,500**

New Investigator Awards in Molecular Parasitology

Cornelis J. Beckers, Ph.D.

Role of cytoplasmic calcium in the regulation of motility and host cell invasion by *Toxoplasma gondii*
University of Alabama-Birmingham School of Medicine
Paid \$32,500

Vivian M. Bellofatto, Ph.D.

Molecular analysis of trypanosome gene transcription
University of Medicine and Dentistry of New Jersey
Paid \$32,500

Michael Cappello, M.D.

Molecular pathogenesis of hookworm anemia
Yale University School of Medicine
Paid \$70,000

Vernon B. Carruthers, Ph.D.

Defining the proteome of toxoplasma secretory proteins
Johns Hopkins University School of Public Health
Approved \$210,000 Paid \$35,000

Daniel J. Eichinger, Ph.D.

Control of encystation-specific gene expression in *Entamoeba*
New York University School of Medicine
Paid \$70,000

Theresa Gaasterland, Ph.D.

Comparative genome annotation of *Plasmodium falciparum*, *Leishmania major*, and *Trypanosoma brucei*
Rockefeller University
Paid \$70,000

Stuart J. Kahn, M.D.

Analysis of the naive T-cell response to the surface glycoprotein superfamily of *Trypanosoma cruzi*
University of Washington School of Medicine
Paid \$32,500

Kami Kim, M.D.

Signaling pathways and *Toxoplasma gondii* differentiation
Albert Einstein College of Medicine
Paid \$32,500

Silvia N. J. Moreno, Ph.D.

Pyrophosphate metabolism in *Toxoplasma gondii*
University of Illinois at Urbana-Champaign College of Veterinary Medicine
Paid \$70,000

Martin Olivier, Ph.D.

Role of the macrophage protein tyrosine phosphatase SHP-1 in *Leishmania* pathogenesis
Laval University Faculty of Medicine
Paid \$32,500

Barbara Papadopoulou, Ph.D.

Functional genomics of stage-specific gene expression in the kinetoplastid protozoan *Leishmania donovani*
Laval University Faculty of Medicine
Approved \$210,000 Paid \$35,000

Christian Tschudi, Ph.D.

Function of cis-splicing in trypanosome RNA
Yale University School of Medicine
Paid \$70,000

Gary E. Ward, Ph.D.

Chemical genetic approach to the study of host cell invasion by *Toxoplasma gondii*
University of Vermont College of Medicine
Approved \$210,000 Paid \$35,000

**SUBTOTALS: Approved \$630,000
 Paid \$617,500**

Scholar Awards in Molecular Pathogenic Mycology

Martin Bard, Ph.D.

Characterization of new target sites for antifungal intervention in the *Candida albicans* ergosterol pathway
Indiana University-Purdue University at Indianapolis
Paid \$85,000

Judith Berman, Ph.D.

Use of *Saccharomyces cerevisiae* to study molecular mechanisms of *Candida albicans* pathogenicity
University of Minnesota
Paid \$80,000

William A. Fonzi, Ph.D.

Environmental signals and virulence of *Candida albicans*
Georgetown University Medical Center
Paid \$60,000

William E. Goldman, Ph.D.

Probing the parasitic lifestyle of *Histoplasma capsulatum*
Washington University School of Medicine
Paid \$60,000

Joseph Heitman, M.D., Ph.D.

Signal transduction pathways regulating virulence of *Cryptococcus neoformans*
Duke University Medical Center
Paid \$80,000

Alexander D. Johnson, Ph.D.

Analysis of a mating-type-like locus in *Candida albicans*
University of California-San Francisco School of Medicine
Paid \$40,000

Elizabeth J. Keath, Ph.D.

Novel molecular and DNA vaccine approaches to *Histoplasma capsulatum*
Saint Louis University
Paid \$80,000

Bruce Klein, M.D.

Genetic immunization against pathogenic fungi
University of Wisconsin Medical School
Paid \$60,000

James W. Kronstad, Ph.D.

Temperature-regulated and infection-regulated gene expression in *Cryptococcus neoformans*
University of British Columbia
Paid \$85,000

Stuart M. Levitz, M.D.

Use of molecular biology to identify *Cryptococcus neoformans* antigens that stimulate cell-mediated immunity
Boston University School of Medicine
Paid \$80,000

Aaron P. Mitchell, Ph.D.

Analysis of the *Candida* CaRIM transduction pathway
Columbia University College of Physicians and Surgeons
Paid \$80,000

Carol S. Newlon, Ph.D.

Analysis of chromosome structure and function in the pathogenic basidiomycete *Cryptococcus neoformans*
University of Medicine and Dentistry of New Jersey
Approved \$425,000 Paid \$42,500

Peter A. B. Orlean, Ph.D.

Glycolipid anchoring of protein and wall biogenesis in fungal pathogens
University of Illinois at Urbana-Champaign
Paid \$80,000

Michael P. Snyder, Ph.D.

Analysis of morphogenic differentiation in *Candida albicans*
Yale University
Paid \$85,000

Paula Sundstrom, Ph.D.

Global regulatory circuits and candidiasis
Ohio State University School of Medicine
Paid \$85,000

**SUBTOTALS: Approved \$425,000
Paid \$1,082,500**

New Investigator Awards in Molecular Pathogenic Mycology

J. Andrew Alspaugh, M.D.

Signal transduction and pathogenicity of *Cryptococcus neoformans*
Duke University Medical Center
Approved \$210,000 Paid \$35,000

Kent L. Buchanan, Ph.D.

Acquired host resistance in cryptococcal meningitis
Tulane University Medical Center
Paid \$32,500

Gary M. Cox, M.D.

Antisense repression in *Cryptococcus neoformans*
Duke University Medical Center
Paid \$70,000

Tamara L. Doering, M.D., Ph.D.

Mechanisms of capsule biosynthesis in *Cryptococcus neoformans*
Washington University School of Medicine
Paid \$70,000

Scott G. Filler, M.D.

Stimulation of endothelial cells in *Candida albicans*
University of California-Los Angeles School of Medicine
Paid \$70,000

Gary B. Huffnagle, Ph.D.

Role of melanin production by *Cryptococcus neoformans* in evasion
of host defenses
University of Michigan Medical Center
Paid \$32,500

Ashraf S. Ibrahim, Ph.D.

Molecular genetics approach for studying the role of iron permease
in the virulence of *Rhizopus oryzae*
University of California-Los Angeles School of Medicine
Approved \$210,000 Paid \$35,000

Patrick J. Keeling, Ph.D.

Early infection and adaptation to intracellular parasitism
in *Microsporidia*
University of British Columbia
Paid \$70,000

Jennifer K. Lodge, Ph.D.

Identification of virulence-related determinants in *Cryptococcus neoformans*
Saint Louis University School of Medicine
Paid \$32,500

Jose L. Lopez-Ribot, Pharm.D., Ph.D.

Gene and protein expression profiling in *Candida albicans* biofilms
University of Texas Health Science Center-San Antonio
Approved \$210,000 Paid \$35,000

Neal F. Lue, M.D., Ph.D.

Functional analysis of telomerase components in *Candida albicans*
Weill Medical College of Cornell University
Paid \$70,000

Anita Sil, M.D., Ph.D.

Genetic analysis of pathogenesis in *Histoplasma capsulatum*
University of California-San Francisco School of Medicine
Paid \$70,000

A. George Smulian, M.B., B.Ch.

Role of MAP kinase Mkp1 in the regulation of cell wall synthesis
in *Pneumocystis carinii*
University of Cincinnati College of Medicine
Paid \$70,000

Brian L. Wickes, Ph.D.

Identification of mating type-associated antifungal targets
in *Cryptococcus neoformans*
University of Texas Health Science Center-San Antonio
Paid \$32,500

Jon Woods, M.D., Ph.D.

Antisense regulation of a protein kinase gene in *Histoplasma capsulatum*
University of Wisconsin Medical School
Paid \$70,000

**SUBTOTALS: Approved \$630,000
Paid \$795,000**

New Initiatives in Malaria Research

James P. Allen, Ph.D.

Elizabeth Davidson, Ph.D.

Arizona State University
Structure-based design of mosquitocidal toxins
Paid \$25,000

Russ B. Altman, M.D., Ph.D.

Stanford University School of Medicine
Knowledge base of biological function for malaria
Paid \$100,000

Sailen Barik, Ph.D.

University of South Alabama College of Medicine
Signal transduction in *Plasmodium*
Paid \$25,000

Scott D. Bohle, Ph.D.

University of Wyoming

Peter W. Stephens, Ph.D.

State University New York-Stony Brook
Interaction of the quinoline antimalarials and malaria pigment
Paid \$100,000

Jon C. Clardy, Ph.D.

Cornell University
Inhibitors of dihydroorotate dehydrogenase for malaria treatment
Paid \$100,000

Fred E. Cohen, M.D., D.Phil.

University of California-San Francisco

Joseph L. Derisi, Ph.D.

University of California-San Francisco School of Medicine
Functional genomics approach to identification of new antimalarial drug targets
Approved \$400,000 Paid \$50,000

John B. Dame, Ph.D.

University of Florida College of Veterinary Medicine

Thomas C. Rowe, Ph.D.

University of Florida College of Medicine
Discovery of a novel malarial DNA gyrase and its development as a drug target
Paid \$50,000

Roberto Docampo, M.D., Ph.D.

University of Illinois at Urbana-Champaign College of Veterinary Medicine
Acidocalcisomes in *Plasmodium*
Paid \$25,000

David A. Fidock, Ph.D.

William R. Jacobs, Ph.D.

Albert Einstein College of Medicine
Molecular genetic analysis of *Plasmodium falciparum*
Approved \$100,000 Paid \$25,000

Partho Ghosh, Ph.D.

University of California-San Diego
Structural studies of *Plasmodium falciparum* histidine-rich protein 2
Paid \$50,000

Daniel L. Hartl, Ph.D.

Harvard University

Dyann F. Wirth, Ph.D.

Harvard School of Public Health
Why are there so few synonymous single nucleotide polymorphisms in *Plasmodium falciparum*
Paid \$100,000

Timothy A. J. Haystead, Ph.D.

Duke University Medical Center
Mining the malarial purine-binding proteome for novel drugs and their targets
Approved \$200,000 Paid \$50,000

Christopher A. Hunter, Ph.D.

University of Pennsylvania School of Veterinary Medicine
Role of NF κ B in resistance to malaria
Paid \$25,000

Anthony A. James, Ph.D.

University of California-Irvine
Genetic control of anopheline vectors
Paid \$100,000

Keith A. Joiner, M.D.

Yale University School of Medicine
Mechanism of hemoglobin uptake in malaria
Approved \$400,000 Paid \$50,000

Kami Kim, M.D.

Vern L. Schramm, Ph.D.

Albert Einstein College of Medicine
Genetic dissection of purine salvage pathways in *Plasmodium*
Approved \$100,000 Paid \$25,000

Walter H. Lewis, Ph.D.

Washington University

Daniel E. Goldberg, M.D., Ph.D.

Washington University School of Medicine
Optimizing the search for new antimalarial therapeutics
Paid \$100,000

Michael A. Marletta, Ph.D.

University of Michigan College of Pharmacy
Heme detoxification in *Plasmodium*
Paid \$50,000

Thomas V. McDonald, M.D.

Albert Einstein College of Medicine
K⁺ channels as therapeutic targets in malaria
Paid \$25,000

Paul D. Roepe, Ph.D.

Georgetown University

James A. Martiney, Ph.D.

Kenneth S. Warren Laboratories
Single-cell photometric analysis of drug-resistant malaria
Paid \$80,000

Stewart H. Shuman, M.D., Ph.D.

Sloan-Kettering Institute
Targeting of mRNA cap formation for treatment of malaria
Approved \$100,000 Paid \$25,000

Mary M. Stevenson, Ph.D.**Philippe Gros, Ph.D.**

McGill University Faculty of Medicine
Genetic and functional dissection of susceptibility to malaria
Paid \$100,000

Akhil B. Vaidya, Ph.D.

MCP Hahnemann University School of Medicine
Plasma membrane proton pumps in malaria parasites
Paid \$100,000

Dyann F. Wirth, Ph.D.

Harvard School of Public Health
Plasmodium falciparum transcriptome: analysis of drug response
Paid \$50,000

**SUBTOTALS: Approved \$1,300,000
Paid \$1,430,000**

Other Grants

In addition to making competitive awards, BWF makes noncompetitive grants for activities that are closely related to our major focus areas. These grants are intended to enhance the general environment for research in the targeted areas.

GENERAL**American Society of Tropical Medicine and Hygiene**

Support for a new BWF-ASTMH Fellowship in Tropical Infectious Diseases
Paid \$52,000

CDC Foundation

Support for students who participate in the CDC's Elective Rotation in Applied Epidemiology as part of the Epidemic Intelligence Service's Fiftieth Anniversary Fellowship Program
Approved \$5,000 Paid \$5,000

Duke University

Support for the United Kingdom-United States Exchange Program reunion and review meeting
Approved \$20,000

National Academy of Sciences

Support for the Institute of Medicine's Forum on Emerging Infections
Approved \$25,000 Paid \$25,000

National Institute of Allergy and Infectious Diseases

Support for a conference titled "Dendritic Cells at the Host-Pathogen Interface"
Approved \$3,000 Paid \$3,000

North Carolina Department of Health and Human Services

Support for a project titled "Surveillance and Evaluation of Environmental Microbiology in the Aftermath of Flooding in Eastern North Carolina, 1999"
Paid \$50,000

University of Cambridge

Support for a "Try-Tryp" meeting
Approved \$35,000 Paid \$35,000

WHO/TDR

Support for the International Training Course on Bioinformatics (Computational Biology) Applied to Genomic Studies
Approved \$12,000 Paid \$12,000

MOLECULAR PARASITOLOGY

American Society of Tropical Medicine and Hygiene

Support for the society's annual meeting
Approved \$25,000 Paid \$25,000

Cesar Chavez Multicultural Academy

Support for program activities, in lieu of an honorarium for Thomas E. Wellems, M.D., Ph.D., a member of the BWF Molecular Parasitology/Malaria Advisory Committee
Approved \$3,000 Paid \$3,000

Fogarty International Center

Support for the third Pan-African conference organized by the Multilateral Initiative on Malaria
Approved \$20,000 Paid \$20,000

Gordon Research Conferences

Support for the Malaria Gordon Conference
Approved \$10,000 Paid \$10,000

Harvard School of Public Health

Support for the Harvard Malaria Initiative workshop titled "Genomes to Drugs"
Approved \$10,000 Paid \$10,000

Keystone Symposia

Support for a meeting titled "Molecular Helminthology: An Integrated Approach" and for a meeting workshop titled "Threat of Drug Resistance: Strategy Session"
Paid \$12,500

Keystone Symposia

Support for Robert Bergquist, Ph.D., of WHO/TDR, to attend the symposium titled "Toward the Genetic Manipulation of Insects"
Approved \$3,000 Paid \$3,000

Keystone Symposia

Support for two symposia: "Malaria's Challenge: From Infants to Genomics to Vaccines" and "Drugs Against Tropical Protozoan Parasites: Target Selections, Structural Biology, and Rational Medicinal Chemistry"
Approved \$10,000 Paid \$10,000

Laval University Faculty of Medicine

Support for two symposia of past and present BWF awardees in the molecular parasitology program held at the International Congress of Parasitology
Approved \$10,000 Paid \$10,000

Malaria Foundation

Support for activities to reach the international scientific community
Approved \$50,000 Paid \$50,000

Marine Biological Laboratory

Support for the training course titled "Biology of Parasitism," from 1999 to 2003
Paid \$150,000

Monash University

Support for creation of an integrated *Plasmodium* genome database
Approved \$213,372 Paid \$69,033

National Institute of Allergy and Infectious Diseases

Support for the BWF/NIAID/Biology of Parasitic Infection lecture series
Approved \$5,000 Paid \$5,000

Naval Medical Research Center

Support for a meeting on variant proteins expressed on the surface of infected erythrocytes and their role in developing malaria vaccines
Approved \$7,500 Paid \$7,500

Seattle Biomedical Research Institute

Support for travel costs of BWF new investigator Theresa Gaasterland, Ph.D., to give a seminar at the institute
Approved \$1,000 Paid \$1,000

Stanford Genome Technology Center

Support for finalizing genome sequencing "gap closure" for *Plasmodium falciparum* chromosome 12
Paid \$100,000

University of Georgia

Support for the Center for Tropical and Emerging Global Diseases, in lieu of an honorarium for Daniel G. Colley, Ph.D., a member of the BWF Molecular Parasitology/Malaria Advisory Committee
Approved \$3,000 Paid \$3,000

University of Pennsylvania

Support for creation of an integrated *Plasmodium* genome database
Paid \$254,498
(\$213,372 of original award to the University of Pennsylvania was transferred/cancelled)

University of Texas Southwestern Medical Center-Dallas

Support for a meeting titled "Polyamine Metabolism of Parasitic Protozoa as a Drug Target"
Approved \$2,000 Paid \$2,000

PATHOGENIC MYCOLOGY

American Society for Microbiology

Support for the sixth annual conference on *Candida* and candidiasis
Approved \$2,500 Paid \$2,500

Institute for Genomic Research

Support for a meeting to discuss sequencing the *Aspergillus fumigatus* genome
Approved \$7,500 Paid \$7,500

Korean Baptist Church

Support for program activities, in lieu of an honorarium for June Kwon-Chung, Ph.D., a member of the BWF Molecular Pathogenic Mycology Advisory Committee
Approved \$3,000 Paid \$3,000

Marine Biological Laboratory

Support for the training course titled "Molecular Mycology: Current Approaches to Fungal Pathogenesis," from 2000 to 2002
Paid \$85,000

Midwest Microbial Pathogenesis Meeting

Support for the group's seventh annual meeting
Approved \$4,000 Paid \$4,000

National Institute of Allergy and Infectious Diseases

Support for U.S. participants at the Medical Mycological Society of Japan's second U.S.-Japan meeting focusing on the importance of genome projects for the medical mycology community
Approved \$10,000 Paid \$10,000

Saint Louis University School of Medicine

Support for a *Cryptococcus neoformans* genome meeting
Approved \$17,000 Paid \$17,000

South Australian Medical Postgraduate Education Association

Support for 10 young investigators to attend the Fifth International Conference on *Cryptococcus* and Cryptococcosis
Approved \$12,500 Paid \$12,500

University of Arizona

Support for scientists to travel to the Twenty-First Fungal Genetics Conference
Approved \$10,000 Paid \$10,000

University of British Columbia

Support for a symposium on the evolution of protist parasites, held at the International Society for Evolutionary Protistology
Approved \$10,000 Paid \$10,000

University of Cincinnati College of Medicine

Support for the Seventh International Workshops on Opportunistic Protists
Approved \$5,000 Paid \$5,000

University of Virginia Health System

Support for a symposium on the *E. histolytica* genome project at the annual American Society of Tropical Medicine and Hygiene meeting
Approved \$8,700 Paid \$8,700

**SUBTOTALS: Approved \$563,072
 Paid \$1,102,731
 Transferred/Cancelled \$213,372**

Interfaces in Science

TOTALS: Approved \$11,740,384 Paid \$5,526,373

Institutional Awards at the Scientific Interface

Listed by name of the training program, the institution or consortium conducting the program, and the researchers directing the program.

Cross-Disciplinary Training Program in Biophysical Dynamics

University of Chicago

Stephen J. Kron, M.D., Ph.D.

Norbert F. Scherer, Ph.D.

Approved \$2,500,000 Paid \$375,000

Graduate Program in Quantitative Biology

University of California-San Francisco School of Pharmacy

David A. Agard, Ph.D.

University of California-San Francisco School of Medicine

Ken A. Dill, Ph.D.

University of California-San Francisco School of Pharmacy

Approved \$2,500,000 Paid \$375,000

Interdisciplinary Graduate and Postdoctoral Training Program in Physics, Chemistry, and Biology

Rockefeller University

Stephen K. Burley, M.D., D.Phil.

Albert Libchaber, Ph.D.

Paid \$548,000

Interdisciplinary Training Program in Brain Science

Brown University

John P. Donoghue, Ph.D.

David Mumford, Ph.D.

Paid \$460,952

La Jolla Interfaces in Science Training Program

Consortium of the University of California-San Diego, the Scripps

Research Institute, the Salk Institute of Biological Studies, and the

San Diego Supercomputing Center; grant administered by the

University of California-San Diego

Elizabeth D. Getzoff, Ph.D.

Scripps Research Institute

José N. Onuchic, Ph.D.

University of California-San Diego

Approved \$1,000,000 Paid \$549,954

Program in Computational Biology

Johns Hopkins University

Michael Paulaitis, Ph.D.

Johns Hopkins University

George D. Rose, Ph.D.

Johns Hopkins University School of Medicine

Paid \$500,000

Program in Computational Molecular Biology

California Institute of Technology

Scott E. Fraser, Ph.D.

Michael L. Roukes, Ph.D.

Paid \$500,000

Program in Mathematical and Computational Neuroscience

Boston University

Howard B. Eichenbaum, Ph.D.

Nancy J. Kopell, Ph.D.

Approved \$1,750,000 Paid \$262,500

Program in Mathematics and Molecular Biology

Consortium of 17 laboratories at 12 institutions nationwide; grant administered by Florida State University

Wilma K. Olson, Ph.D.

Rutgers, the State University of New Jersey-Piscataway

DeWitt L. Sumners, Ph.D.

Florida State University

Approved \$1,000,000 Paid \$500,000

Training Program in Biological Dynamics

Princeton University

John J. Hopfield, Ph.D.

Simon A. Levin, Ph.D.

Approved \$2,500,000 Paid \$375,000

SUBTOTALS: Approved \$11,250,000

Paid \$4,446,406

Innovation Awards in Functional Genomics

These special one-time-only awards were made in conjunction with the dedication of BWF's headquarters building in 2000. Future support for the field of functional genomics is incorporated into ongoing BWF programs.

Christopher B. Burge, Ph.D.

Phillip A. Sharp, Ph.D.

Massachusetts Institute of Technology

Whole genome approaches to pre-mRNA splicing specificity and regulation

Paid \$100,000

Wah Chiu, Ph.D.

Baylor College of Medicine

Gregor Eichele, Ph.D.

Max-Planck Institute for Experimental Endocrinology

Spatial and temporal database of gene expression patterns of mouse brain

Paid \$68,000

R. Mark Henkelman, Ph.D.

University of Toronto Faculty of Medicine

Eugene Fiume, Ph.D.

University of Toronto

Automated image analysis of genetically modified mice

Paid \$100,000

Terence T.-L. Hwa, Ph.D.

University of California-San Diego

Gene expression profiles based on statistical significance of clustering analysis

Paid \$63,250

Monica J. Justice, Ph.D.

John S. Weber, Ph.D.

Baylor College of Medicine

Ian J. Jackson, Ph.D.

Western General Hospital

Mutagenesis of central mouse chromosome 4: a paradigm for functional analysis of mammalian genomes

Paid \$100,000

Sudhir Kumar, Ph.D.

Arizona State University

Computational genomic analysis to identify and dissect functionally important mutations in protein sequences

Paid \$50,000

Elaine A. Ostrander, Ph.D.

Leonid Kruglyak, Ph.D.

University of Washington School of Medicine

Mapping cancer susceptibility genes in dogs by linkage disequilibrium

Paid \$100,000

Gene E. Robinson, Ph.D.

University of Illinois at Urbana-Champaign

Sociogenomics: functional genomic analyses of social behavior with microarrays

Paid \$133,333

Eric D. Siggia, Ph.D.

Frederick R. Cross, Ph.D.

Rockefeller University

Computational and experimental analysis of promoters in the genome of budding yeast

Paid \$25,000

Oliver Smithies, D.Phil.

University of North Carolina-Chapel Hill School of Medicine

Computer simulation and animal modeling of complex genetic systems

Paid \$100,000

Alan R. Templeton, Ph.D.

Washington University

Cladistic analyses of epistasis among candidate genes influencing common disease

Paid \$50,000

SUBTOTALS: Paid \$889,583

Other Grants

In addition to making competitive awards, BWF makes noncompetitive grants for activities that are closely related to our major focus areas. These grants are intended to enhance the general environment for research in the targeted areas.

INTERFACES IN SCIENCE

Biophysical Society

Support for the postdoctoral career development session at the society's annual meeting
Approved \$2,500 Paid \$2,500

Canadian Genetic Diseases Network

Support for an expansion of the computer-laboratory workshops in bioinformatics
Approved \$106,000 Paid \$106,000

Florida State University

Support for a meeting titled "Modelling across the Scales" to include the trainees and mentors from BWF's 10 Institutional Awards at the Scientific Interface training programs
Approved \$300,000

Marine Biological Laboratory

Support for advertising the course titled "Modeling of Biological Systems"
Approved \$6,884 Paid \$6,884

National Academy of Sciences

Support for a workshop on the interface of biomedical science with the mathematical sciences
Approved \$25,000 Paid \$25,000

FUNCTIONAL GENOMICS

Institute for Theoretical Physics

Support for a Statistical Physics and Biological Information Program
Approved \$50,000 Paid \$50,000

**SUBTOTALS: Approved \$490,384
Paid \$190,384**

Translational Research

(Encompassing grant programs formerly grouped under the focus area therapeutic sciences)

TOTALS: Approved \$10,017,700 Paid \$8,202,700

Clinical Scientist Awards in Translational Research

During the fiscal year, some award recipients change institutions, modify the terms of their award at their current institution, or both change institutions and modify their award. In these cases, BWF's policy has been to cancel the remaining portion of the original award and, as necessary, approve a new award. When the award recipient has changed institutions, the new award is made to the new institution; when the award recipient has not moved but has modified the terms, the new award is made to the current institution. In the following descriptions, the name of the award recipient is listed first, the title of the project is listed second, the award recipient's current institution is listed third, and the amount approved or paid to the institution is listed fourth. For award recipients who either changed institutions or modified their award, the portion of the award paid to the original institution, as well as any portion that was transferred or cancelled, is listed last, in parentheses.

Sunil K. Ahuja, M.D.

HIV-1 AIDS pathogenesis: bridging the gap between host genotype and HIV transmission/disease phenotype
University of Texas Health Science Center-San Antonio
Approved \$750,000 Paid \$75,000

Nina Bhardwaj, M.D., Ph.D.

Vaccination of HIV-1 positive individuals by antigen-pulsed dendritic cells
Rockefeller University
Paid \$150,000

Cameron S. Carter, M.D.

Multimodal brain imaging and the pharmacotherapy of cognitive disability in schizophrenia
University of Pittsburgh School of Medicine
Approved \$750,000 Paid \$75,000

Gilbert Chu, M.D., Ph.D.

Cancer treatment by genome-wide transcription scanning
Stanford University Medical Center
Paid \$150,000

Robert B. Darnell, M.D., Ph.D.

Detection and activation of tumor-specific killer cells in animal models and cancer patients
Rockefeller University
Paid \$150,000

Claire M. Doerschuk, M.D.

Response of neutrophils during inflammatory lung disease
Case Western Reserve University School of Medicine
Paid \$150,000

Robert W. Doms, M.D., Ph.D.

Chemokine receptors as new targets for HIV-1 therapeutics
University of Pennsylvania School of Medicine
Paid \$150,000

Jeffrey A. Drebin, M.D., Ph.D.

Targeted suppression of B-catenin in colorectal cancer
Washington University School of Medicine
Approved \$750,000 Paid \$75,000

Brian J. Druker, M.D.

Mechanism-based therapy for chronic myelogenous leukemia
Oregon Health Sciences University
Paid \$150,000

Erol Fikrig, M.D.

Borrelia gene expression and lyme arthritis
Yale University School of Medicine
Paid \$150,000

Glenn I. Fishman, M.D.

Gap junction channels as novel anti-arrhythmic targets
Mount Sinai School of Medicine
Approved \$750,000 Paid \$75,000

Thomas F. Gajewski, M.D., Ph.D.

Development of a second generation melanoma vaccine
University of Chicago Pritzker School of Medicine
Paid \$150,000

Lisa M. Guay-Woodford, M.D.

Genetic modifiers in recessive polycystic kidney disease: implications for pathogenesis and therapeutics
University of Alabama-Birmingham School of Medicine
Approved \$750,000 Paid \$75,000

Eva Guinan, M.D.

Extending the donor pool by inducing alloantigen specific T-cell anergy ex vivo for human hematopoietic stem cell transplantation
Harvard Medical School
Paid \$150,000

Barbara L. Hempstead, M.D., Ph.D.

Growth factor regulation of coronary angiogenesis
Weill Medical College of Cornell University
Paid \$150,000

Marshall S. Horwitz, M.D., Ph.D.

Therapeutic inhibition of aberrant protease activity in inherited neutropenias
University of Washington School of Medicine
Approved \$750,000 Paid \$75,000

Daniel C. Javitt, M.D., Ph.D.

NMDA-based treatment development for schizophrenia
New York University School of Medicine
Paid \$150,000

Alex E. MacKenzie, M.D., Ph.D.

Cytoprotective NAIP and XIAP genes: identification of activation pathways and inducing agents
University of Ottawa Faculty of Medicine
Paid \$150,000

Joseph M. McCune, M.D., Ph.D.

Regulation of human thymic function in vivo
University of California-San Francisco School of Medicine
Paid \$150,000

M. Juliana McElrath, M.D., Ph.D.

Induction of cellular immunity in HIV-1 exposed seronegative individuals
University of Washington School of Medicine
Paid \$150,000

Elizabeth M. McNally, M.D., Ph.D.

Microvascular spasm in the progression of cardiomyopathy
University of Chicago
Approved \$750,000 Paid \$75,000

Jason D. Morrow, M.D.

Isoprostanes as markers and mediators of oxidant stress in humans
Vanderbilt University Medical Center
Paid \$150,000

Anthony J. Muslin, M.D.

Signaling mechanisms in cardiovascular disease
Washington University School of Medicine
Approved \$750,000 Paid \$75,000

Mark R. Philips, M.D.

Endomembrane trafficking of Ras: novel molecular targets for anticancer agents
New York University School of Medicine
Paid \$150,000

Steven A. Porcelli, M.D.

Defining the protective human CD8+ T-cell response against *Mycobacterium tuberculosis*
Albert Einstein College of Medicine
Approved \$750,000 Paid \$75,000

Daniel J. Rader, M.D.

Novel therapeutic approach to atherosclerosis through modulation of HDL metabolism
University of Pennsylvania School of Medicine
Paid \$150,000

W. Edward Robinson Jr., M.D., Ph.D.

Structure-function analyses of clinically relevant HIV integrases
University of California-Irvine College of Medicine
Paid \$150,000

Don C. Rockey, M.D.

Cellular and molecular basis of portal hypertension: an endothelialopathy in cirrhosis
Duke University Medical Center
Paid \$150,000

Howard A. Rockman, M.D.

Novel molecular therapeutic strategies in heart failure: role of beta-adrenergic receptor desensitization
Duke University Medical Center
Paid \$150,000

Antony Rosen, M.B., Ch.B.

Altered structure and clearance of autoantigens during apoptosis: implications for autoimmunity
Johns Hopkins University School of Medicine
Paid \$150,000

Marc E. Rothenberg, M.D., Ph.D.

Experimental analysis of eosinophil-associated gastrointestinal inflammation
University of Cincinnati College of Medicine
Approved \$750,000 Paid \$75,000

Christian W. Schindler, M.D., Ph.D.

Intervention of IL-5 signaling: a therapeutic paradigm for asthma
Columbia University College of Physicians and Surgeons
Paid \$150,000

Ann Marie Schmidt, M.D.

Novel therapeutic strategy for the prevention and treatment of diabetic complications: antagonism of receptor for advanced glycation end products (RAGE)
Columbia University College of Physicians and Surgeons
Paid \$150,000

Mark H. Siegelman, M.D., Ph.D.

Functionally activated lymphocyte CD44 in the initiation and perpetuation of autoimmune disease
University of Texas Southwestern Medical Center-Dallas
Paid \$150,000

Joyce M. Slingerland, M.D., Ph.D.

Resistance to tamoxifen: a consequence of altered p27^{Kip1} regulation during breast cancer progression
University of Toronto Faculty of Medicine
Paid \$150,000

Dennis J. Templeton, M.D., Ph.D.

Stress signaling inhibitors potentiate genotoxin-induced apoptosis in a human colon tumor model
Case Western Reserve University School of Medicine
Paid \$150,000

Matthew L. Warman, M.D.

Delineating the proteins and pathways that maintain human joints and their potential for treating heritable and acquired forms of arthritis
Case Western Reserve University School of Medicine
Paid \$150,000

Mark J. Yeager, M.D., Ph.D.

Structure and function of cardiac gap junction membrane channels
Scripps Research Institute
Paid \$150,000

Hagop Youssoufian, M.D.

Transcellular gene therapy: application to Fanconi anemia
Baylor College of Medicine
Paid \$150,000

SUBTOTALS: Approved \$7,500,000**Paid \$5,100,000*****New Investigator Awards in the Pharmacological or Toxicological Sciences*****PHARMACOLOGICAL SCIENCES****Lee S. Bardwell, Ph.D.**

Novel roles for protein-protein interactions in mitogen-activated protein kinase signaling
University of California-Irvine
Paid \$70,000

Peter J. Belshaw, Ph.D.

Combinatorial synthesis of non-ribosomal peptide-based electrophilic libraries
University of Wisconsin-Madison
Approved \$210,000 Paid \$35,000

Anton M. Bennett, Ph.D.

p21^{Ras} signaling by protein tyrosine dephosphorylation
Yale University School of Medicine
Approved \$210,000 Paid \$35,000

Charles M. Brenner, Ph.D.

Genomic approach to identify chemotherapeutic targets
Thomas Jefferson University Jefferson Medical College
Paid \$32,500

Kathleen Collins, Ph.D.

Biochemical and structural characterization of recombinant *Tetrahymena* telomerase
University of California-Berkeley
Paid \$32,500

Graeme W. Davis, Ph.D.

Molecular and genetic analysis of synaptic homeostasis
University of California-San Francisco School of Medicine
Paid \$70,000

Pehr A. B. Harbury, Ph.D.

DNA display: in vitro evolution of small molecules
Stanford University School of Medicine
Paid \$70,000

Bruce A. Hay, Ph.D.

Identification and characterization of regulators of caspase-dependent cell death signaling
California Institute of Technology
Paid \$32,500

Neil L. Kelleher, Ph.D.

Genome-proteome correlations in respiratory pathogens: an experimental approach for identification of new pharmacological targets
University of Illinois at Urbana-Champaign
Paid \$70,000

Kerry Kornfeld, M.D., Ph.D.

Sar-5, a novel negative regulator of Ras signaling
Washington University School of Medicine
Paid \$32,500

Calvin J. Kuo, M.D., Ph.D.

Physiologic and pathologic roles of vascular endothelial growth factor
Stanford University School of Medicine
Approved \$210,000 Paid \$35,000

Andres V. Maricq, M.D., Ph.D.

Dominant activation of neurons: a genetic approach to uncover mechanisms of neuronal signaling and control of behavior
University of Utah
Paid \$70,000

Carla Mattos, Ph.D.

Surface features of the Ral GTPase obtained from the multiple solvent crystal structures and from its complex with RalBP1 and calmodulin
North Carolina State University
Paid \$70,000

Rama Ranganathan, M.D., Ph.D.

Assembly and function of multi-protein complexes in visual signaling
University of Texas Southwestern Medical Center-Dallas
Paid \$32,500

Ram Sasisekharan, Ph.D.

Heparin-like glycosaminoglycans as a target for therapeutic intervention
Massachusetts Institute of Technology
Paid \$70,000

David P. Siderovski, Ph.D.

GoLoco motif-derived peptides as selective G-protein "perturbagens"
University of North Carolina-Chapel Hill School of Medicine
Approved \$210,000 Paid \$35,000

Scott K. Silverman, Ph.D.

Phototriggered folding approaches to RNA structural motifs and RNA-protein interactions
University of Illinois at Urbana-Champaign
Approved \$210,000 Paid \$35,000

Erik J. Sontheimer, Ph.D.

Reversible control of RNA structure with small biarsenical ligands
Northwestern University
Paid \$70,000

Natalie C. Strynadka, Ph.D.

Antibiotic discovery targeting essential proteins on the bacterial outer membrane
University of British Columbia Faculty of Medicine
Paid \$70,000

Joseph Tsien, Ph.D.

Novel pharmacogenetic approach to neuronal signaling
Princeton University
Paid \$70,000

Wilfred A. van der Donk, Ph.D.

Exploring the post-translational modifications of lantibiotics
University of Illinois at Urbana-Champaign
Paid \$32,500

Lu-Yang Wang, Ph.D.

Regulation of synaptic strength by subtype-specific coupling between Ca²⁺ channels and metatropic receptors
University of Toronto Faculty of Medicine
Approved \$210,000 Paid \$35,000

Beverly R. Wendland, Ph.D.

New pathways to the cell interior: dominant negative and positive effectors of endocytosis
Johns Hopkins University
Paid \$70,000

Hongtao Yu, Ph.D.

Molecular investigation of transitions and checkpoints in mitosis
University of Texas Southwestern Medical Center-Dallas
Paid \$70,000

TOXICOLOGICAL SCIENCES

Raffi V. Aroian, Ph.D.

Bacillus thuringiensis toxicity and resistance in nematodes
University of California-San Diego
Paid \$70,000

Karlene A. Cimprich, Ph.D.

Exploring DNA damage checkpoints using a cell-free system
Stanford University School of Medicine
Paid \$70,000

Philip A. Cole, M.D., Ph.D.

Chemical cross-linking agents for identification of substrates
for protein kinases
Johns Hopkins University School of Medicine
Paid \$32,500

Virginia W. Cornish, Ph.D.

In vivo screening for enzymatic activity
Columbia University
Paid \$70,000

Mohanish P. Deshmukh, Ph.D.

Caspase activation during apoptosis: a novel mechanism of regulation
in neurons
University of North Carolina-Chapel Hill School of Medicine
Approved \$210,000 Paid \$35,000

Bevin P. Engelward, Sc.D.

Fluorescent detection of loss heterozygosity in mammals
Massachusetts Institute of Technology
Paid \$70,000

James M. Ford, M.D.

Transcriptional regulation of damage-inducible DNA repair genes
Stanford University School of Medicine
Paid \$70,000

Hilary A. Godwin, Ph.D.

Biophysical approaches to lead toxicology: biochemistry, detection,
and chelation of Pb(II)
Northwestern University
Paid \$32,500

Su Guo, Ph.D.

Mechanism of action of neurotoxins that induce parkinsonism:
a molecular genetic study in zebra fish
University of California-San Francisco School of Pharmacy
Approved \$210,000 Paid \$35,000

Carla M. Koehler, Ph.D.

Mitochondrial biogenesis in health and disease: assembly of the
mitochondrial inner membrane
University of California-Los Angeles
Paid \$70,000

Fang Liu, Ph.D.

Role of transforming growth factor-beta-inducible gene regulation
in tumorigenesis
Rutgers, the State University of New Jersey College of Pharmacy
Paid \$70,000

Anna K. Mapp, Ph.D.

Small molecules for reprogramming gene expression
University of Michigan College of Pharmacy
Approved \$210,000 Paid \$35,000

Thomas W. Muir, Ph.D.

Structure-activity analysis of the autoinducing peptides from
Staphylococcus aureus responsible for virulence
Rockefeller University
Paid \$70,000

Tomas A. Prolla, Ph.D.

Genetic characterization of the DNA mismatch repair system
in induced mutagenesis
University of Wisconsin Medical School
Paid \$70,000

Terry L. Sheppard, Ph.D.

Chemical toxicology of oxidative DNA damage lesions
Northwestern University
Approved \$210,000 Paid \$35,000

Zhigang Wang, Ph.D.
Mechanism of DNA damage-induced mutagenesis in humans
University of Kentucky
Paid \$32,500

E. Lynn Zechiedrich, Ph.D.
DNA repair and topoisomerases
Baylor College of Medicine
Paid \$32,500

Zhengui Xia, Ph.D.
Mechanisms of arsenite neurotoxicity
University of Washington School of Public Health and Community
Medicine
Paid \$70,000

SUBTOTALS: Approved \$2,100,000
Paid \$2,215,000

Other Grants

Scholar Awards in Experimental Therapeutics

This program was superceded by the Clinical Scientist Awards in Translational Research program.

Arturo Casadevall, M.D., Ph.D.
Development of novel antibody-based drugs against bacterial
and fungal pathogens
Albert Einstein College of Medicine
Paid \$60,000

Thomas Michel, M.D., Ph.D.
Nitric oxide synthases and vascular signal transduction
Harvard Medical School
Paid \$60,000

SUBTOTALS: Paid \$280,000

Jonathan D. Gitlin, M.D.
Mechanisms of cellular copper homeostasis
Washington University School of Medicine
Paid \$80,000

Daniel L. Kaufman, Ph.D.
Biopharmaceuticals for the prevention of insulin-dependent
diabetes mellitus
University of California-Los Angeles School of Medicine
Paid \$80,000

Scholar Awards in Toxicology

This program was superceded by the New Investigator Awards in the Pharmacological or Toxicological Sciences programs.

Christopher Bradfield, Ph.D.
Molecular genetic approaches to study dioxin toxicology
University of Wisconsin-Madison
Paid \$60,000

Titia de Lange, Ph.D.
Cell-based assays for telomerase toxicity
Rockefeller University
Paid \$80,000

SUBTOTALS: Paid \$140,000

In addition to making competitive awards, BWF makes noncompetitive grants for activities that are closely related to our major focus areas. These grants are intended to enhance the general environment for research in the targeted areas.

TRANSLATIONAL RESEARCH

American Federation for Medical Research

Support for trainees to attend the federation's annual meeting

Approved \$10,000 Paid \$10,000

American Society for Clinical Investigation/American Association of Physicians

Support for the joint meeting of the society and the association

Approved \$10,000 Paid \$10,000

Association of American Medical Colleges

Support for the development of the Association for the Accreditation of Human Research Protection Programs

Approved \$200,000 Paid \$200,000

Clinical Research Alliance

Support for a meeting titled "Clinical Research 2001"

Approved \$75,000 Paid \$75,000

National Academy of Sciences

Support for the Institute of Medicine's Clinical Research Roundtable

Paid \$50,000

PHARMACOLOGICAL OR TOXICOLOGICAL SCIENCES

American Society for Pharmacology and Experimental Therapeutics

Support for a symposium and associated plenary speaker at the Experimental Biology 2001 meeting

Approved \$10,000 Paid \$10,000

Aspen Cancer Conference

Support for young investigators to attend a conference titled "Mechanisms of Toxicity, Carcinogenesis, Cancer Prevention, and Cancer Therapy"

Approved \$3,000 Paid \$3,000

Baylor College of Medicine

Support for laboratory clean up due to damage from Tropical Storm Allison

Approved \$15,000 Paid \$15,000

Cold Spring Harbor Laboratory

Support for a meeting to examine how pharmacogenomics and diagnostics will intersect

Approved \$10,000 Paid \$10,000

McGill University

Support for the Second International Meeting on Male-Mediated Developmental Toxicity

Approved \$5,000 Paid \$5,000

Society of Toxicology

Support for a program to introduce undergraduates to the field of toxicology and for travel awards associated with the society's annual meeting

Approved \$10,000 Paid \$10,000

Society of Toxicology of Canada

Support for the society's annual symposium

Approved \$6,700 Paid \$6,700

Stanford University

Support for a conference on DNA repair

Approved \$10,000 Paid \$10,000

Teratology Society

Support for the society's annual meeting

Approved \$5,000 Paid \$5,000

GENERAL

International Conference on the Chemistry and Biology of Mineralized Tissues

Support for two new investigators to travel to the Sixth International Conference on the Chemistry and Biology of Mineralized Tissues

Approved \$3,000 Paid \$3,000

North Carolina Biotechnology Center

Support for the North Carolina Genomics and Bioinformatics Consortium

Approved \$45,000 Paid \$45,000

SUBTOTALS: Approved \$417,700

Paid \$467,700

Science Education

TOTALS: Approved \$1,451,353 Paid \$2,244,216 Transferred/Cancelled \$24,403

Student Science Enrichment Program

American Chemical Society, North Carolina Local Section
Summer Educational Experience for the Disadvantaged
Approved \$179,779 Paid \$59,979

Bennett College
Mathematics, Science, Engineering, and Technology Scholars Program
Paid \$60,000

Campbell University School of Pharmacy
Harnett Central Middle School Science and Technology Enrichment Program
Approved \$109,800 Paid \$42,850

Catawba Science Center
Science Technology Enrichment Program
Approved \$113,280 Paid \$36,300

Cumberland County Schools
Cape Fear Natural Science Academy
Paid \$60,000

Duke University
Design to Learn
Paid \$23,532

Duke University
Techtronics: Hands-on Exploration of Technology in Everyday Life
Approved \$167,500 Paid \$47,500

Duke University Nicholas School of the Environment and Earth Sciences
Connecting Coastal Communities
Approved \$84,659 Paid \$28,053

Durham Academy
Durham Public Schools Summer Institute
Paid \$60,000

Johnson C. Smith University
Intensive Summer Science Camp
Paid \$58,897

Lenoir-Rhyne College
Carolina Institute for the Multicultural Approach to Science
Approved \$179,995 Paid \$60,000

Mountain Area Gardens in Community
Middle School Apprenticeship Program in Garden-Related Sciences
(\$24,403 of original award was transferred/cancelled)

North Carolina Museum of Life and Science
Museums and Universities for Science Enrichment of Students
Paid \$60,724

North Carolina State Museum of Natural Science
Girls in Science Statewide Project
Paid \$54,975

North Carolina State University
Performing Inquiry Based Exploration
Approved \$66,600 Paid \$22,200

North Carolina State University
Science and Mathematics Colloquies at the Science House
Paid \$58,311

Onslow Community Ministries
Sturgeon City Student Science Series
Approved \$51,693 Paid \$51,693

Pines of Carolina Girl Scout Council
Healthy START-UP: Science and Technology around Research Triangle Park
Paid \$60,000

Roanoke Rapids City Schools
Summer Science Explorations in the Roanoke Valley
Paid \$20,000

Shaw University
Mentoring and Encouraging the Science Skills of Youth
Paid \$60,000

Shodor Education Foundation
Stimulating Understanding of Computational Science through Collaboration, Experiment, and Discovery
Paid \$58,596

Swain County Schools
Students Involved and Experiencing Nature, Careers in Science, and Environmental Awareness
Paid \$26,673

University of North Carolina-Chapel Hill School of Medicine
 Scientific Enrichment Opportunities for High School Students
 Approved \$179,730 Paid \$59,910

Warren Wilson College
 Environmental Science Camp
 Paid \$48,750

University of North Carolina-Wilmington
 Oceanographic field support for Summer Ventures in Science and
 Mathematics
 Paid \$10,125

Wilmington Children's Museum
 Middle School Docent Program
 Paid \$6,000

SUBTOTALS: Approved \$1,133,036
Paid \$1,135,068
Transferred/Cancelled \$24,403

BWF Visiting Professorships in the Basic Medical Sciences

Listed by host institution, visiting professor, and professor's affiliation. Titles of BWF Lectures cited if given in fiscal year 2001.

Albert Einstein College of Medicine
 Jack L. Strominger, M.D.
 Harvard University
 Paid \$5,000

East Carolina University School of Medicine
 David A. Williams, M.D.
 Indiana University School of Medicine
 Approved \$5,000

Baylor College of Medicine
 Richard A. Crowther, Ph.D.
 Medical Research Council (United Kingdom)
 Approved \$5,000

Harvard Medical School
 Mitchell Kronenberg, Ph.D.
 La Jolla Institute of Allergy and Immunology
 Approved \$5,000

Baylor College of Medicine
 Carl H. June, M.D.
 University of Pennsylvania School of Medicine
 Adoptive immunotherapy: long-term memories and therapeutic
 vaccines for lymphoma
 Paid \$5,000

Indiana University-Bloomington
 Jill Bargonetti, Ph.D.
 Hunter College
 Tumor suppression by a central controller called p53
 Paid \$5,000

Case Western Reserve University School of Medicine
 Susan S. Taylor, Ph.D.
 University of California-San Diego
 Approved \$5,000

Iowa State University
 Helmut Sies, M.D., Ph.D.
 University of Dusseldorf (Germany)
 Approved \$5,000

Central Caribbean University School of Medicine
 Anatoli Lopatin, Ph.D.
 University of Michigan-Ann Arbor
 Approved \$5,000

Iowa State University
 J. G. Sutcliffe, Ph.D.
 Scripps Research Institute
 Using total gene expression analysis; gene expression profiling to
 investigate neuropsychiatric disorders and neuromodulatory peptides
 for sleeping, dreaming, and eating
 Paid \$5,000

Creighton University School of Medicine
 William E. Paul, M.D.
 National Institute of Allergy and Infectious Diseases
 Cytokine biology
 Paid \$5,000

Louisiana State University Health Sciences Center
 Miles D. Houslay, Ph.D.
 University of Glasgow (United Kingdom)
 Viral immune evasion
 Paid \$5,000

Dalhousie University Faculty of Medicine
 Victor Ling, Ph.D.
 University of British Columbia Faculty of Medicine
 Approved \$5,000

Loyola University of Chicago Stritch School of Medicine
 Hidde L. Ploegh, Ph.D.
 Harvard Medical School
 Paid \$5,000

Marshall University School of Medicine

Daria Mochly-Rosen, Ph.D.

Stanford University School of Medicine

Localization inhibitors in signal transduction: what we dream of, nature dreamt before

Paid \$5,000

McGill University Faculty of Medicine

Gerard Karsenty, M.D., Ph.D.

Baylor College of Medicine

Approved \$5,000

McGill University Faculty of Medicine

Salvador Moncada, M.D., Ph.D.

University College London (United Kingdom)

Nitric oxide and cell respiration: physiology and pathophysiology

Paid \$5,000

Medical College of Wisconsin

Donald A. Fischman, M.D.

Weill Medical College of Cornell University

Approved \$5,000

Medical University of South Carolina College of Medicine

Aravinda Chakravarti, Ph.D.

Johns Hopkins University School of Medicine

Approved \$5,000

Memorial University of Newfoundland Faculty of Medicine

Stephen W. Scherer, Ph.D.

Hospital for Sick Children in Toronto

Approved \$5,000

Morehouse School of Medicine

Alan A. Jackson, M.B., B.Chir., M.D.

University of Southampton (United Kingdom)

Approved \$5,000

Morehouse School of Medicine

Stephen C. Strom, Ph.D.

University of Pittsburgh

Use of hepatocytes in basic and clinical studies

Paid \$5,000

New York University School of Medicine

Jose M. C. Ribeiro, M.D., Ph.D.

National Institute of Allergy and Infectious Diseases

Approved \$5,000

North Dakota State University

Adrienne Bendich, Ph.D.

SmithKline Beecham Consumer Health Care

Supplements: role in improving health in the 21st century

Paid \$5,000

North Dakota State University College of Pharmacy

Maret G. Traber, Ph.D.

Oregon State University

Approved \$5,000

Oregon State University College of Pharmacy

Frances M. Ashcroft, Ph.D., Sc.D.

University Laboratory of Physiology (United Kingdom)

Approved \$5,000

Pennsylvania State University College of Medicine

Alphonse E. Sirica, Ph.D.

Virginia Commonwealth University

Biliary cancer: molecular pathogenesis to new therapeutic strategies

Paid \$5,000

Purdue University School of Pharmacy and Pharmaceutical Sciences

William A. Catterall, Ph.D.

University of Washington School of Medicine

Approved \$5,000

Rutgers, the State University of New Jersey-Piscataway

Eric Westhof, Ph.D.

University Louis Pasteur (France)

Approved \$5,000

Saint Francis Xavier University

John W. Hanrahan, Ph.D.

McGill University

Approved \$5,000

Saint Louis University School of Medicine

Ronald C. Conaway, Ph.D.

Oklahoma Medical Research Foundation

Approved \$5,000

State University of New York Upstate Medical Center-Syracuse

Mikhail Ugryumov, M.D., Ph.D.

Russian Academy of Sciences (Russia)

Neurotransplantation in treatment of neurodegenerative diseases

Paid \$5,000

Texas A&M University College of Veterinary Medicine

Elaine A. Ostrander, Ph.D.

Fred Hutchinson Cancer Research Center

Approved \$5,000

Tulane University School of Medicine

Edward B. Ziff, Ph.D.

New York University

Trafficking of AMPA receptors and the regulation of excitatory synapses

Paid \$5,000

University of Arizona College of Medicine

Susan L. Lindquist, Ph.D.

University of Chicago

From mad cows to “psi-chotic” yeast: new frontiers in genetics, disease, and materials science

Paid \$5,000

University of Calgary Faculty of Medicine

Edward E. Harlow, Ph.D.

Harvard Medical School

Paid \$5,000

University of California-Berkeley

James Barber, Ph.D.

Imperial College of Science, Technology, and Medicine (United Kingdom)

Where does the oxygen we breathe come from?

Paid \$5,000

University of California-Davis

Frederic M. Richards, Ph.D.

Yale University

Paid \$5,000

University of California-Los Angeles School of Medicine

Michael A. Farrell, M.B., B.Chir.

Royal College of Surgeons (Republic of Ireland)

Approved \$5,000

University of California-San Francisco School of Medicine

Shirley M. Tilghman, Ph.D.

Princeton University

Epigenetic regulation of mammalian growth and development

Paid \$5,000

University of Colorado-Boulder

Xiao-dong Wang, Ph.D.

University of Texas Southwestern Medical Center-Dallas

Approved \$5,000

University of Georgia

Charles J. Billington, M.D.

Minneapolis Veterans Affairs Medical Center

Approved \$5,000

University of Guelph

John C. Herr, Ph.D.

University of Virginia Health Sciences Center

From basic sperm biology to commercialization of a diagnostic device: biotechnology underlying Sperm Check I, an immunochromatographic card for detecting low numbers of sperm

Paid \$5,000

University of Miami School of Medicine

Irving L. Weissman, M.D.

Stanford University School of Medicine

Approved \$5,000

University of Michigan-Dearborn

Ralph M. Garruto, Ph.D.

State University of New York-Binghamton

Approved \$5,000

University of Minnesota

Tony Hunter, Ph.D.

Salk Institute for Biological Studies

Cell signaling through tyrosine phosphorylation

Paid \$5,000

University of Minnesota-Duluth School of Medicine

Dean P. Jones, Ph.D.

Emory University School of Medicine

Approved \$5,000

University of Mississippi Medical Center

Charles F. Stevens, M.D., Ph.D.

Salk Institute for Biological Studies

Paid \$5,000

University of Missouri-Columbia School of Medicine

Ian A. Wilson, D.Phil.

Scripps Research Institute

Paid \$5,000

University of Missouri-Kansas City School of Medicine

Ralph Snyderman, M.D.

Duke University Medical Center

Enhancing clinical research: a key to improving health in the United States

Paid \$5,000

University of Montreal Faculty of Medicine

John G. R. Jefferys, Ph.D.

University of Birmingham (United Kingdom)

Neuronal networks for oscillations and epilepsy and neuronal mechanisms of transition to seizures

Paid \$5,000

University of North Carolina-Chapel Hill School of Pharmacy

Tamar Schlick, Ph.D.

New York University

A trajectory of DNA from applied to basic research

Paid \$5,000

University of North Carolina-Chapel Hill School of Public Health

Barbara B. Kahn, M.D.

Harvard Medical School

Approved \$5,000

University of Pittsburgh School of Medicine

Angela M. Gronenborn, Ph.D.

National Institute of Diabetes and Digestive and Kidney Diseases

Molecular structures: important clues for understanding biology

Paid \$5,000

University of South Dakota School of Medicine

John E. Hall, Ph.D.
University of Mississippi Medical Center
Role of neuropeptides and the sympathetic nervous system in obesity hypertension
Paid \$5,000

University of Texas Medical Branch-Galveston

Jan-Ake Gustafsson, M.D., Ph.D.
Karolinska Institute (Sweden)
Approved \$5,000

University of Vermont College of Medicine

Pier M. Mannucci, M.D.
University of Milan (Italy)
Progress and problems in congenital coagulation disorders
Paid \$5,000

University of Washington School of Medicine

Leslie A. Leinwand, Ph.D.
University of Colorado-Boulder
Approved \$5,000

University of Western Ontario Faculty of Medicine and Dentistry

John E. Walker, D.Phil.
Medical Research Council (United Kingdom)
Approved \$5,000

University of Wisconsin School of Medicine

Arturo Casadevall, M.D., Ph.D.
Albert Einstein College of Medicine
Approved \$5,000

Virginia Commonwealth University

Can Ince, M.D.
University of Amsterdam (Netherlands)
Paid \$5,000

Washington State University College of Pharmacy

Lawrence A. Loeb, M.D., Ph.D.
University of Washington School of Medicine
Approved \$5,000

Wayne State University School of Medicine

Anthony T. Campagnoni, Ph.D.
University of California-Los Angeles
Problem in reverse genetics: finding an alternative function for myelin basic protein gene
Paid \$5,000

West Virginia University School of Pharmacy

James R. Halpert, Ph.D.
University of Texas Medical Branch-Galveston
Structure-function relationships of mammalian drug-metabolizing cytochrome P450
Paid \$5,000

Wright State University School of Medicine

Debra I. Diz, Ph.D.
Wake Forest University School of Medicine
Approved \$5,000

**SUBTOTALS: Approved \$165,000
 Paid \$160,000**

BWF Visiting Professorships in the Microbiological Sciences

Listed by host institution, visiting professor, and professor's affiliation. Titles of BWF lectures cited if given in fiscal year 2001.

Chaminade University of Honolulu

John M. Besser, Ph.D.
Minnesota Department of Health
Public health care in the former Soviet Union
Paid \$5,000

Davidson College

Raul J. Cano, Ph.D.
California Polytechnic State University
Approved \$5,000

Florida International University

Nicholas Cohen, Ph.D.
University of Rochester School of Medicine and Dentistry
Approved \$5,000

Florida International University

Michael A. Zasloff, M.D., Ph.D.
Magainin Research Institute
Paid \$5,000

Georgia Southern University

Bettina Wilske, Ph.D.
Max von Pettenkofer Institute for Hygiene and Medicinal Microbiology (Germany)
Lyme borreliosis: causative agent, epidemiology, and clinical picture
Paid \$5,000

Goucher College

Lynn Margulis, Ph.D.
University of Massachusetts
Approved \$5,000

Lehman College

Roberto Docampo, M.D., Ph.D.
 University of Illinois at Urbana-Champaign College of Veterinary
 Medicine
 Trypanosomal acidocalcisomes
 Paid \$5,000

Louisiana State University

Bonnie L. Bassler, Ph.D.
 Princeton University
 Approved \$5,000

McMaster University

Jens Boman, M.D.
 University Hospital of Umea (Sweden)
 The role of *Chlamydia pneumoniae* in respiratory disease
 Paid \$5,000

Morehouse School of Medicine

Anthony S. Fauci, M.D.
 National Institute of Allergy and Infectious Diseases
 Approved \$5,000

North Carolina Central University

Stuart M. Brown, Ph.D.
 New York University Medical Center
 Approved \$5,000

Northern Arizona University

Erik de Clercq, M.D., Ph.D.
 University of Leuven Medical School (Belgium)
 Chemotherapy of human immunodeficiency virus infection
 Paid \$5,000

Oakland University

Timothy J. Donohue, Ph.D.
 University of Wisconsin-Madison
 Approved \$5,000

Oklahoma State University

James M. Tiedje, Ph.D.
 Michigan State University
 Getting a grip on microbial diversity
 Paid \$5,000

University of Central Arkansas

Thomas M. Terry, Ph.D.
 University of Connecticut
 Paid \$5,000

University of Guam

William Fenical, Ph.D.
 University of California-San Diego
 Approved \$5,000

University of Guelph

Geoffrey M. Gadd, Ph.D.
 University of Dundee (United Kingdom)
 Approved \$5,000

University of Missouri-Rolla

Kenneth H. Nealson, Ph.D.
 California Institute of Technology
 The search for life in the universe: lessons from the Earth
 Paid \$5,000

University of Puerto Rico-Humacao University College

Mindy Brashears, Ph.D.
 University of Nebraska-Lincoln
 Current issues in hazard analysis and critical control point
 Paid \$5,000

University of Tennessee-Knoxville

Harald von Boehmer, M.D., Ph.D., D.Sc.
 Dana-Farber Cancer Institute
 Paid \$5,000

University of Texas-El Paso

Joseph O. Falkinham III, Ph.D.
 Virginia Polytechnic Institute and State University
 Approved \$5,000

Wayne State University School of Medicine

Randall K. Holmes, M.D., Ph.D.
 University of Colorado Health Sciences Center
 Approved \$5,000

SUBTOTALS: Approved \$55,000
Paid \$55,000

Other Grants

In addition to making competitive awards, BWF makes noncompetitive grants for activities that are closely related to our major focus areas. These grants are intended to enhance the general environment for research in the targeted areas.

Alzheimer's Association

Support for programs, in lieu of an honorarium for Elmima Johnson, Ph.D., a member of the SSEP Advisory Committee
Approved \$1,250 Paid \$1,250

American Heart Association

Support for programs, in lieu of an honorarium for Elmima Johnson, Ph.D., a member of the SSEP Advisory Committee
Approved \$1,250 Paid \$1,250

American Society for Microbiology

Support for administering the BWF Visiting Professorships in the Microbiological Sciences
Approved \$2,500 Paid \$2,500

American Society for Microbiology

Support for the annual Biomedical Research Conference for Minority Students
Approved \$5,000 Paid \$5,000

Canadian Federation of Biological Societies

Support for administering the BWF Visiting Professorships in the Basic Medical Sciences
Approved \$2,500 Paid \$5,000

Durham Public Education Network

Support for general activities
Approved \$500 Paid \$500

Durham Public Education Network

Support for a one-year pilot science education project
Approved \$17,000 Paid \$17,000

Federation of American Societies for Experimental Biology

Support for administering the BWF Visiting Professorships in the Basic Medical Sciences
Approved \$11,317 Paid \$11,317

Grantmakers for Education

Support for general activities
Approved \$3,000 Paid \$3,000

Medical Research Council of Canada

Support for the BWF Student Research Award Program
Paid \$500,000

National Academy of Sciences

Support for a workshop on issues and opportunities for Ph.D. scientists who are interested in becoming high school teachers
Paid \$100,000

National Association of Academies of Science

Support for a session at the annual meeting of the American Association for the Advancement of Science to provide high school students an opportunity to interact with scientists
Approved \$2,500 Paid \$2,500

North Carolina Biotechnology Center

Support for the Student National Medical Association's clinical research symposium and a health and career awareness fair for middle school and high school students and their parents
Approved \$2,500 Paid \$2,500

North Carolina Center for International Understanding

Support for four teachers to participate in the center's Math/Science Exchange and Study Program
Approved \$8,000 Paid \$8,000

North Carolina FFA Foundation

Support for the foundation's Agriscience Fair
Approved \$500 Paid \$500

North Carolina Society of Hispanic Professionals

Support for the Hispanic Educational Summit 2001
Approved \$500 Paid \$500

North Carolina State University

Support for a series of conferences of representatives from university science departments to discuss K-12 outreach
Paid \$90,431

Public School Forum of North Carolina

Support for developing an international study program for educational policymakers
Paid \$47,900

Public School Forum of North Carolina

Support for the Institute for Educational Policymakers
Paid \$75,000

Shodor Education Foundation

Support for developing and maintaining the Student Science Enrichment Program Web site
Approved \$15,000 Paid \$15,000

University of North Carolina-Chapel Hill

Support for developing the Center for Functional Nanostructures
Approved \$25,000 Paid \$5,000

**SUBTOTALS: Approved \$98,317
Paid \$894,148**

Science and Philanthropy

TOTALS: Approved \$240,800 Paid \$400,800

General

American Society for Cell Biology

Support for the society's annual meeting
Approved \$3,600 Paid \$3,600

National Institute of Environmental Health Sciences

Support for a biomedical science career fair
Approved \$3,600 Paid \$3,600

American Society for Clinical Nutrition

Support for the National Clinical Nutrition Internships program
Approved \$6,000 Paid \$6,000

National Library of Medicine

Support for general activities
Approved \$5,000 Paid \$5,000

American Society for Nutritional Sciences

Support for a new graduate education initiative
Approved \$11,000 Paid \$11,000

North Carolina Association for Biomedical Research

Support for general activities
Approved \$25,000 Paid \$25,000

Council on Foundations

Support for general activities
Approved \$39,600 Paid \$39,600

North Carolina Center for Nonprofits

Support for a conference commemorating the center's tenth anniversary
Approved \$13,500 Paid \$13,500

Foundation Center

Support for general activities
Approved \$7,500 Paid \$7,500

Sigma Xi, the Scientific Research Society

Support for a conference titled "Science, the Arts, and the Humanities:
Connections and Collisions"
Approved \$10,000 Paid \$10,000

Foundation for the National Institutes of Health

Support for the tenth anniversary symposium of the Office of Research
on Women's Health
Approved \$2,500 Paid \$2,500

Southeastern Council of Foundations

Support for general activities
Approved \$5,000 Paid \$5,000

Grantmakers in Health

Support for general activities
Approved \$5,000 Paid \$5,000

University of North Carolina-Chapel Hill School of Pharmacy

Support for the development of the Institute of Natural Medicine
Approved \$25,000 Paid \$25,000

**SUBTOTALS: Approved \$162,300
Paid \$162,300**

Communications

American Association for the Advancement of Science

Support for the Mass Media Science and Engineering Fellows Program
Approved \$16,000 Paid \$16,000

Council for the Advancement of Science Writing

Support for the New Horizons in Science Briefing and the Traveling
Fellowship Program
Approved \$30,000 Paid \$30,000

**SUBTOTALS: Approved \$46,000
Paid \$46,000**

History of Medicine

Wellcome Trust

Support for the Wellcome Trust's tour of the exhibit titled "The Phantom Museum"

Approved \$15,000

SUBTOTALS: Approved \$15,000

Science Policy

American Association for the Advancement of Science

Support for the Center for Science, Technology, and Congress

Paid \$100,000

Research!America

Support for a project to advocate increased funding for medical research

Paid \$25,000

Association of Academic Health Centers

Support for the annual fall meeting, titled "Exploring the Nexus of Research and Business: the Balanced Solutions for Academic Health Centers"

Approved \$7,500 Paid \$7,500

Society for Women's Health Research

Support for the dissemination of an Institute of Medicine report on sex-based biology

Approved \$10,000 Paid \$10,000

Center for the Advancement of Health

Support for translating research into policy and practice

Paid \$50,000

SUBTOTALS: Approved \$17,500

Paid \$192,500

INFORMATION FOR APPLICANTS

The Burroughs Wellcome Fund makes approximately 90 percent of our grants through competitive award programs, which support investigators in targeted areas of basic scientific research that have relevance to human health. Most of BWF's award programs are open only to citizens or permanent residents of the United States and Canada. (Programs with different requirements are noted in the descriptions that follow.) Awards are made with the advice of our advisory committees, which comprise scientists and educators selected for their expertise in the program areas. Program application deadlines for the 2003 award series are listed in the "Program Application Deadlines" section on page 71.

Most grants are made only to degree-granting institutions on behalf of individual researchers, who must be nominated by their institution. Institutions receiving grants must be tax-exempt 501(c)(3) organizations. Government agencies, such as the National Institutes of Health and the Centers for Disease Control and Prevention, generally are not eligible for grants.

Throughout the following program descriptions, references to M.D. and Ph.D. degrees include all types of medical and scientific doctoral degrees.

BWF believes that diversity within the scientific community enhances the well-being of the research enterprise; therefore, we encourage applications from women and from members of underrepresented minority groups.

BWF does not support activities that are primarily clinical in nature (such as disease diagnosis and treatment) or primarily related to health care and health care policy. We generally do not provide support for research projects or other activities outside our competitive programs, nor do we generally support endowments, development campaigns, ordinary operating expenses, capital facilities and equipment, or publications.

To obtain the most up-to-date information about our award programs, visit our Web site at www.bwfund.org

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Competitive Award Programs

Basic Biomedical Sciences

Career Awards in the Biomedical Sciences

These awards are made in honor of Gertrude B. Elion, D.Sc., and George H. Hitchings, Ph.D., who shared the 1988 Nobel Prize in Physiology or Medicine and were long associated with the Burroughs Wellcome Fund. The awards are intended to foster the development and productivity of biomedical researchers who are early in their careers and to help them make the critical transition to becoming independent investigators. The grants provide \$500,000 over five years to bridge advanced postdoctoral training and the first three years of faculty service. Recipients may spend part of the grant period at institutions in the United Kingdom. BWF expects to award about 20 of these grants annually. Approximately half of the awards will go to researchers with a Ph.D. degree and half to those with an M.D. or M.D.-Ph.D. degree. Candidates must have completed at least 12 months but not more than 48 months of postdoctoral research training by the application deadline. For candidates with M.D. degrees, postdoctoral training excludes clinically oriented residencies that do not contain a major research component. Researchers who hold a faculty appointment as an assistant professor or the equivalent, or who know they will hold such an appointment within a year of the application deadline, are not eligible.

Infectious Diseases

Investigators in Pathogenesis of Infectious Disease

These awards provide new opportunities for accomplished investigators at the assistant professor level to study pathogenesis, with a focus on the intersection of human and pathogen biology. The program is intended to shed light on the overarching issues of how human hosts handle infectious challenge. These five-year grants, which provide \$80,000 per year, are intended to give recipients the freedom and flexibility to pursue new avenues of inquiry and higher-risk research projects that hold potential for advancing significantly the biochemical, pharmacological, immunological, and molecular biological understanding of how infectious agents and the human body interact. BWF is particularly interested in work focused on the host, as well as host-pathogen studies originating in viral, bacterial, fungal, or parasite systems. Studies in these areas may have their root in the pathogen, but the focus of the work should be on the effects on the host at the cellular and/or systemic levels. Excellent animal models of human disease are within the scope of the program. Candidates must have an established record of independent research and hold a tenure-track position as an assistant professor or equivalent at a degree-granting institution in the United States or Canada. Up to nine of these grants will be awarded.

Interfaces in Science

Career Awards at the Scientific Interface

These awards are intended to foster the early career development of researchers with backgrounds in the physical/computational sciences whose work addresses biological questions and who are dedicated to pursuing a career in academic research. Candidates are expected to draw from their training in a scientific field other than biology to propose innovative approaches to answer important questions in the biological sciences. The grants provide up to \$500,000 over five years to support up to two years of advanced postdoctoral training and the first three years of a faculty appointment. BWF expects to award up to eight of these grants in 2003. Candidates must have a Ph.D. degree in physics, chemistry (physical, theoretical, or computational), mathematics, computer science, statistics, or engineering. Exceptions will be made only if the candidate can demonstrate significant expertise in one of these areas, evidenced by publications or advanced course work. In addition to being open to U.S. and Canadian citizens and permanent residents, this program is open to temporary residents whose lawful immigration status has been granted and will extend for the duration of the award.

Institutional Awards at the Scientific Interface

These grants, which are made to degree-granting institutions, are intended to encourage the interdisciplinary training of graduate and postdoctoral students from the physical, chemical, and computational sciences so they can better apply their unique knowledge and talents to biological problems. BWF has made grants in this program in 1996, 1998, and 2000. We expect to commit up to \$10 million for these grants each year they are offered, and the grants will provide from \$150,000 to \$500,000 per year for up to five years. Emphasis will be placed on supporting new programs or existing programs that will change graduate and postdoctoral training in a meaningful way, as opposed to programs seeking more funding for activities already under way. Specific guidelines may change for future awards, which will not be made until at least 2004.

Translational Research

Clinical Scientist Awards in Translational Research

These awards are intended to foster the development and productivity of established independent physician-scientists who will strengthen translational research, the two-way transfer between work at the laboratory bench and clinical medicine. The grants provide \$750,000 over five years (\$150,000 per year). BWF expects to award up to 10 of these grants annually. We are interested particularly in supporting investigators who will bring novel ideas and new approaches to translational research and who will mentor the next generation of physician-scientists. Proposed activities may draw on the many recent advances in the basic biomedical sciences—including such fields as biochemistry, cell biology, genetics, immunology, molecular biology, and pharmacology—that provide a wealth of opportunities for studying and alleviating human disease. Candidates generally must be affiliated with a medical school; candidates at other types of degree-granting institutions (including schools of veterinary medicine, public health, and pharmacy) will be considered only if they can demonstrate a plan for coordinating with institutions that provide the patient connection essential for translational research. Candidates must have an M.D. or M.D.-Ph.D. degree and hold an appointment or joint appointment in a subspecialty of clinical medicine. In exceptional circumstances, non-M.D. candidates will be considered if their work is likely to contribute significantly to the clinical enterprise; these candidates should hold an appointment or joint appointment in a clinical department. Candidates must be tenure-track investigators at the late assistant professor level or the associate professor level, or hold an equivalent tenure-track position, at the time of application. Candidates must present evidence of already having established an independent research career, as this is not a “new investigator” award. Individuals holding the rank of professor are ineligible.

Science Education

Student Science Enrichment Program

These awards are limited to nonprofit organizations in BWF’s home state of North Carolina. BWF provides \$1 million annually for this program, and grants provide up to \$60,000 per year for three years. The program’s goals include improving students’ competence in science, nurturing their enthusiasm for science, and interesting them in pursuing careers in research or other science-related areas. The awards are intended to support projects that provide creative science enrichment activities for students in the sixth through twelfth grades who have shown exceptional skills and interest in science, as well as those who may not have had an opportunity to demonstrate conventional “giftedness” in science but are perceived to have high potential. The projects must enable students to participate in hands-on scientific activities and pursue inquiry-based avenues of exploration—an educational approach that has proven to be an effective way to increase students’ understanding and appreciation of the scientific process. Project activities must take place outside of the usual school environment, such as after school, on weekends, or during vacation periods. Projects may be conducted all year, during the school year, or during the summer. Eligible organizations include colleges and universities, community groups, museums and zoos, public and private schools, scientific groups, and others that can provide experiential activities for middle school and high school students. We encourage partnerships—for example, between scientific groups and school systems or between universities and community groups. Industries may participate in collaboration with nonprofit organizations that assume the lead role.

Science and Philanthropy

BWF makes noncompetitive grants for activities that fall outside of our competitive award programs but are closely related to our targeted areas, such as career development of scientists or the pathogenesis of infectious disease. We place special priority on working with nonprofit organizations, including government agencies, to leverage financial support for our targeted areas of research, and on encouraging other foundations to support biomedical research. Proposals should be submitted to BWF in the form of a letter, which should be no more than five pages. Applicants should describe the focus of the activity, the expected outcomes, and the qualifications of the organization or individuals involved; provide certification of the sponsor’s Internal Revenue Service tax-exempt status; and give the total budget for the activity, including any financial support obtained or promised. Proposals are given careful preliminary review, and those deemed appropriate are presented for consideration by BWF’s Board of Directors.

PROGRAM APPLICATION DEADLINES

2003 Award Series

BASIC BIOMEDICAL SCIENCES

Career Awards in the Biomedical Sciences

October 1, 2002

INFECTIOUS DISEASES

Investigators in Pathogenesis of Infectious Disease

November 1, 2002

INTERFACES IN SCIENCE

Career Awards at the Scientific Interface

May 1, 2002

Institutional Awards at the Scientific Interface

See note below*

TRANSLATIONAL RESEARCH

Clinical Scientist Awards in Translational Research

September 1, 2002

SCIENCE EDUCATION

Student Science Enrichment Program

April 10, 2002

SCIENCE AND PHILANTHROPY

Received all year

** These institutional awards are offered periodically, alternating with Career Awards at the Scientific Interface.*

ADVISORY COMMITTEES

The Burroughs Wellcome Fund uses advisory committees for each competitive award program to review grant applications and make recommendations to BWF's Board of Directors, which makes the final decisions. We select members of these committees for their scientific and educational expertise in the program areas. In addition, BWF uses a financial advisory committee to help in developing and reviewing the Fund's investment policies. This committee is appointed by and reports to the Board of Directors.

Career Awards in the Biomedical Sciences

Mina J. Bissell, Ph.D.

Ernest Orlando Lawrence Berkeley National Laboratory

Pamela J. Bjorkman, Ph.D.

Howard Hughes Medical Institute
California Institute of Technology

William Chin, M.D.

Eli Lilly and Company

Patricia K. Donahoe, M.D.

Massachusetts General Hospital
Harvard Medical School

Elaine Fuchs, Ph.D.

Howard Hughes Medical Institute
University of Chicago

Phil Gold, M.D., Ph.D.

Montreal General Hospital
McGill University Faculty of Medicine

Thomas M. Jessell, Ph.D.

Columbia University

Lawrence C. Katz, Ph.D.

Howard Hughes Medical Institute
Duke University Medical Center

Stanley J. Korsmeyer, M.D.

Howard Hughes Medical Institute
Dana-Farber Cancer Institute
Harvard Medical School

George M. Langford, Ph.D.

Dartmouth College

Martin M. Matzuk, M.D., Ph.D.

Baylor College of Medicine

Suzanne R. Pfeffer, Ph.D. (Cochair)

Stanford University School of Medicine

John F. Sheridan, Ph.D.

Ohio State University

Jerome F. Strauss III, M.D., Ph.D. (Cochair)

University of Pennsylvania Health System

Ian A. Wilson, D.Phil.

Scripps Research Institute

James M. Wilson, M.D., Ph.D.

Institute for Human Gene Therapy
University of Pennsylvania Health System

Christopher Wylie, Ph.D.

University of Cincinnati College of Medicine

Investigators in Pathogenesis of Infectious Disease

Arturo Casadevall, M.D., Ph.D.
Albert Einstein College of Medicine

Mary K. Estes, Ph.D.
Baylor College of Medicine

Stephen L. Hajduk, Ph.D.
University of Alabama-Birmingham School of Medicine

Philippa Marrack, Ph.D.
Howard Hughes Medical Institute
National Jewish Medical and Research Center

Magdalene So, Ph.D.
Oregon Health Sciences University

P. Frederick Sparling, M.D. (Chair)
University of North Carolina-Chapel Hill School of Medicine

Interfaces in Science

Robert H. Austin, Ph.D.
Princeton University

Carlos Bustamante, Ph.D.
Howard Hughes Medical Institute
University of California-Berkeley

Susan N. Coppersmith, Ph.D.
University of Wisconsin-Madison

Jeffrey I. Gordon, M.D. (Chair)
Washington University School of Medicine

Douglas A. Lauffenburger, Ph.D.
Massachusetts Institute of Technology

Michael C. Reed, Ph.D.
Duke University

Susan S. Taylor, Ph.D.
Howard Hughes Medical Institute
University of California-San Diego School of Medicine

Clinical Scientist Awards in Translational Research

Martin J. Blaser, M.D. (Cochair)
New York University Medical Center

Bruce A. Chabner, M.D.
Massachusetts General Hospital

Susan George, M.D.
University of Toronto Faculty of Medicine

John W. Griffin, M.D.
Johns Hopkins University School of Medicine

Alan Krensky, M.D.
Stanford University Medical Center

John E. Niederhuber, M.D.
University of Wisconsin Medical School

Jennifer M. Puck, M.D. (Cochair)
National Human Genome Research Institute
National Institutes of Health

Marlene Rabinovitch, M.D.
University of Toronto Faculty of Medicine
University of Toronto Hospital for Sick Children

Judith L. Swain, M.D.
Stanford University Medical Center

Craig B. Thompson, M.D.
Leonard and Madlyn Abramson Family Cancer Research Institute
University of Pennsylvania Medical Center

Michael J. Welsh, M.D.
Howard Hughes Medical Institute
University of Iowa College of Medicine

Wayne M. Yokoyama, M.D.
Howard Hughes Medical Institute
Washington University School of Medicine

New Investigator Awards in the Pharmacological or Toxicological Sciences

This program is being discontinued after the 2001 award series; however the advisory committees will continue to monitor awardees' progress.

PHARMACOLOGICAL SCIENCES SUBCOMMITTEE

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T. Kendall Harden, Ph.D.

University of North Carolina-Chapel Hill School of Medicine

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Vanderbilt University Medical Center

Victor Ling, Ph.D.

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University of California-San Diego School of Medicine

Jeffrey M. Trent, Ph.D.

National Human Genome Research Institute

National Institutes of Health

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Baldomero M. Olivera, Ph.D.

University of Utah

Stephen H. Safe, D.Phil.

Texas A&M University College of Veterinary Medicine

Thomas J. Slaga, Ph.D. (Chair)

AMC Cancer Research Center

Student Science Enrichment Program

John E. Burris, Ph.D. (Cochair)

Beloit College

Luciano Corazza, Ph.D.

University of California-San Diego

G. Thomas Houlihan, Ph.D.

Council of Chief State School Officers

Samuel Houston, Ed.D.

Edgate.com

Marian Johnson-Thompson, Ph.D.

National Institute of Environmental Health Sciences

Shirley M. Malcom, Ph.D. (Cochair)

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Sally G. Shuler

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W. G. Enloe High School

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The committee is composed of four members from outside BWF and two members from BWF's Board of Directors. The board's chair, BWF's president, and BWF's vice president for finance also serve on the committee as nonvoting members.

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Acadian Asset Management

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I. George Miller, M.D.

*John F. Enders Professor of Pediatric Infectious Diseases
Professor of Epidemiology and Molecular Biophysics and Biochemistry
Yale University School of Medicine*



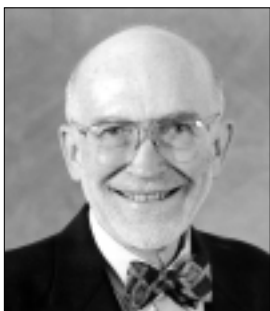
Mary-Lou Pardue, Ph.D.

*Boris Magasanik Professor of Biology
Massachusetts Institute of Technology*



Philip R. Tracy

*Of Counsel
Smith, Anderson, Blount, Dorsett, Mitchell & Jernigan, L.L.P.*



Jean D. Wilson, M.D.

*Charles Cameron Sprague Distinguished Professor of Biomedical Science
University of Texas Southwestern Medical Center-Dallas*

STAFF



Executive

LEFT TO RIGHT:

Enriqueta C. Bond, Ph.D., *President*

Scott G. Schoedler, *Vice President, Finance*

Bernadette M. Marriott, Ph.D., *Vice President, Programs and Communications*



Administration, Finance, Meetings, and Technology

SITTING, LEFT TO RIGHT:

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Kenneth P. Browndorf, *Senior Asset and Accounting Manager*
Martie H. Gregory, *Senior Manager, Facility and Administrative Services*
Judy McConnell, *Librarian/Secretary*

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Betsy Stewart, *Secretary*
Sam Caraballo, *Systems and Web Engineer*
Glenda H. Oxendine, *Document/Web Specialist*
Brent Epps, *Administrative Support*
Catherine L. Voron, *Meeting Professional*
Barbara J. Evans, *Administrative Meeting Assistant*



Programs and Communications

SITTING, LEFT TO RIGHT:

Jean A. Kramarik, *Program Associate*

D. Carr Agyapong, *Senior Program and Communications Officer*

Karyn Hede, *Communications Officer*

Nancy S. Sung, Ph.D., *Program Officer*

STANDING, LEFT TO RIGHT:

Rolly L. Simpson Jr., *Program Associate*

Victoria P. McGovern, Ph.D., *Program Officer*

Debra A. Linkous, *Program Associate*

Debra J. Jinwright, *Administrative Program Assistant*

Melanie B. Scott, *Program and Database Specialist*

Martin Ionescu-Pioggia, Ph.D., *Senior Program Officer*

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To Obtain Information About Programs

BURROUGHS WELLCOME FUND

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